Technical data
1.4.2024

Subject to modifications.

Hoval

Oil / Gas (Heat recovery)

Complete high efficient system solutions for domestic, commercial and industrial applications.

01.04.2024

Oil/gas boilers
(heat value/gas condensation)

Up to 400 kW, now only condensing units are allowed to be placed on the market in the EU member states according to Regulation (EU) No. 813/2013. This also affects replacement heat generators.

Hoval Max-3
Oil/gas boiler

Boiler
- 3-pass steel boiler according to EN 303 part 1 and 2 and EN 304 for firing of Diesel oil, oil L and gas.
- Max-3 (420-1250) complies with the Pressure Equipment Directive 2014/68/CE
- Boiler completely welded
- For LowNOx burner with intern flue gas recirculation
- Insulation at the boiler body 80 mm mineral wool mat
- Boiler completely cased with steel plate, red powder coated
- Flue gas outlet to the rear
- Heating flow connection to the top, heating return connections to the rear, incl. counter flanges, screws and seals

Optional
- Boiler control panel with boiler controller and heating control in various versions
  - Boiler controller
    - with TopTronic® E control
    - with thermostat T 2.2
    - with thermostat T 0.2
- Free-standing calorifier see Calorifiers
- Boiler door swivels to the left

Delivery
- Boiler, thermal insulation and casing delivered separately packed

On site
- Mounting of insulation and casing

Model range

Max-3 type	Max. - min. output kW
(420)	200-500
(530)	220-610
(620)	240-720
(750)	280-870
(1000)	350-1150
(1250)	480-1350
(1500)	640-1750
(1800)	750-2150
(2200)	920-2500
(2700)	1030-3000

Boiler controller with TopTronic® E/E13.4 control

- Maximum operating temperature 90 °C

TopTronic® E controller

Control panel
- Colour touchscreen 4.3 inch
- Heat generator blocking switch for interrupting operation
- Fault signalling lamp

TopTronic® E control module
- Simple, intuitive operating concept
- Display of the most important operating statuses
- Configurable start screen
- Operating mode selection
- Configurable day and week programmes
- Operation of all connected Hoval CAN bus modules
- Commissioning wizard
- Service and maintenance function
- Fault message management
- Analysis function
- Weather display (with HovalConnect option)
- Adaptation of the heating strategy based on the weather forecast (with HovalConnect option)

TopTronic® E basic module heat generator TTE-WEZ
- Control functions integrated for
  - 1 heating/cooling circuit with mixer
  - 1 heating/cooling circuit without mixer
  - 1 hot water charging circuit
  - bivalent and cascade management
- Outdoor sensor
- Immersion sensor (calorifier sensor)
- Contact sensor (flow temperature sensor)
- RAST 5 basic plug set

The supplementary plug set must be ordered in order to use expanded controller functions.

Options for TopTronic® E controller
- Can be expanded by max. 1 module expansion:
  - module expansion heating circuit or
  - module expansion heat balancing or
  - module expansion Universal
- Can be networked with a total of up to 16 controller modules:
  - heating circuit/hot water module
  - solar module
  - buffer module
  - measuring module

Number of modules that can be additionally installed in the electrical box:
- 1 module expansion and 2 controller modules **or**
- 1 controller module and 2 module expansions **or**
- 3 controller modules

Notice
Max. 1 module expansion can be connected to the basic module heat generator TTE-WEZ!

Further information about the TopTronic® E
see “Controls”

Oil automatic function device OFA
- Control function integrated for
  - flue gas sensor for safety shut-off
  - 0-10 V output for connecting a modulating main pump (incl. ΔT control with low consumption)
  - Standard plug connection for 2-stage burner 1 x 230 V
  - Variable input for plant-specific functions (heat generator block, return sensor, info sensor etc.)
  - Variable output for plant-specific functions (thermostat function, operating message, etc.)

Delivery
- Boiler controller separately delivered

On site
- Mounting of the boiler controller at the boiler left or right side

Boiler controller with TopTronic® E/E13.5 control

- Maximum operating temperature 105 °C

- Configuration as TopTronic® E/E13.4 but: safety temperature limiter 120 °C

Delivery
- Boiler controller separately delivered

On site
- Mounting of the boiler controller at the boiler left or right side

Control panel with thermostat T 2.2

- Maximum operating temperature 90 °C

- For systems without TopTronic® E control
- For direct 2-stage burner control, requirement starting from external calorifier or heater instruction is possible.
- Main switch “I/O”
- Safety temperature limiter 110 °C
- Selector switch burner load
- Switch summer/winter
- 3 boiler temperature regulators 30-90 °C
  - temperature regulator for base load heating
  - temperature regulator for full load heating
  - temperature regulator for calorifier
- Boiler and burner breakdown lamp
- Plug connection for burner (with cable and plug)

Optional
- 2 running time meters integrated
- 2 burner running time meters and pulse counters integrated
- Flue gas thermometer, 4.5 m capillary tube

Delivery
- Boiler controller separately delivered

On site
- Mounting of the boiler controller at the boiler left or right side

Control panel with thermostat T 0.2

- Maximum operating temperature 105 °C

- For external control
- For systems without TopTronic® E control
- For special control function

- Main switch “I/O”
- Safety temperature limiter 120 °C
- 3 boiler temperature regulators 50-105 °C
  - temperature regulator for base load heating
  - temperature regulator for full load heating
  - temperature regulator for calorifier
- without burner plug connection

Optional
- 2 running time meters integrated
- 2 burner running time meters and pulse counters integrated
- Flue gas thermometer, 4.5 m capillary tube
- Safety temperature limiter 130 °C

Delivery
- Boiler controller separately delivered

On site
- Mounting of the boiler controller at the boiler left or right side

Oil/gas boiler

Permission Boiler
CE product ID No. CE-0085BL0015
according to Directive on appliances burning gaseous fuels 90/396/EG

Pressure Equipment Directive 2014/68/CE

Hoval Max-3 (420-2700)

3-pass boiler made of steel for oil/gas LowNOx firing, without control panel.
For operating temperature up to 105 °C

Execution: complete delivery
Boiler, thermal insulation and casing delivered separately packed.

Max-3 type	Max. - min. output kW	Operating pressure bar	Part No.
(420)	200-500	6	7013 765
(530)	220-610	6	7013 766
(620)	240-720	6	7013 773
(750)	280-870	6	7013 774
(1000)	350-1150	6	7013 781
(1250)	480-1350	6	7013 782
(1500)	640-1750	6	7013 536
(1800)	750-2150	6	7013 537
(2200)	920-2500	6	7013 538
(2700)	1030-3000	6	7013 620

Control panel with thermostat

Control panel T 2.2
- Operating temperature max. 90 °C
- For systems without TopTronic® E controller.
- For direct 2-stage burner control, incl. plug connection for burner requirement starting from external calorifier or heater instruction is possible.

	Part No.
- without burner running time meter and pulse counter	6015 017
- incl. 2 burner running time meters integrated	6015 477
- incl. 2 burner running time meters and pulse counters integrated	6015 478

- For mounting on heat generator side right (standard) or left (configuration on request). Specify mounting variant in purchase order.

Control panel T 0.2
- Operating temperature max. 105 °C
- For external switching command
- For systems without TopTronic® E controller.
- For special control function without burner plug connection

	Part No.
- without burner running time meter and pulse counter	6015 016
- incl. 2 burner running time meters integrated	6015 475
- incl. 2 burner running time meters and pulse counters integrated	6015 476

- For mounting on heat generator side right (standard) or left (configuration on request). Specify mounting variant in purchase order.

Accessories to control panel with thermostat

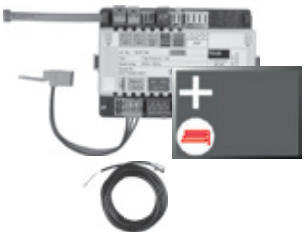
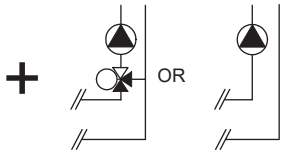
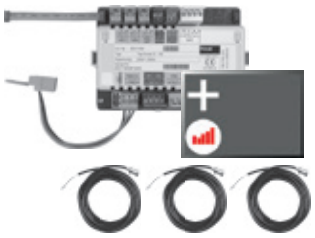
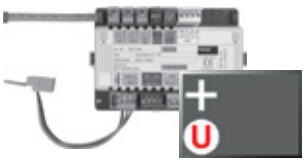
	Part No.
Flue gas thermometer 4.5 m, capillary tube	241 149

Boiler controller with TopTronic® E control

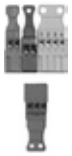
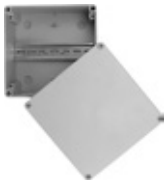
	Part No.
 **Boiler control E13.4 TopTronic® E** for mounting on heat generator side right (standard) or left (configuration on request). Specify mounting variant in purchase order. Operating temperature: max. 90 °C. Control function integrated for - 1 heating circuit with mixer - 1 heating circuit without mixer - 1 DHW charging circuit Heat generator management Additional heat generator management Cascade management Optionally expandable by max. 1 module expansion: - Module expansion heating circuit or - Module expansion Universal Optionally networkable with up to 16 controller modules (incl. solar module). Max. 3 additional controller modules can be installed in control box. Consisting of: electrical box, control panel, TopTronic® E control module, TopTronic® E basic module heat generator, oil automatic function device OFA-200, safety temperature limiter, burner cable cpl. 2-stage, L = 5.0 m, 1 outdoor sensor AF/2P/K, 1 immersion sensor TF/2P/5/6T/S1, L = 5.0 m 1 contact sensor ALF/2P/4/T/S1, L = 4.0 m **Notice** The electrical connection for each external burner must be clarified separately.	6040 236
 **Boiler controller E13.5 TopTronic® E** for installation on the right (standard installation) or left side (configuration on request) of the heat generator. Specify installation variant in purchase order. Max. operating temperature: 105 °C. Version as boiler controller E13.4 TopTronic® E **Notice** The electrical connection for each external burner must be clarified separately.	6040 237

TopTronic® E module expansions

for TopTronic® E basic module heat generator

		Part No.
 	**TopTronic® E module expansion heating circuit TTE-FE HK** Expansion to the inputs and outputs of the basic module heat generator or the heating circuit/domestic hot water module for implementing the following functions: - 1 heating/cooling circuit w/o mixer or - 1 heating/cooling circuit with mixer Consisting of: - Fitting accessories - 1 contact sensor ALF/2P/4/T, L = 4.0 m - Basic plug set FE module **Notice** The supplementary plug set may have to be ordered to implement functions differing from the standard!	6034 576
	**TopTronic® E module expansion heating circuit incl. energy balancing** TTE-FE HK-EBZ Expansion to the inputs and outputs of the basic module heat generator or the heating circuit/domestic hot water module for implementing the following functions: - 1 heating/cooling circuit w/o mixer or - 1 heating/cooling circuit with mixer incl. energy balancing in each case Consisting of: - Fitting accessories - 3 contact sensors ALF/2P/4/T, L = 4.0 m - Plug set FE module **Notice** Suitable flow rate sensors (pulse sensors) must be provided on site.	6037 062
	**TopTronic® E module expansion Universal TTE-FE UNI** Expansion to the inputs and outputs of a controller module (basic module heat generator, heating circuit/domestic hot water module, solar module, buffer module) for implementing various functions Consisting of: - Fitting accessories - Plug set FE module **Further information** see “Controls” - “Hoval TopTronic® E module expansions” chapter **Notice** Refer to the Hoval System Technology to find which functions and hydraulic arrangements can be implemented.	6034 575

Accessories for TopTronic® E

		Part No.
	**TopTronic® E controller modules**	
	TTE-HK/WW TopTronic® E heating circuit/ hot water module	6034 571
	TTE-SOL TopTronic® E solar module	6037 058
	TTE-PS TopTronic® E buffer module	6037 057
	TTE-MWA TopTronic® E measuring module	6034 574
	**Supplementary plug set**	
	for basic module heat generator TTE-WEZ	6034 499
	for controller modules and module expansion TTE-FE HK	6034 503
	**TopTronic® E room control modules**	
	TTE-RBM TopTronic® E room control modules	
	easy white	6037 071
	comfort white	6037 069
	comfort black	6037 070
	**Enhanced language package TopTronic® E**	6039 253
	one SD card required per control module Consisting of the following languages: HU, CS, SL, RO, PL, TR, ES, HR, SR, JA, DA	
	**HovalConnect**	
	HovalConnect LAN	6049 496
	HovalConnect WLAN	6049 498
	HovalConnect Modbus	6049 501
	HovalConnect KNX	6049 593
	TopTronic® E interface modules	
	GLT module 0-10 V	6034 578
	**TopTronic® E sensors**	
	AF/2P/K Outdoor sensor H x W x D = 80 x 50 x 28 mm	2055 889
	TF/2P/5/6T Immersion sensor, L = 5.0 m	2055 888
	ALF/2P/4/T Contact sensor, L = 4.0 m	2056 775
	TF/1.1P/2.5S/6T Collector sensor, L = 2.5 m	2056 776
	**Bivalent switch**	
	for various release or switching functions	
	Bivalent switch 1-piece	2056 858
	Bivalent switch 2-piece	2061 826
	**System housing**	
	System housing 182 mm	6038 551
	System housing 254 mm	6038 552
	**TopTronic® E wall casing**	
	WG-190 Wall casing small	6052 983
	WG-360 Wall casing medium	6052 984
	WG-360 BM Wall casing medium with control module cut-out	6052 985
	WG-510 Wall casing large	6052 986
	WG-510 BM Wall casing large with control module cut-out	6052 987

Further information
see “Controls”

Accessories

Flow temperature monitor
for panel heating (1 controller per heating circuit) 15-95 °C, setting (visible externally) under the casing cover

Clamp-on flow temperature monitor RAK-TW1000S
with retaining strap, without cable and plug — 242 902

Immersion thermostat RAK-TW1000S
Thermostat with immersion sleeve ½″
Depth of immersion 150 mm,
nickel-plated brass — 6010 082

Vibration elements for boiler socket
For sound and vibration absorption.
Made of rubber. Cross section 80/50 mm

Delivery
4 vibration elements per boiler, mounted under the boiler socket

to Max-3 type	Set of pieces	Length mm	Part No.
(420,530)	L200 (4 pcs.)	200	6003 739
(620,750)	L400 (4 pcs.)	400	6003 741
(1000,1250)	L500 (4 pcs.)	500	6003 742
(1500,1800)	L800 (4 pcs.)	800	6005 623
(2200,2700)	L800 (6 pcs.)	800	6005 624

Blind flange
made of steel, incl. fixing screws and seal

	Part No.
Max-3 (420,530)	6002 192
Max-3 (620,750)	6030 026
Max-3 (1000-2700)	6002 156

Intermediate flange drilled for burner adaptation
made of steel, incl. fixing screws and seals

	Part No.
Max-3 (420,530)	6017 595
Max-3 (620,750)	6017 593
Max-3 (1000-2700)	6017 594

Service

Commissioning

Commissioning by works service or Hoval trained authorised serviceman/company is condition for warranty.

For commissioning and other services please contact your Hoval sales office.

Max-3 (420-1250)

Type		(420)	(530)	(620)	(750)	(1000)	(1250)
• Nominal output at 80/60 °C	kW	500	610	720	870	1150	1350
• Max. - min. output (Heating oil EL, variant 1 and natural gas H, variant 1)	kW	320-500	350-610	450-720	520-870	680-1150	850-1350
• Max. - min. output (natural gas H, variant 2)	kW	200-500	220-610	240-720	280-870	350-1150	480-1350
• Burner input max.	kW	539	662	781	944	1247	1459
• Dimensions		see Dimensions					
• Boiler operating temperature max. [1]	°C	90	90	90	90	90	90
• Boiler operating temperature min.		see table operating conditions (below)					
• Return flow temperature min.		see table operating conditions (below)					
• Flue gas temperature min. at the boiler		see table operating conditions (below)					
• Safety temperature limiter setting (water side) [2]	°C	110	110	110	110	110	110
• Operating pressure	bar	6	6	6	6	6	6
• Boiler efficiency at 80/60 °C in full-load operation (related to net calorific value NCV/gross calorific value GCV, heating oil EL)	%	92.7/87.5	92.4/87.2	92.4/87.2	92.5/87.3	92.5/87.3	92.5/87.3
• Boiler efficiency at 30 % partial load (EN 303) (related to net calorific value NCV/gross calorific value GCV, heating oil EL)	%	95.2/89.8	95.3/89.9	94.9/89.5	95.2/89.8	95.3/89.9	95.2/89.8
• Nominal efficiency at 75/60 °C (DIN 4702-8) (related to net calorific value NCV/gross calorific value GCV, heating oil EL)	%	94.8/89.5	94.7/89.4	94.3/89.0	94.8/89.4	94.9/89.5	94.8/89.4
• Stand-by loss qB at 70 °C	Watt	1000	1035	1120	1180	1250	1380
• Flue gas resistance at nominal output 180 °C flue gas temperature, 12.5 % CO_2 , 500 m over sea level (tolerance ± 20 %)	mbar	4.9	5.7	5.2	6.5	7.4	8.0
• Flue gas mass flow at nominal output 12.5 % CO_2 heating oil	kg/h	850	1037	1224	1479	1955	2295
• Flow resistance boiler [3]	z-value	0.022	0.022	0.008	0.008	0.003	0.003
• Water flow resistance at 10 K	mbar	40.4	60.1	30.5	44.5	29.1	40.2
• Water flow resistance at 20 K	mbar	10.1	15.1	7.6	11.1	7.3	10
• Water flow volume at 10 K	m^3/h	42.8	52.2	61.7	74.5	98.5	115.7
• Water flow volume at 20 K	m^3/h	21.4	26.1	30.8	37.2	49.2	57.9
• Boiler water content	litres	552	520	969	938	1528	1478
• Boiler gas volume	m³	0.583	0.602	0.846	0.872	1.35	1.39
• Insulation thickness boiler body	mm	80	80	80	80	80	80
• Weight (incl. casing)	kg	1093	1150	1770	1800	2500	2600
• Weight (without casing)	kg	943	1000	1590	1620	2360	2460
• Maximum draught/underpressure at flue gas outlet	Pa	-50	-50	-50	-50	-50	-50
• Combustion chamber dimension Ø inside x length	mm	606x1624	606x1624	684x1899	684x1899	782x2182	782x2182
• Combustion chamber volume	m³	0.466	0.466	0.669	0.669	1.047	1.047

[1] Limited by the boiler controller E13.4 TopTronic® E and T 2.2 to 90 °C or by E13.5 TopTronic® E and T 0.2 to 105 °C.

[2] Max. safety temperature for boiler controller E13.4 TopTronic® E and T 2.2: 110 °C or E13.5 TopTronic® E and T 0.2: 120 °C.

[3] Flow resistance boiler in mbar = flow rate $(m^3/h)^2$ x z

Possible operating conditions:

Fuel		Heating oil EL		Natural gas H, low-sulphur heating oil EL		Heating oil L
		Variant 1	Variant 2	Variant 1	Variant 2	
min. flue gas temperature	°C	130	110	130	100	130
min. boiler temperature	°C	60	65	65	75	65
min. return temperature	°C	50	55	55	65	55
Return temperature control		yes	yes	yes	yes	yes

Max-3 (1500-2700)

Type		(1500)	(1800)	(2200)	(2700)
• Nominal output at 80/60 °C	kW	1750	2150	2500	3000
• Max. - min. output (Heating oil EL, variant 1 and natural gas H, variant 1)	kW	1050-1750	1250-2150	1500-2500	1780-3000
• Max. - min. output (natural gas H, variant 2)	kW	640-1750	750-2150	920-2500	1030-3000
• Burner input max.	kW	1894	2324	2702	3243
• Dimensions		see Dimensions			
• Boiler operating temperature max. [1]	°C	90	90	90	90
• Boiler operating temperature min.		see table operating conditions (below)			
• Return flow temperature min.		see table operating conditions (below)			
• Flue gas temperature min. at the boiler		see table operating conditions (below)			
• Safety temperature limiter setting (water side) [2]	°C	110	110	110	110
• Operating pressure	bar	6	6	6	6
• Boiler efficiency at 80/60 °C in full-load operation (related to net calorific value NCV/gross calorific value GCV, heating oil EL)	%	92.4/87.2	92.5/87.3	92.5/87.3	92.5/87.3
• Boiler efficiency at 30 % partial load (EN 303) (related to net calorific value NCV/gross calorific value GCV, heating oil EL)	%	95.2/89.8	95.3/89.2	95.2/89.2	95.2/89.2
• Nominal efficiency at 75/60 °C (DIN 4702-8) (related to net calorific value NCV/gross calorific value GCV, heating oil EL)	%	94.8/89.4	94.9/89.5	94.9/89.5	95/89.5
• Stand-by loss qB at 70 °C	Watt	1850	1950	2100	2300
• Flue gas resistance at nominal output 180 °C flue gas temperature, 12.5 % CO_2 , 500 m over sea level (tolerance ± 20 %)	mbar	7.0	8.8	9.1	8.0
• Flue gas mass flow at nominal output 12.5 % CO_2 heating oil	kg/h	3031	3723	4329	5195
• Flow resistance boiler [3]	z-value	0.022	0.022	0.002	0.001
• Water flow resistance at 10 K	mbar	45.0	67.9	91.8	132.2
• Water flow resistance at 20 K	mbar	11.3	17	23	33.1
• Water flow volume at 10 K	m^3/h	150	184.3	214.3	257.1
• Water flow volume at 20 K	m^3/h	75	92.1	107.1	128.6
• Boiler water content	litres	2343	2750	3050	3550
• Boiler gas volume	m³	1.956	2.51	2.761	3.037
• Insulation thickness boiler body	mm	80	80	80	80
• Weight (incl. casing)	kg	3700	4900	5170	5750
• Weight (without casing)	kg	3400	4600	4800	5350
• Maximum draught/underpressure at flue gas outlet	Pa	-50	-50	-50	-50
• Combustion chamber dimension Ø inside x length	mm	880x2417	976x2605	976x2905	976x3233
• Combustion chamber volume	m³	1.58	2.07	2.3	2.41

[1] Limited by the boiler controller E13.4 TopTronic® E and T 2.2 to 90 °C or by E13.5 TopTronic® E and T 0.2 to 105 °C.

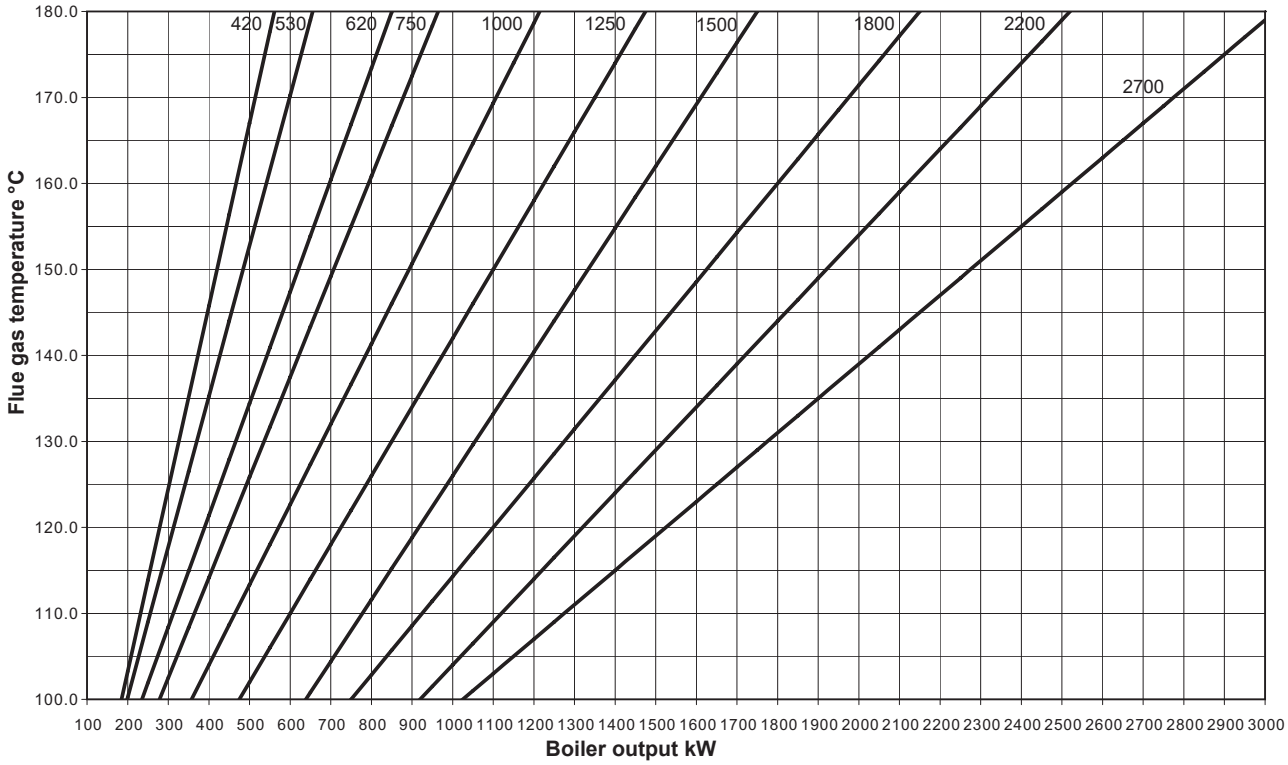
[2] Max. safety temperature for boiler controller E13.4 TopTronic® E and T 2.2: 110 °C or E13.5 TopTronic® E and T 0.2: 120 °C.

[3] Flow resistance boiler in mbar = flow rate $(m^3/h)^2$ x z

Possible operating conditions:

Fuel		Heating oil EL		Natural gas H, low-sulphur heating oil EL		Heating oil L
		Variant 1	Variant 2	Variant 1	Variant 2	
min. flue gas temperature	°C	130	110	130	100	130
min. boiler temperature	°C	60	65	65	75	65
min. return temperature	°C	50	55	55	65	55
Return temperature control		yes	yes	yes	yes	yes

Flue gas output diagram

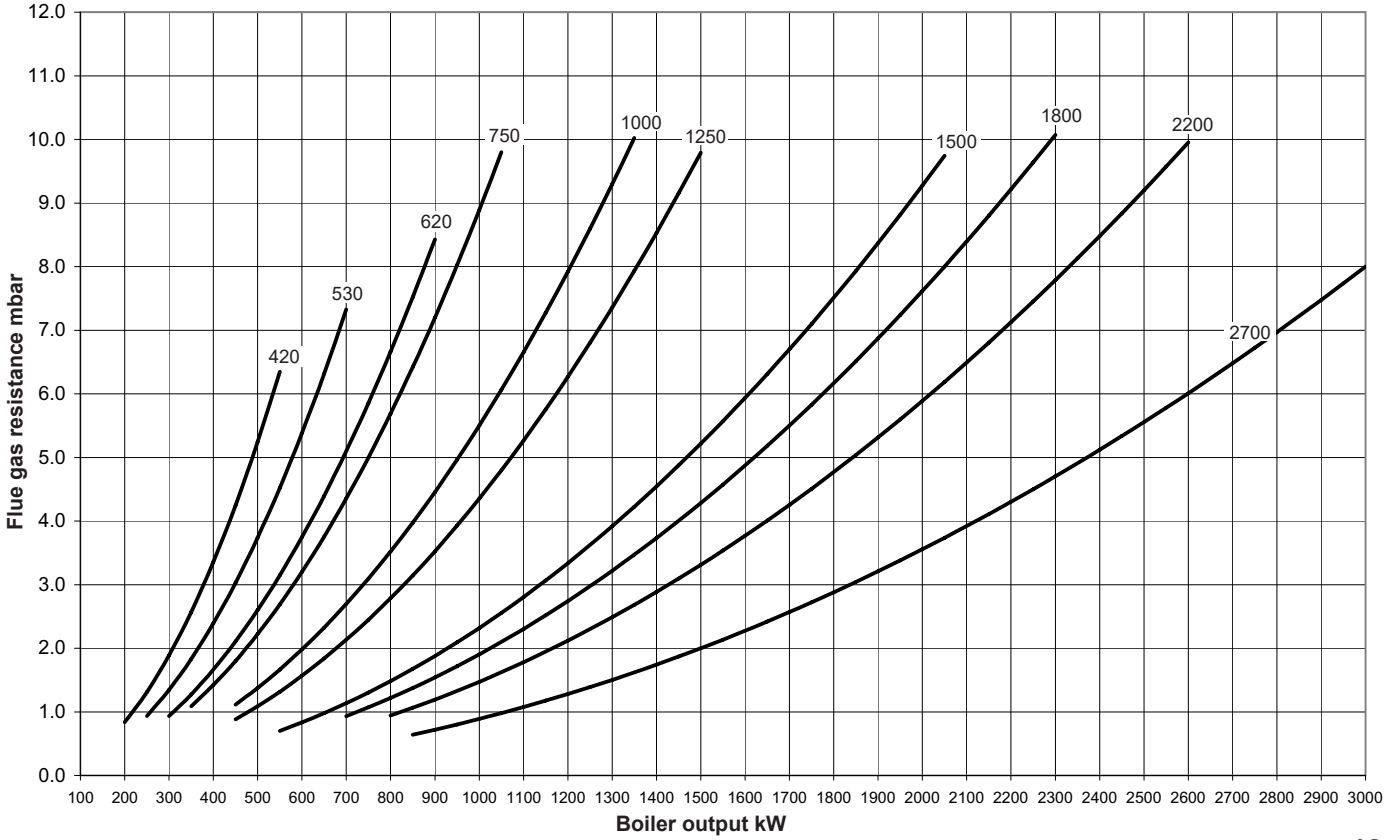


kW = Boiler output
°C = Flue gas temperature on a clean surface, boiler flow temperature 80 °C, return temperature 60 °C (in accordance with DIN 4702).

- Operation with heating oil EL, natural gas
  λ = 1.22 with max. burner output (CO_2 heating oil EL = 12.5 %, CO_2 natural gas = 9.8 %)

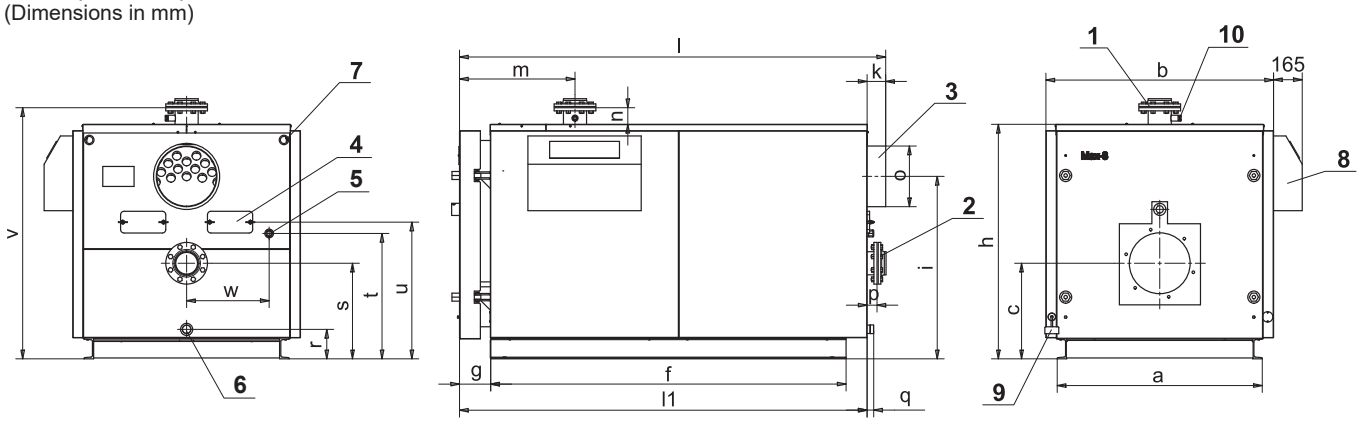
- A reduction of the boiler water temperature to 10 K causes a reduction of the flue gas temperature of approx. 6-8 K.
- A modification of the CO_2 concentration of +1 % causes a modification of the flue gas temperature of approx. -8 K.
- A modification of the CO_2 concentration of -1 % causes a modification of the flue gas temperature of approx. +8 K.

Flue gas resistor



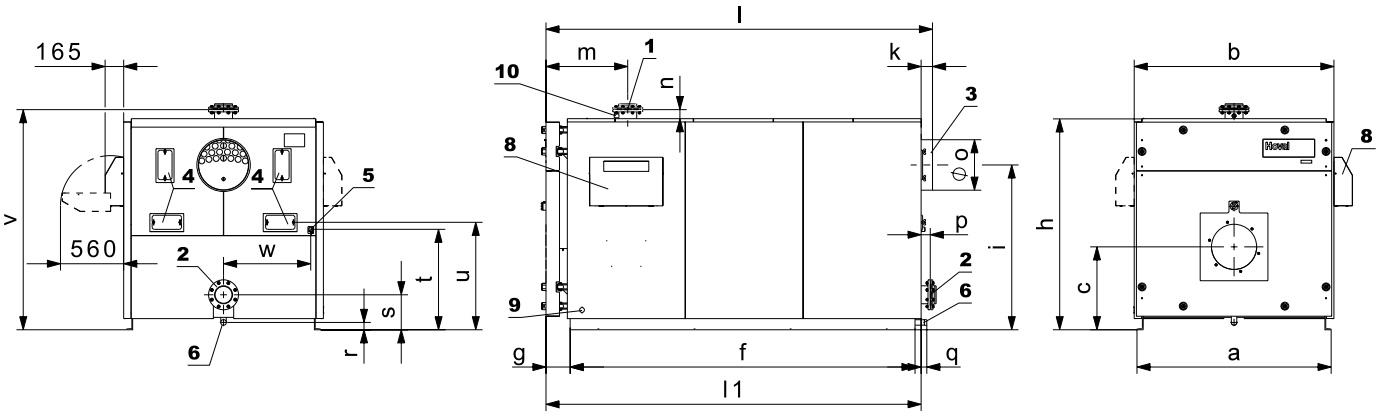
Max-3 (420-1250)

(Dimensions in mm)



Max-3 (1500-2700)

(Dimensions in mm)



1	Flow	(420,530)	DN 100, PN 6	2	Return	(420,530)	DN 100, PN 6
		(620,750)	DN 125, PN 6			(620,750)	DN 125, PN 6
		(1000,1250)	DN 150, PN 6			(1000,1250)	DN 150, PN 6
		(1500-2200)	DN 150, PN 6			(1500-2200)	DN 150, PN 6
		(2700)	DN 200, PN 6			(2700)	DN 200, PN 6

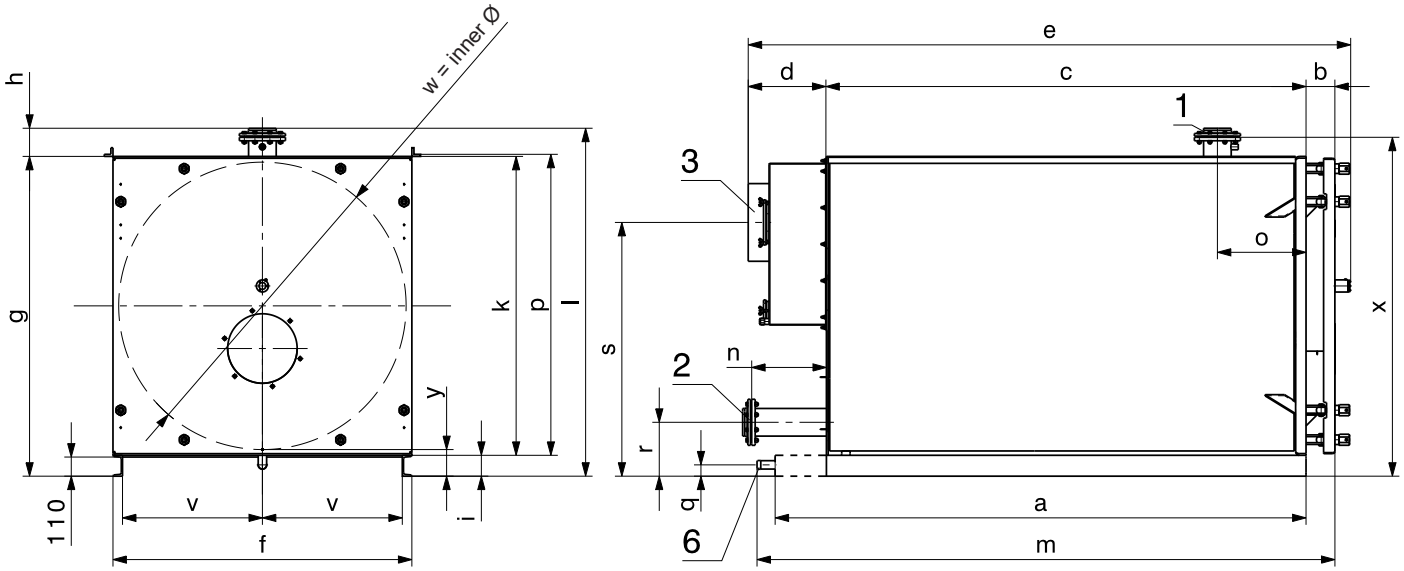
3 Flue gas outlet
4 Cleaning opening
5 Flue gas collector cleaning opening R 1″
6 Drain R 1½″
7 Cable routing
8 Control panel
9 Electrical connection
10 Bushing Rp ¾″ with immersion sleeve for boiler temperature sensor

Max-3 type	a	b	c	f	g	h	i	k	l	l1	m	n	Ø o	p	q	r
(420,530)	1060	1190	515	1770	181	1230	950	104	2178	2074	641	100	299	54	34	175
(620,750)	1180	1310	550	2045	181	1350	1050	105	2452	2347	666	95	349	55	35	170
(1000,1250)	1370	1500	635	2330	181	1550	1250	107	2739	2632	681	111	349	77	37	175
(1500)	1560	1610	665	2685	212	1710	1350	103	3040	2940	722	80	447	83	34	65
(1800)	1720	1770	735	3055	214	1870	1460	103	3424	3320	724	80	447	83	52	65
(2200)	1720	1770	735	3355	214	1870	1460	101	3724	3625	724	80	447	81	50	65
(2700)	1750	1800	755	3700	212	1900	1410	82	4032	3950	722	80	647	82	51	65

Max-3 type	s	t	u	v	w	x
(420,530)	350	595	660	1330	450	-
(620,750)	550	722	786	1445	475	-
(1000,1250)	415	620	685	1660	590	-
(1500)	310	777	842	1790	695	1850
(1800)	310	890	952	1950	773	2040
(2200)	310	890	952	1950	773	2340
(2700)	370	917	982	1980	790	2670

Dimensions without insulation and casing

Boiler incl. hinged flange, connector and flue gas collector.
(Dimensions in mm)



1 Flow
2 Return
3 Flue gas outlet
6 Drain

Max-3 type	a [1]	b	c	d	e	f	g	h	i	k	l	m	n	o	p
(420,530)	1920	150	1770	277	2222	1060	1180	196	120	1060	1376	2077	175	460	1072
(620,750)	2195	150	2045	228	2498	1180	1300	196	120	1180	1496	2353	172	485	1192
(1000,1250)	2480	150	2330	228	2783	1370	1500	187	120	1380	1660	2638	198	500	1392
(1500)	2685	164	2568	260	3078	1560	1680	162	120	1560	1842	2923	240	510	-
(1800)	3055	166	2760	450	3467	1720	1840	162	120	1720	2002	3325	430	510	-
(2200)	3355	166	3060	450	3767	1720	1840	162	120	1720	2002	3625	430	510	-
(2700)	3700	164	3390	430	4075	1750	1870	169	120	1750	2039	3953	430	510	-

Max-3 type	q	r	s	v	w	x	y
(420,530)	175	350	950	475	990	-	-
(620,750)	170	550	1050	535	1110	-	-
(1000,1250)	175	415	1250	630	1298	-	-
(1500)	65	310	1350	725	1494	1790	153
(1800)	65	310	1460	805	1654	1950	153
(2200)	65	310	1460	805	1654	1950	153
(2700)	65	370	1410	820	1684	1980	153

[1] Max-3 (1500-2700): socket protrudes

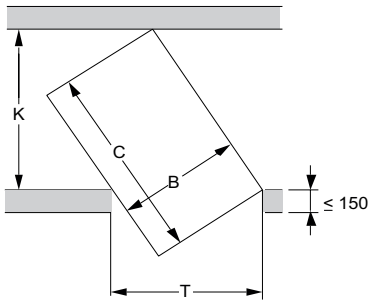
Required min. width of door and corridor to bring in the boiler

The stated measurements are minimal dimensions

$$K = \frac{B}{T} \times L$$

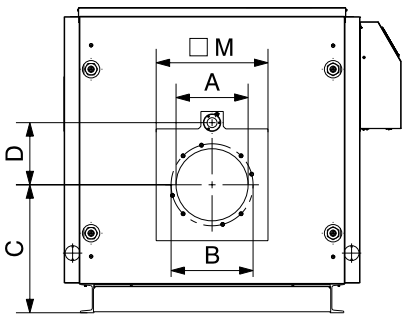
$$T = \frac{B}{K} \times L$$

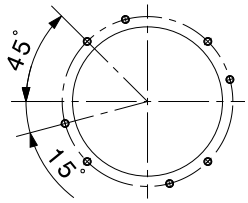
T Door width
K Corridor width
B Boiler width
L Max. boiler length



Furnace dimensions

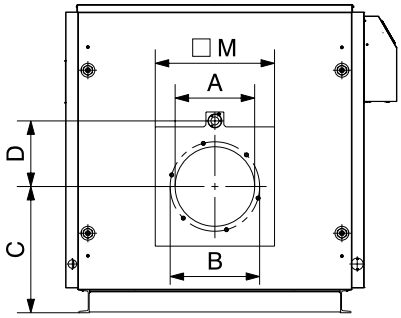
Max-3 (420,530)

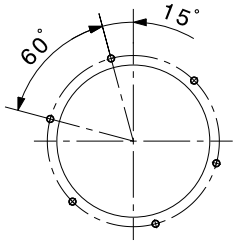




Screw joint flange
Max-3 (420,530)
4 x M12 (45°)
4 x M12 (15°)

Max-3 (620-1250)

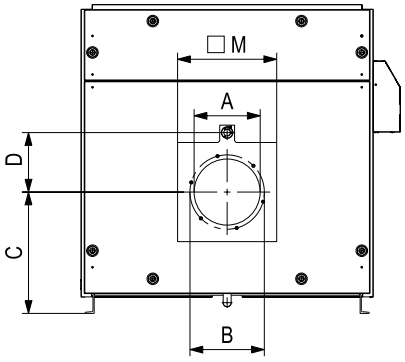


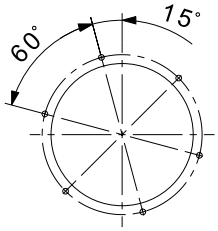


Screw joint flange
Max-3 (620,750)
6 x M12 (15°)

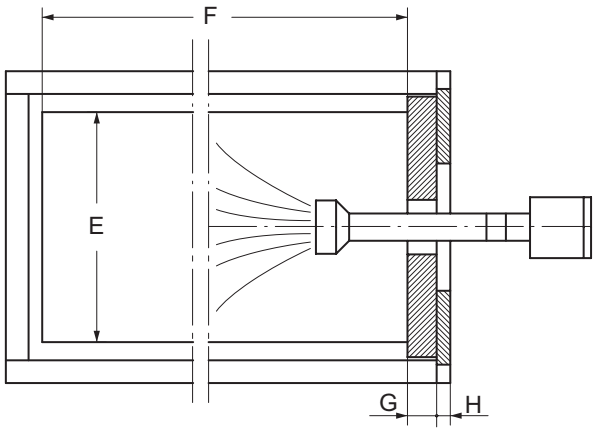
Screw joint flange
Max-3 (1000,1250)
6 x M16 (15°)

Max-3 (1500-2700)



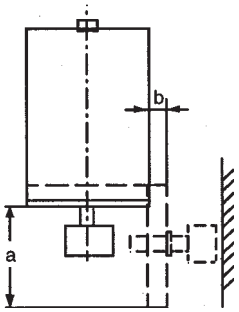


Screw joint flange
Max-3 (1500-2700)
6 x M16 (15°)



Swinging out of boiler door

Boiler door is swivelling to the right or left
(Dimensions in mm)



Dimensions
(Dimensions in mm)

Max-3 type	A	B	C	D	E	F	G	H	M
(420,530)	290	330	515	250	606	1624	163	30	450
(620,750)	350	400	550	310	684	1899	163	30	600
(1000,1250)	400	450	635	330	782	2182	163	30	600
(1500)	400	450	665	360	880	2417	170	30	600
(1800)	400	450	735	360	976	2605	170	30	600
(2200)	400	450	735	360	976	2905	170	30	600
(2700)	400	450	755	360	976	3233	170	30	600

Max-3 type	a	b
(420,530)	1060	150
(620,750)	1180	150
(1000,1250)	1370	150
(1500)	1520	175
(1800,2200)	1680	175
(2700)	1700	175

Standards and guidelines

The official regulations for installation and operation must be observed. In particular, these are the country-specific standards (e.g. EN standard, DIN standards, …) as well as the corresponding regional regulations.

The following requirements and directives must be complied with:

- Hoval technical information and installation instructions
- hydraulic and technical control regulations of Hoval
- DIN EN 12828
  Safety-relevant requirements
- DIN EN 12831 Heaters
  Rules for the calculation of the heat requirements of buildings
- VDI 2035 Protection against damage by corrosion and boiler scale formation in heating and service water installations
- EN 14868 Protection of metallic materials against corrosion
- VDE 0100 supplement 2

Water quality in heating systems

Filling and replacement water, heating water

The following applies:

- VDI 2035
- In addition, the EN 14868 standard must be applied, **as well as the manufacturer-specific specifications**

Manufacturer-specific specifications

Filling and replacement water

The filling and replacement water can be both fully demineralised and also merely softened.

Heating water

- In the case of **full demineralisation of the filling and replacement water**, the electrical conductivity of the heating water must not exceed the value of 100 µS/cm.
- In the case of **softening the filling and replacement water**, the following conditions must be complied with:
  The quality of the heating water must be checked and documented periodically:
  - For an installed heat output above 100 kW up to and including 1000 kW, an annual check of the heating water is required.
  - For an installed heat output above 1000 kW, an check of the heating water is required twice a year.

  The following standard values for the heating water must be measured and adhered to:
  - Electrical conductivity of the heating water for operation with water containing salts: > 100 µS/cm to ≤ 1500 µS/cm
  - pH value of the heating water for systems without aluminium alloy as water-side material 8.2 to 10.0 (measurement 10 weeks after commissioning at the earliest)
- The sum of the chloride, nitrate and sulphate contents in the heating water must not exceed 50 mg/l in total.

Additional notices

- Hoval boilers and calorifiers are suitable for heating systems without significant oxygen intake. (System type I according to EN 14868).
- Systems with continual oxygen intake (e.g. underfloor heating without diffusion-proof plastic piping) or intermittent oxygen intake (e.g. requiring frequent topping-up) must be equipped with a system separation.
- If only the boiler is replaced in an existing system, it is not recommended for the entire heating system to be refilled, provided that the heating water already contained in the system complies with the relevant directives or standards.
- Before filling new systems and, where necessary, existing heating systems containing heating water that does not comply with the directives or standards, the heating system must be professionally cleaned and flushed. The boiler must not be filled until the heating system has been flushed.

Frost protection agent

The planning sheet “Use of frost protection agent” is available from your Hoval contact person.

Combustion air supply

The combustion air supply must be warranted. The air opening must not be lockable.It is very important to ensure that the combustion air is free from halogen compounds. These are present, for example, in spray cans, varnishes, glues, solvents and cleansing agents.

Room air dependent operation:

- Minimum free cross-section for the air opening can be assumed as follows by way of simplification. Nominal heat output is the determining factor!
- A minimum free cross-section of once 150 cm² or twice 75 cm² and an additional 2 cm² for each kW boiler capacity in excess of 50 kW is required for the air opening into the outside air.

Burner installation

- If the weight of the burner (including attachments) of gas and dual-fuel burners is more than 90 kg and the distance of the centre of gravity of the burner to the boiler door is greater than 60 cm, support the burner housing weight directly with a strut to the boiler room floor.
- Depending on the size of the burner flange, an intermediate flange may be required to attach the burner. The intermediate flange including screws and seal must be supplied by the burner company.
- The lines must be positioned so that the boiler door can still be fully opened.
- To allow the boiler door to be swung out 90° to the left or right, the connections must be flexible and routed to the burner in a sufficiently large loop
- In systems with ThermoCondensor, the burner must additionally absorb the resistance of the heat exchanger

The space between the burner pipe and the hinged flange is to be insulated. A line must be routed from the burner to the sight glass to carry cooling air, in order to cool the boiler sight glass and keep it clean.
(Delivery by the burner company)

Electric connection of the burner
- Control voltage 1 x 230 V
- Burner motor 1 x 230 V / 3 x 400 V.
- The burner must be connected to the burner connection plug of the boiler.
- For safety reasons the electrical cable of the burner must be that short that the plug must be removed when swivelling boiler door.

Sound absorbing

Sound absorption is possible through the following steps:
- Heating room walls, ceiling and floor should be very solidly built, a sound absorber should be mounted into the air inlet. Pipe holders and support should be protected by means of anti-vibration sleeves.
- Install sound attenuation cowl for burner.
- If living rooms are located above or under the boiler room, vibration absorbers have to be mounted to the boiler base. Pipes and flue gas tube must be connected flexibly with compensators.
- Connect circulating pumps to the piping network using expansion joints.
- For damping of flame noise it is possible to install a silencer into the flue gas tube (space should be foreseen for later installation).

Measures for sound reduction

Make sure right from the planning phase that bedrooms are not situated in the immediate vicinity of the sound source (heating room, chimney).

A reduction of the radiated burner air sound level in the heating room (reduction of the burner noises) of up to approx. 12 dB can be achieved encapsulating the burner (sound attenuation cowl).

A significant part of the noise development in the combustion chamber and in the secondary heating surfaces is radiated as airborne noise via the flue gas line.
In addition, depending on dimensioning of the chimney and intersection, resonance effects caused by the vibration of the combustion noises (amplification) can occur.
These noises can be reduced on the one hand by measures on the burner side, such as modification of the flame geometry, the atomisation characteristic or the fuel throughput.
On the other hand, flue gas silencers achieve an important noise reduction.
These silencers must usually be adapted to low frequencies of 60-250 Hz.
Flue gas silencers work based on the principle of sound absorption.
The kinetic energy of the flue gases is consumed due to friction, which means a draughting requirement increase in the flue gas line is necessary. This must be taken into account when dimensioning the burner.

The connection piece from the boiler to the flue gas silencer must be gas-tight as the draught and pressure zero points lie behind the flue gas silencer.

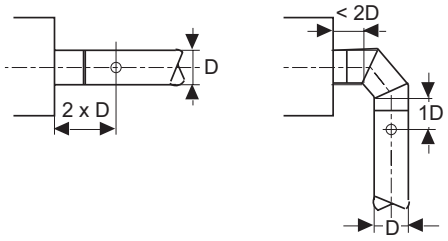
The space required of approx. 1 m for retrofitting of a flue gas silencer should be provided during planning.
Note also that secondary air devices are installed only behind a flue gas silencer.

Installation instructions

Please observe the installation instructions supplied with every boiler.

Chimney/flue gas system

Flue gas line
- The flue gas tube between boiler and chimney must be connected with an angle 30-45° to the chimney.



- If the flue gas tube is longer than 1 m, it must be insulated.
- The flue gas tube must be designed that no condensate water can get into the boiler.
- A closeable flue gas measuring socket with an inner diameter of 10-21 mm must be foreseen. The socket has to be led over the thermal insulation.

Chimney
- The flue gas system must be humidity-insensitive and acid-proof and admitted for flue gas temperatures up to > 160 °C.
- For existing chimney installation the restoration must be carried out according to the instructions of the chimney constructor.
- Calculation of the profile of the chimney according to DIN 4705.
- It is recommendable to use a secondary air valve for chimney draft limiting.

Flue gas temperature and power ranges

In order to achieve a good combustion quality (optimum flame burnout), the outputs must not be less than the specified minimum values.
For new systems, acid-resistant chimneys must be provided or the flue gas temperature must be set correspondingly higher (min. 160 °C).
The minimum flue gas temperature must be coordinated with the chimney conditions, otherwise the formation of sulphuric acid can lead to soot buildup in the chimney.

Diaphragm pressure expansion tank

- Ideally, the diaphragm pressure expansion tank should be connected to the heating system as described in our example applications, with a removable or sealable actuation device. This means that it is not necessary to drain the entire system in order to carry out work on the diaphragm pressure expansion tank.

Safety valve

- A safety valve and an automatic air vent must be installed in the safety flow.

Hoval Max-3 plus
Oil/gas boiler

Boiler
- High-efficiency 3-pass boiler according to EN 14394 for firing of heating oil EL and gas.
- Max-3 plus (420-2700) complies with the Pressure Equipment Directive 2014/68/CE
- Boiler completely welded
- For LowNOx burner with intern flue gas recirculation
- Insulation at the boiler body 80 mm mineral wool mat
- Boiler completely cased with steel plate, red powder coated
- Flue gas outlet to the rear
- Heating flow connection to the top, heating return connections to the rear, incl. counter flanges, screws and seals

Optional
- Boiler control panel with boiler controller and heating control in various versions
  - Boiler controller
    - with TopTronic® E control
    - with thermostat T 2.2
    - with thermostat T 0.2
- Free-standing calorifier see Calorifiers
- Boiler door swivels to the left

Delivery
- Boiler, thermal insulation and casing delivered separately packed

On site
- Mounting of insulation and casing

Model range

Max-3 plus type	Max. - min. output kW
(420)	200-420
(530)	220-530
(620)	240-620
(750)	280-750
(1000)	350-1000
(1250)	480-1250
(1500)	650-1500
(1800)	750-1800
(2200)	920-2200
(2700)	1030-2700

Boiler controller with TopTronic® E/E13.4 control

- Maximum operating temperature 90 °C

TopTronic® E controller

Control panel
- Colour touchscreen 4.3 inch
- Heat generator blocking switch for interrupting operation
- Fault signalling lamp

TopTronic® E control module
- Simple, intuitive operating concept
- Display of the most important operating statuses
- Configurable start screen
- Operating mode selection
- Configurable day and week programmes
- Operation of all connected Hoval CAN bus modules
- Commissioning wizard
- Service and maintenance function
- Fault message management
- Analysis function
- Weather display (with HovalConnect option)
- Adaptation of the heating strategy based on the weather forecast (with HovalConnect option)

TopTronic® E basic module heat generator TTE-WEZ
- Control functions integrated for
  - 1 heating/cooling circuit with mixer
  - 1 heating/cooling circuit without mixer
  - 1 hot water charging circuit
  - bivalent and cascade management
- Outdoor sensor
- Immersion sensor (calorifier sensor)
- Contact sensor (flow temperature sensor)
- RAST 5 basic plug set

The supplementary plug set must be ordered in order to use expanded controller functions.

Options for TopTronic® E controller
- Can be expanded by max. 1 module expansion:
  - module expansion heating circuit or
  - module expansion heat balancing or
  - module expansion Universal
- Can be networked with a total of up to 16 controller modules:
  - heating circuit/hot water module
  - solar module
  - buffer module
  - measuring module

Number of modules that can be additionally installed in the electrical box:
- 1 module expansion and 2 controller modules **or**
- 1 controller module and 2 module expansions **or**
- 3 controller modules

Notice
Max. 1 module expansion can be connected to the basic module heat generator TTE-WEZ!

Further information about the TopTronic® E
see “Controls”

Oil automatic function device OFA
- Control function integrated for
  - flue gas sensor for safety shut-off
  - 0-10 V output for connecting a modulating main pump (incl. ΔT control with low consumption)
  - Standard plug connection for 2-stage burner 1 x 230 V
  - Variable input for plant-specific functions (heat generator block, return sensor, info sensor etc.)
  - Variable output for plant-specific functions (thermostat function, operating message, etc.)

Delivery
- Boiler controller separately delivered

On site
- Mounting of the boiler controller at the boiler left or right side

Boiler controller with TopTronic® E/E13.5 control

- Maximum operating temperature 105 °C

- Configuration as TopTronic® E/E13.4 but: safety temperature limiter 120 °C

Delivery
- Boiler controller separately delivered

On site
- Mounting of the boiler controller at the boiler left or right side

Control panel with thermostat T 2.2

- Maximum operating temperature 90 °C

- For systems without TopTronic® E control
- For direct 2-stage burner control, requirement starting from external calorifier or heater instruction is possible.
- Main switch “I/O”
- Safety temperature limiter 110 °C
- Selector switch burner load
- Switch summer/winter
- 3 boiler temperature regulators 30-90 °C
  - temperature regulator for base load heating
  - temperature regulator for full load heating
  - temperature regulator for calorifier
- Boiler and burner breakdown lamp
- Plug connection for burner (with cable and plug)

Optional
- 2 running time meters integrated
- 2 burner running time meters and pulse counters integrated
- Flue gas thermometer, 4.5 m capillary tube

Delivery
- Boiler controller separately delivered

On site
- Mounting of the boiler controller at the boiler left or right side

Control panel with thermostat T 0.2

- Maximum operating temperature 105 °C

- For external control
- For systems without TopTronic® E control
- For special control function
- Main switch “I/O”
- Safety temperature limiter 120 °C,
- 3 boiler temperature regulators 50-105 °C
  - temperature regulator for base load heating
  - temperature regulator for full load heating
  - temperature regulator for calorifier
- without burner plug connection

Optional
- 2 running time meters integrated
- 2 burner running time meters and pulse counters integrated
- Flue gas thermometer, 4.5 m capillary tube
- Safety temperature limiter 130 °C

Delivery
- Boiler controller separately delivered

On site
- Mounting of the boiler controller at the boiler left or right side

Oil/gas boiler

Permission Boiler
Directive on appliances burning gaseous fuels 90/396/EG
Max-3 plus (420-2700):
CE product ID No. CE-0085BL0015
Pressure Equipment Directive 2014/68/CE

Hoval Max-3 plus (420-2700)

High-efficiency 3-pass boiler made of steel for oil/gas LowNOx firing, without control panel.
For operating temperature up to 105 °C

Execution: complete delivery
Boiler, thermal insulation and casing delivered separately packed.

Max-3 plus type	Max. - min. output kW	Operating pressure bar	Part No.
(420)	200-420	6	7013 783
(530)	220-530	6	7013 784
(620)	240-620	6	7013 785
(750)	280-750	6	7013 786
(1000)	350-1000	6	7013 787
(1250)	480-1250	6	7013 788
(1500)	650-1500	6	7013 626
(1800)	750-1800	6	7013 627
(2200)	920-2200	6	7013 628
(2700)	1030-2700	6	7013 659

The minimum boiler operating temperature and the minimum boiler return temperature must imperatively be observed (see technical data).
A constant return temperature control must be provided!

The condensate trap must imperatively be mounted on the flue gas outlet of the boiler!

Control panel with thermostat

Control panel T 2.2
- Operating temperature max. 90 °C
- For systems without TopTronic® E controller.
- For direct 2-stage burner control, incl. plug connection for burner requirement starting from external calorifier or heater instruction is possible.

	Part No.
- without burner running time meter and pulse counter	6015 017
- incl. 2 burner running time meters integrated	6015 477
- incl. 2 burner running time meters and pulse counters integrated	6015 478

- For mounting on heat generator side right (standard) or left (configuration on request). Specify mounting variant in purchase order.

Control panel T 0.2
- Operating temperature max. 105 °C
- For external switching command
- For systems without TopTronic® E controller.
- For special control function without burner plug connection

	Part No.
- without burner running time meter and pulse counter	6015 016
- incl. 2 burner running time meters integrated	6015 475
- incl. 2 burner running time meters and pulse counters integrated	6015 476

- For mounting on heat generator side right (standard) or left (configuration on request). Specify mounting variant in purchase order.

Accessories to control panel with thermostat

	Part No.
Flue gas thermometer 4.5 m, capillary tube	241 149

Boiler controller with TopTronic® E control

	Part No.
	6040 236
	6040 237

Boiler control E13.4 TopTronic® E
for mounting on heat generator side right (standard) or left (configuration on request). Specify mounting variant in purchase order.
Operating temperature: max. 90 °C.
Control function integrated for
- 1 heating circuit with mixer
- 1 heating circuit without mixer
- 1 DHW charging circuit

Heat generator management
Additional heat generator management
Cascade management
Optionally expandable by max. 1 module expansion:
- Module expansion heating circuit or
- Module expansion Universal

Optionally networkable with up to 16 controller modules (incl. solar module).
Max. 3 additional controller modules can be installed in control box.

Consisting of:
electrical box,
control panel,
TopTronic® E control module,
TopTronic® E basic module heat generator,
oil automatic function device OFA-200,
safety temperature limiter,
burner cable cpl. 2-stage, L = 5.0 m,
1 outdoor sensor AF/2P/K,
1 immersion sensor TF/2P/5/6T/S1, L = 5.0 m
1 contact sensor ALF/2P/4/T/S1, L = 4.0 m

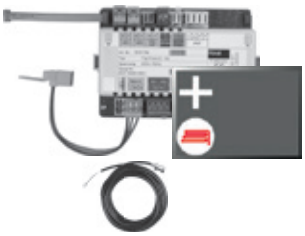
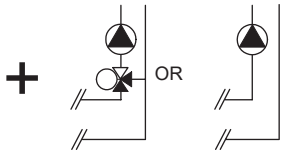
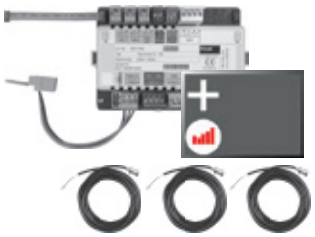
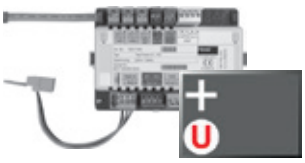
Notice
The electrical connection for each external burner must be clarified separately.

Boiler controller E13.5 TopTronic® E
for installation on the right (standard installation) or left side (configuration on request) of the heat generator. Specify installation variant in purchase order.
Max. operating temperature: 105 °C.
Version as boiler controller E13.4 TopTronic® E

Notice
The electrical connection for each external burner must be clarified separately.

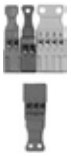
TopTronic® E module expansions

for TopTronic® E basic module heat generator

		Part No.
 	**TopTronic® E module expansion heating circuit TTE-FE HK** Expansion to the inputs and outputs of the basic module heat generator or the heating circuit/domestic hot water module for implementing the following functions: - 1 heating/cooling circuit w/o mixer or - 1 heating/cooling circuit with mixer Consisting of: - Fitting accessories - 1 contact sensor ALF/2P/4/T, L = 4.0 m - Basic plug set FE module **Notice** The supplementary plug set may have to be ordered to implement functions differing from the standard!	6034 576
	**TopTronic® E module expansion heating circuit incl. energy balancing** TTE-FE HK-EBZ Expansion to the inputs and outputs of the basic module heat generator or the heating circuit/domestic hot water module for implementing the following functions: - 1 heating/cooling circuit w/o mixer or - 1 heating/cooling circuit with mixer incl. energy balancing in each case Consisting of: - Fitting accessories - 3 contact sensors ALF/2P/4/T, L = 4.0 m - Plug set FE module **Notice** Suitable flow rate sensors (pulse sensors) must be provided on site.	6037 062
	**TopTronic® E module expansion Universal TTE-FE UNI** Expansion to the inputs and outputs of a controller module (basic module heat generator, heating circuit/domestic hot water module, solar module, buffer module) for implementing various functions Consisting of: - Fitting accessories - Plug set FE module **Further information** see “Controls” - “Hoval TopTronic® E module expansions” chapter **Notice** Refer to the Hoval System Technology to find which functions and hydraulic arrangements can be implemented.	6034 575

Accessories for TopTronic® E

		Part No.
TopTronic® E controller modules		
TTE-HK/WW	TopTronic® E heating circuit/ hot water module	6034 571
TTE-SOL	TopTronic® E solar module	6037 058
TTE-PS	TopTronic® E buffer module	6037 057
TTE-MWA	TopTronic® E measuring module	6034 574



Supplementary plug set		
for basic module heat generator TTE-WEZ		6034 499
for controller modules and module expansion TTE-FE HK		6034 503

TopTronic® E room control modules		
TTE-RBM	TopTronic® E room control modules	
	easy white	6037 071
	comfort white	6037 069
	comfort black	6037 070

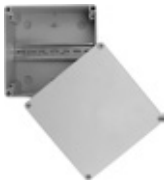
Enhanced language package TopTronic® E		6039 253
one SD card required per control module Consisting of the following languages: HU, CS, SL, RO, PL, TR, ES, HR, SR, JA, DA		

HovalConnect		
HovalConnect LAN		6049 496
HovalConnect WLAN		6049 498
HovalConnect Modbus		6049 501
HovalConnect KNX		6049 593

TopTronic® E interface modules		
GLT module 0-10 V		6034 578

TopTronic® E sensors		
AF/2P/K	Outdoor sensor H x W x D = 80 x 50 x 28 mm	2055 889
TF/2P/5/6T	Immersion sensor, L = 5.0 m	2055 888
ALF/2P/4/T	Contact sensor, L = 4.0 m	2056 775
TF/1.1P/2.5S/6T	Collector sensor, L = 2.5 m	2056 776

Bivalent switch		
for various release or switching functions		
Bivalent switch 1-piece		2056 858
Bivalent switch 2-piece		2061 826



System housing		
System housing 182 mm		6038 551
System housing 254 mm		6038 552

TopTronic® E wall casing		
WG-190	Wall casing small	6052 983
WG-360	Wall casing medium	6052 984
WG-360 BM	Wall casing medium with control module cut-out	6052 985
WG-510	Wall casing large	6052 986
WG-510 BM	Wall casing large with control module cut-out	6052 987

Further information
see “Controls”

	Part No.
 **Flow temperature monitor** for panel heating (1 controller per heating circuit) 15-95 °C, setting (visible externally) under the casing cover	
Clamp-on flow temperature monitor RAK-TW1000S with retaining strap, without cable and plug	242 902
Immersion thermostat RAK-TW1000S Thermostat with immersion sleeve ½″ Depth of immersion 150 mm, nickel-plated brass	6010 082
 **Vibration elements for boiler socket** For sound and vibration absorption. Made of rubber. Cross section 80/50 mm	
Delivery 4 vibration elements per boiler, mounted under the boiler socket	
to Max-3 type / Set of pieces / Length mm	
(420,530) / L200 (4 pcs.) / 200	6003 739
(620,750) / L400 (4 pcs.) / 400	6003 741
(1000,1250) / L500 (4 pcs.) / 500	6003 742
(1500,1800) / L800 (4 pcs.) / 800	6005 623
(2200,2700) / L800 (6 pcs.) / 800	6005 624
 **Blind flange** made of steel, incl. fixing screws and seal	
Max-3 (420,530)	6002 192
Max-3 (620,750)	6030 026
Max-3 (1000-2700)	6002 156
 **Intermediate flange drilled for burner adaptation** made of steel, incl. fixing screws and seals	
Max-3 (420,530)	6017 595
Max-3 (620,750)	6017 593
Max-3 (1000-2700)	6017 594

Service

Commissioning

Commissioning by works service or Hoval trained authorised serviceman/company is condition for warranty.

For commissioning and other services please contact your Hoval sales office.

Max-3 plus (420-1250)

Type		(420)	(530)	(620)	(750)	(1000)	(1250)
• Nominal output at 80/60 °C	kW	420	530	620	750	1000	1250
• Range of output at 80/60 °C	kW	147-420	185-530	217-620	263-750	350-1000	437-1250
• Burner input max.	kW	441	557	651	788	1050	1313
• Boiler operating temperature max. [1]	°C	90	90	90	90	90	90
• Boiler operating temperature min.	°C	see table operating conditions (below)					
• Return flow temperature min.	°C	see table operating conditions (below)					
• Safety temperature limiter setting (water side) [2]	°C	110	110	110	110	110	110
• Operating pressure	bar	6	6	6	6	6	6
• Boiler efficiency at 80/60 °C in full-load operation (related to net calorific value NCV / gross calorific value GCV, heating oil EL)	%	95.2/89.8	95.2/89.8	95.2/89.8	95.2/89.8	95.2/89.8	95.2/89.8
• Boiler efficiency at 30 % partial load (EN 303) (related to net calorific value NCV / gross calorific value GCV, heating oil EL)	%	97.1/91.6	97.1/91.6	97.1/91.6	97.1/91.6	97.1/91.6	97.1/91.6
• Nominal efficiency at 75/60 °C (DIN 4702-8) (related to net calorific value NCV / gross calorific value GCV, heating oil EL)	%	97.0/91.5	97.0/91.5	97.0/91.5	97.0/91.5	97.0/91.5	97.0/91.5
• Stand-by loss qB at 70 °C	Watt	1000	1035	1120	1180	1250	1380
• Flue gas resistance at nominal output natural gas: 10.8 % CO_2, 500 m over sea level (tolerance ± 20 %)	mbar	6.5	8.0	8.2	9.5	10.0	12.0
• Flue gas mass flow at nominal output natural gas: 10.8 % CO_2	kg/h	680	859	1004	1215	1619	2025
• Flow resistance boiler [3]	z-value	0.022	0.022	0.008	0.008	0.003	0.003
• Water flow resistance at 10 K	mbar	28.70	45.70	22.74	33.28	22.18	34.66
• Water flow resistance at 20 K	mbar	7.17	11.42	5.68	8.32	5.54	8.66
• Water flow volume at 10 K	m³/h	36.12	45.58	53.32	64.50	86.00	107.50
• Water flow volume at 20 K	m³/h	18.06	22.79	26.66	32.25	43.00	53.75
• Boiler water content	litres	552	520	969	938	1528	1478
• Boiler gas volume	m³	0.583	0.602	0.846	0.872	1.350	1.390
• Insulation thickness boiler body	mm	80	80	80	80	80	80
• Weight (incl. casing)	kg	1111	1171	1795	1831	2535	2643
• Weight (without casing)	kg	943	1000	1590	1620	2360	2460
• Combustion chamber dimension Ø inside x length	mm	606/1624	606/1624	684/1899	684/1899	782/2182	782/2182
• Combustion chamber volume	m³	0.466	0.466	0.669	0.669	1.047	1.047
• Dimensions		see Dimensions					
• Draught/underpressure at flue gas outlet max.	Pa	-50	-50	-50	-50	-50	-50

[1] Limited by the boiler controller E13.4 TopTronic® E and T 2.2 to 90 °C or by E13.5 TopTronic® E and T 0.2 to 105 °C.
[2] Max. safety temperature for boiler controller E13.4 TopTronic® E and T 2.2: 110 °C or E13.5 TopTronic® E and T 0.2: 120 °C.
[3] Flow resistance boiler in mbar = flow rate $(m^3/h)^2$ x z

Possible operating conditions

Fuel		Heating oil EL	Natural gas H
min. boiler temperature	°C	65	75
min. return temperature	°C	55	65
Return temperature control		yes	yes

Max-3 plus (1500-2700)

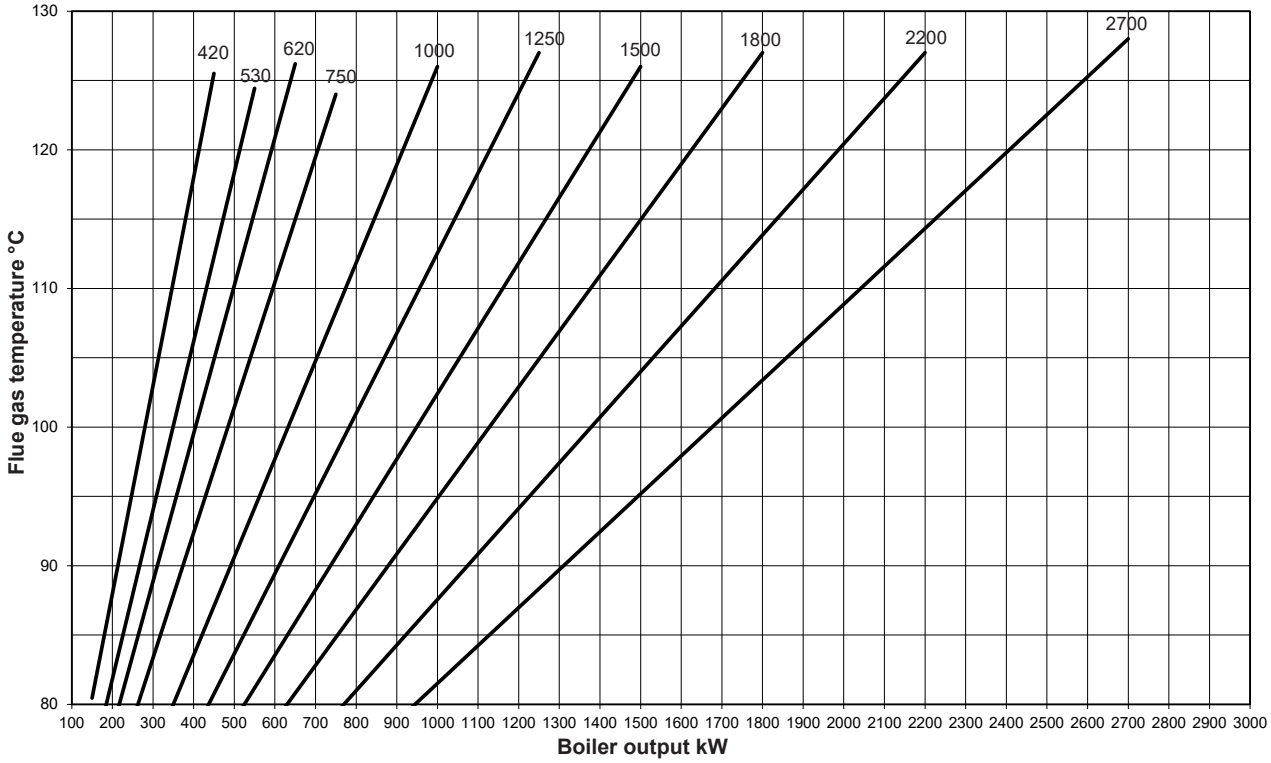
Type		(1500)	(1800)	(2200)	(2700)
• Nominal output at 80/60 °C	kW	1500	1800	2200	2700
• Range of output at 80/60 °C	kW	525-1500	630-1800	770-2200	945-2700
• Burner input max.	kW	1575	1890	2310	2835
• Boiler operating temperature max. [1]	°C	90	90	90	90
• Boiler operating temperature min.	°C		see table operating conditions (below)		
• Return flow temperature min.	°C		see table operating conditions (below)		
• Safety temperature limiter setting (water side) [2]	°C	110	110	110	110
• Operating pressure	bar	6	6	6	6
• Boiler efficiency at 80/60 °C in full-load operation (related to net calorific value NCV / gross calorific value GCV, heating oil EL)	%	95.2/89.8	95.2/89.8	95.2/89.8	95.2/89.8
• Boiler efficiency at 30 % partial load (EN 303) (related to net calorific value NCV / gross calorific value GCV, heating oil EL)	%	97.1/91.6	97.1/91.6	97.1/91.6	97.1/91.6
• Nominal efficiency at 75/60 °C (DIN 4702-8) (related to net calorific value NCV / gross calorific value GCV, heating oil EL)	%	97.0/91.5	97.0/91.5	97.0/91.5	97.0/91.5
• Stand-by loss qB at 70 °C	Watt	1850	1950	2100	2300
• Flue gas resistance at nominal output natural gas: 10.8 % CO_2, 500 m over sea level (tolerance ± 20 %)	mbar	10.0	12.0	13.0	13.0
• Flue gas mass flow at nominal output natural gas: 10.8 % CO_2	kg/h	2429	2916	3564	4374
• Flow resistance boiler [3]	z-value	0.002	0.002	0.002	0.001
• Water flow resistance at 10 K	mbar	33.1	47.6	71.1	53.6
• Water flow resistance at 20 K	mbar	8.3	11.9	17.8	13.4
• Water flow volume at 10 K	m³/h	128.6	154.3	188.6	231.5
• Water flow volume at 20 K	m³/h	64.3	77.4	94.3	115.7
• Boiler water content	litres	2343	2750	3050	3550
• Boiler gas volume	m³	1.956	2.510	2.761	3.037
• Insulation thickness boiler body	mm	80	80	80	80
• Weight (incl. casing)	kg	3748	4955	5230	5810
• Weight (without casing)	kg	3400	4600	4800	5350
• Combustion chamber dimension Ø inside x length	mm	880/2415	980/2595	980/2895	980/3200
• Combustion chamber volume	m³	1.58	2.07	2.30	2.41
• Dimensions			see Dimensions		
• Draught/underpressure at flue gas outlet max.	Pa	-50	-50	-50	-50

[1] Limited by the boiler controller E13.4 TopTronic® E and T 2.2 to 90 °C or by E13.5 TopTronic® E and T 0.2 to 105 °C.
[2] Max. safety temperature for boiler controller E13.4 TopTronic® E and T 2.2: 110 °C or E13.5 TopTronic® E and T 0.2: 120 °C.
[3] Flow resistance boiler in mbar = flow rate $(m^3/h)^2$ x z

Possible operating conditions

Fuel		Heating oil EL	Natural gas H, low-sulphur heating oil EL
min. boiler temperature	°C	65	75
min. return temperature	°C	55	65
Return temperature control		yes	yes

Flue gas output diagram

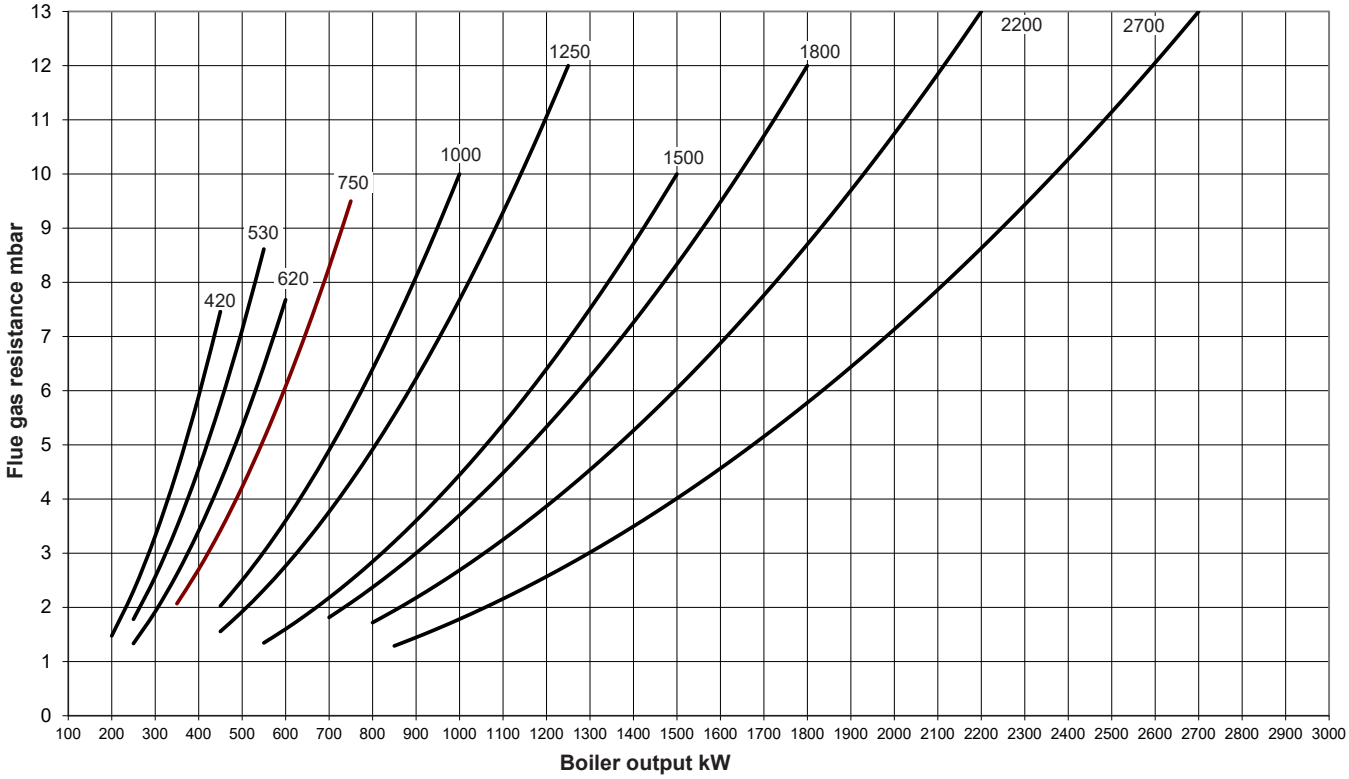


kW = Boiler output
°C = Flue gas temperature on a clean surface, boiler flow temperature 80 °C, return temperature 60 °C (in accordance with DIN 4702).

- Operation with heating oil EL, natural gas
  λ = 1.22 with max. burner output (CO_2 heating oil EL = 12.5 %, CO_2 natural gas = 9.8 %)

- A reduction of the boiler water temperature of 10 K causes a reduction of the flue gas temperature of approx. 6-8 K.
- A modification of the CO_2 concentration of +1 % causes a modification of the flue gas temperature of approx. -8 K.
- A modification of the CO_2 concentration of -1 % causes a modification of the flue gas temperature of approx. +8 K.

Flue gas resistor

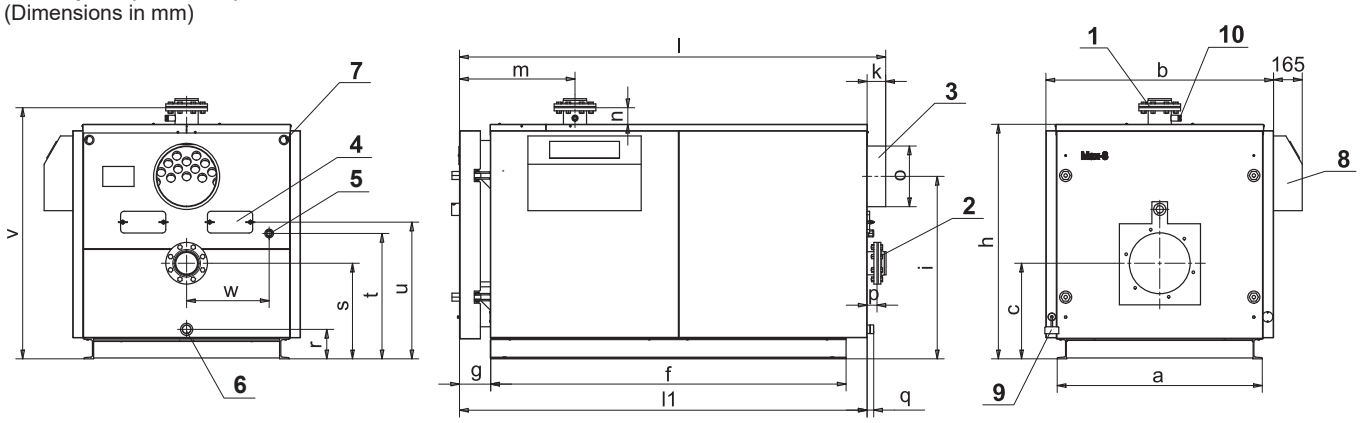


kW = Boiler output

mbar = flue gas resistance λ = 1.11 (natural gas: CO_2 = 10.8 %) 500 above sea level (tolerance: +/- 20 %)

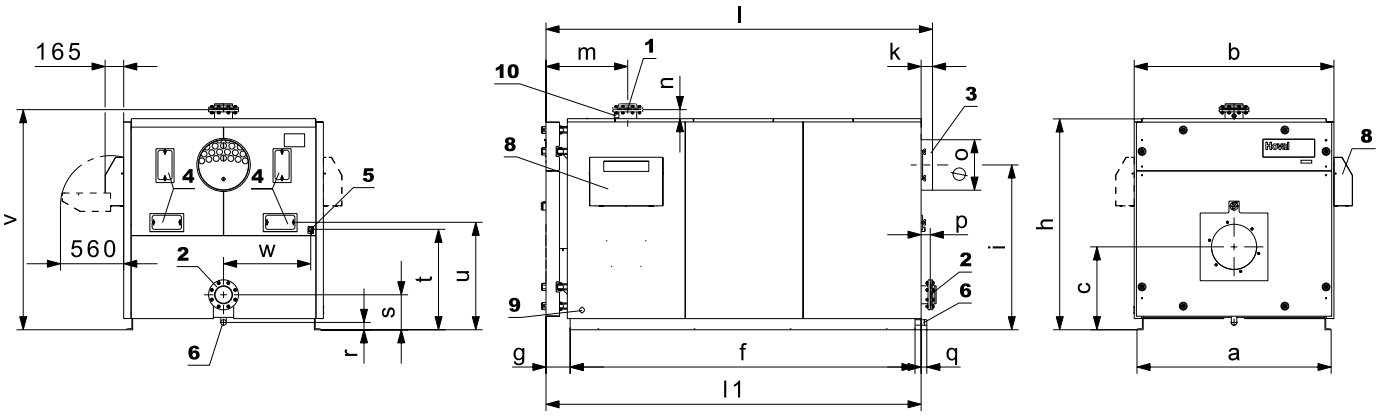
Max-3 plus (420-1250)

(Dimensions in mm)



Max-3 plus (1500-2700)

(Dimensions in mm)



1	Flow	(420,530)	DN 100, PN 6	2	Return	(420,530)	DN 100, PN 6
		(620,750)	DN 125, PN 6			(620,750)	DN 125, PN 6
		(1000,1250)	DN 150, PN 6			(1000,1250)	DN 150, PN 6
		(1500-2200)	DN 150, PN 6			(1500-2200)	DN 150, PN 6
		(2700)	DN 200, PN 6			(2700)	DN 200, PN 6
3	Flue gas outlet						
4	Cleaning opening						

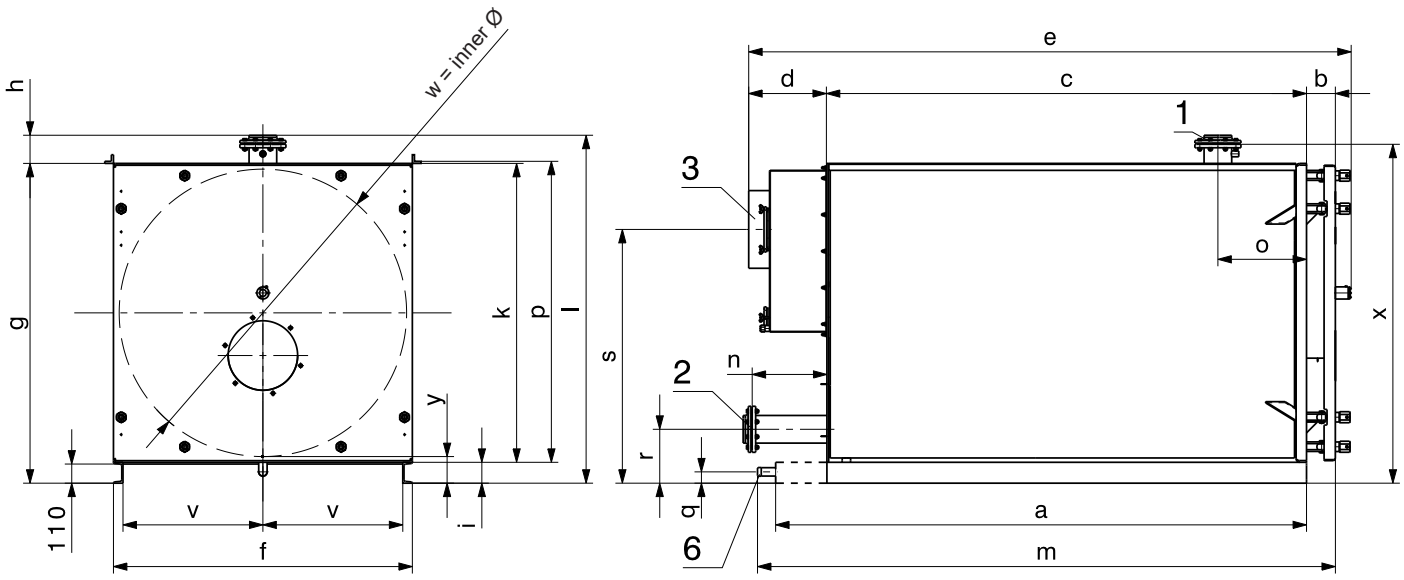
5	Flue gas collector cleaning opening R 1″
6	Drain R 1½″
7	Cable routing
8	Control panel
9	Electrical connection
10	Bushing Rp ¾″ with immersion sleeve for boiler temperature sensor

Max-3 plus type	a	b	c	f	g	h	i	k	l	l1	m	n	Ø o	p	q	r
(420,530)	1060	1190	515	1770	181	1230	950	104	2178	2074	641	100	299	54	34	175
(620,750)	1180	1310	550	2045	181	1350	1050	105	2452	2347	666	95	349	55	35	170
(1000,1250)	1370	1500	635	2330	181	1550	1250	107	2739	2632	681	111	349	77	37	175
(1500)	1560	1610	665	2685	212	1710	1350	103	3040	2940	722	80	447	83	34	65
(1800)	1720	1770	735	3055	214	1870	1460	103	3424	3320	724	80	447	83	52	65
(2200)	1720	1770	735	3355	214	1870	1460	101	3724	3625	724	80	447	81	50	65
(2700)	1750	1800	755	3700	212	1900	1410	82	4032	3950	722	80	647	82	51	65

Max-3 plus type	s	t	u	v	w	x
(420,530)	350	595	660	1330	450	-
(620,750)	550	722	786	1445	475	-
(1000,1250)	415	620	685	1660	590	-
(1500)	310	777	842	1790	695	1850
(1800)	310	890	952	1950	773	2040
(2200)	310	890	952	1950	773	2340
(2700)	370	917	982	1980	790	2670

Dimensions without insulation and casing

Boiler incl. hinged flange, connector and flue gas collector.
(Dimensions in mm)



1 Flow
2 Return
3 Flue gas outlet
6 Drain

Max-3 plus type	a [1]	b	c	d	e	f	g	h	i	k	l	m	n	o	p
(420,530)	1920	150	1770	277	2222	1060	1180	196	120	1060	1376	2077	175	460	1072
(620,750)	2195	150	2045	228	2498	1180	1300	196	120	1180	1496	2353	172	485	1192
(1000,1250)	2480	150	2330	228	2783	1370	1500	187	120	1380	1660	2638	198	500	1392
(1500)	2685	164	2568	260	3078	1560	1680	162	120	1560	1842	2923	240	510	-
(1800)	3055	166	2760	450	3467	1720	1840	162	120	1720	2002	3325	430	510	-
(2200)	3355	166	3060	450	3767	1720	1840	162	120	1720	2002	3625	430	510	-
(2700)	3700	164	3390	430	4075	1750	1870	169	120	1750	2039	3953	430	510	-

Max-3 plus type	q	r	s	v	w	x	y
(420,530)	175	350	950	475	990	-	-
(620,750)	170	550	1050	535	1110	-	-
(1000,1250)	175	415	1250	630	1298	-	-
(1500)	65	310	1350	725	1494	1790	153
(1800)	65	310	1460	805	1654	1950	153
(2200)	65	310	1460	805	1654	1950	153
(2700)	65	370	1410	820	1684	1980	153

[1] Max-3 plus (1500-2700) socket protrudes

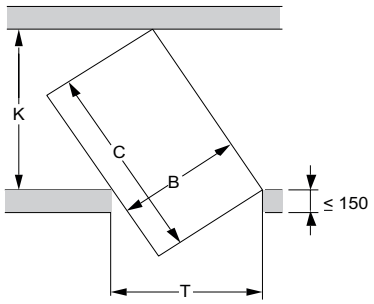
Required min. width of door and corridor to bring in the boiler

The stated measurements are minimal dimensions

$$K = \frac{B}{T} \times L$$

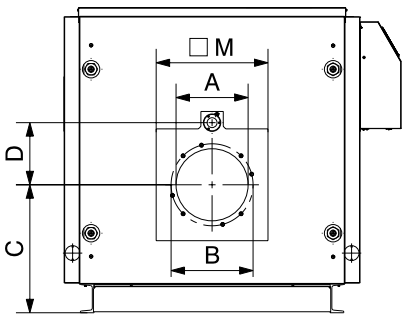
$$T = \frac{B}{K} \times L$$

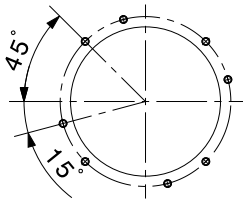
T Door width
K Corridor width
B Boiler width
L Max. boiler length



Furnace dimensions

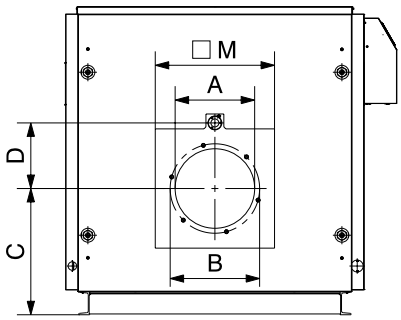
Max-3 plus (420,530)

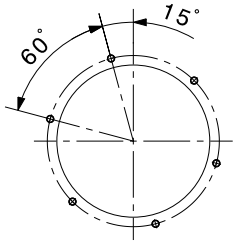




Screw joint flange
Max-3 plus (420,530)
4 x M12 (45°)
4 x M12 (15°)

Max-3 plus (620-1250)

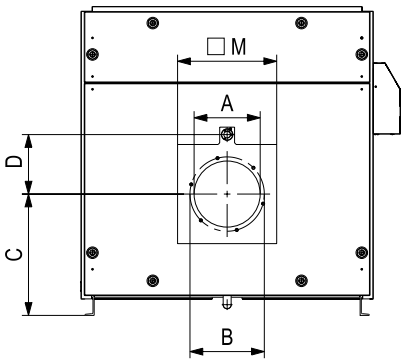


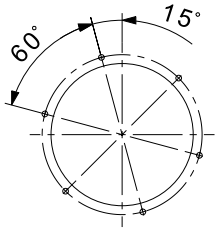


Screw joint flange
Max-3 plus (620,750)
6 x M12 (15°)

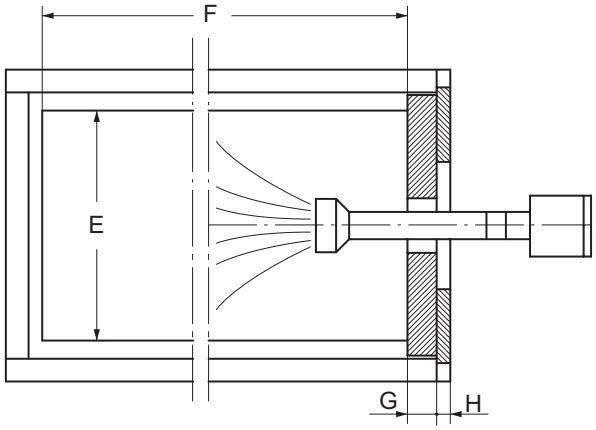
Screw joint flange
Max-3 plus (1000,1250)
6 x M16 (15°)

Max-3 plus (1500-2700)



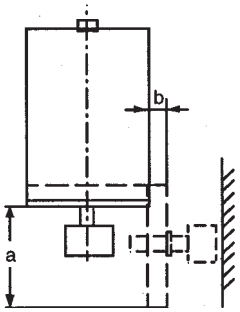


Screw joint flange
Max-3 plus (1500-2700)
6 x M16 (15°)



Swinging out of boiler door

Boiler door is swivelling to the right or left
(Dimensions in mm)



Dimensions
(Dimensions in mm)

Max-3 plus type	A	B	C	D	E	F	G	H	M
(420,530)	290	330	515	250	606	1624	163	30	450
(620,750)	350	400	550	310	684	1899	163	30	600
(1000,1250)	400	450	635	330	782	2182	163	30	600
(1500)	400	450	665	360	880	2417	170	30	600
(1800)	400	450	735	360	976	2605	170	30	600
(2200)	400	450	735	360	976	2905	170	30	600
(2700)	400	450	755	360	976	3233	170	30	600

Max-3 plus type	a	b
(420,530)	1060	150
(620,750)	1180	150
(1000,1250)	1370	150
(1500)	1520	175
(1800,2200)	1680	175
(2700)	1700	175

Standards and guidelines

The official regulations for installation and operation must be observed. In particular, these are the country-specific standards (e.g. EN standard, DIN standards, …) as well as the corresponding regional regulations.

The following requirements and directives must be complied with:

- Hoval technical information and installation instructions
- hydraulic and technical control regulations of Hoval
- DIN EN 12828
  Safety-relevant requirements
- DIN EN 12831 Heaters
  Rules for the calculation of the heat requirements of buildings
- VDI 2035 Protection against damage by corrosion and boiler scale formation in heating and service water installations
- EN 14868 Protection of metallic materials against corrosion
- VDE 0100 supplement 2

Water quality in heating systems

Filling and replacement water, heating water

The following applies:

- VDI 2035
- In addition, the EN 14868 standard must be applied, **as well as the manufacturer-specific specifications**

Manufacturer-specific specifications

Filling and replacement water

The filling and replacement water can be both fully demineralised and also merely softened.

Heating water

- In the case of full **demineralisation of the filling and replacement water**, the electrical conductivity of the heating water must not exceed the value of 100 µS/cm.
- In the case of **softening the filling and replacement water**, the following conditions must be complied with:
  The quality of the heating water must be checked and documented periodically:
  - For an installed heat output above 100 kW up to and including 1000 kW, an annual check of the heating water is required.
  - For an installed heat output above 1000 kW, an check of the heating water is required twice a year.

  The following standard values for the heating water must be measured and adhered to:
  - Electrical conductivity of the heating water for operation with water containing salts: > 100 µS/cm to ≤ 1500 µS/cm
  - pH value of the heating water for systems without aluminium alloy as water-side material 8.2 to 10.0 (measurement 10 weeks after commissioning at the earliest)
- The sum of the chloride, nitrate and sulphate contents in the heating water must not exceed 50 mg/l in total.

Additional notices

- Hoval boilers and calorifiers are suitable for heating systems without significant oxygen intake. (System type I according to EN 14868).
- Systems with continual oxygen intake (e.g. underfloor heating without diffusion-proof plastic piping) or intermittent oxygen intake (e.g. requiring frequent topping-up) must be equipped with a system separation.
- If only the boiler is replaced in an existing system, it is not recommended for the entire heating system to be refilled, provided that the heating water already contained in the system complies with the relevant directives or standards.
- Before filling new systems and, where necessary, existing heating systems containing heating water that does not comply with the directives or standards, the heating system must be professionally cleaned and flushed. The boiler must not be filled until the heating system has been flushed.

Frost protection agent

The planning sheet “Use of frost protection agent” is available from your Hoval contact person.

Combustion air supply

The combustion air supply must be warranted. The air opening must not be lockable.It is very important to ensure that the combustion air is free from halogen compounds. These are present, for example, in spray cans, varnishes, glues, solvents and cleansing agents.

Room air dependent operation:

- Minimum free cross-section for the air opening can be assumed as follows by way of simplification. Nominal heat output is the determining factor!
- A minimum free cross-section of once 150 cm² or twice 75 cm² and an additional 2 cm² for each kW boiler capacity in excess of 50 kW is required for the air opening into the outside air.

Burner installation

- If the weight of the burner (including attachments) of gas and dual-fuel burners is more than 90 kg and the distance of the centre of gravity of the burner to the boiler door is greater than 60 cm, support the burner housing weight directly with a strut to the boiler room floor.
- Depending on the size of the burner flange, an intermediate flange may be required to attach the burner. The intermediate flange including screws and seal must be supplied by the burner company.
- The lines must be positioned so that the boiler door can still be fully opened.
- To allow the boiler door to be swung out 90° to the left or right, the connections must be flexible and routed to the burner in a sufficiently large loop
- In systems with ThermoCondensor, the burner must additionally absorb the resistance of the heat exchanger

The space between the burner pipe and the hinged flange is to be insulated. A line must be routed from the burner to the sight glass to carry cooling air, in order to cool the boiler sight glass and keep it clean.
(Delivery by the burner company)

Electric connection of the burner
- Control voltage 1 x 230 V
- Burner motor 1 x 230 V / 3 x 400 V.
- The burner must be connected to the burner connection plug of the boiler.
- For safety reasons the electrical cable of the burner must be that short that the plug must be removed when swivelling boiler door.

Sound absorbing

Sound absorption is possible through the following steps:
- Heating room walls, ceiling and floor should be very solidly built, a sound absorber should be mounted into the air inlet. Pipe holders and support should be protected by means of anti-vibration sleeves.
- Install sound attenuation cowl for burner.
- If living rooms are located above or under the boiler room, vibration absorbers have to be mounted to the boiler base. Pipes and flue gas tube must be connected flexibly with compensators.
- Connect circulating pumps to the piping network using expansion joints.
- For damping of flame noise it is possible to install a silencer into the flue gas tube (space should be foreseen for later installation).

Measures for sound reduction

Make sure right from the planning phase that bedrooms are not situated in the immediate vicinity of the sound source (heating room, chimney).

A reduction of the radiated burner air sound level in the heating room (reduction of the burner noises) of up to approx. 12 dB can be achieved encapsulating the burner (sound attenuation cowl).

A significant part of the noise development in the combustion chamber and in the secondary heating surfaces is radiated as airborne noise via the flue gas line.
In addition, depending on dimensioning of the chimney and intersection, resonance effects caused by the vibration of the combustion noises (amplification) can occur.
These noises can be reduced on the one hand by measures on the burner side, such as modification of the flame geometry, the atomisation characteristic or the fuel throughput.
On the other hand, flue gas silencers achieve an important noise reduction.
These silencers must usually be adapted to low frequencies of 60-250 Hz.
Flue gas silencers work based on the principle of sound absorption.
The kinetic energy of the flue gases is consumed due to friction, which means a draughting requirement increase in the flue gas line is necessary. This must be taken into account when dimensioning the burner.

The connection piece from the boiler to the flue gas silencer must be gas-tight as the draught and pressure zero points lie behind the flue gas silencer.

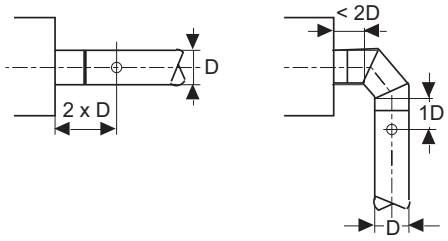
The space required of approx. 1 m for retrofitting of a flue gas silencer should be provided during planning.
Note also that secondary air devices are installed only behind a flue gas silencer.

Installation instructions

Please observe the installation instructions supplied with every boiler.

Chimney/flue gas system

Flue gas line
- The flue gas tube between boiler and chimney must be connected with an angle 30-45° to the chimney.



- If the flue gas tube is longer than 1 m, it must be insulated.
- The flue gas tube must be designed that no condensate water can get into the boiler.
- A closeable flue gas measuring socket with an inner diameter of 10-21 mm must be foreseen. The socket has to be led over the thermal insulation.

Chimney
- The flue gas system must be humidity-insensitive and acid-proof and admitted for flue gas temperatures up to > 160 °C.
- For existing chimney installation the restoration must be carried out according to the instructions of the chimney constructor.
- Calculation of the profile of the chimney according to DIN 4705.
- It is recommendable to use a secondary air valve for chimney draft limiting.

Flue gas temperature and power ranges

In order to achieve a good combustion quality (optimum flame burnout), the outputs must not be less than the specified minimum values.
For new systems, acid-resistant chimneys must be provided or the flue gas temperature must be set correspondingly higher (min. 160 °C).
The minimum flue gas temperature must be coordinated with the chimney conditions, otherwise the formation of sulphuric acid can lead to soot buildup in the chimney.

Diaphragm pressure expansion tank

- Ideally, the diaphragm pressure expansion tank should be connected to the heating system as described in our example applications, with a removable or sealable actuation device. This means that it is not necessary to drain the entire system in order to carry out work on the diaphragm pressure expansion tank.

Safety valve

- A safety valve and an automatic air vent must be installed in the safety flow.

1. General

1.1 The following Terms and Conditions shall apply to all our present and future contracts for deliveries and other services (even if the said Terms and Conditions are not specifically mentioned in verbal, telephonic or fax communications).

1.2 All deviations from the present Terms and Conditions, ancillary verbal agreements and subsequent contractual amendments shall only be valid if they have been confirmed by us in writing.

1.3 Buying terms and conditions of the client shall not be valid even if they are not specifically rejected by us. Our Standard Terms and Conditions of Delivery shall be regarded as accepted at the latest upon receipt of our goods and services by the client.

1.4 If a provision of the present Terms and Conditions of Delivery proves to be wholly or partially invalid, the contracting parties shall replace the aforesaid provision by a new provision which comes as close as possible to the legal and economic intention of the invalid provision.

2. Offers

2.1 Our offers shall be subject to change without notice.

2.2 Orders shall only be regarded as accepted when they have been confirmed by us in writing.

2.3 Illustrations, drawings and all technical details in catalogues and printed material shall be approximate values as customary within the industry. They shall only be binding if specific reference is made to them in the contract. We shall also reserve the right to make technical and design changes after the conclusion of the contract.

2.4 Cost estimates, drawings and other documents shall remain our property and shall be subject to copyright protection; they may not be made available to third parties.

3. Regulations in the country of destination

3.1 At the latest at the time of the order, the buyer shall draw our attention to the regulations and standards in force in the country of destination relating to the design of the delivered goods and the operation thereof and also to the execution of services.

3.2 Our deliveries and services shall comply with the regulations and standards in the country of destination provided the buyer has drawn our attention thereto in accordance with Section 3.1.

3.3 The buyer shall duly inform us of any special application features of goods ordered from us if these differ from our general recommendations.

4. Prices

4.1 Our prices shall be ex works, net, excluding packaging.

4.2 All ancillary costs, e.g. freight, insurance, export, transit, import and other approvals, licenses and authentications, shall be for the account of the buyer. The buyer shall also bear all taxes, charges, customs duty, etc., which are levied in connection with the contract.

4.3 We shall reserve the right to make price adjustments if wage rates or material prices change between the date of the order confirmation and the contractual performance of the contract. Price increases shall normally be notified three months in advance. We shall be bound to the price stated in the order confirmation for a period of three months after the effective date of the price increase.

5. Payment terms

5.1 Unless otherwise agreed in writing, our invoices shall be payable within thirty days with no cash discount. Payment shall be deemed to have been made when the amount in question is at our unrestricted disposal on our account in Swiss Franks.

5.2 Payment dates shall be observed even if any delays whatsoever occur after shipment of the goods from our works. The buyer shall not be permitted to reduce or withhold payments on account of complaints or counterclaims not recognised by us.

5.3 Payments shall also be made if insignificant components are missing but usage of the delivered goods is not rendered impossible as a result or if rectification work has to be carried out on the delivery. We shall be entitled to reject rectification of the defect as long as the buyer has not discharged his/its obligations to us.

5.4 If the buyer fails to comply with the agreed payment dates, default interest shall be paid from the agreed due date without a reminder being issued; the aforesaid interest shall be based on the interest rates prevailing at the domicile of the buyer, but shall be not less than four percent above the current discount rate of the Swiss Central Bank.

5.5 We shall be entitled to make deliveries of pending orders dependent upon settlement of outstanding claims.

6. Reservation of title

6.1 Delivered goods shall remain our property (reserved goods) pending full and complete payment of all present and future claims to which we are entitled regardless of their legal cause. This shall also apply if payments are made in settlement of specifically designated claims.

6.2 The buyer shall be entitled to process and sell reserved goods in the ordinary course of business.

6.3 If our reserved goods are combined or intermingled with other goods, the buyer shall hereby transfer his/its ownership rights in the new goods or chattels to us upon the conclusion of the contract in the amount of the invoice value of the reserved goods.

6.4 If the goods are resold by the buyer, he/it shall hereby transfer to us upon the conclusion of the contract with us his/its claims arising from the aforesaid resale in the amount of the invoice value of the reserved goods.

6.5 If the reserved goods are used by the buyer to perform a works or works delivery contract, his/its claim from the aforesaid works or works delivery contract shall hereby be assigned to us in the same amount and on the same date as for the purchase price claim (Section 6.4).

6.6 As long as he/it is honouring his/its payment obligations, the buyer shall, however, be authorised to collect his/its resale claim which has been assigned to us. He/it may not dispose of such claims by way of assignment to third parties, however. The empowerment of the buyer to collect the claim may be revoked by us at any time. We shall be entitled to notify third party debtors of the assignment. The buyer shall be entitled to provide us with the necessary information and documents in order to enable us to enforce our rights.

6.7 If the value of our securities exceeds our total claims by more than 10 %, we shall be obliged to release securities of our choice at the request of the buyer.

6.8 The buyer shall inform us immediately of any pledge or other impediment to our property enforced by third parties.

6.9 The buyer shall be obliged to collaborate in measures required to protect our title. He/it shall, in particular, empower us upon the conclusion of the contract to make entries or prior notice of the reservation of title at his/its cost in public registers, books and documents, etc., in accordance with the relevant national laws and shall perform all formalities in this respect.

6.10 The buyer shall maintain the reserved goods at his/its cost for the duration of the reservation of title and shall insure the said goods against theft, breakage, fire, water and other risks in our favour. He/it shall also take all steps to ensure that our property claims are neither adversely affected nor rescinded.

7. Delivery periods

7.1 Delivery periods and deadlines stated by us shall be approximate unless we have given an express written confirmation of a deadline as binding.

7.2 Delivery periods shall be deemed to have been met if notification of readiness to deliver has been sent to the buyer before the end of the delivery period.

7.3 The delivery period shall be prolonged if details required for the performance of the contract are not received on time or if they are subsequently changed by the buyer.

7.4 The delivery period shall also be reasonably prolonged if impediments arise which we cannot avert despite exercise of the necessary care (e.g. major operational disruptions, industrial disputes, delayed or defective deliveries, force majeure, etc.).

7.5 If an agreed delivery date is met by more than 14 days, the buyer shall be obliged to set us a reasonable period of grace. The buyer may only withdraw from the contract if our goods have not been delivered by the end of the said period of grace. Compensation claims for non-performance, delayed performance or any consequential losses shall be excluded unless there was gross negligence on our part.

8. Transfer of risk

8.1 Unless expressly agreed otherwise in writing, our “ex works” deliveries shall be made in accordance with the international rules on the interpretation of commercial clauses of the International Chamber of Commerce (Incoterms) in the version in force on the date of the order confirmation.

8.2 The transfer of risk shall be determined by the aforesaid Incoterms.

8.3 Insurance against damages of any kind shall be the responsibility of the buyer.

8.4 Complaints in connection with the transport shall be immediately notified by the buyer to the last carrier upon receipt of the delivery.
8.5 If despatch is delayed at the request of the buyer or for any other reasons not attributable to us, the risk shall pass to the buyer on the original date envisaged for the “ex works” delivery. We shall be entitled to demand payment from this date onwards.

9. Delivery inspection

9.1 The buyer shall be required to inspect deliveries immediately. If the goods do not comply with the order or the delivery note or if visible defects are identified, he/it shall be obliged to notify the aforesaid to us in writing within eight days of receipt. Later complaints shall not be recognised. (Regarding transport damages, cf. Section 8.4)

10. Assembly and operations

10.1 The assembly, putting into operation, operation and maintenance of the delivered goods shall be carried out in accordance with our guidelines. They may be executed by our staff or by appropriately trained third parties as agreed with the buyer.
10.2 If we require a commissioning certificate for certain product groups, warranty claims for the proper functioning of the equipment can only be enforced if a proper hand-over has been documented by a confirmed commissioning certificate received by us within one month of the hand-over.

11. Warranty

11.1 Warranty period
11.1.1 The general warranty period shall be 12 months from the first commissioning but no longer than 18 months from the date on which the relevant goods left our works.
If despatch is delayed for reasons not attributable to us, the warranty shall lapse no later than 18 months after notification of the readiness to deliver.
The general warranty period shall exclude electrical components for which the warranty period shall be 6 months from the first commissioning but no later than 12 months from the date of shipment from our works.
11.1.2 We refer to Section 11.6.1 with regard to the warranty period for third party products.
11.1.3 The warranty period for components which we have repaired during the warranty period or have delivered as replacement shall be 12 months from the completion of our repair or from the date of the replacement delivery but no longer than the end of a period equivalent to twice the original warranty period as per Section 11.1.1.
11.2 Liability for material, design and workmanship defects
11.2.1 The contractual condition of the goods shall be based on the condition upon the transfer of risk.
11.2.2 Defects shall be notified to us immediately in writing.
11.2.3 We shall be liable for all components which can be shown to have become defective or unusable before the end of the warranty period as a result of defective materials, defective design or defective workmanship, with such components being repaired or replaced ex works immediately at our choice.
11.3 Liability for warranted qualities
11.3.1 Warranted qualities shall only be those which are specifically designated as such in the order confirmation or in the relevant specifications.
11.3.2 The aforesaid assurance shall apply at the latest until the end of the warranty period. If a taking-over test has been agreed with the buyer, the assurance shall be deemed as performed if proof of the relevant qualities is furnished during the aforesaid test.
11.3.3 If the warranted qualities are not performed or only partially performed, the buyer shall be entitled to an immediate rectification. The buyer shall grant us the necessary time and opportunity for this purpose.
11.3.4 If the rectification is abortive or only partially successful, the buyer shall be entitled to a reasonable reduction of the purchase price. If the defect is so serious that it cannot be rectified within a reasonable period of time, and if deliveries or services for the notified purpose are not usable or are only usable to a much lesser extent, the buyer shall be entitled to refuse acceptance of the defective component or to withdraw from the contract if part-acceptance is economically unreasonable. We shall only be obliged to refund amounts which have been paid to us for the components affected by the aforesaid withdrawal.
11.4 Exclusion of liability for defects
11.4.1 Our liability shall exclude damages which cannot be proved to have been sustained as a result of defective material, defective design or defective workmanship.
11.4.2 Damages shall therefore be excluded for example which were caused by
- improper work of other persons with regard to planning, site preparation, assembly, operation and maintenance;
- plant concepts and designs which do not comply with the latest state of the art;
- non-observance of our guidelines for planning, assembly, commissioning, operations and maintenance;
- force majeure (e.g. thunderstorms).

11.4.3 The following shall be excluded in particular
- corrosion damages (e.g. as a result of aggressive water, unsuitable water treatment, oxygen intakes, emptying the plant over a longer period of time, falling below the dew point, chemical or electrochemical effects, etc.);
- damages caused by air pollution (e.g. the accumulation of intense dust, aggressive vapours, etc.);
- damages caused by unsuitable equipment and fuels;
- damages caused by overcharging, excessive water pressure, scaling, improper electrical connections and inadequate fuse protection.

11.4.4 Components shall also be excluded from the warranty which are subject to natural wear and tear (e.g. burner nozzles, combustion chamber inserts, ignition and monitoring components in contact with fire, fireclay and wall facings, fuses, seals and flexible tubes).
11.5 Commissioning certificate
11.5.1 We hereby draw attention to the due and proper hand-over and - if envisaged - the commissioning certificate in accordance with Section 10.2 as prerequisites for our warranty.
11.6 Deliveries and services of sub-contractors
11.6.1 Our liability for third party products which form a major part of the delivered goods (e.g. warehouse and conveying equipment, burners, measuring and control equipment, electrical components, flue gas and waste water cleaning equipment) shall - if permissible - be limited to an assignment of our claims against the suppliers of the said third party products.

12. Exclusion of further liability

12.1 The buyer shall have no rights and claims for materials, design and workmanship defects or the lack of warranted qualities unless specifically mentioned in Sections 11.1 to 11.6.
12.2 All claims for compensation, reduction in the contract price, rescission of the contract or withdrawal from the contract shall be excluded in particular unless these are specifically mentioned. Under no circumstances shall the buyer have any compensation claim for damages which were not sustained by the delivered goods themselves (e.g. replacement costs, cost for establishing the cause of the damage, expertises, production stoppages, production losses, lost orders, lost profit and other direct or indirect damages). The aforesaid liability exclusion shall not apply in the event of gross negligence on our part.
12.3 The exclusion as per Section 12.2 shall apply for all breaches of contract and all claims of the buyer regardless of why they were lodged from a legal point of view. It shall therefore also apply for a breach of any ancillary obligations (e.g. inadequate advice, etc.).

13. Jurisdiction

13.1 **The place of jurisdiction for the buyer and for us shall be Vaduz.** We shall be entitled to bring action against the buyer at his/its domicile, however.
13.2 The legal relationship between the parties shall be governed by the substantive laws of Switzerland. The application of the UN convention on contracts for the international sale of goods (CISG) shall be excluded.

Hoval quality.
You can count on us.

Hoval

Hoval is one of the leading international companies for heating and indoor climate solutions. Drawing on more than 75 years of experience and benefiting from a close-knit team culture, the Hoval Group delivers exciting solutions and develops technically superior products. This leadership role requires a sense of responsibility for energy and the environment, which is expressed in an intelligent combination of different heating technologies and customised indoor climate solutions.

Hoval also provides personal consultations and comprehensive customer service. With around 2200 employees in 16 companies around the world, Hoval sees itself not as a conglomerate, but as a large family that thinks and acts globally.
Hoval heating and indoor climate solutions are currently exported to more than 50 countries.

Responsibility for energy and environment

Hoval Aktiengesellschaft
Austrasse 70
FL-9490 Vaduz
Principality of Liechtenstein
(Swiss customs territory)
Phone +423 3992 400
Fax +423 3992 618
E-Mail info@hoval.com
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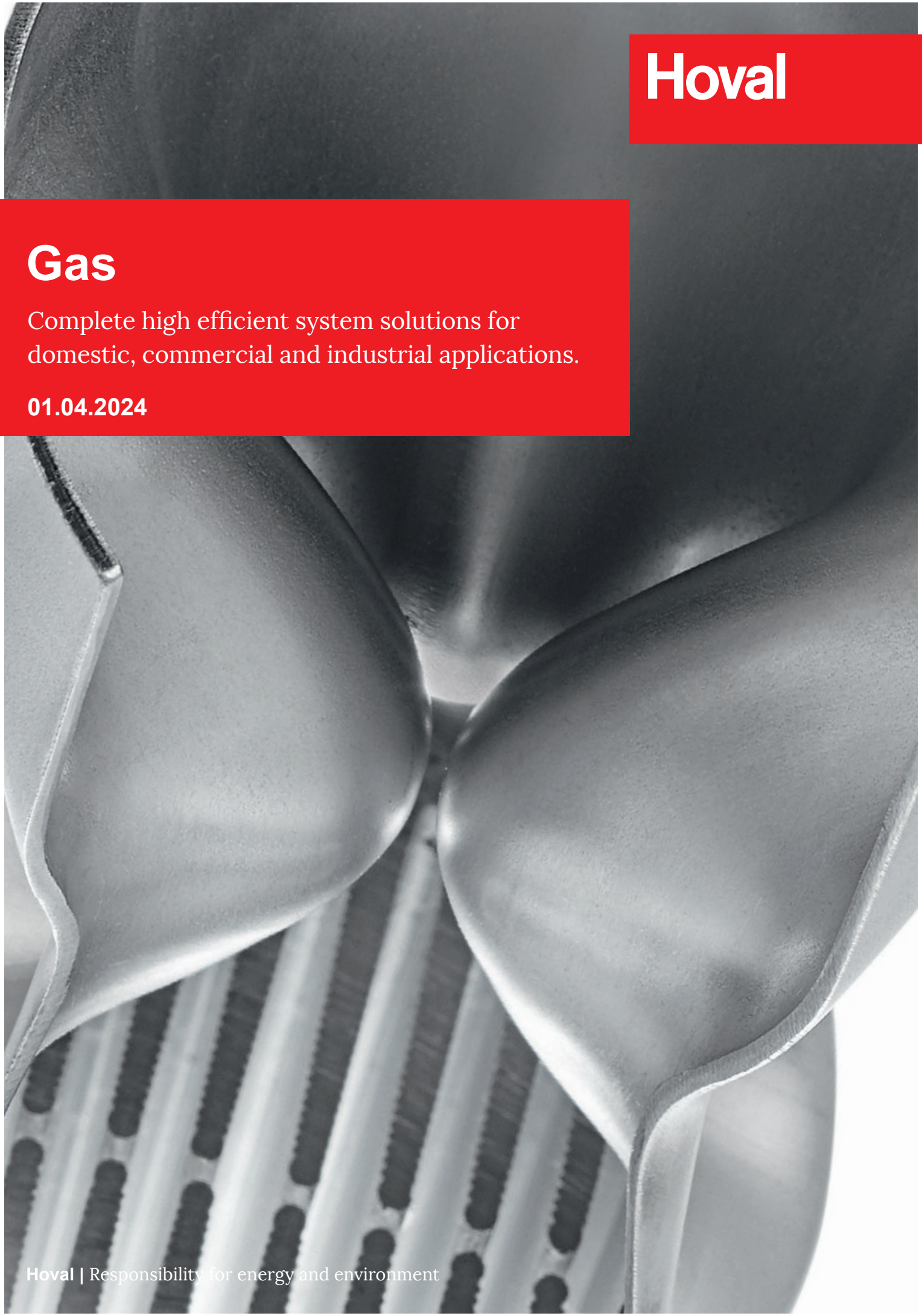


Wall-hanging gas condensing boilers

Floor-standing gas condensing boilers

Hoval TopGas® combi
(21/18, 26/23, 32/28)

Wall-hanging gas condensing boiler
- With condensing boiler technology
- For the combustion of:
  - natural gas E
  - natural gas E with a hydrogen content (H_2) of up to 20 % by vol.
  - propane according to DIN 51622
  - biomethane according to EN 16723
- Heat exchanger made of corrosion resistant aluminium alloy with integrated forced flow copper coil:
  flue gas side: aluminium
  water side: copper
- Hot water is produced with the aid of a second copper coil integrated in the boiler.
- Integrated:
  - high-efficiency pump
  - water pressure sensor
  - hand aspirator
  - flue gas temperature limiter
- Pre-mixing surface burner made of stainless steel
  - Modulating with gas/air group control
  - Automatic ignition
  - Ionisation guard
- Wall-hanging gas condensing boiler fully cased with white varnished steel plates

Basic boiler control panel
- Gas firing sequence controller with monitoring unit
- Modulating burner control
- Main switch “I/O”
- Operation and fault indication

Optional
- Gas valves

Delivery
- Wall-hanging gas condensing boiler fully cased
- Siphon and mounting material in package Wall-hanging gas condensing boiler

Heating controller set RS-OT
- For 1 heating circuit without mixing operation
- Weather-controlled regulation for continuously adjustable decreased boiler water temperature
- With room temperature sensor with switch-in facility
- Located in boiler room or living room
- Outdoor sensor
- Immersion sensor (calorifier sensor)

Cannot be installed in the boiler control panel! Only wall mounting possible!

Model range

TopGas® combi type		Nominal heat output 50/30 °C kW		Hot water output 45 °C dm³/10 min
(21/18)	A	5.9-18.6	A	60
(26/23)	A	7.6-23.4	A	80
(32/28)	A	7.8-27.1	A	124

Energy efficiency class of the compound system with control.

Wall-hanging gas condensing boiler

Boiler permissions
Hoval TopGas® combi (21/18, 26/23, 32/28):
CE product ID No. 0063BQ3155

TopGas® combi (21/18, 26/23, 32/28)

Heat exchanger made of corrosion-free aluminium alloy with integrated forced flow copper coil. Hot water is produced with the aid of a copper coil integrated in the boiler
With a modulating, pre-mixing surface burner made of stainless steel. Including basic boiler control and RS-OT controller, ready cased

TopGas® combi type		Nominal heat output at 50/30 °C kW		Hot water output at 45 °C dm³/10 min	Part No.
(21/18)	A	5.9-18.6	A	60	7014 106
(26/23)	A	7.6-23.4	A	80	7014 107
(32/28)	A	7.8-27.1	A	124	7014 108

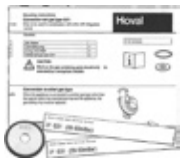
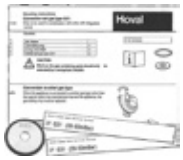
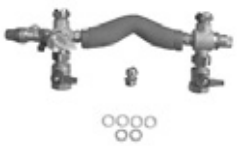
Energy efficiency class of the compound system with control

Wall-hanging gas condensing boiler as above but without controller.

TopGas® combi type		Nominal heat output at 50/30 °C kW		Hot water output at 45 °C dm³/10 min	Part No.
(21/18)	A	5.9-18.6	A	60	7013 539
(26/23)	A	7.6-23.4	A	80	7013 540
(32/28)	A	7.8-27.1	A	124	7013 541

Hoval TopGas® combi may only be operated where the water hardness is less than 15 °dH (german degrees of hardness).

Accessories

		Part No.
	**Modification set for propane** for TopGas® combi (21/18), TopGas® classic (24) no external main gas valve possible!	2057 298
	**Modification set for propane** TopGas® combi (26/23,32/28), TopGas® classic (30) No external main gas valve possible!	2057 299
	**Gas filter 70612/6b Rp ¾″** with instrument glands up/downstream of the filter cartridge (dia.: 9 mm) pore size of filter cartridge < 50 µm Max. pressure differential 10 mbar Max. inlet pressure 100 mbar	2007 995
	**Simple flue gas connecting piece E80** for separate conduction of flue gas and combustion air	2029 057
	**Backflow check valve** for TopGas® classic (12-30), TopGas® combi for preventing the emergence of flue gas from the boiler for use with cascades or with multi-use of flue gas lines	2063 018
	**Automatic, lockable** **quick air vent ⅜″** with removable cover for inspection Casing and cover made of brass CW617N Float made of polyethylene Seal between tank and cover with reinforced polyamide seal Connection G ⅜″ DIN-ISO228/1 Maximum operating pressure: 12 bar Maximum operating temperature: 160 °C Also suitable for water with additives (glycol up to 50 %) With automatic shut-off valve with air breaker made of brass CW617N Seal made of FKM, air breaker made of heat-resistant polymer Spring made of stainless steel	2054 183
	**Visible console for preinstallation** for preinstallation of gas, heating flow and return, cold and hot water connections Possible with all mounting frames or directly on the wall!	2025 779
	**Connection set 3** TopGas® classic (12-30), TopGas® combi (21/18, 26/23, 32/28) without calorifier without/with mounting frame Consisting of: flow fitting, return flow fitting with integrated bypass valve, safety valve 3 bar Filling/drain valve, diaphragm pressure expansion tank connection, 2 ball stop valves Inner bore for heating flow/return flow Rp ¾″ Compression fitting for gas connection	2001 257

Accessories

	Part No.
 **Extension set sanitary tube** for TopGas® combi essential for installation of connection set 3 2 pieces	6016 874
 **Mounting frame MR50 without diaphragm pressure expansion tank** For increasing the space to wall in order to simplify installation (e.g. flue gas duct directly on wall). Not essential except for connection set above.	
TopGas® classic (12)	2029 696
TopGas® classic (18)	2029 701
TopGas® classic (24,30)	2029 702
 **Mounting frame MR110 with diaphragm pressure expansion tank and corrugated hose** for connection to connection set 3 Diaphragm pressure expansion tank with connection set bottom on site! Frame for fastening the Hoval TopGas® combi with built-in diaphragm pressure expansion tank and connection hose Content 12 l/pre-pressure 0.75 bar	
TopGas® combi (21/18)	6016 863
TopGas® combi (26/23)	6016 864
TopGas® combi (32/28)	6016 865
 **Cover** for TopGas® classic (12-30), TopGas® combi (21/18,26/23,32/28) to cover the connection range gas Heating supply and return in combination with connection set 3 Combination with/without mounting frame MR50/MR110 possible	2029 787
 **Flow temperature monitor** for panel heating (1 controller per heating circuit) 15-95 °C, setting (visible externally) under the casing cover	
Clamp-on flow temperature monitor RAK-TW1000S with retaining strap, without cable and plug	242 902
 **Gas valve, passage DN 15, R ½"** with thermally releasing cut-off device	2012 075
 **Gas valve, corner version DN 15, R ½"** with thermally releasing cut-off device	2012 076

Accessories

		Part No.
	**Compression fitting (½″ external thread x 15)** For gas cock when no connection set or finery panel is used for pre-installation.	2001 824
	**Compression fitting (¾″ external thread x 22)** For flow/return when no connection set or finery panel is used for pre-installation.	2006 330
	**Sludge separator with magnet** Type: MB3 DN 25 Rp 1″ With variable connection for vertical or horizontal pipelines Removal of ferromagnetic and non-magnetic dirt and sludge particles from heating or cooling circuits with the medium water or water/glycol (50/50 %) Brass casing Sludge separation up to a particle size of 5 µm With unscrewable casing bottom part for cleaning and inspection work complete with sludge removal tap Nominal diameter: DN 25 Pipe connection: Rp 1″ internal thread Installation length: 90 mm Max. operating pressure: 6 bar Max. flow temperature: 110 °C Max. throughput: 2.0 m³/h Max. flow speed: 1.0 m/s Max. pressure drop: 3.8 kPa Contents: 0.36 l Weight: 2.3 kg	2062 165

Additional sludge separators
see “Various system components”

Service

Commissioning
Commissioning by works service or Hoval trained authorised serviceman/company is condition for warranty.

For commissioning and other services please contact your Hoval sales office.

TopGas® combi (21/18, 26/23, 32/28)

Type			(21/18)	(26/23)	(32/28)
• Nominal heat output at 80/60 °C, natural gas		kW	5.4-17.8	6.9-22.8	7.1-26.3
• Nominal heat output at 50/30 °C, natural gas		kW	5.9-18.6	7.6-23.4	7.8-27.1
• Nominal heat output at 80/60 °C, propane [1]		kW	5.7-17.8	7.3-22.8	7.3-26.3
• Nominal heat output at 50/30 °C, propane [1]		kW	6.3-18.6	8.0-23.4	8.0-27.4
• Nominal heat input with natural gas [2]		kW	5.6-18.7	7.1-23.7	7.2-27.3
• Nominal heat input domestic water heating, natural gas [2]		kW	5.6-22.1	7.1-28.0	7.5-32.7
• Nominal heat input with propane [1]		kW	5.9-18.7	7.5-23.7	7.5-27.3
• Operating pressure heating min./max. (PMS)		bar	1/3	1/3	1/3
• Operating temperature max. (T_{max})		°C	85	85	85
• Boiler water content ($V_{(H20)}$)		l	1.4	1.7	2.0
• Flow resistance boiler				see diagram	
• Minimum circulation water quantity		l/h	180	180	180
• Boiler weight (without water content, incl. cladding)		kg	30	33	36
• Boiler efficiency at 80/60 °C in full-load operation (NCV/GCV)		%	95.4/85.9	96.2/86.7	96.5/86.9
• Boiler efficiency at 30 % partial load operation (EN 15502) (NCV/GCV)		%	107.1/96.5	107.9/97.2	108.5/97.7
• Room heating energy efficiency					
- without control	ηs	%	91	92	93
- with control	ηs	%	93	94	95
- with control and room sensor	ηs	%	95	96	97
• Water heating energy efficiency	ηwh	%	83 (L)	85 (XL)	85 (XL)
• NOx class (EN 15502)			-	-	-
• Nitrogen oxide emissions (EN 15502) (GCV)	NOx	mg/kWh	27	34	51
• O_2 content in flue gas at min./max. nominal heat output		%	5.5/5.1	5.5/5.1	5.5/5.1
• Heat loss in standby mode		Watt	38	38	38
• Dimensions			see table of dimensions		
• Gas flow pressure min./max.					
- Natural gas E/LL		mbar	18-50	18-50	18-50
- Propane		mbar	28-50	28-50	28-50
• Gas connection values at 15 °C/1013 mbar:					
- Natural gas E (Wo = 15.0 kWh/m^3) NCV = 9.97 kWh/m^3		m^3/h	0.56-1.88	0.71-2.38	0.72-2.74
- Natural gas LL (Wo = 12.4 kWh/m^3) NCV = 8.57 kWh/m^3		m^3/h	0.56-1.88	0.71-2.38	0.72-2.74
- Propane [1] (NCV = 25.9 kWh/m^3)		m^3/h	0.23-0.72	0.29-0.92	0.29-1.05
• Operating voltage		V/Hz	230/50	230/50	230/50
• Electrical power consumption (incl. pump) min./max.		Watt	15/80	15/80	15/80
• Standby		Watt	0	2	2
• Type of protection [3]		IP	X4D	X4D	X4D
• Permitted ambient temperature during operation		°C	5-40	5-40	5-40
• Sound power level					
- Heating noise (EN 15036 Part 1) (room air dependent)		dB(A)	45	45	45
• Condensate quantity (natural gas) at 50/30 °C		l/h	1.8	2.2	2.6
• pH value of the condensate		approx.	4.2	4.2	4.2
• Construction type			B23, B33, C13(x), C33(x), C43(x), C53(x), C63(x), C83(x), C93(x)		
• Flue gas system					
- Temperature class			T 120	T 120	T 120
- Flue gas mass flow at max. nominal heat input (dry)		kg/h	31.0	39.3	45.3
- Flue gas mass flow at min. nominal heat input (dry)		kg/h	8.4	10.6	10.8
- Flue gas temperature at max. nominal heat output and 80/60 °C		°C	85	85	85
- Flue gas temperature at max. nominal heat output and 50/30 °C		°C	64	64	64
- Flue gas temperature at min. nominal heat output and 50/30 °C		°C	32	32	32
- Max. permissible temperature of the combustion air		°C	50	50	50
- Flow rate combustion air		Nm^3/h	33.3	42.2	49.2
- Maximum supply pressure for combustion air supply and flue gas line		Pa	75	75	75
- Maximum draught/depression at flue gas outlet		Pa	-50	-50	-50

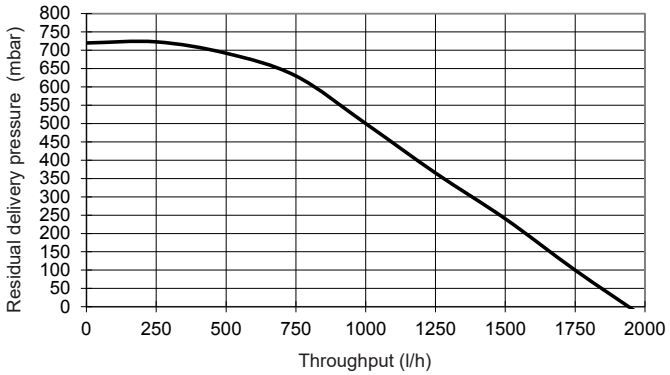
[1] Data related to NCV. TopGas® combi can also be operated with propane.

[2] Data related to NCV. The boiler series is tested for EE/H setting. With a factory setting to a Wobbe value of 15.0 kWh/m^3, operation in the Wobbe value range from 12.0 to 15.7 kWh/m^3 is possible without new settings.

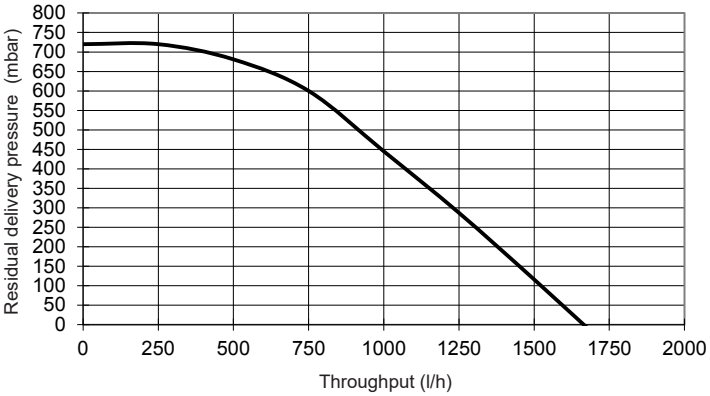
[3] For construction types B23 and B33, type of protection IP20

Maximum residual delivery pressure of heating pump

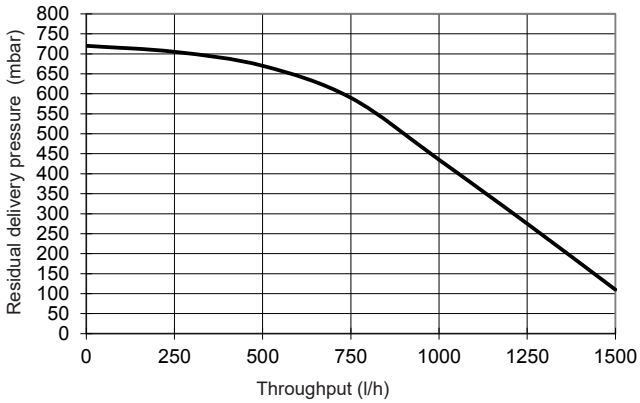
TopGas® combi (21/18)



TopGas® combi (26/23)



TopGas® combi (32/28)



Hot water output with TopGas® combi

TopGas® combi type	Hot water output dm³/10 min [1] 40 °C	Hot water output dm³/h [2] 40 °C	Hot water output dm³/10 min [1] 45 °C	Hot water output dm³/h [2] 45 °C	Max. flow rate through boiler dm³/10 min	Number of flats [3]	Stand-by deficiency qB (70 °C) Watt
(21/18) [4]	97	579	60	360	60	1	60
(26/23) [4]	126	759	80	480	80	1	80
(32/28) [4]	145	869	124	745	95	1	95

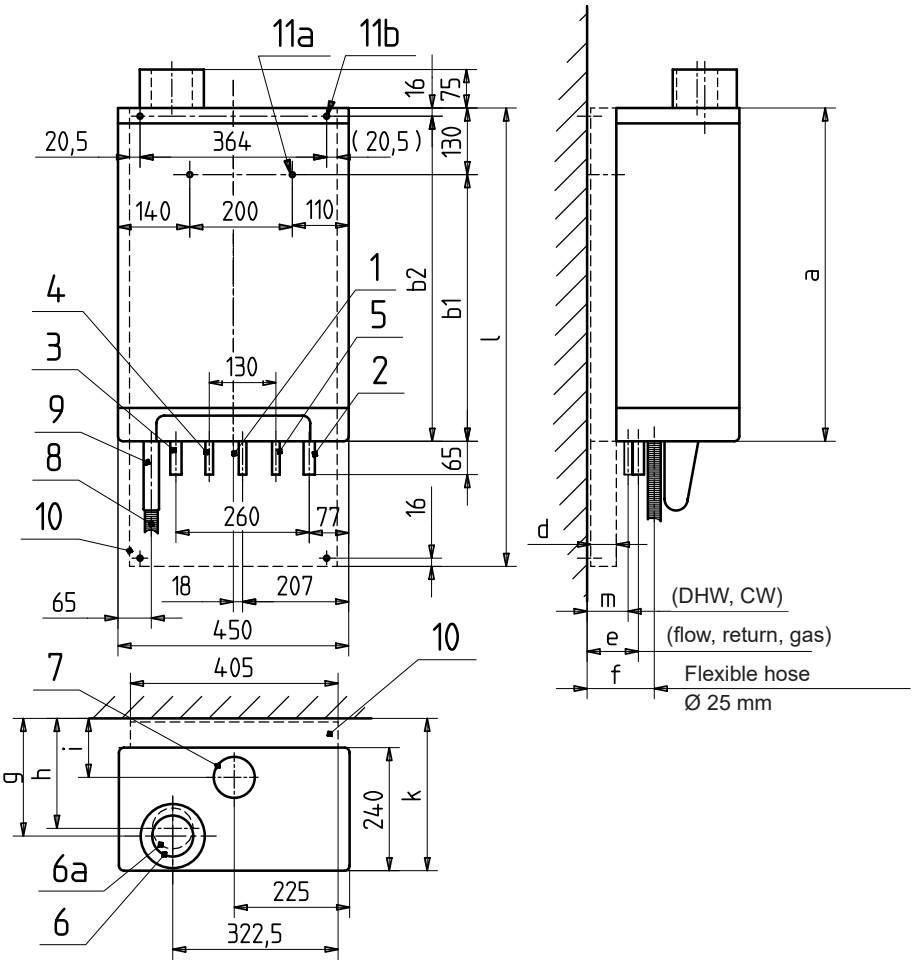
[1] Hot water peak performance in 10 min.
Value can only be attained by addition of cold water to the boiler!
[2] Hot water output per hour.
Value can only be attained by addition of cold water to the boiler!
[3] Flat (3-4 rooms with 3-4 people, 1 bathtub with approx. 150 litres, 1 washbasin, 1 sink)
[4] Data indicated for hot water output valid at input pressure (domestic water/sanitary side) of 2 bar!

Notice
TopGas® combi may only be operated where the water hardness is less than 15 °dH (German degrees of hardness).

TopGas® combi (21/18, 26/23, 32/28)

Minimum spaces
(Dimensions in mm)

- Sideways 50 mm
- Space to ceiling dependent on the flue gas system
- Front 500 mm



1 Gas connection Ø 15 mm (for compression fitting)
2 Return heating Ø 22 mm (for compression fitting)
3 Flow heating Ø 22 mm (for compression fitting)
4 Domestic hot water (DHW) Ø 15 mm (for compression fitting)
5 Cold water (CW) Ø 15 mm (for clamping ring)
6 Concentrical flue gas/combustion air connection C80/125 including measuring opening
6a Single combustion air connection E80 (optional)
7 Connection for external combustion air supply Ø 80 mm (option)
8 Condensate connection Ø 32 mm (hose Ø 25/21 mm)
9 Siphon
10 Mounting frame, width 50 mm or 110 mm with diaphragm pressure expansion tank optional, see Accessories

11a Drill hole Ø 10 mm without mounting frame
11b Drill hole Ø 10 mm with mounting frame

TopGas® combi type	a	b1	b2	d	e	f	g	h	i	k	l	m
(21/18)	590	460		0	50	75	185	170	65	247	–	30
(21/18) with mounting frame (MR50)	590		574	50	100	125	235	220	115	297	834	80
(21/18) with mounting frame with diaphragm pressure expansion tank (MR110)	590		574	110	160	185	295	280	175	357	834	140
(26/23)	650	520		0	50	75	185	170	65	247	–	30
(26/23) with mounting frame (MR50)	650		634	50	100	125	235	220	115	297	894	80
(26/23) with mounting frame with diaphragm pressure expansion tank (MR110)	650		634	110	160	185	295	280	175	357	894	140
(32/28)	710	580		0	50	75	185	170	65	247	–	30
(32/28) with mounting frame (MR50)	710		694	50	100	125	235	220	115	297	954	80
(32/28) with mounting frame with diaphragm pressure expansion tank (MR110)	710		694	110	160	185	295	280	175	357	954	140

Standards and guidelines

The official regulations for installation and operation must be observed. In particular, these are the country-specific standards (e.g. EN standard, DIN standards, …) as well as the corresponding regional regulations.

The following standards and guidelines must be complied with:

- Hoval technical information and installation instructions
- hydraulic and technical control regulations of Hoval
- DVGW directives
- DIN EN 12828 Safety-relevant requirements
- DIN EN 12831 Heaters
  Rules for the calculation of the heat requirements of buildings
- VDI 2035 Protection against damage by corrosion and boiler scale formation in heating and service water installations
- EN 14868 “Protection of metallic materials against corrosion”
- VDE 0100 supplement 2

Water quality in heating systems

Filling and replacement water, heating water

The following applies:

- VDI 2035
- In addition, the EN 14868 standard must be applied, **as well as the manufacturer-specific specifications**

Manufacturer-specific specifications

Filling and replacement water

The filling and replacement water can be both fully demineralised and also merely softened.

Heating water

- In the case of **full demineralisation of the filling and replacement water**, the electrical conductivity of the heating water must not exceed the value of 100 µS/cm.
- In the case of **softening the filling and replacement water**, the following conditions must be complied with:
  - Electrical conductivity of the heating water for operation with water containing salts: > 100 µS/cm to ≤ 1500 µS/cm
  - pH value of the heating water for systems without aluminium alloy as water-side material 8.2 to 10.0 (measurement 10 weeks after commissioning at the earliest)
- The sum of the chloride, nitrate and sulphate contents in the heating water must not exceed 50 mg/l in total.

Additional notices

- Hoval boilers and calorifiers are suitable for heating systems without significant oxygen intake. (System type I according to EN 14868).
- Plants with continual oxygen intake (e.g. underfloor heating without diffusion-proof plastic piping) or intermittent oxygen intake (e.g. requiring frequent topping-up) must be equipped with a system separation.
- If only the boiler is replaced in an existing plant, it is not recommended for the entire heating system to be refilled, provided that the heating water already contained in the system complies with the relevant directives or standards.
- Before filling new systems and, where necessary, existing heating systems containing heating water that does not comply with the directives or standards, the heating system must be professionally cleaned and flushed. The boiler must not be filled until the heating system has been flushed.

Domestic water quality

TopGas® combi may only be operated where the domestic water quality is less than 13 d°H (german degrees of hardness).

Heating room

Boilers cannot be positioned in rooms in which halogen compounds can occur and into which combustion air can enter (e.g. wash-, dryer-, work room, hairdressers and so on).
Halogen compounds can be caused by cleaning and degreasing solutions, dissolvents, glue and bleaching lyes.

Combustion air supply

The supply of combustion air must be guaranteed. There must be no possibility to close the air supply opening. For direct combustion air supply (LAS system), a separator C80/125 -> E80 PP can be used.

The minimum free cross-section for the combustion air can be assumed simplified as follows:

- *Room air-dependent operation*:
  A minimal ventilation outlet of at least 150 cm^2 or 2 x 75 cm^2 cross-section is necessary for of boiler output up to 50 kW. For each further kW output 2 cm^2 more cross-section must be provided.
- *Room air-independent operation with separate combustion air pipe to the boiler*:
  0.8 cm^2 per 1 kW of output. The pressure drop in the combustion air pipe must be considered for the calculation of the flue gas system.

Gas connection

Commissioning

- Start-up is to be carried out only by a specialist.
- Burner setting values according to the installation instructions.

Manual gas shut-off valve and gas filter

Immediately in front of the boiler a manual gas shut-off device (valve) must be installed according to relevant regulations. Should the local regulations or conditions demand this, an approved gas filter must be installed in the gas supply pipe between the gas tap (thermally releasing) and the boiler in order to prevent malfunction due to foreign particles being carried along with the gas.

Type of gas

- The boiler is only to be operated with the type of gas stated on the rating plate.
- A gas pressure controller to reduce the boiler inlet pressure must be installed on-site for propane.

Gas pressure

Necessary gas flow pressure at the boiler inlet: natural gas min. 18 mbar, max. 50 mbar. Propane min. 28 mbar, max. 50 mbar.

Sludge separator

Installation of a sludge separator with magnetic ring in the gas boiler return is recommended.

Minimum heating water circulation quantity

- Depending on the boiler type, different minimum circulating water quantities are required through the boiler. For details, see the corresponding data sheets.
- During burner operation, the circulating pump must be constantly in operation and the minimum heating water circulation quantity must be guaranteed.
- After each burner switch-off, the circulating pump must be in operation for at least 2 minutes (is guaranteed by the boiler controller).

Boiler on the top storey of the building

If the gas boiler TopGas® combi is built in in a roof heating centre, an external water pressure switch must be provided.

Condensate drainage

- A permit for discharge of the flue gas condensate into the sewage system must be obtained from the relevant authority or sewer operator.
- The condensate from the flue gas line can be discharged via the boiler. A condensate trap is no longer needed in the flue gas system.
- The condensate must be conducted openly (funnel) into the sewage system.
- Suitable materials for condensate drain:
  - stoneware pipes
  - pipes made from glass
  - pipes made from stainless steel
  - pipes made from plastic:
    PVC, PE, PP, ABS and UP

Diaphragm pressure expansion tank

- An adequately dimensioned diaphragm pressure expansion tank must be provided.
- The diaphragm pressure expansion tank has to be installed at the diaphragm pressure expansion tank connection (pump intake side) (see “Dimensions”).
- Starting from 70 °C an intermediate tank is necessary.

Flue gas system

- Gas boilers must be connected to a certified and approved flue gas system such as flue gas lines.
- Flue gas lines must be gas-, condensate- and over pressure-tight.
- The flue gas lines must be secured against unwanted loosening of the plug connections.
- The flue gas system must be connected with an angle, so that the resulting condensate of the flue gas system can flow back to the boiler and can be neutralised there before discharging into the canalisation.
- Gas boilers with condensation heat utilisation are to be connected to a flue gas line min. temperature class T120.
- A flue gas temperature limiter is integrated into the boiler.

Looking for the appropriate hydraulic schematic?
Please contact your local Hoval partner.

Hoval TopGas® classic (12-30)

Wall-hanging gas condensing boiler
- With condensing boiler technology
- For the combustion of:
  - natural gas E
  - natural gas E with a hydrogen content (H_2) of up to 20 % by vol.
  - propane according to DIN 51622
  - biomethane according to EN 16723
- Heat exchanger made of corrosion resistant aluminium alloy with integrated forced flow copper coil;
  heating gas side: aluminium
  water side: copper
- Minimal water circulation necessary (see technical data).
- Integrated:
  - speed-controlled high-efficiency pump
  - water pressure sensor
  - hand aspirator
  - flue gas temperature limiter
- Pre-mixing surface burner made of stainless steel
  - Modulating with gas/air group control
  - Automatic ignition
  - Ionisation guard
- Wall-hanging gas condensing boiler fully cased with varnished white steel plates

Basic boiler control panel
- Gas firing sequence controller with monitoring unit
- Modulating burner control
- Main switch “0/1”
- Operation and fault indication
- Regulation of hot water production by means of sensor or by thermostatic demand.
- For connecting a maximum of 1 room control device or 1 remote control with room sensor.

Incl. control, optionally in two different versions:
- RS-OT controller
- TopTronic® E controller

Optional
- Free-standing calorifier TopVal (130, 160)
- Gas valve
- With mounting frame
- With mounting frame and diaphragm pressure expansion tank
- Connection set

Delivery
- Wall-hanging gas condensing boiler fully cased
- Mounting material
- Instruction package
- Appliance handbook

RS-OT controller
- For 1 heating circuit without mixing operation
- Controlled by atmospheric conditions for gliding boiler water temperature
- With integrated overplugable room temperature sensor
- Located in boiler/living room
- Outdoor sensor
- Immersion sensor (calorifier sensor)

Cannot be installed in the boiler control panel! Only wall mounting possible!

Model range

TopGas® classic type		Nominal heat output 40/30 °C kW
(12)	A	3.8-12.0
(18)	A	5.7-18.0
(24)	A	7.7-24.0
(30)	A	9.2-30.0

Energy efficiency class of the compound system with control

Delivery
- Wall-hanging gas condensing boiler fully panelled
- Control separately packed, mounting on-site

TopTronic® E controller
As supplement for basic boiler control panel
Cannot be installed in the boiler control panel! Only wall mounting possible!

Control panel
- Colour touchscreen 4.3 inch
- Heat generator blocking switch for interrupting operation
- Fault signalling lamp

TopTronic® E control module
- Colour touchscreen 4.3 inch
- Simple, intuitive operating concept
- Display of the most important operating statuses
- Configurable start screen
- Operating mode selection
- Configurable day and week programmes
- Operation of all connected Hoval CAN bus modules
- Commissioning wizard
- Service and maintenance function
- Fault message management
- Analysis function
- Weather display (with online HovalConnect)
- Adaptation of the heating strategy based on the weather forecast (with online HovalConnect)

TopTronic® E basic module heat generator TTE-WEZ
- Control functions integrated for
  - 1 heating/cooling circuit with mixer
  - 1 heating/cooling circuit without mixer
  - 1 hot water charging circuit
  - bivalent and cascade management
- RAST 5 basic plug set
- Outdoor sensor
- Immersion sensor (calorifier sensor)
- Contact sensor (flow temperature sensor)
- Cable set ZE2 for connecting the TopTronic® E control to the basic boiler control panel

Wall casing with control module cut-out G-510 BM
- Suitable for installing
  - 1 basic module plus 1 module expansion or
  - 1 basic module plus 1 controller module or
  - 2 controller modules plus 1 module expansion or
  - 1 controller module plus 2 module expansions or
  - 3 controller modules

Options for TopTronic® E controller
- Can be expanded by max. 1 module expansion:
  - module expansion heating circuit or
  - module expansion heat balancing or
  - module expansion Universal
- Can be networked with a total of up to 16 controller modules:
  - heating circuit/hot water module
  - solar module
  - buffer module
  - measuring module

No additional module expansions or controller modules can be installed in the boiler control panel!

The supplementary plug set must be ordered in order to use expanded controller functions.

Further information about the TopTronic® E see “Controls”

Delivery
- Wall-hanging gas condensing boiler fully panelled
- Control and wall casing separately packed, mounting on-site

Floor-mounted/free-standing calorifier TopVal (130,160)
- Water heater with fixed, smooth pipe enamelled stainless steel heat exchanger.
- Floor-mounted calorifier for TopGas® classic (12-30)
- Magnesium protection anode
- Thermal insulation using HCFC free PU foam, with foil mantle, white

Delivery
- Calorifier and thermal insulation completely installed

Calorifier CombiVal ERW (200), white
- Calorifier made of steel, enamelled inside.
- Smooth pipe heat exchanger enamelled, built in.
- Free-standing calorifier for TopGas® classic (12-30)
- Magnesium protection anode integrated.
- Flange for electric heating element.
- Thermal insulation made of Polyurethane foamed on the calorifier, dismantable foil casing, white, completely mounted.
- Pocket welded in including thermometer

On request
- Electric heating element

Delivery
- Calorifier and thermal insulation completely installed (foil jacket can be removed for installation)

Wall-mounted gas condensing boilers

Hoval TopGas® classic (12-30)

incl. RS-OT controller

Heat exchanger made of corrosion-proof aluminium alloy with integrated copper meander with forced flow. With modulating, pre-mixing surface burner made of stainless steel
Including basic boiler control panel and control RS-OT, fully cased

TopGas® classic type		Nominal heat output 50/30 °C kW	Part No.
(12)	A	3.8-12.0	7014 088
(18)	A	5.7-18.0	7014 099
(24)	A	7.7-24.0	7014 100
(30)	A	9.2-30.0	7014 101

Boiler permissions

Hoval TopGas® classic (12-30):
CE product ID No. 0063BQ3155t

Energy efficiency class of the compound system with control

Control cannot be installed in the boiler controller! Only wall installation possible!

Hoval TopGas® classic (12-30)

incl. TopTronic® E controller

Version as above, but with TopTronic® E control in a separate wall housing WG-510 BM

TopGas® classic type		Nominal heat output 50/30 °C kW	Part No.
(12)	A	3.8-12.0	7014 102
(18)	A	5.7-18.0	7014 103
(24)	A	7.7-24.0	7014 104
(30)	A	9.2-30.0	7014 105

Energy efficiency class of the compound system with control

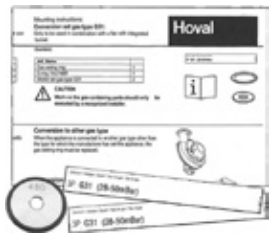
Control cannot be installed in the boiler controller! Only wall installation possible!

Hoval TopGas® classic (12-30)

Design as above but without controller

TopGas® classic type		Nominal heat output 50/30 °C kW	Part No.
(12)	A	3.8-12.0	7013 515
(18)	A	5.7-18.0	7013 516
(24)	A	7.7-24.0	7013 517
(30)	A	9.2-30.0	7013 518

Accessories



Modification set for propane
no external main gas valve possible!

TopGas® classic type	min. output kW (80/60 °C)	Part No.
(12)	3.5	2037 926
(18)	5.8	2057 295
(24)	7.4	2057 298
(30)	9.3	2057 299

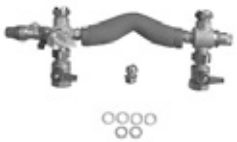
Gas filter 70612/6b Rp ¾" — 2007 995
with instrument glands up/downstream
of the filter cartridge (dia.: 9 mm)
pore size of filter cartridge < 50 µm
Max. pressure differential 10 mbar
Max. inlet pressure 100 mbar

Backflow check valve — 2063 018
for TopGas® classic (12-30),
TopGas® combi
for preventing the emergence
of flue gas from the boiler
for use with cascades or with
multi-use of flue gas lines

Simple flue gas connecting piece E80 — 2029 057
for separate conduction of flue gas and
combustion air

Automatic, lockable — 2054 183
quick air vent ⅜"
with removable cover for inspection
Casing and cover made of brass CW617N
Float made of polyethylene
Seal between tank and cover
with reinforced polyamide seal
Connection G ⅜" DIN-ISO228/1
Maximum operating pressure: 12 bar
Maximum operating temperature: 160 °C
Also suitable for water with additives
(glycol up to 50 %)
With automatic shut-off valve with
air breaker made of brass CW617N
Seal made of FKM, air breaker made of
heat-resistant polymer
Spring made of stainless steel

Accessories

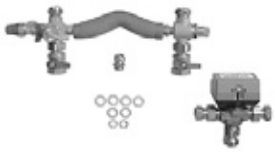
		Part No.
	**Visible console for preinstallation** for preinstallation of gas, heating flow and return, cold and hot water connections Possible with all mounting frames or directly on the wall!	2025 779
	**Connection set 3** TopGas® classic (12-30), TopGas® combi (21/18, 26/23, 32/28) without calorifier without/with mounting frame Consisting of: flow fitting, return flow fitting with integrated bypass valve, safety valve 3 bar Filling/drain valve, diaphragm pressure expansion tank connection, 2 ball stop valves Inner bore for heating flow/return flow Rp ¾″ Compression fitting for gas connection	2001 257
	**Cover** for TopGas® classic (12-30), TopGas® combi (21/18,26/23,32/28) to cover the connection range gas Heating supply and return in combination with connection set 3 Combination with/without mounting frame MR50/MR110 possible	2029 787
	**Mounting frame MR50 without diaphragm pressure expansion tank** For increasing the space to wall in order to simplify installation (e.g. flue gas duct direct on wall). Not essential.	
	TopGas® classic (12)	2029 696
	TopGas® classic (18)	2029 701
	TopGas® classic (24,30)	2029 702
	**Mounting frame MR110 with diaphragm pressure expansion tank and corrugated hose** for connection to the connection set 3, 4 or 10 Frame for fastening the TopGas® classic with built-in diaphragm pressure expansion tank and connection hose Content 12 l/pre-pressure 0.75 bar	
	TopGas® classic (12)	6016 863
	TopGas® classic (18)	6016 864
	TopGas® classic (24,30)	6016 865
	**Connection set 10** for Hoval TopGas® and floor-mounted TopVal calorifier without/with mounting frame MR50/MR110 Consisting of: Flow fitting, return fitting with integrated overflow valve, Safety valve approx. 3 bar Filling/drain valve, diaphragm pressure expansion tank connection, 3-way valve Rp ¾″ 2 shut-off ball valves heating flow/return, internal thread Rp ¾″ Squeezing ring screw connection for gas connection	2025 577

Accessories

		Part No.
	**Gas valve, passage DN 15, R ½″** with thermally releasing cut-off device	2012 075
	**Gas valve, corner version DN 15, R ½″** with thermally releasing cut-off device	2012 076
	**Compression fitting** **(½″ external thread x 15)** For gas cock when no connection set or finery panel is used for pre-installation.	2001 824
	**Compression fitting** **(¾″ external thread x 22)** For flow/return when no connection set or finery panel is used for pre-installation.	2006 330
	**Sludge separator with magnet** Type: MB3 DN 25 Rp 1″ With variable connection for vertical or horizontal pipelines Removal of ferromagnetic and non-magnetic dirt and sludge particles from heating or cooling circuits with the medium water or water/glycol (50/50 %) Brass casing Sludge separation up to a particle size of 5 µm With unscrewable casing bottom part for cleaning and inspection work complete with sludge removal tap Nominal diameter: DN 25 Pipe connection: Rp 1″ internal thread Installation length: 90 mm Max. operating pressure: 6 bar Max. flow temperature: 110 °C Max. throughput: 2.0 m³/h Max. flow speed: 1.0 m/s Max. pressure drop: 3.8 kPa Contents: 0.36 l Weight: 2.3 kg	2062 165
	**3-way reversing valve VC 4012 ¾″** for calorifier external thread ¾″ 230 V/50 Hz single wire control running time: 7 s incl. 1 m cable	6016 891

Additional sludge separators
see “Various system components”

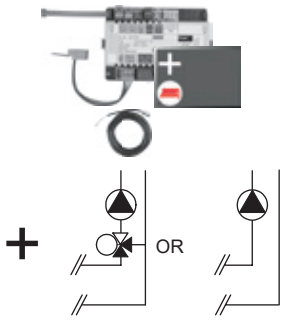
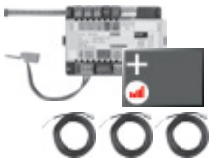
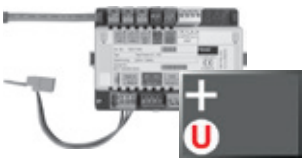
Free-standing calorifier

		Part No.
	B **Calorifier TopVal (130) round** made of steel, inside enamel painted, with permanently installed coil 0.96 m² and magnesium sacrificial anode Useful volume: 128 l Operating/test pressure: 10/13 bar (SVGW 6/13 bar) Operating temperature max.: 95 °C Foil jacket made of synthetic material, RAL 9010, pure white	6037 757
	B **Calorifier TopVal (160) round** made of steel, inside enamel painted, with permanently installed coil 1.01 m² and magnesium sacrificial anode Useful volume: 157 l Operating/test pressure: 10/13 bar (SVGW 6/13 bar) Operating temperature max.: 95 °C Foil jacket made of synthetic material, RAL 9010, pure white	6037 758
	**Connection set 4** for TopGas® and free standing calorifier CombiVal with/without mounting frame MR50/MR110 Consisting of: flow fitting, return flow fitting with integrated bypass valve Safety valve 3 bar Filling/drain valve, diaphragm pressure expansion tank connection 3-way valve Rp ¾″ 2 ball stop valves Inner bore for heating flow/return flow Rp ¾″ Compression fitting for gas connection	2025 576
	B **Calorifier with thermal insulation** **Hoval CombiVal ERW (200) white** made from steel, enamelled on the inside With built-in enamelled plain-tube heat exchanger Magnesium protection anode built in Thermal insulation made of polyurethane rigid foam, foam-lined at the calorifier, removable foil jacket, colour white Technical data: Volume: 196 dm³ Energy efficiency class: B Inspection port flange Ø 180/120 mm Heating surface coil: 0.95 m² Operating temperature: max. 95 °C Operating pressure: max. 10 bar (SVGW 6 bar) Test pressure: 13 bar (SVGW 12 bar) Dimensions (H): 1464 mm, Ø 600 mm Tilting dimension: 1583 mm Weight: 77 kg Delivery: Calorifier, thermal insulation and thermometer mounted packaged and delivered SVGW No. 0503–4950	7015 961

Diaphgragm pressure expansion tanks, heating armature groups and wall distributors
see “Various system components”

TopTronic® E module expansions

for TopTronic® E basic module heat generator

	Part No.
	6034 576
TopTronic® E module expansion heating circuit TTE-FE HK Expansion to the inputs and outputs of the basic module heat generator or the heating circuit/domestic hot water module for implementing the following functions: - 1 heating/cooling circuit w/o mixer or - 1 heating/cooling circuit with mixer Consisting of: - Fitting accessories - 1 contact sensor ALF/2P/4/T, L = 4.0 m - Basic plug set FE module	
Notice The supplementary plug set may have to be ordered to implement functions differing from the standard!	
	6037 062
TopTronic® E module expansion heating circuit incl. energy balancing TTE-FE HK-EBZ Expansion to the inputs and outputs of the basic module heat generator or the heating circuit/domestic hot water module for implementing the following functions: - 1 heating/cooling circuit w/o mixer or - 1 heating/cooling circuit with mixer incl. energy balancing in each case Consisting of: - Fitting accessories - 3 contact sensors ALF/2P/4/T, L = 4.0 m - Plug set FE module	
Notice The flow rate sensor set must be ordered as well.	
	6034 575
TopTronic® E module expansion Universal TTE-FE UNI Expansion to the inputs and outputs of a controller module (basic module heat generator, heating circuit/domestic hot water module, solar module, buffer module) for implementing various functions Consisting of: - Fitting accessories - Plug set FE module	
Notice Refer to the Hoval System Technology to find which functions and hydraulic arrangements can be implemented.	
Further information see “Controls” - “Hoval TopTronic® E module expansions” chapter	

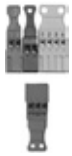
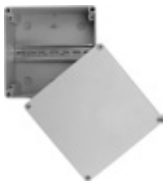
Flow rate sensor sets
Plastic housing

Size	Connection inches	Flow rate l/min	Part No.
DN 8	G ¾″	0.9-15	6038 526
DN 10	G ¾″	1.8-32	6038 507
DN 15	G 1″	3.5-50	6038 508
DN 20	G 1¼″	5-85	6038 509
DN 25	G 1½″	9-150	6038 510

Brass housing

Size	Connection inches	Flow rate l/min	Part No.
DN 10	G 1″	2-40	6042 949
DN 32	G 1½″	14-240	6042 950

Accessories for TopTronic® E

		Part No.
	**TopTronic® E controller modules**	
	TTE-HK/WW TopTronic® E heating circuit/ hot water module	6034 571
	TTE-SOL TopTronic® E solar module	6037 058
	TTE-PS TopTronic® E buffer module	6037 057
	TTE-MWA TopTronic® E measuring module	6034 574
	**Supplementary plug set**	
	for basic module heat generator TTE-WEZ	6034 499
	for controller modules and module expansion TTE-FE HK	6034 503
	**TopTronic® E room control modules**	
	TTE-RBM TopTronic® E room control modules	
	easy white	6037 071
	comfort white	6037 069
	comfort black	6037 070
	**Enhanced language package TopTronic® E**	6039 253
	one SD card required per control module Consisting of the following languages: HU, CS, SL, RO, PL, TR, ES, HR, SR, JA, DA	
	**HovalConnect**	
	HovalConnect LAN	6049 496
	HovalConnect WLAN	6049 498
	HovalConnect Modbus	6049 501
	HovalConnect KNX	6049 593
	TopTronic® E interface modules	
	GLT module 0-10 V	6034 578
	**TopTronic® E sensors**	
	AF/2P/K Outdoor sensor H x W x D = 80 x 50 x 28 mm	2055 889
	TF/2P/5/6T Immersion sensor, L = 5.0 m	2055 888
	ALF/2P/4/T Contact sensor, L = 4.0 m	2056 775
	TF/1.1P/2.5S/6T Collector sensor, L = 2.5 m	2056 776
	**Bivalent switch**	
	for various release or switching functions	
	Bivalent switch 1-piece	2056 858
	Bivalent switch 2-piece	2061 826
	**System housing**	
	System housing 182 mm	6038 551
	System housing 254 mm	6038 552
	**TopTronic® E wall casing**	
	WG-190 Wall casing small	6052 983
	WG-360 Wall casing medium	6052 984
	WG-360 BM Wall casing medium with control module cut-out	6052 985
	WG-510 Wall casing large	6052 986
	WG-510 BM Wall casing large with control module cut-out	6052 987

Further information
see “Controls”

	Part No.
 **Flow temperature monitor** for panel heating (1 controller per heating circuit) 15-95 °C, setting (visible externally) under the casing cover	
Clamp-on flow temperature monitor RAK-TW1000S with retaining strap, without cable and plug	242 902
 **BMS module 0-10 V/OT - OpenTherm (building management system)** no control unit TopTronic® E or RS-OT necessary power supply via OT bus Temp. control external with 0-10 V 0-1.0 V no request 1.0-9.5 V ... 0-100 °C Cannot be installed in boiler control panel: - TopGas® classic (12-30) Can be installed in boiler control panel: - TopGas® classic (35-120)	6016 725
TopGas® classic (12-30) without controller on request	

Service

Commissioning Commissioning by works service or Hoval trained authorised serviceman/company is condition for warranty.	
For commissioning and other services please contact your Hoval sales office.	

TopGas® classic (12-30)

Type			(12)	(18)	(24)	(30)
• Nominal heat output at 80/60 °C, natural gas		kW	3.4-11.5	5.3-17.2	7.0-22.9	8.7-28.5
• Nominal heat output at 50/30 °C, natural gas		kW	3.8-12.0	5.7-18.0	7.7-24.0	9.2-30.0
• Nominal heat output at 80/60 °C, propane [1]		kW	3.5-11.5	5.8-17.3	7.4-22.9	9.2-28.5
• Nominal heat output at 50/30 °C, propane [1]		kW	3.4-12.0	6.3-18.0	8.0-24.0	9.6-30.0
• Nominal heat input with natural gas [2]		kW	3.5-11.8	5.3-17.8	7.1-23.5	8.8-28.9
• Nominal heat input with propane [1]		kW	3.6-11.8	5.9-17.8	7.5-23.5	9.3-28.9
• Operating pressure heating min./max. (PMS)		bar	1/3	1/3	1/3	1/3
• Operating temperature max. (T_{max})		°C	85	85	85	85
• Boiler water content ($V_{(H20)}$)		l	1.4	1.7	2.0	2.0
• Flow resistance boiler				see diagram		
• Minimum circulation water quantity		l/h	180	180	180	180
• Boiler weight (without water content, incl. cladding)		kg	32	35	38	40
• Boiler efficiency at 80/60 °C in full-load operation (NCV/GCV)		%	97.7/88.0	96.9/87.3	97.4/87.7	98.4/88.6
• Boiler efficiency at 30 % partial load operation (EN 15502) (NCV/GCV)		%	108.8/98.0	108.3/97.6	108.9/98.1	108.3/97.6
• Room heating energy efficiency						
- without control	ηs	%	92	92	93	93
- with control	ηs	%	94	94	95	95
- with control and room sensor	ηs	%	96	96	97	97
• NOx class (EN 15502)			-	-	-	-
• Nitrogen oxide emissions (EN 15502) (GCV)	NOx	mg/kWh	27	27	24	53
• O_2 content in flue gas at min./max. nominal heat output		%	5.5/5.1	5.5/5.1	5.5/5.1	5.5/5.1
• Heat loss in standby mode		Watt	38	38	38	38
• Dimensions				see table of dimensions		
• Gas flow pressure min./max.						
- Natural gas E/LL		mbar	17.4-50	17.4-50	17.4-50	17.4-50
- Propane		mbar	28-50	28-50	28-50	28-50
• Gas connection values at 15 °C/1013 mbar:						
- Natural gas E - (Wo = 15.0 kWh/m³) NCV = 9.97 kWh/m³		m³/h	0.35-1.18	0.53-1.79	0.71-2.36	0.88-2.90
- Natural gas LL- (Wo = 12.4 kWh/m³) NCV = 8.57 kWh/m³		m³/h	0.41-1.38	0.62-2.08	0.83-2.74	1.03-3.37
- Propane [1] (NCV = 25.9 kWh/m³)		m³/h	0.14-0.46	0.23-0.69	0.29-0.91	0.36-1.12
• Operating voltage		V/Hz	230/50	230/50	230/50	230/50
• Electrical power consumption (incl. pump) min./max.		Watt	15/80	15/80	15/80	15/80
• Stand-by		Watt	2	2	2	2
• Type of protection [3]		IP	X4D	X4D	X4D	X4D
• Permitted ambient temperature during operation		°C	5-40	5-40	5-40	5-40
• Sound power level						
- Heating noise (EN 15036 Part 1) (room air dependent)		dB(A)	50	50	50	50
• Condensate quantity (natural gas) at 50/30 °C		l/h	1.1	1.6	2.1	2.7
• pH value of the condensate		approx.	4.2	4.2	4.2	4.2
• Construction type				B23, B33, C13(x), C33(x), C43(x), C53(x), C63(x), C83(x), C93(x)		
• Flue gas system						
- Temperature class			T 120	T 120	T 120	T 120
- Flue gas mass flow at max. nominal heat input (dry)		kg/h	19.6	29.5	39.0	49.0
- Flue gas mass flow at min. nominal heat input (dry)		kg/h	5.4	8.0	10.6	13.2
- Flue gas temperature at max. nominal heat output and 80/60 °C		°C	78	78	78	70
- Flue gas temperature at max. nominal heat output and 50/30 °C		°C	57	57	57	51
- Flue gas temperature at min. nominal heat output and 50/30 °C		°C	32	32	32	32
- Max. permissible temperature of the combustion air		°C	50	50	50	50
- Flow rate combustion air		Nm³/h	14.5	21.9	28.9	35.6
- Maximum supply pressure for combustion air supply and flue gas line		Pa	75	75	75	75
- Maximum draught/depression at flue gas outlet		Pa	-50	-50	-50	-50

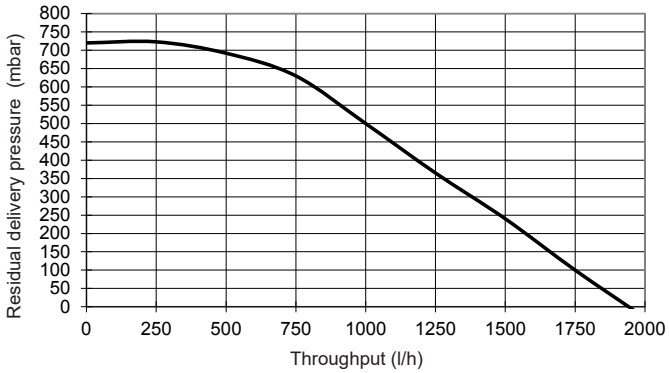
[1] Data related to NCV. TopGas® classic is also suitable for propane/butane (liquid gas) mixtures.

[2] Data related to NCV. The boiler series is tested for EE/H setting. With a factory setting to a Wobbe value of 15.0 kWh/m³, operation in the Wobbe value range from 12.0 to 15.7 kWh/m³ is possible without new settings.

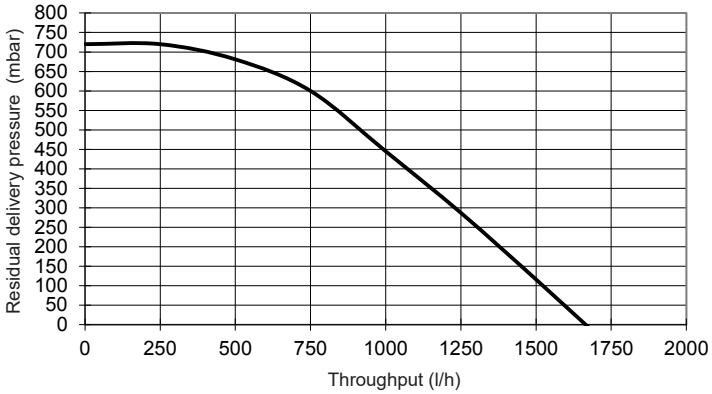
[3] For construction types B23 and B33, type of protection IP20

Maximum residual delivery pressure of heating pump

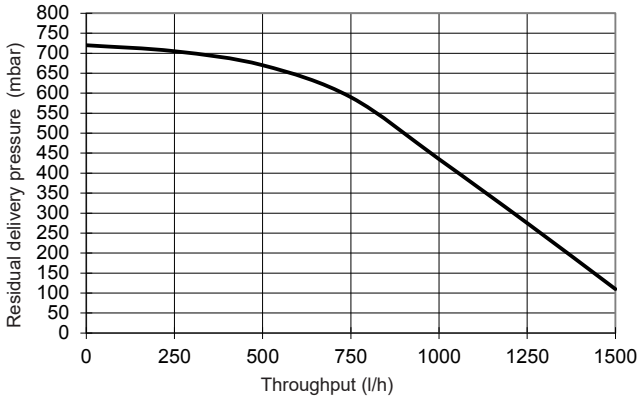
TopGas® classic (12)



TopGas® classic (18)



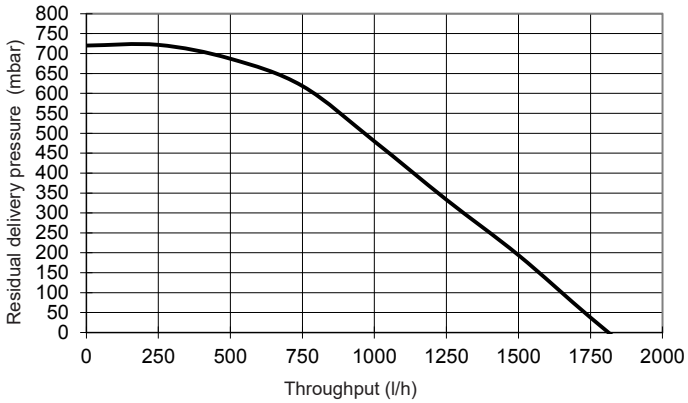
TopGas® classic (24,30)



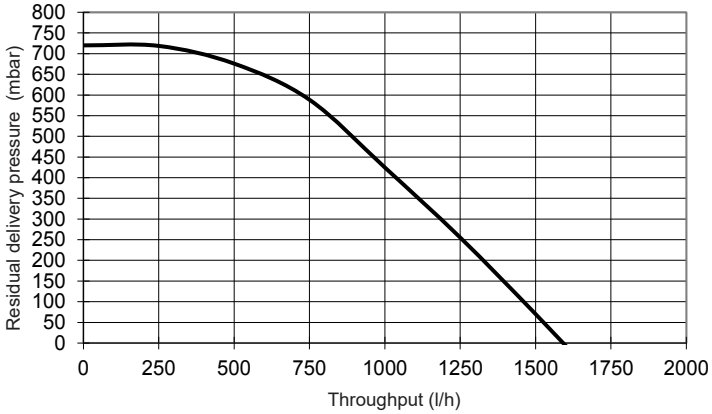
Maximum residual delivery pressure of heating pump TopGas® classic with connection set 4 or connection set 10

(reversing valve included in the set)

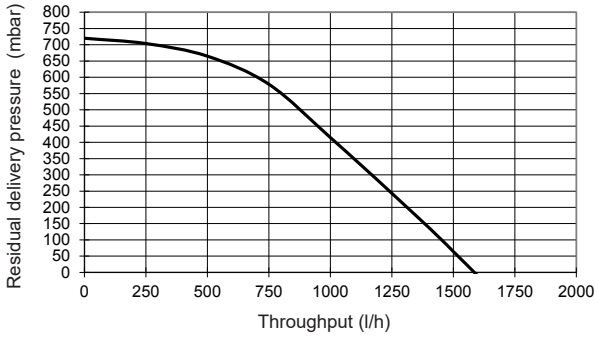
TopGas® classic (12)



TopGas® classic (18)



TopGas® classic (24,30)



Calorifier TopVal (130,160) and CombiVal ERW (200)

Type			TopVal (130)	TopVal (160)	CombiVal ERW (200)
• Capacity		dm^3	128	157	196
• Operating pressure/test pressure		bar	10/13	10/13	10/13
• Max. operating temperature		°C	95	95	95
• Fire protection class			B2	B2	B2
• Heat loss at 65 °C		W	53	56	49
• Weight		kg	53	56	77
• Dimensions	Diameter	mm	590	590	600
	Height	mm	869	1036	1464
Heating register (built-in)					
• Heating surface		m^2	0.96	1.01	0.95
• Heating water		dm^3	6.7	7.1	6.4
• Flow resistance [1]		z-value	22	22	7
• Operating pressure/test pressure		bar	8/13	8/13	8/13
• Max. operating temperature		°C	95	95	110

[1] Flow resistance boiler in mbar = flow rate $(m^3/h)^2$ x z

Hot water output TopVal, CombiVal with TopGas® classic, heating flow 80 °C

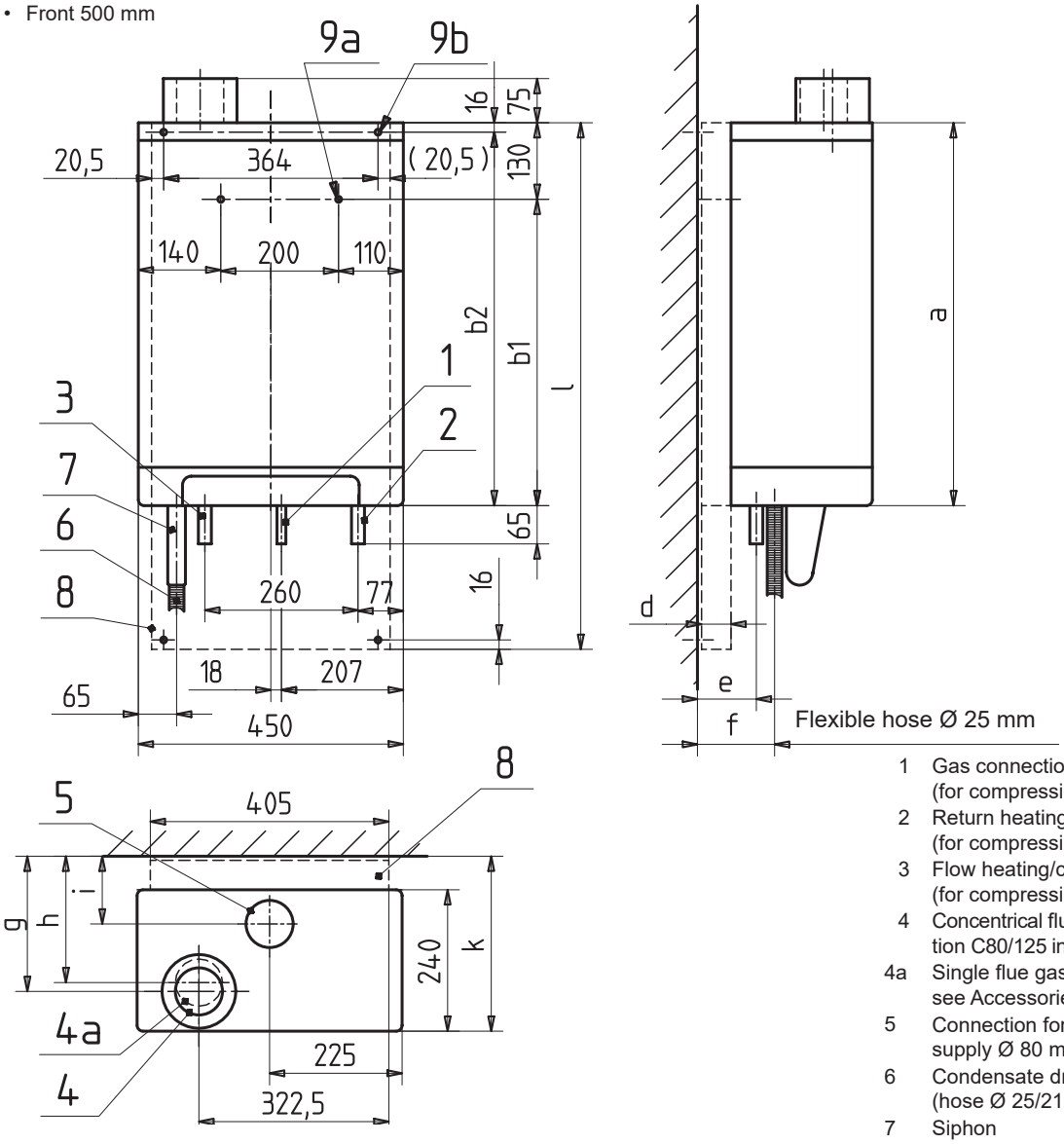
Boiler type		Calorifier type		Hot water output dm^3/10 min [1] 45 °C	Hot water output dm^3/h [2] 45 °C	Number [3] of flats
classic	(12)	TopVal	(130)	166	267	1
	(18)		(130)	179	411	1
	(24)		(130)	190	546	1
	(30)		(130)	198	610	1
classic	(12)	TopVal	(160)	199	267	1
	(18)		(160)	212	411	1-2
	(24)		(160)	223	546	1-2
	(30)		(160)	232	610	1-2
classic	(12)	CombiVal ERW	(200)	243	267	1-2
	(18)		(200)	256	411	1-2
	(24)		(200)	267	546	2
	(30)		(200)	276	610	2

[1] Hot water peak performance in 10 min
[2] Hot water output per hour
[3] Flat (3-4 rooms with 3-4 people, 1 bathtub with approx. 150 litres, 1 washbasin, 1 sink)

TopGas® classic (12-30)

Minimal spaces
(Dimensions in mm)

- Sideways 50 mm
- Space to ceiling dependent on the used flue gas system
- Front 500 mm

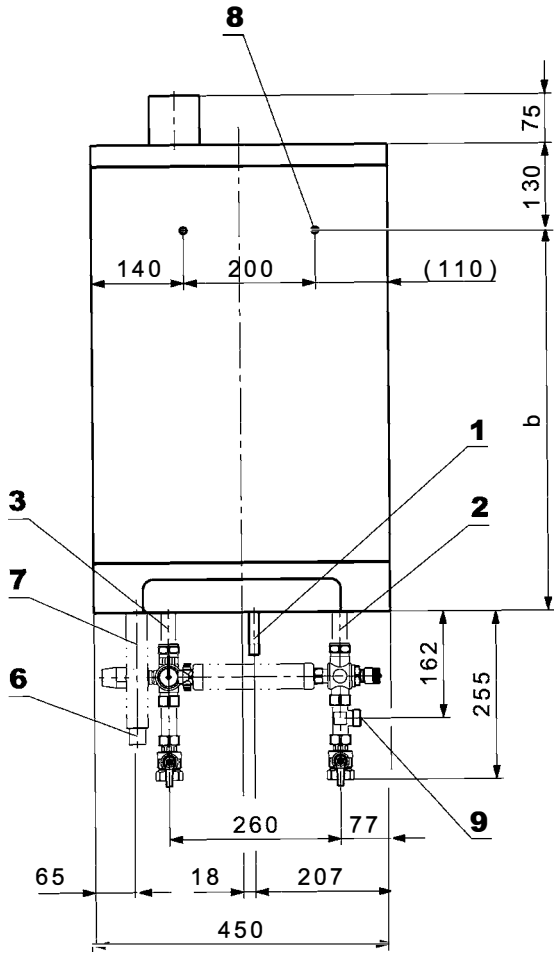


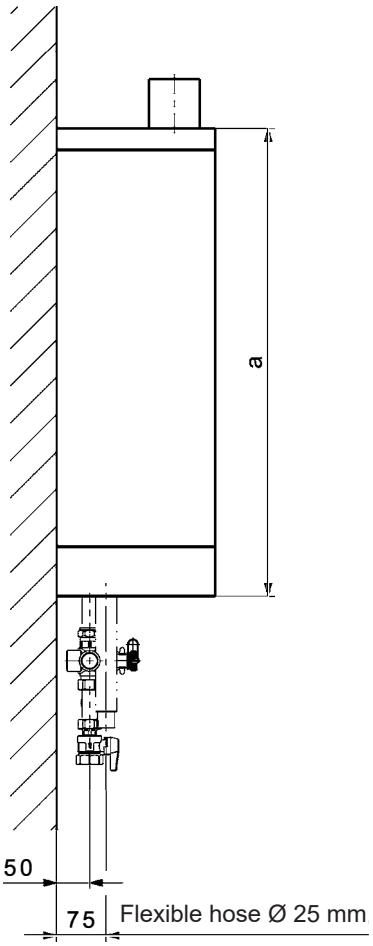
1 Gas connection Ø 15 mm (for compression fitting)
2 Return heating/calorifier Ø 22 mm (for compression fitting)
3 Flow heating/calorifier Ø 22 mm (for compression fitting)
4 Concentrical flue gas/combustion air connection C80/125 including measuring opening
4a Single flue gas connection E80, (optional), see Accessories
5 Connection for external combustion air supply Ø 80 mm (option)
6 Condensate drain Ø 32 mm (hose Ø 25/21 mm)
7 Siphon
8 Mounting frame, 50 mm or 110 mm with diaphragm pressure expansion tank optionally, see Accessories
9a Drill hole Ø 10 mm without mounting frame
9b Drill hole Ø 10 mm with mounting frame

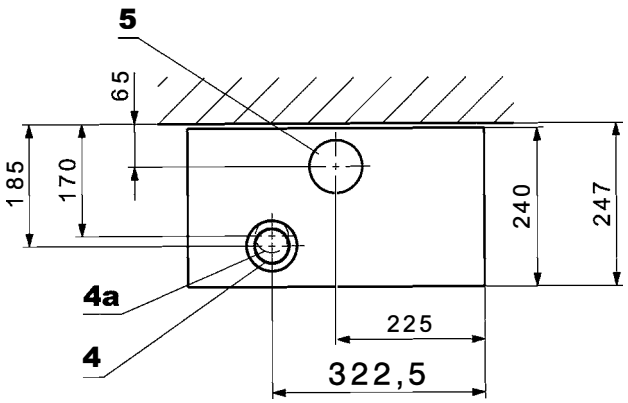
TopGas® classic type	a	b1	b2	d	e	f	g	h	i	k	l
(12)	590	460		0	50	75	185	170	65	247	–
(12) with mounting frame (MR50)	590		574	50	100	125	235	220	115	297	834
(12) with mounting frame with diaphragm pressure expansion tank (MR110)	590		574	110	160	185	295	280	175	357	834
(18)	650	520		0	50	75	185	170	65	247	–
(18) with mounting frame (MR50)	650		634	50	100	125	235	220	115	297	894
(18) with mounting frame with diaphragm pressure expansion tank (MR110)	650		634	110	160	185	295	280	175	357	894
(24,30)	710	580		0	50	75	185	170	65	247	–
(24,30) with mounting frame (MR50)	710		694	50	100	125	235	220	115	297	954
(24,30) with mounting frame with diaphragm pressure expansion tank (MR110)	710		694	110	160	185	295	280	175	357	954

TopGas® classic (12-30) with connection set 3 without mounting frame

Minimal spaces
(Dimensions in mm)
- Sideways 50 mm
- Space to ceiling dependent on the used flue gas system
- Front 500 mm





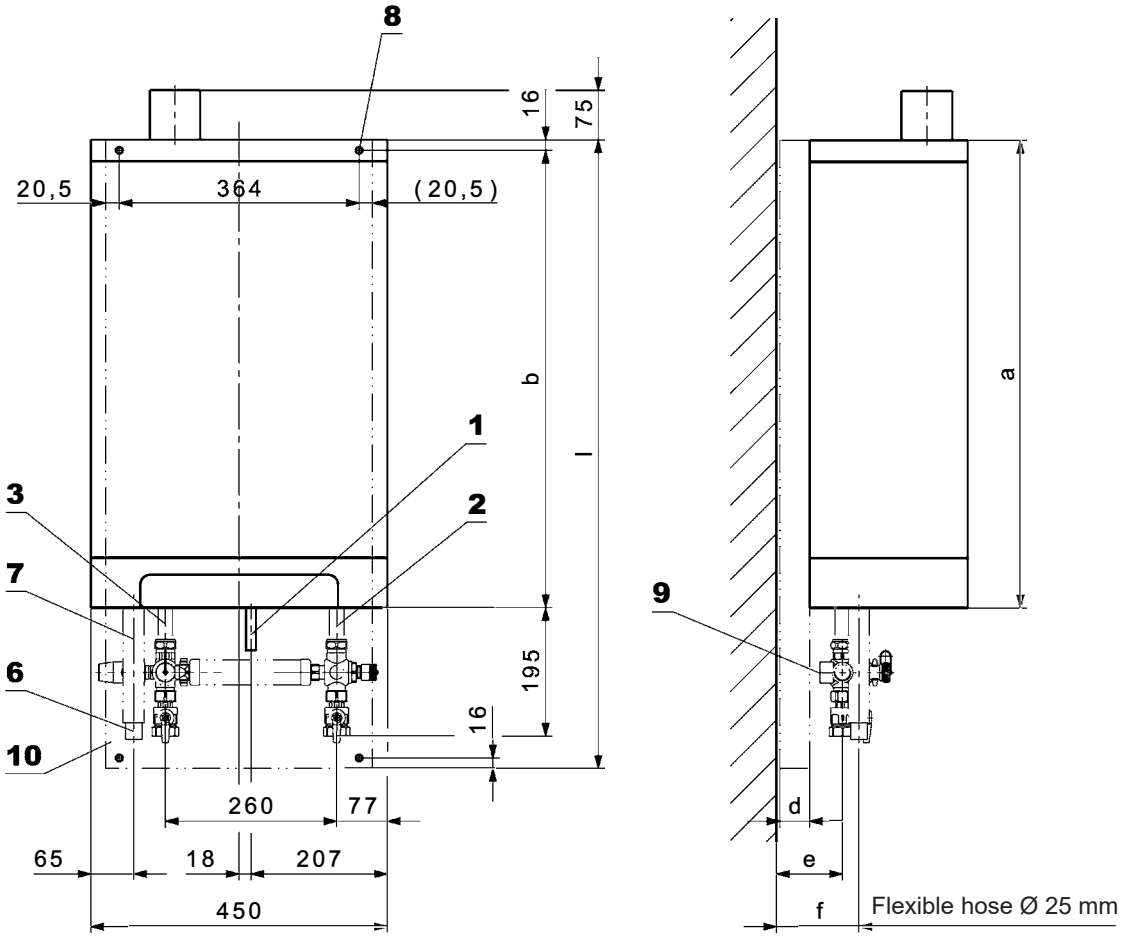


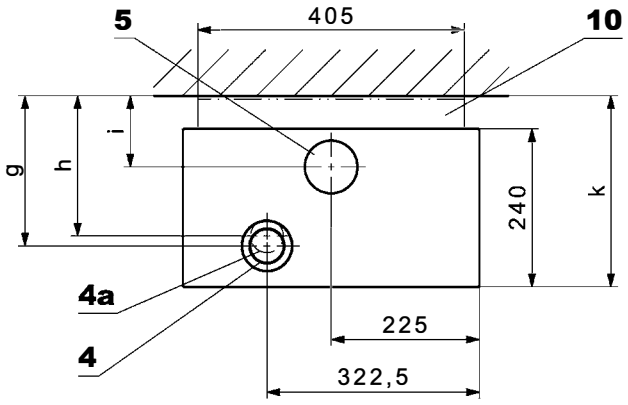
TopGas® classic type	a	b
(12)	590	460
(18)	650	520
(24,30)	710	580

1 Gas connection Ø 15 mm (for compression fitting)
2 Return heating/calorifier Ø 22 mm (for compression fitting)
3 Flow heating/calorifier Ø 22 mm (for compression fitting)
4 Concentrical flue gas/combustion air connection C80/125 including measuring opening
4a Single flue gas connection E80 (optional)
5 Connection for external combustion air supply Ø 80 mm (option)
6 Condensate drain Ø 32 mm (hose Ø 25/21 mm)
7 Siphon
8 Drill hole Ø 10 mm (without mounting frame)
9 Diaphragm pressure expansion tank connection (without mounting frame)

TopGas® classic (12-30) with connection set 3 and mounting frame

Minimal spaces
(Dimensions in mm)
- Sideways 50 mm
- Space to ceiling dependent on the used flue gas system
- Front 500 mm





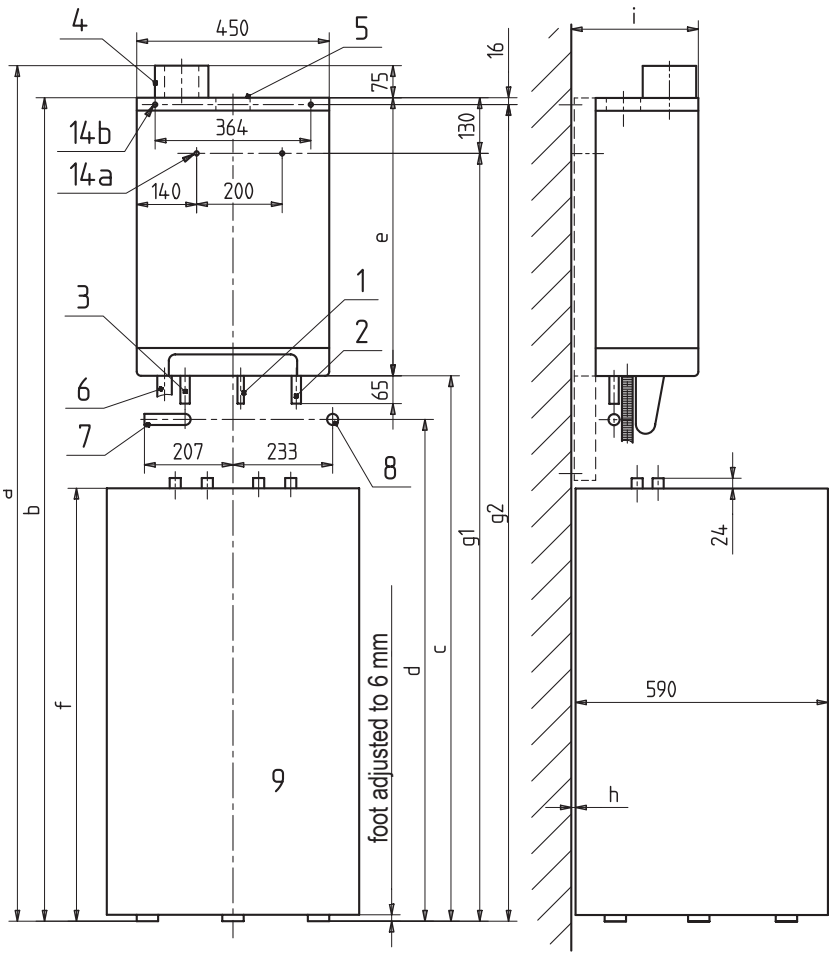
1 Gas connection Ø 15 mm (for compression fitting)
2 Return heating/calorifier Ø 22 mm (for compression fitting)
3 Flow heating/calorifier Ø 22 mm (for compression fitting)
4 Concentrical flue gas/combustion air connection C80/125 including measuring opening
4a Single flue gas connection E80 (optional)
5 Connection for external combustion air supply Ø 80 mm (option)
6 Condensate drain Ø 32 mm (hose Ø 25/21 mm)
7 Siphon
8 Drill hole Ø 10 mm (with mounting frame)
9 Diaphragm pressure expansion tank connection (with mounting frame)
10 Mounting frame 50 mm or 110 mm (optional)

TopGas® classic type	a	b	d	e	f	g	h	i	k	l
(12) with mounting frame (MR50)	590	574	50	100	125	235	220	115	297	834
(12) with mounting frame with diaphragm pressure expansion tank (MR110)	590	574	110	160	185	295	280	175	357	834
(18) with mounting frame (MR50)	650	634	50	100	125	235	220	115	297	894
(18) with mounting frame with diaphragm pressure expansion tank (MR110)	650	634	110	160	185	295	280	175	357	894
(24,30) with mounting frame (MR50)	710	694	50	100	125	235	220	115	297	954
(24,30) with mounting frame with diaphragm pressure expansion tank (MR110)	710	694	110	160	185	295	280	175	357	954

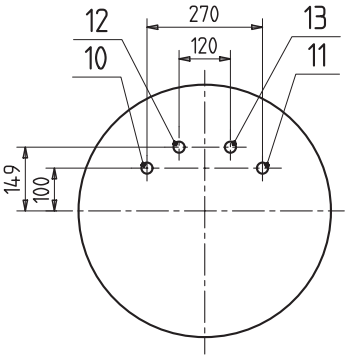
TopGas® classic (12-30) with calorifier TopVal (130,160) placed below

Minimal spaces
(Dimensions in mm)
- Sideways 50 mm
- Space to ceiling dependent on the flue gas system
- Front 500 mm

CombiVal ERW (200)
see Calorifiers



View from the top without TopGas®



1 Gas connection Ø 15 mm (for compression fitting, on site)
2 Return heating/calorifier Ø 22 mm (for compression fitting, on site)
3 Flow heating/calorifier Ø 22 mm (for compression fitting, on site)
4 Concentrical flue gas/combustion air connection C80/125 including measurement vents
5 Connection for external combustion air supply Ø 80 mm (option)
6 Condensate drain Ø 32 mm
7 Connection position laterally flow heating Rp ¾″
8 Connection positions behind return heating Rp ¾″
9 Calorifier TopVal (130,160)
10 Flow heating/calorifier G ¾″ external thread
11 Return heating/calorifier G ¾″ external thread
12 Hot water R ¾″ external thread
13 Cold water R ¾″ external thread

14a Drill hole Ø 10 mm without mounting frame
14b Drill hole Ø 10 mm with mounting frame

TopGas® classic with TopVal 130

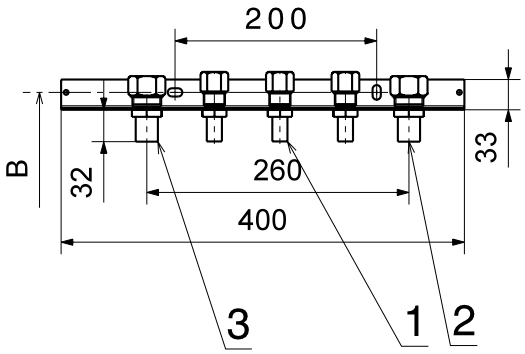
TopGas® classic type	a	b	c	d	e	f	g1	g2	h	i
(12)	1775	1700	1108	950	590	860	1570	–	10	247
(12) with mounting frame (MR50)	1775	1700	1108	950	590	860	–	1684	60	297
(12) with mounting frame with diaphragm pressure expansion tank (MR110)	1823	1748	1156	998	590	860	–	1732	10	357
(18)	1835	1760	1108	950	650	860	1630	–	10	247
(18) with mounting frame (MR50)	1835	1760	1108	950	650	860	–	1744	60	297
(18) with mounting frame with diaphragm pressure expansion tank (MR110)	1883	1808	1156	998	650	860	–	1792	10	357
(24,30)	1895	1820	1108	950	710	860	1690	–	10	247
(24,30) with mounting frame (MR50)	1895	1820	1108	950	710	860	–	1804	60	297
(24,30) with mounting frame with diaphragm pressure expansion tank (MR110)	1943	1868	1156	998	710	860	–	1852	10	357

TopGas® classic with TopVal 160

TopGas® classic type	a	b	c	d	e	f	g1	g2	h	i
(12)	1942	1867	1275	1115	590	1027	1737	–	10	247
(12) with mounting frame (MR50)	1942	1867	1275	1115	590	1027	–	1851	60	297
(12) with mounting frame with diaphragm pressure expansion tank (MR110)	1990	1915	1323	1163	590	1027	–	1899	10	357
(18)	2002	1927	1275	1115	650	1027	1797	–	10	247
(18) with mounting frame (MR50)	2002	1927	1275	1115	650	1027	–	1911	60	297
(18) with mounting frame with diaphragm pressure expansion tank (MR110)	2050	1975	1323	1163	650	1027	–	1959	10	357
(24,30)	2062	1987	1275	1115	710	1027	1857	–	10	247
(24,30) with mounting frame (MR50)	2062	1987	1275	1115	710	1027	–	1971	60	297
(24,30) with mounting frame with diaphragm pressure expansion tank (MR110)	2110	2035	1323	1163	710	1027	–	2020	10	357

Measures for drill holes and visible console for preinstallation without mounting frame

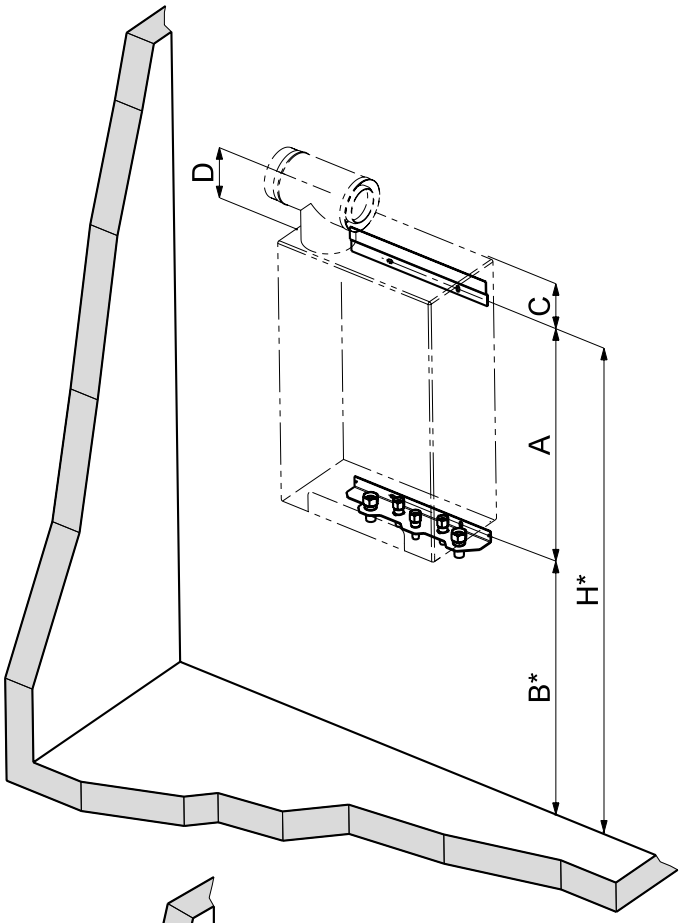
(Dimensions in mm)



1 Gas connection Ø 15 mm (for compression fitting, on site)
2 Return heating/calorifier (for compression fitting, on site)
3 Flow heating/calorifier (for compression fitting, on site)

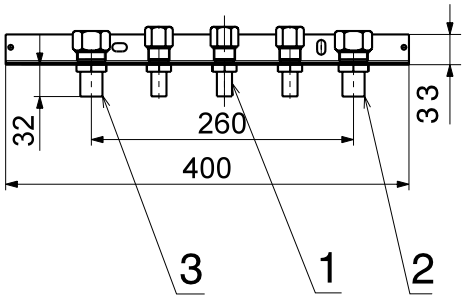
TopGas® classic type	TopVal type	A	B*	H*	C	D
(12)	(130)	518	1052	1570	130	175
	(160)	518	1219	1737	130	175
(18)	(130)	578	1052	1630	130	175
	(160)	578	1219	1797	130	175
(24,30)	(130)	638	1052	1690	130	175
	(160)	638	1219	1857	130	175

* Measures for drill hole



Visible console for preinstallation with mounting frame

(Dimensions in mm)



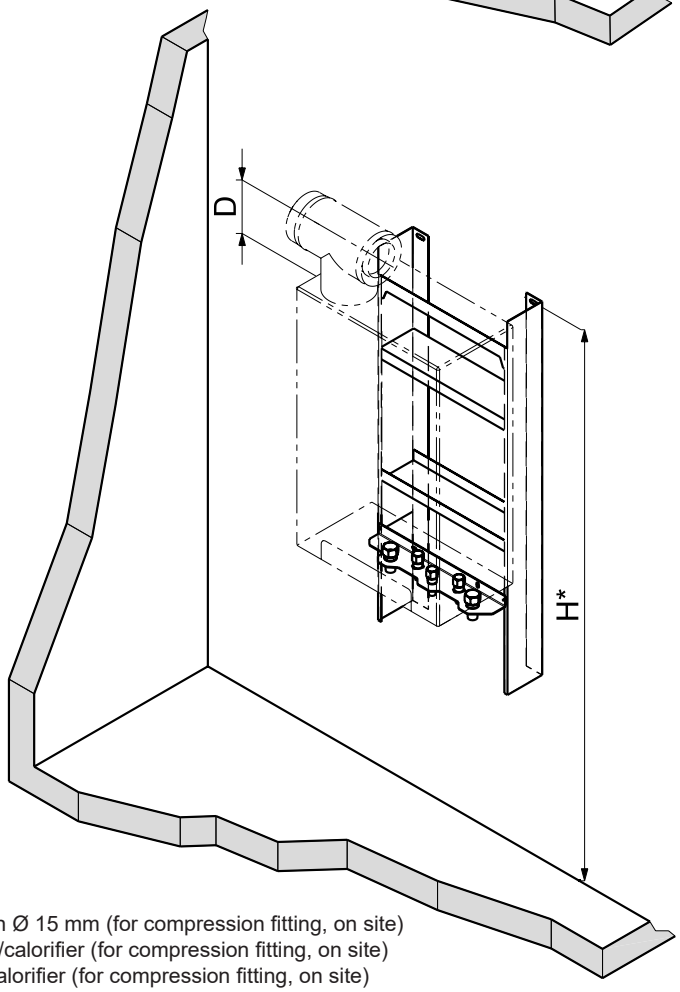
With mounting frame MR50

TopGas® classic type	TopVal type	H *	D
(12)	(130)	1684	175
	(160)	1851	175
(18)	(130)	1744	175
	(160)	1911	175
(24,30)	(130)	1804	175
	(160)	1971	175

With mounting frame MR110 with diaphragm pressure expansion tank

TopGas® classic type	TopVal type	H *	D
(12)	(130)	1732	175
	(160)	1899	175
(18)	(130)	1792	175
	(160)	1959	175
(24,30)	(130)	1852	175
	(160)	2020	175

* Measures for drill hole



1 Gas connection Ø 15 mm (for compression fitting, on site)
2 Return heating/calorifier (for compression fitting, on site)
3 Flow heating/calorifier (for compression fitting, on site)

Standards and guidelines

The official regulations for installation and operation must be observed. In particular, these are the country-specific standards (e.g. EN standard, DIN standards, …) as well as the corresponding regional regulations.

The following standards and guidelines must be complied with:

- Hoval technical information and installation instructions
- hydraulic and technical control regulations of Hoval
- DVGW directives
- DIN EN 12828 Safety-relevant requirements
- DIN EN 12831 Heaters Rules for the calculation of the heat requirements of buildings
- VDI 2035 Protection against damage by corrosion and boiler scale formation in heating and service water installations
- EN 14868 “Protection of metallic materials against corrosion”
- VDE 0100 supplement 2

Water quality in heating systems

Filling and replacement water, heating water

The following applies:

- VDI 2035
- In addition, the EN 14868 standard must be applied, **as well as the manufacturer-specific specifications**

Manufacturer-specific specifications

Filling and replacement water

The filling and replacement water can be both fully demineralised and also merely softened.

Heating water

- In the case of **full demineralisation of the filling and replacement water**, the electrical conductivity of the heating water must not exceed the value of 100 µS/cm.

- In the case of **softening the filling and replacement water**, the following conditions must be complied with:
  - Electrical conductivity of the heating water for operation with water containing salts: > 100 µS/cm to ≤ 1500 µS/cm
  - pH value of the heating water for systems without aluminium alloy as water-side material 8.2 to 10.0 (measurement 10 weeks after commissioning at the earliest)
- The sum of the chloride, nitrate and sulphate contents in the heating water must not exceed 50 mg/l in total.

Additional notices

- Hoval boilers and calorifiers are suitable for heating systems without significant oxygen intake. (System type I according to EN 14868).
- Plants with continual oxygen intake (e.g. underfloor heating without diffusion-proof plastic piping) or intermittent oxygen intake (e.g. requiring frequent topping-up) must be equipped with a system separation.
- In the case of bivalent heating systems, the values of the heat generator with the strictest requirement for water quality must be complied with.
- If only the boiler is replaced in an existing plant, it is not recommended for the entire heating system to be refilled, provided that the heating water already contained in the system complies with the relevant directives or standards.
- Before filling new systems and, where necessary, existing heating systems containing heating water that does not comply with the directives or standards, the heating system must be professionally cleaned and flushed. The boiler must not be filled until the heating system has been flushed.

Heating room

Boilers cannot be positioned in rooms in which halogen compounds can occur and into which combustion air can enter (e.g. wash-, dryer-, work room, hairdressers and so on).
Halogen compounds can be caused by cleaning and degreasing solutions, dissolvents, glue and bleaching lyes.

Combustion air supply

The supply of combustion air must be guaranteed. There must be no possibility to close the air supply opening. For direct combustion air supply (LAS system), a separator C80/125 -> E80 PP can be used.

The minimum free cross-section for the combustion air can be assumed simplified as follows:

- *Room air-independent operation with separate combustion air pipe to the boiler*: 0.8 cm^2 per 1 kW of output. The pressure drop in the combustion air pipe must be considered for the calculation of the flue gas system.

- *Room air-dependent operation*: A minimal ventilation outlet of at least 150 cm^2 or 2 x 75 cm^2 cross-section is necessary for of boiler output up to 50 kW. For each further kW output 2 cm^2 more cross-section must be provided.

Gas connection

Commissioning

- Initial commissioning is only allowed to be carried out by a qualified installer.
- Burner setting values according to the installation instructions.

Manual gas shut-off valve and gas filter

Immediately in front of the boiler a manual gas shut-off device (valve) must be installed according to relevant regulations. Should the local regulations or conditions demand this, an approved gas filter must be installed in the gas supply pipe between the gas tap (thermally releasing) and the boiler in order to prevent malfunction due to foreign particles being carried along with the gas.

Type of gas

- The boiler is only to be operated with the type of gas stated on the rating plate.
- A gas pressure controller to reduce the boiler inlet pressure must be installed on site for propane.

Gas pressure

Necessary gas flow pressure at the boiler inlet: natural gas min. 17.4 mbar, max. 50 mbar. Propane min. 28 mbar, max. 50 mbar.

Sludge separator

Installation of a sludge separator with magnetic ring in the gas boiler return is recommended.

Minimum heating water circulation quantity

- Depending on the boiler type, different minimum circulating water quantities are required through the boiler. For details, see the corresponding data sheets.
- During burner operation, the circulating pump must be constantly in operation and the minimum heating water circulation quantity must be guaranteed.
- After each burner switch-off, the circulating pump must be in operation for at least 2 minutes (is guaranteed by the boiler controller).

Heating boiler in the attic

If the gas boiler TopGas® classic is built-in in a roof control room, an external water pressure guard must be provided.

Condensate drainage

- A permit for discharge of the flue gas condensate into the sewage system must be obtained from the relevant authority or sewer operator.
- The condensate from the flue gas line can be discharged via the boiler. A condensate trap is no longer needed in the flue gas system.
- The condensate must be conducted openly (funnel) into the sewage system.
- Suitable materials for condensate drain:
  - stoneware pipes
  - pipes made from glass
  - pipes made from stainless steel
  - pipes made from plastic: PVC, PE, PP, ABS and UP

Diaphragm pressure expansion tank

- An adequately dimensioned diaphragm pressure expansion tank must be provided.
- The diaphragm pressure expansion tank has to be installed at the diaphragm pressure expansion tank connection (pump intake side) (see “Dimensions”).
- Starting from 70 °C an intermediate tank is necessary.

Flue gas system

- Gas boilers must be connected to a certified and approved flue gas system such as flue gas lines.
- Flue gas lines must be gas-, condensate- and overpressure-tight.
- The flue gas lines must be secured against unwanted loosening of the plug connections.
- The flue gas system must be connected with an angle, so that the resulting condensate of the flue gas system can flow back to the boiler and can be neutralised there before discharging into the canalisation.
- Gas boilers with condensation heat utilisation are to be connected to a flue gas line min. temperature class T120.
- A flue gas temperature limiter is integrated into the boiler.

Looking for the appropriate hydraulic schematic?
Please contact your local Hoval partner.

Hoval TopGas® classic (35-80)

Wall-hanging gas condensing boiler
- With condensing boiler technology
- For the combustion of:
  - natural gas E
  - natural gas E with a hydrogen content (H_2) of up to 20 % by vol.
  - propane according to DIN 51622
  - biomethane according to EN 16723
- Heat exchanger made of corrosion resistant aluminium-silicone cast alloy integrated into stainless steel heating water tank
- Built-in:
  - pressure gauge
  - water pressure guard for water shortage protection
  - flue gas temperature sensor with flue gas limiter function
  - automatic quick aspirator
- Pre-mixing surface burner made of stainless steel
  - Modulating with gas/air group control
  - Automatic ignition
  - Ionisation guard
  - Gas pressure guard
- Minimum water flow necessary (see technical data)
- Wall-hanging gas condensing boiler fully cased with coated white steel plates

Basic boiler control panel
- Control unit for gas burner with monitoring unit BIC 335
- Modulating burner control
- Main guard “I/O”
- Operation and fault indication
- Connection for external gas valve and fault indication

Option
- Propane
- Free-standing calorifier
- Boiler burner control in different designs

Delivery
- Wall-hanging gas condensing boiler fully cased

Heating controller set RS-OT
- For 1 heating circuit without mixing operation Weather-controlled regulation for continuously adjustable decreased boiler water temperature
- With integrated overplugable room temperature sensor, located in boiler room or living room. Can optionally be installed in the boiler control panel.
- Outdoor sensor
- Immersion sensor (calorifier sensor)

BMS-Module 0-10 V/OT (OpenTherm)
(building management system)
For boiler control as part of a building management system
External **temperature control** 0-10 V.
0-1.0 V no requirement
1.0-9.5 V ..... 0-100 °C
Can be installed in the boiler control panel!

Heating controller set TopTronic® E ZE1
(Can be built in) as supplement for basic boiler control panel

Model range

TopGas® classic type		Nominal heat output 50/30 °C kW
(35)	A	7.4-34.9
(45)	A	9.1-44.3
(60)	A	12.8-60.3
(80)		14.8-79.1

Energy efficiency class of the compound system with control

Control panel
- Colour touchscreen 4.3 inch
- Heat generator blocking switch for interrupting operation
- Fault signalling lamp

TopTronic® E control module
- Colour touchscreen 4.3 inch
- Simple, intuitive operating concept
- Display of the most important operating statuses
- Configurable start screen
- Operating mode selection
- Configurable day and week programmes
- Operation of all connected Hoval CAN bus modules
- Commissioning wizard
- Service and maintenance function
- Fault message management
- Analysis function
- Weather display (with online HovalConnect)
- Adaptation of the heating strategy based on the weather forecast (with online HovalConnect)

TopTronic® E basic module heat generator TTE-WEZ
- Control functions integrated for
  - 1 heating/cooling circuit with mixer
  - 1 heating/cooling circuit without mixer
  - 1 hot water charging circuit
  - bivalent and cascade management
- RAST 5 basic plug set
- Outdoor sensor
- Immersion sensor (calorifier sensor)
- Contact sensor (flow temperature sensor)
- Cable set ZE1 for connecting the TopTronic® E control to the basic boiler control panel

No additional module expansions or controller modules can be installed in the boiler control panel!

Options for TopTronic® E controller
- Can be expanded by max. 1 module expansion:
  - module expansion heating circuit or
  - module expansion heat balancing or
  - module expansion Universal
- Can be networked with a total of up to 16 controller modules:
  - heating circuit/hot water module
  - solar module
  - buffer module
  - measuring module

No additional module expansions or controller modules can be installed in the boiler control panel!

The supplementary plug set must be ordered in order to use expanded controller functions.

Further information about the TopTronic® E
see “Controls”

Delivery
- Heating controller set separately packed, mounting on site

Notice
Observe the notices on water quality, see “Engineering”!

Wall-hanging gas condensing boiler

Hoval TopGas® classic (35-80)

Heat exchanger made of aluminium alloy
Modulating burner made of stainless steel and basic boiler control panel, completely cased

TopGas® classic type		Nominal heat output 50/30 °C kW	Part No.
(35)	A	7.4-34.9	7014 580
(45)	A	9.1-44.3	7014 581
(60)	A	12.8-60.3	7014 582
(80)		14.8-79.1	7014 583

Permissions boilers

TopGas® classic (35-80):
CE product ID No. CE-0085BQ0218

Energy efficiency class of the compound system with control

Accessories

Conversion kit for propane 6047 634
for TopGas® classic (35-120)

Connection set AS32-TG
consisting of:
Return:
- Shut-off valve with union nut 2″ side output with boiler fill and drain valve and connection nozzle G ¾″ (external) for connecting a diaphragm pressure expansion tank
- Speed-controlled high-efficiency pump, various versions

Flow:
- Fitting piece (180 mm) G 2″ with integrated non-return flap
- Shut-off valve with union nut 2″ and side outflow with safety valve DN 20, 3 bar up to 100 kW incl. boiler filling/draining valve

Connection set/pump type	Speed control	Part No.
AS32-TG/SPS-S 8 PM1	•	6049 483
AS32-TG/SPS-I 10	•	6059 333
AS32-TG/SPS-I 12 PM1	•	6043 800

Speed control legend

PWM1 or PM1	PWM control signal heating

Connection set AS32-2/H 6039 793
for compact mounting
of all required fittings
of a direct circuit
consisting of:
2 thermometer ball valves
Wall bracket included separately
Connection T-piece DN 32
in the return flow for connecting the sludge separator bottom and
the diaphragm pressure expansion tank
on the side on connection set
installation option
for an overflow valve
incl. non-return valve

Accessories

		Part No.
	**Gas filter** with measurement nozzle before and behind the filter inset (diameter: 9 mm) Pore width of the filter inset < 50 µm Max. pressure difference 10 mbar Max. inlet pressure 100 mbar	

Type	Connection inches	
70612/6B	Rp ¾″	2007 995
70602/6B	Rp 1″	2007 996

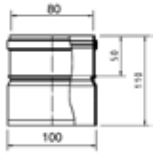
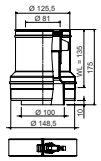
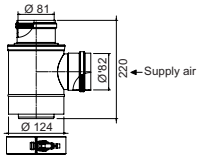
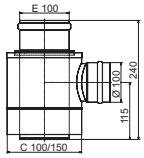
	**Gas valve, passage DN 15, R ½″** with thermally releasing cut-off device	2012 075
	**Gas valve, passage DN 20, R ¾″** with thermally releasing cut-off device	2012 077
	**Gas valve, corner version DN 15, R ½″** with thermally releasing cut-off device	2012 076
	**Gas valve, corner version DN 20, R ¾″** with thermally releasing cut-off device	2012 078
	**Sludge separator with magnet MB3/L DN 25 ... DN 50** Fast and continuous removal of ferromagnetic and non-magnetic dirt and sludge particles Sludge separation up to a particle size of 5 µm Brass housing Max. operating pressure: 6 bar Max. flow temperature: 110 °C	

Type	Connection inches	Flow rate at 1 m/s flow speed m^3/h	
MBL DN 32	Rp 1¼″	3.6	2062 166
MBL DN 40	Rp 1½″	5.0	2062 167

Additional sludge separators
see «Various system components»

Heating armature groups and wall distributors
see “Various system components”

Accessories

		Part No.
	**Reducing part E100 -> E80 PP**	2015 245
	**Concentric reducing part C100/150 -> C80/125 PP** Painted white	2025 334
	**Separating piece C80/125 -> 2 x E80 PP** for room air independent operation for separate conduction of flue gas and combustion air.	2010 174
	**Separating piece C100/150 -> 2 x E100 PP** for UltraOil® (35,50), TopGas® classic (35-80), UltraGas® (50-100) for separate conduction of flue gas and combustion air (LAS system) Recommendation: If the air inlet at the facade is near a noise sensitive place (window of bedroom, terrace etc.), we recommend to use a sound absorber at the direct combustion air inlet.	2015 244
	**Backflow check valve** for TopGas® classic (60-120) to prevent the emergence of flue gas from the boiler in the use of cascades	6036 265

Boiler controller with heating controller set RS-OT

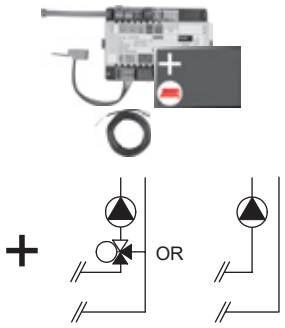
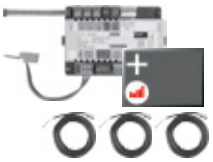
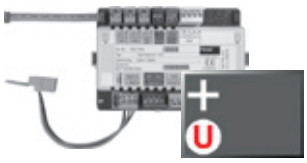
		Part No.
	**Heating controller set RS-OT** (Not for mixing operation!) For 1 heating circuit without mixing operation Flow temperature control controlled by atmospheric conditions with outdoor sensor, immersion sensor (calorifier sensor) and overridable room temperature sensor. Can be implemented as a room temperature control without outdoor sensor. Only wall mounting possible! **Notice** For integration into control panel: mounting set RS-OT must be ordered.	6020 566
	**Mounting set RS-OT** Assembly set for mounting of heating controller set RS-OT into boiler	6018 218
	**BMS module 0-10 V/OT - OpenTherm (building management system)** no control unit TopTronic® E or RS-OT necessary power supply via OT bus Temp. control external with 0-10 V 0-1.0 V no request 1.0-9.5 V ... 0-100 °C Cannot be installed in boiler control panel: - TopGas® classic (12-30) Can be installed in boiler control panel: - TopGas® classic (35-120)	6016 725

Boiler controller with heating controller set TopTronic® E

	Part No.
	
Boiler controller TopTronic® E ZE1 As supplement for basic boiler control panel G04 (can be built in). Mounting of TopTronic® E control module in the front of boiler control panel Mounting of TopTronic® E basic module heat generator in controller Consisting of: TopTronic® E control module TopTronic® E basic module heat generator fitting accessories - 1 outdoor sensor AF/2P/K - 1 immersion sensor TF/2P/5/6T/S1, L = 5.0 m - 1 contact sensor ALF/2P/4/T/S1, L = 4.0 m	6037 312
Notice No additional module expansions or controller modules can be installed in the boiler control panel! This means an additional mixer circuit must be implemented using the TopTronic® E heating circuit/hot water module in an external wall casing.	
For RS-OT and TopTronic® E ZE1	
	
Flow temperature monitor for panel heating (1 controller per heating circuit) 15-95 °C, setting (visible externally) under the casing cover	
Clamp-on flow temperature monitor RAK-TW1000S with retaining strap, without cable and plug	242 902

TopTronic® E module expansions

for TopTronic® E basic module heat generator

	Part No.
 **TopTronic® E module expansion heating circuit TTE-FE HK** Expansion to the inputs and outputs of the basic module heat generator or the heating circuit/domestic hot water module for implementing the following functions: - 1 heating/cooling circuit w/o mixer or - 1 heating/cooling circuit with mixer Consisting of: - Fitting accessories - 1 contact sensor ALF/2P/4/T, L = 4.0 m - Basic plug set FE module **Notice** The supplementary plug set may have to be ordered to implement functions differing from the standard!	6034 576
 **TopTronic® E module expansion heating circuit incl. energy balancing** TTE-FE HK-EBZ Expansion to the inputs and outputs of the basic module heat generator or the heating circuit/domestic hot water module for implementing the following functions: - 1 heating/cooling circuit w/o mixer or - 1 heating/cooling circuit with mixer incl. energy balancing in each case Consisting of: - Fitting accessories - 3 contact sensors ALF/2P/4/T, L = 4.0 m - Plug set FE module **Notice** The flow rate sensor set must be ordered as well.	6037 062
 **TopTronic® E module expansion Universal TTE-FE UNI** Expansion to the inputs and outputs of a controller module (basic module heat generator, heating circuit/domestic hot water module, solar module, buffer module) for implementing various functions Consisting of: - Fitting accessories - Plug set FE module **Notice** Refer to the Hoval System Technology to find which functions and hydraulic arrangements can be implemented. **Further information** see “Controls” - “Hoval TopTronic® E module expansions” chapter	6034 575

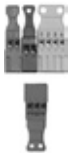
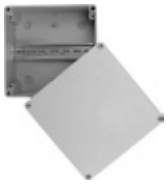
Flow rate sensor sets
Plastic housing

Size	Connection inches	Flow rate l/min	Part No.
DN 8	G ¾″	0.9-15	6038 526
DN 10	G ¾″	1.8-32	6038 507
DN 15	G 1″	3.5-50	6038 508
DN 20	G 1¼″	5-85	6038 509
DN 25	G 1½″	9-150	6038 510

Brass housing

Size	Connection inches	Flow rate l/min	Part No.
DN 10	G 1″	2-40	6042 949
DN 32	G 1½″	14-240	6042 950

Accessories for TopTronic® E

		Part No.
	**TopTronic® E controller modules**	
	TTE-HK/WW TopTronic® E heating circuit/ hot water module	6034 571
	TTE-SOL TopTronic® E solar module	6037 058
	TTE-PS TopTronic® E buffer module	6037 057
	TTE-MWA TopTronic® E measuring module	6034 574
	**Supplementary plug set**	
	for basic module heat generator TTE-WEZ	6034 499
	for controller modules and module expansion TTE-FE HK	6034 503
	**TopTronic® E room control modules**	
	TTE-RBM TopTronic® E room control modules	
	easy white	6037 071
	comfort white	6037 069
	comfort black	6037 070
	**Enhanced language package TopTronic® E**	6039 253
	one SD card required per control module Consisting of the following languages: HU, CS, SL, RO, PL, TR, ES, HR, SR, JA, DA	
	**HovalConnect**	
	HovalConnect LAN	6049 496
	HovalConnect WLAN	6049 498
	HovalConnect Modbus	6049 501
	HovalConnect KNX	6049 593
	TopTronic® E interface modules	
	GLT module 0-10 V	6034 578
	**TopTronic® E sensors**	
	AF/2P/K Outdoor sensor H x W x D = 80 x 50 x 28 mm	2055 889
	TF/2P/5/6T Immersion sensor, L = 5.0 m	2055 888
	ALF/2P/4/T Contact sensor, L = 4.0 m	2056 775
	TF/1.1P/2.5S/6T Collector sensor, L = 2.5 m	2056 776
	**Bivalent switch**	
	for various release or switching functions	
	Bivalent switch 1-piece	2056 858
	Bivalent switch 2-piece	2061 826
	**System housing**	
	System housing 182 mm	6038 551
	System housing 254 mm	6038 552
	**TopTronic® E wall casing**	
	WG-190 Wall casing small	6052 983
	WG-360 Wall casing medium	6052 984
	WG-360 BM Wall casing medium with control module cut-out	6052 985
	WG-510 Wall casing large	6052 986
	WG-510 BM Wall casing large with control module cut-out	6052 987

Further information
see “Controls”

Service

Commissioning
Commissioning by works service or Hoval trained authorised serviceman/company is condition for warranty.

For commissioning and other services please contact your Hoval sales office.

Part No.

TopGas® classic (35-80)

Type			(35)	(45)	(60)	(80)
• Nominal heat output at 80/60 °C, natural gas [1]		kW	6.9-31.7	8.3-39.8	11.9-54.1	13.4-71.8
• Nominal heat output at 50/30 °C, natural gas [1]		kW	7.4-34.9	9.1-44.3	12.8-60.3	14.8-79.1
• Nominal heat output at 80/60 °C, propane [2]		kW	9.5-32.5	10.4-41.5	14.1-56.6	18.4-73.7
• Nominal heat output at 50/30 °C, propane [2]		kW	10.5-36.3	11.45-45.8	15.5-61.1	20.3-79.9
• Nominal heat input with natural gas [3]		kW	6.9-33.0	8.5-42.4	11.7-56.9	13.8-75.8
• Nominal heat input with propane [2]		kW	9.8-33.0	10.7-42.1	14.5-57.7	19.0-74.4
• Operating pressure heating min./max. (PMS)		bar	1/4	1/4	1/4	1/4
• Operating temperature max. (T_{max})		°C	85	85	85	85
• Boiler water content ($V_{(H20)}$)		l	4.0	4.0	5.4	5.4
• Flow resistance boiler		z value	see diagram			
• Minimum circulation water quantity		l/h	300	350	470	550
• Boiler weight (without water content, incl. cladding)		kg	96	96	116	116
• Boiler efficiency at 80/60 °C in full-load operation (NCV/GCV) [4]		%	97.6/88.1	95.7/86.3	97.0/87.5	96.3/86.8
• Boiler efficiency at 30 % partial load (NCV/GCV) [4]		%	107.4/96.6	107.3/96.8	107.3/96.8	107.8/97.3
• Room heating energy efficiency						
- without control	ηs	%	92	92	92	92
- with control	ηs	%	94	94	94	94
- with control and room sensor	ηs	%	96	96	96	96
- annual energy consumption	Q_{HE}	GJ	61	76	104	133
• NOx class (EN 15502)			-	-	-	-
• Nitrogen oxide emissions (EN 15502) (GCV)	NOx	mg/kWh	23.9	27.4	23.4	29.0
• O_2 content in flue gas min./max. output		%	5.7/5.1	5.5/5.3	5.5/5.5	5.5/5.5
• Heat loss in standby mode		Watt	95	95	105	105
• Dimensions			see table of dimensions			
• Gas flow pressure min./max.						
- Natural gas E/LL		mbar	17.4-50	17.4-50	17.4-50	17.4-50
- Propane		mbar	37-50	37-50	37-50	37-50
• Gas connection values at 15 °C/1013 mbar:						
- Natural gas E (Wo = 15.0 kWh/m³) NCV = 9.7 kWh/m³		m³/h	0.7-3.4	0.9-4.4	1.2-5.9	1.4-7.8
- Natural gas LL (G25) - (Wo = 12.4 kWh/m³) NCV = 8.13 kWh/m³		m³/h	0.8-4.1	1.0-5.2	1.4-7.0	1.7-9.3
- Propane (G31) (NCV = 24.4 kWh/m³) [2]		m³/h	0.4-1.4	0.4-1.7	0.6-2.4	0.8-3.0
• Operating voltage		V/Hz	230/50	230/50	230/50	230/50
• Electrical power consumption min./max.		Watt	24/74	24/78	23/78	23/116
• Stand-by		Watt	6	6	6	6
• Type of protection		IP	40D	40D	40D	40D
• Permitted ambient temperature during operation		°C	5-40	5-40	5-40	5-40
• Sound power level						
- Heating noise (EN 15036 Part 1) (room air dependent)		dB(A)	61	61	63	63
• Condensate quantity (natural gas) at 50/30 °C		l/h	3.7	4.3	5.4	7.1
• pH value of the condensate			4-6	4-6	4-6	4-6
• Construction type			B23, C13(x), C33(x), C53(x), C63(x), C93(x)			
• Flue gas system						
- Temperature class			T 120	T 120	T 120	T 120
- Flue gas mass flow at max. nominal heat input (dry)		kg/h	52.5	66.4	88.4	124.0
- Flue gas mass flow at min. nominal heat input (dry)		kg/h	10.5	13.0	17.8	20.9
- Flue gas temperature at max. nominal heat output and 80/60 °C		°C	57.7	59.4	58.9	62.7
- Flue gas temperature at max. nominal heat output and 50/30 °C		°C	36.7	40.5	38.6	43.9
- Flue gas temperature at min. nominal heat output and 50/30 °C		°C	28.8	28.9	29.4	30.0
- Max. permissible temperature of the combustion air		°C	50	50	50	50
- Flow rate combustion air		Nm³/h	42.9	54.2	72.4	102.0
- Maximum supply pressure for combustion air supply and flue gas line		Pa	120	120	140	140
- Maximum draught/depression at flue gas outlet		Pa	-50	-50	-50	-50

[1] In relation to natural gas G20 (100 % methane). With a hydrogen content (H_2) of up to 20 % by vol. in accordance with DVGW ZP3100, an output reduction of up to 7 % is possible.

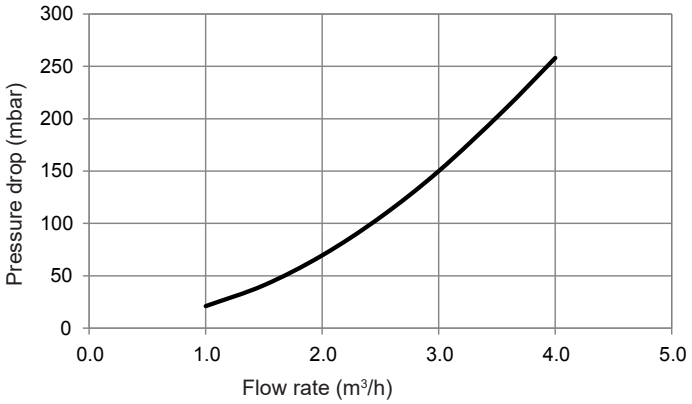
[2] Data related to NCV. TopGas® classic is also suitable for propane/butane (liquid gas) mixtures.

[3] Data related to NCV. The boiler series is tested for EE/H setting. With a factory setting to a Wobbe value of 15.0 kWh/m³, operation in the Wobbe value range from 12.0 to 15.7 kWh/m³ is possible without resetting.

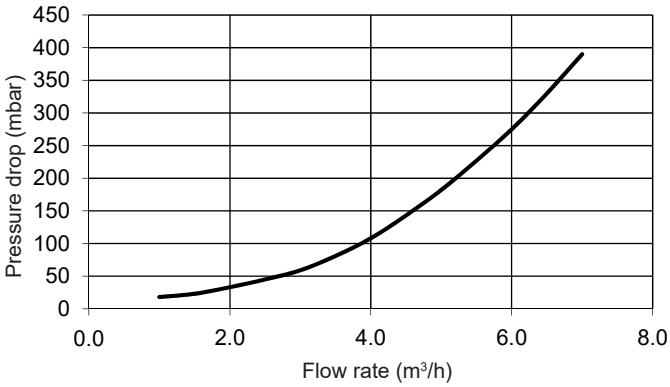
[4] Conversion acc. to EN 15502-1, Appendix J

Flow resistance on the heating water side

TopGas® classic (35,45)

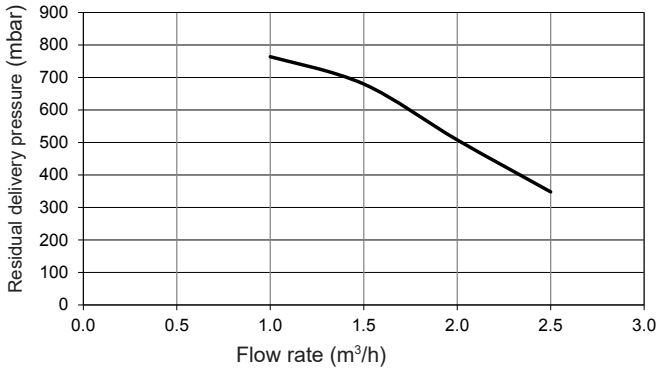


TopGas® classic (60,80)



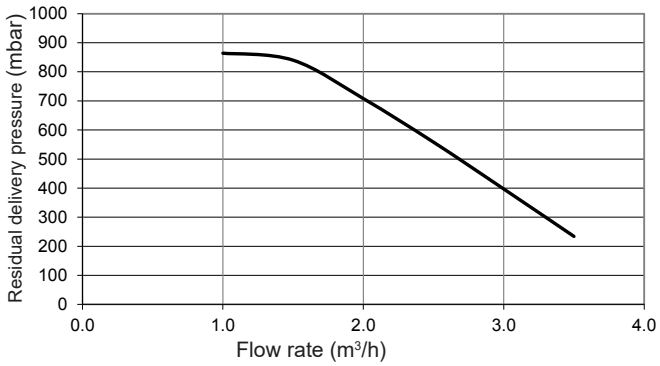
Maximum residual delivery pressure of heating pump with connection set AS32-TG/SPS-S 8 PM1

TopGas® classic (35,45)

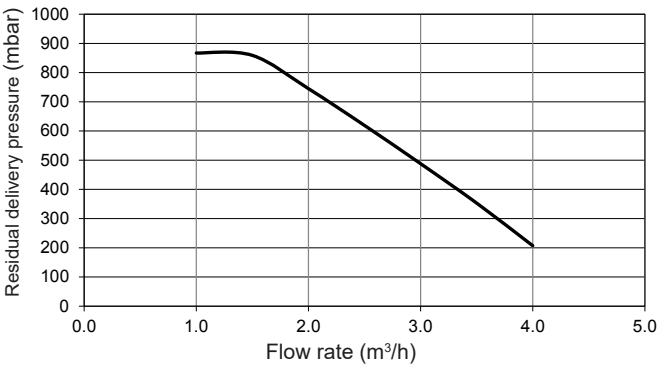


Maximum residual delivery pressure of heating pump with connection set AS32-TG/SPS-I 10

TopGas® classic (35,45)

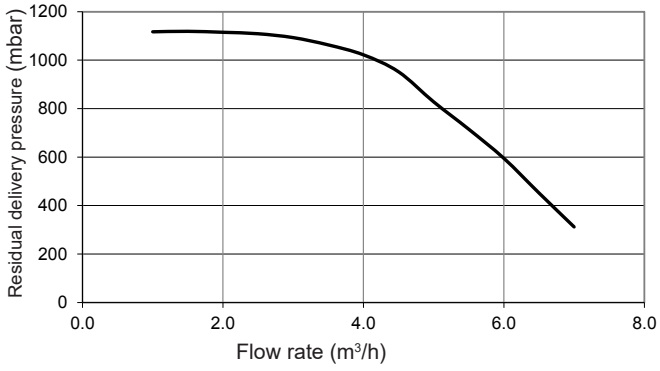


TopGas® classic (60,80)



Maximum residual overpressure of heating pump with connection set AS32-TG/SPS-I 12PM1

TopGas® classic (60,80)

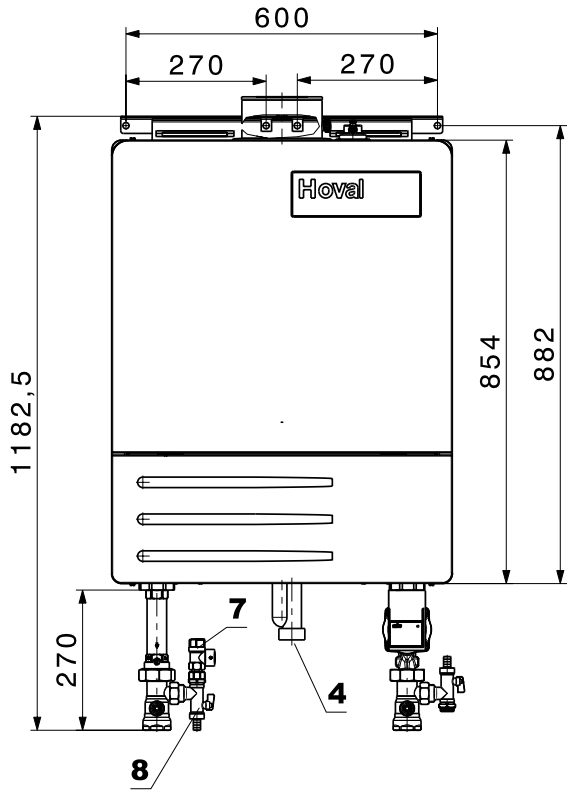


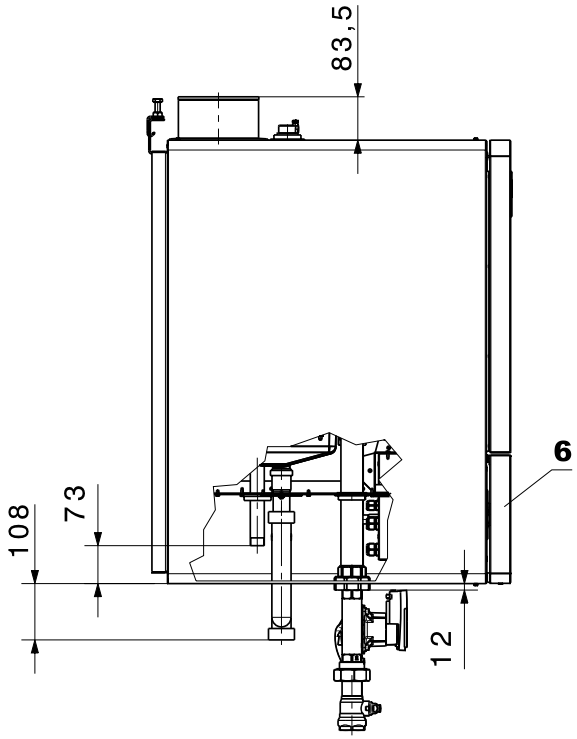
TopGas® classic (35-80)

Minimum spaces

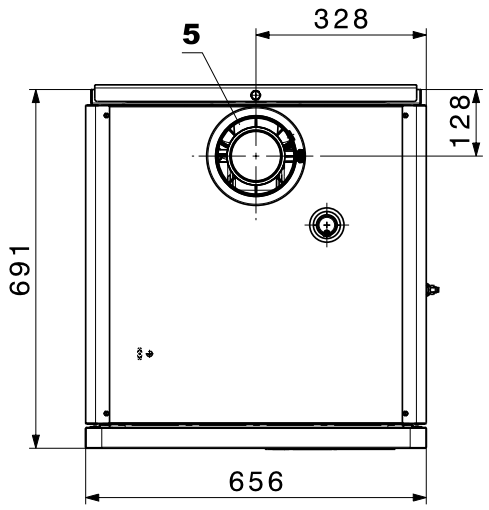
(Dimensions in mm)

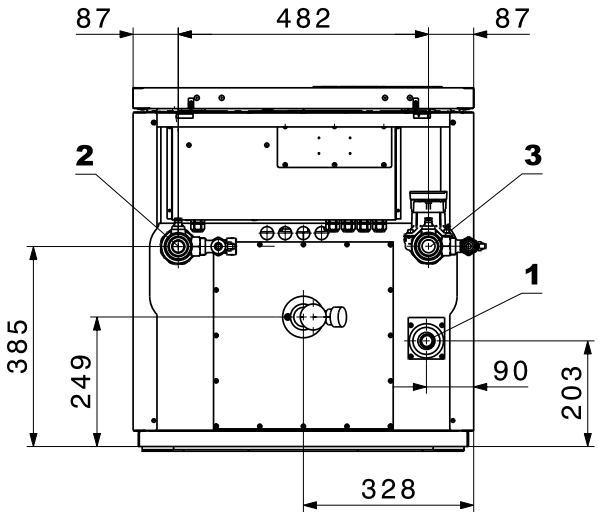
- Sideways 50 mm
- Space to ceiling dependent on the used flue gas system
- Front 500 mm





View from bottom





1	Gas connection	R ¾″
2	Flow heating	R 1 ¼″
3	Return heating	R 1 ¼″
4	Condensate drain	DN 40
5	Concentrical flue gas/combustion air connection C100/150	
6	Cover control panel	
7	Safety valve	
8	KFE ball valve	

Standards and guidelines

The official regulations for installation and operation must be observed. In particular, these are the country-specific standards (e.g. EN standard, DIN standards, …) as well as the corresponding regional regulations.

The following standards and guidelines must be complied with:

- Hoval technical information and installation instructions
- hydraulic and technical control regulations of Hoval
- DVGW directives
- DIN EN 12828 Safety-relevant requirements
- DIN EN 12831 Heaters Rules for the calculation of the heat requirements of buildings
- VDI 2035 Protection against damage by corrosion and boiler scale formation in heating and service water installations
- EN 14868 “Protection of metallic materials against corrosion”
- VDE 0100 supplement 2

Water quality in heating systems

Filling and replacement water, heating water

The following applies:

- VDI 2035
- In addition, the EN 14868 standard must be applied, **as well as the manufacturer-specific specifications**

Manufacturer-specific specifications

Filling and replacement water

The filling and replacement water must be fully demineralised.
The use of fully softened water should be avoided in systems with aluminium alloy as the water-side material.

Heating water

- In the case of **full demineralisation of the filling and replacement water,** the electrical conductivity of the heating water must not exceed the value of 100 µS/cm.
- pH value of the heating water for systems with aluminium alloy as water-side material 8.0 to 8.5 (measurement 10 weeks after commissioning at the earliest)
- The sum of the chloride, nitrate and sulphate contents in the heating water must not exceed 50 mg/l in total.

Additional notices

- Hoval boilers and calorifiers are suitable for heating systems without significant oxygen intake. (System type I according to EN 14868).
- The following systems must be equipped with **separate circuits**:
  - Systems operated with softened water.
  - Plants with continual oxygen intake (e.g. underfloor heating without diffusion-proof plastic piping) or intermittent oxygen intake (e.g. requiring frequent topping-up).
- In the case of bivalent heating systems, the values of the heat generator with the strictest requirement for water quality must be complied with.
- If only the boiler is replaced in an existing plant, it is not recommended for the entire heating system to be refilled, provided that the heating water already contained in the system complies with the relevant directives or standards.
- Before filling new systems and, where necessary, existing heating systems containing heating water that does not comply with the directives or standards, the heating system must be professionally cleaned and flushed. The boiler must not be filled until the heating system has been flushed.

Frost protection agent

The boiler must not be operated with frost protection agent in the heating water.
Separate circuits are required in frost-protected systems.

Heating room

Boilers cannot be positioned in rooms in which halogen compounds can occur and into which combustion air can enter (e.g. wash-, dryer-, work room, hairdressers and so on).
Halogen compounds can be caused by cleaning and degreasing solutions, dissolvents, glue and bleaching lyes.

Combustion air supply

The supply of combustion air must be guaranteed. There must be no possibility to close the air supply opening. For direct combustion air supply (LAS system), use the separator C80/125 -> E80 PP or C100/150 -> E100 PP.

The minimum free cross-section for the combustion air can be assumed simplified as follows:

- *Room air-independent operation with separate combustion air pipe to the boiler:* 0.8 cm² per 1 kW of output. The pressure drop in the combustion air pipe must be considered for the calculation of the flue gas system.

- *Room air-dependent operation:* Minimum free cross-section of the opening into the open: 150 cm² or twice 75 cm² and additionally 2 cm² necessary for each kW of output over 50 kW for vent in to the open.

Gas connection

Commissioning

- Initial commissioning is only allowed to be carried out by a qualified installer.
- Burner setting values according to the installation instructions.

Manual gas shut-off valve and gas filter

Immediately in front of the boiler a manual gas shut-off device (valve) must be installed according to relevant regulations. Should the local regulations or conditions demand this, an approved gas filter must be installed in the gas supply pipe between the gas tap (thermally releasing) and the boiler in order to prevent malfunction due to foreign particles being carried along with the gas.

Type of gas

- The boiler is only to be operated with the type of gas stated on the rating plate.

Gas pressure natural gas

- Necessary gas flow pressure at the boiler inlet: natural gas min. 17.4 mbar, max. 50 mbar

Propane gas pressure

- For propane, a gas pressure regulator must be provided on site for reducing the pilot pressure on the boiler
- Required gas flow pressure at the boiler entry: Propane min. 37 mbar, max. 50 mbar

Gas pressure regulator

- The installation of a gas pressure regulator is only necessary if the gas flow pressure in the gas network exceeds the maximum permissible gas flow pressure of the TopGas® classic or if there are considerable fluctuations in the gas flow pressure.
- Pressure fluctuations in the gas network must be prevented by suitable measures (e.g. gas storage tanks or pressure regulators). The local conditions must be checked in each individual case.

Sludge separator

Installation of a sludge separator with magnetic ring in the gas boiler return is recommended.

Minimum heating water circulation quantity

- Depending on the boiler type, different minimum circulating water quantities are required through the boiler. For details, see the corresponding data sheets.
- During burner operation, the circulating pump must be constantly in operation and the minimum heating water circulation quantity must be guaranteed.
- After each burner switch-off, the circulating pump must be in operation for at least 2 minutes (is guaranteed by the boiler controller).

Heating boiler in the attic

A water pressure guard is built in in the boiler, which automatically turns the gas burner off in case of water shortage. Notice: Mount the diaphragm pressure expansion tank in the boiler flow and the pump in the boiler return. See also paragraph “diaphragm pressure expansion tank”!

Condensate drainage

- A permit for discharge of the flue gas condensate into the sewage system must be obtained from the relevant authority or sewer operator.
- The condensate from the flue gas line can be discharged via the boiler. A condensate trap is no longer needed in the flue gas system.
- The condensate must be conducted openly (funnel) into the sewage system.
- Suitable materials for condensate drain:
  - stoneware pipes
  - pipes made from glass
  - pipes made from stainless steel
  - pipes made from plastic: PVC, PE, PP, ABS and UP

Diaphragm pressure expansion tank

- An adequately dimensioned diaphragm pressure expansion tank must be provided.
- The minimum inlet pressure in the diaphragm pressure expansion tank must be 1.2 bar and the minimum operating pressure in the boiler must be 1.5 bar.
- The pump must be connected in the boiler return and the diaphragm pressure expansion tank must be connected on the pump suction side.
- If the aforementioned minimum operating pressure in the boiler of 1.5 bar cannot be maintained (e.g. roof heating centres), the diaphragm pressure expansion tank must be installed in the boiler flow.
- Starting from 70 °C an additional intermediate tank is necessary.

Flue gas system

- Gas boilers must be connected to a certified and approved flue gas system such as flue gas lines.
- Flue gas lines must be gas-, condensate- and over pressure-tight.
- The flue gas lines must be secured against unwanted loosening of the plug connections.
- The flue gas system must be connected with an angle, so that the resulting condensate of the flue gas system can flow back to the boiler and can be neutralised there before discharging into the canalisation.
- Gas boilers with condensation heat utilisation are to be connected to a flue gas line min. temperature class T120.
- A flue gas temperature limiter is integrated into the boiler.

Allocation of gas filters for TopGas® classic (35-80)

TopGas® classic type	Gas throughput natural gas E m^3/h	Gas filter type	Dimension	Pressure drop gas filter (with clean filter) mbar
(35)	3.3	70612/6B	Rp ¾″	0.10
(45)	4.3	70612/6B	Rp ¾″	0.13
(60)	5.7	70612/6B	Rp ¾″	0.20
(80)	7.6	70602/6B	Rp 1″	0.10

It is essential to set the dimensions of the gas line!

Looking for the appropriate hydraulic schematic?
Please contact your local Hoval partner.

Hoval TopGas® classic (100,120)

Wall-hanging gas condensing boiler
- With condensing boiler technology
- For the combustion of:
  - natural gas E with a hydrogen content (H_2) of up to 20 % by vol.
  - propane according to DIN 51622
  - biomethane according to EN 16723
- Heat exchanger made of corrosion resistant aluminium alloy
- Built in:
  - pressure gauge
  - water pressure guard for water shortage protection
  - flue gas temperature sensor with flue gas temperature limiting function
  - automatic quick aspirator
- Pre-mixing surface burner made of stainless steel
  - Modulating with gas/air group control
  - Automatic ignition
  - Ionisation guard
  - Gas pressure monitor
- Minimal water circulation necessary (see technical data)
- Wall-hanging gas condensing boiler fully cased with coated white steel plates

Basic boiler control panel
- Control unit for gas burner with monitoring unit BIC 335
- Modulating burner control
- Main guard “I/O”
- Operation and fault indication
- Connection for external gas valve and fault indication

Model range

TopGas® classic type	Nominal heat output 50/30 °C kW
(100)	20.7-100.0
(120)	22.9-120.5

Optional
- For propane
- Free-standing calorifier
- Different designs of control panels

Delivery
- Wall-hanging gas condensing boiler fully cased

Heating controller set RS-OT
- For 1 heating circuit without mixing operation Weather-controlled regulation for continuously adjustable decreased boiler water temperature
- With integrated overplugable room temperature sensor
- Located in boiler room or living room
- Outdoor sensor
- Immersion sensor (calorifier sensor)

BMS module 0-10 V/OT (OpenTherm)
(building management system)
For boiler control as part of a building management system.
External **temperature control** 0-10 V.
0-1.0 V no requirement
1.0-9.5 V ..... 0-100 °C
Can be installed in the boiler control panel!

Heating controller set TopTronic® E ZE1
(Can be built in) as supplement for basic boiler control panel

Control panel
- Colour touchscreen 4.3 inch
- Heat generator blocking switch for interrupting operation
- Fault signalling lamp

TopTronic® E control module
- Colour touchscreen 4.3 inch
- Simple, intuitive operating concept
- Display of the most important operating statuses
- Configurable start screen
- Operating mode selection
- Configurable day and week programmes
- Operation of all connected Hoval CAN bus modules
- Commissioning wizard
- Service and maintenance function
- Fault message management
- Analysis function
- Weather display (with HovalConnect option)
- Adaptation of the heating strategy based on the weather forecast (with HovalConnect option)

TopTronic® E basic module heat generator TTE-WEZ
- Control functions integrated for
  - 1 heating/cooling circuit with mixer
  - 1 heating/cooling circuit without mixer
  - 1 hot water charging circuit
  - bivalent and cascade management
- RAST 5 basic plug set
- Outdoor sensor
- Immersion sensor (calorifier sensor)
- Contact sensor (flow temperature sensor)
- Cable set ZE1 for connecting the TopTronic® E control to the basic boiler control panel

Options for TopTronic® E controller
- Can be expanded by max. 1 module expansion:
  - module expansion heating circuit or
  - module expansion heat balancing or
  - module expansion Universal
- Can be networked with a total of up to 16 controller modules:
  - heating circuit/hot water module
  - solar module
  - buffer module
  - measuring module

No additional module expansions or controller modules can be installed in the boiler control panel!

The supplementary plug set must be ordered in order to use expanded controller functions.

Further information about the TopTronic® E
see “Controls”

Delivery
- Heating controller set separately packed, mounting on site

Wall-hanging gas condensing boiler

Hoval TopGas® classic (100,120)

Heat exchanger made of aluminium alloy
Modulating burner made of stainless steel
and basic boiler control panel, fully cased.

TopGas® classic type	Nominal heat output at 50/30 °C kW	Part No.
(100)	20.7-100.0	7014 584
(120)	22.9-120.5	7014 585

Permissions boilers

TopGas® classic (100,120)
CE product ID No. CE-0085BQ0218

Accessories

Conversion kit for propane — 6047 634
for TopGas® classic (35-120)

Connection set AS 40-TG
consisting of:
Return:
- Shut-off valve with union nut 2″ side output with boiler fill and drain valve and connection nozzle G ¾″ (external) for connecting a diaphragm pressure expansion tank
- Speed-controlled high-efficiency pump, various versions

Flow:
- Fitting piece (180 mm) G2″ with integrated non-return valve
- Shut-off valve with integrate non-return valve and side output with safety valve DN 25, 3 bar up to 120 kW incl. boiler fill and drain valve

Connection set / pump type	Speed control	Part No.
AS 40-TG/SPS-I 10	•	6059 334
AS 40-TG/SPS-I 12 PM1	•	6043 802

Speed control legend

PWM1 or PM1	PWM control signal heating

Accessories

Gas filter
with measurement nozzle before and behind the filter inset (diameter: 9 mm)
Pore width of the filter inset < 50 µm
Max. pressure difference 10 mbar
Max. inlet pressure 100 mbar

Type	Connection inches	Part No.
70612/6B	Rp ¾″	2007 995
70602/6B	Rp 1″	2007 996

Gas valve, passage DN 20, R ¾″ — 2012 077
with thermally releasing cut-off device

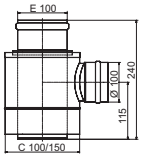
Gas valve, corner version DN 20, R ¾″ — 2012 078
with thermally releasing cut-off device

Sludge separator with magnet MB3/L DN 25 ... DN 50
Fast and continuous removal of ferromagnetic and non-magnetic dirt and sludge particles
Sludge separation up to a particle size of 5 µm
Brass housing
Max. operating pressure: 6 bar
Max. flow temperature: 110 °C

Type	Connection inches	Flow rate at 1 m/s flow speed m^3/h	Part No.
MBL DN 40	Rp 1½″	5.0	2062 167
MBL DN 50	Rp 2″	7.5	2062 168

Additional sludge separators
see «Various system components»

Heating armature groups and wall distributors
see “Various system components”

		Part No.
	**Separating piece C100/150 -> 2 x E100 PP** for UltraOil® (35,50), TopGas® classic (35-80), UltraGas® (50-100) for separate conduction of flue gas and combustion air (LAS system) Recommendation: If the air inlet at the facade is near a noise sensitive place (window of bedroom, terrace etc.), we recommend to use a sound absorber at the direct combustion air inlet.	2015 244
	**Backflow check valve** for TopGas® classic (60-120) to prevent the emergence of flue gas from the boiler in the use of cascades	6036 265

Boiler controller with heating controller set RS-OT

	**Heating controller set RS-OT** (Not for mixing operation!) For 1 heating circuit without mixing operation Flow temperature control controlled by atmospheric conditions with outdoor sensor, immersion sensor (calorifier sensor) and overridable room temperature sensor. Can be implemented as a room temperature control without outdoor sensor. Only wall mounting possible! **Notice** For integration into control panel: mounting set RS-OT must be ordered.	6020 566
	**Mounting set RS-OT** Assembly set for mounting of heating controller set RS-OT into boiler	6018 218
	**BMS module 0-10 V/OT - OpenTherm (building management system)** no control unit TopTronic® E or RS-OT necessary power supply via OT bus Temp. control external with 0-10 V 0-1.0 V no request 1.0-9.5 V ... 0-100 °C Cannot be installed in boiler control panel: - TopGas® classic (12-30) Can be installed in boiler control panel: - TopGas® classic (35-120)	6016 725

Boiler controller with heating controller set TopTronic® E

Boiler controller TopTronic® E ZE1
As supplement for basic boiler control panel G04 (can be built in).

Mounting of TopTronic® E control module in the front of boiler control panel
Mounting of TopTronic® E basic module heat generator in controller

Consisting of:
TopTronic® E control module
TopTronic® E basic module heat generator
fitting accessories
- 1 outdoor sensor AF/2P/K
- 1 immersion sensor TF/2P/5/6T/S1, L = 5.0 m
- 1 contact sensor ALF/2P/4/T/S1, L = 4.0 m

Notice
No additional module expansions or controller modules can be installed in the boiler control panel! This means an additional mixer circuit must be implemented using the TopTronic® E heating circuit/hot water module in an external wall casing.

For RS-OT and TopTronic® E ZE1

Part No.
6037 312

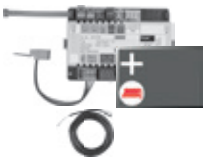
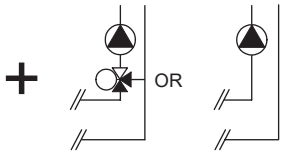
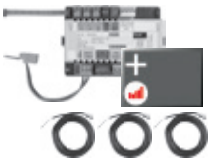
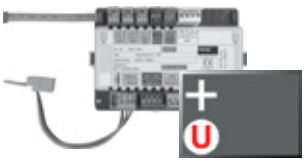
Flow temperature monitor
for panel heating (1 controller per heating circuit) 15-95 °C, setting (visible externally) under the casing cover

Clamp-on flow temperature monitor RAK-TW1000S
with retaining strap, without cable and plug

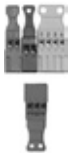
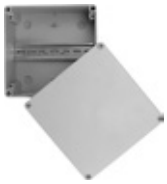
Part No.
242 902

TopTronic® E module expansions

for TopTronic® E basic module heat generator

	Part No.
 	**TopTronic® E module expansion heating circuit TTE-FE HK** Expansion to the inputs and outputs of the basic module heat generator or the heating circuit/domestic hot water module for implementing the following functions: - 1 heating/cooling circuit w/o mixer or - 1 heating/cooling circuit with mixer Consisting of: - Fitting accessories - 1 contact sensor ALF/2P/4/T, L = 4.0 m - Basic plug set FE module **Notice** The supplementary plug set may have to be ordered to implement functions differing from the standard!	6034 576
	**TopTronic® E module expansion heating circuit incl. energy balancing** TTE-FE HK-EBZ Expansion to the inputs and outputs of the basic module heat generator or the heating circuit/domestic hot water module for implementing the following functions: - 1 heating/cooling circuit w/o mixer or - 1 heating/cooling circuit with mixer incl. energy balancing in each case Consisting of: - Fitting accessories - 3 contact sensors ALF/2P/4/T, L = 4.0 m - Plug set FE module **Notice** Suitable flow rate sensors (pulse sensors) must be provided on site.	6037 062
	**TopTronic® E module expansion Universal TTE-FE UNI** Expansion to the inputs and outputs of a controller module (basic module heat generator, heating circuit/domestic hot water module, solar module, buffer module) for implementing various functions Consisting of: - Fitting accessories - Plug set FE module **Further information** see “Controls” - “Hoval TopTronic® E module expansions” chapter **Notice** Refer to the Hoval System Technology to find which functions and hydraulic arrangements can be implemented.	6034 575

Accessories for TopTronic® E

		Part No.
	**TopTronic® E controller modules**	
	TTE-HK/WW TopTronic® E heating circuit/ hot water module	6034 571
	TTE-SOL TopTronic® E solar module	6037 058
	TTE-PS TopTronic® E buffer module	6037 057
	TTE-MWA TopTronic® E measuring module	6034 574
	**Supplementary plug set**	
	for basic module heat generator TTE-WEZ	6034 499
	for controller modules and module expansion TTE-FE HK	6034 503
	**TopTronic® E room control modules**	
	TTE-RBM TopTronic® E room control modules	
	easy white	6037 071
	comfort white	6037 069
	comfort black	6037 070
	**Enhanced language package TopTronic® E**	6039 253
	one SD card required per control module Consisting of the following languages: HU, CS, SL, RO, PL, TR, ES, HR, SR, JA, DA	
	**HovalConnect**	
	HovalConnect LAN	6049 496
	HovalConnect WLAN	6049 498
	HovalConnect Modbus	6049 501
	HovalConnect KNX	6049 593
	TopTronic® E interface modules	
	GLT module 0-10 V	6034 578
	**TopTronic® E sensors**	
	AF/2P/K Outdoor sensor H x W x D = 80 x 50 x 28 mm	2055 889
	TF/2P/5/6T Immersion sensor, L = 5.0 m	2055 888
	ALF/2P/4/T Contact sensor, L = 4.0 m	2056 775
	TF/1.1P/2.5S/6T Collector sensor, L = 2.5 m	2056 776
	**Bivalent switch**	
	for various release or switching functions	
	Bivalent switch 1-piece	2056 858
	Bivalent switch 2-piece	2061 826
	**System housing**	
	System housing 182 mm	6038 551
	System housing 254 mm	6038 552
	**TopTronic® E wall casing**	
	WG-190 Wall casing small	6052 983
	WG-360 Wall casing medium	6052 984
	WG-360 BM Wall casing medium with control module cut-out	6052 985
	WG-510 Wall casing large	6052 986
	WG-510 BM Wall casing large with control module cut-out	6052 987

Further information
see “Controls”

Service

Commissioning
Commissioning by works service or Hoval trained authorised serviceman/company is condition for warranty.

For commissioning and other services please contact your Hoval sales office.

Part No.

TopGas® classic (100,120)

Type			(100)	(120)
• Nominal heat output at 80/60 °C, natural gas [1]		kW	18.6-91.2	20.7-109.7
• Nominal heat output at 50/30 °C, natural gas [1]		kW	20.7-100.0	22.9-120.5
• Nominal heat output at 80/60 °C, propane [2]		kW	22.9-90.4	23.7-107.6
• Nominal heat output at 50/30 °C, propane [2]		kW	25.3-100.0	26.1-120.0
• Nominal heat input with natural gas [3]		kW	19.2-93.7	21.1-114.0
• Nominal heat input with propane [2]		kW	23.7-93.0	24.6-111.5
• Operating pressure heating min./max. (PMS)		bar	1/4	1/4
• Test pressure (PT)		bar	6	6
• Operating temperature max. (T_{max})		°C	85	85
• Boiler water content ($V_{(H20)}$)		l	7.0	7.0
• Flow resistance boiler		z value	see diagram	
• Minimum circulation water quantity		l/h	800	800
• Boiler weight (without water content, incl. cladding)		kg	130	130
• Boiler efficiency at 80/60 °C in full-load operation (NCV/GCV) [4]		%	97.8/88.2	98.6/88.9
• Boiler efficiency at 30 % partial load (NCV/GCV) [4]		%	107.6/97.0	106.1/95.8
• Room heating energy efficiency				
- without control	ηs	%	92	91
- with control	ηs	%	94	93
- with control and room sensor	ηs	%	96	95
- annual energy consumption	Q_{HE}	GJ	171	205
• NOx class (EN 15502)			-	-
• Nitrogen oxide emissions (EN 15502) (GCV)	NOx	mg/kWh	28.0	31.0
• O_2 content in flue gas min./max. output		%	5.5/5.5	4.7/5.5
• Heat loss in standby mode		Watt	115	115
• Dimensions			see table of dimensions	
• Gas flow pressure min./max.				
- Natural gas E/LL		mbar	17.4-50	17.4-50
- Propane		mbar	37-50	37-50
• Gas connection values at 15 °C/1013 mbar:				
- Natural gas E (Wo = 15.0 kWh/m³) NCV = 9.7 kWh/m³		m³/h	2.0-9.7	2.2-11.8
- Natural gas LL (G25) - (Wo = 12.4 kWh/m³) NCV = 8.13 kWh/m³		m³/h	2.4-11.5	2.6-14.0
- Propane (G31) - (NCV = 24.4 kWh/m³) [2]		m³/h	1.0-3.8	1.0-4.6
• Operating voltage		V/Hz	230/50	230/50
• Electrical power consumption min./max.		Watt	22/150	22/214
• Stand-by		Watt	6	6
• Type of protection		IP	40D	40D
• Permitted ambient temperature during operation		°C	5-40	5-40
• Sound power level				
- Heating noise (EN 15036 Part 1) (room air dependent)		dB(A)	63	63
• Condensate quantity (natural gas) at 50/30 °C		l/h	8.9	10.3
• pH value of the condensate			4-6	4-6
• Construction type			B23, C13(x), C33(x), C53(x), C63(x), C93(x)	
• Flue gas system				
- Temperature class			T120	T120
- Flue gas mass flow at max. nominal heat input (dry)		kg/h	152	187
- Flue gas mass flow at min. nominal heat input (dry)		kg/h	29.2	32.0
- Flue gas temperature at max. nominal heat output and 80/60 °C		°C	63	67
- Flue gas temperature at max. nominal heat output and 50/30 °C		°C	43	46
- Flue gas temperature at min. nominal heat output and 50/30 °C		°C	30	30
- Max. permissible temperature of the combustion air		°C	50	50
- Flow rate combustion air		Nm³/h	125	153
- Maximum supply pressure for combustion air supply and flue gas line		Pa	140	140
- Maximum draught/depression at flue gas outlet		Pa	-50	-50

[1] In relation to natural gas G20 (100 % methane). With a hydrogen content (H_2) of up to 20 % in accordance with DVGW ZP3100, an output

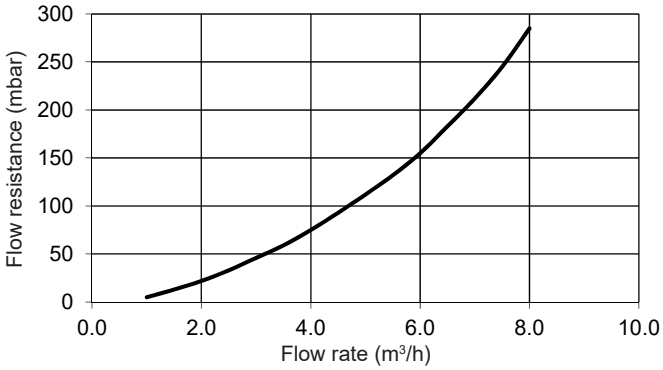
[2] Data related to NCV. TopGas® classic is also suitable for propane/butane (liquid gas) mixtures.

[3] Data related to NCV. The boiler series is tested for EE/H setting. With a factory setting to a Wobbe value of 15.0 kWh/m³, operation in the Wobbe value range from 12.0 to 15.7 kWh/m³ is possible without resetting.

[4] Conversion acc. to EN 15502-1, Appendix J

Flow resistance on the heating water side

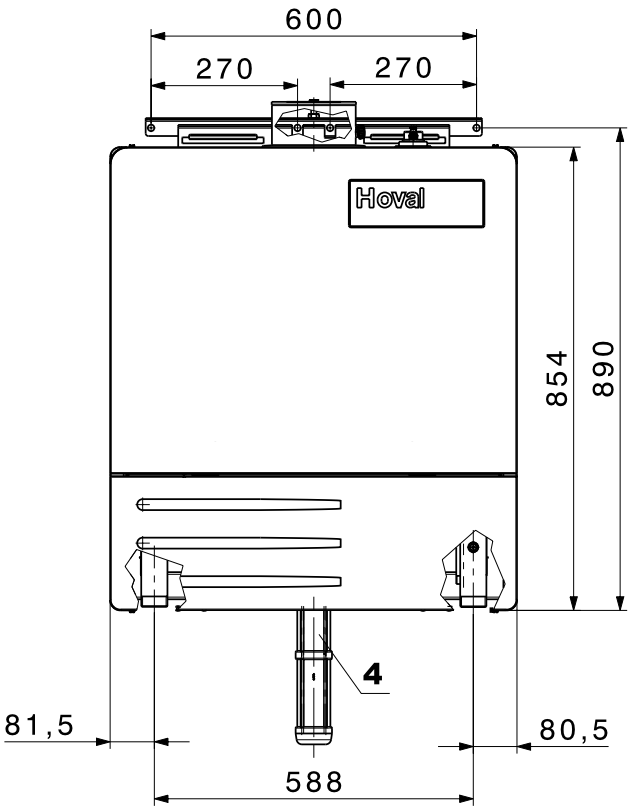
TopGas® classic (100,120)

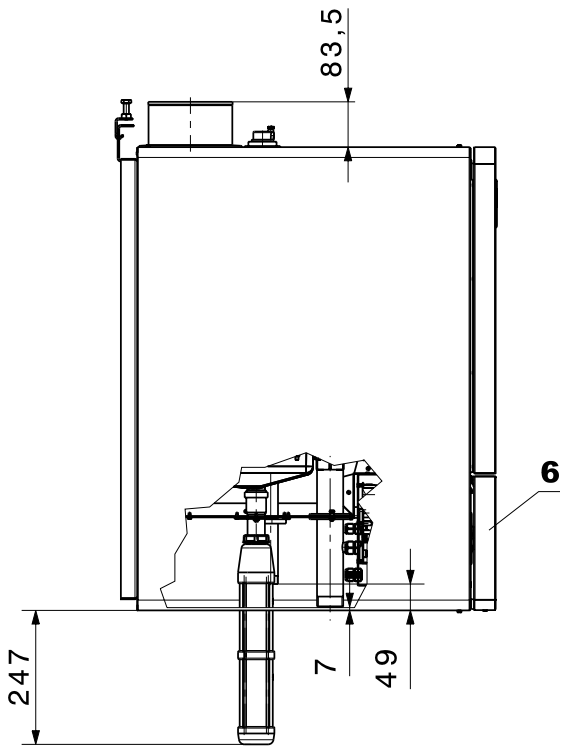


TopGas® classic (100,120)

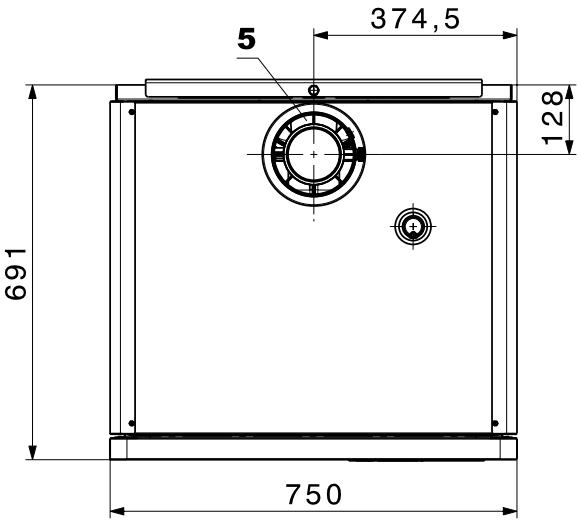
Minimum spaces
(Dimensions in mm)

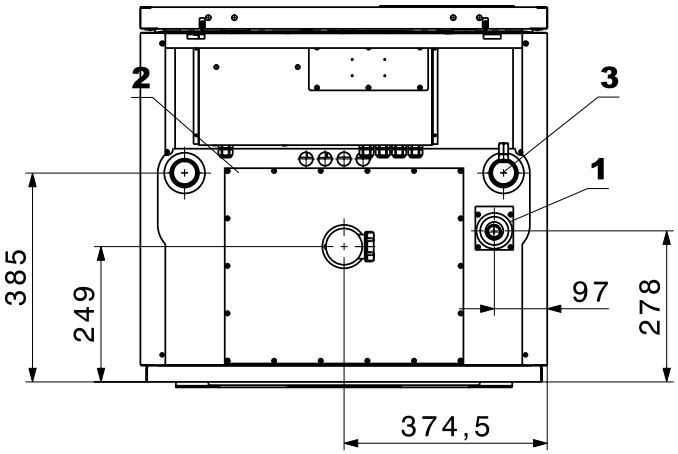
- Sideways 50 mm
- Space to ceiling dependent on the flue gas system
- Front 500 mm





View from bottom





1	Gas connection	R ¾″
2	Flow heating	R 1¼″
3	Return heating	R 1¼″
4	Condensate drain	DN 40
5	Concentrical flue gas/combustion air connection C100/150	
6	Cover control panel	

Standards and guidelines

The official regulations for installation and operation must be observed. In particular, these are the country-specific standards (e.g. EN standard, DIN standards, …) as well as the corresponding regional regulations.

The following standards and guidelines must be complied with:

- Hoval technical information and installation instructions
- hydraulic and technical control regulations of Hoval
- DVGW directives
- DIN EN 12828
  Safety-relevant requirements
- DIN EN 12831 Heaters
  Rules for the calculation of the heat requirements of buildings
- VDI 2035 Protection against damage by corrosion and boiler scale formation in heating and service water installations
- EN 14868 “Protection of metallic materials against corrosion”
- VDE 0100 supplement 2

Water quality in heating systems

Filling and replacement water, heating water

The following applies:

- VDI 2035
- In addition, the EN 14868 standard must be applied, **as well as the manufacturer-specific specifications**

Manufacturer-specific specifications

Filling and replacement water

The filling and replacement water must be fully demineralised.
The use of fully softened water should be avoided in systems with aluminium alloy as the water-side material.

Heating water

- In the case of **full demineralisation of the filling and replacement water,** the electrical conductivity of the heating water must not exceed the value of 100 µS/cm.
- pH value of the heating water for systems with aluminium alloy as water-side material 8.0 to 8.5 (measurement 10 weeks after commissioning at the earliest)
- The sum of the chloride, nitrate and sulphate contents in the heating water must not exceed 50 mg/l in total.

Additional notices

- Hoval boilers and calorifiers are suitable for heating systems without significant oxygen intake. (System type I according to EN 14868).
- The following systems must be equipped with **separate circuits**:
  - Systems operated with softened water.
  - Plants with continual oxygen intake (e.g. underfloor heating without diffusion-proof plastic piping) or intermittent oxygen intake (e.g. requiring frequent topping-up).
- In the case of bivalent heating systems, the values of the heat generator with the strictest requirement for water quality must be complied with.
- If only the boiler is replaced in an existing plant, it is not recommended for the entire heating system to be refilled, provided that the heating water already contained in the system complies with the relevant directives or standards.
- Before filling new systems and, where necessary, existing heating systems containing heating water that does not comply with the directives or standards, the heating system must be professionally cleaned and flushed. The boiler must not be filled until the heating system has been flushed.

Frost protection agent

The boiler must not be operated with frost protection agent in the heating water.
Separate circuits are required in frost-protected systems.

Heating room

Boilers cannot be positioned in rooms in which halogen compounds can occur and into which combustion air can enter (e.g. wash-, dryer-, work room, hairdressers and so on).
Halogen compounds can be caused by cleaning and degreasing solutions, dissolvents, glue and bleaching lyes.

Combustion air supply

The supply of combustion air must be guaranteed. There must be no possibility to close the air supply opening. For direct combustion air supply (LAS system), use the separator C80/125 -> E80 PP or C100/150 -> E100 PP.

The minimum free cross-section for the combustion air can be assumed simplified as follows:

- *Room air-independent operation with separate combustion air pipe to the boiler:*
  0.8 cm² per 1 kW of output. The pressure drop in the combustion air pipe must be considered for the calculation of the flue gas system.

- *Room air-dependent operation:*
  Minimum free cross-section of the opening into the open: 150 cm² or twice 75 cm² and additionally 2 cm² necessary for each kW of output over 50 kW for vent in to the open.

Gas connection

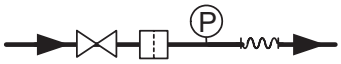
Commissioning

- Initial commissioning is only allowed to be carried out by a qualified installer.
- Burner setting values according to the installation instructions.

Manual gas shut-off valve and gas filter

Immediately in front of the boiler a manual gas shut-off device (valve) must be installed according to relevant regulations. Should the local regulations or conditions demand this, an approved gas filter must be installed in the gas supply pipe between the gas tap (thermally releasing) and the boiler in order to prevent malfunction due to foreign particles being carried along with the gas.

Construction of recommended gas connection



Legend:

manual gas shut-off valve

gas hose/compensator

gas filter

pressure gauge with test burner and push-button valve

Type of gas

- The boiler is only to be operated with the type of gas stated on the rating plate.

Gas pressure natural gas

- In boilers with a nominal heat input in excess of 70 kW, install a pressure regulator in accordance with EN88-1 in the gas supply line directly before the boiler.
- Necessary gas flow pressure at the boiler inlet: natural gas min. 17.4 mbar, max. 50 mbar

Propane gas pressure

- For propane, a gas pressure regulator must be provided on site for reducing the pilot pressure on the boiler
- Required gas flow pressure at the boiler entry: propane min. 37 mbar, max. 50 mbar

Allocation of gas filters for TopGas® classic (100,120)

TopGas® classic type	Gas throughput natural gas E m³/h	Gas filter type	Dimension	Pressure drop gas filter (with clean filter) mbar
(100)	9.4	70602/6B	Rp 1″	0.14
(120)	11.4	70602/6B	Rp 1″	0.20

It is essential to set the dimensions of the gas line!

Sludge separator
Installation of a sludge separator with magnetic ring in the gas boiler return is recommended.

Minimum heating water circulation quantity
- The minimum inlet pressure in the diaphragm pressure expansion tank must be 1.2 bar and the minimum operating pressure in the boiler must be 1.5 bar.
- The pump must be connected in the boiler return and the diaphragm pressure expansion tank must be connected on the pump suction side.
- After each burner switch-off, the circulating pump must be in operation for at least 2 minutes (is guaranteed by the boiler controller).

Heating boiler in the attic
A water pressure guard is built in in the boiler, which automatically turns the gas burner off in case of water shortage. Notice: Mount the diaphragm pressure expansion tank in the boiler flow and the pump in the boiler return. See also paragraph “diaphragm pressure expansion tank”!

Condensate drainage
- A permit for discharge of the flue gas condensate into the sewage system must be obtained from the relevant authority or sewer operator.
- The condensate from the flue gas line can be discharged via the boiler. A condensate trap is no longer needed in the flue gas system.
- The condensate must be conducted openly (funnel) into the sewage system.
- Suitable materials for condensate drain:
  - stoneware pipes
  - pipes made from glass
  - pipes made from stainless steel
  - pipes made from plastic: PVC, PE, PP, ABS and UP

Diaphragm pressure expansion tank
- An adequately dimensioned diaphragm pressure expansion tank must be provided.
- The minimum inlet pressure in the diaphragm pressure expansion tank must be 1.2 bar and the minimum operating pressure in the boiler must be 1.5 bar.
- The pump must be connected in the boiler return and the diaphragm pressure expansion tank must be connected on the pump suction side.
- If the aforementioned minimum operating pressure in the boiler of 1.5 bar cannot be maintained (e.g. roof heating centres), the diaphragm pressure expansion tank must be installed in the boiler flow.
- Starting from 70 °C an additional intermediate tank is necessary.

Flue gas system
- Gas boilers must be connected to a certified and approved flue gas system such as flue gas lines.
- Flue gas lines must be gas-, condensate- and over pressure-tight.
- The flue gas lines must be secured against unwanted loosening of the plug connections.
- The flue gas system must be connected with an angle, so that the resulting condensate of the flue gas system can flow back to the boiler and can be neutralised there before discharging into the canalisation.
- Gas boilers with condensation heat utilisation are to be connected to a flue gas line min. temperature class T120.
- A flue gas temperature limiter is integrated into the boiler.

Looking for the appropriate hydraulic schematic?
Please contact your local Hoval partner.

Hoval UltraGas® (15-100)

Gas condensing boiler
- Steel boiler with condensation technology
- For the combustion of:
  - natural gas E
  - natural gas E with a hydrogen content (H_2) of up to 20 % by vol.
  - propane according to DIN 51622
  - biomethane according to EN 16723
- Combustion chamber made of stainless steel
- Maximal flue gas condensation through downstream heating surface made of **aluFer®** stainless steel bounded pipe; heating gas side: aluminium water side: stainless steel
- Thermal insulation with mineral wool mat
- Water pressure sensor (minimum and maximum pressure limiter integrated)
- Flue gas temperature sensor with flue gas limiter function
- Pre-mix burner
  - with blower and venturi
  - modulating operation
  - automatic ignition
  - ionisation guard
  - gas pressure monitor
- Gas boiler fully cased with steel plate, red powder-coated
- Heating connections to left and right for:
  - heating flow
  - high temperature return
  - low temperature return
- *UltraGas® (15-50):* Flue gas connection backwards to the top
- *UltraGas® (70,100):* concentrical supply air/flue gas connection, vertically upwards, horizontally to rear as option, see accessories and dimension sheet
- TopTronic® E controller installed
- Possibility of connecting an external gas solenoid valve with error output

Model range

UltraGas® type		Nominal heat output 50/30 °C kW
(15)	A	3.0-15.2
(20)	A	4.0-20.2
(27)	A	5.0-26.9
(35)	A	5.8-34.3
(50)	A	8.0-48.8
(70)	A	13.5-69.0
(100)		20.9-99.0

Energy efficiency class of the compound system with control.

TopTronic® E controller

Control panel
- Colour touchscreen 4.3 inch
- Heat generator blocking switch for interrupting operation
- Fault signalling lamp

TopTronic® E control module
- Simple, intuitive operating concept
- Display of the most important operating statuses
- Configurable start screen
- Operating mode selection
- Configurable day and week programmes
- Operation of all connected Hoval CAN bus modules
- Commissioning wizard
- Service and maintenance function
- Fault message management
- Analysis function
- Weather display (with online HovalConnect)
- Adaptation of the heating strategy based on the weather forecast (with online HovalConnect)

TopTronic® E basic module heat generator TTE-WEZ
- Control functions integrated for
  - 1 heating/cooling circuit with mixer
  - 1 heating/cooling circuit without mixer
  - 1 hot water charging circuit
  - bivalent and cascade management
- Outdoor sensor
- Immersion sensor (calorifier sensor)
- Contact sensor (flow temperature sensor)
- RAST 5 basic plug set

Options for TopTronic® E controller
- Can be expanded by max. 1 module expansion:
  - module expansion heating circuit or
  - module expansion heat balancing or
  - module expansion Universal
- Can be networked with a total of up to 16 controller modules:
  - heating circuit/hot water module
  - solar module
  - buffer module
  - measuring module

Number of modules that can be additionally installed in the heat generator:
- 1 module expansion and 1 controller module **or**
- 2 controller modules

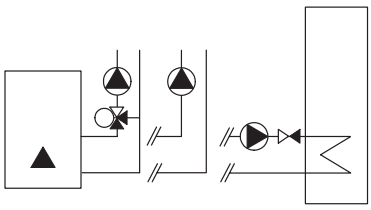
The supplementary plug set must be ordered in order to use expanded controller functions.

Further information about the TopTronic® E
see “Controls”

Optional
- For propane
- Free-standing calorifier see Calorifiers
- Flue gas systems

Delivery
- Floor-standing gas condensing boiler fully cased

Floor-standing gas condensing boiler



Boiler permissions
UltraGas® (15-100)

CE product ID No. CE-0085AQ0620

Hoval UltraGas® (15-100)

Floor-standing gas condensing boiler
with built-in Hoval TopTronic® E control

Control functions integrated for
- 1 heating circuit with mixer
- 1 heating circuit without mixer
- 1 hot water charging circuit
- bivalent and cascade management

- Can be optionally expanded by max. 1 module expansion:
  - module expansion heating circuit or
  - module expansion heat balancing or
  - module expansion Universal
- Can be optionally networked with a total of up to 16 controller modules (incl. solar module)

Boiler made of steel with TopTronic® E control, combustion chamber made of stainless steel. Secondary heating surfaces made of **aluFer®** stainless steel composite pipe. Premix burner with blower. Modulating burner.

Delivery
Gas boiler fully panelled

UltraGas® type		Nominal heat output 50/30 °C kW	Part No.
(15)	A	3.0-15.2	7013 300
(20)	A	4.0-20.2	7013 301
(27)	A	5.0-26.9	7013 302
(35)	A	5.8-34.3	7013 303
(50)	A	8.0-48.8	7013 304
(70)	A	13.5-69.0	7011 990
(100)		20.9-99.0	7011 991

Energy efficiency class of the compound system with control

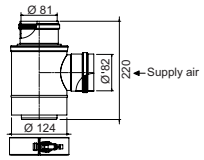
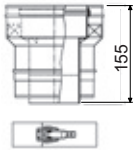
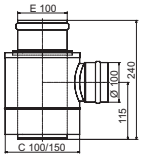
Accessories

	Part No.
Modification set for propane for UltraGas® (15-70)	6047 605
Modification set for propane for UltraGas® (100)	6047 609
Necessary accessories for room air independent operation	
 **Connection set for room air independent operation without sound absorber** for UltraOil® (16-35), UltraGas® (15-50) Consisting of: corrugated pipe Ø 50 mm for combustion air supply to burner. Concentric boiler connection piece E80 -> C80/125 PP for flue gas and supply air. Necessary if no Hoval LAS flue gas line system is used.	6027 510

In the UltraGas®, ventilation of the installation or boiler room must be guaranteed for operation INdependent from the room air.

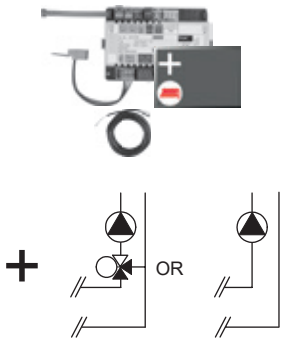
For room air independent operation with separate combustion air duct (not concentrical).

Accessories

		Part No.
	**Separating piece C80/125 -> 2 x E80 PP** for room air independent operation for separate conduction of flue gas and combustion air.	2010 174
	**Adapter piece C80/125 -> C100/150 PP**	2018 533
	**Separating piece C100/150 -> 2 x E100 PP** for UltraOil® (35,50), TopGas® classic (35-80), UltraGas® (50-100) for separate conduction of flue gas and combustion air (LAS system) Recommendation: If the air inlet at the facade is near a noise sensitive place (window of bedroom, terrace etc.), we recommend to use a sound absorber at the direct combustion air inlet.	2015 244
	**Horizontal flue gas connection E100 PP** for UltraOil® (50), UltraGas® (70,100) for the conversion of the vertical flue gas connection (series delivery) to a horizontal to rear routed flue gas connection.	6016 933
	**Suction tube for combustion air** for UltraGas® (70) only necessary with horizontal and concentric flue gas connection (separate ducting of combustion air and flue gas). Connection “Horizontal flue gas connection E100 PP” essential, ø 75 mm The boiler room must be ventilated.	6017 288

TopTronic® E module expansions

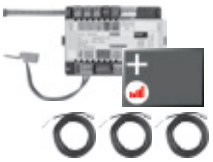
for TopTronic® E basic module heat generator

	Part No.
	6034 576

TopTronic® E module expansion heating circuit TTE-FE HK
Expansion to the inputs and outputs of the basic module heat generator or the heating circuit/domestic hot water module for implementing the following functions:
- 1 heating/cooling circuit w/o mixer or
- 1 heating/cooling circuit with mixer

Consisting of:
- Fitting accessories
- 1 contact sensor ALF/2P/4/T, L = 4.0 m
- Basic plug set FE module

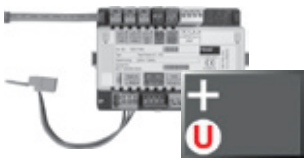
Notice
The supplementary plug set may have to be ordered to implement functions differing from the standard!

	6037 062

TopTronic® E module expansion heating circuit incl. energy balancing
TTE-FE HK-EBZ
Expansion to the inputs and outputs of the basic module heat generator or the heating circuit/domestic hot water module for implementing the following functions:
- 1 heating/cooling circuit w/o mixer or
- 1 heating/cooling circuit with mixer

incl. energy balancing in each case
Consisting of:
- Fitting accessories
- 3 contact sensors ALF/2P/4/T, L = 4.0 m
- Plug set FE module

Notice
The flow rate sensor set must be ordered as well.

	6034 575

TopTronic® E module expansion Universal TTE-FE UNI
Expansion to the inputs and outputs of a controller module (basic module heat generator, heating circuit/domestic hot water module, solar module, buffer module) for implementing various functions
Consisting of:
- Fitting accessories
- Plug set FE module

Notice
Refer to the Hoval System Technology to find which functions and hydraulic arrangements can be implemented.

Further information
see “Controls” - “Hoval TopTronic® E module expansions” chapter

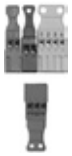
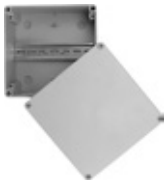
Flow rate sensor sets
Plastic housing

Size	Connection inches	Flow rate l/min	Part No.
DN 8	G ¾″	0.9-15	6038 526
DN 10	G ¾″	1.8-32	6038 507
DN 15	G 1″	3.5-50	6038 508
DN 20	G 1¼″	5-85	6038 509
DN 25	G 1½″	9-150	6038 510

Brass housing

Size	Connection inches	Flow rate l/min	Part No.
DN 10	G 1″	2-40	6042 949
DN 32	G 1½″	14-240	6042 950

Accessories for TopTronic® E

		Part No.
	**TopTronic® E controller modules**	
	TTE-HK/WW TopTronic® E heating circuit/ hot water module	6034 571
	TTE-SOL TopTronic® E solar module	6037 058
	TTE-PS TopTronic® E buffer module	6037 057
	TTE-MWA TopTronic® E measuring module	6034 574
	**Supplementary plug set**	
	for basic module heat generator TTE-WEZ	6034 499
	for controller modules and module expansion TTE-FE HK	6034 503
	**TopTronic® E room control modules**	
	TTE-RBM TopTronic® E room control modules	
	easy white	6037 071
	comfort white	6037 069
	comfort black	6037 070
	**Enhanced language package TopTronic® E**	6039 253
	one SD card required per control module Consisting of the following languages: HU, CS, SL, RO, PL, TR, ES, HR, SR, JA, DA	
	**HovalConnect**	
	HovalConnect LAN	6049 496
	HovalConnect WLAN	6049 498
	HovalConnect Modbus	6049 501
	HovalConnect KNX	6049 593
	TopTronic® E interface modules	
	GLT module 0-10 V	6034 578
	**TopTronic® E sensors**	
	AF/2P/K Outdoor sensor H x W x D = 80 x 50 x 28 mm	2055 889
	TF/2P/5/6T Immersion sensor, L = 5.0 m	2055 888
	ALF/2P/4/T Contact sensor, L = 4.0 m	2056 775
	TF/1.1P/2.5S/6T Collector sensor, L = 2.5 m	2056 776
	**Bivalent switch**	
	for various release or switching functions	
	Bivalent switch 1-piece	2056 858
	Bivalent switch 2-piece	2061 826
	**System housing**	
	System housing 182 mm	6038 551
	System housing 254 mm	6038 552
	**TopTronic® E wall casing**	
	WG-190 Wall casing small	6052 983
	WG-360 Wall casing medium	6052 984
	WG-360 BM Wall casing medium with control module cut-out	6052 985
	WG-510 Wall casing large	6052 986
	WG-510 BM Wall casing large with control module cut-out	6052 987

Further information
see “Controls”

Accessories

		Part No.
	**Flow temperature monitor** for panel heating (1 controller per heating circuit) 15-95 °C, setting (visible externally) under the casing cover	
	Clamp-on flow temperature monitor RAK-TW1000S with retaining strap, without cable and plug	242 902
	Clamp-on flow temperature monitor set RAK-TW1000S with retaining strap, supplied with cable (4 m) and plug	6033 745
	Immersion thermostat RAK-TW1000S Thermostat with immersion sleeve ½″ Depth of immersion 150 mm, nickel-plated brass	6010 082
	**CO monitor** For safety shut-off of the boiler on leakage of carbon monoxide incl. connection cable	6043 277
	for UltraGas® (15-50)	
  Installation example	**Safety set SG15-1″** Suitable up to max. 50 kW complete with safety valve (3 bar) Pressure gauge and autom. aspirator with shut-off valve. Connection: DN 15, 1″ internal thread	641 184
	for UltraGas® (70,100)	
  Installation example	**Safety set SG20-1″** Area of application up to 100 kW complete with safety valve (3 bar) Pressure gauge and autom. aspirator with shut-off valve. Connection: DN 20-1″ internal thread	6014 390
	**Boiler socket** for UltraOil® (16-35), UltraGas® (15-50) to elevate the condensate drainage made of steel height 150 mm anthracite painted	6025 418

Accessories

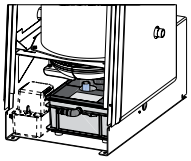
Gas valve
with thermally releasing cut-off device

Type	Connection inches	Part No.
DN 15	R ½″	2012 075
DN 20	R ¾″	2012 077
DN 25	R 1″	2069 324

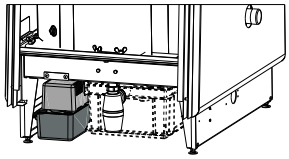
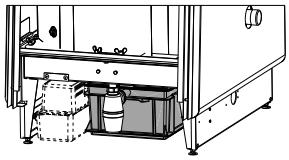
Gas filter
with measurement nozzle before and behind the filter inset (diameter: 9 mm)
Pore width of the filter inset < 50 µm
Max. pressure difference 10 mbar
Max. inlet pressure 100 mbar

Type	Connection inches	Part No.
70612/6B	Rp ¾″	2007 995
70602/6B	Rp 1″	2007 996

Condensate drain for Hoval UltraGas® (15-90)

		Part No.
	**Condensate pump** for transporting condensate into a higher drainage duct Including connection lines Completely wired, cable and plug For connection to the boiler controller Delivery head: max. 4 m Can be combined with neutralisation box	6045 476
	**Neutralisation box** for transporting condensation water into a lower lying drainage duct incl. condensate neutralisation incl. neutralisation granulate 3 kg combinable with condensate pump can be mounted in boiler socket	6024 764
	**Neutralisation granulate** for neutralisation box Refill set volume 3 kg Life time of one filling: approx. 1 year, depending on amount of condensate	2028 906

Condensate drain for Hoval UltraGas® (70,100)

	**Condensate pump** for UltraOil® (50), UltraGas® (70,100) for transporting condensate into a higher drainage duct Including connection lines Completely wired, cable and plug For connection to the boiler controller Delivery head: max. 4 m Can be combined with neutralisation box can be mounted in boiler socket	6061 127
	**Neutralisation box** for UltraOil® (50), UltraGas® (70,100) for transporting condensation water into a lower lying drainage duct incl. neutralisation granulate 6 kg. Combinable with condensate pump; can be mounted in boiler socket	6012 553
	**Neutralisation granulate** for neutralisation box Refill set volume 3 kg Life time of one filling: approx. 1 year, depending on amount of condensate	2028 906

Boiler connection set

		Part No.
	**Connection set AS 25-S/NT/HT** for mounting a heating regulating armature HA25 for MultiJet® (12,16), UltraOil® (16,20), UltraGas® (15,27) Rigid flow pipe and flexible return pipe Suitable for left or right connection Low/high temperature Connection set completely insulated For mounting a heating regulating armature HA20 an adapter set DN 20-DN 25 is required.	6017 055
	**Connection set AS 32-S/NT/HT** for mounting a heating regulating armature HA32 for UltraGas® (35,50) Rigid flow pipe and flexible return pipe with fastening material Suitable for left or right connection Low/high temperature Connection set completely insulated For mounting a heating regulating armature HA25 an adapter set DN 25-DN 32 is required.	6014 846
	**Connection set AS 40-S/NT/HT** for mounting a heating regulating armature HA40 for UltraOil® (50), UltraGas® (70,100) Rigid flow pipe and flexible return pipe with screw flange R 1½" Suitable for left or right connection Low/high temperature Connection set completely insulated For mounting a heating regulating armature HA32 an adapter set DN 32-DN 40 is required.	6014 848
	**Connection set AS 25-LG** for mounting a Compact charging group LG-2 for MultiJet® (12,16), UltraOil® (16-35), UltraGas® (15-27) Suitable for left or right connection Low-temperature return Connection set completely insulated made of flexible pipes	6034 818

Heating armature groups

Heating armature group HA-3BM-R
with 3-way motor mixer and heat-insulating box.
Installation right (flow left)

HA group/pump	Speed control					EEI ≤	Part No.
DN 20 (¾")							
HA20-3BM-R/HSP 4	•			•	•	0.18	6051 715
HA20-3BM-R/HSP 6	•			•	•	0.20	6051 716
HA20-3BM-R/SPS-S 7	•	•		•	•	0.20	6049 541
HA20-3BM-R/SPS-S 8	•	•		•	•	0.20	6049 542
DN 25 (1")							
HA25-3BM-R/HSP 6	•			•	•	0.20	6051 717
HA25-3BM-R/SPS-S 7	•	•		•	•	0.20	6049 545
HA25-3BM-R/SPS-S 8	•	•		•	•	0.20	6049 546
HA25-3BM-R	without pump						6046 642

Pumps for HA25-3BM-R
see "Circulating pumps".
Pump installation dimensions 1½" x 180 mm

DN 32 (1¼")							
HA32-3BM-R/SPS-S 7	•	•		•	•	0.20	6049 549
HA32-3BM-R/SPS-S 8	•	•		•	•	0.20	6049 550
HA32-3BM-R/SPS-I 8	•	•	•	•	•	0.20	6059 328
HA32-3BM-R/SPS-I 12 PM1	•		•	•		0.23	6046 619
HA32-3BM-R	without pump						6046 643

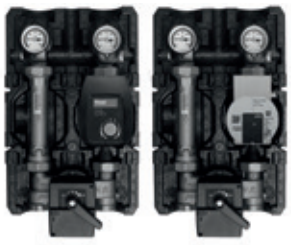
Pumps for HA32-3BM-R
see "Circulating pumps".
Pump installation dimensions 2" x 180 mm

DN 40 (1½")							
HA40-3M-R/SPS-I 8	•		•	•	•	0.20	6059 327
HA40-3M-R/SPS-I 12 PM1	•		•	•		0.23	6040 904
HA40-3M-R	without pump						6014 867

Pumps for HA40-3M
see "Circulating pumps".
Pump installation dimensions DN 40/PN 6 x 250 mm

Speed control legend	
Δp-v	Variable differential pressure
ENF	Vent function 10 min.
	PWM control signal heating
Δp-c	Constant differential pressure
	Constant rotational speed

Heating armature groups



Heating armature group HA-3BM-L
with 3-way motor mixer and heat-insulating box.
Installation left (flow right)

HA group/pump	Speed control					EEI ≤	Part No.
DN 20 (¾")							
HA20-3BM-L/HSP 4	•			•	•	0.18	6051 718
HA20-3BM-L/HSP 6	•			•	•	0.20	6051 719
HA20-3BM-L/SPS-S 7	•	•		•	•	0.20	6049 543
HA20-3BM-L/SPS-S 8	•	•		•	•	0.20	6049 544
DN 25 (1")							
HA25-3BM-L/HSP 6	•			•	•	0.20	6051 720
HA25-3BM-L/SPS-S 7	•	•		•	•	0.20	6049 547
HA25-3BM-L/SPS-S 8	•	•		•	•	0.20	6049 548
HA25-3BM-L	without pump						6046 644

Pumps for HA25-3BM-L
see "Circulating pumps".
Pump installation dimensions 1½" x 180 mm

DN 32 (1¼")							
HA32-3BM-L/SPS-S 7	•	•		•	•	0.20	6049 551
HA32-3BM-L/SPS-S 8	•	•		•	•	0.20	6049 552
HA32-3BM-L/SPS-I 8	•	•	•	•	•	0.20	6059 329
HA32-3BM-L/SPS-I 12 PM1	•		•	•		0.23	6046 631
HA32-3BM-L	without pump						6046 645

Pumps for HA32-3BM-L
see "Circulating pumps".
Pump installation dimensions 2" x 180 mm

Speed control legend	
Δp-v	Variable differential pressure
ENF	Vent function 10 min.
	PWM control signal heating
Δp-c	Constant differential pressure
	Constant rotational speed

Heating armature groups

Charging group LG-2
Heating armature group HA-2
For the connection of a side calorifier or as heating circuit without mixer, with heat-insulating box. Installation right (flow left)

Charging/HA group/pump	Speed control					EEI ≤	Part No.
	Δp-v	ENF	PWM	Δp-c	Constant rotational speed		
DN 20 (¾")							
LG/HA20-2/HSP 4	•			•	•	0.18	6051 743
LG/HA20-2/HSP 6	•			•	•	0.20	6051 744
LG/HA20-2/SPS-S 7	•	•		•	•	0.20	6040 906
LG/HA20-2/SPS-S 8	•	•		•	•	0.20	6040 907
DN 25 (1")							
LG/HA25-2/HSP 6	•			•	•	0.20	6051 745
LG/HA25-2/SPS-S 7	•	•		•	•	0.20	6049 553
LG/HA25-2/SPS-S 8	•	•		•	•	0.20	6049 554
LG/HA25-2	without pump						6046 646

Pumps for LG/HA25-2
see "Circulating pumps".
Pump installation dimensions 1½" x 180 mm

DN 32 (1¼")							
LG/HA32-2/SPS-S 8	•	•		•	•	0.20	6049 555
LG/HA32-2/SPS-I 8	•	•	•	•	•	0.20	6059 330
LG/HA32-2	without pump						6046 647

Pumps for LG/HA32-2
see "Circulating pumps".
Pump installation dimensions 2" x 180 mm

Speed control legend	
Δp-v	Variable differential pressure
ENF	Vent function 10 min.
	PWM control signal heating
Δp-c	Constant differential pressure
	Constant rotational speed

Wall brackets
for mounting a Hoval armature group on the wall

Type	Axle spacing	Connection top	Connection bottom	Wall clearance	Part No.
	mm	inches	inches	mm	
DN 20	90	Rp 1″	R 1″	70,85,100	6019 209
DN 25	125	Rp 1½″	R 1″	87-162	6019 210
DN 32	125	Rp 2″	R 1½″	142,167	6025 295

Adapter set DN 20-DN 25 6013 693
for the installation of the HA group DN 20 to a wall distributor DN 25 or a connection set DN 25.
Installation height: 120 mm

Adapter set
for the installation of the HA group to a wall distributor

Type	Part No.
DN 32-DN 25	6007 191
DN 25-DN 32	6006 954
DN 25-DN 40	6014 852

Adapter fitting DN 32-DN 40 6014 863
for the installation of the HA group DN 32 to a wall distributor DN 40 or a connection set AS 40-S/NT/HT.

Diaphragm pressure expansion tanks, heating armature groups and wall distributors
see “Various system components”

System modules
see “Controls”

Service

Commissioning
Commissioning by works service or Hoval trained authorised serviceman/company is condition for warranty.

For commissioning and other services please contact your Hoval sales office.

Hoval UltraGas® (15-27)

Type			(15)	(20)	(27)
• Nominal heat output at 80/60 °C, natural gas [1]		kW	3.0-14.3	3.8-18.7	4.5-25.0
• Nominal heat output at 50/30 °C, natural gas [1), 2)]		kW	3.0-15.2	4.0-20.2	5.0-26.9
• Nominal heat output at 80/60 °C, propane [3)]		kW	4.5-13.8	4.9-18.6	6.6-24.3
• Nominal heat output at 50/30 °C, propane [2)]		kW	4.8-15.3	5.2-20.7	7.3-27.0
• Nominal heat input with natural gas [4)]		kW	2.9-14.5	3.8-18.9	4.7-25.4
• Nominal heat input with propane [3)]		kW	4.7-14.3	5.1-19.3	6.8-25.2
• Operating pressure heating min./max. (PMS)		bar	1/3	1/3	1/3
• Operating temperature max. (T_{max})		°C	85	85	85
• Boiler water content ($V_{(H20)}$)		l	57	55	51
• Flow resistance boiler [5)]		z value	3.5	3.5	3.5
• Minimum circulation water quantity		l/h	-	-	-
• Boiler weight (without water content, incl. cladding)		kg	176	179	186
• Boiler efficiency at 80/60 °C in full-load operation (NCV/GCV)		%	97.5/87.8	97.0/88.1	97.9/88.2
• Boiler efficiency at 30 % partial load operation (NCV/GCV)		%	107.9/97.2	108.0/97.3	108.0/97.3
• Room heating energy efficiency					
- without control	ηs	%	92	92	92
- with control	ηs	%	94	94	94
- with control and room sensor	ηs	%	96	96	96
• NOx class (EN 15502)			-	-	-
• Nitrogen oxide emissions (EN 15502) (GCV)	NOx	mg/kWh	33	33	32
• O_2-content in flue gas at min./max. nominal heat output		%	5.5/5.1	5.5/5.1	5.5/5.1
• Heat loss in standby mode		Watt	160	160	160
Dimensions			see table of dimensions		
• Gas flow pressure min./max.					
- Natural gas E/LL		mbar	17.4-50	17.4-50	17.4-50
- Propane		mbar	37-50	37-50	37-50
• Gas connection values at 15 °C/1013 mbar:					
- Natural gas E (Wo = 15.0 kWh/m³) NCV = 9.97 kWh/m³		m³/h	0.29-1.45	0.38-1.90	0.47-2.55
- Natural gas LL- (Wo = 12.4 kWh/m³) NCV = 8.57 kWh/m³		m³/h	0.34-1.69	0.44-2.21	0.55-2.96
- Propane (NCV = 25.9 kWh/m³)		m³/h	0.18-0.55	0.20-0.75	0.26-0.97
• Operating voltage		V/Hz	230/50	230/50	230/50
• Electrical power consumption min./max.		Watt	20/44	22/62	20/56
• Stand-by		Watt	9	9	9
• Type of protection		IP	20	20	20
• Permitted ambient temperature during operation		°C	5-40	5-40	5-40
• Sound power level					
- Heating noise (EN 15036 Part 1) (room air dependent)		dB(A)	57	62	66
- Flue gas noise radiated from the mouth (DIN 45635 Part 47) (room air dependent/independent of room air)		dB(A)	43	49	55
- Sound pressure level heating noise (depending on installation conditions) [6)]		dB(A)	50	56	59
• Condensate quantity (natural gas) at 40/30 °C		l/h	1.3	1.8	2.4
• pH value of the condensate		approx.	4.2	4.2	4.2
• Construction type			B23, B23P, C53, C63		
• Flue gas system					
- Temperature class			T120	T120	T120
- Flue gas mass flow at max. nominal heat input (dry)		kg/h	23	31	42
- Flue gas mass flow at min. nominal heat input (dry)		kg/h	4.7	6	7.1
- Flue gas temperature at max. nominal heat output and 80/60 °C		°C	62	63	64
- Flue gas temperature at max. nominal heat output and 50/30 °C		°C	45	45	45
- Flue gas temperature at min. nominal heat output and 50/30 °C		°C	31	31	31
- Max. permissible temperature of the combustion air		°C	50	50	50
- Flow rate combustion air		Nm³/h	17	23	31
- Maximum supply pressure for combustion air supply and flue gas line		Pa	100	100	100
- Maximum draught/depression at flue gas outlet		Pa	-30	-30	-30

[1)] In relation to natural gas G20 (100 % methane). With a hydrogen content (H_2) of up to 20 % by vol. in accordance with DVGW ZP3100, an output reduction of up to 7 % is possible.

[2)] Factory measurements

[3)] Data related to NCV.

[4)] Data related to NCV. The boiler series is tested for EE/H setting. With a factory setting to a Wobbe value of 15.0 kWh/m³, operation in the Wobbe value range from 12.0 to 15.7 kWh/m³ is possible (readjustment might be necessary).

[5)] Flow resistance boiler in mbar = flow rate $(m^3/h)^2$ x z; resp. see diagrams

[6)] Compare notice at “Engineering”.

Hoval UltraGas® (35-100)

Type			(35)	(50)	(70)	(100)
• Nominal heat output at 80/60 °C, natural gas [1]		kW	5.2-33.0	7.5-46.0	12.1-64.5	19.0-92.0
• Nominal heat output at 50/30 °C, natural gas [1), 2)]		kW	5.8-34.3	8.0-48.8	13.5-69.0	20.9-99.0
• Nominal heat output at 80/60 °C, propane [3]		kW	6.9-32.2	9.9-45.5	15.4-63.3	23.0-92.0
• Nominal heat output at 50/30 °C, propane [2]		kW	7.6-34.3	10.9-49.9	17.1-69.0	25.0-99.0
• Nominal heat input with natural gas [4]		kW	5.4-33.3	7.7-46.9	12.5-65.5	19.6-94.1
• Nominal heat input with propane [3]		kW	7.2-33.4	10.2-47.2	16.0-65.5	23.8-94.1
• Operating pressure heating min./max. (PMS)		bar	1/3	1/3	1/4	1/4
• Operating temperature max. (T_{max})		°C	85	85	85	85
• Boiler water content ($V_{(H20)}$)		l	81	75	157	144
• Flow resistance boiler [5]		z value	1.1	1.1	1.5	1.5
• Minimum circulation water quantity		l/h	-	-	-	-
• Boiler weight (without water content, incl. cladding)		kg	205	217	302	331
• Boiler efficiency at 80/60 °C in full-load operation (NCV/GCV)		%	97.9/88.2	98.0/88.3	98.0/88.3	97.6/87.9
• Boiler efficiency at 30 % partial load operation (NCV/GCV)		%	108.1/97.4	108.1/97.4	108.1/97.4	108.1/97.4
• Room heating energy efficiency						
- without control	ηs	%	92	92	92	92
- with control	ηs	%	94	94	94	94
- with control and room sensor	ηs	%	96	96	96	96
• NOx class (EN 15502)			-	-	-	-
• Nitrogen oxide emissions (EN 15502) (GCV)	NOx	mg/kWh	26	28	28	29
• O_2-content in flue gas at min./max. nominal heat output		%	5.5/5.1	5.5/5.1	5.5/5.1	5.5/5.1
• Heat loss in standby mode		Watt	220	220	290	290
Dimensions			see table of dimensions			
• Gas flow pressure min./max.						
- Natural gas E/LL		mbar	17.4-50	17.4-50	17.4-50	17.4-50
- Propane		mbar	37-50	37-50	37-50	37-50
• Gas connection values at 15 °C/1013 mbar:						
- Natural gas E (Wo = 15.0 kWh/m^3) NCV = 9.97 kWh/m^3		m^3/h	0.54-3.34	0.77-4.70	1.25-6.57	1.97-9.44
- Natural gas LL- (Wo = 12.4 kWh/m^3) NCV = 8.57 kWh/m^3		m^3/h	0.63-3.89	0.90-5.47	1.46-7.64	2.29-10.98
- Propane (NCV = 25.9 kWh/m^3)		m^3/h	0.28-1.29	0.39-1.82	0.62-2.53	0.92-3.63
• Operating voltage		V/Hz	230/50	230/50	230/50	230/50
• Electrical power consumption min./max.		Watt	24/95	26/119	25/91	21/230
• Stand-by		Watt	9	9	9	9
• Type of protection		IP	20	20	20	20
• Permitted ambient temperature during operation		°C	5-40	5-40	5-40	5-40
• Sound power level						
- Heating noise (EN 15036 Part 1) (room air dependent)		dB(A)	62	60	64	67
- Flue gas noise radiated from the mouth (DIN 45635 Part 47) (room air dependent/independent of room air)		dB(A)	55	58	55	59
- Sound pressure level heating noise (depending on installation conditions) [6]		dB(A)	55	53	57	59
• Condensate quantity (natural gas) at 40/30 °C		l/h	3.1	4.4	6.2	8.9
• pH value of the condensate		approx.	4.2	4.2	4.2	4.2
• Construction type			B23, B23P, C53, C63			
• Flue gas system						
- Temperature class			T120	T120	T120	T120
- Flue gas mass flow at max. nominal heat input (dry)		kg/h	55	78	109	157
- Flue gas mass flow at min. nominal heat input (dry)		kg/h	8.1	11.6	18.8	29.5
- Flue gas temperature at max. nominal heat output and 80/60 °C		°C	65	68	63	65
- Flue gas temperature at max. nominal heat output and 50/30 °C		°C	46	46	43	44
- Flue gas temperature at min. nominal heat output and 50/30 °C		°C	31	31	31	32
- Max. permissible temperature of the combustion air		°C	50	50	50	50
- Flow rate combustion air		Nm^3/h	41	58	81	117
- Maximum supply pressure for combustion air supply and flue gas line		Pa	120	120	130	130
- Maximum draught/depression at flue gas outlet		Pa	-30	-30	-30	-30

[1] In relation to natural gas G20 (100 % methane). With a hydrogen content (H_2) of up to 20 % by vol. in accordance with DVGW ZP3100, an output reduction of up to 7 % is possible.

[2] Factory measurements

[3] Data related to NCV.

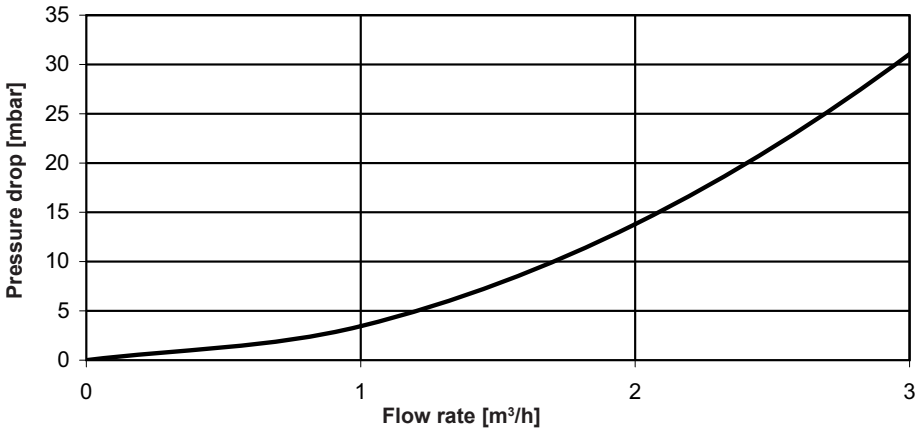
[4] Data related to NCV. The boiler series is tested for EE/H setting. With a factory setting to a Wobbe value of 15.0 kWh/m^3, operation in the Wobbe value range from 12.0 to 15.7 kWh/m^3 is possible (readjustment might be necessary).

[5] Flow resistance boiler in mbar = flow rate (m^3/h)^2 x z; resp. see diagrams

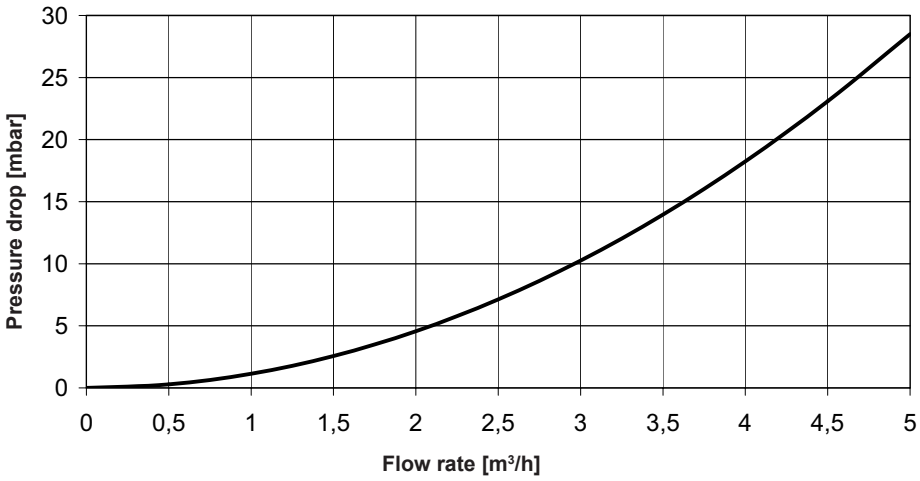
[6] Compare notice at “Engineering”.

Flow resistance on the heating water side

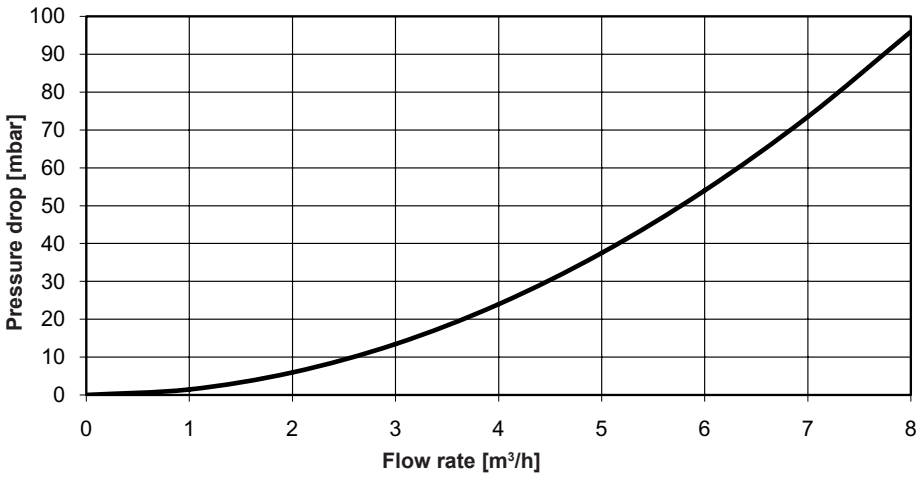
UltraGas® (15-27)



UltraGas® (35,50)

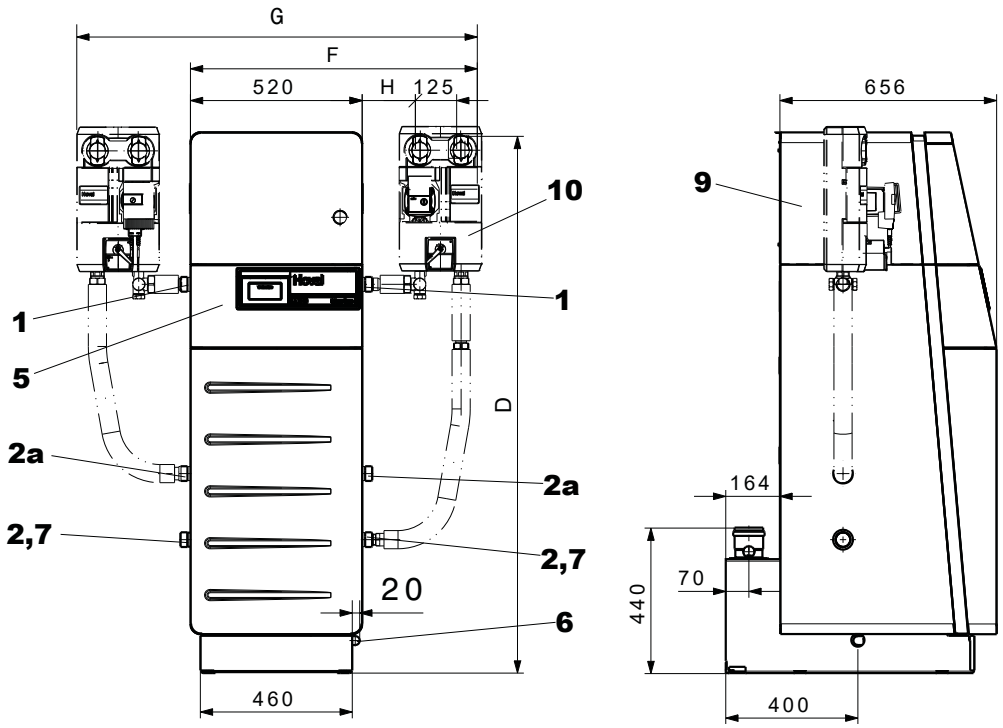


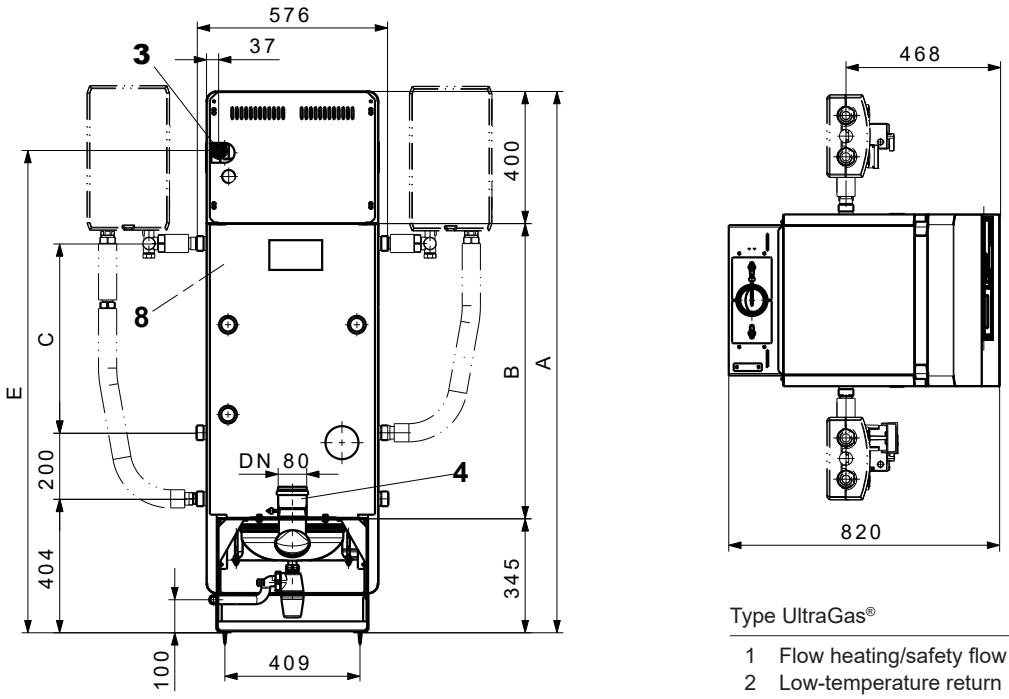
UltraGas® (70,100)



UltraGas® (15-27) with connection set AS25-S/NT/HT and armature group HA25
UltraGas® (35,50) with connection set AS32-S/NT/HT and armature group HA32

(Dimensions in mm)



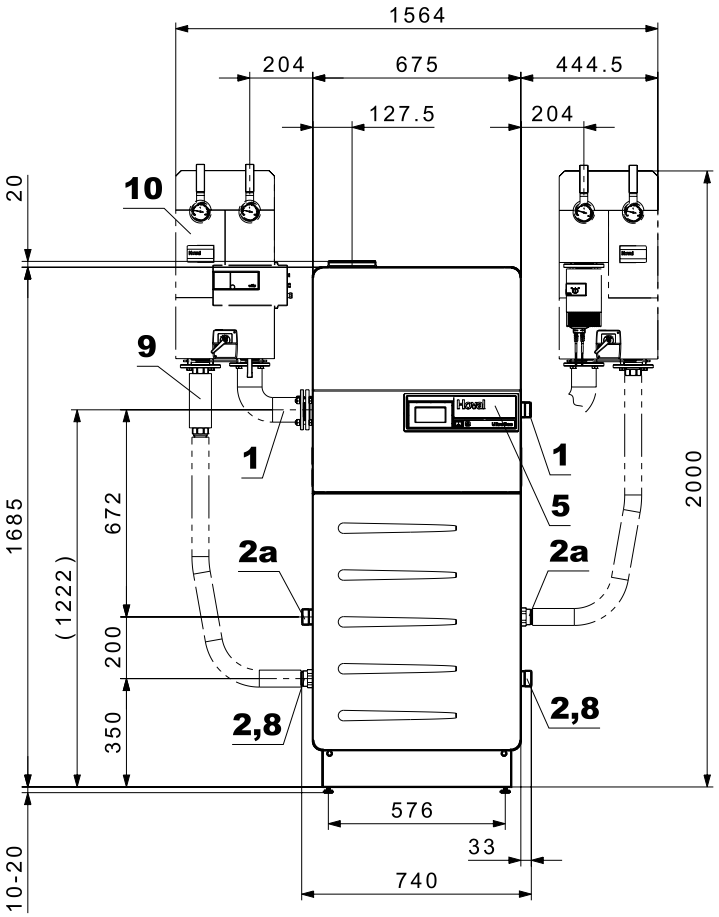


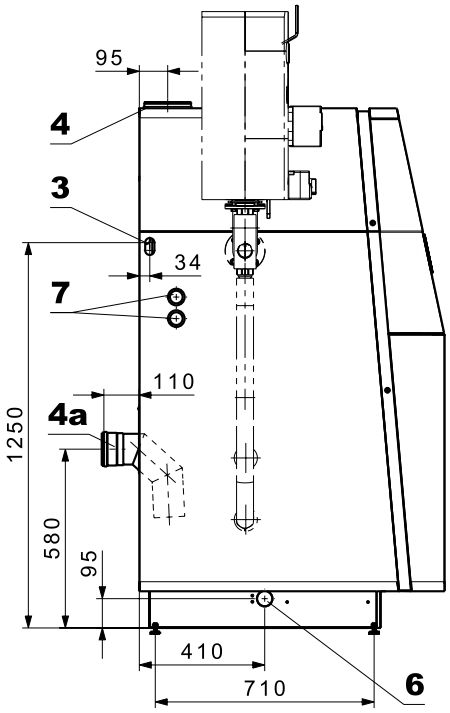
Type	A	B	C	D	E	F	G	H
UltraGas® (15-27)	1400	655	333	1330	1220	852	1184	144
UltraGas® (35,50)	1640	895	573	1620	1460	930	1340	222

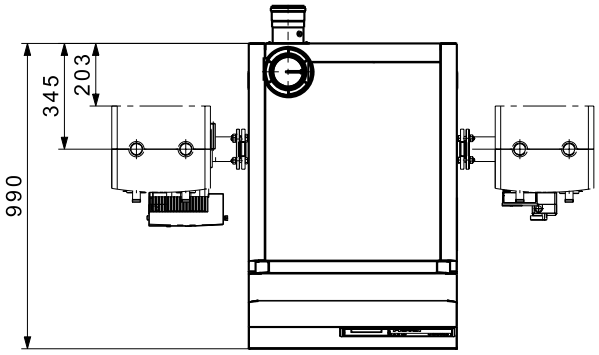
Type UltraGas®		(15-27)	(35,50)
1	Flow heating/safety flow	R 1″	R 1 ¼″
2	Low-temperature return	R 1″	R 1 ¼″
2a	High-temperature return	R 1″	R 1 ¼″
3	Gas connection	Rp ¾″	Rp ¾″
4	Flue gas outlet	DN 80	DN 80
5	Control panel		
6	Condensate drain (left or right) incl. siphon (DN 25) and 2 m PVC passage tube inner Ø 19 x 4 mm		
7	Drain		
8	Electric cable entry point		
9	Sound attenuation cowl		
10	Heating armature group or charging group (option)		

Hoval UltraGas® (70,100) with connection set AS40-S/NT/HT and armature group HA40

(Dimensions in mm)



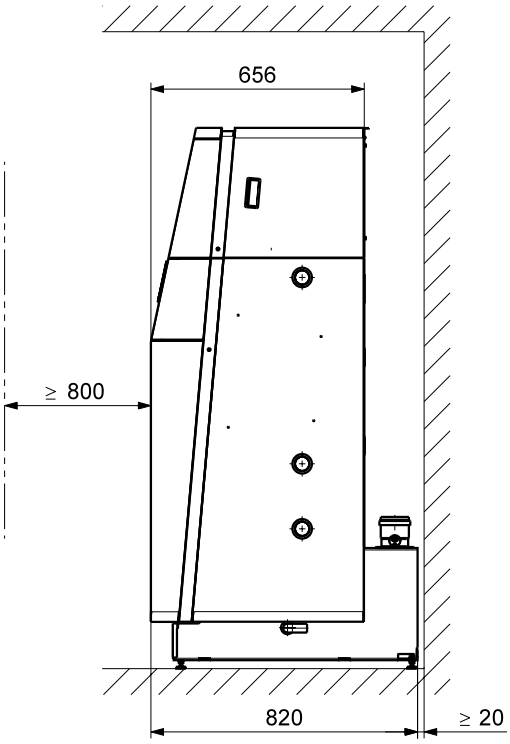


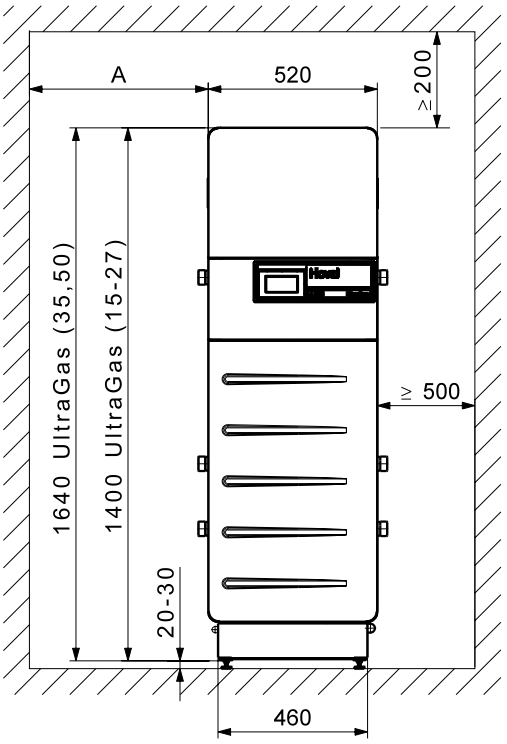


Type UltraGas®		(70)	(100)
1.	Flow heating/safety flow	R 1½″	R 1½″
2.	Low-temperature return	R 1½″	R 1½″
2a.	High-temperature return	R 1½″	R 1½″
3.	Duct for the gas pipe left or right	R ¾″	R ¾″
4.	Concentrical supply air/flue gas connection	C100/150	C100/150
4a.	Combustion air connection to the back (option)	E 100	E 100
5.	Control panel		
6.	Condensate drain (left or right) incl. siphon (DN 25) and 2 m PVC passage tube inner Ø 19 x 4 mm		
7.	Electrical connection left or right		
8.	Drain		
9.	Connection set (option)		
10.	Heating armature group or charging group (option)		

Space requirement
(Dimensions in mm)

UltraGas® (15-50)



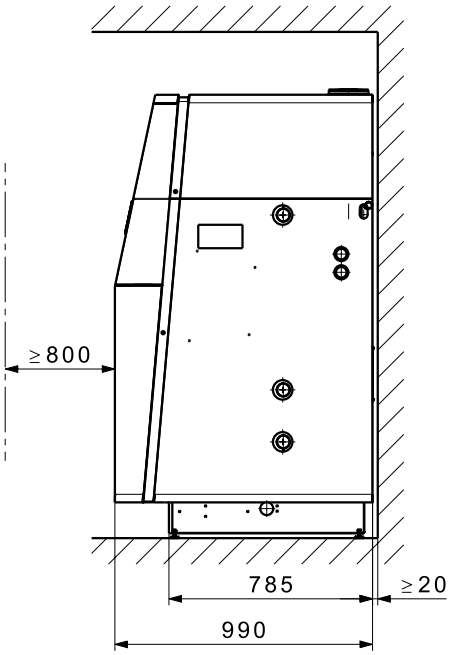


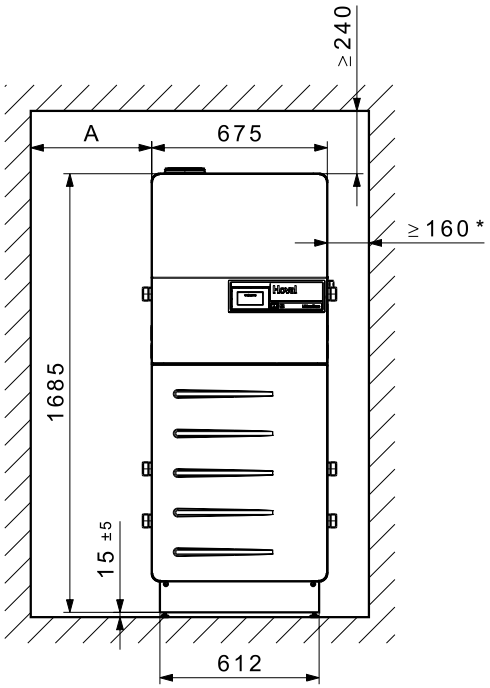
Door of the boiler inclusive burner swivelling to the top and to the left or to the front.
A = minimal 150 mm *
Burner service position in the front - boiler cleaning from the right
A = optimal 300 mm *
Burner service position left - boiler cleaning from the front
Boiler can be placed with the right side directly against the wall however, a minimum gap of 160 mm is required.

* without armature group,
500 mm with armature group

- The cleaning opening must be well accessible.
- Boiler rear side must be accessible.

UltraGas® (70,100)





Door of the boiler inclusive burner swivelling to the top and to the left or to the front.
A = minimal 150 mm *
Burner service position in the front - boiler cleaning from the right
A = optimal 300 mm *
Burner service position left - boiler cleaning from the front

* without armature group,
500 mm with armature group

Standards and guidelines

The official regulations for installation and operation must be observed. In particular, these are the country-specific standards (e.g. EN standard, DIN standards, …) as well as the corresponding regional regulations.

The following standards and guidelines must be complied with:

- Hoval technical information and installation instructions
- hydraulic and technical control regulations of Hoval
- DVGW directives
- DIN EN 12828
  Safety-relevant requirements
- DIN EN 12831 Heaters
  Rules for the calculation of the heat requirements of buildings
- VDI 2035 Protection against damage by corrosion and boiler scale formation in heating and service water installations
- EN 14868 “Protection of metallic materials against corrosion”
- VDE 0100 supplement 2

Water quality in heating systems

Filling and replacement water, heating water

The following applies:

- VDI 2035
- In addition, the EN 14868 standard must be applied, **as well as the manufacturer-specific specifications**

Manufacturer-specific specifications

Filling and replacement water

The filling and replacement water can be both fully demineralised and also merely softened.

Heating water

- In the case of **full demineralisation of the filling and replacement water**, the electrical conductivity of the heating water must not exceed the value of 100 µS/cm.
- In the case of **softening the filling and replacement water,** the following conditions must be complied with:
  - Electrical conductivity of the heating water for operation with water containing salts: > 100 µS/cm to ≤ 1500 µS/cm
  - pH value of the heating water for systems without aluminium alloy as water-side material 8.2 to 10.0 (measurement 10 weeks after commissioning at the earliest)
- The sum of the chloride, nitrate and sulphate contents in the heating water must not exceed 50 mg/l in total.

Additional notices

- Hoval boilers and calorifiers are suitable for heating systems without significant oxygen intake. (System type I according to EN 14868).
- Plants with continual oxygen intake (e.g. underfloor heating without diffusion-proof plastic piping) or intermittent oxygen intake (e.g. requiring frequent topping-up) must be equipped with a system separation.
- In the case of bivalent heating systems, the values of the heat generator with the strictest requirement for water quality must be complied with.
- If only the boiler is replaced in an existing plant, it is not recommended for the entire heating system to be refilled, provided that the heating water already contained in the system complies with the relevant directives or standards.
- Before filling new systems and, where necessary, existing heating systems containing heating water that does not comply with the directives or standards, the heating system must be professionally cleaned and flushed. The boiler must not be filled until the heating system has been flushed.

Frost protection agent

- see separate engineering sheet “Use of frost protection agent”.

Heating room

- Boilers cannot be positioned in rooms in which halogen compounds can occur and into which combustion air can enter (e.g. wash-, dryer-, work room, hairdressers and so on).
- Halogen compounds can be caused by cleaning and degreasing solutions, dissolvents, glue and bleaching lyes.

Combustion air supply

The supply of combustion air must be guaranteed. There must be no possibility to close the air supply opening. The connection for direct combustion air supply must be used for direct combustion air supply to the boiler (LAS system). It is very important to ensure that the combustion air is free from halogen compounds. These are present, for example, in spray cans, varnishes, glues, solvents and cleansing agents.

The minimum free cross-section for the combustion air can be assumed simplified as follows:

- *Room air-independent operation with separate combustion air pipe to the boiler:*
  0.8 cm² per 1 kW of output. The pressure drop in the combustion air pipe must be considered for the calculation of the flue gas system.
- In the UltraGas®, ventilation of the installation or boiler room must be guaranteed for operation independent from the room air.

- *Room air-dependent operation:*
  Minimum free cross-section of the opening into the open: 150 cm² or twice 75 cm² and additionally 2 cm² necessary for each kW of output over 50 kW for vent into the open.

Gas connection

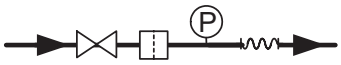
Commissioning

- Initial commissioning must be performed by a specialist technician from Hoval or a gas specialist technician.
- Burner setting values according to the installation instructions.

Manual gas shut-off valve and gas filter

Immediately in front of the boiler a manual gas shut-off device (valve) must be installed according to relevant regulations. Should the local regulations or conditions demand this, an approved gas filter must be installed in the gas supply pipe between the gas tap (thermally releasing) and the boiler in order to prevent malfunction due to foreign particles being carried along with the gas.

Construction of a recommended gas connection



Legend:

 manual gas shut-off valve

 gas hose/compensator

 gas filter

 pressure gauge with test burner and push-button valve

Type of gas

- The boiler is only to be operated with the type of gas stated on the rating plate.

Gas pressure natural gas

- Necessary flow pressure at the boiler inlet:
  UltraGas® (15-100)
  min. 17.4 mbar, max. 50 mbar

Gas pressure propane
- A gas pressure controller to reduce the boiler inlet pressure must be installed on-site for propane.
- Necessary gas flow pressure at the boiler inlet: UltraGas® (15-100) min. 37 mbar, max. 50 mbar

Gas pressure regulator
- The installation of a gas pressure regulator is only necessary if the gas flow pressure in the gas network exceeds the maximum permissible gas flow pressure of the UltraGas® or if there are considerable fluctuations in the gas flow pressure.
- Pressure fluctuations in the gas network must be prevented by suitable measures (e.g. gas storage tanks or pressure regulators). The local conditions must be checked in each individual case.

Closed heating system
The boiler is only approved for use in closed heating systems.

Minimum circulation water quantity
No minimum water circulation volume is required.

Calorifier connection
If a calorifier is connected, all heating groups must be provided with a mixer.

Boiler base
The boiler should be placed on a sufficiently high base (boiler base see accessories) to protect it against floor humidity and for the siphon for condensate drain.

Installation instructions
Please observe the installation instructions supplied with every boiler.

Space requirements
See “Dimensions”

Heating boiler in the attic
- If the gas boiler is positioned on the top floor, the installation of a low water protection, which automatically turns the gas burner off in case of water shortage, is recommended.

Condensate drain
- A permit for discharge of the flue gas condensate into the sewage system must be obtained from the relevant authority or sewer operator.
- The condensate from the flue gas line can be discharged via the boiler. A condensate trap is no longer needed in the flue gas system.
- The condensate must be conducted openly (funnel) into the sewage system.
- Suitable materials for condensate drain:
  - stoneware pipes
  - pipes made from glass
  - pipes made from stainless steel
  - pipes made from plastic: PVC, PE, PP, ABS and UP
- A siphon must be installed at the condensate outlet on the gas boiler (included in the boiler scope of delivery).

Diaphragm pressure expansion tank
- An adequately dimensioned diaphragm pressure expansion tank must be provided.
- The diaphragm pressure expansion tank has to be installed in principle at the boiler return.
- Starting from 70 °C an intermediate tank is necessary.

Safety valve
- At the heating flow a safety valve must be installed. An automatic exhauster is built in the boiler.

Noise damping
The following measures are possible for sound insulation:
- Make boiler room walls, ceiling and floor as solid as possible.
- If there are living areas above or below the boiler room, connect pipes flexibly using expansion joints.
- Connect circulating pumps to the piping network using expansion joints

Noise level
- The acoustic **power** level value is independent on the local and spacial circumstances.
- The acoustic **pressure** level is dependent on the installation conditions and can for instance be 5 to 10 dB(A) lower than the acoustic **power** level at a distance of 1 m.

Recommendation:
If the air inlet at the facade is near a noise sensitive place (window of bedroom, terrace etc.), we recommend to use a sound absorber at the direct combustion air inlet.

Flue gas system
- Gas boilers must be connected to a certified and approved flue gas system such as flue gas lines.
- Flue gas lines must be gas-, condensate- and over pressure-tight.
- The flue gas lines must be secured against unwanted loosening of the plug connections.
- The flue gas system must be connected with an angle, so that the resulting condensate of the flue gas system can flow back to the boiler and can be neutralised there before discharging into the canalisation.
- Gas boilers with condensation heat utilisation are to be connected to a flue gas line min. temperature class T120.
- A flue gas temperature limiter is integrated into the boiler.

Allocation of gas filters for UltraGas® (15-100)

UltraGas® type	Gas throughput natural gas E m^3/h	Gas filter type	Dimension	Pressure drop gas filter (with clean filter) mbar
(15)	1.5	70612/6B	Rp ¾″	0.10
(20)	1.9	70612/6B	Rp ¾″	0.10
(27)	2.6	70612/6B	Rp ¾″	0.10
(35)	3.3	70612/6B	Rp ¾″	0.10
(50)	4.7	70612/6B	Rp ¾″	0.13
(70)	6.6	70602/6B	Rp 1″	0.10
(100)	9.5	70602/6B	Rp 1″	0.14

It is essential to set the dimensions of the gas line!

Looking for the appropriate hydraulic schematic?
Please contact your local Hoval partner.

Hoval UltraGas® 2 (125-1550)

Floor-standing gas condensing boiler
- Floor-standing gas condensing boiler
- For the combustion of:
  - natural gas E
  - natural gas E with a hydrogen content (H_2) of up to 20 % by vol.
  - propane according to DIN 51622
  - biomethane according to EN 16723
- Combustion chamber made of stainless steel
- Maximum flue gas condensation by secondary heating surfaces made of **TurboFer®** hybrid stainless steel composite pipes;
- heating gas side: stainless steel/aluminium water side: stainless steel
- Thermal insulation with mineral wool mat
- Water pressure sensor:
  - Fulfils the function of a minimum and maximum pressure limiter
  - Replacement for the low water level protection
- Flue gas temperature sensor with flue gas limiter function
- Pre-mix burner
  - with fan and venturi
  - modulating operation
  - automatic ignition
  - ionisation guard
  - gas pressure monitor
- Gas boiler fully cased with steel plates, red powder-coated
- Heating connections backwards incl. counter flange, screws and seals for:
  - heating flow
  - high temperature return
  - low temperature return
- *UltraGas® 2 (300-1550):* with integrated gas pipe compensator
- TopTronic® E controller installed
- Possibility of connecting an external gas solenoid valve with error output

TopTronic® E controller

Control panel
- Colour touchscreen 4.3 inch
- Heat generator blocking switch for interrupting operation
- Fault signalling lamp

TopTronic® E control module
- Simple, intuitive operating concept
- Display of the most important operating statuses
- Configurable start screen
- Operating mode selection
- Configurable day and week programmes
- Operation of all connected Hoval CAN bus modules
- Commissioning wizard
- Service and maintenance function
- Fault message management
- Analysis function
- Weather display (with HovalConnect option)
- Adaptation of the heating strategy based on the weather forecast (with HovalConnect option)

TopTronic® E basic module heat generator TTE-WEZ
- Control functions integrated for
  - 1 heating circuit with mixer
  - 1 heating circuit without mixer
  - 1 hot water charging circuit
  - bivalent and cascade management

Model range

UltraGas® 2 type	Nominal heat output at 50/30 °C kW
(125)	25-126
(150)	35-151
(190)	38-191
(230)	51-233
(300)	58-299
(350)	70-352
(400)	69-399
(450)	77-451
(500)	77-491
(620)	136-622
(700)	146-703
(800)	166-804
(1000)	205-999
(1100)	229-1112
(1300)	269-1320
(1550)	324-1550
H (700)	146-703
H (1100)	229-1112
H (1550)	324-1550

- Outdoor sensor
- Immersion sensor (calorifier sensor)
- Contact sensor (flow temperature sensor)
- RAST 5 basic plug set

Options for TopTronic® E controller
- Can be expanded by max. 1 module expansion:
  - module expansion heating circuit or
  - module expansion heat balancing or
  - module expansion Universal
- Can be networked with a total of up to 16 controller modules:
  - heating circuit/hot water module
  - solar module
  - buffer module
  - measuring module

Number of modules that can be additionally installed in the heat generator:
UltraGas® 2 (125-230)
- 1 module expansion and 1 controller module **or**
- 2 controller modules

UltraGas® 2 (300-500):
- 3 controller modules/module expansions

UltraGas® 2 (620-1550):
- 4 controller modules/module expansions

Notice
Max. 1 module expansion can be connected to the basic module heat generator TTE-WEZ!

The supplementary plug set must be ordered in order to use expanded controller functions.

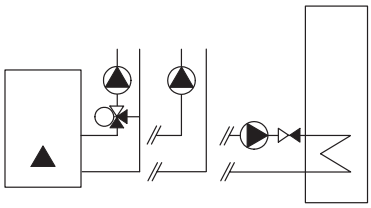
Further information about the TopTronic® E
see “Controls”

Optional
- With or without neutralisation
- Free-standing calorifier see Calorifiers

Delivery
- Boiler, casing and insulation separately packed and delivered

On-site
- Mounting of insulation, casing and control panel
- Mounting of boiler feet

Floor-standing gas condensing boiler



Boiler permissions

CE product ID No.	
UltraGas® 2 (125-1550)	CE-0085DL0175

Hoval UltraGas® 2 (125-1550)

Floor-standing gas condensing boiler
with built-in Hoval TopTronic® E control

Control functions integrated for
- 1 heating circuit with mixer
- 1 heating circuit without mixer
- 1 hot water charging circuit
- bivalent and cascade management

- Can be optionally expanded by max. 1 module expansion:
  - module expansion heating circuit or
  - module expansion heat balancing or
  - module expansion Universal
- Can be optionally networked with a total of up to 16 controller modules (incl. solar module)

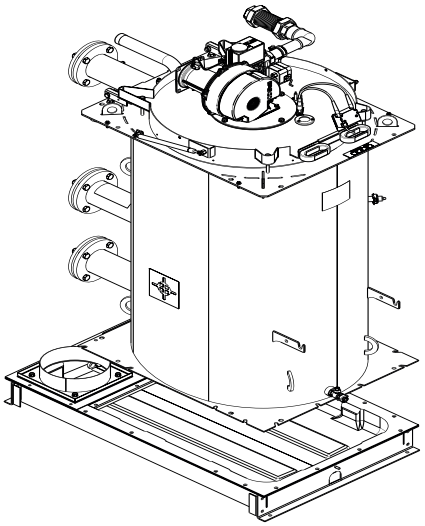
Boiler made of steel with TopTronic® E control, combustion chamber made of stainless steel. Secondary heating surfaces made of **TurboFer®** hybrid stainless steel composite pipes. Pre-mix burner with fan. Modulating burner.

Delivery
Boiler, casing and thermal insulation separately packed

UltraGas® 2 type	Nominal heat output at 50/30 °C kW [1]	Operating pressure bar	Part No.
(125)	25-126	6	7018 911
(150)	35-151	6	7018 912
(190)	38-191	6	7018 913
(230)	51-233	6	7018 914
(300)	58-299	6	7018 823
(350)	70-352	6	7018 824
(400)	69-399	6	7018 825
(450)	77-451	6	7019 125
(500)	77-491	6	7018 826
(620)	136-622	6	7018 848
(700)	146-703	6	7018 869
(800)	166-804	6	7018 841
(1000)	205-999	6	7018 842
(1100)	229-1112	6	7018 843
(1300)	269-1320	6	7018 891
(1550)	324-1550	6	7018 892

[1] kW = modulation range

Floor-standing gas condensing boiler (multi-part installation)



Hoval UltraGas® 2 (125-1550) (multi-part installation)

Double boiler consisting of two individual boilers (UltraGas® 125-1550 kW), each with a built-in Hoval TopTronic® E control for **multi-part installation**.
Assembled on-site by the installer.

UltraGas® 2 type	Nominal heat output 50/30 °C kW	Operating pressure bar	Part No.
(125)	25-126	6	7018 909
(150)	35-151	6	7018 910
(190)	38-191	6	7018 929
(230)	51-233	6	7018 930
(300)	58-299	6	7018 816
(350)	70-352	6	7018 817
(400)	69-399	6	7018 818
(450)	77-451	6	7019 124
(500)	77-491	6	7018 849
(620)	136-622	6	7018 864
(700)	146-703	6	7018 865
(800)	166-804	6	7018 854
(1000)	205-999	6	7018 855
(1100)	229-1112	6	7018 856
(1300)	269-1320	6	7018 899
(1550)	324-1550	6	7018 900

[1] kW = modulation range

Floor-standing gas condensing boiler (high-pressure design)

Hoval UltraGas® 2 H (700-1550) (high-pressure design)

Floor-standing gas condensing boiler in **high-pressure design**
(operating pressure 10 bar)

UltraGas® 2 type	Nominal heat output 50/30 °C kW	Operating pressure bar	Part No.
H (700)	146-703	10	7019 065
H (1100)	229-1112	10	7018 776
H (1550)	324-1550	10	7018 777

[1] kW = modulation range

Delivery time approx. 8 weeks

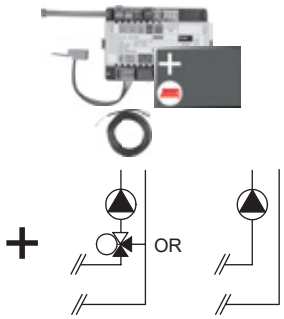
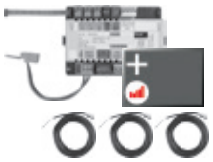
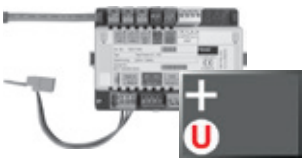
Propane version — **on request**

System flow sensor — 6053 398
for UltraGas® 2 for installation in the flow connector sleeve Rp ¼″, for regulating the flow temperature. Consisting of temperature sensor and connection cable

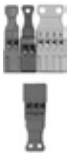
Installation of the system flow sensor is recommended for optimal control of the flow temperature.

TopTronic® E module expansions

for TopTronic® E basic module heat generator

		Part No.
	**TopTronic® E module expansion heating circuit TTE-FE HK** Expansion to the inputs and outputs of the basic module heat generator or the heating circuit/domestic hot water module for implementing the following functions: - 1 heating/cooling circuit w/o mixer or - 1 heating/cooling circuit with mixer Consisting of: - Fitting accessories - 1 contact sensor ALF/2P/4/T, L = 4.0 m - Basic plug set FE module **Notice** The supplementary plug set may have to be ordered to implement functions differing from the standard!	6034 576
	**TopTronic® E module expansion heating circuit incl. energy balancing** TTE-FE HK-EBZ Expansion to the inputs and outputs of the basic module heat generator or the heating circuit/domestic hot water module for implementing the following functions: - 1 heating/cooling circuit w/o mixer or - 1 heating/cooling circuit with mixer incl. energy balancing in each case Consisting of: - Fitting accessories - 3 contact sensors ALF/2P/4/T, L = 4.0 m - Plug set FE module **Notice** Suitable flow rate sensors (pulse sensors) must be provided on site.	6037 062
	**TopTronic® E module expansion Universal TTE-FE UNI** Expansion to the inputs and outputs of a controller module (basic module heat generator, heating circuit/domestic hot water module, solar module, buffer module) for implementing various functions Consisting of: - Fitting accessories - Plug set FE module **Further information** see “Controls” - “Hoval TopTronic® E module expansions” chapter **Notice** Refer to the Hoval System Technology to find which functions and hydraulic arrangements can be implemented.	6034 575

Accessories for TopTronic® E



		Part No.
TopTronic® E controller modules		
TTE-HK/WW	TopTronic® E heating circuit/ hot water module	6034 571
TTE-SOL	TopTronic® E solar module	6037 058
TTE-PS	TopTronic® E buffer module	6037 057
TTE-MWA	TopTronic® E measuring module	6034 574
Supplementary plug set		
for basic module heat generator TTE-WEZ		6034 499
for controller modules and module expansion TTE-FE HK		6034 503
TopTronic® E room control modules		
TTE-RBM	TopTronic® E room control modules	
	easy white	6037 071
	comfort white	6037 069
	comfort black	6037 070
Enhanced language package TopTronic® E one SD card required per control module Consisting of the following languages: HU, CS, SL, RO, PL, TR, ES, HR, SR, JA, DA		6039 253
HovalConnect		
HovalConnect LAN		6049 496
HovalConnect WLAN		6049 498
HovalConnect Modbus		6049 501
HovalConnect KNX		6049 593
TopTronic® E interface modules		
GLT module 0-10 V		6034 578
TopTronic® E sensors		
AF/2P/K	Outdoor sensor H x W x D = 80 x 50 x 28 mm	2055 889
TF/2P/5/6T	Immersion sensor, L = 5.0 m	2055 888
ALF/2P/4/T	Contact sensor, L = 4.0 m	2056 775
TF/1.1P/2.5S/6T	Collector sensor, L = 2.5 m	2056 776
System module SB-SM-BZ1 for passing on a volt-free operating and fault message. (for 1-stage/modulating H-Gens)		6048 055
Bivalent switch		
for various release or switching functions		
Bivalent switch 1-piece		2056 858
Bivalent switch 2-piece		2061 826
System housing		
System housing 182 mm		6038 551
System housing 254 mm		6038 552
TopTronic® E wall casing		
WG-190	Wall casing small	6052 983
WG-360	Wall casing medium	6052 984
WG-360 BM	Wall casing medium with control module cut-out	6052 985
WG-510	Wall casing large	6052 986
WG-510 BM	Wall casing large with control module cut-out	6052 987

Further information
see “Controls”

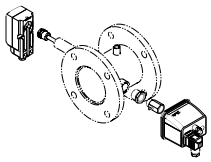
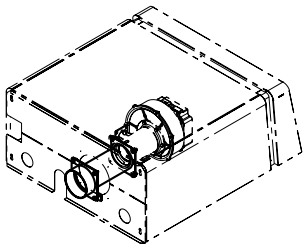
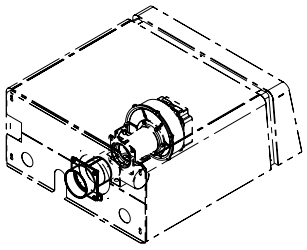
Accessories

	Part No.
 **Flow temperature monitor** for panel heating (1 controller per heating circuit) 15-95 °C, setting (visible externally) under the casing cover	
Clamp-on flow temperature monitor RAK-TW1000S with retaining strap, without cable and plug	242 902
Clamp-on flow temperature monitor set RAK-TW1000S with retaining strap, supplied with cable (4 m) and plug	6033 745
Immersion thermostat RAK-TW1000S Thermostat with immersion sleeve ½″ Depth of immersion 150 mm, nickel-plated brass	6010 082
 **Safety set DN 25** complete with safety valve DN 25 (3 bar), up to 200 kW Pressure gauge and automatic aspirator with barrier Connection: 1″ internal thread	6018 709
 **Safety set DN 32** complete with safety valve DN 32 (3 bar), up to 350 kW Pressure gauge and automatic aspirator with barrier Connection 1¼″ internal thread	6018 710
 Fitting pipe flow  Fitting pipe return	

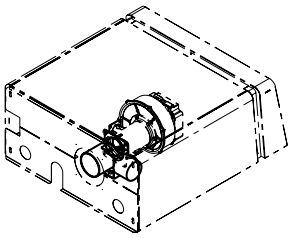
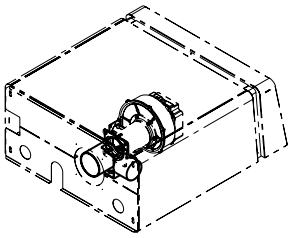
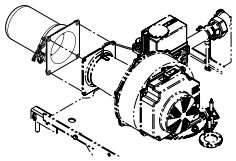
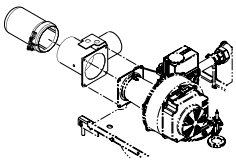
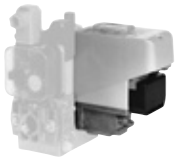
Safety fitting pipe for flow and return
Suitable for max. 6 bar, with screws and nuts.
- for installation on the flow or high and low-temperature return of the Hoval UltraGas® 2 boiler
- for installation of an additional safety temperature limiter, a maximum pressure limiter
- for connection of a diaphragm pressure expansion tank on the return

Dimension	Suitable for UltraGas® 2	Connection	Part No.
DN 65	(125-230)	flow	6053 408
DN 65	(125-230)	return	6023 108
DN 100	(300-700)	flow	6053 409
DN 100	(300-700)	return	6023 110
DN 125	(800-1100)	flow	6055 078
DN 125	(800-1100)	return	6023 112
DN 150	(1300,1550)	flow	6055 079
DN 150	(1300,1550)	return	6051 680

Accessories

	Part No.
 **Safety armature set** Compatible with fitting pipe for meeting safety requirements of EN 12828: > 300 kW or SWKI HE301-01: 70-1000 kW related to single boiler Consisting of: - adjustable maximum pressure limiter incl. ball valve - safety temperature limiter (RAK-ST.131)	6051 903
 **Hydraulic butterfly valve** for direct installation on the flow and/or return of the boiler For 24 V, pre-wired Operating method: continuously controlling (2 ... 10 V)	
UltraGas® 2 (125-230) DN 65	6050 605
UltraGas® 2 (300-700) DN 100	6050 606
UltraGas® 2 (800-1100) DN 125	6050 607
UltraGas® 2 (1300,1550) DN 150	6051 894
 **Connection for direct combustion air supply** Not to be combined with motorised combustion air damper	
UltraGas® 2 (125,150)	6052 548
UltraGas® 2 (190,230)	6052 550
UltraGas® 2 (300-500)	6053 096
UltraGas® 2 (620,700)	6053 779
UltraGas® 2 (800-1100)	6053 781
UltraGas® 2 (1300,1550)	6052 844
Recommendation: If the air intake opening at the facade is near a noise sensitive place (window of bedroom, terrace etc.), we recommend to use a silencer at the direct fresh air inlet.	
 **Connection for direct combustion air supply** Only in combination with a motorised combustion air damper (ordered separately). Can also be used for creating a boiler cascade with a common flue gas line.	
UltraGas® 2 (125,150)	6052 847
UltraGas® 2 (190,230)	6052 848
UltraGas® 2 (300-500)	6053 097
UltraGas® 2 (620,700)	6053 780
UltraGas® 2 (800-1100)	6053 782
UltraGas® 2 (1300,1550)	6052 849

Accessories

	Part No.
 **Motorised combustion air damper DN 110** for UltraGas® 2 (125-500) For boiler cascades with a common flue gas line. Ready-to-connect	6015 196
 **Motorised combustion air damper DN 180** for UltraGas® 2 (620-1550) For boiler cascades with a common flue gas line. Ready-to-connect	6015 197
 **Connection protection filter** for filtering the combustion air in the building phase	
for installation on the air suction socket:	
UltraGas® 2 (125-500)	6052 283
UltraGas® 2 (620-1550)	6052 284
 for installation on the combustion air damper:	
UltraGas® 2 (125-500)	6052 151
UltraGas® 2 (620-1550)	6052 152
 **Gas valve** with thermally releasing cut-off device.	
Type — Connection inches	
DN 25 — R 1″	2069 324
DN 32 — R 1¼″	2069 325
DN 40 — R 1½″	2069 326
DN 50 — R 2″	2069 327
 **Valve testing system** for UltraGas® 2 (125-1550), UltraGas® 2 (250D-3100D) Automatic, compact testing system for testing the leakage of the gas valve before each burner start with ready-to-connect wiring. Suitable for all gas qualities for which the UltraGas® 2 is permitted.	
Type	
UltraGas® 2 (125-350)	6039 964
UltraGas® 2 (400-700)	6039 965
UltraGas® 2 (800-1550)	6054 484
For an UltraGas® 2 double boiler, two valve test systems must be ordered.	

Accessories

For a kit, the gas ball valve, fitting protection and mounting set must each be ordered separately in the same dimension.

Gas valve kit
Set with gas valve and thermally releasing shut-off device
Thermal closing at approx. 95 °C
Tripping time < 60 s
Maximum working pressure 5 bar
Ambient temperature < 60 °C
Combustible gases according to G260

Gas ball valve with flange

type	Part No.
DN 65	2007 988
DN 80	2007 989
DN 100	2007 990

Fitting protection TAS

type	Part No.
TAS 23-65	2069 328
TAS 23-80	2069 329
TAS 23-100	2069 330

Mounting set for assembly
Gas ball valve with fitting protection

type	Part No.
MS-TAS 23-65	6041 745
MS-TAS 23-80	6041 746
MS-TAS 23-100	6041 747

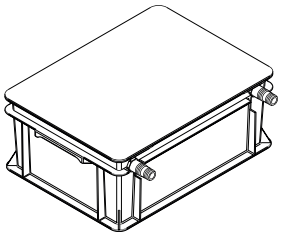
Gas filter
with measurement nozzle before and behind the filter inset (diameter: 9 mm)
Pore width of the filter inset < 50 µm
Max. pressure difference 10 mbar
Inlet pressure:
UltraGas 2 (125-700): max. 80 mbar
UltraGas 2 (800-1550): max 300 mbar

Type	Connection	Part No.
70602/6B	Rp 1″	2007 996
70604/6B	Rp 1¼″	2054 495
70603/6B	Rp 1½″	2007 997
70631/6B	Rp 2″	2007 998
70610F/6B	DN 65	2007 999

Gas pipe compensator 1″
for UltraGas® 2 (125,150), UltraGas® 2 D (250,300)
for compensating for connection tolerances in the gas pipe
6034 556

Gas pipe compensator 1½″
for UltraGas® 2 (190,230), UltraGas® 2 D (380,460)
for compensating for connection tolerances in the gas pipe
6034 557

Condensate drainage to UltraGas® 2



Neutralisation box
Condensate drain into a lower drainage duct
Connection hose: 2 m
Service life up to 1 year, depending on the boiler operating mode
Positioning behind the boiler or laterally
One neutralisation box per boiler

Type		Neutralisation granulate	Part No.
UltraGas® 2 (125-400)	HNB-0400	3 kg	6054 792
UltraGas® 2 (450-800)	HNB-0800	6 kg	6054 793
UltraGas® 2 (1000,1100)	HNB-1200	9 kg	6054 794
UltraGas® 2 (1300,1550)	HNB-1600	12 kg	6054 795

Condensate pump — 6045 476
for transporting condensate
into a higher drainage duct
Including connection lines
Completely wired, cable and plug
For connection to the boiler controller
Delivery head: max. 4 m
Can be combined with neutralisation box

Double condensate pump — 6061 175
For UltraGas® 2 (1000-1550)
for transporting the condensate
into a higher drainage duct
Including connection line
Completely wired, cable and plug
For connection to the boiler controller
Delivery head: 3 m
Can be combined with neutralisation box

Neutralisation granulate — 2028 906
for neutralisation box
Refill set volume 3 kg
Life time of one filling:
approx. 1 year, depending on amount of condensate

Service

Commissioning
Commissioning by works service or Hoval trained authorised serviceman/company is condition for warranty.

For commissioning and other services please contact your Hoval sales office.

Part No.

Hoval UltraGas® 2 (125-230)

Type			(125)	(150)	(190)	(230)
• Nominal heat output at 80/60 °C, natural gas [1]		kW	21-114	33-139	35-177	47-218
• Nominal heat output at 50/30 °C, natural gas [1]		kW	25-126	35-151	38-191	51-233
• Nominal heat output at 80/60 °C, propane [2]		kW	27-113	43-138	55-175	81-217
• Nominal heat output at 50/30 °C, propane [2]		kW	30-126	48-151	62-191	90-233
• Nominal heat input with natural gas [3]		kW	23-116	32-142	35-179	47-223
• Nominal heat input with propane [2]		kW	28-116	44-142	57-179	84-223
• Operating pressure heating min./max. (PMS)		bar	1/6	1/6	1/6	1/6
• Operating temperature max. (T_{max})		°C	95	95	95	95
• Boiler water content ($V_{(H20)}$)		l	207	195	276	265
• Flow resistance boiler			see diagram			
• Minimum circulation water quantity		l/h	-	-	-	-
• Boiler weight (without water capacity, incl. cladding)		kg	390	400	485	505
• Boiler efficiency at 80/60 °C in full-load operation (NCV/GCV) [4]		%	98.6/88.9	97.6/88.1	98.5/88.7	98.2/88.5
• Boiler efficiency at 30 % partial load (NCV/GCV) [4]		%	108.7/98.1	108.7/98.1	109.0/98.2	108.4/97.8
• Room heating energy efficiency						
- without control	ηs	%	93	93	93	93
- with control	ηs	%	95	95	95	95
- with control and room sensor	ηs	%	97	97	97	97
- annual energy consumption	Q_{HE}	GJ	209	265	326	412
• NOx class (EN 15502)			-	-	-	-
• Nitrogen oxide emissions (EN 15502) (GCV)	NOx	mg/kWh	25	28	33	37
• Carbon monoxide emissions at 50/30 °C (related to 3 % of O_2)	CO	mg/Nm^3	31	21	25	13
• O_2 content in flue gas min./max. output		%	5.9/5.6	5.5/6.0	5.9/6.0	6.0/5.9
• Heat loss in standby mode		Watt	380	380	510	510
• Dimensions			see dimensional drawing			
• Gas flow pressure min./max.						
- Natural gas E/LL		mbar	17.4-80	17.4-80	17.4-80	17.4-80
- Propane		mbar	37-57	37-57	37-57	37-57
• Gas inlet pressure max. (idle pressure)		mbar	80	80	80	80
• Gas connection values at 15 °C/1013 mbar:						
- Natural gas E (Wo = 15.0 kWh/m^3) NCV = 9.7 kWh/m^3		m^3/h	2.4-12.0	3.3-14.6	3.6-18.5	4.8-23.0
- Natural gas LL (G25) - (Wo = 12.4 kWh/m^3) NCV = 8.13 kWh/m^3		m^3/h	2.8-14.3	3.9-17.5	4.3-22.0	5.8-27.4
- Propane (G31) NCV = 24.4 kWh/m^3 [2]		m^3/h	1.2-4.8	1.8-5.8	2.3-7.3	3.4-9.1
• Operating voltage		V/Hz	1 x 230/50	1 x 230/50	1 x 230/50	1 x 230/50
• Electrical power consumption min./max.		Watt	41/140	43/225	38/151	49/228
• Standby		Watt	7	8	8	8
• Type of protection		IP	20	20	20	20
• Permitted ambient temperature during operation		°C	5-40	5-40	5-40	5-40
• Sound power level						
- Heating noise (EN 15036 part 1) (room air dependent)		dB(A)	64	69	63	66
- Flue gas noise radiated from the mouth (DIN 45635 part 47) (room air dependent/independent of room air)		dB(A)	69	70	66	68
- Sound pressure level heating noise (reference value depending on installation conditions)		dB(A)	54	59	53	56
• Condensate quantity (natural gas) at 50/30 °C		l/h	11	12	15	20
• pH value of the condensate (approx.)		pH	4.2	4.2	4.2	4.2
• Construction			B23, B23P, C53, C63			
• Flue gas system						
- Temperature class			T120	T120	T120	T120
- Flue gas mass flow at max. nominal heat input (dry)		kg/h	188	226	283	344
- Flue gas mass flow at min. nominal heat input (dry)		kg/h	37	51	55	63
- Flue gas temperature at max. nominal heat output and 80/60 °C		°C	64	65	68	69
- Flue gas temperature at max. nominal heat output and 50/30 °C		°C	43	45	46	47
- Flue gas temperature at min. nominal heat output and 50/30 °C		°C	29	28	29	29
- Max. permissible temperature of the combustion air		°C	48	48	48	48
- Combustion air flow rate		Nm^3/h	154	180	232	280
- Maximum supply pressure for combustion air supply and flue gas line		Pa	120	120	130	130
- Maximum draught/underpressure at flue gas outlet		Pa	-30	-30	-30	-30

[1] In relation to natural gas G20 (100 % methane). With a hydrogen content (H_2) of up to 20 % by vol. in accordance with DVGW ZP3100 (D), an output reduction of up to 7 % is possible.

[2] Data related to NCV, conditional data

[3] Data related to NCV. The boiler series is tested for EE/H setting. With a factory setting to a Wobbe value of 15.0 kWh/m^3, operation in the Wobbe value range from 12.0 to 15.7 kWh/m^3 is possible without resetting.

[4] Conversion acc. to EN 15502-1, Appendix J

Hoval UltraGas® 2 (300-450)

Type			(300)	(350)	(400)	(450)
• Nominal heat output at 80/60 °C, natural gas [1]		kW	54-274	67-315	62-362	73-415
• Nominal heat output at 50/30 °C, natural gas [1]		kW	58-299	70-352	69-399	77-451
• Nominal heat output at 80/60 °C, propane [2]		kW	83-274	115-311	97-361	111-408
• Nominal heat output at 50/30 °C, propane [2]		kW	93-299	129-352	108-399	122-451
• Nominal heat input with natural gas [3]		kW	54-282	64-331	62-374	71-427
• Nominal heat input with propane [2]		kW	87-282	121-331	100-374	115-427
• Operating pressure heating min./max. (PMS)		bar	1/6	1/6	1/6	1/6
• Operating temperature max. (T_{max})		°C	95	95	95	95
• Boiler water content ($V_{(H20)}$)		l	472	452	432	412
• Flow resistance boiler			see diagram			
• Minimum circulation water quantity		l/h	-	-	-	-
• Boiler weight (without water capacity, incl. cladding)		kg	730	765	800	830
• Boiler efficiency at 80/60 °C in full-load operation (NCV/GCV) [4]		%	98.2/88.5	98.2/88.5	98.2/88.5	98.2/88.5
• Boiler efficiency at 30 % partial load (NCV/GCV) [4]		%	109.2/98.4	108.9/98.1	109.0/98.2	108.9/98.1
• Room heating energy efficiency						
- without control	ηs	%	94	93	93	-
- with control	ηs	%	96	95	95	-
- with control and room sensor	ηs	%	98	97	97	-
- annual energy consumption	Q_{HE}	GJ	505	590	653	-
• NOx class (EN 15502)			-	-	-	6
• Nitrogen oxide emissions (EN 15502) (GCV)	NOx	mg/kWh	39	45	39	45
• Carbon monoxide emissions at 50/30 °C (related to 3 % of O_2)	CO	mg/Nm^3	18	26	23	30
• O_2 content in flue gas min./max. output		%	5.5/5.8	5.7/5.7	5.9/5.9	6.0/5.6
• Heat loss in standby mode		Watt	750	750	750	750
• Dimensions			see dimensional drawing			
• Gas flow pressure min./max.						
- Natural gas E/LL		mbar	17.4-80	17.4-80	17.4-80	17.4-80
- Propane		mbar	37-57	37-57	37-57	37-57
• Gas inlet pressure max. (idle pressure)		mbar	80	80	80	80
• Gas connection values at 15 °C/1013 mbar:						
- Natural gas E (Wo = 15.0 kWh/m^3) NCV = 9.7 kWh/m^3		m^3/h	5.6-29.1	6.6-34.1	6.4-38.6	7.3-44.0
- Natural gas LL (G25) - (Wo = 12.4 kWh/m^3) NCV = 8.13 kWh/m^3		m^3/h	6.6-34.7	7.9-40.7	7.6-46.0	8.7-52.5
- Propane (G31) NCV = 24.4 kWh/m^3 [2]		m^3/h	3.6-11.6	5.0-13.6	4.1-15.3	4.7-17.5
• Operating voltage		V/Hz	1 x 230/50	1 x 230/50	1 x 230/50	1 x 230/50
• Electrical power consumption min./max.		Watt	51/365	55/350	56/518	56/590
• Standby		Watt	5	5	5	5
• Type of protection		IP	20	20	20	20
• Permitted ambient temperature during operation		°C	5-40	5-40	5-40	5-40
• Sound power level						
- Heating noise (EN 15036 part 1) (room air dependent)		dB(A)	73	70	73	74
- Flue gas noise radiated from the mouth (DIN 45635 part 47) (room air dependent/independent of room air)		dB(A)	71	72	73	74
- Sound pressure level heating noise (reference value depending on installation conditions)		dB(A)	63	60	63	64
• Condensate quantity (natural gas) at 50/30 °C		l/h	22	25	28	29
• pH value of the condensate (approx.)		pH	4.2	4.2	4.2	4.2
• Construction			B23, B23P, C53, C63			
• Flue gas system						
- Temperature class			T120	T120	T120	T120
- Flue gas mass flow at max. nominal heat input (dry)		kg/h	445	522	591	674
- Flue gas mass flow at min. nominal heat input (dry)		kg/h	85	101	98	112
- Flue gas temperature at max. nominal heat output and 80/60 °C		°C	64	65	66	67
- Flue gas temperature at max. nominal heat output and 50/30 °C		°C	43	44	48	47
- Flue gas temperature at min. nominal heat output and 50/30 °C		°C	29	29	29	29
- Max. permissible temperature of the combustion air		°C	48	48	48	48
- Combustion air flow rate		Nm^3/h	364	428	483	552
- Maximum supply pressure for combustion air supply and flue gas line		Pa	130	130	130	130
- Maximum draught/underpressure at flue gas outlet		Pa	-30	-30	-30	-30

[1] In relation to natural gas G20 (100 % methane). With a hydrogen content (H_2) of up to 20 % by vol. in accordance with DVGW ZP3100 (D), an output reduction of up to 7 % is possible.

[2] Data related to NCV, conditional data

[3] Data related to NCV. The boiler series is tested for EE/H setting. With a factory setting to a Wobbe value of 15.0 kWh/m^3, operation in the Wobbe value range from 12.0 to 15.7 kWh/m^3 is possible without resetting.

[4] Conversion acc. to EN 15502-1, Appendix J

Hoval UltraGas® 2 (500-800)

Type			(500)	(620)	(700)	(800)
• Nominal heat output at 80/60 °C, natural gas [1]		kW	71-449	125-580	132-653	150-743
• Nominal heat output at 50/30 °C, natural gas [1]		kW	77-491	136-622	146-703	166-804
• Nominal heat output at 80/60 °C, propane [2]		kW	111-441	168-569	174-643	233-744
• Nominal heat output at 50/30 °C, propane [2]		kW	121-491	178-622	187-703	254-804
• Nominal heat input with natural gas [3]		kW	71-463	124-591	134-668	151-759
• Nominal heat input with propane [2]		kW	115-463	174-591	180-668	236-759
• Operating pressure heating min./max. (PMS)		bar	1/6	1/6	1/6	1/6
• Operating temperature max. (T_{max})		°C	95	95	95	95
• Boiler water content ($V_{(H20)}$)		l	408	536	509	831
• Flow resistance boiler			see diagram			
• Minimum circulation water quantity		l/h	-	-	-	-
• Boiler weight (without water capacity, incl. cladding)		kg	855	1090	1135	1435
• Boiler efficiency at 80/60 °C in full-load operation (NCV/GCV) [4]		%	98.2/88.5	98.2/88.5	98.2/88.5	98.3/88.6
• Boiler efficiency at 30 % partial load (NCV/GCV) [4]		%	109.0/98.2	109.0/98.2	108.9/98.1	109.1/98.3
• Room heating energy efficiency						
- without control	ηs	%	-	-	-	-
- with control	ηs	%	-	-	-	-
- with control and room sensor	ηs	%	-	-	-	-
- annual energy consumption	Q_{HE}	GJ	-	-	-	-
• NOx class (EN 15502)			6	6	6	6
• Nitrogen oxide emissions (EN 15502) (GCV)	NOx	mg/kWh	50	33	40	36
• Carbon monoxide emissions at 50/30 °C (related to 3 % of O_2)	CO	mg/Nm³	46	24	26	23
• O_2 content in flue gas min./max. output		%	5.5/5.8	5.9/6.0	6.0/5.7	6.0/5.8
• Heat loss in standby mode		Watt	750	1000	1000	1200
• Dimensions			see dimensional drawing			
• Gas flow pressure min./max.						
- Natural gas E/LL		mbar	17.4-80	17.4-80	17.4-80	17.4-300
- Propane		mbar	37-57	37-57	37-57	37-57
• Gas inlet pressure max. (idle pressure)		mbar	80	80	80	300
• Gas connection values at 15 °C/1013 mbar:						
- Natural gas E (Wo = 15.0 kWh/m³) NCV = 9.7 kWh/m³		m³/h	7.3-47.7	12.8-60.9	13.8-68.9	15.6-78.2
- Natural gas LL (G25) - (Wo = 12.4 kWh/m³) NCV = 8.13 kWh/m³		m³/h	8.7-56.9	15.3-72.7	16.5-82.2	18.6-93.4
- Propane (G31) NCV = 24.4 kWh/m³ [2]		m³/h	4.7-19.0	7.1-24.2	7.4-27.4	9.7-31.1
• Operating voltage		V/Hz	1 x 230/50	1 x 230/50	1 x 230/50	1 x 230/50
• Electrical power consumption min./max.		Watt	57/716	63/831	67/1060	94/1012
• Standby		Watt	5	5	5	7
• Type of protection		IP	20	20	20	20
• Permitted ambient temperature during operation		°C	5-40	5-40	5-40	5-40
• Sound power level						
- Heating noise (EN 15036 part 1) (room air dependent)		dB(A)	78	75	76	78
- Flue gas noise radiated from the mouth (DIN 45635 part 47) (room air dependent/independent of room air)		dB(A)	77	72	71	-
- Sound pressure level heating noise (reference value depending on installation conditions)		dB(A)	68	65	66	68
• Condensate quantity (natural gas) at 50/30 °C		l/h	37	51	48	57
• pH value of the condensate (approx.)		pH	4.2	4.2	4.2	4.2
• Construction			B23, B23P, C53, C63			
• Flue gas system						
- Temperature class			T120	T120	T120	T120
- Flue gas mass flow at max. nominal heat input (dry)		kg/h	736	933	1055	1198
- Flue gas mass flow at min. nominal heat input (dry)		kg/h	112	196	211	238
- Flue gas temperature at max. nominal heat output and 80/60 °C		°C	66	68	69	66
- Flue gas temperature at max. nominal heat output and 50/30 °C		°C	44	47	49	44
- Flue gas temperature at min. nominal heat output and 50/30 °C		°C	28	28	29	28
- Max. permissible temperature of the combustion air		°C	48	48	48	48
- Combustion air flow rate		Nm³/h	602	764	863	981
- Maximum supply pressure for combustion air supply and flue gas line		Pa	130	130	130	130
- Maximum draught/underpressure at flue gas outlet		Pa	-30	-30	-30	-30

[1] In relation to natural gas G20 (100 % methane). With a hydrogen content (H_2) of up to 20 % by vol. in accordance with DVGW ZP3100 (D), an output reduction of up to 7 % is possible.

[2] Data related to NCV, conditional data

[3] Data related to NCV. The boiler series is tested for EE/H setting. With a factory setting to a Wobbe value of 15.0 kWh/m³, operation in the Wobbe value range from 12.0 to 15.7 kWh/m³ is possible without resetting.

[4] Conversion acc. to EN 15502-1, Appendix J

Hoval UltraGas® 2 (1000-1550)

Type			(1000)	(1100)	(1300)	(1550)
• Nominal heat output at 80/60 °C, natural gas [1]		kW	185-926	203-1038	241-1230	297-1447
• Nominal heat output at 50/30 °C, natural gas [1]		kW	205-999	229-1112	269-1320	324-1550
• Nominal heat output at 80/60 °C, propane [2]		kW	245-926	299-1033	362-1227	427-1439
• Nominal heat output at 50/30 °C, propane [2]		kW	264-999	316-1112	385-1320	453-1550
• Nominal heat input with natural gas [3]		kW	187-943	206-1057	247-1251	297-1469
• Nominal heat input with propane [2]		kW	248-943	306-1057	371-1251	437-1469
• Operating pressure heating min./max. (PMS)		bar	1/6	1/6	1/6	1/6
• Operating temperature max. (T_{max})		°C	95	95	95	95
• Boiler water content ($V_{(H20)}$)		l	756	718	1211	1118
• Flow resistance boiler			see diagram			
• Minimum circulation water quantity		l/h	-	-	-	-
• Boiler weight (without water capacity, incl. cladding)		kg	1580	1635	2280	2445
• Boiler efficiency at 80/60 °C in full-load operation (NCV/GCV) [4]		%	98.2/88.5	98.2/88.5	98.2/88.5	98.2/88.5
• Boiler efficiency at 30 % partial load (NCV/GCV) [4]		%	109.0/98.2	108.6/97.8	108.7/97.9	108.5/97.7
• Room heating energy efficiency						
- without control	ηs	%	-	-	-	-
- with control	ηs	%	-	-	-	-
- with control and room sensor	ηs	%	-	-	-	-
- annual energy consumption	Q_{HE}	GJ	-	-	-	-
• NOx class (EN 15502)			6	6	6	6
• Nitrogen oxide emissions (EN 15502) (GCV)	NOx	mg/kWh	36	41	37	35
• Carbon monoxide emissions at 50/30 °C (related to 3 % of O_2)	CO	mg/Nm^3	25	26	23	23
• O_2 content in flue gas min./max. output		%	6.0/5.9	6.0/5.9	6.0/5.9	6.0/6.0
• Heat loss in standby mode		Watt	1200	1200	1600	1600
• Dimensions			see dimensional drawing			
• Gas flow pressure min./max.						
- Natural gas E/LL		mbar	17.4-300	17.4-300	17.4-300	17.4-300
- Propane		mbar	37-57	37-57	37-57	37-57
• Gas inlet pressure max. (idle pressure)		mbar	300	300	300	300
• Gas connection values at 15 °C/1013 mbar:						
- Natural gas E (Wo = 15.0 kWh/m^3) NCV = 9.7 kWh/m^3		m^3/h	19.3-97.2	21.2-109.0	25.5-129.0	30.6-151.4
- Natural gas LL (G25) - (Wo = 12.4 kWh/m^3) NCV = 8.13 kWh/m^3		m^3/h	23.0-116.0	25.3-130.0	30.4-153.9	36.5-180.7
- Propane (G31) NCV = 24.4 kWh/m^3 [2]		m^3/h	10.2-38.6	12.5-43.3	15.2-51.3	17.9-60.2
• Operating voltage		V/Hz	1 x 230/50 3 x 400/50	1 x 230/50 3 x 400/50	1 x 230/50 3 x 400/50	1 x 230/50 3 x 400/50
• Electrical power consumption min./max.		Watt	203-1873	203-1933	271/4111	301/4141
• Standby		Watt	7	7	5	7
• Type of protection		IP	20	20	20	20
• Permitted ambient temperature during operation		°C	5-40	5-40	5-40	5-40
• Sound power level						
- Heating noise (EN 15036 part 1) (room air dependent)		dB(A)	83	82	86	85
- Flue gas noise radiated from the mouth (DIN 45635 part 47) (room air dependent/independent of room air)		dB(A)	-	-	-	-
- Sound pressure level heating noise (reference value depending on installation conditions)		dB(A)	73	72	76	75
• Condensate quantity (natural gas) at 50/30 °C		l/h	68	72	100	138
• pH value of the condensate (approx.)		pH	4.2	4.2	4.2	4.2
• Construction			B23, B23P, C53, C63			
• Flue gas system						
- Temperature class			T120	T120	T120	T120
- Flue gas mass flow at max. nominal heat input (dry)		kg/h	1488	1669	1975	2230
- Flue gas mass flow at min. nominal heat input (dry)		kg/h	295	325	390	450
- Flue gas temperature at max. nominal heat output and 80/60 °C		°C	69	70	66	68
- Flue gas temperature at max. nominal heat output and 50/30 °C		°C	47	49	45	46
- Flue gas temperature at min. nominal heat output and 50/30 °C		°C	28	29	29	28
- Max. permissible temperature of the combustion air		°C	48	48	48	48
- Combustion air flow rate		Nm^3/h	1219	1366	1617	1830
- Maximum supply pressure for combustion air supply and flue gas line		Pa	130	130	130	130
- Maximum draught/underpressure at flue gas outlet		Pa	-30	-30	-30	-30

[1] In relation to natural gas G20 (100 % methane). With a hydrogen content (H_2) of up to 20 % by vol. in accordance with DVGW ZP3100 (D), an output reduction of up to 7 % is possible.

[2] Data related to NCV, conditional data

[3] Data related to NCV. The boiler series is tested for EE/H setting. With a factory setting to a Wobbe value of 15.0 kWh/m^3, operation in the Wobbe value range from 12.0 to 15.7 kWh/m^3 is possible without resetting.

[4] Conversion acc. to EN 15502-1, Appendix J

Hoval UltraGas® 2 H (700-1550)

Type			H (700)	H (1100)	H (1550)
• Nominal heat output at 80/60 °C, natural gas [1]		kW	132-653	203-1038	297-1447
• Nominal heat output at 50/30 °C, natural gas [1]		kW	146-703	229-1112	324-1550
• Nominal heat output at 80/60 °C, propane [2]		kW	174-643	299-1033	427-1439
• Nominal heat output at 50/30 °C, propane [2]		kW	187-703	316-1112	453-1550
• Nominal heat input with natural gas [3]		kW	134-668	206-1057	297-1469
• Nominal heat input with propane [2]		kW	180-668	306-1057	437-1469
• Operating pressure heating min./max. (PMS)		bar	1/10	1/10	1/10
• Operating temperature max. (T_{max})		°C	95	95	95
• Boiler water content ($V_{(H20)}$)		l	509	709	1118
• Flow resistance boiler				see diagram	
• Minimum circulation water quantity		l/h	-	-	-
• Boiler weight (without water capacity, incl. cladding)		kg	1170	1735	2550
• Boiler efficiency at 80/60 °C in full-load operation (NCV/GCV) [4]		%	98.2/88.5	98.2/88.5	98.2/88.5
• Boiler efficiency at 30 % partial load (NCV/GCV) [4]		%	108.9/98.1	108.6/97.8	108.5/97.7
• Room heating energy efficiency					
- without control	ηs	%	-	-	-
- with control	ηs	%	-	-	-
- with control and room sensor	ηs	%	-	-	-
- annual energy consumption	Q_{HE}	GJ	-	-	-
• NOx class (EN 15502)			6	6	6
• Nitrogen oxide emissions (EN 15502) (GCV)	NOx	mg/kWh	40	41	35
• Carbon monoxide emissions at 50/30 °C (related to 3 % of O_2)	CO	mg/Nm³	26	26	23
• O_2 content in flue gas min./max. output		%	6.0/5.7	6.0/5.9	6.0/6.0
• Heat loss in standby mode		Watt	1000	1200	1600
• Dimensions				see dimensional drawing	
• Gas flow pressure min./max.					
- Natural gas E/LL		mbar	17.4-80	17.4-300	17.4-300
- Propane		mbar	37-57	37-57	37-57
• Gas inlet pressure max. (idle pressure)		mbar	80	300	300
• Gas connection values at 15 °C/1013 mbar:					
- Natural gas E (Wo = 15.0 kWh/m³) NCV = 9.7 kWh/m³		m³/h	13.8-68.9	21.2-109.0	30.6-151.4
- Natural gas LL (G25) - (Wo = 12.4 kWh/m³) NCV = 8.13 kWh/m³		m³/h	16.5-82.2	25.3-130.0	36.5-180.7
- Propane (G31) NCV = 24.4 kWh/m³ [2]		m³/h	7.4-27.4	12.5-43.3	17.9-60.2
• Operating voltage		V/Hz	1 x 230/50	1 x 230/50 3 x 400/50	1 x 230/50 3 x 400/50
• Electrical power consumption min./max.		Watt	67/1060	203/1933	301/4141
• Standby		Watt	5	7	7
• Type of protection		IP	20	20	20
• Permitted ambient temperature during operation		°C	5-40	5-40	5-40
• Sound power level					
- Heating noise (EN 15036 part 1) (room air dependent)		dB(A)	76	82	85
- Flue gas noise radiated from the mouth (DIN 45635 part 47) (room air dependent/independent of room air)		dB(A)	71	-	-
- Sound pressure level heating noise (reference value depending on installation conditions)		dB(A)	66	72	75
• Condensate quantity (natural gas) at 50/30 °C		l/h	48	72	138
• pH value of the condensate (approx.)		pH	4.2	4.2	4.2
• Construction				B23, B23P, C53, C63	
• Flue gas system					
- Temperature class			T120	T120	T120
- Flue gas mass flow at max. nominal heat input (dry)		kg/h	1055	1669	2230
- Flue gas mass flow at min. nominal heat input (dry)		kg/h	211	325	450
- Flue gas temperature at max. nominal heat output and 80/60 °C		°C	69	70	68
- Flue gas temperature at max. nominal heat output and 50/30 °C		°C	49	49	46
- Flue gas temperature at min. nominal heat output and 50/30 °C		°C	29	29	28
- Max. permissible temperature of the combustion air		°C	48	48	48
- Combustion air flow rate		Nm³/h	863	1366	1830
- Maximum supply pressure for combustion air supply and flue gas line		Pa	130	130	130
- Maximum draught/underpressure at flue gas outlet		Pa	-30	-30	-30

[1] In relation to natural gas G20 (100 % methane). With a hydrogen content (H_2) of up to 20 % by vol. in accordance with DVGW ZP3100 (D), an output reduction of up to 7 % is possible.

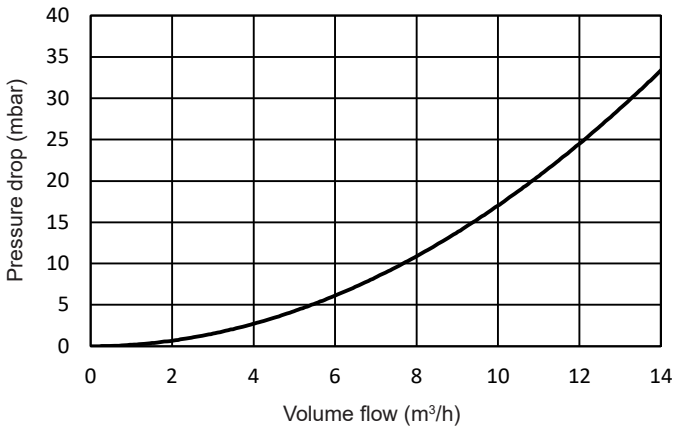
[2] Data related to NCV, conditional data

[3] Data related to NCV. The boiler series is tested for EE/H setting. With a factory setting to a Wobbe value of 15.0 kWh/m³, operation in the Wobbe value range from 12.0 to 15.7 kWh/m³ is possible without resetting.

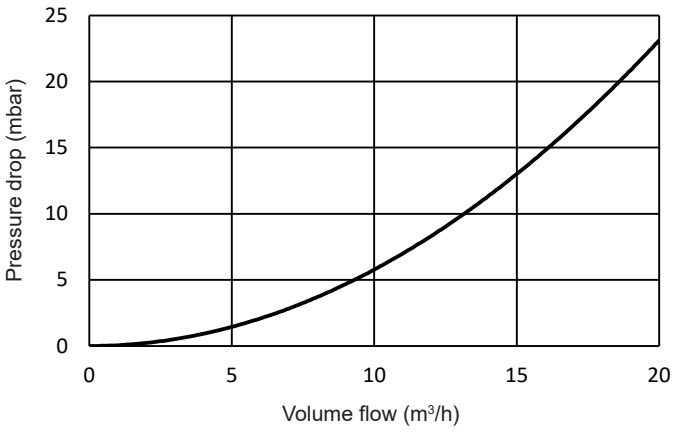
[4] Conversion acc. to EN 15502-1, Appendix J

Flow resistance on the heating water side

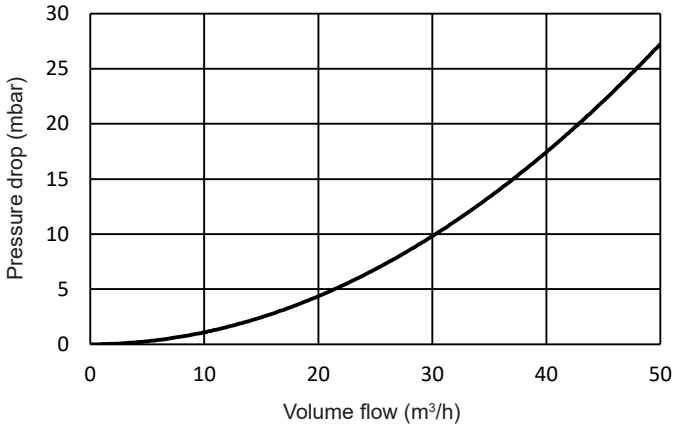
UltraGas® 2 (125,150)



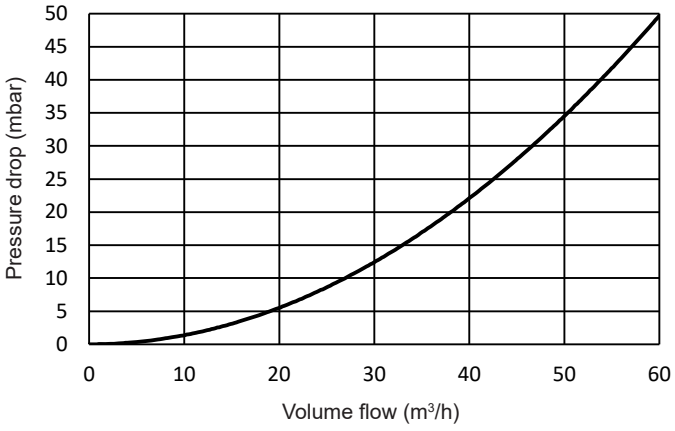
UltraGas® 2 (190,230)



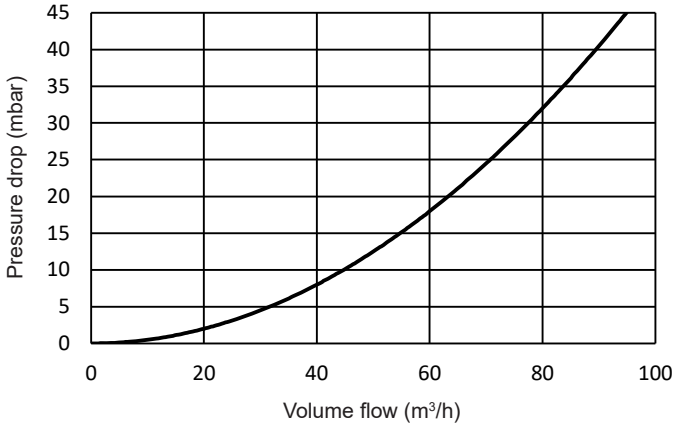
UltraGas® 2 (300-500)



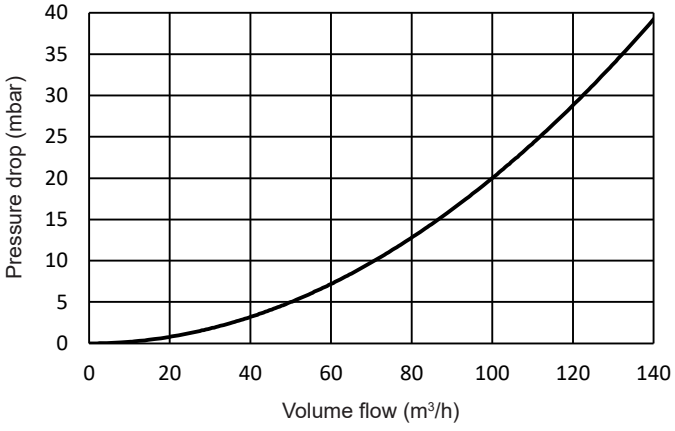
UltraGas® 2 (620,700)



UltraGas® 2 (800-1100)

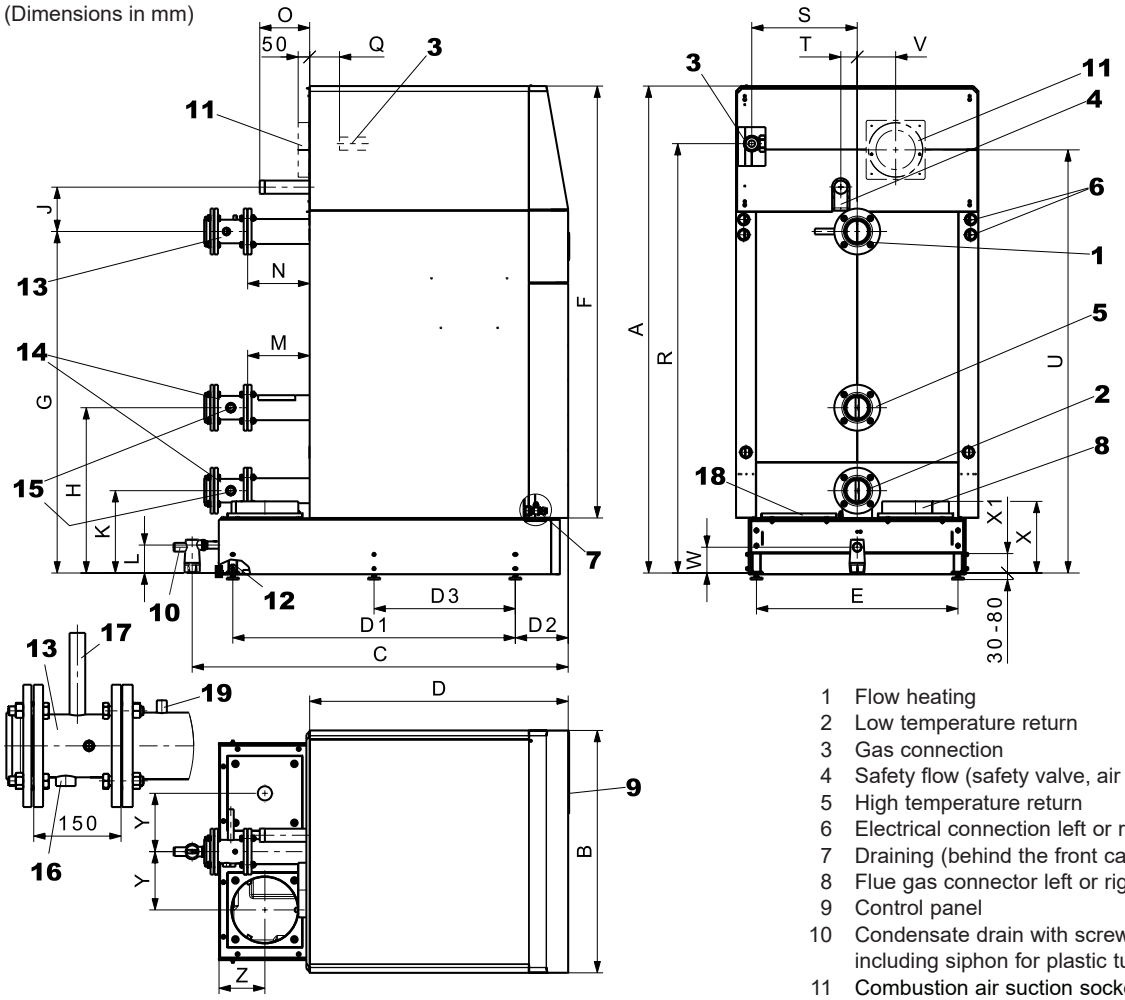


UltraGas® 2 (1300,1550)



UltraGas® 2 (125-1550)

(Dimensions in mm)



Notice
Minimal space see separate page

1 Flow heating
2 Low temperature return
3 Gas connection
4 Safety flow (safety valve, air vent)
5 High temperature return
6 Electrical connection left or right
7 Draining (behind the front casing)
8 Flue gas connector left or right
9 Control panel
10 Condensate drain with screw including siphon for plastic tube
11 Combustion air suction socket (option)
12 Boiler feet (adjustable 30-80 mm)
13 Safety fitting pipe flow (option)
14 Safety fitting pipe return (option)
15 Diaphragm pressure expansion tank connection Rp 1″
16 Pressure limiter Rp ¾″
17 Safety temperature control Rp ½″
18 Cleaning opening left or right
19 Flow connection sleeve Rp ¼″ for installation of the system flow sensor

Type	A	B	C	D	D1	D2	D3	E	F	G	H	J	K	L	M	N	O	Q	R
(125,150)	1923	720	1182	799	754	242	-	533	1681	1479	714	122	334	134	207	207	65	192	1725
(190,230)	1968	820	1256	895	854	242	-	633	1726	1517	717	145	337	134	204	204	69	226	1778
(300-500)	1923	930	1632	1165	1204	242	-	743	1683	1447	745	169	365	131	285	285	189	13	1735
(620,700)	2234	1110	1722	1184	1294	242	-	923	1982	1564	757	203	377	128	286	286	225	-2	1966
(800-1100)	2255	1290	1822	1364	1480	242	-	1103	1987	1573	788	215	408	128	378	378	225	58	1959
(1300,1550)	2395	1560	2200	1640	1790	250	895	1363	2103	1600	822	238	442	138	420	420	218	22	2064
H (700)	2234	1110	1722	1184	1294	242	-	923	1982	1564	757	203	377	128	286	286	225	-2	1966
H (1100)	2255	1290	1822	1364	1480	242	-	1103	1987	1573	788	215	408	128	378	378	225	58	1959
H (1550)	2395	1560	2200	1640	1790	250	895	1363	2103	1600	822	238	442	138	390	390	218	22	2064

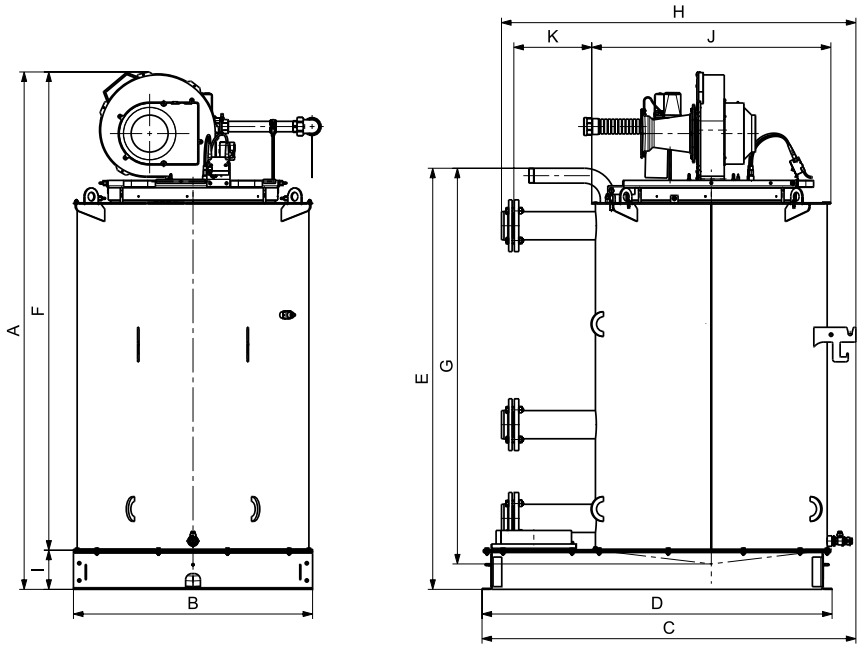
Type	S	T	U	V	W	X	X1	Y	Z	1,2,5*	3	4	8	10	11
(125,150)	318	40	1725	101	124	319	99	157	139	DN 65 / PN 6 / 4-hole	Rp 1″	R 1″	Ø 155/159	DN 40	Ø 122/125
(190,230)	371	50	1778	101	124	319	99	195	139	DN 65 / PN 6 / 4-hole	Rp 1½″	R 1¼″	Ø 155/159	DN 40	Ø 197/200
(300-500)	368	40	1736	101	121	316	96	217	184	DN 100 / PN 6 / 4-hole	Rp 1½″	R 1½″	Ø 252/256	DN 40	Ø 197/200
(620,700)	483	75	1938	176	118	328	89	267	211	DN 100 / PN 6 / 4-hole	Rp 2″	R 2″	Ø 302/306	DN 40	Ø 247/250
(800-1100)	572	100	1959	176	118	374	89	357	219	DN 125 / PN 6 / 8-hole	Rp 2″	R 2″	Ø 302/306	DN 40	Ø 247/250
(1300,1550)	621	100	2064	190	128	398	89	455	244	DN 150 / PN 6 / 8-hole	Rp 2″	R 2″	Ø 402/406	DN 40	Ø 247/250
H (700)	483	75	1938	176	118	328	89	267	211	DN 100 / PN 16 / 8-hole	Rp 2″	R2″	Ø 302/306	DN 40	Ø 247/250
H (1100)	572	100	1959	176	118	374	89	357	219	DN 125 / PN 16 / 8-hole	Rp 2″	R 2″	Ø 302/306	DN 40	Ø 247/250
H (1550)	621	100	2064	190	128	398	89	455	244	DN 150 / PN 16 / 8-hole	Rp 2″	R 2″	Ø 402/406	DN 40	Ø 247/250

* DN = nominal diameter, PN = nominal pressure

Installation dimensions

Boiler without casing and insulation
(Dimensions in mm)

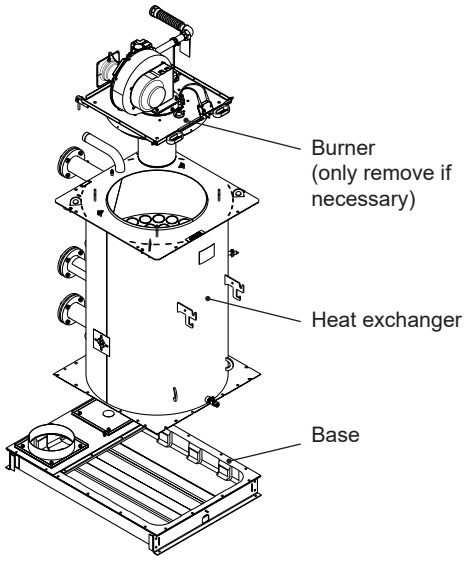
UltraGas® 2 (125-1550)



UltraGas® 2 type	A	B	C	D	E	Dimensions for multi-part installation F	G	H	I	J	K
(125,150)	1765	580	957	880	1519	1625	1421	946	140	580	242
(190,230)	1818	680	1054	980	1583	1678	1484	1037	140	680	236
(300-500)	1777	790	1400	1330	1544	1637	1451	1391	140	950	316
(620,700)	2099	970	1516	1420	1708	1940	1605	1437	159	970	316
(800-1100)	2120	1150	1712	1606	1729	1945	1625	1722	175	1150	408
(1300,1550)	2255	1410	2032	1916	1779	2056	1671	2042	199	1410	458

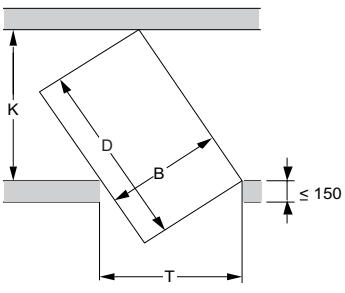
Weights for multi-part installation UltraGas® 2

UltraGas® 2 type	Base kg	Heat exchanger kg	Burner kg
(125)	34	207	29
(150)	34	220	29
(190)	42	272	39
(230)	42	293	39
(300)	60	455	60
(350)	60	486	60
(400)	60	520	60
(450)	60	554	60
(500)	60	576	60
(620)	86	729	80
(700)	86	777	80
(800)	104	1017	93
(1000)	104	1154	100
(1100)	104	1208	100
(1300)	155	1683	160
(1550)	155	1847	160



Required minimum width of door and corridor for boiler installation

The following values are the calculated minimum values (dimensions in mm)



$$K = \frac{B}{T} \times D$$

$$T = \frac{B}{K} \times D$$

B = boiler width
D = max. boiler length
T = door width
K = corridor width

Calculation example for the necessary corridor width

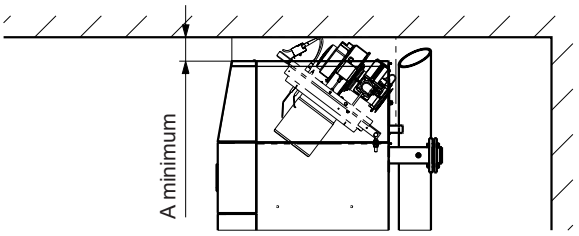
Door width T = 800

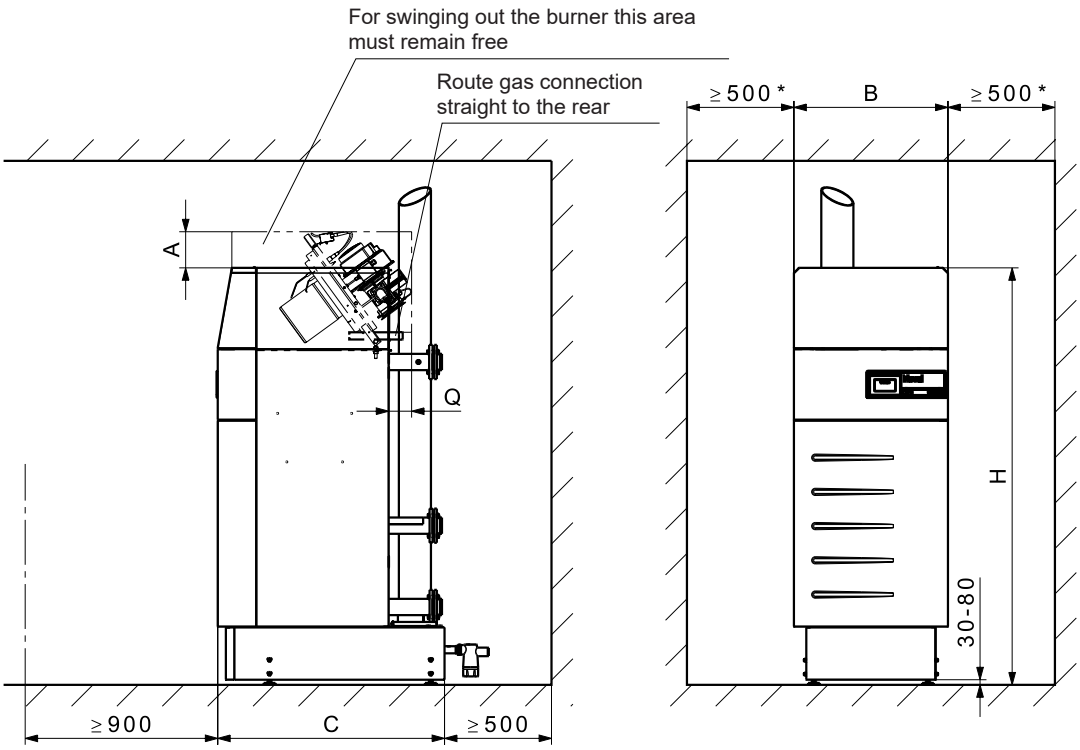
UltraGas® 2 (500) $K = \frac{790}{800} \times 1330 =$ corridor width ≥ 1314

Space requirements

(Dimensions in mm)

UltraGas® 2 (125-1550)





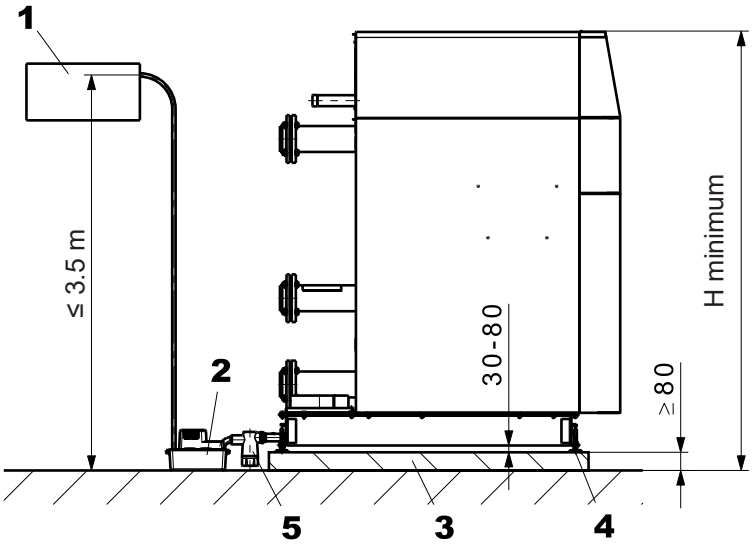
UltraGas® 2 type	A [1]	A minimum [2]	B	C	H [3]	H minimum [4]	Q
(125,150)	169	106	720	1060	1953	1934	125
(190,230)	155	71	820	1160	1998	1979	2
(300-500)	513	156	930	1510	1953	1937	60
(620,700)	121	121	1110	1600	2264	2255	155
(800-1100)	280	195	1290	1786	2285	2276	119
(1300,1550)	291	154	1560	2104	2425	2416	163
H (700)	121	121	1110	1600	2264	2255	155
H (1100)	280	195	1290	1786	2285	2276	119
H (1550)	291	154	1560	2104	2425	2416	163

[1] If room height is too small: Reduction of dimension possible (see A minimum).
[2] **Attention!** With A minimum the burner can not be swung out completely anymore! Cleaning with UltraGas® 2 (125-230) and UltraGas® 2 (620-1550) still possible
[3] Height value assumes adjustable feet are set to 30 mm
[4] The base plates cannot be installed without feet and the installer will have to fit a siphon with min. 70 mm barrier height. For details see next page.

- The heat generator can be placed with one side directly on the wall. However, to protect heat-sensitive walls against damage, a distance of at least 150 mm from the wall must be provided.
- The cleaning opening must be easily accessible. As a result, a minimum distance of 500 mm must be maintained on the cleaning opening side.

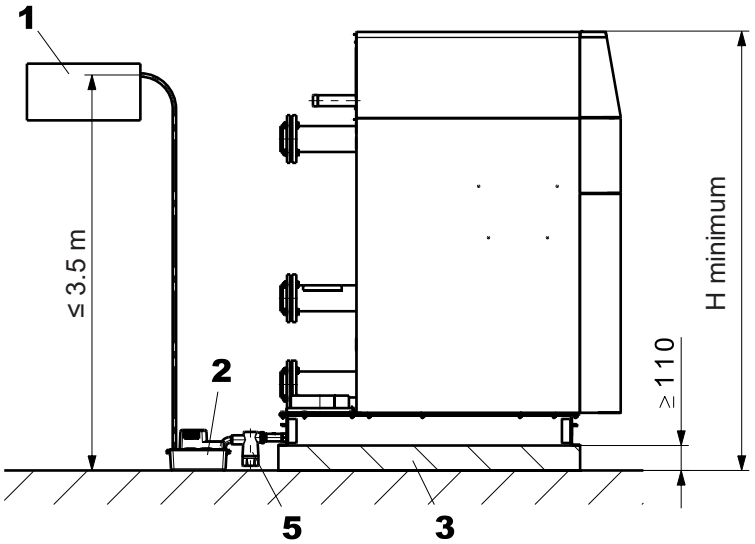
UltraGas® 2 (125-1550) with masonry base and adjustable feet

(Dimensions in mm)



UltraGas® 2 type	H minimum [1]
(125,150)	1934
(190,230)	1979
(300-500)	1937
(620,700)	2255
(800-1100)	2276
(1300,1550)	2416
H (700)	2255
H (1100)	2276
H (1550)	2416

UltraGas® 2 (125-1550) with masonry base without adjustable feet



UltraGas® 2 type	H minimum [1]
(125,150)	1934
(190,230)	1979
(300-500)	1937
(620,700)	2255
(800-1100)	2276
(1300,1550)	2416
H (700)	2255
H (1100)	2276
H (1550)	2416

1 Neutralisation unit (option)
2 Condensate pump (option)
3 Masonry base
4 Feet adjustable up to 30-80 mm
5 Siphon [2]

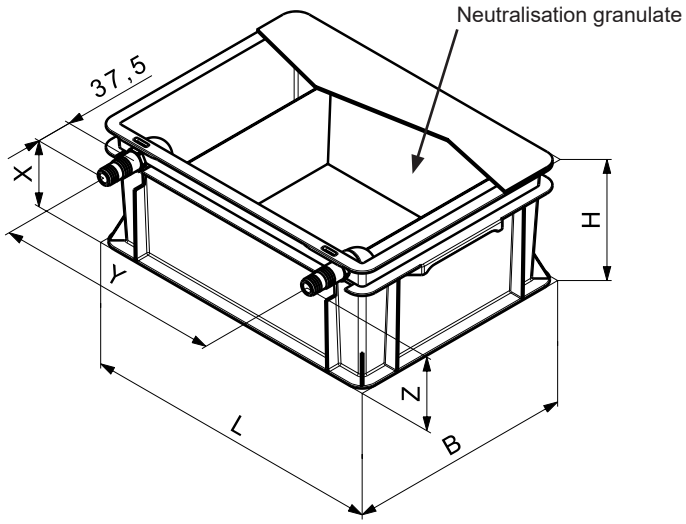
[1] Height value assumes adjustable feet are set to 30 mm
[2] **Caution!** The installer will have to fit a siphon with min. 70 mm barrier height.

Notice

- The steps of the climbing aid provided must be horizontal. Adapt the climbing aid if necessary.
- Base plates and feeds will not be re-funded!
- With H minimum, cleaning the siphon is more difficult.

Neutralisation unit HNB-0400 to HNB-1600

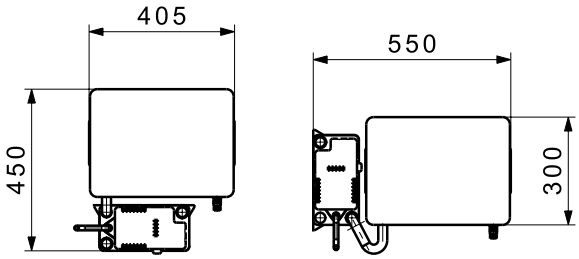
(Dimensions in mm)



	HNB-0400,-0800	HNB-1200,-1600
Dimensions (L x W x H)	405 x 300 x 180 mm	605 x 400 x 180 mm
Inlet height (Z)	128 mm	
Drain height (X)	118 mm	
Distance between the connections (Y)	approx. 350 mm	approx. 550 mm

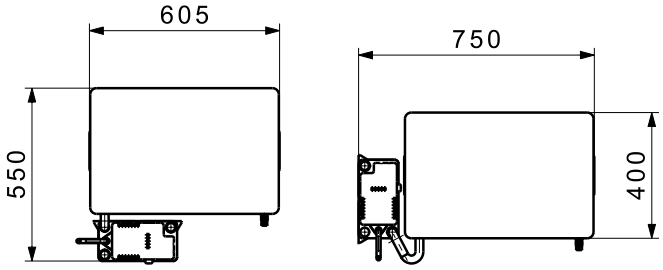
Neutralisation unit HNB-0400,-0800 and condensate pump

(Dimensions in mm)



Neutralisation unit HNB-1200,-1600 and condensate pump

(Dimensions in mm)



Standards and guidelines

The official regulations for installation and operation must be observed. In particular, these are the country-specific standards (e.g. EN standard, DIN standards, …) as well as the corresponding regional regulations.

The following standards and guidelines must be complied with:

- Hoval technical information and installation instructions
- hydraulic and technical control regulations of Hoval
- DVGW directives
- DIN EN 12828
  Safety-relevant requirements
- DIN EN 12831 Heaters
  Rules for the calculation of the heat requirements of buildings
- VDI 2035 Protection against damage by corrosion and boiler scale formation in heating and service water installations
- EN 14868 “Protection of metallic materials against corrosion”
- VDE 0100 supplement 2

Water quality in heating systems

Filling and replacement water, heating water

The following applies:

- VDI 2035
- In addition, the EN 14868 standard must be applied, **as well as the manufacturer-specific specifications**

Manufacturer-specific specifications

Filling and replacement water

The filling and replacement water can be both fully demineralised and also merely softened.

Heating water

- In the case of **full demineralisation of the filling and replacement water**, the electrical conductivity of the heating water must not exceed the value of 100 µS/cm.
- In the case of **softening the filling and replacement water**, the following conditions must be complied with:
  The quality of the heating water must be checked and documented periodically:
  - For an installed heat output above 100 kW up to and including 1000 kW, an annual check of the heating water is required.
  - For an installed heat output above 1000 kW, an check of the heating water is required twice a year.

  The following standard values for the heating water must be measured and adhered to:
  - Electrical conductivity of the heating water for operation with water containing salts: > 100 µS/cm to ≤ 1500 µS/cm
  - pH value of the heating water for systems without aluminium alloy as water-side material 8.2 to 10.0 (measurement 10 weeks after commissioning at the earliest)
- The sum of the chloride, nitrate and sulphate contents in the heating water must not exceed 50 mg/l in total.

Additional notices

- Hoval boilers and calorifiers are suitable for heating systems without significant oxygen intake. (System type I according to EN 14868).
- Plants with continual oxygen intake (e.g. underfloor heating without diffusion-proof plastic piping) or intermittent oxygen intake (e.g. requiring frequent topping-up) must be equipped with a system separation.
- In the case of bivalent heating systems, the values of the heat generator with the strictest requirement for water quality must be complied with.
- If only the boiler is replaced in an existing plant, it is not recommended for the entire heating system to be refilled, provided that the heating water already contained in the system complies with the relevant directives or standards.
- Before filling new systems and, where necessary, existing heating systems containing heating water that does not comply with the directives or standards, the heating system must be professionally cleaned and flushed. The boiler must not be filled until the heating system has been flushed.

Frost protection agent

see separate engineering sheet “Use of frost protection agent”.

Heating room

- Boilers cannot be positioned in rooms in which halogen compounds can occur and into which combustion air can enter (e.g. laundrettes, hairdressers).
- Halogen compounds can be caused by cleaning and degreasing solutions, dissolvents, glue and bleaching lyes. Pay attention to the Procal leaflet, corrosion through Halogen compounds.

Combustion air supply

The supply of combustion air must be guaranteed. There must be no possibility to close the air supply opening. For direct combustion air to boiler (LAS system) mount the connection for direct combustion air inlet. It is very important to ensure that the combustion air is free from halogen compounds. These are present, for example, in spray cans, varnishes, glues, solvents and cleansing agents.

The minimum free cross-section for the combustion air can be assumed simplified as follows:

- *Room air-independent operation with separate combustion air pipe to the boiler:*
  0.8 cm² per 1 kW of output. The pressure drop in the combustion air pipe must be considered for the calculation of the flue gas system.
- In the UltraGas® 2, ventilation of the installation or boiler room must be guaranteed for operation independent from the room air.

- *Room air-dependent operation:*
  Minimum free cross-section of the opening into the open: 150 cm² or twice 75 cm² and additionally 2 cm² necessary for each kW of output over 50 kW for vent into the open.

Gas connection

Commissioning

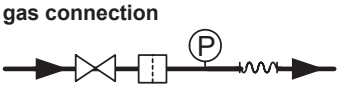
- Initial commissioning must be performed by a specialist technician from Hoval or a gas specialist technician.
- Burner setting values according to the installation instructions.

Manual gas shut-off valve and gas filter

Immediately in front of the boiler a manual gas shut-off device (valve) must be installed according to relevant regulations.

In the UltraGas® 2 (400-1550) type, an external gas filter must be installed in the gas supply line.
Make sure that the gas line from the external gas filter to the gas connection of the boiler is cleaned.
For the UltraGas® (125-350) types, it is necessary to comply with the local regulations concerning the need for a gas filter.

Construction of a recommended gas connection



Legend:


manual gas shut-off valve


gas hose/compensator


gas filter

pressure gauge with test burner and push-button valve

Type of gas

- The boiler is only to be operated with the type of gas stated on the rating plate.

Gas pressure natural gas

Necessary gas flow pressure at the boiler inlet:
UltraGas® 2 (125-700) min. 17.4 mbar, max. 80 mbar
UltraGas® 2 (800-1550) min. 17.4 mbar, max. 300 mbar

Gas pressure propane

- A gas pressure controller to reduce the boiler inlet pressure must be installed on-site for propane.
- Necessary gas flow pressure at the boiler inlet:
  UltraGas® 2 (125-1550)
  min. 37 mbar, max. 50 mbar

Gas pressure regulator

- The installation of a gas pressure regulator is only necessary if the gas flow pressure in the gas network exceeds the maximum permissible gas flow pressure of the UltraGas® 2 or if there are considerable fluctuations in the gas flow pressure.
- Pressure fluctuations in the gas network must be prevented by suitable measures (e.g. gas storage tanks or pressure regulators). The local conditions must be checked in each individual case.

Closed heating system
The boiler is only approved for use in closed heating systems.

Minimum circulation water quantity
No minimum water circulation volume is required.

Calorifier connection
If a calorifier is connected, all heating groups must be provided with a mixer.

Installation instructions
Please observe the installation instructions supplied with every boiler.

Space requirements
See “Dimensions” for information

Pump follow-on
For operating temperatures of the boiler above 85 °C, after each burner switch-off, the circulating pump must be in operation for at least 2 minutes (the pump after-run is included in the boiler controller with TopTronic© E control).

Heating boiler in the attic
If the gas boiler is positioned on the top floor, the installation of a low water protection, which automatically turns the gas burner off in case of water shortage, is recommended.

Condensate drain
- A permit for discharge of the flue gas condensate into the sewage system must be obtained from the relevant authority or sewer operator.
- The condensate from the flue gas line can be discharged via the boiler. A condensate trap is no longer needed in the flue gas system.
- The condensate must be conducted openly (funnel) into the sewage system.
- Suitable materials for condensate drain:
  - stoneware pipes
  - pipes made from glass
  - pipes made from stainless steel
  - pipes made from plastic: PVC, PE, PP, ABS and UP
- A siphon must be installed at the condensate outlet on the gas boiler (included in the boiler scope of delivery).

Diaphragm pressure expansion tank
- An adequately dimensioned diaphragm pressure expansion tank must be provided.
- The diaphragm pressure expansion tank has to be installed in principle at the boiler return, or at the safety flow.
- Starting from 70 °C an intermediate tank is necessary.

Safety valve
- At the safety flow a safety valve and an automatic exhauster must be installed.

Noise damping
The following measures are possible for sound insulation:
- Make boiler room walls, ceiling and floor as solid as possible.
- If there are living areas above or below the boiler room, connect pipes flexibly using expansion joints.
- Connect circulating pumps to the piping network using expansion joints

Noise level
- The acoustic **power** level value is dependent on the local and spacial circumstances.
- The acoustic **pressure** level is dependent on the installation conditions and can for instance be 5 to 10 dB(A) lower than the acoustic **power** level at a distance of 1 m.

Recommendation:
If the combustion air intake opening is located on the house facade near a noise-sensitive place (window of bedroom, garden terrace, etc.), we recommend using a silencer in the combustion air duct.

Allocation of gas filters for UltraGas® 2

UltraGas® 2 type	Gas throughput m^3/h	Gas filter type	Dimension	Pressure drop gas filter (with clean filter) mbar
(125)	11.9	70602/6B	Rp 1″	0.2
(150)	14.2	70602/6B	Rp 1″	0.3
(190)	18.0	70603/6B	Rp 1½″	0.2
(230)	22.4	70603/6B	Rp 1½″	0.2
(300)	29.2	70603/6B	Rp 1½″	0.3
(350)	33.9	70603/6B	Rp 1½″	0.4
(400)	38.6	70603/6B	Rp 1½″	0.6
(450)	44.0	70603/6B	Rp 1½″	0.7
(500)	46.4	70631/6B	Rp 2″	0.5
(620)	59.3	70631/6B	Rp 2″	0.7
(700)	67.0	70631/6B	Rp 2″	0.8
(800)	76.1	70631/6B	Rp 2″	0.9
(1000)	94.6	70631/6B	Rp 2″	1.4
(1100)	106.0	70631/6B	Rp 2″	1.6
(1300)	125.5	70610F/6B	DN 65	1.5
(1550)	147.3	70610F/6B	DN 65	2.1

Flue gas system

- Gas boilers must be connected to a flue gas system (chimney or flue gas lines).
- Flue gas lines must be gas tight and leak tight against condensate and over pressure.
- The flue gas lines must be secured against unwanted loosening of the plug connections.
- The flue gas system must be connected with an angle, so that the resulting condensate of the flue gas system can flow back to the boiler and can be neutralised there before discharging into the canalisation.
- Gas boilers with condensation heat utilisation are to be connected to a flue gas line min. Temperature class T120.
- A flue gas temperature limiter is built in in the boiler.

Standard values for flue gas line dimensions

Standard values for the flue gas line dimensions can be found in the following table.

Table with bases for calculation

- Calculation based on max. 1000 m above sea level.
- Installation room with supply air opening (room air dependent operation)
- An individual calculation must be carried out for room air-independent operation (accessories as option) or a combustion air supply via a duct.
- Connecting line was calculated with max. 5 m.

- The first 2 m of the flue gas line must be configured with the same dimension as the flue gas connector, after which the size of the flue gas system can be selected according to the table below.

Table “Standard values for flue gas line dimensions”

Boiler		Flue gas line (smooth walled)	Number of elbows 90° (flue gas + combustion air)			
UltraGas® 2	Internal Ø flue gas outlet	Designation	Total pipe length in m (flue gas + combustion air)			
type	mm	DN	1	2	3	4
(125)	155	130	24	23	22	21
(150)	155		18	17	16	15
(125)	155	150	47	47	46	45
(150)	155		45	45	45	44
(190)	155		43	42	40	38
(230)	155		20	20	19	18
(230)	155	175	44	43	43	42
(230)	155	200	45	44	43	43
(300)	252		45	44	43	43
(350)	252		44	43	43	42
(400)	252	250	44	43	42	41
(450)	252		50	50	50	50
(500)	252		50	50	50	50
(620)	302		43	42	41	40
(700)	302		42	41	40	39
(800)	302	300	45	44	43	43
(1000)	302		44	43	43	42
(1100)	302	350	47	46	45	44
(1300)	402		46	45	44	43
(1550)	402		45	44	43	43
H (700)	302	250	42	41	40	39
H (1100)	302	350	47	46	45	44
H (1550)	402		45	44	43	43

Notice: The values in the table “Standard values for flue gas line dimensions” are standard values for reference.
An exact calculation for the flue gas duct must be made on-site.
For chimney systems above 25 m effective height, negative pressure in the chimney is to be expected in some operating conditions.
Therefore, we recommend an individual design of the chimney system and checking the individual pressure conditions.

**Looking for the appropriate hydraulic schematic?
Please contact your local Hoval partner.**

Hoval UltraGas® 2 D (250-3100)

Gas boiler
- Double boiler made of steel with condensing technology consisting of 2 individual boilers of 125, 150, 190, 230, 300, 350, 400, 450, 500, 620, 700, 800, 1000, 1100, 1300 or 1550 kW
- For the combustion of:
  - natural gas E
  - natural gas E with a hydrogen content (H_2) of up to 20 % by vol.
  - propane according to DIN 51622
  - biomethane according to EN 16723
- Combustion chamber made of stainless steel
- Maximum flue gas condensation by secondary heating surfaces made of **TurboFer®** hybrid stainless steel composite pipes; heating gas side: stainless steel/aluminium water side: stainless steel
- Thermal insulation with mineral wool mat
- Water pressure sensor:
  - Fulfils the function of a minimum and maximum pressure limiter
  - Replacement for the low water level protection
- Flue gas temperature sensor with flue gas limiter function
- Pre-mix burner
  - with fan and venturi
  - modulating operation
  - automatic ignition
  - ionisation guard
  - gas pressure monitor
- Gas boiler fully cased with steel plates, red powder-coated
- Flue gas overpressure set consisting of motorised air intake suction flap (connection for direct combustion air supply without accessories possible) and flue gas collector.
- Heating connections backwards incl. counter flange, screws and seals for:
  - heating flow
  - high temperature return
  - low temperature return
- *UltraGas® 2 D (600-3100):* with integrated gas pipe compensator
- Each individual boiler has a Hoval TopTronic® E control built in
- Possibility of connecting an external gas solenoid valve with error output

TopTronic® E controller

Control panel
- Colour touchscreen 4.3 inch
- Heat generator blocking switch for interrupting operation
- Fault signalling lamp

TopTronic® E control module
- Simple, intuitive operating concept
- Display of the most important operating statuses
- Configurable start screen
- Operating mode selection
- Configurable day and week programmes
- Operation of all connected Hoval CAN bus modules
- Commissioning wizard
- Service and maintenance function
- Fault message management
- Analysis function
- Weather display (with HovalConnect option)
- Adaptation of the heating strategy based on the weather forecast (with HovalConnect option)

Model range

UltraGas® 2 type	Nominal heat output at 50/30 °C kW
D (250)	25-252
D (300)	35-302
D (380)	38-382
D (460)	51-466
D (600)	58-598
D (700)	70-704
D (800)	69-798
D (900)	77-902
D (1000)	77-982
D (1240)	136-1244
D (1400)	146-1406
D (1600)	166-1608
D (2000)	205-1998
D (2200)	229-2224
D (2600)	269-2640
D (3100)	324-3100
DH (1400)	146-1406
DH (2200)	229-2224
DH (3100)	324-3100

TopTronic® E basic module heat generator TTE-WEZ
- Control functions integrated for
  - 1 heating circuit with mixer
  - 1 heating circuit without mixer
  - 1 hot water charging circuit
  - bivalent and cascade management
- Outdoor sensor
- Immersion sensor (calorifier sensor)
- Contact sensor (flow temperature sensor)
- RAST 5 basic plug set

Options for TopTronic® E controller
- Can be expanded by max. 1 module expansion:
  - module expansion heating circuit or
  - module expansion heat balancing or
  - module expansion Universal
- Can be networked with a total of up to 16 controller modules:
  - heating circuit/hot water module
  - solar module
  - buffer module
  - measuring module

Number of modules that can be additionally installed in the heat generator (per single boiler):

UltraGas® 2 (125-230)
- 1 module expansion and 1 controller module **or**
- 2 controller modules

UltraGas® 2 (300-500):
- 3 controller modules/module expansions

UltraGas® 2 (620-1550):
- 4 controller modules/module expansions

Notice
Max. 1 module expansion can be connected to the basic module heat generator TTE-WEZ!

The supplementary plug set must be ordered in order to use expanded controller functions.

Further information about the TopTronic® E
see “Controls”

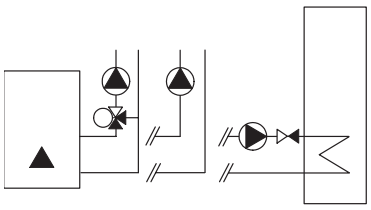
Optional
- Free-standing calorifier see “Calorifiers”
- Additional control for more heating circuits
- Hydraulic connection

Delivery
- 2 gas boilers, casing with thermal insulation, 2 TopTronic® E controls, flue gas collector and combustion air connection delivered separately packed

On site
- Mounting of casing, thermal insulations and boiler control panel
- Mounting of boiler feet
- Mounting of the flue gas connection line and flue gas overpressure set (two motorised combustion air dampers and a flue gas collector)
- Bus cable for connecting the two boiler controllers of the double boiler on site (not included in scope of delivery)

Notice
For the version with common flue gas line with overpressure, the flue gas excess pressure set must be imperatively mounted.

Floor-standing gas condensing boiler



Boiler permissions

UltraGas® 2 D (250-3100)
CE product ID No.: applied for

Hoval UltraGas® 2 D (250-3100)

Double boiler consisting of two individual boilers (UltraGas® 2 125-1550 kW), each with a built-in Hoval TopTronic® E control

Control functions integrated for
- 1 heating circuit with mixer
- 1 heating circuit without mixer
- 1 hot water charging circuit
- bivalent and cascade management

• Can be optionally expanded by max. 1 module expansion:
- module expansion heating circuit or
- module expansion heat balancing or
- module expansion Universal

• Can be optionally networked with a total of up to 16 controller modules (incl. solar module)

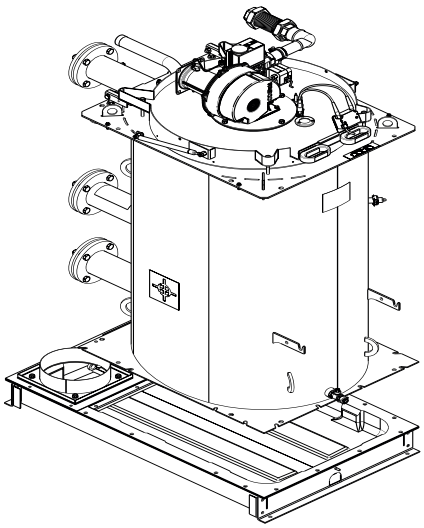
Gas boiler made of steel with TopTronic® E control, combustion chamber made of stainless steel.
Secondary heating surfaces made of **TurboFer®** stainless steel composite pipes.
Pre-mix burner with fan.

Delivery
2 gas boilers, cladding and thermal insulation
2 TopTronic® E controls, flue gas collector and combustion air connection supplied separately packaged

UltraGas® 2 type	Nominal heat output at 50/30 °C kW	Operating pressure bar	Part No.
D (250)	25-252	6	7018 907
D (300)	35-302	6	7018 908
D (380)	38-382	6	7018 933
D (460)	51-466	6	7018 934
D (600)	58-598	6	7018 812
D (700)	70-704	6	7018 813
D (800)	69-798	6	7018 814
D (900)	77-902	6	7019 143
D (1000)	77-982	6	7018 815
D (1240)	136-1244	6	7018 880
D (1400)	146-1406	6	7018 881
D (1600)	166-1608	6	7018 857
D (2000)	205-1998	6	7018 858
D (2200)	229-2224	6	7018 859
D (2600)	269-2640	6	7018 903
D (3100)	324-3100	6	7018 904

[1] kW = modulation range

Floor-standing gas condensing boiler (multi-part installation)



Hoval UltraGas® 2 D (250D-3100D) (multi-part installation)

Double boiler consisting of two individual boilers (UltraGas® 125-1550 kW), each with a built-in Hoval TopTronic® E control for **multi-part installation**.
Assembled on-site by the installer.

UltraGas® 2 type	Output at 50/30 °C kW	Operating pressure bar	Part No.
D (250)	25-252	6	7018 905
D (300)	35-302	6	7018 906
D (380)	38-382	6	7018 931
D (460)	51-466	6	7018 932
D (600)	58-598	6	7018 850
D (700)	70-704	6	7018 851
D (800)	69-798	6	7018 852
D (900)	77-902	6	7019 142
D (1000)	77-982	6	7018 853
D (1240)	136-1244	6	7018 867
D (1400)	146-1406	6	7018 868
D (1600)	166-1608	6	7018 860
D (2000)	205-1998	6	7018 861
D (2200)	229-2224	6	7018 862
D (2600)	269-2640	6	7018 901
D (3100)	324-3100	6	7018 902

[1] kW = modulation range

Floor-standing gas condensing boiler (high-pressure design)

Delivery time approx. 8 weeks

Hoval UltraGas® 2 DH (1400-3100) (high-pressure design)

Floor-standing gas condensing boiler in **high-pressure design**
(operating pressure 10 bar)

UltraGas® 2 type	Output at 50/30 °C kW [1)]	Operating pressure bar	Part No.
DH (1400)	146-1406	10	7019 105
DH (2200)	229-2224	10	7018 831
DH (3100)	324-3100	10	7018 832

[1] kW = modulation range

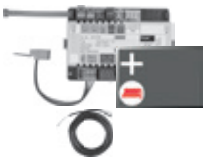
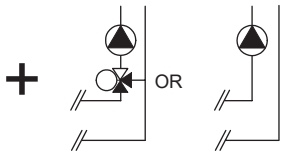
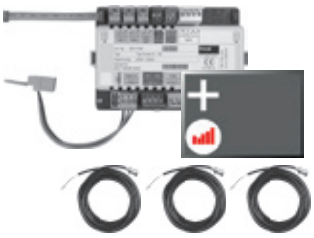
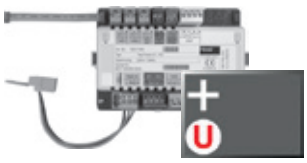
Propane version — **on request**

System flow sensor — 6053 398
for UltraGas® 2 for installation in the flow connector sleeve Rp ¼″,
for regulating the flow temperature.
Consisting of temperature sensor and connection cable

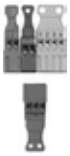
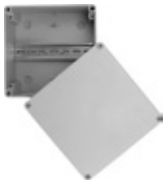
Installation of the system flow sensor is recommended for optimal control of the flow temperature.

TopTronic® E module expansions

for TopTronic® E basic module heat generator

		Part No.
 	**TopTronic® E module expansion heating circuit TTE-FE HK** Expansion to the inputs and outputs of the basic module heat generator or the heating circuit/domestic hot water module for implementing the following functions: - 1 heating/cooling circuit w/o mixer or - 1 heating/cooling circuit with mixer Consisting of: - Fitting accessories - 1 contact sensor ALF/2P/4/T, L = 4.0 m - Basic plug set FE module **Notice** The supplementary plug set may have to be ordered to implement functions differing from the standard!	6034 576
	**TopTronic® E module expansion heating circuit incl. energy balancing** TTE-FE HK-EBZ Expansion to the inputs and outputs of the basic module heat generator or the heating circuit/domestic hot water module for implementing the following functions: - 1 heating/cooling circuit w/o mixer or - 1 heating/cooling circuit with mixer incl. energy balancing in each case Consisting of: - Fitting accessories - 3 contact sensors ALF/2P/4/T, L = 4.0 m - Plug set FE module **Notice** Suitable flow rate sensors (pulse sensors) must be provided on site.	6037 062
	**TopTronic® E module expansion Universal TTE-FE UNI** Expansion to the inputs and outputs of a controller module (basic module heat generator, heating circuit/domestic hot water module, solar module, buffer module) for implementing various functions Consisting of: - Fitting accessories - Plug set FE module **Further information** see “Controls” - “Hoval TopTronic® E module expansions” chapter **Notice** Refer to the Hoval System Technology to find which functions and hydraulic arrangements can be implemented.	6034 575

Accessories for TopTronic® E

		Part No.
	**TopTronic® E controller modules**	
	TTE-HK/WW TopTronic® E heating circuit/ hot water module	6034 571
	TTE-SOL TopTronic® E solar module	6037 058
	TTE-PS TopTronic® E buffer module	6037 057
	TTE-MWA TopTronic® E measuring module	6034 574
	**Supplementary plug set**	
	for basic module heat generator TTE-WEZ	6034 499
	for controller modules and module expansion TTE-FE HK	6034 503
	**TopTronic® E room control modules**	
	TTE-RBM TopTronic® E room control modules	
	easy white	6037 071
	comfort white	6037 069
	comfort black	6037 070
	**Enhanced language package TopTronic® E** one SD card required per control module Consisting of the following languages: HU, CS, SL, RO, PL, TR, ES, HR, SR, JA, DA	6039 253
	**HovalConnect**	
	HovalConnect LAN	6049 496
	HovalConnect WLAN	6049 498
	HovalConnect Modbus	6049 501
	HovalConnect KNX	6049 593
	TopTronic® E interface modules	
	GLT module 0-10 V	6034 578
	**TopTronic® E sensors**	
	AF/2P/K Outdoor sensor H x W x D = 80 x 50 x 28 mm	2055 889
	TF/2P/5/6T Immersion sensor, L = 5.0 m	2055 888
	ALF/2P/4/T Contact sensor, L = 4.0 m	2056 775
	TF/1.1P/2.5S/6T Collector sensor, L = 2.5 m	2056 776
	**System module SB-SM-BZ1** for passing on a volt-free operating and fault message. (for 1-stage/modulating H-Gens)	6048 055
	**Bivalent switch**	
	for various release or switching functions	
	Bivalent switch 1-piece	2056 858
	Bivalent switch 2-piece	2061 826
	**System housing**	
	System housing 182 mm	6038 551
	System housing 254 mm	6038 552
	**TopTronic® E wall casing**	
	WG-190 Wall casing small	6052 983
	WG-360 Wall casing medium	6052 984
	WG-360 BM Wall casing medium with control module cut-out	6052 985
	WG-510 Wall casing large	6052 986
	WG-510 BM Wall casing large with control module cut-out	6052 987

Further information
see “Controls”

Accessories

	Part No.
 **Flow temperature monitor** for panel heating (1 controller per heating circuit) 15-95 °C, setting (visible externally) under the casing cover	
Clamp-on flow temperature monitor RAK-TW1000S with retaining strap, without cable and plug	242 902
Clamp-on flow temperature monitor set RAK-TW1000S with retaining strap, supplied with cable (4 m) and plug	6033 745
Immersion thermostat RAK-TW1000S Thermostat with immersion sleeve ½″ Depth of immersion 150 mm, nickel-plated brass	6010 082
 **Safety set DN 25** complete with safety valve DN 25 (3 bar), up to 200 kW Pressure gauge and automatic aspirator with barrier Connection: 1″ internal thread	6018 709
 **Safety set DN 32** complete with safety valve DN 32 (3 bar), up to 350 kW Pressure gauge and automatic aspirator with barrier Connection 1¼″ internal thread	6018 710
 Fitting pipe flow  Fitting pipe return	

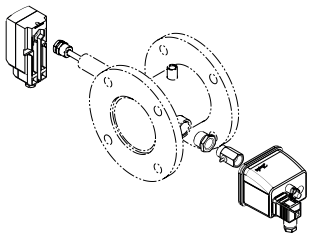
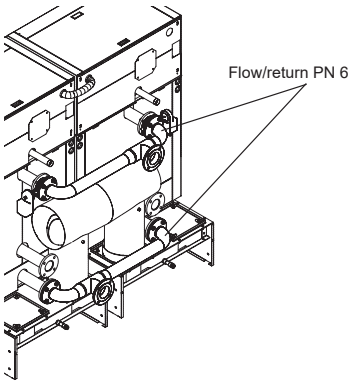
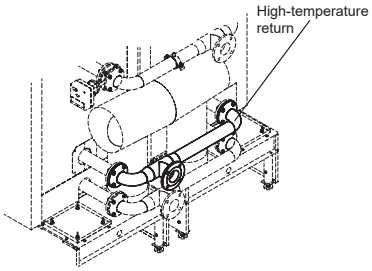
Safety fitting pipe for flow and return
Suitable for max. 6 bar, with screws and nuts
- for installation on the flow or high and low-temperature return of the Hoval UltraGas® 2 boiler
- for installation of an additional safety temperature limiter, a maximum pressure limiter
- for connection of a diaphragm pressure expansion tank on the return

Dimension	Suitable for UltraGas® 2 D	Connection	Part No.
DN 65 [1)]	(250-460)	flow	6053 408
DN 65 [1)]	(250-460)	return	6023 108
DN 100 [1)]	(600-1400)	flow	6053 409
DN 100 [1)]	(600-1400)	return	6023 110
DN 125 [1)]	(1600-2200)	flow	6055 078
DN 125 [1)]	(1600-2200)	return	6023 112
DN 150 [1)]	(2600,3100)	flow	6055 079
DN 150 [1)]	(2600,3100)	return	6051 680

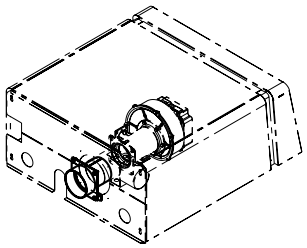
[1)] 2 pieces are necessary

Further information see “Dimensions” Hoval UltraGas® 2 (125-1550)

Accessories

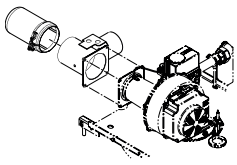
	Part No.
 **Safety armature set** Compatible with fitting pipe for meeting safety requirements of EN 12828: > 300 kW or SWKI HE301-01: 70-1000 kW related to single boiler Consisting of: - adjustable maximum pressure limiter incl. ball valve - safety temperature limiter (RAK-ST.131) **2 pieces needed per double boiler**	6051 903
 **Hydraulic connection set for double boiler flow/return PN 6** Pipe connection set for double boiler incl. hydraulic butterfly valves For 24 V, pre-wired Operating method: continuously controlling (2 ... 10 V)	
for UltraGas® 2 D (250-460)	6054 637
for UltraGas® 2 D (600-1000)	6054 638
for UltraGas® 2 D (1240,1400)	6054 639
for UltraGas® 2 D (1600-2200)	6054 640
for UltraGas® 2 D (2600,3100)	6054 641
 **Hydraulic butterfly valve** for direct installation on the flow and/or return of the boiler For 24 V, pre-wired Operating method: continuously controlling (2 ... 10 V) As an option if no flow/return set is ordered.	
UltraGas® 2 (125-230) DN 65	6050 605
UltraGas® 2 (300-700) DN 100	6050 606
UltraGas® 2 (800-1100) DN 125	6050 607
UltraGas® 2 (1300,1550) DN 150	6051 894
2 pieces needed per double boiler	
 **Hydraulic connection double boiler high-temperature return PN 6 for UltraGas® 2 D** for UltraGas® 2 D (e.g. for return calorifier charging)	
UltraGas® 2 D (250-460)	6054 636
UltraGas® 2 D (600-1000)	6054 396
UltraGas® 2 D (1240,1400)	6004 924
UltraGas® 2 D (1600-2200)	6009 534
UltraGas® 2 D (2600,3100)	6051 915

Accessories

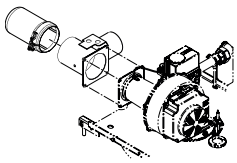


Connection for direct combustion air supply
Only in combination with a motorised combustion air damper (ordered separately).
Can also be used for creating a boiler cascade with a common flue gas line.

	Part No.
UltraGas® 2 (125,150)	6052 847
UltraGas® 2 (190,230)	6052 848
UltraGas® 2 (300-500)	6053 097
UltraGas® 2 (620,700)	6053 780
UltraGas® 2 (800-1100)	6053 782
UltraGas® 2 (1300,1550)	6052 849



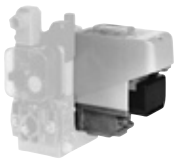
Connection protection filter — 6052 151
for UltraGas® 2 (125-500)
for installation on
the motorised combustion air damper
for filtering the combustion air
in the building phase
Pore width of the filter < 50 µm



Connection protection filter — 6052 152
for UltraGas® 2 (620-1550)
for installation on
the motorised combustion air damper
for filtering the combustion air
in the building phase
Pore width of the filter < 50 µm

Gas valve
with thermally releasing cut-off device.

Type	Connection inches	Part No.
DN 25	R 1″	2069 324
DN 32	R 1¼″	2069 325
DN 40	R 1½″	2069 326
DN 50	R 2″	2069 327



Valve testing system
for UltraGas® 2 (125-1550),
UltraGas® 2 (250D-3100D)
Automatic, compact testing system for testing the leakage of the gas valve before each burner start with ready-to-connect wiring.
Suitable for all gas qualities for which the UltraGas® 2 is permitted.

Type	Part No.
UltraGas® 2 D (250D-700D)	6039 964
UltraGas® 2 D (800D-1400D)	6039 965
UltraGas® 2 D (1600D-3100D)	6054 484

For an UltraGas® 2 double boiler, two valve test systems must be ordered.

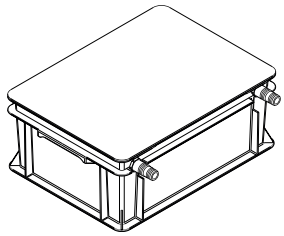
Accessories

For a kit, the gas ball valve, fitting protection and mounting set must each be ordered separately in the same dimension.

	Part No.
Gas valve kit Set with gas valve and thermally releasing shut-off device Thermal closing at approx. 95 °C Tripping time < 60 s Maximum working pressure 5 bar Ambient temperature < 60 °C Combustible gases according to G260	
Gas ball valve with flange Type	
DN 65	2007 988
DN 80	2007 989
DN 100	2007 990
Fitting protection TAS Type	
TAS 23-65	2069 328
TAS 23-80	2069 329
TAS 23-100	2069 330
Mounting set for assembly Gas ball valve with fitting protection Type	
MS-TAS 23-65	6041 745
MS-TAS 23-80	6041 746
MS-TAS 23-100	6041 747
Gas filter with measurement nozzle before and behind the filter inset (diameter: 9 mm) Pore width of the filter inset < 50 µm Max. pressure difference 10 mbar Inlet pressure: UltraGas 2 (125-700): max. 80 mbar UltraGas 2 (800-1550): max 300 mbar	
Type — Connection	
70602/6B — Rp 1″	2007 996
70604/6B — Rp 1¼″	2054 495
70603/6B — Rp 1½″	2007 997
70631/6B — Rp 2″	2007 998
70610F/6B — DN 65	2007 999
Gas pipe compensator 1″ for UltraGas® 2 (125,150), UltraGas® 2 D (250,300) for compensating for connection tolerances in the gas pipe	6034 556
Gas pipe compensator 1½″ for UltraGas® 2 (190,230), UltraGas® 2 D (380,460) for compensating for connection tolerances in the gas pipe	6034 557

2 pieces per double boiler necessary

Condensate drainage to UltraGas® 2 D



Neutralisation box
Condensate drain into a lower drainage duct
Connection hose: 2 m
Service life up to 1 year, depending on the boiler operating mode
Positioning behind the boiler or laterally
One neutralisation box per boiler

Type		Neutralisation granulate	Part No.
UltraGas® 2 (125-400)	HNB-0400	3 kg	6054 792
UltraGas® 2 (450-800)	HNB-0800	6 kg	6054 793
UltraGas® 2 (1000,1100)	HNB-1200	9 kg	6054 794
UltraGas® 2 (1300,1550)	HNB-1600	12 kg	6054 795

Condensate pump 6045 476
for transporting condensate
into a higher drainage duct
Including connection lines
Completely wired, cable and plug
For connection to the boiler controller
Delivery head: max. 4 m
Can be combined with neutralisation box

Double condensate pump 6061 175
For UltraGas® 2 (1000-1550)
for transporting the condensate
into a higher drainage duct
Including connection line
Completely wired, cable and plug
For connection to the boiler controller
Delivery head: 3 m
Can be combined with neutralisation box

2 pieces needed per double boiler

Neutralisation granulate 2028 906
for neutralisation box
Refill set volume 3 kg
Life time of one filling:
approx. 1 year, depending on amount of condensate

Part No.

Service

Commissioning
Commissioning by works service or Hoval trained authorised serviceman/company is condition for warranty.

For commissioning and other services please contact your Hoval sales office.

Hoval UltraGas® 2 D (250-460)

Type			D (250)	D (300)	D (380)	D (460)
• Nominal heat output at 80/60 °C, natural gas [1]		kW	21-228	33-278	35-354	47-436
• Nominal heat output at 50/30 °C, natural gas [1]		kW	25-252	35-302	38-382	51-466
• Nominal heat output at 80/60 °C, propane [2]		kW	27-226	43-276	55-351	81-434
• Nominal heat output at 50/30 °C, propane [2]		kW	30-252	48-302	62-382	90-466
• Nominal heat input with natural gas [3]		kW	23-232	32-284	35-358	47-446
• Nominal heat input with propane [2]		kW	28-232	44-284	57-358	84-446
• Operating pressure heating min./max. (PMS)		bar	1/6	1/6	1/6	1/6
• Operating temperature max. (T_{max})		°C	95	95	95	95
• Boiler water content ($V_{(H20)}$)		l	2 x 207	2 x 195	2 x 276	2 x 265
• Flow resistance boiler			see diagram			
• Minimum circulation water quantity		l/h	-	-	-	-
• Boiler weight (without water capacity, incl. cladding)		kg	2 x 390	2 x 400	2 x 485	2 x 505
• Boiler efficiency at 80/60 °C in full-load operation (NCV/GCV) [4]		%	98.6/88.9	97.6/88.1	98.5/88.7	98.2/88.5
• Boiler efficiency at 30 % partial load (NCV/GCV) [4]		%	108.7/98.1	108.7/98.1	109.0/98.2	108.4/97.8
• Room heating energy efficiency						
- without control	ηs	%	93	93	93	93
- with control	ηs	%	95	95	95	95
- with control and room sensor	ηs	%	97	97	97	97
- annual energy consumption	Q_{HE}	GJ	386	479	598	751
• NOx class (EN 15502)			-	-	-	6
• Nitrogen oxide emissions (EN 15502) (GCV)	NOx	mg/kWh	25	28	33	37
• Carbon monoxide emissions at 50/30 °C (related to 3 % of O_2)	CO	mg/Nm^3	31	21	25	13
• O_2 content in flue gas min./max. output		%	5.9/5.6	5.5/6.0	5.9/6.0	6.0/5.9
• Heat loss in standby mode		Watt	760	760	1020	1020
• Dimensions			see dimensional drawing			
• Gas flow pressure min./max.						
- Natural gas E/LL		mbar	17.4-80	17.4-80	17.4-80	17.4-80
- Propane		mbar	37-57	37-57	37-57	37-57
• Gas inlet pressure max. (idle pressure)		mbar	80	80	80	80
• Gas connection values at 15 °C/1013 mbar:						
- Natural gas E (Wo = 15.0 kWh/m^3) NCV = 9.7 kWh/m^3		m^3/h	2.4-23.9	3.3-29.3	3.6-36.9	4.8-46.0
- Natural gas LL (G25) - (Wo = 12.4 kWh/m^3) NCV = 8.13 kWh/m^3		m^3/h	2.8-28.5	3.9-34.9	4.3-44.0	5.8-54.9
- Propane (G31) NCV = 24.4 kWh/m^3 [2]		m^3/h	1.2-9.5	1.8-11.6	2.3-14.7	3.4-18.3
• Operating voltage		V/Hz	1 x 230/50	1 x 230/50	1 x 230/50	1 x 230/50
• Electrical power consumption min./max.		Watt	41/280	43/450	38/302	49/456
• Standby		Watt	7	8	8	8
• Type of protection		IP	20	20	20	20
• Permitted ambient temperature during operation		°C	5-40	5-40	5-40	5-40
• Sound power level						
- Heating noise (EN 15036 part 1) (room air dependent)		dB(A)	76	81	67	70
- Flue gas noise radiated from the mouth (DIN 45635 part 47) (room air dependent/independent of room air)		dB(A)	-	-	-	-
• Condensate quantity (natural gas) at 50/30 °C		l/h	22	24	30	40
• pH value of the condensate (approx.)		pH	4.2	4.2	4.2	4.2
• Construction			B23, B23P, C53, C63			
• Flue gas system						
- Temperature class			T120	T120	T120	T120
- Flue gas mass flow at max. nominal heat input (dry)		kg/h	376	452	566	688
- Flue gas mass flow at min. nominal heat input (dry)		kg/h	37	51	55	63
- Flue gas temperature at max. nominal heat output and 80/60 °C		°C	64	65	68	69
- Flue gas temperature at max. nominal heat output and 50/30 °C		°C	43	45	46	47
- Flue gas temperature at min. nominal heat output and 50/30 °C		°C	29	28	29	29
- Max. permissible temperature of the combustion air		°C	48	48	48	48
- Combustion air flow rate		Nm^3/h	308	360	464	560
- Maximum supply pressure for combustion air supply and flue gas line		Pa	60	60	60	60
- Maximum draught/underpressure at flue gas outlet		Pa	-30	-30	-30	-30

[1] In relation to natural gas G20 (100 % methane). With a hydrogen content (H_2) of up to 20 % by vol. in accordance with DVGW ZP3100 (D), an output reduction of up to 7 % is possible.

[2] Data related to NCV, conditional data

[3] Data related to NCV. The boiler series is tested for EE/H setting. With a factory setting to a Wobbe value of 15.0 kWh/m^3, operation in the Wobbe value range from 12.0 to 15.7 kWh/m^3 is possible without resetting.

[4] Conversion acc. to EN 15502-1, Appendix J

Hoval UltraGas® 2 D (600-1000)

Type			D (600)	D (700)	D (800)	D (900)
• Nominal heat output at 80/60 °C, natural gas [1]		kW	54-548	67-630	62-724	73-830
• Nominal heat output at 50/30 °C, natural gas [1]		kW	58-598	70-704	69-798	77-902
• Nominal heat output at 80/60 °C, propane [2]		kW	83-548	115-622	97-722	111-816
• Nominal heat output at 50/30 °C, propane [2]		kW	93-598	129-704	108-798	122-902
• Nominal heat input with natural gas [3]		kW	54-564	64-662	62-748	71-854
• Nominal heat input with propane [2]		kW	87-564	121-662	100-748	115-854
• Operating pressure heating min./max. (PMS)		bar	1/6	1/6	1/6	1/6
• Operating temperature max. (T_{max})		°C	95	95	95	95
• Boiler water content ($V_{(H20)}$)		l	2 x 472	2 x 452	2 x 432	2 x 412
• Flow resistance boiler			see diagram			
• Minimum circulation water quantity		l/h	-	-	-	-
• Boiler weight (without water capacity, incl. cladding)		kg	2 x 730	2 x 765	2 x 800	2 x 830
• Boiler efficiency at 80/60 °C in full-load operation (NCV/GCV) [4]		%	98.2/88.5	98.2/88.5	98.2/88.5	98.2/88.5
• Boiler efficiency at 30 % partial load (NCV/GCV) [4]		%	109.2/98.4	108.9/98.1	109.0/98.2	108.9/98.1
• Room heating energy efficiency						
- without control	ηs	%	94	93	93	-
- with control	ηs	%	96	95	95	-
- with control and room sensor	ηs	%	98	97	97	-
- annual energy consumption	Q_{HE}	GJ	926	1076	1212	-
• NOx class (EN 15502)			6	6	6	6
• Nitrogen oxide emissions (EN 15502) (GCV)	NOx	mg/kWh	39	45	39	45
• Carbon monoxide emissions at 50/30 °C (related to 3 % of O_2)	CO	mg/Nm^3	18	26	23	30
• O_2 content in flue gas min./max. output		%	5.5/5.8	5.7/5.7	5.9/5.9	6.0/5.6
• Heat loss in standby mode		Watt	1500	1500	1500	1500
• Dimensions			see dimensional drawing			
• Gas flow pressure min./max.						
- Natural gas E/LL		mbar	17.4-80	17.4-80	17.4-80	17.4-80
- Propane		mbar	37-57	37-57	37-57	37-57
• Gas inlet pressure max. (idle pressure)		mbar	80	80	80	80
• Gas connection values at 15 °C/1013 mbar:						
- Natural gas E (Wo = 15.0 kWh/m^3) NCV = 9.7 kWh/m^3		m^3/h	5.6-58.1	6.6-68.2	6.4-77.1	7.3-88.0
- Natural gas LL (G25) - (Wo = 12.4 kWh/m^3) NCV = 8.13 kWh/m^3		m^3/h	6.6-69.4	7.9-81.4	7.6-92.0	8.7-105.0
- Propane (G31) NCV = 24.4 kWh/m^3 [2]		m^3/h	3.6-23.1	4.9-27.1	4.1-30.7	4.7-35.0
• Operating voltage		V/Hz	1 x 230/50	1 x 230/50	1 x 230/50	1 x 230/50
• Electrical power consumption min./max.		Watt	51/730	55/700	56/1036	56/1180
• Standby		Watt	5	5	5	5
• Type of protection		IP	20	20	20	20
• Permitted ambient temperature during operation		°C	5-40	5-40	5-40	5-40
• Sound power level						
- Heating noise (EN 15036 part 1) (room air dependent)		dB(A)	76	73	76	77
- Flue gas noise radiated from the mouth (DIN 45635 part 47) (room air dependent/independent of room air)		dB(A)	-	-	-	-
• Condensate quantity (natural gas) at 50/30 °C		l/h	44	50	56	58
• pH value of the condensate (approx.)		pH	4.2	4.2	4.2	4.2
• Construction			B23, B23P, C53, C63			
• Flue gas system						
- Temperature class			T120	T120	T120	T120
- Flue gas mass flow at max. nominal heat input (dry)		kg/h	890	1044	1182	1348
- Flue gas mass flow at min. nominal heat input (dry)		kg/h	85	101	98	112
- Flue gas temperature at max. nominal heat output and 80/60 °C		°C	64	65	66	67
- Flue gas temperature at max. nominal heat output and 50/30 °C		°C	43	44	48	47
- Flue gas temperature at min. nominal heat output and 50/30 °C		°C	29	29	29	29
- Max. permissible temperature of the combustion air		°C	48	48	48	48
- Combustion air flow rate		Nm^3/h	728	856	966	1104
- Maximum supply pressure for combustion air supply and flue gas line		Pa	60	60	60	60
- Maximum draught/underpressure at flue gas outlet		Pa	-30	-30	-30	-30

[1] In relation to natural gas G20 (100 % methane). With a hydrogen content (H_2) of up to 20 % by vol. in accordance with DVGW ZP3100 (D), an output reduction of up to 7 % is possible.

[2] Data related to NCV, conditional data

[3] Data related to NCV. The boiler series is tested for EE/H setting. With a factory setting to a Wobbe value of 15.0 kWh/m^3, operation in the Wobbe value range from 12.0 to 15.7 kWh/m^3 is possible without resetting.

[4] Conversion acc. to EN 15502-1, Appendix J

Hoval UltraGas® 2 D (1000-1600)

Type			D (1000)	D (1240)	D (1400)	D (1600)
• Nominal heat output at 80/60 °C, natural gas [1]		kW	71-898	125-1160	132-1306	150-1486
• Nominal heat output at 50/30 °C, natural gas [1]		kW	77-982	136-1244	146-1406	166-1608
• Nominal heat output at 80/60 °C, propane [2]		kW	111-882	168-1139	174-1286	233-1488
• Nominal heat output at 50/30 °C, propane [2]		kW	121-982	178-1244	187-1406	254-1610
• Nominal heat input with natural gas [3]		kW	71-926	124-1182	134-1336	151-1518
• Nominal heat input with propane [2]		kW	115-926	174-1182	180-1336	236-1518
• Operating pressure heating min./max. (PMS)		bar	1/6	1/6	1/6	1/6
• Operating temperature max. (T_{max})		°C	95	95	95	95
• Boiler water content ($V_{(H20)}$)		l	2 x 408	2 x 536	2 x 509	2 x 831
• Flow resistance boiler			see diagram			
• Minimum circulation water quantity		l/h	-	-	-	-
• Boiler weight (without water capacity, incl. cladding)		kg	2 x 855	2 x 1090	2 x 1135	2 x 1435
• Boiler efficiency at 80/60 °C in full-load operation (NCV/GCV) [4]		%	98.2/88.5	98.2/88.5	98.2/88.5	98.3/88.6
• Boiler efficiency at 30 % partial load (NCV/GCV) [4]		%	109.0/98.2	109.0/98.2	108.9/98.1	109.1/98.3
• Room heating energy efficiency						
- without control	ηs	%	-	-	-	-
- with control	ηs	%	-	-	-	-
- with control and room sensor	ηs	%	-	-	-	-
- annual energy consumption	Q_{HE}	GJ	-	-	-	-
• NOx class (EN 15502)			6	6	6	6
• Nitrogen oxide emissions (EN 15502) (GCV)	NOx	mg/kWh	50	33	40	36
• Carbon monoxide emissions at 50/30 °C (related to 3 % of O_2)	CO	mg/Nm^3	46	24	26	23
• O_2 content in flue gas min./max. output		%	5.5/5.8	5.9/6.0	6.0/5.7	6.0/5.8
• Heat loss in standby mode		Watt	1500	2000	2000	2400
• Dimensions			see dimensional drawing			
• Gas flow pressure min./max.						
- Natural gas E/LL		mbar	17.4-80	17.4-80	17.4-80	17.4-300
- Propane		mbar	37-57	37-57	37-57	37-57
• Gas inlet pressure max. (idle pressure)		mbar	80	80	80	300
• Gas connection values at 15 °C/1013 mbar:						
- Natural gas E (Wo = 15.0 kWh/m^3) NCV = 9.7 kWh/m^3		m^3/h	7.3-95.5	12.8-121.9	13.8-137.7	15.6-156.5
- Natural gas LL (G25) - (Wo = 12.4 kWh/m^3) NCV = 8.13 kWh/m^3		m^3/h	8.7-113.9	15.3-145.4	16.5-164.3	18.6-186.7
- Propane (G31) NCV = 24.4 kWh/m^3 [2]		m^3/h	4.7-38.0	7.1-48.4	7.4-54.8	9.7-62.2
• Operating voltage		V/Hz	1 x 230/50	1 x 230/50	1 x 230/50	1 x 230/50
• Electrical power consumption min./max.		Watt	57/1432	63/1662	67/2120	94/2024
• Standby		Watt	5	5	5	7
• Type of protection		IP	20	20	20	20
• Permitted ambient temperature during operation		°C	5-40	5-40	5-40	5-40
• Sound power level						
- Heating noise (EN 15036 part 1) (room air dependent)		dB(A)	81	78	79	81
- Flue gas noise radiated from the mouth (DIN 45635 part 47) (room air dependent/independent of room air)		dB(A)	-	72	71	-
• Condensate quantity (natural gas) at 50/30 °C		l/h	74	102	96	114
• pH value of the condensate (approx.)		pH	4.2	4.2	4.2	4.2
• Construction			B23, B23P, C53, C63			
• Flue gas system						
- Temperature class			T120	T120	T120	T120
- Flue gas mass flow at max. nominal heat input (dry)		kg/h	1472	1866	2110	2396
- Flue gas mass flow at min. nominal heat input (dry)		kg/h	112	196	211	238
- Flue gas temperature at max. nominal heat output and 80/60 °C		°C	66	68	69	66
- Flue gas temperature at max. nominal heat output and 50/30 °C		°C	44	47	49	44
- Flue gas temperature at min. nominal heat output and 50/30 °C		°C	28	28	29	28
- Max. permissible temperature of the combustion air		°C	48	48	48	48
- Combustion air flow rate		Nm^3/h	1204	1528	1726	1962
- Maximum supply pressure for combustion air supply and flue gas line		Pa	60	60	60	60
- Maximum draught/underpressure at flue gas outlet		Pa	-30	-30	-30	-30

[1] In relation to natural gas G20 (100 % methane). With a hydrogen content (H_2) of up to 20 % by vol. in accordance with DVGW ZP3100 (D), an output reduction of up to 7 % is possible.

[2] Data related to NCV, conditional data

[3] Data related to NCV. The boiler series is tested for EE/H setting. With a factory setting to a Wobbe value of 15.0 kWh/m^3, operation in the Wobbe value range from 12.0 to 15.7 kWh/m^3 is possible without resetting.

[4] Conversion acc. to EN 15502-1, Appendix J

Hoval UltraGas® 2 D (2000-3100)

Type			D (2000)	D (2200)	D (3600)	D (3100)
• Nominal heat output at 80/60 °C, natural gas [1]		kW	185-1852	203-2076	241-2460	297-2894
• Nominal heat output at 50/30 °C, natural gas [1]		kW	205-1998	229-2224	269-2640	324-3100
• Nominal heat output at 80/60 °C, propane [2]		kW	245-1852	299-2067	362-2455	427-2877
• Nominal heat output at 50/30 °C, propane [2]		kW	264-1998	316-2224	385-2640	453-3100
• Nominal heat input with natural gas [3]		kW	187-1886	206-2114	247-2502	297-2938
• Nominal heat input with propane [2]		kW	248-1886	306-2114	371-2502	437-2938
• Operating pressure heating min./max. (PMS)		bar	1/6	1/6	1/6	1/6
• Operating temperature max. (T_{max})		°C	95	95	95	95
• Boiler water content ($V_{(H20)}$)		l	2 x 756	2 x 718	2 x 1211	2 x 1118
• Flow resistance boiler			see diagram			
• Minimum circulation water quantity		l/h	-	-	-	-
• Boiler weight (without water capacity, incl. cladding)		kg	2 x 1580	2 x 1635	2 x 2280	2 x 2445
• Boiler efficiency at 80/60 °C in full-load operation (NCV/GCV) [4]		%	98.2/88.5	98.2/88.5	98.2/88.5	98.2/88.5
• Boiler efficiency at 30 % partial load (NCV/GCV) [4]		%	109.0/98.2	108.6/97.8	108.7/97.9	108.5/97.7
• Room heating energy efficiency						
- without control	ηs	%	-	-	-	-
- with control	ηs	%	-	-	-	-
- with control and room sensor	ηs	%	-	-	-	-
- annual energy consumption	Q_{HE}	GJ	-	-	-	-
• NOx class (EN 15502)			6	6	6	6
• Nitrogen oxide emissions (EN 15502) (GCV)	NOx	mg/kWh	36	41	37	35
• Carbon monoxide emissions at 50/30 °C (related to 3 % of O_2)	CO	mg/Nm^3	25	26	23	23
• O_2 content in flue gas min./max. output		%	6.0/5.9	6.0/5.9	6.0/5.9	6.0/6.0
• Heat loss in standby mode		Watt	2400	2400	3200	3200
• Dimensions			see dimensional drawing			
• Gas flow pressure min./max.						
- Natural gas E/LL		mbar	17.4-300	17.4-300	17.4-300	17.4-300
- Propane		mbar	37-57	37-57	37-57	37-57
• Gas inlet pressure max. (idle pressure)		mbar	300	300	300	300
• Gas connection values at 15 °C/1013 mbar:						
- Natural gas E (Wo = 15.0 kWh/m^3) NCV = 9.7 kWh/m^3		m^3/h	19.3-194.4	21.2-217.9	25.5-257.9	30.6-302.9
- Natural gas LL (G25) - (Wo = 12.4 kWh/m^3) NCV = 8.13 kWh/m^3		m^3/h	23.0-232.0	25.3-260.0	30.4-307.7	36.5-361.4
- Propane (G31) NCV = 24.4 kWh/m^3 [2]		m^3/h	10.2-77.3	12.6-86.6	15.2-102.5	17.9-120.4
• Operating voltage		V/Hz	1 x 230/50 3 x 400/50	1 x 230/50 3 x 400/50	1 x 230/50 3 x 400/50	1 x 230/50 3 x 400/50
• Electrical power consumption min./max.		Watt	203/3746	203/3866	271/8222	301/8282
• Standby		Watt	7	7	5	7
• Type of protection		IP	20	20	20	20
• Permitted ambient temperature during operation		°C	5-40	5-40	5-40	5-40
• Sound power level						
- Heating noise (EN 15036 part 1) (room air dependent)		dB(A)	86	85	89	88
- Flue gas noise radiated from the mouth (DIN 45635 part 47) (room air dependent/independent of room air)		dB(A)	-	-	-	-
• Condensate quantity (natural gas) at 50/30 °C		l/h	136	144	200	276
• pH value of the condensate (approx.)		pH	4.2	4.2	4.2	4.2
• Construction			B23, B23P, C53, C63			
• Flue gas system						
- Temperature class			T120	T120	T120	T120
- Flue gas mass flow at max. nominal heat input (dry)		kg/h	2976	3338	3950	4460
- Flue gas mass flow at min. nominal heat input (dry)		kg/h	295	325	390	450
- Flue gas temperature at max. nominal heat output and 80/60 °C		°C	69	70	66	68
- Flue gas temperature at max. nominal heat output and 50/30 °C		°C	47	49	45	46
- Flue gas temperature at min. nominal heat output and 50/30 °C		°C	28	29	29	28
- Max. permissible temperature of the combustion air		°C	48	48	48	48
- Combustion air flow rate		Nm^3/h	2438	2732	3234	3660
- Maximum supply pressure for combustion air supply and flue gas line		Pa	60	60	60	60
- Maximum draught/underpressure at flue gas outlet		Pa	-30	-30	-30	-30

[1] In relation to natural gas G20 (100 % methane). With a hydrogen content (H_2) of up to 20 % by vol. in accordance with DVGW ZP3100 (D), an output reduction of up to 7 % is possible.

[2] Data related to NCV, conditional data

[3] Data related to NCV. The boiler series is tested for EE/H setting. With a factory setting to a Wobbe value of 15.0 kWh/m^3, operation in the Wobbe value range from 12.0 to 15.7 kWh/m^3 is possible without resetting.

[4] Conversion acc. to EN 15502-1, Appendix J

Hoval UltraGas® 2 DH (1400-3100)

Type			DH (1400)	DH (2200)	DH (3100)
• Nominal heat output at 80/60 °C, natural gas [1]		kW	132-1306	203-2076	297-2894
• Nominal heat output at 50/30 °C, natural gas [1]		kW	146-1406	229-2224	324-3100
• Nominal heat output at 80/60 °C, propane [2]		kW	174-1286	299-2067	427-2877
• Nominal heat output at 50/30 °C, propane [2]		kW	187-1406	316-2224	453-3100
• Nominal heat input with natural gas [3]		kW	134-1336	206-2114	297-2938
• Nominal heat input with propane [2]		kW	180-1336	306-2114	437-2938
• Operating pressure heating min./max. (PMS)		bar	1/10	1/10	1/10
• Operating temperature max. (T_{max})		°C	95	95	95
• Boiler water content ($V_{(H20)}$)		l	2 x 509	2 x 709	2 x 1118
• Flow resistance boiler				see diagram	
• Minimum circulation water quantity		l/h	-	-	-
• Boiler weight (without water capacity, incl. cladding)		kg	2 x 1170	2 x 1735	2 x 2550
• Boiler efficiency at 80/60 °C in full-load operation (NCV/GCV) [4]		%	98.2/88.5	98.2/88.5	98.2/88.5
• Boiler efficiency at 30 % partial load (NCV/GCV) [4]			108.9/98.1	108.6/97.8	108.5/97.7
• Room heating energy efficiency					
- without control	ηs	%	-	-	-
- with control	ηs	%	-	-	-
- with control and room sensor	ηs	%	-	-	-
- annual energy consumption	Q_{HE}	GJ	-	-	-
• NOx class (EN 15502)			6	6	6
• Nitrogen oxide emissions (EN 15502) (GCV)	NOx	mg/kWh	40	41	35
• Carbon monoxide emissions at 50/30 °C (related to 3 % of O_2)	CO	mg/Nm³	26	26	23
• O_2 content in flue gas min./max. output		%	6.0/5.7	6.0/5.9	6.0/6.0
• Heat loss in standby mode		Watt	2000	2400	3200
• Dimensions				see dimensional drawing	
• Gas flow pressure min./max.					
- Natural gas E/LL		mbar	17.4-80	17.4-300	17.4-300
- Propane		mbar	37-57	37-57	37-57
• Gas inlet pressure max. (idle pressure)		mbar	80	300	300
• Gas connection values at 15 °C/1013 mbar:					
- Natural gas E (Wo = 15.0 kWh/m³) NCV = 9.7 kWh/m³		m³/h	13.8-137.7	21.2-217.9	30.6-302.9
- Natural gas LL (G25) - (Wo = 12.4 kWh/m³) NCV = 8.13 kWh/m³		m³/h	16.5-164.3	25.3-260.0	36.5-361.4
- Propane (G31) NCV = 24.4 kWh/m³ [2]		m³/h	7.4-54.8	12.6-86.6	17.9-120.4
• Operating voltage		V/Hz	1 x 230/50	1 x 230/50 3 x 400/50	1 x 230/50 3 x 400/50
• Electrical power consumption min./max.		Watt	67/2120	203/3866	301/8282
• Standby		Watt	5	7	7
• Type of protection		IP	20	20	20
• Permitted ambient temperature during operation		°C	5-40	5-40	5-40
• Sound power level					
- Heating noise (EN 15036 part 1) (room air dependent)		dB(A)	79	85	88
- Flue gas noise radiated from the mouth (DIN 45635 part 47) (room air dependent/independent of room air)		dB(A)	71	-	-
• Condensate quantity (natural gas) at 50/30 °C		l/h	96	144	276
• pH value of the condensate (approx.)		pH	4.2	4.2	4.2
• Construction				B23, B23P, C53, C63	
• Flue gas system					
- Temperature class			T120	T120	T120
- Flue gas mass flow at max. nominal heat input (dry)			2110	3338	4460
- Flue gas mass flow at min. nominal heat input (dry)			211	325	450
- Flue gas temperature at max. nominal heat output and 80/60 °C		°C	69	70	68
- Flue gas temperature at max. nominal heat output and 50/30 °C		°C	49	49	46
- Flue gas temperature at min. nominal heat output and 50/30 °C		°C	29	29	28
- Max. permissible temperature of the combustion air		°C	48	48	48
- Combustion air flow rate		Nm³/h	1726	2732	3660
- Maximum supply pressure for combustion air supply and flue gas line		Pa	60	60	60
- Maximum draught/underpressure at flue gas outlet		Pa	-30	-30	-30

1) In relation to natural gas G20 (100 % methane). With a hydrogen content (H2) of up to 20 % by vol. in accordance with DVGW ZP3100 (D), an output reduction of up to 7 % is possible.

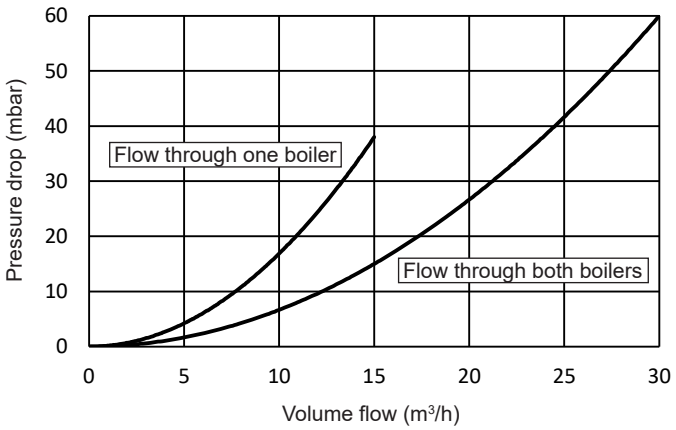
2) Data related to NCV, conditional data

3) Data related to NCV. The boiler series is tested for EE/H setting. With a factory setting to a Wobbe value of 15.0 kWh/m³, operation in the Wobbe value range from 12.0 to 15.7 kWh/m³ is possible without resetting.

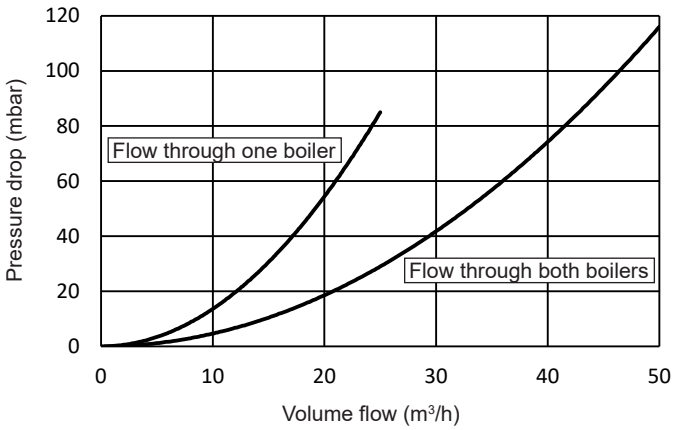
4) Conversion acc. to EN 15502-1, Appendix J

Flow resistance on the heating water side

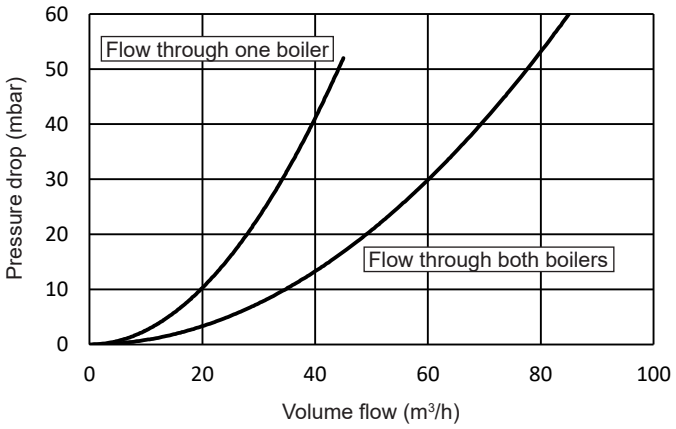
UltraGas® 2 D (250,300)



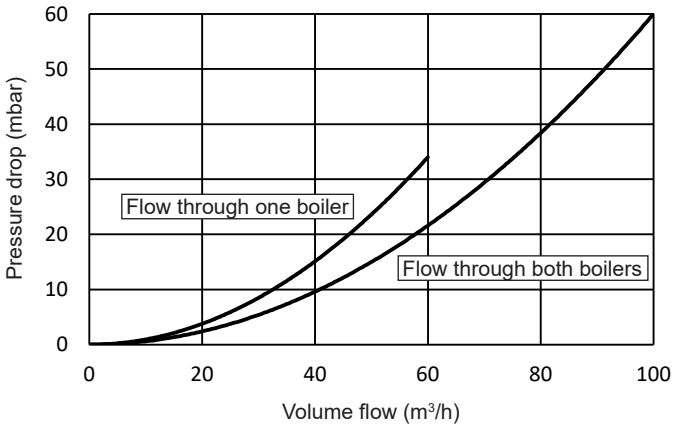
UltraGas® 2 D (380,460)



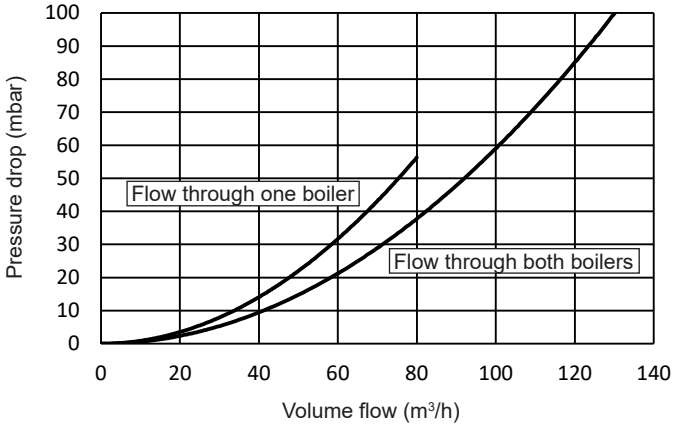
UltraGas® 2 D (600-1000)



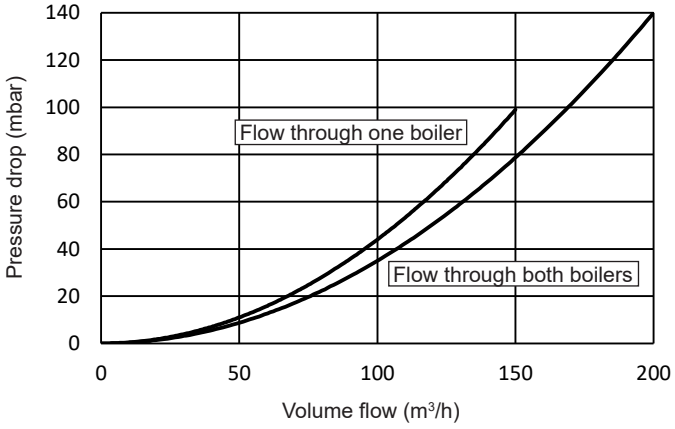
UltraGas® 2 D (1240,1400)



UltraGas® 2 D (1600-2200)

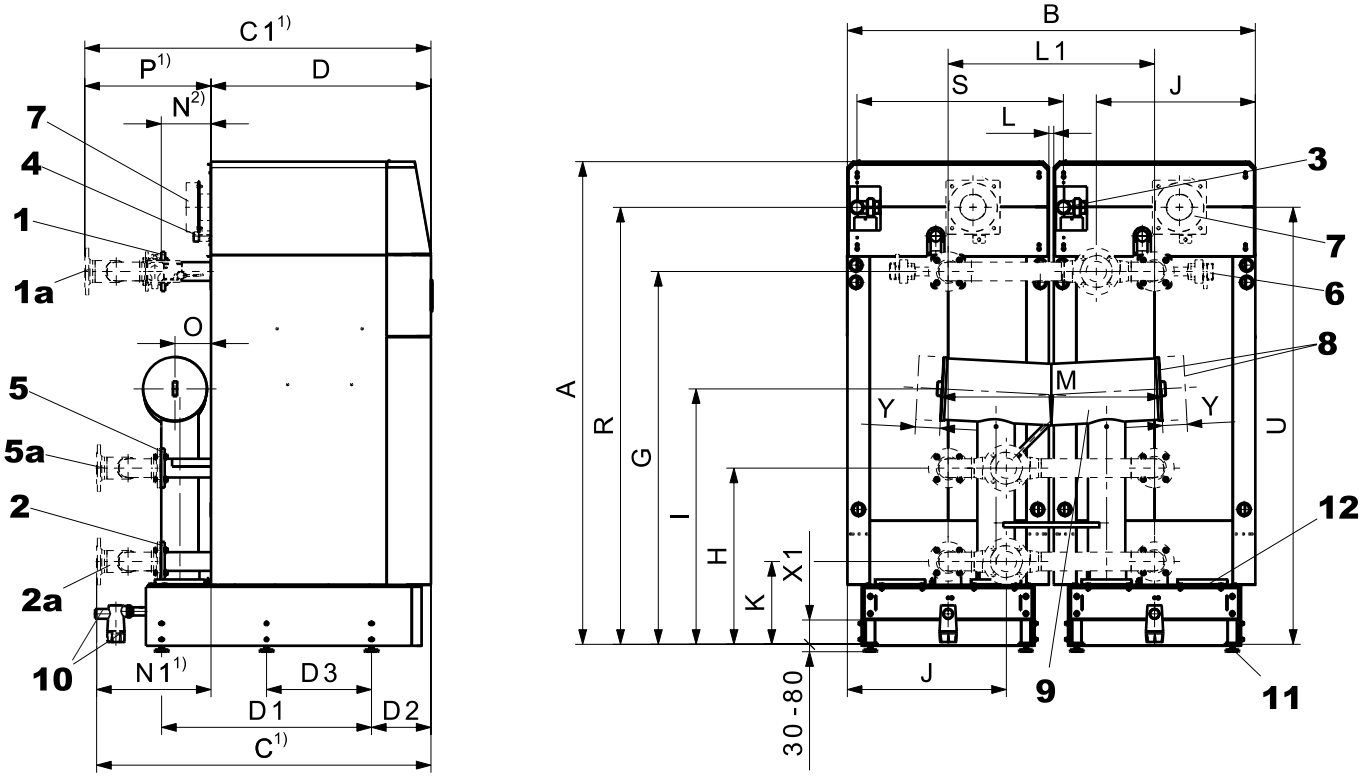


UltraGas® 2 D (2600,3100)



UltraGas® 2 D (250-3100)

(Dimensions in mm)



1 Flow heating
1a Hydraulic connection flow (option) 2)
2 Low-temperature return
2a Hydraulic connection low-temperature return (option) 2)
3 Gas connection
4 Safety flow (safety valve, air vent)
5 High-temperature return
5a Hydraulic connection high-temperature return (option) 2)
6 Hydraulic shut-off valve (option)
7 Combustion air intake connector (option)
8 Flue gas outlet connection left or right
9 Flue gas collector
10 Condensate drain with siphon and screw connection for plastic pipe
11 Boiler feet (adjustable 30-80 mm)
12 Cleaning opening

Notice
For subsequent technical details, see single boiler UltraGas® 2 (125-1550):
- Detailed dimensions and dimensions for multi-part installation
- Mounting position of system flow sensor
- Safety fitting pipe flow/return for mounting the protection set and diaphragm pressure expansion tank

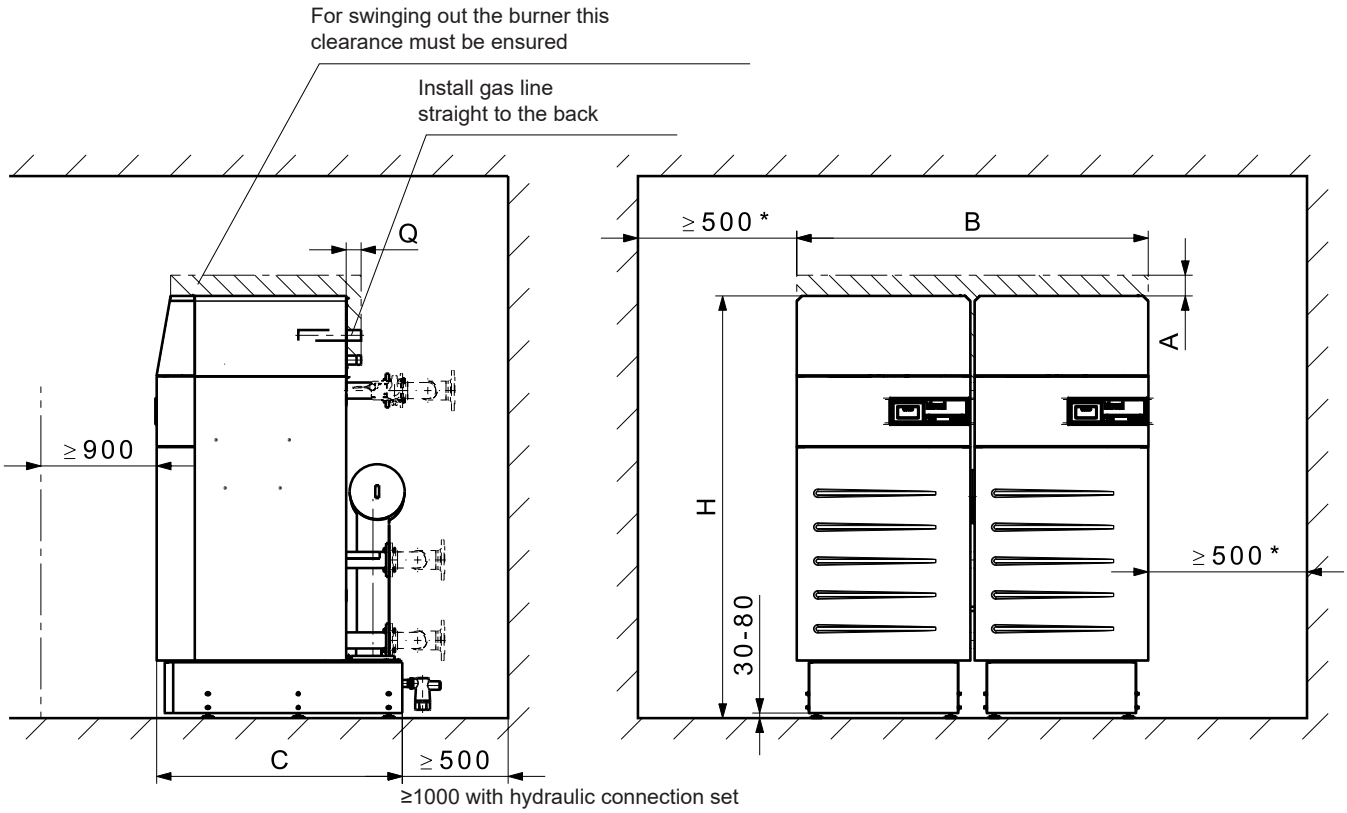
Type	A	B	C 1)	C1 1)	D	D1	D2	D3	G	H	I	J	K	L	L1	M	N 2)	N1 1)	O	P 1)	R	S	U	X1	Y
D (250,300)	1923	1560	1269	1317	799	754	242	-	1479	714	1116	597	334	120	840	902	207	470	142	518	1725	840	1725	99	-
D (380,460)	1968	1660	1363	1411	895	854	242	-	1517	717	1116	647	337	20	840	902	204	468	147	516	1778	840	1778	99	-
D (600-1000)	1923	1880	1807	1864	1165	1204	242	-	1447	745	1143	814	365	20	950	930	285	642	176	699	1735	950	1736	96	-
D (1240,1400)	2234	2240	1827	1884	1184	1294	242	-	1564	757	1195	904	377	20	1130	1019	286	643	205	700	1966	1130	1938	89	-
D (1600-2200)	2255	2600	2158	2218	1364	1480	242	-	1573	788	1280	1054	408	20	1310	1018	378	794	228	854	1959	1310	1959	89	-
D (2600,3100)	2395	3150	2571	2631	1640	1790	250	895	1600	822	1231	1339	442	30	1590	1322	420	931	240	991	2064	1590	2064	89	495
DH (1400)	2234	2240	1827	1884	1184	1294	242	-	1564	757	1195	904	377	20	1130	1019	286	643	205	700	1966	1130	1938	89	-
DH (2200)	2255	2600	-	-	1364	1480	242	-	1573	788	1280	1054	408	20	1310	1018	378	-	228	-	1959	1310	1959	89	-
DH (3100)	2395	3150	-	-	1640	1790	250	895	1600	822	1231	1339	442	30	1590	1322	390	-	240	-	2064	1590	2064	89	495

Type	1,2,5 3)	1a,2a,5a 2), 3)	3	4	7	8	10
D (250,300)	DN 65 / PN 6 / 4-hole	DN 80 / PN 6 / 4-hole	Rp 1″	R 1″	Ø 122/125	Ø 254/256	DN 40
D (380,460)	DN 65 / PN 6 / 4-hole	DN 80 / PN 6 / 4-hole	Rp 1½″	R 1¼″	Ø 197/200	Ø 254/256	DN 40
D (600-1000)	DN 100 / PN 6 / 4-hole	DN 125 / PN 6 / 8-hole	Rp 1½″	R 1½″	Ø 197/200	Ø 306/308	DN 40
D (1240,1400)	DN 100 / PN 6 / 4-hole	DN 125 / PN 6 / 8-hole	Rp 2″	R 2″	Ø 247/250	Ø 356/358	DN 40
D (1600-2200)	DN 125 / PN 6 / 8-hole	DN 150 / PN 6 / 8-hole	Rp 2″	R 2″	Ø 247/250	Ø 402/404	DN 40
D (2600,3100)	DN 150 / PN 6 / 8-hole	DN 200 / PN 6 / 8-hole	Rp 2″	R 2″	Ø 247/250	Ø 504/506	DN 40
DH (1400)	DN 100 / PN 16 / 4-hole	-	Rp 2″	R 2″	Ø 247/250	Ø 356/358	DN 40
DH (2200)	DN 125 / PN 16 / 8-hole	-	Rp 2″	R 2″	Ø 247/250	Ø 402/404	DN 40
DH (3100)	DN 150 / PN 16 / 8-hole	-	Rp 2″	R 2″	Ø 247/250	Ø 504/506	DN 40

1) UltraGas® 2 D: dimensions incl. hydraulic connections and hydraulic butterfly valves
2) UltraGas® 2 D and UltraGas® 2 DH: dimensions without hydraulic connection and hydraulic butterfly valve
No hydraulic connections of the double boilers are available for UltraGas® 2 DH.
3) DN = nominal diameter, PN = nominal pressure

Space requirements

UltraGas® 2 D (250-3100)
(Dimensions in mm)



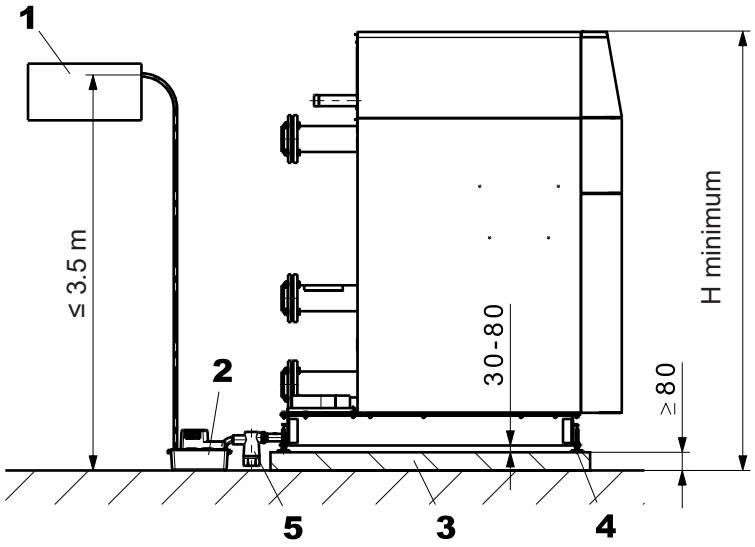
UltraGas® 2 type	A [1]	A minimum [2]	B	C	H [3]	H minimum [4]	Q
D (250,300)	169	106	1560	1060	1953	1934	125
D (380,460)	155	71	1660	1160	1998	1979	2
D (600-1000)	513	156	1880	1510	1953	1937	60
D (1240,1400)	121	121	2240	1600	2264	2255	155
D (1600-2200)	280	195	2600	1786	2285	2276	119
D (2600,3100)	291	154	3150	2104	2425	2416	163
DH (1400)	121	121	2240	1600	2264	2255	155
DH (2200)	280	195	2600	1786	2285	2276	119
DH (3100)	291	154	3150	2104	2425	2416	163

[1] If room height is too small: Reduction of dimension possible (see A minimum).
[2] **Attention!** With A minimum the burner can not be swung out completely anymore! Cleaning with UltraGas® 2 D (250-460) and UltraGas® 2 D (1240-3100) still possible
[3] Height value assumes adjustable feet are set to 30 mm
[4] The base plates cannot be installed without feet and the installer will have to fit a siphon with min. 70 mm barrier height. For details see next page.

- The heat generator can be placed with one side directly on the wall. However, to protect heat-sensitive walls against damage, a distance of at least 150 mm from the wall must be provided.
- The cleaning opening must be easily accessible. As a result, a minimum distance of 500 mm must be maintained on the cleaning opening side.

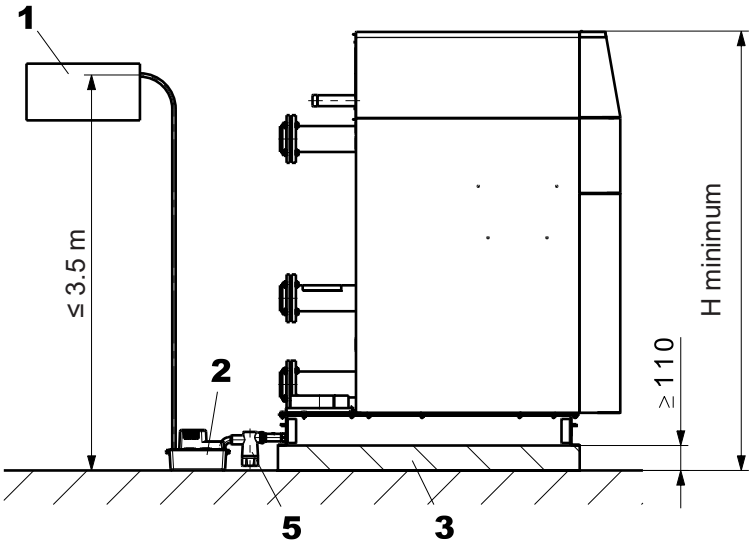
UltraGas® 2 (250-3100) with masonry base and adjustable feet

(Dimensions in mm)



UltraGas® 2 type	H minimum [1]
D (250,300)	1934
D (380,460)	1979
D (600-1000)	1937
D (1240,1400)	2255
D (1600-2200)	2276
D (2600,3100)	2416
DH (1400)	2255
DH (2200)	2276
DH (3100)	2416

UltraGas® 2 (250-3100) with masonry base without adjustable feet



UltraGas® 2 type	H minimum [1]
D (250,300)	1934
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D (600-1000)	1937
D (1240-1400)	2255
D (1600-2200)	2276
D (2600,3100)	2416
DH (1400)	2255
DH (2200)	2276
DH (3100)	2416

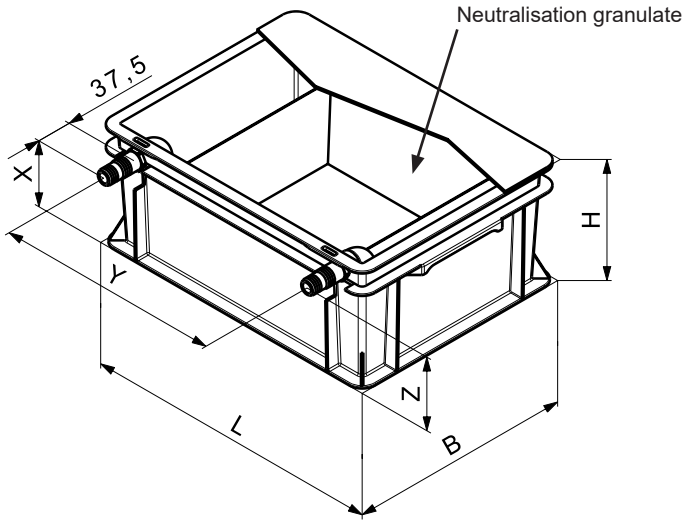
1 Neutralisation unit (option)
2 Condensate pump (option)
3 Masonry base
4 Feet adjustable up to 30-80 mm
5 Siphon [2]

[1] Height value assumes adjustable feet are set to 30 mm
[2] **Caution!** The installer will have to fit a siphon with min. 70 mm barrier height.

Notice
- The steps of the climbing aid provided must be horizontal. Adapt the climbing aid if necessary.
- Base plates and feeds will not be re-funded!
- With H minimum, cleaning the siphon is more difficult.

Neutralisation unit HNB-0400 to HNB-1600

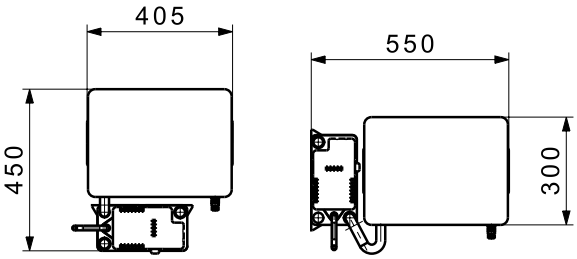
(Dimensions in mm)



	HNB-0400,-0800	HNB-1200,-1600
Dimensions (L x W x H)	405 x 300 x 180 mm	605 x 400 x 180 mm
Inlet height (Z)	128 mm	
Drain height (X)	118 mm	
Distance between the connections (Y)	approx. 350 mm	approx. 550 mm

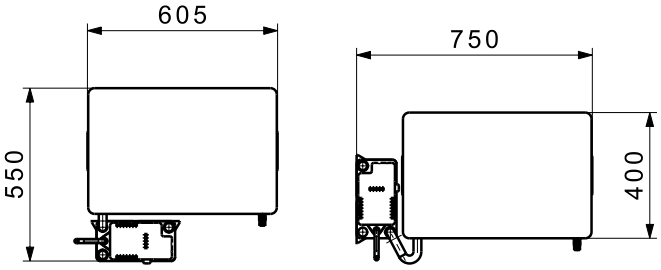
Neutralisation unit HNB-0400,-0800 and condensate pump

(Dimensions in mm)



Neutralisation unit HNB-1200,-1600 and condensate pump

(Dimensions in mm)



Standards and guidelines

The official regulations for installation and operation must be observed. In particular, these are the country-specific standards (e.g. EN standard, DIN standards, …) as well as the corresponding regional regulations.

The following standards and guidelines must be complied with:

- Hoval technical information and installation instructions
- hydraulic and technical control regulations of Hoval
- DVGW directives
- DIN EN 12828
  Safety-relevant requirements
- DIN EN 12831 Heaters
  Rules for the calculation of the heat requirements of buildings
- VDI 2035 Protection against damage by corrosion and boiler scale formation in heating and service water installations
- EN 14868 “Protection of metallic materials against corrosion”
- VDE 0100 supplement 2

Water quality in heating systems

Filling and replacement water, heating water

The following applies:

- VDI 2035
- In addition, the EN 14868 standard must be applied, **as well as the manufacturer-specific specifications**

Manufacturer-specific specifications

Filling and replacement water

The filling and replacement water can be both fully demineralised and also merely softened.

Heating water

- In the case of **full demineralisation of the filling and replacement water**, the electrical conductivity of the heating water must not exceed the value of 100 µS/cm.

- In the case of **softening the filling and replacement water**, the following conditions must be complied with:
  The quality of the heating water must be checked and documented periodically:
  - For an installed heat output above 100 kW up to and including 1000 kW, an annual check of the heating water is required.
  - For an installed heat output above 1000 kW, an check of the heating water is required twice a year.

  The following standard values for the heating water must be measured and adhered to:
  - Electrical conductivity of the heating water for operation with water containing salts: > 100 µS/cm to ≤ 1500 µS/cm
  - pH value of the heating water for systems without aluminium alloy as water-side material 8.2 to 10.0 (measurement 10 weeks after commissioning at the earliest)
- The sum of the chloride, nitrate and sulphate contents in the heating water must not exceed 50 mg/l in total.

Additional notices

- Hoval boilers and calorifiers are suitable for heating systems without significant oxygen intake. (System type I according to EN 14868).
- Plants with continual oxygen intake (e.g. underfloor heating without diffusion-proof plastic piping) or intermittent oxygen intake (e.g. requiring frequent topping-up) must be equipped with a system separation.
- In the case of bivalent heating systems, the values of the heat generator with the strictest requirement for water quality must be complied with.
- If only the boiler is replaced in an existing plant, it is not recommended for the entire heating system to be refilled, provided that the heating water already contained in the system complies with the relevant directives or standards.
- Before filling new systems and, where necessary, existing heating systems containing heating water that does not comply with the directives or standards, the heating system must be professionally cleaned and flushed. The boiler must not be filled until the heating system has been flushed.

Frost protection agent

see separate engineering sheet “Use of frost protection agent”.

Heating room

- Boilers cannot be positioned in rooms in which halogen compounds can occur and into which combustion air can enter (e.g. laundrettes, hairdressers).
- Halogen compounds can be caused by cleaning and degreasing solutions, dissolvents, glue and bleaching lyes. Pay attention to the Procal leaflet, corrosion through halogen compounds.

Combustion air supply

The supply of combustion air must be guaranteed. There must be no possibility to close the air supply opening. For direct combustion air to boiler mount the connection for direct combustion air inlet. It is very important to ensure that the combustion air is free from halogen compounds. These are present, for example, in spray cans, varnishes, glues, solvents and cleansing agents.

For the version with common flue gas line with overpressure, the flue gas excess pressure set must be imperatively mounted!

The minimum free cross-section for the combustion air can be assumed simplified as follows:

- *Room air-independent operation with separate combustion air pipe to the boiler:*
  0.8 cm² per 1 kW of output. The pressure drop in the combustion air pipe must be considered for the calculation of the flue gas system.
- In the UltraGas® 2, ventilation of the installation or boiler room must be guaranteed for operation independent from the room air.

- *Room air-dependent operation:*
  Minimum free cross-section of the opening into the open: 150 cm² or twice 75 cm² and additionally 2 cm² necessary for each kW of output over 50 kW for vent into the open.

Gas connection

Commissioning

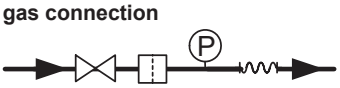
- Initial commissioning must be performed by a specialist technician from Hoval or a gas specialist technician.
- Burner setting values according to the installation instructions.

Manual gas shut-off tap and gas filter

Immediately in front of the boiler a manual gas shut-off device (tap) must be installed according to relevant regulations.

In the UltraGas® 2 (400-1550) type, an external gas filter must be installed in the gas supply line.
Make sure that the gas line from the external gas filter to the gas connection of the boiler is cleaned.
For the UltraGas® 2 (125-350) types, it is necessary to comply with the local regulations concerning the need for a gas filter.

Construction of a recommended gas connection



Legend:


manual gas shut-off valve


gas hose/compensator


gas filter

pressure gauge with test burner and push-button valve

Type of gas

- The boiler is only to be operated with the type of gas stated on the rating plate.

Gas pressure natural gas

Necessary gas flow pressure at the boiler inlet:
UltraGas® 2 D (250-1400) min. 17.4 mbar, max. 80 mbar
UltraGas® 2 D (1600-3100) min. 17.4 mbar, max. 300 mbar

Gas pressure propane

- A gas pressure controller to reduce the boiler inlet pressure must be installed on-site for propane.

- Necessary gas flow pressure at the boiler inlet: UltraGas® 2 (125-1550) min. 37 mbar, max. 50 mbar

Gas pressure regulator

- The installation of a gas pressure regulator is only necessary if the gas flow pressure in the gas network exceeds the maximum permissible gas flow pressure of the UltraGas® 2 D or if there are considerable fluctuations in the gas flow pressure.
- Pressure fluctuations in the gas network must be prevented by suitable measures (e.g. gas storage tanks or pressure regulators). The local conditions must be checked in each individual case.

Closed heating system

The boiler is only approved for use in closed heating systems.

Minimum circulation water quantity

No minimum water circulation volume is required.

Calorifier connection

If a calorifier is connected, all heating groups must be provided with a mixer.

Installation instructions

Please observe the installation instructions supplied with every boiler.

Space requirements

See “Dimensions” for information

Pump follow-on

For operating temperatures of the boiler above 85 °C, after each burner switch-off, the circulating pump must be in operation for at least 2 minutes (the pump after-run is included in the boiler controller with TopTronic© E control).

Heating boiler in the attic

If the gas boiler is positioned on the top floor, the installation of a low water protection, which automatically turns the gas burner off in case of water shortage, is recommended.

Condensate drain

- A permit for discharge of the flue gas condensate into the sewage system must be obtained from the relevant authority or sewer operator.
- The condensate from the flue gas system can be discharged through the boiler. A condensate trap is not needed anymore with the flue gas system.
- The condensate must be conducted openly (funnel) into the sewage system.
- Suitable materials for condensate drain:
  - stoneware pipes
  - pipes made from glass
  - pipes made from stainless steel
  - pipes made from plastic: PVC, PE, PP, ABS and UP
- A siphon must be installed at the condensate outlet on the gas boiler (included in the boiler scope of delivery).

Diaphragm pressure expansion tank

- An adequately dimensioned diaphragm pressure expansion tank must be provided.
- The diaphragm pressure expansion tank has to be installed in principle at the boiler return, or at the safety flow.
- Starting from 70 °C an intermediate tank is necessary.

Safety valve

- At the safety flow a safety valve and an automatic exhauster must be installed.

Noise damping

The following measures are possible for sound insulation:

- Make boiler room walls, ceiling and floor as solid as possible.
- If there are living areas above or below the boiler room, connect pipes flexibly using expansion joints.
- Connect circulating pumps to the piping network using expansion joints

Noise level

- The acoustic power level value is dependent on the local and spacial circumstances.
- The acoustic pressure level is dependent on the installation conditions and can for instance be 5 to 10 dB(A) lower than the acoustic power level at a distance of 1 m.

Recommendation:
If the combustion air intake opening is located on the house facade near a noise-sensitive place (window of bedroom, garden terrace, etc.), we recommend using a silencer in the combustion air duct.

Flue gas system

- Gas boilers must be connected to a certified and approved flue gas system such as flue gas lines.
- Flue gas lines must be gas-, condensate- and over pressure-tight.
- The flue gas lines must be secured against unwanted loosening of the plug connections.
- The flue gas system must be connected with an angle, so that the resulting condensate of the flue gas system can flow back to the boiler and can be neutralised there before discharging into the canalisation.
- Gas boilers with condensation heat utilisation are to be connected to a flue gas line min. temperature class T120.
- A flue gas temperature limiter is integrated into the boiler.

Allocation of gas filters for UltraGas® 2

UltraGas® 2 type	Gas throughput m³/h	Gas filter type	Dimension	Pressure drop gas filter (with clean filter) mbar
(125)	11.9	70602/6B	Rp 1″	0.2
(150)	14.2	70602/6B	Rp 1″	0.3
(190)	18.0	70603/6B	Rp 1½″	0.2
(230)	22.4	70603/6B	Rp 1½″	0.2
(300)	29.2	70603/6B	Rp 1½″	0.3
(350)	33.9	70603/6B	Rp 1½″	0.4
(400)	38.6	70603/6B	Rp 1½″	0.6
(450)	44.0	70603/6B	Rp 1½″	0.7
(500)	46.4	70631/6B	Rp 2″	0.5
(620)	59.3	70631/6B	Rp 2″	0.7
(700)	67.0	70631/6B	Rp 2″	0.8
(800)	76.1	70631/6B	Rp 2″	0.9
(1000)	94.6	70631/6B	Rp 2″	1.4
(1100)	106.0	70631/6B	Rp 2″	1.6
(1300)	125.5	70610F/6B	DN 65	1.5
(1550)	147.3	70610F/6B	DN 65	2.1

Standard values for flue gas line dimensions

Standard values for the flue gas line dimensions can be found in the following table.

Table with bases for calculation

- Calculation based on max. 1000 m above sea level.
- Installation room with supply air opening (room air dependent operation)
- An individual calculation must be carried out for room air-independent operation (accessories as option) or a combustion air supply via a duct.
- Connecting line was calculated with max. 5 m.
- Flue gas overpressure set: Mandatory, included in the scope of delivery!

- The first 2 m of the flue gas line must be configured with the same dimension as the flue gas connector, after which the size of the flue gas system can be selected according to the table below.

Table "Standard values for flue gas line dimensions"

Boiler		Flue gas line (smooth walled)	Number of elbows 90° (flue gas + combustion air)			
UltraGas® 2	Internal Ø flue gas outlet	Designation	Total pipe length in m (flue gas + combustion air)			
type	mm	DN	1	2	3	4
D (250)	254	200	45	44	43	43
D (300)	254		44	43	43	42
D (380)	254	225	46	45	44	43
D (460)	254	250	47	46	45	44
D (600)	306	300	48	47	46	45
D (700)	306		47	46	45	44
D (800)	306		46	45	44	43
D (900)	306	350	50	50	50	50
D (1000)	306		48	48	47	46
D (1240)	356		47	46	45	44
D (1400)	356	400	48	47	46	45
D (1600)	402		46	45	44	43
D (2000)	402	450	47	46	45	44
D (2200)	402	500	46	45	44	43
D (2600)	504		48	48	47	46
D (3100)	504		48	47	46	45
DH (1400)	356	400	48	47	46	45
DH (2200)	402	500	46	45	44	43
DH (3100)	504		48	47	46	45

Notice: The values in the table "Standard values for flue gas line dimensions" are standard values for reference.
An exact calculation for the flue gas duct must be made on-site.
For chimney systems above 25 m effective height, negative pressure in the chimney is to be expected in some operating conditions.
Therefore, we recommend an individual design of the chimney system and checking the individual pressure conditions.

**Looking for the appropriate hydraulic schematic?
Please contact your local Hoval partner.**

1. General

1.1 The following Terms and Conditions shall apply to all our present and future contracts for deliveries and other services (even if the said Terms and Conditions are not specifically mentioned in verbal, telephonic or fax communications).

1.2 All deviations from the present Terms and Conditions, ancillary verbal agreements and subsequent contractual amendments shall only be valid if they have been confirmed by us in writing.

1.3 Buying terms and conditions of the client shall not be valid even if they are not specifically rejected by us. Our Standard Terms and Conditions of Delivery shall be regarded as accepted at the latest upon receipt of our goods and services by the client.

1.4 If a provision of the present Terms and Conditions of Delivery proves to be wholly or partially invalid, the contracting parties shall replace the aforesaid provision by a new provision which comes as close as possible to the legal and economic intention of the invalid provision.

2. Offers

2.1 Our offers shall be subject to change without notice.

2.2 Orders shall only be regarded as accepted when they have been confirmed by us in writing.

2.3 Illustrations, drawings and all technical details in catalogues and printed material shall be approximate values as customary within the industry. They shall only be binding if specific reference is made to them in the contract. We shall also reserve the right to make technical and design changes after the conclusion of the contract.

2.4 Cost estimates, drawings and other documents shall remain our property and shall be subject to copyright protection; they may not be made available to third parties.

3. Regulations in the country of destination

3.1 At the latest at the time of the order, the buyer shall draw our attention to the regulations and standards in force in the country of destination relating to the design of the delivered goods and the operation thereof and also to the execution of services.

3.2 Our deliveries and services shall comply with the regulations and standards in the country of destination provided the buyer has drawn our attention thereto in accordance with Section 3.1.

3.3 The buyer shall duly inform us of any special application features of goods ordered from us if these differ from our general recommendations.

4. Prices

4.1 Our prices shall be ex works, net, excluding packaging.

4.2 All ancillary costs, e.g. freight, insurance, export, transit, import and other approvals, licenses and authentications, shall be for the account of the buyer. The buyer shall also bear all taxes, charges, customs duty, etc., which are levied in connection with the contract.

4.3 We shall reserve the right to make price adjustments if wage rates or material prices change between the date of the order confirmation and the contractual performance of the contract. Price increases shall normally be notified three months in advance. We shall be bound to the price stated in the order confirmation for a period of three months after the effective date of the price increase.

5. Payment terms

5.1 Unless otherwise agreed in writing, our invoices shall be payable within thirty days with no cash discount. Payment shall be deemed to have been made when the amount in question is at our unrestricted disposal on our account in Swiss Franks.

5.2 Payment dates shall be observed even if any delays whatsoever occur after shipment of the goods from our works. The buyer shall not be permitted to reduce or withhold payments on account of complaints or counterclaims not recognised by us.

5.3 Payments shall also be made if insignificant components are missing but usage of the delivered goods is not rendered impossible as a result or if rectification work has to be carried out on the delivery. We shall be entitled to reject rectification of the defect as long as the buyer has not discharged his/its obligations to us.

5.4 If the buyer fails to comply with the agreed payment dates, default interest shall be paid from the agreed due date without a reminder being issued; the aforesaid interest shall be based on the interest rates prevailing at the domicile of the buyer, but shall be not less than four percent above the current discount rate of the Swiss Central Bank.

5.5 We shall be entitled to make deliveries of pending orders dependent upon settlement of outstanding claims.

6. Reservation of title

6.1 Delivered goods shall remain our property (reserved goods) pending full and complete payment of all present and future claims to which we are entitled regardless of their legal cause. This shall also apply if payments are made in settlement of specifically designated claims.

6.2 The buyer shall be entitled to process and sell reserved goods in the ordinary course of business.

6.3 If our reserved goods are combined or intermingled with other goods, the buyer shall hereby transfer his/its ownership rights in the new goods or chattels to us upon the conclusion of the contract in the amount of the invoice value of the reserved goods.

6.4 If the goods are resold by the buyer, he/it shall hereby transfer to us upon the conclusion of the contract with us his/its claims arising from the aforesaid resale in the amount of the invoice value of the reserved goods.

6.5 If the reserved goods are used by the buyer to perform a works or works delivery contract, his/its claim from the aforesaid works or works delivery contract shall hereby be assigned to us in the same amount and on the same date as for the purchase price claim (Section 6.4).

6.6 As long as he/it is honouring his/its payment obligations, the buyer shall, however, be authorised to collect his/its resale claim which has been assigned to us. He/it may not dispose of such claims by way of assignment to third parties, however. The empowerment of the buyer to collect the claim may be revoked by us at any time. We shall be entitled to notify third party debtors of the assignment. The buyer shall be entitled to provide us with the necessary information and documents in order to enable us to enforce our rights.

6.7 If the value of our securities exceeds our total claims by more than 10 %, we shall be obliged to release securities of our choice at the request of the buyer.

6.8 The buyer shall inform us immediately of any pledge or other impediment to our property enforced by third parties.

6.9 The buyer shall be obliged to collaborate in measures required to protect our title. He/it shall, in particular, empower us upon the conclusion of the contract to make entries or prior notice of the reservation of title at his/its cost in public registers, books and documents, etc., in accordance with the relevant national laws and shall perform all formalities in this respect.

6.10 The buyer shall maintain the reserved goods at his/its cost for the duration of the reservation of title and shall insure the said goods against theft, breakage, fire, water and other risks in our favour. He/it shall also take all steps to ensure that our property claims are neither adversely affected nor rescinded.

7. Delivery periods

7.1 Delivery periods and deadlines stated by us shall be approximate unless we have given an express written confirmation of a deadline as binding.

7.2 Delivery periods shall be deemed to have been met if notification of readiness to deliver has been sent to the buyer before the end of the delivery period.

7.3 The delivery period shall be prolonged if details required for the performance of the contract are not received on time or if they are subsequently changed by the buyer.

7.4 The delivery period shall also be reasonably prolonged if impediments arise which we cannot avert despite exercise of the necessary care (e.g. major operational disruptions, industrial disputes, delayed or defective deliveries, force majeure, etc.).

7.5 If an agreed delivery date is met by more than 14 days, the buyer shall be obliged to set us a reasonable period of grace. The buyer may only withdraw from the contract if our goods have not been delivered by the end of the said period of grace. Compensation claims for non-performance, delayed performance or any consequential losses shall be excluded unless there was gross negligence on our part.

8. Transfer of risk

8.1 Unless expressly agreed otherwise in writing, our “ex works” deliveries shall be made in accordance with the international rules on the interpretation of commercial clauses of the International Chamber of Commerce (Incoterms) in the version in force on the date of the order confirmation.

8.2 The transfer of risk shall be determined by the aforesaid Incoterms.

8.3 Insurance against damages of any kind shall be the responsibility of the buyer.

8.4 Complaints in connection with the transport shall be immediately notified by the buyer to the last carrier upon receipt of the delivery.
8.5 If despatch is delayed at the request of the buyer or for any other reasons not attributable to us, the risk shall pass to the buyer on the original date envisaged for the “ex works” delivery. We shall be entitled to demand payment from this date onwards.

9. Delivery inspection

9.1 The buyer shall be required to inspect deliveries immediately. If the goods do not comply with the order or the delivery note or if visible defects are identified, he/it shall be obliged to notify the aforesaid to us in writing within eight days of receipt. Later complaints shall not be recognised. (Regarding transport damages, cf. Section 8.4)

10. Assembly and operations

10.1 The assembly, putting into operation, operation and maintenance of the delivered goods shall be carried out in accordance with our guidelines. They may be executed by our staff or by appropriately trained third parties as agreed with the buyer.
10.2 If we require a commissioning certificate for certain product groups, warranty claims for the proper functioning of the equipment can only be enforced if a proper hand-over has been documented by a confirmed commissioning certificate received by us within one month of the hand-over.

11. Warranty

11.1 Warranty period
11.1.1 The general warranty period shall be 12 months from the first commissioning but no longer than 18 months from the date on which the relevant goods left our works.
If despatch is delayed for reasons not attributable to us, the warranty shall lapse no later than 18 months after notification of the readiness to deliver.
The general warranty period shall exclude electrical components for which the warranty period shall be 6 months from the first commissioning but no later than 12 months from the date of shipment from our works.
11.1.2 We refer to Section 11.6.1 with regard to the warranty period for third party products.
11.1.3 The warranty period for components which we have repaired during the warranty period or have delivered as replacement shall be 12 months from the completion of our repair or from the date of the replacement delivery but no longer than the end of a period equivalent to twice the original warranty period as per Section 11.1.1.
11.2 Liability for material, design and workmanship defects
11.2.1 The contractual condition of the goods shall be based on the condition upon the transfer of risk.
11.2.2 Defects shall be notified to us immediately in writing.
11.2.3 We shall be liable for all components which can be shown to have become defective or unusable before the end of the warranty period as a result of defective materials, defective design or defective workmanship, with such components being repaired or replaced ex works immediately at our choice.
11.3 Liability for warranted qualities
11.3.1 Warranted qualities shall only be those which are specifically designated as such in the order confirmation or in the relevant specifications.
11.3.2 The aforesaid assurance shall apply at the latest until the end of the warranty period. If a taking-over test has been agreed with the buyer, the assurance shall be deemed as performed if proof of the relevant qualities is furnished during the aforesaid test.
11.3.3 If the warranted qualities are not performed or only partially performed, the buyer shall be entitled to an immediate rectification. The buyer shall grant us the necessary time and opportunity for this purpose.
11.3.4 If the rectification is abortive or only partially successful, the buyer shall be entitled to a reasonable reduction of the purchase price. If the defect is so serious that it cannot be rectified within a reasonable period of time, and if deliveries or services for the notified purpose are not usable or are only usable to a much lesser extent, the buyer shall be entitled to refuse acceptance of the defective component or to withdraw from the contract if part-acceptance is economically unreasonable. We shall only be obliged to refund amounts which have been paid to us for the components affected by the aforesaid withdrawal.
11.4 Exclusion of liability for defects
11.4.1 Our liability shall exclude damages which cannot be proved to have been sustained as a result of defective material, defective design or defective workmanship.
11.4.2 Damages shall therefore be excluded for example which were caused by
- improper work of other persons with regard to planning, site preparation, assembly, operation and maintenance;
- plant concepts and designs which do not comply with the latest state of the art;
- non-observance of our guidelines for planning, assembly, commissioning, operations and maintenance;
- force majeure (e.g. thunderstorms).

11.4.3 The following shall be excluded in particular
- corrosion damages (e.g. as a result of aggressive water, unsuitable water treatment, oxygen intakes, emptying the plant over a longer period of time, falling below the dew point, chemical or electrochemical effects, etc.);
- damages caused by air pollution (e.g. the accumulation of intense dust, aggressive vapours, etc.);
- damages caused by unsuitable equipment and fuels;
- damages caused by overcharging, excessive water pressure, scaling, improper electrical connections and inadequate fuse protection.

11.4.4 Components shall also be excluded from the warranty which are subject to natural wear and tear (e.g. burner nozzles, combustion chamber inserts, ignition and monitoring components in contact with fire, fireclay and wall facings, fuses, seals and flexible tubes).
11.5 Commissioning certificate
11.5.1 We hereby draw attention to the due and proper hand-over and - if envisaged - the commissioning certificate in accordance with Section 10.2 as prerequisites for our warranty.
11.6 Deliveries and services of sub-contractors
11.6.1 Our liability for third party products which form a major part of the delivered goods (e.g. warehouse and conveying equipment, burners, measuring and control equipment, electrical components, flue gas and waste water cleaning equipment) shall - if permissible - be limited to an assignment of our claims against the suppliers of the said third party products.

12. Exclusion of further liability

12.1 The buyer shall have no rights and claims for materials, design and workmanship defects or the lack of warranted qualities unless specifically mentioned in Sections 11.1 to 11.6.
12.2 All claims for compensation, reduction in the contract price, rescission of the contract or withdrawal from the contract shall be excluded in particular unless these are specifically mentioned. Under no circumstances shall the buyer have any compensation claim for damages which were not sustained by the delivered goods themselves (e.g. replacement costs, cost for establishing the cause of the damage, expertises, production stoppages, production losses, lost orders, lost profit and other direct or indirect damages). The aforesaid liability exclusion shall not apply in the event of gross negligence on our part.
12.3 The exclusion as per Section 12.2 shall apply for all breaches of contract and all claims of the buyer regardless of why they were lodged from a legal point of view. It shall therefore also apply for a breach of any ancillary obligations (e.g. inadequate advice, etc.).

13. Jurisdiction

13.1 **The place of jurisdiction for the buyer and for us shall be Vaduz.** We shall be entitled to bring action against the buyer at his/its domicile, however.
13.2 The legal relationship between the parties shall be governed by the substantive laws of Switzerland. The application of the UN convention on contracts for the international sale of goods (CISG) shall be excluded.

Hoval quality.
You can count on us.

Hoval

Hoval is one of the leading international companies for heating and indoor climate solutions. Drawing on more than 75 years of experience and benefiting from a close-knit team culture, the Hoval Group delivers exciting solutions and develops technically superior products. This leadership role requires a sense of responsibility for energy and the environment, which is expressed in an intelligent combination of different heating technologies and customised indoor climate solutions.

Hoval also provides personal consultations and comprehensive customer service. With around 2200 employees in 16 companies around the world, Hoval sees itself not as a conglomerate, but as a large family that thinks and acts globally.
Hoval heating and indoor climate solutions are currently exported to more than 50 countries.

Responsibility for energy and environment

Hoval Aktiengesellschaft
Austrasse 70
FL-9490 Vaduz
Principality of Liechtenstein
(Swiss customs territory)
Phone +423 3992 400
Fax +423 3992 618
E-Mail info@hoval.com
www.hoval.com

2024 - 04 | Subject to modifications

Your Hoval partner

Hoval

Heat pumps

Free energy from air, brine or water combined with high efficient heat pumps.

01.04.2024

Air/water heat pumps

Outdoor installation, modulating

Brine/water or water/water heat pumps

Indoor installation, single-stage

Indoor installation, two-stage

Plate heat exchangers

Engineering

Hoval Belaria® pro comfort
Hoval Belaria® pro compact

Modulating monoblock heat pump for heating and cooling in the living area. Belaria® pro compact (8/100/300) and (13/100/300) additionally with integrated buffer storage tank (100 litres) and calorifier (300 litres) in the indoor unit.

Monoblock heat pump set up outdoors consisting of outdoor unit and indoor unit.

Belaria® pro outdoor unit
- Compact floor-mounted air/water heat pump
- Elegant and extremely quiet outdoor unit
- Housing with sheet metal enclosure, powder-coated, anthracite colour (DB703)
- Belaria® pro (8-15) with modulating scroll compressor
- Refrigerant R290
- L-shaped louvre-type evaporator with the Belaria® pro (8,13)
- Straight louvre-type evaporator with the Belaria® pro (15)
- Speed-controlled axial fan with FlowGrid (inlet grille) with the Belaria® pro (8,13), Belaria® pro (15) without FlowGrid
- Condensate drip tray incl. tray heating and condensate trace heater for channelling all the condensate in the outdoor unit, fixed installation, 1″ connection
- Plate-type condenser made of stainless steel/copper
- Built-in gas separator with safety valve 2.5 bar
- With cooling function with corresponding hydraulics
- Hydraulic connections behind louvre grille
  - Belaria® pro (8,13): heating connections 1″
  - Belaria® pro (15): heating connections 1¼″
  - Filter ball valve in heat pump return
- Electrical connections behind louvre grille
  - 230 V control current, supplied from the indoor unit
  - 400 V main power supply, supplied from the indoor unit
  - Data cable - bus connection to the indoor unit
- With fitting accessories for fixing the outdoor unit on the ground

Belaria® pro comfort indoor unit
- Compact wall-mounted indoor unit
- Casing made of structured EPP, colour black
- TopTronic® E controller installed
- With WFA-200S automatic heat pump device
- Integrated components:
  - Speed-regulated high-efficiency pump
  - Flow sensor/heat meter
  - Electric heating element 6 kW
  - 3-way switching ball valve for heating/ domestic hot water
- Sensor set consisting of outdoor sensor, flow sensor and domestic hot water sensor included in the scope of delivery
- Diaphragm pressure expansion tanks see “Various system components”

Model range

Belaria® pro comfort type	35 °C	55 °C	Heat output [1] A-7W35 kW	Heat output [1] A2W35 kW	Cooling capacity [1] A35W18 kW
(8)	A+++	A+++	2.0-8.3	2.1-8.3	3.1-10.2
(13)	A+++	A+++	4.0-10.3	4.1-11.8	5.1-14.0
(15)	A+++	A+++	6.0-13.3	6.0-14.5	6.1-16.6

Belaria® pro compact type	35 °C	55 °C	Heat output [1] A-7W35 kW	Heat output [1] A2W35 kW	Cooling capacity [1] A35W18 kW
(8/100/300)	A+++	A+++ A	2.0-8.3	2.1-8.3	3.1-10.2
(13/100/300)	A+++	A+++ A	4.0-10.3	4.1-11.8	5.1-14.0

Energy efficiency class of the compound system with control.
[1] Modulation range

- Hydraulic connections at bottom
  - Belaria® pro (8,13): heating connections 1″ domestic hot water 1″
  - Belaria® pro (15): heating connections 1¼″ domestic hot water 1¼″
- Electrical connections introduced from bottom
- With fitting accessories for fixing the indoor unit to the wall
- Shut-off ball valves are included in the scope of delivery

Belaria® pro compact indoor unit
- Compact floor-mounted indoor unit
- Casing made from painted, galvanised sheet steel. Colour flame red/brown red (RAL 3000/RAL 3011)
- TopTronic® E controller installed
- With WFA-200S automatic heat pump device
- Integrated 100 litre buffer storage tank
- Integrated 300 litre calorifier
- Enamel painted calorifier with PU hard-foam insulation, energy efficiency class A, load profile XXL. Maintenance flange and magnesium protection anode built in
- Integrated components:
  - Speed-regulated high-efficiency pump
  - Flow sensor/heat meter
  - Electric heating element 6 kW
  - 3-way switching ball valve for heating/ domestic hot water
  - Heating/cooling circuit pump and mixer
  - Shut-off ball valves
- Sensor set: outdoor sensor included, flow sensor and calorifier sensor installed
- Diaphragm pressure expansion tanks see “Various system components”
- Hydraulic connections top
  - Heating connections 1″
  - Hot water connection 1″
  - Cold water connection 1″
- Electrical connections introduced from top

TopTronic® E controller

Control panel
- 4.3-inch colour touchscreen
- Heat generator blocking switch for interrupting operation
- Fault signalling lamp
- Mains isolator

TopTronic® E control module
- Simple, intuitive operating concept
- Display of the most important operating states
- Configurable start screen
- Operating mode selection
- Configurable day and week programmes
- Operation of all connected Hoval CAN bus modules
- Commissioning wizard
- Service and maintenance function
- Fault message management
- Analysis function
- Weather display (with HovalConnect option)
- Adaptation of the heating strategy based on the weather forecast (with HovalConnect option)

TopTronic® E basic module heat generator TTE-WEZ
- Integrated control functions for
  - 1 heating/cooling circuit with mixer
  - 1 heating/cooling circuit without mixer
  - 1 hot water charging circuit
  - Bivalent and cascade management
- Outdoor sensor
- Immersion sensor (calorifier sensor)
- Contact sensor (flow temperature sensor)
- RAST 5 basic plug set

Options for TopTronic® E controller
- Can be expanded by max. 1 module expansion:
  - Module expansion heating circuit or
  - Module expansion Universal or
  - Module expansion heat balancing
- Can be networked with up to 16 controller modules in total:
  - Heating circuit/DHW module
  - Solar module
  - Buffer module
  - Measuring module

Number of additional modules that can be installed in the heat generator:
Indoor unit Belaria® pro comfort:
- 1 module expansion and 1 controller module
  or
- 2 controller modules

Indoor unit Belaria® pro compact:
- 1 module expansion and 1 controller module

The supplementary plug set must be ordered in order to use expanded controller functions.

For further information about the TopTronic® E, see “Controls”

EnergyManager PV smart
Feature to increase self-generated power consumption in use with HovalConnect.

If a HovalConnect gateway is used together with the heat pump, the EnergyManager PV smart feature is available. This allows the heat pump to be operated preferentially at times of higher solar radiation. The feature uses online weather data on the current solar radiation for this purpose and can be adjusted by means of an associated threshold value. The self-consumption of electricity from an existing photovoltaic plant is thus increased and the purchase of grid electricity is reduced. This results in a lasting and significant cost-saving potential without further investment costs for the customer.

Delivery
- Indoor and outdoor unit delivered packaged separately
- Sensor set Belaria® pro comfort:
  Outdoor, flow and calorifier sensor included separately in the electrical box
- Sensor set Belaria® pro compact:
  Outdoor sensor included, calorifier sensor and flow sensor installed in the indoor unit

On site
- Wall ducts for hydraulic connection lines
- Hydraulic connection lines outdoor/indoor unit
- Electrical connection line outdoor/indoor unit

Air/water heat pump

Hoval Belaria® pro comfort

Belaria® pro comfort Type	Heat output [1] A-7W35 kW	A2W35 kW	Cooling capacity [1] A35W18 kW	Part No.
(8)	2.0-8.3	2.1-8.3	3.1-10.2	7019 480
(13)	4.0-10.3	4.1-11.8	5.1-14.0	7019 481
(15)	6.0-13.3	6.0-14.5	6.1-16.6	7019 482

[1] Modulation range

Hoval Belaria® pro compact

with integrated buffer storage tank (100 litres) and calorifier (300 litres)

Belaria® pro compact Type	Heat output [1] A-7W35 kW	A2W35 kW	Cooling capacity [1] A35W18 kW	Part No.
(8/100/300)	2.0-8.3	2.1-8.3	3.1-10.2	7019 212
(13/100/300)	4.0-10.3	4.1-11.8	5.1-14.0	7019 213

[1] Modulation range

EnergyManager PV smart
Free feature to increase self-generated power consumption in use with HovalConnect.

Further information
see “Description”

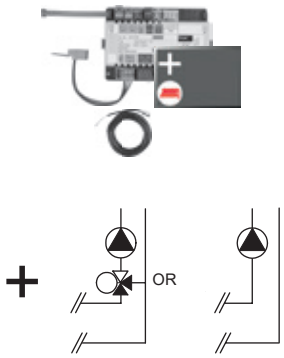
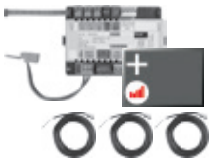
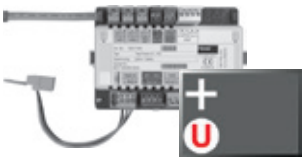
Energy efficiency class
see “Description”

Electric heating elements
see “Calorifiers” - chapter “Electric heating elements”

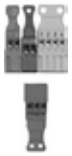
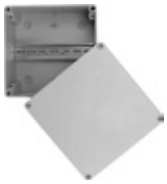
When using glycol (antifreeze) - primary and/or secondary - a separation system must be used.

TopTronic® E module expansions

for TopTronic® E basic module heat generator

		Part No.
	**TopTronic® E module expansion heating circuit TTE-FE HK** Expansion to the inputs and outputs of the basic module heat generator or the heating circuit/domestic hot water module for implementing the following functions: - 1 heating/cooling circuit w/o mixer or - 1 heating/cooling circuit with mixer Consisting of: - Fitting accessories - 1 contact sensor ALF/2P/4/T, L = 4.0 m - Basic plug set FE module **Notice** The supplementary plug set may have to be ordered to implement functions differing from the standard!	6034 576
	**TopTronic® E module expansion heating circuit incl. energy balancing** TTE-FE HK-EBZ Expansion to the inputs and outputs of the basic module heat generator or the heating circuit/domestic hot water module for implementing the following functions: - 1 heating/cooling circuit w/o mixer or - 1 heating/cooling circuit with mixer incl. energy balancing in each case Consisting of: - Fitting accessories - 3 contact sensors ALF/2P/4/T, L = 4.0 m - Plug set FE module	6037 062
	**TopTronic® E module expansion Universal TTE-FE UNI** Expansion to the inputs and outputs of a controller module (basic module heat generator, heating circuit/domestic hot water module, solar module, buffer module) for implementing various functions Consisting of: - Fitting accessories - Plug set FE module Further information see “Controls” section - “Hoval TopTronic® E module expansions” chapter **Notice** Refer to the Hoval System Technology to find which functions and hydraulic arrangements can be implemented.	6034 575

Accessories for TopTronic® E

		Part No.
	**TopTronic® E controller modules**	
	TTE-HK/WW TopTronic® E heating circuit/ hot water module	6034 571
	TTE-SOL TopTronic® E solar module	6037 058
	TTE-PS TopTronic® E buffer module	6037 057
	TTE-MWA TopTronic® E measuring module	6034 574
	**Supplementary plug set**	
	for basic module heat generator TTE-WEZ	6034 499
	for controller modules and module expansion TTE-FE HK	6034 503
	**TopTronic® E room control modules**	
	TTE-RBM TopTronic® E room control modules	
	easy white	6037 071
	comfort white	6037 069
	comfort black	6037 070
	**Enhanced language package TopTronic® E**	6039 253
	one SD card required per control module Consisting of the following languages: HU, CS, SL, RO, PL, TR, ES, HR, SR, JA, DA	
	**HovalConnect**	
	HovalConnect LAN	6049 496
	HovalConnect WLAN	6049 498
	HovalConnect Modbus	6049 501
	HovalConnect KNX	6049 593
	TopTronic® E interface modules	
	GLT module 0-10 V	6034 578
	**TopTronic® E sensors**	
	AF/2P/K Outdoor sensor H x W x D = 80 x 50 x 28 mm	2055 889
	TF/2P/5/6T Immersion sensor, L = 5.0 m	2055 888
	ALF/2P/4/T Contact sensor, L = 4.0 m	2056 775
	TF/1.1P/2.5S/6T Collector sensor, L = 2.5 m	2056 776
	**Bivalent switch**	
	for various release or switching functions	
	Bivalent switch 1-piece	2056 858
	Bivalent switch 2-piece	2061 826
	**System housing**	
	System housing 182 mm	6038 551
	System housing 254 mm	6038 552
	**TopTronic® E wall casing**	
	WG-190 Wall casing small	6052 983
	WG-360 Wall casing medium	6052 984
	WG-360 BM Wall casing medium with control module cut-out	6052 985
	WG-510 Wall casing large	6052 986
	WG-510 BM Wall casing large with control module cut-out	6052 987

Further information
see “Controls”

Accessories for Belaria® pro (8,13)

HP line insul. AF-WPP 125-32
for Belaria® pro (8,13)
Flexible, pre-insulated and self-compensating line with two heating pipes and two empty pipes
Outside diameter: 125 mm
Fluid pipes: 2 x 32 mm/2.9 mm
Empty pipe 1: 32 mm
Empty pipe 2: 25 mm
Bending radius: 0.5 m
Operating temperature: -40 °C to +90 °C
Maximum temperature: +95 °C

Dimension inside/outside	Line length m	Part No.
DN 25/32	10	2077 577
DN 25/32	15	2077 578
DN 25/32	20	2077 579
DN 25/32	25	2077 580

Connector set HP line VS 32-WPP — 6053 304
For HP line insulated AF-WPP 125-32
Consisting of:
- 2 shrink-fit end caps
- 4 clamping adapters 1″ external thread, PN 6
- 1 building feed-in pressing water Core hole diameter 198-202 mm
- 1 fixed point clamp

Lining pipe DN 200 D210/200 x 400 — 2080 584
For HP line insulated AF-WPP
Lining pipe for feeding the HP lines through ceilings, walls and floors.
Suitable for walling in and cementing in.
Lining pipe material: PVC
Formwork cover material: PE
Outer Ø: 210 mm
Internal Ø: 200 mm
Length: 400 mm

Connection set AS25-BPA — 6055 496
For Belaria® pro (8,13)
Flexible connection line that can be shortened for connecting flow and return within the heat pump
Consisting of:
- 1 3.0 m corrugated pipe DN 20 insulated
Insulation 20/28 with PE protective foil
- 3 angle screw connection IT/ET 1″
- 4 union nuts 1″
- 3 support rings 1″
1 extra support ring for compression
- 7 flat seals NBR

Notice
In cooling applications, the piping and fittings must be insulated accordingly.

Adhesive tape IKB — 2023 563
for thermal insulation made of EPDM
Thickness: 3 mm
Width: 50 mm
Roll: 15 m

Accessories for Belaria® pro (15)

HP line insul. AF-WPP 125-32
for Belaria® pro (8,13)
Flexible, pre-insulated and self-compensating line with two heating pipes and two empty pipes
Outside diameter: 125 mm
Fluid pipes: 2 x 32 mm/2.9 mm
Empty pipe 1: 32 mm
Empty pipe 2: 25 mm
Bending radius: 0.5 m
Operating temperature: -40 °C to +90 °C
Maximum temperature: +95 °C

Dimension inside/outside	Line length m	Part No.
DN 32/40	10	2077 581
DN 32/40	15	2077 582
DN 32/40	20	2077 583
DN 32/40	25	2077 584

Connector set HP line VS 40-WPP — 6053 305
For HP line insulated AF-WPP 145-40
Consisting of:
- 2 shrink-fit end caps
- 4 clamping adapters 1¼″ external thread, PN 6
- 1 building feed-in pressing water
Core hole diameter: 198-202 mm
- 1 fixed point clamp

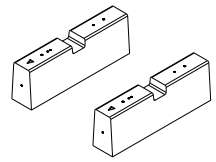
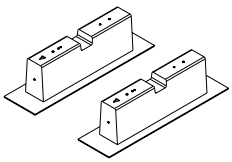
Lining pipe DN 200 D210/200 x 400 — 2080 584
For HP line insulated AF-WPP
Lining pipe for feeding the HP lines through ceilings, walls and floors.
Suitable for walling in and cementing in.
Lining pipe material: PVC
Formwork cover material: PE
Outer Ø: 210 mm
Internal Ø: 200 mm
Length: 400 mm

Connection set AS32-BPA — 6055 497
For Belaria® pro (15)
Flexible connection line that can be shortened for connecting flow and return within the heat pump
Consisting of:
- 1 3.0 m corrugated pipe DN 25 insulated
Insulation 20/35 with PE protective foil
- 3 external thread IT/ET 1¼″
- 4 union nuts 1¼″
- 3 support rings 1¼″
1 extra support ring for compression
- 7 flat seals NBR

Notice
In cooling applications, the piping and fittings must be insulated accordingly.

Adhesive tape IKB — 2023 563
for thermal insulation made of EPDM
Thickness: 3 mm
Width: 50 mm
Roll: 15 m

Accessories

	Part No.
 **Concrete base set BSW02-FU** for Belaria® pro (8-15) and UltraSource® B (8,11) for safe installation of an outdoor unit on a firm base Consisting of: 2 concrete bases with cast-in fastening sleeves M8 and M10 Dimensions (H x W x D): 250 x 750 x 150 mm Weight: 2 pieces of 57 kg	6054 856
 **Concrete base set BSW02-FD** for Belaria® pro (8-15) and UltraSource® B (8,11) for safe installation of an outdoor unit on the flat roof. Consisting of: 2 concrete bases with cast-in fastening sleeves M8 and M10 Protective mats with aluminium lining Dimensions (H x W x D): 250 x 750 x 150 mm Weight: 2 pieces of 57 kg	6054 857

Notice
In a flat roof installation, all standards concerning statics, wind load and access to roofs must be complied with.

Further information
see “Engineering” chapter

Vibration decoupler
for reducing structure-borne noise from heat pumps indoors, cannot be shortened
Consisting of:
- 1 vibration decoupler insulated for heating side flat-sealing with union nut
- 2 flat seals
Nominal pressure: PN 10

Dimension	Connection inches	Nominal length mm	Part No.
DN 25	1″	300	2082 222
DN 25	1″	500	2082 223
DN 25	1″	1000	2080 794
DN 32	1¼″	300	2082 224
DN 32	1¼″	500	2082 225
DN 32	1¼″	1000	2080 796
DN 40	1½″	500	2082 226
DN 40	1½″	1000	2080 798
DN 50	2″	500	2082 227
DN 50	2″	1000	2080 800

Separation system of heat pump
For separating the heating circuit from the primary heating circuit
Consisting of:
- Plate heat exchanger (soldered)
- Connection bracket for wall installation
- Filling/flushing unit
- Connection screw fittings

Type	TS	Number of plates	Part No.
Belaria® pro comfort (8)	32-20	20	**on request**
Belaria® pro comfort (13)	32-20	20	**on request**
Belaria® pro comfort (15)	32-26	40	**on request**

Heating circuit pump, diaphragm pressure expansion tanks and frost protection must be ordered separately.

Separation system of heat pump
For separating the heating circuit from the primary heating circuit
Consisting of:
- Plate heat exchanger (soldered)
- Connection bracket for wall installation
- Filling/flushing unit
- Pump incl. thermal insulation shell, mains and signal cable, as well as connection screw fittings

Type	TS	Number of plates	Part No.
Belaria® pro compact (8/100/300)	32-20	20	**on request**
Belaria® pro compact (13/100/300)	32-20	20	**on request**

Diaphragm pressure expansion tanks and frost protection must be ordered separately.

Separation systems, see internal documents

HA group HA 25-2-WP
for Belaria® pro compact (8,13/100/300)
Direct heating/cooling circuit without mixer for mounting in the Belaria® pro compact indoor unit

6053 317

Correx® impressed current anode
for Belaria® pro compact (8,13/100/300)
for long-term corrosion protection for installation in the enamelled calorifier with built-in socket.

6051 882

Only either a Correx® impressed current anode or a magnesium anode is allowed to be used.

Heating/cooling accessories

		Part No.
	**Differential pressure relief valve DN 20** for free installation with flexible centre distance Connections at both ends 1″ external thread Operating pressure: max. 10 bar Operating temperature: max. 120 °C Setting range: 0.05-0.5 bar Length: 93 mm Casing made of brass with setting handle made of plastic	240 554
	**Differential pressure relief valve DN 32** for installation in a HA group DN 32 both ends 1¼″ external thread Self-sealing with O-ring and screw connections Operating pressure: max. 10 bar Operating temperature: max. 110 °C Setting range: 0.1-0.6 bar Connections: 1¼″ internal thread/ 1¼″ external thread Centre distance: 125 mm Casing and spring hood made of brass Spring made of stainless steel Seals made of EPDM Setting handle made of plastic with hexagon socket fastening screw	6014 849
	**Connection set AS32-2/H** for compact mounting of all required fittings of a direct circuit consisting of: 2 thermometer ball valves Wall bracket included separately Connection T-piece DN 32 in the return flow for connecting the sludge separator bottom and the diaphragm pressure expansion tank on the side on connection set installation option for an overflow valve incl. non-return valve	6039 793
	**System water protection filter FGM025-200** For horizontal installation in return For filtration of heating and cooling water Consisting of: - Filter head and bowl in brass - Magnetic insert (nickel-neodymium) - 2 pressure gauges - filter surface in stainless steel - Filter fineness 200 µm - With drain valve - Connections Rp 1″ internal thread with integrated shut-off valves and union connection (outlet) Max. flow rate (Δp < 0.1 bar): 5.5 m³/h Weight: 6.8 kg Water temperature: max. 90 °C - incl. steam diffusion-tight insulating shells	6058 256

Notice
Performs the function of sludge separator and strainer.

Domestic hot water accessories

		Part No.
	**Dew point switch FAS** mechanical dew point switch for monitoring the formation of condensate using adjustable switching value	2070 911
	**Safety set SG15-1″** Suitable up to max. 50 kW complete with safety valve (3 bar) Pressure gauge and autom. aspirator with shut-off valve. Connection: DN 15, 1″ internal thread	641 184

Services

Commissioning
Commissioning by works service or Hoval trained authorised serviceman/company is condition for warranty.

For commissioning and other services please contact your Hoval sales office.

Belaria® pro comfort (8-15)
Belaria® pro compact (8/100/300,13/100/300)

Type		(8) (8/100/300)	(13) (13/100/300)	(15)
• Energy efficiency class of the compound system with control [1]	35 °C/55 °C	A+++/A+++	A+++/A+++	A+++/A+++
• Energy efficiency class load profile XXL	Domestic hot water	-/A	-/A	-
• Room heating energy efficiency “moderate climate” 35 °C ηS	%	207	203	221
• Room heating energy efficiency “moderate climate” 55 °C ηS	%	154	154	162
• Water heating energy efficiency consumption profile/ηwh 35 °C/55 °C	-/%	XXL/105	XXL/101	-/-
• Seasonal coefficient of performance moderate climate 35 °C/55 °C	SCOP	5.3/3.9	5.2/4.0	5.6/4.1
• Seasonal coefficient of performance heating A35W18 [2]	SEER	4.5	5.3	4.7
• Seasonal coefficient of performance heating A35W7 [2]	SEER	2.5	2.9	3.0
Max./min. performance data heating and cooling in acc. with EN 14511				
• Max. heat output A2W35	kW	8.3	11.8	14.5
• Max. heat output A-7W35	kW	8.3	10.3	13.3
• Min. heat output A15W35	kW	2.6	4.0	6.1
• Max. cooling capacity A35W18	kW	10.2	14.0	16.6
• Max. cooling capacity A35W7	kW	7.9	10.8	12.1
• Min. cooling capacity A35W18	kW	3.1	5.1	6.1
Nominal output data heating in acc. with EN 14511				
• Nominal heat output A2W35	kW	3.5	5.3	8.7
• Coefficient of performance A2W35	COP	4.6	4.6	4.7
• Nominal heat output A7W35	kW	4.1	5.9	9.8
• Coefficient of performance A7W35	COP	5.4	5.5	5.6
• Nominal heat output A-7W35	kW	4.0	5.3	8.5
• Coefficient of performance A-7W35	COP	3.4	3.5	3.5
Nominal output data cooling in acc. with EN 14511				
• Nominal cooling capacity A35W18	kW	6.3	9.7	11.6
• Energy efficiency ratio A35W18	EER	4.9	4.6	4.6
• Nominal cooling capacity A35W7	kW	4.4	6.5	7.5
• Energy efficiency ratio A35W7	EER	3.5	3.2	3
Sound data				
• Max. sound power level outdoor unit, night operation	dB(A)	44	49	48
• Sound power level EN 12102 outdoor unit [3]	dB(A)	46	51	50
• Max. sound power level outdoor unit	dB(A)	55	57	55
• Sound pressure level 5 m [3), 4)]	dB(A)	27	32	31
• Sound pressure level 10 m [3), 4)]	dB(A)	21	26	25
Hydraulic data				
• Max. flow temperature	°C	70	70	70
• Max. flow rate heating side with A7W35, ΔT 6 K	m^3/h	1.2	1.8	2.3
• Nominal flow rate heating side with A7W35, ΔT 5 K	m^3/h	0.7	1	1.7
• Pressure drop heating side at nominal flow	kPa	4.5	11.0	31.0
• Residual overpressure of heating pump at max. pump speed and nominal flow	kPa	69	81	49
• Residual overpressure of heating pump at max. flow rate	kPa	53	62	32
• Max. operating pressure on the heating side [11]	bar	2.5	2.5	2.5
• Max. operating pressure domestic hot water side	bar	10	10	-
• Flow/return connection heating	R	1″	1″	1¼"
• Cold water connection Belaria® pro comfort	R	1″	1″	1¼"
• Cold/hot water connection Belaria® pro compact	R	1″/1″	1″/1″	-
• Nominal air volume outdoor unit (A7W35 and nominal rotation speed)	m^3/h	2000	3000	4900
• Hydraulic connection line, max. length/dimension inside [5]	m/DN	30/DN 25	30/DN 25	30/DN 32
Cooling technical data				
• Refrigerant		R290	R290	R290
• Compressor		modulating	modulating	modulating
• Refrigerant filling quantity	kg	1.2	1.8	2.8
• Compressor oil filling quantity	l	0.9	0.9	0.9
• Compressor oil type		PZ46M	PZ46M	PZ46M

Type		(8) (8/100/300)	(8) (8/100/300)	(15)
Electrical data				
• Electrical connection compressor	V/Hz	3~400/50	3~400/50	3~400/50
• Electrical connection electric heating element	V/Hz	3~400/50	3~400/50	3~400/50
• Control electrical connection	V/Hz	1~230/50	1~230/50	1~230/50
• Max. heat pump operating current	A	8.5	9.5	12.9
• Max. compressor operating current	A	8.5	9.5	12.9
• Max. electric heating element operating current	A	13	13	13
• Max. output for electric heating element	kW	6	6	6
• Max. fan operating current	A	0.3	0.6	0.4
• Max. fan power consumption	W	70	140	84
• Max. starting current heat pump	A	8.5	9.5	12.9
• Output factor		0.88	0.88	0.88
• External protection main current	A	C/K 13	C/K 13	C/K 13
• External protection control current	A	B/Z 13	B/Z 13	B/Z 13
• External protection electric heating element	A	B/Z 13	B/Z 13	B/Z 13
Dimensions/weight of outdoor unit				
• Dimensions (H x W x D)	mm	954x1575x791	954x1575x791	1432x1575x791
• Weight	kg	287	300	350
• Protection class		IP24	IP24	IP24
Dimensions/weight of indoor unit Belaria® pro comfort				
• Dimensions (H x W x D)	mm	1005x550x280	1005x550x280	1005x550x280
• Weight	kg	30	30	30
• Protection class		IP20	IP20	IP20
Dimensions/weight of indoor unit Belaria® pro compact				
• Dimensions (H x W x D)	mm	1930x790x790	1930x790x790	-
• Tilting dimension	mm	2085	2085	-
• Weight	kg	360	360	-
• Protection class		IP20	IP20	-
• Dimensions without cladding (H x W x D) [6]	mm	1930x783x785	1930x783x785	-
Hot water storage tank Belaria® pro compact				
• Volume [7]	dm^3	327	327	-
• Heating surface of heating coil	m^2	4.0	4.0	-
• Heating water of heating coil	dm^3	32	32	-
• Maximum storage tank temperature with electric heating element	°C	75	75	-
• Max. operating temperature	°C	80	80	-
• Output capacity at 40 °C and storage tank temperature at 60 °C [8]	l	570	570	-
• Output capacity at 40 °C and storage tank temperature at 65 °C [9]	l	634	634	-
• Output capacity at 40 °C and storage tank temperature at 75 °C [10]	l	745	745	-
• Output capacity at 46 °C and storage tank temperature at 60 °C [8]	l	469	469	-
• Output capacity at 46 °C and storage tank temperature at 65 °C [9]	l	522	522	-
• Output capacity at 46 °C and storage tank temperature at 75 °C [10]	l	613	613	-
Heating water storage tank (buffer) Belaria® pro compact				
• Volume [7]	dm^3	93	93	-

[1] Related to moderate climate

[2] EN 14825

[3] The sound values apply with a clean evaporator. These values are temporarily exceeded before defrosting.

[4] The sound pressure levels indicated apply if the outdoor unit is placed at a building façade. These values are reduced by 3 dB if the outdoor unit is free-standing. With installation in a corner, the sound pressure level increases by 3 dB.

[5] If the Belaria® pro is operated without a buffer storage tank connected in parallel, the customer must assess whether the next larger pipe dimension is more suitable due to the pressure drop. Hydraulic connection lines DN 40 are listed in the Belaria® pro (24) chapter.

[6] The removal of the cladding sections is time-consuming.

[7] Storage capacity incl. heating coil

[8] 12 °C cold water temperature/60 °C lower storage tank temperature (heat pump)

[9] 12 °C cold water temperature/65 °C lower storage tank temperature (heat pump + electric heating element)

[10] 12 °C cold water temperature/75 °C lower storage tank temperature (heat pump + electric heating element)

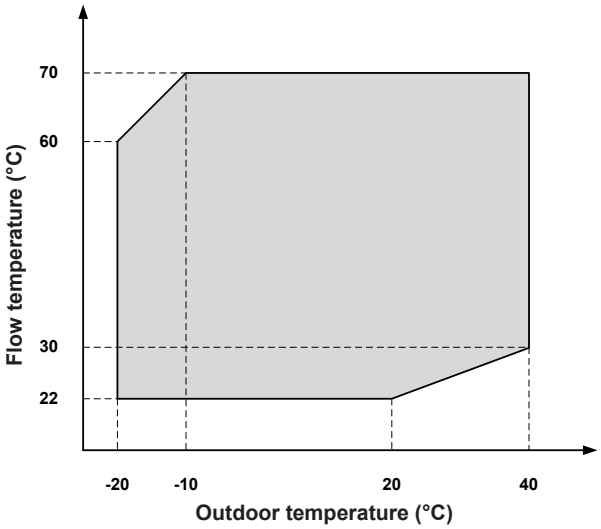
[11] Maximum operating pressure of the system without isolating system 2.5 bar, because the outdoor unit is protected with 2.5 bar. Provide general protection of the system in the building with 3 bar. An isolating system must be provided for system pressures of 3.0 bar or more.

Using a fault-current circuit breaker RCCB type B, IΔn ≥ 300 mA is recommended. Country-specific regulations must be observed.

Diagrams of areas of application

Heating and domestic hot water

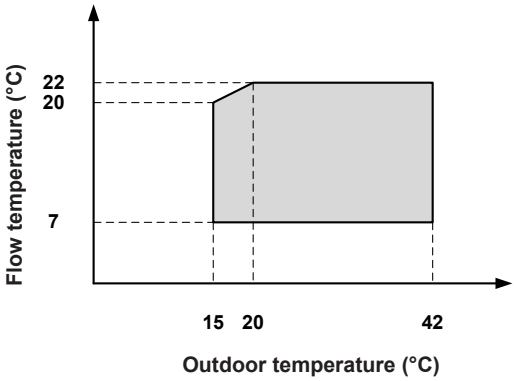
Belaria® pro comfort (8-15)
Belaria® pro compact (8/100/300), (13/100/300)



Area of application of the heat pump for heating/domestic hot water (Belaria® pro comfort and pro compact)

Cooling

Belaria® pro comfort (8-15)
Belaria® pro compact (8/100/300), (13/100/300)



Area of application of the heat pump for cooling (Belaria® pro comfort and pro compact)

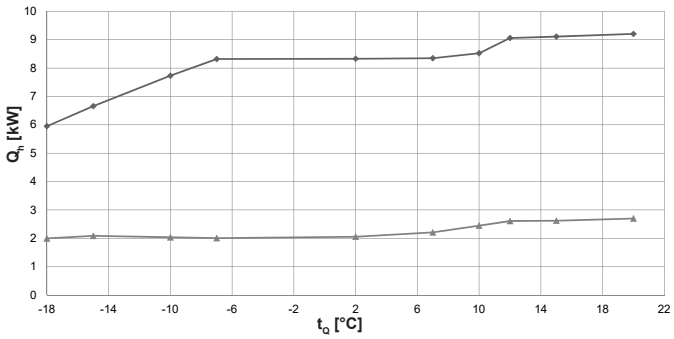
Performance data – heating

Maximum heat output allowing for defrosting losses

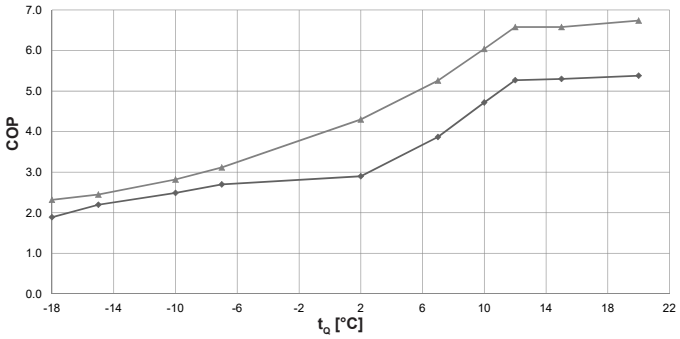
Belaria® pro comfort (8), compact (8/100/300)

Data according to EN 14511

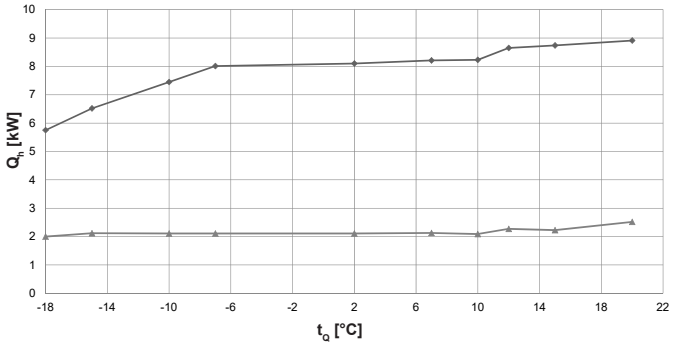
Heat output - t_{VL} 35 °C



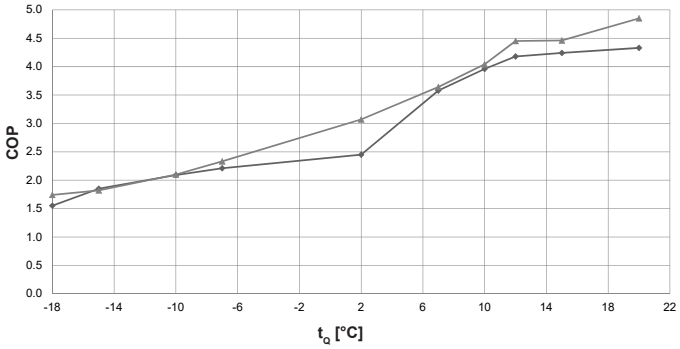
Coefficient of performance - t_{VL} 35 °C



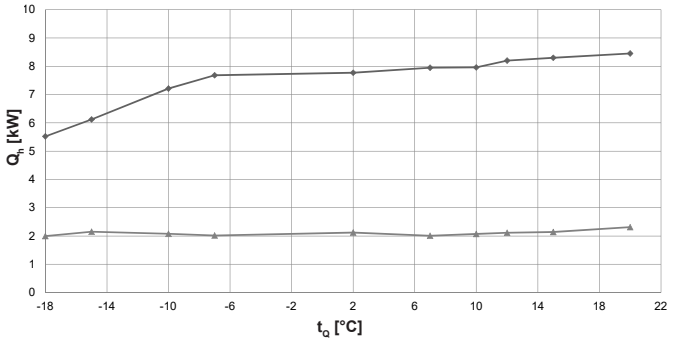
Heat output - t_{VL} 45 °C



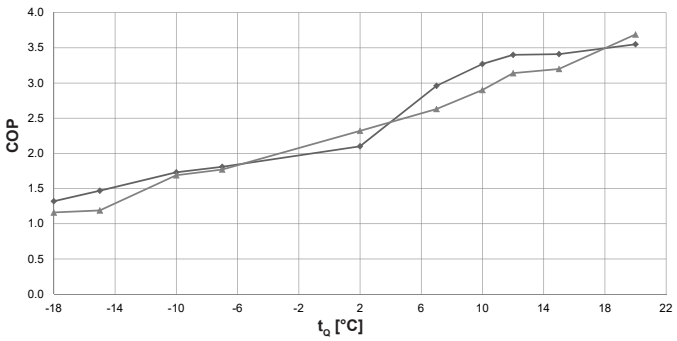
Coefficient of performance - t_{VL} 45 °C



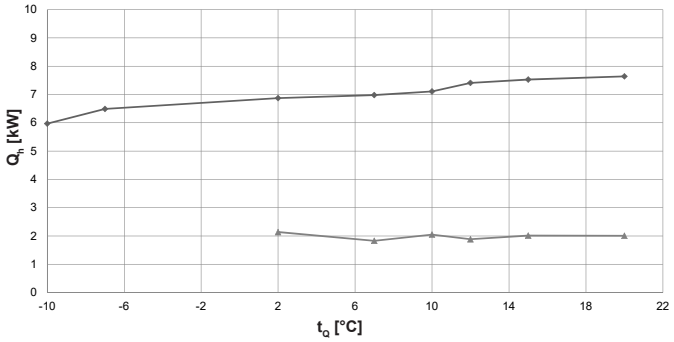
Heat output - t_{VL} 55 °C



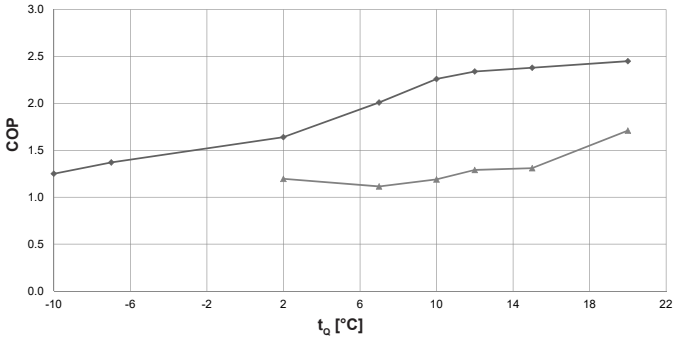
Coefficient of performance - t_{VL} 55 °C



Heat output - t_{VL} 70 °C



Coefficient of performance - t_{VL} 70 °C



t_{VL} = heating flow temperature (°C)
t_Q = source temperature (°C)
Q_h = heat output (kW), measured in accordance with standard EN 14511
COP = Coefficient of Performance for the overall unit in accordance with standard EN 14511

Maximum output
Minimum output

Performance data – heating

Belaria® pro comfort (8), compact (8/100/300)

Data according to EN 14511

		Maximum output			Minimum output		
t_{VL} °C	t_Q °C	Q_h kW	P kW	COP	Q_h kW	P kW	COP
35	-18	6.0	3.1	1.9	2.0	0.9	2.3
	-15	6.7	3.0	2.2	2.1	0.9	2.5
	-10	7.7	3.1	2.5	2.0	0.7	2.8
	-7	8.3	3.1	2.7	2.0	0.6	3.1
	2	8.3	2.9	2.9	2.1	0.5	4.3
	7	8.4	2.2	3.9	2.2	0.4	5.3
	10	8.5	1.8	4.7	2.5	0.4	6.0
	12	9.1	1.7	5.3	2.6	0.4	6.6
	15	9.1	1.7	5.3	2.6	0.4	6.6
	20	9.2	1.7	5.4	2.7	0.4	6.7
45	-18	5.8	3.7	1.6	2.0	1.1	1.7
	-15	6.5	3.5	1.9	2.1	1.2	1.8
	-10	7.5	3.6	2.1	2.1	1.0	2.1
	-7	8.0	3.6	2.2	2.1	0.9	2.3
	2	8.1	3.3	2.5	2.1	0.7	3.1
	7	8.2	2.3	3.6	2.1	0.6	3.6
	10	8.2	2.1	4.0	2.1	0.5	4.0
	12	8.7	2.1	4.2	2.3	0.5	4.5
	15	8.7	2.1	4.2	2.2	0.5	4.5
	20	8.9	2.1	4.3	2.5	0.5	4.9
50	-18	5.6	3.9	1.4	2.0	1.4	1.5
	-15	6.3	3.8	1.7	2.1	1.4	1.5
	-10	7.3	3.8	1.9	2.1	1.1	1.9
	-7	7.8	3.9	2.0	2.1	1.0	2.1
	2	7.9	3.5	2.3	2.1	0.8	2.7
	7	8.1	2.5	3.3	2.1	0.7	3.1
	10	8.1	2.2	3.6	2.1	0.6	3.5
	12	8.4	2.2	3.8	2.2	0.6	3.8
	15	8.5	2.2	3.8	2.2	0.6	3.8
	20	8.7	2.2	3.9	2.4	0.6	4.3
55	-18	5.5	4.2	1.3	2.0	1.7	1.2
	-15	6.1	4.2	1.5	2.2	1.8	1.2
	-10	7.2	4.2	1.7	2.1	1.2	1.7
	-7	7.7	4.2	1.8	2.0	1.1	1.8
	2	7.8	3.7	2.1	2.1	0.9	2.3
	7	8.0	2.7	3.0	2.0	0.8	2.6
	10	8.0	2.4	3.3	2.1	0.7	2.9
	12	8.2	2.4	3.4	2.1	0.7	3.1
	15	8.3	2.4	3.4	2.1	0.7	3.2
	20	8.5	2.4	3.6	2.3	0.6	3.7
60	-18	5.4	4.6	1.2	-	-	-
	-15	5.8	4.6	1.3	-	-	-
	-10	6.7	4.5	1.5	2.1	1.5	1.4
	-7	7.4	4.5	1.6	2.0	1.3	1.5
	2	7.6	3.9	1.9	2.1	1.1	1.9
	7	7.6	3.0	2.6	2.0	0.9	2.1
	10	7.8	2.7	2.8	2.1	0.9	2.3
	12	8.0	2.6	3.0	2.0	0.8	2.5
	15	8.1	2.7	3.0	2.1	0.8	2.6
	20	8.2	2.6	3.2	2.2	0.7	3.1
70	-18	-	-	-	-	-	-
	-15	-	-	-	-	-	-
	-10	6.0	4.8	1.3	-	-	-
	-7	6.5	4.7	1.4	-	-	-
	2	6.9	4.2	1.6	2.1	1.8	1.2
	7	7.0	3.5	2.0	1.8	1.6	1.1
	10	7.1	3.1	2.3	2.0	1.7	1.2
	12	7.4	3.2	2.3	1.9	1.5	1.3
	15	7.5	3.2	2.4	2.0	1.5	1.3
	20	7.6	3.1	2.5	2.0	1.2	1.7

t_{VL} = heating flow temperature (°C)
t_Q = source temperature (°C)
Q_h = heat output (kW), measured in accordance with standard EN 14511
P = power consumption, overall unit (kW)
COP = Coefficient of Performance for the overall unit in accordance with standard EN 14511

Observe daily power interruptions!
see “Engineering heat pumps general”

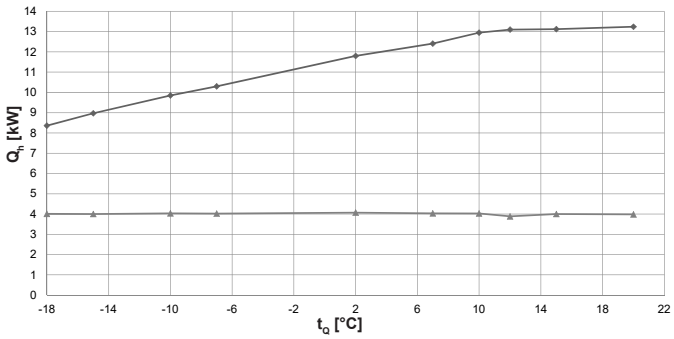
Performance data – heating

Maximum heat output allowing for defrosting losses

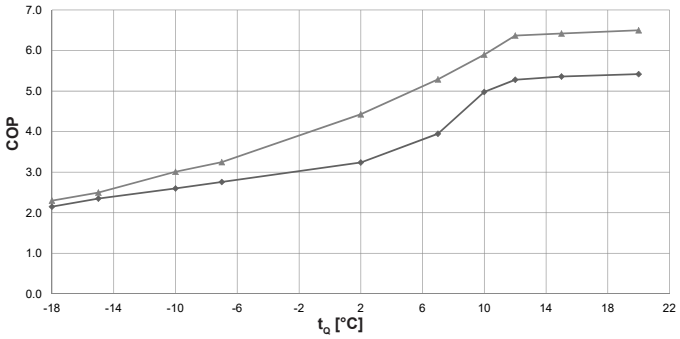
Belaria® pro comfort (13), compact (13/100/300)

Data according to EN 14511

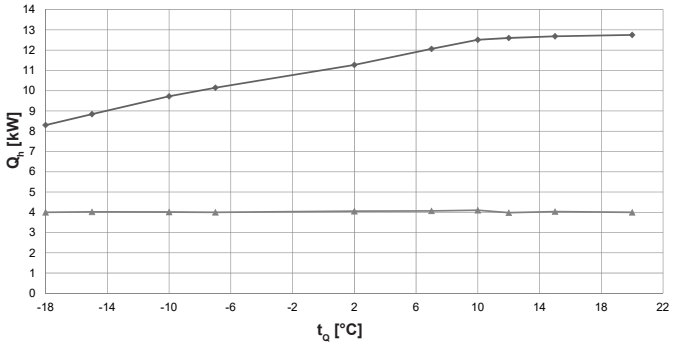
Heat output - t_{VL} 35 °C



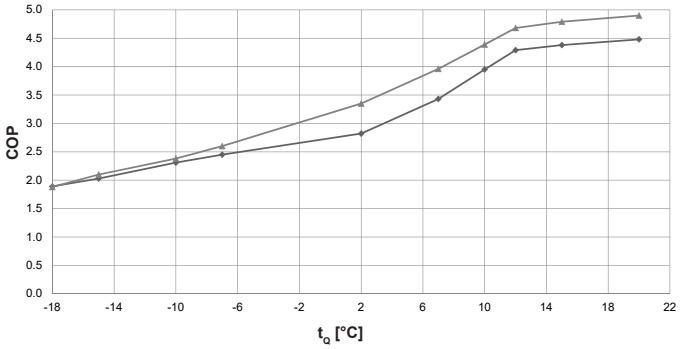
Coefficient of performance - t_{VL} 35 °C



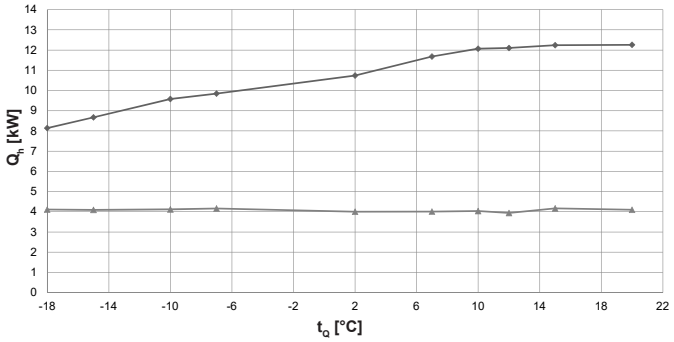
Heat output - t_{VL} 45 °C



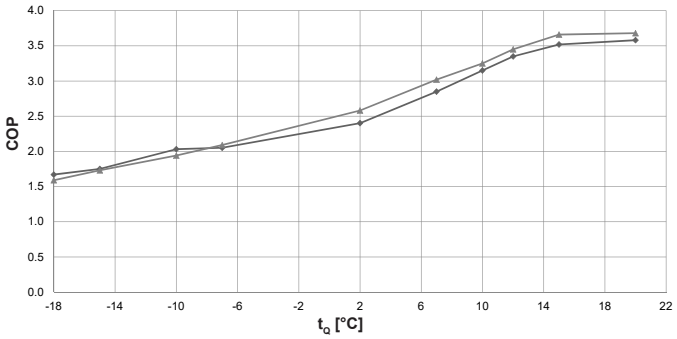
Coefficient of performance - t_{VL} 45 °C



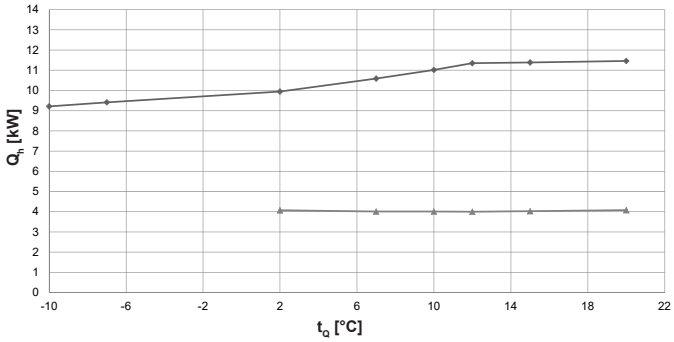
Heat output - t_{VL} 55 °C



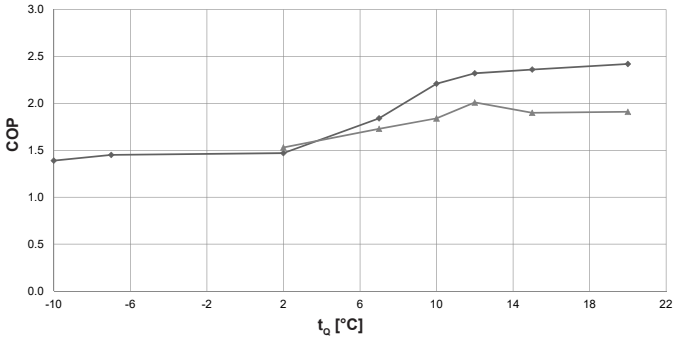
Coefficient of performance - t_{VL} 55 °C



Heat output - t_{VL} 70 °C



Coefficient of performance - t_{VL} 70 °C



t_{VL} = heating flow temperature (°C)
t_Q = source temperature (°C)
Q_h = heat output (kW), measured in accordance with standard EN 14511
COP = Coefficient of Performance for the overall unit in accordance with standard EN 14511

Maximum output
Minimum output

Performance data – heating

Belaria® pro comfort (13), compact (13/100/300)

Data according to EN 14511

		Maximum output			Minimum output		
t_{VL} °C	t_Q °C	Q_h kW	P kW	COP	Q_h kW	P kW	COP
35	-18	8.4	3.9	2.2	4.0	1.7	2.3
	-15	9.0	3.8	2.4	4.0	1.6	2.5
	-10	9.9	3.8	2.6	4.0	1.3	3.0
	-7	10.3	3.7	2.8	4.0	1.2	3.3
	2	11.8	3.6	3.2	4.1	0.9	4.4
	7	12.4	3.1	4.0	4.0	0.8	5.3
	10	13.0	2.6	5.0	4.0	0.7	5.9
	12	13.1	2.5	5.3	3.9	0.6	6.4
	15	13.1	2.4	5.4	4.0	0.6	6.4
	20	13.2	2.4	5.4	4.0	0.6	6.5
45	-18	8.3	4.4	1.9	4.0	2.1	1.9
	-15	8.8	4.4	2.0	4.0	1.9	2.1
	-10	9.7	4.2	2.3	4.0	1.7	2.4
	-7	10.1	4.1	2.5	4.0	1.5	2.6
	2	11.3	4.0	2.8	4.1	1.2	3.4
	7	12.1	3.5	3.4	4.1	1.0	4.0
	10	12.5	3.2	4.0	4.1	0.9	4.4
	12	12.6	2.9	4.3	4.0	0.9	4.7
	15	12.7	2.9	4.4	4.0	0.8	4.8
	20	12.8	2.8	4.5	4.0	0.8	4.9
50	-18	8.2	4.6	1.8	4.1	2.3	1.7
	-15	8.8	4.6	1.9	4.1	2.1	1.9
	-10	9.6	4.4	2.2	4.1	1.9	2.2
	-7	10.0	4.4	2.3	4.1	1.7	2.3
	2	11.0	4.2	2.6	4.0	1.4	3.0
	7	11.9	3.8	3.1	4.0	1.2	3.5
	10	12.3	3.5	3.6	4.1	1.1	3.8
	12	12.4	3.2	3.8	4.0	1.0	4.1
	15	12.5	3.2	4.0	4.1	1.0	4.2
	20	12.5	3.1	4.0	4.1	0.9	4.3
55	-18	8.1	4.9	1.7	4.1	2.6	1.6
	-15	8.7	5.0	1.8	4.1	2.4	1.7
	-10	9.6	4.7	2.0	4.1	2.1	1.9
	-7	9.9	4.8	2.1	4.2	2.0	2.1
	2	10.7	4.5	2.4	4.0	1.6	2.6
	7	11.7	4.1	2.9	4.0	1.3	3.0
	10	12.1	3.8	3.2	4.0	1.2	3.3
	12	12.1	3.6	3.4	3.9	1.1	3.5
	15	12.2	3.5	3.5	4.2	1.1	3.7
	20	12.3	3.4	3.6	4.1	1.1	3.7
60	-18	8.1	5.2	1.6	-	-	-
	-15	8.6	5.3	1.6	-	-	-
	-10	9.4	5.3	1.8	4.1	2.4	1.7
	-7	9.7	5.2	1.9	4.1	2.2	1.9
	2	10.5	5.1	2.0	4.0	1.8	2.2
	7	11.5	4.5	2.6	4.0	1.5	2.6
	10	11.9	4.3	2.8	4.0	1.4	2.8
	12	11.9	4.1	2.9	4.0	1.3	3.0
	15	12.0	3.9	3.1	3.9	1.3	3.1
	20	12.0	3.8	3.1	4.1	1.3	3.1
70	-18	-	-	-	-	-	-
	-15	-	-	-	-	-	-
	-10	9.2	6.6	1.4	-	-	-
	-7	9.4	6.5	1.5	-	-	-
	2	9.9	6.8	1.5	4.1	2.7	1.5
	7	10.6	5.8	1.8	4.0	2.3	1.7
	10	11.0	5.0	2.2	4.0	2.2	1.8
	12	11.4	4.9	2.3	4.0	2.0	2.0
	15	11.4	4.8	2.4	4.0	2.1	1.9
	20	11.5	4.7	2.4	4.1	2.1	1.9

t_{VL} = heating flow temperature (°C)
t_Q = source temperature (°C)
Q_h = heat output (kW), measured in accordance with standard EN 14511
P = power consumption, overall unit (kW)
COP = Coefficient of Performance for the overall unit in accordance with standard EN 14511

Observe daily power interruptions!
see “Engineering heat pumps general”

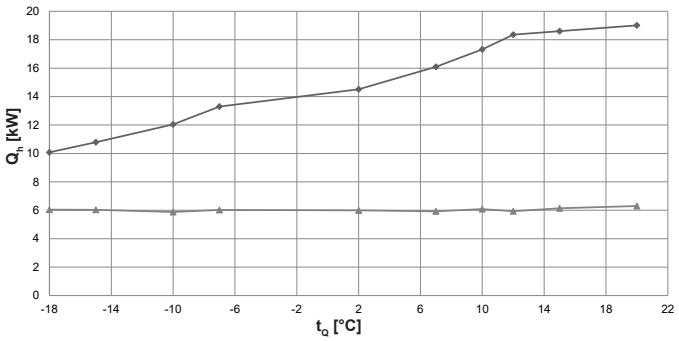
Performance data – heating

Maximum heat output allowing for defrosting losses

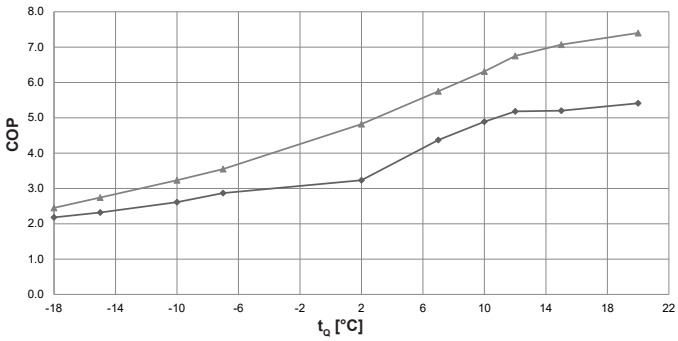
Belaria® pro comfort (15)

Data according to EN 14511

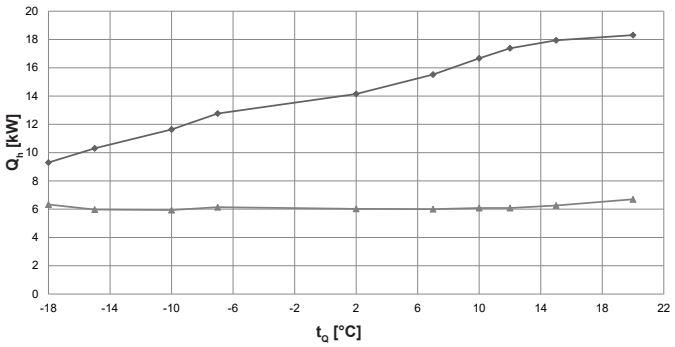
Heat output - t_{VL} 35 °C



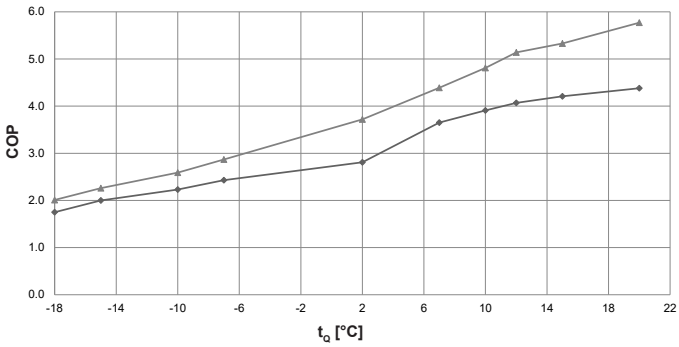
Coefficient of performance - t_{VL} 35 °C



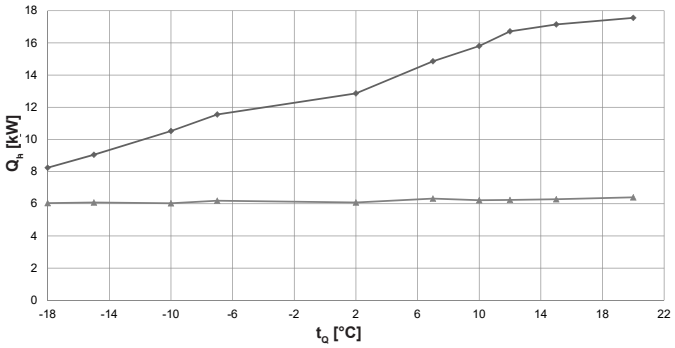
Heat output - t_{VL} 45 °C



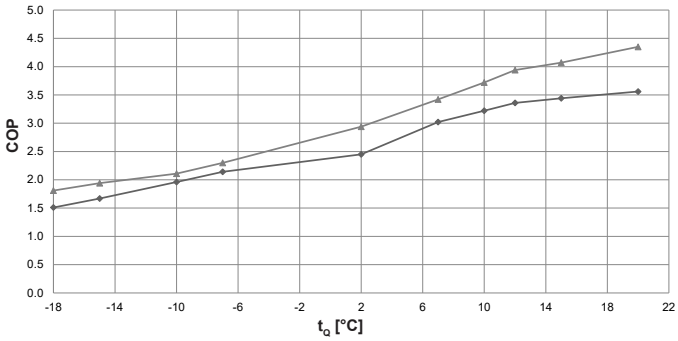
Coefficient of performance - t_{VL} 45 °C



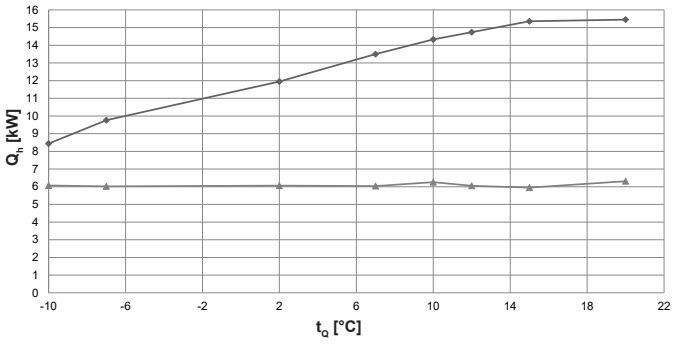
Heat output - t_{VL} 55 °C



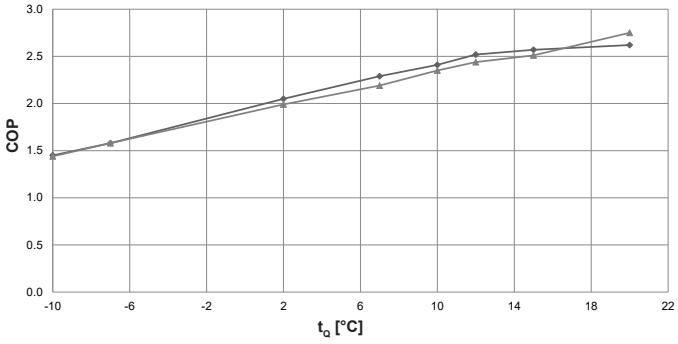
Coefficient of performance - t_{VL} 55 °C



Heat output - t_{VL} 70 °C



Coefficient of performance - t_{VL} 70 °C



t_{VL} = heating flow temperature (°C)
t_Q = source temperature (°C)
Q_h = heat output (kW), measured in accordance with standard EN 14511
COP = Coefficient of Performance for the overall unit in accordance with standard EN 14511

Maximum output
Minimum output

Performance data – heating

Belaria® pro comfort (15)

Data according to EN 14511

		Maximum output			Minimum output		
t_{VL} °C	t_Q °C	Q_h kW	P kW	COP	Q_h kW	P kW	COP
35	-18	10.1	4.6	2.2	6.0	2.5	2.5
	-15	10.8	4.7	2.3	6.0	2.2	2.7
	-10	12.0	4.6	2.6	5.9	1.8	3.2
	-7	13.3	4.6	2.9	6.0	1.7	3.6
	2	14.5	4.5	3.2	6.0	1.2	4.8
	7	16.1	3.7	4.4	5.9	1.0	5.8
	10	17.3	3.5	4.9	6.1	1.0	6.3
	12	18.4	3.5	5.2	5.9	0.9	6.8
	15	18.6	3.6	5.2	6.1	0.9	7.1
	20	19.0	3.5	5.4	6.3	0.9	7.4
45	-18	9.3	5.3	1.8	6.3	3.1	2.0
	-15	10.3	5.2	2.0	6.0	2.6	2.3
	-10	11.6	5.2	2.2	5.9	2.3	2.6
	-7	12.8	5.3	2.4	6.1	2.1	2.9
	2	14.2	5.0	2.8	6.0	1.6	3.7
	7	15.5	4.3	3.7	6.0	1.4	4.4
	10	16.7	4.3	3.9	6.1	1.3	4.8
	12	17.4	4.3	4.1	6.1	1.2	5.1
	15	17.9	4.3	4.2	6.3	1.2	5.3
	20	18.3	4.2	4.4	6.7	1.2	5.8
50	-18	8.8	5.4	1.6	6.2	3.2	1.9
	-15	9.9	5.4	1.8	6.0	2.9	2.1
	-10	11.1	5.3	2.1	6.0	2.5	2.4
	-7	12.3	5.5	2.2	6.2	2.4	2.6
	2	13.5	5.1	2.6	6.1	1.8	3.3
	7	15.2	4.7	3.3	6.2	1.6	3.9
	10	16.3	4.7	3.5	6.2	1.4	4.3
	12	17.1	4.7	3.7	6.2	1.4	4.5
	15	17.5	4.7	3.8	6.3	1.3	4.7
	20	17.9	4.5	4.0	6.6	1.3	5.1
55	-18	8.2	5.5	1.5	6.0	3.3	1.8
	-15	9.1	5.4	1.7	6.1	3.1	1.9
	-10	10.5	5.4	2.0	6.0	2.9	2.1
	-7	11.6	5.4	2.1	6.2	2.7	2.3
	2	12.9	5.2	2.5	6.1	2.1	2.9
	7	14.9	4.9	3.0	6.3	1.8	3.4
	10	15.8	4.9	3.2	6.2	1.7	3.7
	12	16.7	5.0	3.4	6.2	1.6	3.9
	15	17.2	5.0	3.4	6.3	1.5	4.1
	20	17.6	4.9	3.6	6.4	1.5	4.4
60	-18	8.6	5.2	1.4	6.0	4.0	1.5
	-15	9.1	5.6	1.5	6.0	3.6	1.7
	-10	10.1	5.6	1.7	6.0	3.2	1.9
	-7	10.8	5.4	2.0	6.2	3.1	2.0
	2	12.4	5.5	2.3	6.0	2.4	2.5
	7	14.5	5.4	2.7	6.0	2.1	2.8
	10	15.5	5.4	2.8	6.1	2.0	3.1
	12	16.1	5.4	3.0	6.0	1.9	3.2
	15	16.4	5.4	3.0	6.0	1.8	3.4
	20	16.7	5.1	3.3	6.1	1.7	3.7
70	-18	-	-	-	-	-	-
	-15	-	-	-	-	-	-
	-10	8.4	5.8	1.5	6.1	4.2	1.4
	-7	9.8	6.2	1.6	6.0	3.8	1.6
	2	12.0	5.8	2.1	6.1	3.0	2.0
	7	13.5	5.9	2.3	6.0	2.8	2.2
	10	14.3	5.9	2.4	6.3	2.7	2.4
	12	14.7	5.8	2.5	6.1	2.5	2.4
	15	15.4	6.0	2.6	6.0	2.4	2.5
	20	15.5	5.9	2.6	6.3	2.3	2.8

t_{VL} = heating flow temperature (°C)
t_Q = source temperature (°C)
Q_h = heat output (kW), measured in accordance with standard EN 14511
P = power consumption, overall unit (kW)
COP = Coefficient of Performance for the overall unit in accordance with standard EN 14511

Observe daily power interruptions!
see “Engineering heat pumps general”

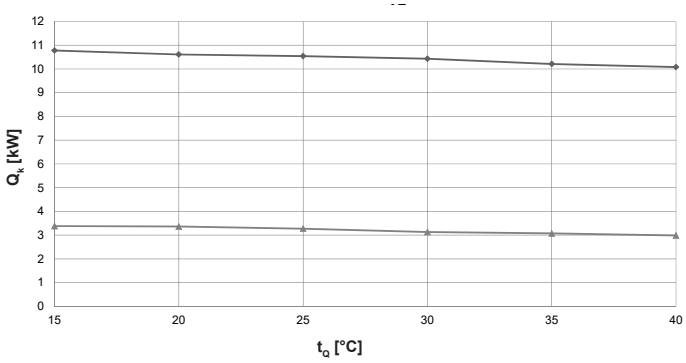
Performance data – cooling

Maximum cooling capacity

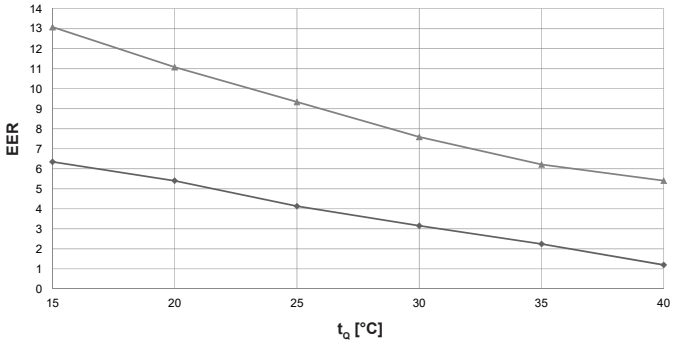
Belaria® pro comfort (8), compact (8/100/300)

Data according to EN 14511

Cooling capacity - t_{VL} 18 °C



Energy efficiency ratio - t_{VL} 18 °C



Maximum output
Minimum output

Belaria® pro comfort (8), compact (8/100/300)

Data according to EN 14511

		Maximum output			Minimum output		
t_{VL} °C	t_Q °C	Q_k kW	P kW	EER	Q_k kW	P kW	EER
7	15	10.7	2.0	5.4	3.0	0.4	8.5
	20	10.2	3.8	2.6	3.1	0.4	7.0
	25	9.6	4.5	2.1	3.1	0.6	5.6
	30	8.8	4.8	1.8	3.1	0.7	4.5
	35	7.9	5.8	1.3	3.1	0.8	3.7
	40	7.1	5.4	1.3	3.3	1.0	3.3
12	15	10.8	1.4	7.7	3.3	0.3	10.2
	20	10.6	3.0	3.5	3.1	0.4	8.7
	25	10.6	4.2	2.5	3.1	0.4	7.1
	30	10.0	4.7	2.1	3.1	0.5	6.1
	35	9.2	5.7	1.6	3.0	0.6	5.3
	40	8.6	5.4	1.6	2.9	0.6	4.6
18	15	10.8	1.0	6.3	3.4	0.3	13.1
	20	10.6	2.0	5.4	3.4	0.3	11.1
	25	10.5	2.6	4.1	3.3	0.4	9.3
	30	10.4	3.3	3.2	3.1	0.4	7.6
	35	10.2	4.6	2.2	3.1	0.5	6.2
	40	10.1	5.4	1.2	3.0	0.6	5.4

t_{VL} = cooling water flow temperature (°C)
t_Q = source temperature (°C)
Q_k = cooling capacity (kW), measured in accordance with standard EN 14511
P = power consumption, overall unit (kW)
EER = Energy Efficiency Ratio for the overall unit in accordance with standard EN 14511

Observe daily power interruptions!
see “Engineering heat pumps general”

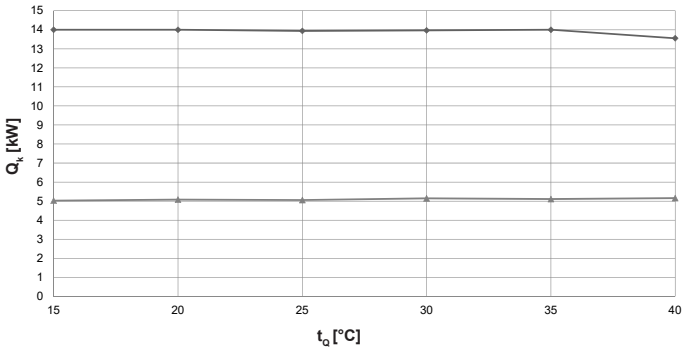
Performance data – cooling

Maximum cooling capacity

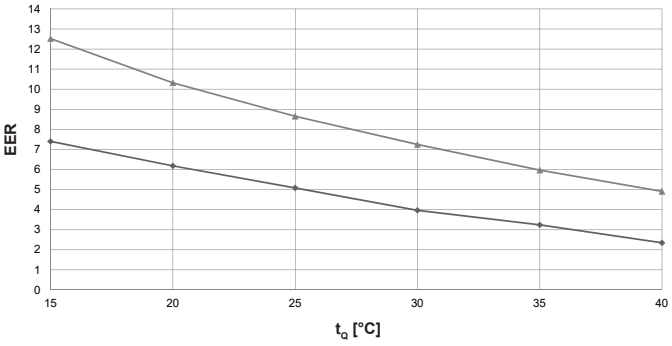
Belaria® pro comfort (13), compact (13/100/300)

Data according to EN 14511

Cooling capacity - t_{VL} 18 °C



Energy efficiency ratio - t_{VL} 18 °C



Maximum output
Minimum output

Belaria® pro comfort (13), compact (13/100/300)

Data according to EN 14511

		Maximum output			Minimum output		
t_{VL} °C	t_Q °C	Q_k kW	P kW	EER	Q_k kW	P kW	EER
7	15	14.0	3.9	3.6	5.0	0.6	8.1
	20	13.4	4.4	3.0	5.1	0.8	6.5
	25	12.7	4.8	2.6	5.1	1.0	5.3
	30	11.8	5.1	2.3	5.1	1.2	4.3
	35	10.8	5.5	2.0	5.1	1.4	3.5
	40	9.5	5.7	1.7	5.1	1.8	2.8
12	15	14.0	2.8	5.1	5.0	0.5	9.5
	20	14.0	3.5	4.0	5.1	0.6	7.9
	25	14.0	4.5	3.1	5.1	0.8	6.7
	30	13.4	4.9	2.7	5.1	0.9	5.7
	35	12.6	5.4	2.3	5.1	1.1	4.6
	40	11.5	5.8	2.0	5.1	1.3	3.9
18	15	14.0	1.9	7.4	5.0	0.4	12.5
	20	14.0	2.3	6.2	5.1	0.5	10.3
	25	13.9	2.7	5.1	5.1	0.6	8.7
	30	14.0	3.5	4.0	5.2	0.7	7.3
	35	14.0	4.3	3.2	5.1	0.9	6.0
	40	13.6	5.8	2.4	5.2	1.1	4.9

t_{VL} = cooling water flow temperature (°C)
t_Q = source temperature (°C)
Q_k = cooling capacity (kW), measured in accordance with standard EN 14511
P = power consumption, overall unit (kW)
EER = Energy Efficiency Ratio for the overall unit in accordance with standard EN 14511

Observe daily power interruptions!
see “Engineering heat pumps general”

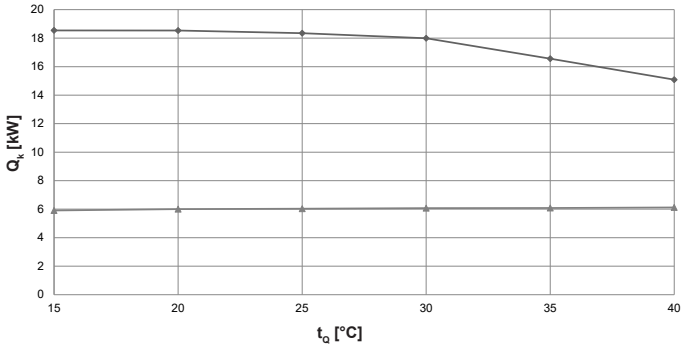
Performance data – cooling

Maximum cooling capacity

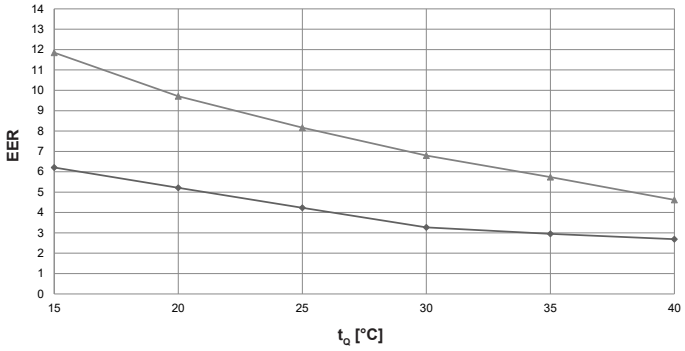
Belaria® pro comfort (15)

Data according to EN 14511

Cooling capacity - t_{VL} 18 °C



Energy efficiency ratio - t_{VL} 18 °C



Maximum output
Minimum output

Belaria® pro comfort (15)

Data according to EN 14511

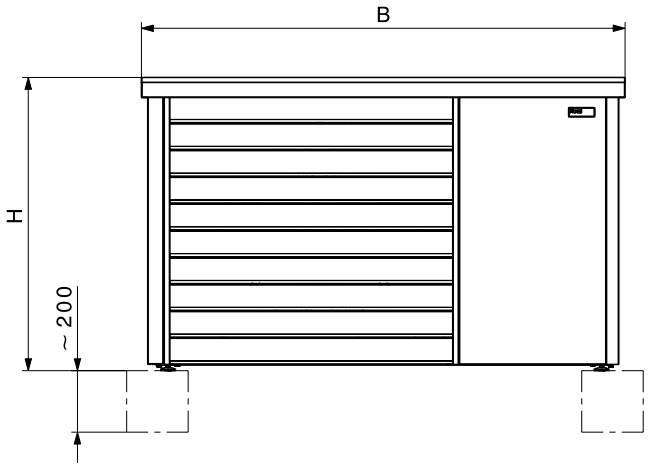
		Maximum output			Minimum output		
t_{VL} °C	t_Q °C	Q_k kW	P kW	EER	Q_k kW	P kW	EER
7	15	17.1	4.8	3.5	6.0	0.8	7.2
	20	15.9	5.3	3.0	6.1	1.0	6.2
	25	14.5	5.3	2.7	5.9	1.1	5.3
	30	13.0	5.5	2.4	5.9	1.4	4.3
	35	12.1	5.5	2.2	6.1	1.7	3.6
	40	10.9	5.6	2.0	6.0	2.2	2.8
12	15	18.4	4.3	4.3	6.0	0.7	9.0
	20	17.8	5.3	3.4	6.0	0.8	7.6
	25	16.9	5.3	3.2	6.1	0.9	6.7
	30	15.3	5.4	2.8	6.0	1.1	5.5
	35	14.2	5.4	2.6	5.9	1.3	4.5
	40	13.0	5.5	2.4	6.1	1.7	3.6
18	15	18.5	3.0	6.2	5.9	0.5	11.9
	20	18.5	3.6	5.2	6.0	0.6	9.7
	25	18.3	4.3	4.2	6.0	0.7	8.2
	30	18.0	5.5	3.3	6.1	0.9	6.8
	35	16.6	5.6	3.0	6.1	1.1	5.7
	40	15.1	5.6	2.7	6.1	1.3	4.6

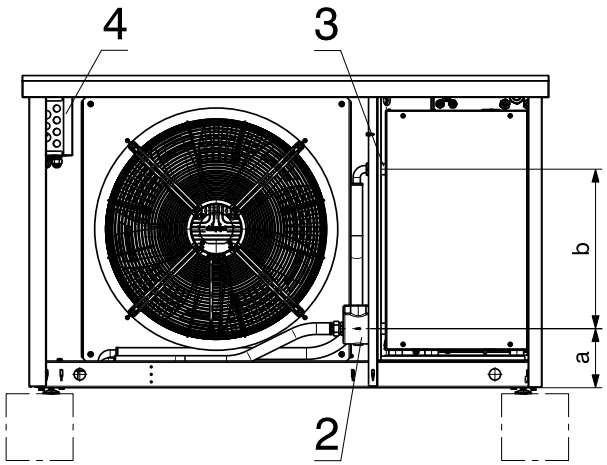
t_{VL} = cooling water flow temperature (°C)
t_Q = source temperature (°C)
Q_k = cooling capacity (kW), measured in accordance with standard EN 14511
P = power consumption, overall unit (kW)
EER = Energy Efficiency Ratio for the overall unit in accordance with standard EN 14511

Observe daily power interruptions!
see “Engineering heat pumps general”

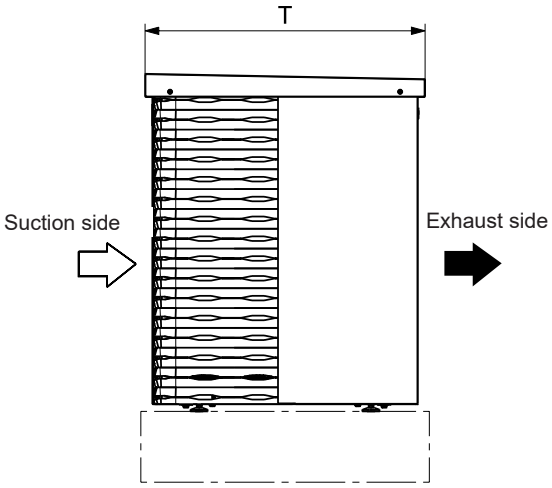
Belaria® pro
Outdoor unit
(Dimensions in mm)

Front view

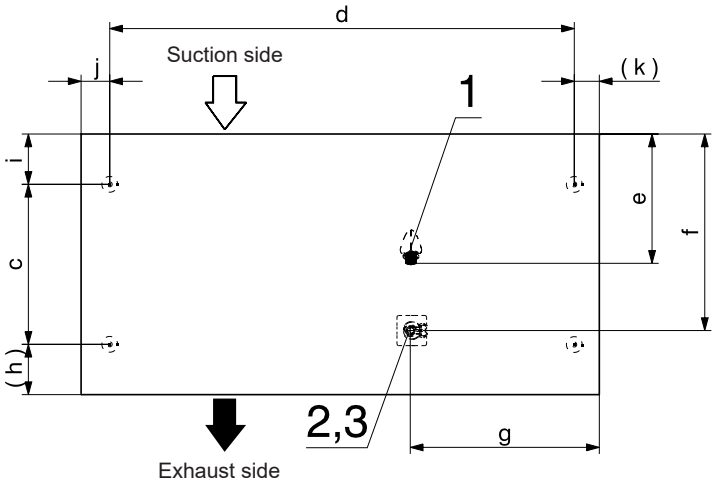




View from the left



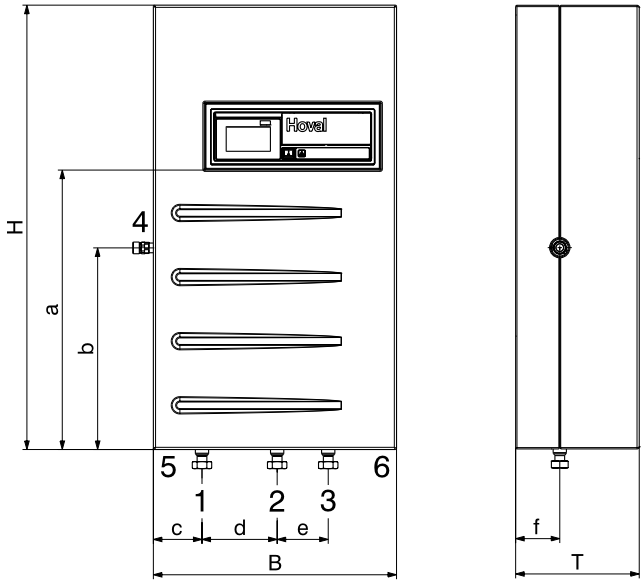
View from top



1 Condensate drain 1″
2 Connection hydraulic connection line return (8,13): 1″ ext. thread/(15): 1¼″ ext. thread
3 Connection hydraulic connection line flow (8,13): 1″ ext. thread/(15): 1¼″ ext. thread
4 Electrical connection

Type	H	B	T	a	b	c	d	e	f	g	h	i	j	k
Belaria® pro (8)	954	1575	791	175	480	485	1410	400	600	640	150	155	90	75
Belaria® pro (13)	954	1575	791	175	480	485	1410	400	600	640	150	155	90	75
Belaria® pro (15)	1432	1575	791	175	480	485	1410	400	600	640	150	155	90	75

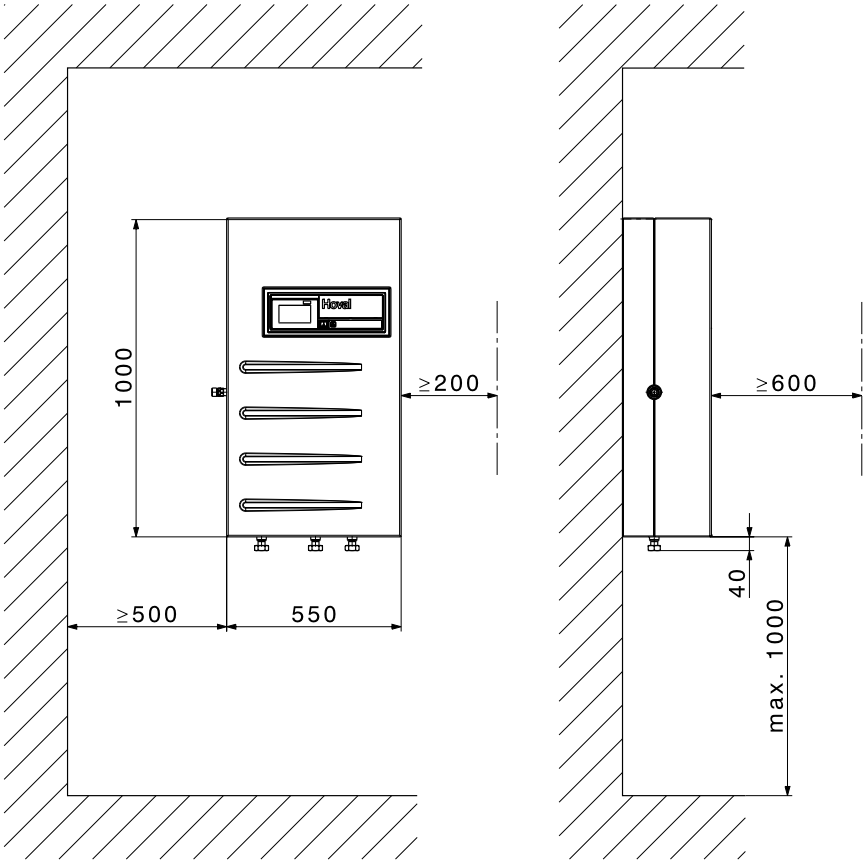
Belaria® pro comfort (8-15)
Indoor unit
(Dimensions in mm)



1	Flow outdoor unit (return not guided through indoor unit)	1″ ext. th. 1¼″ ext. th.	Belaria® pro (8,13) Belaria® pro (15)
2	Flow heating	1″ ext. th. 1¼″ ext. th.	Belaria® pro (8,13) Belaria® pro (15)
3	Flow hot water charging	1″ ext. th. 1¼″ ext. th.	Belaria® pro (8,13) Belaria® pro (15)
4	Connection for diaphragm pressure expansion tank/pressure gauge	¾″ ext. th.	
4	Safety assembly (accessories)		
5	Cable feed-in sensors, RS485		
6	Cable feed-in main current, control current		

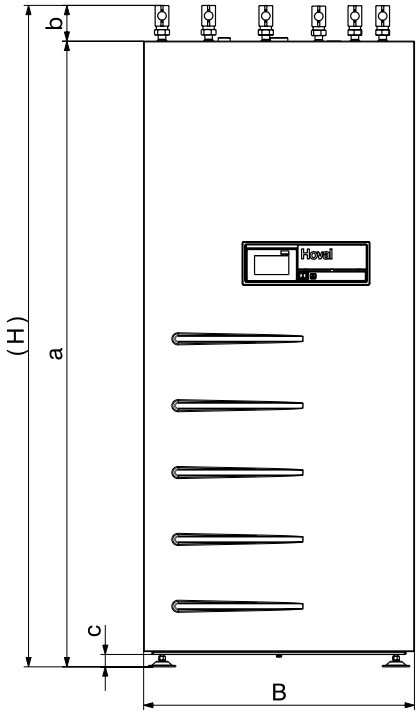
Type	H	B	T	a	b	c	d	e	f
Belaria® pro comfort (8)	1005	550	280	630	455	110	170	115	100
Belaria® pro comfort (13)	1005	550	280	630	455	110	170	115	100
Belaria® pro comfort (15)	1005	550	280	630	455	110	170	115	100

Belaria® pro comfort (8-15)
Indoor unit wall-mounted

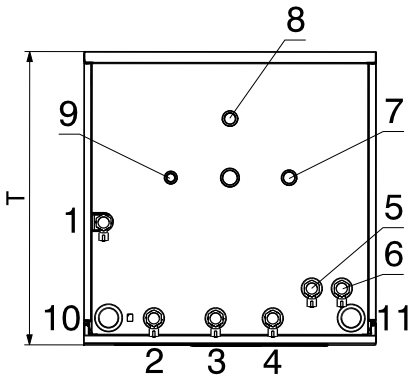


To ensure good operability and accessibility to the electrical/hydraulic connections, a clearance of max. 1000 mm must be provided from the ground to the lower edge of the indoor unit.

Belaria® pro compact (8/100/300), (13/100/300)
Indoor unit with buffer storage tank and calorifier
(Dimensions in mm)



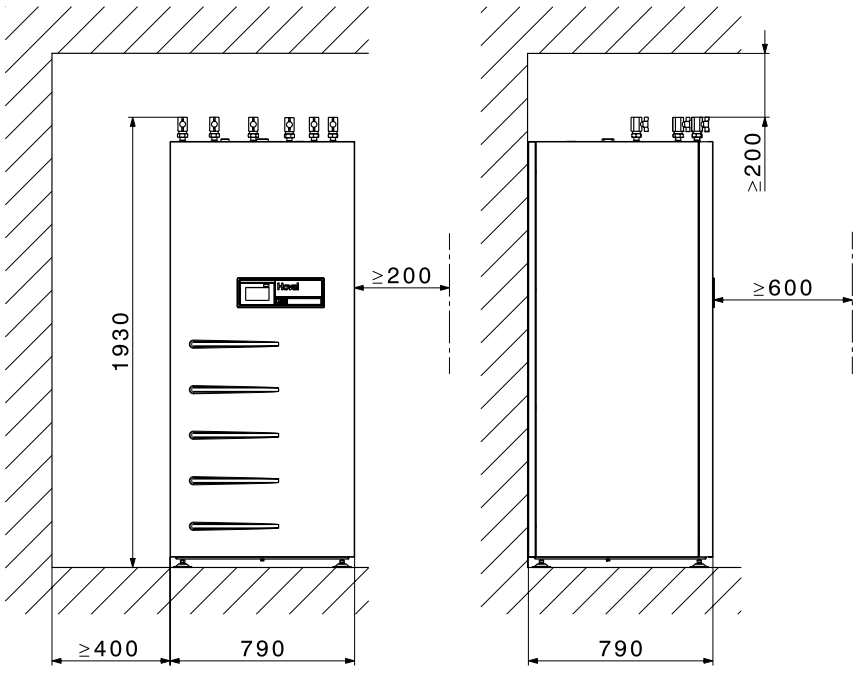
View from above



1 Outdoor unit flow 1″ int. thread
2 Outdoor unit return 1″ int. thread
3 Flow second heating circuit 1″ int. thread (optional)
4 Return second heating circuit 1″ int. thread (optional)
5 Flow heating circuit 1″ int. thread
6 Return heating circuit 1″ int. thread
7 Hot water connection 1″ int. thread
8 Cold water connection 1″ int. thread
9 Circulation connection ¾″ ext. thread
10 Cable feed-in sensors, RS485
11 Cable feed-in main current, control current

Type	H	B	T	a	b	c
Belaria® pro compact (8/100/300)	1930	790	790	1825	105	38
Belaria® pro compact (13/100/300)	1930	790	790	1825	105	38

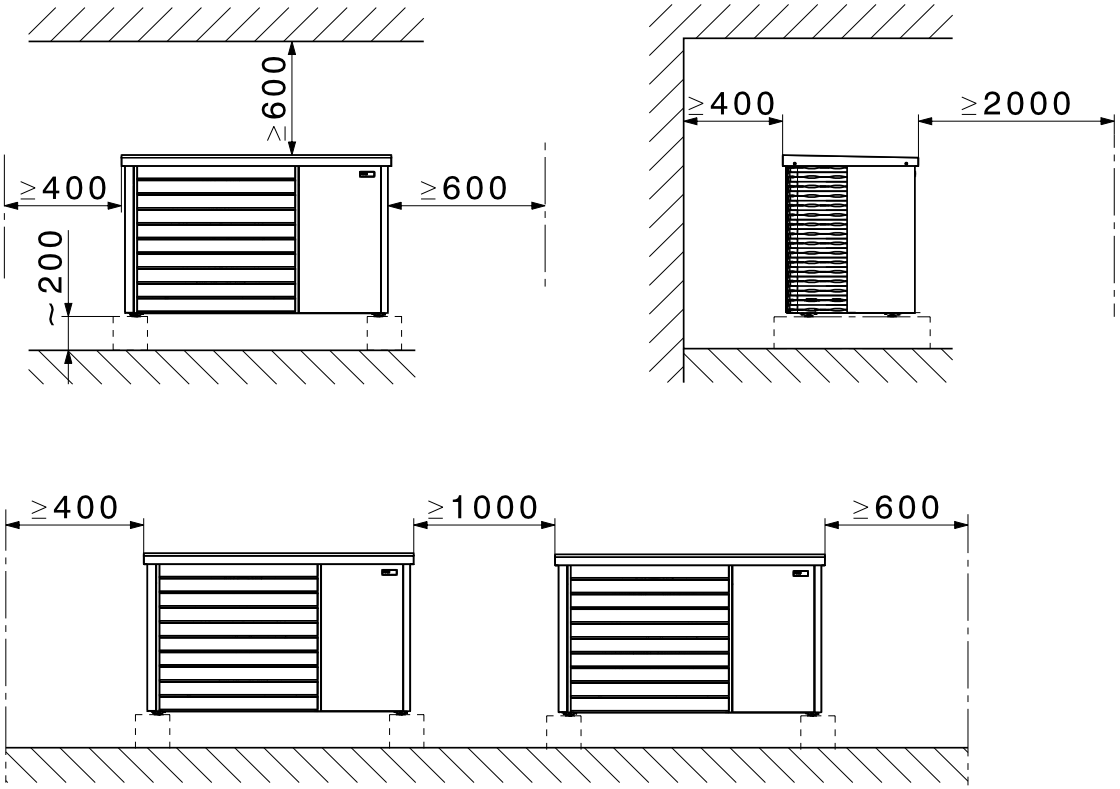
Belaria® pro compact (8,13/100/300)
Indoor unit floor-mounted



To ensure accessibility to the electrical/hydraulic connections, a clearance of at least 200 mm must be provided above the indoor unit. In addition, the side clearances must be observed.

Space requirement
(Dimensions in mm)

Belaria® pro
Outdoor unit

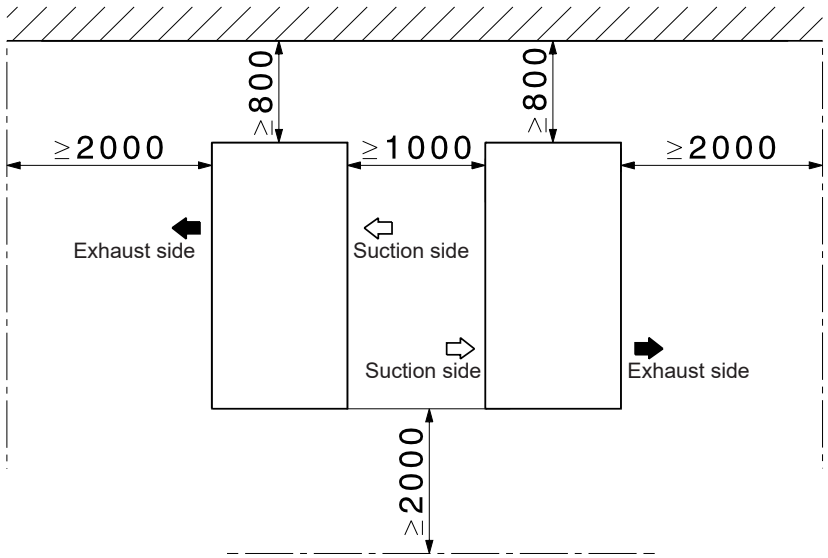


Any possible openings/recesses and ignition sources must be avoided within a radius of one meter around the outdoor unit.

In order to ensure accessibility during maintenance, a clearance of at least 600 mm upwards must be maintained.
For any service work, the minimum clearances at the rear and sides of the heat pump must be observed.

Belaria® pro
Outdoor unit

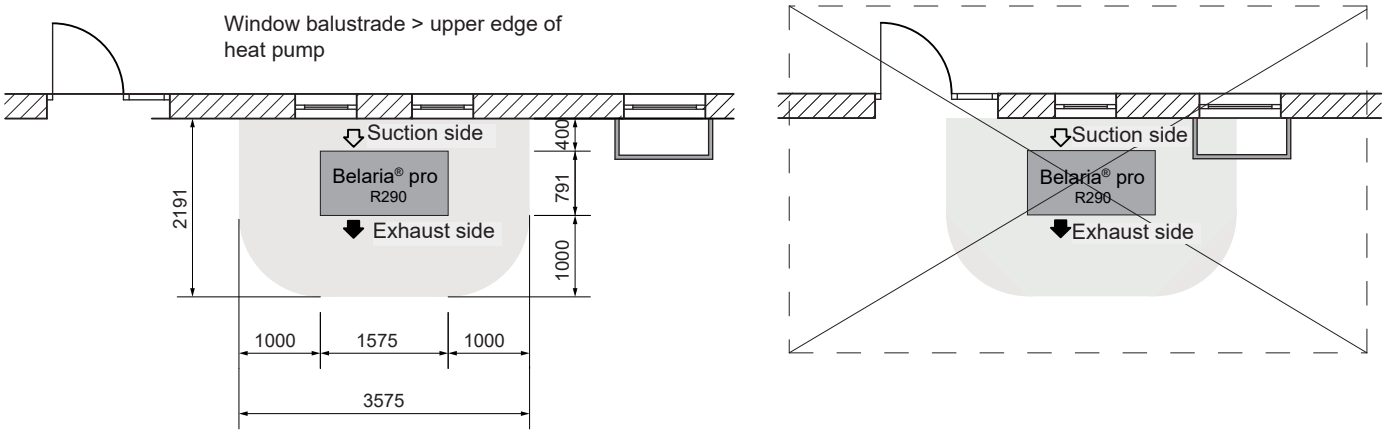
View from above



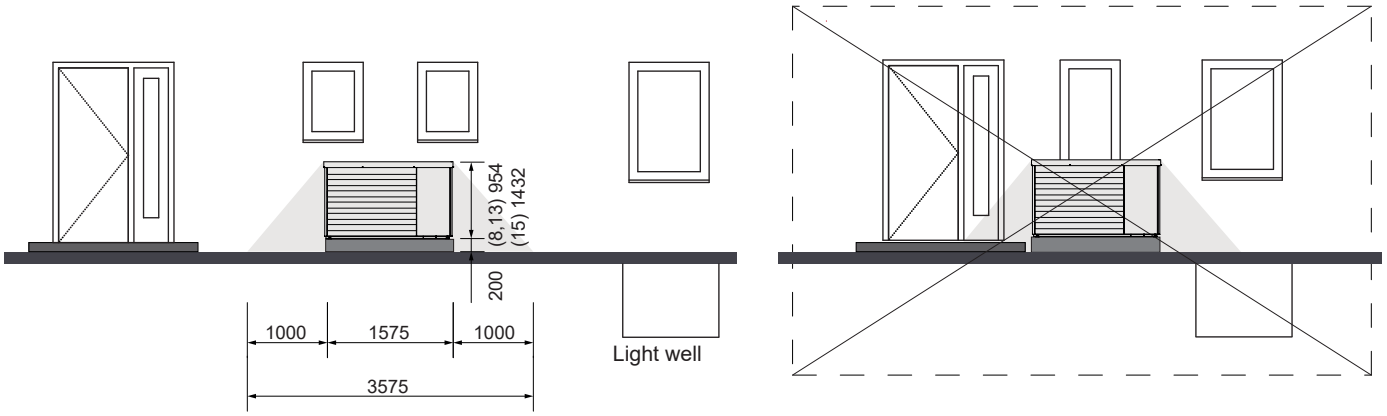
Presentation of protection zones

Belaria® pro with refrigerant R290
(Dimensions in mm)

Floor plan - protection zone when installed in front of a wall

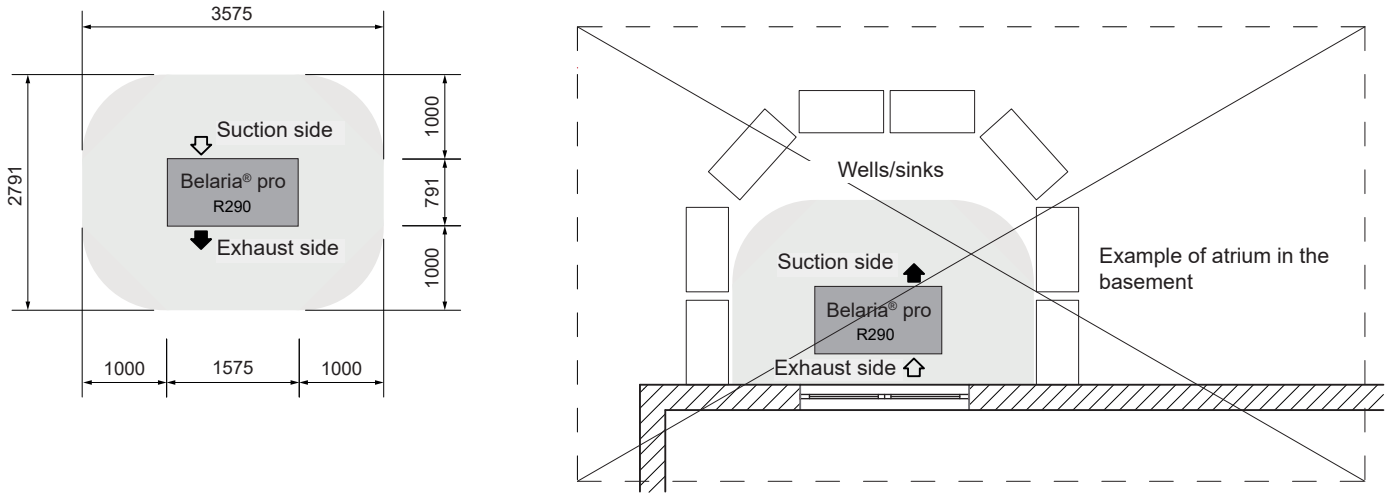


View - protection zone when installed in front of a wall

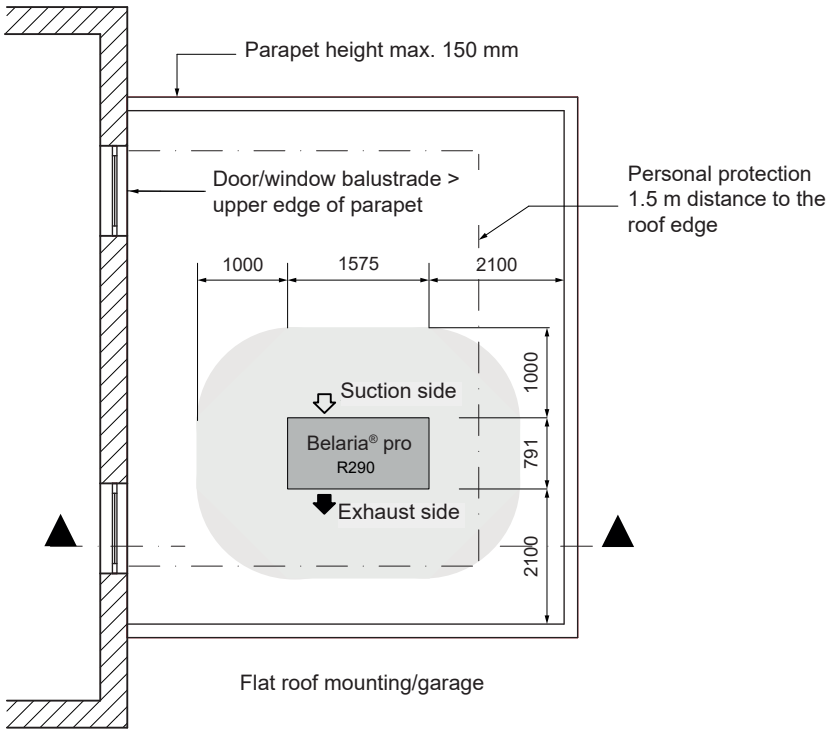


- There must be no building openings (windows, doors, shafts, ventilation openings, floor drains or the like) within a radius of 1 m from the outdoor unit and no potential ignition sources must be present.
- Window balustrades must be higher than the upper edge of the outdoor unit in the protection zone!
- The heat pump must be at least 1 m from the property boundary; observe building regulations!
- At the entrances to properties, it must be ensured that no vehicle can enter the protection zone.

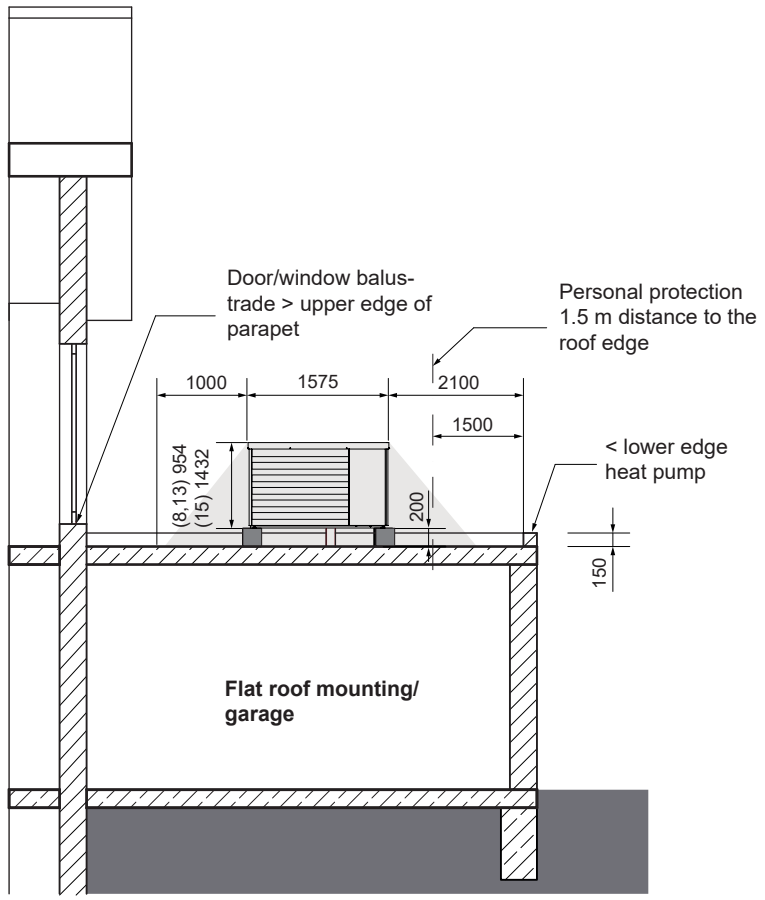
Floor plan - protection zone when installed outdoors



Floor plan flat roof - protection zone



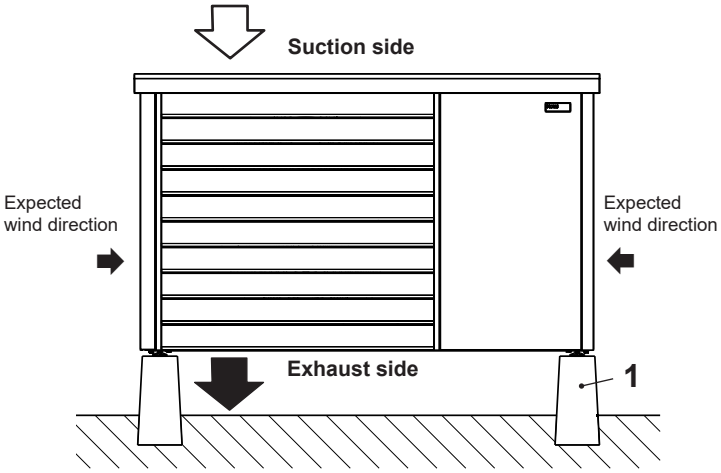
Section flat roof - protection zone



- Strict compliance with safety measures regarding combustible refrigerants.
- All standards concerning statics, wind load and access to roofs must be complied with. The outdoor unit must be firmly bolted onto the substructure (e.g. concrete base). The heat pump must be prevented from tilting.
- Minimum distance of the heat pump to the roof edge: 1.5 m (personal protection) + 0.6 m (working area refrigeration circuit).
- Accessibility for maintenance and repair work must be ensured. For work on the heat pump, a measuring case and test equipment, refrigerant bottle, etc. must be transported to the site, amongst other things. In addition to the safety equipment (fall protection devices, anchoring devices, etc.), this must also be taken into account for skylights, stairs, railings, etc.
- There must be no floor-to-ceiling doors/ windows to the flat roof, or balustrade must be higher than the parapet.
- Protection zones around windows must be complied with.
- There must not be any pipe vents, skylights or the like on the flat roof within a radius of 1 m from the heat pump.
- If there is a risk of frost, a siphon must be installed in the shaft immediately before the condensate drain is introduced into the downpipe.

Installation variants for Belaria® pro outdoor unit
(Dimensions in mm)

Firm base on site with strip foundation

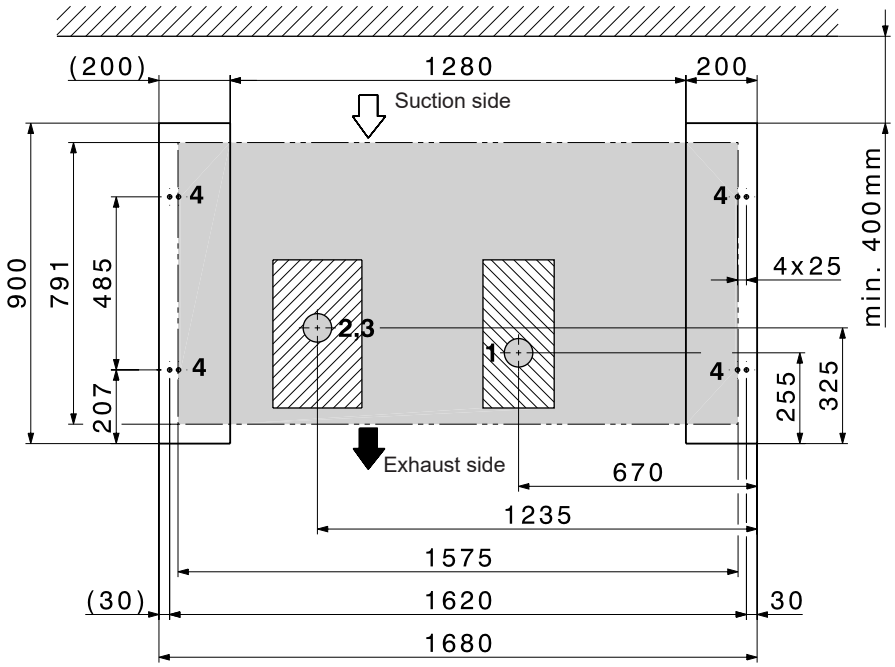


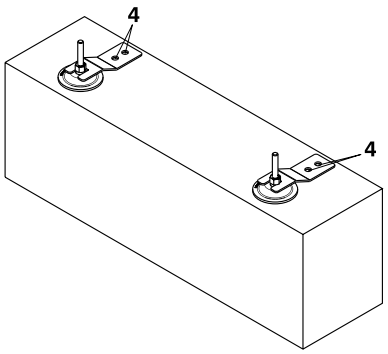
1 Concrete base on site

The base must not form a sink. A circumferential base is therefore not permitted.

Installation variants for Belaria® pro outdoor unit
(Dimensions in mm)

Strip foundation
Plan concrete base set
(view from above)





Attachment of the outdoor unit from the outside (laterally) using the supplied clamps.
The clamps are visible.
It is not necessary to remove the cladding sections.

Possible area for empty tubes in the concrete base

Possible area for condensate drain in the concrete base

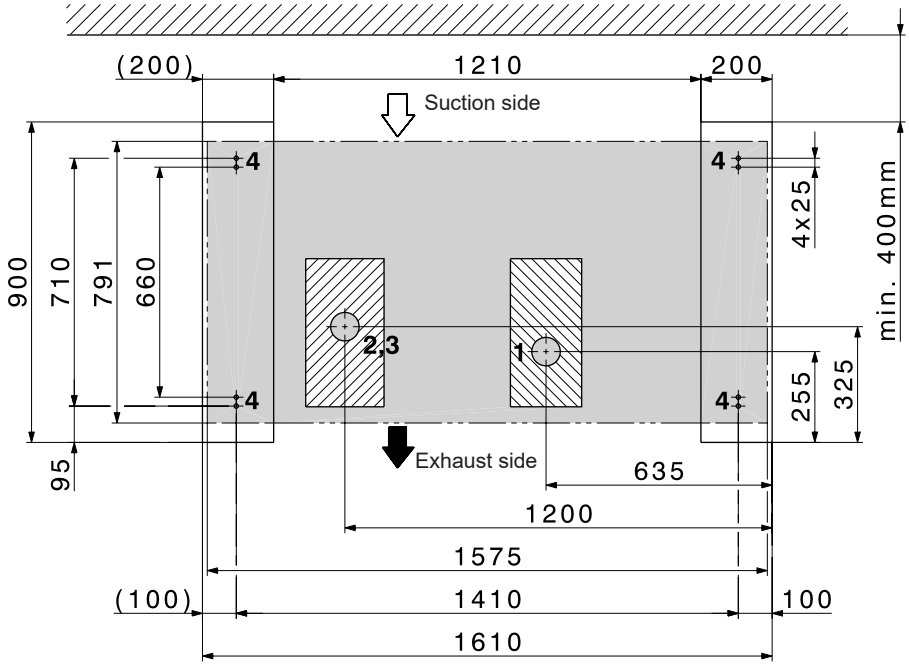
1 Condensate drain area
2 Area FL hydraulics
RT hydraulics
3 Electrics area
4 Attachment points M8 Belaria® pro (dowels in scope of delivery)

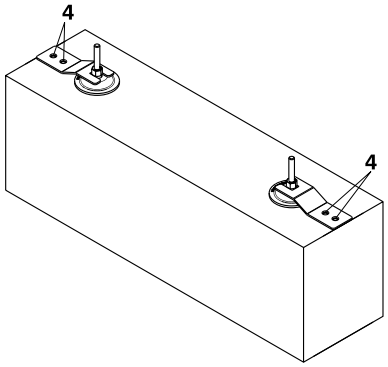
Installation variants for Belaria® pro outdoor unit

(Dimensions in mm)

Strip foundation

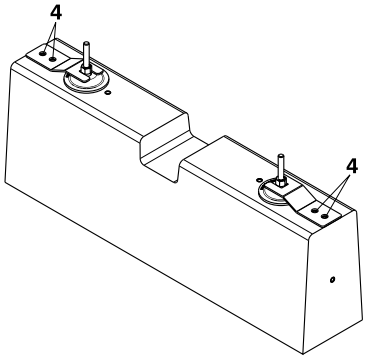
Plan concrete base set
(view from above)





Attachment of the outdoor unit from the “inside/bottom” (grey area) of the heat pump using the supplied clamps.
The clamps are not visible.
It is necessary to remove the cladding sections.

Installation on concrete base set BSW02
Attention: dimensions (H x W x D) concrete base set BSW02 250 x 150 x 750 mm



Possible area for empty tubes in the concrete base

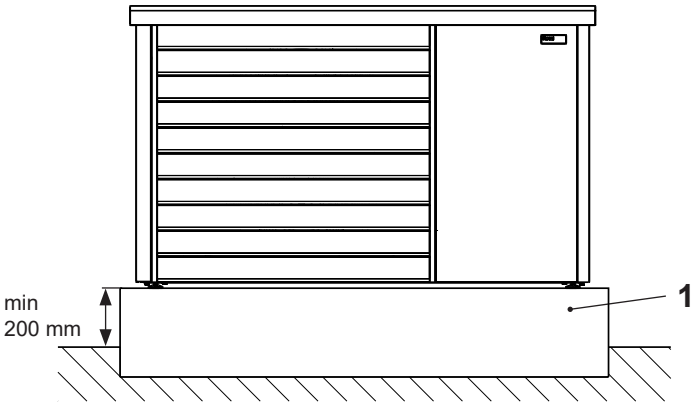
Possible area for condensate drain in the concrete base

1 Condensate drain area
2 Area FL hydraulics
RT hydraulics
3 Electrics area
4 Attachment points M8 Belaria® pro (dowels in scope of delivery)

Installation variants for Belaria® pro outdoor unit

(Dimensions in mm)

Firm base on site with floor plate

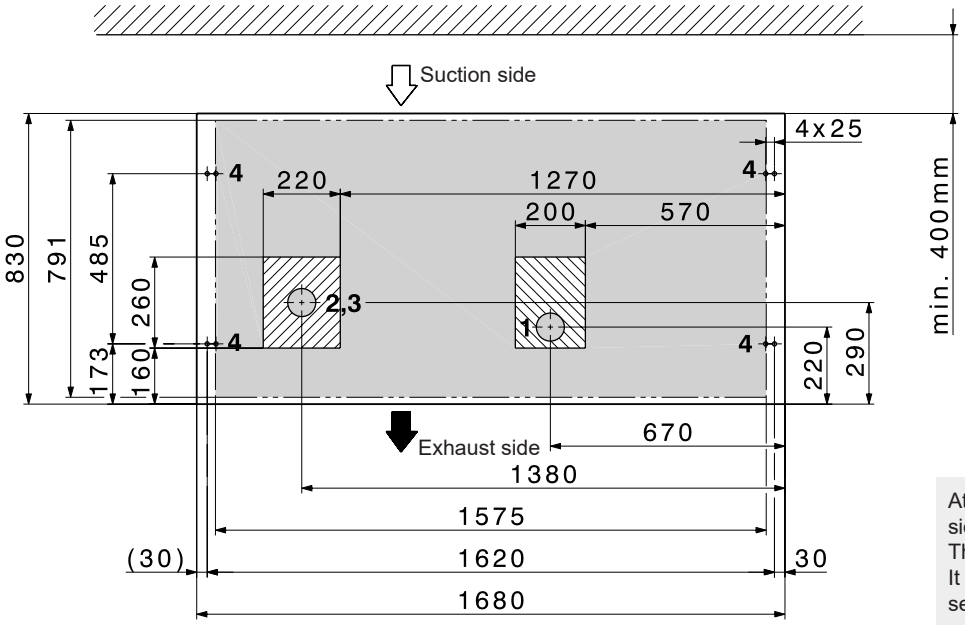


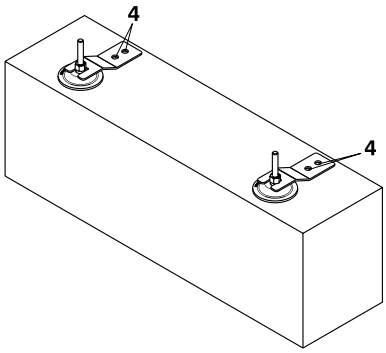
1 Floor plate on site

The base must not form a sink. A circumferential base is therefore not permitted.

Floor plate

Plan
(view from above)





Attachment of the outdoor unit from the outside (laterally) using the supplied clamps.
The clamps are visible.
It is not necessary to remove the cladding sections.

Possible area for empty tubes in the concrete base

Possible area for condensate drain in the concrete base

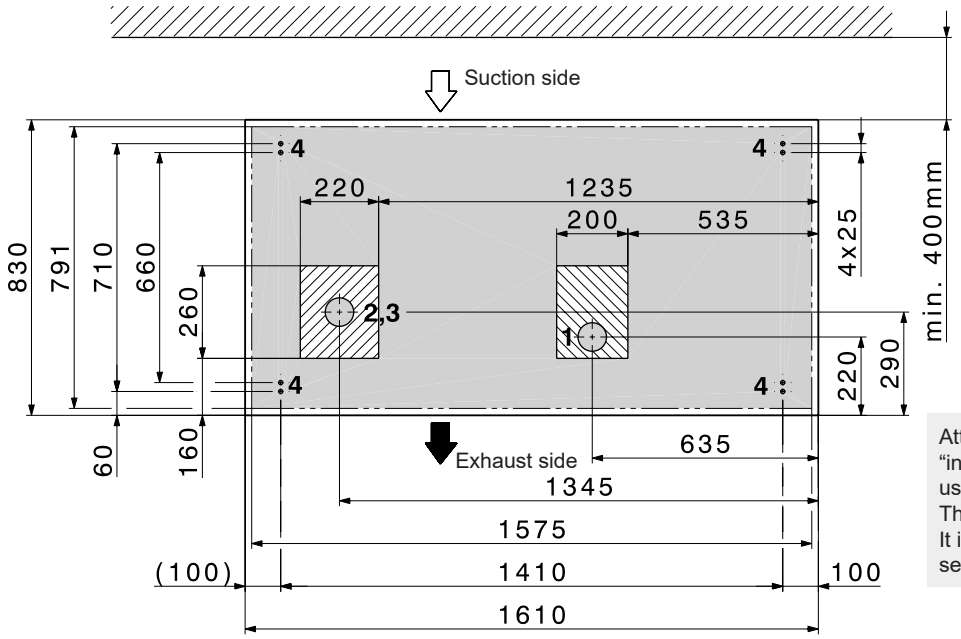
1 Condensate drain area
2 Area FL hydraulics
RT hydraulics
3 Electrics area
4 Attachment points M8 Belaria® pro (dowels in scope of delivery)

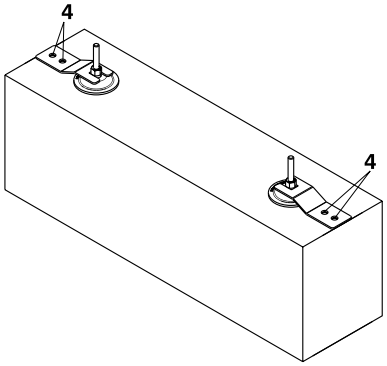
Installation variants for Belaria® pro outdoor unit

(Dimensions in mm)

Floor plate

Plan
(view from above)





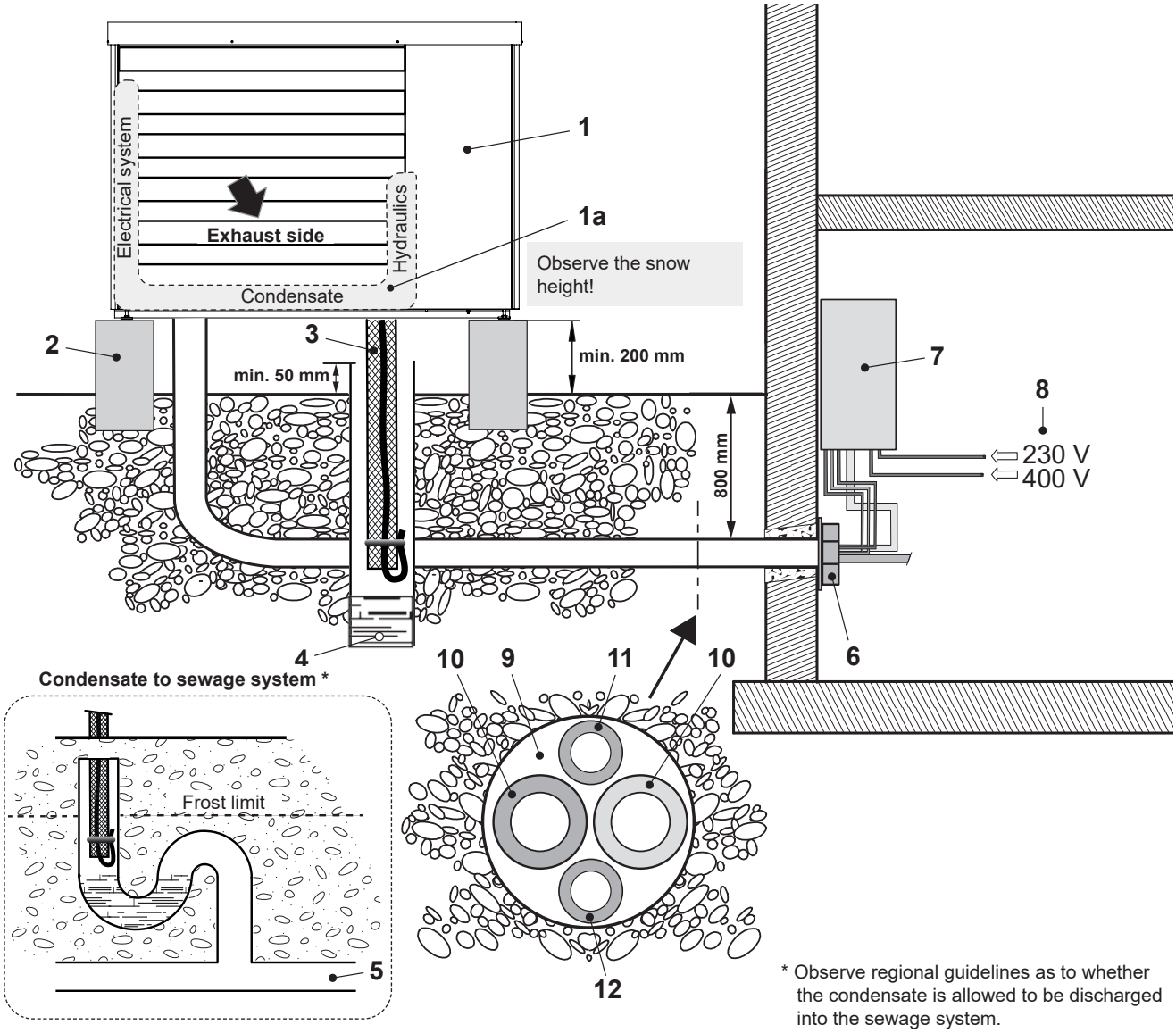
Attachment of the outdoor unit from the “inside/bottom” (grey area) of the heat pump using the supplied clamps.
The clamps are not visible.
It is necessary to remove the cladding sections.

Possible area for empty tubes in the concrete base

Possible area for condensate drain in the concrete base

1 Condensate drain area
2 Area FL hydraulics
RT hydraulics
3 Electrics area
4 Attachment points M8 Belaria® pro (dowels in scope of delivery)

Configuration and connection diagram Belaria® pro



* Observe regional guidelines as to whether the condensate is allowed to be discharged into the sewage system.

1 Outdoor unit
1a Space for connection of hydraulics (FL + RT), condensate drain and electrics.
2 Concrete base
3 Condensate drain heat pump Ø 28 mm, drain pipe DN 100
4 Variant 1: Seepage (duct/gravel layer)
5 Variant 2: Discharging into the sewage system (penetration into the soil must be made leak-tight)
6 Wall bushing
(hydraulic and electrical connections)
7 Belaria® pro comfort indoor unit (8-15)
On the Belaria® pro compact (8,13/100/300), the hydraulic and electrical connections are located on the top of the unit!
8 Main current:
3 x 400 V/50 Hz
Control current:
1 x 230 V/50 Hz
Electric heating element main current:
3 x 400 V/50 Hz
Network cables (optional)
9 Empty tube for hydraulics and electrics
10 Connection line flow + return
11 Empty tube for electrical connections for outdoor unit
Main current outdoor unit: 3 x 400 V/50 Hz
Outdoor unit control current: 1 x 230 V/50 Hz
12 Empty tube for data bus RS485

Requirements and directives
The general requirements and directives listed in the chapter Engineering apply.

Set-up
- The distance between the indoor and outdoor unit must be as short as possible. Only short and simple routing of lines guarantees cost effectiveness and low heat losses.
- The maximum permitted single cable length is 30 m between the outdoor unit, via the indoor unit and the heating storage tank. This must not be exceeded.
  If the Belaria® pro is operated without a buffer storage tank connected in parallel, the customer must assess whether the next larger pipe dimension is more suitable due to the pressure drop.
- There must be no building openings (windows, doors, shafts, ventilation openings, etc.) within a radius of 1 m from the outdoor unit and no potential ignition sources must be present.
- Wall ducts into the building must be airtight.
- The outdoor unit must not be placed in or near floor recesses.
- The outdoor unit must not be placed closer than 1 m to the boundary of the property. Country-specific regulations must be observed.
- The air intake and air outlet sides must not be narrowed or blocked. The air outlet side must be the side facing away from the building and unobstructed (> 2 m).
- For efficiency reasons, the line length with the Belaria® pro comfort between the calorifier and the indoor unit is not allowed to be more than 10 m.

Outdoor unit
The outdoor unit is installed outdoors. The installation location must be selected carefully. It is essential that the following ancillary conditions are met:
- The maximum line length according to the installation must not be exceeded.
- The connection lines must be laid insulated and frost-proof.
- The installation location must be chosen in such a way that no noise pollution can occur (do not install near bedrooms, keep a distance from neighbours), hedges and bushes can have a sound-absorbing effect.
- Unobstructed air inflow and outflow must be possible.
- It is imperative that the minimum distances are observed (see Dimensions/Space requirement)
- The intake air must be free of impurities such as sand and aggressive substances such as ammonia, sulphur, chlorine etc.
- The outdoor unit must be installed on a load-bearing fixed structure.
- If the unit is installed at wind-prone locations, the alignment of the heat pump must be selected in such a way that the expected wind direction is crossways to the suction direction of the outdoor unit.
- If an alternative installation in areas subject to strong winds cannot be avoided, an additional wind shield in the form of a hedge, for example, should be installed, or additional fastening should be provided for the outdoor unit.
- If the installation location is not protected against snowfall, it must be chosen in such a way that the evaporator remains free of snow.
- The outdoor unit must always be installed on a solid surface in a horizontal position. This can be achieved by means of concrete bases or a floor plate.
- The load-bearing capability must be adequate. The unit must be fixed with 4 M8 screws.
- Air heat pumps generate condensate during operation. This can amount to 8 litres per defrost cycle within 2 minutes for the outdoor unit of the Belaria® pro.
- The condensate drain must be frost-proof so that the condensate can flow away without problems even at outdoor temperatures below 0 °C.
- If the discharge is into the sewage system, a siphon must be provided and the duct lead-through into the ground must be sealed so that no refrigerant can enter the sewage system uncontrolled.
- If there is a risk of frost, a siphon must be installed in the shaft immediately before the condensate drain is introduced into the downpipe.
- The condensate trough included in the outdoor unit is already equipped with a tank heater at the factory and thus prevents freezing.
- The condensate drain line is also secured with the preassembled heating tape.
- The air outlet has increased susceptibility to frost. Gutters, water pipes and water containers must not be situated right next to the outlet.
- If installed near the coast, the location must be at least 5 km from the coastline. If this safe distance is not complied with, increased corrosion can be expected. These cases are excluded from the warranty.
- To prevent damage caused by animals such as rodents or insects, all cable ducts must be properly sealed.
- The hydraulic lines from the heat pump can transmit structure-borne noise. Therefore, structure-borne noise decoupling should be provided, e.g. with sound-insulating hoses.

Flat roof installation
Flat roof installation of the Belaria® pro is possible under the following conditions:
- Strict compliance with safety measures regarding flammable refrigerants (see below).
- All standards concerning statics, wind load and access to roofs must be complied with. The outdoor unit must be firmly bolted onto the substructure (e.g. concrete base). The heat pump must be prevented from tilting.
- Minimum distance of the heat pump to the roof edge: 1.5 m (personal protection) + 0.6 m (working area refrigeration circuit).
- Accessibility for maintenance and repair work must be ensured. For work on the heat pump, a measuring case and test equipment, refrigerant bottle, etc. must be transported to the site, amongst other things. In addition to the safety equipment (fall protection devices, anchoring devices, etc.), this must also be taken into account for skylights, stairs, railings, etc.

Safety measures to be complied with
- There must be no building openings (windows, doors, shafts, ventilation openings, floor drains, etc.) within a radius of 1 m from the outdoor unit and no potential ignition sources must be present.
- Wall or ceiling ducts into the building must be airtight.
- The outdoor unit must not be placed in or near floor recesses.
- The outdoor unit must not be placed closer than 1 m to the boundary of the property. Country-specific regulations must be observed.
- The air intake and air outlet sides must not be narrowed or blocked. The air outlet side must be the side facing away from the building and unobstructed (> 2 m).
- The condensate is allowed to be directed into a shaft. A siphon must be installed upstream of the connection to the downpipe. The siphon must be located inside the building.

Indoor unit
- The installation location must be selected in accordance with the valid requirements and directives.
- The indoor unit must be installed in a room protected against frost, by an approved specialist company. Room temperature must be between 5 °C and 25 °C.
- Installation in wet rooms, dusty rooms or rooms with a potentially explosive atmosphere is not permitted.
- To minimise vibration and noise inside the building, the inside of the heat pump should be isolated as well as possible from the building structure. The screed must be recessed around the indoor unit. For example, indoor units should never be installed on lightweight ceilings/floors.
- The connections for the heat pump or heating flow are located at the bottom of the Belaria® pro comfort indoor unit and at the top of the Belaria® pro compact.
- The connections for hot and cold water as well as for the hot water circulation are also located on top in the Belaria® pro compact.
- Due to the accessibility to the hydraulic system, the distances must be maintained on all sides (see Dimensions/Space requirements).
- False flow rates as a result of incorrect dimensions of the pipework, incorrect fittings or improper pump operation can cause damage to the heat pump.

The installation of a system water protection filter in the return of the outdoor unit is mandatory.

Electrical connections
- The electrical connection must be carried out by a qualified technician and registered with the responsible energy supply company. The relevant electrical installation company is responsible for ensuring that electrical connection is carried out in accordance with standards and that safeguard measures are put in place.
- The mains voltage at the connection terminals of the heat pump must be 400 V or 230 V ± 10 %. The conductor cross-sections of the connection line must be checked by the electrical company carrying out the work.
- A fault-current circuit breaker is recommended. Country-specific requirements must be complied with. If the “fault-current circuit breaker” safeguard measure is implemented by the electrical company, a separate fault-current circuit breaker is recommended for the heat pump.
- This fault-current circuit breaker must be of the all-current-sensitive type B (IΔN ≥ 300 mA). The specified RCCB types apply to the heat pump regardless of externally connected components (refer to assembly instructions, data sheets).
- Owing to the starting currents that occur, circuit breakers with a type “C” or “K” tripping characteristic are to be used for the main circuit.
- For the control circuit and additional electric heating (if present), circuit breakers with a type “B” or “Z” tripping characteristic are sufficient.
- The electrical connection and feeder lines must be copper cables.
- Please refer to the wiring diagram for electrical details.
- The wall feedthrough should slope down from the inside to the outside.
- To avoid damage, the opening should be padded on the inside or, for example, lined with a PVC pipe.
- After installation, the wall opening must be sealed with a suitable sealing compound on site, observing the fire protection regulations.

Routing of the hydraulic connection lines
- If the hydraulic connection lines are laid in the ground, this must be done in a protective tube. For example, this can be a PVC pipe with a diameter of 150 mm.
- Wall ducts must be sealed to the outside on site.
- After the hydraulic connection lines have been laid, they must be checked for damage and reinsulated. In case of cooling, condensate can form on the pipes.
- The hydraulic connection lines must be laid decoupled from the building and must never be laid flush-mounted.
- Care must be taken to ensure that water pipes do not pass through the sleeping or living areas.
- Shut-off valves must be installed on site in accordance with the corresponding hydraulic diagram. The shut-off valves are not allowed to be opened until immediately before commissioning.
- The danger of frost damage must be taken into account if there are prolonged power outages.

Room cooling
- Room cooling can be provided by fan convectors and is recommended. The connection lines for the fan convectors must have condensation-proof insulation. In addition, the condensate from the fan convectors must be drained off.
- If panel heating is used for room cooling, various criteria such as temperatures below the dewpoint or the temperature profiles must be allowed for, and can lead to costly consequential damage in the case of inadequate planning or incorrect use.
  We recommend that you consult Hoval.

Further guidelines
see “Engineering”

Connection on drinking water side
- The hydraulic connection is made according to the information in the corresponding diagrams from Hoval.
- According to the Drinking Water Regulation and DIN 50930-6, the domestic hot water storage tank is suitable for normal drinking water (pH value > 7.3).
- The connection piping can be made using galvanised pipes, stainless steel pipes, copper pipes or plastic pipes.
- The connections must be made pressure-tight.
- The safety devices tested for the components in accordance with DIN 1988 and DIN 4753 must be installed in the cold water pipe.
- The 10 bar operating pressure stated on the data plate is not allowed to be exceeded. Install a pressure reducing valve if necessary.
- A suitable water filter must be installed in the cold water pipe.
- A water softener must be installed if the water is hard.

Installation on heating side
- All pertinent laws, regulations and standards for heating house pipework and for heat pump systems must be complied with.
- It is imperative that a sludge separator is installed in the heating return upstream from the heat pump.
- The safety and expansion devices for closed heating systems must be provided in accordance with EN 12828.
- Dimensioning of the pipework must be done according to the required flow rates and given pressure drops.
- Ventilation possibilities must be provided at the highest points and drainage possibilities at the lowest points of the connection lines.
- To prevent energy losses, the connection lines must be insulated with suitable material.

Transport and storage
- When removing the packaging, check the outdoor unit for damage. If the outdoor unit was damaged during transport or storage, contact Hoval customer service, a service partner or a licensed specialist immediately. They must carry out a leak test with a suitable leak detector. In the event of a leak, the outdoor unit must be repaired.
- Store the outdoor unit in a cool place without fire hazard and without direct exposure to heat sources. The ambient temperature must not exceed 43 °C.
- The same regulations apply for storage as for installation (no recesses, ventilation pipes, ignition sources in the storage area).
- The outdoor unit must not be stored in closed rooms, cellars or garages.
- The outdoor unit is only allowed to be stored outdoors.
- During transport, ensure sufficient ventilation in the closed vehicle, also when parking and stopping.
- Storage in passageways, escape routes or in front of entrances or exits is not permitted.
- Ignition sources such as naked flames, switched-on gas appliances, electric heaters, etc. must be kept away from the unit.
- Transport and storage only in upright position. Protect from mechanical damage and from falling over or falling down (make sure the load is secure).

**Looking for the appropriate hydraulic schematic?
Please contact your local Hoval partner.**

Hoval Belaria® pro

Modulating monoblock heat pump for heating and cooling in the living area.

Monoblock heat pump set up outdoors consisting of outdoor unit and indoor unit.

Belaria® pro outdoor unit

- Compact floor-mounted air/water heat pump
- Elegant and extremely quiet outdoor unit
- Housing with sheet metal enclosure, powder-coated, anthracite colour (DB703)
- Belaria® pro with modulating scroll compressor
- Refrigerant R290
- Straight louvre-type evaporator
- Speed-controlled axial fan with FlowGrid (inlet grille)
- Condensate drip tray incl. tray heating and condensate trace heater for channelling all the condensate in the outdoor unit, fixed installation, 1″ connection
- Plate-type condenser made of stainless steel/copper
- With cooling function with corresponding hydraulics
- Hydraulic connections behind louvre grille
  - heating connections 1½″
  - Filter ball valve in heat pump return
- Electrical connections behind louvre grille
  - 230 V control current, supplied from the indoor unit
  - 400 V main power supply
  - Data cable - bus connection to the indoor unit
- With fitting accessories for fixing the outdoor unit on the ground

Belaria® pro indoor unit

- Compact wall-mounted indoor unit
- Casing made of structured EPP, colour black
- TopTronic® E controller installed
- With WFA-200S automatic heat pump device
- Integrated components:
  - Speed-regulated high-efficiency pump
  - Flow sensor/heat meter
- Sensor set consisting of outdoor sensor, flow sensor and domestic hot water sensor included in the scope of delivery
- Diaphragm pressure expansion tanks see “Various system components”
- Hydraulic connections at bottom
  - heating connections 1¼″ - reductions 1½″-1¼″ supplied
- Electrical connections introduced from bottom
- With fitting accessories for fixing the indoor unit to the wall
- Shut-off ball valves are included in the scope of delivery

TopTronic® E controller

Control panel

- 4.3-inch colour touchscreen
- Heat generator blocking switch for interrupting operation
- Fault signalling lamp
- Mains isolator

Model range

Belaria® pro type			Heat output [1]		Cooling capacity [1]
			A-7W35	A2W35	A35W18
	35 °C	55 °C	kW	kW	kW
(24)	A+++	A+++	10.5-22.1	10.1-24.0	10.2-24.4

Energy efficiency class of the compound system with control.
[1] Modulation range

TopTronic® E control module

- Simple, intuitive operating concept
- Display of the most important operating states
- Configurable start screen
- Operating mode selection
- Configurable day and week programmes
- Operation of all connected Hoval CAN bus modules
- Commissioning wizard
- Service and maintenance function
- Fault message management
- Analysis function
- Weather display (with HovalConnect option)
- Adaptation of the heating strategy based on the weather forecast (with HovalConnect option)

TopTronic® E basic module heat generator TTE-WEZ

- Integrated control functions for
  - 1 heating/cooling circuit with mixer
  - 1 heating/cooling circuit without mixer
  - 1 hot water charging circuit
  - Bivalent and cascade management
- Outdoor sensor
- Immersion sensor (calorifier sensor)
- Contact sensor (flow temperature sensor)
- RAST 5 basic plug set

Options for TopTronic® E controller

- Can be expanded by max. 1 module expansion:
  - Module expansion heating circuit or
  - Module expansion Universal or
  - Module expansion heat balancing
- Can be networked with up to 16 controller modules in total:
  - Heating circuit/DHW module
  - Solar module
  - Buffer module
  - Measuring module

Number of additional modules that can be installed in the heat generator:

- 1 module expansion and 1 controller module **or**
- 2 controller modules

The supplementary plug set must be ordered in order to use expanded controller functions.

For further information about the TopTronic® E, see “Controls”

EnergyManager PV smart
Feature to increase self-generated power consumption in use with HovalConnect.

If a HovalConnect gateway is used together with the heat pump, the EnergyManager PV smart feature is available. This allows the heat pump to be operated preferentially at times of higher solar radiation. The feature uses online weather data on the current solar radiation for this purpose and can be adjusted by means of an associated threshold value. The self-consumption of electricity from an existing photovoltaic plant is thus increased and the purchase of grid electricity is reduced. This results in a lasting and significant cost-saving potential without further investment costs for the customer.

Delivery
- Indoor and outdoor unit delivered packaged separately
- Sensor set Belaria® pro:
  Outdoor, flow and calorifier sensor included separately in the electrical box

On site
- Wall ducts for hydraulic connection lines
- Hydraulic connection lines outdoor/indoor unit
- Electrical connection line outdoor/indoor unit

Air/water heat pump

Hoval Belaria® pro (24)

Belaria® pro Type	Heat output [1] A-7W35 kW	A2W35 kW	Cooling capacity [1] A35W18 kW	Part No.
(24)	10.5-22.1	10.1-24.0	10.2-24.4	7018 674

[1] Modulation range

EnergyManager PV smart
Free feature to increase self-generated power consumption in use with HovalConnect.

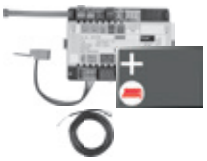
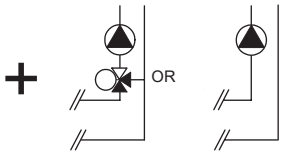
Further information
see “Description”

Electric heating elements
see “Calorifiers” - chapter “Electric heating elements”

Energy efficiency class
see “Description”

TopTronic® E module expansions

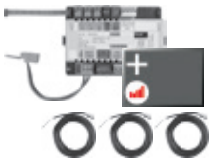
for TopTronic® E basic module heat generator

	Part No.
 	6034 576

TopTronic® E module expansion heating circuit TTE-FE HK
Expansion to the inputs and outputs of the basic module heat generator or the heating circuit/domestic hot water module for implementing the following functions:
- 1 heating/cooling circuit w/o mixer or
- 1 heating/cooling circuit with mixer

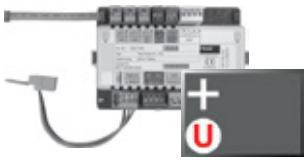
Consisting of:
- Fitting accessories
- 1 contact sensor
ALF/2P/4/T, L = 4.0 m
- Basic plug set FE module

Notice
The supplementary plug set may have to be ordered to implement functions differing from the standard!

	6037 062

TopTronic® E module expansion heating circuit incl. energy balancing
TTE-FE HK-EBZ
Expansion to the inputs and outputs of the basic module heat generator or the heating circuit/domestic hot water module for implementing the following functions:
- 1 heating/cooling circuit w/o mixer or
- 1 heating/cooling circuit with mixer

incl. energy balancing in each case
Consisting of:
- Fitting accessories
- 3 contact sensors
ALF/2P/4/T, L = 4.0 m
- Plug set FE module

	6034 575

TopTronic® E module expansion Universal TTE-FE UNI
Expansion to the inputs and outputs of a controller module (basic module heat generator, heating circuit/domestic hot water module, solar module, buffer module) for implementing various functions
Consisting of:
- Fitting accessories
- Plug set FE module

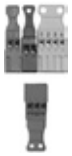
Further information
see “Controls” section - “Hoval TopTronic® E module expansions” chapter

Notice
Refer to the Hoval System Technology to find which functions and hydraulic arrangements can be implemented.

Accessories for TopTronic® E

TopTronic® E controller modules

		Part No.
TTE-HK/WW	TopTronic® E heating circuit/ hot water module	6034 571
TTE-SOL	TopTronic® E solar module	6037 058
TTE-PS	TopTronic® E buffer module	6037 057
TTE-MWA	TopTronic® E measuring module	6034 574



Supplementary plug set

for basic module heat generator TTE-WEZ	6034 499
for controller modules and module expansion TTE-FE HK	6034 503

TopTronic® E room control modules

TTE-RBM	TopTronic® E room control modules	
	easy white	6037 071
	comfort white	6037 069
	comfort black	6037 070

Enhanced language package TopTronic® E 6039 253

one SD card required per control module
Consisting of the following languages:
HU, CS, SL, RO, PL, TR, ES, HR,
SR, JA, DA

HovalConnect

HovalConnect LAN	6049 496
HovalConnect WLAN	6049 498
HovalConnect Modbus	6049 501
HovalConnect KNX	6049 593

TopTronic® E interface modules

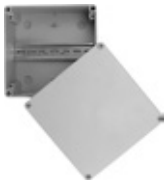
GLT module 0-10 V	6034 578

TopTronic® E sensors

AF/2P/K	Outdoor sensor H x W x D = 80 x 50 x 28 mm	2055 889
TF/2P/5/6T	Immersion sensor, L = 5.0 m	2055 888
ALF/2P/4/T	Contact sensor, L = 4.0 m	2056 775
TF/1.1P/2.5S/6T	Collector sensor, L = 2.5 m	2056 776

Bivalent switch

for various release or switching functions	
Bivalent switch 1-piece	2056 858
Bivalent switch 2-piece	2061 826



System housing

System housing 182 mm	6038 551
System housing 254 mm	6038 552

TopTronic® E wall casing

WG-190	Wall casing small	6052 983
WG-360	Wall casing medium	6052 984
WG-360 BM	Wall casing medium with control module cut-out	6052 985
WG-510	Wall casing large	6052 986
WG-510 BM	Wall casing large with control module cut-out	6052 987

Further information
see “Controls”

Accessories

HP line insul. AF-WPP 160-50
for Belaria® pro (24)
Flexible, pre-insulated and self-compensating line with two heating pipes and two empty pipes
Outside diameter: 160 mm
Fluid pipes: 2 x 50 mm/4.6 mm
Empty pipe 1: 32 mm
Empty pipe 2: 25 mm
Bending radius: 0.5 m
Operating temperature: -40 °C to +90 °C
Maximum temperature: +95 °C

Dimension inside/outside	Line length m	Part No.
DN 40/50	10	2080 580
DN 40/50	15	2080 581
DN 40/50	20	2080 582
DN 40/50	25	2080 583

Connector set HP line VS 50-WPP — 6058 641
For HP line insulated AF-WPP 160-50
Consisting of:
- 2 shrink-fit end caps
- 4 clamping adapters 1½″ external thread, PN 6
- 1 building feed-in pressing water Core hole diameter: 198-202 mm
- 1 fixed point clamp

Lining pipe DN 200 D210/200 x 400 — 2080 584
For HP line insulated AF-WPP
Lining pipe for feeding the HP lines through ceilings, walls and floors.
Suitable for walling in and cementing in.
Lining pipe material: PVC
Formwork cover material: PE
Outer Ø: 210 mm
Internal Ø: 200 mm
Length: 400 mm

Connection set AS40-BPA — 6058 642
For Belaria® pro (24)
Flexible connection line that can be shortened for connecting flow and return within the heat pump
Consisting of:
- 1 3.0 m corrugated pipe DN 32 insulated
Insulation 19/42 with PE protective foil
- 2 angle screw connections IT/ET 1½″
- 4 union nuts 1½″
- 3 support rings 1½″
1 extra support ring for compression
- 6 flat seals NBR

Notice
In cooling applications, the piping and fittings must be insulated accordingly.

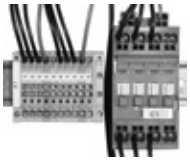
Adhesive tape IKB — 2023 563
for thermal insulation made of EPDM
Thickness: 3 mm
Width: 50 mm
Roll: 15 m

Vibration decoupler
for reducing structure-borne noise
from heat pumps indoors,
cannot be shortened
Consisting of:
- 1 vibration decoupler
insulated for heating side
flat-sealing with union nut
- 2 flat seals
Nominal pressure: PN 10

Dimension	Connection inches	Nominal length mm	Part No.
DN 25	1″	300	2082 222
DN 25	1″	500	2082 223
DN 25	1″	1000	2080 794
DN 32	1¼″	300	2082 224
DN 32	1¼″	500	2082 225
DN 32	1¼″	1000	2080 796
DN 40	1½″	500	2082 226
DN 40	1½″	1000	2080 798
DN 50	2″	500	2082 227
DN 50	2″	1000	2080 800

Separation system TS40-36-WP-SG 6058 808
for Belaria® pro (24)
for separation of heating circuit and
primary heating circuit.
Consisting of:
- Plate heat exchanger with 36 plates
(soldered)
- Wall installation connection bracket
- Filling/flushing unit
- Connection screw fittings
- Safety group DN 15-1″ insulated

System water protection filter 6058 256
FGM025-200
For horizontal installation in return
For filtration of heating and cooling water
Consisting of:
- Filter head and bowl in brass
- Magnetic insert (nickel-neodymium)
- 2 pressure gauges
- filter surface in stainless steel
- Filter fineness 200 µm
- With drain valve
- Connections Rp 1″ internal thread
with integrated shut-off valves and
union connection (outlet)
Max. flow rate (Δp < 0.1 bar): 5.5 m³/h
Weight: 6.8 kg
Water temperature: max. 90 °C
- incl. steam diffusion-tight insulating shells

		Part No.
	**Differential pressure relief valve DN 32** for installation in a HA group DN 32 both ends 1¼″ external thread Self-sealing with O-ring and screw connections Operating pressure: max. 10 bar Operating temperature: max. 110 °C Setting range: 0.1-0.6 bar Connections: 1¼″ internal thread/ 1¼″ external thread Centre distance: 125 mm Casing and spring hood made of brass Spring made of stainless steel Seals made of EPDM Setting handle made of plastic with hexagon socket fastening screw	6014 849
	**Safety set SG15-1″** Suitable up to max. 50 kW complete with safety valve (3 bar) Pressure gauge and autom. aspirator with shut-off valve. Connection: DN 15, 1″ internal thread	641 184
	**Switching ball valve VBI60...L** **DN 25-50, PN 16, 120 °C** • Three-way ball valve made of brass with threaded connection • Leakage rate: 0 ... 0.0001 % of kvs value • Permitted media: cold water, cooling water, DHW, hot water, water with frost protection • Recommendation: water treatment according to VDI 2035 • Media temperature: -10 ... 120 °C	
	DN 25 — Connection Rp 1″ — kvs 9 m³/h	6052 444
	DN 32 — Connection Rp 1¼″ — kvs 13 m³/h	6052 445
	DN 40 — Connection Rp 1½″ — kvs 25 m³/h	6052 446
	DN 50 — Connection Rp 2″ — kvs 37 m³/h	6052 447
	**Motor drive GLB341.9E** For straight-way ball valves VAG60.. and switching ball valves VBI60.. DN 15-50 Operating voltage: 230 V, 50/60 Hz Control signal 2-point/3-point Single-wire/2 wire control Operating time: 150 s Nominal torque: 10 Nm Permitted ambient temperature: -32 °C to +55 °C	2070 331
	**Control set (switching contactor)** For Belaria® pro (24) Necessary for activating an external electric heating element. Control kit for installation in the wall-mounted indoor unit.	6058 668
	**Dew point switch FAS** mechanical dew point switch for monitoring the formation of condensate using adjustable switching value	2070 911

Part No.

Services

Commissioning
Commissioning by works service or Hoval trained authorised serviceman/company is condition for warranty.

For commissioning and other services please contact your Hoval sales office.

Belaria® pro (24)

Type		pro (24)
• Energy efficiency class of the compound system with control [1]	35 °C/55 °C	A+++/A+++
• Room heating energy efficiency “moderate climate” 35 °C ηS	%	225
• Room heating energy efficiency “moderate climate” 55 °C ηS	%	165
• Seasonal coefficient of performance moderate climate 35 °C/55 °C	SCOP	5.7/4.2
• Seasonal coefficient of performance heating A35W18 [2]	SEER	5.6
• Seasonal coefficient of performance heating A35W7 [2]	SEER	3.2
Max./min. performance data heating and cooling in acc. with EN 14511		
• Max. heat output A2W35	kW	24.0
• Max. heat output A-7W35	kW	22.1
• Min. heat output A15W35	kW	10.0
• Max. cooling capacity A35W18	kW	22.2
• Max. cooling capacity A35W7	kW	10.2
• Min. cooling capacity A35W18	kW	0.0
Nominal output data heating in acc. with EN 14511		
• Nominal heat output A2W35	kW	14.5
• Coefficient of performance A2W35	COP	4.9
• Nominal heat output A7W35	kW	16.7
• Coefficient of performance A7W35	COP	5.7
• Nominal heat output A-7W35	kW	14.8
• Coefficient of performance A-7W35	COP	3.6
Nominal output data cooling in acc. with EN 14511		
• Nominal cooling capacity A35W18	kW	18.6
• Energy efficiency ratio A35W18	EER	4.5
• Nominal cooling capacity A35W7	kW	13.8
• Energy efficiency ratio A35W7	EER	3.4
Sound data		
• Max. sound power level outdoor unit, night operation	dB(A)	52
• Sound power level EN 12102 outdoor unit [3), 4)]	dB(A)	58
• Max. sound power level outdoor unit	dB(A)	62
• Sound pressure level 5 m [3), 5)]	dB(A)	39
• Sound pressure level 10 m [3), 5)]	dB(A)	33
Hydraulic data		
• Max. flow temperature	°C	70
• Max. flow rate heating side with A7W35, ΔT 6 K	m^3/h	3.9
• Nominal flow rate heating side with A7W35, ΔT 5 K	m^3/h	2.9
• Pressure drop heating side at nominal flow	kPa	10
• Residual overpressure of heating pump at max. pump speed and nominal flow	kPa	60
• Residual overpressure of heating pump at max. flow rate	kPa	35
• Max. operating pressure on the heating side	bar	3
• Flow/return connection heating	R	1½″
• Nominal air volume outdoor unit (A7W35 and nominal rotation speed)	m^3/h	6600
• Hydraulic connection line, max. length/dimension inside	m/DN	30/DN 40
Cooling technical data		
• Refrigerant		R290
• Compressor		modulating
• Refrigerant filling quantity	kg	4.4
• Compressor oil filling quantity	l	0.9
• Compressor oil type		PZ46M

Type		pro (24)
Electrical data		
• Electrical connection compressor	V/Hz	3~400/50
• Control electrical connection	V/Hz	1~230/50
• Max. heat pump operating current	A	19.5
• Max. compressor operating current	A	19.2
• Max. fan operating current	A	0.28
• Max. fan power consumption	W	194
• Max. starting current heat pump	A	19.2
• Output factor		0.88
• External protection main current	A	C/K 20
• External protection control current	A	B/Z 13
Dimensions/weight of outdoor unit		
• Dimensions (H x W x D)	mm	1461 x 1928 x 997
• Weight	kg	450
• Protection class		IP24
Dimensions/weight of indoor unit Belaria® pro		
• Dimensions (H x W x D)	mm	1005 x 550 x 280
• Weight	kg	28
• Protection class		IP20

[1] Related to moderate climate

[2] EN 14825

[3] The sound values apply with a clean evaporator. These values are temporarily exceeded before defrosting.

[4] The sound power level EN 12102 outdoor unit is 56 dB(A) at 30 % compressor speed.

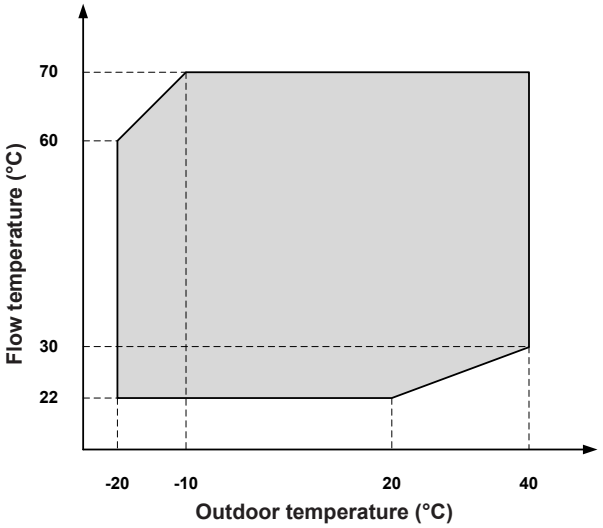
[5] The sound pressure levels indicated apply if the outdoor unit is placed at a building façade. These values are reduced by 3 dB if the outdoor unit is free-standing. With installation in a corner, the sound pressure level increases by 3 dB.

Using a fault-current circuit breaker RCCB type B, IΔn ≥ 300 mA is recommended. Country-specific regulations must be observed.

Diagrams of areas of application

Heating and domestic hot water

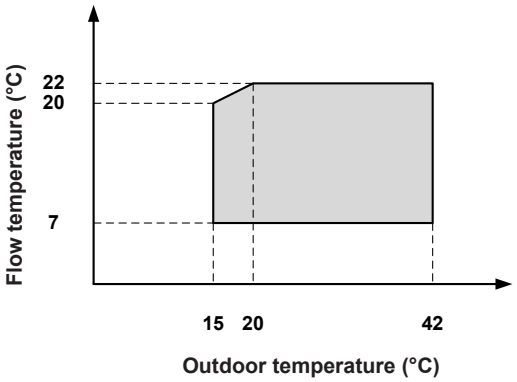
Belaria® pro (24)



Area of application of the heat pump for heating/domestic hot water

Cooling

Belaria® pro (24)



Area of application of the heat pump for cooling

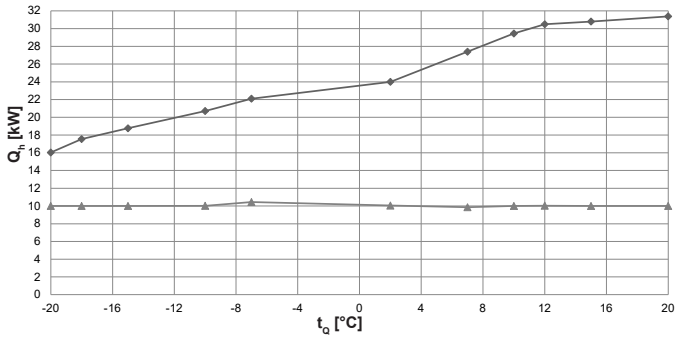
Performance data – heating

Maximum heat output allowing for defrosting losses

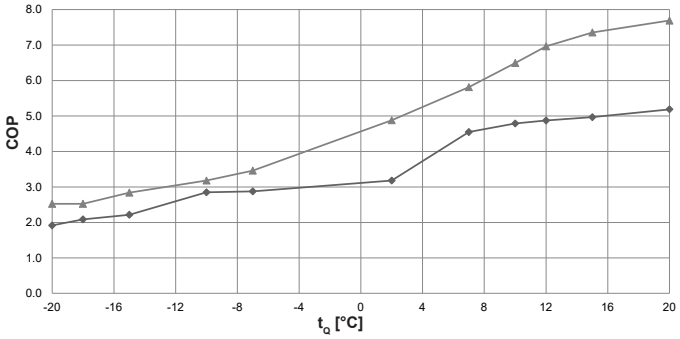
Belaria® pro (24)

Data according to EN 14511

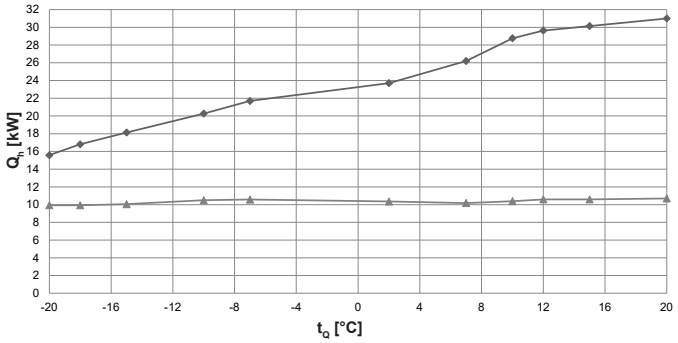
Heat output - t_{VL} 35 °C



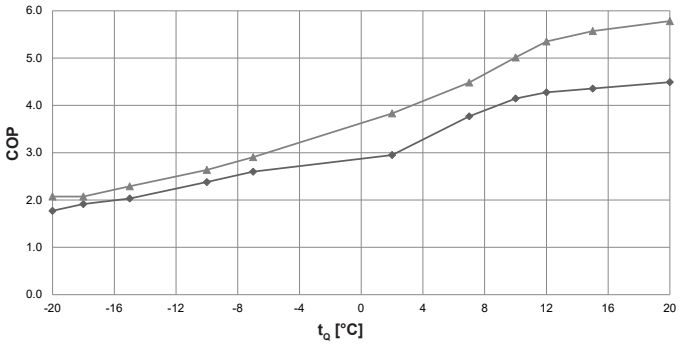
Coefficient of performance - t_{VL} 35 °C



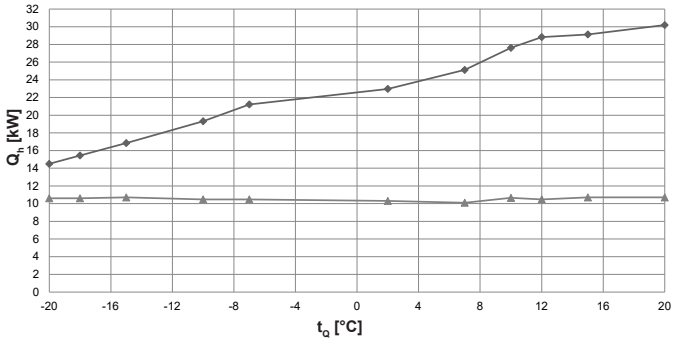
Heat output - t_{VL} 45 °C



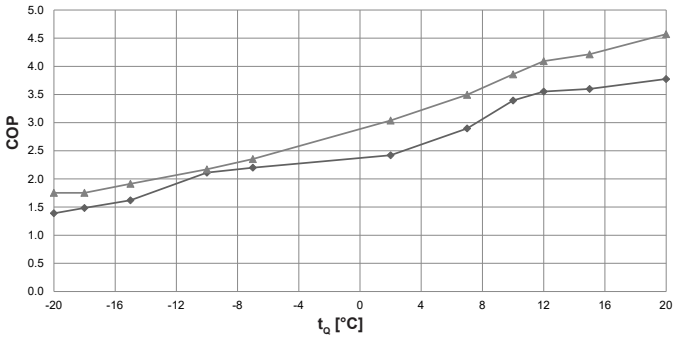
Coefficient of performance - t_{VL} 45 °C



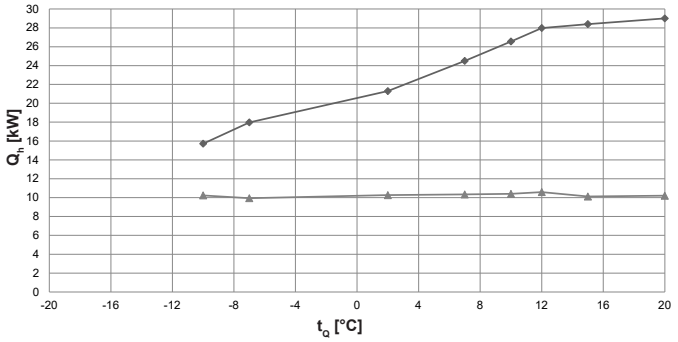
Heat output - t_{VL} 55 °C



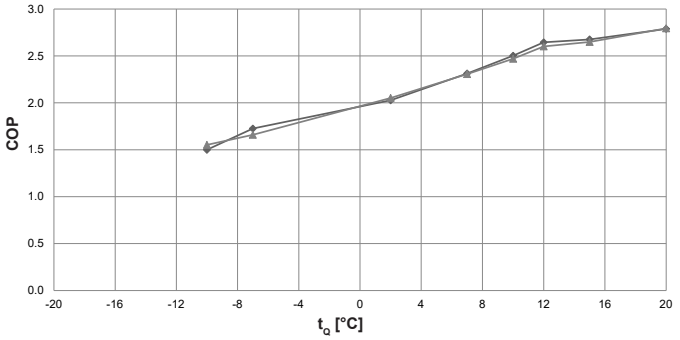
Coefficient of performance - t_{VL} 55 °C



Heat output - t_{VL} 70 °C



Coefficient of performance - t_{VL} 70 °C



t_{VL} = heating flow temperature (°C)
t_Q = source temperature (°C)
Q_h = heat output (kW), measured in accordance with standard EN 14511
COP = Coefficient of Performance for the overall unit in accordance with standard EN 14511

Maximum output
Minimum output

Performance data – heating

Belaria® pro (24)

Data according to EN 14511

		Maximum output			Minimum output		
t_{VL} °C	t_Q °C	Q_h kW	P kW	COP	Q_h kW	P kW	COP
35	-20	16.0	8.4	1.9	10.0	4.0	2.5
	-18	17.6	8.4	2.1	10.0	4.0	2.5
	-15	18.8	8.5	2.2	10.0	3.5	2.8
	-10	20.7	7.3	2.9	10.0	3.2	3.2
	-7	22.1	7.7	2.9	10.5	3.0	3.5
	2	24.0	7.5	3.2	10.1	2.1	4.9
	7	27.4	6.0	4.6	9.9	1.7	5.8
	10	29.5	6.2	4.8	10.0	1.5	6.5
	12	30.5	6.3	4.9	10.0	1.4	7.0
	15	30.8	6.2	5.0	10.0	1.4	7.4
	20	31.4	6.1	5.2	10.0	1.3	7.7
45	-20	15.6	8.8	1.8	9.9	4.8	2.1
	-18	16.8	8.8	1.9	9.9	4.8	2.1
	-15	18.1	8.9	2.0	10.1	4.4	2.3
	-10	20.3	8.5	2.4	10.5	4.0	2.6
	-7	21.7	8.4	2.6	10.6	3.6	2.9
	2	23.7	8.0	3.0	10.4	2.7	3.8
	7	26.2	7.0	3.8	10.2	2.3	4.5
	10	28.8	6.9	4.1	10.4	2.1	5.0
	12	29.6	6.9	4.3	10.6	2.0	5.4
	15	30.2	6.9	4.4	10.6	1.9	5.6
	20	31.0	6.9	4.5	10.7	1.9	5.8
50	-20	15.0	9.7	1.5	11.0	5.2	1.9
	-18	16.1	9.6	1.7	10.0	5.2	1.9
	-15	17.5	9.7	1.8	10.0	4.8	2.1
	-10	19.8	8.8	2.2	10.0	4.4	2.4
	-7	21.7	9.1	2.4	10.0	4.0	2.6
	2	23.3	8.8	2.7	10.0	3.0	3.4
	7	25.7	7.8	3.3	10.0	2.6	4.0
	10	28.2	7.5	3.7	10.0	2.3	4.4
	12	29.2	7.5	3.9	10.0	2.3	4.7
	15	29.6	7.5	3.9	10.0	2.2	4.9
	20	30.6	7.5	4.1	10.0	2.1	5.2
55	-20	14.5	10.4	1.4	10.6	6.1	1.8
	-18	15.4	10.4	1.5	10.6	6.1	1.8
	-15	16.9	10.4	1.6	10.7	5.6	1.9
	-10	19.3	9.2	2.1	10.5	4.8	2.2
	-7	21.2	9.6	2.2	10.5	4.5	2.4
	2	23.0	9.5	2.4	10.3	3.4	3.0
	7	25.1	8.7	2.9	10.1	2.9	3.5
	10	27.6	8.1	3.4	10.7	2.8	3.9
	12	28.8	8.1	3.6	10.5	2.6	4.1
	15	29.1	8.1	3.6	10.7	2.5	4.2
	20	30.2	8.0	3.8	10.7	2.3	4.6

Further performance data - heating
see next page

t_{VL} = heating flow temperature (°C)
t_Q = source temperature (°C)
Q_h = heat output (kW), measured in accordance with standard EN 14511
P = power consumption, overall unit (kW)
COP = Coefficient of Performance for the overall unit in accordance with standard EN 14511

Observe daily power interruptions!
see “Engineering heat pumps general”

Performance data – heating

Belaria® pro (24)

Data according to EN 14511

		Maximum output			Minimum output		
t_{VL} °C	t_Q °C	Q_h kW	P kW	COP	Q_h kW	P kW	COP
60	-20	14.0	11.4	1.2	11.3	7.1	1.6
	-18	14.8	11.4	1.3	10.3	6.5	1.6
	-15	16.2	11.1	1.5	10.5	6.1	1.7
	-10	18.8	10.4	1.8	10.4	5.4	1.9
	-7	20.7	10.2	2.0	10.3	5.0	2.1
	2	22.6	10.2	2.2	9.7	4.1	2.4
	7	24.6	9.5	2.6	10.4	3.5	3.0
	10	27.0	8.7	3.1	10.3	3.2	3.3
	12	28.4	8.7	3.3	10.5	3.1	3.4
	15	28.6	8.7	3.3	10.5	3.0	3.5
	20	29.7	8.5	3.5	10.5	2.8	4.0
70	-10	15.7	10.5	1.5	10.2	6.6	1.6
	-7	18.0	10.4	1.7	9.9	6.0	1.7
	2	21.3	10.5	2.0	10.3	5.0	2.1
	7	24.5	10.6	2.3	10.3	4.5	2.3
	10	26.6	10.6	2.5	10.4	4.2	2.5
	12	28.0	10.6	2.6	10.6	4.1	2.6
	15	28.4	10.6	2.7	10.1	3.8	2.6
	20	29.0	10.4	2.8	10.2	3.7	2.8

t_{VL} = heating flow temperature (°C)
t_Q = source temperature (°C)
Q_h = heat output (kW), measured in accordance with standard EN 14511
P = power consumption, overall unit (kW)
COP = Coefficient of Performance for the overall unit in accordance with standard EN 14511

Observe daily power interruptions!
see “Engineering heat pumps general”

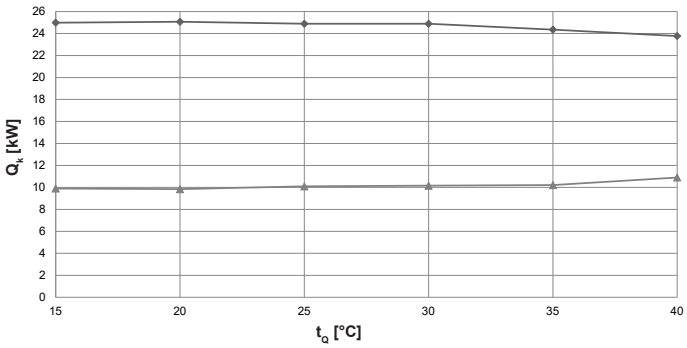
Performance data – cooling

Maximum cooling capacity

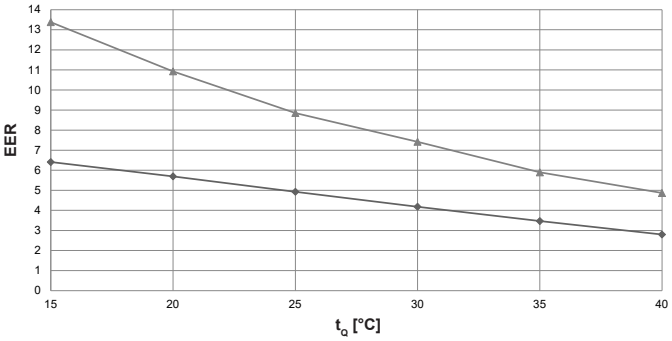
Belaria® pro (24)

Data according to EN 14511

Cooling capacity - t_{VL} 18 °C



Energy efficiency ratio - t_{VL} 18 °C



Maximum output
Minimum output

Belaria® pro (24)

Data according to EN 14511

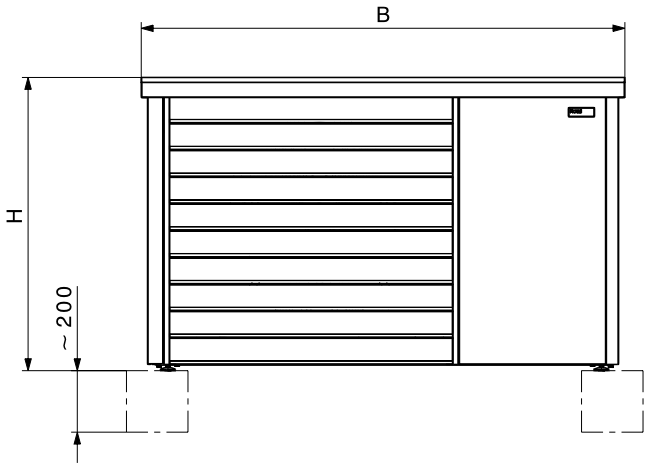
		Maximum output			Minimum output		
t_{VL} °C	t_Q °C	Q_k kW	P kW	EER	Q_k kW	P kW	EER
7	15	24.7	6.5	3.8	10.3	1.2	8.5
	20	25.0	8.2	3.1	10.4	1.5	6.8
	25	24.1	9.0	2.7	10.4	1.9	5.5
	30	23.4	9.5	2.5	10.4	2.8	3.7
	35	22.2	10.4	2.1	9.9	3.4	2.9
	40	19.4	10.5	1.9	9.7	4.9	2.0
12	15	25.2	5.1	5.0	9.9	1.0	10.4
	20	24.9	5.8	4.3	10.2	1.2	8.6
	25	25.0	6.8	3.7	10.4	1.5	6.9
	30	25.1	8.4	3.0	10.6	1.9	5.7
	35	24.4	9.9	2.5	10.6	2.3	4.7
	40	22.5	11.0	2.0	10.1	2.6	3.9
18	15	25.0	3.9	6.4	9.9	0.7	13.4
	20	25.1	4.4	5.7	9.8	0.9	10.9
	25	24.9	5.1	4.9	10.1	1.1	8.9
	30	24.9	6.0	4.2	10.2	1.4	7.4
	35	24.4	7.0	3.5	10.2	1.7	5.9
	40	23.8	8.5	2.8	10.9	2.2	4.9

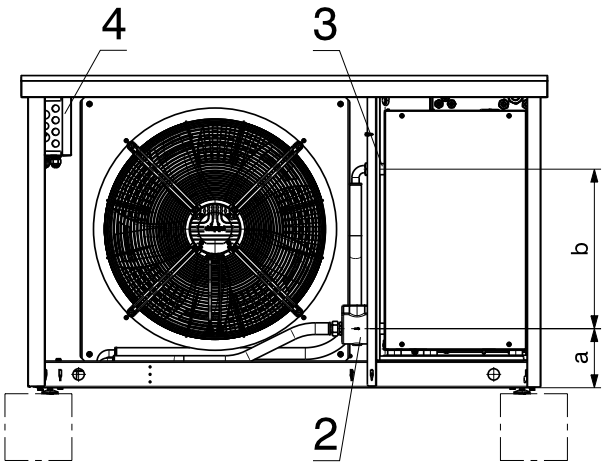
t_{VL} = cooling water flow temperature (°C)
t_Q = source temperature (°C)
Q_k = cooling capacity (kW), measured in accordance with standard EN 14511
P = power consumption, overall unit (kW)
EER = Energy Efficiency Ratio for the overall unit in accordance with standard EN 14511

Observe daily power interruptions!
see “Engineering heat pumps general”

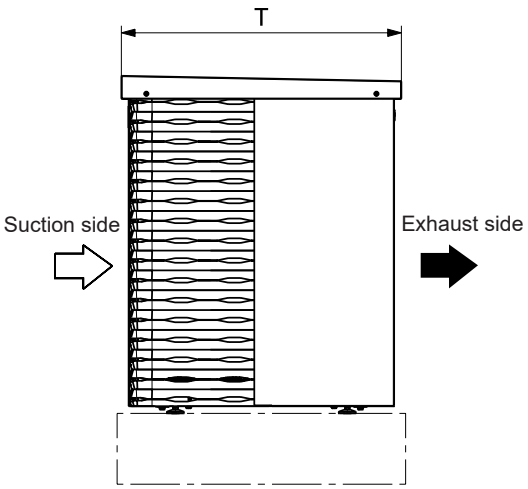
Belaria® pro
Outdoor unit
(Dimensions in mm)

Front view

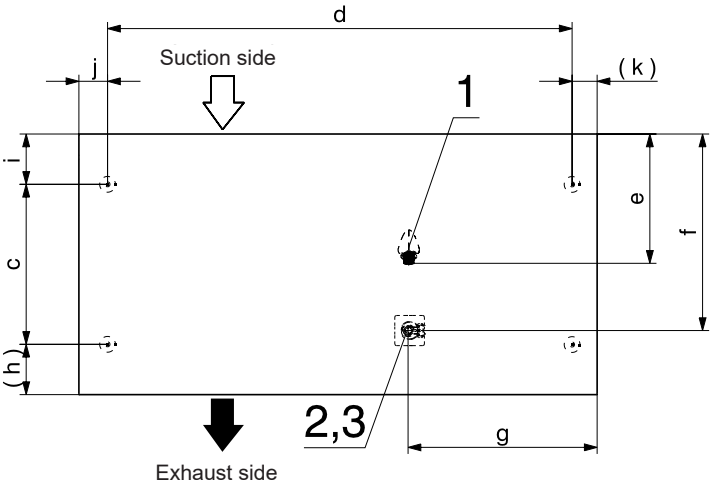




View from the left



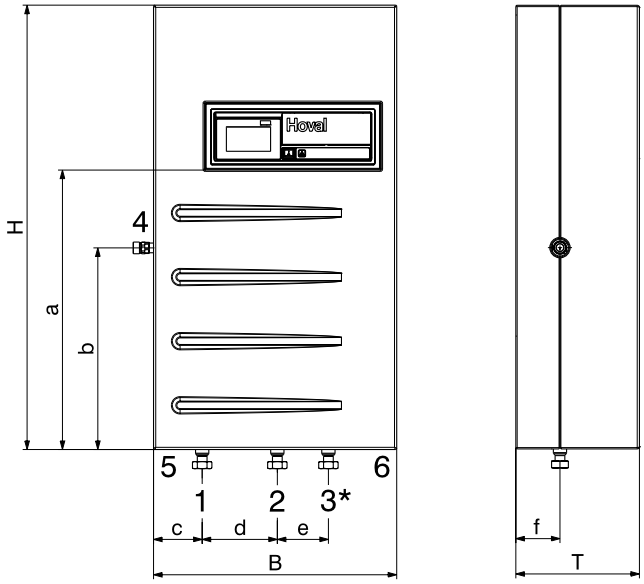
View from top



1	Condensate drain 1″	
2	Connection hydraulic connection line return	1½″ ext. thread
3	Connection hydraulic connection line flow	1½″ ext. thread
4	Electrical connection	

Type	H	B	T	a	b	c	d	e	f	g	h	i	j	k
Belaria® pro (24)	1461	1928	997	280	410	685	1750	380	800	760	150	160	100	80

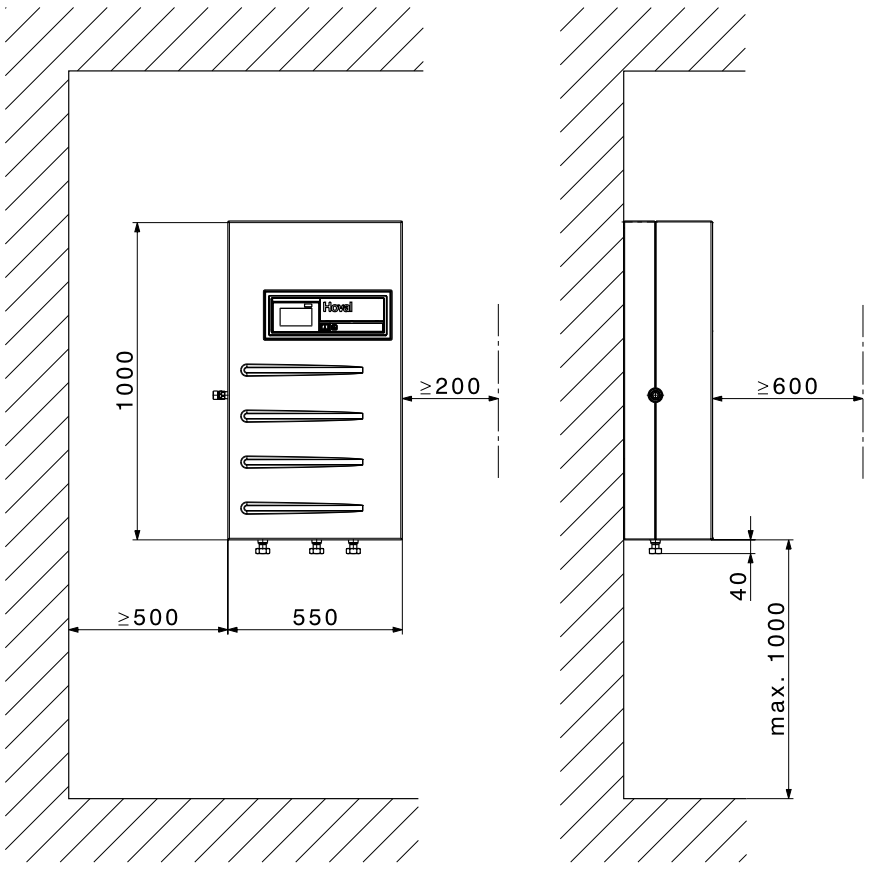
Belaria® pro (24)
Indoor unit
(Dimensions in mm)



1	Flow outdoor unit (return not guided through indoor unit)	1½″ ext. th.
2	Flow heating	1½″ ext. th.
3*	No connection with Belaria® pro (24)	
4	Safety assembly (accessories)	¾″ ext. th.
5	Cable feed-in sensors, RS485	
6	Cable feed-in control current	

Type	H	B	T	a	b	c	d	e	f
Belaria® pro (24)	1005	550	280	630	455	110	170	115	100

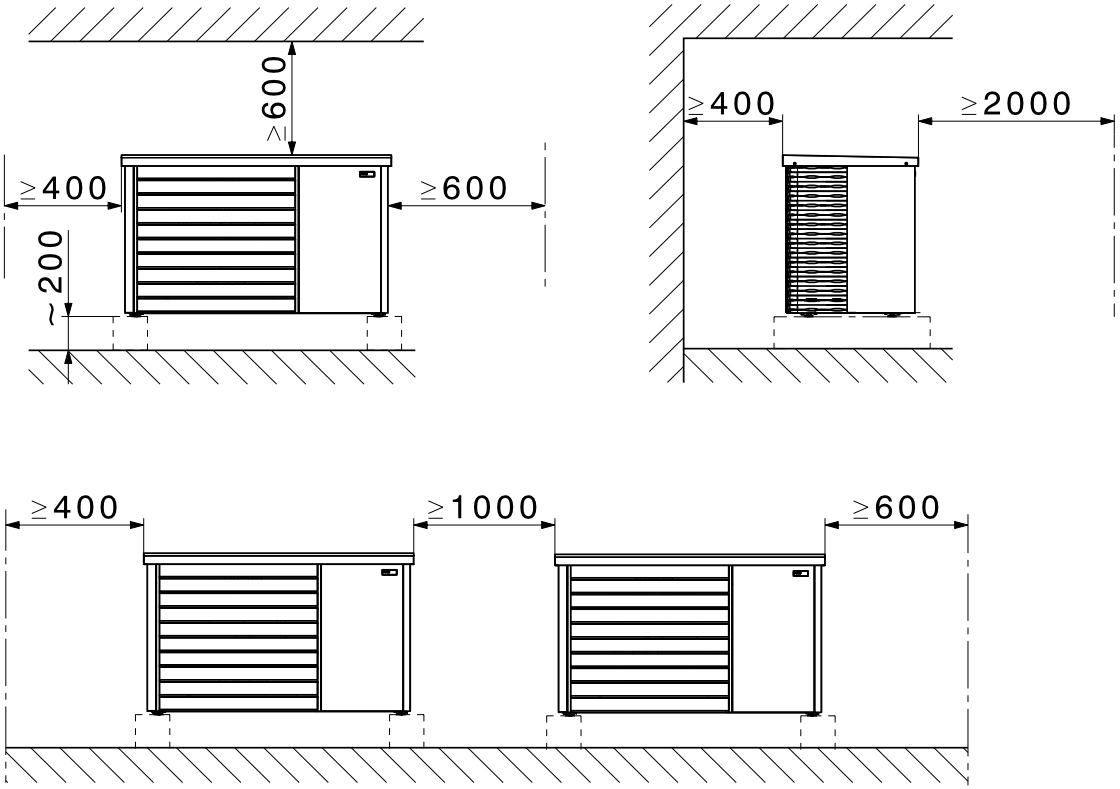
Belaria® pro (24)
Indoor unit wall-mounted



To ensure good operability and accessibility to the electrical/hydraulic connections, a clearance of max. 1000 mm must be provided from the ground to the lower edge of the indoor unit.

Space requirement
(Dimensions in mm)

Belaria® pro
Outdoor unit

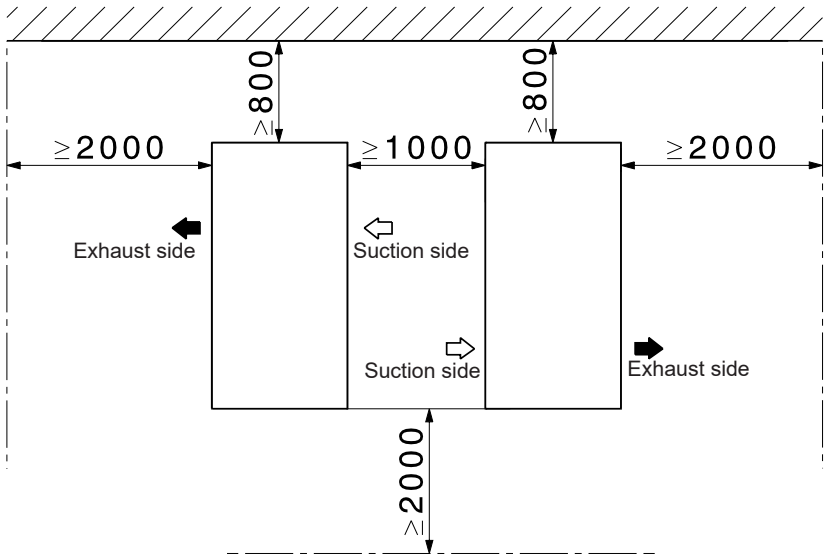


Any possible openings/recesses and ignition sources must be avoided within a radius of one meter around the outdoor unit.

In order to ensure accessibility during maintenance, a clearance of at least 600 mm upwards must be maintained.
For any service work, the minimum clearances at the rear and sides of the heat pump must be observed.

Belaria® pro
Outdoor unit

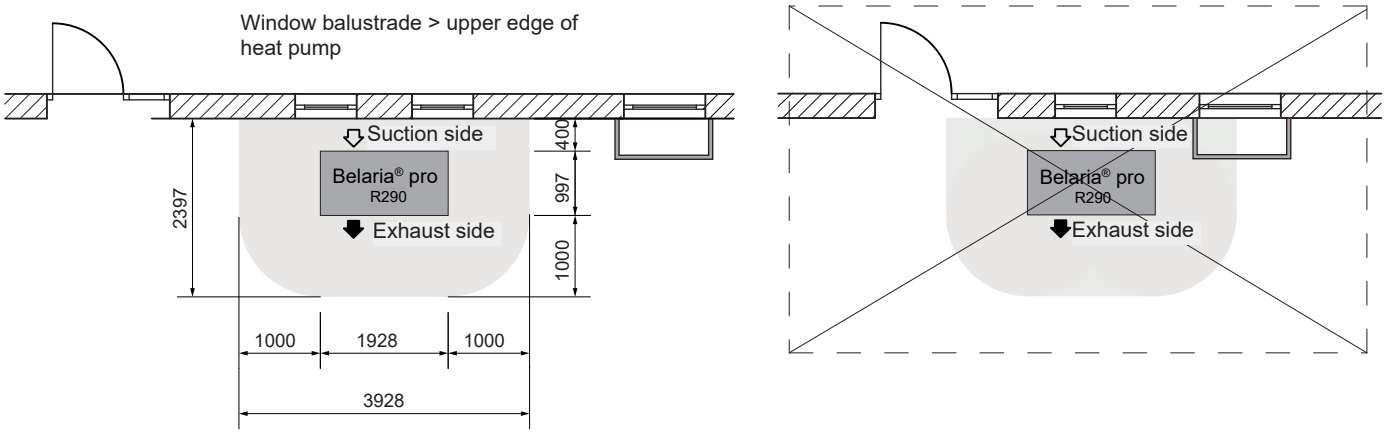
View from above



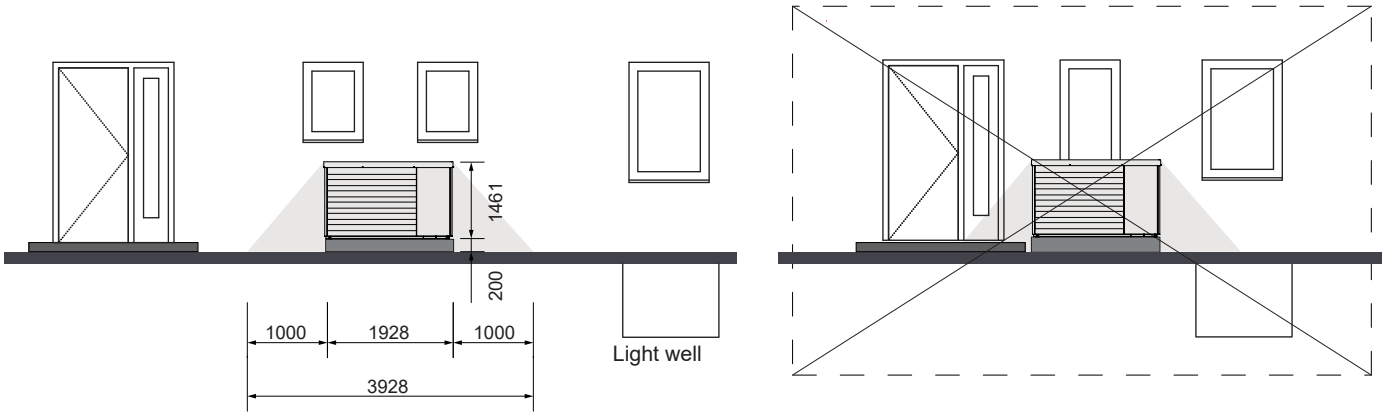
Presentation of protection zones

Belaria® pro with refrigerant R290
(Dimensions in mm)

Floor plan - protection zone when installed in front of a wall

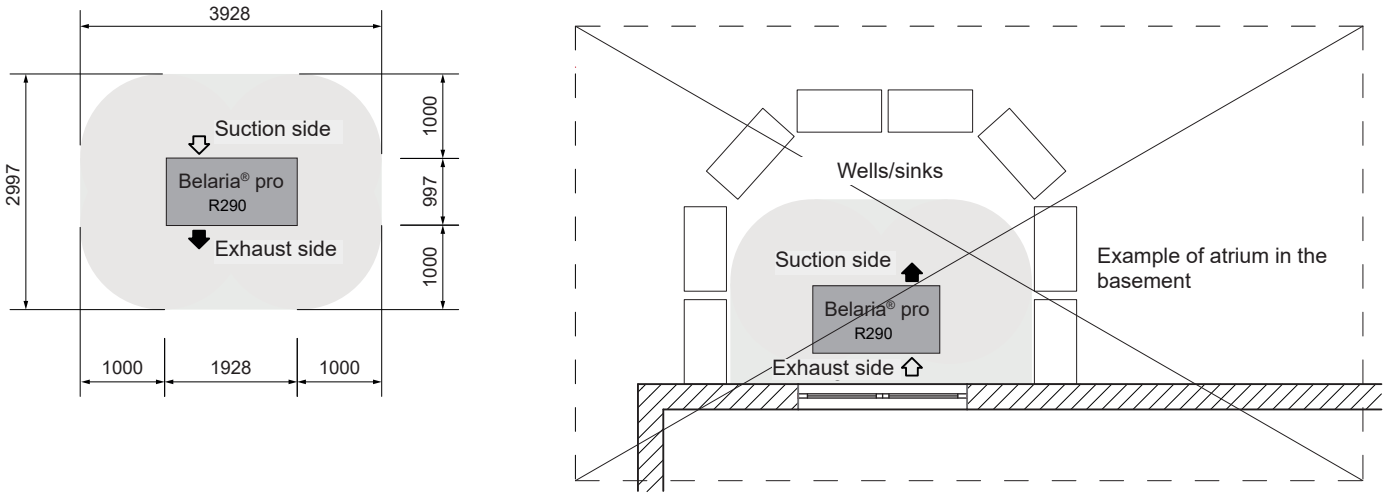


View - protection zone when installed in front of a wall

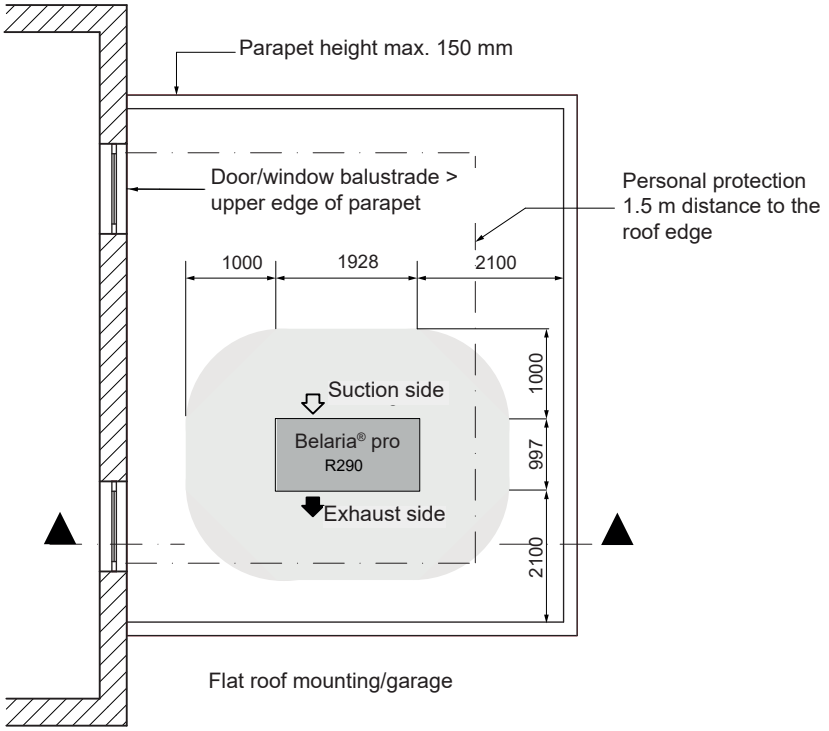


- There must be no building openings (windows, doors, shafts, ventilation openings, floor drains or the like) within a radius of 1 m from the outdoor unit and no potential ignition sources must be present.
- Window balustrades must be higher than the upper edge of the outdoor unit in the protection zone!
- The heat pump must be at least 1 m from the property boundary; observe building regulations!
- At the entrances to properties, it must be ensured that no vehicle can enter the protection zone.

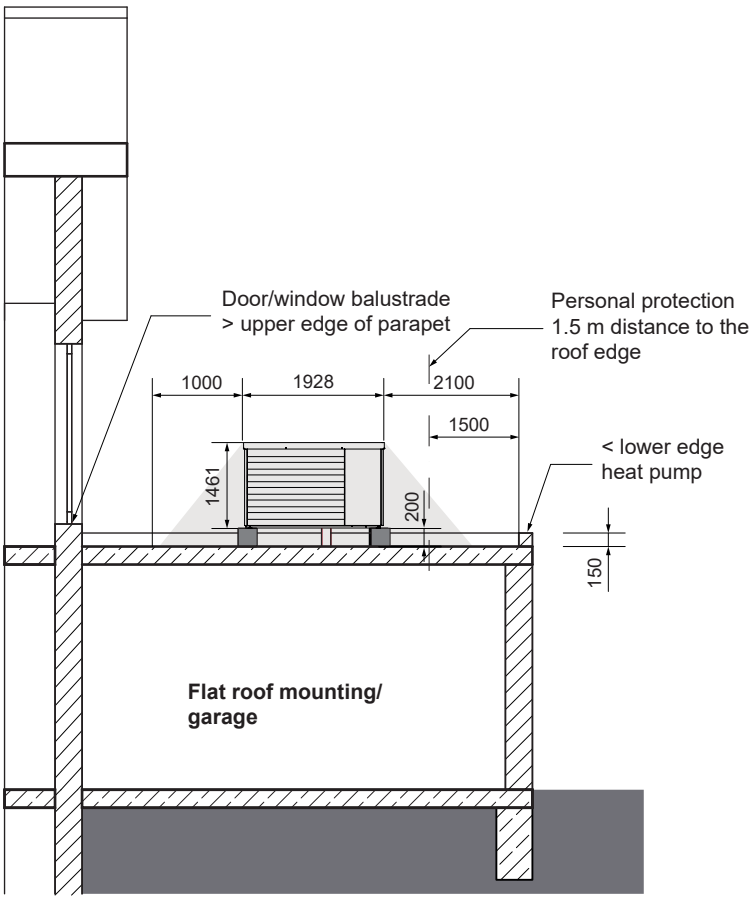
Floor plan - protection zone when installed outdoors



Floor plan flat roof - protection zone



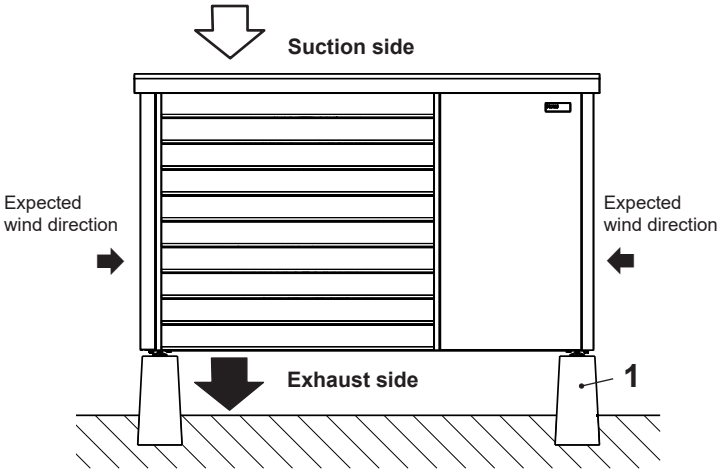
Section flat roof - protection zone



- Strict compliance with safety measures regarding combustible refrigerants.
- All standards concerning statics, wind load and access to roofs must be complied with. The outdoor unit must be firmly bolted onto the substructure (e.g. concrete base). The heat pump must be prevented from tilting.
- Minimum distance of the heat pump to the roof edge: 1.5 m (personal protection) + 0.6 m (working area refrigeration circuit).
- Accessibility for maintenance and repair work must be ensured. For work on the heat pump, a measuring case and test equipment, refrigerant bottle, etc. must be transported to the site, amongst other things. In addition to the safety equipment (fall protection devices, anchoring devices, etc.), this must also be taken into account for skylights, stairs, railings, etc.
- There must be no floor-to-ceiling doors/ windows to the flat roof, or balustrade must be higher than the parapet.
- Protection zones around windows must be complied with.
- There must not be any pipe vents, skylights or the like on the flat roof within a radius of 1 m from the heat pump.
- If there is a risk of frost, a siphon must be installed in the shaft immediately before the condensate drain is introduced into the downpipe.

Installation variants for Belaria® pro outdoor unit
(Dimensions in mm)

Firm base on site with strip foundation

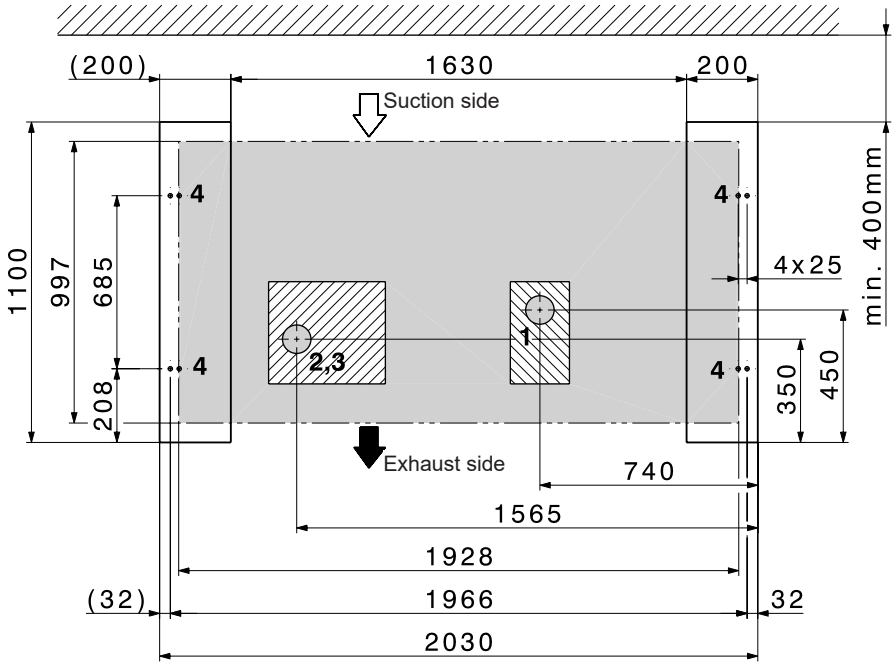


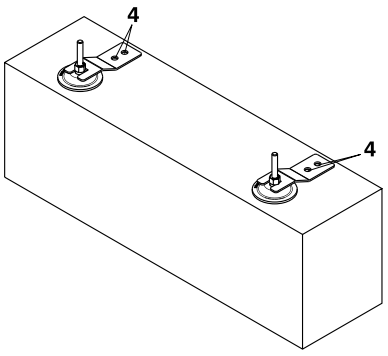
1 Concrete base on site

The base must not form a sink. A circumferential base is therefore not permitted.

Installation variants for Belaria® pro outdoor unit
(Dimensions in mm)

Strip foundation
Plan concrete base set
(view from above)





Attachment of the outdoor unit from the outside (laterally) using the supplied clamps.
The clamps are visible.
It is not necessary to remove the cladding sections.

Possible area for empty tubes in the concrete base

Possible area for condensate drain in the concrete base

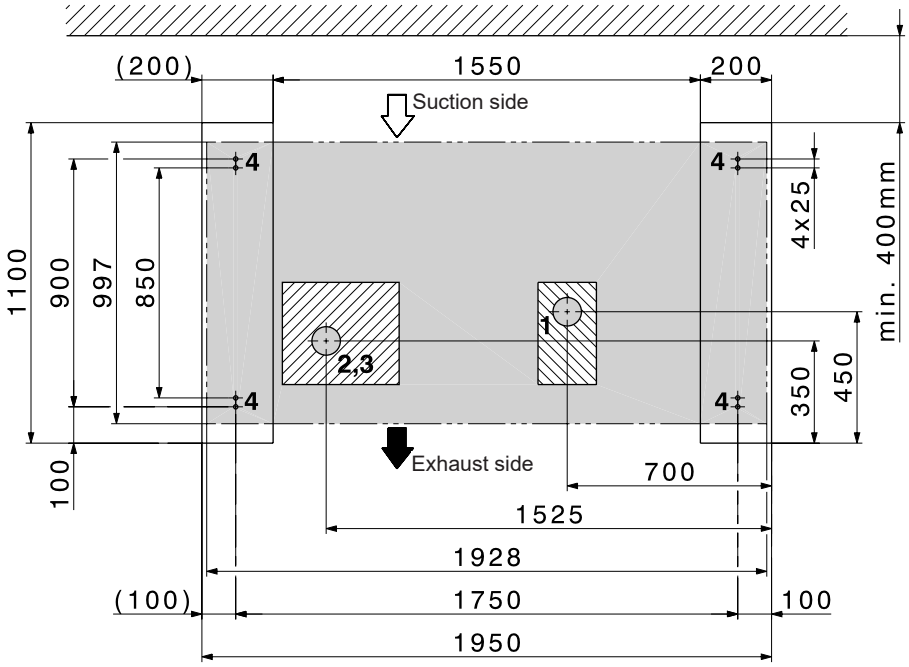
1 Condensate drain area
2 Area FL hydraulics
RT hydraulics
3 Electrics area
4 Attachment points M8 Belaria® pro (dowels in scope of delivery)

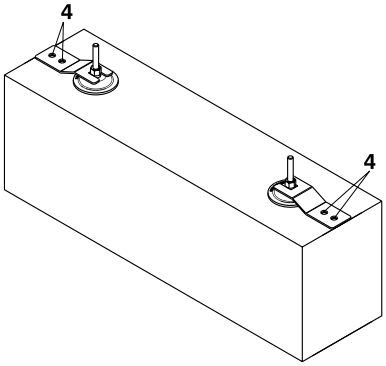
Installation variants for Belaria® pro outdoor unit

(Dimensions in mm)

Strip foundation

Plan concrete base set
(view from above)





Attachment of the outdoor unit from the “inside/bottom” (grey area) of the heat pump using the supplied clamps.
The clamps are not visible.
It is necessary to remove the cladding sections.

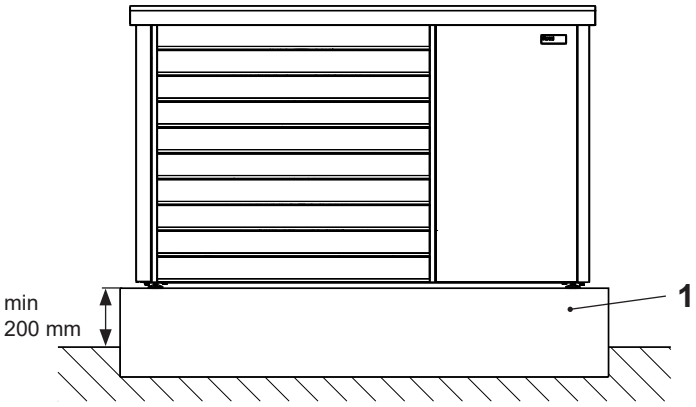
Possible area for empty tubes in the concrete base

Possible area for condensate drain in the concrete base

1 Condensate drain area
2 Area FL hydraulics
RT hydraulics
3 Electrics area
4 Attachment points M8 Belaria® pro (dowels in scope of delivery)

Installation variants for Belaria® pro outdoor unit
(Dimensions in mm)

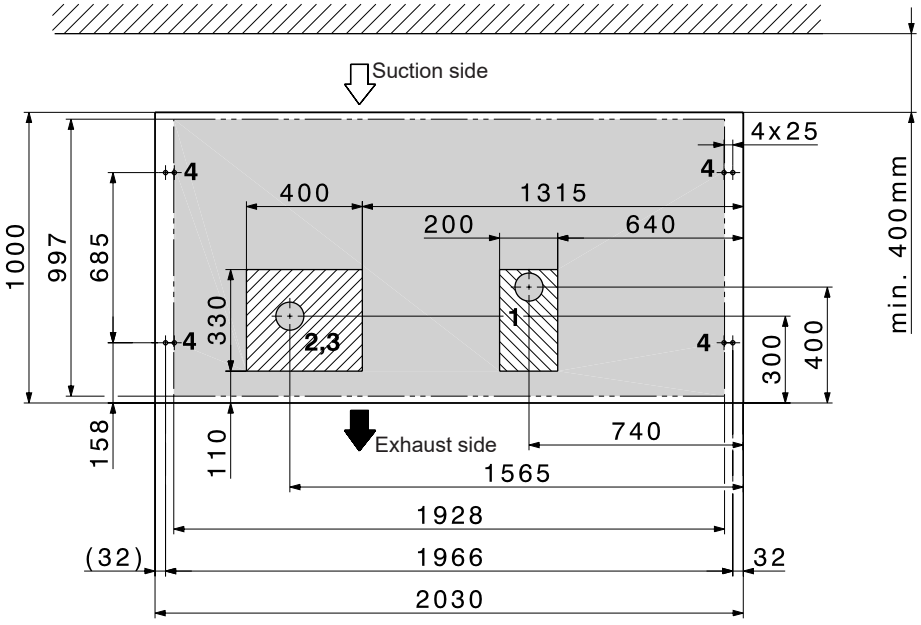
Firm base on site with floor plate

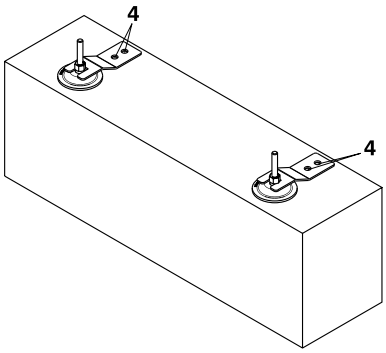


1 Floor plate on site

The base must not form a sink. A circumferential base is therefore not permitted.

Floor plate
Plan
(view from above)





Attachment of the outdoor unit from the outside (laterally) using the supplied clamps.
The clamps are visible.
It is not necessary to remove the cladding sections.

Possible area for empty tubes in the concrete base

Possible area for condensate drain in the concrete base

1 Condensate drain area
2 Area FL hydraulics
RT hydraulics
3 Electrics area
4 Attachment points M8 Belaria® pro (dowels in scope of delivery)

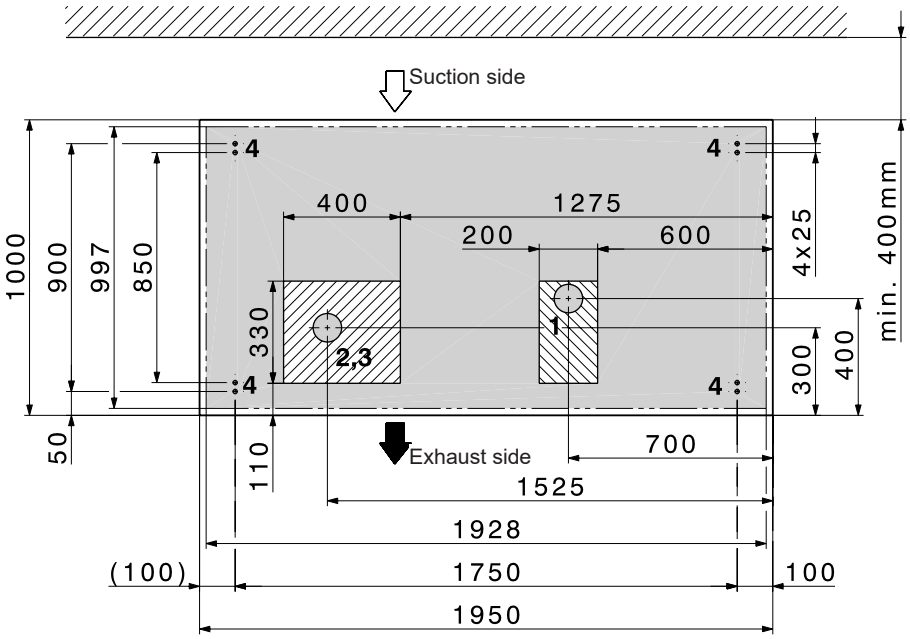
Installation variants for Belaria® pro outdoor unit

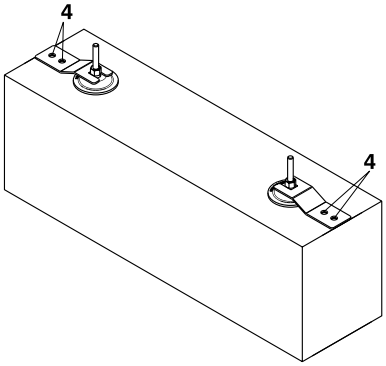
(Dimensions in mm)

Floor plate

Plan

(view from above)





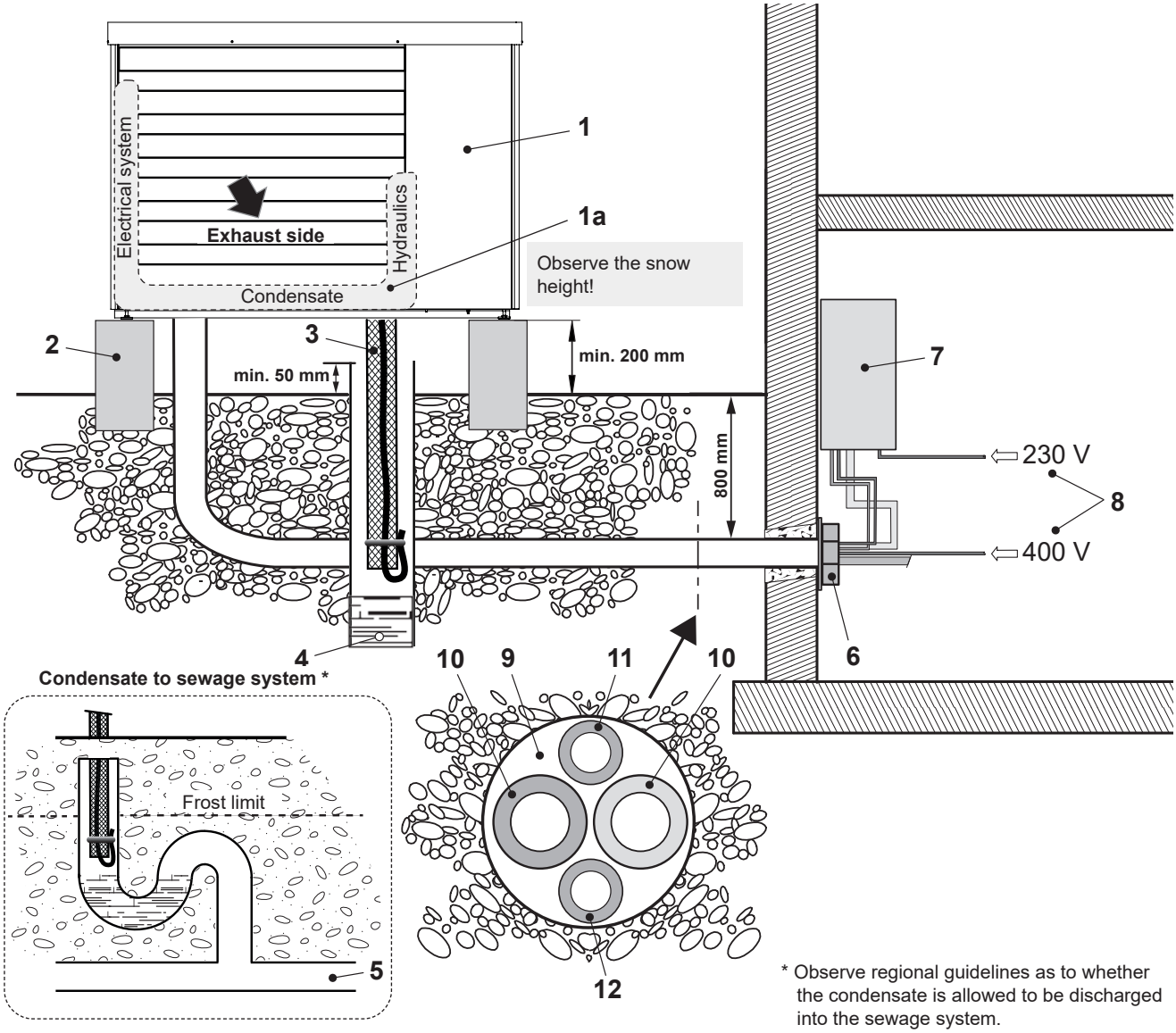
Attachment of the outdoor unit from the “inside/bottom” (grey area) of the heat pump using the supplied clamps.
The clamps are not visible.
It is necessary to remove the cladding sections.

Possible area for empty tubes in the concrete base

Possible area for condensate drain in the concrete base

1 Condensate drain area
2 Area FL hydraulics
RT hydraulics
3 Electrics area
4 Attachment points M8 Belaria® pro (dowels in scope of delivery)

Configuration and connection diagram Belaria® pro (24)



* Observe regional guidelines as to whether the condensate is allowed to be discharged into the sewage system.

1 Outdoor unit
1 a Space for connection of hydraulics (FL + RT), condensate drain and electrics.
2 Concrete base
3 Condensate drain heat pump, drain pipe DN 100
4 Variant 1: Seepage (duct/gravel layer)
5 Variant 2: Discharging into the sewage system (penetration into the soil must be made leak-tight)
6 Wall bushing (hydraulic and electrical connections)
7 Belaria® pro (24) indoor unit
8 Main current:
3 x 400 V/50 Hz
Control current:
1 x 230 V/50 Hz
Electric heating element main current:
3 x 400 V/50 Hz
Network cables (optional)
9 Empty tube for hydraulics and electrics
10 Connection line FL + RT
11 Empty tube for electrical connections for outdoor unit
Main current outdoor unit: 3 x 400 V/50 Hz
Outdoor unit control current: 1 x 230 V/50 Hz
12 Empty tube for data bus RS485

Requirements and directives
The general requirements and directives listed in the chapter Engineering apply.

Set-up
- The distance between the indoor and outdoor unit must be as short as possible. Only short and simple routing of lines guarantees cost effectiveness and low heat losses.
- The maximum permitted single cable length is 30 m between the outdoor unit, via the indoor unit and the heating storage tank. This must not be exceeded.
- There must be no building openings (windows, doors, shafts, ventilation openings, etc.) within a radius of 1 m from the outdoor unit and no potential ignition sources must be present.
- Wall ducts into the building must be airtight.
- The outdoor unit must not be placed in or near floor recesses.
- The outdoor unit must not be placed closer than 1 m to the boundary of the property. Country-specific regulations must be observed.
- The air intake and air outlet sides must not be narrowed or blocked. The air outlet side must be the side facing away from the building and unobstructed (> 2 m).
- Due to efficient water heating, the line length with the Belaria® pro between the calorifier and the indoor unit is not allowed to be more than 10 m.

Outdoor unit
The outdoor unit is installed outdoors. The installation location must be selected carefully. It is essential that the following ancillary conditions are met:
- The maximum line length according to the installation must not be exceeded.
- The connection lines must be laid insulated and frost-proof.
- The installation location must be chosen in such a way that no noise pollution can occur (do not install near bedrooms, keep a distance from neighbours), hedges and bushes can have a sound-absorbing effect.
- Unobstructed air inflow and outflow must be possible.
- It is imperative that the minimum distances are observed (see Dimensions/Space requirement).
- The intake air must be free of impurities such as sand and aggressive substances such as ammonia, sulphur, chlorine etc.
- The outdoor unit must be installed on a load-bearing fixed structure.
- If the unit is installed at wind-prone locations, the alignment of the heat pump must be selected in such a way that the expected wind direction is crossways to the suction direction of the outdoor unit.
- If an alternative installation in areas subject to strong winds cannot be avoided, an additional wind shield in the form of a hedge, for example, should be installed, or additional fastening should be provided for the outdoor unit.
- If the installation location is not protected against snowfall, it must be chosen in such a way that the evaporator remains free of snow.
- The outdoor unit must always be installed on a solid surface in a horizontal position. This can be achieved by means of concrete bases or a floor plate.
- The load-bearing capability must be adequate. The unit must be fixed with 4 M8 screws.
- Air heat pumps generate condensate during operation. This can amount to 10 litres per defrost cycle within 2 minutes for the outdoor unit of the Belaria® pro.
- The condensate drain must be frost-proof so that the condensate can flow away without problems even at outdoor temperatures below 0 °C.
- If the discharge is into the sewage system, a siphon must be provided and the duct lead-through into the ground must be sealed so that no refrigerant can enter the sewage system uncontrolled.
- If there is a risk of frost, a siphon must be installed in the shaft immediately before the condensate drain is introduced into the downpipe.
- The condensate trough included in the outdoor unit is already equipped with a tank heater at the factory and thus prevents freezing.
- The condensate drain line is also secured with the preassembled heating tape.
- The air outlet has increased susceptibility to frost. Gutters, water pipes and water containers must not be situated right next to the outlet.
- If installed near the coast, the location must be at least 5 km from the coastline. If this safe distance is not complied with, increased corrosion can be expected. These cases are excluded from the warranty.
- To prevent damage caused by animals such as rodents or insects, all cable ducts must be properly sealed.
- The hydraulic lines from the heat pump can transmit structure-borne noise. Therefore, structure-borne noise decoupling should be provided, e.g. with sound-insulating hoses.

Flat roof installation
Flat roof installation of the Belaria® pro is possible under the following conditions:
- Strict compliance with safety measures regarding flammable refrigerants (see below).
- All standards concerning statics, wind load and access to roofs must be complied with. The outdoor unit must be firmly bolted onto the substructure (e.g. concrete base). The heat pump must be prevented from tilting.
- Minimum distance of the heat pump to the roof edge: 1.5 m (personal protection) + 0.6 m (working area refrigeration circuit).
- Accessibility for maintenance and repair work must be ensured. For work on the heat pump, a measuring case and test equipment, refrigerant bottle, etc. must be transported to the site, amongst other things. In addition to the safety equipment (fall protection devices, anchoring devices, etc.), this must also be taken into account for skylights, stairs, railings, etc.

Safety measures to be complied with
- There must be no building openings (windows, doors, shafts, ventilation openings, floor drains, etc.) within a radius of 1 m from the outdoor unit and no potential ignition sources must be present.
- Wall or ceiling ducts into the building must be airtight.
- The outdoor unit must not be placed in or near floor recesses.
- The outdoor unit must not be placed closer than 1 m to the boundary of the property. Country-specific regulations must be observed.
- The air intake and air outlet sides must not be narrowed or blocked. The air outlet side must be the side facing away from the building and unobstructed (> 2 m).
- The condensate is allowed to be directed into a shaft. A siphon must be installed upstream of the connection to the downpipe. The siphon must be located inside the building.

Indoor unit
- The installation location must be selected in accordance with the valid requirements and directives.
- The indoor unit must be installed in a room protected against frost, by an approved specialist company. Room temperature must be between 5 °C and 25 °C.
- Installation in wet rooms, dusty rooms or rooms with a potentially explosive atmosphere is not permitted.
- To minimise vibration and noise inside the building, the inside of the heat pump should be isolated as well as possible from the building structure. For example, indoor units should never be installed on lightweight ceilings/floors.
- The connections for the heat pump or heating flow are located at the bottom of the Belaria® pro indoor unit.
- Due to the accessibility to the hydraulic system, the distances must be maintained on all sides (see Dimensions/Space requirements).
- False flow rates as a result of incorrect dimensions of the pipework, incorrect fittings or improper pump operation can cause damage to the heat pump.

The installation of a sludge separator in the return of the outdoor unit is mandatory.

Electrical connections
- The electrical connection must be carried out by a qualified technician and registered with the responsible energy supply company. The relevant electrical installation company is responsible for ensuring that electrical connection is carried out in accordance with standards and that safeguard measures are put in place.

- The mains voltage at the connection terminals of the heat pump must be 400 V or 230 V ± 10 %. The conductor cross-sections of the connection line must be checked by the electrical company carrying out the work.
- A fault-current circuit breaker is recommended. Country-specific requirements must be complied with. If the “fault-current circuit breaker” safeguard measure is implemented by the electrical company, a separate fault-current circuit breaker is recommended for the heat pump.
- This fault-current circuit breaker must be of the all-current-sensitive type B (IΔN ≥ 300 mA). The specified RCCB types apply to the heat pump regardless of externally connected components (refer to assembly instructions, data sheets).
- Owing to the starting currents that occur, circuit breakers with a type “C” or “K” tripping characteristic are to be used for the main circuit.
- For the control circuit and additional electric heating (if present), circuit breakers with a type “B” or “Z” tripping characteristic are sufficient.
- The electrical connection and feeder lines must be copper cables.
- Please refer to the wiring diagram for electrical details.
- The wall feedthrough should slope down from the inside to the outside.
- To avoid damage, the opening should be padded on the inside or, for example, lined with a PVC pipe.
- After installation, the wall opening must be sealed with a suitable sealing compound on site, observing the fire protection regulations.

Routing of the hydraulic connection lines

- If the hydraulic connection lines are laid in the ground, this must be done in a protective tube. For example, this can be a PVC pipe with a diameter of 150 mm.
- Wall ducts must be sealed to the outside on site.
- After the hydraulic connection lines have been laid, they must be checked for damage and reinsulated. In case of cooling, condensate can form on the pipes.
- The hydraulic connection lines must be laid decoupled from the building and must never be laid flush-mounted.
- Care must be taken to ensure that water pipes do not pass through the sleeping or living areas.
- Shut-off valves must be installed on site in accordance with the corresponding hydraulic diagram. The shut-off valves are not allowed to be opened until immediately before commissioning.
- The danger of frost damage must be taken into account if there are prolonged power outages.

Room cooling

- Room cooling can be provided by fan convectors and is recommended. The connection lines for the fan convectors must have condensation-proof insulation. In addition, the condensate from the fan convectors must be drained off.
- If panel heating is used for room cooling, various criteria such as temperatures below the dewpoint or the temperature profiles must be allowed for, and can lead to costly consequential damage in the case of inadequate planning or incorrect use.
  We recommend that you consult Hoval.

Further guidelines
see “Engineering”

Connection on drinking water side

- The hydraulic connection is made according to the information in the corresponding diagrams from Hoval.
- According to the Drinking Water Regulation and DIN 50930-6, the domestic hot water storage tank is suitable for normal drinking water (pH value > 7.3).
- The connection piping can be made using galvanised pipes, stainless steel pipes, copper pipes or plastic pipes.
- The connections must be made pressure-tight.
- The safety devices tested for the components in accordance with DIN 1988 and DIN 4753 must be installed in the cold water pipe.
- The 10 bar operating pressure stated on the data plate is not allowed to be exceeded. Install a pressure reducing valve if necessary.
- A suitable water filter must be installed in the cold water pipe.
- A water softener must be installed if the water is hard.

Installation on heating side

- All pertinent laws, regulations and standards for heating house pipework and for heat pump systems must be complied with.
- It is imperative that a sludge separator is installed in the heating return upstream from the heat pump.
- The safety and expansion devices for closed heating systems must be provided in accordance with EN 12828.
- Dimensioning of the pipework must be done according to the required flow rates and given pressure drops.
- Ventilation possibilities must be provided at the highest points and drainage possibilities at the lowest points of the connection lines.
- To prevent energy losses, the connection lines must be insulated with suitable material.

Transport and storage

- When removing the packaging, check the outdoor unit for damage. If the outdoor unit was damaged during transport or storage, contact Hoval customer service, a service partner or a licensed specialist immediately. They must carry out a leak test with a suitable leak detector. In the event of a leak, the outdoor unit must be repaired.
- Store the outdoor unit in a cool place without fire hazard and without direct exposure to heat sources. The ambient temperature must not exceed 43 °C.
- The same regulations apply for storage as for installation (no recesses, ventilation pipes, ignition sources in the storage area).
- The outdoor unit must not be stored in closed rooms, cellars or garages.
- The outdoor unit is only allowed to be stored outdoors.
- During transport, ensure sufficient ventilation in the closed vehicle, also when parking and stopping.
- Storage in passageways, escape routes or in front of entrances or exits is not permitted.
- Ignition sources such as naked flames, switched-on gas appliances, electric heaters, etc. must be kept away from the unit.
- Transport and storage only in upright position. Protect from mechanical damage and from falling over or falling down (make sure the load is secure).
- Transport by crane: The outdoor unit can be lifted by a crane and carried to the installation site. For this purpose, there are three stiffening brackets below the cover with openings for the passage of the transport straps.

**Looking for the appropriate hydraulic schematic?
Please contact your local Hoval partner.**

Hoval Belaria® fit (8-26)

Modulating monoblock heat pump for heating and cooling in the living area.

- For heating and cooling in cascades and domestic hot water production
- Modulating air/water heat pump in compact design for outdoor installation
- Smart Grid-ready
- Cladding made from painted, galvanised sheet steel (RAL 9001)
- Speed-controlled axial fans
  - Belaria® fit (8,13) 1 piece
  - Belaria® fit (20,26) 2 pieces
- Hermetic, inverter-controlled rotary compressor mounted on vibration-damping rubber mounts to ensure vibration-free operation under all operating conditions
- Silenced casing
- Oil sump heater
- Finned heat exchanger with hydrophilic Blue Fin coating
- Copper-soldered plate heat exchanger made of stainless steel with polypropylene insulation and frost protection heatingw
- Electronic expansion valve
- 4-way valve for refrigeration circuit switching
- Liquid separator and collector
- Filter dryer
- High and low-pressure switches
- Circulating pump
  - Belaria® fit (8,13) self-regulating
  - Belaria® fit (20,26) 3-stage
- Automatic bleeder valve
- Diaphragm pressure expansion tank
  - Usable volume 4.8 l
- Safety valve
- Flow monitor
- Electrical box internally wired ready for connection
- External operator terminal with display and function keys

Condensate drain
- It must be ensured that the condensate produced can be absorbed to a sufficient extent by a gravel bed (see configuration and connection diagram).
- Condensate drip tray see accessories

Hydraulic connections
- Heating connections

Electrical connections
- See installation instructions

Delivery
- Belaria® fit
- 1 temperature sensor (further temperature sensors see accessories)
- Operator terminal

On site
- Wall openings for water-side connection lines
- Water-side connection lines
- Electrical connection lines

Model range

Belaria® fit type	Energy efficiency class of the compound system with control 35 °C	55 °C	Heat output A-7W35 kW	A2W35 kW	Cooling capacity A35W18 kW
(8) 1PH	A+++	A++	7.3	8.7	11.1
(13) 1PH	A+++	A++	12.7	13.2	15.3
(13) 3PH	A+++	A++	12.7	13.2	15.3
(20) 3PH	A+++	A++	19.9	20.2	21.7
(26) 3PH	A++	A+	23.3	26.0	31.9

1PH = 1-phase electrical connection 230 V/50 Hz
3PH = 3-phase electrical connection 400 V/50 Hz

Operator terminal
- Operator terminal with graphical display and function keys
- Control and monitoring of the modulating heat pumps
- Setting the heating and cooling curves
- Selection of the operating mode: Standard, Silent and Supersilent
- Display of the current operating parameters
- The operator terminal can be installed in any room.
- Can also be used as thermostat
- Control also possible via Modbus
- Operation available in 16 languages
- Included in the scope of delivery of the Belaria® fit

Air/water heat pump

Hoval Belaria® fit (8-26)

Type	Heat output A-7W35 kW	Heat output A2W35 kW	Cooling capacity A35W18 kW	Part No.
(8) 1PH	7.3	8.7	11.1	7019 241
(13) 1PH	12.7	13.2	15.3	7019 242
(13) 3PH	12.7	13.2	15.3	7019 243
(20) 3PH	19.9	20.2	21.7	7019 244
(26) 3PH	23.3	26.0	31.9	7019 245

1PH = 1-phase electrical connection
230 V/50 Hz
3PH = 3-phase electrical connection
400 V/50 Hz

Notice
A buffer storage tank must be provided. Suitable buffer storage tanks see “Calorifiers” and Engineering Belaria® fit (8-26).

Energy efficiency class
see “Description”

Accessories for Belaria® fit (8,13)

HP line insul. AF-WPP 125-32
for Belaria® pro (8,13) and Belaria® fit (8,13)
Flexible, pre-insulated and self-compensating line with two heating pipes and two empty pipes.
Outside diameter: 125 mm
Fluid pipes: 2 x 32 mm/2.9 mm
Empty pipe 1: 32 mm
Empty pipe 2: 25 mm
Bending radius: 0.5 m
Operating temperature: -40 °C to +90 °C
Maximum temperature: +95 °C

Dimension inside/outside	Line length m	Part No.
DN 25/32	10	2077 577
DN 25/32	15	2077 578
DN 25/32	20	2077 579
DN 25/32	25	2077 580

Connector set HP line VS 32-WPP — 6053 304
For HP line insulated AF-WPP 125-32
Consisting of:
- 2 shrink-fit end caps
- 4 clamping adapters 1″ external thread, PN 6
- 1 building feed-in pressing water Core hole diameter 198-202 mm
- 1 fixed point clamp

Lining pipe DN 200 D210/200 x 400 — 2080 584
For HP line insulated AF-WPP
Lining pipe for feeding the HP lines through ceilings, walls and floors.
Suitable for walling in and cementing in.
Lining pipe material: PVC
Formwork cover material: PE
Outer Ø: 210 mm
Internal Ø: 200 mm
Length: 400 mm

Adhesive tape IKB — 2023 563
for thermal insulation made of EPDM
Thickness: 3 mm
Width: 50 mm
Roll: 15 m

Accessories for Belaria® fit (20,26)

HP line insul. AF-WPP 145-40
for Belaria® pro (15), Belaria® fit (20,26) and Daikin Altherma 3 H HT W (14,18)
Flexible, pre-insulated and self-compensating line with two heating pipes and two empty pipes.
Outside diameter: 125 mm
Fluid pipes: 2 x 32 mm/2.9 mm
Empty pipe 1: 32 mm
Empty pipe 2: 25 mm
Bending radius: 0.5 m
Operating temperature: -40 °C to +90 °C
Maximum temperature: +95 °C

Dimension inside/outside	Line length m	Part No.
DN 32/40	10	2077 581
DN 32/40	15	2077 582
DN 32/40	20	2077 583
DN 32/40	25	2077 584

Connector set HP line VS 40-WPP — 6053 305
For HP line insulated AF-WPP 145-40
Consisting of:
- 2 shrink-fit end caps
- 4 clamping adapters 1¼″ external thread, PN 6
- 1 building feed-in pressing water
Core hole diameter: 198-202 mm
- 1 fixed point clamp

Lining pipe DN 200 D210/200 x 400 — 2080 584
For HP line insulated AF-WPP
Lining pipe for feeding the HP lines through ceilings, walls and floors.
Suitable for walling in and cementing in.
Lining pipe material: PVC
Formwork cover material: PE
Outer Ø: 210 mm
Internal Ø: 200 mm
Length: 400 mm

Adhesive tape IKB — 2023 563
for thermal insulation made of EPDM
Thickness: 3 mm
Width: 50 mm
Roll: 15 m

Accessories

Frost protection valve FS108-32 G 1¼" BS
Drains the heating system if the temperature of the heating water falls below 3 °C.
Casing made of brass EN 12165 CW724R-M
Springs made of stainless steel EN 10270-3
EPDM seals
- Connection: G 1¼" (ISO 228-1) flat-sealing
- Operating medium: water
- Operating pressure: max. 10 bar
- Operating temperature: 0-65 °C
- Ambient temperature: -30 °C / +60 °C
- Opening temperature (water): 3 ±1 °C
- Closing temperature (water) 4 ±1 °C
- Kv (passage) = 70 m³/h
- Discharge capacity at 3 bar: 0.5-1 l/h

Part No. 2075 998

At least 2 pieces are required!
Drains the heating system if the temperature of the heating water falls below +3 °C (± 1 °C). Not below +7 °C for cooling.
Observe downward slope, more drain valves may be necessary (flow, return, water traps).

Electric auxiliary heater
Electric auxiliary heater with output power that can be selected locally in three levels, with power supply 230 V/50 Hz or 400 V+N/50 Hz. The kit includes contactors and safety devices for proper operation.
Thermostat with manual reset, thermostat with automatic reset and fuses for protection against abnormal overcurrents.

Type	Output power kW	Part No.
Belaria® fit (8,13) 1PH	2/4/6	6061 315
Belaria® fit (13-26) 3PH	3/6/9	6061 316

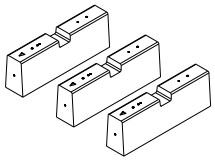
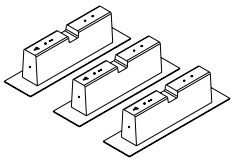
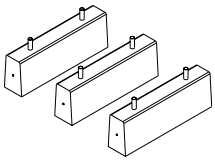
Vibration damper set
for Belaria® fit (8-26)
for reducing the transmission of solid-borne noise in installation
without condensate drip tray
Consisting of:
- 6 vibration-damping adjustable feet
- 6 threaded rods M10
incl. fitting accessories

Part No. 6061 180

Vibration damper set
for Belaria® fit
for reducing the transmission of solid-borne noise in installation
without condensate drip tray
Consisting of:
- 6 vibration-damping adjustable feet
- 6 threaded rods M10
incl. fitting accessories

Type	Part No.
Belaria® fit (8,13)	6061 321
Belaria® fit (20,26)	6061 322

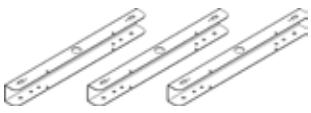
		Part No.
	**Condensate drip tray** for Belaria® fit (8-26) Condensate drip tray with electric heater for collecting and draining the condensate, with connection for the siphon. The drip tray is equipped with an automatically activated frost protection heater that prevents freezing of the condensate and is controlled by a thermostat. **Notice:** When using the condensate drip tray, the corresponding vibration damper set must also be ordered.	6061 314
	**Condensate hose set** Hose 2 m incl. clip 2 pieces are required.	6061 156
	**Temperature sensor** Temperature sensor for recording the following temperatures: - Thermal solar circuit - Boiler or external electric heating - Hot water storage tank - Mixer circuit - Low loss header	
	Length 10 m	6061 317
	Length 30 m	6061 318
	**Switching ball valve VBI60...L** **DN 25-50, PN 16, 120 °C** • Three-way ball valve made of brass with threaded connection • Leakage rate: 0 ... 0.0001 % of kvs value • Permitted media: cold water, cooling water, DHW, hot water, water with frost protection • Recommendation: water treatment according to VDI 2035 • Media temperature: -10 ... 120 °C	
	DN / Connection inches / kvs m^3/h	
	25 / Rp 1″ / 9	6052 444
	32 / Rp 1¼″ / 13	6052 445
	40 / Rp 1½″ / 25	6052 446
	50 / Rp 2″ / 37	6052 447
	**Motor drive GLB341.9E** For straight-way ball valves VAG60.. and switching ball valves VBI60.. DN 15-50 Operating voltage: 230 V, 50/60 Hz Control signal 2-point/3-point Single-wire/2 wire control Operating time: 150 s Nominal torque: 10 Nm Permitted ambient temperature: -32 °C to +55 °C	2070 331

		Part No.
	**Concrete base set BSW01-FU3** for Belaria® fit (8-26) for safe installation of the heat pump on a firm base Consisting of: 3 concrete bases with cast-in fastening sleeves, screw set Dimensions (H x W x D): 250 x 750 x 150 mm Weight: 3 pieces of 58 kg	6061 176
	**Concrete base set BSW01-FD3** for Belaria® fit (8-26) for safe installation of the heat pump on the flat roof Consisting of: 3 concrete bases with cast-in fastening sleeves, protective mats with aluminium lining, screw set Dimensions (H x W x D): 250 x 750 x 150 mm Weight: 3 pieces of 58 kg	6061 177
	**Concrete base set BSW01-ZS3** for Belaria® fit (8-26) for safe installation of the heat pump in gravel bed for gardens and meadows. Additional base height 250 mm for plug combination with concrete base set BSW01-FU3 Consisting of: 3 additional concrete bases, screw set Dimensions (H x W x D): 250 x 750 x 150 mm Weight: 3 pieces of 58 kg	6061 178

Notice
For fastening the Belaria® fit (8-26) on the concrete base sets BSW01, the base set SWK02-3 must also be ordered.

Notice
In a flat roof installation, all standards concerning statics, wind load and access to roofs must be complied with.

Further information
see “Engineering” chapter

	**Base set SKW02-3** for concrete base set BSW01 for safe installation of an outdoor unit on a firm base or on the flat roof Consisting of: - 3 mounting rails - 3 fastening sets	6061 179
	**Wired room thermostat** for Daikin Altherma 3 H HT W (14,18) and Belaria® fit (8-26) Simple and convenient regulation of the indoor temperature for ideal comfort and energy savings. Various time programs can be selected. Installation of the room thermostat on the inside wall in the living area, electrical connection to the operator terminal on site. Voltage-free on/off contact (230 V)	6023 044

Vibration decoupler
for reducing structure-borne noise
from heat pumps indoors,
cannot be shortened
Consisting of:
- 1 vibration decoupler
insulated for heating side
flat-sealing with union nut
- 2 flat seals
Nominal pressure: PN 10

Dimension	Connection inches	Nominal length mm	Part No.
DN 25	1″	300	2082 222
DN 25	1″	500	2082 223
DN 25	1″	1000	2080 794
DN 32	1¼″	300	2082 224
DN 32	1¼″	500	2082 225
DN 32	1¼″	1000	2080 796
DN 40	1½″	500	2082 226
DN 40	1½″	1000	2080 798
DN 50	2″	500	2082 227
DN 50	2″	1000	2080 800

System water protection filter FGM025-200 6058 256
For horizontal installation in return
For filtration of heating and cooling water
Consisting of:
- Filter head and bowl in brass
- Magnetic insert (nickel-neodymium)
- 2 pressure gauges
- filter surface in stainless steel
- Filter fineness 200 µm
- With drain valve
- Connections Rp 1″ internal thread
with integrated shut-off valves and
union connection (outlet)
Max. flow rate (Δp < 0.1 bar): 5.5 m³/h
Weight: 6.8 kg
Water temperature: max. 90 °C
- incl. steam diffusion-tight insulating shells

Notice
Performs the function of sludge separator and strainer.

Dew point switch FAS 2070 911
mechanical dew point switch
for monitoring the formation of
condensate using adjustable
switching value

Safety set SG15-1″ 641 184
Suitable up to max. 50 kW
complete with safety valve (3 bar)
Pressure gauge and autom.
aspirator with shut-off valve.
Connection: DN 15, 1″ internal thread

Part No.

Services

Commissioning
Commissioning by works service or Hoval trained authorised serviceman/company is condition for warranty.

For commissioning and other services please contact your Hoval sales office.

Belaria® fit (8-26)

Type		(8) 1 PH	(13) 1 PH	(13) 3 PH	(20) 3 PH	(26) 3 PH
• Energy efficiency class of the compound system with control	35 °C/55 °C		A+++ / A++		A+++ / A++	A++ / A+
• Room heating energy efficiency “moderate climate” 35 °C ηS	%	206	186	186	181	165
• Room heating energy efficiency “moderate climate” 55 °C ηS	%	131	135	135	125	123
• Seasonal coefficient of performance moderate climate 35 °C	SCOP	5.2	4.7	4.7	4.6	4.2
• Seasonal coefficient of performance moderate climate 55 °C	SCOP	3.4	3.5	3.5	3.2	3.2
Max. performance data heating and cooling in acc. with EN 14511						
• Heat output A2W35	kW	8.7	13.2	13.2	20.2	26.0
• Coefficient of performance A2W35	COP	4.1	3.5	3.5	3.2	2.9
• Heat output A-7W35	kW	7.3	12.7	12.7	19.9	23.3
• Coefficient of performance A-7W35	COP	3.2	2.8	2.8	2.4	2.3
• Cooling capacity A35W18	kW	11.1	15.3	15.3	21.7	31.9
• Energy efficiency ratio A35W18	EER	4.7	3.3	3.3	4.4	3.7
• Cooling capacity A35W7	kW	7.9	11.7	11.7	17.1	12.7
• Energy efficiency ratio A35W7	EER	3.5	2.3	2.3	2.9	2.3
Sound data						
• Sound power level “Standard”	dB(A)	59	65	65	71	77
• Sound power level “Silent” [1]	dB(A)	56	61	61	66	75
• Sound power level “Supersilent” [1]	dB(A)	54	59	59	63	73
Hydraulic data						
• Maximum flow temperature	°C	65	65	65	60	60
• Max. operating pressure on the heating side	bar			3		
• Built-in fan			1 axial fan		2 axial fans	
Cooling technical data						
• Refrigerant		R32	R32	R32	R32	R32
• Refrigeration circuits				1		
• Compressor stages		modulating	modulating	modulating	modulating	modulating
• Refrigerant filling quantity	kg	1.40	1.75	1.75	5.00	5.00
• Compressor oil type			DAPHNE HERMETIC OIL FW68S			
Electrical data						
• Connections	V/Hz	1~230/50	1~230/50	3~400/50	3~400/50	3~400/50
• Starting current (compressor and fan) [2]	A	16	26	11	21	28.5
Dimensions/Weight						
• Dimensions (H x W x D)	mm		864 x 1385 x 523		1557 x 1120 x 528	
• Weight	kg	105	129	144	177	177

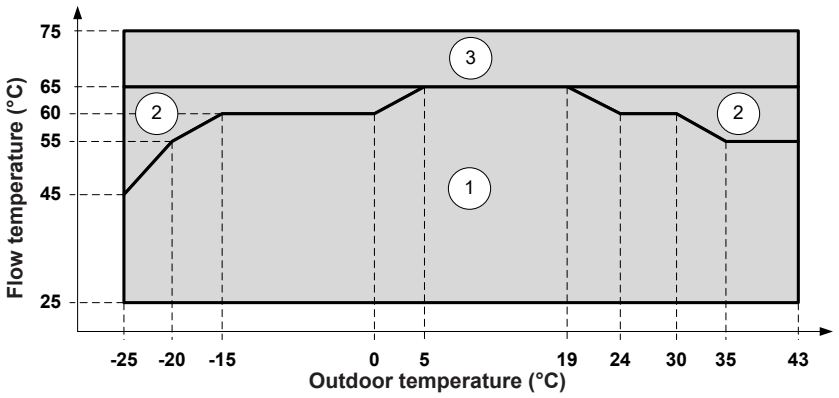
[1] Reduced outputs according to performance data.

[2] Country-specific regulations must be observed. Selection of the fuse size by the electrician.

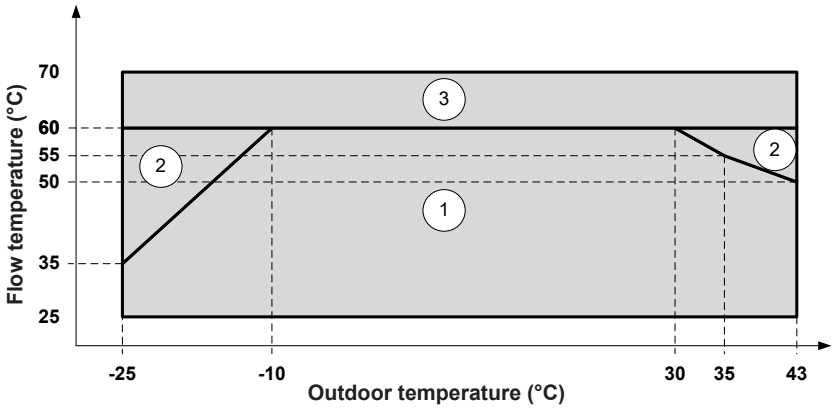
The use of a fast-acting fault-current circuit breaker (< 0.1 s) IΔn ≥ 30 mA is recommended. Country-specific regulations must be observed.

Diagrams of areas of application

Heating and hot water Belaria® fit (8,13)

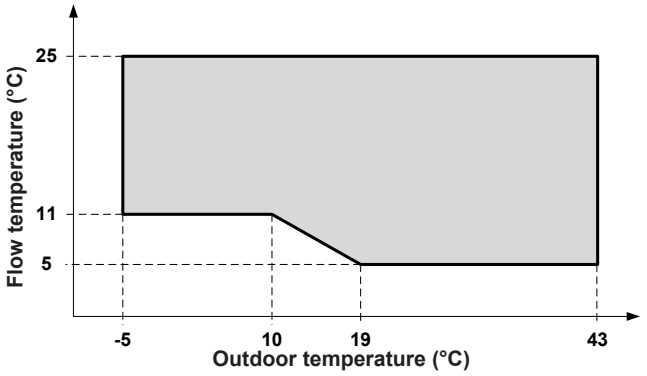


Heating and hot water Belaria® fit (20,26)

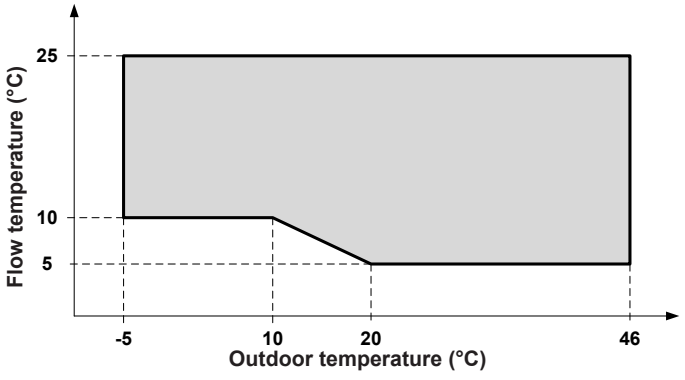


1 Area of application of the heat pump for heating and domestic hot water
2 Extended area of application of the heat pump for heating and domestic hot water including electric heating element
3 Extended area of application of the heat pump for heating and domestic hot water including boiler

Cooling Belaria® fit (8,13)



Cooling Belaria® fit (20,26)



Sound pressure level

Type	Sound power level frequency band [Hz]								Sound power level [1]	Sound pressure level [1]
	63	125	250	500	1000	2000	4000	8000	dB(A)	dB(A)
Belaria® fit (8) 1PH	68	69	58	56	52	49	48	39	59 / 56 / 54	45 / 42 40
Belaria® fit (13) 1PH	73	68	62	63	59	57	50	44	65 / 61 / 59	50 / 46 / 44
Belaria® fit (13) 3PH	71	72	64	60	58	57	57	54	65 / 61 / 59	50 / 46 /44
Belaria® fit (20) 3PH	71	79	70	67	64	61	53	50	70 / 66 / 63	55 / 51 / 49
Belaria® fit (26) 3 PH	75	81	77	73	71	69	61	57	77 / 75 / 73	61 / 59 / 57

[1] Standard / Silent (low noise / Super Silent (whisper mode)

The sound data refers to units under full load with nominal test conditions.
Reference conditions: water inlet/outlet temperature 47/55 °C, outdoor temperature 7 °C, dry bulb / 6 °C wet bulb
The sound pressure level refers to a distance of 1 metre from the outer surface of the unit during operation in the open.
The sound power level is determined according to the tensiometric method (EN ISO 9614-2).

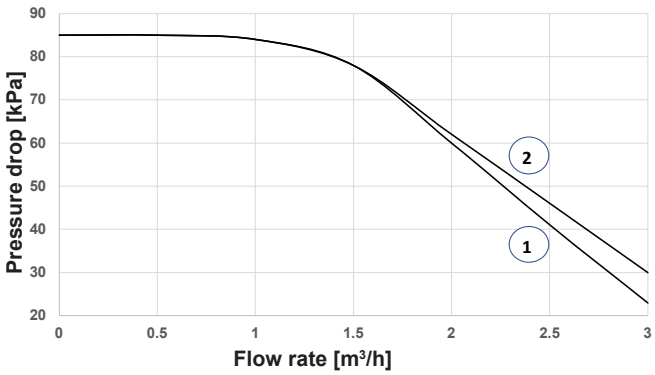
In Silent mode, the maximum outputs must be reduced by the correction factor 0.8.
In Supersilent mode, the maximum outputs must be reduced by the correction factor 0.6.

Notice: The Silent and Supersilent functions are designed for temporary operation of the unit.

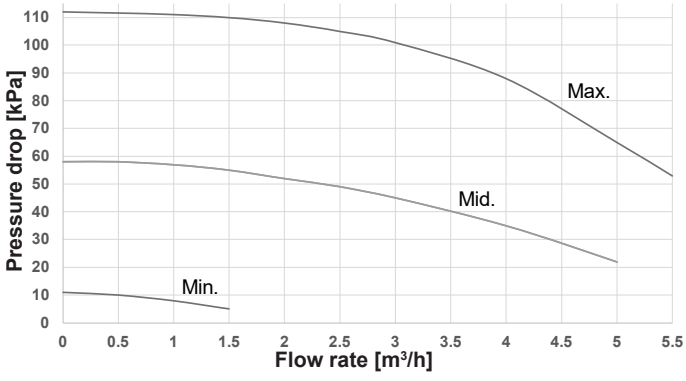
Sound pressure level [dB(A)]	Distance [m]						
	1	2	3	4	5	6	10
Belaria® fit (8) 1PH	44.0	40.9	38.1	36.0	34.4	32.9	29.0
Belaria® fit (13) 1PH	50.0	45.9	43.1	41.0	39.4	37.9	34.0
Belaria® fit (13) 3PH	50.0	45.9	43.1	41.0	39.4	37.9	34.0
Belaria® fit (20) 3PH	57.0	52.9	50.2	48.1	46.4	51.0	47.0
Belaria® fit (26) 3PH	63.0	58.9	56.2	54.1	52.4	51.0	47.0

Residual overpressure

Belaria® fit (8,13)



Belaria® fit (20,26)



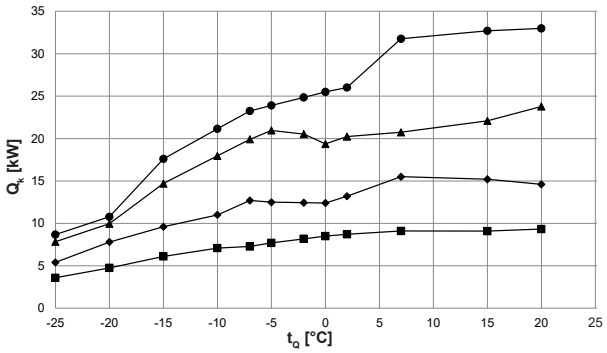
1 Belaria® fit (8) 1PH
2 Belaria® fit (13) 1PH / 3PH

Notice
It is recommended for a buffer storage tank to be installed.

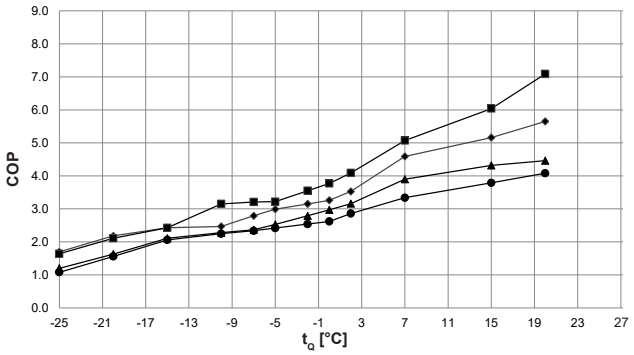
Performance data – heating

Maximum heat output allowing for defrosting losses
Data according to EN 14511

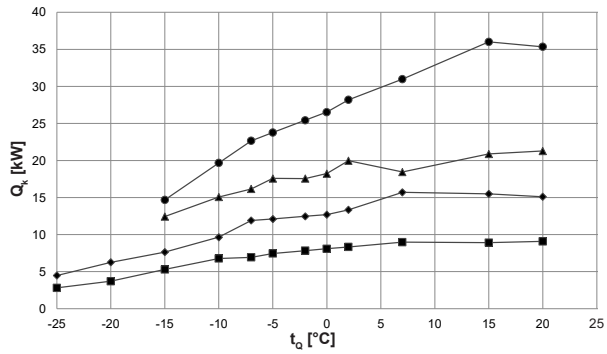
Heat output - t_{VL} 35 °C



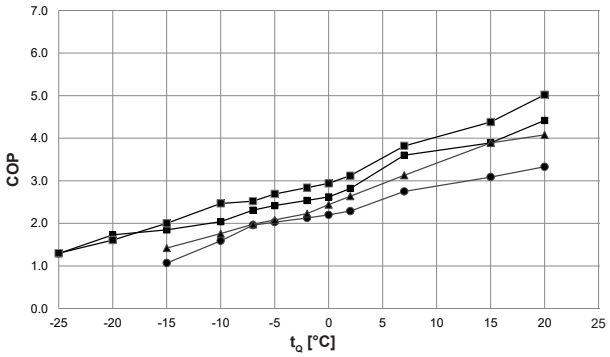
Coefficient of performance - t_{VL} 35 °C



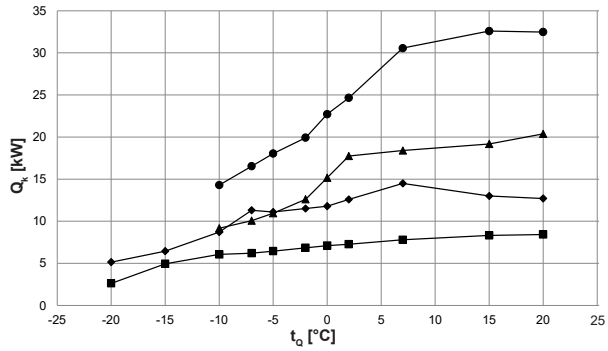
Heat output - t_{VL} 45 °C



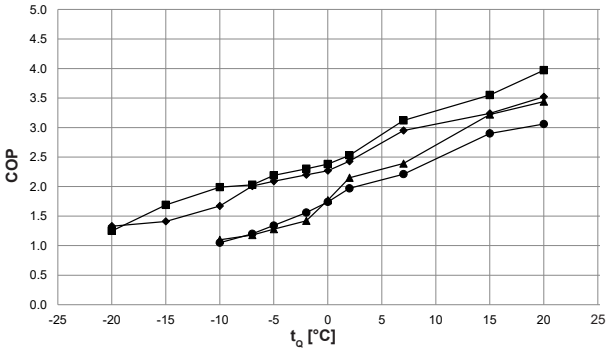
Coefficient of performance - t_{VL} 45 °C



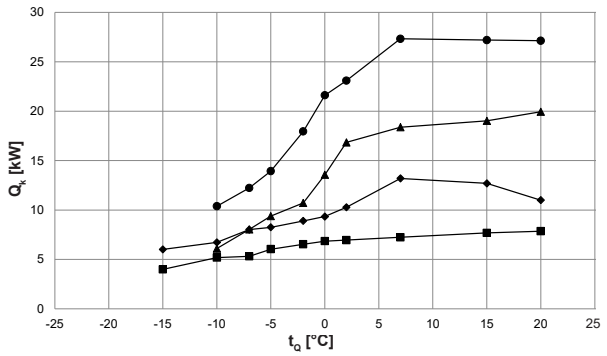
Heat output - t_{VL} 55 °C



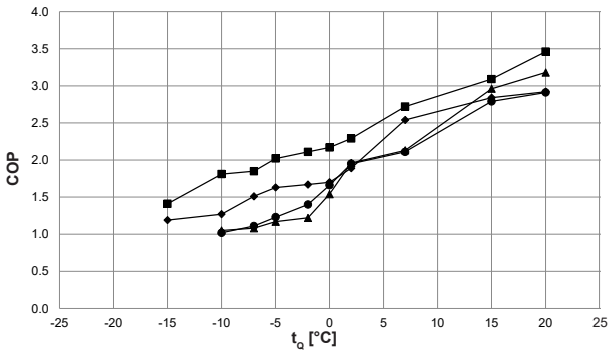
Coefficient of performance - t_{VL} 55 °C



Heat output - t_{VL} 60 °C



Coefficient of performance - t_{VL} 60 °C



t_{VL} = heating flow temperature (°C)
t_Q = source temperature (°C)
Q_h = heat output at full load (kW), measured in accordance with standard EN 14511
COP = Coefficient of performance for the overall unit in accordance with standard EN 14511

■ Belaria® fit (8) 1PH
◆ Belaria® fit (13) 1PH/3PH
▲ Belaria® fit (20) 3PH
● Belaria® fit (26) 3PH

Performance data - heating

Data according to EN 14511

		Belaria® fit (8)			Belaria® fit (13)			Belaria® fit (20)			Belaria® fit (26)		
t_{VL} °C	t_Q °C	Q_h kW	P kW	COP	Q_h kW	P kW	COP	Q_h kW	P kW	COP	Q_h kW	P kW	COP
35	-25	3.6	2.2	1.6	5.4	3.2	1.7	7.8	6.5	1.2	8.7	8.0	1.1
	-20	4.7	2.2	2.1	7.8	3.6	2.2	10.0	6.1	1.6	10.8	6.9	1.6
	-15	6.1	2.5	2.4	9.6	4.0	2.4	14.7	7.0	2.1	17.6	8.5	2.1
	-10	7.1	2.2	3.2	11.0	4.5	2.5	18.0	7.9	2.3	21.1	9.4	2.3
	-7	7.3	2.3	3.2	12.7	4.6	2.8	19.9	8.4	2.4	23.3	9.9	2.3
	-5	7.7	2.4	3.2	12.5	4.2	3.0	21.0	8.3	2.5	23.9	9.9	2.4
	-2	8.2	2.3	3.6	12.4	3.9	3.2	20.5	7.4	2.8	24.9	9.8	2.5
	0	8.5	2.3	3.8	12.4	3.8	3.3	19.4	6.5	3.0	25.5	9.7	2.6
	2	8.7	2.1	4.1	13.2	3.7	3.5	20.2	6.4	3.2	26.0	9.1	2.9
	7	9.1	1.8	5.1	15.5	3.4	4.6	20.7	5.3	3.9	31.8	9.5	3.3
	15	9.1	1.5	6.0	15.2	2.9	5.2	22.1	5.1	4.3	32.7	8.6	3.8
	20	9.3	1.3	7.1	14.6	2.6	5.7	23.8	5.3	4.5	33.0	8.1	4.1
45	-25	2.8	2.2	1.3	4.5	3.5	1.3	-	-	-	-	-	-
	-20	3.7	2.3	1.6	6.3	3.6	1.7	-	-	-	-	-	-
	-15	5.3	2.6	2.0	7.6	4.1	1.9	12.4	8.8	1.4	14.7	13.7	1.1
	-10	6.8	2.7	2.5	9.6	4.7	2.0	15.1	8.6	1.8	19.7	12.4	1.6
	-7	6.9	2.8	2.5	11.9	5.2	2.3	16.2	8.2	2.0	22.7	11.6	2.0
	-5	7.4	2.8	2.7	12.1	5.0	2.4	17.6	8.5	2.1	23.8	11.7	2.0
	-2	7.8	2.8	2.8	12.5	4.9	2.5	17.6	7.9	2.2	25.4	11.9	2.1
	0	8.1	2.8	2.9	12.7	4.8	2.6	18.2	7.5	2.4	26.5	12.1	2.2
	2	8.3	2.7	3.1	13.3	4.7	2.8	20.0	7.6	2.6	28.2	12.3	2.3
	7	9.0	2.4	3.8	15.7	4.4	3.6	18.5	5.9	3.1	31.0	11.3	2.8
	15	8.9	2.0	4.4	15.5	4.0	3.9	20.9	5.4	3.9	36.0	11.7	3.1
	20	9.1	1.8	5.0	15.1	3.4	4.4	21.3	5.2	4.1	35.3	10.6	3.3
55	-25	-	-	-	-	-	-	-	-	-	-	-	-
	-20	2.6	2.1	1.3	5.1	3.9	1.3	-	-	-	-	-	-
	-15	4.9	2.9	1.7	6.5	4.6	1.4	-	-	-	-	-	-
	-10	6.1	3.1	2.0	8.7	5.2	1.7	9.2	8.3	1.1	14.3	13.6	1.1
	-7	6.2	3.1	2.0	11.3	5.6	2.0	10.1	8.5	1.2	16.5	13.8	1.2
	-5	6.5	2.9	2.2	11.1	5.3	2.1	11.0	8.6	1.3	18.0	13.5	1.3
	-2	6.8	3.0	2.3	11.5	5.2	2.2	12.6	8.9	1.4	19.9	12.8	1.6
	0	7.1	3.0	2.4	11.8	5.2	2.3	15.2	8.6	1.8	22.7	13.1	1.7
	2	7.3	2.9	2.5	12.6	5.2	2.4	17.7	8.3	2.2	24.7	12.5	2.0
	7	7.8	2.5	3.1	14.5	4.9	3.0	18.4	7.7	2.4	30.6	13.8	2.2
	15	8.3	2.3	3.6	13.0	4.0	3.2	19.2	6.0	3.2	32.6	11.2	2.9
	20	8.4	2.1	4.0	12.7	3.6	3.5	20.4	5.9	3.4	32.5	10.6	3.1
60	-25	-	-	-	-	-	-	-	-	-	-	-	-
	-20	-	-	-	-	-	-	-	-	-	-	-	-
	-15	4.0	2.8	1.4	6.0	5.1	1.2	-	-	-	-	-	-
	-10	5.2	2.9	1.8	6.7	5.3	1.3	6.1	5.8	1.1	10.4	10.2	1.0
	-7	5.3	2.9	1.9	8.0	5.3	1.5	8.0	7.4	1.1	12.2	11.0	1.1
	-5	6.0	3.0	2.0	8.3	5.1	1.6	9.4	8.0	1.2	13.9	11.3	1.2
	-2	6.5	3.1	2.1	8.9	5.3	1.7	10.7	8.8	1.2	18.0	12.8	1.4
	0	6.9	3.2	2.2	9.3	5.5	1.7	13.6	8.8	1.5	21.6	13.0	1.7
	2	7.0	3.0	2.3	10.3	5.4	1.9	16.8	8.6	2.0	23.1	11.8	2.0
	7	7.2	2.7	2.7	13.2	5.2	2.5	18.4	8.6	2.1	27.3	13.0	2.1
	15	7.7	2.5	3.1	12.7	4.5	2.8	19.0	6.4	3.0	27.2	9.7	2.8
	20	7.9	2.3	3.5	11.0	3.8	2.9	19.9	6.3	3.2	27.1	9.3	2.9

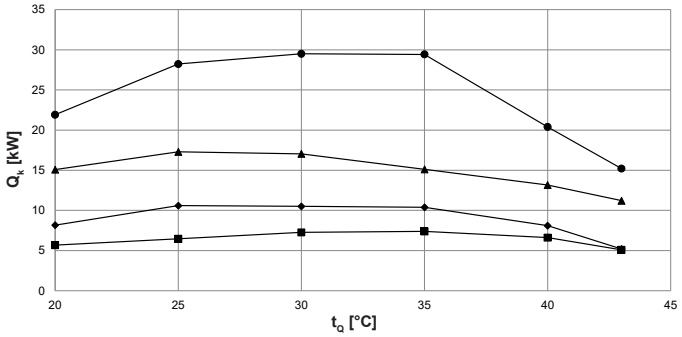
t_{VL} = heating flow temperature (°C)
t_Q = source temperature (°C)
Q_h = heat output at full load (kW), measured in accordance with standard EN 14511
P = power consumption for the overall unit (kW)
COP = Coefficient of performance for the overall unit in accordance with standard EN 14511

Observe daily power interruptions!
see “Engineering heat pumps general”

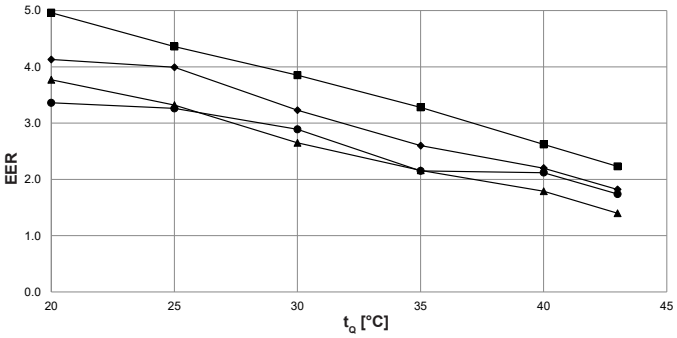
Performance data - cooling

Maximum cooling capacity
Data according to EN 14511

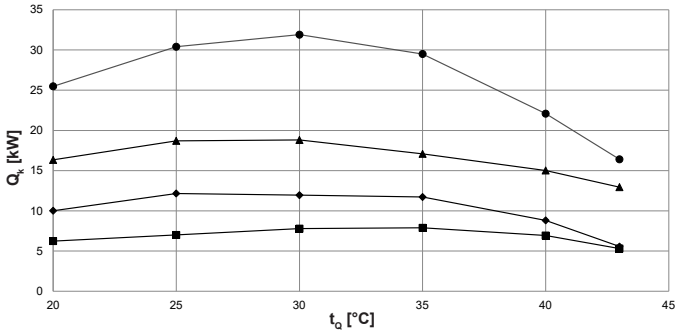
Cooling capacity - t_{VL} 5 °C



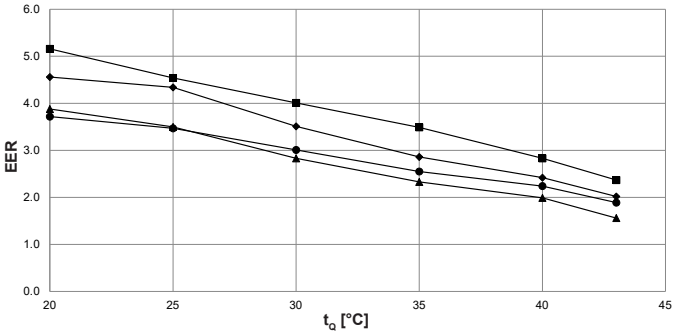
Energy efficiency ratio - t_{VL} 5 °C



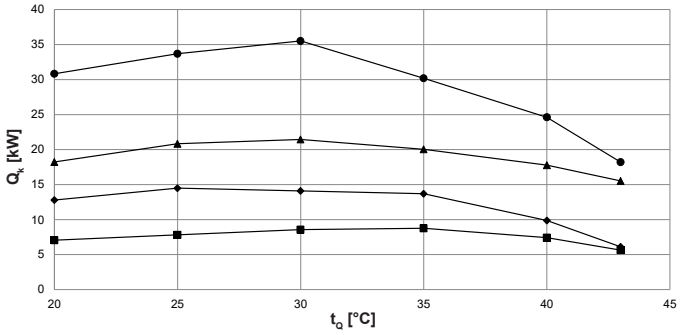
Cooling capacity - t_{VL} 7 °C



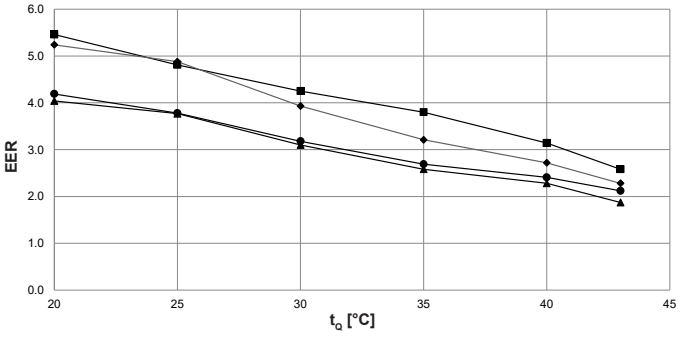
Energy efficiency ratio - t_{VL} 7 °C



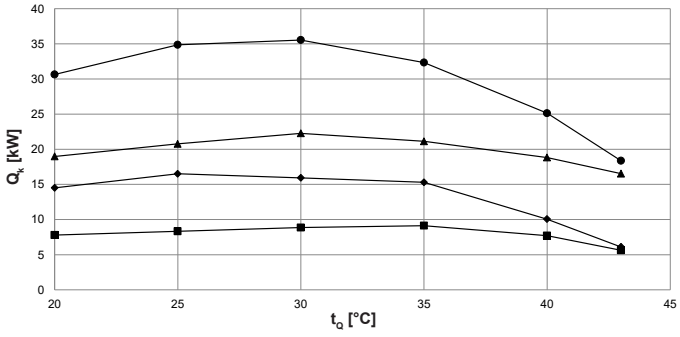
Cooling capacity - t_{VL} 10 °C



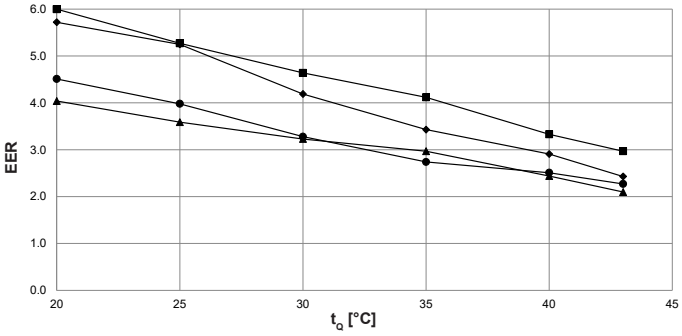
Energy efficiency ratio - t_{VL} 10 °C



Cooling capacity - t_{VL} 12 °C



Energy efficiency ratio - t_{VL} 12 °C



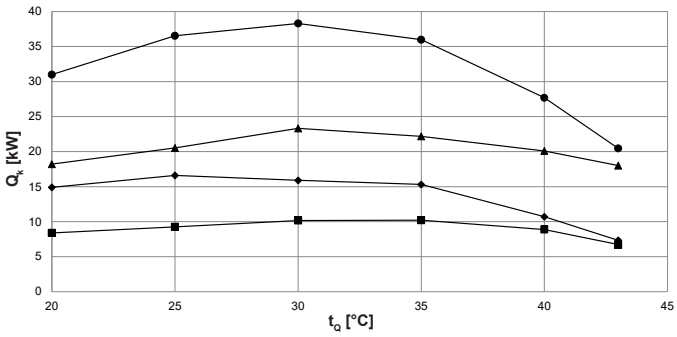
t_{VL} = cooling water flow temperature (°C)
t_Q = source temperature (°C)
Q_k = cooling capacity at full load (kW), measured in accordance with standard EN 14511
EER = Energy Efficiency Ratio for the overall unit in accordance with standard EN 14511

- ■ Belaria® fit (8) 1PH
- ◆ Belaria® fit (13) 1PH/3PH
- ▲ Belaria® fit (20) 3PH
- ● Belaria® fit (26) 3PH

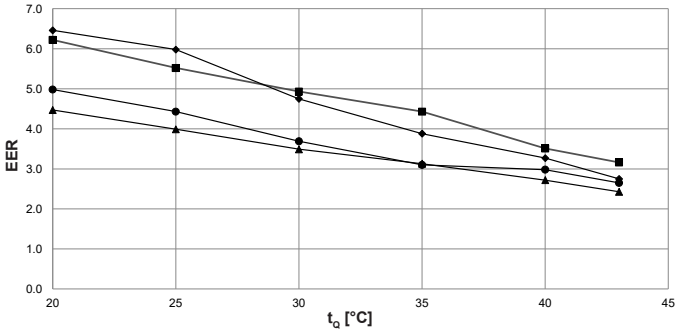
Performance data - cooling

Maximum cooling capacity
Data according to EN 14511

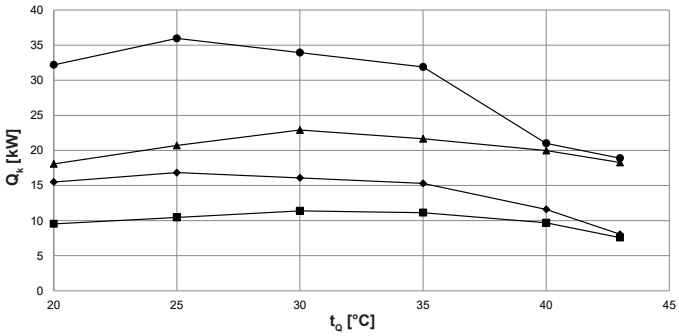
Cooling capacity - t_{VL} 15 °C



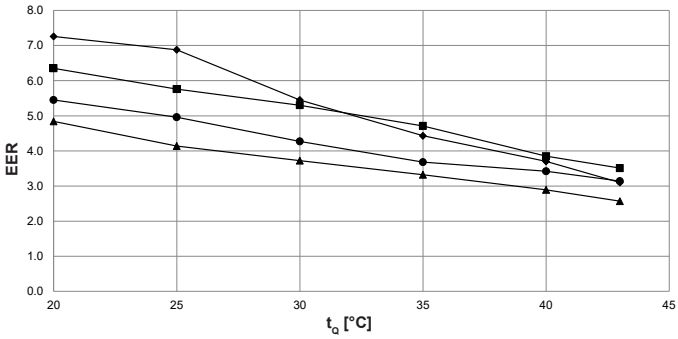
Energy efficiency ratio - t_{VL} 15 °C



Cooling capacity - t_{VL} 18 °C



Energy efficiency ratio - t_{VL} 18 °C



t_{VL} = cooling water flow temperature (°C)
t_Q = source temperature (°C)
Q_k = cooling capacity at full load (kW), measured in accordance with standard EN 14511
EER = Energy Efficiency Ratio for the overall unit in accordance with standard EN 14511

- ■ Belaria® fit (8) 1PH
- ◆ Belaria® fit (13) 1PH/3PH
- ▲ Belaria® fit (20) 3PH
- ● Belaria® fit (26) 3PH

Performance data – cooling

Data according to EN 14511

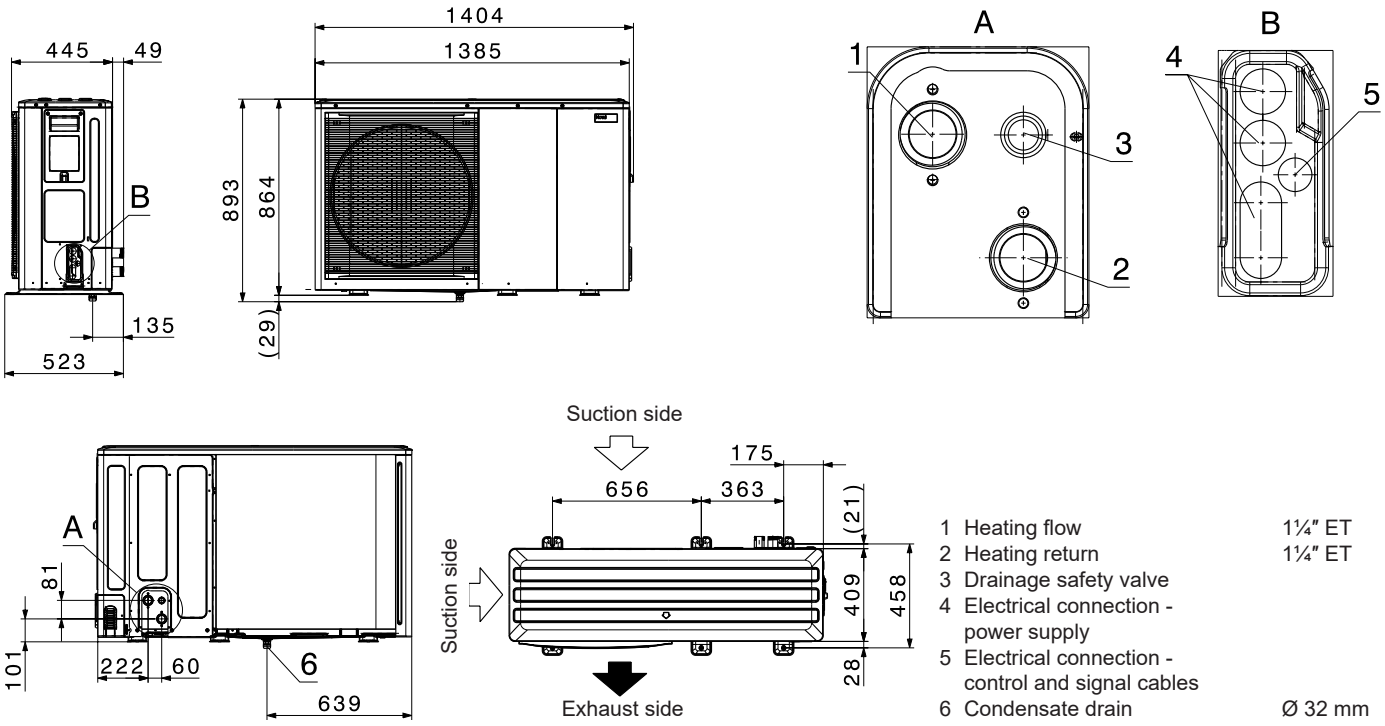
		Belaria® fit (8)			Belaria® fit (13)			Belaria® fit (20)			Belaria® fit (26)		
t_{VL} °C	t_Q °C	Q_h kW	P kW	EER	Q_h kW	P kW	EER	Q_h kW	P kW	EER	Q_h kW	P kW	EER
5	20	5.7	1.1	5.0	8.2	2.2	3.8	15.1	3.7	4.1	21.9	6.5	3.4
	25	6.5	1.5	4.4	10.6	3.2	3.3	17.3	4.3	4.0	28.2	8.7	3.3
	30	7.3	1.9	3.9	10.5	4.0	2.7	17.1	5.3	3.2	29.5	10.2	2.9
	35	7.4	2.3	3.3	10.4	4.8	2.2	15.1	5.8	2.6	29.4	13.7	2.2
	40	6.6	2.5	2.6	8.1	4.5	1.8	13.2	6.0	2.2	20.4	9.6	2.1
	43	5.1	2.3	2.2	5.2	3.7	1.4	11.2	6.2	1.8	15.2	8.7	1.7
7	20	6.2	1.2	5.2	10.0	2.6	3.9	16.3	3.6	4.6	25.5	6.8	3.7
	25	7.0	1.5	4.5	12.2	3.5	3.5	18.7	4.3	4.3	30.4	8.8	3.5
	30	7.8	1.9	4.0	11.9	4.2	2.8	18.8	5.4	3.5	31.9	10.6	3.0
	35	7.9	2.3	3.5	11.7	5.0	2.3	17.1	6.0	2.9	29.5	11.6	2.6
	40	6.9	2.4	2.8	8.8	4.4	2.0	15.0	6.2	2.4	22.1	9.9	2.2
	43	5.3	2.2	2.4	5.6	3.6	1.6	12.9	6.4	2.0	16.4	8.7	1.9
10	20	7.1	1.3	5.5	12.8	3.2	4.0	18.2	3.5	5.2	30.8	7.4	4.2
	25	7.8	1.6	4.8	14.5	3.8	3.8	20.8	4.3	4.9	33.7	8.9	3.8
	30	8.6	2.0	4.3	14.1	4.5	3.1	21.5	5.5	3.9	35.5	11.2	3.2
	35	8.8	2.3	3.8	13.7	5.3	2.6	20.1	6.2	3.2	30.2	11.2	2.7
	40	7.4	2.4	3.1	9.9	4.3	2.3	17.8	6.5	2.7	24.6	10.2	2.4
	43	5.6	2.2	2.6	6.1	3.3	1.9	15.5	6.8	2.3	18.2	8.6	2.1
12	20	7.8	1.3	6.0	14.5	3.6	4.0	19.0	3.3	5.7	30.6	6.8	4.5
	25	8.3	1.6	5.3	16.5	4.6	3.6	20.8	4.0	5.3	34.9	8.8	4.0
	30	8.9	1.9	4.6	15.9	4.9	3.2	22.3	5.3	4.2	35.5	10.8	3.3
	35	9.1	2.2	4.1	15.3	5.2	3.0	21.1	6.2	3.4	32.3	11.8	2.7
	40	7.7	2.3	3.3	10.1	4.1	2.4	18.8	6.5	2.9	25.1	10.0	2.5
	43	5.6	1.9	3.0	6.1	2.9	2.1	16.5	6.8	2.4	18.4	8.1	2.3
15	20	8.4	1.3	6.2	14.9	3.3	4.5	18.2	2.8	6.5	31.0	6.2	5.0
	25	9.3	1.7	5.5	16.6	4.2	4.0	20.5	3.4	6.0	36.5	8.2	4.4
	30	10.2	2.1	4.9	15.9	4.6	3.5	23.3	4.9	4.8	38.3	10.4	3.7
	35	10.2	2.3	4.4	15.3	4.9	3.1	22.2	5.7	3.9	36.0	11.6	3.1
	40	8.9	2.5	3.5	10.7	3.9	2.7	20.1	6.1	3.3	27.7	9.3	3.0
	43	6.7	2.1	3.2	7.3	3.0	2.4	18.0	6.5	2.8	20.5	7.7	2.7
18	20	9.5	1.5	6.4	15.5	3.2	4.8	18.1	2.5	7.3	32.2	5.9	5.5
	25	10.5	1.8	5.8	16.8	4.1	4.1	20.7	3.0	6.9	36.0	7.2	5.0
	30	11.4	2.1	5.3	16.1	4.3	3.7	22.9	4.2	5.5	33.9	7.9	4.3
	35	11.1	2.4	4.7	15.3	4.6	3.3	21.7	4.9	4.4	31.9	8.7	3.7
	40	9.7	2.5	3.9	11.6	4.0	2.9	20.0	5.4	3.7	21.0	6.1	3.4
	43	7.6	2.2	3.5	8.1	3.1	2.6	18.3	5.9	3.1	18.9	6.0	3.1

t_{VL} = cooling water flow temperature (°C)
t_Q = source temperature (°C)
Q_k = cooling capacity at full load (kW), measured in accordance with standard EN 14511
P = power consumption for the overall unit (kW)
EER = Energy Efficiency Ratio for the overall unit in accordance with standard EN 14511

Observe daily power interruptions!
see “Engineering heat pumps general”

Belaria® fit (8,13)

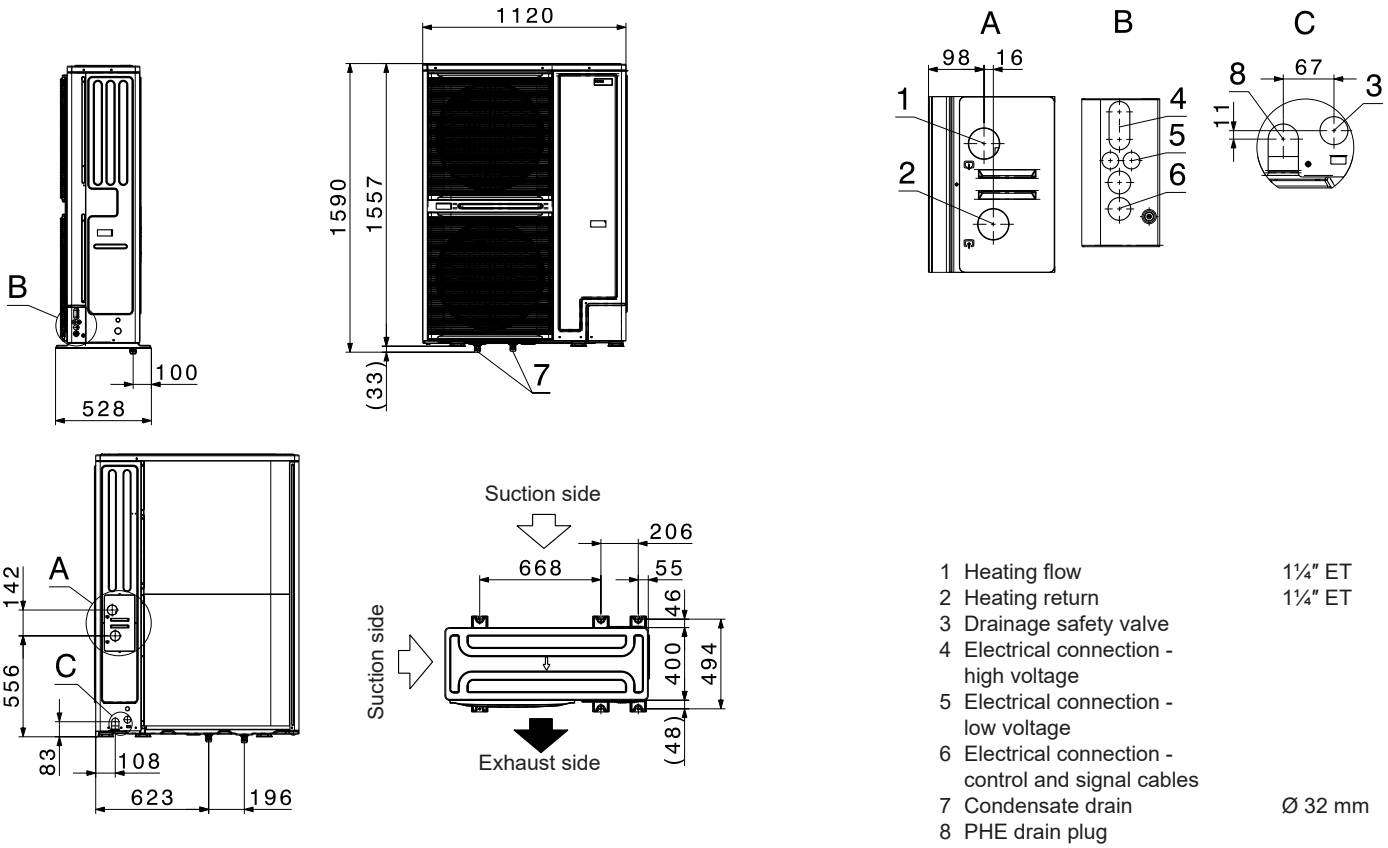
(Dimensions in mm)



1	Heating flow	1¼" ET
2	Heating return	1¼" ET
3	Drainage safety valve	
4	Electrical connection - power supply	
5	Electrical connection - control and signal cables	
6	Condensate drain	Ø 32 mm

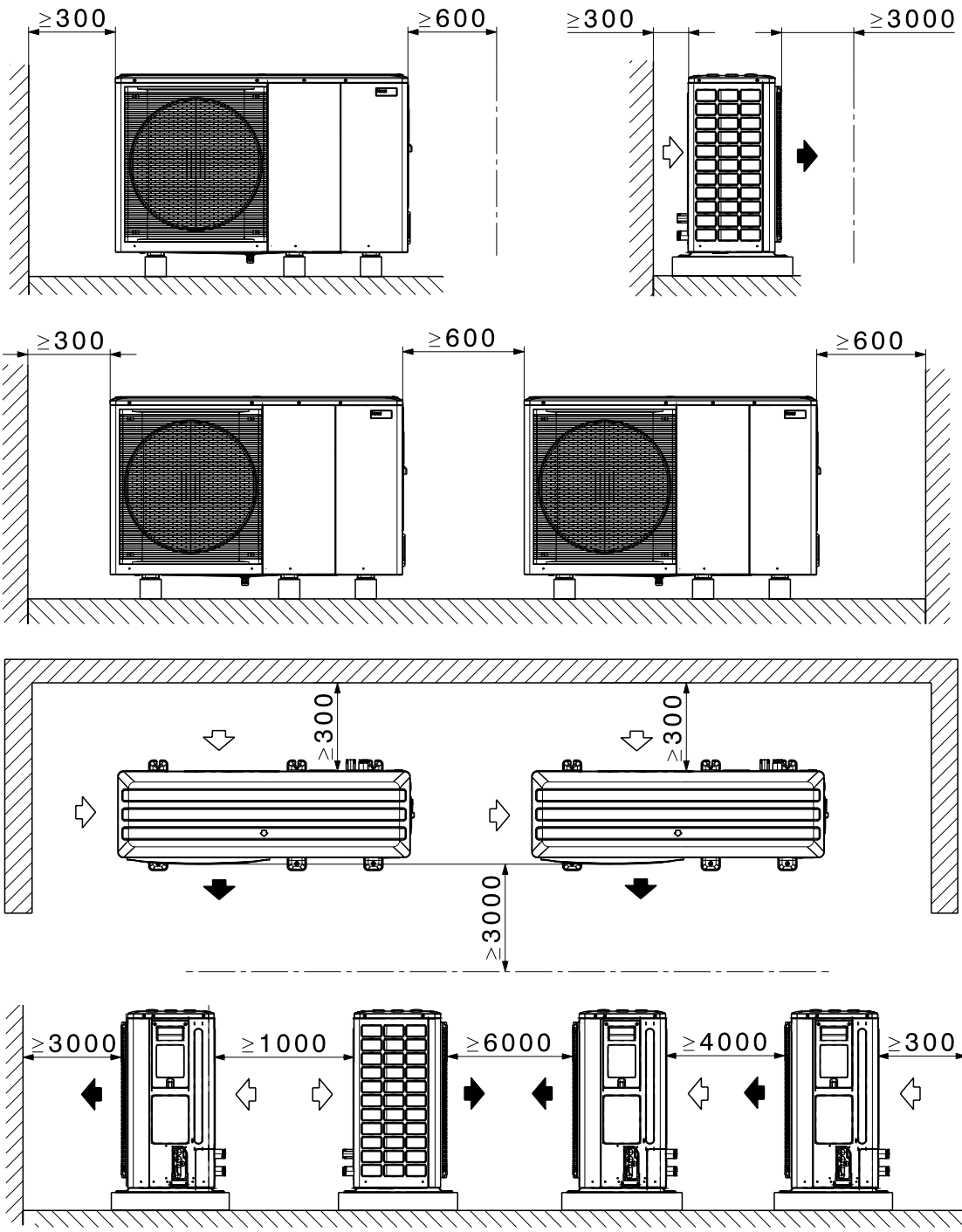
Belaria® fit (20,26)

(Dimensions in mm)



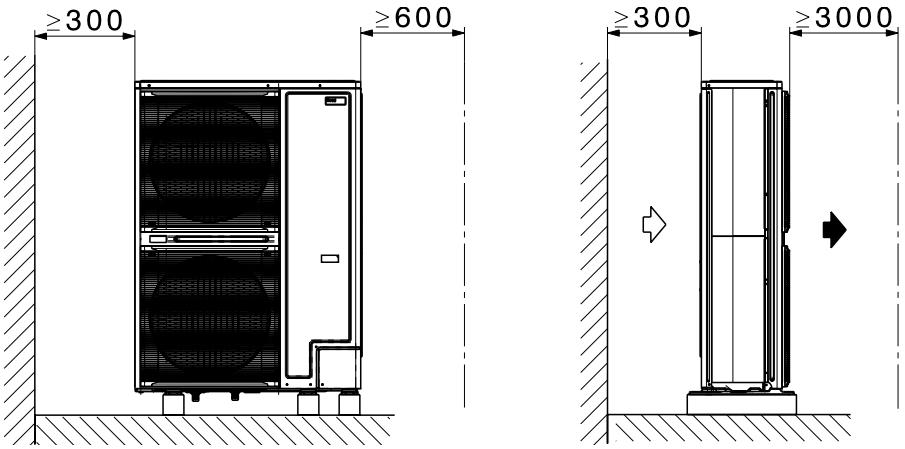
1	Heating flow	1¼" ET
2	Heating return	1¼" ET
3	Drainage safety valve	
4	Electrical connection - high voltage	
5	Electrical connection - low voltage	
6	Electrical connection - control and signal cables	
7	Condensate drain	Ø 32 mm
8	PHE drain plug	

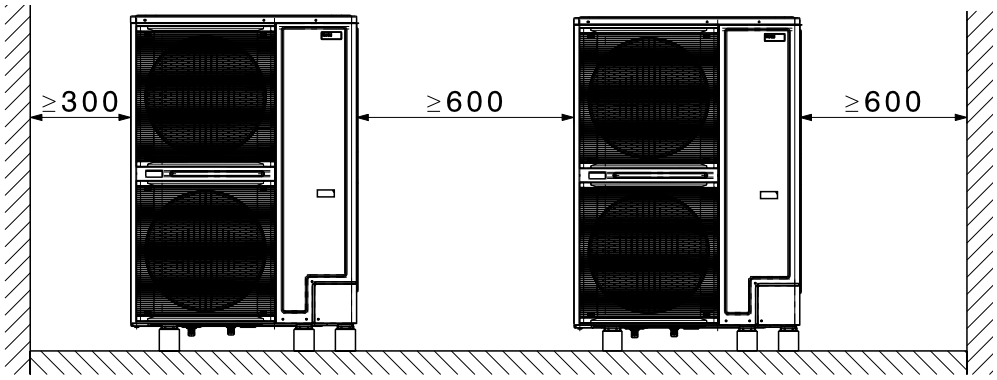
Space requirement Belaria® fit (8,13)
(Dimensions in mm)

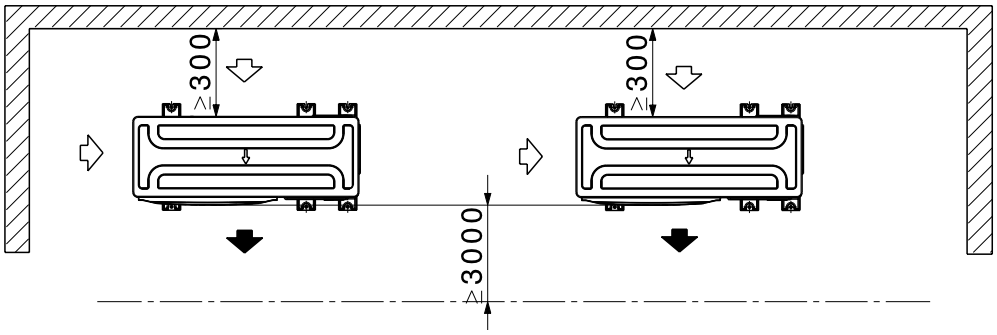


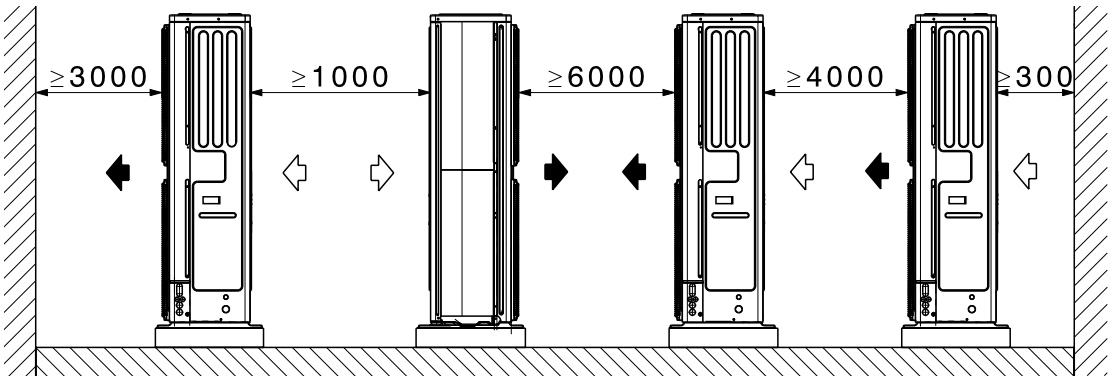
Space requirement Belaria® fit (20,26)

(Dimensions in mm)



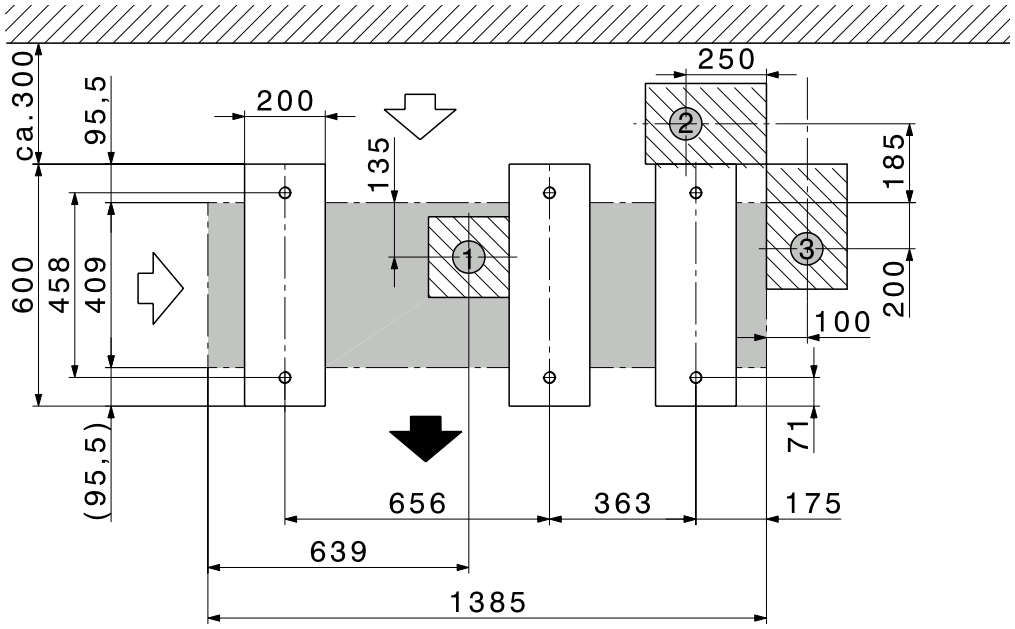


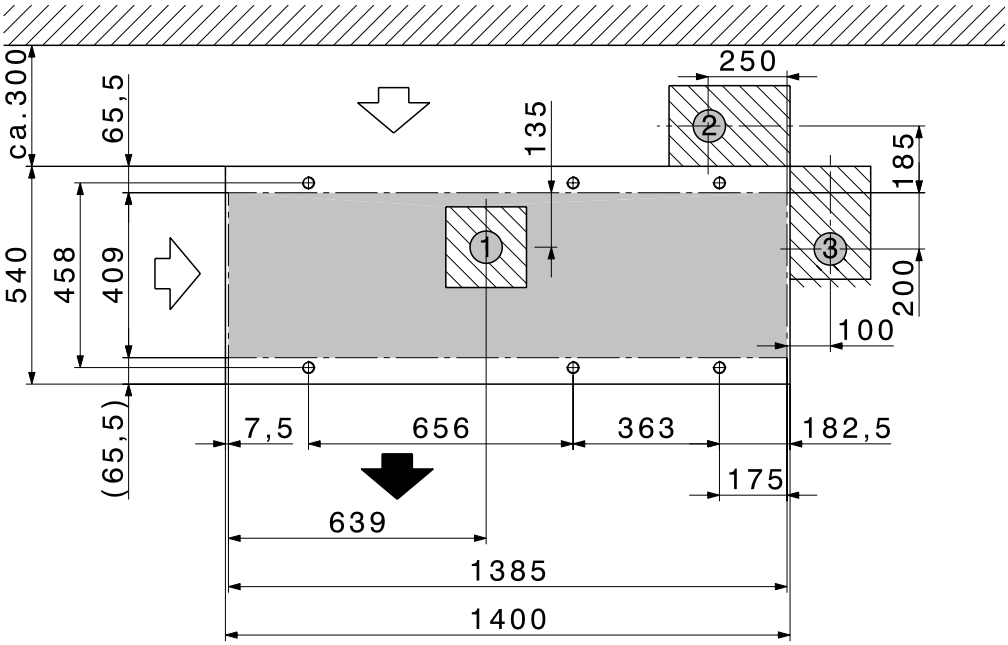




Installation of Belaria® fit

(Dimensions in mm)

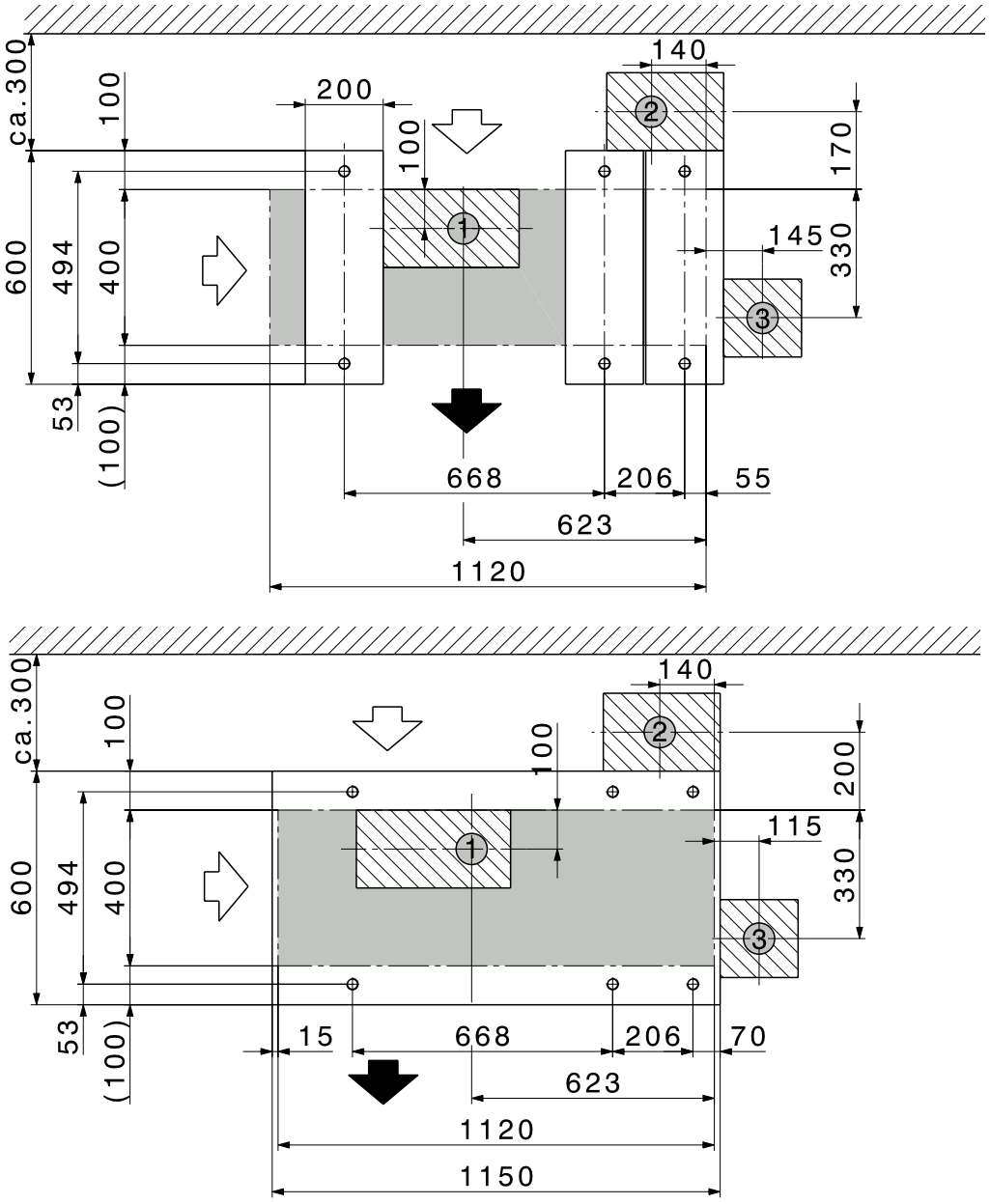




1 Condensate drain area
2 Flow/return area
3 Electrical connection

Installation of Belaria® fit (20,26)

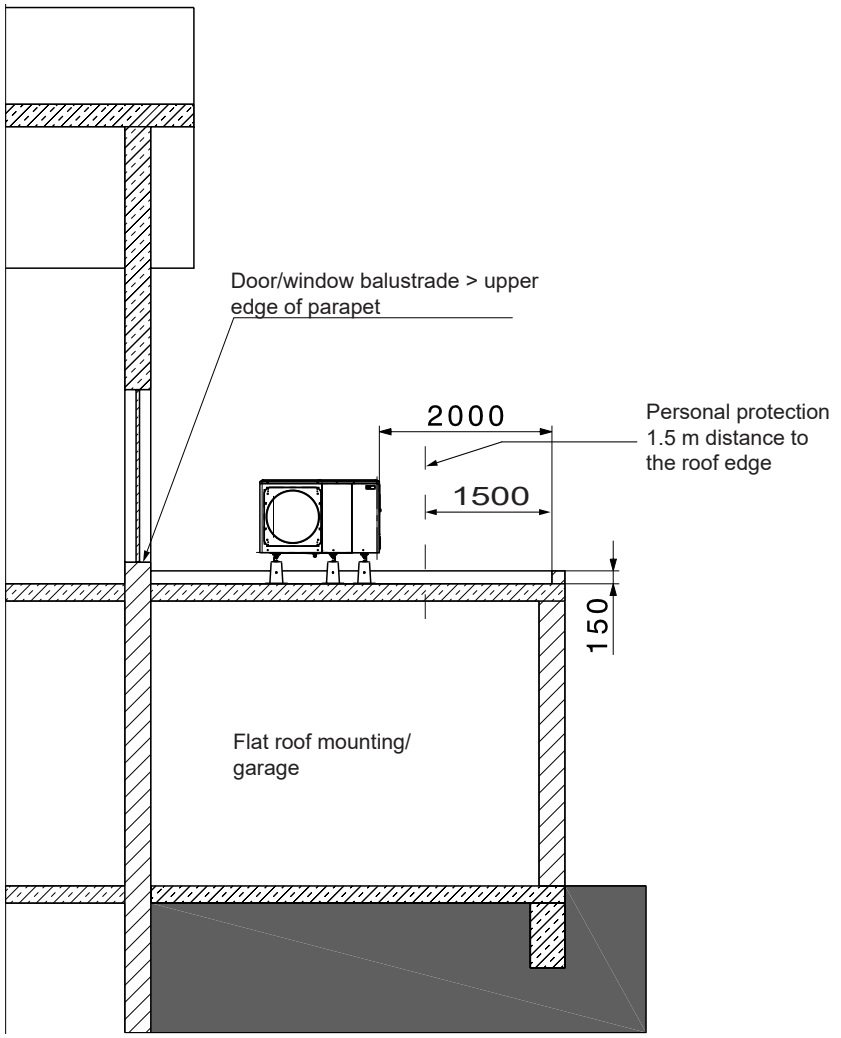
(Dimensions in mm)

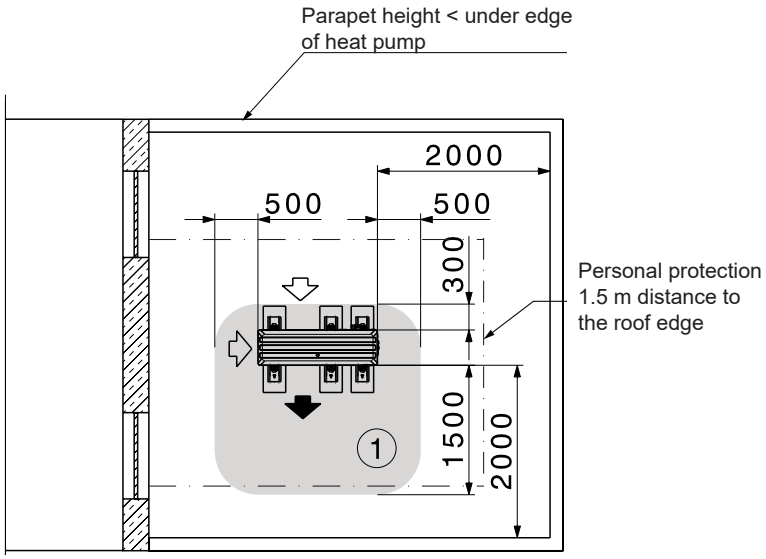


1 Condensate drain area
2 Flow/return area
3 Electrical connection

Installation of Belaria® fit (8,13)

(Dimensions in mm)



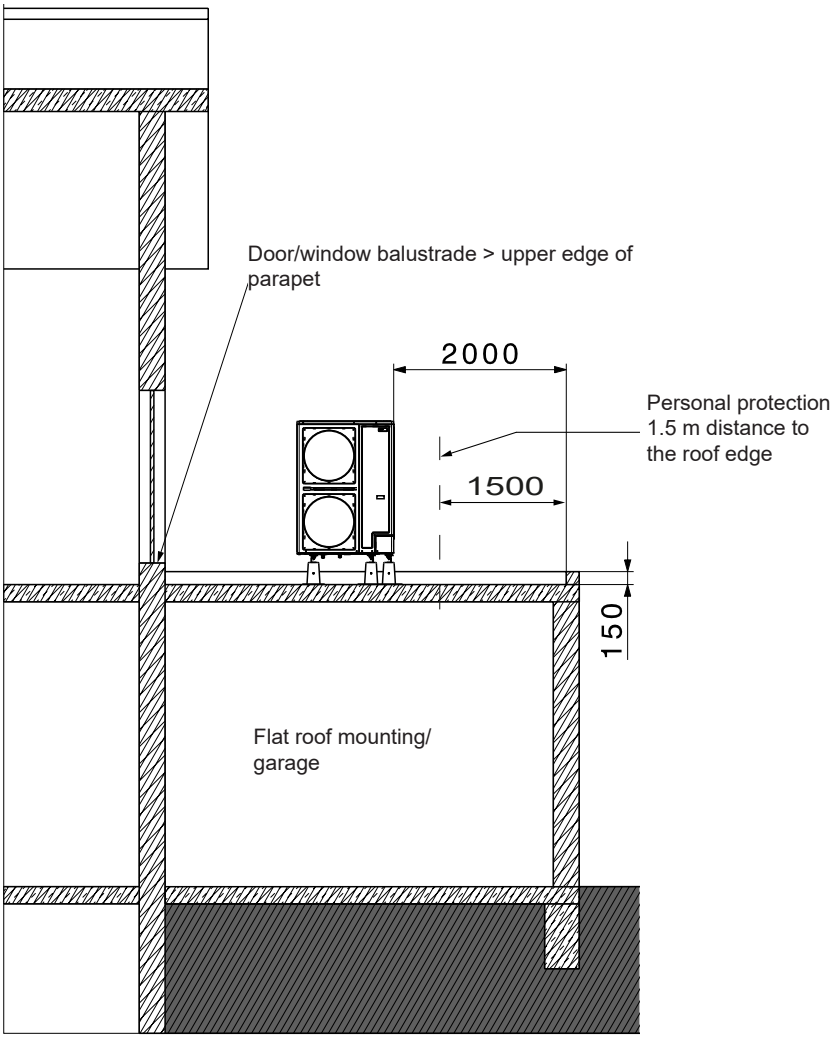


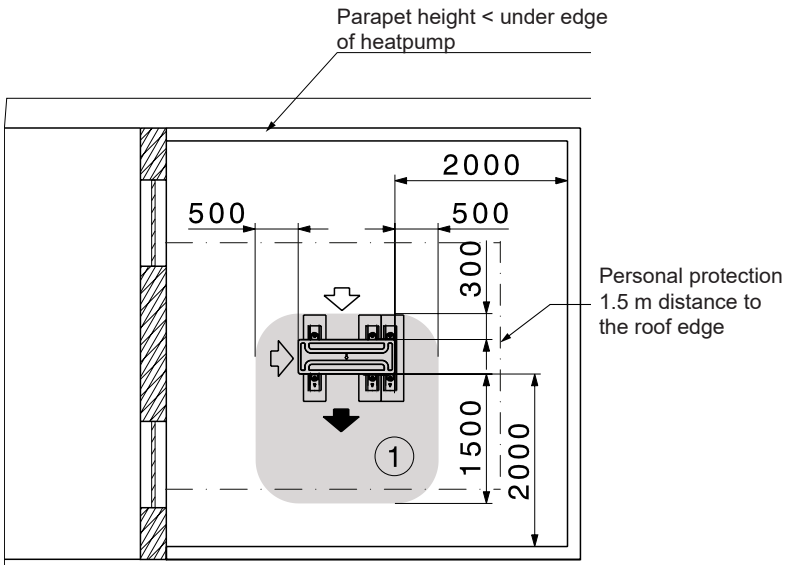
- All standards concerning statics, wind load and access to roofs must be complied with. The outdoor unit must be firmly bolted onto the substructure (e.g. concrete base). The heat pump must be prevented from tilting.
- Minimum distance of the heat pump to the roof edge: 2 m (personal protection + working area refrigeration circuit).
- Accessibility for maintenance and repair work must be ensured. For work on the heat pump, a measuring case and test equipment, refrigerant bottle, etc. must be transported to the site, amongst other things. In addition to the safety equipment (fall protection devices, anchoring devices, etc.), this must also be taken into account for skylights, stairs, railings, etc.

1 Operating range

Installation of Belaria® fit (20,26)

(Dimensions in mm)





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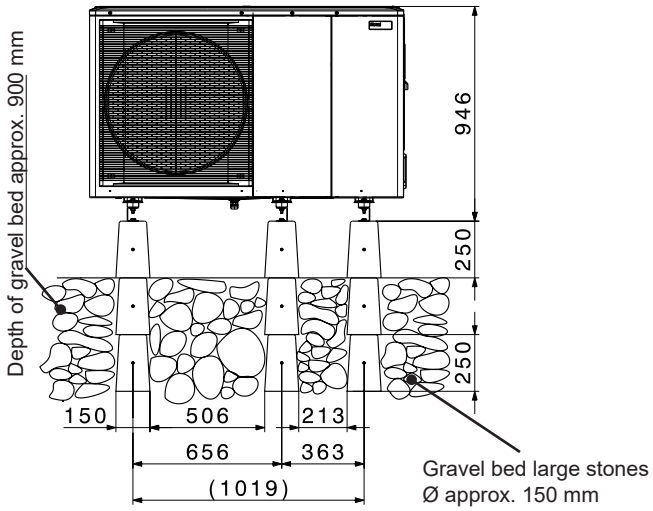
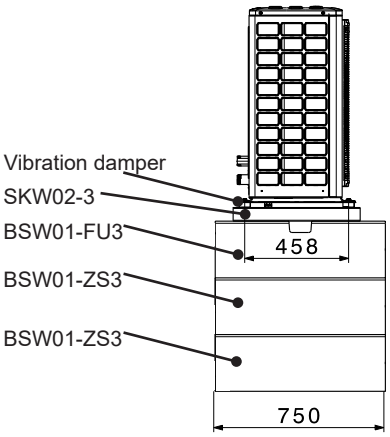
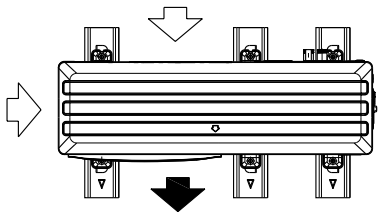
- Minimum distance of the heat pump to the roof edge: 2 m (personal protection + working area refrigeration circuit).
- Accessibility for maintenance and repair work must be ensured. For work on the heat pump, a measuring case and test equipment, refrigerant bottle, etc. must be transported to the site, amongst other things. In addition to the safety equipment (fall protection devices, anchoring devices, etc.), this must also be taken into account for skylights, stairs, railings, etc.

1 Operating range

Installation concrete base - gravel bed
Belaria® fit (8,13)
(Dimensions in mm)

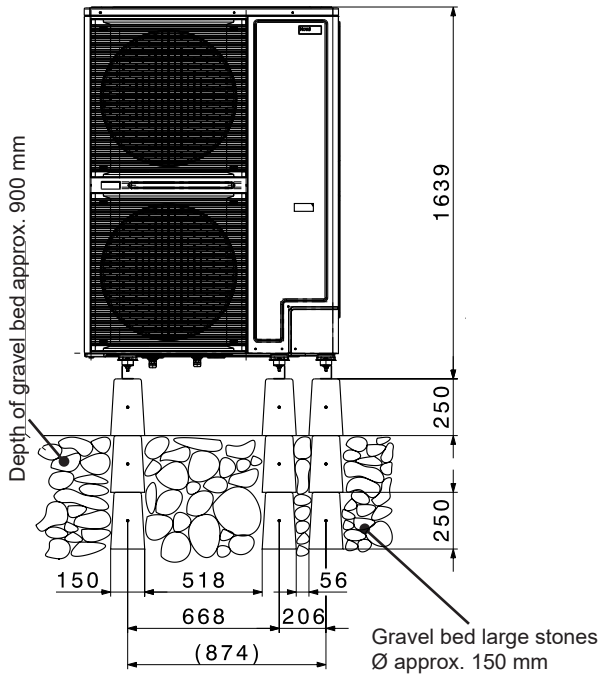


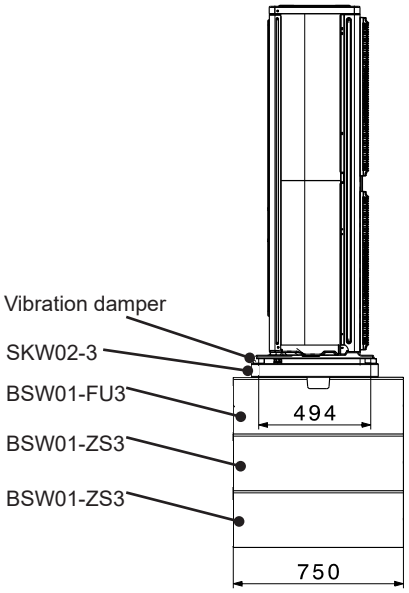


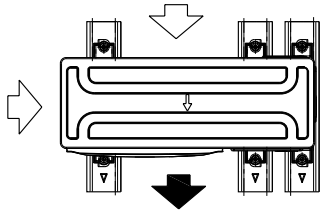


Notice
Use 6 sets of M10 anchor bolts, nuts and washers to secure the unit to the base set. Provide a free space of at least 150 mm under the unit. Place the unit on suitable vibration dampers appropriate to the weight of the unit, to effectively dampen vibrations.

Belaria® fit (20,26)
(Dimensions in mm)





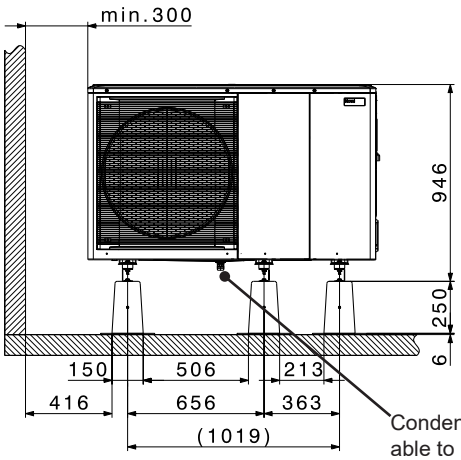


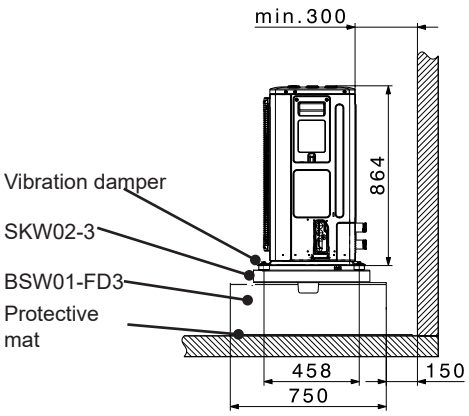
Notice
Use 6 sets of M10 anchor bolts, nuts and washers to secure the unit to the base set. Provide a free space of at least 150 mm under the unit. Place the unit on suitable vibration dampers appropriate to the weight of the unit, to effectively dampen vibrations.

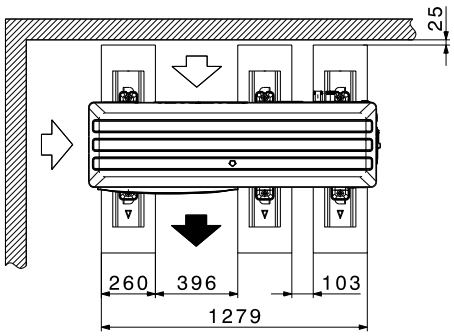
Installation concrete base - flat roof

Belaria® fit (8,13)

(Dimensions in mm)



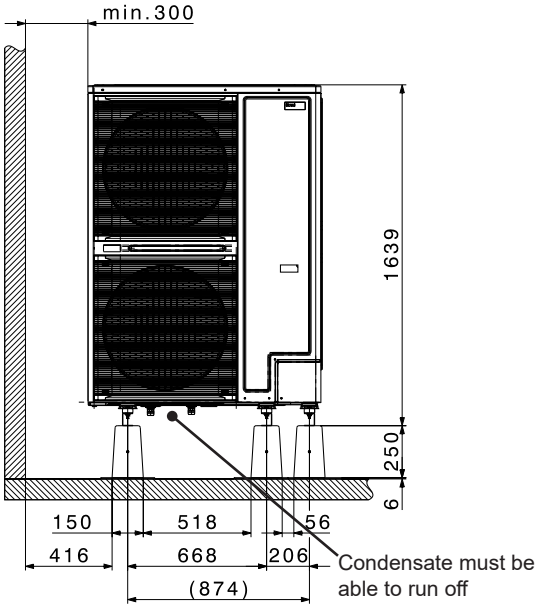


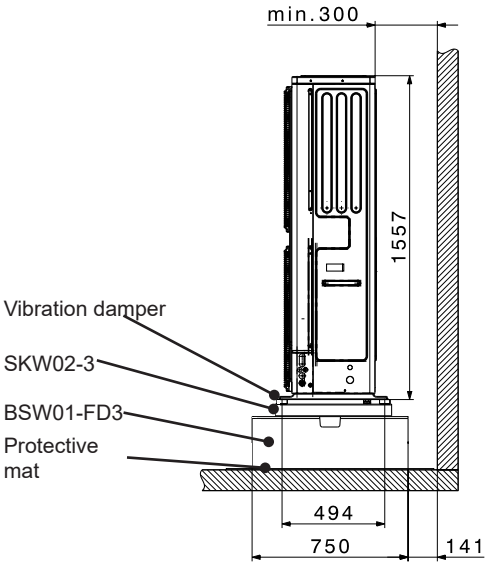


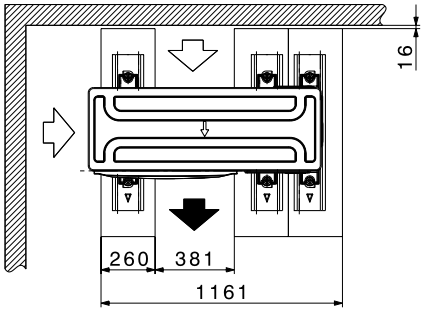
Notice
Use 6 sets of M10 anchor bolts, nuts and washers to secure the unit to the base set. Provide a free space of at least 150 mm under the unit. Place the unit on suitable vibration dampers appropriate to the weight of the unit, to effectively dampen vibrations.

Belaria® fit (20,26)

(Dimensions in mm)



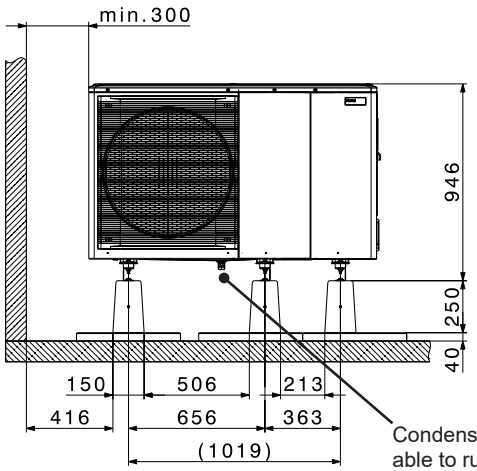


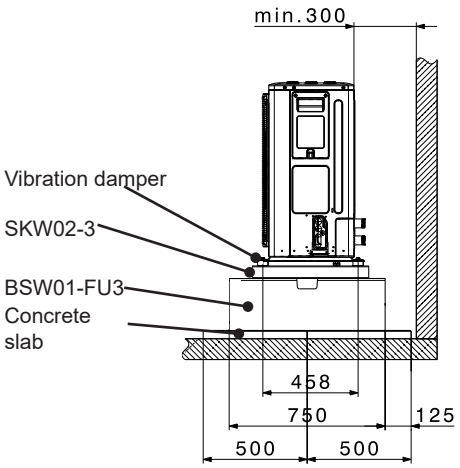


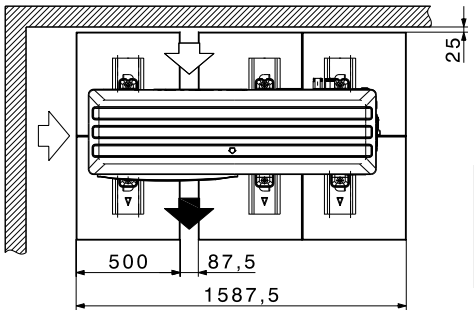
Notice
Use 6 sets of M10 anchor bolts, nuts and washers to secure the unit to the base set. Provide a free space of at least 150 mm under the unit. Place the unit on suitable vibration dampers appropriate to the weight of the unit, to effectively dampen vibrations.

Installation concrete base - firm base
Belaria® fit (8,13)

(Dimensions in mm)



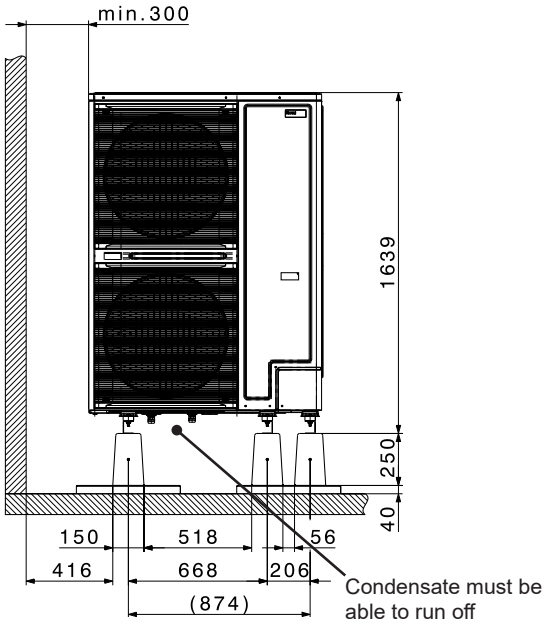


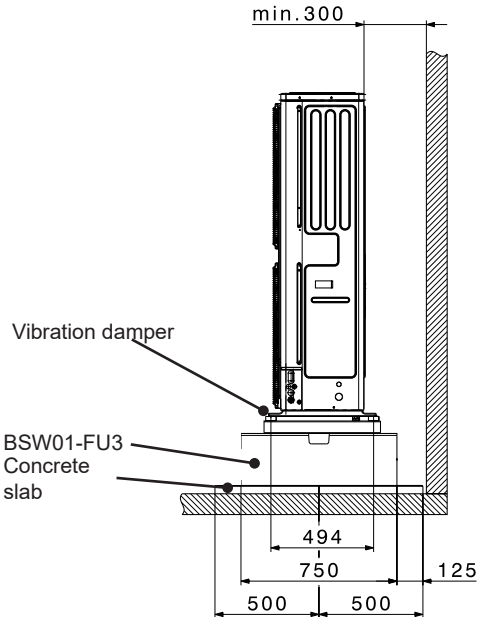


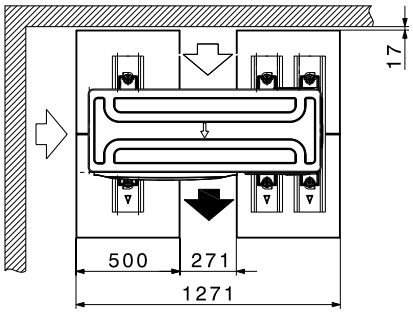
Notice
Use 6 sets of M10 anchor bolts, nuts and washers to secure the unit to the base set. Provide a free space of at least 150 mm under the unit. Place the unit on suitable vibration dampers appropriate to the weight of the unit, to effectively dampen vibrations.

Belaria® fit (20,26)

(Dimensions in mm)







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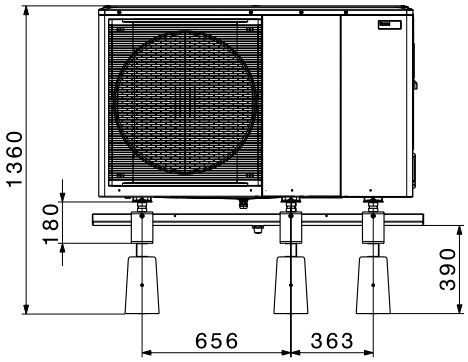
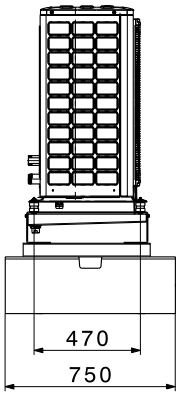
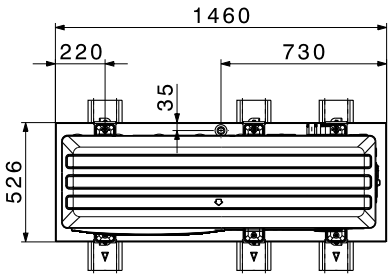
Installation concrete base – condensate drip tray

Belaria® fit (8,13)

(Dimensions in mm)



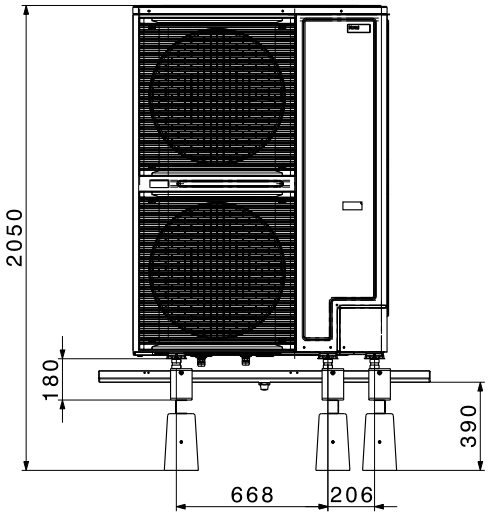


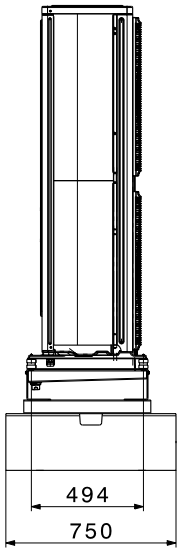


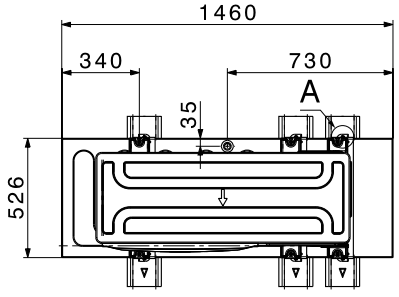
Notice
Use 6 sets of threaded rods M8, nuts and washers to secure the unit to the base set. Provide a free space of at least 150 mm under the unit. Place the unit on suitable vibration dampers appropriate to the weight of the unit, to effectively dampen vibrations.

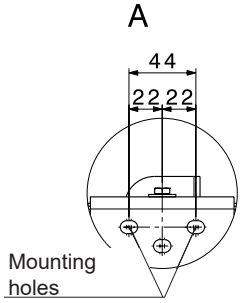
Belaria® fit (20,26)

(Dimensions in mm)









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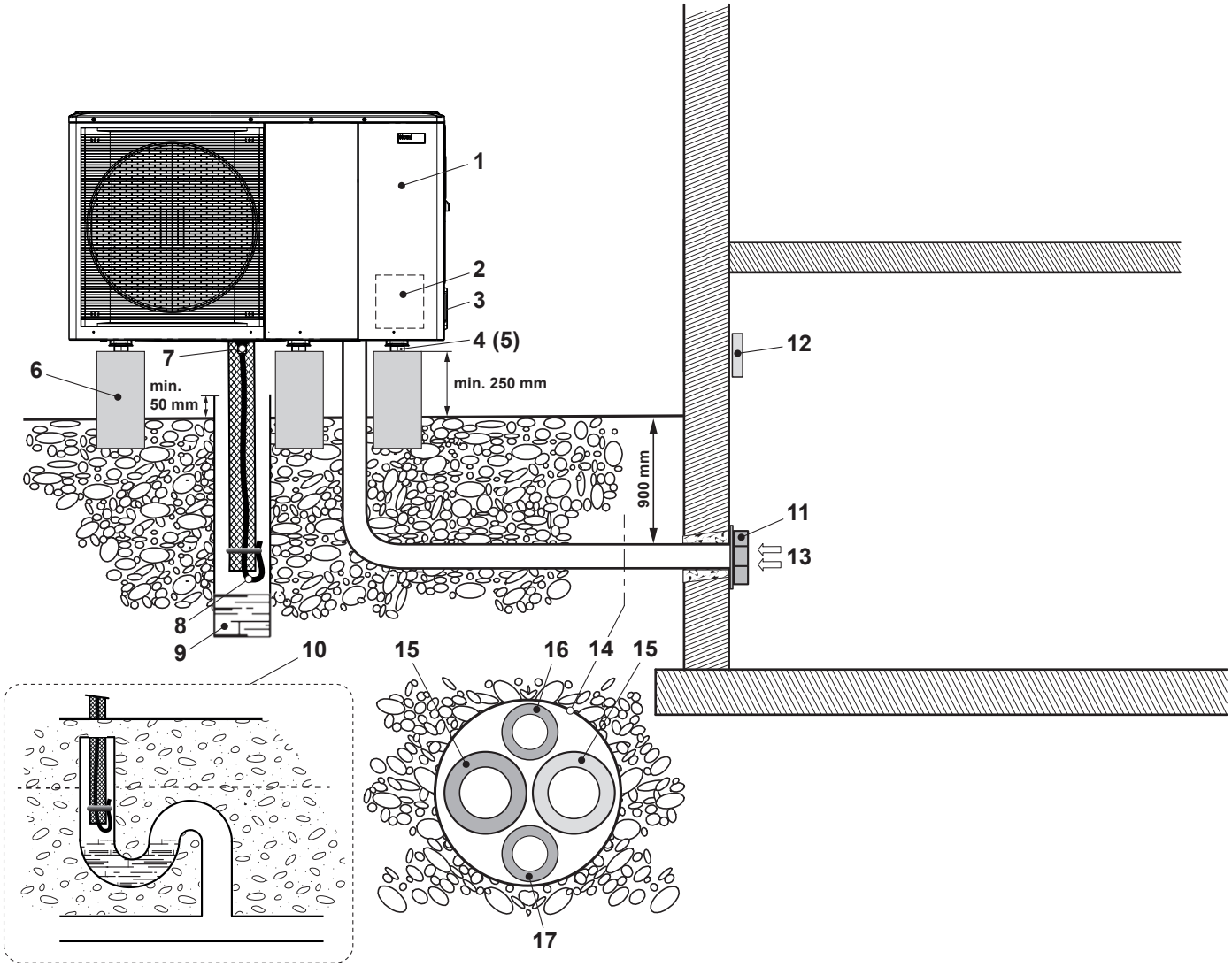
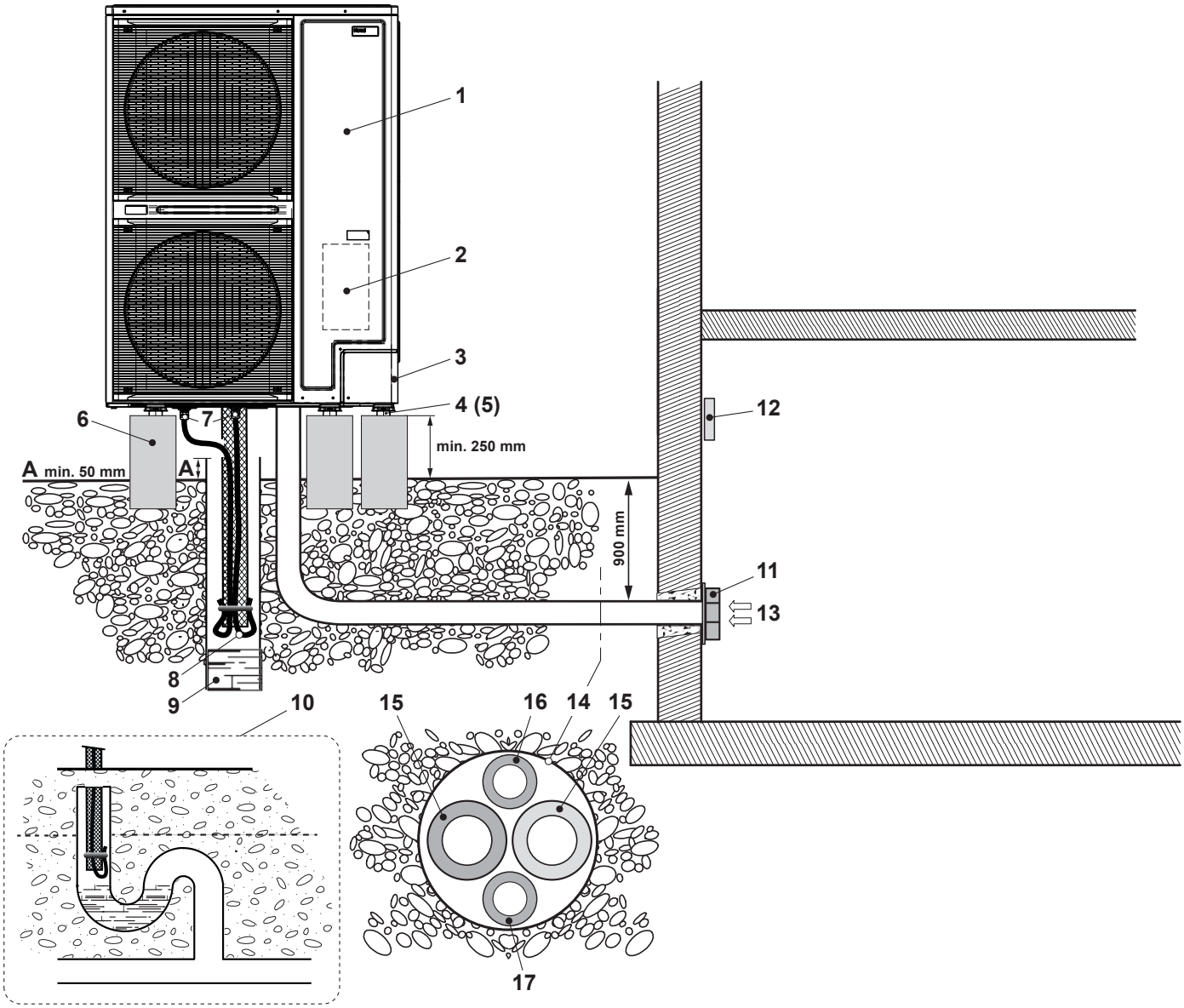
Configuration and connection diagram
Belaria® fit (8,13)



1	Belaria® fit (8,13)	
2	Hydraulic connection	
3	Electrical connection (electrical power supply, control and signal cables)	
4	Vibration damper	
5	Base kit	
6	Concrete base	
7	Condensate drain	
8	Condensate drain hose	
9	Absorbing well	
10	Discharging into the sewage system (penetration into the soil must be made leak-tight)	
11	Wall bushing	
12	Operator terminal	
13	Main current	3 x 400 V/50 Hz
	Control current	1 x 230 V/50 Hz
14	Heat pump line or empty tube	
15	Connection pipe FL + RT	
16	Empty tube for electrical power supply	
17	Empty tube for control and signal cables	

The piping from the boiler room to the heat pump must be configured by the installer. Connecting pipes are not included.

Configuration and connection diagram
Belaria® fit (20,26)



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The piping from the boiler room to the heat pump must be configured by the installer. Connecting pipes are not included.

Requirements and directives
The general requirements and directives listed in the chapter Engineering apply.

Aufstellung
- The Belaria® fit must be mounted outdoors. The installation location must be selected in accordance with the valid requirements and directives.
- Lines carrying water must be laid insulated and frost-proof.
- The installation location must be selected as close to the building as possible. Only short and simple routing of lines guarantees cost effectiveness and low heat losses.
- The installation location must be chosen in such a way that no noise pollution can occur (do not install near bedrooms, keep a distance from neighbours).
- Make sure that the installation location is well ventilated.
- DO NOT install the unit in the following places or locations:
  - In a potentially explosive atmosphere.
  - In places where there is a risk of fire due to escaping flammable gases (e.g. thinner or petrol) or airborne carbon fibres or flammable dust particles.
  - In places where corrosive gases (example: sulphuric acid gas) are produced.
- Wall ducts into the building must be airtight.
- The heat pump must not be placed closer than 1 m to the boundary of the property. Country-specific regulations must be observed.
- The air intake and air outlet sides must not be narrowed or covered.
- The air supply and the air outlet must be without obstruction.
- It is imperative that the minimum distances are observed (see Dimensions/Space requirement).
- The intake air must be free of impurities such as sand and aggressive substances such as ammonia, sulphur, chlorine etc.
- The heat pump must be installed on a load-bearing fixed structure.
- If the heat pump is installed at wind-prone locations, the alignment of the heat pump must be selected in such a way that the expected wind direction is at right angles to the suction direction.
- If an alternative installation in areas subject to strong winds cannot be avoided, an additional wind shield in the form of a hedge, for example, should be installed.
- The heat pump must always be installed on a solid surface in a horizontal position. This can be achieved by means of concrete bases.
- The load-bearing capacity must be adequate. The unit is mounted with 6 vibration-damping adjustable feet.
- Air/water heat pumps generate condensate during operation. It must be ensured that the condensate produced can be absorbed to a sufficient extent by a gravel bed (see configuration and connection diagram).
- When air is discharged upwards, there is an increased frost hazard. Gutters, water pipes and water containers must not be situated in the immediate vicinity.
- The condensate drain must be discharged outside the building and must not be led into or through a building.
- To prevent damage caused by animals such as rodents or insects, all cable ducts must be properly sealed.
- The hydraulic lines from the heat pump can transmit structure-borne noise. Therefore, structure-borne noise decoupling should be provided, e.g. with compensators.

Flat roof installation
Flat roof installation of the Belaria® fit is possible under the following conditions:
- All standards concerning statics, wind load and access to roofs must be complied with.
- The heat pump must be firmly bolted onto the substructure (e.g. concrete base). The heat pump must be prevented from tilting.
- Minimum distance of the heat pump to the roof edge: 2 m (personal protection) + 0.5 m (working area refrigeration circuit).
- Accessibility for maintenance and repair work must be ensured. For work on the heat pump, a measuring case and test equipment, refrigerant bottle, etc. must be transported to the site, amongst other things. In addition to the safety equipment (fall protection devices, anchoring devices, etc.), this must also be taken into account for skylights, stairs, railings, etc.

Room cooling
- Room cooling can be provided by fan convectors and is recommended. The connection lines for the fan convectors must have condensation-tight insulation.
- In addition, the condensate from the fan convectors must be drained off.
- If panel heating is used for room cooling, various criteria such as temperatures below the dewpoint or the temperature profiles must be allowed for, and can lead to costly consequential damage in the case of inadequate planning or incorrect use. We recommend that you consult Hoval.

Installation on heating side
- All pertinent laws, regulations and standards for heating house pipework and for heat pump systems must be complied with.
- A sludge separator must be installed in the heating flow and a filter ball valve in the heating return.
- The safety and expansion devices for closed heating systems must be provided in accordance with EN 12828.
- Dimensioning of the pipework must be done according to the required flow rates and given pressure drops.
- Ventilation must be provided at the highest points and drainage at the lowest points of the connection lines.
- To prevent energy losses, the connection lines must be insulated with suitable material.

Electrical connections
- The electrical connection must be carried out by a qualified technician and registered with the responsible energy supply company. The relevant electrical installation company is responsible for ensuring that electrical connection is carried out in accordance with standards and that safeguard measures are put in place.
- The mains voltage at the connection terminals of the heat pump must be 400 V or 230 V +/-10%. The conductor cross-sections of the connection line must be checked by the electrical company carrying out the work.
- A fast-acting fault-current circuit breaker (< 0.1 s / IΔN ≥ 30 mA) is recommended. Country-specific requirements must be complied with. If the “fault-current circuit breaker” safeguard measure is implemented by the electrical company, a separate fault-current circuit breaker is recommended for the heat pumps. The specified RCCB types apply to the heat pump regardless of externally connected components (refer to assembly instructions, data sheets).
- Circuit breakers must be provided for the main circuit. The starting currents must be taken into account in the design.
- The electrical connection and feeder lines must be copper cables.
- Please refer to the wiring diagram for electrical details.
- The wall feedthrough should slope down from the inside to the outside.
- To avoid damage, the opening should be padded on the inside or, for example, lined with a PVC pipe.
- After installation, the wall opening must be sealed with a suitable sealing compound on site in compliance with fire protection regulations!
- The distance between the high and low voltage cables should be at least 50 mm.

Routing of the hydraulic connection lines

- If the hydraulic connection lines are laid in the ground, this must be done in a protective tube. For example, this can be a PVC pipe with a diameter of 250 mm.
- Wall ducts must be sealed to the outside on site.
- After the hydraulic connection lines have been laid, they must be checked for damage and reinsulated. In case of cooling, condensate can form on the pipes.
- The hydraulic connection lines must be laid decoupled from the building and must never be laid flush-mounted.
- Care must be taken to ensure that water pipes do not pass through the sleeping or living areas.
- Shut-off valves must be installed on site in accordance with the corresponding hydraulic diagram. Opening the shut-off valves is only allowed immediately before commissioning!
- The danger of frost damage must be taken into account if there are prolonged power outages.
- False flow rates as a result of incorrect dimensions of the pipework, incorrect fittings or improper pump operation can cause damage to the heat pump.

Notice
To protect against frost damage to the heat exchanger of the heat pump, frost protection valves must be installed in the supply and return of the heat pump.
At least 2 pieces are required!
Observe downward slope, more drain valves may be necessary (flow, return, water traps).

Buffer storage tank

A buffer storage tank ensures optimal operating conditions for the heat pump.

- Hydraulic decoupling of the various volumetric flows from the heat pump and heat distribution system (heating)
- Absorbs the power reserves of the heat pump and reduces the switch-on frequency (cycling)
- Allows several heating circuits to be connected

A buffer storage tank is mandatory for Hoval air/water heat pumps. A buffer storage tank can be dispensed with if a direct heating or cooling circuit with storage capacity is involved, and there is always a constant flow rate (⅔ must be unblockable).
For Hoval heat pumps, the following minimum sizes of the buffer storage tank (EnerVal) must be observed. The minimum running times of the heat pumps are taken into account.
For air/water heat pumps, the energy required for defrosting the heat pump is included.
The volumes for power company off-periods shall be added on a project-by-project basis in accordance with local regulations.

Minimum sizes of buffer storage tank

	EnerVal type
Belaria® fit (8)	100
Belaria® fit (13)	300
Belaria® fit (20)	500
Belaria® fit (26)	800

Transport and storage

- When removing the packaging, check the heat pump for damage. If the heat pump was damaged during transport or storage, contact Hoval customer service, a service partner or a licensed specialist immediately. They must carry out a leak test with a suitable leak detector. In the event of a leak, the heat pump must be repaired.
- Store the outdoor unit in a cool place without fire hazard and without direct exposure to heat sources. The ambient temperature must not exceed 43 °C.
- The same regulations apply for storage as for installation (no recesses, ventilation pipes, ignition sources in the storage area).
- The heat pump must not be stored in closed rooms, cellars or garages.
- The heat pump is only allowed to be stored outdoors.
- During transport, ensure sufficient ventilation in the closed vehicle, also when parking and stopping.
- Storage in passageways, escape routes or in front of entrances or exits is not permitted
- Ignition sources such as naked flames, switched-on gas appliances, electric heaters, etc. must be kept away from the unit.
- Transport and storage only in upright position. Protect from mechanical damage and from falling over or falling down (make sure the load is secure).

Hoval Belaria® fit (40-70)

Air/water heat pump

- Modulating air/water heat pump in compact design for outdoor installation
- For heating and cooling in cascades up to 16 machines
- Output modulation 30-100 %
- Flow temperatures up to 60 °C
- Supporting frame structure with powder coating (RAL 9001)
- External cladding made of surface-coated steel sheet (RAL 9001)
- Multi-row fin evaporator with large surface area with hydrophilic coating and speed-controlled axial fans
- Condense drip tray with electrical heating
- Safety valve 6 bar
- Flow switch
- Drain valve
- Temperature sensor
- Pressure relief valve
- Refrigerant R32
- Hermetically sealed compressors with inverter control
- Copper-soldered plate heat exchanger made of stainless steel with polypropylene insulation and frost protection heating
- Main switch
- Electrical box internally wired ready for connection
- Voltage-free contact for ON/OFF
- Voltage-free contact for summer/winter changeover

Including additional PCB for expanded functions
The available digital contacts enable the following remote functions:
- Remote switch-on/off
- Heating/cooling (summer/winter switch)
- Water heating
- Two-zone management
- SG ready
- Energy supply company lock (remote operation on/off)
- Demand limit
- Activation of “Super Silent” version (whisper mode, can be selected on user interface)

The additional PCB does not allow the simultaneous use of digital inputs and Modbus signals.

Condensate drain
- It must be ensured that the condensate produced can be absorbed to a sufficient extent by a gravel bed (see configuration and connection diagram).

Hydraulic connections
- Heating connections with supplied Victaulic couplings

Electrical connections
- See installation instructions

TopTronic® E controller (option)

For enabling the Belaria® fit and regulating the plant

Model range

Belaria® fit type	35 °C	55 °C	Max. flow °C	Heat output [1] A2W35 kW	Cooling capacity [1] A35W18 kW
(40)	A+++	A++	60	22.7-40.6	33.8-59.3
(53)	A++	A++	60	25.4-53.2	37.5-78.0
(70)	A++	A+	60	41.0-71.0	58.5-104.0

[1] Modulation range

Operator terminal
- Operator terminal with graphical display and function keys
- Control and monitoring of the modulating heat pumps
- Setting the heating and cooling curves
- Selection of the operating mode: Standard, Silent and Super Silent
- Display of the current operating parameters
- The operator terminal can be installed in any room.
- Can also be used as thermostat
- Control also possible via Modbus
- Operation available in 16 languages
- Included in the scope of delivery of the Belaria® fit

Air/water heat pump - modulating

Hoval Belaria® fit

Belaria® fit type	Heat output [1] A2W35 kW	Cooling capacity [1] A35W18 kW	Part No.
(40)	22.7-40.6	33.8-59.3	7019 246
(53)	25.4-53.2	37.5-78.0	7019 247
(70)	41.0-71.0	58.5-104.0	7019 248

[1] Modulation range

Notice
Corresponding charging pumps:

Hoval system pump set SPS-I with interface for pump control
Type 0-10 V

See “Circulating pumps”

Energy efficiency class
see “Description”

Electric heating elements
see “Calorifiers” - chapter “Electric heating elements”

Notice
A buffer storage tank must be provided. Suitable buffer storage tanks see “Calorifiers” and Engineering Belaria® fit.

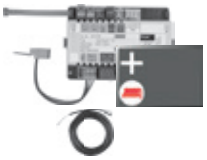
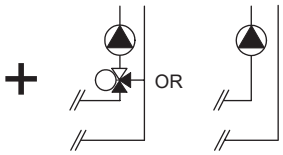
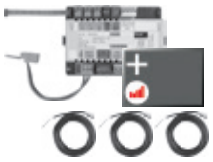
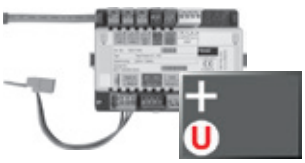
Notice
Plants can optionally be installed:
- stand-alone
- with a secondary heat generator
- with a TopTronic® E controller
- with a PLC.

Accessories

		Part No.
	**Electrical box** for wall installation in building interiors with built-in Hoval TopTronic® E controller Integrated control functions for - 1 heating/cooling circuit with mixer - 1 heating/cooling circuit without mixer - 1 hot water charging circuit - Bivalent and cascade management Can be optionally expanded by max. 1 module expansion and 1 controller module or 2 controller modules: - Module expansion heating circuit or - Module expansion heat balancing or - Module expansion Universal Can be optionally networked with up to 16 controller modules in total (incl. solar module) Incl. outdoor sensor, immersion sensor (calorifier sensor), contact sensor (flow temperature sensor) and RAST 5 basic plug set	6058 626
	**Flange set Victaulic MH50-DN50-50** Flange extensions DN 50/PN 6 for attachment of standard flanges to the Victaulic connection pipes Incl. Victaulic couplings DN 50	6032 293
	**Welded-on flanges** Version in black incl. screws and joints. 2 welded-on flanges Nominal diameter: DN 50 Nominal pressure: PN 6	6041 217
	**Vibration damper set** for Belaria® fit for reducing the transmission of solid-borne noise Consisting of: - 4 vibration-damping adjustable feet - 4 threaded rods Incl. fitting accessories	
	Type — Version Belaria® fit (40,53) — plastic Belaria® fit (70) — metal springs	6059 770 6059 771
	**Condensate hose set** Hose 2 m incl. clip 2 pieces are required.	6061 156

TopTronic® E module expansions

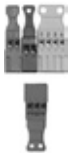
for TopTronic® E basic module heat generator

		Part No.
 	**TopTronic® E module expansion heating circuit TTE-FE HK** Expansion to the inputs and outputs of the basic module heat generator or the heating circuit/domestic hot water module for implementing the following functions: - 1 heating/cooling circuit w/o mixer or - 1 heating/cooling circuit with mixer Consisting of: - Fitting accessories - 1 contact sensor ALF/2P/4/T, L = 4.0 m - Basic plug set FE module **Notice** The supplementary plug set may have to be ordered to implement functions differing from the standard!	6034 576
	**TopTronic® E module expansion heating circuit incl. energy balancing** TTE-FE HK-EBZ Expansion to the inputs and outputs of the basic module heat generator or the heating circuit/domestic hot water module for implementing the following functions: - 1 heating/cooling circuit w/o mixer or - 1 heating/cooling circuit with mixer incl. energy balancing in each case Consisting of: - Fitting accessories - 3 contact sensors ALF/2P/4/T, L = 4.0 m - Plug set FE module **Notice** The flow rate sensor set must be ordered as well.	6037 062
	**TopTronic® E module expansion Universal TTE-FE UNI** Expansion to the inputs and outputs of a controller module (basic module heat generator, heating circuit/domestic hot water module, solar module, buffer module) for implementing various functions Consisting of: - Fitting accessories - Plug set FE module **Notice** Refer to the Hoval System Technology to find which functions and hydraulic arrangements can be implemented. **Further information** see “Controls” - “Hoval TopTronic® E module expansions” chapter	6034 575

Accessories for TopTronic® E

TopTronic® E controller modules

		Part No.
TTE-HK/WW	TopTronic® E heating circuit/ hot water module	6034 571
TTE-SOL	TopTronic® E solar module	6037 058
TTE-PS	TopTronic® E buffer module	6037 057
TTE-MWA	TopTronic® E measuring module	6034 574



Supplementary plug set

for basic module heat generator TTE-WEZ	6034 499
for controller modules and module expansion TTE-FE HK	6034 503

TopTronic® E room control modules

TTE-RBM	TopTronic® E room control modules	
	easy white	6037 071
	comfort white	6037 069
	comfort black	6037 070

Enhanced language package TopTronic® E 6039 253

one SD card required per control module
Consisting of the following languages:
HU, CS, SL, RO, PL, TR, ES, HR,
SR, JA, DA

HovalConnect

HovalConnect LAN	6049 496
HovalConnect WLAN	6049 498
HovalConnect Modbus	6049 501
HovalConnect KNX	6049 593

TopTronic® E interface modules

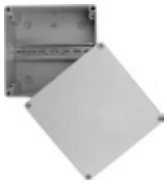
GLT module 0-10 V	6034 578

TopTronic® E sensors

AF/2P/K	Outdoor sensor H x W x D = 80 x 50 x 28 mm	2055 889
TF/2P/5/6T	Immersion sensor, L = 5.0 m	2055 888
ALF/2P/4/T	Contact sensor, L = 4.0 m	2056 775
TF/1.1P/2.5S/6T	Collector sensor, L = 2.5 m	2056 776

Bivalent switch

for various release or switching functions	
Bivalent switch 1-piece	2056 858
Bivalent switch 2-piece	2061 826



System housing

System housing 182 mm	6038 551
System housing 254 mm	6038 552

TopTronic® E wall casing

WG-190	Wall casing small	6052 983
WG-360	Wall casing medium	6052 984
WG-360 BM	Wall casing medium with control module cut-out	6052 985
WG-510	Wall casing large	6052 986
WG-510 BM	Wall casing large with control module cut-out	6052 987

Further information
see “Controls”

Accessories

Sludge separator with magnet
BE DN 50...100 FM
Sludge separator with magnet for continuous removal of magnetic and non-magnetic dirt and sludge particles from heating and cooling circuits.
Steel casing (St 37.2)
Sludge separation up to a particle size of 5 µm.
Pipe connection: PN 16, welded-on flange
Max. operating pressure: 10 bar
Max. flow temperature: 110 °C

Type	Connection	Flow rate at 1.5 m/s flow speed m³/h	Part No.
BE DN050 FM	DN 50	12.5	2062 169
BE DN065 FM	DN 65	20.0	2062 170
BE DN080 FM	DN 80	27.0	2062 171
BE DN100 FM	DN 100	47.0	2062 172

Insulations for sludge separator
BE DN 50...100 FM

Type	suitable for sludge separator	Material	Part No.
TB050	BE050 FM - BE065 FM	PUR	2050 617
TB080	BE080 FM - BE100 FM	PUR	2050 618

System water protection filter FF050-200 2076 376
Cast-iron casing with opposite connection flanges at same height for filtration of heating and cooling water
Consisting of:
Casing and cover made of cast iron GGG-50
Cover with clip lock
- Filter strainer insert made of stainless steel
- Cover seal made of NBR
- 2 magnetic inserts (nickel-neodymium)
- 2 pressure gauges
- Filter surface made of stainless steel
- Filter fineness 200 µm
- With filling and drain valve
- Connections flange DN 50
- Nominal pressure: 10 bar

Max. flow rate: (Δp < 0.1 bar): 18 m³/h
Weight: 15 kg
Water temperature max. 80 °C

Accessories

	Part No.
 **Safety set SG20-1″** Area of application up to 100 kW complete with safety valve (3 bar) Pressure gauge and autom. aspirator with shut-off valve. Connection: DN 20-1″ internal thread	6014 390
 **Set of vibration decouplers SEK 50-500** for reducing structure-borne noise from heat pumps in the indoor area Connections: Union nut 2″ IT (both sides) Nominal length: 500 mm Operating pressure at +20 °C: 10 bar Operating temperature: -40 °C to +100 °C Material: stainless steel 1.4301 Consisting of: - 2 vibration decouplers - 4 flat seals	6053 290

Services

Commissioning
Commissioning by works service or Hoval trained authorised serviceman/company is condition for warranty.

For commissioning and other services please contact your Hoval sales office.

Belaria® fit (40-70)

Type		(40)	(53)	(70)
• Energy efficiency class of the compound system with contr	35 °C/55 °C	A+++ / A++	A++ / A++	A++ / A+
• Energy efficiency heating “moderate climate” 35/55 °C ηS,h [1]	%	175 / 127	173 / 125	169 / 123
• Seasonal coefficient of performance heating moderate climate 35/55 °C	SCOP	4.46 / 3.24	4.41 / 3.19	4.29 / 3.16
• Energy efficiency cooling ηS,c	%	170.0	167.0	166.0
• Seasonal energy efficiency cooling	SEER	4.3	4.3	4.2
Max. performance data heating and cooling in acc. with EN				
• Heat output A2W35	kW	40.6	53.2	71
• Coefficient of performance A2W35	COP	3.6	3.4	3.1
• Heat output A-7W35	kW	30.7	40.5	59.2
• Coefficient of performance A-7W35	COP	2.9	2.8	2.7
• Cooling capacity A35W18	kW	59.3	78	104
• Energy efficiency ratio A35W18	EER	4.2	3.5	3.7
• Cooling capacity A35W7	kW	43.9	56.9	80.4
• Energy efficiency ratio A35W7	EER	3.1	2.9	2.9
Sound data according to EN ISO 9614-2				
• Sound power level “Standard”	dB(A)	75	78	81
• Sound power level “Supersilent” [2]	dB(A)	71	72	75
Hydraulic data				
• Maximum flow temperature	°C	60	60	60
• Nominal heating water quantity heating ΔT 5 K (A7W35)	m^3/h	9.4	11.5	15.0
• Nominal heating water quantity heating ΔT 8 K (A7W35)	m^3/h	5.9	7.2	9.4
• Nominal heating water quantity cooling ΔT 4 K (A35W7)	m^3/h	9.5	12.3	17.3
• Nominal heating water quantity cooling ΔT 4 K (A35W18)	m^3/h	12.8	16.8	22.4
• Max. operating pressure on the heating side	bar		6	
• Flow/return connection heating	R (AG)	2"	2″	2″
• Built-in fan			1 axial fan	
• Nominal air quantity	m^3/h	23040	27000	40500
Cooling technical data				
• Refrigerant		R32	R32	R32
• Refrigeration circuits			1	
• Compressor stages		modulating	modulating	modulating
• Refrigerant filling quantity	kg	14	14	17.5
• Compressor oil filling quantity	l	4.6	4.6	6
• Compressor oil type			DAPHNE HERMETIC OIL FW68S	
Electrical data				
• Connections	V/Hz	3~400/50	3~400/50	3~400/50
• Starting current (compressor and fan)	A	20.3	20.3	31
• Main current fuse [3]	A	50	50	80
Dimensions/Weight				
• Dimensions (H x W x D)	mm		1480 x 2300 x 1060	1505 x 3325 x 1100
• Weight	kg	513	513	830

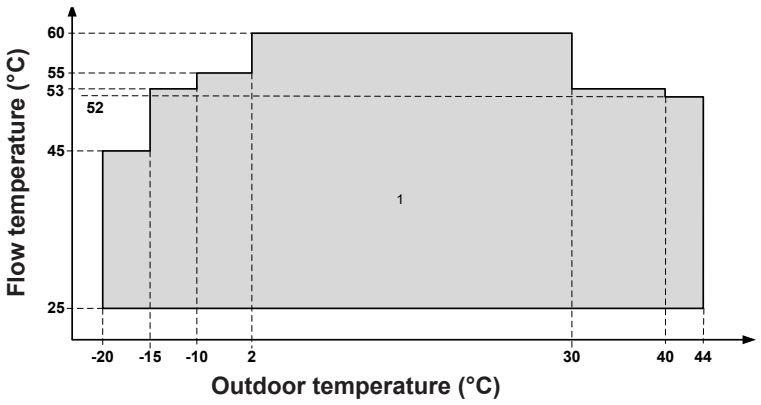
[1] 2 % can be added for class II heat pump incl. control.

[2] Reduced heat outputs according to heating performance data

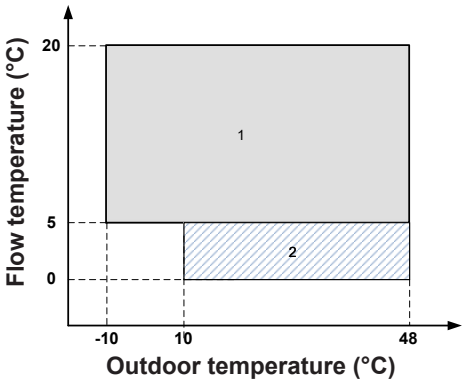
[3] Country-specific regulations must be observed. Selection of the fuse size by the electrician.

Diagrams of areas of application

Heating and hot water Belaria® fit (40-70)



Cooling Belaria® fit (40-70)



1 Normal operating range

2 Operating range in which the use of ethylene glycol is mandatory

Sound pressure level

Standard

Type	Sound pressure level frequency band [Hz]								Sound pressure level	Sound power level
	63	125	250	500	1000	2000	4000	8000	dB(A)	dB(A)
Belaria® fit (40)	76	75	70	71	73	65	60	50	58	75
Belaria® fit (53)	76	75	68	72	76	69	62	52	61	78
Belaria® fit (70)	59	67	70	75	79	73	68	60	63	81

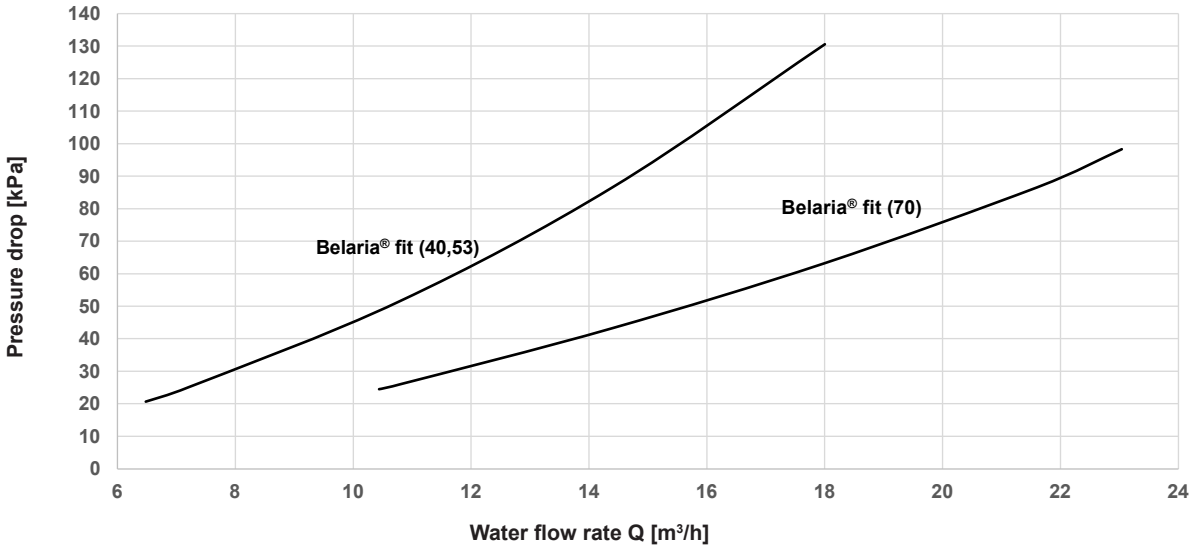
Super Silent (whisper mode)

Type	Sound pressure level frequency band [Hz]								Sound pressure level	Sound power level
	63	125	250	500	1000	2000	4000	8000	dB(A)	dB(A)
Belaria® fit (40)	50	62	67	67	69	62	57	48	54	71
Belaria® fit (53)	73	72	67	68	70	62	57	47	55	72
Belaria® fit (70)	56	69	69	72	69	67	67	59	57	75

The sound levels refer to the nominal conditions of the heat pumps.
The sound pressure level refers to a distance of 1 meter from the outer surface of the unit during operation in the open.
The noise levels are determined according to the tensiometric method (EN ISO 9614-2).
The data refers to the following conditions in heating mode:
- Water in the internal heat exchanger = 30/35 °C
- Ambient temperature 7 °C

The data refers to the following conditions in cooling mode:
- Water in the internal heat exchanger = 12/7 °C
- Ambient temperature 35 °C

Pressure drop of the internal heat exchanger



The water pressure drops are calculated assuming an average water temperature of 7 °C.

Permitted water flow rates

		Belaria® fit (40,53)	Belaria® fit (70)
Minimum flow rate	[m³/h]	6.5	10.4
Maximum flow rate	[m³/h]	18.0	23.0

Correction factors when using glycol

ETHYLENE GLYCOL percentage by weight %	5	10	15	20	25	30	35	40	45	50
Freezing point °C	-2	-3.9	-6.5	-8.9	-11.8	-15.6	-19	-23.4	-27.8	-32.7
Safety temperature	3	1	-1	-4	-6	-10	-14	-19	-23.8	-29.4
Correction factor for the refrigerating capacity/heat output of the unit	0.997	0.994	0.990	0.986	0.981	0.976	0.970	0.964	0.957	0.950
Correction factor for power consumption of the compressor	0.999	0.999	0.998	0.997	0.996	0.996	0.995	0.994	0.993	0.993
Correction factor for the pressure drop in the system	1.016	1.035	1.056	1.080	1.106	1.135	1.166	1.200	1.236	1.275

PROPYLENE GLYCOL percentage by weight %	5	10	15	20	25	30	35	40	45	50
Freezing point °C	-2	-3.9	-6.5	-8.9	-11.8	-15.6	-19	-23.4	-27.8	-32.7
Safety temperature	3	1	-1	-4	-6	-10	-14	-19	-23.8	-29.4
Correction factor for the refrigerating capacity/heat output of the unit	0.995	0.990	0.983	0.976	0.968	0.960	0.950	0.939	0.928	0.916
Correction factor for power consumption of the compressor	0.999	0.997	0.995	0.993	0.991	0.988	0.986	0.983	0.980	0.977
Correction factor for the pressure drop in the system	1.027	1.058	1.093	1.133	1.176	1.224	1.276	1.332	1.393	1.457

The specified correction factors refer to water-glycol mixtures that are used to prevent frost formation on the heat exchangers of the water circuit during the winter break.

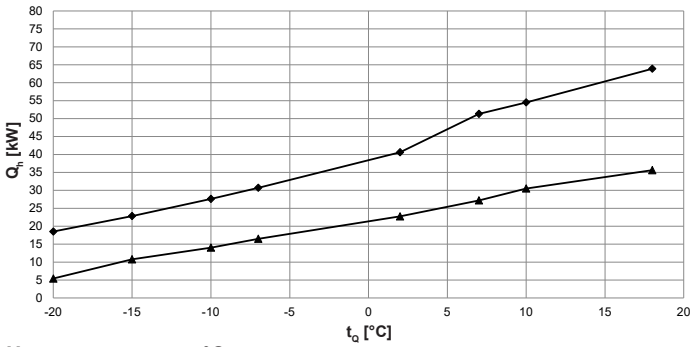
For the exact specifications of the frost protection agent used, refer to the respective manufacturer's data sheet!

Performance data – heating

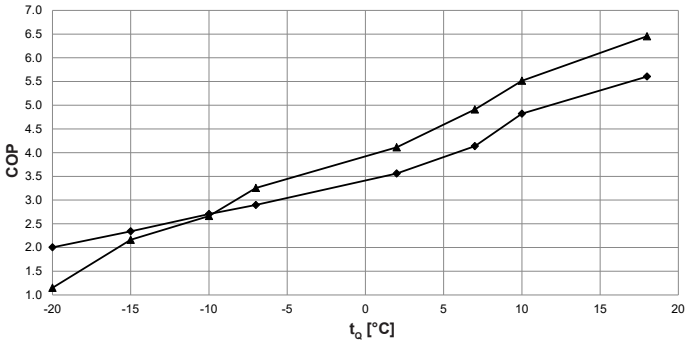
Maximum heat output allowing for defrosting losses
Data according to EN 14511:2018

Belaria® fit (40)

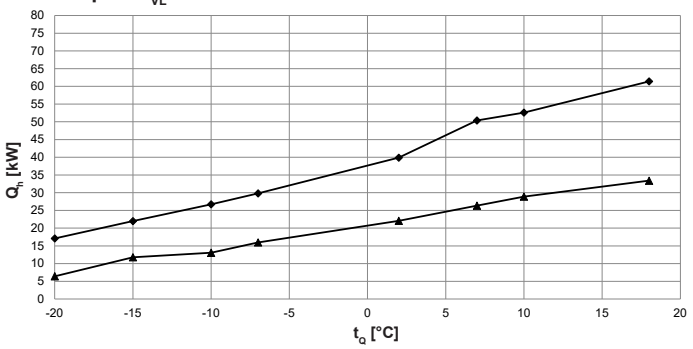
Heat output - t_{VL} 35 °C



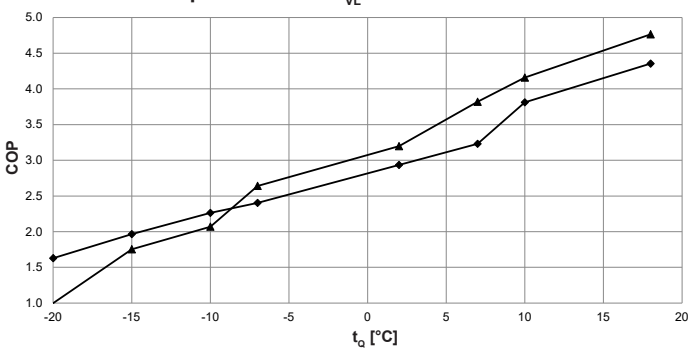
Coefficient of performance - t_{VL} 35 °C



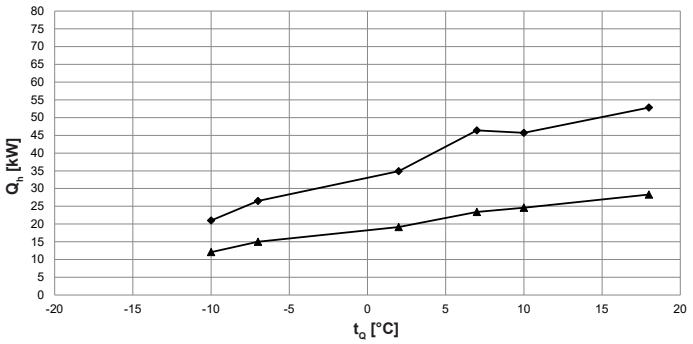
Heat output - t_{VL} 45 °C



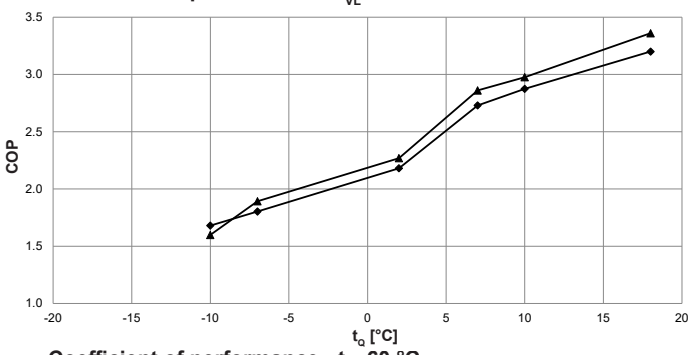
Coefficient of performance - t_{VL} 45 °C



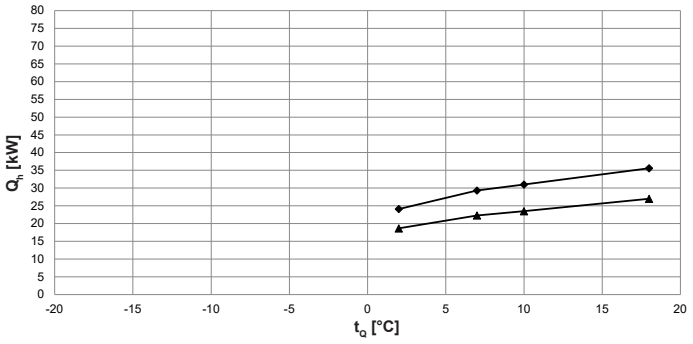
Heat output - t_{VL} 55 °C



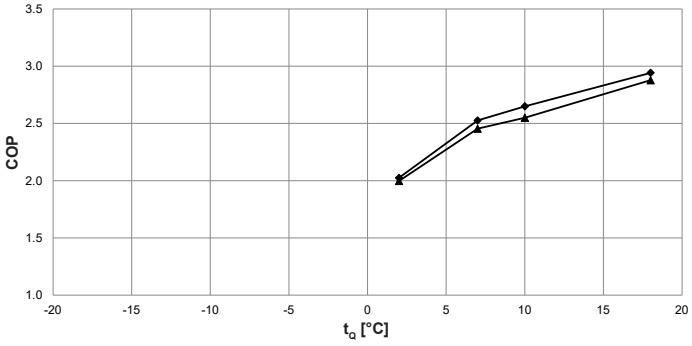
Coefficient of performance - t_{VL} 55 °C



Heat output - t_{VL} 60 °C



Coefficient of performance - t_{VL} 60 °C



t_{VL} = heating flow temperature (°C)
t_Q = source temperature (°C)
Q_h = heat output at full load (kW), measured in accordance with standard EN 14511
COP = Coefficient of performance for the overall unit in accordance with standard EN 14511

max. output
min. output

Output correction factors in Super Silent mode (whisper mode)

Flow temperature	°C	35	40	45	50	55	60
Heat output factor	-	0.87	0.83	0.83	0.80	0.80	0.60
Power consumption factor	-	0.88	0.84	0.84	0.77	0.77	0.60
COP factor	-	1.00	1.00	1.00	1.03	1.03	1.00

Performance data – heating

Maximum heat output allowing for defrosting losses
Data according to EN 14511:2018

Belaria® fit (40)

		Maximum output			Minimum output		
t_{VL} °C	t_Q °C	Q_h kW	P kW	COP	Q_h kW	P kW	COP
35	-20	18.5	9.2	2.0	5.4	4.7	1.1
	-15	22.8	9.7	2.3	10.7	5.0	2.2
	-10	27.6	10.2	2.7	14.0	5.3	2.7
	-7	30.7	10.6	2.9	16.5	5.1	3.3
	2	40.6	11.4	3.6	22.7	5.5	4.1
	7	51.3	12.4	4.1	27.2	5.5	4.9
	10	54.5	11.3	4.8	30.5	5.5	5.5
	18	63.9	11.4	5.6	35.6	5.5	6.5
40	-20	17.8	9.7	1.8	7.5	5.9	1.3
	-15	22.3	10.4	2.1	10.2	5.3	1.9
	-10	27.1	11.0	2.5	13.5	5.7	2.4
	-7	30.2	11.4	2.6	16.3	5.5	2.9
	2	39.9	12.4	3.2	22.2	6.2	3.6
	7	50.8	12.4	4.1	28.1	6.2	4.6
	10	53.5	12.5	4.3	29.6	6.2	4.8
	18	62.7	12.7	4.9	34.5	6.2	5.6
45	-20	17.1	10.5	1.6	6.4	6.4	1.0
	-15	22.0	11.2	2.0	11.8	6.7	1.8
	-10	26.7	11.8	2.3	13.1	6.3	2.1
	-7	29.8	12.4	2.4	16.0	6.0	2.6
	2	39.9	13.6	2.9	22.1	6.9	3.2
	7	50.4	15.6	3.2	26.4	6.9	3.8
	10	52.6	13.8	3.8	28.9	7.0	4.2
	18	61.4	14.1	4.4	33.4	7.0	4.8
50	-20	-	-	-	-	-	-
	-15	19.7	12.4	1.6	11.4	7.4	1.5
	-10	24.1	13.2	1.8	12.5	6.7	1.9
	-7	27.1	13.6	2.0	15.3	6.8	2.3
	2	35.6	14.7	2.4	19.6	7.6	2.6
	7	44.2	14.3	3.1	24.2	7.4	3.3
	10	46.8	14.5	3.2	25.5	7.4	3.4
	18	54.4	14.9	3.7	29.4	7.5	3.9
55	-20	-	-	-	-	-	-
	-15	-	-	-	-	-	-
	-10	21.0	12.5	1.7	12.1	7.6	1.6
	-7	26.5	14.7	1.8	15.0	7.9	1.9
	2	34.9	16.0	2.2	19.1	8.4	2.3
	7	46.4	17.0	2.7	23.4	8.2	2.9
	10	45.7	15.9	2.9	24.6	8.3	3.0
	18	52.8	16.5	3.2	28.3	8.4	3.4
60	-20	-	-	-	-	-	-
	-15	-	-	-	-	-	-
	-10	-	-	-	-	-	-
	-7	-	-	-	-	-	-
	2	24.1	11.9	2.0	18.7	9.3	2.0
	7	29.3	11.6	2.5	22.3	9.1	2.5
	10	31.0	11.7	2.6	23.5	9.2	2.6
	18	35.6	12.1	2.9	27.0	9.4	2.9

t_{VL} = heating flow temperature (°C)
t_Q = source temperature (°C)
Q_h = heat output at full load (kW), measured in accordance with standard EN 14511
P = power consumption for the overall unit (kW)
COP = Coefficient of performance for the overall unit in accordance with standard EN 14511

Output correction factors in Super Silent mode (whisper mode)

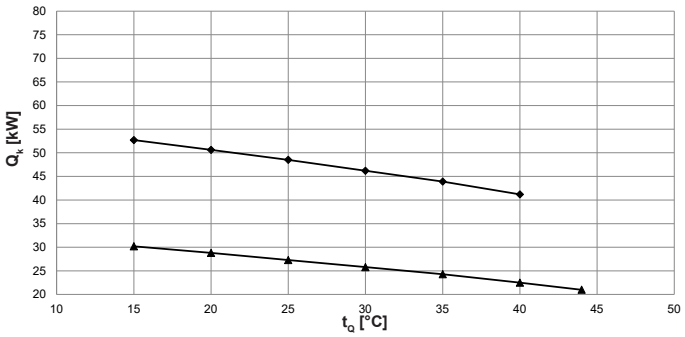
Flow temperature	°C	35	40	45	50	55	60
Heat output factor	-	0.87	0.83	0.83	0.80	0.80	0.60
Power consumption factor	-	0.88	0.84	0.84	0.77	0.77	0.60
COP factor	-	1.00	1.00	1.00	1.03	1.03	1.00

Performance data - cooling

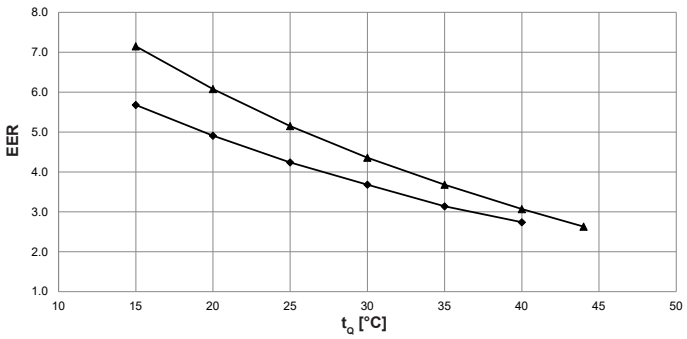
Maximum cooling capacity
Data according to EN 14511:2018

Belaria® fit (40)

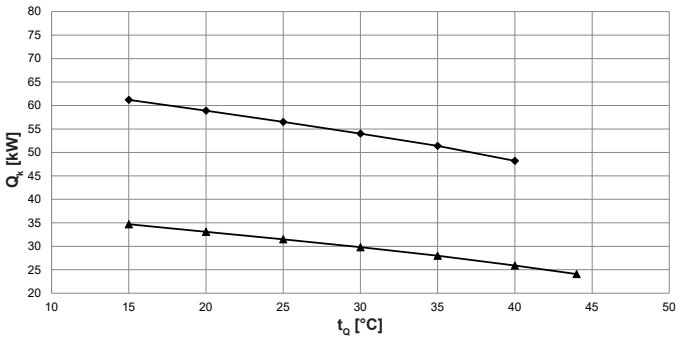
Cooling capacity - t_{VL} 7 °C



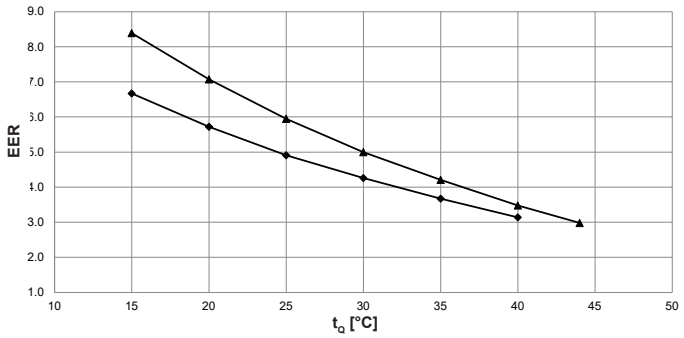
Energy efficiency ratio - t_{VL} 7 °C



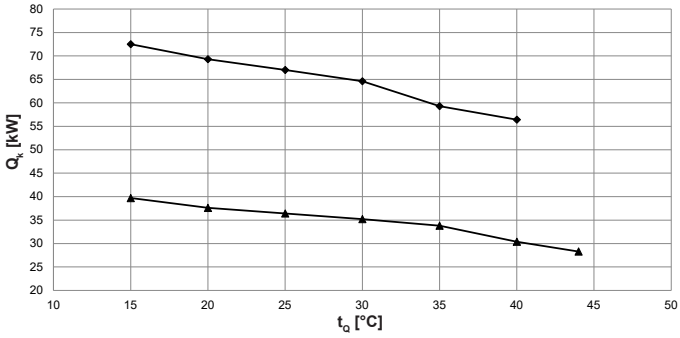
Cooling capacity - t_{VL} 12 °C



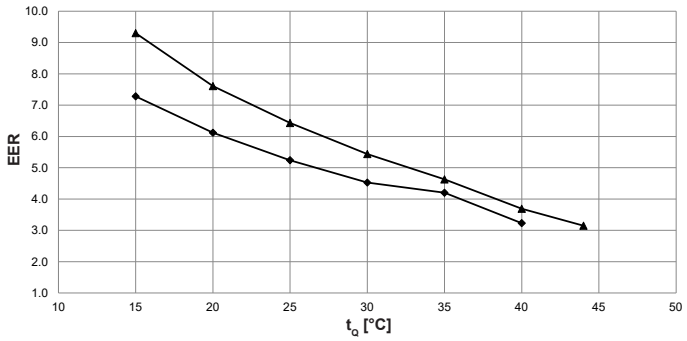
Energy efficiency ratio - t_{VL} 12 °C



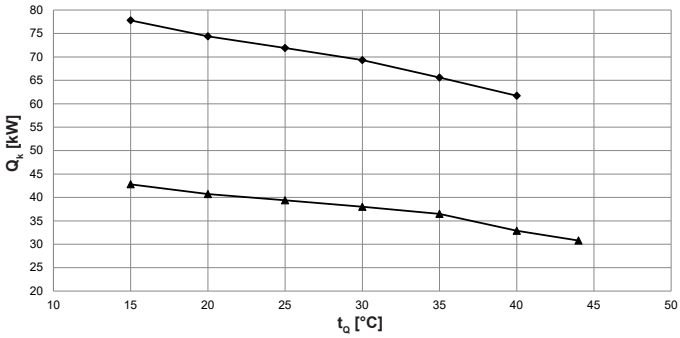
Cooling capacity - t_{VL} 18 °C



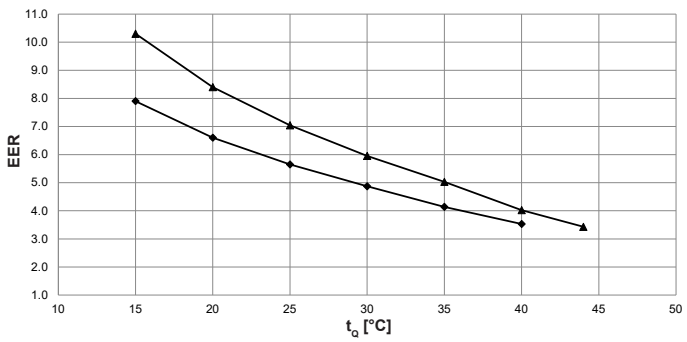
Energy efficiency ratio - t_{VL} 18 °C



Cooling capacity - t_{VL} 20 °C



Energy efficiency ratio - t_{VL} 20 °C



t_{VL} = cooling water flow temperature (°C)
t_Q = source temperature (°C)
Q_k = cooling capacity at full load (kW), measured in accordance with standard EN 14511
EER = Energy Efficiency Ratio for the overall unit in accordance with standard EN 14511

max. output
min. output

Output correction factors in Super Silent mode (whisper mode)

Cooling capacity factor	-	0.87
Power consumption factor	-	0.87
EER factor	-	1.00

Performance data - cooling

Maximum cooling capacity
Data according to EN 14511:2018

Belaria® fit (40)

		Maximum output			Minimum output		
t_{VL} °C	t_Q °C	Q_k kW	P kW	EER	Q_k kW	P kW	EER
7	15	52.7	9.3	5.7	30.2	4.2	7.2
	20	50.6	10.3	4.9	28.8	4.7	6.1
	25	48.5	11.4	4.2	27.3	5.3	5.2
	30	46.2	12.6	3.7	25.8	5.9	4.4
	35	43.9	14.0	3.1	24.3	6.6	3.7
	40	41.2	15.0	2.7	22.5	7.3	3.1
	44	-	-	-	21.0	8.0	2.6
10	15	57.8	9.2	6.3	32.9	4.2	7.9
	20	55.6	10.3	5.4	31.4	4.7	6.7
	25	53.3	11.5	4.6	29.8	5.3	5.6
	30	50.9	12.7	4.0	28.2	5.9	4.7
	35	48.4	13.9	3.5	26.5	6.6	4.0
	40	45.4	15.2	3.0	24.5	7.4	3.3
	44	-	-	-	22.9	8.1	2.8
12	15	61.2	9.2	6.7	34.7	4.1	8.4
	20	58.9	10.3	5.7	33.1	4.7	7.1
	25	56.5	11.5	4.9	31.5	5.3	6.0
	30	54.0	12.7	4.3	29.8	6.0	5.0
	35	51.4	14.0	3.7	28.0	6.7	4.2
	40	48.2	15.4	3.1	25.9	7.4	3.5
	44	-	-	-	24.1	8.1	3.0
15	15	68.2	10.1	6.8	36.5	4.4	8.3
	20	65.2	11.4	5.7	34.6	5.1	6.8
	25	62.1	12.8	4.9	32.5	5.8	5.7
	30	60.0	14.2	4.2	31.3	6.5	4.8
	35	57.7	15.8	3.7	30.3	7.4	4.1
	40	54.4	17.3	3.1	28.0	8.2	3.4
	44	-	-	-	26.2	9.0	2.9
18	15	72.5	10.0	7.3	39.7	4.3	9.3
	20	69.3	11.3	6.1	37.6	4.9	7.6
	25	67.0	12.8	5.2	36.4	5.7	6.4
	30	64.6	14.3	4.5	35.2	6.5	5.4
	35	59.3	14.1	4.2	33.8	7.3	4.6
	40	56.4	17.5	3.2	30.4	8.2	3.7
	44	-	-	-	28.3	9.0	3.2
20	15	77.8	9.8	7.9	42.8	4.2	10.3
	20	74.4	11.3	6.6	40.7	4.8	8.4
	25	71.9	12.7	5.7	39.4	5.6	7.0
	30	69.3	14.2	4.9	38.0	6.4	6.0
	35	65.6	15.8	4.1	36.5	7.3	5.0
	40	61.7	17.5	3.5	32.9	8.2	4.0
	44	-	-	-	30.8	9.0	3.4

t_{VL} = cooling water flow temperature (°C)
t_Q = source temperature (°C)
Q_k = cooling capacity at full load (kW), measured in accordance with standard EN 14511
P = power consumption for the overall unit (kW)
EER = Energy Efficiency Ratio for the overall unit in accordance with standard EN 14511

Output correction factors in Super Silent mode (whisper mode)

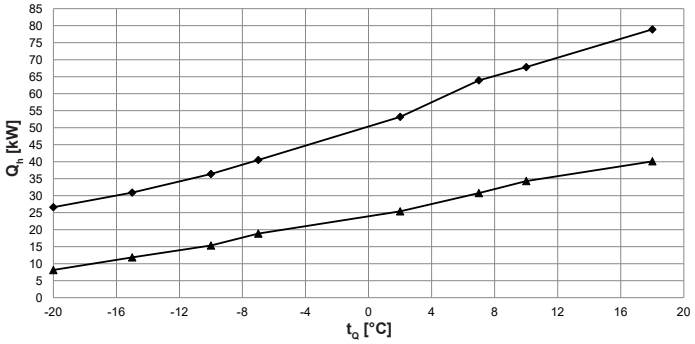
Cooling capacity factor	-	0.87
Power consumption factor	-	0.87
EER factor	-	1.00

Performance data – heating

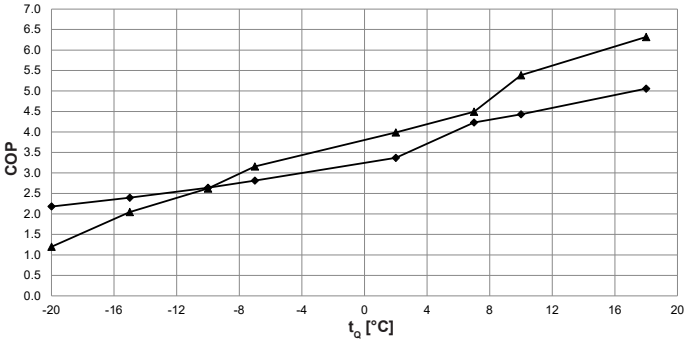
Maximum heat output allowing for defrosting losses
Data according to EN 14511:2018

Belaria® fit (53)

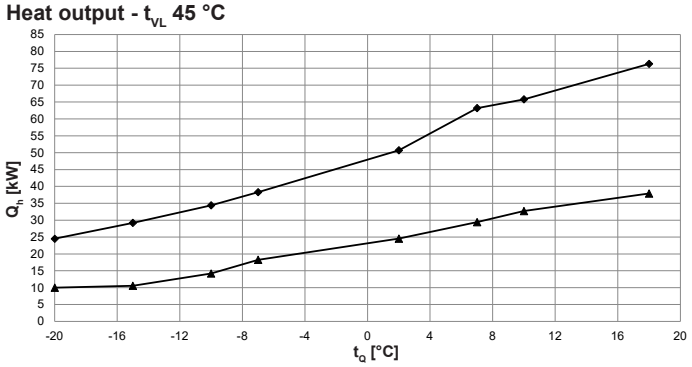
Heat output - t_{VL} 35 °C



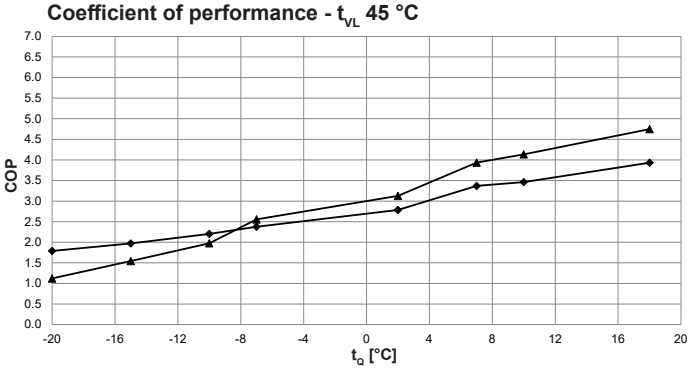
Coefficient of performance - t_{VL} 35 °C



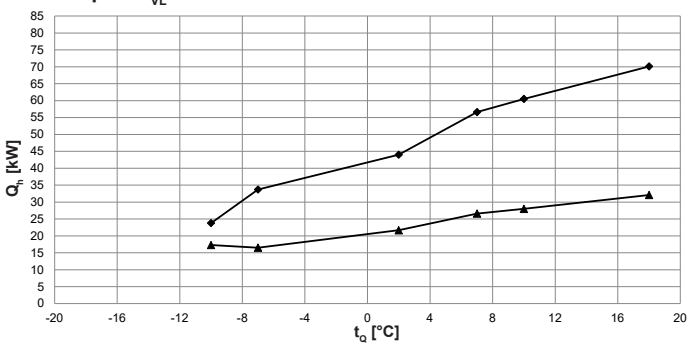
Heat output - t_{VL} 45 °C



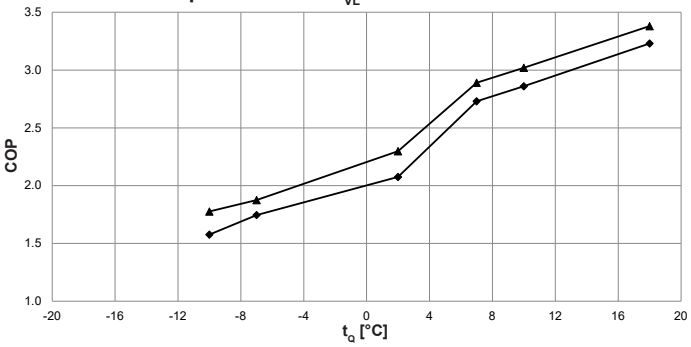
Coefficient of performance - t_{VL} 45 °C



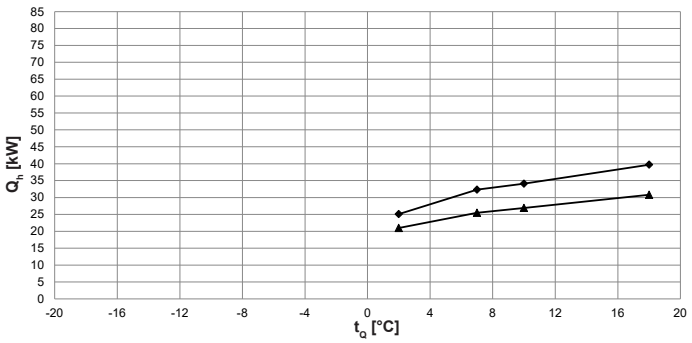
Heat output - t_{VL} 55 °C



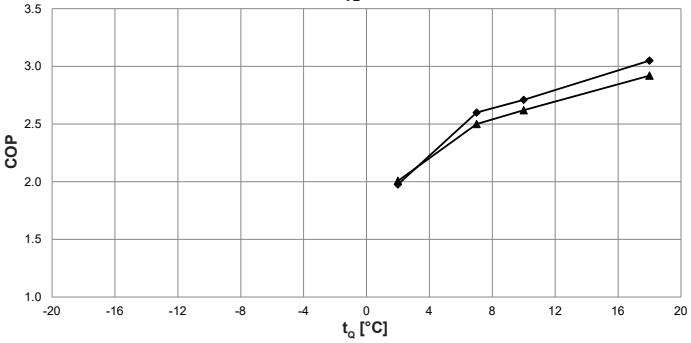
Coefficient of performance - t_{VL} 55 °C



Heat output - t_{VL} 60 °C



Coefficient of performance - t_{VL} 60 °C



t_{VL} = heating flow temperature (°C)
t_Q = source temperature (°C)
Q_h = heat output at full load (kW), measured in accordance with standard EN 14511
COP = Coefficient of performance for the overall unit in accordance with standard EN 14511

max. output
min. output

Output correction factors in Super Silent mode (whisper mode)

Flow temperature	°C	35	40	45	50	55	60
Heat output factor	-	0.87	0.79	0.79	0.80	0.80	0.82
Power consumption factor	-	0.80	0.74	0.74	0.80	0.80	0.80
COP factor	-	1.04	1.07	1.07	1.02	1.02	1.03

Performance data – heating

Maximum heat output allowing for defrosting losses
Data according to EN 14511:2018

Belaria® fit (53)

		Maximum output			Minimum output		
t_{VL} °C	t_Q °C	Q_h kW	P kW	COP	Q_h kW	P kW	COP
35	-20	26.6	12.2	2.2	8.1	6.8	1.2
	-15	30.9	12.9	2.4	11.9	5.8	2.0
	-10	36.4	13.8	2.6	15.3	5.9	2.6
	-7	40.5	14.4	2.8	18.9	6.0	3.2
	2	53.2	15.8	3.4	25.4	6.4	4.0
	7	63.9	15.1	4.2	30.8	6.8	4.5
	10	67.8	15.3	4.4	34.3	6.4	5.4
	18	78.9	15.6	5.1	40.1	6.3	6.3
40	-20	25.5	12.9	2.0	11.0	8.5	1.3
	-15	30.0	13.8	2.2	11.3	6.3	1.8
	-10	35.1	14.5	2.4	14.9	6.6	2.3
	-7	39.5	14.9	2.7	18.7	6.5	2.9
	2	51.7	16.6	3.1	25.0	7.0	3.5
	7	63.5	16.8	3.8	31.6	7.0	4.5
	10	66.8	17.0	3.9	33.5	7.1	4.7
	18	77.7	17.4	4.5	39.0	7.1	5.5
45	-20	24.5	13.7	1.8	10.0	8.9	1.1
	-15	29.2	14.8	2.0	10.6	6.8	1.5
	-10	34.4	15.6	2.2	14.2	7.2	2.0
	-7	38.3	16.1	2.4	18.3	7.1	2.6
	2	50.7	18.2	2.8	24.5	7.8	3.1
	7	63.2	18.7	3.4	29.4	7.8	3.9
	10	65.8	19.0	3.5	32.7	7.9	4.1
	18	76.3	19.4	3.9	37.9	8.0	4.7
50	-20	-	-	-	-	-	-
	-15	26.5	16.1	1.6	9.5	7.4	1.3
	-10	31.4	17.2	1.8	13.5	7.8	1.7
	-7	34.6	17.8	1.9	17.4	8.0	2.2
	2	44.9	19.4	2.3	22.2	8.6	2.6
	7	58.6	19.0	3.1	27.3	8.6	3.4
	10	61.8	19.3	3.2	28.9	8.4	3.5
	18	71.7	19.9	3.6	33.4	8.5	3.9
55	-20	-	-	-	-	-	-
	-15	-	-	-	-	-	-
	-10	23.8	15.1	1.6	17.3	9.7	1.8
	-7	33.7	19.3	1.7	16.5	8.8	1.9
	2	44.0	21.2	2.1	21.7	9.4	2.3
	7	56.6	20.7	2.7	26.6	9.2	2.9
	10	60.5	21.2	2.9	28.0	9.3	3.0
	18	70.1	21.7	3.2	32.1	9.5	3.4
60	-20	-	-	-	-	-	-
	-15	-	-	-	-	-	-
	-10	-	-	-	-	-	-
	-7	-	-	-	-	-	-
	2	25.1	12.7	2.0	21.0	10.5	2.0
	7	32.3	12.4	2.6	25.5	10.2	2.5
	10	34.1	12.6	2.7	26.9	10.3	2.6
	18	39.7	13.0	3.1	30.8	10.5	2.9

t_{VL} = heating flow temperature (°C)
t_Q = source temperature (°C)
Q_h = heat output at full load (kW), measured in accordance with standard EN 14511
P = power consumption for the overall unit (kW)
COP = Coefficient of performance for the overall unit in accordance with standard EN 14511

Output correction factors in Super Silent mode (whisper mode)

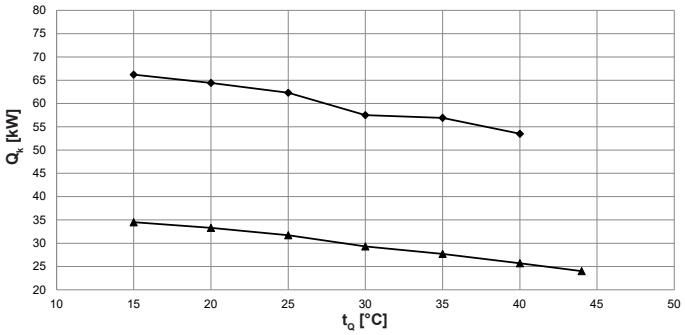
Flow temperature	°C	35	40	45	50	55	60
Heat output factor	-	0.87	0.79	0.79	0.80	0.80	0.82
Power consumption factor	-	0.80	0.74	0.74	0.80	0.80	0.80
COP factor	-	1.04	1.07	1.07	1.02	1.02	1.03

Performance data - cooling

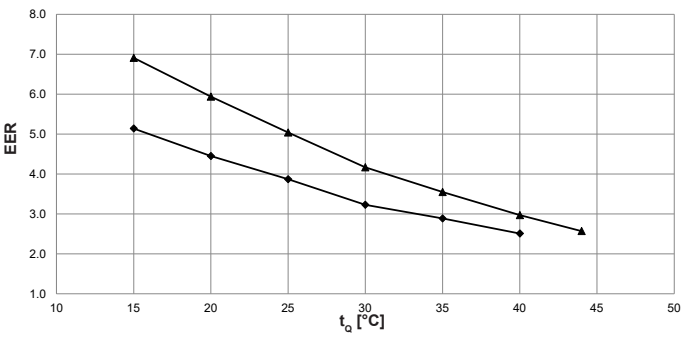
Maximum cooling capacity
Data according to EN 14511:2018

Belaria® fit (53)

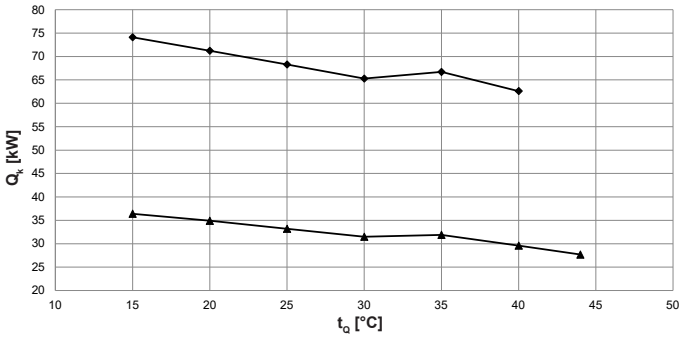
Cooling capacity - t_{VL} 7 °C



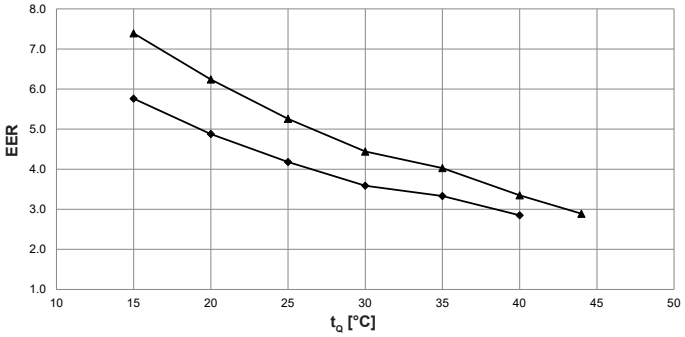
Energy efficiency ratio - t_{VL} 7 °C



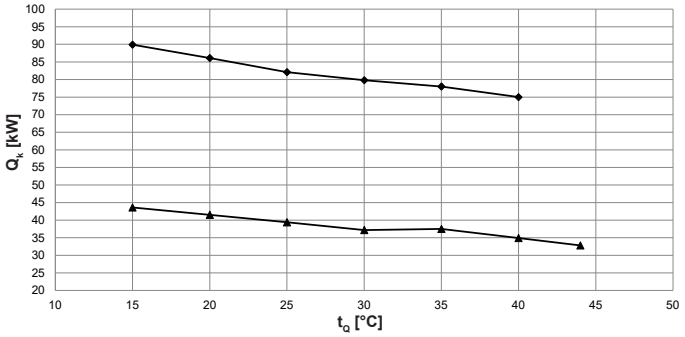
Cooling capacity - t_{VL} 12 °C



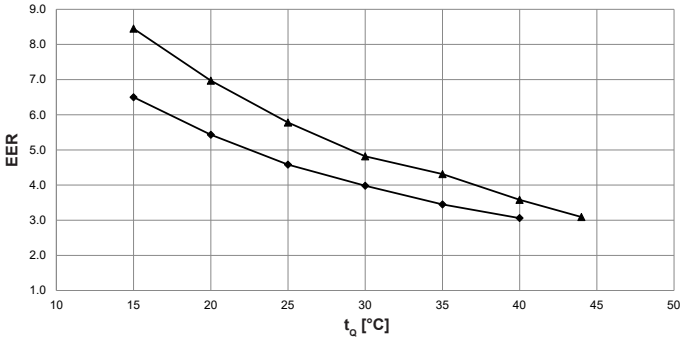
Energy efficiency ratio - t_{VL} 12 °C



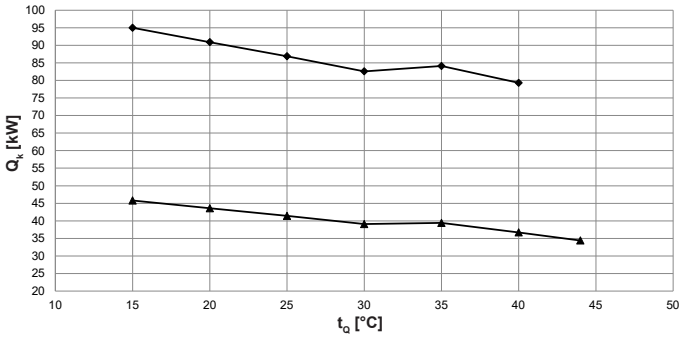
Cooling capacity - t_{VL} 18 °C



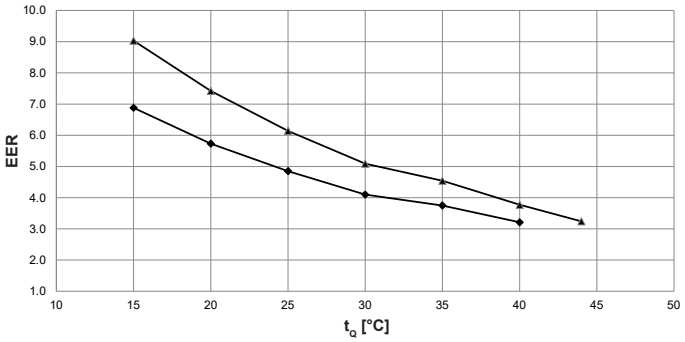
Energy efficiency ratio - t_{VL} 18 °C



Cooling capacity - t_{VL} 20 °C



Energy efficiency ratio - t_{VL} 20 °C



t_{VL} = cooling water flow temperature (°C)
t_Q = source temperature (°C)
Q_k = cooling capacity at full load (kW), measured in accordance with standard EN 14511
EER = Energy Efficiency Ratio for the overall unit in accordance with standard EN 14511

max. output
min. output

Output correction factors in Super Silent mode (whisper mode)

Cooling capacity factor	-	0.83
Power consumption factor	-	0.80
EER factor	-	1.06

Performance data - cooling

Maximum cooling capacity
Data according to EN 14511:2018

Belaria® fit (53)

		Maximum output			Minimum output		
t_{VL} °C	t_Q °C	Q_k kW	P kW	EER	Q_k kW	P kW	EER
7	15	66.2	12.9	5.1	34.5	5.0	6.9
	20	64.4	14.5	4.5	33.3	5.6	5.9
	25	62.3	16.1	3.9	31.7	6.3	5.0
	30	57.5	17.8	3.2	29.3	7.0	4.2
	35	56.9	19.7	2.9	27.7	7.8	3.6
	40	53.5	21.3	2.5	25.7	8.7	3.0
	44	-	-	-	24.0	9.3	2.6
10	15	70.0	12.9	5.4	34.6	5.0	7.0
	20	67.3	14.5	4.6	33.0	5.6	5.9
	25	64.4	16.3	4.0	31.5	6.3	5.0
	30	61.5	18.0	3.4	29.8	7.1	4.2
	35	62.9	19.8	3.2	30.3	7.9	3.8
	40	58.9	21.7	2.7	28.1	8.8	3.2
	44	-	-	-	26.3	9.5	2.8
12	15	74.1	12.9	5.8	36.4	4.9	7.4
	20	71.2	14.6	4.9	34.9	5.6	6.2
	25	68.3	16.3	4.2	33.2	6.3	5.3
	30	65.3	18.2	3.6	31.5	7.1	4.4
	35	66.7	20.0	3.3	31.9	7.9	4.0
	40	62.6	22.0	2.9	29.6	8.8	3.4
	44	-	-	-	27.7	9.6	2.9
15	15	82.5	13.9	6.0	40.3	5.0	8.1
	20	78.6	15.8	5.0	38.4	5.7	6.7
	25	75.3	17.8	4.2	36.4	6.5	5.6
	30	72.0	19.9	3.6	34.6	7.3	4.7
	35	73.7	22.1	3.3	35.0	8.2	4.3
	40	69.2	24.3	2.9	32.4	9.2	3.5
	44	-	-	-	30.3	10.2	3.0
18	15	89.9	13.8	6.5	43.6	5.2	8.5
	20	86.1	15.9	5.4	41.5	6.0	7.0
	25	82.1	17.9	4.6	39.4	6.8	5.8
	30	79.8	20.1	4.0	37.2	7.7	4.8
	35	78.0	22.6	3.5	37.5	8.7	4.3
	40	75.0	24.5	3.1	34.9	9.7	3.6
	44	-	-	-	32.8	10.6	3.1
20	15	95.0	13.8	6.9	45.8	5.1	9.0
	20	90.9	15.9	5.7	43.6	5.9	7.4
	25	86.9	17.9	4.9	41.4	6.7	6.1
	30	82.6	20.1	4.1	39.1	7.7	5.1
	35	84.1	22.4	3.8	39.4	8.7	4.5
	40	79.3	24.7	3.2	36.7	9.7	3.8
	44	-	-	-	34.4	10.6	3.2

t_{VL} = cooling water flow temperature (°C)
t_Q = source temperature (°C)
Q_k = cooling capacity at full load (kW), measured in accordance with standard EN 14511
P = power consumption for the overall unit (kW)
EER = Energy Efficiency Ratio for the overall unit in accordance with standard EN 14511

Output correction factors in Super Silent mode (whisper mode)

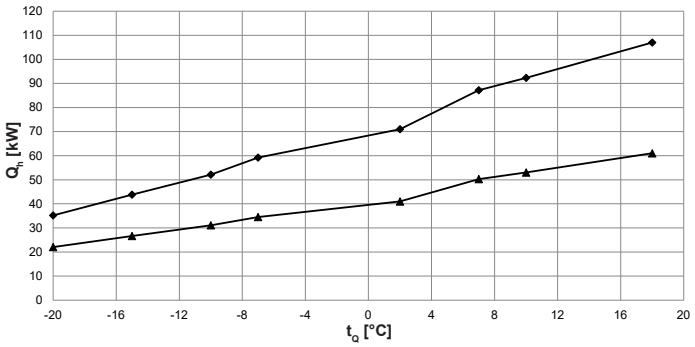
Cooling capacity factor	-	0.83
Power consumption factor	-	0.80
EER factor	-	1.06

Performance data – heating

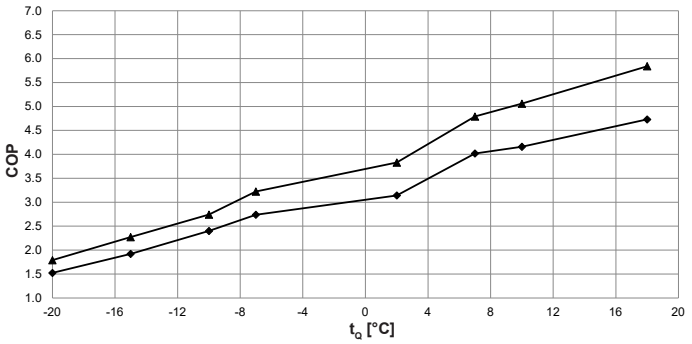
Maximum heat output allowing for defrosting losses
Data according to EN 14511:2018

Belaria® fit (70)

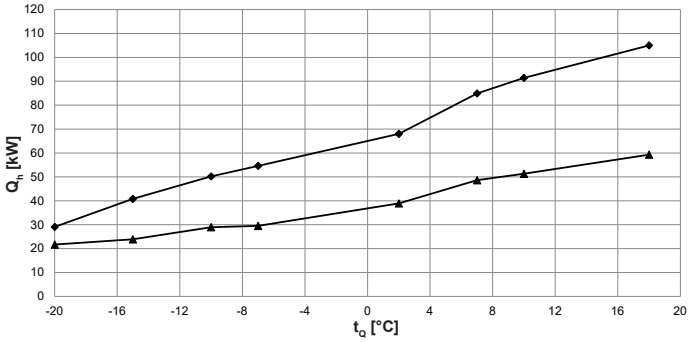
Heat output - t_{VL} 35 °C



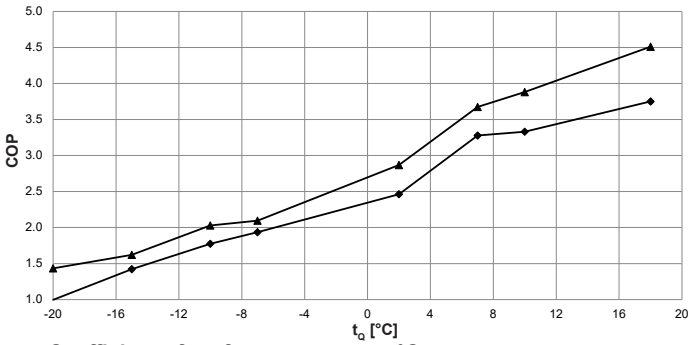
Coefficient of performance - t_{VL} 35 °C



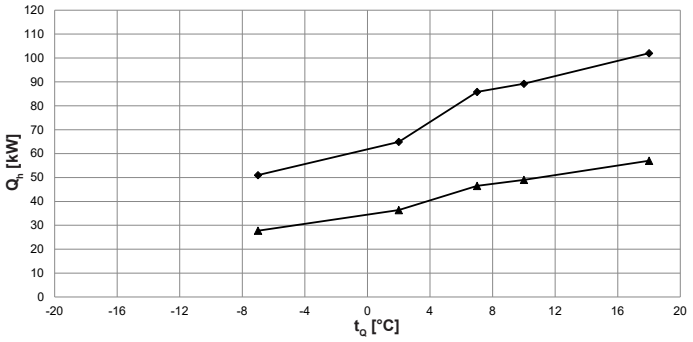
Heat output - t_{VL} 45 °C



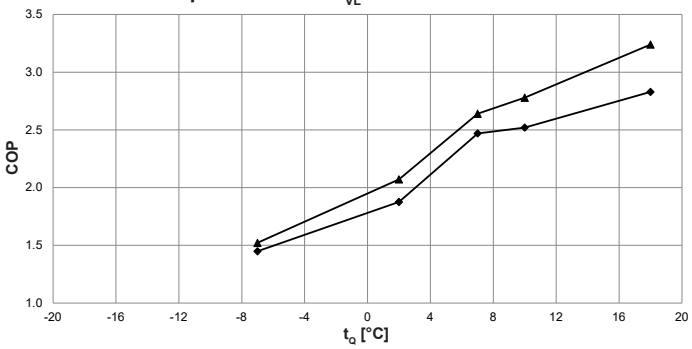
Coefficient of performance - t_{VL} 45 °C



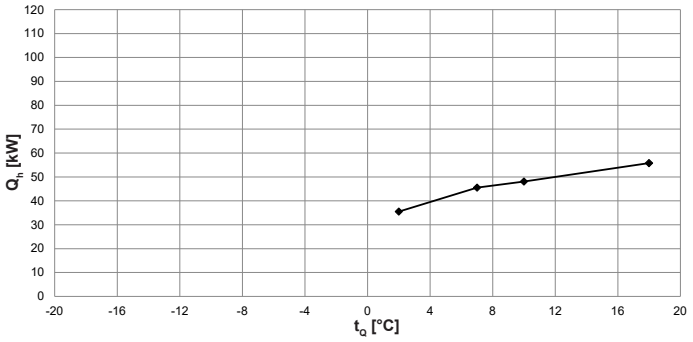
Heat output - t_{VL} 55 °C



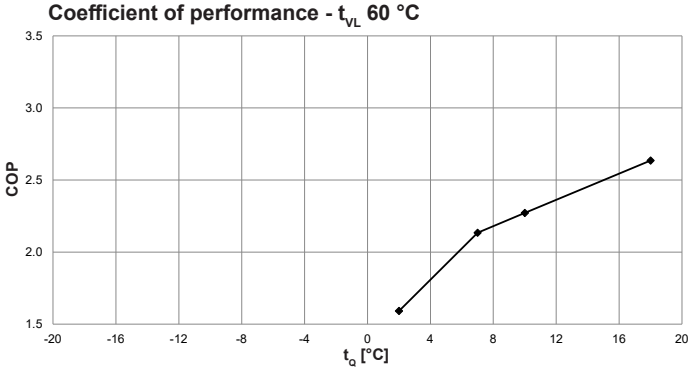
Coefficient of performance - t_{VL} 55 °C



Heat output - t_{VL} 60 °C



Coefficient of performance - t_{VL} 60 °C



t_{VL} = heating flow temperature (°C)
t_Q = source temperature (°C)
Q_h = heat output at full load (kW), measured in accordance with standard EN 14511
COP = Coefficient of performance for the overall unit in accordance with standard EN 14511

max. output
min. output

Output correction factors in Super Silent mode (whisper mode)

Flow temperature	°C	35	40	45	50	55	60
Heat output factor	-	0.83	0.82	0.81	0.80	0.80	0.80
Power consumption factor	-	0.83	0.72	0.72	0.74	0.74	0.74
COP factor	-	1.02	1.14	1.14	1.08	1.08	1.08

Performance data – heating

Maximum heat output allowing for defrosting losses
Data according to EN 14511:2018

Belaria® fit (70)

		Maximum output			Minimum output		
t_{VL} °C	t_Q °C	Q_h kW	P kW	COP	Q_h kW	P kW	COP
35	-20	35.2	23.1	1.5	22.0	12.3	1.8
	-15	43.8	22.8	1.9	26.6	11.7	2.3
	-10	52.1	21.7	2.4	31.1	11.3	2.7
	-7	59.2	21.6	2.7	34.5	10.7	3.2
	2	71.0	22.6	3.1	41.0	10.7	3.8
	7	87.2	21.7	4.0	50.3	10.5	4.8
	10	92.3	22.2	4.2	53.0	10.5	5.1
	18	107.0	22.6	4.7	61.0	10.4	5.8
40	-20	34.1	26.1	1.3	20.6	14.7	1.4
	-15	42.2	25.6	1.6	24.7	13.0	1.9
	-10	51.0	25.3	2.0	30.0	12.6	2.4
	-7	55.8	25.2	2.2	31.6	12.4	2.5
	2	69.7	24.8	2.8	40.3	12.0	3.4
	7	86.0	24.2	3.6	49.4	11.7	4.2
	10	91.8	24.6	3.7	52.0	11.7	4.5
	18	106.0	25.1	4.2	60.0	11.6	5.2
45	-20	29.1	29.2	1.0	21.7	15.1	1.4
	-15	40.8	28.7	1.4	23.9	14.7	1.6
	-10	50.2	28.3	1.8	29.0	14.3	2.0
	-7	54.6	28.2	1.9	29.5	14.1	2.1
	2	68.0	27.6	2.5	38.9	13.6	2.9
	7	84.9	25.9	3.3	48.6	13.2	3.7
	10	91.4	27.4	3.3	51.3	13.2	3.9
	18	105.0	28.0	3.8	59.3	13.1	4.5
50	-20	-	-	-	-	-	-
	-15	36.2	32.2	1.1	22.9	14.1	1.6
	-10	43.5	31.7	1.4	28.0	16.1	1.7
	-7	52.7	31.5	1.7	28.6	15.9	1.8
	2	66.3	30.9	2.1	37.6	15.4	2.4
	7	86.2	31.3	2.8	47.7	15.5	3.1
	10	90.2	31.5	2.9	50.3	15.5	3.2
	18	103.0	32.1	3.2	58.2	15.4	3.8
55	-20	-	-	-	-	-	-
	-15	-	-	-	-	-	-
	-10	-	-	-	-	-	-
	-7	51.0	35.2	1.4	27.7	18.2	1.5
	2	64.9	34.6	1.9	36.4	17.6	2.1
	7	85.8	34.7	2.5	46.5	17.6	2.6
	10	89.2	35.4	2.5	49.0	17.6	2.8
	18	102.0	36.0	2.8	57.0	17.6	3.2
60	-20	-	-	-	-	-	-
	-15	-	-	-	-	-	-
	-10	-	-	-	-	-	-
	-7	-	-	-	-	-	-
	2	35.5	22.3	1.6	-	-	-
	7	45.5	21.3	2.1	-	-	-
	10	48.1	21.2	2.3	-	-	-
	18	55.8	21.2	2.6	-	-	-

t_{VL} = heating flow temperature (°C)
t_Q = source temperature (°C)
Q_h = heat output at full load (kW), measured in accordance with standard EN 14511
P = power consumption for the overall unit (kW)
COP = Coefficient of performance for the overall unit in accordance with standard EN 14511

Output correction factors in Super Silent mode (whisper mode)

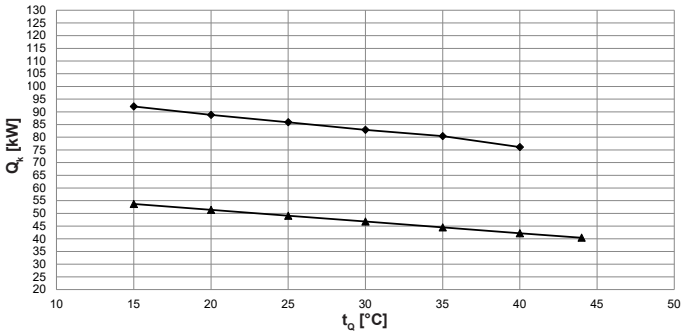
Flow temperature	°C	35	40	45	50	55	60
Heat output factor	-	0.83	0.82	0.81	0.80	0.80	0.80
Power consumption factor	-	0.83	0.72	0.72	0.74	0.74	0.74
COP factor	-	1.02	1.14	1.14	1.08	1.08	1.08

Performance data - cooling

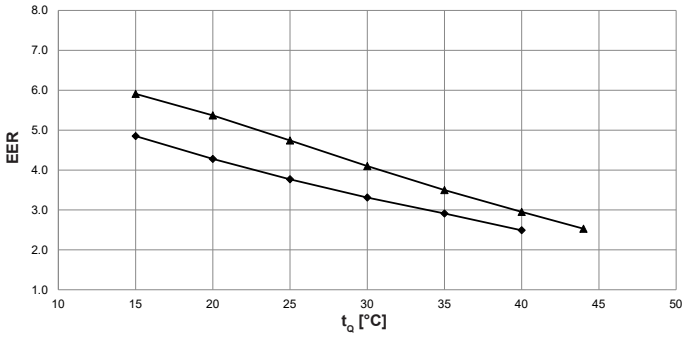
Maximum cooling capacity
Data according to EN 14511:2018

Belaria® fit (70)

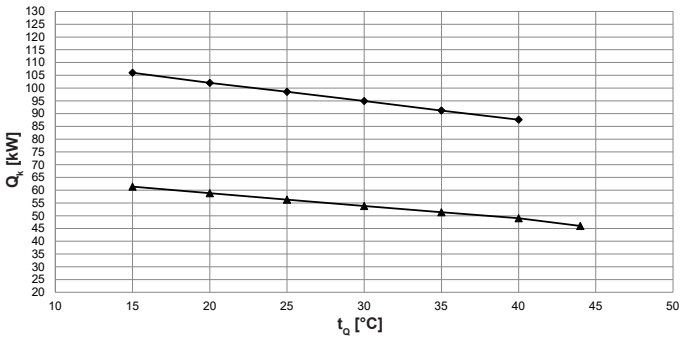
Cooling capacity - t_{VL} 7 °C



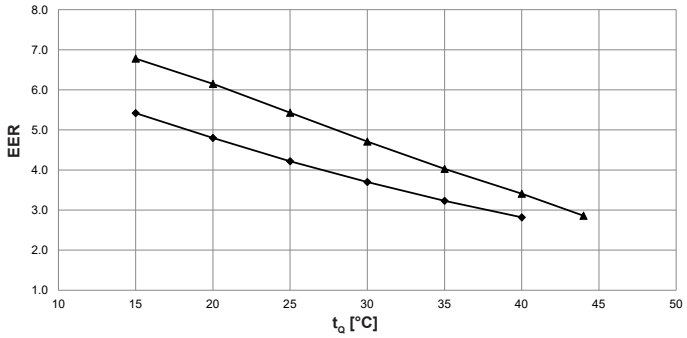
Energy efficiency ratio - t_{VL} 7 °C



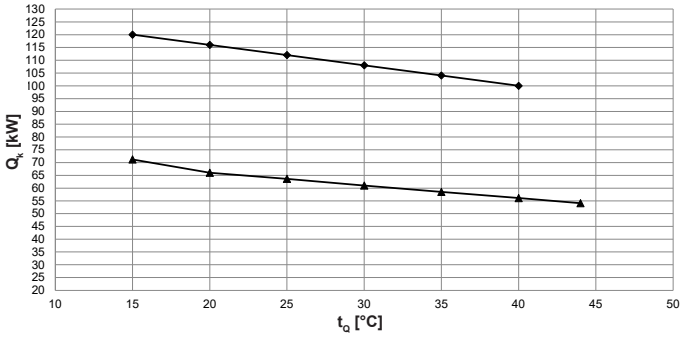
Cooling capacity - t_{VL} 12 °C



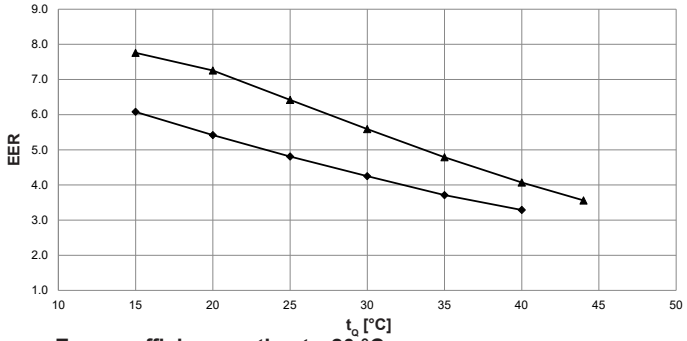
Energy efficiency ratio - t_{VL} 12 °C



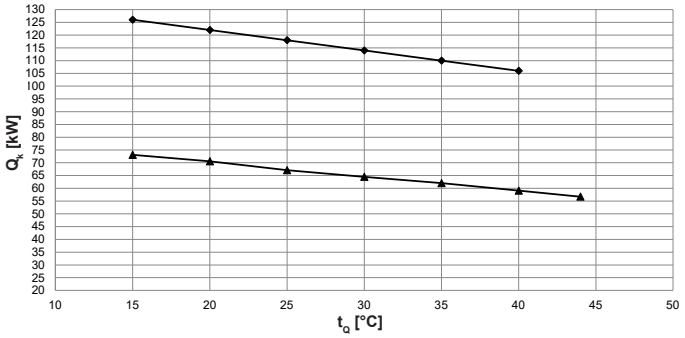
Cooling capacity - t_{VL} 18 °C



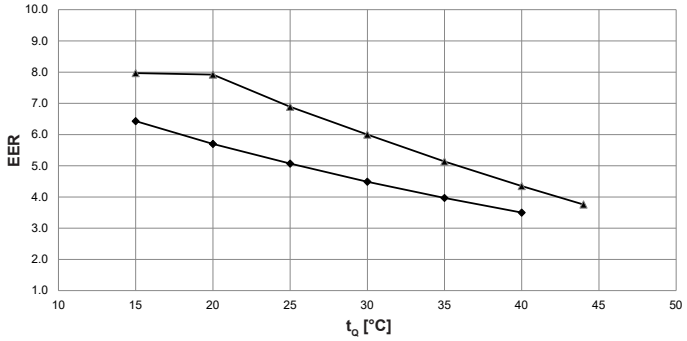
Energy efficiency ratio - t_{VL} 18 °C



Cooling capacity - t_{VL} 20 °C



Energy efficiency ratio - t_{VL} 20 °C



t_{VL} = cooling water flow temperature (°C)
t_Q = source temperature (°C)
Q_k = cooling capacity at full load (kW), measured in accordance with standard EN 14511
EER = Energy Efficiency Ratio for the overall unit in accordance with standard EN 14511

max. output
min. output

Output correction factors in Super Silent mode (whisper mode)

Cooling capacity factor	-	0.80
Power consumption factor	-	0.78
EER factor	-	1.04

Performance data - cooling

Maximum cooling capacity
Data according to EN 14511:2018

Belaria® fit (70)

		Maximum output			Minimum output		
t_{VL} °C	t_Q °C	Q_k kW	P kW	EER	Q_k kW	P kW	EER
7	15	92.1	19.0	4.9	53.7	9.1	5.9
	20	88.8	20.7	4.3	51.4	9.6	5.4
	25	85.9	22.8	3.8	49.1	10.4	4.7
	30	82.9	25.0	3.3	46.8	11.4	4.1
	35	80.4	27.6	2.9	44.5	12.7	3.5
	40	76.1	30.6	2.5	42.2	14.3	3.0
	44	47.0	18.6	2.5	40.4	16.0	2.5
10	15	100.0	19.3	5.2	58.2	9.1	6.4
	20	96.7	21.1	4.6	55.0	9.5	5.8
	25	93.1	23.1	4.0	7.0	1.4	5.1
	30	89.6	25.5	3.5	53.3	12.0	4.5
	35	86.1	28.0	3.1	50.9	13.4	3.8
	40	82.5	30.9	2.7	48.5	15.1	3.2
	44	51.5	19.3	2.7	46.1	16.6	2.8
12	15	106.0	19.6	5.4	61.4	9.1	6.8
	20	102.0	21.3	4.8	58.8	9.6	6.2
	25	98.5	23.3	4.2	56.3	10.4	5.4
	30	94.9	25.6	3.7	53.8	11.4	4.7
	35	91.2	28.2	3.2	51.4	12.8	4.0
	40	87.6	31.1	2.8	49.0	14.4	3.4
	44	54.7	18.7	2.9	46.0	16.1	2.9
15	15	110.0	19.3	5.7	64.2	9.1	7.0
	20	106.0	21.0	5.1	61.1	9.3	6.6
	25	103.0	23.1	4.5	58.6	10.1	5.8
	30	99.0	25.3	3.9	56.1	11.1	5.1
	35	95.3	27.7	3.4	53.7	12.4	4.3
	40	91.8	30.5	3.0	51.3	13.9	3.7
	44	56.1	18.3	3.1	48.2	15.8	3.1
18	15	120.0	19.7	6.1	71.2	9.2	7.8
	20	116.0	21.4	5.4	66.0	9.1	7.3
	25	112.0	23.3	4.8	63.6	9.9	6.4
	30	108.0	25.4	4.3	61.0	10.9	5.6
	35	104.0	28.0	3.7	58.5	12.2	4.8
	40	100.0	30.4	3.3	56.1	13.8	4.1
	44	62.2	18.0	3.5	54.1	15.2	3.6
20	15	126.0	19.6	6.4	73.1	9.2	8.0
	20	122.0	21.4	5.7	70.6	8.9	7.9
	25	118.0	23.3	5.1	67.1	9.7	6.9
	30	114.0	25.4	4.5	64.5	10.8	6.0
	35	110.0	27.7	4.0	62.0	12.1	5.1
	40	106.0	30.3	3.5	59.1	13.6	4.4
	44	64.5	17.9	3.6	56.7	15.1	3.8

t_{VL} = cooling water flow temperature (°C)
t_Q = source temperature (°C)
Q_k = cooling capacity at full load (kW), measured in accordance with standard EN 14511
P = power consumption for the overall unit (kW)
EER = Energy Efficiency Ratio for the overall unit in accordance with standard EN 14511

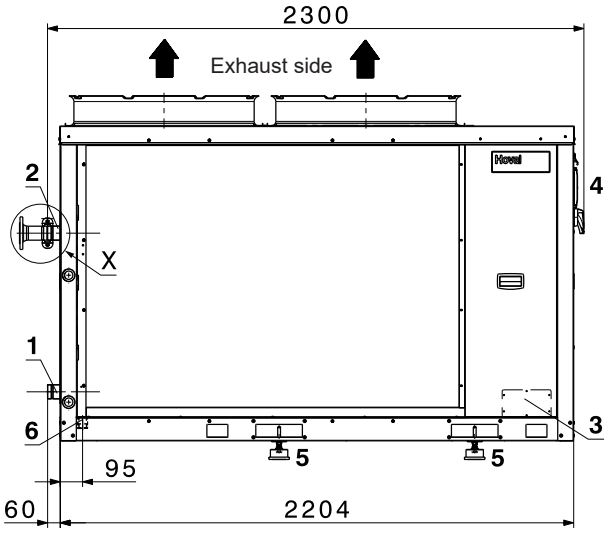
Output correction factors in Super Silent mode (whisper mode)

Cooling capacity factor	-	0.80
Power consumption factor	-	0.78
EER factor	-	1.04

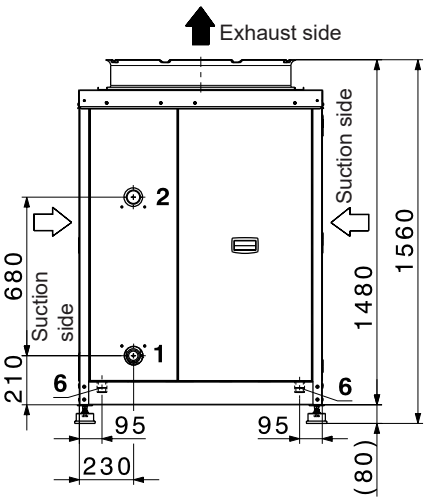
Belaria® fit (40,53)

(Dimensions in mm)

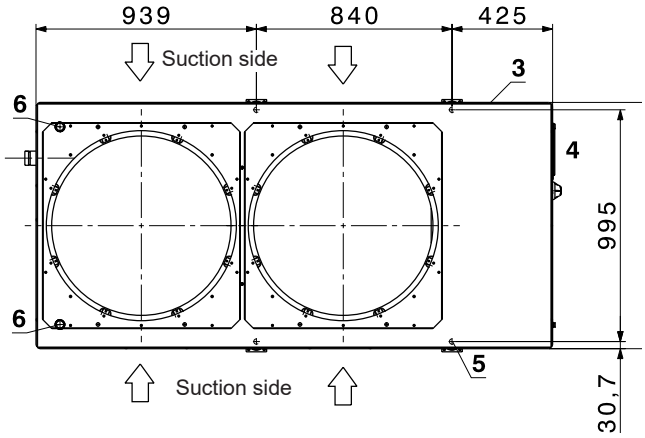
Front view

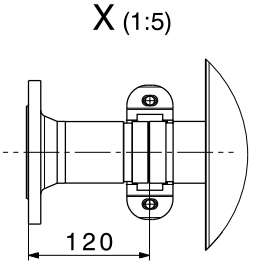


Side view



Rear





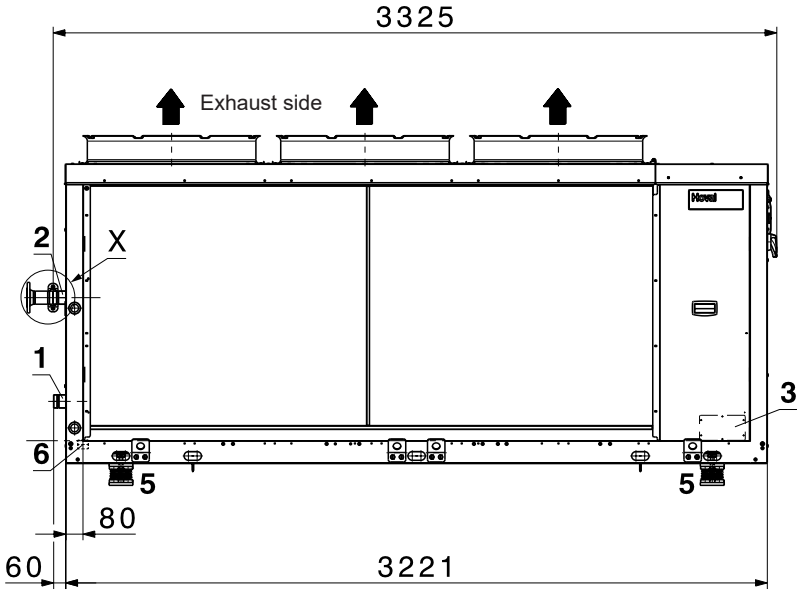
optional accessory:
flange set Victaulic

1 Flow heating DN 50
2 Return heating DN 50
3 Electrical connection
4 Control module bracket
5 Hole for attachment of the heat pump
6 Condensate drain DN 32

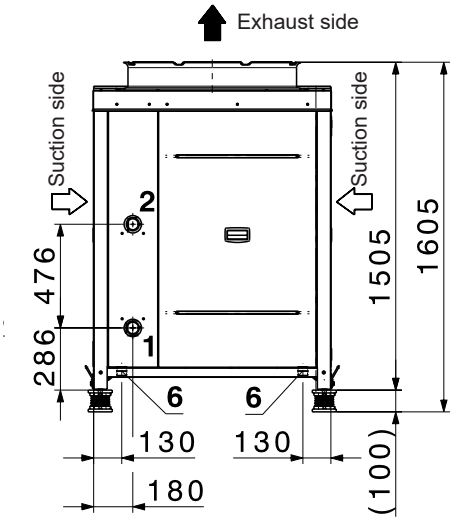
Belaria® fit (70)

(Dimensions in mm)

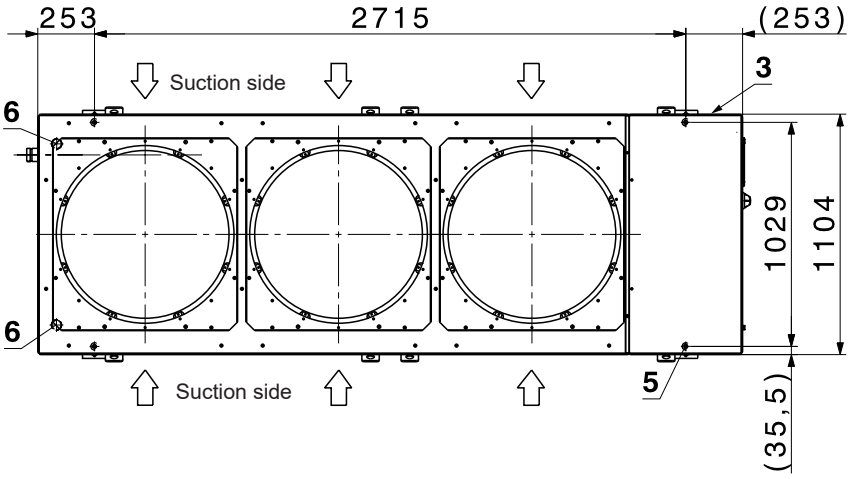
Front view

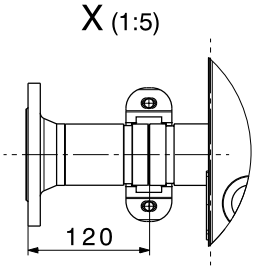


Side view



Rear



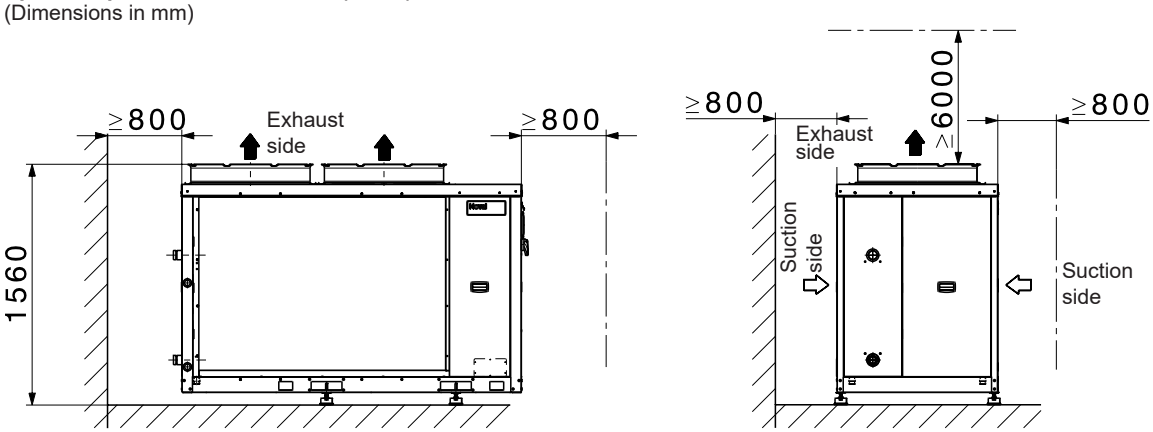


optional accessory:
flange set Victaulic

1 Flow heating DN 50
2 Return heating DN 50
3 Electrical connection
4 Control module bracket
5 Hole for attachment of the heat pump
6 Condensate drain DN 32

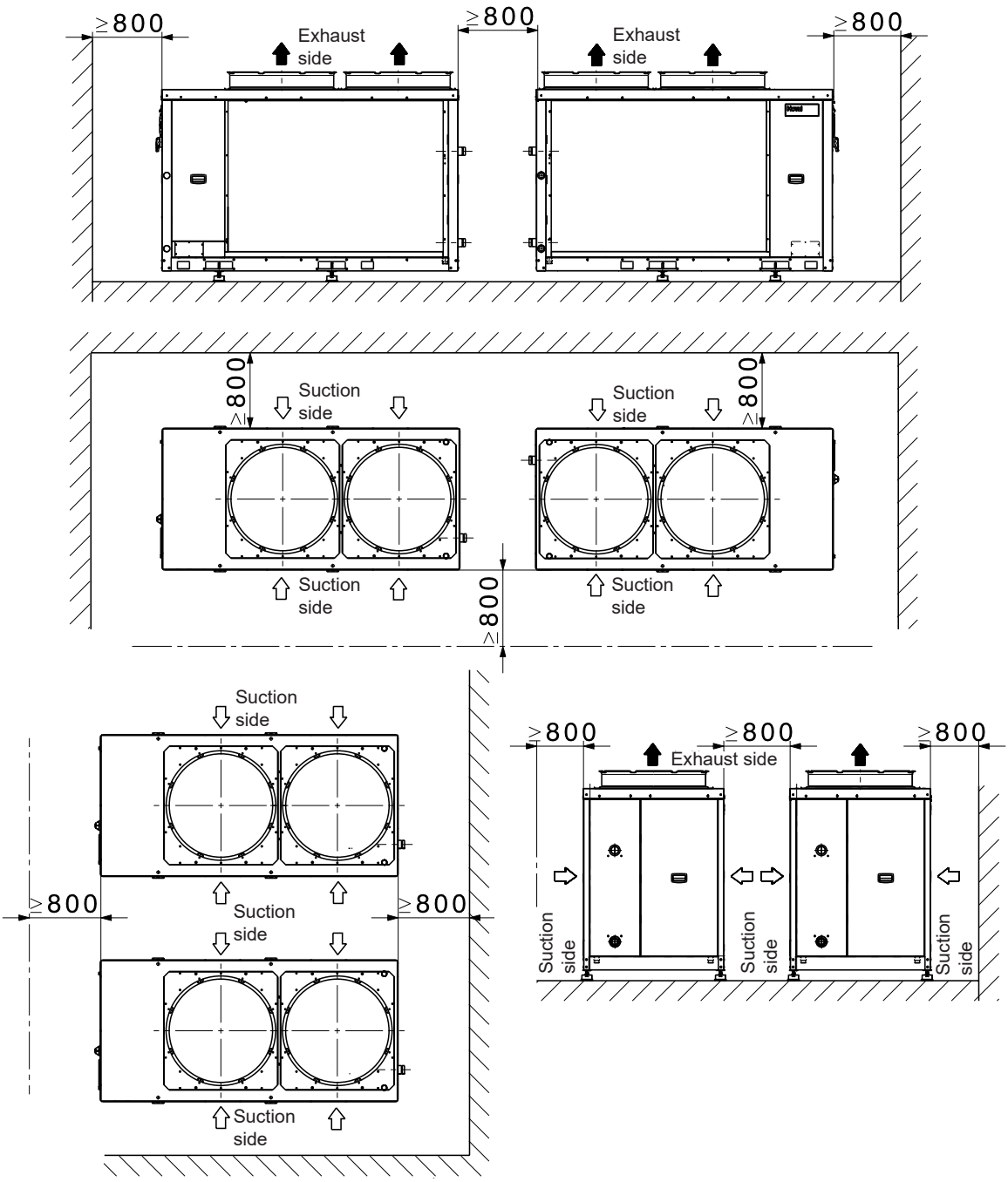
Space requirement Belaria® fit (40,53)

(Dimensions in mm)



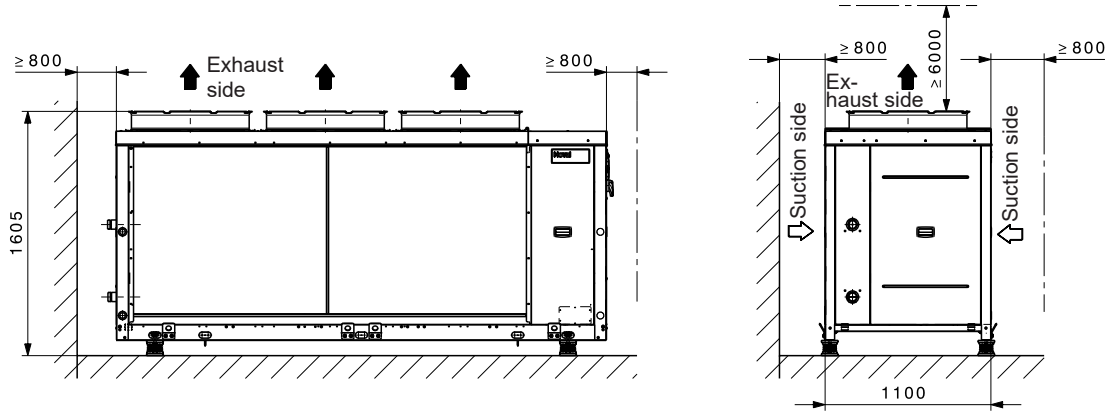
Minimum distances for cascade systems Belaria® fit (40,53)

(Dimensions in mm)



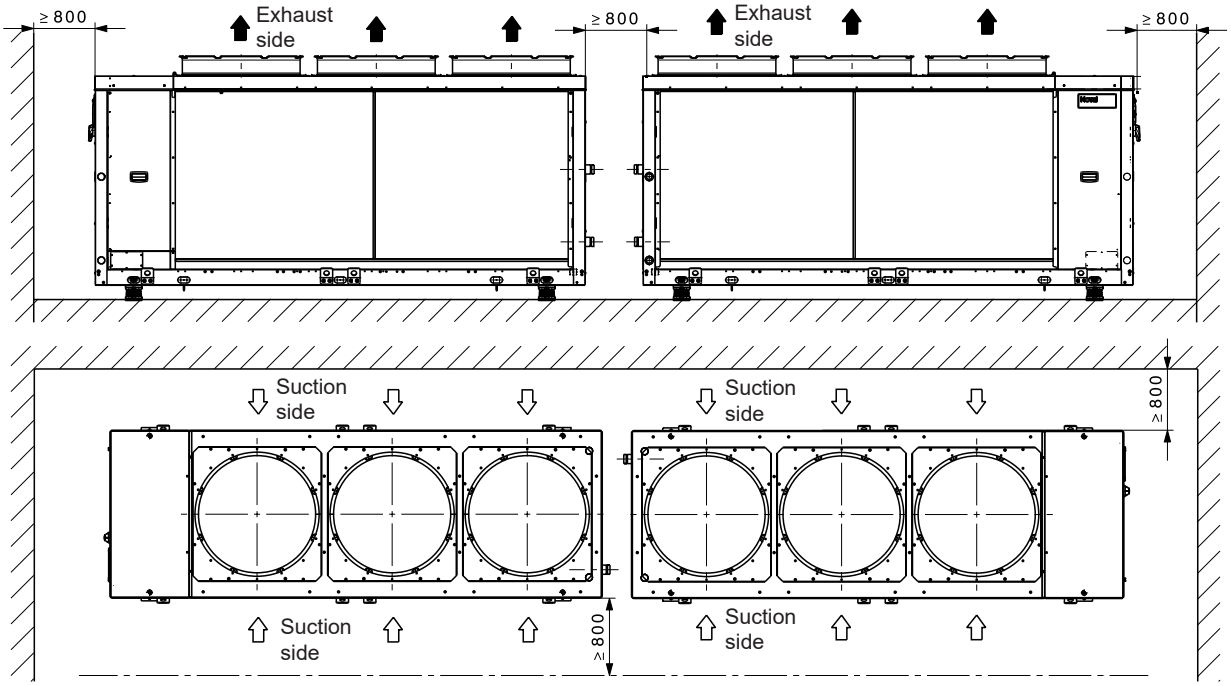
Space requirement Belaria® fit (70)

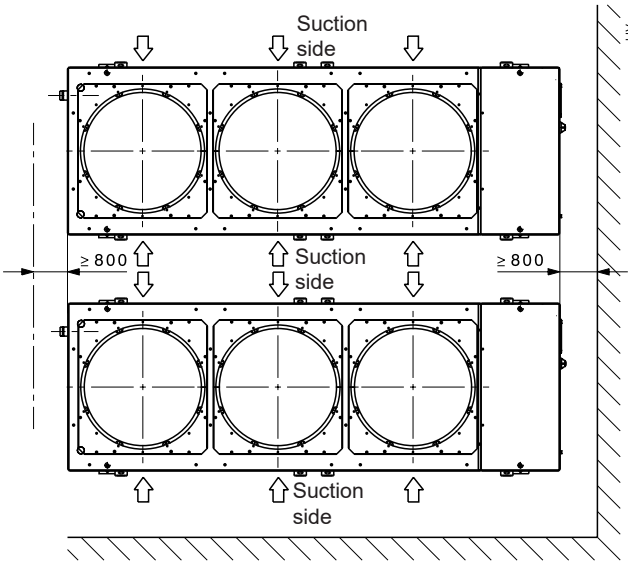
(Dimensions in mm)

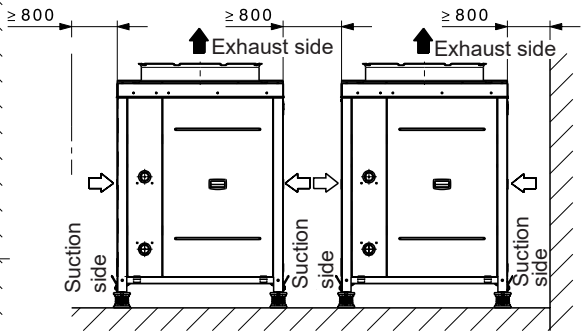


Minimum distances for cascade systems Belaria® fit (70)

(Dimensions in mm)



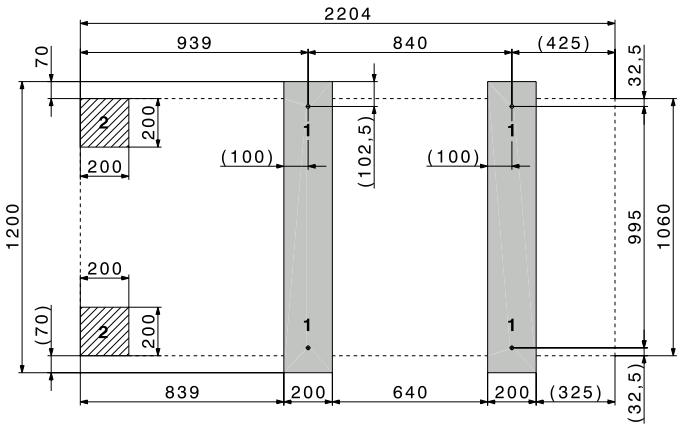




Base design Belaria® fit (40,53)

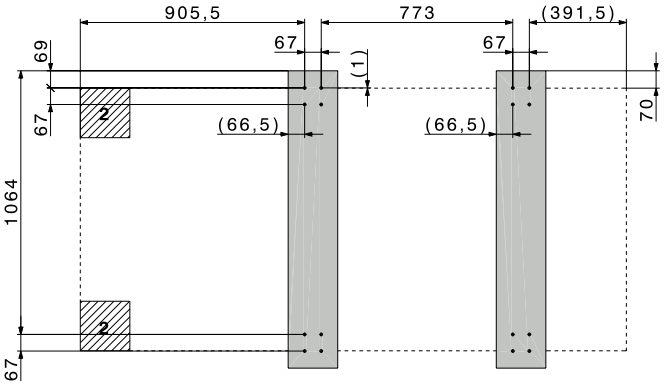
(Dimensions in mm)

Base plan feet

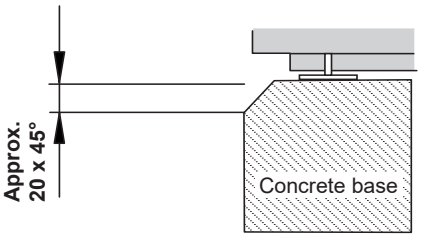


1 Hole for attachment of the heat pump M12
2 Condensate drain area

Base plan set of vibration-damping feet



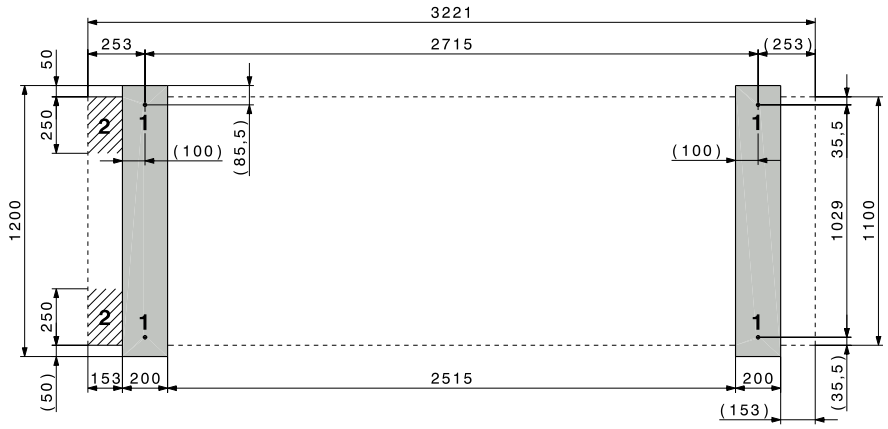
The concrete base must have a level surface the size of the Belaria® fit. The base should have chamfered edges.



Base design Belaria® fit (70)

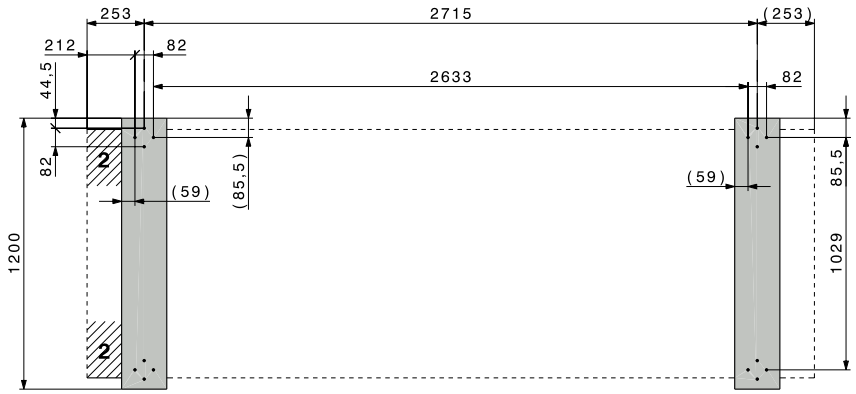
(Dimensions in mm)

Base plan feet

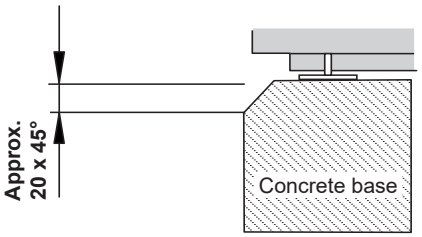


1 Hole for attachment of the heat pump M16
2 Condensate drain area

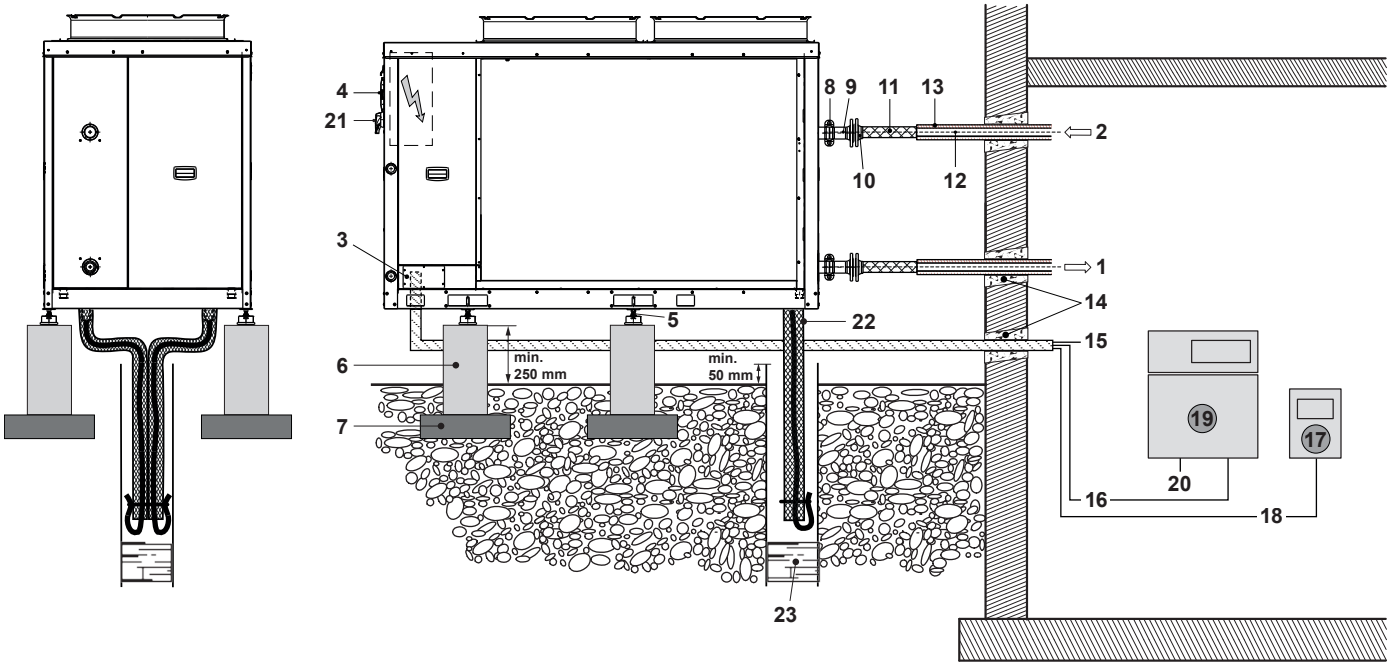
Base plan set of vibration-damping feet



The concrete base must have a level surface the size of the Belaria® fit. The base should have chamfered edges.



Configuration and connection diagram for the Belaria® fit



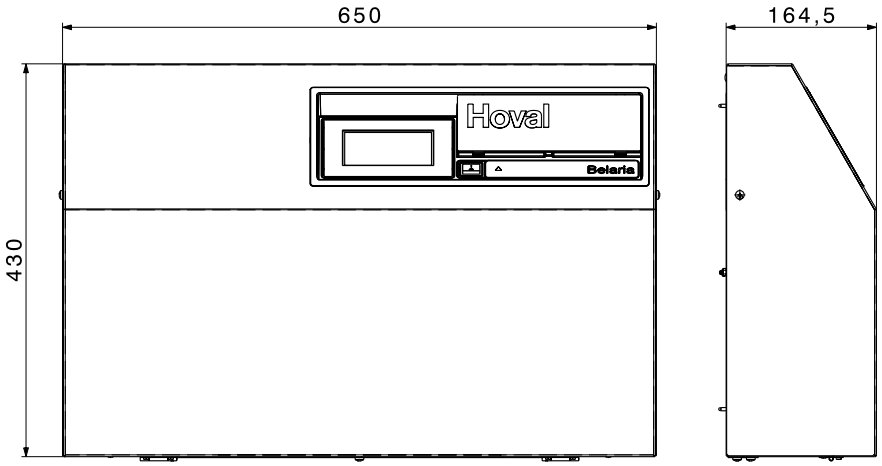
1 Heating flow DN 50
2 Heating return DN 50
3 Electrical system feed-through
4 Control module bracket (installation possible on site)
5 Vibration dampers (option)
6 Concrete base (on site)
7 Vibration decouplers (on site)
8 Victaulic coupling (included in the scope of delivery)
9 Victaulic connection pipe (included in the scope of delivery)
10 Set of welded-on flanges (option)
11 Vibration decouplers (option)
12 Hydraulic line (on site)
13 Insulation (on site)
14 Feed-throughs (on site)
15 Main current — 400 V/5-pin (configuration of cross-section on site)
16 Connection to heat pump
Request On/Off — 230 V/2-pin (see wiring diagram)
Cooling mode On/Off — 230 V/2-pin (see wiring diagram)
Alarm — 230 V/2-pin (see wiring diagram)
17 Operator terminal
18 Connection of heat pump operator terminal
(on-site
line length < 40 m: 5 x 0.75 mm² shielded
line length < 300 m: 3 x 0.75 mm² shielded)
19 Electrical box
20 Control current — 230 V/13 A/3-pin (see wiring diagram)
21 Main switch
22 Condensate drain DN 32
23 Seepage (duct/gravel layer)

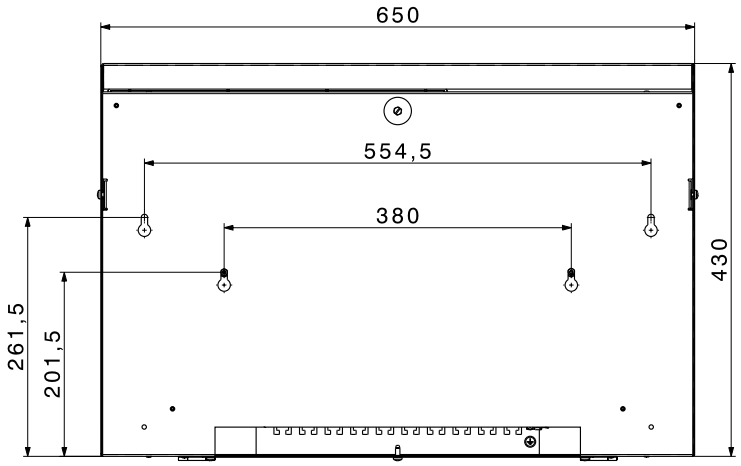
The piping from the boiler room to the heat pump must be configured by the installer. Connecting pipes are not included.

Notice
If the operator terminal is installed at a distance of more than 40 metres from the heat pump, the power supply unit supplied must be used.

Electrical box for Belaria® fit

(Dimensions in mm)





Requirements and directives
The general requirements and directives listed in the chapter Engineering apply.

Set-up
- The Belaria® fit must be mounted outdoors. The installation location must be selected in accordance with the valid requirements and directives.
- Lines carrying water must be laid insulated and frost-proof.
- The installation location must be selected as close to the building as possible. Only short and simple routing of lines guarantees cost effectiveness and low heat losses.
- The installation location must be chosen in such a way that no noise pollution can occur (do not install near bedrooms, keep a distance from neighbours).
- There must be no building openings (windows, doors, shafts, ventilation openings or the like) within a radius of 1 m from the outdoor unit and no potential ignition sources must be present.
- Make sure that the installation location is well ventilated.
- DO NOT install the unit in the following places or locations:
  - In a potentially explosive atmosphere.
  - In places where there is a risk of fire due to escaping flammable gases (e.g. thinner or petrol) or airborne carbon fibres or flammable dust particles.
  - In places where corrosive gases (example: sulphuric acid gas) are produced.

  Corrosion of copper pipes and solder joints can lead to leaks in the refrigerant circuit.
- Wall ducts into the building must be airtight.
- The heat pump must not be placed in or near floor recesses.
- The heat pump must not be placed closer than 1 m to the boundary of the property. Country-specific regulations must be observed.
- The air intake and air outlet sides must not be narrowed or covered.
- The lateral air supply and the air outlet to the top must be without obstruction.
- It is imperative that the minimum distances are observed (see Dimensions/Space requirement).
- The intake air must be free of impurities such as sand and aggressive substances such as ammonia, sulphur, chlorine etc.
- The heat pump must be installed on a load-bearing fixed structure.
- If the heat pump is installed at wind-prone locations, the alignment of the heat pump must be selected in such a way that the expected wind direction is at right angles to the suction direction.
- If an alternative installation in areas subject to strong winds cannot be avoided, an additional wind shield in the form of a hedge, for example, should be installed.
- The heat pump must always be installed on a solid surface in a horizontal position. This can be achieved by means of concrete bases.
- The load-bearing capability must be adequate. The unit can be mounted with 4 vibration-damping adjustable feet.
- Air/water heat pumps generate condensate during operation. It must be ensured that the condensate produced can be absorbed to a sufficient extent by a gravel bed (see configuration and connection diagram).
- When air is discharged upwards, there is an increased frost hazard. Gutters, water pipes and water containers must not be situated in the immediate vicinity.
- The condensate drain must be discharged outside the building and must not be led into or through a building.
- To prevent damage caused by animals such as rodents or insects, all cable ducts must be properly sealed.
- The hydraulic lines from the heat pump can transmit structure-borne noise. Therefore, structure-borne noise decoupling should be provided, e.g. with compensators.

Flat roof installation
Flat roof installation of the Belaria® fit is possible under the following conditions:
- Strict compliance with safety measures regarding combustible refrigerants (see safety measures to be complied with).
- All standards concerning statics, wind load and access to roofs must be complied with.
- The heat pump must be firmly bolted onto the substructure (e.g. concrete base). The heat pump must be prevented from tilting.
- Minimum distance of the heat pump to the roof edge: 1.5 m (personal protection) + 0.8 m (working area refrigeration circuit).
- Accessibility for maintenance and repair work must be ensured. For work on the heat pump, a measuring case and test equipment, refrigerant bottle, etc. must be transported to the site, amongst other things. In addition to the safety equipment (fall protection devices, anchoring devices, etc.), this must also be taken into account for skylights, stairs, railings, etc.

Electrical connections
- The electrical connection must be carried out by a qualified technician and registered with the responsible energy supply company. The relevant electrical installation company is responsible for ensuring that electrical connection is carried out in accordance with standards and that safeguard measures are put in place.
- The mains voltage at the connection terminals of the heat pump must be 400 V or 230 V +/-10%. The conductor cross-sections of the connection line must be checked by the electrical company carrying out the work.
- This fault-current circuit breaker must be of the all-current-sensitive type B (IΔN ≥ 300 mA). Country-specific requirements must be complied with. If the “fault-current circuit breaker” safeguard measure is implemented by the electrical company, a separate fault-current circuit breaker is recommended for the heat pumps. The specified RCCB types apply to the heat pump regardless of externally connected components (refer to assembly instructions, data sheets).
- Circuit breakers must be provided for the main circuit. The starting currents must be taken into account in the design.
- The electrical connection and feeder lines must be copper cables.
- Please refer to the wiring diagram for electrical details.
- The wall feedthrough should slope down from the inside to the outside.
- To avoid damage, the opening should be padded on the inside or, for example, lined with a PVC pipe.
- After installation, the wall opening must be sealed with a suitable sealing compound on site in compliance with fire protection regulations!
- The distance between the high and low voltage cables should be at least 50 mm.

Routing of the hydraulic connection lines
- If the hydraulic connection lines are laid in the ground, this must be done in a protective tube.
- Wall ducts must be sealed to the outside on site.
- After the hydraulic connection lines have been laid, they must be checked for damage and reinsulated. In case of cooling, condensate can form on the pipes.
- The hydraulic connection lines must be laid decoupled from the building and must never be laid flush-mounted.
- Shut-off valves must be installed on site in accordance with the corresponding hydraulic diagram. Opening the shut-off valves is only allowed immediately before commissioning!
- The danger of frost damage must be taken into account if there are prolonged power outages.
- False flow rates as a result of incorrect dimensions of the pipework, incorrect fittings or improper pump operation can cause damage to the heat pump.

Notice
If the main flow is interrupted during the utility lock, it is mandatory for the primary circuit to be implemented with a frost protection agent mixture.

Buffer storage tank
A buffer storage tank ensures optimal operating conditions for the heat pump:
- Hydraulic decoupling of the various volumetric flows from the heat pump and heat distribution system (heating)
- Absorbs the power reserves of the heat pump and reduces the switch-on frequency (cycling)
- Allows several heating circuits to be connected

The Hoval Belaria® fit air/water heat pump requires a buffer storage tank.

Minimum sizes of buffer storage tank

	EnerVal type
Belaria® fit (40)	2000
Belaria® fit (53)	2000
Belaria® fit (70)	1500 + 1500

The buffer storage tank must be made correspondingly larger in order to bridge periods when the electricity is switched off by the energy company, in particular in the case of radiator heating systems.

Further guidelines
see “Engineering”

Installation on heating side
- All pertinent laws, regulations and standards for heating house pipework and for heat pump systems must be complied with.
- A sludge separator must be installed in the heating flow and a filter ball valve in the heating return.
- The safety and expansion devices for closed heating systems must be provided in accordance with EN 12828.
- Dimensioning of the pipework must be done according to the required flow rates and given pressure drops.
- Ventilation must be provided at the highest points and drainage at the lowest points of the connection lines.
- To prevent energy losses, the connection lines must be insulated with suitable material.

Transport and storage
- When removing the packaging, check the heat pump for damage. If the heat pump was damaged during transport or storage, contact Hoval customer service, a service partner or a licensed specialist immediately. They must carry out a leak test with a suitable leak detector. In the event of a leak, the heat pump must be repaired.
- Store the outdoor unit in a cool place without fire hazard and without direct exposure to heat sources. The ambient temperature must not exceed 43 °C.
- The same regulations apply for storage as for installation (no recesses, ventilation pipes, ignition sources in the storage area).
- The heat pump must not be stored in closed rooms, cellars or garages.
- The heat pump is only allowed to be stored outdoors.
- During transport, ensure sufficient ventilation in the closed vehicle, also when parking and stopping.
- Storage in passageways, escape routes or in front of entrances or exits is not permitted.
- Ignition sources such as naked flames, switched-on gas appliances, electric heaters, etc. must be kept away from the unit.
- Transport and storage only in upright position. Protect from mechanical damage and from falling over or falling down (make sure the load is secure).

Hoval Thermalia® comfort

Heat pump system for heating in the living area.

- Compact floor-standing brine/water or water/water heat pumps
- Stable casing made of powder-coated sheet steel with removable and sound-insulated side walls
  Colour brown red (RAL 3011)
- Front made of powder-coated sheet steel, removable and sound-insulated
  Colour flame red (RAL 3000)
- Acoustically insulated casing with triple mounting of the compressor
- Sound-insulated floor mat
- Spiral (scroll) compressor
- Evaporator and plate-type condenser made of stainless steel/copper
- Electronic expansion valve
- Electronic starting current limiter with rotating field and phase monitoring
- Speed-controlled, highly efficient heating and brine pump
- 3-way switching ball valve for heating/domestic hot water with drive
- Integrated brine pressure monitoring
- Hydraulic connections at rear:
  Thermalia® comfort (8-17): 1″
  Thermalia® comfort H (7,10): 1″
- TopTronic® E control installed
- Sensor set consisting of outdoor sensor, flow sensor and domestic hot water sensor included in the scope of delivery.
- Heat pump delivered pre-wired and ready for connection
- Electrical connections at rear
- Refrigerant:
  Thermalia® comfort (8-17): R410A
  Thermalia® comfort H (7,10): R134a
- Brine connections at rear:
  Thermalia® comfort (8-17): 1″
  Thermalia® comfort H (7,10): 1″

Model range

Thermalia® comfort type	Water/water 35 °C	Water/water 55 °C	Brine/water 35 °C	Brine/water 55 °C	Refrigerant	Max. flow °C	Heat output B0W35 kW	Heat output W10W35 kW
(8)	A+++	A+++	A+++	A++	R410A	62	7.6	9.6
(10)	A+++	A+++	A+++	A++	R410A	62	10.6	12.7
(13)	A+++	A+++	A+++	A++	R410A	62	13.4	17.5
(17)	A+++	A+++	A+++	A++	R410A	62	17.2	22.3
H (7)	A+++	A+++	A+++	A++	R134a	67	6.5	9.1
H (10)	A+++	A+++	A+++	A++	R134a	67	9.1	12.8

Energy efficiency class of the compound system with control

TopTronic® E controller

Control panel

- 4.3-inch colour touchscreen
- Heat generator blocking switch for interrupting operation
- Fault signalling lamp

TopTronic® E control module

- Simple, intuitive operating concept
- Display of the most important operating states
- Configurable start screen
- Operating mode selection
- Configurable day and week programmes
- Operation of all connected Hoval CAN bus modules
- Commissioning wizard
- Service and maintenance function
- Fault message management
- Analysis function
- Weather display (with online HovalConnect)
- Adaptation of the heating strategy based on the weather forecast (with online HovalConnect)

TopTronic® E basic module heat generator TTE-WEZ

- Integrated control functions for
  - 1 heating/cooling circuit with mixer
  - 1 heating/cooling circuit without mixer
  - 1 hot water charging circuit
  - Bivalent and cascade management
- Outdoor sensor
- Immersion sensor (calorifier sensor)
- Contact sensor (flow temperature sensor)
- RAST 5 basic plug set

Options for TopTronic® E controller

- Can be expanded by max. 1 module expansion:
  - Module expansion heating circuit or
  - Universal module expansion or
  - Heat balancing module expansion
- Can be networked with up to 16 controller modules in total:
  - Heating circuit/DHW module
  - Solar module
  - Buffer module
  - Measuring module

Number of additional modules that can be installed in the heat generator:

- 1 module expansion and 1 controller module

The supplementary plug set must be ordered in order to use expanded controller functions.

For further information about the TopTronic® E,
see “Controls” section

EnergyManager PV smart
Feature to increase self-generated power consumption in use with HovalConnect.

If a HovalConnect gateway is used together with the heat pump, the free EnergyManager PV smart feature is available. This allows the heat pump to be operated preferentially at times of higher solar radiation. The feature uses online weather data on the current solar radiation for this purpose and can be adjusted by means of an associated threshold value. The self-consumption of electricity from an existing photovoltaic plant is thus increased and the purchase of grid electricity is reduced. This results in a lasting and significant cost-saving potential without further investment costs for the customer.

Delivery
- One-piece design. Compact unit wired-up internally ready for connection, supplied fully packaged
- Sensor set supplied loose

Options
- Connection set heating
- Connection set domestic hot water

Brine/water-water/water heat pump

Hoval Thermalia® comfort

Refrigerant R410A

Flow temperature max. 62 °C

Thermalia® comfort type	Heat output B0W35 kW	Heat output W10W35 kW	Part No.
(8)	7.6	9.6	7018 562
(10)	10.6	12.7	7018 563
(13)	13.4	17.5	7018 564
(17)	17.2	22.3	7018 565

Hoval Thermalia® comfort H

Refrigerant R410A

Flow temperature max. 67 °C

Thermalia® comfort H type	Heat output B0W35 kW	Heat output W10W35 kW	Part No.
(7)	6.5	9.1	7018 566
(10)	9.1	12.8	7018 567

EnergyManager PV smart
Free feature to increase self-generated power consumption in use with HovalConnect.

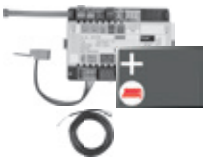
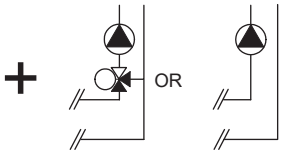
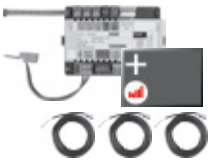
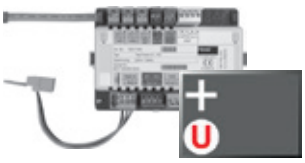
Further information
see “Description”

Energy efficiency class
see Description

Electric heating elements
see “Calorifiers” - chapter “Electric heating elements”

TopTronic® E module expansions

for TopTronic® E basic module heat generator

		Part No.
 	**TopTronic® E module expansion heating circuit TTE-FE HK** Expansion to the inputs and outputs of the basic module heat generator or the heating circuit/domestic hot water module for implementing the following functions: - 1 heating/cooling circuit w/o mixer or - 1 heating/cooling circuit with mixer Consisting of: - Fitting accessories - 1 contact sensor ALF/2P/4/T, L = 4.0 m - Basic plug set FE module **Notice** The supplementary plug set may have to be ordered to implement functions differing from the standard!	6034 576
	**TopTronic® E module expansion heating circuit incl. energy balancing** TTE-FE HK-EBZ Expansion to the inputs and outputs of the basic module heat generator or the heating circuit/domestic hot water module for implementing the following functions: - 1 heating/cooling circuit w/o mixer or - 1 heating/cooling circuit with mixer incl. energy balancing in each case Consisting of: - Fitting accessories - 3 contact sensors ALF/2P/4/T, L = 4.0 m - Plug set FE module **Notice** Suitable flow rate sensors (pulse sensors) must be provided on site.	6037 062
	**TopTronic® E module expansion Universal TTE-FE UNI** Expansion to the inputs and outputs of a controller module (basic module heat generator, heating circuit/domestic hot water module, solar module, buffer module) for implementing various functions Consisting of: - Fitting accessories - Plug set FE module **Notice** Refer to the Hoval System Technology to find which functions and hydraulic arrangements can be implemented. **Further information** see “Controls” - “Hoval TopTronic® E module expansions” chapter	6034 575

Flow rate sensor sets
Plastic housing

Size	Connection inches	Flow rate l/min	Part No.
DN 8	G ¾″	0.9-15	6038 526
DN 10	G ¾″	1.8-32	6038 507
DN 15	G 1″	3.5-50	6038 508
DN 20	G 1¼″	5-85	6038 509
DN 25	G 1½″	9-150	6038 510

Brass housing

Size	Connection inches	Flow rate l/min	Part No.
DN 10	G 1″	2-40	6042 949
DN 32	G 1½″	14-240	6042 950
DN 40	G 2″	22-400	6055 092

Notice:
With the flow sensors, heat balancing is possible via TopTronic® E module expansion.

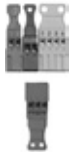
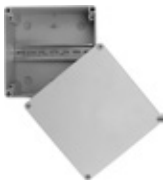
Flow rate sensor sets
Plastic housing

Size	Connection inches	Flow rate l/min	Part No.
DN 20	G 1¼″	5-85	6060 598

Notice:
With the flow sensors, heat balancing is possible via the automatic heat pump device.

Notice:
The flow rate sensor set must be installed without fail. Freezing can be prevented with the help of flow rate sensors and further technical measures. In order to protect the heat pump from frost in the event of a power failure or for example in bivalence mode, a system separation or other technical measures must be provided on site.

Accessories for TopTronic® E

		Part No.
	**TopTronic® E controller modules**	
	TTE-HK/WW TopTronic® E heating circuit/ hot water module	6034 571
	TTE-SOL TopTronic® E solar module	6037 058
	TTE-PS TopTronic® E buffer module	6037 057
	TTE-MWA TopTronic® E measuring module	6034 574
	**Supplementary plug set**	
	for basic module heat generator TTE-WEZ	6034 499
	for controller modules and module expansion TTE-FE HK	6034 503
	**TopTronic® E room control modules**	
	TTE-RBM TopTronic® E room control modules	
	easy white	6037 071
	comfort white	6037 069
	comfort black	6037 070
	**Enhanced language package TopTronic® E** one SD card required per control module Consisting of the following languages: HU, CS, SL, RO, PL, TR, ES, HR, SR, JA, DA	6039 253
	**HovalConnect**	
	HovalConnect LAN	6049 496
	HovalConnect WLAN	6049 498
	HovalConnect Modbus	6049 501
	HovalConnect KNX	6049 593
	TopTronic® E interface modules	
	GLT module 0-10 V	6034 578
	**TopTronic® E sensors**	
	AF/2P/K Outdoor sensor H x W x D = 80 x 50 x 28 mm	2055 889
	TF/2P/5/6T Immersion sensor, L = 5.0 m	2055 888
	ALF/2P/4/T Contact sensor, L = 4.0 m	2056 775
	TF/1.1P/2.5S/6T Collector sensor, L = 2.5 m	2056 776
	**Bivalent switch**	
	for various release or switching functions	
	Bivalent switch 1-piece	2056 858
	Bivalent switch 2-piece	2061 826
	**System housing**	
	System housing 182 mm	6038 551
	System housing 254 mm	6038 552
	**TopTronic® E wall casing**	
	WG-190 Wall casing small	6052 983
	WG-360 Wall casing medium	6052 984
	WG-360 BM Wall casing medium with control module cut-out	6052 985
	WG-510 Wall casing large	6052 986
	WG-510 BM Wall casing large with control module cut-out	6052 987

Further information
see “Controls”

Accessories

	Part No.
 **Hose set SCH25-25-12-4** for Thermalia® comfort (8-13) and Thermalia® comfort H (7,10) Consisting of: - 4 reinforced hoses PN 10 DN 25 1″ IT insulated for brine and heating side flat-sealing with union nut - Length: 1.2 m - 4 brackets DN 25 - Seals	6055 133
 **Hose set SCH25-32-12-4** for Thermalia® comfort (17) Consisting of: - 4 reinforced hoses PN 10 DN 32 1¼″ IT insulated for brine and heating side flat-sealing with union nut - Length: 1.2 m - 4 brackets DN 32 - Seals	6055 134

Accessories for water heating

	Part No.
 **Domestic hot water set SW25-25-12-1** for Thermalia® comfort (8-17) and Thermalia® comfort H (7,10) Consisting of: - 1 reinforced hose PN 10 DN 25 1″ IT insulated for domestic hot water side flat-sealing with union nut - Length: 1.2 m - 2 brackets DN 25 - Seals	6055 122
 **System water protection filter FGM025-200** For horizontal installation in return For filtration of heating and cooling water Consisting of: - Filter head and bowl in brass - Magnetic insert (nickel-neodymium) - 2 pressure gauges - filter surface in stainless steel - Filter fineness 200 µm - With drain valve - Connections Rp 1″ internal thread with integrated shut-off valves and union connection (outlet) Max. flow rate (Δp < 0.1 bar): 5.5 m³/h Weight: 6.8 kg Water temperature: max. 90 °C - incl. steam diffusion-tight insulating shells	6058 256

Notice
Fulfills the function of sludge separator and strainer

Further strainers
see “Various system components”

Electric instantaneous water heater available on request

Accessories

Vibration decoupler
for reducing structure-borne noise
from heat pumps indoors,
cannot be shortened
Consisting of:
- 1 vibration decoupler
insulated for heating side
flat-sealing with union nut
- 2 flat seals
Nominal pressure: PN 10

Dimension	Connection inches	Nominal length mm	Part No.
DN 25	1″	300	2082 222
DN 25	1″	500	2082 223
DN 25	1″	1000	2080 794
DN 32	1¼″	300	2082 224
DN 32	1¼″	500	2082 225
DN 32	1¼″	1000	2080 796
DN 40	1½″	500	2082 226
DN 40	1½″	1000	2080 798
DN 50	2″	500	2082 227
DN 50	2″	1000	2080 800

Circulating pumps, actuators, buffer storage tanks etc.,
see separate brochures

Necessary at boiler room temperatures < 10 °C

Crankcase heater — 6019 718
for Belaria® twin I/IR (20-30),
Thermalia® comfort (8-17),
Thermalia® comfort H (7,10),
Thermalia® twin (20-42),
Thermalia® twin H (13-22)
Necessary for heating
room temperatures < 10 °C
for protecting the compressor
For Belaria® twin I/IR
2 pieces are necessary

Instantaneous water heater kit DN 50 — 6044 070
consisting of electrical box ready
for connection for electrical
protection incl. assembly fittings.
for combination with all
screw-in electric heating elements EP.
Screw-in electric heating element
must be ordered separately.

		Part No.
	**Ground water immersion sensor TF/1.1P/5S/5T/H-WP L = 5 m silicone** Ground water sensor for heat pumps, Cable length: 5 m (silicone) without plug Sensor sleeve diameter: 5 x 60 mm Unaffected by condensation Sensor characteristic: PT1000 Circuit board construction Double-curved contact-pressure spring Operating temperature: -50…200 °C Protection class: IP65	6048 378
	**Immersion sensor TF/1.1P/2.5/6T, L = 2.5 m FW** for TopTronic® E basic module district heating/fresh water, basic module district heating com Sensor for district heating applications (PT1000) Cable length: 2.5 m without plug (plug supplied with controller module/ module expansion) Sensor sleeve diameter: 6 x 50 mm Dewpoint-proof Sensor may already be included in scope of supply of heat generator/controller module/module expansion Operating temperature: -50…105 °C Protection class: IP67	2056 777
	Accessories water/water	
	**Frost protection concentrate PowerCool DC 924-PXL** on basis propylene glycol completely mixable with water with corrosion protection Frost protection: -20 °C with 40 % mixture ratio Content plastic container: 10 kg	2009 987
	**Brine filling station in compact design DN 25** with shut-off valves, filter and EPS insulation. Application temperatures: -20 °C to +60 °C Frost protection: max. 50 % Connections: DN 25 G 1″ Kvs: 12.5 m³/h Max. operating pressure: 1.0 MPa (10 bar) Dirt screen integrated	6037 537
	**Brine filling station in compact design DN 32** with shut-off valves, filter and EPS insulation. Application temperatures: -20 °C to +60 °C Frost protection: max. 50 % Connections: DN 32 G 1¼″ Kvs: 22 m³/h Max. operating pressure: 1.0 MPa (10 bar) Dirt screen integrated	6033 364

Notice
For ground water applications, the ground water pump (submersible pump) can not be directly connected to the heat pump. Corresponding on-site connections must be provided here.

		Part No.
	**Float body flow meter** Bistable Reed contact as NC contact Area of application 300-3000 l/h Temperature range 0-80 °C Nominal pressure: 10 bar Connection: Rp 1½″ Pressure drop: 25 mbar Installation length: 335 mm Max. voltage: 230 V Max. continuous current: 0.2 A	2040 707
	**Float body flow meter** Bistable Reed contact as NC contact Area of application 600-6000 l/h Temperature range 0-80 °C Nominal pressure: 10 bar Connection: Rp 1½″ Pressure drop: 25 mbar Installation length: 335 mm Max. voltage: 230 V Max. continuous current: 0.2 A	2040 708
	**Differential pressure relief valve DN 32** for installation in a HA group DN 32 both ends 1¼″ external thread Self-sealing with O-ring and screw connections Operating pressure: max. 10 bar Operating temperature: max. 110 °C Setting range: 0.1-0.6 bar Connections: 1¼″ internal thread/ 1¼″ external thread Centre distance: 125 mm Casing and spring hood made of brass Spring made of stainless steel Seals made of EPDM Setting handle made of plastic with hexagon socket fastening screw	6014 849

Services

Commissioning
Commissioning by works service or Hoval trained authorised serviceman/company is condition for warranty.

For commissioning and other services please contact your Hoval sales office.

Thermalia® comfort (8-17) with R410A

Type		(8)	(10)	(13)	(17)
Brine/water application B0W35					
• Energy efficiency class of the compound system with control	35 °C/55 °C	A+++/A++	A+++/A++	A+++/A++	A+++/A++
• Room heating energy efficiency “moderate climate” 35 °C ηS	%	183	197	197	193
• Room heating energy efficiency “moderate climate” 55 °C ηS	%	135	136	141	142
Water/water application W10W35					
• Energy efficiency class of the compound system with control	35 °C/55 °C	A+++/A+++	A+++/A+++	A+++/A+++	A+++/A+++
• Room heating energy efficiency “moderate climate” 35 °C ηS	%	240	253	261	244
• Room heating energy efficiency “moderate climate” 55 °C ηS	%	166	174	184	175
• Seasonal coefficient of performance moderate climate (brine) 35 °C/55 °C	SCOP	4.6/3.3	5.0/3.5	5.0/3.7	5.0/3.7
Max. performance data heating in acc. with EN 14511					
• Heat output B0W35	kW [1]	7.6	10.6	13.4	17.2
• Coefficient of performance B0W35	COP	4.6	4.8	4.8	4.7
• Heat output W10W35	kW	9.6	12.7	17.5	22.3
• Coefficient of performance W10W35	COP	5.9	6.1	6.3	5.9
Nominal volume flow rate and pressure drop brine/water					
Heating (ΔT = 5 K)	m^3/h	1.0	1.4	1.8	2.3
• ΔP Pressure drop condenser	kPa	7	8	9	10
• Residual overpressure	kPa	63	49	56	41
Heat source (ΔT = 3 K)	m^3/h	1.8	2.5	3.2	4.1
• ΔP Pressure drop evaporator (glycol)	kPa	16	19	21	19
• Residual overpressure	kPa	59	67	91	93
Nominal volume flow rate and pressure drop water/water					
Heating (ΔT = 5 K)	m^3/h	1.7	2.2	3.0	3.9
• ΔP Pressure drop condenser	kPa	11	12	16	14
• Residual overpressure	kPa	49	36	34	21
Heat source (ΔT = 5 K) [2]	m^3/h	1.4	1.8	2.5	3.2
• ΔP Pressure drop evaporator	kPa	9	10	15	12
• Residual overpressure	kPa	81	98	101	105
Operating limit values					
• Heating		see diagrams of areas of application			
• Hot water		see diagrams of areas of application			
• Operating pressure max. water side	bar	6	6	6	6
• Operating pressure max. brine side	bar	6	6	6	6
• Installation place operation [3]	°C (min./max.)	5/35	5/35	5/35	5/35
• Storage	°C (min./max.)	-15/46	-15/46	-15/46	-15/46
• Compressor, type		1 x spiral (scroll), hermetic			
• Refrigerant filling quantity (R410A)	kg	1.6	1.9	2.1	2.4
• Compressor oil filling quantity		1.24	1.24	1.98	1.98
• Type of compressor oil		Emkarate RL32 3MAF			
• Condenser/evaporator		Plate heat exchanger			
• Material		Stainless steel V4A, AISI 316, 1.4401			
• Pipe connections at rear	G	1″	1″	1″	1″

Type		(8)	(10)	(13)	(17)
Electrical data [4]					
• Voltage	V	3~400	3~400	3~400	3~400
• Frequency	Hz	50	50	50	50
• Voltage range	V	380-420	380-420	380-420	380-420
• Max. compressor operating current	A	6.2	7.4	9.7	13
• Starting current with starting current limiter [5]	A	12.4	14.8	19.4	26
• Principal current (external protection) with brine systems	A	13	13	13	16
- Type		C,D,K	C,D,K	C,D,K	C,D,K
• Principal current (external protection) with ground water systems	A	13	13	13	16
- Type		C,D,K	C,D,K	C,D,K	C,D,K
• Control current (external protection)	A	13	13	13	13
- Type		B,C,D,K,Z	B,C,D,K,Z	B,C,D,K,Z	B,C,D,K,Z
Weight					
• Operating weight approx.	kg	155	160	165	170

[1] kW = standard values according to EN 14511; values for B0W35 with 25 % monopolypropylene

[2] ΔT in accordance with regional regulations. The temperature difference is adjustable from 3 to 6 kelvin. The pump regulates the volumetric current to the set temperature difference.

[3] < 10 °C: Crankcase heater is necessary

[4] Values for electrical data apply for supply voltage of 3~400 V

[5] Effective value

Thermalia® comfort H (7,10) with R134a

Type		H (7)	H (10)
Brine/water application B0W35			
• Energy efficiency class of the compound system with control	35 °C/55 °C	A+++/A++	A+++/A++
• Room heating energy efficiency “moderate climate” 35 °C ηS	%	186	192
• Room heating energy efficiency “moderate climate” 55 °C ηS	%	139	144
Water/water application W10W35			
• Energy efficiency class of the compound system with control	35 °C/55 °C	A+++/A+++	A+++/A+++
• Room heating energy efficiency “moderate climate” 35 °C ηS	%	249	254
• Room heating energy efficiency “moderate climate” 55 °C ηS	%	184	189
• Seasonal coefficient of performance moderate climate (brine) 35 °C/55 °C	SCOP	4.7/3.5	4.9/3.7
Max. performance data heating in acc. with EN 14511			
• Heat output B0W35	kW [1]	6.5	9.1
• Coefficient of performance B0W35	COP	4.5	4.6
• Heat output W10W35	kW	9.1	12.8
• Coefficient of performance W10W35	COP	5.9	6.0
Nominal volume flow rate and pressure drop brine/water			
Heating (ΔT = 5 K)	m^3/h	1.1	1.6
• ΔP Pressure drop condenser	kPa	6.0	7.0
• Residual overpressure	kPa	70	55
Heat source (ΔT = 3 K)	m^3/h	1.5	2.1
• ΔP Pressure drop evaporator (glycol)	kPa	4.0	4.0
• Residual overpressure	kPa	76	91
Nominal volume flow rate and pressure drop water/water			
Heating (ΔT = 5 K)	m^3/h	1.6	2.3
• ΔP Pressure drop condenser	kPa	13	14
• Residual overpressure	kPa	49	33
Heat source (ΔT = 5 K) [2]	m^3/h	1.3	1.9
• ΔP Pressure drop evaporator	kPa	4	4
• Residual overpressure	kPa	86	104
Operating limit values			
• Heating		see diagrams of areas of application	
• Hot water		see diagrams of areas of application	
• Operating pressure max. water side	bar	6	6
• Operating pressure max. brine side	bar	6	6
• Installation place operation [3]	°C (min./max.)	5/35	5/35
• Storage	°C (min./max.)	-15/46	-15/46
• Compressor, type		1 x spiral (scroll), hermetic	
• Refrigerant filling quantity (R134a)	kg	2.8	3.2
• Compressor oil filling quantity		1.45	1.98
• Type of compressor oil		Emkarate RL32 3MAF	
• Condenser/evaporator		Plate heat exchanger	
• Material		Stainless steel V4A, AISI 316, 1.4401	
• Pipe connections at rear	G	1″	1″

Type		H (7)	H (10)
Electrical data [4]			
• Voltage	V	3~400	3~400
• Frequency	Hz	50	50
• Voltage range	V	380-420	380-420
• Max. compressor operating current	A	6.8	10.1
• Starting current with starting current limiter [5]	A	13.6	20.2
• Principal current (external protection) with brine systems	A	13	13
- Type		C,D,K	C,D,K
• Principal current (external protection) with ground water systems	A	13	13
- Type		C,D,K	C,D,K
• Control current (external protection)	A	13	13
- Type		B,C,D,K,Z	B,C,D,K,Z
Weight			
• Operating weight approx.	kg	160	170

[1] kW = standard values according to EN 14511; values for B0W35 with 25 % monopolypropylene

[2] ΔT in accordance with regional regulations. The temperature difference is adjustable from 3 to 6 kelvin. The pump regulates the volumetric current to the set temperature difference.

[3] < 10 °C: Crankcase heater is necessary

[4] Values for electrical data apply for supply voltage of 3~400 V

[5] Effective value

Thermalia® comfort (8-17), comfort H (7,10)

Sound emission

The effective sound pressure level in the installation room depends on various factors such as room size, absorption capacity, reflection, free sound propagation, etc.

Therefore it is important that the installation room lies, if possible, outside the noise-sensitive range and is supplied with sound-absorbing doors.

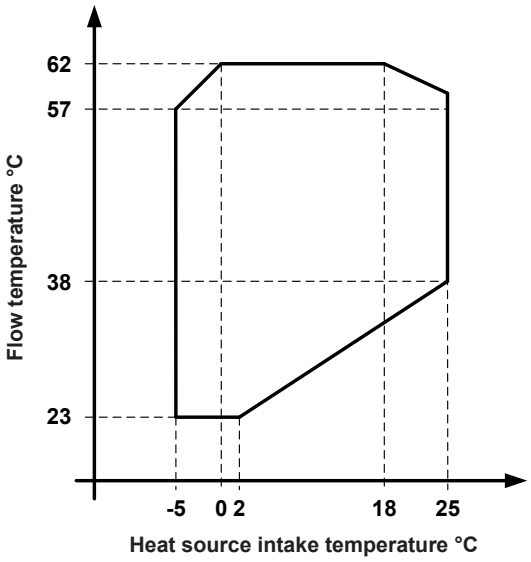
Ducts and pipes must be fixed to walls and ceiling in a way that no structure-borne sound is being transmitted to the system.

Thermalia® comfort (8-17) Thermalia® comfort H (7,10)	(8)	(10) (7)	(13)	(17) (10)
Sound power level dB(A)	44	45	45	46

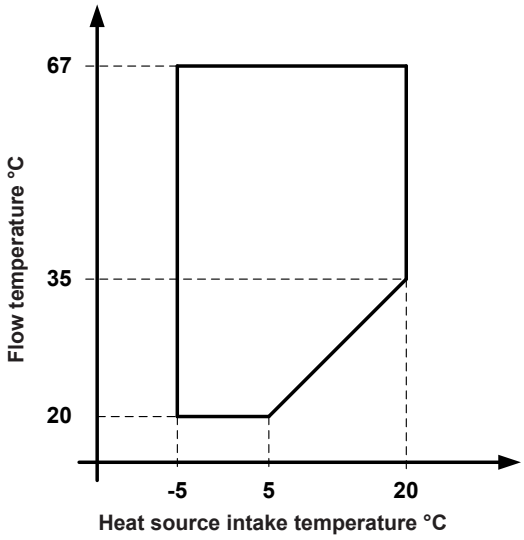
Diagrams of areas of application

Heating and hot water

Thermalia® comfort (8-17)



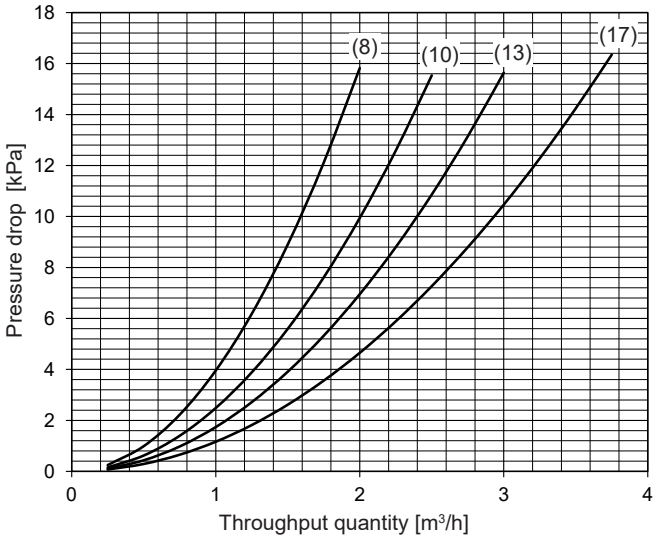
Thermalia® comfort H (7,10)



Thermalia® comfort (8-17)

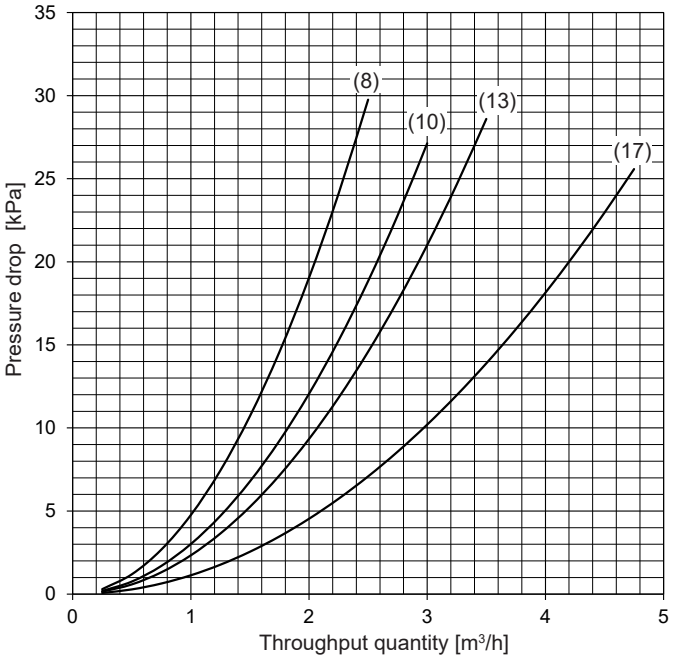
Heating

Pressure drop condenser with water



Heat source

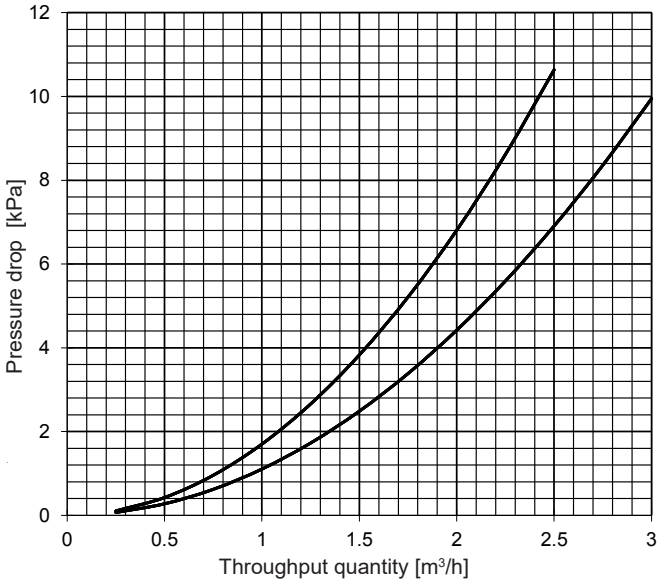
Pressure drop evaporator with ethylene glycol 25 % (Antifrogen N)



Thermalia® comfort H (7,10)

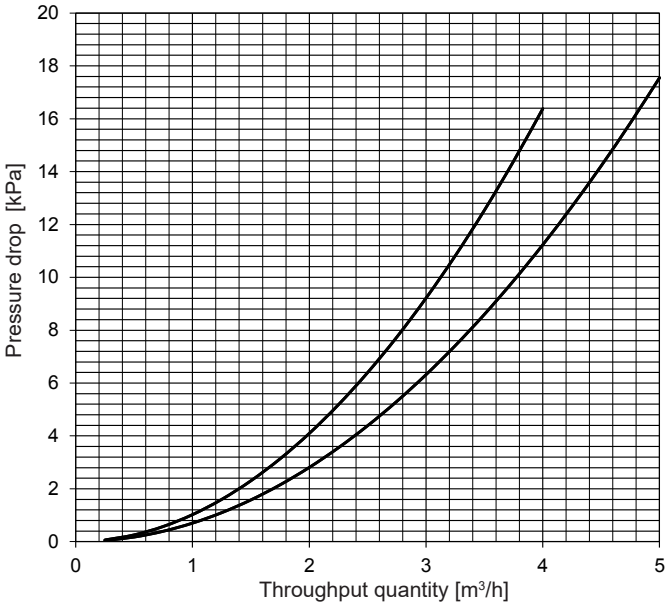
Heating

Pressure drop condenser with water



Heat source

Pressure drop evaporator with ethylene glycol 25 % (Antifrogen N)



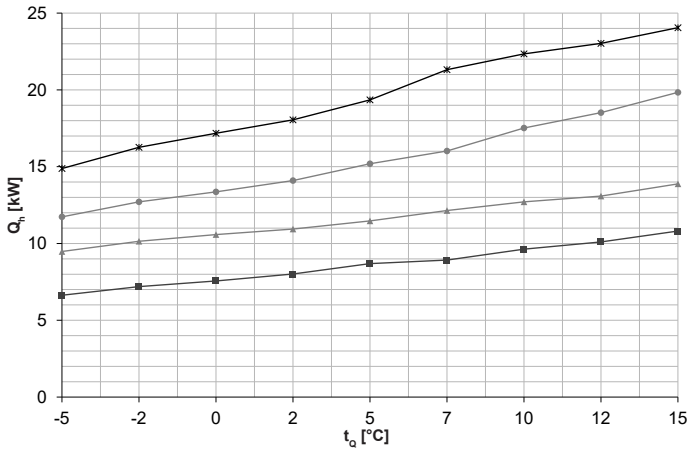
Performance data - heating

Maximum heat output

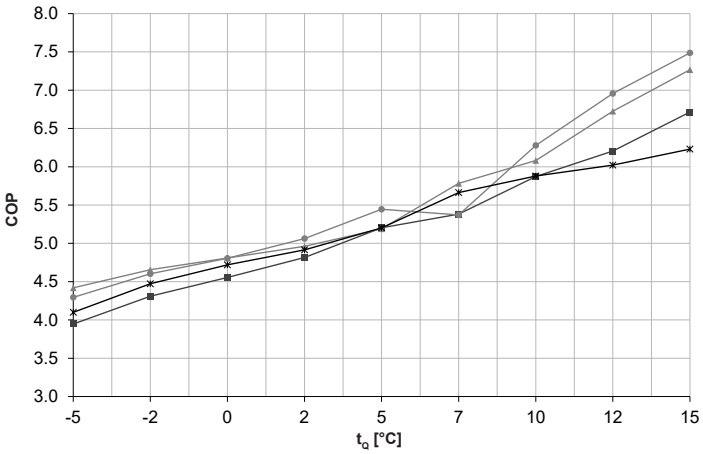
Thermalia® comfort (8-17)

Data according to EN 14511

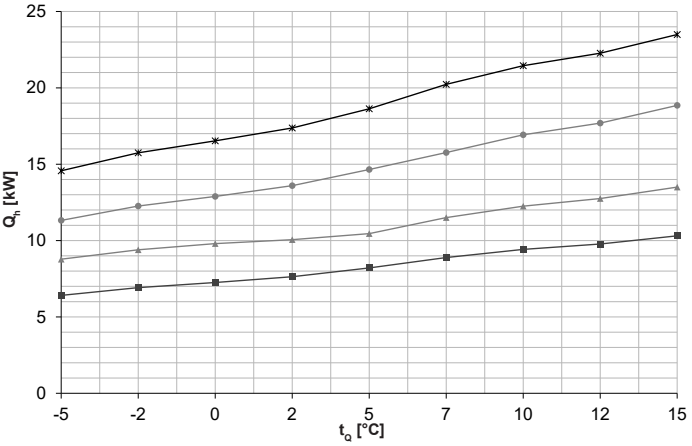
Heat output - t_{VL} 35 °C



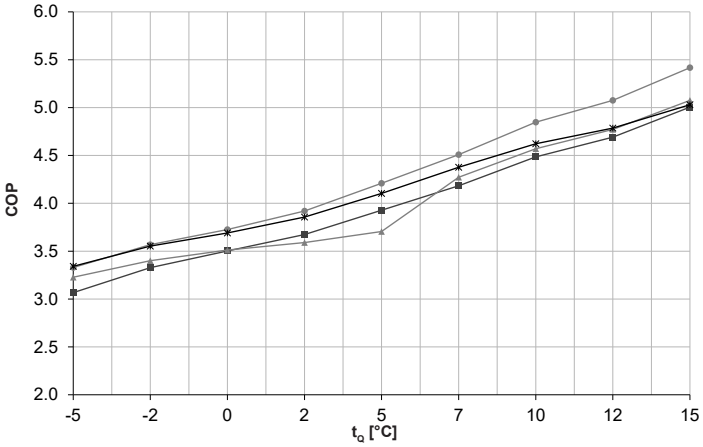
Coefficient of performance - t_{VL} 35 °C



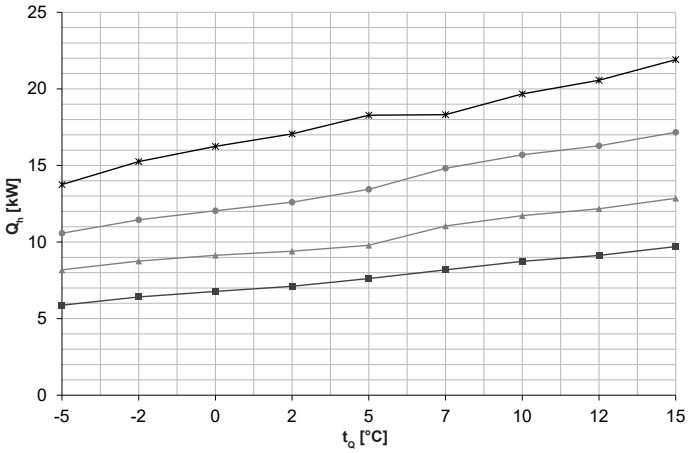
Heat output - t_{VL} 45 °C



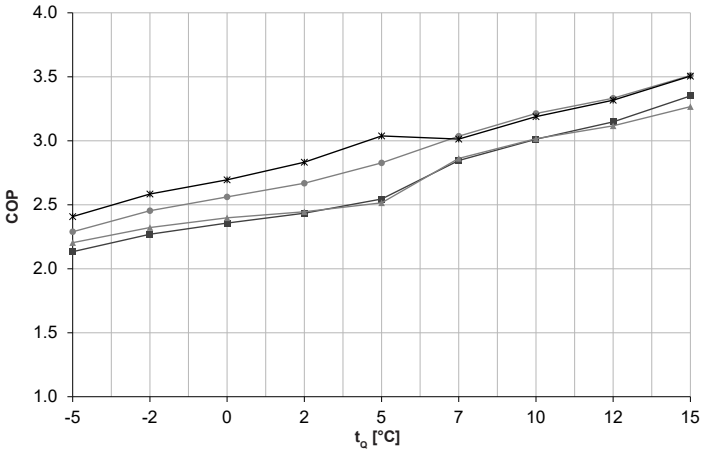
Coefficient of performance - t_{VL} 45 °C

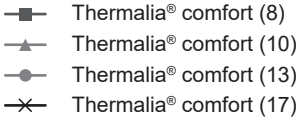


Heat output - t_{VL} 62 °C



Coefficient of performance - t_{VL} 62 °C





t_{VL} = heating flow temperature (°C)
t_Q = source temperature (°C)
Q_h = heat output at full load (kW), measured in accordance with standard EN 14511
COP = Coefficient of Performance for the overall unit in accordance with standard EN 14511

Performance data - heating
Thermalia® comfort (8-17)

Data according to EN 14511

t_{VL} °C		t_Q °C	Q_h kW	(8) P kW	COP	Q_h kW	(10) P kW	COP	Q_h kW	(13) P kW	COP	Q_h kW	(17) P kW	COP
30	Brine	-5	6.7	1.5	4.3	9.7	2.0	5.0	11.9	2.5	4.7	15.0	3.4	4.4
		-2	7.3	1.5	4.8	10.4	2.0	5.2	12.9	2.5	5.1	16.4	3.4	4.9
		0	7.7	1.5	5.0	10.8	2.0	5.4	13.5	2.6	5.3	17.4	3.4	5.2
		2	8.1	1.5	5.3	11.2	2.0	5.6	14.3	2.6	5.6	18.3	3.4	5.4
		5	8.9	1.5	5.8	11.8	2.0	5.9	15.4	2.6	6.0	19.6	3.4	5.7
	Water	7	8.9	1.5	6.0	12.4	1.9	6.5	16.1	2.7	6.0	21.7	3.5	6.2
		10	9.7	1.5	6.5	12.9	1.9	6.8	17.7	2.6	6.9	22.6	3.5	6.4
		12	10.2	1.5	6.9	13.2	1.7	7.8	18.8	2.4	7.9	23.3	3.5	6.6
		15	11.0	1.5	7.5	14.0	1.7	8.4	20.2	2.4	8.5	24.2	3.6	6.8
35	Brine	-5	6.6	1.7	4.0	9.5	2.1	4.4	11.7	2.7	4.3	14.9	3.6	4.1
		-2	7.2	1.7	4.3	10.1	2.2	4.7	12.7	2.8	4.6	16.3	3.6	4.5
		0	7.6	1.7	4.6	10.6	2.2	4.8	13.4	2.8	4.8	17.2	3.6	4.7
		2	8.0	1.7	4.8	10.9	2.2	5.0	14.1	2.8	5.1	18.0	3.7	4.9
		5	8.7	1.7	5.2	11.5	2.2	5.2	15.2	2.8	5.4	19.4	3.7	5.2
	Water	7	8.9	1.7	5.4	12.1	2.1	5.8	16.0	3.0	5.4	21.3	3.8	5.7
		10	9.6	1.6	5.9	12.7	2.1	6.1	17.5	2.8	6.3	22.3	3.8	5.9
		12	10.1	1.6	6.2	13.1	1.9	6.7	18.5	2.7	7.0	23.0	3.8	6.0
		15	10.8	1.6	6.7	13.9	1.9	7.3	19.8	2.7	7.5	24.1	3.9	6.2
40	Brine	-5	6.5	1.9	3.5	9.1	2.4	3.8	11.5	3.1	3.8	14.7	4.0	3.7
		-2	7.1	1.9	3.8	9.8	2.5	4.0	12.5	3.1	4.0	16.0	4.0	4.0
		0	7.4	1.9	4.0	10.2	2.5	4.1	13.1	3.1	4.2	16.9	4.1	4.2
		2	7.8	1.9	4.2	10.5	2.5	4.2	13.8	3.1	4.4	17.7	4.1	4.3
		5	8.5	1.9	4.5	11.0	2.5	4.4	14.9	3.1	4.8	19.0	4.1	4.6
	Water	7	8.9	1.9	4.7	11.8	2.4	4.9	15.9	3.2	4.9	20.8	4.2	5.0
		10	9.5	1.9	5.1	12.5	2.4	5.2	17.2	3.1	5.5	21.9	4.2	5.2
		12	9.9	1.9	5.4	12.9	2.3	5.6	18.1	3.1	5.9	22.6	4.2	5.3
		15	10.6	1.8	5.8	13.7	2.3	6.0	19.3	3.1	6.3	23.8	4.3	5.6
45	Brine	-5	6.4	2.1	3.1	8.8	2.7	3.2	11.3	3.4	3.3	14.6	4.4	3.3
		-2	6.9	2.1	3.3	9.4	2.8	3.4	12.3	3.4	3.6	15.7	4.4	3.6
		0	7.3	2.1	3.5	9.8	2.8	3.5	12.9	3.5	3.7	16.5	4.5	3.7
		2	7.6	2.1	3.7	10.1	2.8	3.6	13.6	3.5	3.9	17.4	4.5	3.9
		5	8.2	2.1	3.9	10.5	2.8	3.7	14.7	3.5	4.2	18.6	4.5	4.1
	Water	7	8.9	2.1	4.2	11.5	2.7	4.3	15.8	3.5	4.5	20.2	4.6	4.4
		10	9.4	2.1	4.5	12.3	2.7	4.6	16.9	3.5	4.9	21.5	4.6	4.6
		12	9.8	2.1	4.7	12.8	2.7	4.8	17.7	3.5	5.1	22.3	4.7	4.8
		15	10.3	2.1	5.0	13.5	2.7	5.1	18.9	3.5	5.4	23.5	4.7	5.0
50	Brine	-5	6.2	2.3	2.7	8.6	3.0	2.9	11.1	3.8	3.0	14.3	4.8	3.0
		-2	6.7	2.3	2.9	9.2	3.1	3.0	12.0	3.8	3.2	15.6	4.9	3.2
		0	7.1	2.3	3.1	9.6	3.1	3.1	12.6	3.8	3.3	16.4	5.0	3.3
		2	7.4	2.3	3.2	9.9	3.1	3.2	13.3	3.8	3.5	17.3	5.0	3.5
		5	8.0	2.3	3.4	10.3	3.1	3.3	14.3	3.9	3.7	18.6	5.0	3.7
	Water	7	8.6	2.4	3.6	11.4	3.0	3.7	15.5	3.9	4.0	19.6	5.1	3.8
		10	9.2	2.4	3.9	12.1	3.0	4.0	16.6	3.9	4.3	20.9	5.1	4.1
		12	9.5	2.4	4.1	12.6	3.0	4.2	17.3	3.9	4.4	21.7	5.2	4.2
		15	10.1	2.3	4.3	13.3	3.0	4.4	18.4	3.9	4.7	23.0	5.2	4.4
55	Brine	-5	5.9	2.5	2.4	8.4	3.3	2.6	10.9	4.1	2.6	14.0	5.3	2.7
		-2	6.5	2.5	2.6	9.0	3.4	2.7	11.8	4.2	2.8	15.4	5.4	2.9
		0	6.9	2.5	2.7	9.4	3.4	2.8	12.4	4.2	3.0	16.3	5.4	3.0
		2	7.2	2.6	2.8	9.7	3.4	2.8	13.0	4.2	3.1	17.2	5.5	3.2
		5	7.8	2.6	3.0	10.1	3.5	2.9	13.9	4.2	3.3	18.5	5.5	3.4
	Water	7	8.4	2.6	3.2	11.2	3.4	3.3	15.2	4.3	3.5	19.0	5.6	3.4
		10	8.9	2.6	3.4	11.9	3.4	3.5	16.2	4.3	3.8	20.3	5.7	3.6
		12	9.3	2.6	3.5	12.4	3.4	3.7	16.9	4.3	3.9	21.1	5.7	3.7
		15	9.9	2.6	3.8	13.1	3.4	3.9	17.9	4.3	4.1	22.4	5.7	3.9
62	Brine	-5	5.9	2.8	2.1	8.2	3.7	2.2	10.6	4.6	2.3	13.8	5.7	2.4
		-2	6.4	2.8	2.3	8.8	3.8	2.3	11.5	4.7	2.5	15.3	5.9	2.6
		0	6.8	2.9	2.4	9.1	3.8	2.4	12.0	4.7	2.6	16.3	6.0	2.7
		2	7.1	2.9	2.4	9.4	3.8	2.5	12.6	4.7	2.7	17.1	6.0	2.8
		5	7.6	3.0	2.5	9.8	3.9	2.5	13.4	4.8	2.8	18.3	6.0	3.0
	Water	7	8.2	2.9	2.9	11.0	3.9	2.9	14.8	4.9	3.0	18.3	6.1	3.0
		10	8.7	2.9	3.0	11.7	3.9	3.0	15.7	4.9	3.2	19.7	6.2	3.2
		12	9.1	2.9	3.2	12.2	3.9	3.1	16.3	4.9	3.3	20.6	6.2	3.3
		15	9.7	2.9	3.4	12.9	3.9	3.3	17.2	4.9	3.5	21.9	6.2	3.5

t_{VL} = heating flow temperature (°C)
t_Q = source temperature (°C)
Q_h = heat output at full load (kW), measured in accordance with standard EN 14511
P = power consumption of the overall unit (kW)
COP = Coefficient of Performance for the overall unit in accordance with standard EN 14511

Observe daily power interruptions!
see “Engineering heat pumps general”

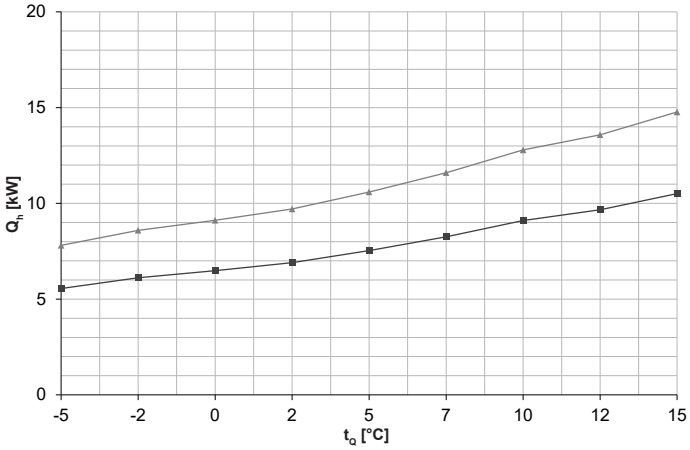
Performance data - heating

Maximum heat output

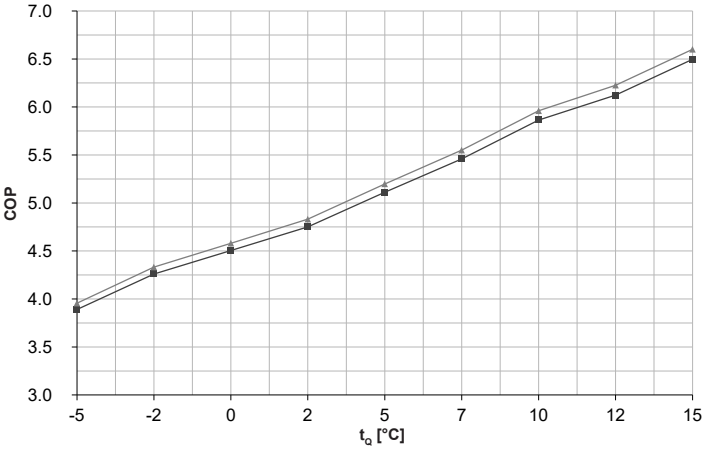
Thermalia® comfort H (7,10)

Data according to EN 14511

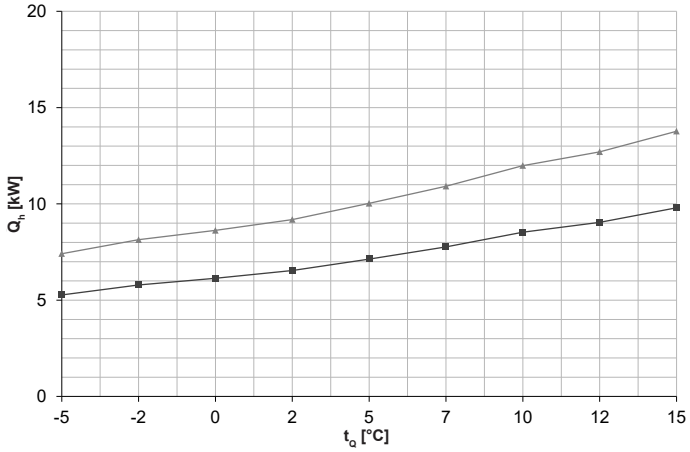
Heat output - t_{VL} 35 °C



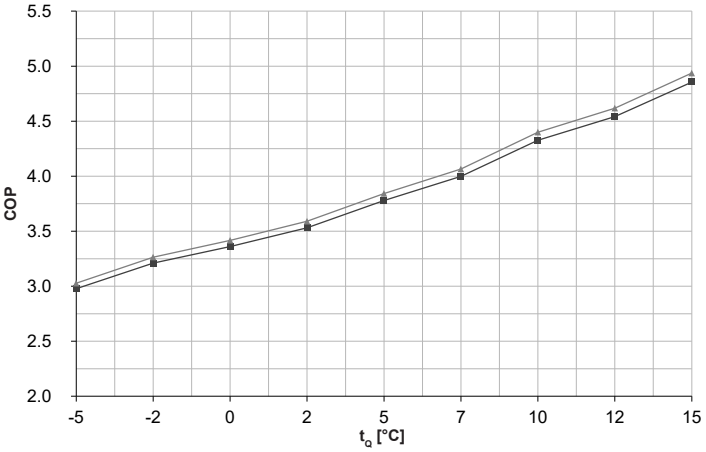
Coefficient of performance - t_{VL} 35 °C



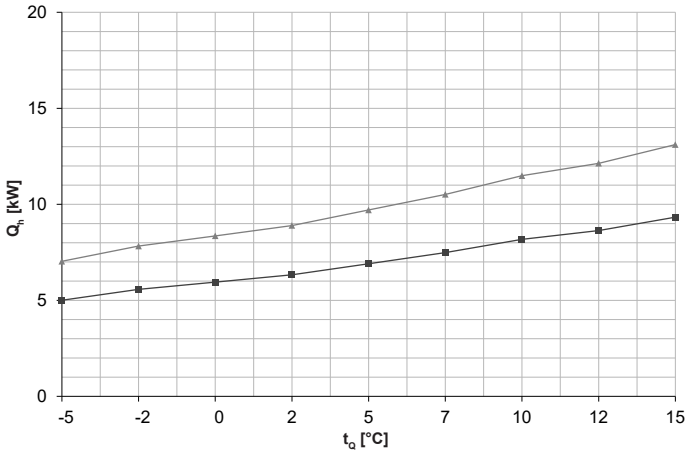
Heat output - t_{VL} 50 °C



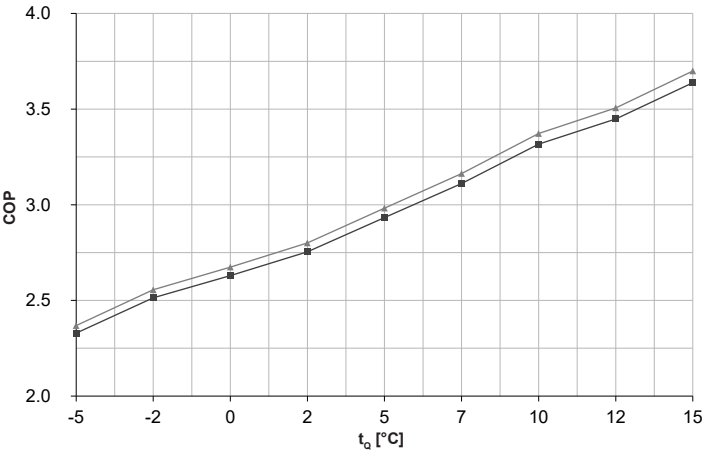
Coefficient of performance - t_{VL} 50 °C



Heat output - t_{VL} 65 °C



Coefficient of performance - t_{VL} 65 °C



t_{VL} = heating flow temperature (°C)
t_Q = source temperature (°C)
Q_h = heat output at full load (kW), measured in accordance with standard EN 14511
COP = Coefficient of Performance for the overall unit in accordance with standard EN 14511

Thermalia® comfort H (7)
Thermalia® comfort H (10)

Performance data - heating
Thermalia® comfort H (7,10)

Data according to EN 14511

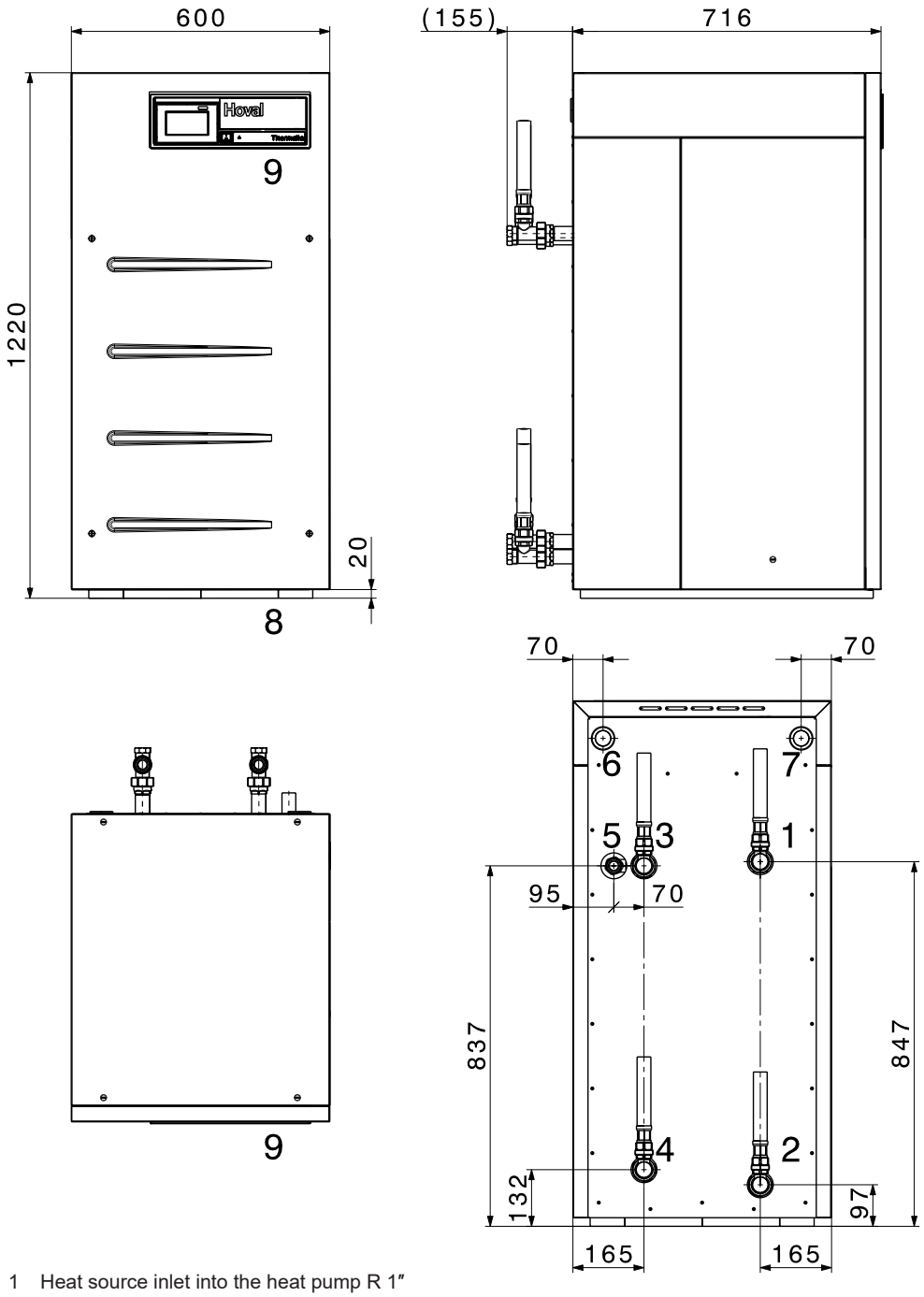
t_{VL} °C		t_Q °C	H (7) Q_h kW	H (7) P kW	H (7) COP	H (10) Q_h kW	H (10) P kW	H (10) COP
30	Brine	-5	5.6	1.4	4.2	7.9	1.9	4.2
		-2	6.2	1.4	4.6	8.7	1.9	4.7
		0	6.6	1.4	4.9	9.2	1.9	4.9
		2	7.0	1.4	5.1	9.8	1.9	5.2
		5	7.6	1.4	5.5	10.7	1.9	5.6
	Water	7	8.4	1.4	5.9	11.8	2.0	6.0
		10	9.3	1.5	6.3	13.0	2.0	6.4
		12	9.8	1.5	6.6	13.8	2.1	6.7
		15	-	-	-	-	-	-
35	Brine	-5	5.6	1.4	3.9	7.8	2.0	4.0
		-2	6.1	1.4	4.3	8.6	2.0	4.3
		0	6.5	1.4	4.5	9.1	2.0	4.6
		2	6.9	1.5	4.8	9.7	2.0	4.8
		5	7.5	1.5	5.1	10.6	2.0	5.2
	Water	7	8.3	1.5	5.5	11.6	2.1	5.6
		10	9.1	1.6	5.9	12.8	2.1	6.0
		12	9.7	1.6	6.1	13.6	2.2	6.2
		15	10.5	1.6	6.5	14.8	2.2	6.6
40	Brine	-5	5.5	1.5	3.5	7.7	2.1	3.6
		-2	6.0	1.6	3.9	8.4	2.2	3.9
		0	6.3	1.6	4.1	8.9	2.2	4.1
		2	6.8	1.6	4.3	9.5	2.2	4.3
		5	7.4	1.6	4.6	10.4	2.2	4.7
	Water	7	8.1	1.7	4.9	11.3	2.3	4.9
		10	8.9	1.7	5.3	12.5	2.3	5.4
		12	9.4	1.7	5.5	13.2	2.4	5.6
		15	10.2	1.7	5.9	14.4	2.4	6.0
45	Brine	-5	5.4	1.7	3.2	7.5	2.3	3.4
		-2	5.9	1.7	3.5	8.2	2.3	3.6
		0	6.2	1.7	3.7	8.7	2.3	3.7
		2	6.6	1.7	3.9	9.3	2.4	3.9
		5	7.2	1.7	4.1	10.1	2.4	4.2
	Water	7	7.9	1.8	4.4	11.1	2.5	4.4
		10	8.7	1.8	4.8	12.2	2.5	4.8
		12	9.2	1.8	5.0	12.9	2.5	5.1
		15	10.0	1.9	5.4	14.0	2.6	5.5
50	Brine	-5	5.3	1.8	3.0	7.4	2.4	3.0
		-2	5.8	1.8	3.2	8.1	2.5	3.3
		0	6.1	1.8	3.4	8.6	2.5	3.4
		2	6.5	1.9	3.5	9.2	2.6	3.6
		5	7.1	1.9	3.8	10.0	2.6	3.8
	Water	7	7.8	1.9	4.0	10.9	2.7	4.1
		10	8.5	2.0	4.3	12.0	2.7	4.4
		12	9.0	2.0	4.5	12.7	2.8	4.6
		15	9.8	2.0	4.9	13.8	2.8	4.9
55	Brine	-5	5.2	1.9	2.8	7.3	2.6	2.8
		-2	5.7	1.9	3.0	8.0	2.7	3.0
		0	6.1	2.0	3.1	8.5	2.7	3.2
		2	6.5	2.0	3.3	9.1	2.7	3.3
		5	7.1	2.0	3.5	9.9	2.8	3.5
	Water	7	7.7	2.1	3.7	10.8	2.9	3.8
		10	8.4	2.1	4.0	11.8	2.9	4.0
		12	8.9	2.1	4.2	12.5	3.0	4.2
		15	9.6	2.2	4.4	13.5	3.0	4.5
62	Brine	-5	5.1	2.1	2.4	7.1	2.9	2.5
		-2	5.6	2.1	2.6	7.9	2.9	2.7
		0	6.0	2.2	2.8	8.4	3.0	2.8
		2	6.4	2.2	2.9	9.0	3.0	2.9
		5	7.0	2.3	3.1	9.8	3.1	3.1
	Water	7	7.5	2.3	3.3	10.6	3.2	3.3
		10	8.2	2.4	3.5	11.6	3.3	3.6
		12	8.7	2.4	3.6	12.2	3.3	3.7
		15	9.4	2.4	3.9	13.2	3.4	3.9
65	Brine	-5	5.0	2.1	2.3	7.0	3.0	2.4
		-2	5.6	2.2	2.5	7.8	3.1	2.6
		0	5.9	2.3	2.6	8.4	3.1	2.7
		2	6.3	2.3	2.8	8.9	3.2	2.8
		5	6.9	2.4	2.9	9.7	3.3	3.0
	Water	7	7.5	2.4	3.1	10.5	3.3	3.2
		10	8.2	2.5	3.3	11.5	3.4	3.4
		12	8.6	2.5	3.5	12.1	3.5	3.5
		15	9.3	2.6	3.6	13.1	3.5	3.7
		25	-	-	-	-	-	-

t_{VL} = heating flow temperature (°C)
t_Q = source temperature (°C)
Q_h = heat output at full load (kW), measured in accordance with standard EN 14511
P = power consumption of the overall unit (kW)
COP = Coefficient of Performance for the overall unit in accordance with standard EN 14511

Observe daily power interruptions!
see “Engineering heat pumps general”

Thermalia® comfort (8-17) and comfort H (7,10)

(Dimensions in mm)



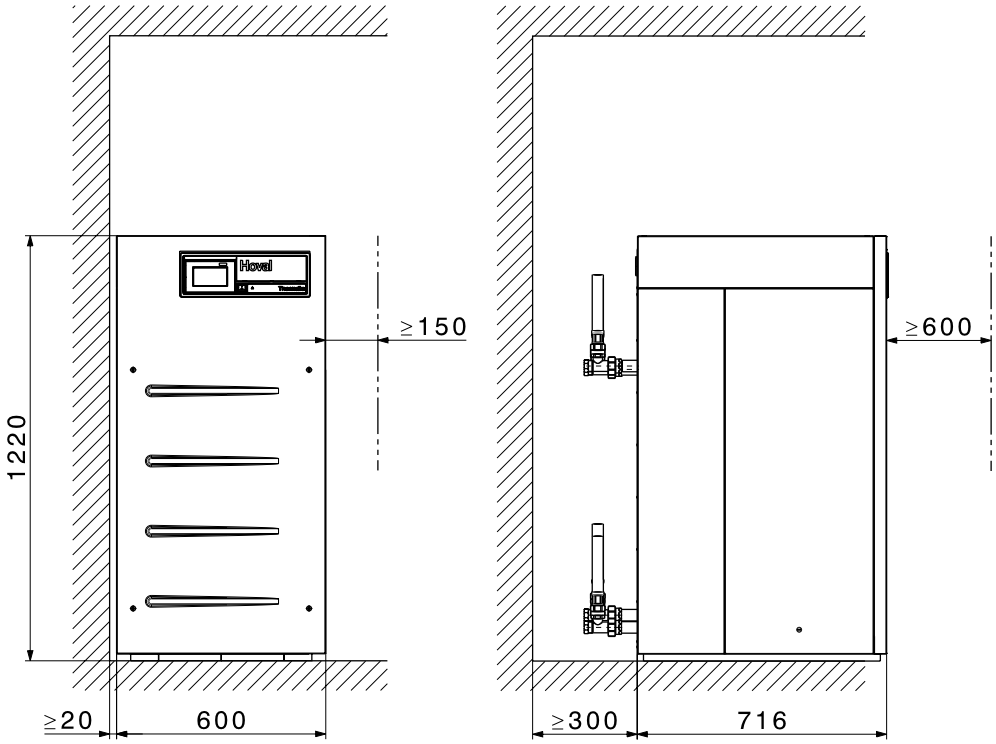
1 Heat source inlet into the heat pump R 1″
2 Heat source outlet from the heat pump R 1″
3 Heating flow R 1″
4 Heating return R 1″
5 Hot water R 1″
6 Cable feedthrough for main current
7 Cable feedthrough for sensors
8 Vibration damping
9 Control panel

The 4 flexible hoses 1″ can be extracted from the heat pump by at least 300 mm.

Space requirement

Required wall distance in mm for operation and maintenance
(Dimensions in mm)

front	rear	right or left side
min. 600	min. 300	min. 150



Looking for the appropriate hydraulic schematic?
Please contact your local Hoval partner.

Hoval Thermalia® twin
Hoval Thermalia® twin H

Brine/water-water/water heat pump

- Brine/water-water/water heat pump with two output stages for indoor installation
- Compact unit with high energy efficiency
- Extremely low-noise with triple-mounted construction
- Stable framework of galvanised sheet steel; with removable, powder-coated, sound-insulated side panels, colour brown red (RAL 3011)
- Sound-insulated plastic hood, colour flame red (RAL 3000)
- Temperatures and pressures of brine and refrigeration circuit available
- 2 spiral (scroll) compressors
- Electronic expansion valve
- Plate heat exchanger system of stainless steel
- Electronic starting current limiter with rotary field/phase monitoring for each compressor
- Integrated brine pressure monitoring
- Hydraulic connections to the rear
- Sound-insulating floor mat
- Refrigerant
  Thermalia® twin (20-42) with R410A
  Thermalia® twin H (13-22) with R134a
- Heat pump wired ready
- TopTronic® E controller installed

Electrical connections
- Connection to the rear

TopTronic® E controller

Control panel
- Colour touchscreen 4.3 inch
- Heat generator blocking switch for interrupting operation
- Fault signalling lamp

TopTronic® E control module
- Simple, intuitive operating concept
- Display of the most important operating statuses
- Configurable start screen
- Operating mode selection
- Configurable day and week programmes
- Operation of all connected Hoval CAN bus modules
- Commissioning wizard
- Service and maintenance function
- Fault message management
- Analysis function
- Weather display (with online HovalConnect)
- Adaptation of the heating strategy based on the weather forecast (with online HovalConnect)

Model range

Thermalia® twin type	Water/water 35 °C	Water/water 55 °C	Brine/water 35 °C	Brine/water 55 °C	Refrigerant	Max. flow °C	Heat output B0W35 kW	Heat output W10W35 kW
(20)	A+++	A+++	A+++	A++	R410A	62	20.4	27.3
(26)	A+++	A+++	A+++	A++	R410A	62	26.2	35.1
(36)	A+++	A+++	A+++	A+++	R410A	62	35.3	46.4
(42)	A+++	A+++	A+++	A++	R410A	62	42.0	55.4
H (13)	A+++	A+++	A+++	A++	R134a	67	12.3	17.0
H (19)	A+++	A+++	A+++	A++	R134a	67	18.0	24.7
H (22)	A+++	A+++	A+++	A++	R134a	67	20.9	28.8

Energy efficiency class of the compound system with control

TopTronic® E basic module heat generator TTE-WEZ
- Control functions integrated for
  - 1 heating/cooling circuit with mixer
  - 1 heating/cooling circuit without mixer
  - 1 hot water charging circuit
  - bivalent and cascade management
- Outdoor sensor
- Immersion sensor (calorifier sensor)
- Contact sensor (flow temperature sensor)
- RAST 5 basic plug set

Options for TopTronic® E controller
- Can be expanded by max. 1 module expansion:
  - module expansion heating circuit or
  - module expansion heat balancing or
  - module expansion Universal
- Can be networked with a total of up to 16 controller modules:
  - heating circuit/hot water module
  - solar module
  - buffer module
  - measuring module

Number of modules that can be additionally installed in the heat generator:
- 1 module expansion and 1 controller module **or**
- 2 controller modules

The supplementary plug set must be ordered in order to use expanded controller functions.

Further information about the TopTronic® E
see “Controls”

EnergyManager PV smart
Feature to increase self-generated power consumption in use with HovalConnect.

If a HovalConnect gateway is used together with the heat pump, the EnergyManager PV smart feature is available. This allows the heat pump to be operated preferentially at times of higher solar radiation. The feature uses online weather data on the current solar radiation for this purpose and can be adjusted by means of an associated threshold value. The self-consumption of electricity from an existing photovoltaic plant is thus increased and the purchase of grid electricity is reduced. This results in a lasting and significant cost-saving potential without further investment costs for the customer

Delivery
- Heat pump on pallet, plastic hood and floor plate separately packed
- Flexible hoses included
- Sensor set separately packed

Brine/water-water/water heat pump

Hoval Thermalia® twin

Refrigerant R410A

Flow temperature max. 62 °C

Thermalia® twin type	Heat output B0W35 kW	Heat output W10W35 kW	Part No.
(20)	20.4	27.3	7018 990
(26)	26.2	35.1	7018 991
(36)	35.3	46.4	7018 992
(42)	42.0	55.4	7018 993

Hoval Thermalia® twin H

Refrigerant R410A

Flow temperature max. 67 °C

Thermalia® twin H type	Heat output B0W35 kW	Heat output W10W35 kW	Part No.
(13)	12.3	17.0	7018 994
(19)	18.0	24.7	7018 995
(22)	20.9	28.8	7018 996

Notice
Suitable heat source and charging pumps:

Hoval system pump set SPS-I with interface for pump control
Type 0-10 V or PWM1

Premium pump Stratos
with IF module Stratos Ext. Off (0-10 V)

See “Circulating pumps”

EnergyManager PV smart
Free feature to increase self-generated power consumption in use with HovalConnect.

Further information
see “Description”

Electric heating elements
see “Calorifiers” - chapter “Electric heating elements”

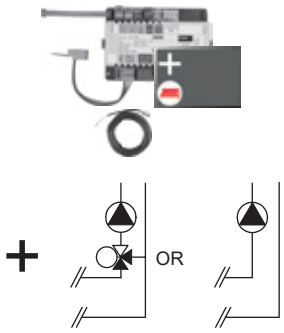
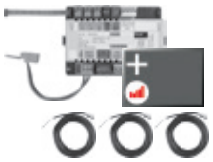
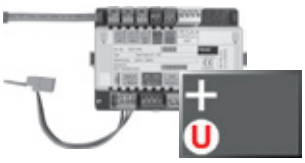
Installation
The heat pump may be tilted by a maximum of 30° during transportation and installation.

Hose set SPCH40-40-10-4 — 6058 823
for Thermalia® twin (20,26) and Thermalia® twin H (13,19)
Consisting of:
- 4 reinforced hoses PN 10 DN 40 1½″ IT insulated for brine and heating side flat-sealing with union nut
- Length: 1.0 m
- 4 brackets DN 40
- Seals

Hose set SPCH50-50-10-4 — 6058 824
for Thermalia® twin (36,42) and Thermalia® twin H (22)
Consisting of:
- 4 reinforced hoses PN 10 DN 50 2″ IT insulated for brine and heating side flat-sealing with union nut
- Length: 1.0 m
- 4 brackets DN 50
- Seals

TopTronic® E module expansions

for TopTronic® E basic module heat generator

		Part No.
	**TopTronic® E module expansion heating circuit TTE-FE HK** Expansion to the inputs and outputs of the basic module heat generator or the heating circuit/domestic hot water module for implementing the following functions: - 1 heating/cooling circuit w/o mixer or - 1 heating/cooling circuit with mixer Consisting of: - Fitting accessories - 1 contact sensor ALF/2P/4/T, L = 4.0 m - Basic plug set FE module **Notice** The supplementary plug set may have to be ordered to implement functions differing from the standard!	6034 576
	**TopTronic® E module expansion heating circuit incl. energy balancing** TTE-FE HK-EBZ Expansion to the inputs and outputs of the basic module heat generator or the heating circuit/domestic hot water module for implementing the following functions: - 1 heating/cooling circuit w/o mixer or - 1 heating/cooling circuit with mixer incl. energy balancing in each case Consisting of: - Fitting accessories - 3 contact sensors ALF/2P/4/T, L = 4.0 m - Plug set FE module **Notice** Suitable flow rate sensors (pulse sensors) must be provided on site.	6037 062
	**TopTronic® E module expansion Universal TTE-FE UNI** Expansion to the inputs and outputs of a controller module (basic module heat generator, heating circuit/domestic hot water module, solar module, buffer module) for implementing various functions Consisting of: - Fitting accessories - Plug set FE module **Notice** Refer to the Hoval System Technology to find which functions and hydraulic arrangements can be implemented. **Further information** see “Controls” - “Hoval TopTronic® E module expansions” chapter	6034 575

Flow rate sensor sets
Plastic housing

Size	Connection inches	Flow rate l/min	Part No.
DN 8	G ¾″	0.9-15	6038 526
DN 10	G ¾″	1.8-32	6038 507
DN 15	G 1″	3.5-50	6038 508
DN 20	G 1¼″	5-85	6038 509
DN 25	G 1½″	9-150	6038 510

Brass housing

Size	Connection inches	Flow rate l/min	Part No.
DN 10	G 1″	2-40	6042 949
DN 32	G 1½″	14-240	6042 950
DN 40	G 2″	22-400	6055 092

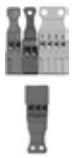
Hoval recommended use
Flow rate sensor set DN 40 made of brass. Installation location within the heat pump.

Notice
The flow rate sensor set must be installed without fail. Freezing can be prevented with the help of flow rate sensors and further technical measures. In order to protect the heat pump from frost in the event of a power failure or for example in bivalence mode, a system separation or other technical measures must be provided on site.

Accessories for TopTronic® E

TopTronic® E controller modules

		Part No.
TTE-HK/WW	TopTronic® E heating circuit/ hot water module	6034 571
TTE-SOL	TopTronic® E solar module	6037 058
TTE-PS	TopTronic® E buffer module	6037 057
TTE-MWA	TopTronic® E measuring module	6034 574



Supplementary plug set

for basic module heat generator TTE-WEZ	6034 499
for controller modules and module expansion TTE-FE HK	6034 503

TopTronic® E room control modules

TTE-RBM	TopTronic® E room control modules	
	easy white	6037 071
	comfort white	6037 069
	comfort black	6037 070

Enhanced language package TopTronic® E 6039 253

one SD card required per control module
Consisting of the following languages:
HU, CS, SL, RO, PL, TR, ES, HR,
SR, JA, DA

HovalConnect

HovalConnect LAN	6049 496
HovalConnect WLAN	6049 498
HovalConnect Modbus	6049 501
HovalConnect KNX	6049 593

TopTronic® E interface modules

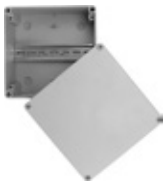
GLT module 0-10 V	6034 578

TopTronic® E sensors

AF/2P/K	Outdoor sensor H x W x D = 80 x 50 x 28 mm	2055 889
TF/2P/5/6T	Immersion sensor, L = 5.0 m	2055 888
ALF/2P/4/T	Contact sensor, L = 4.0 m	2056 775
TF/1.1P/2.5S/6T	Collector sensor, L = 2.5 m	2056 776

Bivalent switch

for various release or switching functions	2056 858
Bivalent switch 1-piece	2061 826
Bivalent switch 2-piece	



System housing

System housing 182 mm	6038 551
System housing 254 mm	6038 552

TopTronic® E wall casing

WG-190	Wall casing small	6052 983
WG-360	Wall casing medium	6052 984
WG-360 BM	Wall casing medium with control module cut-out	6052 985
WG-510	Wall casing large	6052 986
WG-510 BM	Wall casing large with control module cut-out	6052 987

Further information
see “Controls”

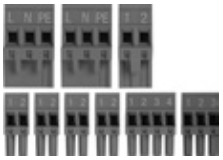
Accessories

Switching ball valve VBI60...L
DN 25-50, PN 16, 120 °C

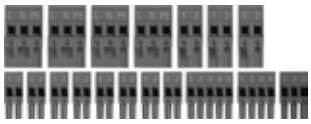
- Three-way ball valve made of brass with threaded connection
- Leakage rate: 0 ... 0.0001 % of kvs value
- Permitted media: cold water, cooling water, DHW, hot water, water with frost protection
- Recommendation: water treatment according to VDI 2035
- Media temperature: -10 ... 120 °C

DN	Connection inches	kvs m^3/h	Part No.
25	Rp 1″	9	6052 444
32	Rp 1¼″	13	6052 445
40	Rp 1½″	25	6052 446
50	Rp 2″	37	6052 447

Motor drive GLB341.9E — 2070 331
For straight-way ball valves VAG60.. and switching ball valves VBI60.. DN 15-50
Operating voltage: 230 V, 50/60 Hz
Control signal 2-point/3-point
Single-wire/2 wire control
Operating time: 150 s
Nominal torque: 10 Nm
Permitted ambient temperature: -32 °C to +55 °C



Expansion connector set — 6032 509
for the automatic heat pump device ECR461
Use for additional function:
- Flow monitor
- Crankcase bottom heating
(included in the scope of delivery for Belaria® twin A, twin AR, dual AR)
- Condensation drain heating
- Heat quantity metering
Plugs:
- 1 230 V digital input
- 2 230 V outputs
- 4 low-voltage inputs
- 1 ratio. Input
- 1 4-pin low-voltage input



Universal plug set — 6032 510
for automatic heat pump device ECR461
Plugs:
- 3 digital 230 V inputs
- 4 230 V outputs
- 6 low-voltage inputs
- 2 low-voltage outputs
- 1 ratio. input
- 1 electronic expansion valve
- 1 4-pin low-voltage input

	Part No.
Necessary at boiler room temperatures < 10 °C	
 **Crankcase heater** for Belaria® twin I/IR (20-30), Thermalia® comfort (8-17), Thermalia® comfort H (7,10), Thermalia® twin (20-42), Thermalia® twin H (13-22) Necessary for heating room temperatures < 10 °C for protecting the compressor For Belaria® twin I/IR 2 pieces are necessary	6019 718
 **Instantaneous water heater kit DN 50** consisting of electrical box ready for connection for electrical protection incl. assembly fittings. for combination with all screw-in electric heating elements EP. Screw-in electric heating element must be ordered separately.	6044 070
 **System water protection filter** **FGM025...050 - 200** For horizontal installation in return for filtration of heating and cooling water, with high filtration capacity for corrosion particles and dirt without significant pressure drop. Consisting of: - Filter head and bowl in brass - Magnetic insert (nickel-neodymium) - 2 pressure gauges - Very large filter surface made of stainless steel - Filter fineness 200 µm - With drain valve - Connections Rp 1″ and Rp 2″: Internal thread with integrated shut-off valves and union connection (outlet) - Water temperature: max. 90 °C - incl. steam diffusion-tight insulating shells	
Notice Fulfills the function of sludge separator and strainer	
 **FF050 - 200** Casing and cover made of cast iron GGG-50 Cover with clip lock - Filter strainer insert made of stainless steel - Cover seal made of NBR - 2 magnetic insert (nickel-neodymium) - 2 pressure gauges - Very large filter surface in stainless steel - Filter fineness 200 µm - With filling and drain valve - Connections flange DN 50	

Type	Connection	Flow rate at Δp < 0.1 bar pressure drop m³/h	
FGM025	Rp 1″	5.5	6058 256
FGM050	Rp 2″	7.2	6058 257
FF050	DN 50	18.0	2076 376

Further strainers
see “Various system components”

Accessories

Vibration decoupler
for reducing structure-borne noise
from heat pumps indoors,
cannot be shortened
Consisting of:
- 1 vibration decoupler
insulated for heating side
flat-sealing with union nut
- 2 flat seals
Nominal pressure: PN 10

Dimension	Connection inches	Nominal length mm	Part No.
DN 25	1″	300	2082 222
DN 25	1″	500	2082 223
DN 25	1″	1000	2080 794
DN 32	1¼″	300	2082 224
DN 32	1¼″	500	2082 225
DN 32	1¼″	1000	2080 796
DN 40	1½″	500	2082 226
DN 40	1½″	1000	2080 798
DN 50	2″	500	2082 227
DN 50	2″	1000	2080 800

Accessories water/water

Safety group SG15-¾″ 2015 354
Retaining bar incl. safety valve,
pressure gauge, air vent and connection
fittings for expansion chambers

Diaphragm pressure expansion tank N 25/4 2078 741
for closed heating and cooling
water systems according to DIN EN 13831
Certification according to Pressure
Equipment Directive 2014/68/EU

- Durable epoxy resin coating
- Non-exchangeable half-diaphragm
according to DIN EN 13831
- Addition of antifreeze
min. 25 % to 50 %
- With threaded connections
System temperature max. 120 °C
Operating temperature: max. 70 °C
Colour: grey
Nominal volume: 25 l
Operating pressure: max. 4 bar
Ex-works gas inlet pressure: 1.5 bar
Connection: R ¾″
Diameter: 308 mm
Height: 477 mm
Weight: 4.3 kg

Ground water accessories

		Part No.
	**Brine filling station in compact design DN 25** with shut-off valves, filter and EPS insulation. Application temperatures: -20 °C to +60 °C Frost protection: max. 50 % Connections: DN 25 G 1″ Kvs: 12.5 m³/h Max. operating pressure: 1.0 MPa (10 bar) Dirt screen integrated	6037 537
	**Brine filling station in compact design DN 32** with shut-off valves, filter and EPS insulation. Application temperatures: -20 °C to +60 °C Frost protection: max. 50 % Connections: DN 32 G 1¼″ Kvs: 22 m³/h Max. operating pressure: 1.0 MPa (10 bar) Dirt screen integrated	6033 364
	**Float body flow meter** Bistable Reed contact as NC contact Area of application 1500-15000 l/h Temperature range 0-80 °C Nominal pressure: 10 bar Connection: Rp 2″ Pressure drop: 30 mbar Installation length: 335 mm Max. voltage: 230 V Max. continuous current: 0.2 A	2040 709
	**Ground water pump kit SB-GWP** for Thermalia® twin (20-42), twin H (13-22) Contactor for actuation of a 3-phase ground water pump. Ready to connect without thermal overload protection	6041 092

Services

Commissioning
Commissioning by works service or Hoval trained authorised serviceman/company is condition for warranty.

For commissioning and other services please contact your Hoval sales office.

Thermalia® twin (20-42) with R410A

Type		(20)	(26)	(36)	(42)
Brine/water application B0W35					
• Energy efficiency class of the compound system with control	35 °C/55 °C	A+++/A++	A+++/A++	A+++/A+++	A+++/A++
• Room heating energy efficiency “moderate climate” 35 °C ηS	%	204	199	207	208
• Room heating energy efficiency “moderate climate” 55 °C ηS	%	138	138	149	140
Water/water application W10W35					
• Energy efficiency class of the compound system with control	35 °C/55 °C	A+++/A+++	A+++/A+++	A+++/A+++	A+++/A+++
• Room heating energy efficiency “moderate climate” 35 °C ηS	%	280	276	272	260
• Room heating energy efficiency “moderate climate” 55 °C ηS	%	184	181	192	176
• Seasonal coefficient of performance moderate climate (brine) 35 °C /55 °C	SCOP	5.2/3.6	5.2/3.6	5.4/3.9	5.3/3.6
Max. performance data heating in acc. with EN 14511					
• Heat output B0W35	kW [1]	20.4	26.2	35.3	42.0
• Coefficient of performance B0W35	COP	4.9	4.8	5.0	4.8
• Heat output W10W35	kW	27.3	35.1	46.4	55.4
• Coefficient of performance W10W35	COP	6.6	6.4	6.4	6.1
Nominal volume flow rate and resistance brine/water heat pump					
Heating (Δt = 7 K)	m^3/h	2.5	3.3	4.4	5.2
• ΔP Pressure drop condenser	kPa	5.3	7.3	5	5.3
Heat source (Δt = 3 K)	m^3/h	4.9	6.2	8.5	10.0
• ΔP Pressure drop evaporator	kPa	12	13	14	14
Nominal volume flow rate and resistance water/water heat pump					
Heating (Δt = 7 K)	m^3/h	3.4	4.3	5.7	6.8
• ΔP Pressure drop condenser	kPa	9.8	12.5	8.5	9.0
Heat source (Δt = 5 K) [2]	m^3/h	4.0	5.0	6.8	8.0
• ΔP Pressure drop evaporator	kPa	5.0	5.5	6.5	6.0
Operating limit values		see diagrams of areas of application			
• Operating pressure max. water side	bar	6	6	6	6
• Operating pressure max. brine side	bar	6	6	6	6
• Installation place operation [3]	°C (min./max.)	5/35	5/35	5/35	5/35
• Storage	°C (min./max.)	-15/50	-15/50	-15/50	-15/50
• Compressor, type		2 x spiral (scroll), hermetic			
• Refrigerant filling quantity (R410A)	kg	6.5	7.1	8.2	9.0
• Compressor oil filling quantity	l	2.48	2.48	3.78	3.5
• Type of compressor oil		Emkarate RL32 3MAF			
• Condenser/evaporator		Plate heat exchanger			
• Material		Stainless steel V4A, AISI 316, 1.4401			
• Connections	R	1½″	1½″	2″	2″
• Piping connections with flex. connecting hose	Rp	1½″	1½″	2″	2″
Electrical data [4]					
• Voltage	V	3~400	3~400	3~400	3~400
• Frequency	Hz	50	50	50	50
• Voltage range	V	380-420	380-420	380-420	380-420
• Max. compressor operating current	A	13.1	16.9	24.0	29.3
• Starting current with starting current limiter [5]	A	25.4	32.7	44.5	55.1
• Principal current (external protection) with brine systems	A	16	20	32	32
- Type		C,D,K	C,D,K	C,D,K	C,D,K
• Principal current (external protection) with ground water systems	A	20	25	32	40
- Type		C,D,K	C,D,K	C,D,K	C,D,K
• Control current (external protection)	A	13	13	13	13
- Type		B,C,D,K,Z	B,C,D,K,Z	B,C,D,K,Z	B,C,D,K,Z
Weight					
• Operating weight approx.	kg	280	286	298	310

[1] kW = standard values according to EN 14511; values for B0W35 with 25 % monopolypropylene

[2] ΔT in accordance with regional regulations. The temperature difference is adjustable from 3 to 6 kelvin. The pump regulates the volumetric current to the set temperature difference.

[3] < 10 °C: Crankcase heater is necessary

[4] Values for electrical data apply for supply voltage of 3~400 V

[5] Effective value, operating current compressor 1 + starting current with starting current limiter

Thermalia® twin H (13-22) with R134a

Type		H (13)	H (19)	H (22)
Brine/water application B0W35				
• Energy efficiency class of the compound system with control	35 °C/55 °C	A+++/A++	A+++/A++	A+++/A++
• Room heating energy efficiency “moderate climate” 35 °C ηS	%	190	181	185
• Room heating energy efficiency “moderate climate” 55 °C ηS	%	135	136	136
Water/water application W10W35				
• Energy efficiency class of the compound system with control	35 °C/55 °C	A+++/A+++	A+++/A+++	A+++/A+++
• Room heating energy efficiency “moderate climate” 35 °C ηS	%	229	231	242
• Room heating energy efficiency “moderate climate” 55 °C ηS	%	173	174	180
• Seasonal coefficient of performance moderate climate (brine) 35 °C /55 °C	SCOP	4.7/3.4	4.6/3.5	4.9/3.5
Max. performance data heating in acc. with EN 14511				
• Heat output B0W35	kW [1]	12.3	18.0	20.9
• Coefficient of performance B0W35	COP	4.5	4.4	4.6
• Heat output W10W35	kW	17.0	24.7	28.8
• Coefficient of performance W10W35	COP	5.7	5.6	5.9
Nominal volume flow rate and resistance brine/water heat pump				
Heating (Δt = 7 K)	m^3/h	1.6	2.3	2.7
• ΔP Pressure drop condenser	kPa	1.6	2.0	2.3
Heat source (Δt = 3 K)	m^3/h	2.9	4.2	4.9
• ΔP Pressure drop evaporator	kPa	4	5	6
Nominal volume flow rate and resistance water/water heat pump				
Heating (Δt = 7 K)	m^3/h	2.2	3.2	3.8
• ΔP Pressure drop condenser	kPa	3.1	3.9	4.4
Heat source (Δt = 5 K) [2]	m^3/h	2.6	3.7	4.4
• ΔP Pressure drop evaporator	kPa	2.4	3.0	3.6
Operating limit values		see diagrams of areas of application		
• Operating pressure max. water side	bar	6	6	6
• Operating pressure max. brine side	bar	6	6	6
• Installation place operation [3]	°C (min./max.)	5/35	5/35	5/35
• Storage	°C (min./max.)	-15/50	-15/50	-15/50
• Compressor, type		2 x spiral (scroll), hermetic		
• Refrigerant filling quantity (R134a)	kg	4.8	5.9	6.5
• Compressor oil filling quantity	l	2.9	3.78	3.78
• Type of compressor oil		Emkarate RL32 3MAF		
• Condenser/evaporator		Plate heat exchanger		
• Material		Stainless steel V4A, AISI 316, 1.4401		
• Connections	R	2″	2″	2″
• Piping connections with flex. connecting hose	Rp	2″	2″	2″
Electrical data [4]				
• Voltage	V	3~400	3~400	3~400
• Frequency	Hz	50	50	50
• Voltage range	V	380-420	380-420	380-420
• Max. compressor operating current	A	9.4	13.3	15.8
• Starting current with starting current limiter [5]	A	21.7	27.1	37.4
• Principal current (external protection) with brine systems	A	16	16	20
- Type		C,D,K	C,D,K	C,D,K
• Principal current (external protection) with ground water systems	A	16	20	25
- Type		C,D,K	C,D,K	C,D,K
• Control current (external protection)	A	13	13	13
- Type		B,C,D,K,Z	B,C,D,K,Z	B,C,D,K,Z
Weight				
• Operating weight approx.	kg	273	283	293

[1] kW = standard values according to EN 14511; values for B0W35 with 25 % monopolypropylene

[2] ΔT in accordance with regional regulations. The temperature difference is adjustable from 3 to 6 kelvin. The pump regulates the volumetric current to the set temperature difference.

[3] < 10 °C: Crankcase heater is necessary

[4] Values for electrical data apply for supply voltage of 3~400 V

[5] Effective value, operating current compressor 1 + starting current with starting current limiter

Thermalia® twin (20-42), twin H (13-22)

Sound emission

The effective sound pressure level [1] in the installation room depends on various factors such as room size, absorption capacity, reflection, free sound propagation, etc.

Therefore it is important that the installation room lies, if possible, outside the noise-sensitive range and is supplied with sound-absorbing doors.

Ducts and pipes must be fixed to walls and ceiling in a way that no structure-borne sound is being transmitted to the system.

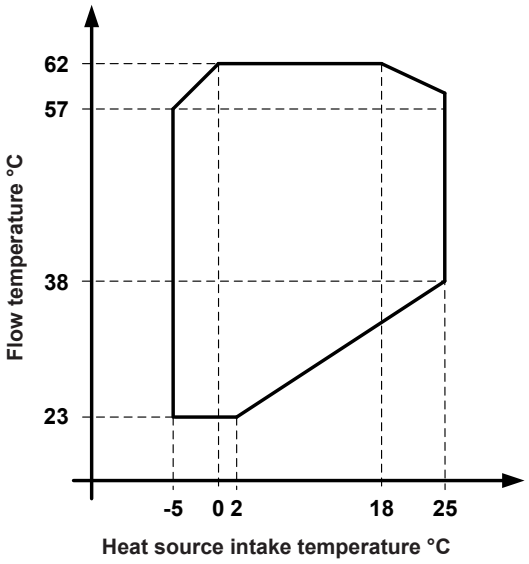
Thermalia® twin (20-42)		(20)		(26)		(36)		(42)	
Thermalia® twin H (13-22)		(13)		(19)		(22)			
Stage		1	2	1	2	1	2	1	2
Sound power level dB(A)	dB(A)	47	50	49	51	52	55	53	56
Sound pressure level dB(A) [1]	dB(A)	35	38	37	39	40	43	41	44

[1] Sound pressure level, distance 1 m (in standard room with approx. 5-6 dB(A) sound absorption)

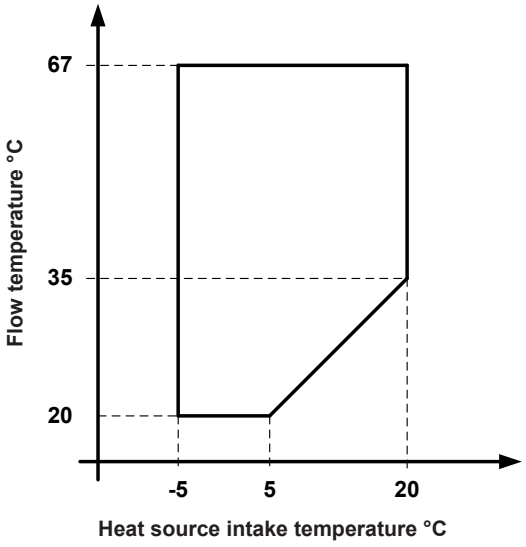
Diagrams of areas of application

Heating and hot water

Thermalia® twin (20-42)

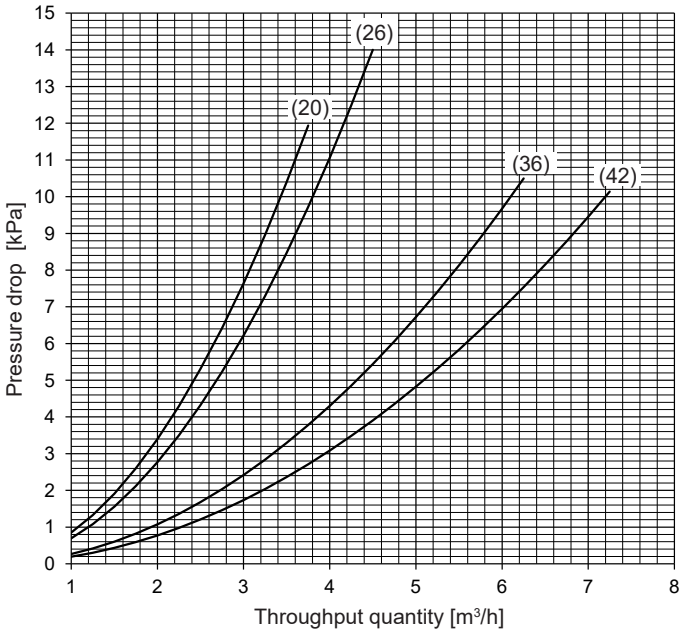


Thermalia® twin H (13-22)



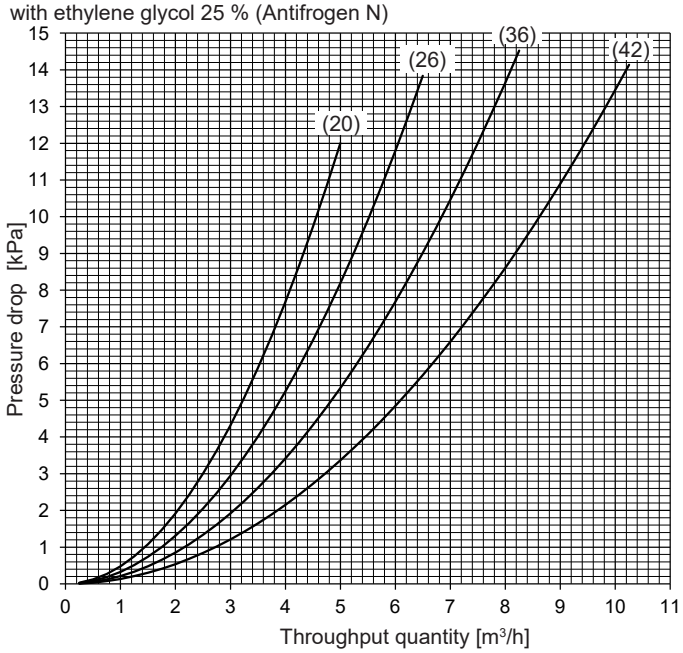
Thermalia® twin (20-42)
Heating

Pressure drop condenser with water



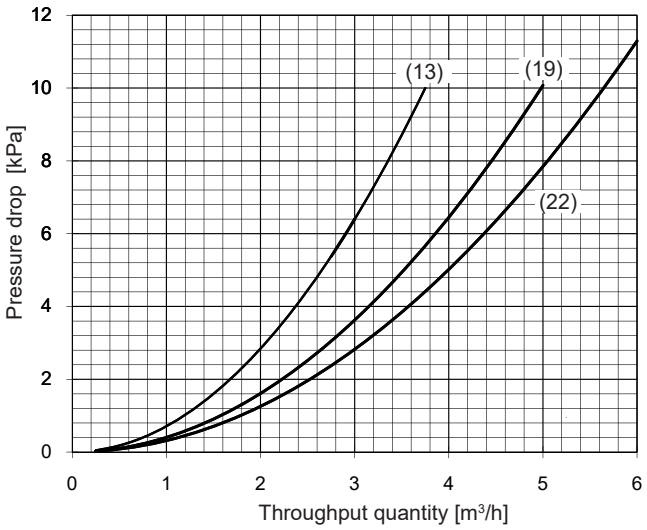
Heat source

Pressure drop evaporator
with ethylene glycol 25 % (Antifrogen N)



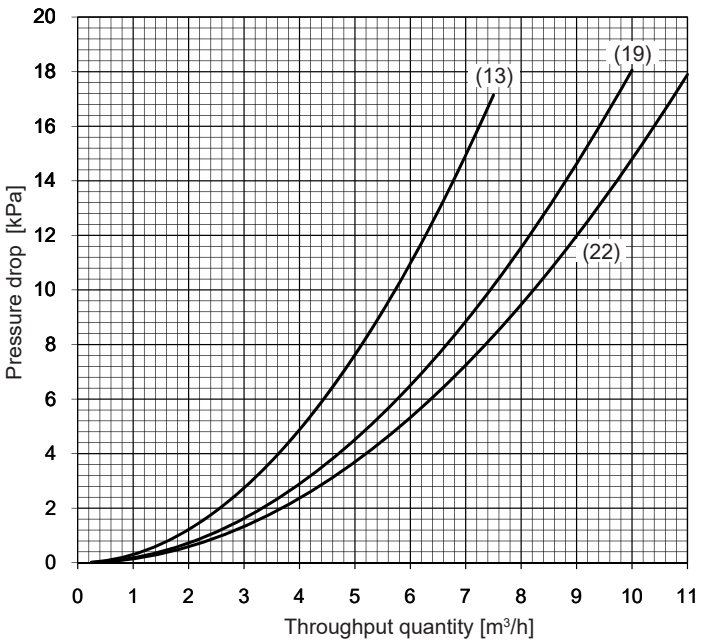
Thermalia® twin H (13-22)
Heating

Pressure drop condenser with water



Heat source

Pressure drop evaporator
with ethylene glycol 25 % (Antifrogen N)



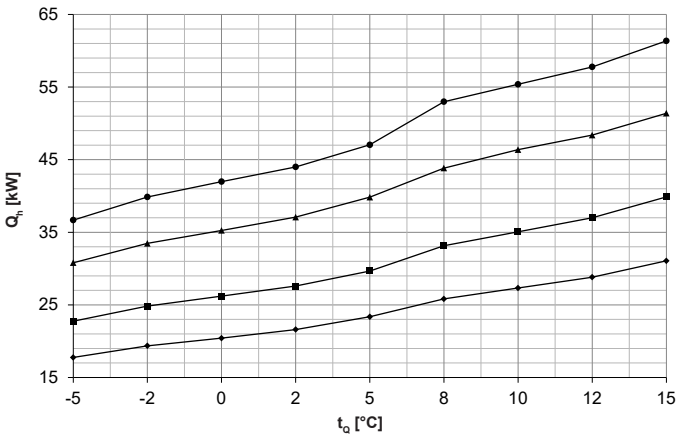
Performance data - heating

Maximum heat output

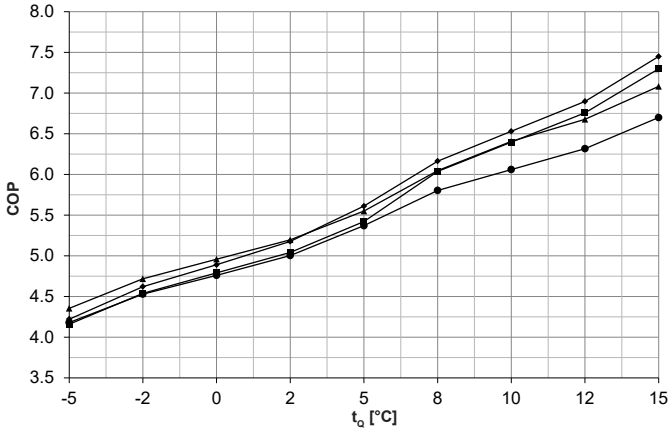
Thermalia® twin (20-42)

Data according to EN 14511

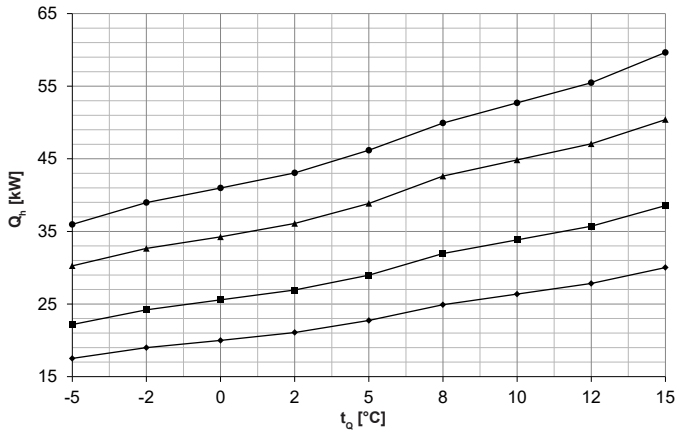
Heat output - t_{VL} 35 °C



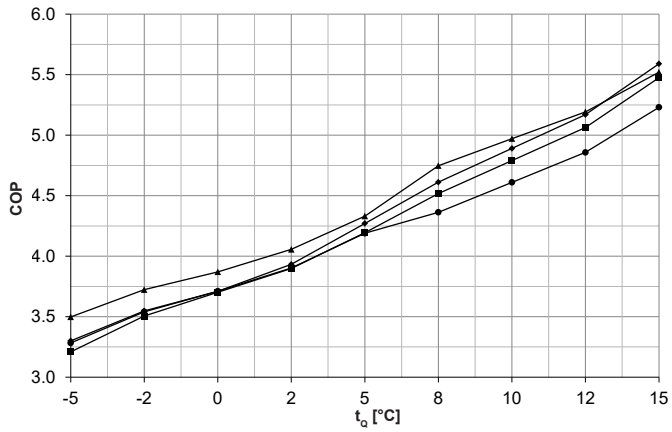
Coefficient of performance - t_{VL} 35 °C



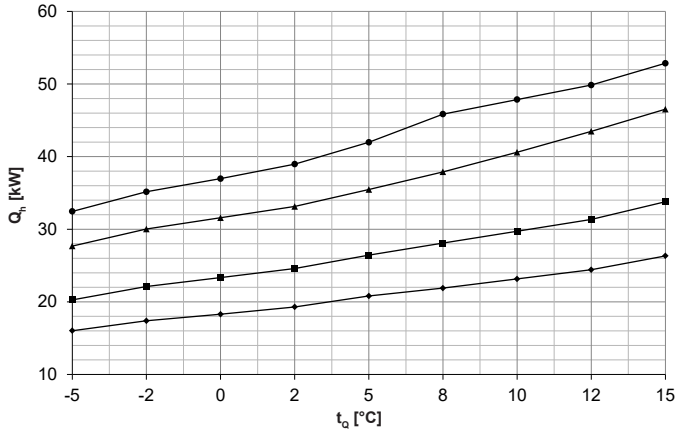
Heat output - t_{VL} 45 °C



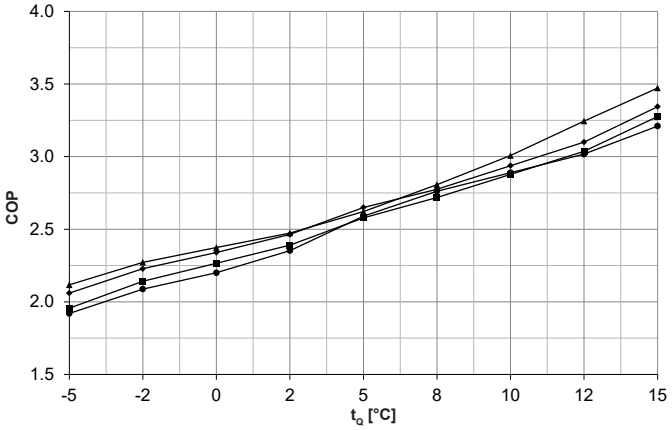
Coefficient of performance - t_{VL} 45 °C



Heat output - t_{VL} 60 °C



Coefficient of performance - t_{VL} 60 °C



t_{VL} = heating flow temperature (°C)
t_Q = source temperature (°C)
Q_h = heat output at full load (kW), measured in accordance with standard EN 14511
COP = Coefficient of Performance for the overall unit in accordance with standard EN 14511

- Thermalia® twin (20)
- Thermalia® twin (26)
- Thermalia® twin (36)
- Thermalia® twin (42)

Performance data - heating
Thermalia® twin (20-42)

Data according to EN 14511

t_{VL} °C		t_Q °C	Q_h kW	(20) P kW	COP	Q_h kW	(26) P kW	COP	Q_h kW	(36) P kW	COP	Q_h kW	(42) P kW	COP
30	Brine	-5	18.1	3.7	4.9	23.3	4.9	4.8	31.4	6.3	5.0	36.8	7.9	4.7
		-2	19.8	3.7	5.3	25.4	4.9	5.2	34.2	6.3	5.4	40.3	7.9	5.1
		0	20.9	3.7	5.6	26.8	4.9	5.5	36.1	6.3	5.7	42.5	7.9	5.4
		2	22.0	3.7	6.0	28.2	4.8	5.8	38.0	6.3	6.0	44.8	7.9	5.7
		5	23.8	3.7	6.5	30.4	4.8	6.3	40.8	6.3	6.5	48.1	7.9	6.1
	Water	8	26.3	3.6	7.3	33.7	4.7	7.2	44.4	6.4	7.0	54.5	8.0	6.8
		10	27.8	3.6	7.8	35.7	4.7	7.6	47.2	6.4	7.4	56.7	8.0	7.1
		12	29.3	3.6	8.2	37.6	4.7	8.0	49.0	6.3	7.7	58.9	8.0	7.4
		15	31.6	3.6	8.9	40.5	4.7	8.7	51.9	6.3	8.2	62.2	8.0	7.7
35	Brine	-5	17.8	4.2	4.2	22.8	5.5	4.2	30.8	7.1	4.4	36.7	8.8	4.2
		-2	19.4	4.2	4.6	24.8	5.5	4.5	33.5	7.1	4.7	39.9	8.8	4.5
		0	20.4	4.2	4.9	26.2	5.5	4.8	35.3	7.1	5.0	42.0	8.8	4.8
		2	21.6	4.2	5.2	27.6	5.5	5.0	37.1	7.1	5.2	44.0	8.8	5.0
		5	23.4	4.2	5.6	29.7	5.5	5.4	39.8	7.2	5.6	47.0	8.8	5.4
	Water	8	25.8	4.2	6.2	33.1	5.5	6.0	43.8	7.3	6.1	53.0	9.1	5.8
		10	27.3	4.2	6.5	35.1	5.5	6.4	46.4	7.2	6.4	55.4	9.1	6.1
		12	28.8	4.2	6.9	37.0	5.5	6.8	48.4	7.2	6.7	57.8	9.1	6.3
		15	31.1	4.2	7.5	39.9	5.5	7.3	51.4	7.3	7.1	61.4	9.2	6.7
40	Brine	-5	17.6	4.8	3.7	22.5	6.2	3.6	30.5	7.9	3.9	36.3	9.9	3.7
		-2	19.2	4.8	4.0	24.5	6.2	4.0	33.1	7.9	4.2	39.4	9.9	4.0
		0	20.2	4.8	4.2	25.9	6.2	4.2	34.8	8.0	4.4	41.5	9.9	4.2
		2	21.3	4.8	4.5	27.3	6.2	4.4	36.6	8.0	4.6	43.5	9.9	4.4
		5	23.0	4.7	4.9	29.3	6.2	4.7	39.3	8.1	4.9	46.6	9.9	4.7
	Water	8	25.4	4.8	5.3	32.6	6.3	5.2	43.2	8.1	5.3	51.5	10.3	5.0
		10	26.8	4.8	5.6	34.5	6.3	5.5	45.6	8.1	5.6	54.0	10.3	5.3
		12	28.3	4.8	5.9	36.4	6.3	5.8	47.7	8.2	5.9	56.6	10.3	5.5
		15	30.5	4.8	6.4	39.2	6.3	6.3	50.9	8.2	6.2	60.5	10.3	5.9
45	Brine	-5	17.5	5.3	3.3	22.2	6.9	3.2	30.3	8.7	3.5	36.0	11.0	3.3
		-2	19.0	5.4	3.6	24.2	6.9	3.5	32.7	8.8	3.7	39.0	11.0	3.5
		0	20.0	5.4	3.7	25.6	6.9	3.7	34.3	8.9	3.9	41.0	11.0	3.7
		2	21.1	5.4	3.9	26.9	6.9	3.9	36.1	8.9	4.1	43.1	11.0	3.9
		5	22.7	5.3	4.3	29.0	6.9	4.2	38.9	9.0	4.3	46.2	11.0	4.2
	Water	8	24.9	5.4	4.6	32.0	7.1	4.5	42.6	9.0	4.8	49.9	11.4	4.4
		10	26.4	5.4	4.9	33.8	7.1	4.8	44.8	9.0	5.0	52.7	11.4	4.6
		12	27.8	5.4	5.2	35.7	7.1	5.1	47.1	9.1	5.2	55.5	11.4	4.9
		15	30.0	5.4	5.6	38.5	7.0	5.5	50.4	9.1	5.5	59.6	11.4	5.2
50	Brine	-5	17.0	6.0	2.8	21.8	7.8	2.8	29.6	9.6	3.1	34.5	12.5	2.8
		-2	18.4	6.0	3.1	23.6	7.8	3.0	32.1	9.7	3.3	37.4	12.6	3.0
		0	19.4	6.1	3.2	24.9	7.8	3.2	33.8	9.8	3.5	39.4	12.6	3.1
		2	20.4	6.1	3.4	26.1	7.7	3.4	35.2	9.8	3.6	41.6	12.6	3.3
		5	22.0	6.0	3.7	28.0	7.7	3.6	37.2	9.7	3.8	44.7	12.4	3.6
	Water	8	24.0	6.1	3.9	30.8	8.0	3.8	42.1	10.1	4.2	48.7	13.0	3.8
		10	25.4	6.1	4.2	32.6	8.0	4.1	44.2	10.1	4.4	51.3	12.9	4.0
		12	26.8	6.1	4.4	34.4	8.0	4.3	46.3	10.2	4.6	53.8	12.9	4.2
		15	28.9	6.1	4.7	37.1	8.0	4.6	49.5	10.3	4.8	57.6	12.9	4.5
55	Brine	-5	16.4	6.6	2.5	21.4	8.8	2.4	29.0	10.6	2.7	33.0	14.1	2.3
		-2	17.8	6.7	2.7	23.1	8.7	2.7	31.6	10.7	3.0	35.9	14.2	2.5
		0	18.8	6.7	2.8	24.2	8.6	2.8	33.3	10.8	3.1	37.9	14.2	2.7
		2	19.8	6.7	2.9	25.3	8.6	3.0	34.2	10.6	3.2	40.1	14.1	2.8
		5	21.3	6.7	3.2	26.9	8.5	3.2	35.6	10.4	3.4	43.3	13.9	3.1
	Water	8	23.1	6.9	3.4	29.7	9.0	3.3	41.5	11.2	3.7	47.5	14.5	3.3
		10	24.5	6.9	3.6	31.4	9.0	3.5	43.6	11.2	3.9	49.9	14.5	3.5
		12	25.8	6.9	3.8	33.2	9.0	3.7	45.6	11.3	4.0	52.2	14.4	3.6
		15	27.9	6.8	4.1	35.8	9.0	4.0	48.6	11.4	4.3	55.7	14.4	3.9
60	Brine	-5	16.0	7.8	2.1	20.3	10.4	2.0	27.7	13.1	2.1	32.5	16.9	1.9
		-2	17.4	7.8	2.2	22.1	10.3	2.1	30.0	13.2	2.3	35.2	16.8	2.1
		0	18.3	7.8	2.3	23.3	10.3	2.3	31.6	13.3	2.4	37.0	16.8	2.2
		2	19.3	7.8	2.5	24.6	10.3	2.4	33.1	13.4	2.5	39.0	16.6	2.4
		5	20.8	7.9	2.7	26.4	10.3	2.6	35.5	13.5	2.6	42.0	16.2	2.6
	Water	8	21.9	7.9	2.8	28.1	10.3	2.7	37.9	13.5	2.8	45.9	16.6	2.8
		10	23.2	7.9	2.9	29.7	10.3	2.9	40.6	13.5	3.0	47.9	16.6	2.9
		12	24.4	7.9	3.1	31.4	10.3	3.0	43.5	13.4	3.2	49.9	16.5	3.0
		15	26.3	7.9	3.3	33.8	10.3	3.3	46.5	13.4	3.5	52.9	16.5	3.2

t_{VL} = heating flow temperature (°C)
t_Q = source temperature (°C)
Q_h = heat output at full load (kW), measured in accordance with standard EN 14511
P = power consumption of the overall unit (kW)
COP = Coefficient of Performance for the overall unit in accordance with standard EN 14511

Observe daily power interruptions!
see “Engineering heat pumps general”

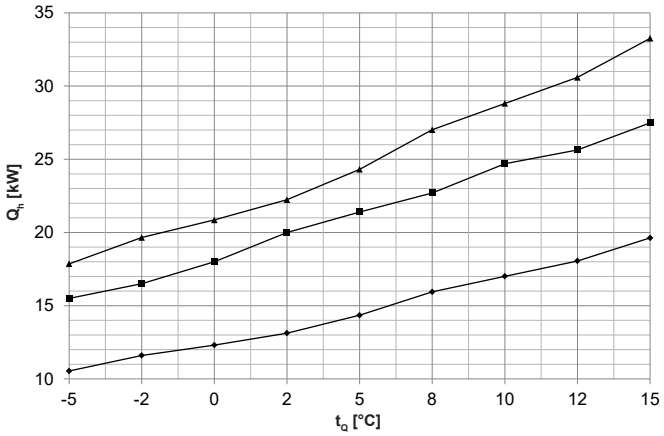
Performance data - heating

Maximum heat output

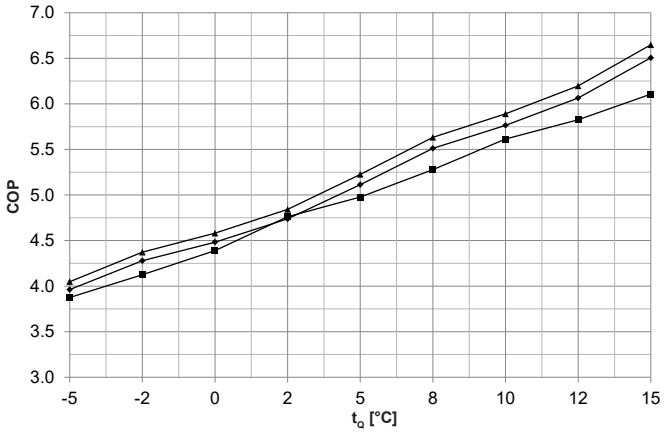
Thermalia® twin H (13-22)

Data according to EN 14511

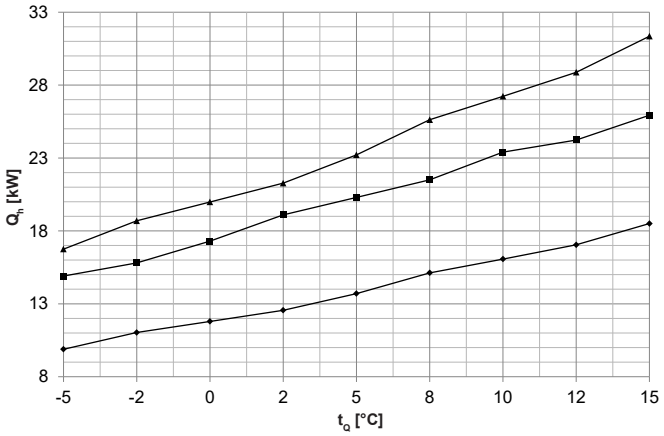
Heat output - t_{VL} 35 °C



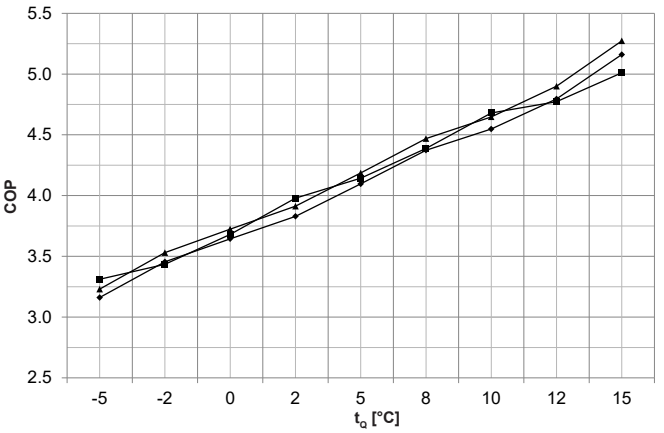
Coefficient of performance - t_{VL} 35 °C



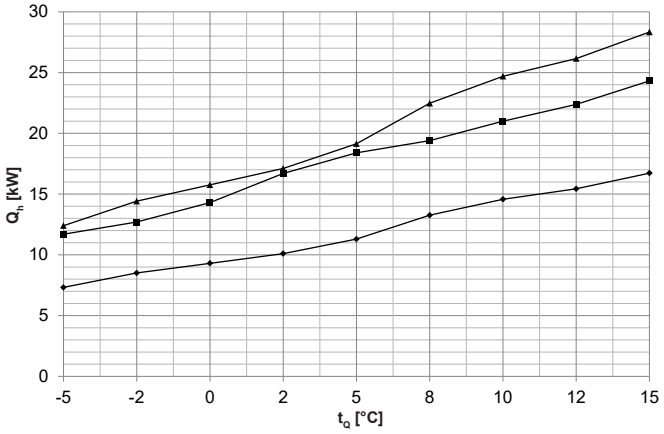
Heat output - t_{VL} 45 °C



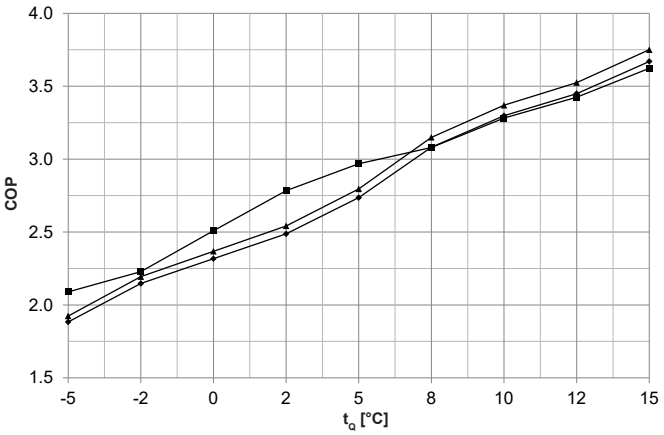
Coefficient of performance - t_{VL} 45 °C



Heat output - t_{VL} 60 °C



Coefficient of performance - t_{VL} 60 °C



t_{VL} = heating flow temperature (°C)
t_Q = source temperature (°C)
Q_h = heat output at full load (kW), measured in accordance with standard EN 14511
COP = Coefficient of Performance for the overall unit in accordance with standard EN 14511

Thermalia® twin H (13)
Thermalia® twin H (19)
Thermalia® twin H (22)

Performance data - heating
Thermalia® twin H (13-22)

Data according to EN 14511

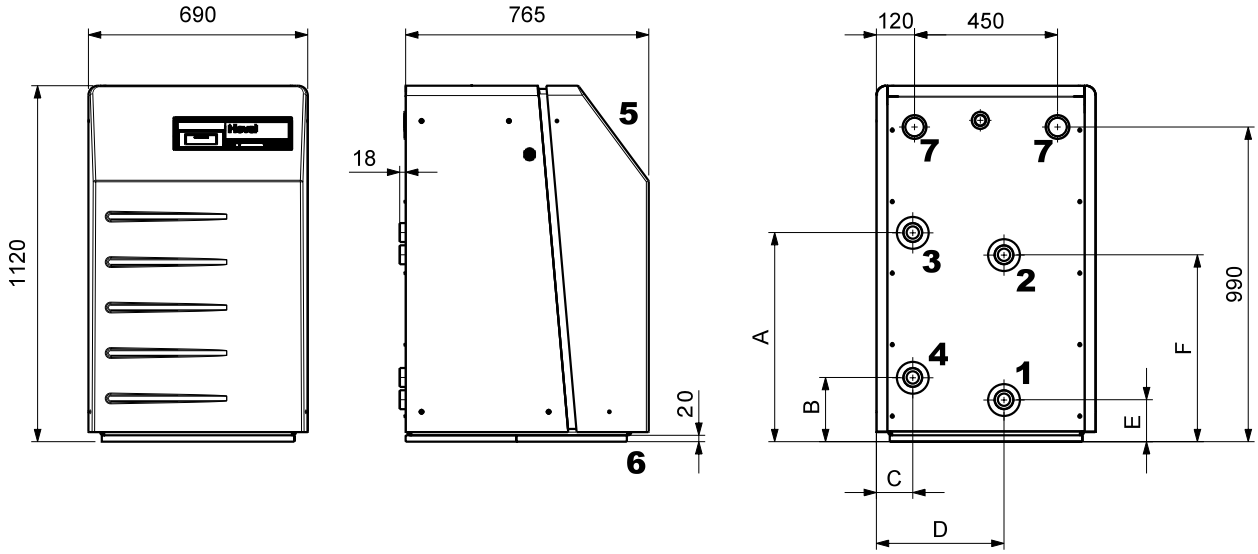
t_{VL} °C		t_Q °C	H (13) Q_h kW	H (13) P kW	H (13) COP	H (19) Q_h kW	H (19) P kW	H (19) COP	H (22) Q_h kW	H (22) P kW	H (22) COP
30	Brine	-5	10.9	2.4	4.5	15.8	3.5	4.5	18.4	4.0	4.6
		-2	11.9	2.5	4.8	16.8	3.7	4.5	20.1	4.1	4.9
		0	12.6	2.5	5.0	18.4	3.7	5.0	21.3	4.1	5.1
		2	13.4	2.5	5.3	20.5	3.8	5.4	22.7	4.2	5.5
		5	14.7	2.5	5.8	22.0	3.9	5.6	24.9	4.2	5.9
	Water	8	16.4	2.6	6.3	24.0	4.0	6.0	27.7	4.3	6.4
		10	17.5	2.7	6.6	25.3	4.0	6.3	29.6	4.4	6.7
		12	-	-	-	-	-	-	-	-	-
		15	-	-	-	-	-	-	-	-	-
35	Brine	-5	10.5	2.7	4.0	15.5	4.0	3.9	17.9	4.4	4.1
		-2	11.6	2.7	4.3	16.5	4.0	4.1	19.7	4.5	4.4
		0	12.3	2.7	4.5	18.0	4.1	4.4	20.9	4.6	4.6
		2	13.1	2.8	4.7	20.0	4.2	4.8	22.2	4.6	4.8
		5	14.3	2.8	5.1	21.4	4.3	5.0	24.3	4.7	5.2
	Water	8	15.9	2.9	5.5	22.7	4.3	5.2	27.0	4.8	5.6
		10	17.0	3.0	5.8	24.7	4.4	5.6	28.8	4.9	5.9
		12	18.1	3.0	6.1	25.6	4.4	5.8	30.6	4.9	6.2
		15	19.6	3.0	6.5	27.5	4.5	6.1	33.3	5.0	6.7
40	Brine	-5	10.2	2.9	3.5	15.1	4.4	3.4	17.3	4.8	3.6
		-2	11.3	3.0	3.8	16.1	4.4	3.7	19.2	4.9	3.9
		0	12.1	3.0	4.0	17.6	4.5	3.9	20.4	5.0	4.1
		2	12.8	3.0	4.3	19.5	4.6	4.2	21.8	5.0	4.3
		5	14.0	3.1	4.6	20.8	4.7	4.4	23.8	5.1	4.7
	Water	8	15.5	3.2	4.9	22.0	4.8	4.6	26.3	5.3	5.0
		10	16.5	3.2	5.1	24.0	4.8	5.0	28.0	5.4	5.2
		12	17.5	3.3	5.4	25.1	4.9	5.1	29.7	5.4	5.5
		15	19.1	3.3	5.8	26.8	5.0	5.4	32.3	5.5	5.9
45	Brine	-5	9.9	3.1	3.2	14.9	4.5	3.3	16.8	5.2	3.2
		-2	11.0	3.2	3.5	15.8	4.6	3.4	18.7	5.3	3.5
		0	11.8	3.2	3.6	17.3	4.7	3.7	20.0	5.4	3.7
		2	12.6	3.3	3.8	19.1	4.8	4.0	21.3	5.4	3.9
		5	13.7	3.3	4.1	20.3	4.9	4.1	23.2	5.5	4.2
	Water	8	15.1	3.5	4.4	21.5	4.9	4.4	25.6	5.7	4.5
		10	16.1	3.5	4.6	23.4	5.0	4.7	27.2	5.9	4.7
		12	17.0	3.6	4.8	24.2	5.1	4.8	28.9	5.9	4.9
		15	18.5	3.6	5.2	25.9	5.2	5.0	31.4	5.9	5.3
50	Brine	-5	9.0	3.4	2.7	13.8	4.9	2.8	15.3	5.6	2.7
		-2	10.2	3.4	3.0	14.8	4.9	3.0	17.3	5.7	3.0
		0	11.0	3.5	3.1	16.3	5.0	3.3	18.6	5.8	3.2
		2	11.7	3.5	3.3	18.3	5.2	3.5	19.9	5.9	3.4
		5	12.9	3.6	3.6	19.7	5.3	3.7	21.9	6.0	3.7
	Water	8	14.5	3.7	3.9	20.8	5.4	3.9	24.6	6.2	4.0
		10	15.6	3.8	4.1	22.6	5.4	4.2	26.4	6.3	4.2
		12	16.5	3.9	4.3	23.6	5.5	4.3	28.0	6.4	4.4
		15	17.9	3.9	4.6	25.4	5.6	4.5	30.3	6.5	4.7
55	Brine	-5	8.2	3.6	2.3	12.8	5.2	2.5	13.9	6.0	2.3
		-2	9.3	3.7	2.5	13.8	5.3	2.6	15.8	6.1	2.6
		0	10.1	3.8	2.7	15.3	5.4	2.8	17.2	6.2	2.8
		2	10.9	3.8	2.9	17.5	5.6	3.1	18.5	6.3	2.9
		5	12.1	3.9	3.1	19.0	5.7	3.3	20.5	6.4	3.2
	Water	8	13.9	4.0	3.5	20.1	5.8	3.5	23.5	6.7	3.5
		10	15.1	4.1	3.7	21.8	5.9	3.7	25.5	6.8	3.7
		12	16.0	4.2	3.8	23.0	6.0	3.8	27.1	6.9	3.9
		15	17.3	4.2	4.1	24.8	6.2	4.0	29.3	7.0	4.2
60	Brine	-5	7.3	3.9	1.9	11.7	5.6	2.1	12.4	6.4	1.9
		-2	8.5	4.0	2.2	12.7	5.7	2.2	14.4	6.6	2.2
		0	9.3	4.0	2.3	14.3	5.7	2.5	15.8	6.7	2.4
		2	10.1	4.1	2.5	16.7	6.0	2.8	17.1	6.7	2.5
		5	11.3	4.1	2.7	18.4	6.2	3.0	19.1	6.8	2.8
	Water	8	13.3	4.3	3.1	19.4	6.3	3.1	22.5	7.1	3.2
		10	14.6	4.4	3.3	21.0	6.4	3.3	24.7	7.3	3.4
		12	15.4	4.5	3.5	22.4	6.5	3.4	26.2	7.4	3.5
		15	16.7	4.6	3.7	24.3	6.7	3.6	28.3	7.6	3.8

t_{VL} = heating flow temperature (°C)
t_Q = source temperature (°C)
Q_h = heat output at full load (kW), measured in accordance with standard EN 14511
P = power consumption of the overall unit (kW)
COP = Coefficient of Performance for the overall unit in accordance with standard EN 14511

Observe daily power interruptions!
see “Engineering heat pumps general”

Thermalia® twin (20-42) and twin H (13-22)

(Dimensions in mm)



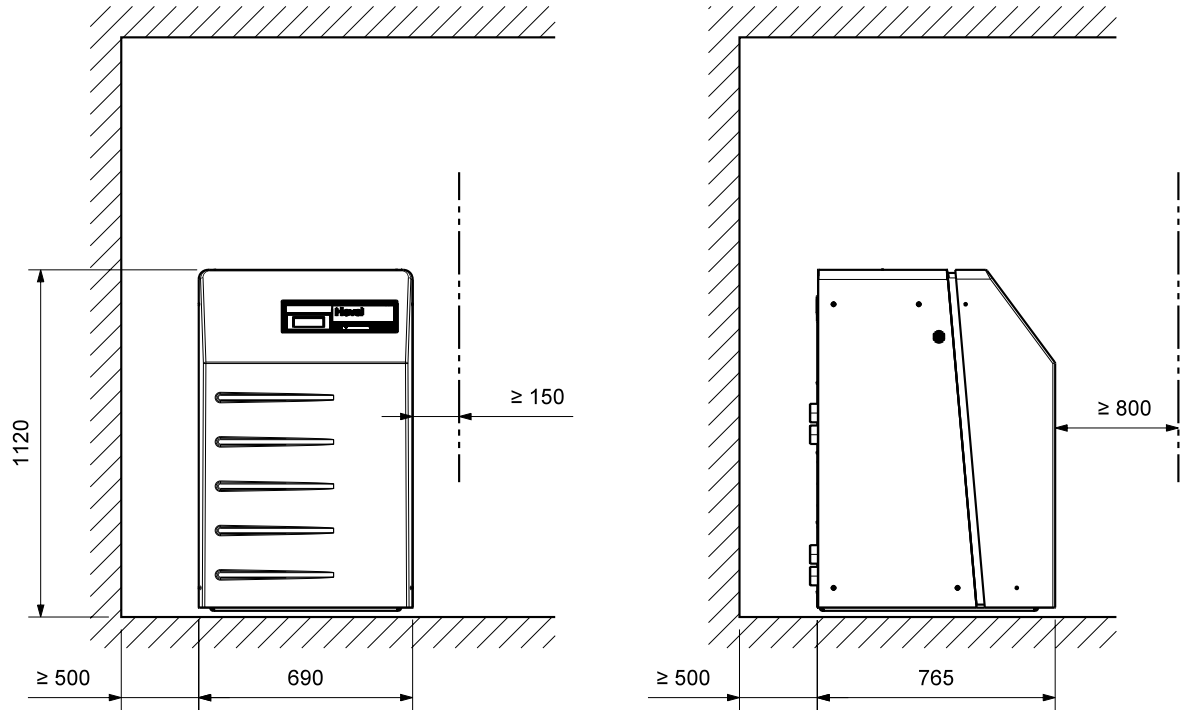
Type	A	B	C	D	E	F
Thermalia® twin (20-42)	741	222	274.5	481.5	170	689
Thermalia® twin H (13-22)	658	202	114	401	132	588

1 Heat source outlet from the heat pump R 1½″
Thermalia® twin (20,26), twin H (13,19)
Heat source outlet from the heat pump R 2″
Thermalia® twin (36,42), twin H (22)
2 Heat source inlet into the heat pump R 1½″
Thermalia® twin (20,26), twin H (13,19)
Heat source inlet into the heat pump R 2″
Thermalia® twin (36,42), twin H (22)
3 Heating flow R 1½″
Thermalia® twin (20,26), twin H (13,19)
Heating flow R 2″
Thermalia® twin (36,42), twin H (22)
4 Heating return R 1½″
Thermalia® twin (20,26), twin H (13,19)
Heating return R 2″
Thermalia® twin (36,42), twin H (22)
5 Operating panel
6 Vibration damping
7 Electrical connection

Space requirement

Required wall distance in mm for operation and maintenance
(Dimensions in mm)

Front	Rear	Right or left side
min. 800	min. 500	min. 500



Looking for the appropriate hydraulic schematic?
Please contact your local Hoval partner.

Hoval Thermalia® dual

Brine/water-water/water heat pump

- Compact unit with high energy efficiency
- Extremely quiet running thanks to 3-bearing construction
- Stable steel frame structure, a ground plate including vibration-free machine adjustable feet
- Removable, powder-coated sheet steel side panels and front doors with quick-release fasteners
- All casing parts are sound-insulated and thermally insulated
- Colour of side panels, ceiling and rear side: brown red (RAL 3011)
- Colour of doors: flame red (RAL 3000)
- 2 spiral (scroll) compressors
- With plate heat exchanger (condenser and evaporator) made of stainless steel (1.4401), soldered
- Two separate refrigeration circuits with electronic expansion valves, filter dryer with sight glass, liquid receivers and high-pressure and low-pressure sensors
- Electronic initial current limiter with rotating field and phase monitoring
- Integrated brine pressure monitoring
- Two output levels
- Refrigerants
  Thermalia® dual, dual R (55-140) with 410A
  Thermalia® dual H (35-90) with R134a
- Heat pump wired and ready to connect
- Operating side on front with integrated TopTronic® E controller

Electrical connections
- Connection at rear

Delivery
- Heat pump pre-assembled and packed

TopTronic® E controller

Control panel
- Colour touchscreen 4.3 inch
- Heat generator blocking switch for interrupting operation
- Fault signalling lamp

TopTronic® E control module
- Simple, intuitive operating concept
- Display of the most important operating statuses
- Configurable start screen
- Operating mode selection
- Configurable day and week programmes
- Operation of all connected Hoval CAN bus modules
- Commissioning wizard
- Service and maintenance function
- Fault message management
- Analysis function
- Weather display (with online HovalConnect)
- Adaptation of the heating strategy based on the weather forecast (with online HovalConnect)

Model range

Thermalia® dual type	Water/water 35 °C	Water/water 55 °C	Brine/water 35 °C	Brine/water 55 °C	Refrigerant	Flow min. °C	Flow max. °C	Heat output B0W35 kW	Heat output W10W35 kW	Cooling capacity B17W9 kW	Cooling capacity B25W18 kW
(55)	A+++	A+++	A+++	A++	2 x R410A	-	62	57.9	76.9	-	-
(70)			A+++	A++	2 x R410A	-	62	73.2	97.2	-	-
(85)					2 x R410A	-	62	84.8	112.8	-	-
(110)					2 x R410A	-	62	113.4	149.1	-	-
(140)					2 x R410A	-	62	137.8	181.1	-	-
H (35)	A+++	A+++	A+++	A++	2 x R134a	-	70	34.9	49.3	-	-
H (50)	A+++	A+++	A+++	A++	2 x R134a	-	70	52.5	71.8	-	-
H (70)			A+++	A++	2 x R134a	-	70	70.9	97.1	-	-
H (90)					2 x R134a	-	70	87.3	119.5	-	-
R (55)	A+++	A+++	A+++	A++	2 x R410A	7	62	57.9	76.7	64.7	81.1
R (70)			A+++	A++	2 x R410A	7	62	73.2	97.2	86.2	108.3
R (85)					2 x R410A	7	62	84.8	112.8	107.0	127.7
R (110)					2 x R410A	7	62	113.4	149.1	138.1	165.0
R (140)					2 x R410A	7	62	137.8	181.1	156.9	183.9

Energy efficiency class of the compound system with control

TopTronic® E basic module heat generator TTE-WEZ
- Control functions integrated for
  - 1 heating/cooling circuit with mixer
  - 1 heating/cooling circuit without mixer
  - 1 hot water charging circuit
  - bivalent and cascade management
- Outdoor sensor
- Immersion sensor (calorifier sensor)
- Contact sensor (flow temperature sensor)
- RAST 5 basic plug set

Options for TopTronic® E controller
- Can be expanded by max. 1 module expansion:
  - module expansion heating circuit or
  - module expansion Universal
  - module expansion heat balancing
- Can be networked with a total of up to 16 controller modules:
  - heating circuit/hot water module
  - solar module
  - buffer module
  - measuring module

Number of modules that can be additionally installed in the heat generator:
- 1 module expansion and 1 controller module
  or
- 2 controller modules

The supplementary plug set must be ordered in order to use expanded controller functions.

Further information about the TopTronic® E
see “Controls”

EnergyManager PV smart
Feature to increase self-generated power consumption in use with HovalConnect.

If a HovalConnect gateway is used together with the heat pump, the EnergyManager PV smart feature is available. This allows the heat pump to be operated preferentially at times of higher solar radiation. The feature uses online weather data on the current solar radiation for this purpose and can be adjusted by means of an associated threshold value. The self-consumption of electricity from an existing photovoltaic plant is thus increased and the purchase of grid electricity is reduced. This results in a lasting and significant cost-saving potential without further investment costs for the customer

Brine/water or water/water heat pump

Hoval Thermalia® dual

Refrigerant R410A, 2 circuits
Max. flow temperature 62 °C

Thermalia® dual type	Heat output B0W35 kW	Heat output W10W35 kW	Part No.
(55)	57.9	76.9	7018 997
(70)	73.2	97.2	7018 998
(85)	84.8	112.8	7018 999
(110)	113.4	149.1	7014 294
(140)	137.8	181.1	7014 295

Hoval Thermalia® dual H

Refrigerant R134a, 2 circuits.
Max. flow temperature 70 °C

Thermalia® dual H type	Heat output B0W35 kW	Heat output W10W35 kW	Part No.
H (35)	34.9	49.3	7019 003
H (50)	52.5	71.8	7019 004
H (70)	70.9	97.1	7019 005
H (90)	87.3	119.5	7014 299

Hoval Thermalia® dual R

Refrigerant R410A, 2 circuits
Max. flow temperature 62 °C

Thermalia® dual R type	Cooling capacity [1] B17W9 kW	Cooling capacity [1] B25W18 kW	Part No.
R (55)	64.7	81.1	7019 000
R (70)	86.2	108.3	7019 001
R (85)	107.0	127.7	7019 002
R (110)	138.1	165.0	7016 553
R (140)	156.9	183.9	7016 554

[1] Heat output: see Hoval Thermalia® dual

EnergyManager PV smart
Free feature to increase self-generated power consumption in use with HovalConnect.

Further information
see “Description”

Notice
Suitable heat source and charging pumps:

Hoval system pump set SPS-I with interface for pump control
Type 0-10 V or PWM1

Premium pump Stratos
with IF module Stratos Ext. Off (0-10 V)

See “Circulating pumps”

Energy efficiency class
see Description

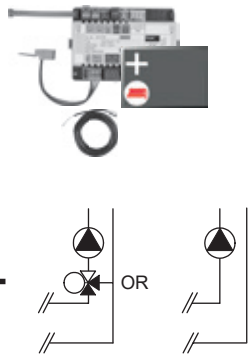
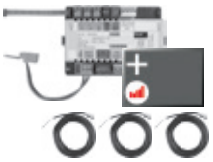
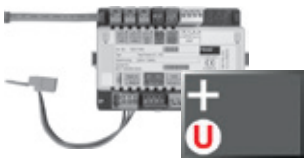
Installation
The heat pump may be tilted by a maximum of 30° during transportation and installation.

Accessories

		Part No.
	**Hose set SPCH50-50-10-4** for Thermalia® dual (55-85), dual H (35-70), dual R (55-85) Consisting of: - 4 reinforced hoses PN 10 DN 50 2″ IT insulated for brine and heating side flat-sealing with union nut - Length: 1.0 m - Seals	6058 825
	**Set of sound attenuation feet 65/75** for Thermalia® dual (55,70), dual H (35,50), dual R (55,70) for reducing the transmission of solid-borne noise Set consisting of 4 vibration-damping adjustable feet, threaded rod and locknut Elastomer part material: NR, black Housing material: galvanised steel, chromated	6045 228
	**Set of sound attenuation feet 45/55** for Thermalia® dual (85-140), dual H (70,90), dual R (85-140) for reducing the transmission of solid-borne noise Set consisting of 4 vibration-damping adjustable feet, threaded rod and locknut Elastomer part material: NR, black Housing material: galvanised steel, chromated	6045 229

TopTronic® E module expansions

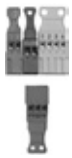
for TopTronic® E basic module heat generator

		Part No.
	**TopTronic® E module expansion heating circuit TTE-FE HK** Expansion to the inputs and outputs of the basic module heat generator or the heating circuit/domestic hot water module for implementing the following functions: - 1 heating/cooling circuit w/o mixer or - 1 heating/cooling circuit with mixer Consisting of: - Fitting accessories - 1 contact sensor ALF/2P/4/T, L = 4.0 m - Basic plug set FE module **Notice** The supplementary plug set may have to be ordered to implement functions differing from the standard!	6034 576
	**TopTronic® E module expansion heating circuit incl. energy balancing** TTE-FE HK-EBZ Expansion to the inputs and outputs of the basic module heat generator or the heating circuit/domestic hot water module for implementing the following functions: - 1 heating/cooling circuit w/o mixer or - 1 heating/cooling circuit with mixer incl. energy balancing in each case Consisting of: - Fitting accessories - 3 contact sensors ALF/2P/4/T, L = 4.0 m - Plug set FE module **Notice** Suitable flow rate sensors (pulse sensors) must be provided on site.	6037 062
	**TopTronic® E module expansion Universal TTE-FE UNI** Expansion to the inputs and outputs of a controller module (basic module heat generator, heating circuit/domestic hot water module, solar module, buffer module) for implementing various functions Consisting of: - Fitting accessories - Plug set FE module **Further information** see “Controls” - “Hoval TopTronic® E module expansions” chapter **Notice** Refer to the Hoval System Technology to find which functions and hydraulic arrangements can be implemented.	6034 575

Accessories for TopTronic® E

TopTronic® E controller modules

		Part No.
TTE-HK/WW	TopTronic® E heating circuit/ hot water module	6034 571
TTE-SOL	TopTronic® E solar module	6037 058
TTE-PS	TopTronic® E buffer module	6037 057
TTE-MWA	TopTronic® E measuring module	6034 574



Supplementary plug set

for basic module heat generator TTE-WEZ	6034 499
for controller modules and module expansion TTE-FE HK	6034 503

TopTronic® E room control modules

TTE-RBM	TopTronic® E room control modules	
	easy white	6037 071
	comfort white	6037 069
	comfort black	6037 070

Enhanced language package TopTronic® E 6039 253

one SD card required per control module
Consisting of the following languages:
HU, CS, SL, RO, PL, TR, ES, HR,
SR, JA, DA

HovalConnect

HovalConnect LAN	6049 496
HovalConnect WLAN	6049 498
HovalConnect Modbus	6049 501
HovalConnect KNX	6049 593

TopTronic® E interface modules

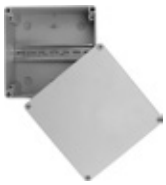
GLT module 0-10 V	6034 578

TopTronic® E sensors

AF/2P/K	Outdoor sensor H x W x D = 80 x 50 x 28 mm	2055 889
TF/2P/5/6T	Immersion sensor, L = 5.0 m	2055 888
ALF/2P/4/T	Contact sensor, L = 4.0 m	2056 775
TF/1.1P/2.5S/6T	Collector sensor, L = 2.5 m	2056 776

Bivalent switch

for various release or switching functions	
Bivalent switch 1-piece	2056 858
Bivalent switch 2-piece	2061 826



System housing

System housing 182 mm	6038 551
System housing 254 mm	6038 552

TopTronic® E wall casing

WG-190	Wall casing small	6052 983
WG-360	Wall casing medium	6052 984
WG-360 BM	Wall casing medium with control module cut-out	6052 985
WG-510	Wall casing large	6052 986
WG-510 BM	Wall casing large with control module cut-out	6052 987

Further information
see “Controls”

Accessories

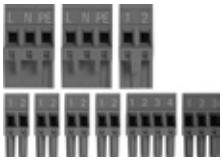
		Part No.
	**Flange compensator set DN 80 PN 6** for Thermalia® dual (110-140), dual H (90), dual R (110-140) for reducing the transmission of solid-borne and fluid-borne noise Set consisting of 4 flange compensators DN 80 PN 6 without fittings Structural length:130 mm	6040 025
	**System water protection filter FF050-200** Cast-iron casing with opposite connection flanges at same height for filtration of heating and cooling water Consisting of: Casing and cover made of cast iron GGG-50 Cover with clip lock - Filter strainer insert made of stainless steel - Cover seal made of NBR - 2 magnetic inserts (nickel-neodymium) - 2 pressure gauges - Filter surface made of stainless steel - Filter fineness 200 µm - With filling and drain valve - Connections flange DN 50 - Nominal pressure: 10 bar Max. flow rate: ($\Delta p < 0.1$ bar): 18 m³/h Weight: 15 kg Water temperature max. 80 °C	2076 376

Strainers
see “Various system components”

Float body flow meter
Bistable Reed contact as NC contact
Nominal pressure: 10 bar
Installation length: 335 mm

Area of application l/h	°C	Connection	Part No.
1500-15000	0-80	Rp 2″	2040 709
3000-30000	0-80	DN 65	2064 164
8000-60000	0-80	DN 65	2064 165

For active cooling, the installation of a flow controller is mandatory!



Expansion connector set — 6032 509
for the automatic heat pump device ECR461
Use for additional function:
- Flow monitor
- Crankcase bottom heating

(included in the scope of delivery for Belaria® twin A, twin AR, dual AR)
- Condensation drain heating
- Heat quantity metering

Plugs:
- 1 230 V digital input
- 2 230 V outputs
- 4 low-voltage inputs
- 1 ratio. Input
- 1 4-pin low-voltage input

Frost protection temperature switch 270XT-95068 — 2007 313
to heat source ground water
Type of protection: IP40
Area of application: -24/18 °C

Service

Commissioning by works service or Hoval trained authorised serviceman/company is condition for warranty.

For commissioning and other services please contact your Hoval sales office.

Thermalia® dual (55-140) with R410A

Type		(55)	(70)	(85)	(110)	(140)
Brine/water application B0W35						
• Energy efficiency class of the compound system with control	35 °C/55 °C	A+++/A++	A+++/A++	-	-	-
• Room heating energy efficiency “moderate climate” 35 °C ηS	%	195	193	194	194	193
• Room heating energy efficiency “moderate climate” 55 °C ηS	%	138	140	142	141	141
Water/water application W10W35						
• Energy efficiency class of the compound system with control	35 °C/55 °C	A+++/A+++	-	-	-	-
• Room heating energy efficiency “moderate climate” 35 °C ηS	%	257	249	250	242	245
• Room heating energy efficiency “moderate climate” 55 °C ηS	%	185	180	181	177	178
• Seasonal coefficient of performance moderate climate (brine) 35 °C/55 °C	SCOP	5.1/3.7	5.0/3.7	5.1/3.7	5.1/3.7	5.0/3.7
Max. performance data heating in acc. with EN 14511						
• Heat output B0W35	kW [1]	57.9	73.2	84.8	113.4	137.8
• Coefficient of performance B0W35	COP	4.63	4.6	4.63	4.62	4.61
• Heat output W10W35	kW	76.9	97.2	112.8	149.1	181.1
• Coefficient of performance W10W35	COP	6.1	5.9	5.9	5.7	5.8
Sound data according to EN 12102						
• Sound power level	dB(A)	57.2	55.7	57.2	64.2	64.2
Hydraulic data brine/water B0W35						
• Maximum flow temperature	°C	62	62	62	62	62
• Maximum operating pressure	bar	16	16	16	6	6
• Heating water spread	K	5	5	5	5	5
• Required volume flow	m^3/h	9.9	12.6	14.6	19.5	23.7
• Pressure drop, condenser	kPa	5.7	6.2	5.4	7.6	8.1
• Condenser connections	R (ext. thread)	2″	2“	2″	DN 80/PN 6	DN 80/PN 6
• Brine spread	K	3	3	3	3	3
• Required volume flow	m^3/h	13.7	17.3	20.1	26.7	32.6
• Pressure drop, evaporator	kPa	15.8	10.0	11.2	12.8	11.3
• Evaporator connections	R (ext. thread)	2″	2″	2″	DN 80/PN 6	DN 80/PN 6
Hydraulic data water/water W10/W35 (intermediate circuit)						
• Maximum flow temperature	°C	62	62	62	62	62
• Maximum operating pressure	bar	16	16	16	6	6
• Heating water spread	K	5	5	5	5	5
• Required volume flow	m^3/h	13.2	16.7	19.4	25.6	31.1
• Pressure drop, condenser	kPa	9.8	10.6	9.3	12.6	13.4
• Condenser connections	R (ext. thread)	2″	2″	2″	DN 80/PN 6	DN 80/PN 6
• Brine spread in intermediate circuit [2]	K	3	4	4	4	5
• Required volume flow GW	m^3/h	20.9	19.7	22.9	30.1	29.3
• Pressure drop, evaporator	kPa	28.3	17.2	19.8	22.8	18.6
• Evaporator connections	R (ext. thread)	2″	2″	2″	DN 80/PN 6	DN 80/PN 6
Refrigerating data						
• Refrigerant		R410A	R410A	R410A	R410A	R410A
• Refrigerant filling quantity	kg	2 x 6.0	2 x 7.4	2 x 8.2	2 x 10.0	2 x 10.7
• Compressor oil filling quantity	l	2 x 2.46	2 x 3.30	2 x 3.60	2 x 6.70	2 x 6.70
• Type of compressor oil		DAPHNE HERMETIC OIL FVC32D	Emkarate RL 32HB - 160SZ - 160Z	Emkarate RL 32HB - 160SZ - 160Z	Emkarate RL 32HB - 160SZ - 160Z	Emkarate RL 32HB - 160SZ - 160Z
Electrical data						
• Power supply	V	3+N~400 V/50 Hz				
• Max. power consumption (without pumps)	kW	24.8	30.4	34.6	46.6	56.6
• Max. operating current (without pumps)	A	45.6	51.0	58.2	75.6	93.2
• Max. starting current	A	85.3	100.5	114.1	160.3	186.6
• Main current fuse (on site)	A	C63	C63	C80	C100	C125
• Control current fuse (on site)	A	16	16	16	16	16
Dimensions/weight						
• Dimensions (H x W x D)	mm	1907 x 1066 x 774			1907 x 1316 x 774	
• Minimum size of the installation room (without ventilation)	m^3	16	17	19	26	31
• Weight	kg	560	620	700	770	820

[1] kW = standard values according to EN 14511; values for B0W35 with 25 % monopolypropylene

[2] ΔT in accordance with regional regulations. The temperature difference is adjustable from 3 to 6 kelvin. The pump regulates the volumetric current to the set temperature difference.

Thermalia® dual H (35-90) with R134a

Type		H (35)	H (50)	H (70)	H (90)
Brine/water application B0W35					
• Energy efficiency class of the compound system with control	35 °C/55 °C	A+++/A++	A+++/A++	A+++/A++	-
• Room heating energy efficiency “moderate climate” 35 °C ηS	%	184	182	182	178
• Room heating energy efficiency “moderate climate” 55 °C ηS	%	135	139	132	131
Water/water application W10W35					
• Energy efficiency class of the compound system with control	35 °C/55 °C	A+++/A+++	A+++/A+++	-	-
• Room heating energy efficiency “moderate climate” 35 °C ηS	%	256	246	245	240
• Room heating energy efficiency “moderate climate” 55 °C ηS	%	180	179	177	174
• Seasonal coefficient of performance moderate climate (brine) 35 °C/55 °C	SCOP	4.6/3.5	4.8/3.6	4.8/3.5	4.7/3.5
Max. performance data heating in acc. with EN 14511					
• Heat output B0W35	kW [1]	34.9	52.5	70.9	87.3
• Coefficient of performance B0W35	COP	4.3	4.4	4.4	4.3
• Heat output W10W35	kW	49.3	71.8	97.1	119.5
• Coefficient of performance W10W35	COP	6.0	5.8	5.8	5.7
Sound data according to EN 12102					
• Sound power level	dB(A)	55.2	60.2	63.2	63.2
Hydraulic data brine/water B0W35					
• Maximum flow temperature	°C	70	70	70	70
• Maximum operating pressure	bar	16	16	16	6
• Heating water spread	K	5	5	5	5
• Required volume flow	m^3/h	6.0	9.0	12.2	15.0
• Pressure drop, condenser	kPa	4.2	3.3	3.9	4.7
• Condenser connections	R (ext. thread)	2″	2″	2″	DN 80/PN 6
• Brine spread	K	3	3	3	3
• Required volume flow	m^3/h	8.1	12.2	16.5	20.2
• Pressure drop, evaporator	kPa	8.9	9.1	8.3	8.8
• Evaporator connections	R (ext. thread)	2″	2″	2″	DN 80/PN 6
Hydraulic data water/water W10/W35 (intermediate circuit)					
• Maximum flow temperature	°C	70	70	70	70
• Maximum operating pressure	bar	16	16	16	6
• Heating water spread	K	5	5	5	5
• Required volume flow	m^3/h	8.5	12.3	16.7	20.5
• Pressure drop, condenser	kPa	7.8	6.0	7.0	8.4
• Condenser connections	R (ext. thread)	2″	2″	2″	DN 80/PN 6
• Brine spread in intermediate circuit [2]	K	3	3	4	4
• Required volume flow GW	m^3/h	13.4	19.4	19.6	24.1
• Pressure drop, evaporator	kPa	18.2	16.8	15.2	15.9
• Evaporator connections	R (ext. thread)	2″	2″	2″	DN 80/PN 6
Refrigerating data					
• Refrigerant		R134a	R134a	R134a	R134a
• Refrigerant filling quantity	kg	2 x 5.4	2 x 8.0	2 x 8.2	2 x 9.0
• Compressor oil filling quantity	l	2 x 3.3	2 x 6.2	2 x 8.0	2 x 8.0
• Type of compressor oil		Emkarate RL 32HB - 160SZ - 160Z	Emkarate RL 32HB - 160SZ - 160Z	Emkarate RL 32HB - 160SZ - 160Z	Emkarate RL 32HB - 160SZ - 160Z
Electrical data					
• Power supply	V	3+N~400 V/50 Hz			
• Max. power consumption (without pumps)	kW	17.4	25.6	34.8	44.2
• Max. operating current (without pumps)	A	32.0	45.6	58.6	75.8
• Max. starting current	A	76.0	107.8	151.8	182.9
• Main current fuse (on site)	A	C50	C63	C80	C100
• Control current fuse (on site)	A	16	16	16	16
Dimensions/weight					
• Dimensions (H x W x D)	mm	1907 x 1066 x 774		1907 x 1316 x 774	
• Minimum size of the installation room (without ventilation)	m^3	22	24	27	36
• Weight	kg	670	700	770	800

[1] kW = standard values according to EN 14511; values for B0W35 with 25 % monopolypropylene

[2] ΔT in accordance with regional regulations. The temperature difference is adjustable from 3 to 6 kelvin.
The pump regulates the volumetric current to the set temperature difference.

Thermalia® dual R (55-140) with R410A

Type		R (55)	R (70)	R (85)	R (110)	R (140)
Brine/water application B0W35						
• Energy efficiency class of the compound system with control	35 °C/55 °C	A+++/A++	A+++/A++	-	-	-
• Room heating energy efficiency “moderate climate” 35 °C ηS	%	195	193	194	194	193
• Room heating energy efficiency “moderate climate” 55 °C ηS	%	138	140	142	141	141
Water/water application W10W35						
• Energy efficiency class of the compound system with control	35 °C/55 °C	A+++/A+++	-	-	-	-
• Room heating energy efficiency “moderate climate” 35 °C ηS	%	257	249	250	242	245
• Room heating energy efficiency “moderate climate” 55 °C ηS	%	185	180	181	177	178
• Seasonal coefficient of performance moderate climate (brine) 35 °C/55 °C	SCOP	5.1/3.7	5.0/3.7	5.1/3.7	5.1/3.7	5.0/3.7
Max. performance data heating and cooling in acc. with EN 14511						
• Heat output B0W35	kW [1]	57.9	73.2	84.8	113.4	137.8
• Coefficient of performance B0W35	COP	4.63	4.6	4.63	4.62	4.61
• Heat output W10W35	kW	76.9	97.2	112.8	149.1	181.1
• Coefficient of performance W10W35	COP	6.07	5.87	5.91	5.73	5.79
• Cooling capacity B17W9	kW	64.7	86.2	107	138.1	156.9
• Energy efficiency ratio B17W9	EER	6.12	6.6	7.21	6.51	6.05
• Cooling capacity B25W18	kW	81.1	108.3	127.7	165	183.9
• Energy efficiency ratio B25W18	EER	6.44	6.71	6.95	6.31	6.04
Sound data according to EN 12102						
• Sound power level	dB(A)	57.2	55.7	57.2	64.2	64.2
Hydraulic data brine/water B0W35						
• Maximum flow temperature	°C	62	62	62	62	62
• Maximum operating pressure	bar	16	16	16	6	6
• Heating water spread	K	5	5	5	5	5
• Required volume flow	m^3/h	9.9	12.6	14.6	19.5	23.7
• Pressure drop, condenser	kPa	5.7	6.2	5.4	7.6	8.1
• Condenser connections	R (ext. thread)	2″	2“	2″	DN 80/PN 6	DN 80/PN 6
• Brine spread	K	3	4	4	4	5
• Required volume flow	m^3/h	14.8	14.0	16.3	20.9	21.1
• Pressure drop, evaporator	kPa	15.8	10.0	11.2	12.8	11.3
• Evaporator connections	R (ext. thread)	2″	2″	2″	DN 80/PN 6	DN 80/PN 6
Hydraulic data water/water W10/W35 (intermediate circuit)						
• Maximum flow temperature	°C	62	62	62	62	62
• Maximum operating pressure	bar	16	16	16	6	6
• Heating water spread	K	5	5	5	5	5
• Required volume flow	m^3/h	13.2	16.7	19.4	25.6	31.1
• Pressure drop, condenser	kPa	9.8	10.6	9.3	12.6	13.4
• Condenser connections	R (ext. thread)	2″	2″	2″	DN 80/PN 6	DN 80/PN 6
• Brine spread in intermediate circuit [2]	K	3	4	4	4	5
• Required volume flow GW	m^3/h	20.9	19.7	22.9	30.1	29.3
• Pressure drop, evaporator	kPa	28.3	17.2	19.8	22.8	18.6
• Evaporator connections	R (ext. thread)	2″	2″	2″	DN 80/PN 6	DN 80/PN 6
Refrigerating data						
• Refrigerant		R410A	R410A	R410A	R410A	R410A
• Refrigerant filling quantity	kg	2 x 6.0	2 x 7.4	2 x 8.2	2 x 10.0	2 x 10.7
• Compressor oil filling quantity	l	2 x 2.46	2 x 3.3	2 x 3.6	2 x 6.7	2 x 6.7
• Type of compressor oil		DAPHNE HERMETIC OIL FVC32D	Emkarate RL 32HB - 160SZ - 160Z	Emkarate RL 32HB - 160SZ - 160Z	Emkarate RL 32HB - 160SZ - 160Z	Emkarate RL 32HB - 160SZ - 160Z
Electrical data						
• Power supply	V	3+N~400 V/50 Hz				
• Max. power consumption (without pumps)	kW	24.8	30.4	34.6	46.6	56.6
• Max. operating current (without pumps)	A	45.6	51	58.2	75.6	93.2
• Max. starting current	A	85.3	100.5	114.1	160.3	186.6
• Main current fuse (on site)	A	C63	C63	C80	C100	C125
• Control current fuse (on site)	A	16	16	16	16	16
Dimensions/weight						
• Dimensions (H x W x D)	mm	1907 x 1066 x 774			1907 x 1316 x 774	
• Minimum size of the installation room (without ventilation)	m^3	27.2	33.6	37.3	45.5	48.6
• Weight	kg	560	620	700	770	820

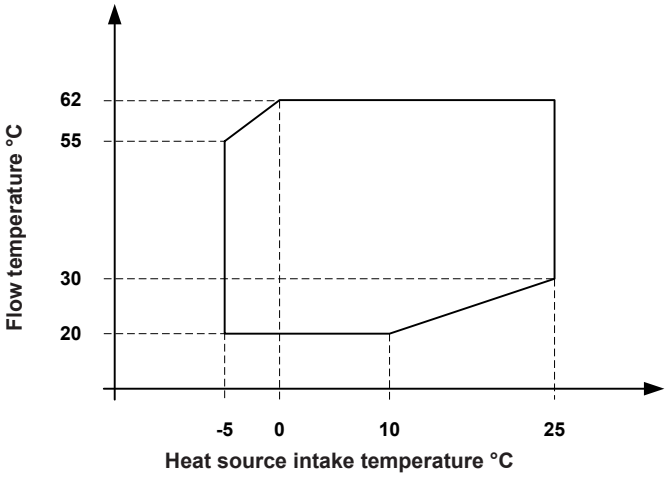
[1] kW = standard values according to EN 14511; values for B0W35 with 25 % monopolypropylene

[2] ΔT in accordance with regional regulations. The temperature difference is adjustable from 3 to 6 kelvin. The pump regulates the volumetric current to the set temperature difference.

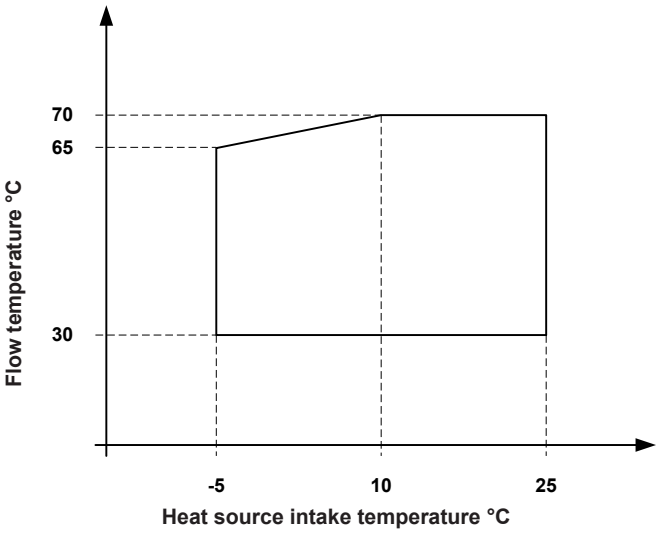
Diagrams of areas of application

Heating and hot water

Thermalia® dual (55-140), dual R (55-140)

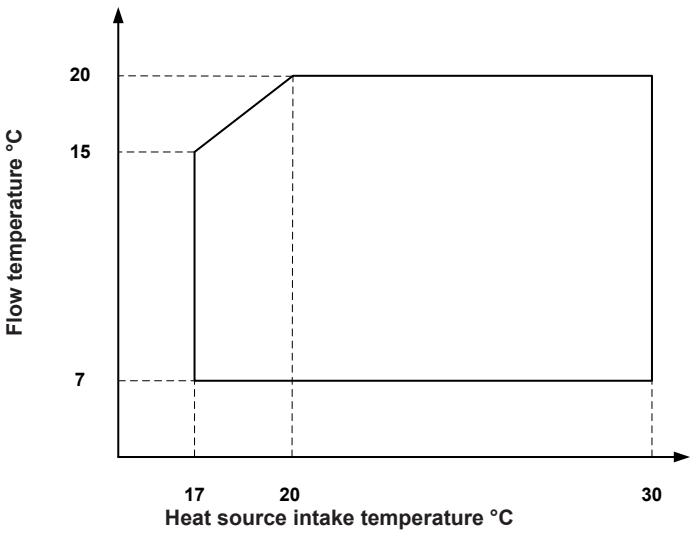


Thermalia® dual H (35-90)



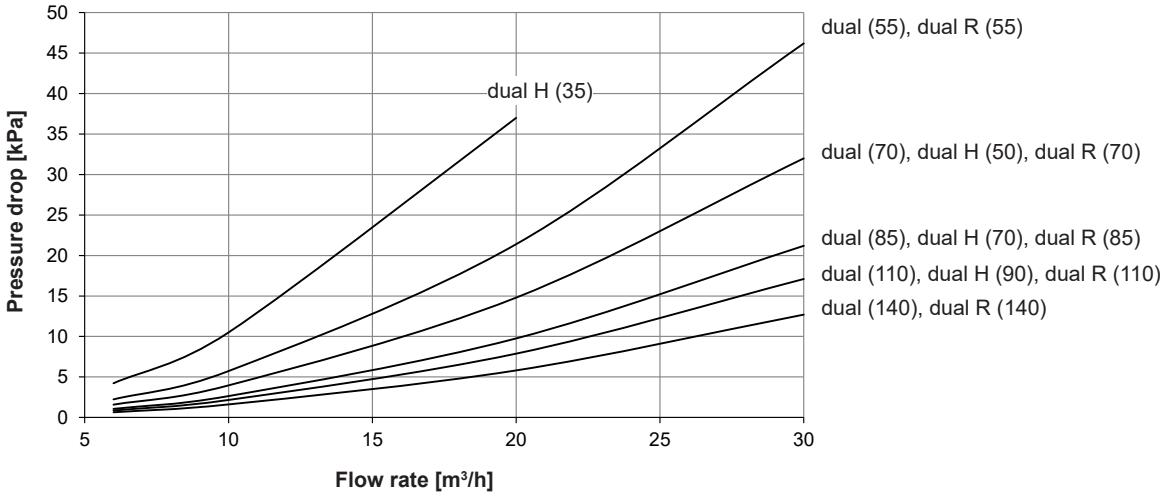
Cooling

Thermalia® dual R (55-140)



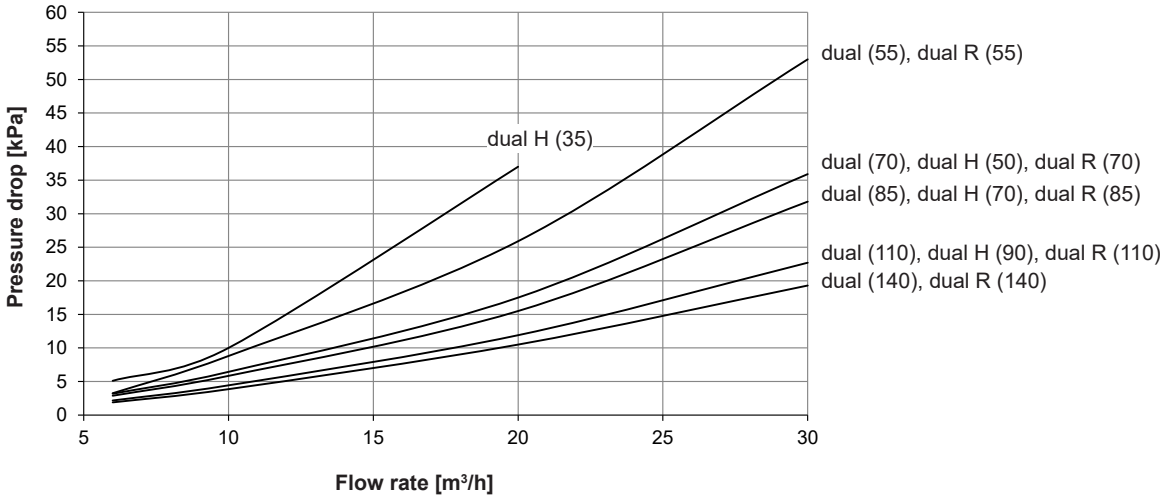
Heating

Pressure drop condenser
with water



Heat source

Pressure drop evaporator
with ethylene glycol 25 %
(antifrogen N)



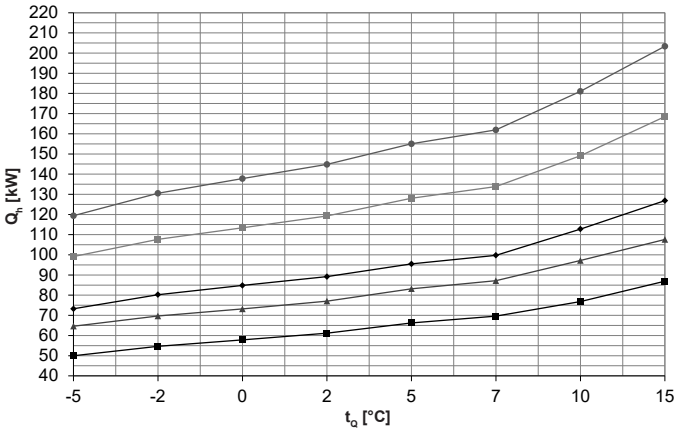
Performance data - heating

Maximum heat output

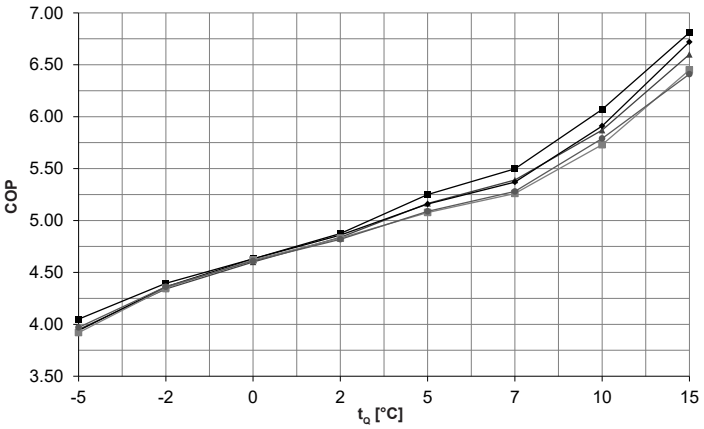
Thermalia® dual (55-140), dual R (55-140) with R410A

Data according to EN 14511

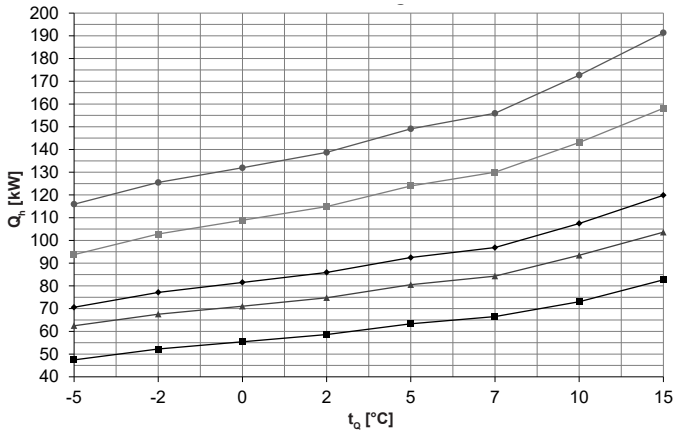
Heat output - t_{VL} 35 °C



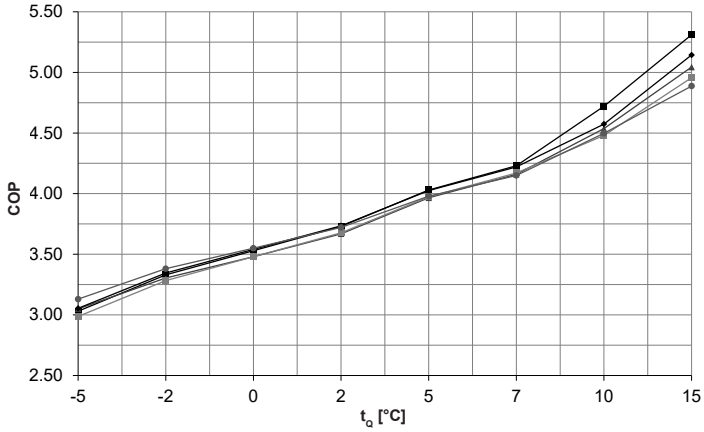
Coefficient of performance - t_{VL} 35 °C



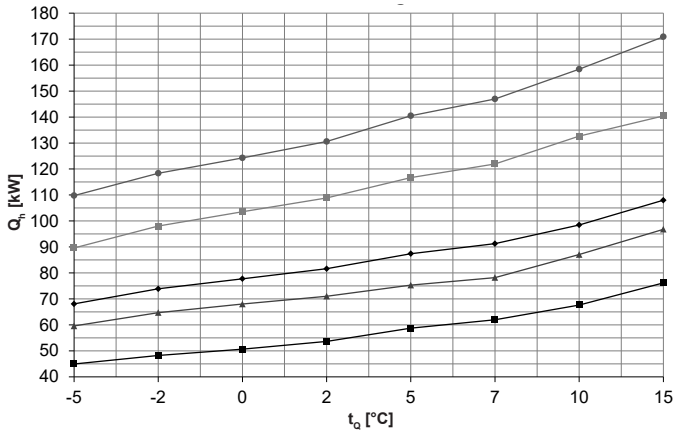
Heat output - t_{VL} 45 °C



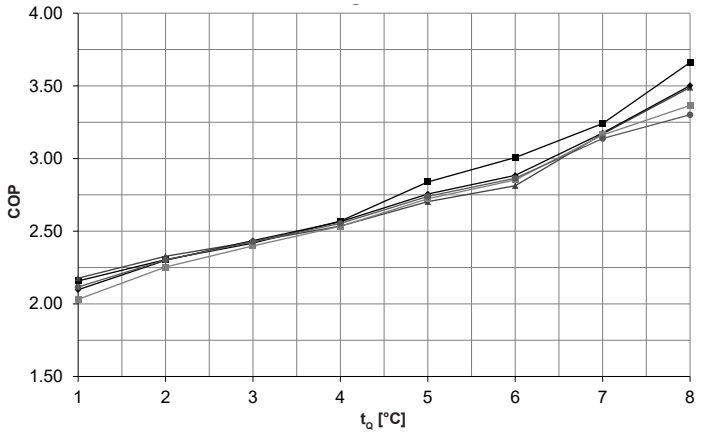
Coefficient of performance - t_{VL} 45 °C



Heat output - t_{VL} 62 °C



Coefficient of performance - t_{VL} 62 °C



t_{VL} = heating flow temperature (°C)
t_Q = source temperature (°C)
Q_h = heat output at full load (kW), measured in accordance with standard EN 14511
COP = Coefficient of Performance for the overall unit in accordance with standard EN 14511

- Thermalia® dual, dual R (55)
- Thermalia® dual, dual R (70)
- Thermalia® dual, dual R (85)
- Thermalia® dual, dual R (110)
- Thermalia® dual, dual R (140)

Performance data - heating

Thermalia® dual (55-140), dual R (55-140)

Data according to EN 14511

t_{VL} °C		t_Q °C	(55), R (55) Q_h kW	P kW	COP	(70), R (70) Q_h kW	P kW	COP	(85), R (85) Q_h kW	P kW	COP	(110), R (110) Q_h kW	P kW	COP	(140), R (140) Q_h kW	P kW	COP
30	Brine	-5	50.6	10.9	4.7	65.6	14.3	4.6	74.0	15.6	4.7	100.1	21.2	4.7	121.5	25.4	4.8
		-2	55.9	10.9	5.1	70.6	13.8	5.1	81.2	15.5	5.2	109.0	20.9	5.2	132.6	25.3	5.2
		0	59.3	11.0	5.4	74.1	13.6	5.5	86.0	15.5	5.6	115.0	20.8	5.5	139.9	25.4	5.5
		2	62.6	11.0	5.7	78.2	13.5	5.8	90.5	15.5	5.8	121.1	20.9	5.8	147.0	25.5	5.8
		5	67.6	11.2	6.1	84.9	13.7	6.2	97.1	15.7	6.2	130.3	21.5	6.1	157.5	26.0	6.1
		7	70.9	11.2	6.3	89.2	13.8	6.5	101.5	15.8	6.4	136.5	21.7	6.3	164.5	26.2	6.3
	Water	10	78.4	11.0	7.1	99.1	14.5	6.8	115.4	16.9	6.8	152.2	23.1	6.6	185.3	27.7	6.7
		15	88.8	11.2	7.9	109.6	14.2	7.7	130.3	16.7	7.8	173.7	23.2	7.5	209.4	28.0	7.5
35	Brine	-5	50.0	12.3	4.1	64.6	16.4	4.0	73.2	18.6	3.9	99.1	25.3	3.9	119.4	30.1	4.0
		-2	54.7	12.4	4.4	69.7	16.1	4.3	80.2	18.4	4.4	107.7	24.8	4.4	130.5	29.9	4.4
		0	57.9	12.5	4.6	73.2	15.9	4.6	84.8	18.3	4.6	113.4	24.6	4.6	137.8	29.9	4.6
		2	61.2	12.6	4.9	77.0	15.9	4.8	89.2	18.4	4.9	119.2	24.7	4.8	144.8	30.0	4.8
		5	66.3	12.6	5.3	83.2	16.1	5.2	95.5	18.5	5.2	128.0	25.2	5.1	155.0	30.5	5.1
		7	69.6	12.7	5.5	87.2	16.2	5.4	99.8	18.6	5.4	133.9	25.4	5.3	161.9	30.7	5.3
	Water	10	76.9	12.7	6.1	97.2	16.6	5.9	112.8	19.1	5.9	149.1	26.0	5.7	181.1	31.3	5.8
		15	86.9	12.8	6.8	107.6	16.3	6.6	126.8	18.9	6.7	168.5	26.1	6.5	203.4	31.7	6.4
40	Brine	-5	48.9	14.0	3.5	63.7	18.4	3.5	72.2	20.9	3.5	96.8	28.4	3.4	117.8	33.6	3.5
		-2	53.5	14.0	3.8	68.8	18.2	3.8	78.9	20.7	3.8	105.6	28.0	3.8	128.1	33.5	3.8
		0	56.6	14.1	4.0	72.2	18.1	4.0	83.4	20.6	4.1	111.4	27.8	4.0	135.0	33.4	4.0
		2	59.8	14.1	4.2	76.0	18.1	4.2	87.7	20.6	4.3	117.3	27.8	4.2	141.9	33.6	4.2
		5	64.8	14.1	4.6	81.9	18.1	4.5	94.1	20.7	4.5	126.1	28.2	4.5	152.2	33.9	4.5
		7	68.1	14.2	4.8	85.7	18.2	4.7	98.3	20.7	4.7	131.9	28.3	4.7	159.0	34.1	4.7
	Water	10	75.0	14.1	5.3	95.3	18.6	5.1	110.1	21.3	5.2	146.1	29.0	5.0	176.9	34.8	5.1
		15	84.8	14.2	6.0	105.6	18.4	5.7	123.4	21.1	5.9	163.3	29.0	5.6	197.4	35.4	5.6
45	Brine	-5	47.5	15.7	3.0	62.5	20.5	3.1	70.6	23.1	3.1	93.7	31.4	3.0	115.9	37.0	3.1
		-2	52.2	15.7	3.3	67.6	20.4	3.3	77.2	23.1	3.4	102.8	31.3	3.3	125.5	37.1	3.4
		0	55.4	15.7	3.5	71.1	20.4	3.5	81.5	23.0	3.5	108.9	31.3	3.5	132.0	37.2	3.6
		2	58.6	15.7	3.7	74.8	20.4	3.7	85.9	23.0	3.7	114.9	31.2	3.7	138.7	37.3	3.7
		5	63.3	15.7	4.0	80.5	20.3	4.0	92.5	23.0	4.0	124.0	31.2	4.0	149.1	37.5	4.0
		7	66.5	15.7	4.2	84.3	20.3	4.2	96.8	22.9	4.2	130.0	31.2	4.2	155.9	37.6	4.2
	Water	10	73.1	15.5	4.7	93.5	20.6	4.5	107.5	23.5	4.6	143.0	31.9	4.5	172.7	38.4	4.5
		15	82.7	15.6	5.3	103.6	20.5	5.0	119.9	23.3	5.1	158.1	31.9	5.0	191.3	39.2	4.9
50	Brine	-5	47.1	17.1	2.8	61.8	22.5	2.8	70.3	26.1	2.7	93.5	35.5	2.6	114.2	41.9	2.7
		-2	51.1	17.2	3.0	66.9	22.5	3.0	76.6	25.9	3.0	102.2	35.0	2.9	123.7	41.6	3.0
		0	53.9	17.2	3.1	70.3	22.6	3.1	80.8	25.8	3.1	107.9	34.8	3.1	130.1	41.5	3.1
		2	57.0	17.2	3.3	73.7	22.6	3.3	84.9	25.7	3.3	113.5	34.7	3.3	136.8	41.6	3.3
		5	62.1	17.1	3.6	78.9	22.6	3.5	91.0	25.7	3.5	121.8	34.8	3.5	146.9	41.8	3.5
		7	65.3	17.1	3.8	82.3	22.5	3.7	95.1	25.7	3.7	127.4	34.9	3.7	153.6	41.9	3.7
	Water	10	71.7	17.2	4.2	91.6	22.6	4.1	104.8	25.7	4.1	140.0	34.9	4.0	168.5	42.0	4.0
		15	80.9	17.2	4.7	101.6	22.7	4.5	116.4	25.5	4.6	152.9	34.8	4.4	185.3	42.9	4.3
55	Brine	-5	46.5	18.6	2.5	62.1	24.2	2.6	70.5	28.3	2.5	92.8	38.5	2.4	113.7	45.5	2.5
		-2	49.9	18.7	2.7	66.8	24.2	2.8	76.6	27.7	2.8	101.7	37.4	2.7	122.0	44.4	2.8
		0	52.5	18.7	2.8	70.0	24.1	2.9	80.6	27.4	2.9	107.4	36.8	2.9	127.8	43.9	2.9
		2	55.5	18.7	3.0	73.2	24.1	3.0	84.4	27.3	3.1	112.8	36.7	3.1	134.2	43.9	3.1
		5	60.7	18.6	3.3	77.9	24.1	3.2	90.1	27.3	3.3	120.5	37.0	3.3	144.5	44.3	3.3
		7	64.0	18.5	3.5	81.1	24.1	3.4	93.9	27.3	3.4	125.7	37.1	3.4	151.2	44.5	3.4
	Water	10	70.2	18.8	3.7	89.7	24.6	3.6	102.2	27.9	3.7	136.9	37.8	3.6	164.3	45.5	3.6
		15	79.0	18.8	4.2	99.6	24.8	4.0	112.9	27.7	4.1	147.7	37.7	3.9	179.3	46.6	3.9
62	Brine	-5	45.0	20.8	2.2	59.6	27.4	2.2	68.1	32.5	2.1	89.6	44.1	2.0	109.8	51.9	2.1
		-2	48.2	20.9	2.3	64.7	27.8	2.3	73.9	32.1	2.3	98.0	43.5	2.3	118.4	51.4	2.3
		0	50.7	20.9	2.4	68.0	28.0	2.4	77.8	31.9	2.4	103.6	43.2	2.4	124.3	51.2	2.4
		2	53.7	20.9	2.6	71.0	28.0	2.5	81.6	31.8	2.6	108.9	43.0	2.5	130.6	51.2	2.6
		5	58.7	20.7	2.8	75.3	27.9	2.7	87.4	31.7	2.8	116.7	42.8	2.7	140.5	51.3	2.7
		7	62.0	20.6	3.0	78.2	27.8	2.8	91.3	31.6	2.9	121.9	42.7	2.9	147.0	51.3	2.9
	Water	10	67.6	20.9	3.2	87.1	27.5	3.2	98.5	31.0	3.2	132.7	42.0	3.2	158.4	50.5	3.1
		15	76.2	20.8	3.7	96.8	27.7	3.5	108.0	30.8	3.5	140.4	41.7	3.4	170.9	51.8	3.3

t_{VL} = heating flow temperature (°C)
t_Q = source temperature (°C)
Q_h = heat output at full load (kW), measured in accordance with standard EN 14511
P = power consumption of the overall unit (kW)
COP = Coefficient of Performance for the overall unit in accordance with standard EN 14511

Observe daily power interruptions!
see “Engineering heat pumps general”

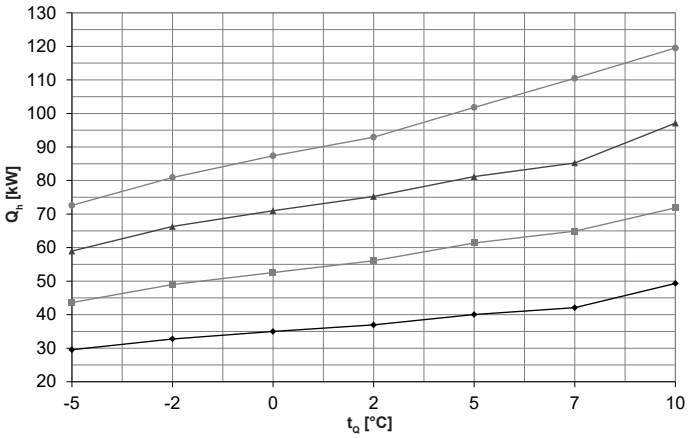
Performance data - heating

Maximum heat output

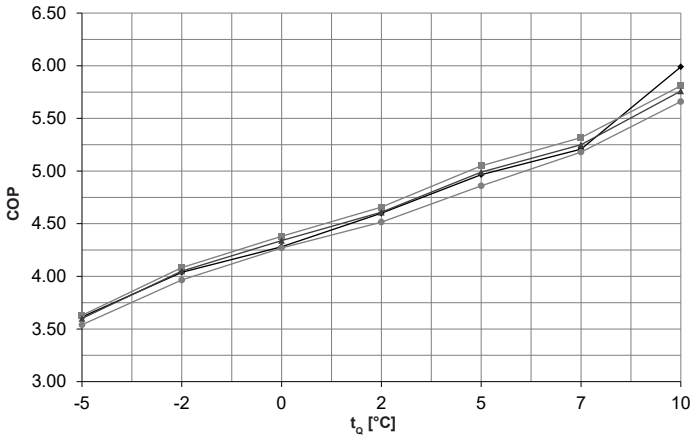
Thermalia® dual H (35-90) with R134a

Data according to EN 14511

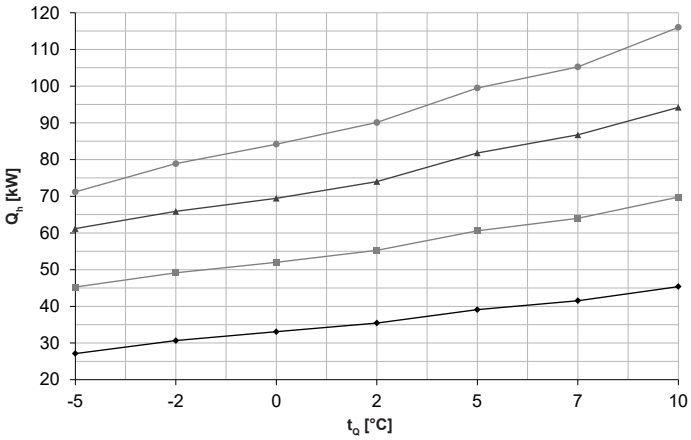
Heat output - t_{VL} 35 °C



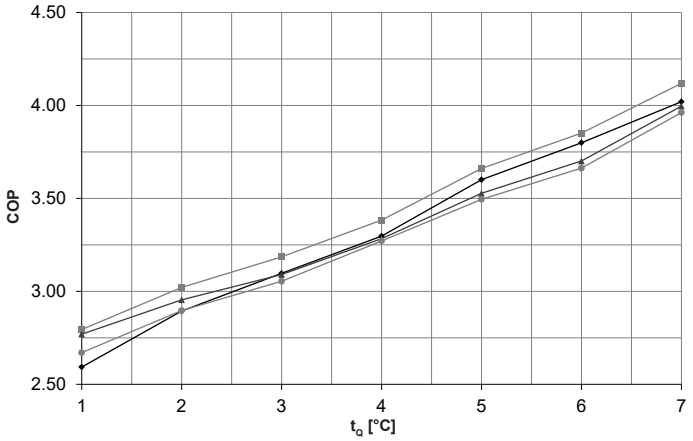
Coefficient of performance - t_{VL} 35 °C



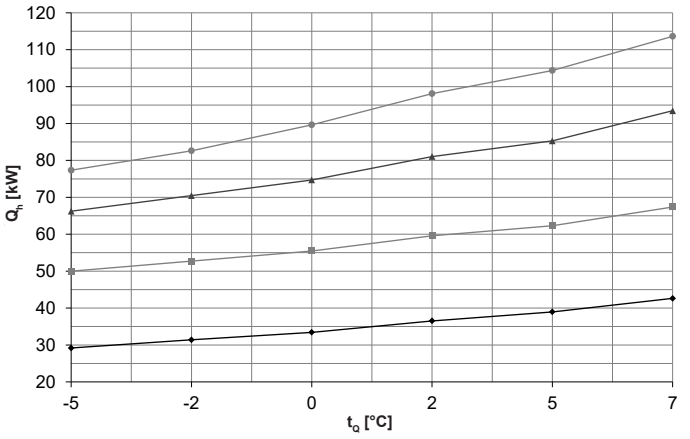
Heat output - t_{VL} 50 °C



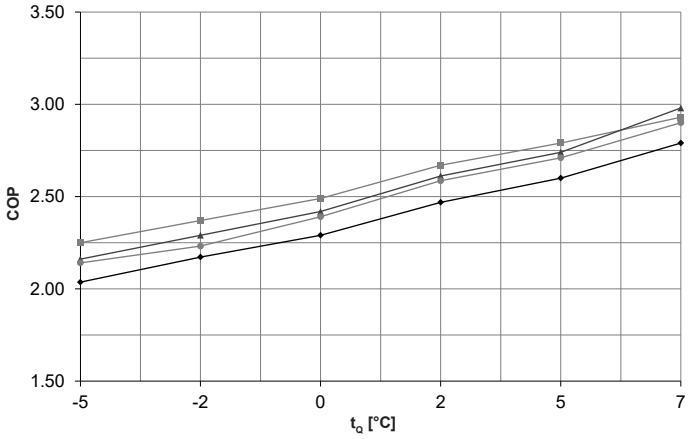
Coefficient of performance - t_{VL} 50 °C



Heat output - t_{VL} 65 °C



Coefficient of performance - t_{VL} 65 °C



t_{VL} = heating flow temperature (°C)
t_Q = source temperature (°C)
Q_h = heat output at full load (kW), measured in accordance with standard EN 14511
COP = Coefficient of Performance for the overall unit in accordance with standard EN 14511

- Thermalia® dual H (35)
- Thermalia® dual H (50)
- Thermalia® dual H (70)
- Thermalia® dual H (90)

Performance data - heating

Thermalia® dual H (35-90)

Data according to EN 14511

t_{VL} °C		t_Q °C	H (35) Q_h kW	H (35) P kW	H (35) COP	H (50) Q_h kW	H (50) P kW	H (50) COP	H (70) Q_h kW	H (70) P kW	H (70) COP	H (90) Q_h kW	H (90) P kW	H (90) COP
35	Brine	-5	29.5	8.2	3.6	43.6	12.0	3.6	59.0	16.4	3.6	72.6	20.5	3.5
		-2	32.8	8.1	4.0	49.0	12.0	4.1	66.3	16.4	4.1	80.9	20.4	4.0
		0	35.0	8.1	4.3	52.5	12.0	4.4	71.0	16.4	4.3	87.4	20.3	4.3
		2	37.0	8.0	4.6	56.1	12.0	4.7	75.2	16.3	4.6	92.9	20.6	4.5
		5	40.0	8.1	5.0	61.4	12.2	5.1	81.2	16.3	5.0	101.8	20.9	4.9
		7	42.1	8.1	5.2	64.9	12.2	5.3	85.2	16.2	5.3	110.5	21.3	5.2
	Water	10	49.3	8.2	6.0	71.8	12.4	5.8	97.1	16.9	5.8	119.5	21.1	5.7
40	Brine	-5	28.7	9.0	3.2	44.4	13.2	3.4	60.0	18.0	3.3	71.9	22.4	3.2
		-2	32.1	9.1	3.5	49.1	13.2	3.7	66.1	18.0	3.7	80.2	22.4	3.6
		0	34.5	9.1	3.8	52.4	13.3	4.0	70.2	18.1	3.9	86.1	22.5	3.8
		2	36.7	9.0	4.1	55.8	13.3	4.2	74.6	18.1	4.1	91.7	22.4	4.1
		5	40.1	9.0	4.4	61.0	13.5	4.5	81.4	18.5	4.4	100.4	23.3	4.3
		7	42.4	9.1	4.7	64.5	13.5	4.8	85.9	18.6	4.6	107.2	23.6	4.5
	Water	10	47.5	9.2	5.2	71.2	13.7	5.2	95.8	19.0	5.0	118.1	23.7	5.0
45	Brine	-5	27.8	9.7	2.9	45.1	14.6	3.1	61.0	19.9	3.1	71.4	24.4	2.9
		-2	31.5	9.8	3.2	49.7	14.7	3.4	66.0	19.9	3.3	79.5	24.7	3.2
		0	33.9	9.9	3.4	52.8	14.7	3.6	69.7	19.9	3.5	85.0	24.9	3.4
		2	36.4	9.9	3.7	55.8	14.8	3.8	74.0	20.2	3.7	90.8	25.3	3.6
		5	40.1	10.2	3.9	60.3	14.9	4.0	81.2	20.9	3.9	99.6	25.8	3.9
		7	42.6	10.3	4.1	63.3	15.0	4.2	85.8	21.2	4.0	105.5	26.1	4.0
	Water	10	46.6	10.2	4.6	70.4	15.3	4.6	94.6	21.4	4.4	116.9	26.4	4.4
50	Brine	-5	27.1	10.5	2.6	45.3	16.2	2.8	61.2	22.1	2.8	71.2	26.7	2.7
		-2	30.7	10.6	2.9	49.1	16.3	3.0	65.9	22.3	3.0	78.9	27.2	2.9
		0	33.1	10.7	3.1	52.0	16.3	3.2	69.5	22.5	3.1	84.2	27.6	3.1
		2	35.5	10.8	3.3	55.2	16.3	3.4	74.0	22.5	3.3	90.1	27.5	3.3
		5	39.1	10.9	3.6	60.6	16.5	3.7	81.8	23.2	3.5	99.5	28.5	3.5
		7	41.5	10.9	3.8	64.0	16.6	3.9	86.7	23.4	3.7	105.3	28.7	3.7
	Water	10	45.4	11.3	4.0	69.8	16.9	4.1	94.2	23.6	4.0	116.0	29.3	4.0
55	Brine	-5	26.4	11.5	2.3	45.1	18.0	2.5	61.0	24.5	2.5	71.2	29.1	2.5
		-2	29.9	11.7	2.6	48.6	18.0	2.7	65.8	25.0	2.6	78.3	30.0	2.6
		0	32.2	11.8	2.7	51.3	18.1	2.8	69.5	25.3	2.8	83.5	30.5	2.7
		2	34.5	11.9	2.9	54.8	18.2	3.0	74.2	25.5	2.9	89.7	30.9	2.9
		5	38.1	12.0	3.2	60.8	18.3	3.3	82.2	25.6	3.2	99.9	31.3	3.2
		7	40.4	12.1	3.4	64.6	18.4	3.5	87.3	25.7	3.4	106.5	31.5	3.4
	Water	10	44.8	12.5	3.6	69.0	18.8	3.7	94.1	25.9	3.6	115.4	32.2	3.6
65	Brine	-5	-	-	-	-	-	-	-	-	-	-	-	-
		-2	29.2	14.3	2.0	50.0	22.2	2.3	66.2	30.6	2.2	77.3	36.1	2.1
		0	31.4	14.5	2.2	52.7	22.2	2.4	70.5	30.8	2.3	82.6	37.0	2.2
		2	33.4	14.6	2.3	55.5	22.3	2.5	74.7	30.9	2.4	89.6	37.5	2.4
		5	36.5	14.8	2.5	59.6	22.3	2.7	81.0	31.0	2.6	98.1	37.9	2.6
		7	39.0	15.0	2.6	62.3	22.3	2.8	85.3	31.1	2.7	104.4	38.5	2.7
	Water	10	42.6	15.3	2.8	67.4	23.0	2.9	93.5	31.4	3.0	113.6	39.2	2.9
67	Water	13	46.3	15.0	3.1	73.2	22.5	3.2	100.5	31.3	3.2	122.9	38.5	3.2
		15	48.4	4.9	3.2	76.5	22.4	3.4	105.0	31.2	3.4	128.9	38.5	3.3

t_{VL} = heating flow temperature (°C)
t_Q = source temperature (°C)
Q_h = heat output at full load (kW), measured in accordance with standard EN 14511
P = power consumption of the overall unit (kW)
COP = Coefficient of Performance for the overall unit in accordance with standard EN 14511

Observe daily power interruptions!
see “Engineering heat pumps general”

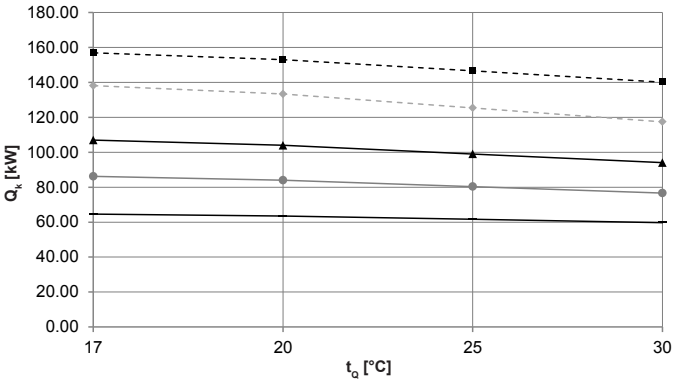
Performance data – cooling

Maximum cooling capacity

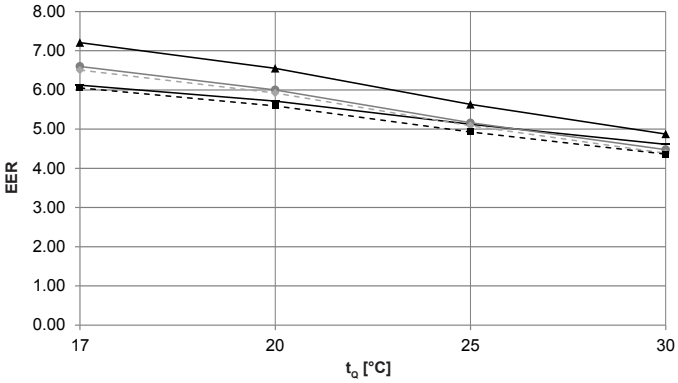
Thermalia® dual R (55-140) with R410A

Data according to EN 14511

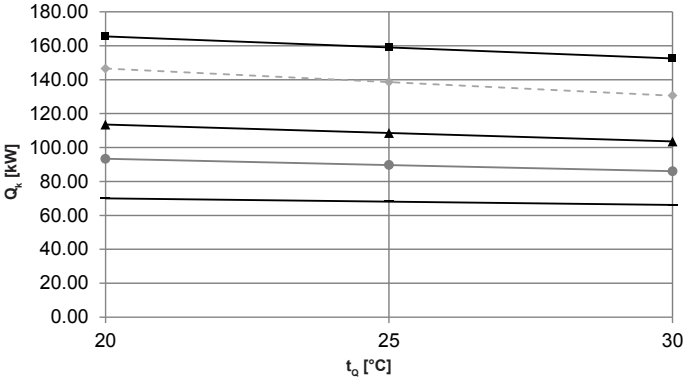
Cooling capacity - t_{VL} 9 °C



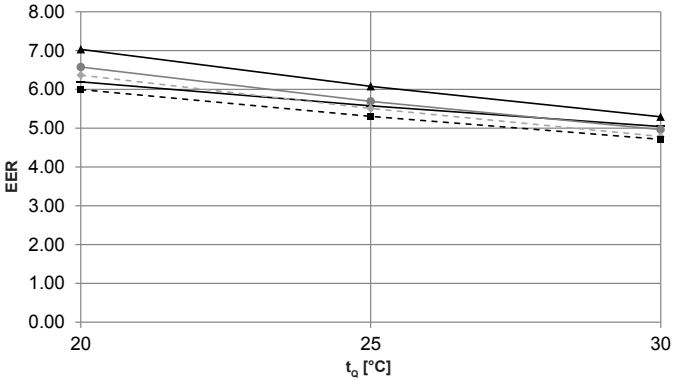
Energy efficiency ratio - t_{VL} 9 °C



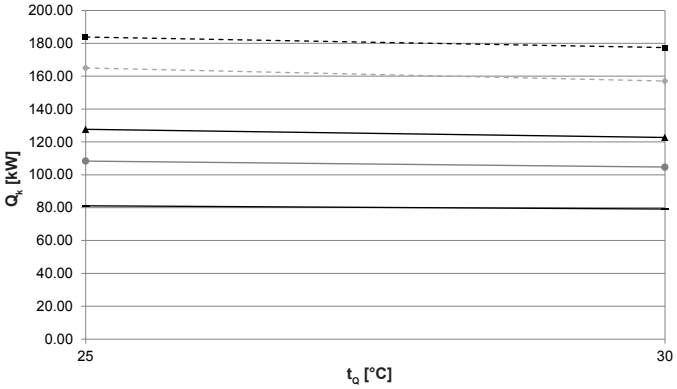
Cooling capacity - t_{VL} 12 °C



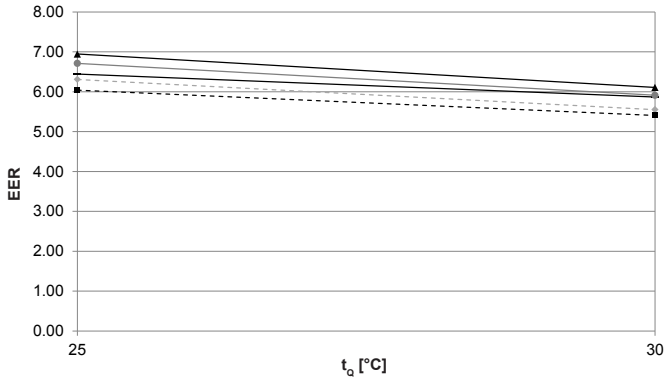
Energy efficiency ratio - t_{VL} 12 °C



Cooling capacity - t_{VL} 18 °C



Energy efficiency ratio - t_{VL} 18 °C



t_{VL} = cooling water flow temperature (°C)
t_Q = source temperature (°C)
Q_k = cooling capacity (kW), measured in accordance with standard EN 14511
EER = Energy Efficiency Ratio for the overall unit in accordance with standard EN 14511

- Thermalia® dual R (55)
- Thermalia® dual R (70)
- Thermalia® dual R (85)
- Thermalia® dual R (110)
- Thermalia® dual R (140)

Performance data – cooling

Thermalia® dual R (55-140)
Data according to EN 14511

t_{VL} °C	Heat source Medium t1	t_Q °C	R (55) Q_k kW	P kW	EER	R (70) Q_k kW	P kW	EER	R (85) Q_k kW	P kW	EER	R (110) Q_k kW	P kW	EER	R (140) Q_k kW	P kW	EER
9	Brine (Sole)	17	64.7	10.6	6.1	86.2	13.1	6.6	107.0	14.8	7.2	138.1	21.2	6.5	156.9	25.9	6.1
		20	63.5	11.1	5.7	84.0	14.0	6.0	104.0	15.9	6.6	133.3	22.5	5.9	153.0	27.4	5.6
		25	61.6	12.0	5.1	80.3	15.6	5.2	99.0	17.6	5.6	125.4	24.7	5.1	146.6	29.7	4.9
		30	59.7	12.9	4.6	76.7	17.1	4.5	94.0	19.3	4.9	117.4	26.8	4.4	140.1	32.1	4.4
12	Brine (Sole)	20	70.0	11.3	6.2	93.3	14.2	6.6	113.6	16.1	7.0	146.5	23.0	6.4	165.5	27.6	6.0
		25	68.1	12.2	5.6	89.7	15.8	5.7	108.6	17.9	6.1	138.6	25.2	5.5	159.0	30.0	5.3
		30	66.2	13.1	5.0	86.0	17.3	5.0	103.6	19.6	5.3	130.6	27.3	4.8	152.5	32.4	4.7
15	Brine (Sole)	25	74.6	12.4	6.0	99.0	16.0	6.2	118.2	18.1	6.5	151.8	25.7	5.9	171.4	30.2	5.7
		30	72.7	13.3	5.5	95.3	17.5	5.4	113.2	19.8	5.7	143.8	27.8	5.2	165.0	32.6	5.1
18	Brine (Sole)	25	81.1	12.6	6.4	108.3	16.2	6.7	127.7	18.4	7.0	165.0	26.2	6.3	183.9	30.4	6.0
		30	79.2	13.5	5.9	104.7	17.7	5.9	122.7	20.1	6.1	157.0	28.3	5.6	177.4	32.8	5.4

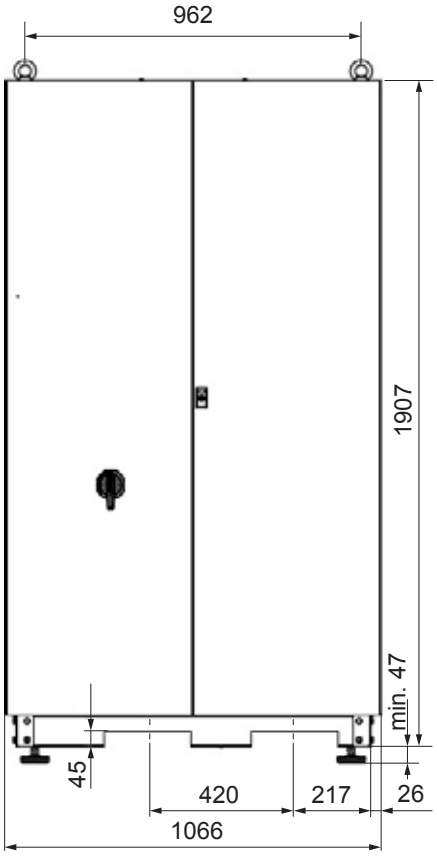
t_{VL} = cooling water flow temperature (°C)
t_Q = source temperature (°C)
Q_k = cooling capacity (kW), measured in accordance with standard EN 14511
P = power consumption of the overall unit (kW) incl. high-efficiency pump, measured in accordance with EN 14511
EER = Energy Efficiency Ratio for the overall unit in accordance with standard EN 14511

Observe daily power interruptions!
see “Engineering heat pumps general”

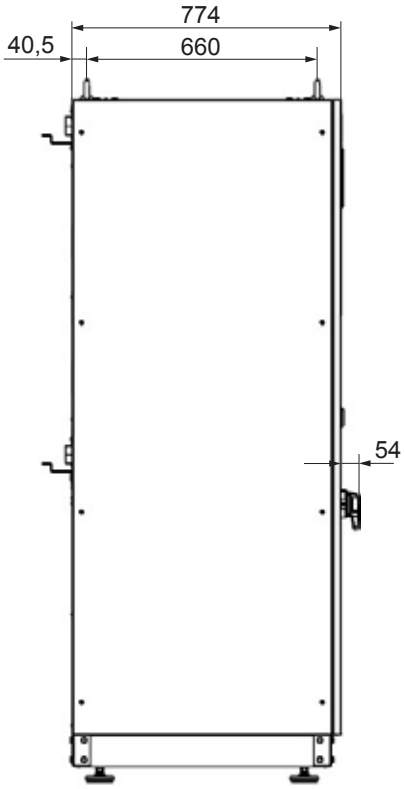
Thermalia® dual (55-85), dual H (35), dual R (55-85)

(Dimensions in mm)

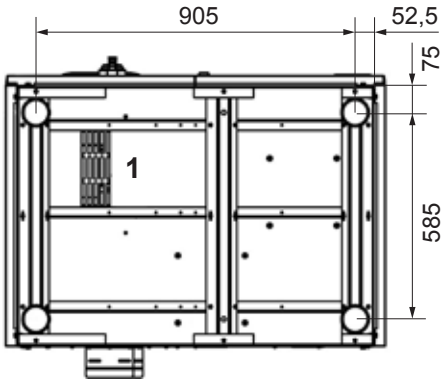
Front view



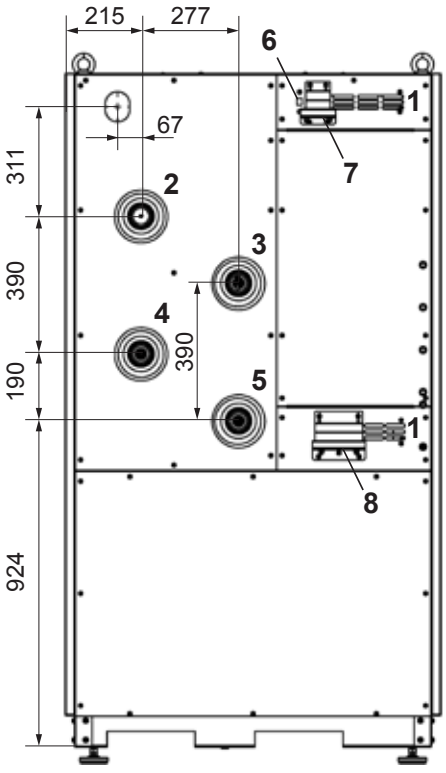
Side view



View from below



Rear view

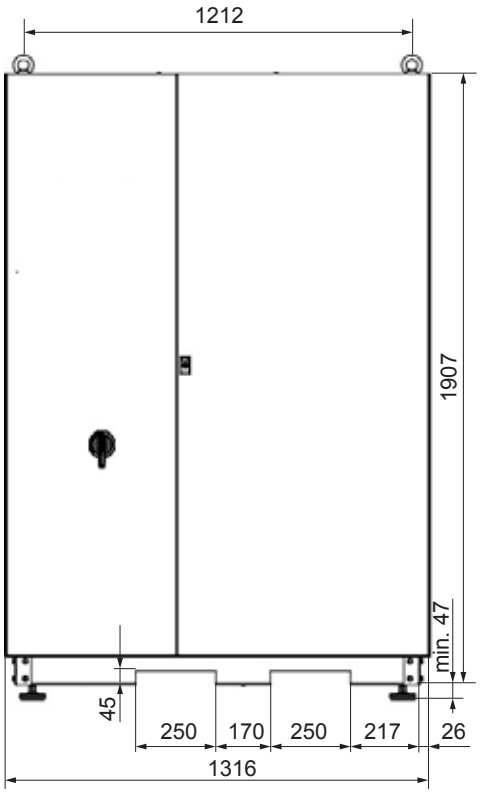


1 Vent opening
2 Flow heating or storage tank Rp 2″
3 Heat source inlet into the heat pump Rp 2″
4 Return heating or storage tank Rp 2″
5 Heat source outlet from the heat pump Rp 2″
6 LAN interface
7 Cable feedthrough for sensors and actuators
8 Cable feedthrough for the mains supply and connection to the main circuit

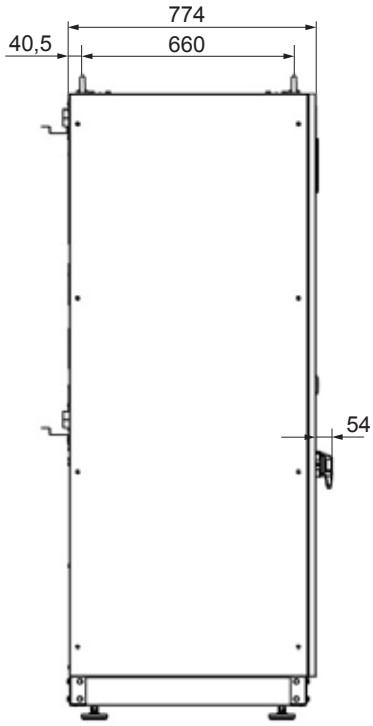
Adjustable feet with M12 thread

Thermalia® dual (110-140), dual H (50-90), dual R (110-140)
(Dimensions in mm)

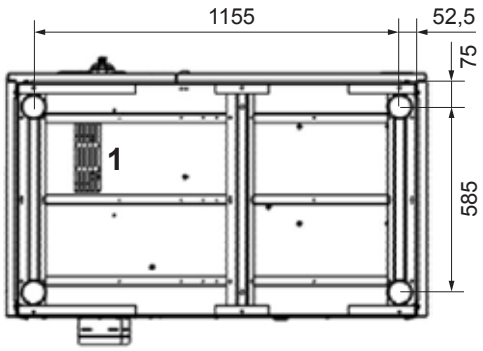
Front view



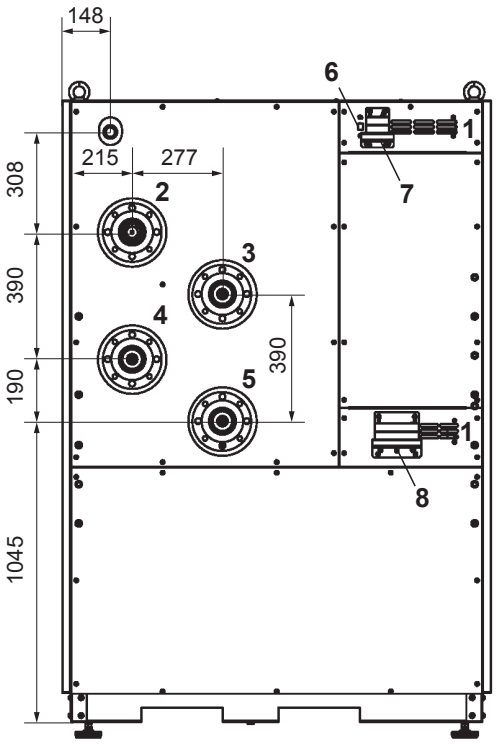
Side view



View from below



Rear view



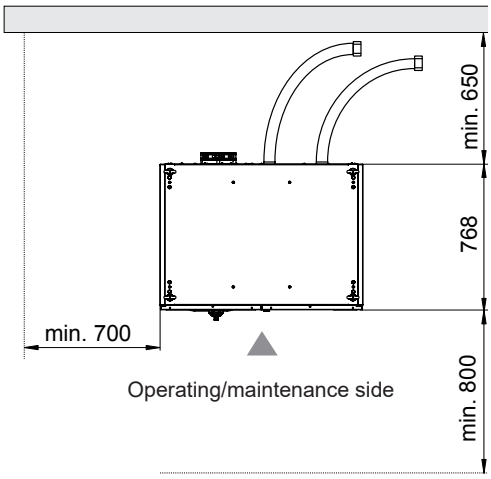
1 Vent opening
2 Flow heating or storage tank
Thermalia® dual H (50,70) Rp 2″
Thermalia® dual, dual R (110,140), dual H (90) flange DN 80/PN 6
3 Heat source inlet into the heat pump
Thermalia® dual H (50,70) Rp 2″
Thermalia® dual, dual R (110,140), dual H (90) flange DN 80/PN 6
4 Return heating or storage tank
Thermalia® dual H (50,70) Rp 2″
Thermalia® dual, dual R (110,140), dual H (90) flange DN 80/PN 6
5 Heat source outlet from the heat pump
Thermalia® dual H (50,70) Rp 2″
Thermalia® dual, dual R (110,140), dual H (90) flange DN 80/PN 6
6 LAN interface
7 Cable feedthrough for sensors and actuators
8 Cable feedthrough
for the mains supply and connection to the main circuit

Adjustable feet with M12 thread

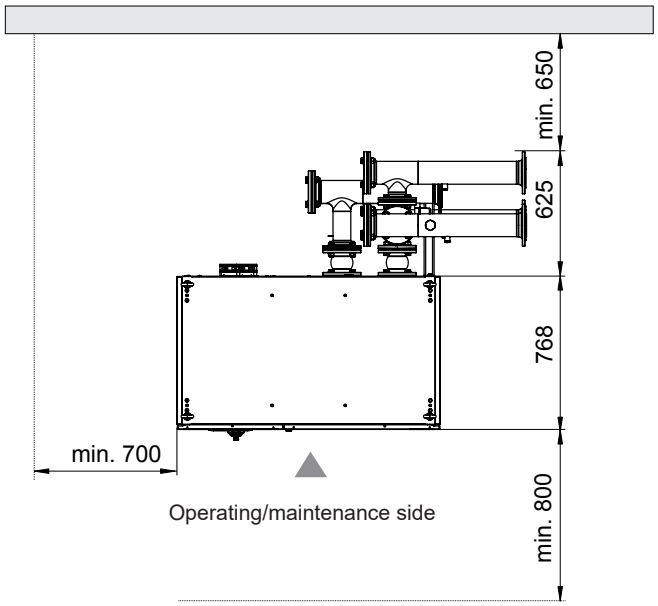
Space requirement

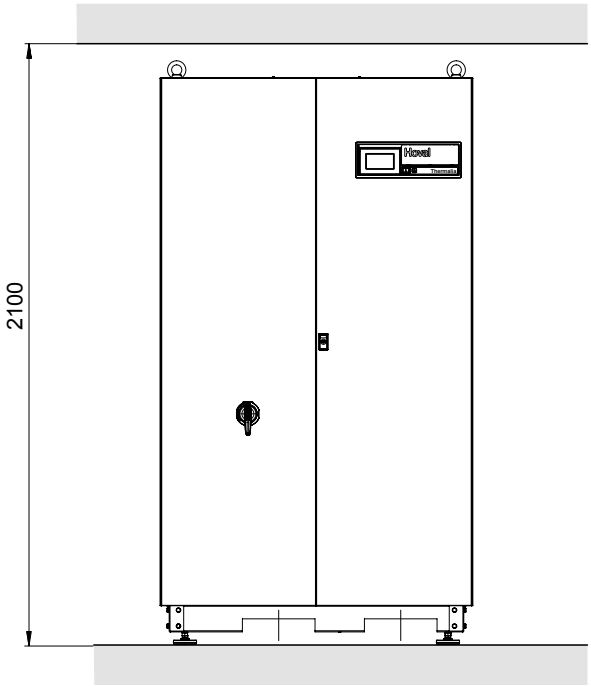
Required wall clearance for operation and maintenance
(Dimensions in mm)

Thermalia® dual (55-85), dual H (35-70), dual R (55-85)



Thermalia® dual (110-140), dual H (90), dual R (110-140)





**Looking for the appropriate hydraulic schematic?
Please contact your local Hoval partner.**

Plate heat exchanger passive cooling Danfoss

- Plate heat exchanger with the new Micro Plate™ technology
- A new plate embossing that can transfer heat more efficiently, with lower pressure drop and longer service life
- Heat exchanger brazed with copper solder under vacuum for heating and cooling applications with approval according to the Pressure Equipment Directive 97/23/EC
- Operating pressure: max. 25 bar
- Min./max. temperature: -10/180 °C
- Suitable for circulation water/water containing glycol with up to 50 % glycol proportion, ethylene glycol/propylene glycol-water mixtures, ethanol-water solutions and other suitable heat transfer fluids
- Connection type: cylindrical external thread according to DIN ISO 228/1
- Plates made of stainless steel, material number 1.4404

Plate heat exchanger passive cooling

Heat pump	Type	Connection (inch)	Pressure loss (kPa)		Flow rate (m³/h)		Cooling capacity (kW)	Part No.
			Primary	secondary	Primary	secondary		
UltraSource®								
T (8)	XB06L-1-20	G ¾″	17	14	1.52	1.34	7.8	2080 140
T (13)	XB06L-1-36	G ¾″	18	14	2.58	2.29	13.3	2080 143
T (17)	XB06L-1-50	G ¾″	19	15	3.42	3.03	17.6	2080 144
Thermalia®								
comfort (8)	XB06L-1-20	G ¾″	16	13	1.48	1.31	7.6	2080 140
comfort (10)	XB06L-1-26	G ¾″	19	15	2.10	1.83	10.6	2080 141
comfort (13)	XB06L-1-36	G ¾″	18	14	2.60	2.30	13.4	2080 143
comfort (17)	XB06L-1-50	G ¾″	18	15	3.34	2.96	17.2	2080 144
comfort H (7)	XB06L-1-16	G ¾″	17	15	1.26	1.12	6.5	2080 139
comfort H (10)	XB06L-1-26	G ¾″	14	12	1.77	1.57	9.1	2080 141
twin (20)	XB12L-1-36	G 1¼″	18	15	3.96	3.03	20.4	2080 148
twin (26)	XB12L-1-50	G 1¼″	16	13	5.09	3.52	26.2	2080 149
twin (36)	XB12L-1-70	G 1¼″	16	13	6.86	4.51	35.3	2080 150
twin (42)	XB12L-1-80	G 1¼″	18	14	8.16	6.08	42.0	2080 151
twin H (13)	XB06L-1-30	G ¾″	20	16	2.39	2.12	12.3	2080 142
twin H (19)	XB12L-1-30	G 1¼″	19	15	3.50	3.10	18.0	2080 147
twin H (22)	XB12L-1-36	G 1¼″	19	15	4.06	3.60	20.9	2080 148
dual (55)	XB61L-SB-1-50	G 2″	15	13	11.25	9.98	57.9	2080 136
dual (70)	XB61L-SB-1-60	G 2″	19	15	14.22	12.61	73.2	2080 137
dual (85)	XB61L-SB-1-80	G 2″	17	14	16.47	14.61	84.8	2080 138
dual (110)	XB52M-1-110	G 2″	19	14	22.03	19.54	113.4	2080 145
dual (140)	XB52M-1-140	G 2″	19	14	26.76	23.74	137.8	2080 146
dual H (35)	XB12L-1-70	G 1¼″	16	12	6.78	6.01	34.9	2080 150
dual H (50)	XB61L-SB-1-40	G 2″	18	15	10.20	9.05	52.5	2080 135
dual H (70)	XB61L-SB-1-60	G 2″	17	14	13.77	12.22	70.9	2080 137
dual H (90)	XB61L-SB-1-80	G 2″	18	15	16.96	15.04	87.3	2080 138

Primary circuit source T_{in} 11 °C / T_{out} 16 °C
Secondary circuit heating T_{in} 23 °C / T_{out} 18 °C
Brazing material: copper (Cu)

Notice:
For further technical details on the heat exchangers, see “Various system components”.

Plate heat exchanger for system separation Danfoss

- Stainless steel plate heat exchanger without seals, brazed with stainless steel (StS) or copper (Cu) under vacuum to form a compact unit
- New type of Micro Plate$_{TM}$ heat exchanger technology with unique plate structure for more effective heat transfer, lower pressure drops and longer service life
- Thick-walled, flat-sealing threaded connections or flange connections
- Design resistant to corrosion
- Calculation and materials according to the AD information sheets
- Produced according to DIN ISO 9001, CE-tested according to the Pressure Equipment Directive 97/23/EG (PED)
  - Energy and cost savings through unique Micro Plate™ MPHE design
  - Reduced pressure drop due to optimised flow distribution
  - Improved heat transfer due to uniformly high flow velocity over the entire transfer surface
  - Longer service life
  - Design resistant to corrosion
  - Compact design
- Operating pressure side 1: max. 16 bar
- Operating pressure side 2: max. 16 bar
- Min./max. temperature: -10/180 °C
- Plate material: EN 1.4404 (AISI 316L)
- Brazing material: stainless steel
- Approval/certification: PED art. 4.3
- Connections: cylindrical external thread according to DIN ISO 228/1

Plate heat exchanger for system separation Sondex

- SONDEX® plate heat exchanger screwed
- Consisting of profiled heat exchanger plates, clamped together by clamping bolts between stand and pressure plate and secured on upper and lower carrying rod
- With additional support profile for correct installation and removal of the mobile pressure plate and the plate pack
- With exclusive use of seals without adhesive in the SONDER LOCK or HANG ON process (simple seal change on site)
- Steel frame, primer-coated and painted blue (RAL 5010)
- Produced according to the DS/EN ISO 9001:2000 quality assurance system and according to the Pressure Equipment Directive 2014/68/EU (PED)
- Pressure test and leak test with works certificate included
- Operating pressure: max. 10 bar
- Operating temperature: 90 °C
- Plate material: 0.5 mm AISI 316
- Sealing material: NITRIL HT HANG ON (H)
- Including: Support for screwed plate heat exchanger, as stable foot construction

Plate heat exchanger for system separation heating side Danfoss

Heat pump	Type	Connection (inch)	Pressure loss (kPa)		Flow rate (m³/h)		Cooling capacity (kW)	Part No.
			Primary	secondary	Primary	secondary		
Belaria®								
pro (8)	XB12L-1-20	G 1¼"	9.2	6.4	1.4	1.3	8.3	2080 152
pro (13)	XB12L-1-20	G 1¼"	19.0	13.2	2.0	2.0	11.8	2080 152
pro (15)	XB12L-1-26	G 1¼"	16.5	12.0	2.6	2.5	14.5	2080 153
pro (24)	XB12L-1-36	G 1¼"	20.0	15.0	4.0	3.8	24.0	2080 148

Primary circuit: source T_{in} 45 °C / T_{out} 40 °C
Secondary circuit: heating T_{in} 35 °C / T_{out} 30 °C
Brazing material: copper (Cu)

Plate heat exchanger for system separation ground water Sondex

Heat pump	Type	Pressure loss (kPa)		Flow rate (m³/h)		Cooling capacity (kW)	Part No.
		Primary	secondary	Primary	secondary		
UltraSource®							
T (8)	S8A-IT10-18-TL	20	13	2.4	1.8	8.2	2080 181
T (13)	S8A-IT10-22-TL	20	16	3.2	2.4	11.0	2080 182
T (17)	S8A-IT10-36-TL	19	14	5.2	3.9	18.0	2080 183
Thermalia®							
comfort (8)	S8A-IT10-18-TL	19	12	2.3	1.7	8.0	2080 181
comfort (10)	S8A-IT10-22-TL	18	14	3.0	2.3	10.6	2080 182
comfort (13)	S8A-IT10-36-TL	17	13	4.2	3.2	14.7	2080 183
comfort (17)	S8A-IT10-36-TL	20	15	4.3	4.0	18.7	2080 183
comfort H (7)	S8A-IT10-18-TL	18	12	2.1	1.6	7.5	2080 181
comfort H (10)	S8A-IT10-22-TL	19	15	3.1	2.3	10.7	2080 182
twin (20)	S8A-IG16-60-TL	17	14	6.6	5.0	23.1	2080 184
twin (26)	S8A-IG16-60-TL	20	16	8.5	6.4	29.6	2080 184
twin (36)	S14A-ST16-50-TL	17	13	11.2	8.4	39.2	2080 185
twin (42)	S14A-ST16-50-TL	20	15	13.3	10.0	46.3	2080 185
twin H (13)	S8A-IT10-36-TL	15	12	4.0	3.0	14.0	2080 183
twin H (19)	S8A-IG16-60-TL	15	13	5.8	4.4	20.3	2080 184
twin H (22)	S8A-IG16-60-TL	18	15	6.9	5.1	23.9	2080 184
dual (55)	S14A-ST16-72-TL	20	14	18.4	13.8	64.2	2080 186
dual (70)	S19A-IG16-86-TL	16	13	23.1	17.3	80.6	2080 187
dual (85)	S19A-IG16-86-TL	18	14	26.9	20.1	93.7	2080 187
dual (110)	S19A-IG16-152-TL	17	11	35.3	26.5	123.1	2080 188
dual (140)	S19A-IG16-152-TL	20	15	42.9	32.2	149.8	2080 188
dual H (35)	S14A-ST16-50-TL	18	14	11.8	8.8	41.1	2080 185
dual H (50)	S14A-ST16-72-TL	18	13	17.0	12.8	59.4	2080 186
dual H (70)	S19A-IG16-86-TL	16	13	23.0	17.2	80.2	2080 187
dual H (90)	S19A-IG16-86-TL	20	15	28.2	21.2	98.4	2080 187

Primary circuit: source T_{in} 10 °C / T_{out} 7 °C
Secondary circuit: heating T_{in} 9 °C / T_{out} 5 °C

Notice:
Insulation on site

Notice:
For further technical details on the heat exchangers, see “Various system components”.

Accessories

Thermal insulation
Material: Polyurethane (PU)
Thermal conductivity: 0.035 W/mK
Thickness: 20 mm

Suitable for plate heat exchanger type	Number of plates variant H	M	L	Part No.
XB06			08-26	2080 123
XB06			30-48	2080 124
XB06			50	2083 874
XB12	10-52	10-40	10-36	2080 125
XB12	60-100	50-92	40-72	2080 126
XB12	110-140	100-110	80-100	2080 127
XB52		72-104		2080 128
XB52		106-140		2083 875

Notice:
Not for cooling applications

Thermal insulation
Material: mineral wool
Thermal conductivity: 0.029 W/mK
Thickness: 30 mm

Suitable for plate heat exchanger type	Number of plates variant H	M	L	Part No.
XB61	30-90	30-90	30-50	2080 129
XB61	91-160	71-120	51-100	2080 130

Notice:
Not for cooling applications

Screwing set
containing two end pieces with union nuts and seals
Material: brass

Suitable for plate heat exchanger type	Connection inches	Part No.
XB04, XB06, XB24	G ¾″ E - G 1″ E	2080 131
XB12	G 1¼″ E - G 1″ E	2080 132
XB12	G 1¼″ E - G 1½″ E	2080 133

Notice:
Two sets are necessary

Set with 2 welding ends G 2″ A/DN 40 with union nuts and seals 2080 134
suitable for the types:
XB51, 52, 59 M-1, 61-SB-1
Diameter: 1½″
Operating pressure: max. 25 bar
Material: 1.0308

Notice:
Two sets are necessary

Services

Commissioning
Commissioning by works service or Hoval trained authorised serviceman/company is condition for warranty.

For commissioning and other services please contact your Hoval sales office.

Requirements and directives

The following requirements and directives must be complied with:

- Technical information and assembly instructions from Hoval
- Hydraulic regulations and those pertaining to instrumentation and control
- Building regulations
- Fire protection regulations
- Regulations of the local power station
- VDI 4640: Thermal use of the underground
- DIN EN 1736: Refrigerating systems and heat pumps
- DIN EN 378: Refrigerating systems and heat pumps - Safety and environmental requirements
- DIN EN 13313: Refrigerating systems and heat pumps - Competence of personnel
- VDI Directive 2035: Protection against corrosion and boiler scale in heating and domestic hot water systems.
- EN 12828: Heating systems in buildings - Design of hot water heating systems
- EN 12831: Heating systems in buildings - Method for calculation of the design heat load
- EN 15450: Heating systems in buildings - Design of heat pump heating systems

Switzerland:

Environment

- Chemical risk reduction ordinance (CRRV), Appendix 2.10 ff
- Instructions for using heat from water and ground (Buwal)
- Instructions for using heat with closed geothermal probes (Buwal)
- Noise abatement regulations (LSV)
- SN 253 120 (refrigerant definitions)
- Cantonal and local regulations
- SIA 384/1: Heating systems in buildings

Electrical connection

- VSE recommendations for connecting heat pump systems for heating and domestic water heating to the network of electricity companies (2.29d, September 1983)
- Regulations of the local power station
- Do not attach any rigid connections (e.g. cable duct) to the heat pump housing

Planning and design

- Cantonal and local fire prevention authority regulations as well as state-specific regulations
- SWKI directive 92-1 hydraulic circuit of heat pump heating systems
- FWS and GKS regulations and codes of practice
- SWKI HE301-01 guidelines “Safety engineering installations for heating systems”
- Bivalent systems: special engineering guidelines for the corresponding supplementary heat generator must be observed
- SIA 384/6 Geothermal probes

Austria:

Environment

- ÖWAV code of practice 207: Thermal use of underground water and the underground – heating and cooling
- ÖNORM S 5021: Basic acoustical principles for town, regional and physical planning
- ÖAL Directive no. 3: Assessment of noise emissions in the neighbouring area

Electrical connection

- Country-specific and regional regulations and laws, in particular ÖVE directives

Planning and design

- OIB Directive no. 4: Safety in use and barrier-free access
- ÖNORM B3417: Safety equipment for roofs
- ÖNORM H 12828: Design of hot water central heating systems with or without water heating
- ÖNORM H 5195-1 and -2: Heat transfer media for building services systems
- ÖNORM M 7755: Heat pump heating systems

Germany:

Environment

- DIN 8901: Refrigerating systems and heat pumps - Protection of soil, ground and surface water
- TA-Lärm: Requirements on the installation location
- LAI acoustic guidelines

Electrical connection

- VDE directives
- Technical connection condition (TAB 2019) for connecting to the low voltage grid
- DIN 8947: Heat pumps; heat pump units with electric driven compressors for heating of water
- §14a Energy Industry Act: Grid-serving connection (operation as controllable consumption appliance)

Planning and design

- Building Energy Act GEG
- Drinking Water Ordinance (TrinkwV)
- DVGW worksheets W 551 and W 553
- DIN EN 15450: Heating systems in buildings - Design of heat pump heating systems
- VDI 4640
- VDI 4650

Buffer storage tank

A buffer storage tank ensures optimal operating conditions for the heat pump.

- Hydraulic decoupling of the various volumetric flows from the heat pump and heat distribution system (heating)
- Absorbs the power reserves of the heat pump and reduces the switch-on frequency (cycling)
- Allows several heating circuits to be connected

A buffer storage tank is mandatory for Hoval air/water heat pumps (defrost energy).

A buffer storage tank can be dispensed with if a direct heating or cooling circuit with storage capacity is involved, and there is always a constant flow rate (⅔ must be unblockable).

For Hoval heat pumps, the following minimum sizes of the buffer storage tank (EnerVal) must be observed. The minimum running times of the heat pumps are taken into account.
For air/water heat pumps, the energy required for defrosting the heat pump is included.

The volumes for power company off-periods shall be added on a project-by-project basis in accordance with local regulations.

Recommeded minimum sizes of buffer storage tank

	EnerVal type	DuoVal E/C (100/300)
UltraSource® B comfort C (8)	**100**	•
UltraSource® B compact C (8/200)	**100**	
UltraSource® B comfort C (11)	**100**	•
UltraSource® B compact C (11/200)	**100**	
UltraSource® B comfort C (17)	**300**	
Belaria® pro comfort (8)	**100**	•
Belaria® pro comfort (13)	**100**	•
Belaria® pro comfort (15)	**300**	
Belaria® pro (24)	**500**	
Belaria® comfort ICM (8)	**100**	•
Belaria® comfort ICM (13)	**100**	•
Belaria® twin I/IR (20)	**500**	
Belaria® twin I/IR (25)	**500**	
Belaria® twin I/IR (30)	**800**	
Belaria® twin A/AR (32)	**800**	
Belaria® dual AR (60)	**1000**	
Daikin Altherma (14)	**100**	•
Daikin Altherma (18)	**100**	•
Belaria® fit (8)	**300**	
Belaria® fit (13)	**500**	
Belaria® fit (20)	**800**	
Belaria® fit (26)	**1000**	
Belaria® fit (40)	**2000**	
Belaria® fit (53)	**2000**	
Belaria® fit (70)	**1500 + 1500**	

	EnerVal type	DuoVal E/C (100/300)
UltraSource® T comfort (8)	**100**	•
UltraSource® T compact (8/200)	**100**	
UltraSource® T comfort (13)	**100**	•
UltraSource® T compact (13/200)	**100**	
UltraSource® T comfort (17)	**200**	
Thermalia® comfort (8)	**300**	
Thermalia® comfort (10)	**500**	
Thermalia® comfort (13)	**500**	
Thermalia® comfort (17)	**800**	
Thermalia® comfort H (7)	**300**	
Thermalia® comfort H (13)	**500**	
Thermalia® twin (20)	**500**	
Thermalia® twin (26)	**500**	
Thermalia® twin (36)	**800**	
Thermalia® twin (42)	**1000**	
Thermalia® twin H (13)	**300**	
Thermalia® twin H (19)	**300**	
Thermalia® twin H (22)	**500**	
Thermalia® dual (55)	**1500**	
Thermalia® dual (70)	**1500**	
Thermalia® dual (85)	**2000**	
Thermalia® dual (110)	**1500 + 1000**	
Thermalia® dual (140)	**1500 + 1500**	
Thermalia® dual H (35)	**800**	
Thermalia® dual H (50)	**1000**	
Thermalia® dual H (70)	**1500**	
Thermalia® dual H (90)	**2000**	
Thermalia® dual R (55)	**1500**	
Thermalia® dual R (70)	**1500**	
Thermalia® dual R (85)	**2000**	
Thermalia® dual R (110)	**1500 + 1000**	
Thermalia® dual R (140)	**1500 + 1500**	

Notice:
Check the availability of the respective units in different countries

Off-periods by power companies

If the power supply for the heat pump is temporarily shut down by the power company (for example due to special tariffs), this has to be taken into account in the design of the heat pump. The daily heat quantity must then be produced when electricity is available. The heat pump must be designed for the maximum off-period in accordance with the energy supply contract.
With radiator heating systems, the loss of radiant heat if the electricity is switched off by the energy company is seen as a nuisance, even though the room temperature may not in fact drop significantly. This must be taken into consideration in the design process. A larger buffer storage tank can only bring a limited improvement as with a heat pump, the temperature elevation is kept to a minimum for a better COP.

The volumes for power company off-periods shall be added to the minimum sizes of the buffer storage tanks on a project-by-project basis in accordance with local regulations.

Set-up

In the case of floating screed or underlay, a recess should be cut in the screed and the impact sound insulation around the heat pump.

- The installation location must be selected in accordance with the valid requirements and directives. Rooms with high air humidity, for example laundry rooms, etc. are not suitable installation locations (dewpoint < 10 °C)
- The heat pumps installed inside can be mounted on the floor in the boiler room
- The installation location must be free from dust or other foreign matter which could lead to contamination
- Access for the purpose of operation and maintenance must be ensured
- Penetrations and openings in the masonry must be created proficiently (cold bridges, etc. on the outside wall must be avoided at all costs)
- Concrete shafts and light wells by means of which the air is drawn in or blown out must be provided with drainage
- If the ambient temperature of the heat pump is less than 10 °C, it must be equipped with a crankcase heater for each compressor. This applies to heat pumps whether they are set up indoors or outdoors

Indoors

- **Where possible, the installation location should be outside noise-sensitive areas of the building and equipped with a sound-absorbing door**
- Access for the purpose of operation and maintenance must be ensured
- The installation room must be frost-free
- The space around the indoor unit must allow for adequate air circulation
- If water is discharged through the safety valve, precautions must be taken to ensure that this water is drained away
- The indoor unit is not allowed to be installed where there could be a potentially explosive atmosphere
- The heat pump must not be installed in a room that is also used as a workplace or workshop. If construction work which generates a lot of dust is carried out in the installation room of the heat pump, the unit must be switched off and covered
- If the noise level is measured under the actual installation conditions, this will be higher than specified in the unit specification. This is because of reflected noise from the surroundings
- Take precautions so that no damage can be caused by leaking water if there is a leak at the installation location and in the vicinity
- The floor must withstand the weight of the indoor unit. It must be level so that no vibration and noise is created and the unit stands securely
- Do not place objects on the unit
- Do not climb onto, sit on or stand on the unit
- Make sure that adequate precautions are or will be taken according to the particular local and national regulations in the event that there is a leak in the refrigerant circuit

It is imperative that a sludge separator is installed in the heating return upstream from the heat pump.

Outdoors

The outdoor unit is installed outdoors. The installation location must be selected carefully. It is essential that the following ancillary conditions are met:

- The subsoil in the installation location must be sufficiently stable to bear the weight of the unit and its vibration in operation
- The location must have adequate space for installation, maintenance and cleaning of the unit (see “Dimensions/Space requirements”)
- As condensate flows out of the outdoor unit, a gravel bed to absorb the condensate must be installed under it. Do not place anything under the outdoor unit that is sensitive to moisture
- Due to the sound emissions, the installation location should not be beneath living-room or bedroom windows and be far enough away from neighbouring buildings (perform calculation)
- The selected location should be such that the air blown out by the unit does not bother occupants of the building or neighbours
- No parts and systems at risk of frost damage are allowed to be on the blow-out side
- It is essential to avoid air short-circuiting. The space necessary for intake and outlet must always be provided (see “Space required”)
- The installation location must be selected so that the air intake and outlet are not blocked or obstructed by snow, leaves, etc.
- Installation in wall niches is not recommended (air short circuit, sound reflection)
- Several units must not be installed directly one above the other
- Install the units, the mains cables and the branch wiring at least 3 m away from TV sets and radios. This should prevent interference with picture and sound
- The intake air must be completely free of aggressive substances such as ammonia, sulphur, chlorine etc
- Install the outdoor unit so that the intake side faces the wall and is not directly exposed to the wind
- Never install the outdoor unit in a place where the intake side is directly exposed to the wind
- The outdoor unit must be protected from heavy snowfall
- Install the unit at sufficient height above the ground to ensure that the unit is not covered by snow and freezing condensate cannot impair operation (see separate base plans)

Sound emissions

Indoor installation

The effective sound pressure level in the installation room depends on various factors such as room size, absorption capacity, reflection, free sound propagation, etc. For this reason, it is important to ensure that where possible, the boiler room is outside noise-sensitive areas of the building and equipped with a sound-absorbing door.
If air/water heat pumps are set up indoors, the intake and exhaust air openings or the installation location must be selected so that the sound emissions are not perceived as a disruptive. The openings in the masonry for intake and exhaust air or the installation location must be made in the less frequented area of the building (not below or adjacent to living rooms and bedrooms).
Air ducts made of concrete have unfavourable acoustic properties and often magnify noise emissions. It is therefore advisable to equip the air ducts with a sound-absorbing, weatherproof lining or with sound attenuation splitters.

Outdoor installation

When air/water heat pumps are set up outdoors, optimum planning of the installation location is particularly important, since the noise not only affects the building in question but also often adjacent buildings or properties. The installation location must be selected so that there are no living rooms and bedrooms in the noise emission area. In many cases, selecting the set-up location on the “noisy side” facing the road or street has proven to be ideal.
When it comes to noise emissions, local conditions and individual noise sensitivity play a significant role, which means it is recommended for a specialist (acoustic engineer) to be consulted with regard to finding a solution. No rigid connections (e.g. cable ducts) are allowed to be attached to heat pumps, in order to avoid solid-borne noise.

Design of the heat source

An earthbound heat source (flat collector, depth probe) must be designed for the total energy requirement. The total energy requirement is the sum of the energy requirements for room heating, water heating and, where applicable, special applications.

Hot water supply

If the domestic hot water is heated using the heating heat pump, this must be taken into account when designing the heat pump.
One and two-family home:
0.25 kW per person needs to be added to the heat output. This corresponds to a domestic hot water requirement of about 50 litres at 45 °C per day.

Multi-family home:
In the multi-family home, the design is carried out according to DIN EN 15450 taking account of the hygiene requirements as stated in the Drinking Water Ordinance as well as DVGW worksheets W 551 and W 553. Accordingly, it is first necessary to calculate the maximum domestic hot water requirement and the consumption behaviour. As a rule of thumb, a daily average domestic hot water requirement of 1.45 kWh per person can be assumed. At a storage temperature of 60 °C, this corresponds to a water quantity of 25 l per person.
In the case of increased domestic hot water requirement (large tubs, monsoon showers, etc.) the required bulk output and the daily domestic hot water requirement must be calculated and taken into consideration when dimensioning the heat pump or heat source.
Ideally, calorifiers with large inlying plain tube heat exchangers (CombiVal ESR and ESSR) are used.

The maximum heat output of the heat pump is decisive for setting the size of the heat exchanger surface area:

- Heat exchanger surface area = 0.3-0.4 m^2 per kW max. heat pump heat output during the operating time of the system (air/water heat pumps with A20/W55)
- In 2-stage heat pumps, the output of the first stage can be used

Power requirement for special applications
If the heat pump is also used, for example, to heat swimming pools, it is important to take the greatly increased energy requirement into consideration in the design phase.
In the case of an outdoor swimming pool which is only heated outside the heating season, the increased annual runtimes mean that the heat source needs to be correspondingly enlarged (only for geothermal heat).
If an indoor swimming pool is heated all year round, the required output for room heating and heating of the water in the pool must be added to the total output, in addition to the increased runtime.

Installation
The system must be filled in accordance with the applicable standards.
Where copper is used as an installation material, damage to the rubber tubes used with heat pumps to reduce the structure-borne sound level may occur. As an alternative, corrugated stainless steel tubing can be used (on site). However, such pipes bring less reduction of structure-borne sound.
An air separator must be installed in the flow pipe.
A sludge separator must be installed in the return line to the heat pump.

Baking out
The baking out of buildings and floors (underlays) must not be done with Hoval heat pumps. If this instruction is not observed, the additional load can lead to irreparable damage to the heat source. Failure to do so may result in losses of guarantee/warranty. Alternative heat sources should thus be used for the baking out.
This is generally done by installing an electric water heater.
However, mobile heaters running on electricity, oil or gas can also be used.

Operating modes
Monovalent:
As a stand-alone heat generator, the heat pump covers all heat demands at all times. For the monovalent operating mode, ensure that the maximum achievable flow temperature of the heat pump is greater than the maximum required flow temperature of the heating.

Bivalent parallel and single energy source:
The heat pump alone heats until the switch-on point (bivalent point) is reached. An additional heat generator then heats the water in parallel to this. If this additional heat generator is an electric heating element, then the operating mode is monoenergetic. For a bivalent parallel operating mode, ensure that the maximum achievable flow temperature of the heat pump is greater than the maximum required flow temperature of the heater.

Bivalent alternative:
The heat pump alone heats until the switching point (bivalent point) is reached. An additional heat generator then heats the water alone. For the alternative bivalent operating mode, ensure that the maximum achievable flow temperature of the heat pump is greater than the maximum flow temperature of the heater. Higher temperatures are thereafter possible with the additional heat generator.

Bivalent semi-parallel:
The heat pump alone heats until the switch-on point (bivalent point) is reached. An additional heat generator then heats in parallel to this until the switch-off point of the heat pump. The heat pump can be switched off in this case either based on efficiency or energy cost criteria, taking account of the necessary flow temperature.

Performance data

The standard points for specifying the relevant values are clearly defined. The following conditions apply to heat pump systems:
Air/water A2W35
Brine/water B0W35
Water/water W10/W35

Heat source:

- A2 = air inlet temperature 2 °C
- B0 = brine inlet temperature 0 °C
- W10 = water inlet temperature 10 °C

Heat utilisation (heating):

- W35 = water outlet temperature 35 °C

Electrical data

The grid operators require the following information in order to grant approval:

Imax (A)	=	max. current consumption of the heat pump. Used for setting the dimensions of the feeder cable and fusing.
Starting current (A)	=	current consumption on direct starting with external starting current limiter
cos ϕ	=	power factor; used for setting the dimensions of any power factor correction

This information specific to heat pumps is listed for the specific products in the Hoval catalogue and on the heat pump rating plate.

Switzerland:
The required clarifications and the approval request must be made during the planning phase of the system. The approval of the responsible grid operator must have already been obtained when the heat pump is ordered!

If the inrush current exceeds the maximum values defined by the grid operator (system), a frequency converter must be supplied or installed by the client.

Water quality in heating systems

Filling and replacement water, heating water

The following applies:
- For Germany VDI 2035
- For Austria ÖNORM H5195
- In addition, the EN 14868 standard must be applied, **as well as the manufacturer-specific specifications**

Manufacturer-specific specifications

Filling and replacement water
The filling and replacement water can be both fully demineralised and also merely softened.

Heating water
- In the case of full demineralisation of the filling and replacement water, the electrical conductivity of the heating water must not exceed the value of 100 µS/cm.
- In the case of softening the filling and replacement water, the following conditions must be complied with:
  - Electrical conductivity of the heating water for operation with water containing salts: > 100 µS/cm to ≤ 1500 µS/cm
  - pH value of the heating water for systems without aluminium alloy as water-side material 8.2 to 10.0 (measurement 10 weeks after commissioning at the earliest)
- The sum of the chloride, nitrate and sulphate contents in the heating water must not exceed 50 mg/l in total.

Additional notices
- Hoval heat pumps and calorifiers are suitable for heating systems without significant oxygen intake (system type I in accordance with EN 14868.)
- Systems with continual oxygen intake (e.g. underfloor heating without diffusion-proof plastic piping) or intermittent oxygen intake (e.g. requiring frequent topping-up) must be equipped with a system separation.
- If only the heat pump is replaced in an existing system, it is not recommended for the entire heating system to be refilled, provided that the heating water already contained in the system complies with the relevant directives or standards.
- Before filling new systems and, where necessary, existing heating systems containing heating water that does not comply with the directives or standards, the heating system must be professionally cleaned and flushed. The heat pump must not be filled until the heating system has been flushed.

Frost protection agent
See separate engineering sheet “Use of frost protection agent”.

Water composition

Water quality

Heating water:
- The requirements of European standard EN 14868 and the SWKI directive BT 102-01 must be met
- Hoval heat generators are suitable for heating systems without significant oxygen intake (system type I in accordance with EN 14868)
- Systems with
  - **continuous** oxygen intake (e.g. underfloor heating systems without diffusion-proof plastic piping) or
  - **intermittent** oxygen intake (e.g. requiring frequent topping-up)

  must be equipped with **separate circuits**
- Treated heating water must be tested at least once every year, or more frequently if specified by the manufacturer of the inhibitor
- In the case of existing systems (e.g. replacing the heat generator), if the water quality of the existing heating water meets the requirements of BT 102-01, re-filling the system is not recommended
- Before filling new systems and, where necessary, existing systems, the heating system must be professionally cleaned and flushed! The heat generator must not be filled until the heating system has been flushed
- Parts of the heat generator/calorifier which come into contact with water are made of copper and stainless steel
- Due to the danger of stress cracking corrosion to the stainless steel part and pitting in the copper part of the heat generator, the chloride, nitrate and sulphate content in the heating water must not exceed 100 mg/l in total
- The pH value of the heating water should be between 8.3 and 9.0 after 6-12 weeks of heating operation to avoid obstruction of the flow as a result of deposits of corrosion products from other heating system materials

Filling and replacement water:
- As a rule, the best filling and replacement water for a system with Hoval heat generator is untreated domestic water. The requirements of EN 14868 must be met in this context
- To maintain the high efficiency of the heat generator, the water content of the system and the maximum flow temperature should not exceed the values in the tables, based on the output of the heat generator (smallest heat generator for systems with more than one heat generator)
- The total quantity of filling and replacement water added to the heat generator over its service life must not be higher than three times the system water content
- SWKI BT 102-01 applies to the protection of the heating system, and it makes the exact specifications for the filling water quality.

Engineering checklist for heat pump systems

- Definition of hydraulic diagram according to Hoval standard for heating, possibly hot water and cooling
- Dimensions of heat pump type selected according to Qh, flow temperature and operating method and application limits (tables/heat output curves/bivalence point)
- Define minimum size of buffer storage tank
- Observe placement and bringing in possibility of heat pump, buffer storage tank and calorifier
- Configuration of calorifier with corresponding size and required heat register size according to table
- Clarification of electrical supply with energy supply company (conditions/off-periods/connected load)
- Clarification of subsidy amounts and ancillary conditions

Air/water heat pumps
Split version
- Installation location of outdoor unit/position: air outlet and intake must be clear
- No parts and systems at risk of frost damage are allowed to be on the blow-out side
- The necessary clearance (see “Dimensions/space required”) and accessibility must be assured
- Noise development requires minimum distances from sensitive rooms in adjacent buildings. These must be complied with (country-specific requirements)
- There must be a condensate drain for the outdoor unit
- The indoor unit must be positioned so the necessary clearances are complied with
- Pipes (refrigerant) must be routed in accordance with the specifications in the installation instructions
- Avoid direct connection to the heating network, and if this is not possible, then only by differential pressure relief valve (minimum flow rate) and intermediate tank (minimum water volume)
- Possible selection of type with cooling function
- Cooling with fan convectors (caution: condensate drain for fan convectors)

Brine/water heat pumps
Clarification of heat source
- Installation location (not under bedroom)
- Dimensioning of geothermal probe/flat collector (domestic hot water supplement/number of probes/pressure drop calculation (aim for minimum current consumption of brine pump))

Air/water heat pumps
Monoblock
- Installation location (indoor or outdoor). Air outlet and intake must be clear. Comply with notes on air guidance
- No parts and systems at risk of frost damage are allowed to be on the blow-out side
- The necessary clearance (see “Dimensions/space required”) and accessibility must be assured
- Noise development (not under bedrooms)
- Noise development requires minimum distances from sensitive rooms in adjacent buildings. These must be complied with (country-specific requirements). Provide damping measures if required
- There must be a condensate drain

Ground water heat pumps
Clarification of ground water approval
- Geological water inspection report
- Ground water temperatures summer + winter/quantity in l/min or m^3/h
- Installation location (not under bedroom)
- Connection of ground water only via separating heat exchanger (intermediate carrier circuit). Separating heat exchanger is configured according to the heat pump type (table). Caution: intermediate carrier circuit: read out heat output and flow temperature at brine/water +7 °C)
- Design of ground source heat pump and possible intermediate circuit pump according to nominal flow rates and pressure drops
- The intermediate circuit is filled with frost protection agent for frost protection of -15 °C

Version and commissioning

Clarify which installation location and which system concept are provided, and contact Hoval in case anything is unclear.

Checks before installation
The following checks are required before installation:
- Consult the installation, operating and maintenance instructions of the Hoval heat pumps
- Access for the purpose of operation and maintenance
- Dimensions and position of the masonry openings
- Position of heating connections and condensate drain
- Position of the condensate drain
- Drainage of the air ducts or set-up area for the heat pump and acoustic insulation of the air ducts
- Setting up the heat pump (clearances, minimum distances)

Hydraulics
- Check the hydraulic piping of the system according to be selected hydraulic schematic
- Clarify any open issues before installation
- The wiring diagram does not serve as a hydraulic schematic, but merely for positioning of sensors, valves, pumps and thermostats, etc.
- Fittings and instruments must be installed according to the corresponding engineering documents

Electrical installation
- The electrical connection cables to the heat pump must be installed in accordance with Hoval's and the country's specific regulations. Do not attach any rigid connections (e.g. cable duct) to the heat pump housing
- The information on the system diagram must be complied with
- Quality and routing regulations for the sensor cables must be complied with
- The low-voltage cables must be routed separately (not in the same cable duct as 230 V or 400 V cables)
- Comply with the connection requirements of the grid operator (TAB 2019)
- If a frequency converter is required (starting current), it must be supplied by the client

Checks before commissioning
The following items must be checked before notifying Hoval that the system is ready for commissioning:
- Hydraulic piping
- Positioning and installation of the instruments and fittings
- Positioning and installation of the sensors according to the corresponding wiring diagram or project diagram
- Electrical connections for heat pump, control systems, sensors, pumps, motorised valves, etc.
- Functions of the complete heat source system
- Flushing, filling and venting of the complete system

Geothermal probe systems/surface collectors
Comply with the following in geothermal probe systems that are filled with a mixture of frost protection agent and water:
- Fully demineralised water must be used
- The concentration of frost protection agent must be selected at least so as to ensure protection against frost down to -15 °C and so that the required minimum concentration stipulated by the frost protection agent manufacturer is maintained (protection against sludge formation and corrosion). However, the frost protection concentrations should be kept as low as possible with a view to improved heat transmission and lower pump output
- The frost protection agent and the water must be mixed in the required concentration prior to filling. Filling with ready-mixed solution that meets the aforementioned requirements is recommended

Caution!
The condenser and evaporator of a heat pump are sensitive to blockage, as a result of which the system must be flushed carefully on the heating and source sides before the heat pump is connected. The heat exchanger should not have any flow during the flushing procedure. The heating water must be treated according to the recommendations of the professional associations.

Hydraulic balancing/setting the flow rates
- The flow rates are calibrated by the installer. This should the based on the recommended nominal flow rate of the heat pump
- In systems with a buffer storage tank, the flow rate in the fully opened heat circuit must not be greater than the flow rate in the buffer circuit, otherwise the colder heating water return will overflow through the buffer storage tank, leading to mixed temperatures in the flow to the heating system.

Notice for commissioning
The registration form should be sent to Hoval 14 days in advance.

- The commissioning should be carried out during the heating period, the best time is during the transitional period
- Temporary electrical installations as well as systems operating in the building carcass are exposed to hazards (electrical power cuts, incorrect operation by third parties, etc.) which can lead to damage to the heat pump and the entire system
- In systems in the building carcass, it is not possible to maintain the boundary conditions such as installation location without frost risk, minimum required return temperature, etc. for the heat pump in practical terms, meaning that no correct operation is assured

Caution!
- *Air/water heat pumps*
  The heat output of the air/water heat pump is significantly dependent on the outdoor temperature, as a result of which no commissioning activities should be undertaken at temperatures close to the freezing point, in the building carcass for drying out of the structure or for routing underfloor heating pipes (provide buffer storage tank with an electric heating element). Split pipes can only be evacuated properly at a temperature above 8 °C, as a result of which the equipment room must have a room temperature of at least 15 °C. Due to the risk of moisture entering the refrigeration circuit, the outdoor unit cannot be connected in rainy weather. During commissioning, the room temperature of the heated rooms must be at least 15 °C. If a buffer storage tank is provided, its heating water temperature is not allowed to be less than 20 °C during commissioning.
- *Brine/water heat pumps*
  The brine/water heat pumps with geothermal probes as the heat source are not suitable for drying out the building carcass or for laying underfloor heating pipes, due to the output/load mixing ratio. The long running times of the heat pump can lead to excessive use of the geothermal probes and thus long-term damage as well as a lower utilisation temperature and even the establishment of permafrost.

Commissioning
It is used for checking and setting the definitive operating values of the system as well as for instructing the operating personnel.
During commissioning, the engineering set-points of the system must be known, and the following persons must be present:
- The installer to inspect the heating-side installation
- The electrician to inspect the electrical installation
- Hoval Service
- The building owner or the person responsible for operation. Hoval service only prepares the commissioning protocol of the heat pump or the system parts supplied by Hoval. The operating instructions for the Hoval heat pumps and the accessories supplied by Hoval are delivered with the articles or handed over during commissioning.

Caution!
If Hoval is required to undertake commissioning in uninhabited building carcasses without the required general conditions and proficiently undertaken electrical and heating installation of the system incl. bleeding, Hoval will not accept liability for operation. The system is operated at the owner's own risk. The required visits to the system will be invoiced separately.

The installer/planner of the system is responsible for the operating instructions and for providing instruction in third-party products and/or the entire system!
All Hoval hydraulic schematics and engineering guidelines serve as aids during planning. The planner/installer of the system is responsible for its correct functioning.

Heat sources
The heat source (with the exception of the temperature level of the heating system) significantly determines the efficiency, the operational safety and efficiency of a heat pump system. The most important factors are
- unrestricted availability during the utilisation period
- temperature level of the heat source during the utilisation period
- energy required for transporting the heat source
- chemical and physical safety of the heat source (working safety, maintenance work involved)

Proficient planning and undertaking of the heat source use are amongst the most important tasks for the planning and installer.

Heat sources that are predominantly used for heating living areas are natural and renewable heat sources such as:
- Fresh air
- Ground
- Ground water, waste water
- Surface water (lakes, rivers)

Waste heat utilisation with heat pumps involves using the heat pump for heat recovery in which the planning must take account not only of the usual criteria such as temperature level, type (waste water, extract air, exhaust gas), chemical and mechanical cleanliness, etc. but also the simultaneity of availability and heat use. A precise analysis is absolutely essential.

Fresh air
Fresh air is available everywhere. The following aspects must be considered when planning with fresh air as the heat source:
- Area of application of the heat pump
- Output fluctuations of the heat pump due to temperature fluctuations of the heat source
- Defrosting losses of the heat pump
- Sound emission
- Condensation formation
- In coastal regions or other areas with salty air, corrosion can decrease the lifetime of the evaporator

Heat pumps have clearly defined application limits, which means it is essential to consider the application limits when designing the system.

Ground
Setting up and operating geothermal probes and ground source collectors requires official approval. The heat capacity and thermal conductivity of the soil depend on its composition and water content. It is possible to use it in two different ways
- Vertically with geothermal probes
- Horizontally with ground collectors

Observe the following:
- The heat withdrawn must always be significantly less than can be replenished naturally
- In bivalent systems, the dimensions of the heat source system must be suitable with regard to the amount of heat withdrawn (90 kWh per metre of geothermal probe length)

Geothermal probes
The planning criteria are:
- The specific heat extraction rate which depends on the thermal conductivity (λ) of the underground; a specific cooling capacity of max. 47 W/m probe length can be assumed as guidance values
- The max. heat extraction per year should not exceed 90-100 kWh per metre of geothermal probe length

In addition, the following aspects need to be considered:
- The lowest possible total hydraulic resistance through optimisation of the number of geothermal probes, probe diameter and depth
- **A certified, specialist drilling company must be used for planning and undertaking the geothermal probe system**

Ground collectors
The energy that is used for compensating for the heat deficit or heat surplus comes almost exclusively from solar radiation and percolating water (rain, snow meltwater). A ground collector is, so to speak, as climate collector which is significantly influenced by weather events. The latent heat exploitation when there is a change of state in the water in the moist soil has a positive influence when it comes to calculating the balance. This means the evaporating temperature of the heat pump remains relatively constant over a long time. VDI 4640 must be taken into account during the design, as well as:

for the soil surface
- the climate zone and the aspect of the building
- the thermal conductivity of the soil and the effective number of operating hours

for the ground collector system
- the lowest possible total resistance
- by optimisation of the number of lines and line length
- If there is insufficient floorspace available, an alternative heat source must be sought

For further details see:
Heat source use/ground collectors.

Ground water
If the temperature of the ground water is below 8 °C in the seasonal profile, this must be taken into account in the planning.

Using ground water as a heat source requires official approval. Ground water is a very good heat source because of its high heat capacity and heat transfer properties.
Connection of ground water only via a separating heat exchanger (intermediate carrier circuit).
System-based clarifications are mandatory.
The most important criteria are:
- Hydro-geological report
- Water analysis
- Official approval/concession

In addition, the following aspects must be considered for the planning:
- The min. heat source temperature during the utilisation period
- The min. permitted evaporator outlet temperature of the selected heat pump
- The specifications of the authorities, such as the type of use, the design of the withdrawal and return well, etc.
- A qualified specialist company must be contacted for planning and installing the heat source system

In addition, the following aspects must be considered for the planning:
- VDI 4640
- Min. heat source temperature and flow rate during the utilisation period
- Official regulations such as type of use, configuration of the withdrawal and return well, etc.
- Possibility of infiltration through water from rivers or lakes
- The design must be based on reliable temperature data
- A certified, specialist drilling company must be used for planning and undertaking the system of ground water boreholes

The heat source must be free of chemical or mechanical contamination.

Surface water
If the temperature of the surface water is below 8 °C in the seasonal profile, this must be taken into account in the planning.

Planning a heat source system with sweet/river water, etc. as the heat source is a challenging task and demands great experience from the planner. Surface water use must be via an intermediate carrier circuit (separating heat exchanger). Under favourable conditions, for example close to the bank, it is possible to provide a filtering well (as with ground water) as well as an intermediate circuit (indirect use).

Use is not advised without reliable long-term information about the min./max. temperature of the heat source and chemical/mechanical safety.

A feasibility analysis and estimating the maintenance work involved are preconditions for implementation.

The dimensions of the heat exchanger for indirect use are as for ground water.

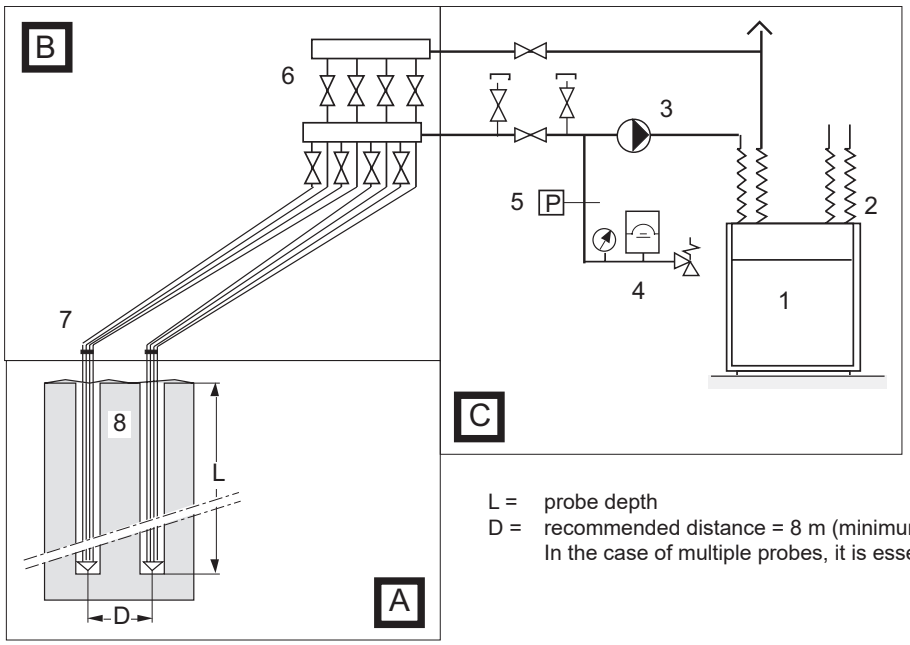
Using public surface water must be reported to the responsible water resources authority, as in the case of ground water use.

A qualified specialist company must be contacted for planning and installing the heat source system.

Heat sources

Geothermal probes

Schematic diagram heat sources/geothermal probes
- Geothermal probe system



Field A) Geothermal probes
Drilling of geothermal probes including delivery and installation of the probe pipes. Backfilling with bentonite.

Field B) Connections
Manifolds/collectors, connection lines, making penetrations in walls and trenching.

Field C) Heat pump connection
Connecting pipes between manifold/collector and heat pumps incl. heat source feed pump, safety devices and fittings.

L = probe depth
D = recommended distance = 8 m (minimum 5 m)
In the case of multiple probes, it is essential to clarify the placement.

Legend		Field	Delivery	Installation
1	Heat pump	C	Hoval	Installer
2	Flexible connections	C	Hoval	Installer
3	Heat source feed pump (Cold water version)	C	Hoval	Installer
4	Diaphragm pressure expansion tank	C	Hoval	Installer
5	Pressure monitor	C	Hoval	Installer
6	Distributor/collector (PVC/C)	B	Installer	Installer
7	Connecting line (HDPE 32 or 40 mm Ø)	B	Drilling company or installer	on behalf of the installer
8	Geothermal probes	A	Certified drilling company	Drilling company on behalf of the client

If the heat source system is filled with water only, it must be specially dimensioned. It is mandatory to install a flow monitor and a frost protection thermostat.

Heat sources

Ground water

Preliminary information required

- Suitability regarding quantities and temperatures (t ≥ 6 °C)
- Official approval
- Hydro-geological report
- Water analysis
- The effective minimum ground water temperature

Indirect utilisation with ground water

- The minimum ground water temperature during the utilisation period determines the tapping volume (required flow rate)
- In the case of river or sweet water, it is imperative to determine the precise temperature progression during the heating period
- The intermediate heat exchanger must be suitable for use with river or sweet water. Strainers and, if necessary, backwash filters are necessary to protect against contaminating particles such as sand. It must be possible to clean the heat exchangers.
- A filter must be installed upstream of the plate exchanger
- The hydraulic piping of the system must be carried out according to the selected hydraulic schematic.
- The intermediate circuit is filled with frost protection agent according to the engineering guidelines. The output of the heat pump can thus be read off for brine +5 °C.
- The intermediate circuit pump must be planned in a cold-water design

Direct utilisation of ground water

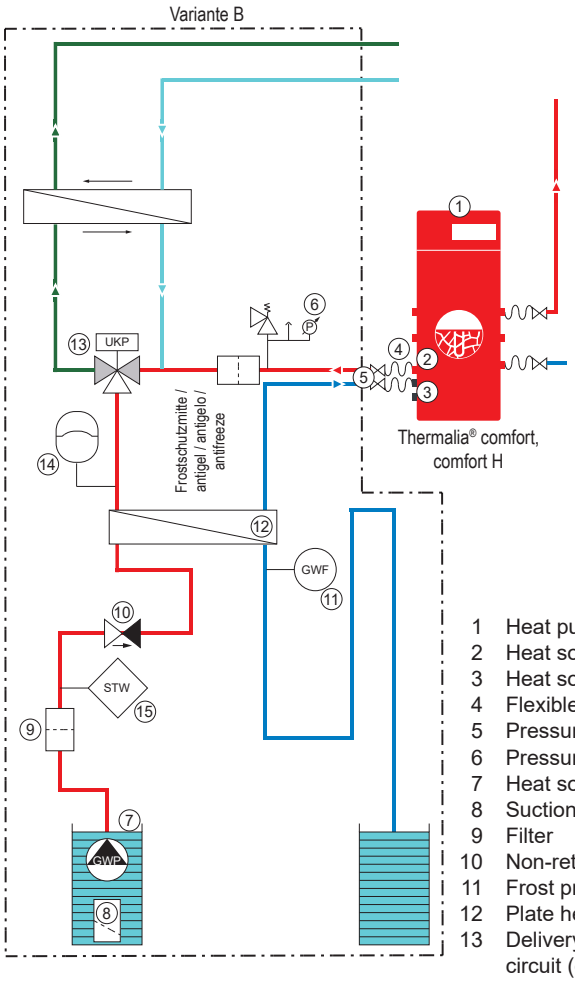
State-of-the-art evaporator design (soldered plate heat exchangers) makes applications with a direct throughflow of ground water inadvisable

- These evaporators have very narrow flow channels and are extremely sensitive to even very fine dirt particles such as those abundant in ground water
- If individual channels become blocked, they can freeze, resulting in leakage towards the refrigeration circuit. This can cause irreparable damage to a machine
- Flow monitors and frost protection thermostats cannot detect obstructions, as the deviations are too slight to be registered
- Upstream fine filters can only solve the problem of obstructions to a certain extent, and need frequent cleaning
- The somewhat lower performance coefficient is more than compensated for by the high operational reliability
- In such cases, Hoval will not accept liability for damage to the evaporator

Notices:

- The ground water temperature varies according to location.
- The design must be based on reliable temperature data
- The heat source system, (withdrawal and return well) must be installed by a specialist company

The heat source must be free of chemical or mechanical contamination.



1 Heat pump
2 Heat source inlet
3 Heat source outlet
4 Flexible connections
5 Pressure measurement nozzle ⅜″
6 Pressure monitor
7 Heat source feed pump
8 Suction filter
9 Filter
10 Non-return valve
11 Frost protection temperature monitor
12 Plate heat exchanger
13 Delivery pump in heat source intermediate circuit (cold-water design)
14 Diaphragm pressure expansion tank
15 Flow monitor

Other recommended components:

- Flow jacket (when in use)
- Securing/recovery rope
- Rope clamp
- Dry running protection
- Wall anchor
- Water quantity meter
- Vacuum breaker or pressure holding valve

Notice
In the case of systems without an intermediate heat exchanger, Hoval accepts no liability for damage caused by soiling or freezing of the evaporator!

Heating

Heat utilisation system (heat sink)

Heating

The heat pump is a compression cooling machine and behaves very dynamically.
This requires suitable flow rates through the heat exchangers of the heat pump on both the heat source and heat utilisation side. Since the heat exchangers of the heat pump have very low water contents, the constantly changing heat output demand of the system (predominant time of the heating period!) leads to excessive switching frequencies. However, short intervals mean insufficient time for stabilisation of the refrigeration circuit (loss of efficiency) on the one hand, and can lead to compressor failures on the other. In addition, there is the requirement of the electricity companies, which limit the switching frequency to 3 times per hour due to grid stability considerations. Therefore, suitable measures must be taken or the system must be planned in such a way that the boundary conditions of the heat pump and the requirement of the electricity company can be met at all times.
The most important criteria for meeting the boundary conditions are:

- Correct flow rate through the heat pump during the entire time of use
- Sufficient storage capacity and a minimum water volume of the heat utilisation side (heating)

Underfloor heating systems without thermostatic valves can meet these requirements in most cases.
If the boundary conditions cannot be met, the heat pump must be hydraulically decoupled from the heat utilisation system (heating). A buffer storage tank is required for this. The buffer storage tank ensures that the boundary conditions of the heat pump can be met in any load condition of the system.

Water heating

Generous dimensioning of the calorifier in terms of heat exchanger and drinking water volume is recommended. The maximum heat output of the heat pump is decisive for setting the size of the heat exchanger.

- Recommended heat exchanger area 0.3-0.4 m^2 per kW max. heat output of the heat pump during the operating time of the system (air/water heat pumps at A20/W50)
- Min. drinking water volume = daily requirement
- In two-stage heat pumps, the output of the first stage can be used.

Example Heating

System example: Brine/water and water/water heat pumps without buffer storage tank

Application
Underfloor heating with heat storage capacity, low temperature heating system with heating group without thermostatic valves

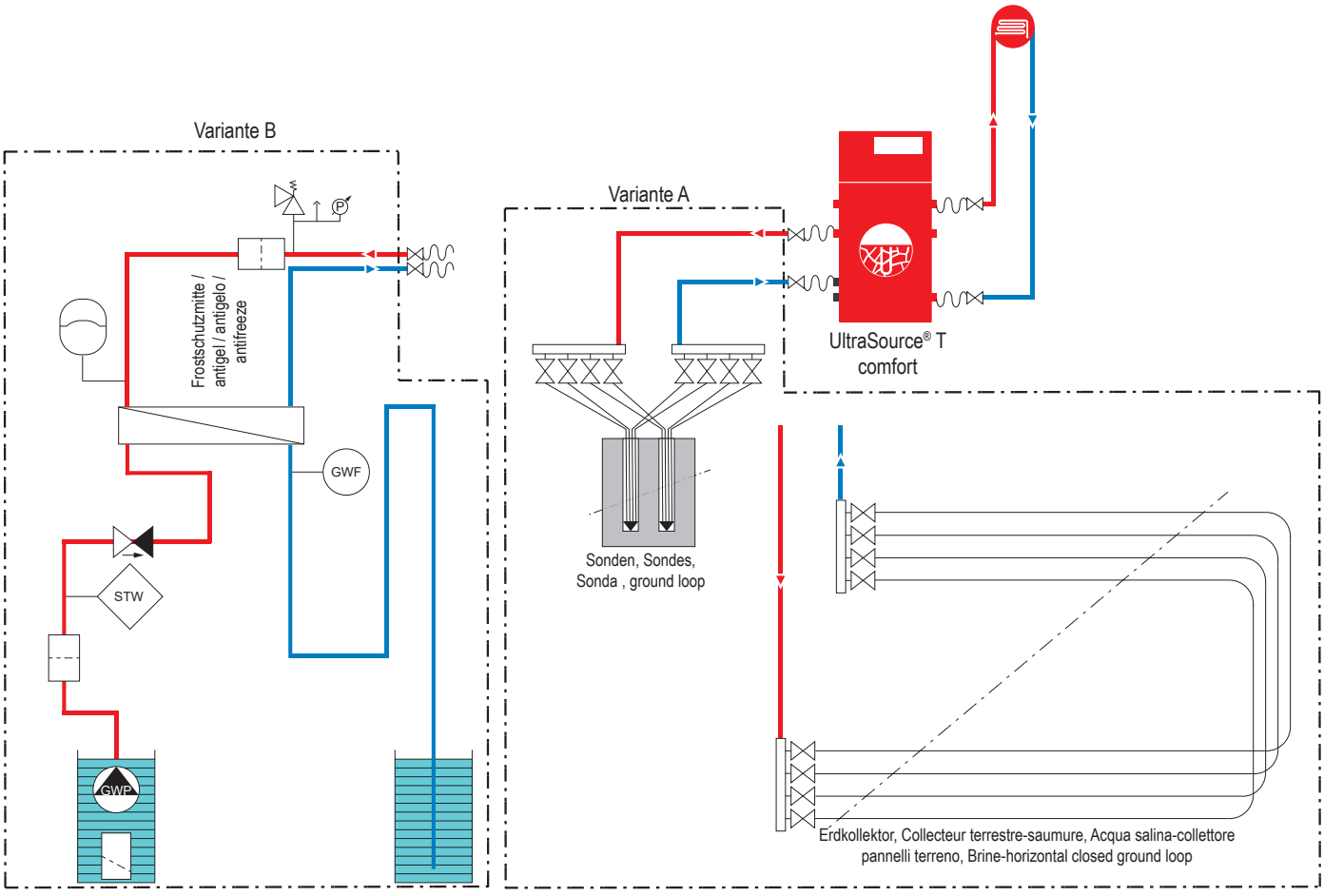
Heat pump function
The heat pump works in dependence on the outdoor temperature (2-point regulator) with continuously controlled operating mode. The underfloor heating balances unfavourable output/load ratios.

The heat pump is put into operation when the temperature level in the return falls below a preset level. Switch-on and switch-off command via return sensor.
The switching difference is adjustable.
The additional re-switching delay allows a maximum of 3 starts per hour.
The switching function is controlled by a microprocessor, allows long runtimes and ensures a higher annual coefficient of performance for the heat pump.

Heating controller
The weather-controlled heating controller (2-point controller) guarantees a good heat supply to the heating system and works in a user-defined manner.

Ensure a minimum system water content.

If the heating circuits are equipped with thermostatic valves, a bypass with a relief valve must be installed.



Notice
The example schematics merely show the basic principle and do not contain all information required for installation. The installation must be done according to local conditions, dimensioning and regulations.

Example Heating

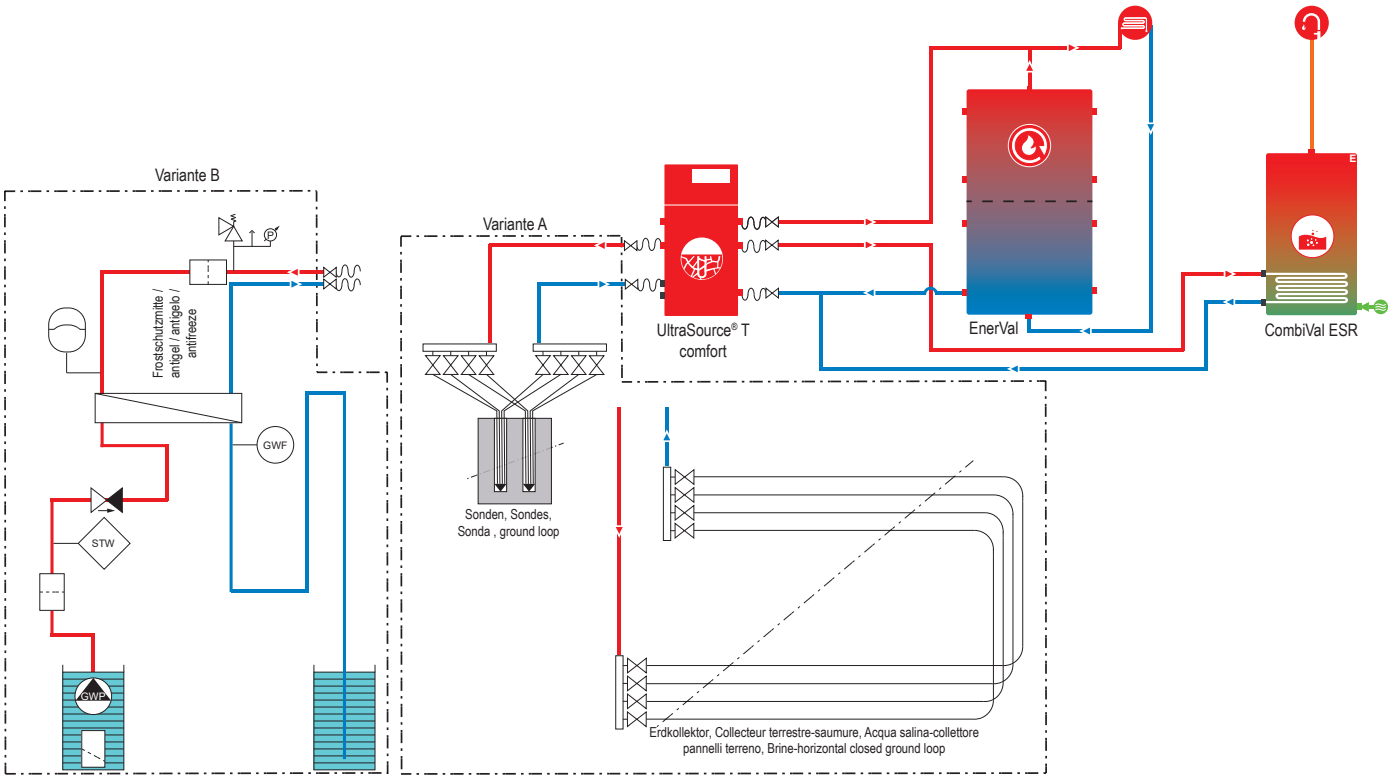
System example:
Brine/water and water/water heat pumps with buffer storage tank and calorifier

Application
Low temperature heating system with max. 2 heating groups, one buffer storage tank and one calorifier

Heat pump function
The heat pump works in dependence on the outdoor temperature (2-point regulator) with continuously controlled operating mode. The buffer storage tank balances unfavourable output/load ratios, allows energy-efficient and user-defined discharge and has a positive influence on the service life of the heat pump.

The heat pump is only put into operation when the temperature level in the buffer storage tank no longer meets heating system requirements and is taken out of operation when the additional output can no longer be absorbed by the buffer storage tank.
The switching difference is adjustable and allows long runtimes.
The additional re-switching delay allows a maximum of 3 start-ups per hour and guarantees a long service life. The switching functions are controlled by a microprocessor, ensuring long runtimes and a high annual Coefficient of Performance for the heat pump.

Heating controller
The weather-controlled heating controller (3-point controller) as a discharge control guarantees an optimum heat supply to the heating system and works in a user-defined manner for maximum convenience.



Notice
The example schematics merely show the basic principle and do not contain all information required for installation. The installation must be done according to local conditions, dimensioning and regulations.

Flat collectors DA 25, 120 m
Laying distance 0.5 m

Heating load (incl. domestic hot water)		kW	UltraSource® T comfort/ compact (8) 3	4	5	6	7	UltraSource® T comfort/ compact (13) 8	9	10	11	12	13	UltraSource® T comfort (17) 14	15	16	17	18
15 W/m²	Required area	m²	160	213	260	313	367	427	480	533	587	640	693	747	800	853	907	960
	Number of collector circuits	units	4	5	6	7	8	9	10	12	13	14	15	16	17	18	19	20
20 W/m²	Required area	m²	120	160	195	235	275	320	360	400	440	480	520	560	600	640	680	720
	Number of collector circuits	units	3	4	5	5	6	7	8	9	10	10	11	12	13	14	15	15
25 W/m²	Required area	m²	96	128	156	188	220	256	288	320	352	384	416	448	480	512	544	576
	Number of collector circuits	units	2	3	3	4	4	5	5	6	6	7	7	8	8	9	10	10
30 W/m²	Required area	m²	80	107	130	157	184	214	240	267	294	320	347	374	400	427	454	480
	Number of collector circuits	units	2	2	3	3	4	4	4	5	5	6	6	7	7	8	8	8
35 W/m²	Required area	m²	69	92	112	135	158	183	206	229	252	275	298	320	343	366	389	412
	Number of collector circuits	units	2	2	2	3	3	4	4	4	5	5	5	6	6	7	7	7

Type			Thermalia® comfort (8)	(10)	(13)	(17)	H (7)	H (10)
15 W/m²	Required area	m²	393	560	707	907	340	473
	Number of collector circuits	units	9	12	15	19	8	10
20 W/m²	Required area	m²	295	420	530	680	255	355
	Number of collector circuits	units	7	9	12	15	6	8
25 W/m²	Required area	m²	236	336	424	544	204	284
	Number of collector circuits	units	4	6	8	10	4	5
30 W/m²	Required area	m²	197	280	354	454	170	237
	Number of collector circuits	units	4	5	6	8	3	4
35 W/m²	Required area	m²	169	240	303	389	146	203
	Number of collector circuits	units	3	4	6	7	3	4

Type			Thermalia® twin (20)	(26)	(36)	(42)	H (13)	H (19)	H (22)
15 W/m²	Required area	m²	1080	1380	1880	2213	640	927	1087
	Number of collector circuits	units	23	29	40	47	14	20	23
20 W/m²	Required area	m²	810	1035	1410	1660	480	695	815
	Number of collector circuits	units	17	22	30	35	10	15	17
25 W/m²	Required area	m²	648	828	1128	1328	384	556	652
	Number of collector circuits	units	11	14	19	23	7	10	11
30 W/m²	Required area	m²	540	690	940	1107	320	464	544
	Number of collector circuits	units	9	12	16	19	6	8	10
35 W/m²	Required area	m²	463	592	806	949	275	398	466
	Number of collector circuits	units	8	10	14	16	5	7	8

Type			Thermalia® dual R (55)	R (70)	R (85)	R (110)	R (140)	H (35)	H (50)	H (70)	H (90)
15 W/m²	Required area	m²	3027	3820	4433	5920	7193	1793	2700	3647	4453
	Number of collector circuits	units	64	80	93	124	150	38	57	76	75
20 W/m²	Required area	m²	2270	2865	3325	4440	5395	1345	2025	2735	3340
	Number of collector circuits	units	48	60	70	93	113	29	43	57	70
25 W/m²	Required area	m²	1816	2292	2660	3552	4316	1076	1620	2188	2672
	Number of collector circuits	units	31	39	45	60	72	18	27	37	45
30 W/m²	Required area	m²	1514	1910	2217	2960	3597	897	1350	1824	2227
	Number of collector circuits	units	26	32	37	50	60	15	23	31	38
35 W/m²	Required area	m²	1298	1638	1900	2538	3083	769	1158	1563	1909
	Number of collector circuits	units	22	28	32	43	52	13	20	27	32

Extraction rates

Soil type	Heat extraction rate [W/m²]
Dry, sandy soil	10-15
Moist, sandy soil	15-20
Dry, loamy soil	20-25
Moist, loamy soil	25-30
Silt	30-35
Sandy clay	35-40

- The design of flat collectors when using heat pumps with modulating output (types: UltraSource® T comfort and compact) is based on the heat load of the building in accordance with DIN EN 12831 and the demand for hot water and pool, if present. This total demand (total output) minus the nominal compressor input power corresponds to the heat extraction power required by the flat collector
- All information relates to a total running time per year of max. 1800 h (heating of living space and water heating). This corresponds to a monovalent configuration when the heat pump meets the required total output for heating and domestic hot water (standard systems without special use). If the operating time is longer, the heat source must also be enlarged correspondingly.

Flat collectors DA 32, 200 m
Laying distance 0.65 m

Heating load (incl. domestic hot water)		kW	UltraSource® T comfort/ compact (8) 3	4	5	6	7	UltraSource® T comfort/ compact (13) 8	9	10	11	12	13	UltraSource® T comfort (17) 14	15	16	17	18
15 W/m²	Required area	m²	160	213	260	313	367	427	480	533	587	640	693	747	800	853	907	960
	Number of collector circuits	units	2	2	2	3	3	4	4	4	5	5	6	6	6	7	7	8
20 W/m²	Required area	m²	120	160	195	235	275	320	360	400	440	480	520	560	600	640	680	720
	Number of collector circuits	units	1	2	2	2	3	3	3	3	4	4	4	5	5	5	6	6
25 W/m²	Required area	m²	96	128	156	188	220	256	288	320	352	384	416	448	480	512	544	576
	Number of collector circuits	units	1	1	2	2	2	2	3	3	3	3	4	4	4	4	5	5
30 W/m²	Required area	m²	80	107	130	157	184	214	240	267	294	320	347	374	400	427	454	480
	Number of collector circuits	units	1	1	1	2	2	2	2	3	3	3	3	3	3	4	4	4
35 W/m²	Required area	m²	69	92	112	135	158	183	206	229	252	275	298	320	343	366	389	412
	Number of collector circuits	units	1	1	1	2	2	2	2	2	2	3	3	3	3	3	3	4

Type			Thermalia® comfort (8)	(10)	(13)	(17)	H (7)	H (10)
15 W/m²	Required area	m²	393	560	707	907	340	473
	Number of collector circuits	units	3	5	6	7	3	4
20 W/m²	Required area	m²	295	420	530	680	255	355
	Number of collector circuits	units	3	4	4	6	2	3
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	Number of collector circuits	units	2	3	4	5	2	3
30 W/m²	Required area	m²	197	280	354	454	170	237
	Number of collector circuits	units	2	3	3	4	2	2
35 W/m²	Required area	m²	169	240	303	389	146	203
	Number of collector circuits	units	2	2	3	3	2	2

Type			Thermalia® twin (20)	(26)	(36)	(42)	H (13)	H (19)	H (22)
15 W/m²	Required area	m²	1080	1380	1880	2213	640	927	1087
	Number of collector circuits	units	9	11	15	17	5	7	9
20 W/m²	Required area	m²	810	1035	1410	1660	480	695	815
	Number of collector circuits	units	7	8	11	13	4	6	7
25 W/m²	Required area	m²	648	828	1128	1328	384	556	652
	Number of collector circuits	units	5	7	9	10	3	5	5
30 W/m²	Required area	m²	540	690	940	1107	320	464	544
	Number of collector circuits	units	5	6	8	9	3	4	5
35 W/m²	Required area	m²	463	592	806	949	275	398	466
	Number of collector circuits	units	4	5	7	8	3	3	4

Type			Thermalia® dual R (55)	R (70)	R (85)	R (110)	R (140)	H (35)	H (50)	H (70)	H (90)
15 W/m²	Required area	m²	3027	3820	4433	5920	7193	1793	2700	3647	4453
	Number of collector circuits	units	23	29	34	45	54	14	21	28	34
20 W/m²	Required area	m²	2270	2865	3325	4440	5395	1345	2025	2735	3340
	Number of collector circuits	units	18	22	25	34	41	11	16	21	26
25 W/m²	Required area	m²	1816	2292	2660	3552	4316	1076	1620	2188	2672
	Number of collector circuits	units	14	18	20	27	33	9	13	17	21
30 W/m²	Required area	m²	1514	1910	2217	2960	3597	897	1350	1824	2227
	Number of collector circuits	units	12	15	17	23	27	7	11	14	17
35 W/m²	Required area	m²	1298	1638	1900	2538	3083	769	1158	1563	1909
	Number of collector circuits	units	10	13	15	20	24	6	9	12	15

Extraction rates

Soil type	Heat extraction rate [W/m²]
Dry, sandy soil	10-15
Moist, sandy soil	15-20
Dry, loamy soil	20-25
Moist, loamy soil	25-30
Silt	30-35
Sandy clay	35-40

- The design of flat collectors when using heat pumps with modulating output (types: UltraSource® T comfort and compact) is based on the heat load of the building in accordance with DIN EN 12831 and the demand for hot water and pool, if present. This total demand (total output) minus the nominal compressor input power corresponds to the heat extraction power required by the flat collector
- All information relates to a total running time per year of max. 1800 h (heating of living space and water heating). This corresponds to a monovalent configuration when the heat pump meets the required total output for heating and domestic hot water (standard systems without special use). If the operating time is longer, the heat source must also be enlarged correspondingly.

Heating load (incl. domestic hot water)		kW	UltraSource® T comfort/ compact (8) 3	4	5	6	7	UltraSource® T comfort/ compact (13) 8	9	10	11	12	13	UltraSource® T comfort (17) 14	15	16	17	18
40 W/m	Total depth	m	60	80	98	118	138	160	180	200	220	240	260	280	300	320	340	360
	Frost protection	l	41	56	68	81	96	110	124	138	152	165	180	193	206	221	234	247
45 W/m	Total depth	m	54	72	87	105	123	143	160	178	196	214	232	249	267	285	303	320
	Frost protection	l	37	49	60	72	85	98	110	122	136	148	160	172	184	197	209	221
50 W/m	Total depth	m	48	64	78	94	110	128	144	160	176	192	208	224	240	256	272	288
	Frost protection	l	33	44	53	65	76	88	100	110	121	132	144	154	165	177	188	198
55 W/m	Total depth	m	44	59	71	86	100	117	131	146	160	175	190	204	219	233	248	262
	Frost protection	l	31	41	49	60	69	81	90	101	110	121	130	141	150	161	170	181
60 W/m	Total depth	m	40	54	65	79	92	107	120	134	147	160	174	187	200	214	227	240
	Frost protection	l	28	37	45	55	64	73	82	92	101	110	120	129	138	148	157	165

Type			Thermalia® comfort (8)	(10)	(13)	(17)	comfort H (7)	(10)	twin (20)	(26)	(36)	(42)
40 W/m	Total depth	m	148	210	265	339	128	178	405	518	705	830
	Frost protection	l	105	149	188	241	91	127	288	369	502	591
45 W/m	Total depth	m	132	187	236	301	114	158	360	460	627	738
	Frost protection	l	94	133	168	214	81	113	256	327	446	525
50 W/m	Total depth	m	118	168	212	271	102	142	324	414	564	664
	Frost protection	l	84	119	151	193	73	101	231	295	401	473
55 W/m	Total depth	m	108	153	193	247	93	130	295	377	513	604
	Frost protection	l	77	109	137	176	66	92	210	268	365	430
60 W/m	Total depth	m	99	140	177	226	85	119	270	345	470	554
	Frost protection	l	70	100	126	161	60	85	192	246	335	394

Type			Thermalia® twin H (13)	(19)	(22)	dual, dual R (55)	(70)	(85)	(110)	(140)	dual H (35)	(50)	(70)	(90)
40 W/m	Total depth	m	240	348	408	1135	1433	1663	2138	2698	670	1013	1365	1675
	Frost protection	l	171	248	290	808	1020	1183	1522	1920	477	721	972	1192
45 W/m	Total depth	m	214	309	363	1009	1274	1478	1900	2398	596	900	1214	1489
	Frost protection	l	152	220	258	718	907	1052	1352	1706	424	641	864	1060
50 W/m	Total depth	m	192	278	326	908	1146	1330	1710	2158	536	810	1092	1340
	Frost protection	l	137	198	232	646	815	946	1217	1536	381	577	777	954
55 W/m	Total depth	m	175	253	297	826	1042	1210	1555	1962	488	737	993	1219
	Frost protection	l	124	180	211	588	742	861	1106	1396	347	524	707	868
60 W/m	Total depth	m	160	232	272	757	955	1109	1425	1799	447	675	910	1117
	Frost protection	l	114	165	194	539	679	789	1014	1280	318	480	647	795

* The total depth and the frost protection concentration are calculated for duplex probes (4 x 32 x 2.9) and corresponds to 33 % in vol. Hoval frost protection concentrate for a frost protection of -15 °C. The frost protection for the connection pipes and supply pipes is to be calculated separately. The dimensioning table offers reference values for planning and is not intended as a substitute for geological evaluation.

Where the total depth is split between several boreholes, an additional allowance must be made.
These allowances depend, amongst other things, on the distance between the boreholes.

Extraction rates

Soil type	Heat extraction rate [W/m]
Sand, dry gravel	< 25
Sand, grit, aquiferous	65-80
Clay, moist loam	35-50
Solid limestone	55-70
Sandstone	65-80
Acidic magmatite (e.g. granite)	65-85
Basic magmatite (e.g. basalt)	40-65
Gneiss	70-85

- The design of flat collectors when using heat pumps with modulating output (types: UltraSource® T comfort and compact) is based on the heat load of the building in accordance with DIN EN 12831 and the demand for hot water and pool, if present. This total demand (total output) minus the nominal compressor input power corresponds to the heat extraction power required by the flat collector
- All information relates to a total running time per year of max. 1800 h (heating of living space and water heating). This corresponds to a monovalent configuration when the heat pump meets the required total output for heating and domestic hot water (standard systems without special use). If the operating time is longer, the heat source must also be enlarged correspondingly.

1 Explanation
To use the geothermal heat, geothermal collector circuits made of plastic with 120 m each are laid horizontally and at a depth of approx. 1.2 m to 1.5 m. The collector pipes contain a mixture of water and frost protection agent which is circulated by means of a circulating pump. The energy is transferred to an intermediate heat exchanger, which is where the evaporation takes place.

2 Laying depth
Depending on the depth of frost penetration, at least 20 cm under. A laying depth of between 1.2 m and 1.5 m is generally sufficient. Laying depths more than 2 m are to be avoided.

3 Laying distance
In practice, routing is carried out with the following average distances:
Pipe DA 25 = 0.5 m
Pipe DA 32 = 0.65 m

4 Laying area
The laying area must be grown and must not be raised unevenly. Before the first heat extraction, the ground has to be compressed. The surface must be undeveloped and even, have only a minimal slope and moreover may not be built on and/or sealed (asphalted, concreted over) at a later point in time. Sloping sites should be avoided because of the risk of slipping, but do not represent a problem for the function of the heat pump system.
It is important on sloping sites that the collector is laid across the slope, and that the distributor is located at the highest point if possible (ventilation). The location of the flat collector must be entered on a plan which remains attached to the heat pump.

5 Bringing in the collectors
The collector pipes cannot be kinked or dented. The circuits are laid in a sand bed of approx. 10 cm. The circuits are then covered on every side with sand in order to protect them and to allow optimum heat transfer. The sand not needed between the collectors can be used for this. The circuits of 120 m each are to be laid in their entirety (do not shorten them!) and extended into the shaft and/or into the basement approx. 1 m or until assembly can be carried out smoothly at the distributor. When it is being filled, the collector must be kept under 3 bar (pressure protocol). It is recommended to lay warning tapes approx. 50 cm above the collector pipes. The brine circuit is to be filled with a water-frost protection agent mixture with a frost protection of -15 °C (when using the 33 % in vol. Hoval frost protection concentrate). Practical guide: Use water that has been preheated to 30 °C when mixing so that a lasting mixture is ensured and a sound measurement of frost protection is possible.

6 Safety distances
Water pipes: min. 1.5 m
Ducts: min. 1 m
Buildings, walls, area border: min. 1.2 m.
If these minimum distances cannot be observed, the object to be protected has to be insulated accordingly (closed pore insulation) to avoid frost damage.

7 Connection pipe to heating house
It is recommended to join the collector circuits to a shaft (preferably Hoval geothermal heat shaft), so that only two pipes have to be fed to the heating house after that. The geothermal heat shaft must be rainwater-tight and it is essential that it is drained (gravel layer, drainage, ...). The connection pipes are also to be laid in a sand bed.

Configuration of the connection pipe according to applicable standards of the country in question.

The following dimensions are recommended (material PE-HD PN10):

UltraSource® T (8), Thermalia® comfort (8-10), comfort H (7,10): DA 40
UltraSource® T (13,17),
Thermalia® comfort (13,17), twin H (13): DA 50
Thermalia® twin (20,26), twin H (19,22): DA 63
Thermalia® twin (36-42), dual (55),
dual H (35,50), dual R (55): DA 75
Thermalia® dual (70,85), dual H (50-90),
dual R (70,85): DA 90

8 Commissioning
Commissioning of the heat pump is carried out exclusively by Hoval customer service. The heat pump must be electrically connected and the system filled, well flushed and vented. After commissioning, the customer receives a completion certificate.

1 Explanation
To use the geothermal heat, depth probes (preferably 2-circuit probes) are inserted into the ground to a max. depth of 200 m per bore hole. The collector pipes contain a mixture of water and frost protection agent which is circulated by means of a circulating pump. The energy is transferred to an intermediate heat exchanger, which is where the evaporation takes place.
A letter of approval is required from the authorities to lay a heat pump unit with depth probe.

2 Dimensioning of the deep borehole
The quick guide offers guide values for planning and is not intended as a substitute for geological evaluation.
In the case of special applications which do not increase the output of the heat pump (e.g. outdoor swimming pool), the heat source must be enlarged if the annual runtime is extended (greater annual extraction).

3 Laying/drilling depth
The boreholes are made according to calculation and the probes are inserted by the drilling company. If the subsoil actually hit differs from the projected geology, the depth of the borehole(s) must be adjusted to the new situation!
The connection pipes are laid in trenches at a depth of approx. 1.2 m.

4 Laying/drilling spacing
Centre of deep borehole to centre of deep borehole min. 7 m (depending on the approval from the authorities, other distances can be stipulated). Larger distances between the boreholes reduce the additional allowance made for the total borehole metres.
The connection pipes are to be laid in a sand bed with a minimum distance of 50 cm.

5 Laying/drilling area
The surface must be undeveloped and even, and have only a minimal slope. The drilling points must be accessible with a drilling device (approx. 20 t in weight, approx. 3 m wide). The position of the depth probes and connection pipes is to be drawn on a plan, which remains on the heat pump.

6 Bringing in the depth probes
The drilling company makes the borehole, inserts and backfills the probe and performs a pressure test. Ensure that the probe is properly and sufficiently backfilled from bottom to top.
It is recommended to use 2-circuit (duplex) probes. Water and electricity are needed to make the borehole. The drilling mud must be capable of being stored at the borehole (skip or container). Buildings should possibly be protected against splash water from the drilling.
If several boreholes are required, ensure that the boreholes all have the same depth and that the connection pipes are all the same length in order to ensure equal rock pressure conditions. Otherwise, flow rate indicators have to be installed. It is recommended to lay warning tapes approx. 50 cm above the connection pipes.
The brine circuit is to be filled with a water-frost protection agent mixture with a frost protection of -15 °C (when using the 33 % in vol. Hoval frost protection concentrate). Practical guide: Use water that has been preheated to 30 °C when mixing so that a lasting mixture is ensured and a sound measurement of frost protection is possible.

7 Safety distances
Between the boreholes: min. 7 m.
To water pipes, ducts, buildings, walls and area borders: min. 3 m.
Depending on the approval from the authorities, other distances can be stipulated.

8 Connection pipe to heating house
It is recommended to join the collector circuits to a shaft (preferably Hoval geothermal heat shaft), so that only two pipes have to be fed to the heating house. The geothermal heat shaft must be rainwater-tight and it is essential that it is drained (gravel layer, drainage, ...). The connection pipes are also to be laid in a sand bed.

Configuration of the connection pipe according to applicable standards of the country in question.

The following dimensions are recommended (material PE-HD PN 10):

UltraSource® T (8), Thermalia® comfort (8-10), comfort H (7,10): DA 40
UltraSource® T (13,17), Thermalia® comfort (13,17), twin H (13): DA 50
Thermalia® twin (20,26), twin H (19,22): DA 63
Thermalia® twin (36-42), dual (55), dual H (35,50), dual R (55): DA 75
Thermalia® dual (70,85), dual H (50-90), dual R (70,85): DA 90

The specified dimensions are sufficient for connection pipes with a length of approx. 25 m (one direction). For longer connection pipes, choose a larger pipe diameter.

9 Curing time
Standard cement-bentonite mixtures for the grouting of the depth probes have a curing time of 28 days. Within this time period, the depth probe cannot be operated yet. Ask the drilling company about this.

10 Commissioning
Commissioning of the heat pump is carried out exclusively by Hoval customer service.
The heat pump must be electrically connected and the system filled, well flushed and vented. After commissioning, the customer receives a completion certificate.

1 Explanation

To use the ground water heat, pumping and injection wells are mounted. A submerged pump pumps the ground water through an intermediate heat exchanger. This intermediate circuit, which is filled with frost protection agent, transfers the energy to a heat exchanger in the heat pump, which is where evaporation takes place. A letter of approval is required from the authorities to mount a water/water heat pump unit.

2 Direct utilisation of ground water (without intermediate circuit)

The design of modern evaporators (brazed plate heat exchangers with very narrow plate spacing for high transfer rates) is such that applications with direct ground water throughflow are not allowed. These evaporators have very narrow flow channels and are extremely sensitive to even very fine dirt particles such as those abundant in ground water. If individual channels become blocked, they can freeze, resulting in leakage. This can cause irreparable damage to the heat pump. Flow monitors and temperature monitoring devices cannot be used, as the deviations are so slight that they are not registered. Upstream fine filters provide only a partial solution to the problem and need frequent cleaning.

Notice
In the case of systems without an intermediate heat exchanger (direct utilisation of ground water), Hoval accepts no liability for any damage caused by soiling or freezing of the evaporator!

3 Indirect utilisation of ground water (with intermediate circuit)

The somewhat lower performance coefficient is more than compensated for by the high operational reliability. Even with indirect use, ground water analysis is essential to allow selection of the appropriate intermediate heat exchanger and in order to identify problems caused by iron or manganese in combination with oxygen. Ideally, a separating heat exchanger in gasketed design should be used. Such heat exchangers can be dismantled for cleaning and have wider plate spacing. The hydraulic **piping** of the system must be carried out according to the selected hydraulic schematic. The intermediate circuit is filled with frost protection agent for frost protection of -15 °C (corresponds to 33 % in vol. Hoval frost protection concentrate). The output of the heat pump can thus be read off for brine +7 °C.

4 Ground water

A pump trial run of at least 3 days must be performed in order to ascertain the effectiveness and in order to “clean” the production well. The minimum permissible temperature of the returned ground water is 5 °C.

For the intermediate heat exchanger, the following limit values must be observed during the entire operating time of the heat pump (groundwater analyses are essential, the water quality can change constantly):

ph-value	7-9
Sulphates	< 100 mg/l
Chlorides	< 50 mg/l
Nitrates	< 100 mg/l
Phosphates	< 2 mg/l
Free chlorides	< 0.5 mg/l
Free carbonic acid	< 20 mg/l
Ammonia	< 2 mg/l
Iron	< 0.2 mg/l [1]
Manganese	< 0.1 mg/l [1]
Oxygen	< 2 mg/l [1]
Electric conductivity	50-600 µS/cm

[1] If the limit value for iron or manganese is exceeded, the presence of oxygen leads to silting up of the heat exchanger or formation of iron and manganese oxide deposits in the injection well.

5 Wells

Two bored wells are ideally mounted. However, where the geology permits this, the injection well can also be used as an absorbing well. Chiselled wells are to be avoided. The injection well should be at least 10 to 15 m away from the ground water flow (depending on the ground water situation, greater distances may be necessary).

6 Connection pipe

The supply and drainage pipes must be laid so that they are protected against frost at a minimum depth of 1.5 m. Ensure that there is a slight slope to the well.
From the production well, a feed pipe is to be laid for the electrical supply pipe of the pump. A backflushable fine filter with a maximum mesh size of 0.5 mm must be placed in the supply pipe, upstream of the heat pump.

A flow monitor is to be installed in the drainage pipe, upstream from the heat pump, to protect the heat pump (observe the installation instructions). After the flow monitor, a throttle valve is to be installed to adjust the flow rate. The connection pipes are also to be laid in a sand bed.

The following dimensions are recommended (material PE-HD PN 10):

UltraSource® T (8), Thermalia® comfort (8-10), comfort H (7,10): DA 40
UltraSource® T (13,17), Thermalia® comfort (13,17), twin H (13): DA 50
Thermalia® twin (20,26), twin H (19,22): DA 6
Thermalia® twin (36-42), dual (55), dual H (35,50), dual R (55): DA 75
Thermalia® dual (70,85), dual H (50-90), dual R (70,85): DA 90

The specified dimensions are sufficient for connection pipes with a length of approx. 25 m (one direction). For longer connection pipes, choose a larger pipe diameter.

7 Design of the well pump

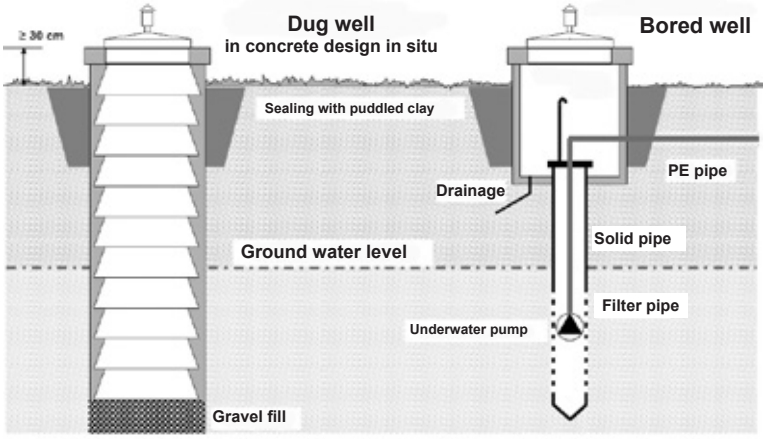
$$m_W = \frac{(Q_K \times 3600)}{(c \times \Delta T)} \quad [kg/h]$$

m_W = mass flow [kg/h] (corresponds approx. to a water flow rate [l/h])
Q_K = refrigerating capacity of the heat pump = heat output – electrical output [kW]
c = specific thermal capacity [kJ/kg.K] (c = 4.187 kJ/kg.K)
ΔT = temperature difference [K] (cooling down of the ground water)
3600 = conversion factor (1 kWh = 3600 kJ)

Rule of thumb: 200 l/h per kW heat pump heat output with a temperature difference of 4 K. Underwater pumps with an integrated non-return flap must be used.

8 Commissioning

Commissioning of the heat pump is carried out exclusively by Hoval customer service. The heat pump must be electrically connected and the system filled, well flushed and vented. After commissioning, the customer receives a commissioning report.



Active/passive cooling

- The low temperature can be output into the room using various systems
- Structural conditions (underfloor heating) and requirements on the room air status (dehumidification, room air temperature) must be taken into account when selecting the system
- It is a good idea to plan a separate cooling circuit for cooling. It can, for example, be combined with a cooling ceiling or a ventilation system
- For lower comfort requirements where a cooling effect suffices, heating via underfloor heating or partial cooling via fan convectors is also possible
- Special thermostatic valves are required that are suitable for heating and cooling operations. Standard thermostatic valves for heating systems close at low room temperatures

Cooling via panel heating

- In panel cooling, the surfaces enclosing the room (ceilings, floors or walls) are cooled by the following systems:
  - Underfloor heating, wall heating
  - Cooling ceilings
  - Concrete core temperature control
- In all panel cooling systems, the temperature at the surfaces is not allowed to fall below the dewpoint temperature so that condensation will not form
- The fixed value of 18 °C is not allowed to be reduced by the user
- Dehumidification of the room air is not possible with panel cooling systems, and must be performed using additional systems if required
- If the room air is not dehumidified, the relative humidity will increase as the room temperature falls – which can lead to a reduction in comfort
- A plate heat exchanger is installed in the brine circuit (passive cooling)
- The minimum cooling temperature (dewpoint temperature) is regulated by a 3-way mixer valve
- A dewpoint monitor is required so as to avoid condensation formation (dropping below the dewpoint) on the cooling surfaces.

Cooling by fan convectors

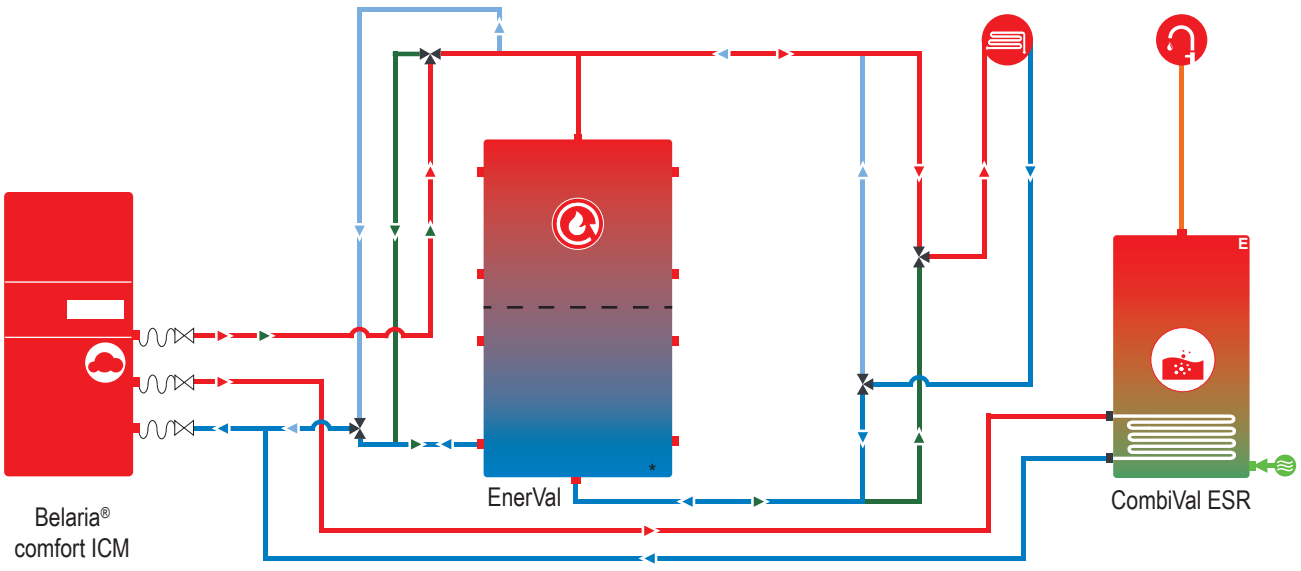
- Recommended use only with active cooling
- The heat pump must be equipped with a flow monitor
- Fan convectors can cool and dehumidify the room air. This increases the comfort level
- In fan convectors, cold water flows in the cooling circuit at a temperature below the dewpoint. The resulting condensation must be drained away
- The connection pipes to the fan convector must be insulated to prevent vapour diffusion and avoid any condensation forming on them

Pipe systems

- Materials resistant to corrosion must be used, such as plastic, chromium steel or a steel that has been treated to resist corrosion
- Galvanised pipes or fittings are not allowed to be used
- In the building, the network of pipes including storage tanks and fittings must be insulated to prevent vapour diffusion and avoid any condensation forming

Examples

Active cooling



Notice
The example schematics merely show the basic principle and do not contain all information required for installation. The installation must be done according to local conditions, dimensioning and regulations.

Example Cooling

Active cooling

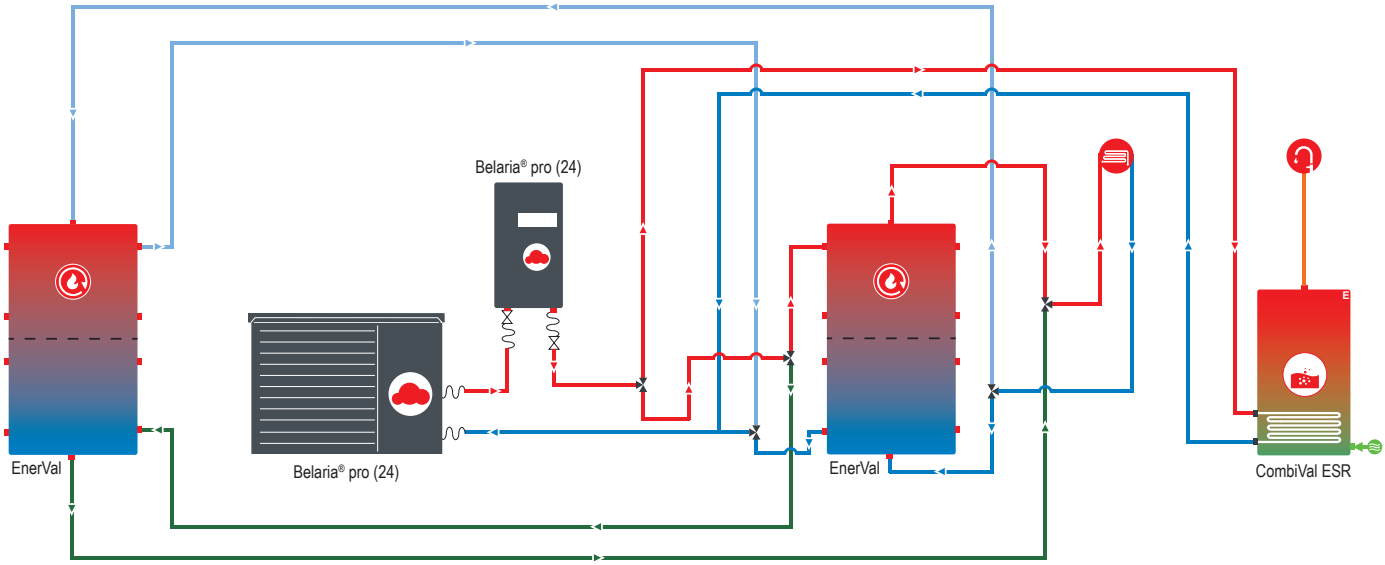
The cooling energy is produced actively with the heat pump for the purpose of cooling. To achieve this, process reversal is carried out in cooling operation. In this case, the heat utilisation side (condenser) becomes the heat absorption side (evaporator). In contrast to passive cooling, the compressor energy must be produced additionally. Cooling/heating operation cannot take place simultaneously. To ensure that the heat pump does not receive too many on/off switching and switchover commands to water heating, we recommend the use of a cooling buffer tank in every case. Depending on the system concept, the heating storage tank can also be used as a cooling storage tank.

General notes on cooling

- Cooling operation must always be monitored. If the room temperature is cooled in an unlimited manner, condensation will form. This, in turn, can damage components. We recommend monitoring the flow temperature in combination with the moisture (dewpoint limit thermostat)
- It is of advantage to plan a separate cooling circuit for cooling. It can, for example, be combined with a cooling ceiling or a ventilation system. For lower comfort requirements where a cooling effect suffices, heating via underfloor heating or partial cooling via fan convectors is also possible
- The water flow must be guaranteed, otherwise no cooling can take place. In case of cooling via the heating surfaces, individual thermostatic controls must be used, which can be switched to cooling mode. Otherwise the valves are closed in the summer and cooling cannot take place

Planning

- Hydraulic integration is ideally via a cooling buffer
- A mixer is required for adjustment of the cooling load of the rooms to the outdoor temperature
- To prevent the formation of condensation, the buffer and all brine and cold water pipes must be rendered vapour-impermeable and thermally insulated in accordance with recognised engineering practices
- Cooling mode is switched on or off manually
- To protect against frost damage in the condenser, it is mandatory to install a flow monitor in the pump circuit (see schematic)



Notice
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Example Cooling

Passive cooling via geothermal probes

Increasingly, at our latitudes, cooling of living areas is offered with the geothermal probe via the panel heating (underfloor or wall heating). The following instructions should be followed for careful planning and also to ensure that the user is fully aware of the limitations of this equipment technology, and operates the system correctly.

Planning

- The dewpoint in the floor or wall must not be undershot at any time
- This is achieved by a fixed value regulation of the flow temperature
- The fixed value must be set high enough to ensure that the dewpoint is not undershot
- The flow temperature setpoint is limited to min. 18 °C
- The cooling must be switched on and off manually

The following must be observed for systems with cooling by floor or wall surfaces:

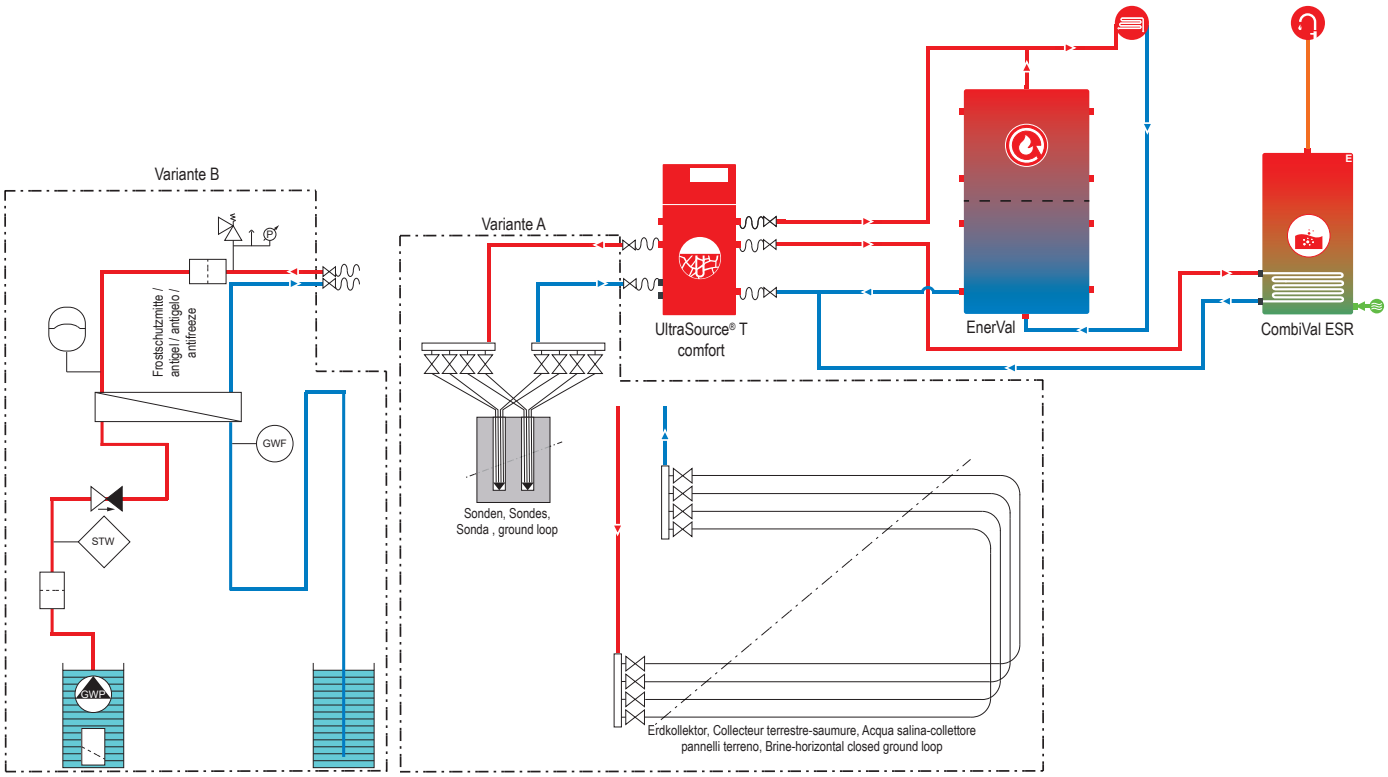
- The cold remains largely on the floor
- This temperature distribution can be perceived as uncomfortable: the occupant has cold feet and a warm head
- The temperature difference between the cooling surface and the air is very small
- No guaranteed cooling capacity can be specified
- Like panel heating, panel cooling also responds slowly
- No condensate is discharged; thus the relative humidity in the room increases
- The lower room temperature combined with the high relative humidity scarcely improves comfort. A humid climate is created
- The minimum limit of 18 °C is not allowed to be reduced by the user

Note the following in comparison with a small air conditioner:

- The energy savings compared to the air conditioner are small
- An air conditioner dehumidifies the air; a humid climate is not created
- An air conditioner delivers a cooling effect rapidly after being switched on
- The costs of an air conditioner are comparatively low

Comparison with other cooling systems:

Surface cooling systems are also used in some cases for cooling office buildings. However, these are usually ceiling cooling systems in conjunction with ventilation. So it is a combination of cooling by radiation (ceiling) and bringing in cool air (with dehumidification). This convenient system technology is usually too complicated and expensive for residential use. Ventilation convectors with condensate drip tray represent another option for air conditioning. Cooled and dehumidified air is introduced at certain places via the convectors (there should be no draughts). In this case, a reversible heat pump that can provide active cooling can also be used.



Notice
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Smart Grid (PV function)

Load management with heat pumps

Heat pumps are currently the most efficient method of storing electricity from volatile generation (electricity from renewable sources such as: wind power, photovoltaic systems or even from combined heat and power).
Smart Grid in this context refers to an intelligent power system.
In contrast to earlier electricity connections that only operate in one direction, the Smart Grid features many distributed electricity generation and consumption systems.
It is obvious that it makes most sense to consume the electricity close to where it is generated. This reduces the grid system load and the public grid system predominantly functions as a balancing mechanism.

The following conditions must be met by the system for efficient and convenient operation:
- Smart meter electricity tariff or the building's own PV system/small wind turbine with Smart Grid-capable inverter or PV load manager (own electricity consumption)
- Heat pump
- TopTronic® E
- Sufficiently large buffer storage tank
- Mixer circuit
- Possibly additional electrical heating

The heat pump is switched on and off or controlled depending on atmospheric conditions. Moreover, it is switched on when a particular green electricity surplus is reached and charges the buffer storage tank and any calorifiers to a higher temperature.
At times when no green electricity is available any longer, the heating is supplied from the charged buffer storage tank. The heat pump needs to be operated less frequently during periods when no or only a little internal current is being generated.

SG Ready standard:
This defines the following 4 functions depending on the PV surplus:
- Normal operation (no influence)
- Heat pump inhibit
- Preferential operation (increased operation)
- Forced acceptance (max. operation)

This is implemented using 2 digital inputs on the TopTronic® E. A 4-core signal cable from the inverter/PV load manager or from the Smart Meter to the heat pump is required for this. The information must be provided potential-free.

0-10 V control:
An on-site energy manager provides a 0-10 V signal which is dependent on the PV surplus. Preferential operation (increased operation) and forced acceptance (max. operation) are activated by adjustable thresholds in the TopTronic® E depending on the available electrical output (PV surplus).

Hoval EnergyManager PV smart:
In addition to the remote monitoring function, the online connection (HovalConnect) of the heat pump system also has the Hoval EnergyManager PV smart integrated in it.
The Hoval EnergyManager PV smart operates with the solar radiation indicated in the weather forecast, and acts either on the preferential operation (increased operation) or forced acceptance (max. operation).

Thermalia® brine/water heat pumps

Material	Calorifier type			Heating surface [m²]	Thermalia® comfort, comfort H: (8)	(10)	(13)	(17)	H (7)	H (10)	Thermalia® twin, twin H: (20)	(26)	(36)	(42)	H (13)	H (19)	H (22)	Thermalia® dual, dual H, dual R: (55)	(70)	(85)	(110)	(140)	H (35)	H (50)	H (70)	H (90)
Enamel	CombiVal (= CV)	ER	200	0.95																						
			300	1.45																						
			400	1.80											■											
			500	1.90											■											
			800	3.70							■					■	■									
			1000	4.50							■	■														
		ESR	200	1.80											■											
			300	2.60	■										■											
			400	3.80	■	■			■	■	■				■	■	■									
		ESSR	500	5.90		■	■	■		■	■	■	■		■	■	■						■			
			800	7.00				■			■	■	■	■		■	■						■			
			1000	9.15				■			■	■	■	■				■					■	■		
	MultiVal (= MV)	ERR	300	0.80																						
			400	1.00																						
			500	1.30																						
		ESRR	500	4.30	■	■	■		■	■	■	■			■	■	■									
			800	5.20		■	■			■	■	■			■	■	■									
			1000	6.10		■	■	■			■	■	■		■	■	■						■			
Stainless steel	CombiVal (= CV)	CR	200	1.28																						
			300	1.28																						
			500	1.70											■											
			800	2.63																						
			1000	2.63																						
		CSR	300	2.56	■				■						■											
			400	3.40	■	■				■	■				■	■	■									
			500	5.26		■	■			■	■	■			■	■	■									
			800	6.30				■			■	■	■			■	■						■			
			1000	10.00				■			■	■	■	■				■					■	■		
			1250	10.00								■	■	■				■					■	■		
			1500	11.30									■	■				■	■				■	■		
			2000	12.70										■					■					■	■	
	MultiVal (= MV)	CRR	500	1.28																						
			800	1.28																						
			1000	1.28																						
		CSRR	500	5.20	■	■	■		■	■	■	■			■	■	■									
			800	7.40		■	■	■		■	■	■	■	■	■	■	■						■			
			1000	10.00			■	■			■	■	■	■		■	■	■					■	■		
			1500	11.30				■			■	■	■	■			■	■	■				■	■		
			2000	11.30								■	■	■				■	■				■	■		

The allocation of the calorifiers to the heat pumps is based on the heating surface of the storage tank coil, heat output of the heat pump for domestic hot water charging, maximum duration of domestic hot water charging and other parameters. For this reason, this allocation table only contains standard values.

Notice
For higher comfort requirements or a higher hot water requirement, we recommend the storage tank series with larger heating coils: series ESR and ESSR (or CSR).

Notice
The suggested combinations of heat pump with calorifier are a recommendation according to the suitable coil size and duration of domestic hot water charging (120 minutes). It is possible to deviate from the recommended combinations depending on how the customer uses it.

Thermalia® water/water heat pumps

					Thermalia® comfort, comfort H						Thermalia® twin, twin H							Thermalia® dual, dual H, dual R								
Heat generator type					(8)	(10)	(13)	(17)	H (7)	H (10)	(20)	(26)	(36)	(42)	H (13)	H (19)	H (22)	(55)	(70)	(85)	(110)	(140)	H (35)	H (50)	H (70)	H (90)
Material	Calorifier type			Heating surface [m²]																					
Enamel	CombiVal (= CV)	ER	200	0.95																					
			300	1.45																					
			400	1.80																					
			500	1.90																					
			800	3.70							■				■	■									
			1000	4.50							■	■				■	■								
		ESR	200	1.80																					
			300	2.60					■						■										
			400	3.80	■	■			■	■	■				■	■	■								
		ESSR	500	5.90	■	■	■			■	■	■			■	■	■								
			800	7.00			■	■			■	■	■		■	■	■								
			1000	9.15				■			■	■	■	■		■	■					■			
	MultiVal (= MV)	ERR	300	0.80																					
			400	1.00																					
			500	1.30																					
		ESRR	500	4.30	■	■			■	■	■				■	■	■								
			800	5.20	■	■	■		■	■	■	■			■	■	■								
			1000	6.10		■	■	■		■	■	■	■		■	■	■								
Stainless steel	CombiVal (= CV)	CR	200	1.28																					
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			800	2.63											■										
			1000	2.63																					
		CSR	300	2.56					■						■										
			400	3.40	■				■						■	■									
			500	5.26	■	■	■			■	■	■			■	■	■								
			800	6.30			■	■			■	■	■		■	■	■								
			1000	10.00				■			■	■	■	■		■	■					■			
			1250	10.00							■	■	■	■			■					■			
			1500	11.30								■	■	■								■			
			2000	12.70									■	■				■				■	■		
	MultiVal (= MV)	CRR	500	1.28																					
			800	1.28																					
			1000	1.28																					
		CSRR	500	5.20	■	■	■		■	■	■	■			■	■	■								
			800	7.40	■	■	■	■		■	■	■	■	■	■	■	■					■			
			1000	10.00		■	■	■		■	■	■	■	■	■	■	■					■			
			1500	11.30			■	■			■	■	■	■		■	■					■			
			2000	11.30							■	■	■	■			■								

The allocation of the calorifiers to the heat pumps is based on the heating surface of the storage tank coil, heat output of the heat pump for domestic hot water charging, maximum duration of domestic hot water charging and other parameters. For this reason, this allocation table only contains standard values.

Notice
The suggested combinations of heat pump with calorifier are a recommendation according to the suitable coil size and duration of domestic hot water charging (120 minutes). It is possible to deviate from the recommended combinations depending on how the customer uses it.

Notice
For higher comfort requirements or a higher hot water requirement, we recommend the storage tank series with larger heating coils: series ESR and ESSR (or CSR).

1. General

1.1 The following Terms and Conditions shall apply to all our present and future contracts for deliveries and other services (even if the said Terms and Conditions are not specifically mentioned in verbal, telephonic or fax communications).

1.2 All deviations from the present Terms and Conditions, ancillary verbal agreements and subsequent contractual amendments shall only be valid if they have been confirmed by us in writing.

1.3 Buying terms and conditions of the client shall not be valid even if they are not specifically rejected by us. Our Standard Terms and Conditions of Delivery shall be regarded as accepted at the latest upon receipt of our goods and services by the client.

1.4 If a provision of the present Terms and Conditions of Delivery proves to be wholly or partially invalid, the contracting parties shall replace the aforesaid provision by a new provision which comes as close as possible to the legal and economic intention of the invalid provision.

2. Offers

2.1 Our offers shall be subject to change without notice.

2.2 Orders shall only be regarded as accepted when they have been confirmed by us in writing.

2.3 Illustrations, drawings and all technical details in catalogues and printed material shall be approximate values as customary within the industry. They shall only be binding if specific reference is made to them in the contract. We shall also reserve the right to make technical and design changes after the conclusion of the contract.

2.4 Cost estimates, drawings and other documents shall remain our property and shall be subject to copyright protection; they may not be made available to third parties.

3. Regulations in the country of destination

3.1 At the latest at the time of the order, the buyer shall draw our attention to the regulations and standards in force in the country of destination relating to the design of the delivered goods and the operation thereof and also to the execution of services.

3.2 Our deliveries and services shall comply with the regulations and standards in the country of destination provided the buyer has drawn our attention thereto in accordance with Section 3.1.

3.3 The buyer shall duly inform us of any special application features of goods ordered from us if these differ from our general recommendations.

4. Prices

4.1 Our prices shall be ex works, net, excluding packaging.

4.2 All ancillary costs, e.g. freight, insurance, export, transit, import and other approvals, licenses and authentications, shall be for the account of the buyer. The buyer shall also bear all taxes, charges, customs duty, etc., which are levied in connection with the contract.

4.3 We shall reserve the right to make price adjustments if wage rates or material prices change between the date of the order confirmation and the contractual performance of the contract. Price increases shall normally be notified three months in advance. We shall be bound to the price stated in the order confirmation for a period of three months after the effective date of the price increase.

5. Payment terms

5.1 Unless otherwise agreed in writing, our invoices shall be payable within thirty days with no cash discount. Payment shall be deemed to have been made when the amount in question is at our unrestricted disposal on our account in Swiss Franks.

5.2 Payment dates shall be observed even if any delays whatsoever occur after shipment of the goods from our works. The buyer shall not be permitted to reduce or withhold payments on account of complaints or counterclaims not recognised by us.

5.3 Payments shall also be made if insignificant components are missing but usage of the delivered goods is not rendered impossible as a result or if rectification work has to be carried out on the delivery. We shall be entitled to reject rectification of the defect as long as the buyer has not discharged his/its obligations to us.

5.4 If the buyer fails to comply with the agreed payment dates, default interest shall be paid from the agreed due date without a reminder being issued; the aforesaid interest shall be based on the interest rates prevailing at the domicile of the buyer, but shall be not less than four percent above the current discount rate of the Swiss Central Bank.

5.5 We shall be entitled to make deliveries of pending orders dependent upon settlement of outstanding claims.

6. Reservation of title

6.1 Delivered goods shall remain our property (reserved goods) pending full and complete payment of all present and future claims to which we are entitled regardless of their legal cause. This shall also apply if payments are made in settlement of specifically designated claims.

6.2 The buyer shall be entitled to process and sell reserved goods in the ordinary course of business.

6.3 If our reserved goods are combined or intermingled with other goods, the buyer shall hereby transfer his/its ownership rights in the new goods or chattels to us upon the conclusion of the contract in the amount of the invoice value of the reserved goods.

6.4 If the goods are resold by the buyer, he/it shall hereby transfer to us upon the conclusion of the contract with us his/its claims arising from the aforesaid resale in the amount of the invoice value of the reserved goods.

6.5 If the reserved goods are used by the buyer to perform a works or works delivery contract, his/its claim from the aforesaid works or works delivery contract shall hereby be assigned to us in the same amount and on the same date as for the purchase price claim (Section 6.4).

6.6 As long as he/it is honouring his/its payment obligations, the buyer shall, however, be authorised to collect his/its resale claim which has been assigned to us. He/it may not dispose of such claims by way of assignment to third parties, however. The empowerment of the buyer to collect the claim may be revoked by us at any time. We shall be entitled to notify third party debtors of the assignment. The buyer shall be entitled to provide us with the necessary information and documents in order to enable us to enforce our rights.

6.7 If the value of our securities exceeds our total claims by more than 10 %, we shall be obliged to release securities of our choice at the request of the buyer.

6.8 The buyer shall inform us immediately of any pledge or other impediment to our property enforced by third parties.

6.9 The buyer shall be obliged to collaborate in measures required to protect our title. He/it shall, in particular, empower us upon the conclusion of the contract to make entries or prior notice of the reservation of title at his/its cost in public registers, books and documents, etc., in accordance with the relevant national laws and shall perform all formalities in this respect.

6.10 The buyer shall maintain the reserved goods at his/its cost for the duration of the reservation of title and shall insure the said goods against theft, breakage, fire, water and other risks in our favour. He/it shall also take all steps to ensure that our property claims are neither adversely affected nor rescinded.

7. Delivery periods

7.1 Delivery periods and deadlines stated by us shall be approximate unless we have given an express written confirmation of a deadline as binding.

7.2 Delivery periods shall be deemed to have been met if notification of readiness to deliver has been sent to the buyer before the end of the delivery period.

7.3 The delivery period shall be prolonged if details required for the performance of the contract are not received on time or if they are subsequently changed by the buyer.

7.4 The delivery period shall also be reasonably prolonged if impediments arise which we cannot avert despite exercise of the necessary care (e.g. major operational disruptions, industrial disputes, delayed or defective deliveries, force majeure, etc.).

7.5 If an agreed delivery date is met by more than 14 days, the buyer shall be obliged to set us a reasonable period of grace. The buyer may only withdraw from the contract if our goods have not been delivered by the end of the said period of grace. Compensation claims for non-performance, delayed performance or any consequential losses shall be excluded unless there was gross negligence on our part.

8. Transfer of risk

8.1 Unless expressly agreed otherwise in writing, our “ex works” deliveries shall be made in accordance with the international rules on the interpretation of commercial clauses of the International Chamber of Commerce (Incoterms) in the version in force on the date of the order confirmation.

8.2 The transfer of risk shall be determined by the aforesaid Incoterms.

8.3 Insurance against damages of any kind shall be the responsibility of the buyer.

8.4 Complaints in connection with the transport shall be immediately notified by the buyer to the last carrier upon receipt of the delivery.
8.5 If despatch is delayed at the request of the buyer or for any other reasons not attributable to us, the risk shall pass to the buyer on the original date envisaged for the “ex works” delivery. We shall be entitled to demand payment from this date onwards.

9. Delivery inspection

9.1 The buyer shall be required to inspect deliveries immediately. If the goods do not comply with the order or the delivery note or if visible defects are identified, he/it shall be obliged to notify the aforesaid to us in writing within eight days of receipt. Later complaints shall not be recognised. (Regarding transport damages, cf. Section 8.4)

10. Assembly and operations

10.1 The assembly, putting into operation, operation and maintenance of the delivered goods shall be carried out in accordance with our guidelines. They may be executed by our staff or by appropriately trained third parties as agreed with the buyer.
10.2 If we require a commissioning certificate for certain product groups, warranty claims for the proper functioning of the equipment can only be enforced if a proper hand-over has been documented by a confirmed commissioning certificate received by us within one month of the hand-over.

11. Warranty

11.1 Warranty period

11.1.1 The general warranty period shall be 12 months from the first commissioning but no longer than 18 months from the date on which the relevant goods left our works.
If despatch is delayed for reasons not attributable to us, the warranty shall lapse no later than 18 months after notification of the readiness to deliver.
The general warranty period shall exclude electrical components for which the warranty period shall be 6 months from the first commissioning but no later than 12 months from the date of shipment from our works.

11.1.2 We refer to Section 11.6.1 with regard to the warranty period for third party products.

11.1.3 The warranty period for components which we have repaired during the warranty period or have delivered as replacement shall be 12 months from the completion of our repair or from the date of the replacement delivery but no longer than the end of a period equivalent to twice the original warranty period as per Section 11.1.1.

11.2 Liability for material, design and workmanship defects

11.2.1 The contractual condition of the goods shall be based on the condition upon the transfer of risk.

11.2.2 Defects shall be notified to us immediately in writing.

11.2.3 We shall be liable for all components which can be shown to have become defective or unusable before the end of the warranty period as a result of defective materials, defective design or defective workmanship, with such components being repaired or replaced ex works immediately at our choice.

11.3 Liability for warranted qualities

11.3.1 Warranted qualities shall only be those which are specifically designated as such in the order confirmation or in the relevant specifications.

11.3.2 The aforesaid assurance shall apply at the latest until the end of the warranty period. If a taking-over test has been agreed with the buyer, the assurance shall be deemed as performed if proof of the relevant qualities is furnished during the aforesaid test.

11.3.3 If the warranted qualities are not performed or only partially performed, the buyer shall be entitled to an immediate rectification. The buyer shall grant us the necessary time and opportunity for this purpose.

11.3.4 If the rectification is abortive or only partially successful, the buyer shall be entitled to a reasonable reduction of the purchase price. If the defect is so serious that it cannot be rectified within a reasonable period of time, and if deliveries or services for the notified purpose are not usable or are only usable to a much lesser extent, the buyer shall be entitled to refuse acceptance of the defective component or to withdraw from the contract if part-acceptance is economically unreasonable. We shall only be obliged to refund amounts which have been paid to us for the components affected by the aforesaid withdrawal.

11.4 Exclusion of liability for defects

11.4.1 Our liability shall exclude damages which cannot be proved to have been sustained as a result of defective material, defective design or defective workmanship.

11.4.2 Damages shall therefore be excluded for example which were caused by
- improper work of other persons with regard to planning, site preparation, assembly, operation and maintenance;
- plant concepts and designs which do not comply with the latest state of the art;
- non-observance of our guidelines for planning, assembly, commissioning, operations and maintenance;
- force majeure (e.g. thunderstorms).

11.4.3 The following shall be excluded in particular
- corrosion damages (e.g. as a result of aggressive water, unsuitable water treatment, oxygen intakes, emptying the plant over a longer period of time, falling below the dew point, chemical or electrochemical effects, etc.);
- damages caused by air pollution (e.g. the accumulation of intense dust, aggressive vapours, etc.);
- damages caused by unsuitable equipment and fuels;
- damages caused by overcharging, excessive water pressure, scaling, improper electrical connections and inadequate fuse protection.

11.4.4 Components shall also be excluded from the warranty which are subject to natural wear and tear (e.g. burner nozzles, combustion chamber inserts, ignition and monitoring components in contact with fire, fireclay and wall facings, fuses, seals and flexible tubes).

11.5 Commissioning certificate

11.5.1 We hereby draw attention to the due and proper hand-over and - if envisaged - the commissioning certificate in accordance with Section 10.2 as prerequisites for our warranty.

11.6 Deliveries and services of sub-contractors

11.6.1 Our liability for third party products which form a major part of the delivered goods (e.g. warehouse and conveying equipment, burners, measuring and control equipment, electrical components, flue gas and waste water cleaning equipment) shall - if permissible - be limited to an assignment of our claims against the suppliers of the said third party products.

12. Exclusion of further liability

12.1 The buyer shall have no rights and claims for materials, design and workmanship defects or the lack of warranted qualities unless specifically mentioned in Sections 11.1 to 11.6.

12.2 All claims for compensation, reduction in the contract price, rescission of the contract or withdrawal from the contract shall be excluded in particular unless these are specifically mentioned. Under no circumstances shall the buyer have any compensation claim for damages which were not sustained by the delivered goods themselves (e.g. replacement costs, cost for establishing the cause of the damage, expertises, production stoppages, production losses, lost orders, lost profit and other direct or indirect damages). The aforesaid liability exclusion shall not apply in the event of gross negligence on our part.

12.3 The exclusion as per Section 12.2 shall apply for all breaches of contract and all claims of the buyer regardless of why they were lodged from a legal point of view. It shall therefore also apply for a breach of any ancillary obligations (e.g. inadequate advice, etc.).

13. Jurisdiction

13.1 **The place of jurisdiction for the buyer and for us shall be Vaduz.** We shall be entitled to bring action against the buyer at his/its domicile, however.

13.2 The legal relationship between the parties shall be governed by the substantive laws of Switzerland. The application of the UN convention on contracts for the international sale of goods (CISG) shall be excluded.

Hoval quality.
You can count on us.

Hoval

Hoval is one of the leading international companies for heating and indoor climate solutions. Drawing on more than 75 years of experience and benefiting from a close-knit team culture, the Hoval Group delivers exciting solutions and develops technically superior products. This leadership role requires a sense of responsibility for energy and the environment, which is expressed in an intelligent combination of different heating technologies and customised indoor climate solutions.

Hoval also provides personal consultations and comprehensive customer service. With around 2200 employees in 16 companies around the world, Hoval sees itself not as a conglomerate, but as a large family that thinks and acts globally.
Hoval heating and indoor climate solutions are currently exported to more than 50 countries.

Responsibility for energy and environment

Hoval Aktiengesellschaft
Austrasse 70
FL-9490 Vaduz
Principality of Liechtenstein
(Swiss customs territory)
Phone +423 3992 400
Fax +423 3992 618
E-Mail info@hoval.com
www.hoval.com

2024 - 04 | Subject to modifications

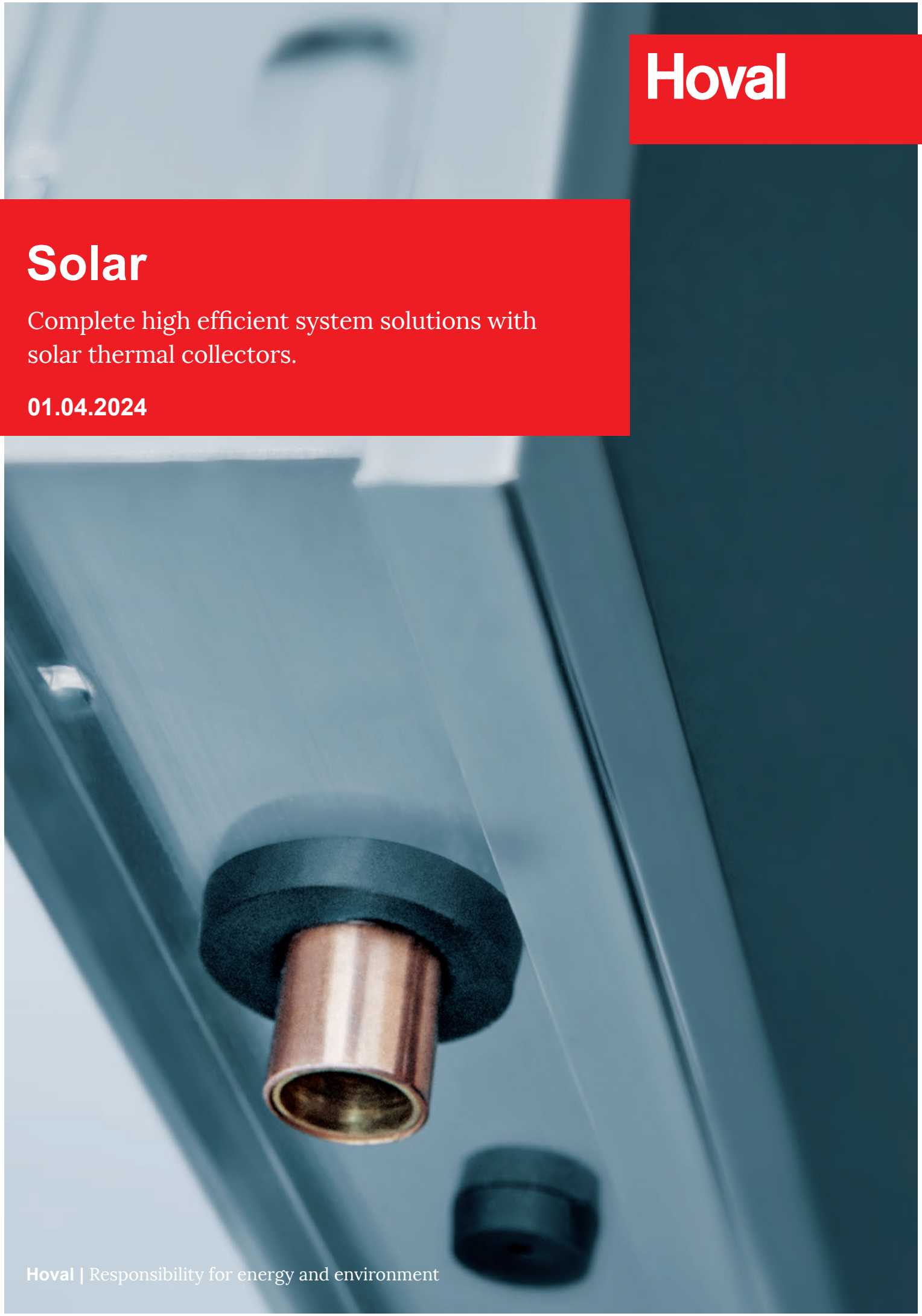
Your Hoval partner

Hoval

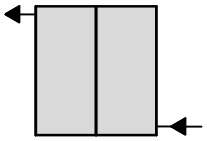
Solar

Complete high efficient system solutions with solar thermal collectors.

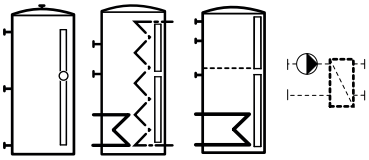
01.04.2024



Solar collectors



Buffer storage tanks, stratified storage tanks and stratified combination storage tanks

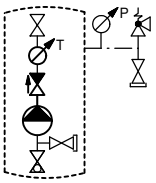


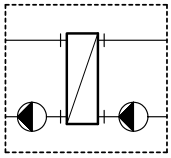
Hoval EnerVal, EnerVal G, EnerVal G cool
Hoval VarioVal FLS
Hoval VarioVal RLS, RHS see «Calorifiers»

Calorifiers

Suitable calorifiers see «Calorifiers»
- Enamelled version
  CombiVal ER, ESR, ESSR **200-1000 l**
  MultiVal ERR, ESRR **300-1000 l**
- Stainless steel version
  CombiVal CR, CSR **200-2000 l**
  MultiVal CRR, CSRR **500-2000 l**

Solar armature groups





TopTronic® E controller

Engineering

Hoval UltraSol® 2

Flat collector

- High-performance flat collector, glazed, for thermal utilisation of solar energy
- Vertical and horizontal design
- For surface-mounted, flat roof or in-roof installation
- Stable frame made of aluminium extruded sections
- Structured toughened safety glass (ESG) with anti-reflective coating on one side
- Aluminium full-surface absorber with highly-selective coating
- Serpentine manifold made of copper with 4 connections
- Collector connections and connectors with compression fitting
- Thermal insulation made of mineral wool (20 mm)
- High annual yield (Würzburg 50 °C) 1009 kWh/collector

Delivery UltraSol®, UltraSol® eco

- max. 10 pcs. upright on each pallet

Solarkeymark-certified

Certifications

Hoval UltraSol® 2	*Solar Keymark* 011-7S2954 F

Model range

UltraSol® 2 type	Installation	Gross collector surface area m²	Absorber surface area/ Aperture surface m²
UltraSol® 2 V	vertical	2.53	2.33
UltraSol® 2 H	horizontal	2.53	2.33

Installation sets

- On-roof installation parallel and elevated (0°,20°,30°,45°) vertical and horizontal consisting of:
  - substructure and hydraulic
  - roof connection

  Substructure suitable for the following roof connections:
  - interlocking tile
  - plain tile
  - slate, Eternit
  - tin roof clamp
  - hanger bolts
  - on-site roof connection with quick-mount adapter
- Flat roof mounting with concrete base 45°
  - for horizontal collectors

Solar cable SL

- Stainless steel corrugated tube for solar heating circuits, material 1.4404
- Low-noise, pressure-resistant and diffusion-tight
- Pipe insulation made of synthetic rubber, CFC-free
- Silicone cable for temperature sensor integrated
- Weatherproof, UV-resistant and PVC-free protective sleeve
- Pipe system for endless laying, for quick and easy installation

Delivery

Solar cables completely packed

Connection set

- Connection set for connecting the Hoval UltraSol® 2 flat collectors to a solar fitting group ¾″ using solar cables (e.g. SAG20)
- Connection screw fittings matching R ¾″/Rp ¾″

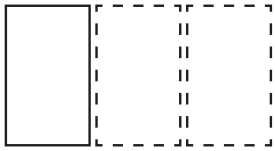
Delivery

Collector connection set separately packed

Flat-panel collectors

Hoval UltraSol®

- High-performance flat collector for solar systems with water/glycol mixture as heat transfer medium
- Structured toughened safety glass (ESG) with anti-reflective coating on one side
- Highly-selective coated absorber
- High annual yield (Würzburg 50 °C) 1009 kWh/collector



Flat collector - vertical installation type

UltraSol® 2 type	Collector surface area Gross m²	Absorber m²	Number of collectors units	Part No.
1V	2.53	2.33	1	6050 633
2V	5.06	4.66	2	6050 634
3V	7.59	6.99	3	6050 635
4V	10.12	9.32	4	6050 636
5V	12.65	11.65	5	6050 637
6V	15.18	13.98	6	6050 638
7V	17.71	16.31	7	6050 639
8V	20.24	18.64	8	6050 640
9V	22.77	20.97	9	6050 641
10V	25.30	23.30	10	6050 642

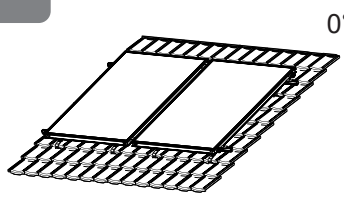
Flat collector - horizontal installation type

UltraSol® 2 type	Collector surface area Gross m²	Absorber m²	Number of collectors units	Part No.
1H	2.53	2.33	1	6050 643
2H	5.06	4.66	2	6050 644
3H	7.59	6.99	3	6050 645
4H	10.12	9.32	4	6050 646
5H	12.65	11.65	5	6050 647
6H	15.18	13.98	6	6050 648
7H	17.71	16.31	7	6050 649
8H	20.24	18.64	8	6050 650
9H	22.77	20.97	9	6050 651
10H	25.30	23.30	10	6050 652

Installation set
See following pages

Installation sets for on-roof installation
side-by-side, vertical 0°

On-roof installation



Metal tiles and roof bushings for concrete, clay and plain tiles see collector accessories

Notice
Collector connections and roof connection of collector, see following pages

Substructure and hydraulic collector connections
(without roof connection and collector connections of collector)

Substructure and hydraulic collector connections for on-roof mounting vertical 0°
- for Hoval flat collectors UltraSol® 2 for on-roof installation parallel with the roof
- Substructure suitable for
  - interlocking tile
  - plain tile
  - slate, Eternit
  - tin roof clamp
  - hanger bolts
- Roof pitch min. 22°

Consisting of:
- complete fitting accessories (without roof connection and collector connections)
- hydraulic collector connectors

for number of collectors vertical per collector field units	Installation set	Part No.
1	AD0V-1	6051 243
2	AD0V-2	6051 244
3	AD0V-3	6051 245
4	AD0V-4	6051 246
5	AD0V-5	6051 247
6	AD0V-6	6051 248
7	AD0V-7	6051 249
8	AD0V-8	6051 250

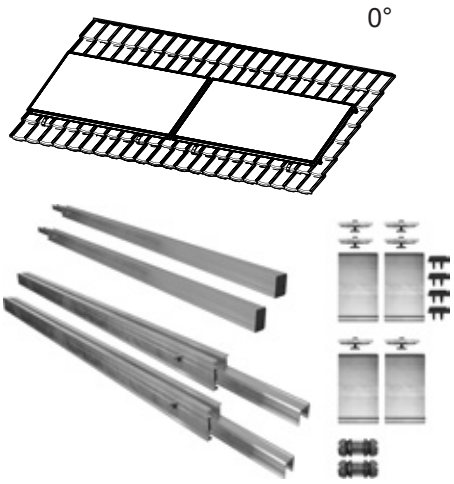
Extra 3rd support section
for Hoval flat collectors UltraSol® 2 for on-roof installation vertical (AD0V) parallel to the roof.
For increased snow loads up to 5.6 [1] kN/m²
Consisting of:
- Support sections (collector supports)
- US2 collector clamps cpl.

for number of collectors vertical per collector field units	Installation set	Part No.
1	AD0V-1	6052 933
2	AD0V-2	6052 934
3	AD0V-3	6052 935
4	AD0V-4	6052 936
5	AD0V-5	6052 937
6	AD0V-6	6052 938
7	AD0V-7	6052 939
8	AD0V-8	6052 940

[1] Depending on rafter spacing, roof connection and roof pitch. See engineering notes

Installation sets for on-roof installation
side-by-side, horizontal 0°

On-roof installation



Metal tiles and roof bushings for concrete, clay and plain tiles see collector accessories

Notice
Collector connections and roof connection of collector, see following pages

Substructure and hydraulic collector connections
(without roof connection and collector connections of collector)

Substructure and hydraulic collector connections for on-roof mounting horizontal 0°
- for Hoval flat collectors UltraSol® 2 for on-roof installation parallel with the roof
- Substructure suitable for
  - interlocking tile
  - plain tile
  - slate, Eternit
  - tin roof clamp
  - hanger bolts
- Roof pitch min. 22°

Consisting of:
- complete fitting accessories (without roof connection and collector connections)
- hydraulic collector connectors

for number of collectors horizontal per collector field units	Installation set	Part No.
1	AD0H-1	6051 251
2	AD0H-2	6051 252
3	AD0H-3	6051 253
4	AD0H-4	6051 254
5	AD0H-5	6051 255
6	AD0H-6	6051 256

Extra 3rd support section
for Hoval flat collectors UltraSol® 2 for on-roof installation horizontal (AD0V) parallel to the roof.
For increased snow loads up to 5.6 [1] kN/m²
Consisting of:
- Support sections (collector supports)
- US2 collector clamps cpl.

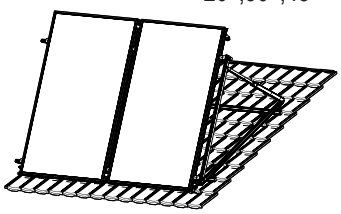
for number of collectors horizontal per collector field units	Installation set	Part No.
1	AD0H-1	6052 941
2	AD0H-2	6052 942
3	AD0H-3	6052 943
4	AD0H-4	6052 944
5	AD0H-5	6052 945
6	AD0H-6	6052 946

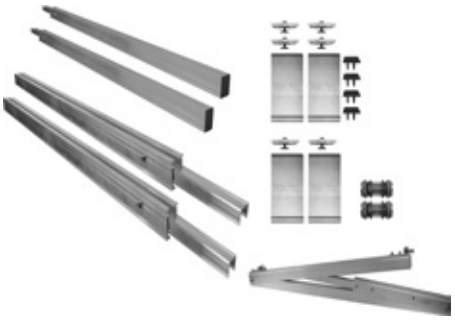
[1] Depending on rafter spacing, roof connection and roof pitch. See engineering notes

Installation sets for on-roof installation
side-by-side, vertical 20°,30°,45°

On-roof installation

20°,30°,45°





Metal tiles and roof bushings for concrete, clay and plain tiles see collector accessories

Notice
Collector connections and roof connection of collector, see following pages

Substructure and hydraulic collector connections
(without roof connection and collector connections of collector)

Substructure and hydraulic collector connections for on-roof mounting vertical 20°,30°,45°
- for Hoval flat plate collectors UltraSol® 2
- for on-roof installation elevated 20°,30°,45° in relation to the roof
- Substructure suitable for
  - interlocking tile
  - plain tile
  - slate, Eternit
  - tin roof clamp
  - hanger bolts

Consisting of:
- complete fitting accessories (without roof connection and collector connections)
- hydraulic collector connectors
- Adjustable elevation angle 20°,30°,45°
- Wind bracing

for number of collectors vertical per collector field units	Installation set	Part No.
1	AD20-45V-1	6051 257
2	AD20-45V-2	6051 258
3	AD20-45V-3	6051 259
4	AD20-45V-4	6051 260
5	AD20-45V-5	6051 261
6	AD20-45V-6	6051 262
7	AD20-45V-7	6051 263
8	AD20-45V-8	6051 264

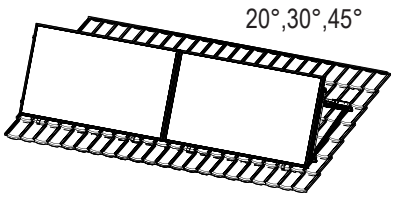
Extra 3rd support section
for Hoval flat collectors UltraSol® 2 for on-roof installation 20°,30°,45° vertical (AD20-45V) to the roof.
For increased snow loads up to 5.6 [1] kN/m²
Consisting of:
- Support sections (collector supports)
- US2 collector clamps cpl.
- Cross-connector for support profiles

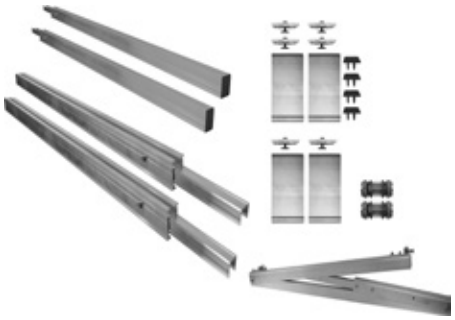
for number of collectors vertical per collector field units	Installation set	Part No.
1	AD20-45V-1	6052 947
2	AD20-45V-2	6052 948
3	AD20-45V-3	6052 949
4	AD20-45V-4	6052 950
5	AD20-45V-5	6052 951
6	AD20-45V-6	6052 952
7	AD20-45V-7	6052 953
8	AD20-45V-8	6052 954

[1] Depending on rafter spacing, roof connection and roof pitch. See engineering notes

Installation sets for on-roof installation
side-by-side, horizontal 20°,30°,45°

On-roof installation





Metal tiles and roof bushings for concrete, clay and plain tiles see collector accessories

Notice
Collector connections and roof connection of collector, see following pages

Substructure and hydraulic collector connections
(without roof connection and collector connections of collector)

Substructure and hydraulic collector connections for on-roof mounting horizontal 20°,30°,45°
- for Hoval flat plate collectors UltraSol® 2
- for on-roof installation elevated 20°,30°,45° in relation to the roof
- Substructure suitable for
  - interlocking tile
  - plain tile
  - slate, Eternit
  - tin roof clamp
  - hanger bolts

Consisting of:
- complete fitting accessories (without roof connection and collector connections)
- hydraulic collector connectors
- Adjustable elevation angle 20°,30°,45°
- Wind bracing

for number of collectors horizontal per collector field units	Installation set	Part No.
1	AD20-45H-1	6051 265
2	AD20-45H-2	6051 266
3	AD20-45H-3	6051 267
4	AD20-45H-4	6051 268
5	AD20-45H-5	6051 269
6	AD20-45H-6	6051 270

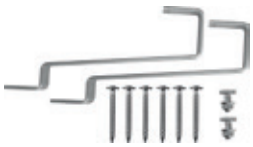
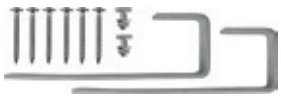
Elevation horizontal 60° see accessories

Extra 3rd support section
for Hoval flat collectors UltraSol® 2 for on-roof installation 20°,30°,45°,60° horizontal (AD20-45H) to the roof.
For increased snow loads up to 5.6[1] kN/m²
Consisting of:
- Support sections (collector supports)
- US2 collector clamps cpl.
- Cross-connector for support profiles

for number of collectors horizontal per collector field units	Installation set	Part No.
1	AD20-45H-1	6052 955
2	AD20-45H-2	6052 956
3	AD20-45H-3	6052 957
4	AD20-45H-4	6052 958
5	AD20-45H-5	6052 959
6	AD20-45H-6	6052 960

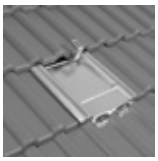
[1] Depending on rafter spacing, roof connection and roof pitch. See engineering notes

Roof connections for on-roof installation

		Part No.
	Determining the number of roof connection sets see chapter Engineering/Table 1 and 2	
	**Roof bar set adjustable tile** for attaching the carrier profiles for on-roof attachment of UltraSol® 2 Consisting of: - 2 roof bars - Screw set US2-SHS	6037 731
	**Roof bar set adjustable heavy duty** for elevated static requirements for attaching the carrier profiles for on-roof attachment of UltraSol® 2 Consisting of: - 2 roof bars HD - Screw set US2-SHS	6037 764
	**Packing plate 2 mm** for levelling the roof bars	2061 367
	**Packing plate 3 mm** for levelling the roof bars	2061 368
	**Roof bar set plain tile** for attaching the carrier profiles for on-roof attachment of UltraSol® 2 Consisting of: - 2 roof bars - Screw set US2-SHS - Installation set T-head bolt can only be used in conjunction with metal tiles.	6037 767
	**Roof bar set slate/Flat Eternit** for attaching the carrier profiles for on-roof attachment of UltraSol® 2 Consisting of: - 2 roof bars - Screw set US2-SHS - Installation set T-head bolt can only be used in conjunction with metal tiles.	6037 769

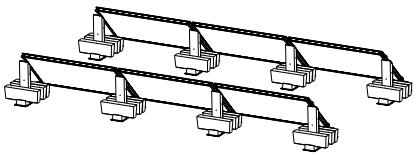
		Part No.
	**Clamp set tin roof clamp** for attaching the carrier profiles for on-roof attachment of UltraSol® 2 Consisting of: - 2 tin roof clamps - Installation set T-head bolt	6037 770
	**Hanger bolt set individual** for attaching the carrier profiles for on-roof attachment of UltraSol® 2 Consisting of: - 2 hanger bolts M12 - 2 quick-mount adapters M12 cpl.	6037 771
	**Double level screw set** for attaching the carrier profiles for on-roof attachment of UltraSol® 2 Consisting of: - 2 double level screws US-Dss - Installation set T-head bolt	6037 772
	**Screw set concrete base** for attaching the carrier profiles for on-roof attachment of UltraSol® 2 Consisting of: - 2 threaded rod M10 x 150 - 2 quick-mount adapters M10 cpl.	6037 775

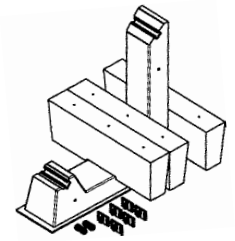
Metal tiles and roof bushings for concrete, clay and plain tiles

		Part No.
	**Metal tiles, type concrete** for exchanging a concrete pantile (e.g. interlocking tile) galvanised version	2057 258
	**Roof bushing, type concrete** for tube bushing (1 tube) through the roof cladding of a concrete pantile (e.g. interlocking tile) galvanised version, 2 pieces	2057 259
	**Metal tiles, type clay 260** for exchanging the roof tile (e.g. variable-gauge tiles) galvanised version	2057 260
	**Metal tiles, type plain** for exchanging the roof tile (e.g. plain tile) galvanised version	2057 262
	**Roof bushing, type clay 260** for tube bushing (1 tube) through the roof cladding (e.g. variable-gauge tiles and plain tile) galvanised version, 2 pieces	2057 261
	**Metal tiles, type slate** for protecting the roof tile (e.g. Eternit slabs, slate slabs) galvanised version	2057 264
	**Roof bushing, type slate** for tube bushing (1 tube) through the roof cladding (e.g. Eternit slabs, slate slabs) galvanised version, 2 pieces	2057 265

Installation sets
Flat roof installation concrete base
side-by-side, horizontal

Flat roof-mounting
Concrete base





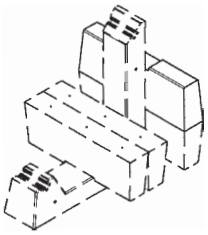
Flat roof - concrete base
45°, horizontal
- for Hoval flat collectors UltraSol® 2 H, UltraSol® eco H
- for flat roof installation 45°
- with concrete base

Comprising:
- Two-part concrete base (approx. 92 kg) incl. 3 additional weights (of approx. 50 kg) Total weight: 242 kg
- Protective mat with aluminium lining
- complete fitting accessories (without collector connections)
- hydraulic collector connectors

Notice
Collector connections, see following pages

for number of collectors per collector field units	Installation set	Part No.
1	FDBS45H-1	6051 271
2	FDBS45H-2	6051 272
3	FDBS45H-3	6051 273
4	FDBS45H-4	6051 274
5	FDBS45H-5	6051 275
6	FDBS45H-6	6051 276
7	FDBS45H-7	6051 277
8	FDBS45H-8	6051 278

Notice regarding mounting sets FDBS45H and additional weight
The additional weights included in the standard set are not sufficient for every application (see engineering guidelines). Exactly determining the additional weights requires an assessment for the specific building and situation, and calculation of the wind load.
In addition, the maximum roof load must be checked by the structural engineer/civil engineer.



Additional weight for concrete base 2075 124
for UltraSol® 2 H flat plate collector
For increasing loading weight
in areas with increased wind loads
or on high buildings.
incl. 3 M8 threaded sleeves
Max. 7 additional weights/concrete base
Installation area (L x W): approx. 200 x 100
Dimensions (L x W x H):
740 x 130 x 250
Additional weight approx. 50 kg

Solar cables

Flexible stainless steel corrugated tube for solar heating circuits, material 1.4404, ready-insulated. Silicone cable for temperature sensor integrated.
Weatherproof, UV-resistant and PVC-free protective sleeve.

Solar cable type	Nominal pipe width	Length m	Part No.
SL 1515	DN 15	15	2054 140
SL 1520	DN 15	20	2054 141
SL 1525	DN 15	25	2054 142
SL 2015	DN 20	15	2054 143
SL 2020	DN 20	20	2054 154
SL 2025	DN 20	25	2054 155
SL 2515	DN 25	15	2054 156
SL 2520	DN 25	20	2054 157
SL 2525	DN 25	25	2054 158

Individual hydraulic sets

Hydraulics basic set GS 18
for hydraulic connection of a collector field with stainless steel corrugated pipe
Consisting of:
- 2 connection fittings 90°
- 1 air vent plug
- 1 dummy plug

Collector connections:
- Cu round pipe Ø 18 mm

Dimension solar line stainless steel corrugated tube	Part No.
DN 15	6051 315
DN 20	6051 316
DN 25	6051 317

Hydraulics basic set GS 18-¾″ ET FS90 — 6051 314
for hydraulic connection of a collector field to connection fitting ¾″ external thread flat sealing.
Consisting of:
- 2 connection brackets 90°, 18-¾″ external thread flat sealing
- 1 vent plug
- 1 dummy plug
- 2 flat seals

Collector connections:
- Ø 18 mm Cu round pipe

Hydraulics basic set GS 18-¾″ ET FS — 6051 313
for hydraulic connection of a collector field to connection fitting ¾″ external thread flat sealing.
Consisting of:
- 2 straight connection fittings, 18-¾″ external thread flat sealing
- 1 vent plug
- 1 dummy plug
- 2 flat seals

Collector connections:
- Ø 18 mm Cu round pipe

Solar cables

Connection set armature group flow/return
for connecting the Hoval solar cables
to a solar armature group ¾″
(e.g. SAG 20 or equalising valve DN 20).
Solar cable side with metal sealing.
Armature group side with flat seal (PTFE,
Teflon resistant to temperatures up to 260 °C).

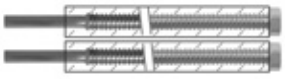
Dimension solar line stainless steel corrugated tube	Connection fitting	Part No.
DN 15	R ¾″	6026 411
DN 20	R ¾″	6026 412
DN 25	R ¾″	6026 413

Solar branch kit FL/RT
for connecting several collector fields
to a shared Hoval solar line.
Metallically sealing.
3 connections
Consisting of:
- 2 T-pieces

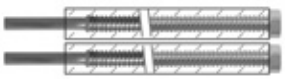
Dimension solar line stainless steel corrugated tube	Part No.
DN 15	6042 233
DN 20	6042 234
DN 25	6042 235

Connection coupling
for extending the solar cable

Dimension solar line stainless steel corrugated tube	Type	Part No.
DN 15	VKSL15	2054 159
DN 20	VKSL20	2054 160
DN 25	VKSL25	2054 161



Connection set type WES DN 20 2054 162
for connecting a collector field
(with connecting angles) to a
pipeline created by the customer.
2 stainless steel corrugated pipes
with 13 mm PE heat insulation,
incl. screw connection, ¾″ or
22 x 1 x 100 mm copper solder bush,
L = 1000 mm



Connection set type WES DN 20 2062 006
for connecting a collector field
(with connecting angles) to a
pipeline created by the customer.
2 stainless steel corrugated pipes
with 13 mm PE heat insulation,
incl. screw connection, ¾″ or
22 x 1 x 100 mm copper solder bush,
L = 3000 mm

Transition screw connection to connection set WES 2054 163
Compression fitting ¾″ external thread
fits 22 x 1 mm copper end piece for
further installation with steel pipe
Price includes 2 pieces

		Part No.
	**Hydraulic connection** for collector field distance max. 30 cm Consisting of: 2 corrugated tubes DN 20 insulated L = 500 mm on both sides ¾″ connection with seal 2 connection brackets 90° ¾″	6051 202
	**Hydraulic extension set ESN** for hydraulic connection of the collectors side by side. Consisting of: - 2 elastic collector connections with squeezing ring screw connections (compensator), incl. insulation	6051 318
	**Lock set VS-US2** for hydraulic closure of a collector field. - 1 vent plug - 1 dummy plug Collector connections: - Cu round pipe Ø 18 mm	6051 232
	**Connection set AS-US2 18** for hydraulic connection of a collector field to the stainless steel corrugated pipe. Consisting of: - 2 connection fittings 90° Collector connections: - Cu round pipe Ø 18 mm Dimension solar line stainless steel corrugated tube	
	DN 15	6051 322
	DN 20	6051 323
	DN 25	6051 324
	**Connection set AS-US2 18-¾″ ET FS** for hydraulic connection of a collector field to connection fitting ¾″ external thread flat sealing. Consisting of: - 2 straight connection fitting, 18-¾″ external thread flat sealing - 2 flat seal Collector connections: - Cu round pipe Ø 18 mm	6051 320
	**Connection set AS-US2 18-¾″ ET FS90** for hydraulic connection of a collector field to connection fitting ¾″ external thread flat sealing. Consisting of: - 2 connection brackets 90°, 18-¾″ external thread flat sealing - 2 flat seals Collector connections: - Ø 18 mm Cu round pipe	6051 321

Balancing valve TN
As a regulating and shut-off valve with direct display of the flow rate on the bypass.
Max. operating temperature 185 °C

DN	Measuring range l/min	Connection Rp x Rp	kvs m^3/h	Part No.
DN 20	2-12	¾″ x ¾″	2.2	2038 034
DN 20	8-30	¾″ x ¾″	5.0	2038 035
DN 25	10-40	1″ x 1″	8.1	2038 036
DN 32	20-70	1¼″ x 1¼″	17.0	2038 037

Accessories

Frost protection mixture PowerCool DC923-PXL
on basis propylene glycol
mixed with softened water
with corrosion protection
Frost protection: -25 °C
Content plastic container: 30 kg

Part No. 2077 235

Frost protection concentrate PowerCool DC 924-PXL
on basis propylene glycol
completely mixable with water
with corrosion protection
Frost protection: -20 °C with 40 % mixture ratio
Content plastic container: 10 kg

Part No. 2009 987

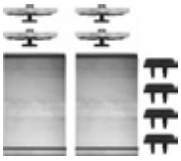
Hand refractometer
for measuring the cloud point of water-propylene glycol mixtures, water-ethylene glycol mixtures, and water-ethanol mixtures
Coolant HighSOL refractive index nD20

Part No. 2066 933

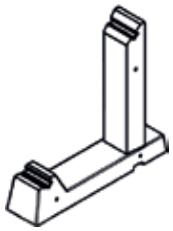
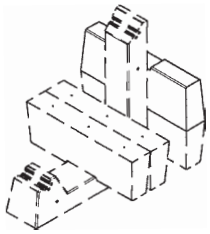
Individual sets/further installation sets

		Part No.
	**Roof bar US2-DBAV - adj. tile** for attaching the carrier profiles for on-roof attachment of UltraSol® 2 1 pce w/o screw set US2-SHS	6037 730
	**Roof bar US2-DBCV - tile HD** for attaching the carrier profiles for on-roof attachment of UltraSol® 2 1 pce w/o screw set US2-SHS Version stainless steel heavy duty	6037 763
	**Screw set roof bars US2-SHS** 6 x wood screws Torx 8 x 80 st. steel	6037 732
	**Packing plate 2 mm** for levelling the roof bars	2061 367
	**Packing plate 3 mm** for levelling the roof bars	2061 368
	**Hanger bolt US2-ss - individual** M12 x 300 incl. quick-mount adapter incl. EPDM seal	2061 347
	**Double level screw US2-Dss** 2 x M12 x 300 incl. mounting plate incl. EPDM seals	2061 348
	**Roof bar US2-DBC - type plain** for attaching the carrier profiles for on-roof attachment of UltraSol® 2 1 pce w/o screw set US2-SHS	2061 344
	**Roof bar US2-DBC - slate** for attaching the carrier profiles for on-roof attachment of UltraSol® 2 1 pce w/o screw set US2-SHS	2061 398
	**Installation set T-head bolt** 2 x bolt and nut	6037 766
	**Clamp US2-BFK - tin joint**	6037 795
	**Quick-mount adapter M10 cpl.** for attaching the carrier profiles	6037 773
	**Quick-mount adapter M12 cpl.** for attaching the carrier profiles	6037 774
	**Hanger bolt M12 x 300 CR** incl. EPDM seal, nut and locknut	2053 051

		Part No.
	**Carrier profile ADKBV cpl. 1360 mm** On-roof short base - vertical	6050 655
	Carrier profile ADLBV cpl. 1986 mm On-roof base long - vertical	6050 656
	**Carrier profile ADKEV cpl. 1252 mm** On-roof expansion short - vertical incl. profile connector 45 cpl.	6050 657
	**Carrier profile ADLEV cpl. 1878 mm** On-roof expansion long - vertical incl. profile connector 45 cpl.	6050 658
	**Carrier profile ADBH cpl. 2260 mm** On-roof base - horizontal	6050 659
	**Carrier profile ADEH cpl. 2152 mm** On-roof expansion - horizontal incl. profile connector 45 cpl.	6050 660
	**Profile connector 45 cpl.** incl. self-tapping screws	6037 787
	**Elevation 20, 30, 45° V cpl.** Vertical version incl. 4 cross connectors cpl.	6050 661
	**Elevation 20, 30, 45° H cpl.** horizontal version incl. 4 cross-connectors cpl.	6037 790
	**Elevation 60° H cpl.** horizontal version incl. 4 cross-connectors cpl.	6042 143
	**Wind bracing H/V cpl.** for horizontal or vertical elevation	6037 762

		Part No.
	**Cross-connector cpl.** for attaching the elevation with the carrier profiles	6037 788
	**Mounting set 5-US2 ADGS** **Collector fastening basic set** On-roof mounting Consisting of: - 4 US2 collector end clamps cpl. - 4 end caps 45 Hoval - 2 anti-slip protections	6050 662
	**Mounting set 5-US2 ADES** **Collector fastening extension set** On-roof mounting Consisting of: - 2 US2 collector middle clamps cpl. - 2 anti-slip protections	6050 663
	**Collector clamp 5-US2 AD** Individual collector clamp for on-roof installation Consisting of: - 1 US2 collector clamp cpl.	6050 677
	**Mounting set 5-US2 BSGS** **Collector fastening basic set** Flat roof mounting concrete base Consisting of: - 4 US2 collector end clamps cpl.	6050 664
	**Mounting set 5-US2 BSES** **Collector fastening extension set** Flat roof mounting concrete base Consisting of: - 2 US2 collector middle clamps cpl.	6050 665

Individual sets concrete base

		Part No.
	**Concrete base 45° cpl.** for Hoval UltraSol® 2 H flat plate collector 2-piece, slope 45° with cast-in retaining tube profile for collector fastening incl. folding split pin 6/40/33 galvanised for protection against lifting off incl. support turn protector Dimensions (L x W x H): 930 x 190 x 865 mm Weight: approx. 92 kg	6050 805
	**Additional weight for concrete base** for UltraSol® 2 H flat plate collector For increasing loading weight in areas with increased wind loads or on high buildings. incl. 3 M8 threaded sleeves Max. 7 additional weights/concrete base Installation area (L x W): approx. 200 x 100 Dimensions (L x W x H): 740 x 130 x 250 Additional weight approx. 50 kg	2075 124
	Notice regarding concrete base and additional weight Exactly determining the additional weights requires an assessment for the specific building and situation, and calculation of the wind load. In addition, the maximum roof load must be checked by the structural engineer/civil engineer.	
	**Protective mat with aluminum lining** for concrete base for protecting the roof cladding and compensating irregularities Dimensions (L x W x H): 1000 x 260 x 6 mm	2061 579

Services

Commissioning
Commissioning by works service or Hoval trained authorised serviceman/company is condition for warranty.

For commissioning and other services please contact your Hoval sales office.

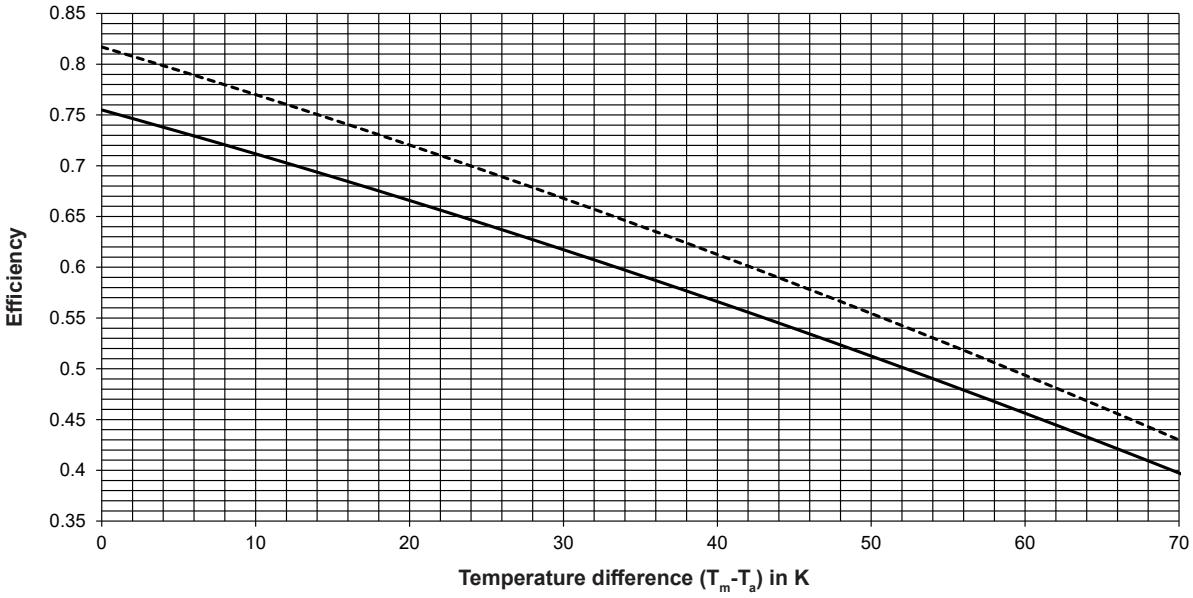
UltraSol® 2

Type		UltraSol® 2 V	UltraSol® 2 H
Optical efficiency (aperture surface) $\eta_{0,b}$ [1]	%	81.7	81.7
a_1 [1]	W/(m²K)	4.55	4.55
a_2 [1]	W/(m²K²)	0.014	0.014
Optical efficiency (gross area) $\eta_{0,b}$ [2]	%	75.5	75.5
a_1 [2]	W/(m²K)	4.2	4.2
a_2 [2]	W/(m²K²)	0.013	0.013
Reference surfaces			
• Total surface area	m²	2.53	2.53
• Aperture surface	m²	2.33	2.33
• Absorber surface	m²	2.33	2.33
Collector/casing			
• Design		Extruded sections	
• Length, width, height		see dimensional drawing	
• Material		Aluminium	
• Weight	kg	43	43
Absorber			
• Absorber area coating		selective	
• Solar absorption level	%	95	95
• Hemispheric emissions level	%	5	5
• Heat transfer medium content	l	1.5	1.7
• Flow shape		Serpentine manifold	
• Number of connections		4	
• Configuration of connections		Compression fittings - CU round pipe Ø 18 mm	
Glass cover (transparent cover)			
• Product name		Structured toughened safety glass (ESG) with anti-reflective coating on one side	
• Transmission level	%	94	94
• Thickness	mm	3.2	
Thermal insulation			
• Material		Mineral wool	
• Thermal conductivity	W/(m²K)	0.039	0.039
• Thickness	mm	20	20
• Hail resistance class		HW 3 (hailstones of Ø up to 30 mm)	
Application limits			
• Standard standstill temperature	°C	180	180
• Max. perm. operating pressure	bar	10	10
• Permitted heat transfer medium		Glycol/water mixture	
• Specific flow rate approx.	l/(h m²)	15-50	15-50
• Nominal flow per collector approx.	l/h	40-100	40-100
• Min. collector pitch		22°	
• Max. collector pitch		90°	

[1] Peak efficiency of the collector (η_b at $T_m^* = 0$), with reference to T_m^*, based on the direct irradiation intensity G_b (reference area: gross area of 2.53 m²)

[2] Peak efficiency of the collector (η_b at $T_m^* = 0$), with reference to T_m^*, based on the direct irradiation intensity G_b (reference area: aperture surface with 2.33 m²)

Efficiency characteristic curve UltraSol® 2

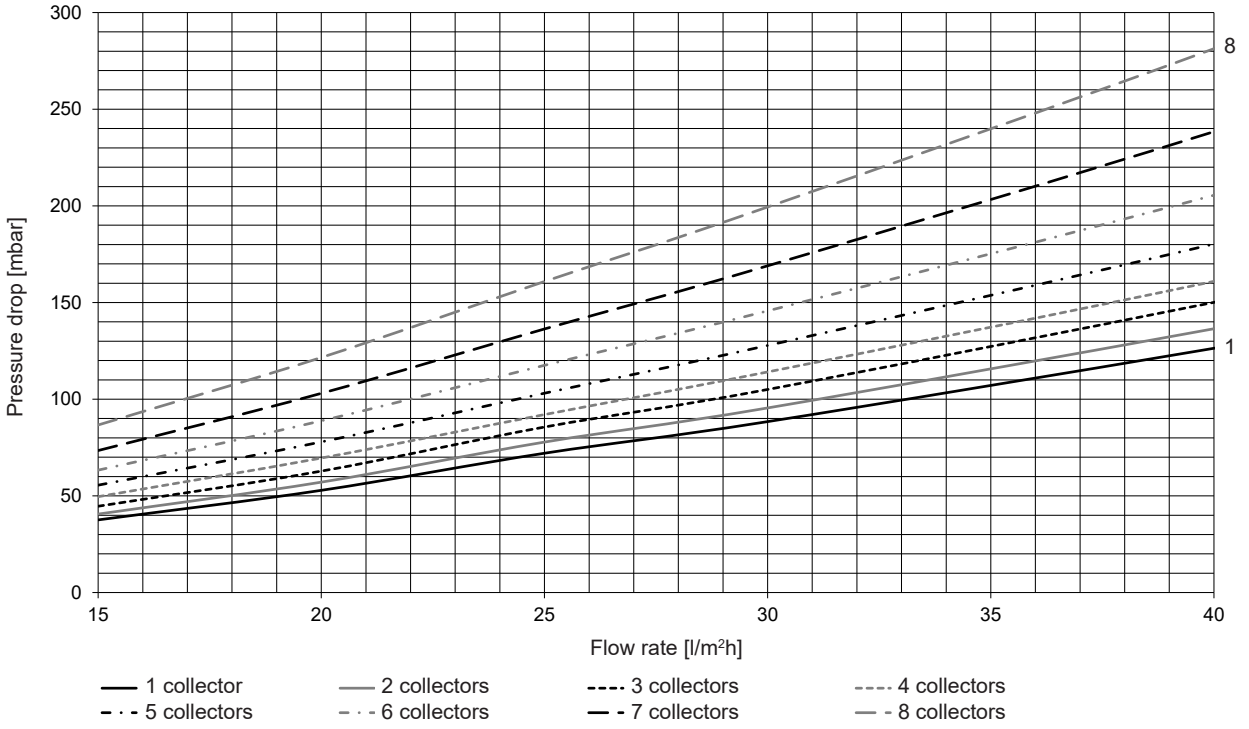


——— UltraSol® 2 (Gross area)
- - - - - - UltraSol® 2 (Aperture surface)

T_m = average collector temperature
T_a = ambient temperature

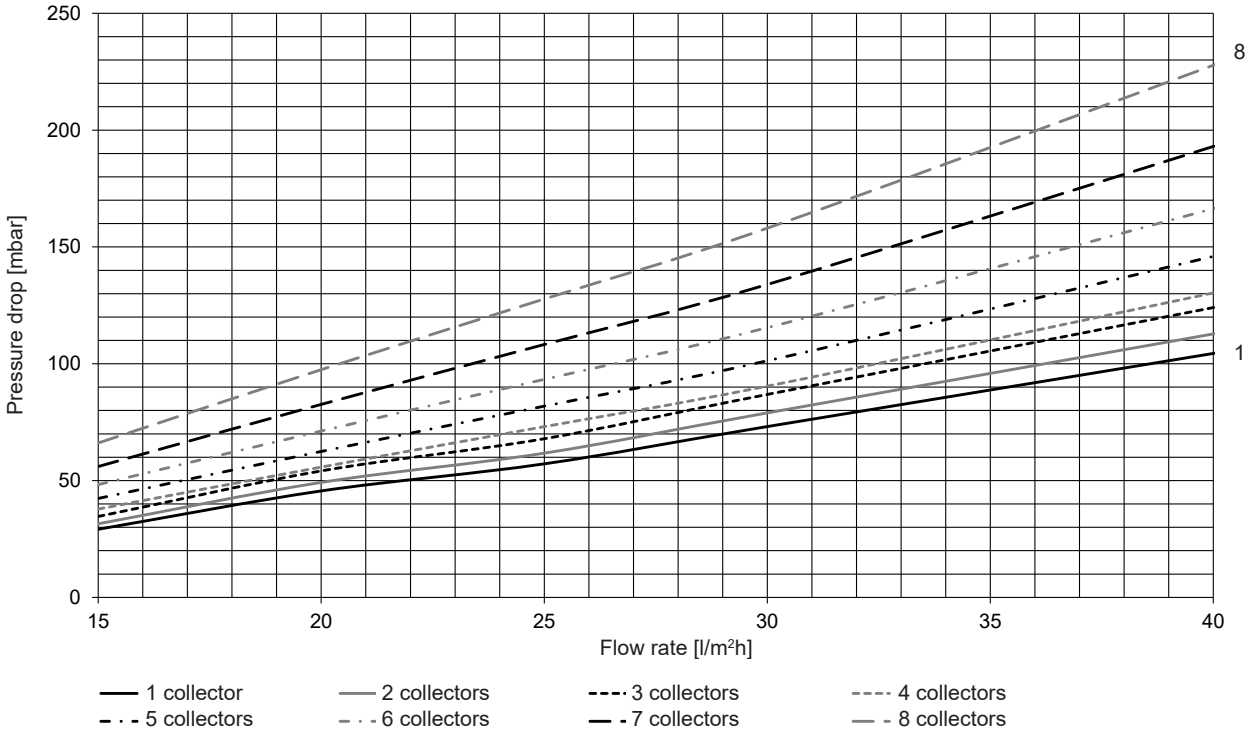
Pressure drop - UltraSol® 2, vertical

Water-Glycol mixture - temp. 20 °C



Pressure drop - UltraSol® 2, horizontal

Water-Glycol mixture - temp. 20 °C

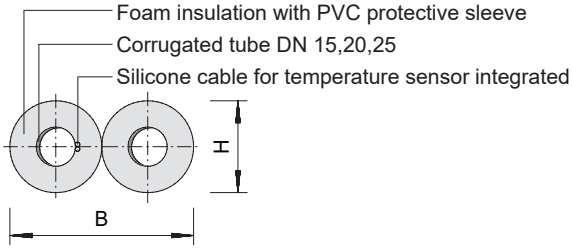


Solar cable SL

- Flexible stainless steel corrugated tube, material 1.4404.
- Max. pressure at 200 °C: 10 bar

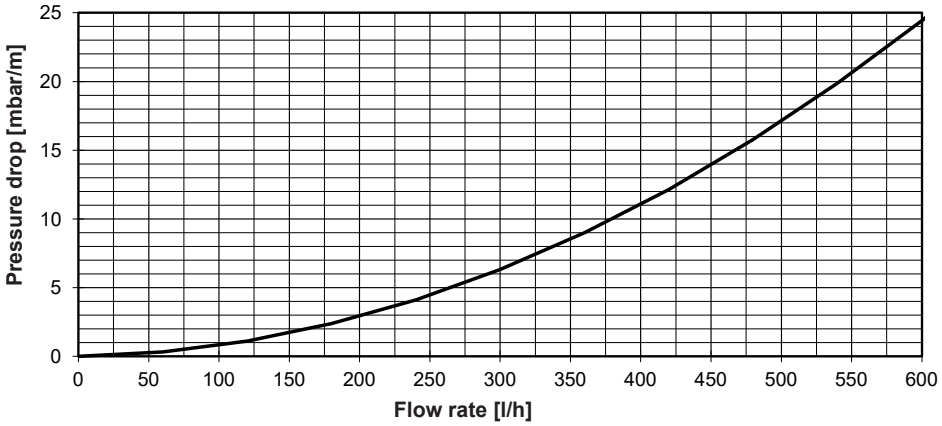
Type	Nominal pipe width		Di	De	Radius	Max. operating pressure	Weight	Wall thickness	Content
	DN	R	mm	mm	mm	bar	kg/m	mm	l/m
SL 15	15	R ½″	16.6	21.4	35	10	0.140	0.18	0.28
SL 20	20	R ¾″	20.6	26.2	40	10	0.195	0.18	0.43
SL 25	25	R 1″	25.6	31.6	50	10	0.235	0.20	0.64

Type	B	H	Insulation thickness
	mm	mm	mm
SL 15	103	51	14
SL 20	125	62	14
SL 25	142	70	20

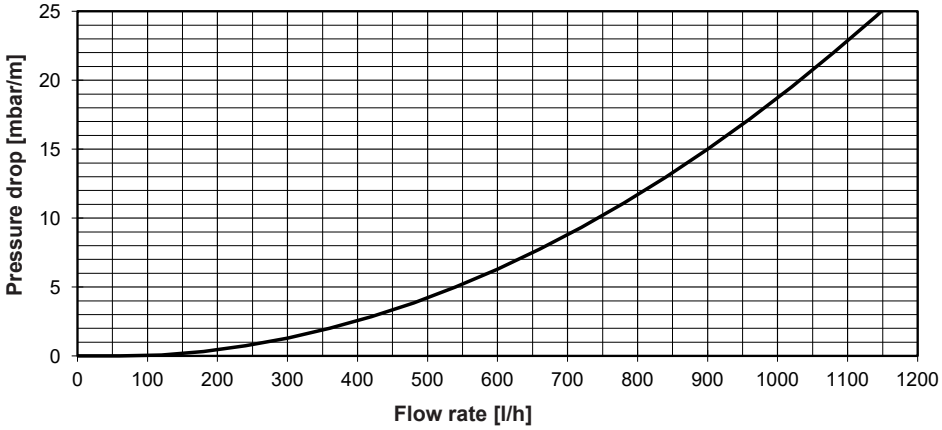


Specific pressure drop value (per metre individual pipe)
Glycol/water mixture 40/60 % and 40 °C

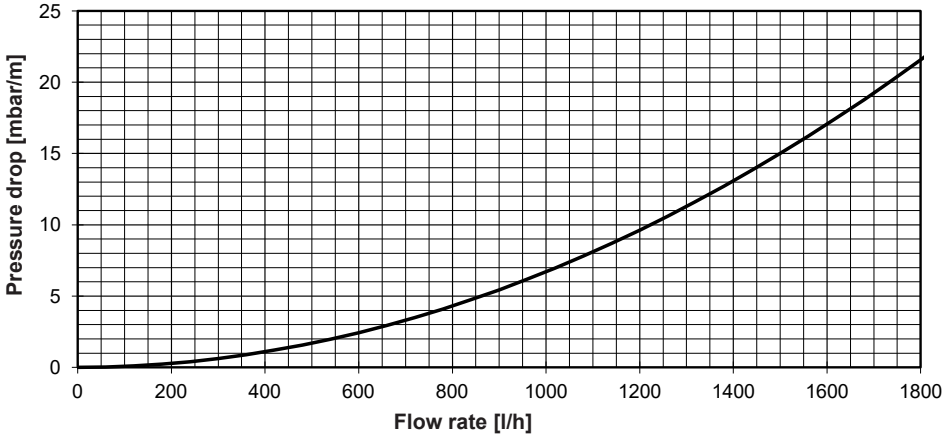
DN 15



DN 20



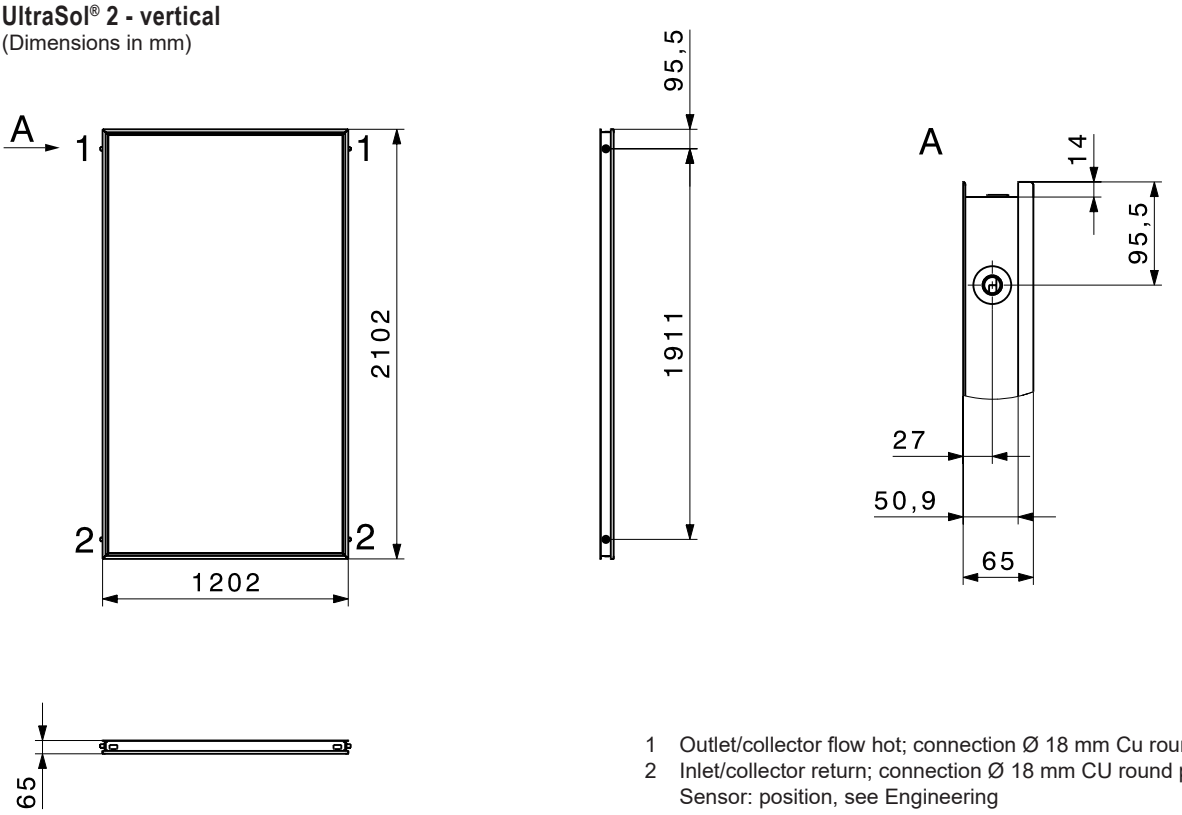
DN 25



1 mbar = 100 Pa = 0.1 kPa

UltraSol® 2 - vertical

(Dimensions in mm)

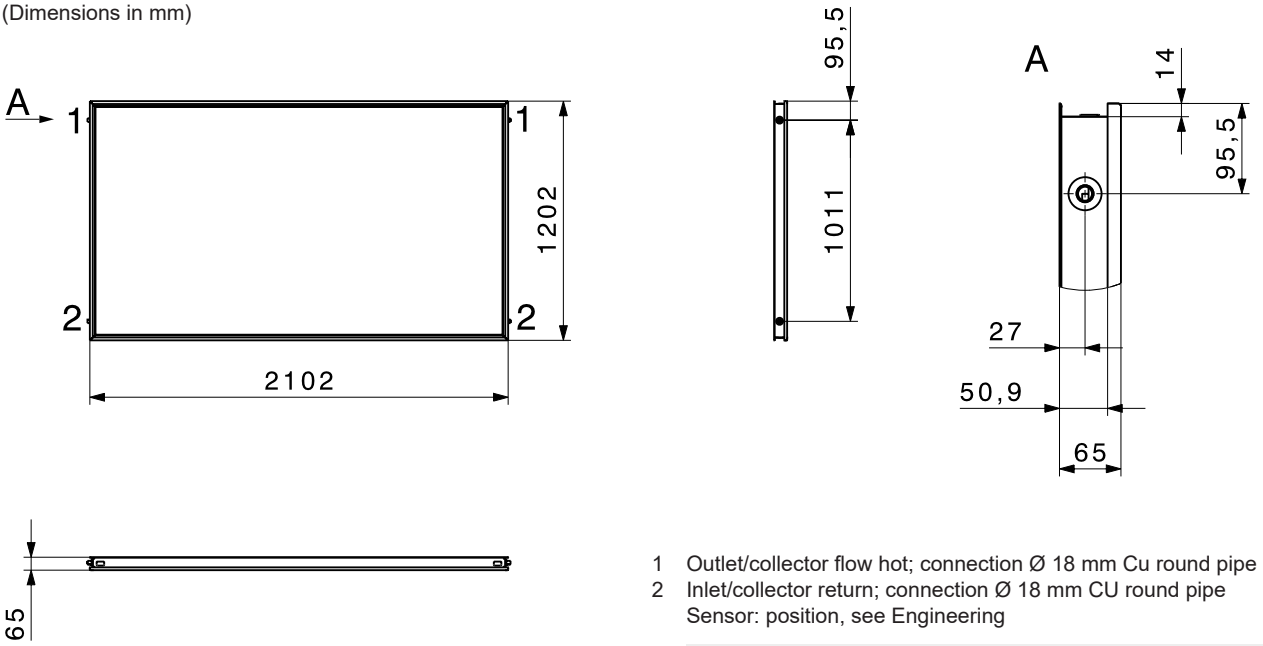


1 Outlet/collector flow hot; connection Ø 18 mm Cu round pipe
2 Inlet/collector return; connection Ø 18 mm CU round pipe
Sensor: position, see Engineering

- One-sided connection left or right possible (not Tichelmann)
- Connection on alternating sides possible (Tichelmann)

UltraSol® 2 - horizontal

(Dimensions in mm)

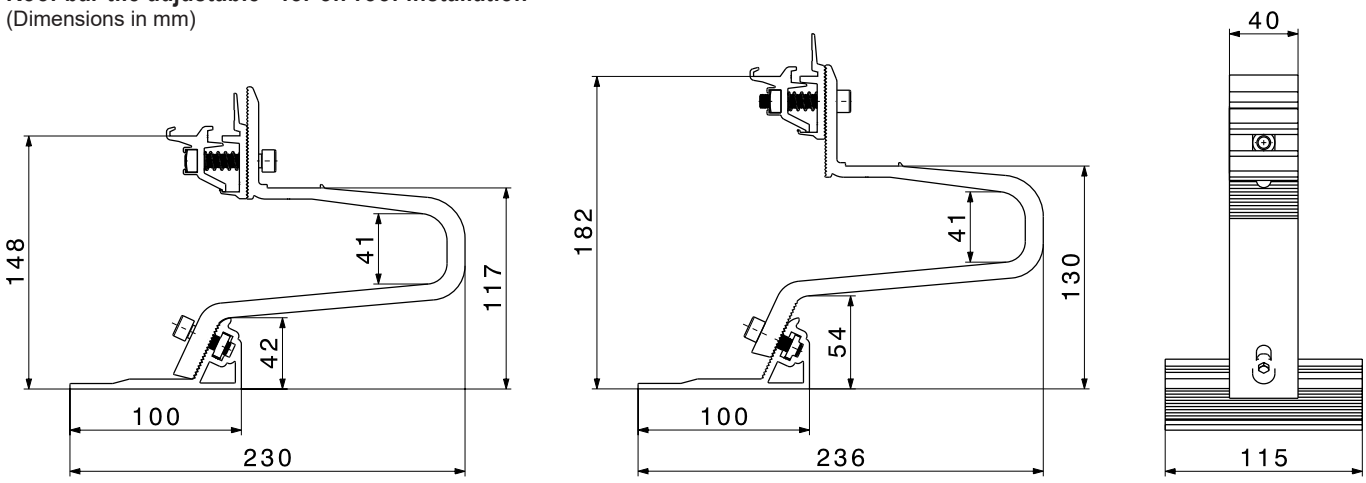


1 Outlet/collector flow hot; connection Ø 18 mm Cu round pipe
2 Inlet/collector return; connection Ø 18 mm CU round pipe
Sensor: position, see Engineering

- One-sided connection left or right possible (not Tichelmann)
- Connection on alternating sides possible (Tichelmann)

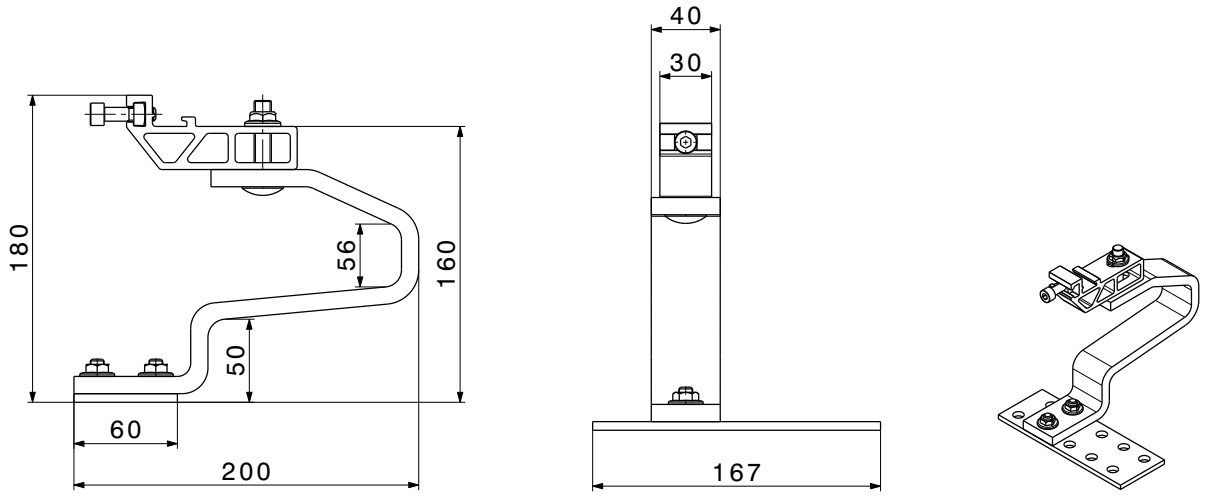
Roof bar tile adjustable - for on-roof installation

(Dimensions in mm)



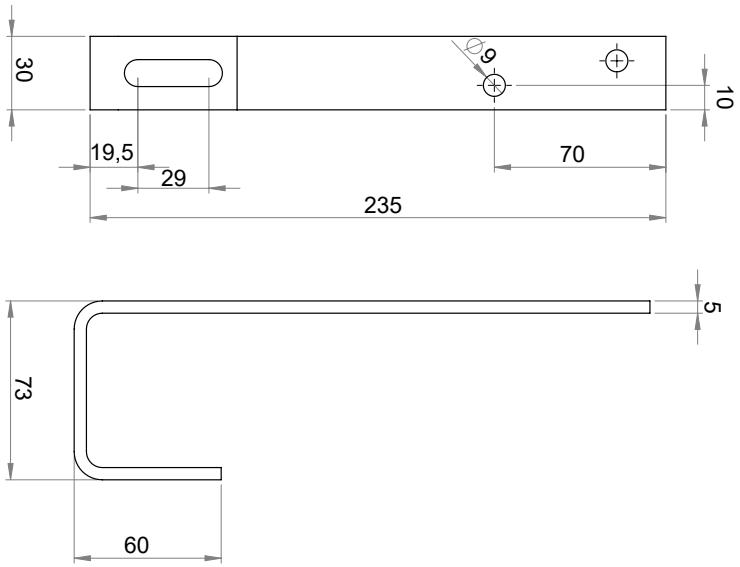
Roof bar tile heavy duty - for on-roof installation

(Dimensions in mm)



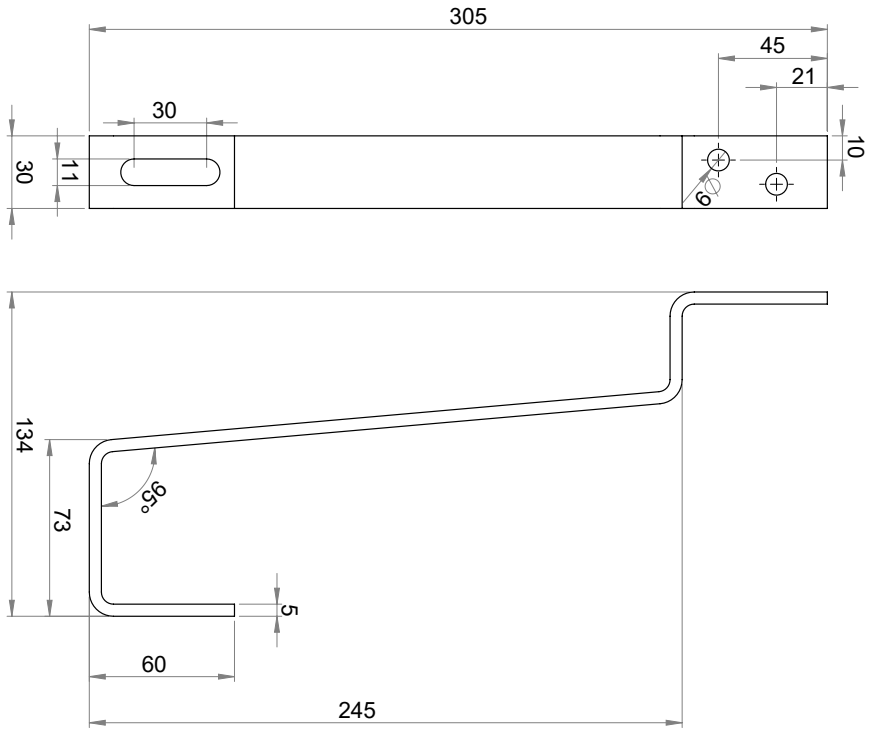
Roof bar slate - for on-roof installation

(Dimensions in mm)



Roof bar plain tile - for on-roof installation

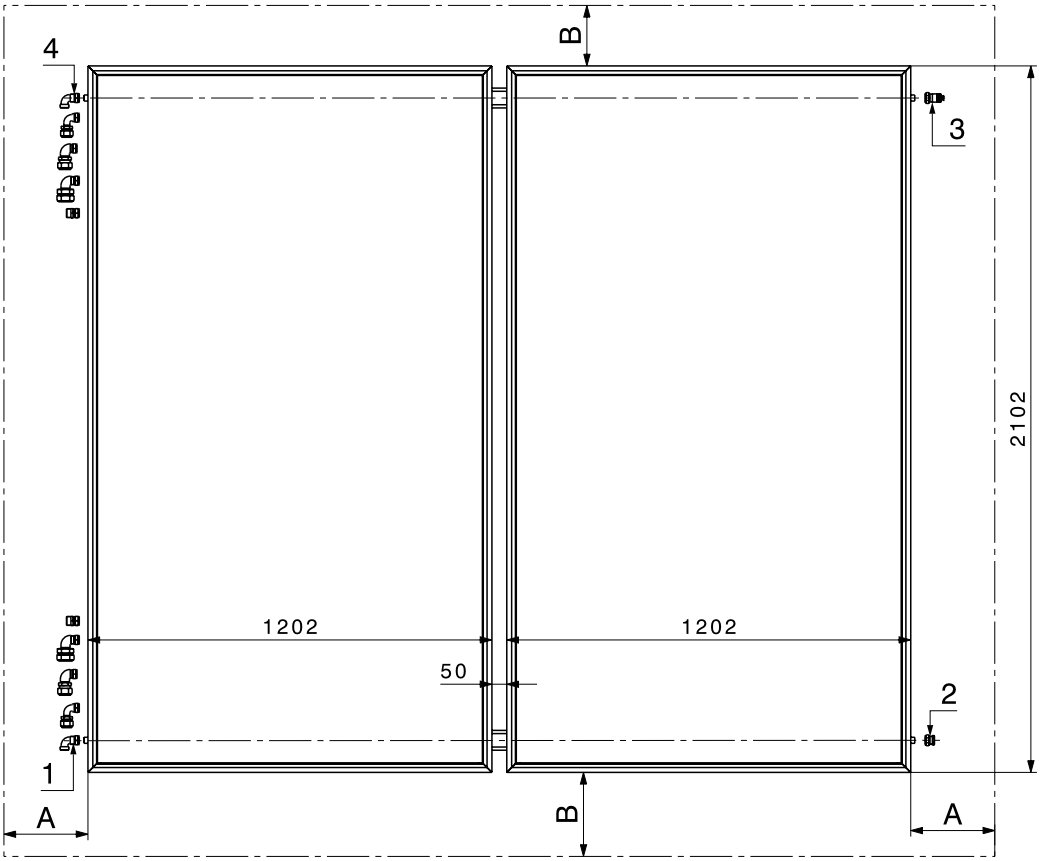
(Dimensions in mm)



Space requirements

UltraSol® 2 - vertical

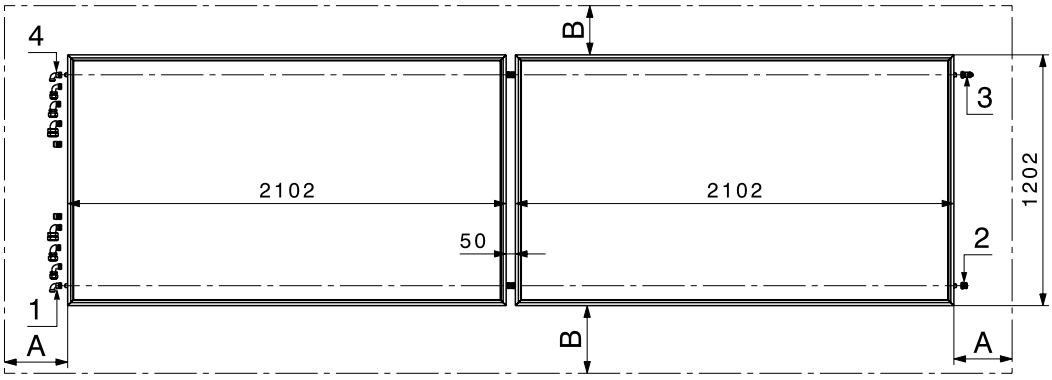
(Dimensions in mm)



Inverted configuration of the connections is also possible.

UltraSol® 2 - horizontal

(Dimensions in mm)



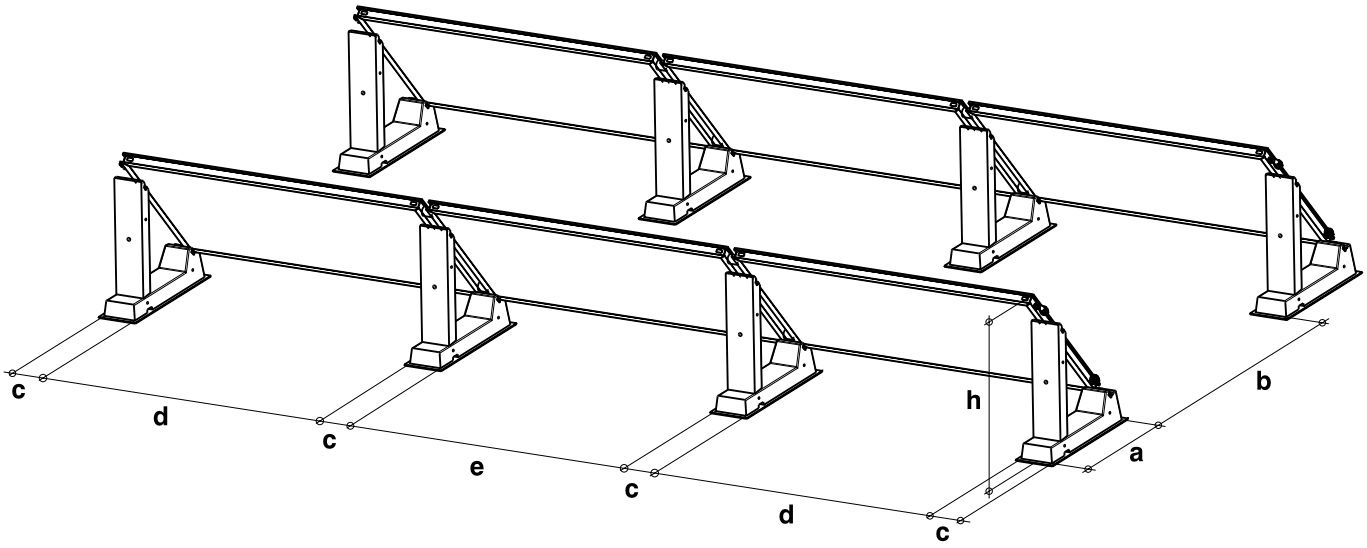
Inverted configuration of the connections is also possible.

1 Inlet/collector return; connection Ø 18 mm CU round pipe
2 Dummy plug
3 Dummy plug with integrated manual vent
4 Outlet/collector flow hot; connection Ø 18 mm Cu round pipe
Select short line routing
Sensor: position, see Engineering

A Space for installation/removal of connection brackets and collectors 250 mm.
B top At least one tile length distance from the gable (roof ridge).
B bottom At least one tile length distance from the end of the roof (eaves).
Also comply with local regulations relating to snow safety (number of snow holders).

Space requirements

Concrete base - installation
(Dimensions in mm)



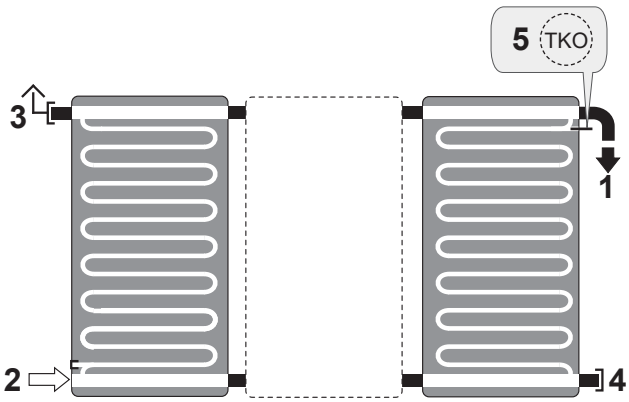
Type	Installation angle	h	a	b	c	d	e
UltraSol® 2	45°	*1083	930	min. 1100	215	1897	1937

* With protective mat

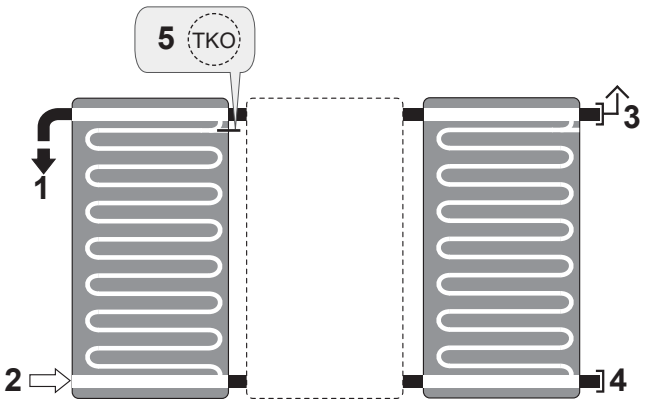
Piping of the collector series
Connection example for collector series

UltraSol® 2 V (collector vertical)

Connection variant: Tichelmann, max. 8 collectors/row
Inverted configuration of the connections is also possible.

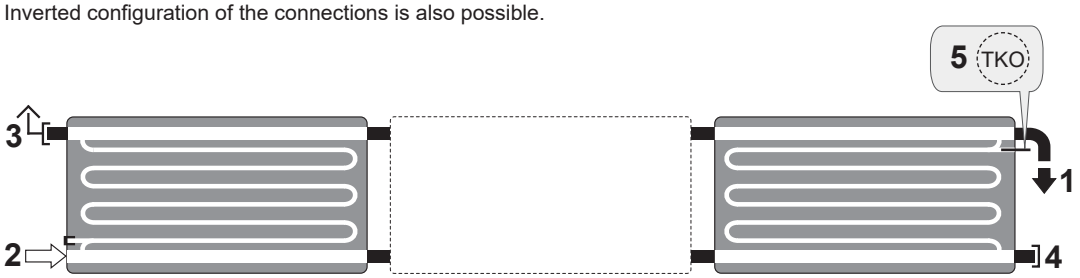


Connection variant: non-Tichelmann, max. 8 collectors/row
Inverted configuration of the connections is also possible..



UltraSol® 2 H (collector horizontal)

Connection variant: Tichelmann, max. 8 collectors/row
Inverted configuration of the connections is also possible.



Connection variant: non-Tichelmann, max. 8 collectors/row
Inverted configuration of the connections is also possible.

1 Line from collector field (collector flow, warm) select short line routing

2 Line to collector field (collector return)

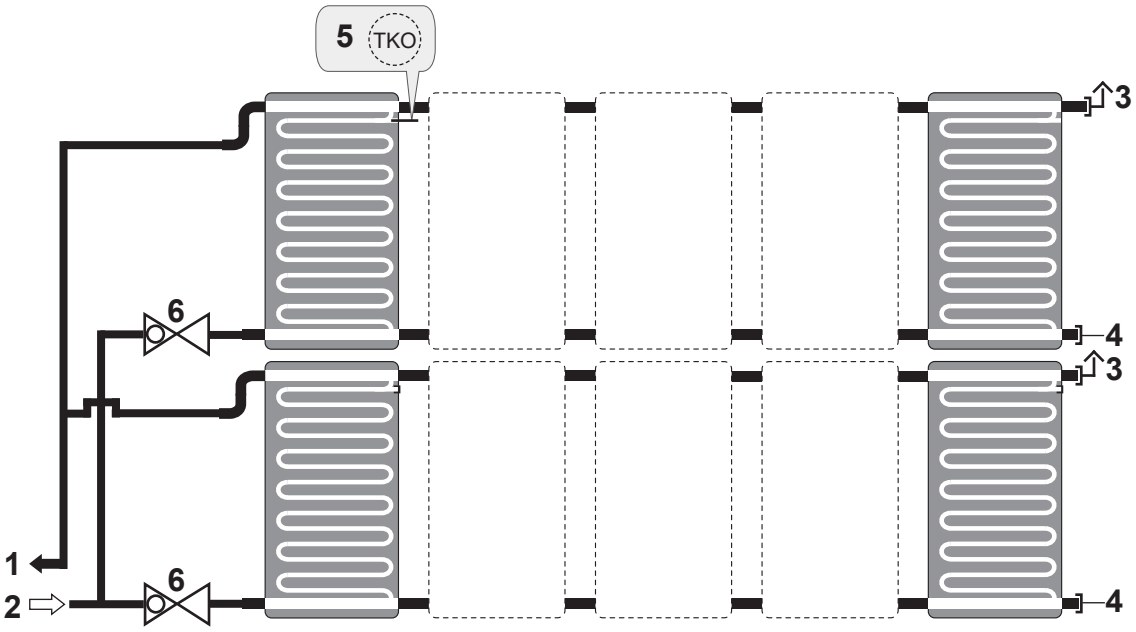
3 Dummy plug with integrated manual vent

4 Dummy plug

5 TKO Immersion sleeve Differential control sensor or solar sensor

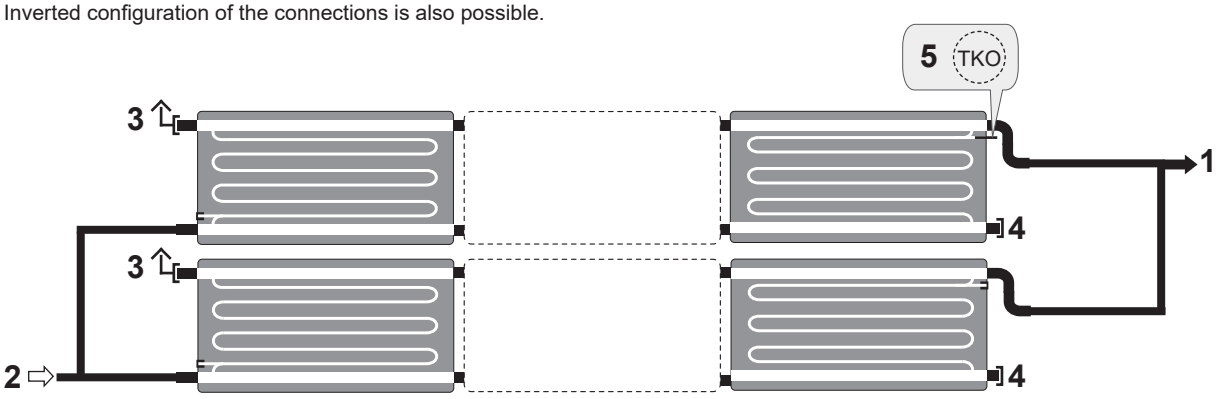
UltraSol® 2 V (collector vertical)

Connection variant: non-Tichelmann, max. 8 collectors/row
Inverted configuration of the connections is also possible.



UltraSol® 2 H (collector horizontal)

Connection variant: non-Tichelmann, max. 8 collectors/row
Inverted configuration of the connections is also possible.



1 Line from collector field (collector flow, warm)
select short line routing

2 Line to collector field (collector return)

3 Dummy plug with integrated manual vent

4 Dummy plug

5 TKO Immersion sleeve
Differential control sensor or solar sensor

6 Control valve

Static dimensioning aid

The following requirements and directives must be complied with:

- Regionally applicable standards and regulations
- The installer is responsible for ensuring compliance with the relevant standards and local regulations.
- The snow and wind loads are regulated by DIN EN 1991 and the associated national appendix.
- The European standard EN 1991-1-3 must be observed. It is valid up to altitudes of 1500 m. Any altitudes above that are regulated by special national appendices.

General information on statics

- Installation is only permissible on roof areas or substructures of sufficient load-bearing capacity. It is essential for the static load-bearing capacity of the roof or the substructure to be checked by the local statics engineer before the collectors are installed.
- The examination of the entire collector structure according to DIN 1055 Parts 4 and 5 is required by the local statics engineer, in particular in areas subject to high snowfall or high wind speeds.Attention in this must be paid to all special features of the installation site (foehn winds, venturi effects, eddy formation etc.) that can lead to increased load.

Roof-mounted systems

- With roof-mounted systems, particular attention must be paid to the quality of the wood in the substructure with regard to the durability of the screw connections for attaching collector installation fixtures.
- The selection and also the number of roof connections must be adapted to the local snow and wind loads.
- Binding statements about the wind and snow loads as well as building altitudes about seal level must be obtained from the relevant authorities in the regions.
- If the roof anchors are exposed to maximum load, their geometry means that deformation will be unavoidable and contact between the roof anchor and the tiles can often not been prevented. As a result, it is recommended for metal tiles to be used if there will be high snow and wind loads.
- The significant number of roof connection sets is based on the calculated minimum number of attachment points for the planned number of collectors without taking account of the building-specific anchoring conditions of the roof covering and the building structure.
- The local force application via roof connection sets has been provided.
- The transmission of forces via the screw connection to the building structure does not form part of this calculation and must be verified separately.
- To prevent impermissible wind suction loads, the collectors must not be installed near the edges of the roof. The relevant standards must be observed in this case.
  When elevators are used, the upper edge of the collector must not project beyond the ridge of the roof.
- Collectors must not be installed under a height change, in order to avoid increased loads due to windblown or slipping snow from the higher section of the roof onto the collector field. If snow guards are mounted on the more elevated roof for this reason, the statics of this roof must be inspected.

Penetrations of the roof cladding (all roof types)

Penetrations of the roof cladding should be avoided wherever possible. If penetrations with mounting elements (e.g. hanger bolts) or other components (e.g. solar lines) cannot be avoided, they must be carried out by experts in accordance with the regionally applicable standards and guidelines:

Germany: DIN 18531
Austria: ÖNORM B 7220
Switzerland: SIA 271
Other regionally applicable directives of the roofing trade must be observed and complied with.

Personal protection

- In order to carry out work on the roof, safety equipment for personal protection must be included in the planning. For pitched roofs, these are safety roof hooks and for flat roofs, suitable attachment points or cable systems. Regarding work on the roof, local regulations must be adhered to.

On-roof mounting and flat-roof mounting with elevations

Table 1 shows the max. permissible snow and wind loads (characteristic for the location of the system) for the specified collector inclinations depending on the distance between the fastening points (rafter spacing) and the selected fastening elements. These loads refer to the use of the max. possible number of fixing points, i.e. e.g. when using each rafter.
In the case of elevated installation on a flat roof, the specified rafter distances are to be equated with the distances between the fixing points on the (on-site) substructure. The required number of mounting sets for the planned number of collectors and the mounting distance can be found in Table 2. It must be checked and ensured that the existing roof or substructure on site can absorb the loads occurring and guarantee a secure anchoring of the fastening points. All values given must be checked/calculated by a recognised statics/structural engineer if necessary. Consequently, no legal claims can be asserted on this basis.

The following links can be used to determine the characteristic snow load s_k:

Switzerland:
https://www.dlubal.com/de/schnee-wind-erdbeben-lastzonen/schnee-sia-261.html

Austria:
https://www.dlubal.com/de/schnee-wind-erdbeben-lastzonen/schnee-onorm-b-1991-1-3.html
https://www.hora.gv.at/

Germany:
https://www.dlubal.com/de/schnee-wind-erdbeben-lastzonen/schnee-din-en-1991-1-3.html

Liechtenstein:
https://www.dlubal.com/de/schnee-wind-erdbeben-lastzonen/schnee-ll-bauv.html

The minimum permissible inclination of the collector is 22°. For collector inclinations over 60°, a detailed calculation by a statics/structural engineer is necessary.

AD0V: On-roof mounting, 0° (parallel to the roof), collector design V
AD0H: On-roof mounting, 0° (parallel to the roof), collector design H

AD20-45V: On-roof mounting, elevated 20 ... 45° (plus roof pitch), collector design V
AD20-60H: On-roof mounting, elevated 20 ... 60° (plus roof pitch), collector design H

FD20-45V: Flat roof mounting, elevated 20 ... 45°, collector design V
FD20-60H: Flat-roof mounting, elevated 20 ... 60°, collector design H

Table 1

On-roof mounting and flat-roof mounting with elevations
Collector inclination 22 ... 32° to the horizontal
Collector UltraSol® 2 V/H

		2 profile rows standard load					
Rafter spacing	[mm]	≤ 600		> 600 ... ≤ 800		> 800 ... ≤ 1000	
max. permissible loads	[kN/m²]	Snow [1]	Wind	Snow [1]	Wind	Snow [1]	Wind
Roof bar tile adjustable US2-DBAV	AD0V	1.6	0.9	1.2	0.7	1.0	0.7
	AD20-45V	1.2	0.7	1.2	0.7	not permissible	
	AD0H	3.6	1.0	2.6	0.9	2.0	0.9
	AD20-45H	1.2	0.7	1.2	0.7	not permissible	
	AD60H	1.2	0.7	1.2	0.7	not permissible	
Roof bar tile heavy duty US2-DBCV	AD0V	2.6	1.0	2.0	0.9	1.6	0.9
	AD20-45V	2.0	0.8	2.0	0.8	not permissible	
	AD0H	5.0	1.5	4.0	0.9	3.5	0.9
	AD20-45H	2.0	0.8	2.0	0.8	not permissible	
	AD60H	2.0	0.8	2.0	0.8	not permissible	
Roof bar plain tile US2-DBC-plain tile [2]	AD0V	1.6	0.9	1.2	0.7	1.0	0.7
	AD20-45V	not permissible		not permissible		not permissible	
	AD0H	3.6	1.0	2.6	0.9	2.0	0.9
	AD20-45H	not permissible		not permissible		not permissible	
	AD60H	not permissible		not permissible		not permissible	
Roof bar slate US2-DBC-slate [2]	AD0V	1.6	0.9	1.2	0.7	1.0	0.7
	AD20-45V	not permissible		not permissible		not permissible	
	AD0H	3.6	1.0	2.6	0.9	2.0	0.9
	AD20-45H	not permissible		not permissible		not permissible	
	AD60H	not permissible		not permissible		not permissible	
Hanger bolt	AD0V	1.4	0.9	0.9	0.9	0.6	0.4
	AD20-45V	not permissible		not permissible		not permissible	
	AD0H	1.8	0.9	1.2	0.9	0.9	0.9
	AD20-45H	not permissible		not permissible		not permissible	
	FD20-30V	1.4	0.9	0.9	0.9	0.6	0.4
	FD20-30H	1.8	0.9	1.2	0.9	0.9	0.9
Double level screw	AD0V	1.8	0.9	1.2	0.9	1.0	0.9
	AD20-45V	not permissible		not permissible		not permissible	
	AD0H	4.0	0.9	2.8	0.9	2.4	0.9
	AD20-45H	not permissible		not permissible		not permissible	
	FD20-30V	1.8	0.9	1.2	0.9	1.0	0.9
	FD20-30H	4.0	0.9	2.8	0.9	2.4	0.9
Tin roof clamp [3]	AD0V	max. perm. load: pressure 2.0 kN - suction 1.5 kN					
	AD20-45V	not permissible		not permissible		not permissible	
	AD0H	max. perm. load: pressure 2.0 kN - suction 1.5 kN					
	AD20-45H	not permissible		not permissible		not permissible	

[1] Characteristic snow load s_k
[2] Only in combination with metal tiles
[3] The specified values of the sheet metal seam clamps apply as max. load per clamp. When using sheet metal seam clamps, the load-bearing capacity of the sheet metal seams and the sheet metal roof must be checked on site. The number and distribution of the clamps must be calculated by the customer. All values given must be checked/calculated by a recognised statics/structural engineer if necessary. Elevated mounting with sheet metal seam clamps is not permitted!

On-roof mounting and flat-roof mounting with elevations
Collector inclination 22 ... 32° to the horizontal
Collector UltraSol® 2 V/H

		3 profile rows increased load (statics supplement - extra 3rd support section)					
Rafter spacing	[mm]	≤ 600		> 600 ... ≤ 800		> 800 ... ≤ 1000	
max. permissible loads	[kN/m²]	Snow [1]	Wind	Snow [1]	Wind	Snow [1]	Wind
Roof bar tile adjustable US2-DBAV	AD0V	2.8	1.1	2.0	0.9	1.6	0.7
	AD20-45V	1.2	0.7	1.2	0.7	not permissible	
	AD0H	5.5	1.2	4.0	1.1	3.1	1.1
	AD20-45H	1.2	0.7	1.2	0.7	not permissible	
	AD60H	1.2	0.7	1.2	0.7	not permissible	
Roof bar tile heavy duty US2-DBCV	AD0V	4.5	1.1	3.0	1.1	2.3	1.1
	AD20-45V	2.0	0.8	2.0	0.8	not permissible	
	AD0H	5.6	1.2	5.6	1.2	4.8	1.2
	AD20-45H	2.0	0.8	2.0	0.8	not permissible	
	AD60H	2.0	0.8	2.0	0.8	not permissible	

Table 1

On-roof mounting and flat-roof mounting with elevations
Collector inclination 33 ... 60° to the horizontal
Collector UltraSol® 2 V/H

		2 profile rows standard load					
Rafter spacing	[mm]	≤ 600		> 600 ... ≤ 800		> 800 ... ≤ 1000	
max. permissible loads	[kN/m²]	Snow [1]	Wind	Snow [1]	Wind	Snow [1]	Wind
Roof bar tile adjustable US2-DBAV	AD0V	1.4	0.7	0.9	0.7	0.8	0.7
	AD20-45V	1.2	0.7	1.2	0.7	not permissible	
	AD0H	2.8	0.9	2.2	0.7	1.6	0.7
	AD20-45H	1.2	0.7	1.2	0.7	not permissible	
	AD60H	1.2	0.7	1.2	0.7	not permissible	
Roof bar tile heavy duty US2-DBCV	AD0V	1.8	0.9	1.2	0.9	1.0	0.9
	AD20-45V	2.0	0.8	2.0	0.8	not permissible	
	AD0H	4.0	0.9	2.8	0.9	2.4	0.9
	AD20-45H	2.0	0.8	2.0	0.8	not permissible	
	AD60H	2.0	0.8	2.0	0.8	not permissible	
Roof bar plain tile US2-DBC-plain tile [2]	AD0V	1.4	0.7	0.9	0.7	0.8	0.7
	AD20-45V	not permissible		not permissible		not permissible	
	AD0H	2.8	0.9	2.2	0.7	1.6	0.7
	AD20-45H	not permissible		not permissible		not permissible	
	AD60H	not permissible		not permissible		not permissible	
Roof bar slate US2-DBC-slate [2]	AD0V	1.4	0.7	0.9	0.7	0.8	0.7
	AD20-45V	not permissible		not permissible		not permissible	
	AD0H	2.8	0.9	2.2	0.7	1.6	0.7
	AD20-45H	not permissible		not permissible		not permissible	
	AD60H	not permissible		not permissible		not permissible	
Hanger bolt	AD0V	1.4	0.9	0.9	0.9	0.6	0.4
	AD20-45V	not permissible		not permissible		not permissible	
	AD0H	1.8	0.9	1.2	0.9	0.9	0.9
	AD20-45H	not permissible		not permissible		not permissible	
	AD60H	not permissible		not permissible		not permissible	
	FD45V	1.4	0.9	0.9	0.9	0.6	0.4
	FD45H	1.8	0.9	1.2	0.9	0.9	0.9
	FD60H	1.8	0.9	1.2	0.9	0.9	0.9
Double level screw	AD0V	1.8	0.9	1.2	0.9	1.0	0.9
	AD20-45V	not permissible		not permissible		not permissible	
	AD0H	4.0	0.9	2.8	0.9	2.4	0.9
	AD20-45H	not permissible		not permissible		not permissible	
	AD60H	not permissible		not permissible		not permissible	
	FD45V	1.8	0.9	1.2	0.9	1.0	0.9
	FD45H	4.0	0.9	2.8	0.9	2.4	0.9
	FD60H	4.0	0.9	2.8	0.9	2.4	0.9
Tin roof clamp [3]	AD0V	max. perm. load: pressure 2.0 kN - suction 1.5 kN					
	AD45V	not permissible		not permissible		not permissible	
	AD0H	max. perm. load: pressure 2.0 kN - suction 1.5 kN					
	AD45H	not permissible		not permissible		not permissible	
	AD60H	not permissible		not permissible		not permissible	

[1] Characteristic snow load s_k
[2] Only in combination with metal tiles
[3] The specified values of the sheet metal seam clamps apply as max. load per clamp. When using sheet metal seam clamps, the load-bearing capacity of the sheet metal seams and the sheet metal roof must be checked on site. The number and distribution of the clamps must be calculated by the customer. All values given must be checked/calculated by a recognised statics/structural engineer if necessary. Elevated mounting with sheet metal seam clamps is not permitted!

On-roof mounting and flat-roof mounting with elevations
Collector inclination 33 ... 60° to the horizontal

Collector UltraSol® 2 V/H		3 profile rows increased load (statics supplement - extra 3rd support section)					
Rafter spacing	[mm]	≤ 600		> 600 ... ≤ 800		> 800 ... ≤ 1000	
max. permissible loads	[kN/m²]	Snow [1]	Wind	Snow [1]	Wind	Snow [1]	Wind
Roof bar tile adjustable US2-DBAV	AD0V	2.3	0.9	1.7	0.7	1.2	0.7
	AD20-45V	1.2	0.7	1.2	0.7	not permissible	
	AD0H	4.4	1.1	3.1	1.1	2.3	1.1
	AD20-45H	1.2	0.7	1.2	0.7	not permissible	
	AD60H	1.2	0.7	1.2	0.7	not permissible	
Roof bar tile heavy duty US2-DBCV	AD0V	3.0	1.1	2.2	0.9	1.6	0.9
	AD20-45V	2.0	0.8	2.0	0.8	not permissible	
	AD0H	5.0	1.2	4.1	1.2	4.3	1.2
	AD20-45H	2.0	0.8	2.0	0.8	not permissible	
	AD60H	2.0	0.8	2.0	0.8	not permissible	

Table 2 shows the calculated minimum number of roof connection sets for the planned number of collectors without taking account of the building-specific anchoring conditions of the roof covering and the building structure.
The values must be checked according to local conditions and the status of the roof construction and be calculated by a recognised statics/structural engineer. Consequently, no legal claims can be asserted on this basis.

Lengthwise expansion
Due to high temperature differences between summer and winter, the lengthwise expansion of the profiles must be considered.
The carrier profiles must be divided with a gap (min. 4 cm) after every 12 m. Consequently, a maximum of 8 vertical collectors or 6 horizontal collectors can be juxtaposed. The distance between the collector fields is minimum 10 cm.

Table 2: Minimum number of roof connection sets (1 set = 2 attachment points)

UltraSol® 2 V	**Number of collectors**							
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Rafter spacing [1] 1000 mm	2	3	4	5	7	8	9	10
Rafter spacing [1] 900 mm	2	3	5	6	7	9	10	12
Rafter spacing [1] 800 mm	2	4	5	7	8	10	12	13
Rafter spacing [1] 700 mm	2	4	6	8	9	11	13	15
Rafter spacing [1] 600 mm	2	5	7	9	11	13	15	17
Rafter spacing [1] 500 mm	3	6	8	11	13	16	18	21

UltraSol® 2 H	**Number of collectors**					
	1	**2**	**3**	**4**	**5**	**6**
Rafter spacing [1] 1000 mm	3	5	7	10	12	14
Rafter spacing [1] 900 mm	3	5	7	9	11	13
Rafter spacing [1] 800 mm	2	4	6	7	8	10
Rafter spacing [1] 700 mm	3	4	6	8	10	12
Rafter spacing [1] 600 mm	2	4	6	8	10	12
Rafter spacing [1] 500 mm	3	5	7	9	11	13

[1] Distance between fixing levels

Snow load

Calculation examples snow load on-roof mounting

	Example 1	Example 2	Example 3	Example 4
Collector angle	30°	45°	35°	45°
On-roof mounting	AD0V: On-roof mounting, 0° (parallel to the roof), collector design V	AD20-45V: On-roof mounting, elevated 20 ... 45° (plus roof pitch), collector design V	AD0H: On-roof mounting, 0° (parallel to the roof), collector design H	AD0H: On-roof mounting, 0° (parallel to the roof), collector design H
Rafter spacing	600 mm	600 mm	800 mm	800 mm
Characteristic snow load s_k	CH-7000 Chur: s_k = 2.46 kN/m²	CH-7000 Chur: s_k = 2.46 kN/m²	AT-6353 Going am Wilden Kaiser: s_k = 4.08 kN/m²	DE-83022 Rosenheim: s_k = 1.39 kN/m²
Permissible roof brackets (see Table 1)	With 2 profile levels (standard load): - Roof bracket tile heavy duty US2-DBCV s_k = 2.6 kN/m²	Not a permissible design	With 3 profile levels (increased load): - Roof bracket tile heavy duty US2-DBCV s_k = 4.1 kN/m²	With 2 profile levels (standard load): - Roof bracket tile adjustable US2-DBAV s_k = 2.2 kN/m² - Roof bracket tile heavy duty US2-DBCV s_k = 2.8 kN/m² - Roof bracket plain tile US2-DBC-plain tile s_k = 2.2 kN/m² - Roof bracket slate US2-DBC-slate s_k = 2.2 kN/m²
Conclusion	In this example, the on-roof mounting can be performed with the roof bracket tile heavy duty and 2 profile levels.	The characteristic snow load s_k is higher than the permissible load of the on-roof mounting. On-roof mounting cannot be performed in this form.	In this example, the on-roof mounting can be performed with the roof bracket tile heavy duty and 3 profile levels.	In this example, the on-roof mounting can be performed with the roof bracket tile adjustable, the roof bracket tile heavy duty and the roof bracket plain tile and 2 profile levels.

Flat roof systems

Wind load calculation according to DIN EN 1991-1-3 and -4 for free-standing flat roof systems

In general, calculation in accordance with standard DIN EN 1991-1-3 and -4 applies for the detailed wind load calculation.
The existing recommendation should cover the standard cases and ease handling in daily use However, this recommendation does not release the planning authority from carefully examining the local conditions and having a designated specialist (structural engineer/civil engineer) make a detailed calculation. Consequently, no liability claims can be asserted on this basis.

The following points are decisive for the design of the wind load:
- Collector angle
- Backpressure zone/wind zone
- Terrain category/location
- Height of building above terrain
- Building dimensions/shape
- Roof edge height (attic)
- Distance from collectors to roof edge
- Number of collectors in a row

The more exposed, the more free-standing the building is, the higher are the expected wind loads. In city areas, the buildings are often protected from wind by other neighbouring buildings.

Minimum requirement - number of additional weights

Table 3 shows the additional weights for the UltraSol® 2 concrete base system.
The information in the table only refers to these isolated cases. The values do not apply for every situation and must be checked and adjusted to the local situation. Consequently, no legal claims can be asserted on this basis. Higher backpressures and wind speeds must be determined and calculated in accordance with DIN EN 1991-1-3 and -4.

At total heights above 10 m, additional anchoring is recommended (safety level 2 or 3). Since the collectors can tilt at higher wind loads, it is especially important that the first row of collectors facing the wind be braced.

The reference value of the backpressure corresponds to the top speed (gusts of a few seconds). Its return period is 50 years. For constructions at locations with unusual wind conditions, for example peaks or ridges, increasing the values should be examined on a case-by-case basis.

Table 3: minimum requirement - number of additional weights

Base speed pressure $q_{b,0}$ [1]	Backpressure	Peak speed (gust speed) v_p [2]		Number of UltraSol® 2 H per collector row (angle 45°)						
				Up to 2 collectors	Up to 3 collectors	Up to 4 collectors	Up to 5 collectors	Up to 6 collectors	Up to 7 collectors	Up to 8 collectors
kN/m²	kN/m²	m/s	km/h	Number of additional weights with 50 kg each [3]						
0.19	0.4	25.3	91	3	3	3	4	4	4	4
0.24	0.5	28.3	102	4	4	5	5	5	5	6
0.29	0.6	31.1	112	5	6	6	7	7	7	7
0.34	0.7	33.6	121	6	7	Detailed determination necessary by structural engineer				
0.38	0.8	35.8	129	Detailed determination necessary by structural engineer						
0.43	0.9	38.7	139	Detailed determination necessary by structural engineer						
0.48	1.0	40.8	147	Detailed determination necessary by structural engineer						

[1] Base speed pressure $q_{b,0}$ according to EN 1991-1-3 and -4
[2] Peak speed (gust speed) v_p according to ÖNORM B 1991-1-4
[3] Specification of additional weights applies per concrete base
Calculation valid for: attic height > 200 mm; coefficient of friction of underlay mat 0.65; roof distances > 1.5 m

1. Calculating the wind load

Base speeds and speed pressures:

Wind zone	Base wind speed $v_{b,0}$ in m/s	Base speed pressure q_b in kN/m²
1	< 22.5	0.32
2	< 25.0	0.39
3	< 27.5	0.47
4	< 30.0	0.56

Example for DE: https://www.dlubal.com/de/schnee-wind-erdbeben-lastzonen/wind-din-en-1991-1-4.html

Determining the terrain category (TC)

Terrain categories according to DIN EN 1991-1-4:

Terrain category (TC)	Definition
Terrain category I	Open sea; lakes with at least 5 km open area in wind direction; level, flat land without obstacles
Terrain category II	Terrain with hedges, individual farms, houses or trees, e.g. agricultural area
Terrain category III	Suburbs, industrial or commercial areas; woodland
Terrain category IV	Urban areas where at least 15 % of the area is occupied by buildings with an average height exceeding 15 m

2. Determination of the maximum gust speed

Gust speed in wind zone 1:

Reference height in metres	GK I in km/h	GK II in km/h	GK III in km/h	GK IV in km/h
0	112	105	100	93
10	136	124	103	93
16	136	124	111	93
20	139	128	115	98

Gust speed in wind zone 2:

Reference height in metres	GK I in km/h	GK II in km/h	GK III in km/h	GK IV in km/h
0	124	117	111	104
10	145	131	114	104
16	152	138	123	104
20	155	142	127	109

Gust speed in wind zone 3:

Reference height in metres	GK I in km/h	GK II in km/h	GK III in km/h	GK IV in km/h
0	137	129	122	114
10	159	144	126	114
16	167	152	135	114
20	170	156	140	119

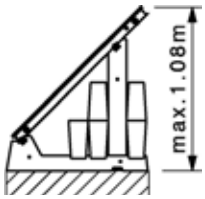
Gust speed in wind zone 4:

Reference height in metres	GK I in km/h	GK II in km/h	GK III in km/h	GK IV in km/h
0	149	140	133	124
10	174	157	137	124
16	182	166	148	125
20	186	170	153	130

3. Determination of the minimum number of additional weights per concrete base according to Table 3

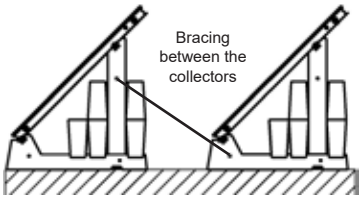
With the value of the maximum gust speed, the number of required additional weights (50 kg each) per concrete base can be calculated. The value in the tables must be above the maximum gust speed of the location.

Safety levels for fastening and installation conditions
Depending on the building height and situation, the safety of the system must also be increased. The bracing must be created with stable rails or with steel cables.

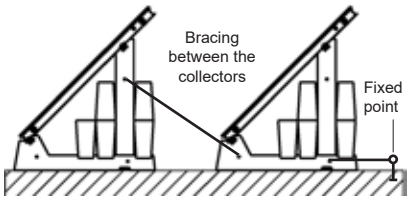


Safety level 1
- Increase in dead weight with number of additional weights

M8 threads are moulded on the sides of the concrete base for bracing the collector rows.



Safety level 2
- Increase in dead weight with number of additional weights
- Additional fastening of the rows among one another
- Bracing (e.g. perforated rail)
- Recommended if height of building more than 10 m above terrain
- The bracing must be attached to the edge of the collector field. If there are 4 or more collectors in a row, additional bracing must be fitted in the middle of the field



Safety level 3
- Increase in dead weight with number of additional weights
- Additional fastening of the rows among one another
- Fastening of rows to a stable fixed point (on-site)
- On-site bracing (e.g. perforated rail)
- Recommended with backpressure of 1.3 kN/m² or more, or without roof edge (< 20 cm)

Substructure of the roof/statics
Before the weights are positioned on the roof, the statics of the roof must be checked. The responsible structural engineer must be consulted. The compressive strength of the substructure must also be checked. Not every type of insulation is suitable for high point loads. If pallets are delivered to the roof, the permissible loads on the roof must be observed. The following table shows the weights per concrete base depending on the number of additional weights.

Table 4 relates to
- the total weight of the concrete base
- additional weights and
- collector divided by the number of collectors installed in a row

Weights
Concrete base: 92 kg
Additional weight: 50 kg
Collector: 43 kg
Concrete base contact surface: 0.2 m²

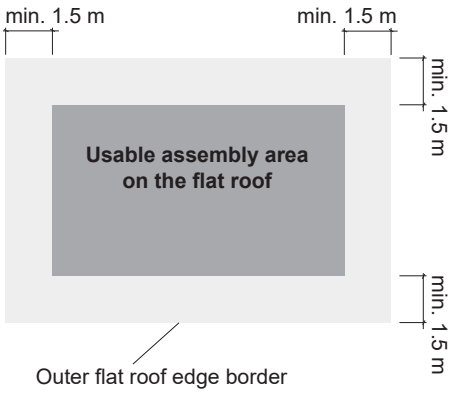
The following number of concrete bases are included in the calculation per row: Number of collectors +1

If the point load on the structure is too high, the weight can be distributed over a larger area using a load distribution plate under the base.

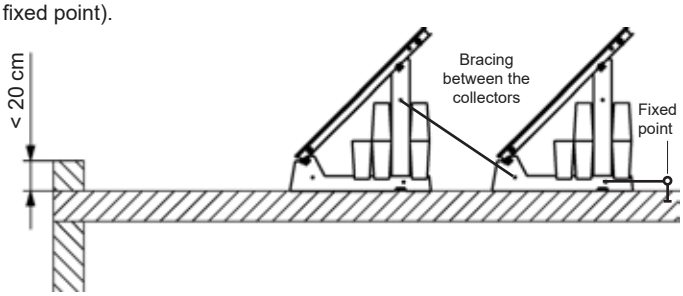
Table 4

	Number of collectors/row Weight per collector in a row in kg							
	1	2	3	4	5	6	7	8
with 3 additional weights	527	406	366	346	333	325	320	315
with 4 additional weights	627	481	432	408	393	384	377	372
with 5 additional weights	727	556	499	471	453	442	434	428
with 6 additional weights	827	631	566	533	513	500	491	484
with 7 additional weights	927	706	632	596	573	559	548	540

Flat roof edge border zones
To prevent impermissible wind suction loads, the collectors must not be installed near the edges of the roof. The relevant standards must be observed in this case.
When installing solar collectors, the critical areas near the edge must not be used as assembly areas.



Flat roof systems without roof edge border
In systems that have no or little flat roof edge border (height less than 20 cm), particular caution is recommended. In this case, the entire construction is exposed to the complete wind forces. That is why we recommend safety level 3 (bracing rows and fastening to a stable fixed point).



Protection of the roof layer

The flat roof must be protected against damage. Damage to the roof cladding is time-consuming and very cost-intensive to repair. The roof must therefore be thoroughly cleaned before installation. Especially pointed objects such as stones, shards and tools must be removed. The gravel covering must be completely removed in the area of the concrete base. Under the base, the roof cladding must be protected with an insulating mat (e.g. foam rubber mat).

Recommended pipe dimension (copper or stainless steel pipe)

for monopropylene glycol/water mixture 40/60 % and 50 °C

Flow rate		DN 10 12 x 1 mm		DN 12 15 x 1 mm		DN 15 18 x 1 mm		DN 20 22 x 1 mm		DN 25 28 x 1.5 mm		DN 32 35 x 1.5 mm		DN 40 42 x 1.5 mm	
[l / h]	[l/min]	v [m/s]	Δp [mbar/m]	v [m/s]	Δp [mbar/m]	v [m/s]	Δp [mbar/m]	v [m/s]	Δp [mbar/m]	v [m/s]	Δp [mbar/m]	v [m/s]	Δp [mbar/m]	v [m/s]	Δp [mbar/m]
125	2.08	0.44	3.10	0.26	1.10	0.17	0.50	0.11	0.20	0.07	0.10	0.04	0.00	0.03	0.00
150	2.50	0.53	6.70	0.31	1.30	0.21	0.60	0.13	0.20	0.08	0.10	0.05	0.00	0.03	0.00
175	2.92	0.62	8.70	0.37	1.50	0.24	0.70	0.15	0.30	0.10	0.10	0.06	0.00	0.04	0.00
200	3.33	0.71	10.90	0.42	3.20	0.28	0.80	0.18	0.30	0.11	0.10	0.07	0.00	0.05	0.00
250	4.17	0.88	15.90	0.52	4.60	0.35	1.70	0.22	0.40	0.14	0.20	0.09	0.10	0.06	0.00
300	5.00	1.06	21.70	0.63	6.30	0.41	2.40	0.27	0.80	0.17	0.20	0.10	0.10	0.07	0.00
350	5.83	1.24	28.30	0.73	8.20	0.48	3.10	0.31	1.10	0.20	0.20	0.12	0.10	0.08	0.00
400	6.67	1.41	35.60	0.84	10.30	0.55	3.90	0.35	1.40	0.23	0.50	0.14	0.10	0.09	0.00
450	7.50	1.59	43.60	0.94	12.60	0.62	4.70	0.40	1.70	0.25	0.60	0.16	0.10	0.10	0.00
500	8.33	1.77	52.40	1.05	15.10	0.69	5.70	0.44	2.00	0.28	0.70	0.17	0.20	0.12	0.10
600	10.00	2.12	71.90	1.26	20.70	0.83	7.80	0.53	2.70	0.34	0.90	0.21	0.30	0.14	0.10
700	11.67	2.48	94.10	1.46	27.10	0.97	10.10	0.62	3.50	0.40	1.20	0.24	0.40	0.16	0.20
800	13.33	2.83	118.90	1.67	34.10	1.11	12.70	0.71	4.40	0.45	1.50	0.28	0.50	0.19	0.20
900	15.00	3.18	146.20	1.88	41.90	1.24	15.60	0.80	5.40	0.51	1.90	0.31	0.60	0.21	0.20
1000	16.67	3.54	175.90	2.09	50.40	1.38	18.80	0.88	6.50	0.57	2.30	0.35	0.70	0.23	0.30
1200	20.00	4.24	242.60	2.51	69.30	1.66	25.80	1.06	8.90	0.68	3.10	0.41	1.00	0.28	0.40
1500	25.00	5.31	360.20	3.14	102.70	2.07	38.10	1.33	13.20	0.85	4.60	0.52	1.40	0.35	0.60
1750	29.17	6.19	473.70	3.66	134.80	2.42	50.00	1.55	17.30	0.99	6.00	0.60	1.90	0.41	0.70
2000	33.33	7.07	601.00	4.19	170.70	2.76	63.30	1.77	21.80	1.13	7.60	0.69	2.30	0.47	0.90
2250	37.50	7.96	741.90	4.71	210.40	3.11	77.90	1.99	26.90	1.27	9.30	0.78	2.90	0.52	1.10
2500	41.67	8.84	896.00	5.23	253.70	3.45	93.90	2.21	32.30	1.41	11.20	0.86	3.50	0.58	1.40
2750	45.83	9.73	1063.00	5.76	300.70	3.80	111.10	2.43	38.20	1.56	13.20	0.95	4.10	0.64	1.60
3000	50.00	10.61	1243.00	6.28	351.20	4.14	129.70	2.65	44.60	1.70	15.40	1.04	4.70	0.70	1.90

V = Flow speed [m/s]

Δp = Pressure drop [mbar/m]

= Recommended pipe dimension

We recommend using commercially available copper and stainless steel pipe as the pipe raw material.
Heat insulation - depending on installation orientation:
- In the outdoor area, UV radiation resistant and robust (temperature, small animals)
- In the indoor area, depending on requirement, provide with fire and/or with touch protection

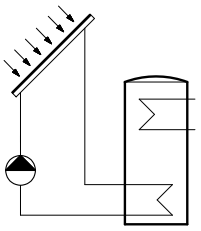
Table does not apply for corrugated tube.
Further information see solar cable SL

Looking for the appropriate hydraulic schematic?
Please contact your local Hoval partner.

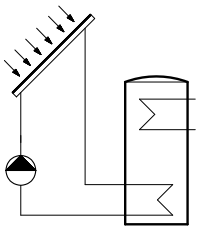
Solar armature groups without heat exchanger (direct)

		SAG20	SAG25/32	SAG20 und SAR20
				
Collector surface	approx. m²	25	40/100	40

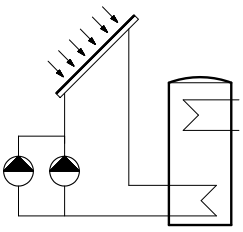
Examples
Solar system for hot water



Solar system
with SAG20



Solar system
with SAG25/32

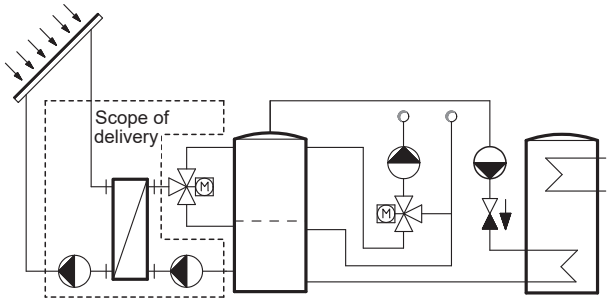


Solar system
with SAG20 and SAR20
combined for parallel
pump operation

Solar armature groups with heat exchanger

		TransTherm® solar (25)	(50)	(100)	(200)
					
Collector surface	approx. m²	25	50	100	150
Heat exchanger	built in	•	•	•	•
Reversing valve	external (option)	•	•	•	•

Example
Solar system for heating and hot
water, storage stratified charge top
or centre with reversing valve



Hoval solar armature group SAG20

- Solar armature group DN 20 (¾″)
- Circulating pump included separately
- 2 ball valves (key-operated) with thermometer
- Backflow preventer in the flow and return
- Adjustable flow rate with display (1-20 l/min.) or FlowRotor (0.5-15 l/min.) with PT1000 sensors (only for type FR)
- Permanent air vent AirStop
- Safety device
  - Safety valve (6 bar)
  - Pressure gauge (6 bar)
  - Flexible connection hose made of stainless steel for the diaphragm pressure expansion tank
- Rinsing and filling unit
- Shapely designed heat damming box made of EPP half shells

Delivery
- Solar armature group packed
- Pump delivered separately packed

Solar armature/ group/pump type	Continuous flow measurement range Calibration valve l/min	FlowRotor l/min	Speed control
SAG20/SPS 7	1-20	-	● ● ●
SAG20/SPS 7 PM2 [1]	1-20	-	●
SAG20FR/SPS 7 PM2 [1]	-	0.5-15	●

[1] Actuation of pump only possible with PWM-capable controller (TopTronic® E)

Hoval solar armature group SAG25/SAG32

- Solar armature group DN 25 (1″)/DN 32 (1¼″)
- Circulating pump separately packed
- 2 ball valves (key-operated) with thermometer
- Backflow preventer in the flow and return
- Safety device (6 bar)
  - Safety valve (6 bar)
  - Pressure gauge
  - Flexible connection hose made of stainless steel for the diaphragm pressure expansion tank
- Rinsing and filling unit
- Wall mounting console enclosed separately
- Shapely designed heat damming box made of EPP half shells

Delivery
- Solar armature packed
- Pump delivered separately packed
- Optional calibration valves and air vent available (recommended)

Solar armature group/pump type	Continuous flow measurement range Calibration valve l/min	FlowRotor l/min	Speed control
SAG25/SPS 8	10-40 [1]	1-35 [1]	● ● ● ● ●
SAG32/SPS 12 PM2	20-70 [1]	5-100 [1]	● ● ●

[1] Optional accessory (recommended): calibration valve or FlowRotor

Hoval solar return armature group SAR20

- Solar return armature group DN 20 (¾″)
- Circulating pump included separately
- Ball valve (key-operated) with thermometer
- Backflow preventer
- Adjustable flow rate with display (1-20 l/min.) or FlowRotor (0.5-15 l/min.) with PT1000 sensors (only for type FR)
- Safety device
  - Safety valve (6 bar)
  - Pressure gauge (6 bar)
  - Flexible connection hose made of stainless steel for the diaphragm pressure expansion tank
- Rinsing and filling unit
- Shapely designed heat damming box made of EPP half shells
- Incl. screw connection 1″ internal thread for mounting at the calorifier

Delivery
- Solar armature group packed
- Pump delivered separately packed

Solar return armature group/pump type	Continuous flow measurement range Calibration valve l/min	FlowRotor l/min	Speed control
SAR20/SPS 7	1-20	-	● ● ●
SAR20FR/SPS 7 PM2 [1]	-	0.5-15	●

[1] Actuation of pump only possible with PWM-capable controller (TopTronic® E)

FR = integrated flow rate sensor
PWM = variable flow rate possible

Speed control legend	
Δp-v	Variable differential pressure
ENF	Vent function 10 min.
	PWM control signal solar
Δp-c	Constant differential pressure
n-const	Constant speed

Solar armature groups

Hoval solar armature groups SAG20/25/32

Solar armature group/pump type	Continuous flow measurement range Calibration valve l/min	Flow rotor l/min	Part No.
SAG20/SPS 7	1-20	-	6049 478
SAG20/SPS 7 PM2 [2), 3)]	1-20	-	6049 479
SAG20FR/SPS 7 PM2 [2), 3)]	-	0.5-15	6049 480
SAG25/SPS-I 8	10-40 [1)]	1-35 [1)]	6059 332
SAG32/SPS 12 PM2 [2)]	20-70 [1)]	5-100 [1)]	6040 931

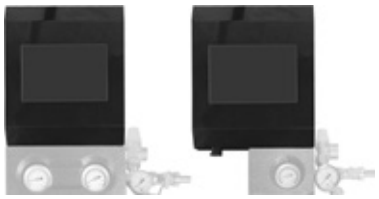
Hoval solar return armature groups SAR20

Solar return armature group/pump type	Continuous flow measurement range Calibration valve l/min	Flow rotor l/min	Part No.
SAR20/SPS 7	1-20	-	6049 481
SAR20FR/SPS 7 PM2 [3)]	-	0.5-15	6049 482

[1] Optional accessory (recommended): calibration valve or FlowRotor
[2] with PWM interface
[3] Actuation of pump only possible with PWM-capable controller (TopTronic® E)

FR = integrated flow rate sensor

Accessories

		Part No.
	**Solar controller set WM complete** for wall mounting consisting of a black housing incl. TopTronic® E solar module 1 immersion sensor TF/2P/5/6T, L = 5 m 1 collector sensor TF/1.1P/2.5S/5.5T, L = 2.5 m Basic connector set Blind cover for control module cut-out incl. wall mounting material TopTronic® E control module as an option	6027 257
	**Solar controller set AG complete** for mounting on regulating armature SAG20 or SAR20 consisting of a black housing incl. TopTronic® E solar module 1 immersion sensor TF/2P/5/6T, L = 5 m 1 collector sensor TF/1.1P/2.5S/5.5T, L = 2.5 m Basic connector set Blind cover for control module cut-out TopTronic® E control module as an option	6037 492
	**TopTronic® E control module black with 4.3″ colour touchscreen** For operation of all controller modules connected to the bus system (basic, solar, buffer modules etc.) Connection to the Hoval bus system via RJ45 plug connection or via plug terminals (max. 0.75 mm²), flat design with flexible installation option Installation: - in control panel of the heat generator - in the Hoval wall casing - in the control panel front, black high-gloss cover, customer-specific configurable start screen, Display of current weather or weather forecast (only possible in combination with HovalConnect) Consisting of: - TopTronic® E control module black - Clamping device set control module - RJ45-RAST 5 CAN cable, L = 500	6043 844

Accessories

Calibration valve TN
As regulating and shut-off valve with direct display of the flow rate on the sight glass.
Max. operating temperature: 185 °C

DN	Measuring range [l/min]	Connection Rp x Rp	kvs m^3/h	Part No.
20	2-12	¾″ x ¾″	2.2	2038 034
20	8-30	¾″ x ¾″	5.0	2038 035
25	10-40	1″ x 1″	8.1	2038 036
32	20-70	1¼″ x 1¼″	17.0	2038 037

FlowRotor kit
for performance related control, system monitoring and heat metering.
Consisting of:
Proximity-type flow rate sensor and PT1000 sensors.
Pre-assembled ready for connection, sensor cable included.
Operating temperature: max. 120 °C
DN 20: can be installed in the insulation of an SAG/SAR20.
DN 25/32: can be installed under an SAG25/32

DN	Measuring range l/min	Connection inches	Part No.
20	0.5-15	¾″	6037 631
25	1-35	1″	6037 632
32	5-100	1¼″	6037 693

Permanent air vent ¾″ 641 311
brass, vertical installation in the flow of the solar line for permanent degassing of the solar liquid
Integrated collecting tank for gases
Manual venting using spanner
Connections: top R ¾″, bottom Rp ¾″

Permanent aspirator 1″ Airstop 641 463
Made of brass.
Installation in the flow of the solar circuit for the permanent degassing of the solar fluid.
Collecting box for the gases integrated
Deairing manual via screw wrench
Connections: above, lower R 1″

Accessories

Permanent air vent
With high air separation efficiency due to stainless steel filter
Automatic degassing
Installation in horizontal lines of the collector return
Max. operating temperature 160 °C
Max. operating pressure PN 10

Type	kvs m³/h	Application limit l/min	Part No.
¾″	10.0	23	6014 392
1″	28.1	35	6031 803
1¼″	48.8	58	6031 804

Clamping ring connector
for the connection of solar armature groups DN 20 (¾″), self-sealing with O-ring, metallic clamping ring and stilt sleeve.
Applicable up to 150 °C.

	Part No.
Connection ¾″ external thread x 15 mm	6010 055
Connection ¾″ external thread x 18 mm	6010 056
Connection ¾″ external thread x 22 mm	6010 057

Straight-way ball valve VAG60..
DN 15-25, PN 16, 120 °C
- Brass straight-way ball valve with threaded connection
- incl. seals and screw connections

DN	Connection valve inches	Connection fitting inches	kvs m³/h	V̇ at ΔP 50 mbar m³/h	Part No.
15	G 1″	Rp ½″	9	2.01	6046 579
20	G 1¼″	Rp ¾″	17	3.80	6046 580
25	G 1½″	Rp 1″	22	4.92	6046 581

Switching ball valve VBI60...L
DN 15-32, PN 40, -10 ... 120 °C
- Ball valve body made of brass
- Connections with internal thread Rp acc. to ISO 7-1
- Leakage rate: 0 ... 0.0001 % of Kvs value

DN	Connection inches	kvs m³/h	Part No.
15	Rp ½″	5	6052 422
20	Rp ¾″	9	6052 443
25	Rp 1″	9	6052 444
32	Rp 1¼″	13	6052 445

Motor drive GLB341.9E — Part No. 2070 331
For straight-way ball valves VAG60.. and switching ball valves VBI60.. DN 15-50
Operating voltage: 230 V, 50/60 Hz
Control signal 2-point/3-point
Single-wire/2 wire control
Operating time: 150 s
Nominal torque: 10 Nm
Permitted ambient temperature:
-32 °C to +55 °C

Accessories

Thermostatic water mixer TM200
3-way mixer
for regulation of the water temperature
Material: brass
Connection size: R ¾“
Hot water: max. 90 °C
Setting range: 30-60 °C
Flow rate: 27 l/min
(at Δ p = 1 bar)
kvs value: 1.62 m³/h

Part No. 2005 915

Thermostatic mixing valve JRG
3-way mixing valve, made of brass,
for regulating of the water temperature.
Hot water max. 90 °C
Adjusting range 45-65 °C
Factory setting for: 55 °C
Pressure: PN 10
Connections: external thread (JRG 25-50)
Flanges (JRG 65)
incl. screwed joint

Type	Dimension	Connection size	kvs m³/h	Part No.
JRG 25	1″	1½″	4.0	2061 407
JRG 32	1¼″	2″	8.5	2061 408
JRG 40	1½″	2¼″	12.0	2061 409
JRG 50	2″	2¾″	16.0	2061 410
JRG 65	DN 65	DN 65	28.0	2038 638

Frost protection mixture PowerCool DC923-PXL
on basis propylene glycol
mixed with softened water
with corrosion protection
Frost protection: -25 °C
Content plastic container: 30 kg

Part No. 2077 235

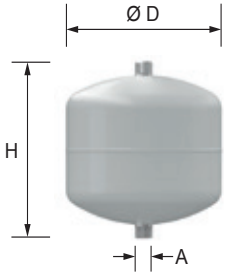
Frost protection concentrate PowerCool DC 924-PXL
on basis propylene glycol
completely mixable with water
with corrosion protection
Frost protection: -20 °C with
40 % mixture ratio
Content plastic container: 10 kg

Part No. 2009 987

Diaphragm pressure expansion tanks

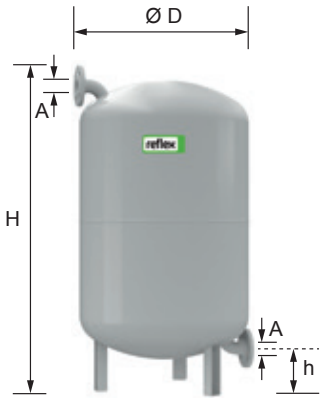
Reflex S
Especially for solar installations and also for heating and cooling water systems.
For frost protection additive up to 50 %.
Permitted operating pressure 10 bar.
Permitted operating temperature of vessel/diaphragm 120 °C/70 °C.
Type S 8-25 for wall installation with clamping band (clamping band see accessories)
Type S 8-33 for wall installation with lugs.
Type S 50-600 with feet.
Gas inlet pressure at the factory:
type S 8-33 1.5 bar and type S 50-600 3 bar

Reflex type	Ø D mm	H mm	h mm	A inches	Weight kg	Part No.
S 8	206	332	-	G ¾″	1.8	2006 634
S 12	280	300	-	G ¾″	2.2	2006 635
S 18	280	409	-	G ¾″	3	2006 636
S 25	280	518	-	G ¾″	3.7	2006 637
S 33	354	455	-	G ¾″	4.8	2006 638
S 50	415	469	158	R ¾″	8	2006 639
S 80	486	562	166	R 1″	12.1	2006 640
S 100	486	667	166	R 1″	12.9	2006 641
S 140	486	886	172	R 1″	19	2017 376
S 200	640	758	205	R 1″	27.5	2006 642
S 250	640	888	205	R 1″	32.4	2017 384
S 300	640	1092	235	R 1″	47	2006 643
S 400	746	1102	245	R 1″	61	2017 385
S 500	746	1321	245	R 1″	72	2006 644
S 600	746	1559	245	R 1″	87	2017 386



Reflex V
In-line vessel made of sheet steel, from Reflex V 40 on feet.
Designed for operating pressures up to 10 bar.
Type V 6-20 for wall installation with clamping band (clamping band see accessories).
V 200-300 flange PN 16

Reflex type	Ø D mm	H mm	h mm	A inches	Weight kg	Part No.
V 6	206	244	-	R ¾″	4	2032 084
V 12	280	287	-	R ¾″	3.3	2032 085
V 20	280	360	-	R ¾″	3.3	2032 086
V 40	409	562	113	R 1″	9.7	2057 249
V 60	409	732	172	R 1″	12.4	2006 864
V 200	634	901	142	DN 40	35.2	242 824
V 300	634	1201	142	DN 40	48	242 825
V 350	640	1341	210	DN 40	51	242 827



Further information
see “Various system components”

Accessories

		Part No.
	**Console with strap** for Reflex N 8-25, S 8-25, V 6-20 vertical installation Vessel connection top or bottom	242 878
	**Quick connection SU R ¾″ x ¾″** for diaphragm pressure expansion tanks in closed heating and cooling water plants. With shut-off valve against unintended closing and drain according to DIN 4751 Part 2, tested by TÜV Connection R ¾″ PN 10/120 °C	242 771
	**Quick connection SU R 1″ x 1″** for diaphragm pressure expansion tanks in closed heating and cooling water plants. With shut-off valve against unintended closing (check ball) and drain according to DIN 4751 Part 2 tested by TÜV Connection R 1″ PN 10/120 °C	242 772

Services

Commissioning
Commissioning by works service or Hoval trained authorised serviceman/company is condition for warranty.

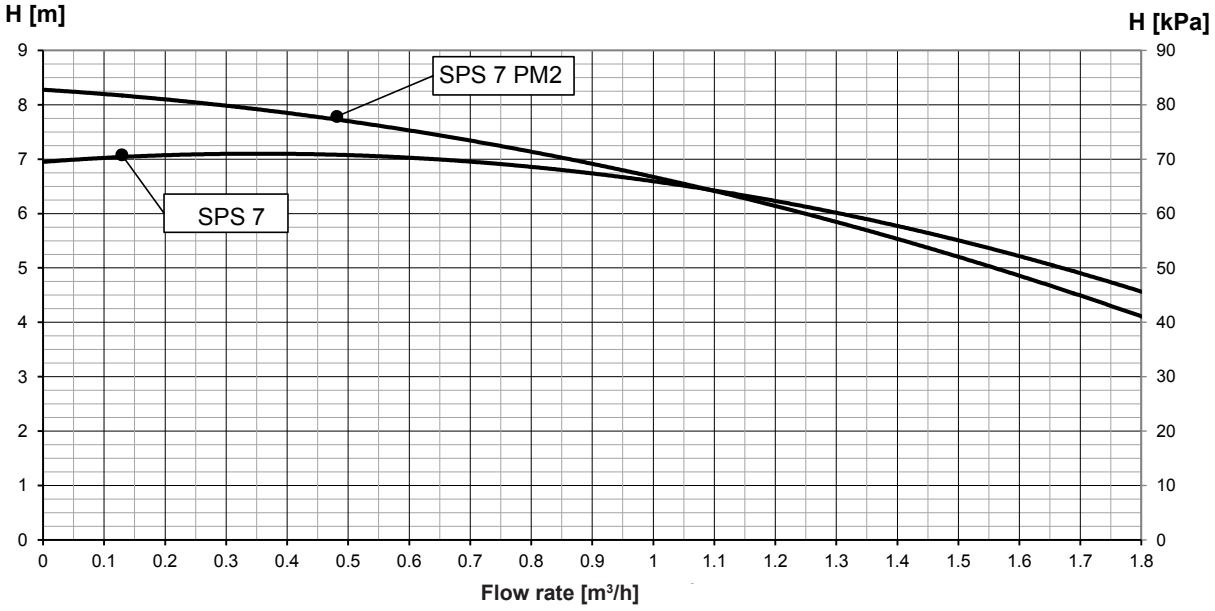
For commissioning and other services please contact your Hoval sales office.

Solar armature groups

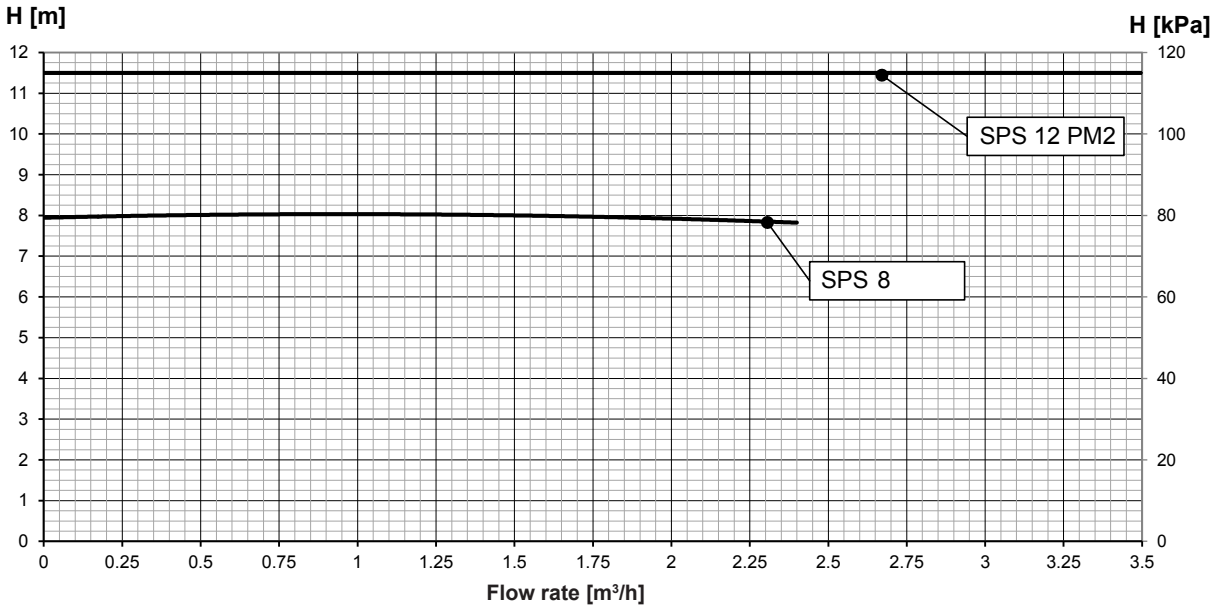
Type			SAR20	SAR20FR	SAG20	SAG20	SAG20FR	SAG25	SAG32
• Pump			SPS 7	SPS 7 PM2	SPS 7	SPS 7 PM2	SPS 7 PM2	SPS 8	SPS 12 PM2
• Voltage		V	1 x 230	1 x 230	1 x 230	1 x 230	1 x 230	1 x 230	1 x 230
• Maximum power consumption		W	45	45	45	45	45	130	310
• Maximum current		A	0.44	0.44	0.44	0.44	0.44	0.91	1.37
• Flow measuring range	Calibration valve	l/min	1-20	-	1-20	1-20	-	10-40 [1]	20-70 [1]
	FlowRotor	l/min	-	0.5-15	-	-	0.5-15	1-35 [1]	5-100 [1]
• Operating pressure		bar	6	6	6	6	6	6	6
• Maximum temperature temporary		°C	110	110	110	110	110	110	110

[1] Optional accessory (recommended): calibration valve or FlowRotor

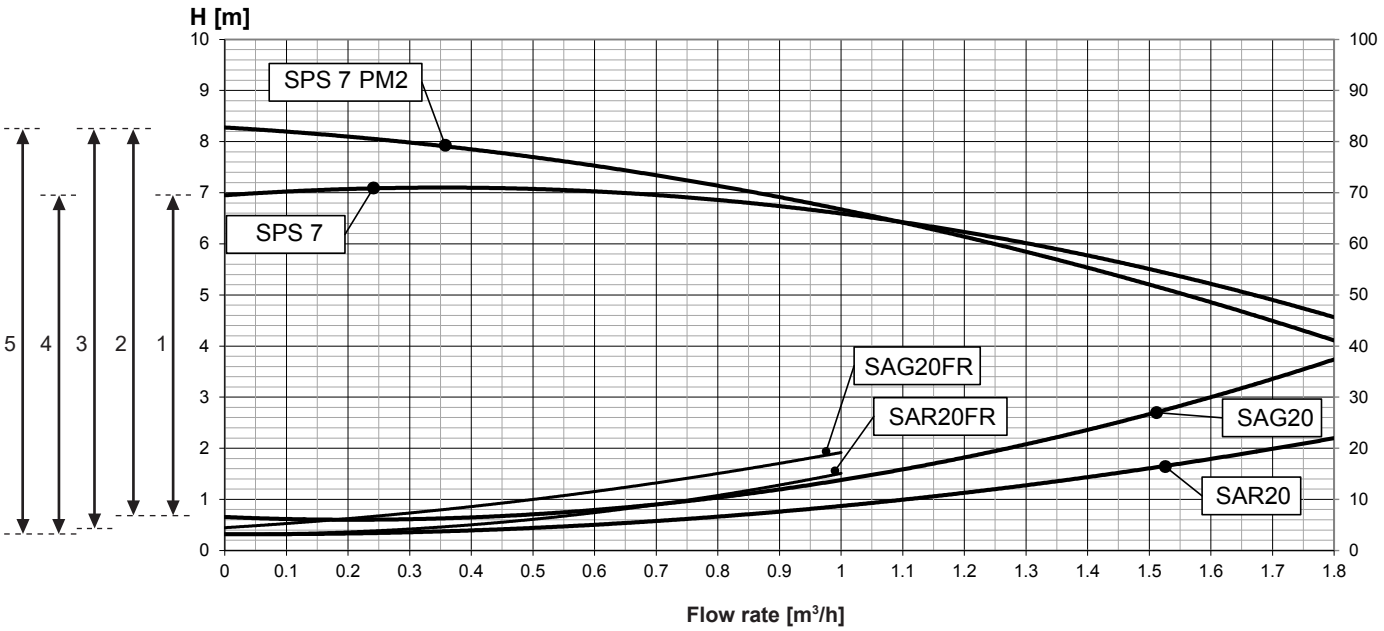
Pump characteristic curves SAG20 and SAR20



Pump characteristic curves SAG25 and SAG32



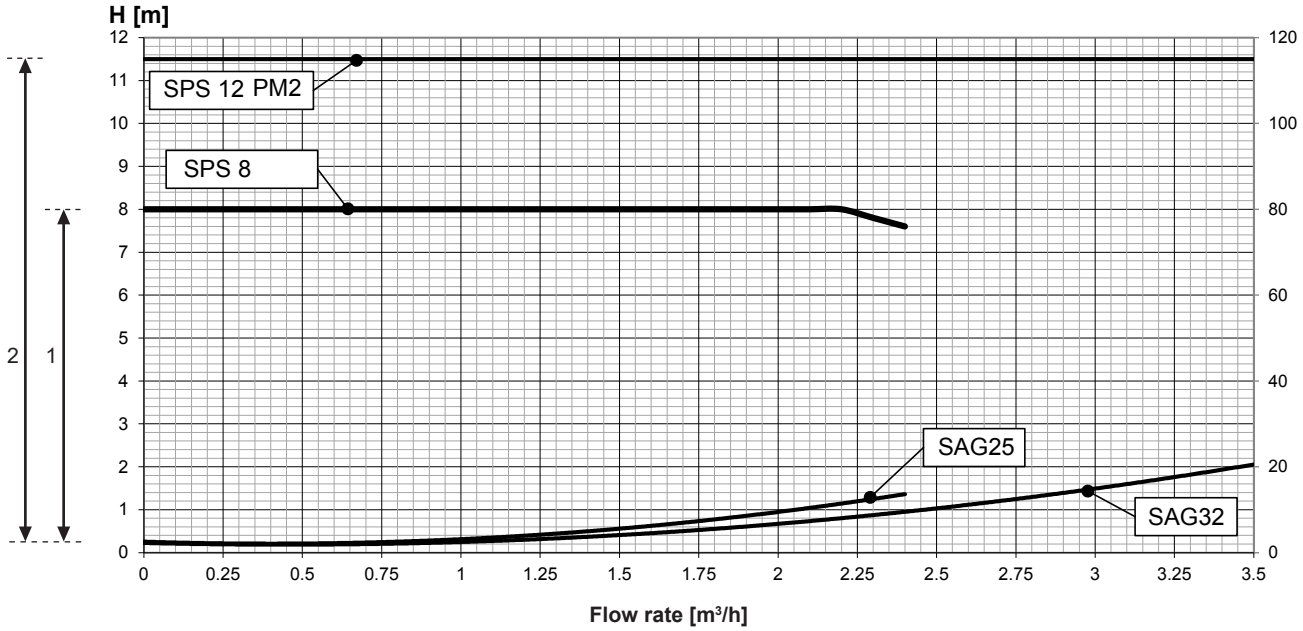
Residual overpressure SAG20, SAG20FR, SAR20 and SAR20FR



Max. residual overpressure
1 SAG20/SPS 7
2 SAG20/SPS 7 PM2
3 SAG20FR/SPS 7 PM2
4 SAR20/SPS 7
5 SAR20FR/SPS 7 PM2

1 mbar = 100 Pa = 0.1 kPa

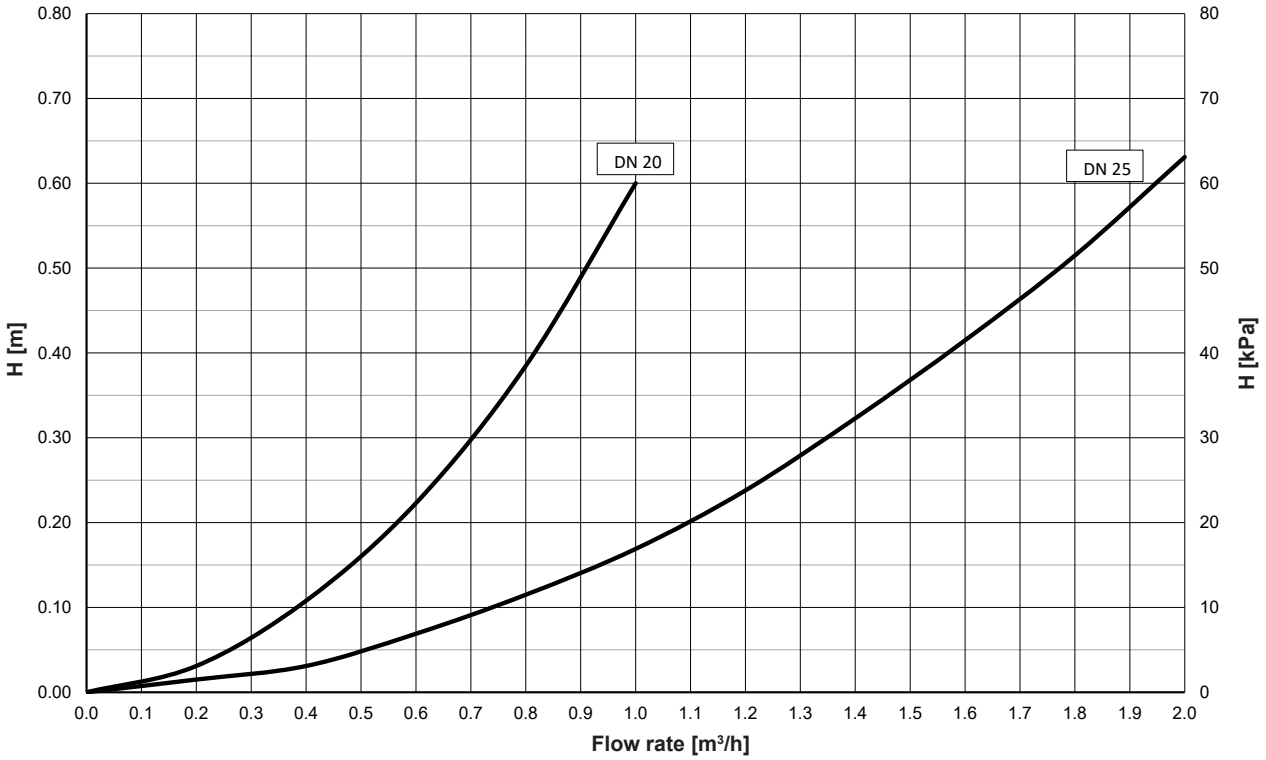
Residual overpressure SAG25 and SAG32



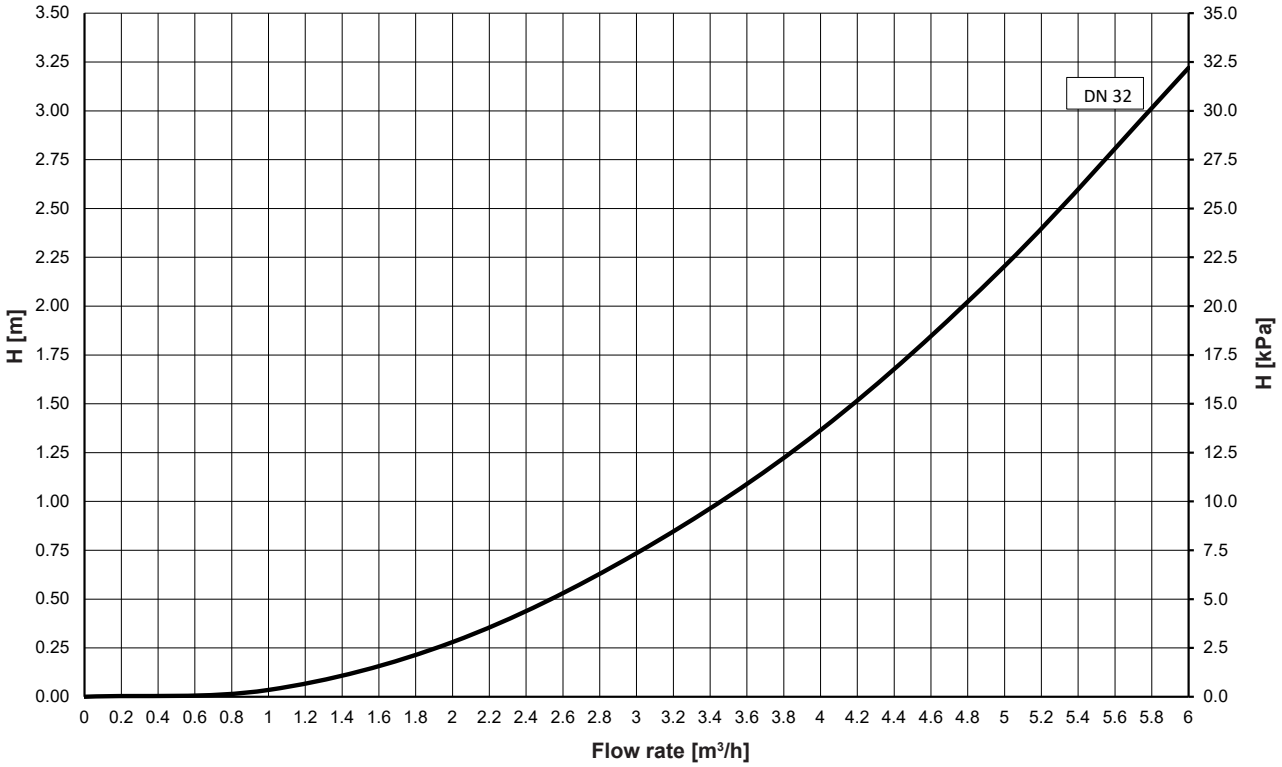
Max. residual overpressure
1 SAG25/SPS 8
2 SAG32/SPS 12 PM2

1 mbar = 100 Pa = 0.1 kPa

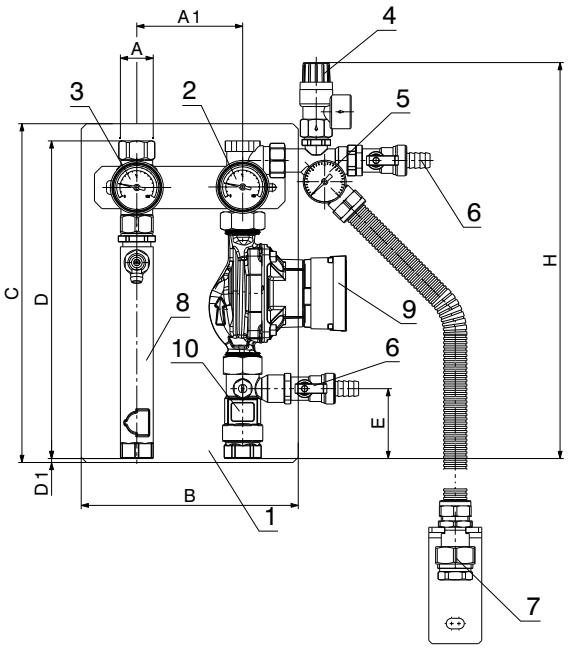
Pressure drop FlowRotor DN 20 and DN 25

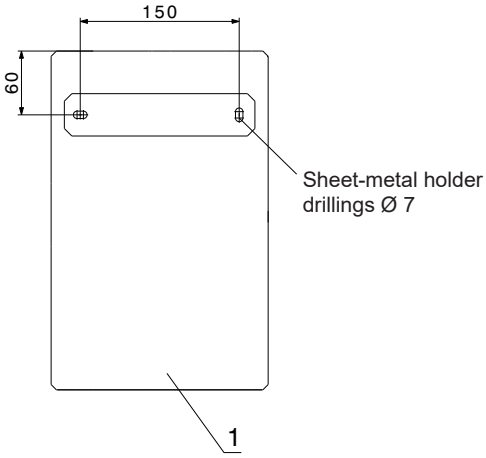


Pressure drop FlowRotor DN 32

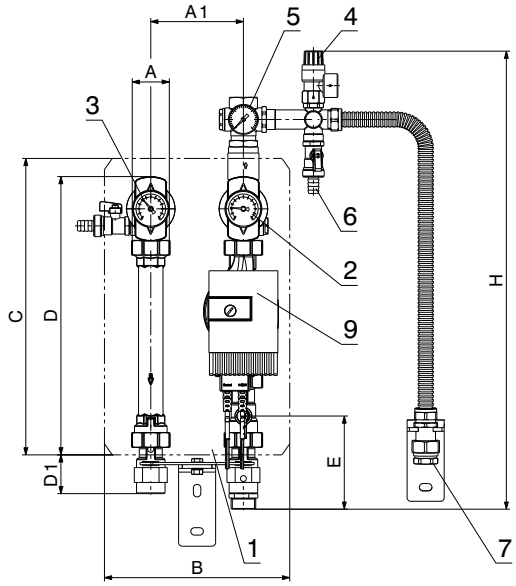


Solar armature group SAG20





Solar armature group SAG25/32

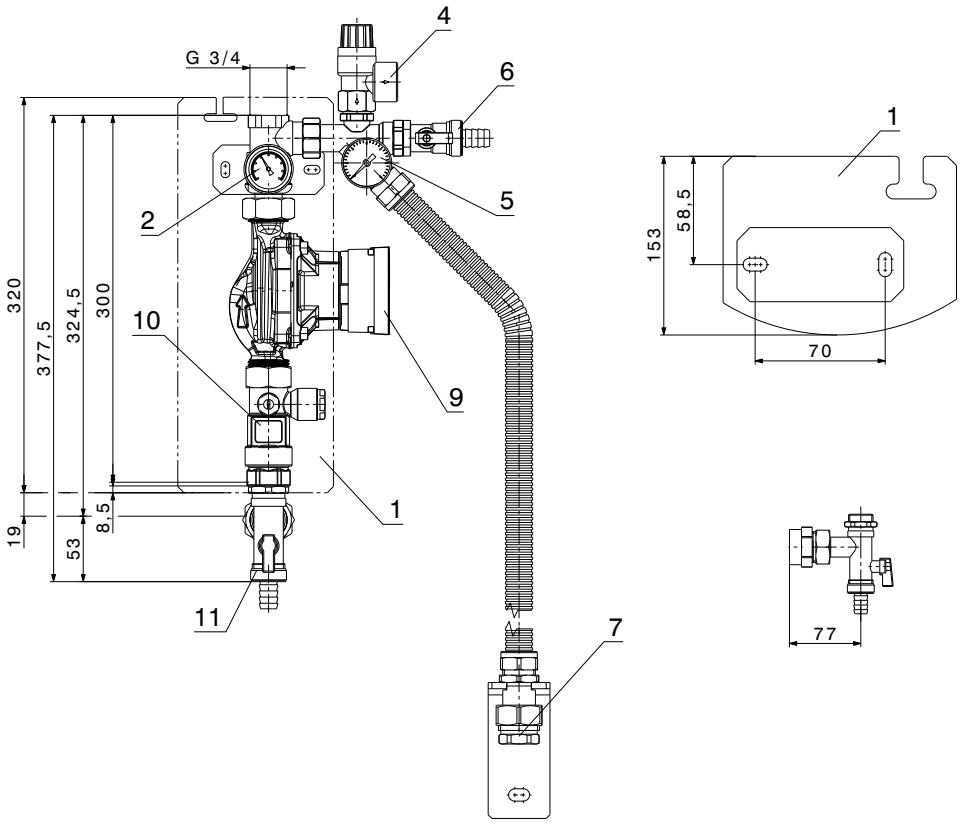


1 Insulation
2 Thermometer blue
3 Thermometer red
4 Safety valve
5 Pressure gauge ¼″ 0-6 bar
6 Ball valve with lock nut
7 Container connection coupling
8 AirStop
9 Solar pump
10 Flow meter

Wall mounting SAG 25/32
Bracket with variably adjustable distance to the wall

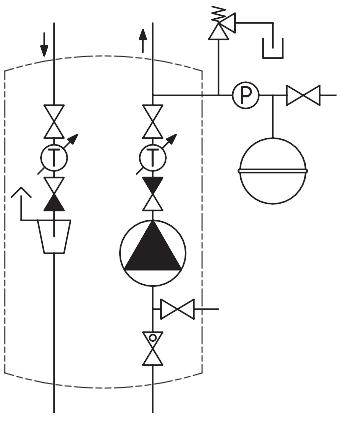
Type	A	A1	B	C	D	D1	E	H
DN 20	Rp ¾″	100	205	320	300	7	66	371
DN 25	Rp 1″	125	250	380	340	89	172	744
DN 32	Rp 1¼″	125	250	440	400	52	126	618

Solar return armature group SAR20

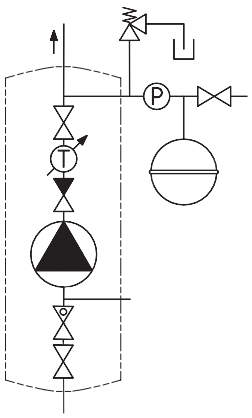


1 Insulation
2 Thermometer blue
4 Safety valve
5 Pressure gauge ¼" 0-6 bar
6 Ball valve with lock nut
7 Container connection coupling
9 Solar pump
10 Flow meter
11 Ball valve with flange

Schematic diagram of the solar armature group SAG20

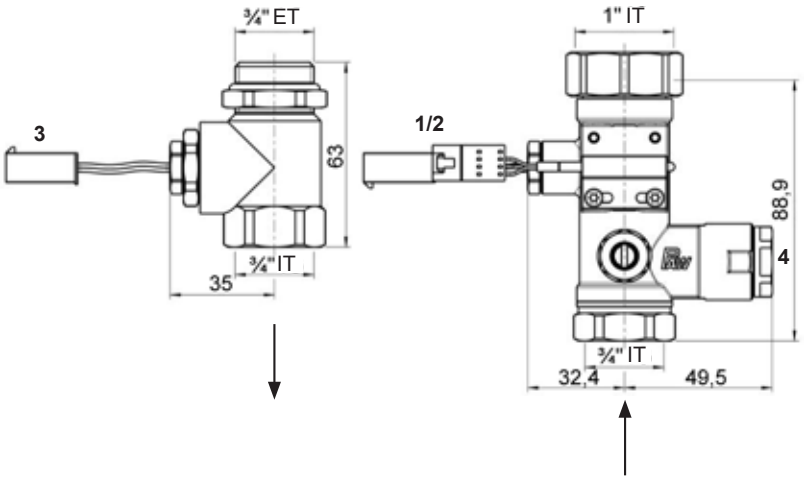


Schematic diagram of the solar return armature group SAR20



Kit FlowRotor

(Dimensions in mm)



1 Flow rate sensor
2 Temperature sensor for heat metering
3 Temperature sensor for heat metering
4 Flushing port

Dimensioning guidelines for diaphragm pressure expansion tanks of solar plants in the small range

The diaphragm pressure expansion tank is used for accommodating the expansion in volume of the heat carrier fluid in the solar circuit. Its size must be selected according to the applicable design regulations for diaphragm pressure expansion tanks.
If there is a possibility of the plant operating in standby mode for a long period, i.e. without heat output, it is necessary for the diaphragm pressure expansion tank to be able to hold the entire content of the collector array in addition to the expansion volume.

Circuit

The diaphragm pressure expansion tank must be arranged with a safety valve in the return to the collector which cannot be blocked off, as a result of which there is bound to be follow-up pressure maintenance, i.e. integration of the diaphragm pressure expansion tank on the pressure side of the circulating pump.

Selected example - solar installation, safety valve 6 bar:
Installation with 6 UltraSol® 2 collectors vertical
System height 15 m

Take account of the following for the effective expansion volume in litres:

1. Volume: Collector field volume and flow at 100 %
   Plant volume at 10 % incl. heat exchanger

2. Useful volume of the diaphragm pressure expansion tank depending on the system height.

6 UltraSol® 2 collectors				
vertical of	2.5 litres	at	100 %	15.0 l
Flow	12.5 litres	at	100 %	12.5 l
Return	12.5 litres	at	10 %	1.25 l
Heat exchanger	37 litres	at	10 %	3.7 l
Expansion volume				32.5 l

Min. preliminary pressure:
System height + 0.3 bar = 1.8 bar (18 m)
In the table, select the next-higher preliminary pressure: 2 bar
If the diaphragm pressure expansion tank is connected on the pressure side of the pump, the pressure value of the pump must be included in calculation to prevent cavitation.
System height + pump pressure + 0.3 bar

selected:
diaphragm pressure expansion tank type Reflex N 80/6

Intermediate tank (if t_R > 70 °C!)
Contents collectors = 15.2 litres
selected:
intermediate tank type **V20**

Execution:
A system-based configuration is mandatory!

Selection table Reflex N/S

with safety valve 6 bar
Capacity V_N of the empty tank in litres with a pre-pressure of

Type		1.5 bar	2 bar	2.5 bar	3 bar	3.5 bar	4 bar
18/6	l	8	6	5	4	2	1
25/6	l	12	10	8	6	4	3
35/6	l	17	15	13	10	7	5
50/6	l	26	22	19	15	12	8
80/6	l	41	36	31	26	20	15
100/6	l	51	45	38	32	26	19
140/6	l	72	63	54	45	36	27
200/6	l	103	90	77	64	51	38
250/6	l	128	112	96	80	64	48
300/6	l	154	135	115	96	77	58
400/6	l	205	180	154	128	103	77
500/6	l	256	224	192	160	128	96
600/6	l	308	269	231	192	154	115
800/6	l	410	359	308	256	205	154
1000/6	l	513	449	385	321	256	192
Maximum possible system height*		12 m	17 m	22 m	27 m	32 m	37 m

* System height = middle of diaphragm pressure expansion tank up to the uppermost point on the heating system / solar installation

Hoval Solar charging modules

TransTherm® solar (25), DN 20 (¾″)
TransTherm® solar (50), DN 20 (¾″)
TransTherm® solar (100), DN 25 (1″)
TransTherm® solar (200), DN 40 (1½″)

- Solar charging module for the transfer of heat from the primary circuit (solar circuit) to the secondary circuit (buffer storage tank; secondary side not suitable for direct domestic water heating)
- Circulating pump pre-installed for primary and secondary circuit
- Flow rate sensor FlowRotor with PT1000 sensors installed in the primary circuit
- Balancing valve installed in the secondary circuit
- TransTherm® solar (25): 4 ball valves with thermometer
- TransTherm® solar (50-200): 4 ball valves
- Gravity brake in flow and return of primary circuit and in return of secondary circuit
- Stainless steel plate heat exchanger
- Permanent exhaust valve AirStop
- Safety devices:
  - safety valve (6 bar) for the primary circuit
  - pressure gauge
  - flexible connection hose made of stainless steel for the diaphragm pressure expansion tank and
  - safety valve for the secondary circuit
    - TransTherm® solar (25): 3 bar
    - TransTherm® solar (50-200): 6 bar
- Rinsing and filling unit
- Heat damming box made of EPP half shells
- Wall mounting plate

Delivery
- Solar charging module packed








Solar heat transfer stations

Hoval TransTherm® solar charging modules

type	Possible measuring range l/min	Pump primary circuit type	Pump secondary circuit type	Part No.
(25)	0.5-15	UPM3 15-145 [1]	UPM3 15-75 [1]	6037 694
(50)	2-50	UPM3 15-145 [1]	UPM3 15-75 [1]	6037 695
(100)	2-50	PML 25-145 [1]	UPM3 25-75 [1]	6037 696
(200)	5-130	UPM XL 25-125 [1]	UPML 25-105 [1]	6037 697

[1] Variable flow rate possible (PWM);
FlowRotor installed in the primary circuit.
Optional accessories secondary circuit (recommended): FlowRotor
Operation only possible with PWM-capable controller, both pumps are equipped with PWM signal “Solar” (TopTronic® E/UNI-FE)

Accessories

FlowRotor kit
for performance related control,
system monitoring and heat metering
Consisting of:
Proximity-type flow rate sensor
and PT1000 sensors
Pre-assembled ready for connection,
sensor cable included
Operating temperature: max. 120 °C
DN 20: can be installed in the insulation
of an SAG/SAR20
DN25/32: can be installed under an SAG25/32

DN	Measuring range l/min	Connection inches	Part No.
20	0.5-15	¾″	6037 631
25	1-35	1″	6037 632
32	5-100	1¼″	6037 693

Switching ball valve VBI60...L
DN 15-40, PN 40, -10 ... 120 °C
- Ball valve body made of brass
- Connections with internal thread Rp acc. to ISO 7-1
- Leakage rate: 0 ... 0.0001 % of Kvs value

DN	Connection inches	kvs m^3/h	Part No.
15	Rp ½″	5	6052 422
20	Rp ¾″	9	6052 443
25	Rp 1″	9	6052 444
32	Rp 1¼″	13	6052 445
40	Rp 1½″	25	6052 446

Motor drive GLB341.9E — 2070 331
For straight-way ball valves VAG60.. and
switching ball valves VBI60.. DN 15-50
Operating voltage: 230 V, 50/60 Hz
Control signal 2-point/3-point
Single-wire/2 wire control
Operating time: 150 s
Nominal torque: 10 Nm
Permitted ambient temperature:
-32 °C to +55 °C

For further accessories
see “Solar control systems”, “Solar armature groups” or “Various system components” chapter

Services

Commissioning
Commissioning by works service or Hoval trained authorised serviceman/company is condition for warranty.

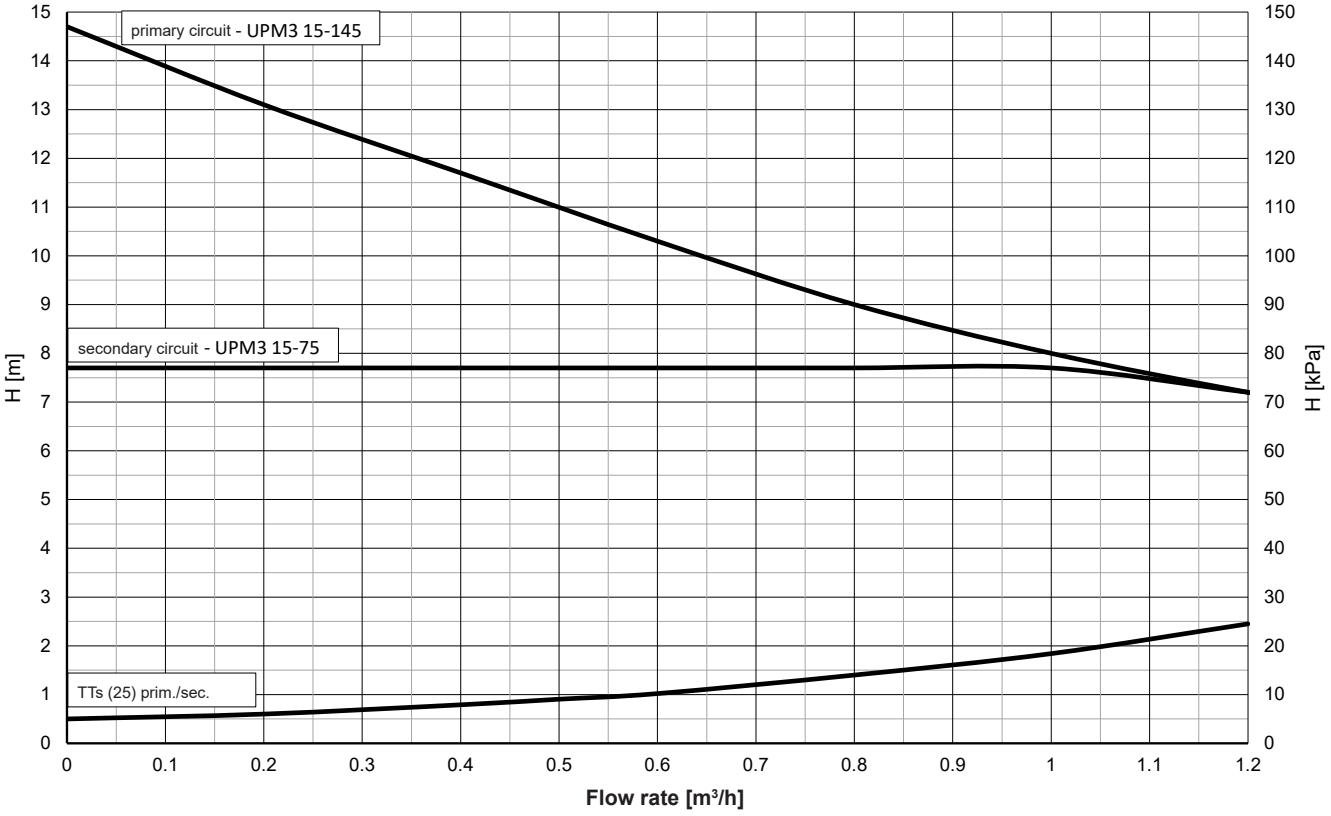
For commissioning and other services please contact your Hoval sales office.

TransTherm® solar (25-200)

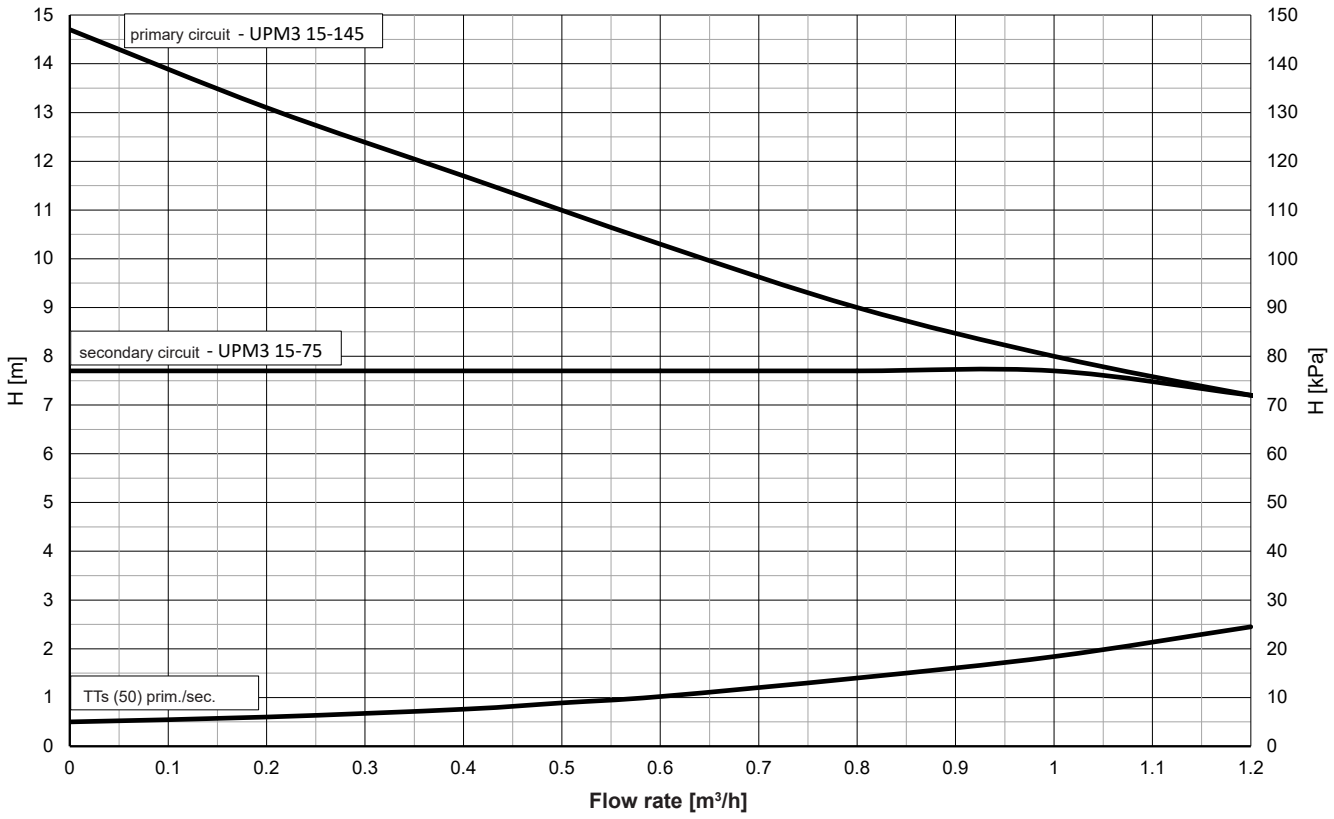
Type		(25)	(50)	(100)	(200)
Pump - primary circuit		UPM3 15-145	UPM3 15-145	PML 25-145	UPM XL 25-125
Pump - secondary circuit		UPM3 15-75	UPM3 15-75	UPM3 25-75	UPML 25-105
Voltage	V	1 x 230	1 x 230	1 x 230	1 x 230
Max. power consumption - primary/secondary circuit	W	60/45	60/45	140/45	180/140
Max. current - primary/secondary circuit	A	0.58/0.48	0.58/0.48	1.1/0.48	1.4/1.1
Max. pressure - primary/secondary circuit	bar	6/3	6/6	6/6	6/6
Max. temperature - primary/secondary circuit	°C	120/95	120/95	120/95	120/95
Max. temperature temporary primary/secondary circuit	°C	160/120	160/120	160/120	160/120
Flow measuring range [1]	l/min	0.5-15	2-50	2-50	5-130
Collector surface up to approx.	m^2	25	50	100	150

[1] Optional accessories secondary circuit (recommended): balancing valve or FlowRotor

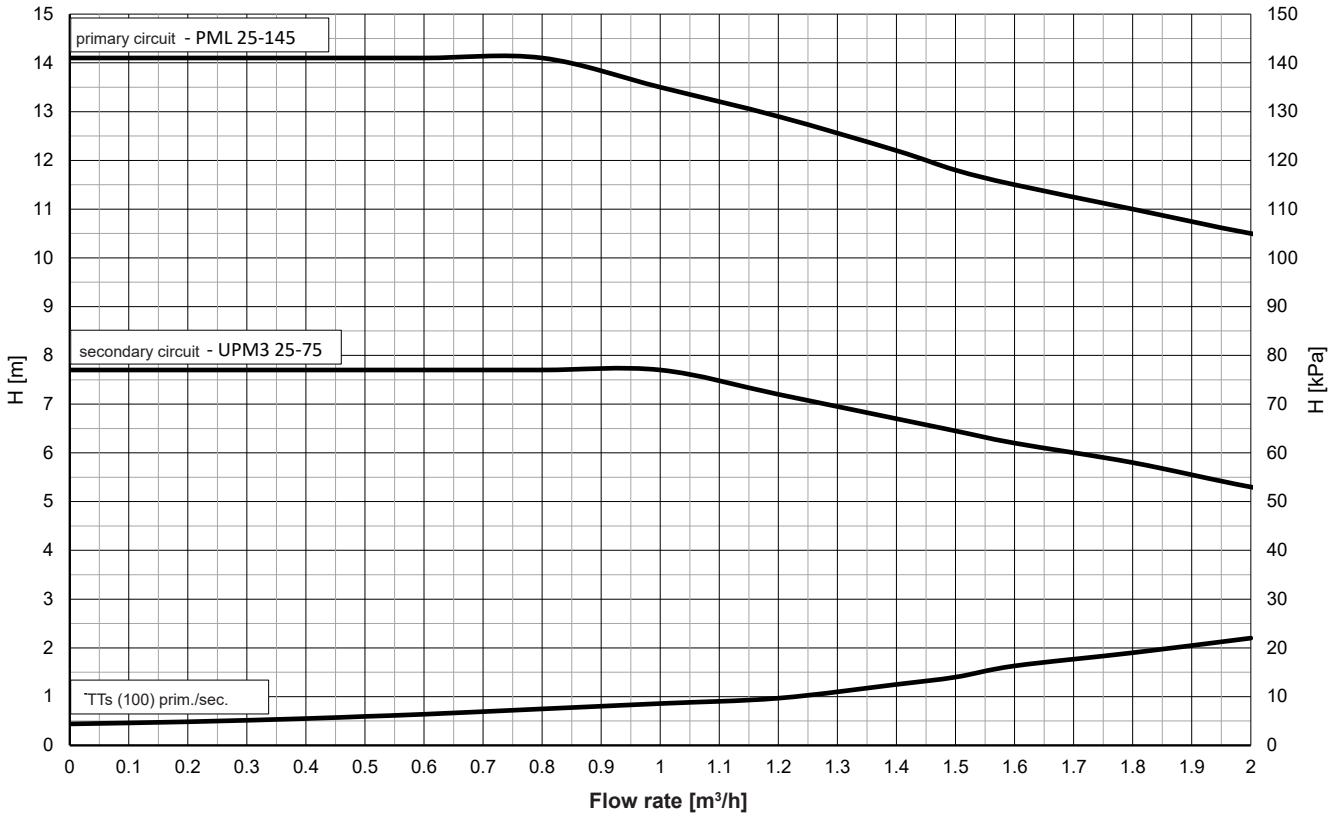
Residual overpressure TransTherm® solar (25)



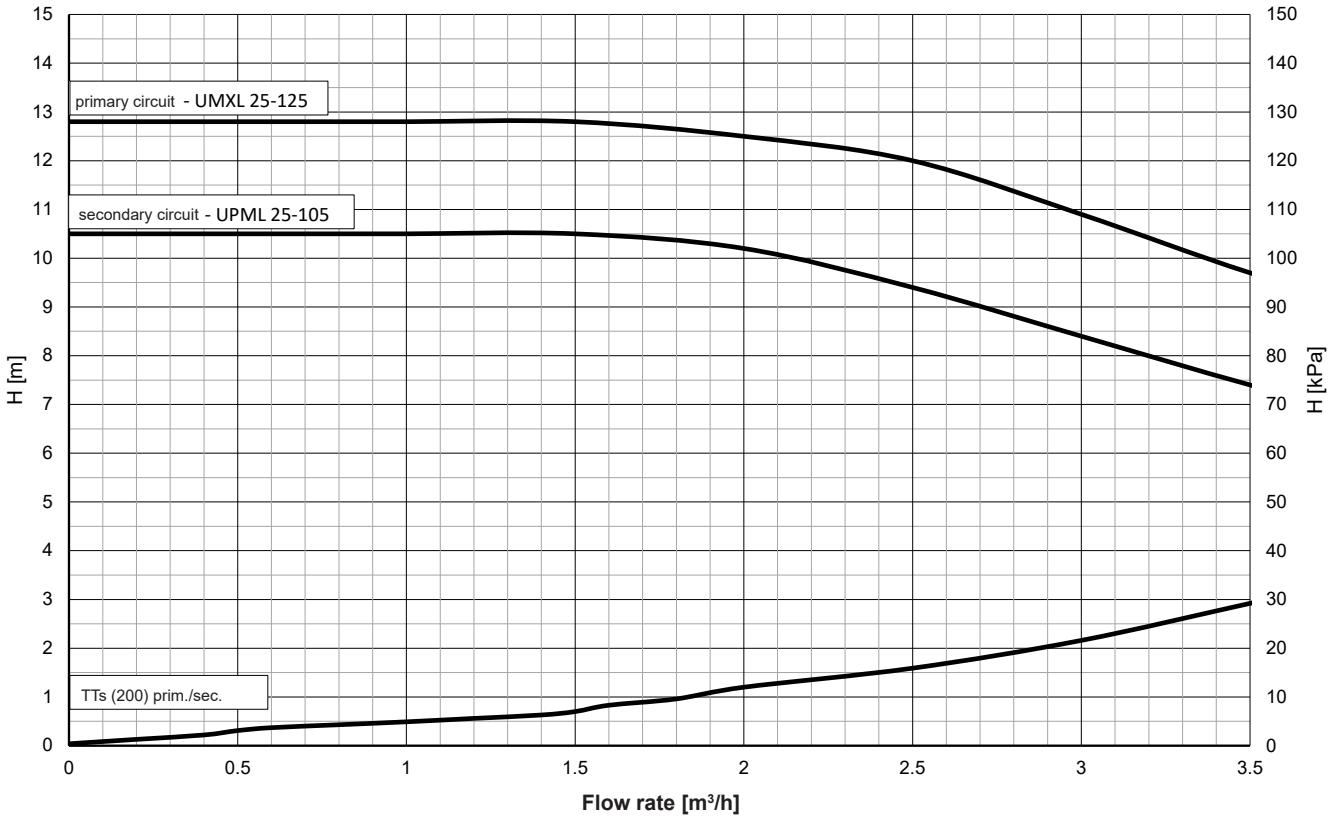
Residual overpressure TransTherm® solar (50)



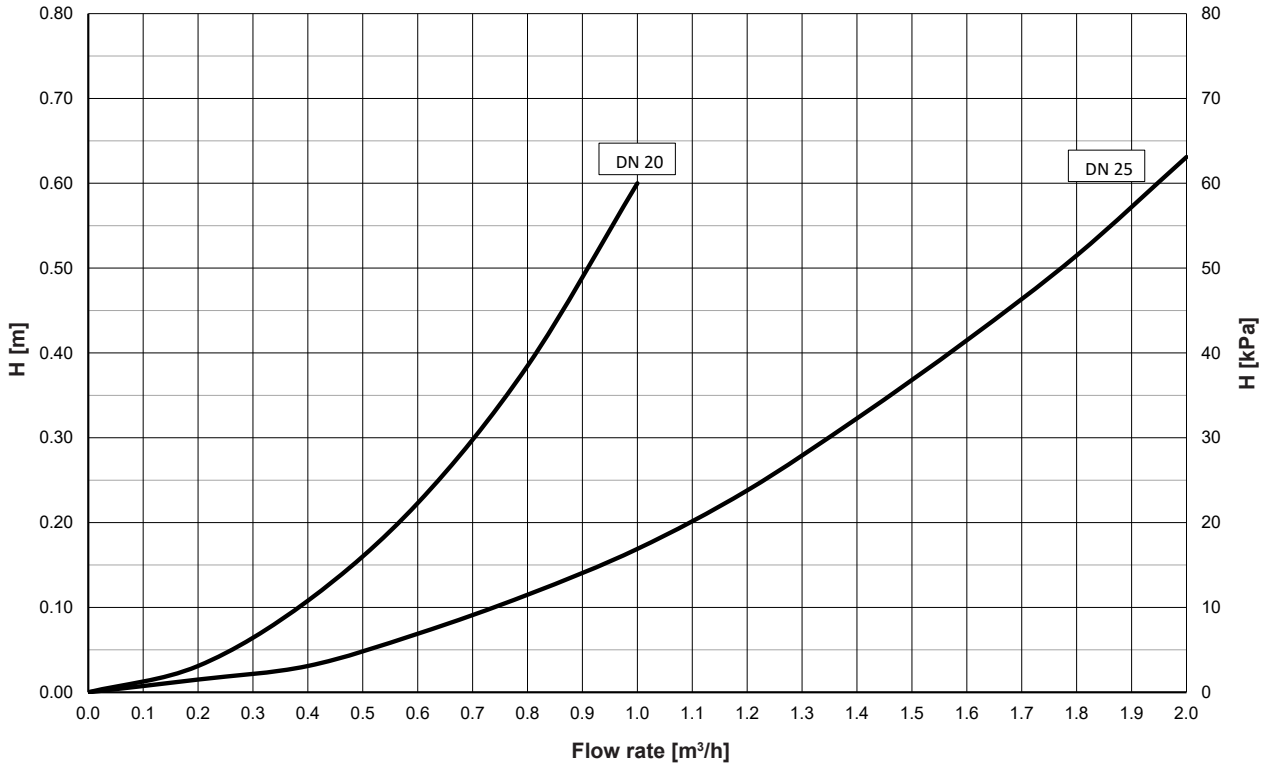
Residual overpressure TransTherm® solar (100)



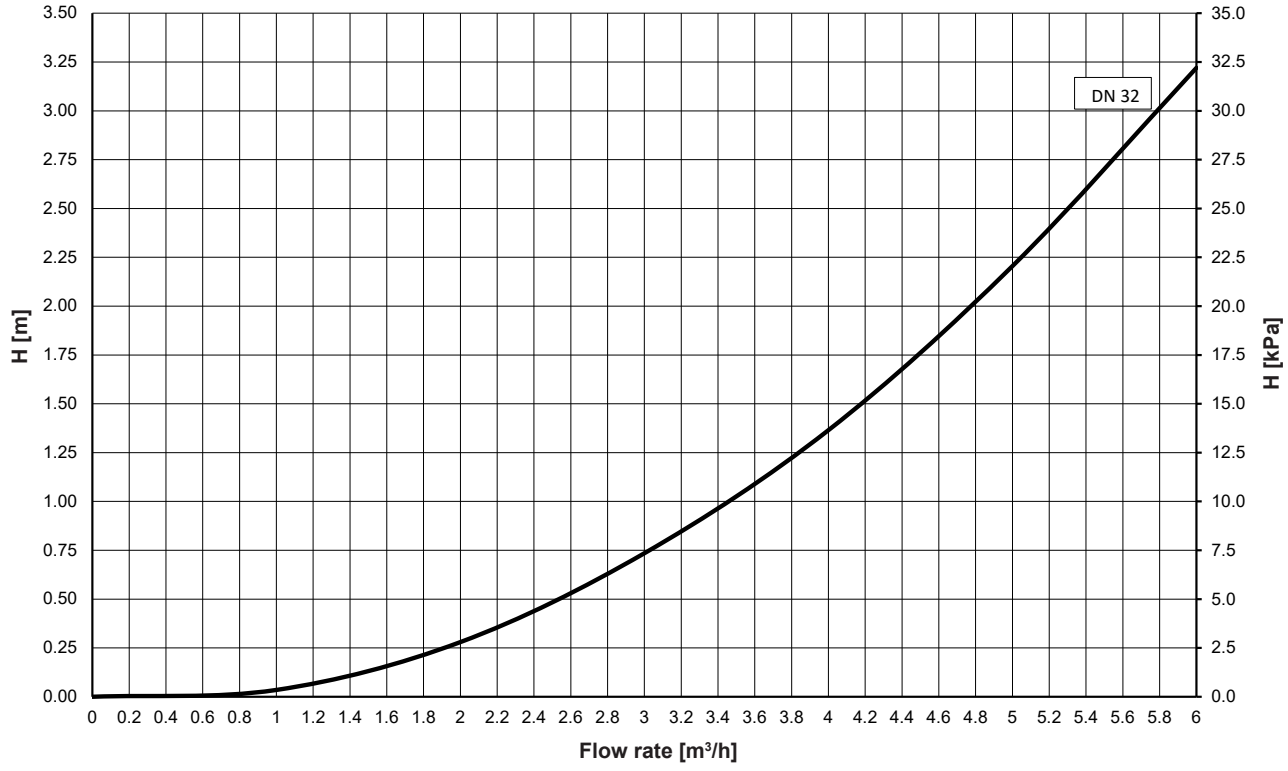
Residual overpressure TransTherm® solar (200)



Pressure drop FlowRotor DN 20 and DN 25

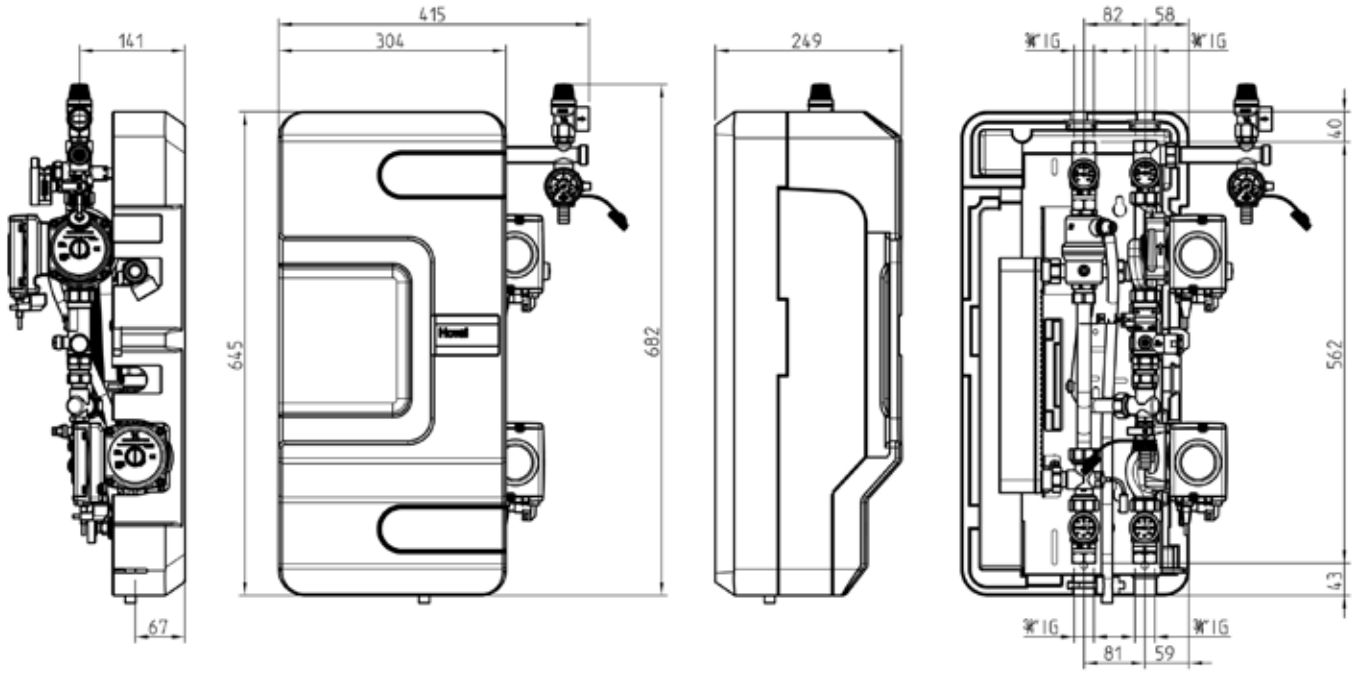


Pressure drop FlowRotor DN 32

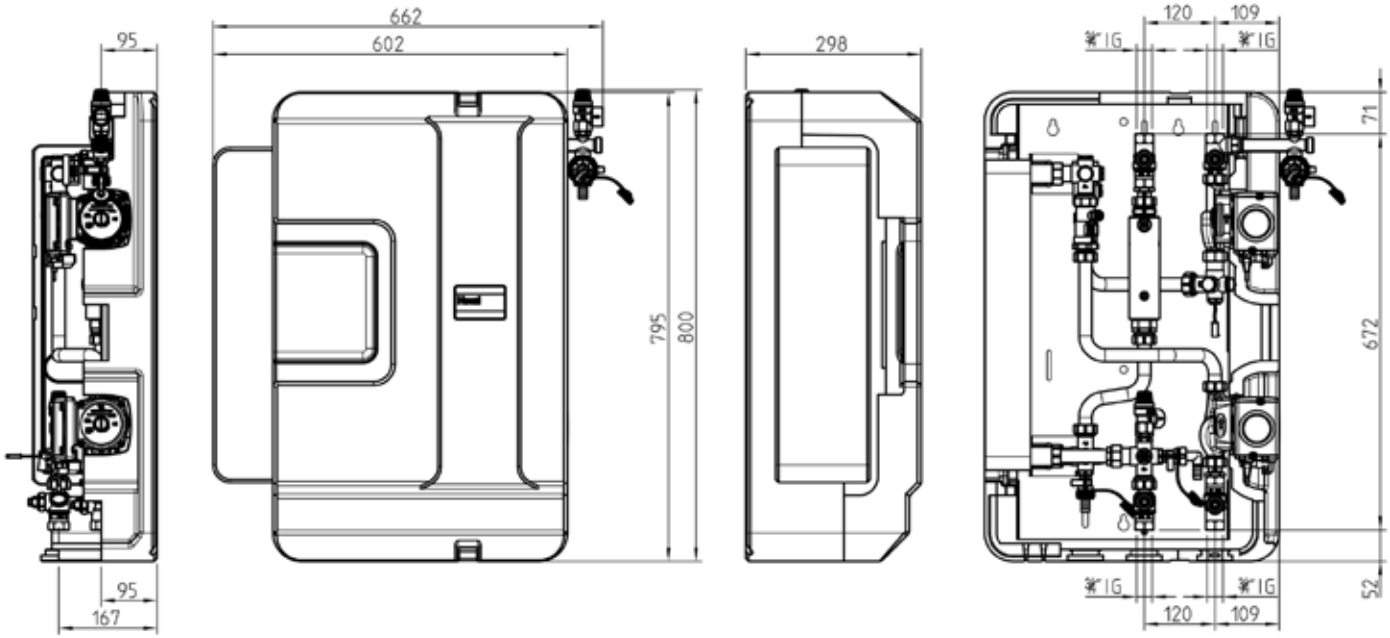


TransTherm® solar (25)

(Dimensions in mm)



TransTherm® solar (50,100)

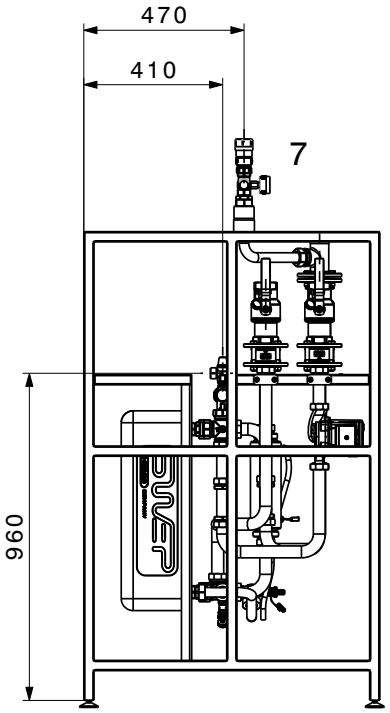


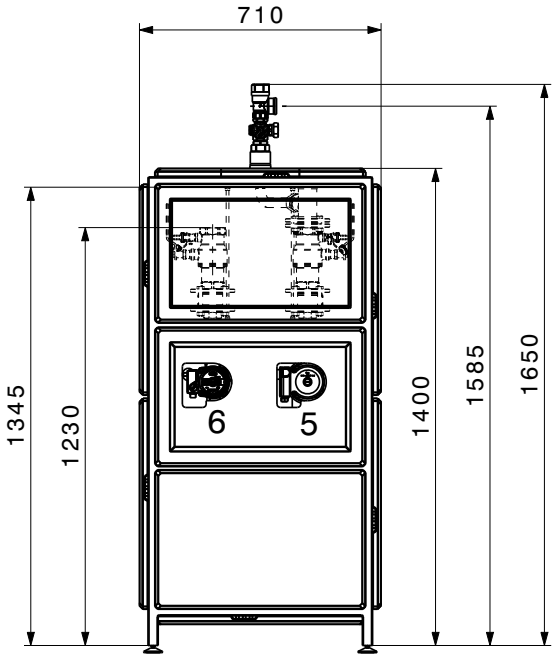
Connection dimensions TransTherm® solar (25-100)

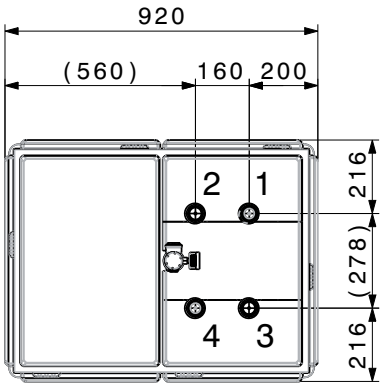
TransTherm® solar	(25)	(50)	(100)
1 Solar flow	Rp ¾″	Rp ¾″	Rp 1″
2 Solar return	Rp ¾″	Rp ¾″	Rp 1″
3 Heating flow	Rp ¾″	Rp ¾″	Rp 1″
4 Heating return	Rp ¾″	Rp ¾″	Rp 1″

TransTherm® solar (200)

(Dimensions in mm)







TransTherm® solar		(200)
1	Solar flow	Rp 1½″
2	Solar return	Rp 1½″
3	Heating flow	Rp 1½″
4	Heating return	Rp 1½″
5	Solar pump	
6	Heating pump	
7	Safety valve/pressure gauge	

Looking for the appropriate hydraulic schematic?
Please contact your local Hoval partner.

TopTronic® E solar module

- The controller module is suitable for use as differential temperature control, control of thermal solar plants, for heating process water and/or heating support.
- The controller module contains predefined hydraulic applications for different applications or plants.
- The solar yield calculation calculates the current output, the split yield in kWh as well as the total yield in MWh.
- Control unit with integrated regulating functions for:
  - One/two circuit solar energy plants
  - integrated heat balancing
  - Various additional functions
- Connection technology executed as plug-in screw terminals in coded RAST 5 design
- Update capability of the controller software
- Time and date via integrated RTC, multi-year spring reserve
- Fine fuse 10 A
- Control unit suitable for cabinet installation thanks to ability to install on DIN rail 35 x 15 x 2.2 mm
- Expansion possibilities via Hoval CAN bus:
  - max. 16 controller modules in the bus system
  - max. 16 solar modules in the bus system

Notice
Operation of the controller module is generally via the TopTronic® E control module installed in the heat generator!
If the control module is used without Hoval heat generator, the control module for operating the solar module and a wall casing with control module cut-out must be ordered separately!

Inputs and outputs
- 3 variable sensor inputs:
  - 2 variable inputs for connection of a sensor
  - 1 variable input for connection of a sensor or pulse sensor
- 0-10 V input
- 0-10 V or PWM output for controlling a variable-speed pump
- Connection of a flow rate sensor (pulse sensor), e.g. for heat metering
- Variable 230 V 3-point output
- Variable 230 V output, e.g. for controlling a solar charging pump
- 230 V optocoupler input connected in series to the variable 230 V output

Option
- Can be expanded by max. 2 module expansions (expansion of the inputs/outputs):
  - Module expansion universal

Functions
- Simple configuration and parameter setting of the plant by predefined hydraulic and function applications
- 41 pre-programmed basic variants
- Differential temperature control
- Integrated solar yield calculation
- Storage tank cascade with up to 4 consumers
- Loading and unloading function for buffer
- Cooling down function
- Overheating and frost protection
- Forced energy/high-temperature discharge

Notice
Max. 2 module expansions can be connected.

TopTronic® E module expansion Universal

TopTronic® E module expansion Universal

- Collector cascade with up to 2 collector fields
- Charging via plate heat exchanger
- Heat exchanger cascade
- Additional functions, e.g. recharging function, circulating pump, etc.
- Start help function
- Consumer loading with type selection
- High temperature discharge
- Fault reporting output
- Return flow increase
- Forced energy/high-temperature discharge on storage tank or buffer maximum temperature
- Relay test for each output can be activated separately
- Self-test with error diagnosis and error memory
- Functions that can be implemented with module expansions:
  - Multi-circuit solar plants with up to 4 consumers
  - 2 collector fields
  - misc. application functions acc. to heating system diagrams

Notice
Depending on the complexity of the corresponding system hydraulics, module expansions are required for using the listed functions (max. 2 module expansions can be connected)!

Use
- Control of thermal solar plants with differential temperature control for heating process water and/or heating support
- For one/two-circuit solar plants with varying complexity with integrated heat balancing
- For decentralised assembly - remote from the control module - directly at the sensors and actuators (solar regulating armature located a long way away):
  - Installation in wall casing/control panel
  - Connection to the operating unit via Hoval CAN bus
- With significant expansion capability by controller modules via the Hoval CAN bus
- For flexible integration in modern communication systems via different interface modules
- For remote connection via HovalConnect

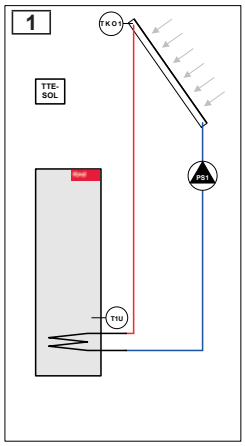
Delivery
- TopTronic® E solar module incl. 2 mounting clips for DIN rail attachment
- DIN rail with fitting accessories
- 1 immersion sensor TF/2P/5/6T, L = 5.0 m
- 1 collector sensor TF/1.1P/2.5S/5.5T, L = 2.5 m
- Basic plug set for controller module
  - Mains in
  - Plug for 230 V output (VA3)
  - Plug for 2 x 230 V output (VA1/VA2)
  - Plug for optocoupler input (SK-VA3)
  - 2 plugs for sensor (VE1/VE2)
  - Plug for 0-10 V output (VA10V/PWM)
  - Plug for Hoval CAN bus

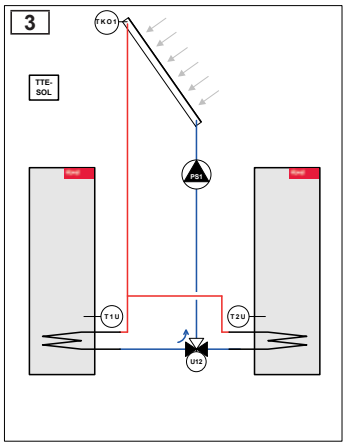
Notice
The supplementary plug set may have to be ordered to implement functions differing from the standard!

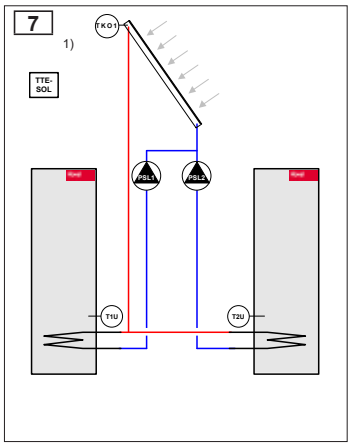
Functions that can be implemented

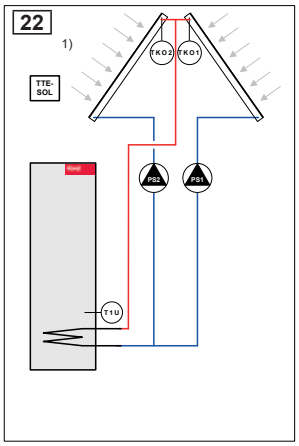
TopTronic® E solar module

TTE-SOL	1 collector	2 collectors	Ext. HE	1 consumer	2 consumers	3 consumers	4 consumers	Change-over unit	Shut-off unit
Hydr. 1	●			●					
Hydr. 3	●			●	●			●	
Hydr. 5	●		●	●	●			●	
Hydr. 7	●			●	●				
Hydr. 9	●		●	●	●				
Hydr. 11	●			●	●	●		●	
Hydr. 13	●		●	●	●	●		●	
Hydr. 15	●			●	●	●			
Hydr. 17	●		●	●	●	●			
Hydr. 19	●			●	●	●	●	●	
Hydr. 20	●		●	●	●	●	●	●	
Hydr. 21	●			●	●	●	●		
Hydr. 22		●		●					
Hydr. 24		●		●	●			●	
Hydr. 26		●	●	●	●			●	
Hydr. 28		●	●	●	●				
Hydr. 30		●		●	●	●		●	
Hydr. 32		●	●	●	●	●		●	
Hydr. 34		●		●	●	●	●	●	
Hydr. 35		●	●	●	●	●	●	●	
Hydr. 36	●		●	●	●				●
Hydr. 37	●		●	●	●	●			●
Hydr. 38	●		●	●	●	●	●		●
Hydr. 39		●	●	●	●				●
Hydr. 40		●	●	●	●	●			●
Hydr. 41		●	●	●	●	●	●		●

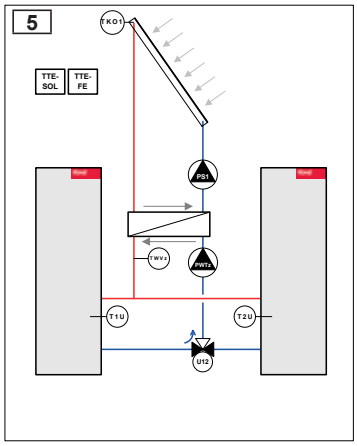


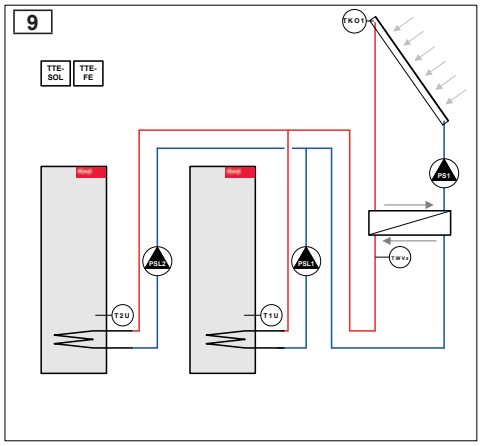


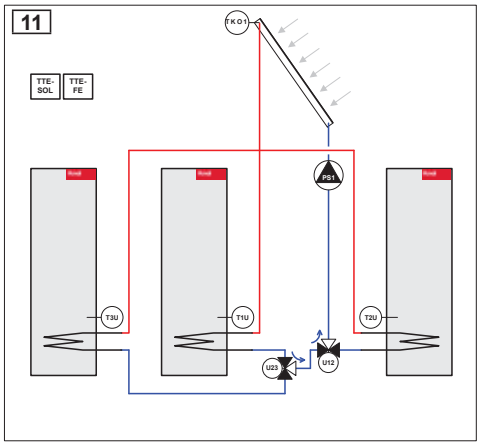




TopTronic® E solar module and 1 module expansion

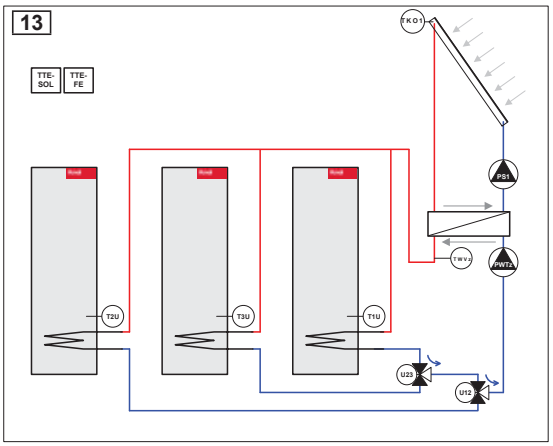






[1] When using several variable-speed pumps, an additional function expansion is required.

13



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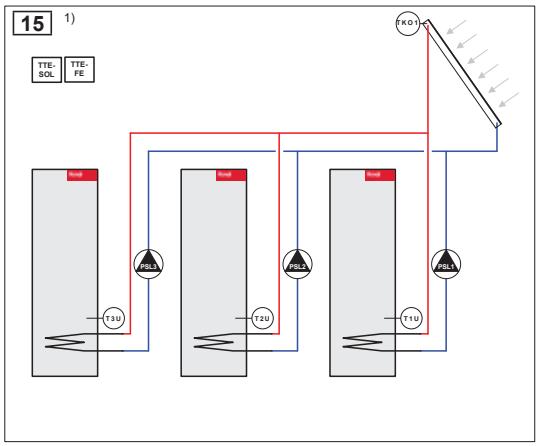

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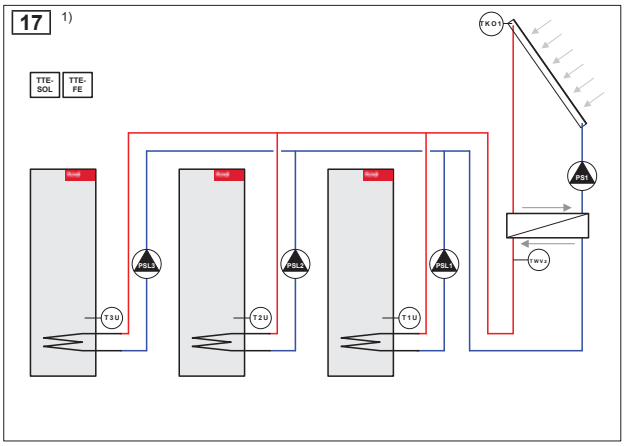

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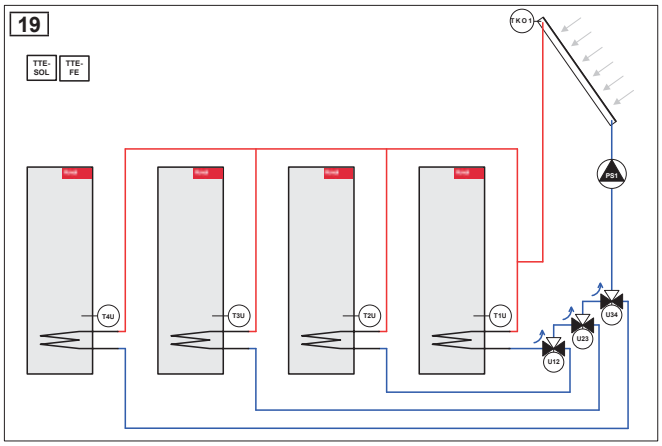

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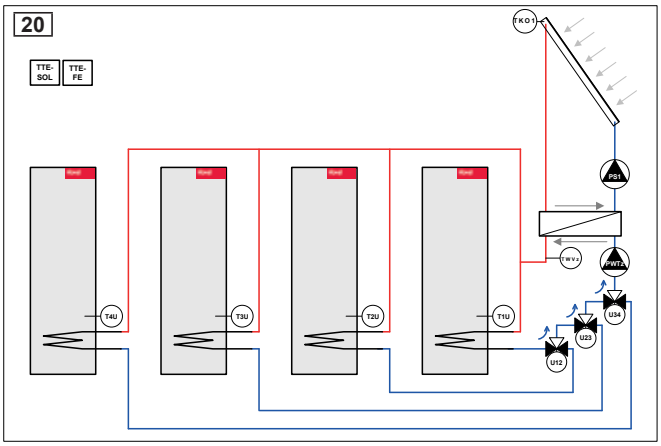

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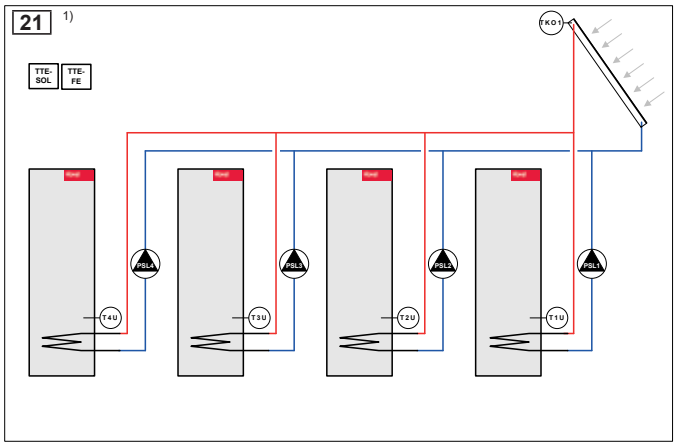

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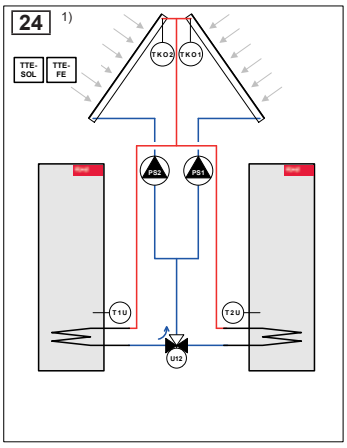

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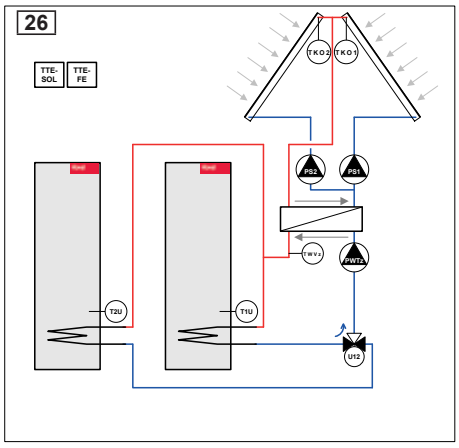

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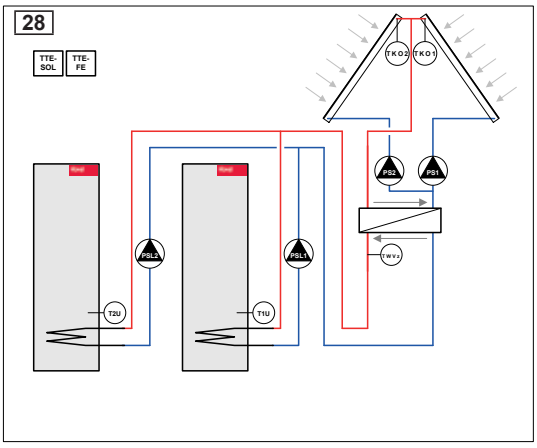

1) When using several variable-speed pumps, an additional function expansion is required.

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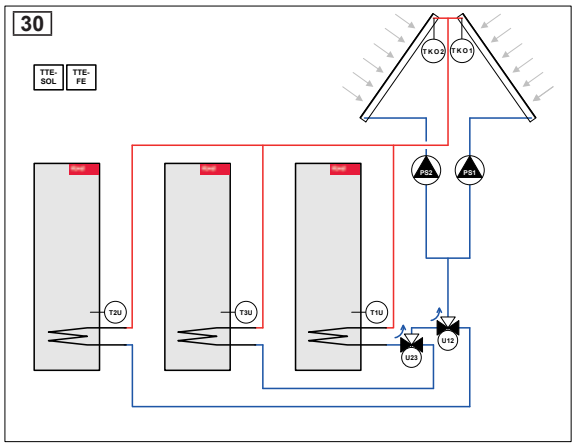

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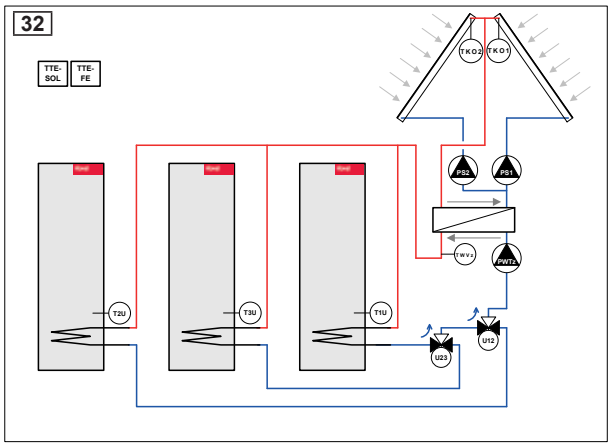

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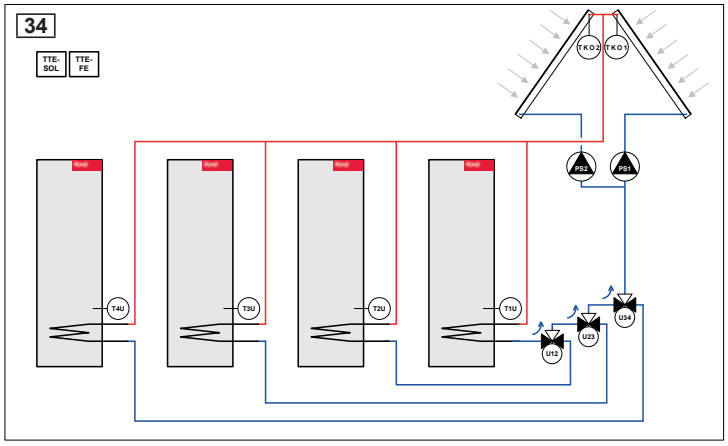

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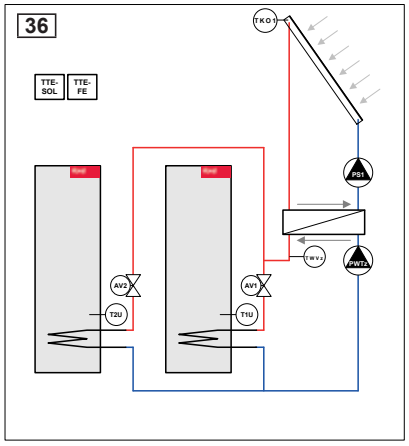

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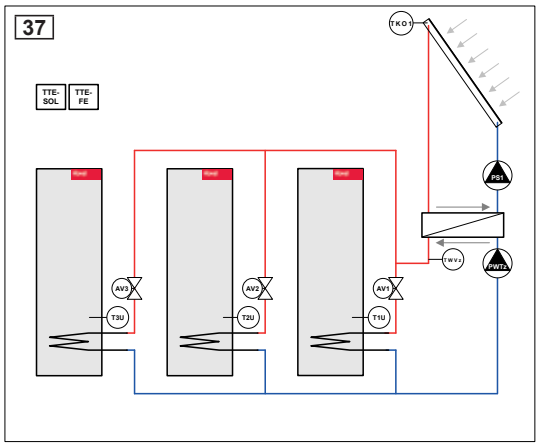

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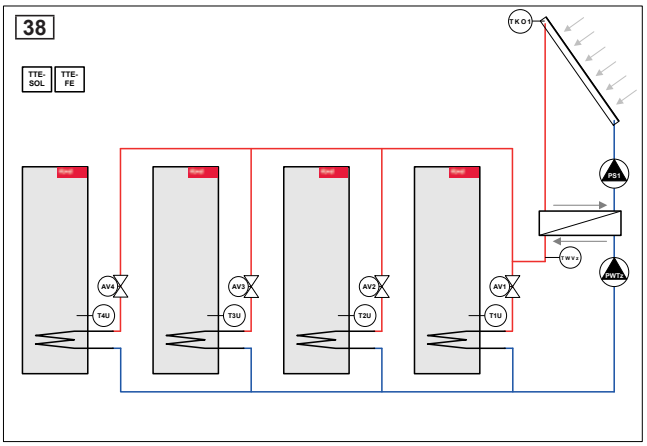

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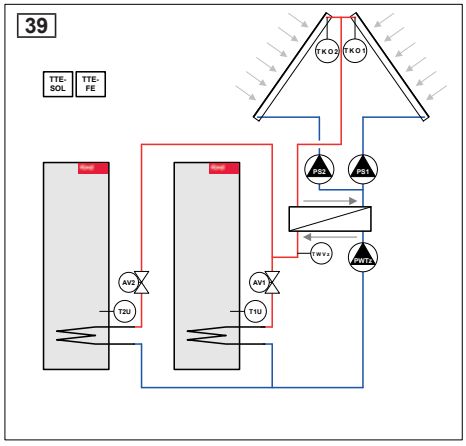

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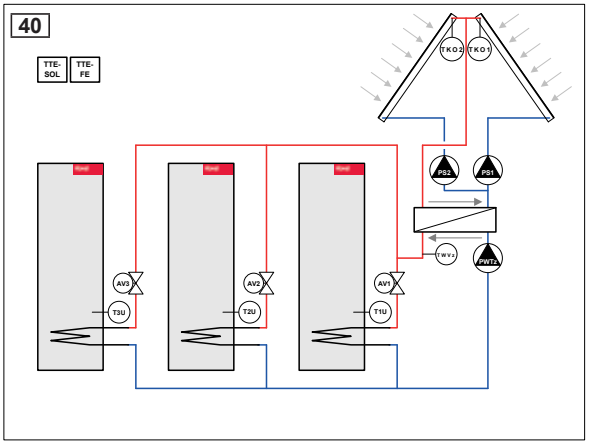
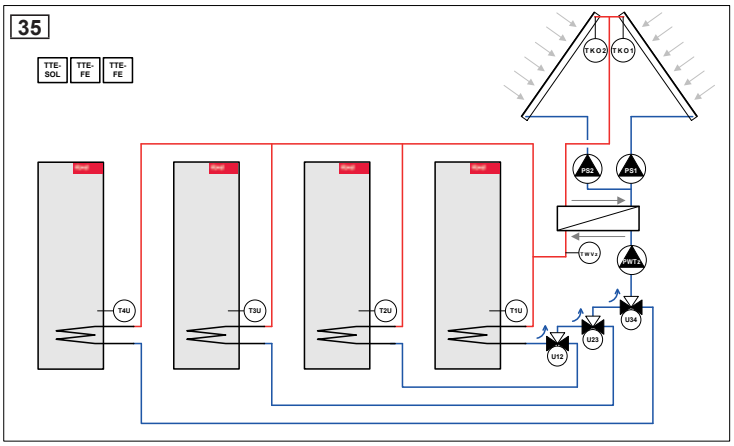
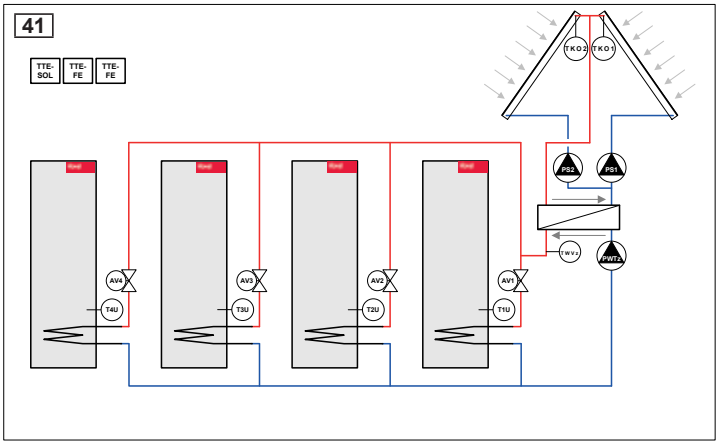
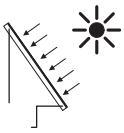


TopTronic® E solar module and 2 module expansions





TopTronic® E controller module



TopTronic® E solar module TTE-SOL
The controller module is suitable for use as temperature differential control, control of thermal solar plants, for domestic water heating and/or heating support.
Controller module with integrated control functions for
- solar circuit
- collector cascade
- storage tank cascade with up to 4 consumers
- consumer loading, with type selection
- temperature differential control
- loading and unloading function for additional/reserve buffer tank
- Integrated solar yield calculation

Consisting of:
- Fitting accessories
- 1 immersion sensor TF/2P/5/6T, L = 5 m
- 1 collector sensor TF/1.1P/2.5S/5.5T L = 2.5 m
- Basic plug set for controller module

Part No. 6037 058

Notice
In a standalone application, the control module for operating the solar module and a wall casing must be ordered separately!!

Notice
Depending on the complexity, module expansions are required for using the listed functions (max. 2 module expansion can be connected)!

Notice
The supplementary plug set may have to be ordered to implement functions differing from the standard!

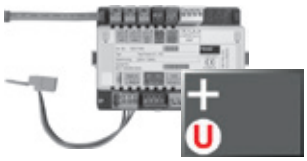
Supplementary plug set for controller modules and module expansion TTE-FE HK
Consisting of RAST 5 mating plugs for connecting further sensors and actuators on the controller module or on the module expansion.
The controller module is already equipped with a basic plug set, the supplementary plug set is required for advanced functions.

Consisting of:
- Plug for mains out (230 V)
- Plug for sensor (VE3) (variable input)
- Plug for 0-10 V input (VE10V)
- Plug for flow rate sensor input (FVT)

Part No. 6034 503

TopTronic® E module expansion

for TopTronic® E solar module

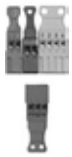
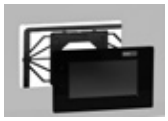
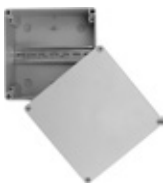


Max. 2 expansions can be connected.

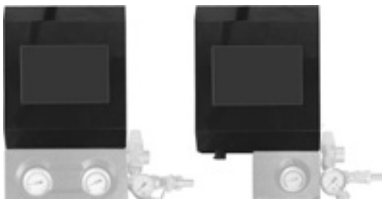
	Part No.
TopTronic® E module expansion Universal TTE-FE UNI Expansion to the inputs and outputs of a controller module (basic module heat generator, heating circuit/domestic hot water module, solar module, buffer module) for implementing various functions Consisting of: - Fitting accessories - Plug set FE module	6034 575

Notice
Refer to the Hoval System Technology to find which functions and hydraulic arrangements can be implemented.

Accessories for TopTronic® E

		Part No.
	**TopTronic® E controller modules**	
	TTE-HK/WW TopTronic® E heating circuit/ hot water module	6034 571
	TTE-PS TopTronic® E buffer module	6037 057
	TTE-MWA TopTronic® E measuring module	6034 574
	**Supplementary plug set**	
	for basic module heat generator TTE-WEZ	6034 499
	**TopTronic® E control module**	
	TTE-BM black	6043 844
	**TopTronic® E room control modules**	
	TTE-RBM TopTronic® E room control modules	
	easy white	6037 071
	comfort white	6037 069
	comfort black	6037 070
	**Enhanced language package TopTronic® E**	6039 253
	one SD card required per control module Consisting of the following languages: HU, CS, SL, RO, PL, TR, ES, HR, SR, JA, DA	
	**HovalConnect**	
	HovalConnect LAN	6049 496
	HovalConnect WLAN	6049 498
	HovalConnect Modbus	6049 501
	HovalConnect KNX	6049 593
	TopTronic® E interface modules	
	GLT module 0-10 V	6034 578
	**TopTronic® E sensors**	
	AF/2P/K Outdoor sensor H x W x D = 80 x 50 x 28 mm	2055 889
	TF/2P/5/6T Immersion sensor, L = 5.0 m	2055 888
	ALF/2P/4/T Contact sensor, L = 4.0 m	2056 775
	TF/1.1P/2.5S/6T Collector sensor, L = 2.5 m	2056 776
	**Bivalent switch**	
	for various release or switching functions	
	Bivalent switch 1-piece	2056 858
	Bivalent switch 2-piece	2061 826
	**System housing**	
	System housing 182 mm	6038 551
	System housing 254 mm	6038 552
	**TopTronic® E wall casing**	
	WG-190 Wall casing small	6052 983
	WG-360 Wall casing medium	6052 984
	WG-360 BM Wall casing medium with control module cut-out	6052 985
	WG-510 Wall casing large	6052 986
	WG-510 BM Wall casing large with control module cut-out	6052 987

Further information
see “Controls”

	Part No.
 **Solar controller set WM complete** for wall mounting consisting of a black housing incl. TopTronic® E solar module 1 immersion sensor TF/2P/5/6T, L = 5 m 1 collector sensor TF/1.1P/2.5S/5.5T, L = 2.5 m Basic connector set Blind cover for control module cut-out incl. wall mounting material TopTronic® E control module as an option	6027 257
 **Solar controller set AG complete** for mounting on regulating armature SAG20 or SAR20 consisting of a black housing incl. TopTronic® E solar module 1 immersion sensor TF/2P/5/6T, L = 5 m 1 collector sensor TF/1.1P/2.5S/5.5T, L = 2.5 m Basic connector set Blind cover for control module cut-out TopTronic® E control module as an option	6037 492

Services

 **Commissioning** Commissioning by works service or Hoval trained authorised serviceman/company is condition for warranty. For commissioning and other services please contact your Hoval sales office.	

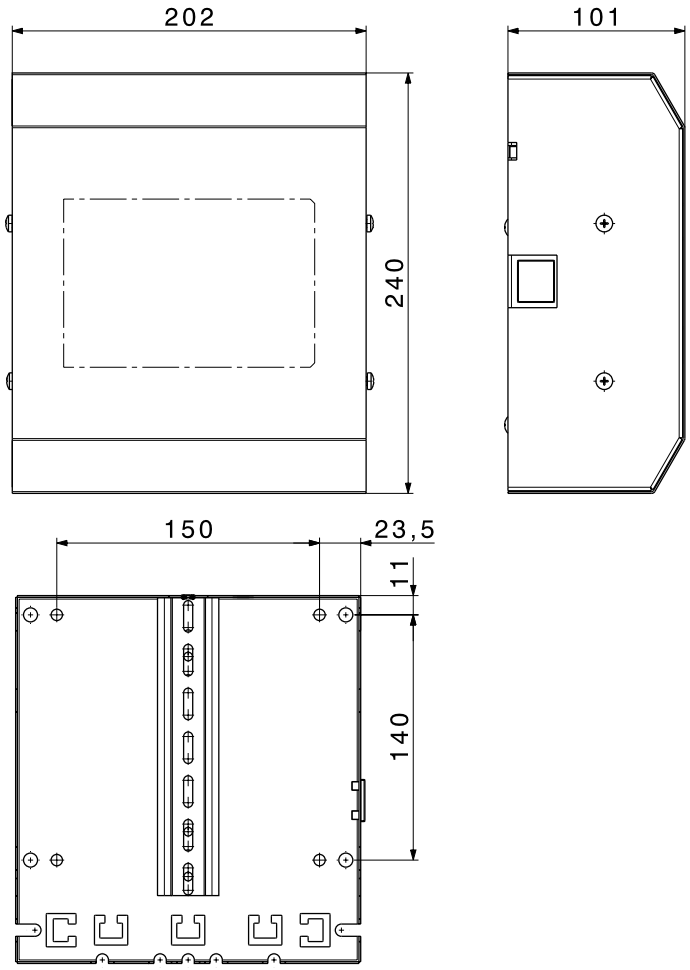
TopTronic® E solar module

Type		TTE-SOL
• Power supply max		230 V AC +6/-10 %
• Frequency	Hz	50-60
• Max. power consumption incl. bus supply, module expansions, approx.	W	18.9
• Min. power consumption	W	0.8
• Max. power consumption	W	7.8
• Fuse		T 10 A H 250 V
Output (low voltage)		
• Electromechanical relays		3
Output (extra-low voltage)		
• Signal output PWM or 0-10 V		1
Switching capacity		
• Electromechanical relays	A	3
Input (low voltage)		
• Optocoupler input		1
Inputs (extra-low voltage)		
• Input 0-10 V		1
• Inputs sensors		2
• Inputs flow rate sensor		1
• Pulse input (can be switched over to sensor)		1
• Voltage measuring circuit, with protective isolation 2.9 kV	V	15
Expansion (module expansion)		
• Max. number		2
Casing		
• Installation		Top hat rail mounting
• Dimensions (W x H x D) incl. plug	mm	150 x 100 x 75
• Ambient temperature (during operation)	°C	0…50
• Humidity (in operation), non-condensing	%, RH	20...80
• Storage temperature	°C	0…50
Bus system (Hoval CAN bus)		
• Capacity		Max. 4 control modules/3 control modules + 1 gateway
• Bus supply		yes
• Bus line		4-wire bus
• Bus length max twisted, shielded	m	100 (greater distances possible with engineering of additional measures)
• Line cross-section	mm²	0.5
• Cable type (recommended)		JY-(ST)Y 2 x 2 x 0.8
Other bus interfaces		Internal unit bus (master)
Miscellaneous		
• Spring reserve		approx. 10 years, battery buffered
• Type of protection		IP20
• Protection class		I – EN 60730

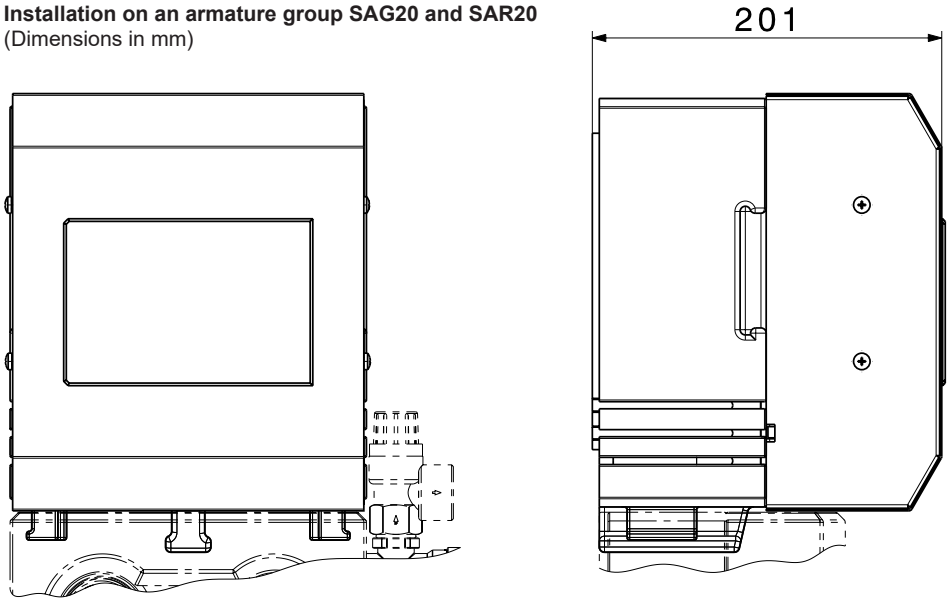
Electrical connection

TopTronic® E solar module

Solar controller set WM (wall installation)
Solar controller set AG (armature group)
(Dimensions in mm)



Installation on an armature group SAG20 and SAR20
(Dimensions in mm)

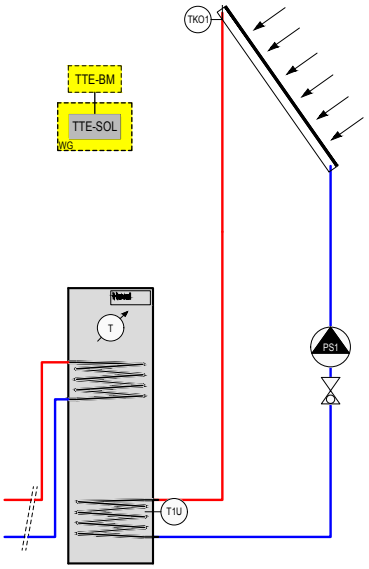


Heat quantity balancing for solar systems

Variant 1 (305)
Energy balancing without installation of a heat meter

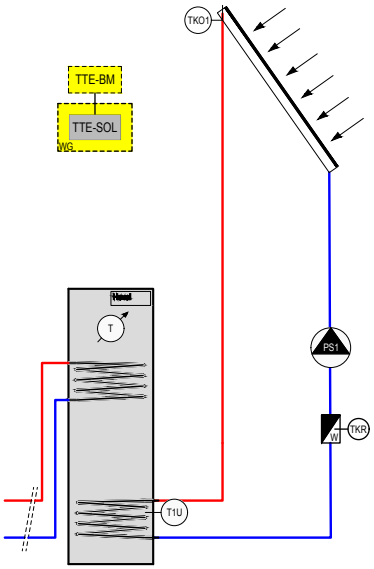
TopTronic® E solar module offers the opportunity of calculating and displaying the solar yield by storing a fixed flow rate of value. Also, when a speed-controlled circulating pump is used, there is no need for additional components in order to calculate the solar yield. **Variant 2** can be used for more accurate balancing.

- Application: energy yield calculation collector circuit
- Flow: constant or speed-controlled - balancing valve TN necessary
- Flow sensor: collector sensor (TKO1)
- Return sensor: calorifier sensor (T1U)



Variant 2 (310)
Energy balancing with heat meter

- Application: energy yield calculation collector circuit
- Flow: FlowRotor kit (FlowRotor already installed in solar armature group SAG/SAR FR)
- Flow sensor: collector sensor (TKO1)
- Return sensor: installed in FlowRotor (TKR)



1 Use of solar energy

The use of the solar energy reduces the pollutant emissions with the production of low-temperature heat and preserves thereby the environment.
With the use of solar energy no fossil sources are being burned, thus valuable raw materials are being preserved at negligible annual operating cost.
Per year up to 1200 kW/h of sun exposure energy is available for water heating, swimming pool heating and low-temperature heating per square metre of collector surface.
Professionally dimensioned and implemented solar plants prepare for many decades a large part of the yearly warm water with a temperature of 60 °C and beyond.
By the use of high-quality materials the life expectancy of a solar plant amounts to several decades.

The use of solar energy is today a highly developed technology, which:
- is absolutely safe and causes no damage
- does not decrease the dependence on valuable and regenerable, fossil sources of energy
- can be used without impairment of the environment
- is available free of charge, without the danger of economic price influence or manipulation
- can be used decentralised, whereby expensive distribution and control devices can be cancelled
- is available continuously for all time

2 Planning and dimensioning references for solar plants

Information for new buildings
Solar plants can be integrated in many cases optimally in the roof. Certain difficulties with the accommodation of the collectors due to the prescribed roof pitch resp. the roof ridge direction can occur. Therefore it is already advisable, when planning of the new building to keep certain guidelines which favour the solar energy use:

1. During the building of the house it is to be respected unimpaired exposition to sun of the roof area within the range of southeast to southwest. The chimney and the roof systems should be accommodated in the northern part of the house if possible.
2. For the in-roof installation of the collectors in a south lateral roof area (or a part of the same), the angle of inclination should amount > 22° for sheet metal frames on site or > 25° for sheet metal frames from Hoval. Otherwise the collectors must be raised against the roof pitch.
3. If an installation of the collector plant on the roof should prove as technically unfavourable, it can be installed also on the ground.
4. For the solar connection pipes either a shaft is to be planned, or the tubes can be installed first between the assembly place of the collectors up to the storage tank.
5. The water heating takes place separately from the boiler for example in the solar water heater. The boiler can be warmed up both by the solar plant and with the conventional heating. During correct planning of the solar plant the heating system for water heating can remain out of operation in the summer half-year.
6. For the part-solar room heating different combinations are possible.
7. Warm water connections for washing machine, dishwasher etc. are recommended.
8. To increase the utilisation of the valuable heating energy generally applies:
   - Very well thermally insulated buildings
   - Energy-fair architecture for passive use of solar energy
   - Design of the hot water heating on a low flow temperature
   - Modern heating regulation and system engineering
9. The collector angle is freely selectable between 22° and 90°.

The most important components of a solar plant are an efficient long-term collector, the solar armature group, the solar regulation and the solar storage tank with the integrated heat exchanger, which is co-ordinated with the size of the collector surface and the water heater volume. With larger plants an external plate-type heat exchanger should be used.

A professional assembly is a requirement for the full efficiency of the solar plant.

1 Collectors

The collector surface should be arranged to south. (Angles of inclination of the collectors see dimensioning guidelines). The collector surface should not stand in the shadow at any time of day.

2 Fastening parts

The minimum installation angle of the collectors Hoval UltraSol® 2 is 22°; if using Hoval sheet metal edgings 25°.
Depending on the assembly place of the collectors, Hoval supplies fastening parts and assembly kits for the different mounting types:

- in-roof assembly with integrated sheet metal frame
- on-roof assembly parallel to the roof pitch
- on-roof assembly with raised angle of inclination
- flat roof assembly and assembly at the soil with different angles of inclination

3 Connection tubes

The solar circuit consists of the tubes for the heat transfer medium, usually copper tubes including thermal insulation, which are layed from the collector to the water heater, and of sensor tubes for the difference temperature control and the frost-protected heat distribution medium. As an alternative to the copper tubes, pre-fabricated solar pipes with thermal insulation and integrated sensor leads and made from corrugated stainless steel tubing are finding increasing use.
The advantage of these connection pipes lies in easier and quicker routing.

4 Solar armature group

The solar armature group provides for the forced circulation of the heat distribution medium in the solar circuit and contains all fill, lock off, safety and indicator armatures (manometer, thermometer).
With the operation of the solar storage tank or with multi-circuit plants the solar armature group SAG will be used, which is mountable onto the wall.
In addition this thermally insulated, assembly-finished unit offers the possibility to connect a diaphragm pressure expansion tank.
The performance of the circulating pump should be examined (dependent on collector surface, pipework length and flow resistances).

5 Solar calorifier and energy storage tank

With conventional solar plants for water heating and room heating support the solar water heaters within the lower range are heated by a heating element on the inside or - with larger collector surfaces - by an external plate-type heat exchanger.
The Hoval solar multi-storage tank is equipped with largely dimensioned fixed inserted heating elements on the inside (MultiVal ERR, MultiVal ESRR, MultiVal CRR, MultiVal CSRR).
It goes without saying that all solar calorifiers also offer the possibility of heating a part of the storage tank volume by conventional heat generators, and can be additionally equipped with electric heating sets.

6 Solar control

A non-toxic, frost-protected heat transfer fluid is heated in the collectors. As soon as the temperature at the collector sensor is higher than the temperature measured in the lower part of the solar storage tank by the set temperature difference, the circulating pump is switched on via the solar control system. Thereby the heat transfer medium heated up in the collectors is transported into the heat exchanger, which is in the water heater, delivers the warmth at the service water or the heating water and flows cooled down back into the collectors.
This circuit is only interrupted if the temperature difference between collector and memory sensors is again smaller than the adjusted difference temperature.
Depending upon plant conception and the number of the solar energy customers who can be warmed up one-circuit resp. multi-circuit regulations are necessarily.

For the description of the quality of solar collectors and for the comparison of their efficiency some collector characteristic data worked satisfactorily. These characteristic data is determined after standardised testing methods by independent testing institutes.

1 Conversion factor

(η 0, unit %)
is the maximum collector efficiency in per cent. It is reached if the average collector temperature is equal to the ambient temperature.

2 Heat loss coefficient

(U-value, unit W/m²K)
describes the average heat loss of the collector related to the entrance surface and the temperature difference between collector work temperature (= average collector temperature) and ambient temperature.

3 Collector characteristic

The collector characteristic shows the dependence of the collector efficiency on the temperature difference between collector work temperature and ambient temperature and the sun exposure. The process of the collector characteristic is determined by the building method of the collector and the operating conditions. Thus affect the light permeability of the collector vitrification, the kind of the absorber coating, the thermal insulation and the radiation and convection losses the process.

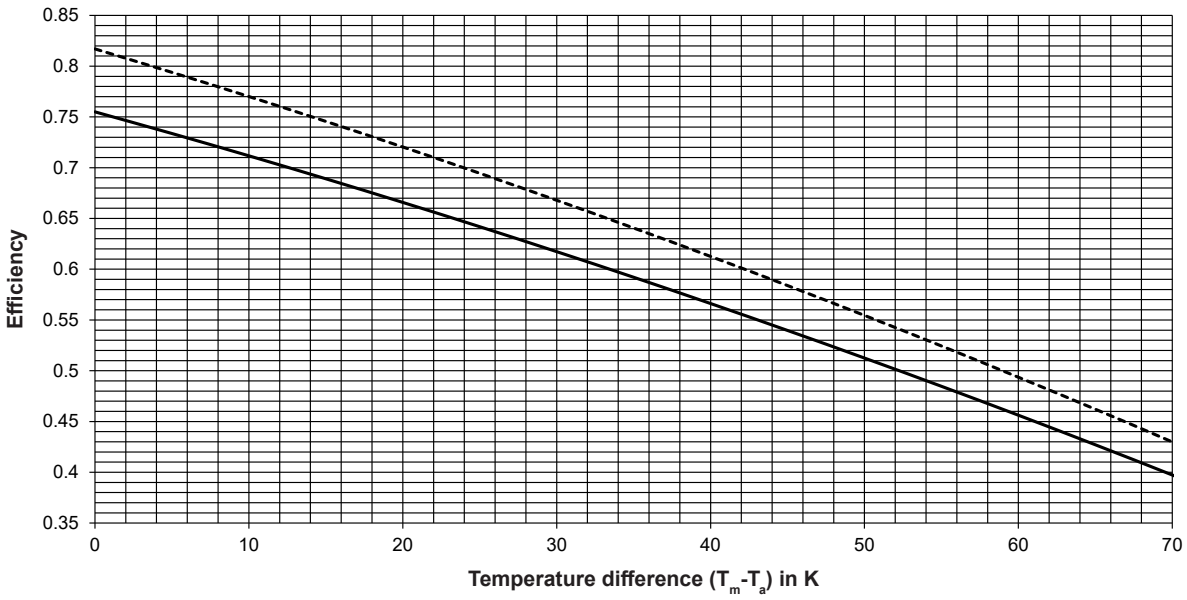
A collector with a high conversion factor, small heat loss coefficient and flat characteristic is considered as energetically particularly favourably.

For the comparison of collectors the effective absorber surface (collector effective area) of a collector is in addition, just as important, since by it the total quantity of the irradiation energy taken up by the collector is determined.

4 Collector testing

The quality and energy efficiency of solar collectors is determined by standardised test procedures of independent institutions, e.g. according to EN 12975. Based upon this testing the European quality label for solar collectors “Solar KEYMARK” is being issued.
Hoval solar collectors are quality and performance-tested by different inspecting authorities and are labelled with Solar KEYMARK. As a result, they meet the highest quality standards.

Efficiency characteristic curve UltraSol® 2



——— UltraSol® 2 (gross area)
- - - - - - UltraSol® 2 (aperture area)

T_m = average collector temperature
T_a = ambient temperature

Valid for flat collectors under the following conditions

1. Average sun exposure about 1200 kWh per square meters and year, related to the horizontal irradiation surface and the Central European climate conditions.
2. Sunshine on the collector surface more than 90 %, no shade
3. Collector angle of inclination depending upon type of use and period of use:
   - Open-air swimming pool from May to September 25-35°
   - Service water and indoor swimming pool 30-50°
   - Service water all year round 35-55°
   - Service water and additional heating 40-60°
4. Deviation of the collector surface from the south < 35°. In the case of deviations from 35 up to 45° of the south direction an enlargement of the collector surface of approx. 20 % is necessary. Collector arrangements with deviations greater than 45° from the south direction are not recommended.
5. As far as possible the entire collector surface should be arranged in an orientation. An allocation on differently oriented collector fields is not recommended.

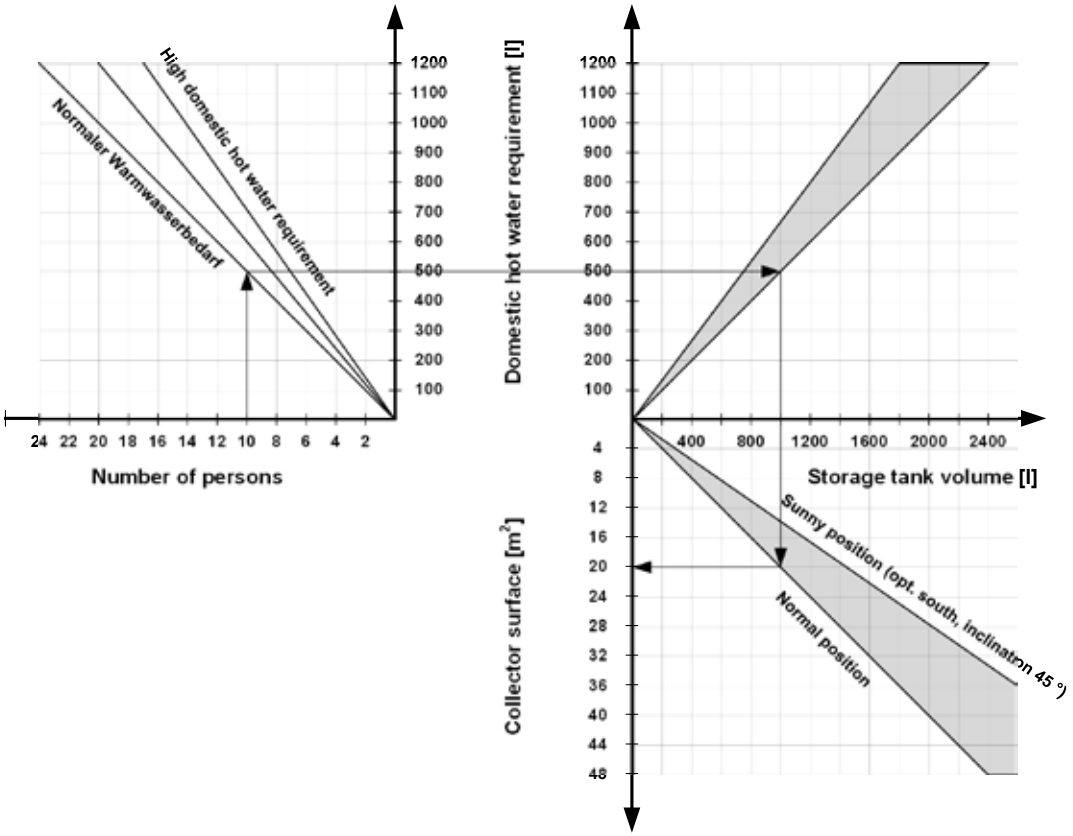
1 Water heating:

For the water heating with standard solar plants (flat collector HighFlow) approx. 1.5 m² collector surface and 50 to 85 litres storage volume are necessary per person.

Examples of water heating:

2-3	persons, collector surface up to 4 m²	storage tank of 300 l
3-4	persons, collector surface up to 6 m²	storage tank of 300 l
4-6	persons, collector surface up to 8 m²	storage tank of 500 l
6-8	persons, collector surface up to 10 m²	storage tank of 500 l
8-10	persons, collector surface up to 12 m²	storage tank of 500 l
10-14	persons, collector surface up to 16 m²	storage tank of 800 l
14-18	persons, collector surface up to 20 m²	storage tank of 1000 l
18-24	persons, collector surface up to 24 m²	storage tank of 2 x 800 l

Dimensioning diagram solar collector surface for water heating



Interpretation diagram for the solar collector surface with standard solar plants for water heating.

2 Room heating:

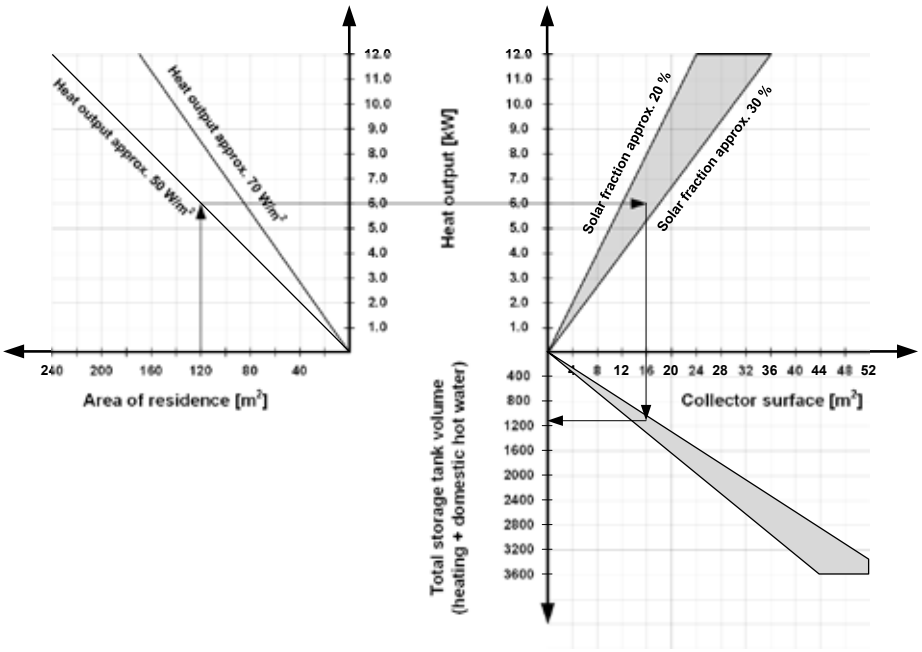
Particularly in the transitional period and in connection with low-temperature heating systems (wall or under-floor heating) solar collectors can be used depending upon irradiation with considerable success.
As approximate value 1.5-2 m² collector surface are to be planned additionally for water heating per 10 m² living space, respectively 15-20 % of the surface which has to be heated.

In progressive low-energy buildings, the heating system can be supported even with smaller collector surfaces (from 10 % of the heated area).

3 Swimming pool heating:

Swimming pools may be warmed up with copper collectors only over a suitable heat exchanger (dual-circuit systems). As approximate value at least ⅔ of the basin surface as collector surface are to be planned.

Dimensioning diagram solar collector surface for water heating and heating support



Solar collectors

Solar collectors are used to generate heat and utilise the total momentary radiation. The orientation and slope of the solar collectors have a significant influence on the effectivity of the solar plant and must be checked for each individual system.

Location

- *Sloping roof*
  A good solution. Orientation, angle of inclination and shade must be checked. Collector field designs are available for on-roof and in-roof assembly.

- *Flat roof*
  Very good solution allowing optimum selection of orientation and angle of inclination for the solar collectors. Shade must be checked. Solar collectors can often be erected in two or more rows.

- *Building facade/balcony*
  Poor results. An angle of inclination of 15-20° for the collectors already ensures much better utilisation. Some wall installation sets with several angles of inclination are available. We highly recommend an on-site supporting structure for the collector assembly with corresponding angles of inclination.

Approximate values

Standard values for collector surfaces

Single- and two-family homes

	Collector surface per person m²	per MWh/a *
Hot water	1-1.25	-
Hot water+ Heating support	-	0.6-1

Multiple dwelling units

	Collector surface per person m²
Hot water	0.8
Preheating	0.5

* Annual heat demand for hot water and heating

Allowances for the collector surface

Hot water

Orientation	Slope degrees	Flat collector %
	0-22°	not permissible
South	22-25°	approx. 10
South-west	25-60°	0
South-east	60-75°	approx. 10
	75-90°	30-50
	0-22°	not permissible
West	22-30°	15-20
East	30-50°	0
	50-75°	30-50
	75-90°	50-80

Hot water and heating support

Orientation	Slope degrees	Flat collector %
	0-22°	not permissible
South	22-25°	20-30
South-west	25-60°	10
South-east	60-75°	0
	75-90°	20-40
	0-22°	not permissible
West	22-30°	25-35
East	30-50°	35-45
	50-75°	45-60
	75-90°	60-100

Heating outdoor swimming pools

Orientation	Slope degrees	Flat collector %
South	0-22°	5
	22-40°	0
	40-60°	15
South-west	0-22°	15
South-east	22-40°	0
	40-60°	20
West	0-22°	10
East	22-40°	25
	40-60°	40

Shade

(proportion of shade max. 25 %)

Period	Allowance
All-year	20 %
Winter and between seasons	10 %
November to January	0 %

Approximate values for collector yields

Annual yield per m² useful collector surface, dependent on location, system design and user characteristics.

Hot water

Utilisation standard	kWh/m²a
High degree of coverage	300-450
Average degree of coverage	400-550
Preheating	450-650

Hot water and heating support

Design	kWh/m²a
Generous dimensions	150-250
Average dimensions	200-300
Tight dimensions	250-500

In mountain regions, the solar collectors should not remain covered with snow for long periods of time. They should be positioned in such a way that the snow slides off (min. slope 45º, no snow fence at the bottom).

Heating outdoor swimming pools

Flat collector type	Yield kWh/m²a
unglazed, SP absorber	280-330
glazed	260-320

Heat exchangers

The solar circuit heat exchangers should be designed for an average temperature difference (ΔT_m) of approx. 5-15 K at max. collector output (700 W/m²). Up to approx. 30 m² collector surface, internal heat exchanger surfaces are usually used. Above this, an external heat exchanger (plate exchanger) is recommended. Calorifiers should be designed for 700 W/m² collector output and an average temperature difference of 5-10 K. Note that there is a danger of calcification. For this reason, the plate exchanger should rather be used for heating the swimming pool or for charging heating water tanks.

Approximate values
for internal heat exchangers
- Plain-tube exchangers:
  0.15-0.25 m² per m² collector surface
- Finned-tube exchangers
  0.3-0.5 m² per m² collector surface

Influence of ΔT_m selection:
Effect on the efficiency of the system

ΔT_m	5 K	10 K	15 K	20 K
Change	+3.5 %	0	-3.5 %	-7 %

Solar storage tanks

The heat supplied by the solar collectors is transferred in the solar storage. The solar storage bridges the time gap between heat recovery and consumption. The solar storage tank incl. connections and flanges should be well insulated and *all connection pipes should be connected with a siphon*.

Check the max. permissible operating temperature and operating pressure of the solar storage tank.

Approximate values
Standard values for the tank size

Hot water

	Volume dm³
Single- and two-family houses	85/person
Volumetric content for additional heating (electric)	acc. to daily demand
Multi-family houses	80/person
Volumetric content for solar heating *	40/m² collector surface
additional heating electric boiler	acc. to daily demand 15-60/person

Hot water and heating support
for single- and two-family houses

	Volume per m² collector surface
Solar heating *	40-60
Additional heating	40-60

* Free “solar volume” for the storage of solar energy

Diaphragm pressure expansion tank
The dimensions of the diaphragm pressure expansion tank must be selected taking into account the total content of the collectors (in the event of evaporation).
Observe the following during selection:
- Max. operating temperature (provide pre-tank where necessary)
- Check the pretension of the selected diaphragm pressure expansion tank against system-specific data.

Solar circuit pipes
Copper, iron or stainless steel pipes can be used for the solar circuit. The pipe runs should be kept short, in particular the flow pipe for the collector field (line from the collector field to the consumer load). Pipes must be routed and insulated professionally.
The thermal insulation should be resistant to temperatures of at least 130 °C. For recommended insulation thickness and pipe cross-sections: see Solar collectors.

Heat transfer liquid
As a rule, a frost protection agent on polypropylene basis is used as frost protection in the solar circuit. The concentration should be selected according to the climate zone and system-specific data. A frost protection percentage of 40 % is usually sufficient. Percentages of over 50 % frost protection should be avoided.

Example: approx. -20 °C outside temperature (glycol content 40 %). *The water and glycol must be mixed before introducing the mixture into the system.*

Circulating pumps, instruments, armatures
Check the max. permissible operating temperature for the selected products.

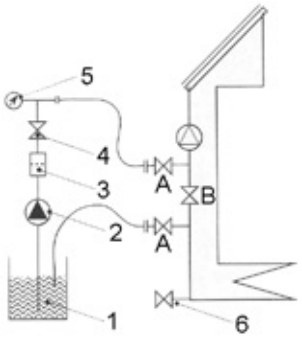
Overheating protection
High temperatures and possible formation of vapour in the solar circuit can never be completely ruled out. (The sun supplies heat even when this heat cannot be used directly.)
Causes:
- Systems with widely fluctuating consumption
- Power failure or defective system components

For this reason, we recommend the inclusion of an overheating concept before realisation of the system. The minimum requirements here are:
- regulatory measures
- thermal discharge safety device
- selection of the correct diaphragm pressure expansion tank
- selection of the appropriate frost protection agent

Flushing, filling and venting

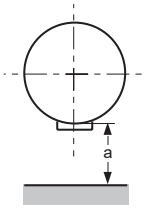
The system may only be filled and pressure testing carried out when the sun is not shining on the collector field.

Flushing of the system is extremely IMPORTANT and must be carried out with due care, for preference with the prepared heat transfer liquid.
Dirt particles in the system cause malfunctions. Use filters!
The system may only be filled if it can be put into operation at the same time. A jet pump should be used to fill the system.
The system should be completely installed, filled and connected on the consumer side, including the solar storage tank, and the heat transfer fluid should be mixed and ready.



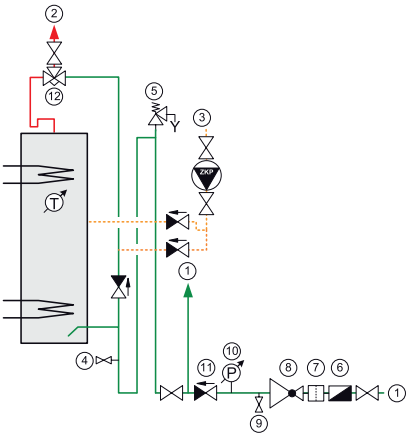
1 Tank
2 Jet pump
3 Filter
4 Ball valves
5 Pressure gauge
6 Drain
A Open
B Closed

Necessary space
- The inspection opening has to be well accessible.
- Distance to the wall for the installation and removal of the electric heating element (a):



Calorifier	dm³	a
MultiVal ERR	300-500 l	≥ 600
MultiVal ESRR	800-1000 l	≥ 950
MultiVal CRR	300-540 l	≥ 600
MultiVal CSRR	800-2000 l	≥ 950
EnerVal	500-1500 l	≥ 950
(laterally left or right distance to wall for mounting of casing)		≥ 700

Plumbing
- For electrical heating a hot water distribution system without circulation must be planned if possible.
- The hot water pipe must be insulated and installed with a siphon (minimum ≥ 200 mm).
- Maximum safety adjustment: 1 bar less than the maximum operating pressure
- Caution! When only small amounts of hot water are tapped, higher hot water temperatures can occur. (Depending on comfort requirements, provide suitable measures, e.g. thermomixer etc.)

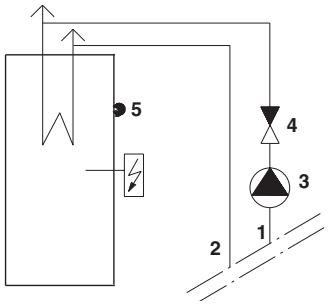


1 Cold water
2 Hot water
3 Circulation
4 Drain
5 Safety valve
6 Pressure reduction valve
7 Testing device
8 Return flow inhibitor
9 Connection for manometer
10 Thermostatic blender for water

Heating assembly

(Recharging with boiler)

- Flow and return lines must be connected in such a way that no flow reversal and single-pipe gravity circulation can occur with the charging pump switched off and electric heating switched on (see drawing).
- Expansion of heating water must always be ensured (also during electric charging).
- Install air vent at the top point of the heating water pipe.



1 Flow
2 Return
3 Venting charging pump
4 Non-return valve
5 Temperature regulator

Commissioning

- The system must be created, the heating and plumbing installation carried out, the system filled, vented and the electrical connections established in accordance with the design documentation and assembly specifications for the system components supplied.
- At the time of commissioning, the design values must be known and the building owner or the person responsible for operation present for instruction.
- Registration should be carried out in good time before the planned date of commissioning.

Maintenance

The following inspections must be planned for maintenance of the system:

Inspection	Type
User	
Condition of system	Visual inspection
Circulating pump	periodical
Pressure	

The thermal solar plant must be checked regularly in order to ensure the operational safety and the efficiency as well as the high durability in the long term. Inspection should be carried out annually and maintenance every 2 years. The completion of a maintenance contract is recommended for all thermal solar plants.

Static dimensioning aid

The following requirements and directives must be complied with:

- Regionally applicable standards and regulations
- The installer is responsible for ensuring compliance with the relevant standards and local regulations.
- The snow and wind loads are regulated by DIN EN 1991 and the associated national appendix.

General information on statics

- Installation is only permissible on roof areas or substructures of sufficient load-bearing capacity. It is essential for the static load-bearing capacity of the roof or the substructure to be checked by the local statics engineer before the collectors are installed.
- The examination of the entire collector structure according to DIN 1055 Parts 4 and 5 is required by the local statics engineer, in particular in areas subject to high snowfall or high wind speeds.Attention in this must be paid to all special features of the installation site (foehn winds, venturi effects, eddy formation etc.) that can lead to increased load.

Roof-mounted systems

- With roof-mounted systems, particular attention must be paid to the quality of the wood in the substructure with regard to the durability of the screw connections for attaching collector installation fixtures. The selection and also the number of roof connections must be adapted to the local snow and wind loads. Binding statements about the wind and snow loads as well as building altitudes about seal level must be obtained from the relevant authorities in the regions.
- If the roof anchors are exposed to maximum load, their geometry means that deformation will be unavoidable and contact between the roof anchor and the tiles can often not been prevented. As a result, it is recommended for metal tiles to be used if there will be high snow and wind loads.
- The significant number of roof connection sets is based on the calculated minimum number of attachment points for the planned number of collectors without taking account of the building-specific anchoring conditions of the roof covering and the building structure. The local force application via roof connection sets has been provided. The transmission of forces via the screw connection to the building structure does not form part of this calculation and must be verified separately.
- To prevent impermissible wind suction loads, the collectors must not be installed near the edges of the roof. The relevant standards must be observed in this case.
  When elevators are used, the upper edge of the collector must not project beyond the ridge of the roof. Collectors must not be installed under a height change, in order to avoid increased loads due to windblown or slipping snow from the higher section of the roof onto the collector field. If snow guards are mounted on the more elevated roof for this reason, the statics of this roof must be inspected.

Personal protection

- In order to carry out work on the roof, safety equipment for personal protection must be included in the planning. For pitched roofs, these are safety roof hooks and for flat roofs, suitable attachment points or cable systems. Regarding work on the roof, local regulations must be adhered to.

Flat roof systems

Wind load calculation according to DIN EN 1991-1-3 and -4 for free-standing flat roof systems

In general, calculation in accordance with standard DIN EN 1991-1-3 and -4 applies for the detailed wind load calculation. The existing recommendation should cover the standard cases and ease handling in daily use However, this recommendation does not release the planning authority from carefully examining the local conditions and having a designated specialist (structural engineer/civil engineer) make a detailed calculation.
Consequently, no liability claims can be asserted on this basis.

The following points are decisive for the design of the wind load:

- Collector angle
- Backpressure zone/wind zone
- Terrain category/location
- Height of building above terrain
- Building dimensions/shape
- Roof edge height (attic)
- Distance from collectors to roof edge
- Number of collectors in a row

The more exposed, the more free-standing the building is, the higher are the expected wind loads. In city areas, the buildings are often protected from wind by other neighbouring buildings.

1. General

1.1 The following Terms and Conditions shall apply to all our present and future contracts for deliveries and other services (even if the said Terms and Conditions are not specifically mentioned in verbal, telephonic or fax communications).

1.2 All deviations from the present Terms and Conditions, ancillary verbal agreements and subsequent contractual amendments shall only be valid if they have been confirmed by us in writing.

1.3 Buying terms and conditions of the client shall not be valid even if they are not specifically rejected by us. Our Standard Terms and Conditions of Delivery shall be regarded as accepted at the latest upon receipt of our goods and services by the client.

1.4 If a provision of the present Terms and Conditions of Delivery proves to be wholly or partially invalid, the contracting parties shall replace the aforesaid provision by a new provision which comes as close as possible to the legal and economic intention of the invalid provision.

2. Offers

2.1 Our offers shall be subject to change without notice.

2.2 Orders shall only be regarded as accepted when they have been confirmed by us in writing.

2.3 Illustrations, drawings and all technical details in catalogues and printed material shall be approximate values as customary within the industry. They shall only be binding if specific reference is made to them in the contract. We shall also reserve the right to make technical and design changes after the conclusion of the contract.

2.4 Cost estimates, drawings and other documents shall remain our property and shall be subject to copyright protection; they may not be made available to third parties.

3. Regulations in the country of destination

3.1 At the latest at the time of the order, the buyer shall draw our attention to the regulations and standards in force in the country of destination relating to the design of the delivered goods and the operation thereof and also to the execution of services.

3.2 Our deliveries and services shall comply with the regulations and standards in the country of destination provided the buyer has drawn our attention thereto in accordance with Section 3.1.

3.3 The buyer shall duly inform us of any special application features of goods ordered from us if these differ from our general recommendations.

4. Prices

4.1 Our prices shall be ex works, net, excluding packaging.

4.2 All ancillary costs, e.g. freight, insurance, export, transit, import and other approvals, licenses and authentications, shall be for the account of the buyer. The buyer shall also bear all taxes, charges, customs duty, etc., which are levied in connection with the contract.

4.3 We shall reserve the right to make price adjustments if wage rates or material prices change between the date of the order confirmation and the contractual performance of the contract. Price increases shall normally be notified three months in advance. We shall be bound to the price stated in the order confirmation for a period of three months after the effective date of the price increase.

5. Payment terms

5.1 Unless otherwise agreed in writing, our invoices shall be payable within thirty days with no cash discount. Payment shall be deemed to have been made when the amount in question is at our unrestricted disposal on our account in Swiss Franks.

5.2 Payment dates shall be observed even if any delays whatsoever occur after shipment of the goods from our works. The buyer shall not be permitted to reduce or withhold payments on account of complaints or counterclaims not recognised by us.

5.3 Payments shall also be made if insignificant components are missing but usage of the delivered goods is not rendered impossible as a result or if rectification work has to be carried out on the delivery. We shall be entitled to reject rectification of the defect as long as the buyer has not discharged his/its obligations to us.

5.4 If the buyer fails to comply with the agreed payment dates, default interest shall be paid from the agreed due date without a reminder being issued; the aforesaid interest shall be based on the interest rates prevailing at the domicile of the buyer, but shall be not less than four percent above the current discount rate of the Swiss Central Bank.

5.5 We shall be entitled to make deliveries of pending orders dependent upon settlement of outstanding claims.

6. Reservation of title

6.1 Delivered goods shall remain our property (reserved goods) pending full and complete payment of all present and future claims to which we are entitled regardless of their legal cause. This shall also apply if payments are made in settlement of specifically designated claims.

6.2 The buyer shall be entitled to process and sell reserved goods in the ordinary course of business.

6.3 If our reserved goods are combined or intermingled with other goods, the buyer shall hereby transfer his/its ownership rights in the new goods or chattels to us upon the conclusion of the contract in the amount of the invoice value of the reserved goods.

6.4 If the goods are resold by the buyer, he/it shall hereby transfer to us upon the conclusion of the contract with us his/its claims arising from the aforesaid resale in the amount of the invoice value of the reserved goods.

6.5 If the reserved goods are used by the buyer to perform a works or works delivery contract, his/its claim from the aforesaid works or works delivery contract shall hereby be assigned to us in the same amount and on the same date as for the purchase price claim (Section 6.4).

6.6 As long as he/it is honouring his/its payment obligations, the buyer shall, however, be authorised to collect his/its resale claim which has been assigned to us. He/it may not dispose of such claims by way of assignment to third parties, however. The empowerment of the buyer to collect the claim may be revoked by us at any time. We shall be entitled to notify third party debtors of the assignment. The buyer shall be entitled to provide us with the necessary information and documents in order to enable us to enforce our rights.

6.7 If the value of our securities exceeds our total claims by more than 10 %, we shall be obliged to release securities of our choice at the request of the buyer.

6.8 The buyer shall inform us immediately of any pledge or other impediment to our property enforced by third parties.

6.9 The buyer shall be obliged to collaborate in measures required to protect our title. He/it shall, in particular, empower us upon the conclusion of the contract to make entries or prior notice of the reservation of title at his/its cost in public registers, books and documents, etc., in accordance with the relevant national laws and shall perform all formalities in this respect.

6.10 The buyer shall maintain the reserved goods at his/its cost for the duration of the reservation of title and shall insure the said goods against theft, breakage, fire, water and other risks in our favour. He/it shall also take all steps to ensure that our property claims are neither adversely affected nor rescinded.

7. Delivery periods

7.1 Delivery periods and deadlines stated by us shall be approximate unless we have given an express written confirmation of a deadline as binding.

7.2 Delivery periods shall be deemed to have been met if notification of readiness to deliver has been sent to the buyer before the end of the delivery period.

7.3 The delivery period shall be prolonged if details required for the performance of the contract are not received on time or if they are subsequently changed by the buyer.

7.4 The delivery period shall also be reasonably prolonged if impediments arise which we cannot avert despite exercise of the necessary care (e.g. major operational disruptions, industrial disputes, delayed or defective deliveries, force majeure, etc.).

7.5 If an agreed delivery date is met by more than 14 days, the buyer shall be obliged to set us a reasonable period of grace. The buyer may only withdraw from the contract if our goods have not been delivered by the end of the said period of grace. Compensation claims for non-performance, delayed performance or any consequential losses shall be excluded unless there was gross negligence on our part.

8. Transfer of risk

8.1 Unless expressly agreed otherwise in writing, our “ex works” deliveries shall be made in accordance with the international rules on the interpretation of commercial clauses of the International Chamber of Commerce (Incoterms) in the version in force on the date of the order confirmation.

8.2 The transfer of risk shall be determined by the aforesaid Incoterms.

8.3 Insurance against damages of any kind shall be the responsibility of the buyer.

8.4 Complaints in connection with the transport shall be immediately notified by the buyer to the last carrier upon receipt of the delivery.
8.5 If despatch is delayed at the request of the buyer or for any other reasons not attributable to us, the risk shall pass to the buyer on the original date envisaged for the “ex works” delivery. We shall be entitled to demand payment from this date onwards.

9. Delivery inspection

9.1 The buyer shall be required to inspect deliveries immediately. If the goods do not comply with the order or the delivery note or if visible defects are identified, he/it shall be obliged to notify the aforesaid to us in writing within eight days of receipt. Later complaints shall not be recognised. (Regarding transport damages, cf. Section 8.4)

10. Assembly and operations

10.1 The assembly, putting into operation, operation and maintenance of the delivered goods shall be carried out in accordance with our guidelines. They may be executed by our staff or by appropriately trained third parties as agreed with the buyer.
10.2 If we require a commissioning certificate for certain product groups, warranty claims for the proper functioning of the equipment can only be enforced if a proper hand-over has been documented by a confirmed commissioning certificate received by us within one month of the hand-over.

11. Warranty

11.1 Warranty period

11.1.1 The general warranty period shall be 12 months from the first commissioning but no longer than 18 months from the date on which the relevant goods left our works.
If despatch is delayed for reasons not attributable to us, the warranty shall lapse no later than 18 months after notification of the readiness to deliver.
The general warranty period shall exclude electrical components for which the warranty period shall be 6 months from the first commissioning but no later than 12 months from the date of shipment from our works.

11.1.2 We refer to Section 11.6.1 with regard to the warranty period for third party products.

11.1.3 The warranty period for components which we have repaired during the warranty period or have delivered as replacement shall be 12 months from the completion of our repair or from the date of the replacement delivery but no longer than the end of a period equivalent to twice the original warranty period as per Section 11.1.1.

11.2 Liability for material, design and workmanship defects

11.2.1 The contractual condition of the goods shall be based on the condition upon the transfer of risk.

11.2.2 Defects shall be notified to us immediately in writing.

11.2.3 We shall be liable for all components which can be shown to have become defective or unusable before the end of the warranty period as a result of defective materials, defective design or defective workmanship, with such components being repaired or replaced ex works immediately at our choice.

11.3 Liability for warranted qualities

11.3.1 Warranted qualities shall only be those which are specifically designated as such in the order confirmation or in the relevant specifications.

11.3.2 The aforesaid assurance shall apply at the latest until the end of the warranty period. If a taking-over test has been agreed with the buyer, the assurance shall be deemed as performed if proof of the relevant qualities is furnished during the aforesaid test.

11.3.3 If the warranted qualities are not performed or only partially performed, the buyer shall be entitled to an immediate rectification. The buyer shall grant us the necessary time and opportunity for this purpose.

11.3.4 If the rectification is abortive or only partially successful, the buyer shall be entitled to a reasonable reduction of the purchase price. If the defect is so serious that it cannot be rectified within a reasonable period of time, and if deliveries or services for the notified purpose are not usable or are only usable to a much lesser extent, the buyer shall be entitled to refuse acceptance of the defective component or to withdraw from the contract if part-acceptance is economically unreasonable. We shall only be obliged to refund amounts which have been paid to us for the components affected by the aforesaid withdrawal.

11.4 Exclusion of liability for defects

11.4.1 Our liability shall exclude damages which cannot be proved to have been sustained as a result of defective material, defective design or defective workmanship.

11.4.2 Damages shall therefore be excluded for example which were caused by
- improper work of other persons with regard to planning, site preparation, assembly, operation and maintenance;
- plant concepts and designs which do not comply with the latest state of the art;
- non-observance of our guidelines for planning, assembly, commissioning, operations and maintenance;
- force majeure (e.g. thunderstorms).

11.4.3 The following shall be excluded in particular
- corrosion damages (e.g. as a result of aggressive water, unsuitable water treatment, oxygen intakes, emptying the plant over a longer period of time, falling below the dew point, chemical or electrochemical effects, etc.);
- damages caused by air pollution (e.g. the accumulation of intense dust, aggressive vapours, etc.);
- damages caused by unsuitable equipment and fuels;
- damages caused by overcharging, excessive water pressure, scaling, improper electrical connections and inadequate fuse protection.

11.4.4 Components shall also be excluded from the warranty which are subject to natural wear and tear (e.g. burner nozzles, combustion chamber inserts, ignition and monitoring components in contact with fire, fireclay and wall facings, fuses, seals and flexible tubes).

11.5 Commissioning certificate

11.5.1 We hereby draw attention to the due and proper hand-over and - if envisaged - the commissioning certificate in accordance with Section 10.2 as prerequisites for our warranty.

11.6 Deliveries and services of sub-contractors

11.6.1 Our liability for third party products which form a major part of the delivered goods (e.g. warehouse and conveying equipment, burners, measuring and control equipment, electrical components, flue gas and waste water cleaning equipment) shall - if permissible - be limited to an assignment of our claims against the suppliers of the said third party products.

12. Exclusion of further liability

12.1 The buyer shall have no rights and claims for materials, design and workmanship defects or the lack of warranted qualities unless specifically mentioned in Sections 11.1 to 11.6.

12.2 All claims for compensation, reduction in the contract price, rescission of the contract or withdrawal from the contract shall be excluded in particular unless these are specifically mentioned. Under no circumstances shall the buyer have any compensation claim for damages which were not sustained by the delivered goods themselves (e.g. replacement costs, cost for establishing the cause of the damage, expertises, production stoppages, production losses, lost orders, lost profit and other direct or indirect damages). The aforesaid liability exclusion shall not apply in the event of gross negligence on our part.

12.3 The exclusion as per Section 12.2 shall apply for all breaches of contract and all claims of the buyer regardless of why they were lodged from a legal point of view. It shall therefore also apply for a breach of any ancillary obligations (e.g. inadequate advice, etc.).

13. Jurisdiction

13.1 **The place of jurisdiction for the buyer and for us shall be Vaduz.** We shall be entitled to bring action against the buyer at his/its domicile, however.

13.2 The legal relationship between the parties shall be governed by the substantive laws of Switzerland. The application of the UN convention on contracts for the international sale of goods (CISG) shall be excluded.

Hoval quality.
You can count on us.

Hoval

Hoval is one of the leading international companies for heating and indoor climate solutions. Drawing on more than 75 years of experience and benefiting from a close-knit team culture, the Hoval Group delivers exciting solutions and develops technically superior products. This leadership role requires a sense of responsibility for energy and the environment, which is expressed in an intelligent combination of different heating technologies and customised indoor climate solutions.

Hoval also provides personal consultations and comprehensive customer service. With around 2200 employees in 16 companies around the world, Hoval sees itself not as a conglomerate, but as a large family that thinks and acts globally.
Hoval heating and indoor climate solutions are currently exported to more than 50 countries.

Responsibility for energy and environment

Hoval Aktiengesellschaft
Austrasse 70
FL-9490 Vaduz
Principality of Liechtenstein
(Swiss customs territory)
Phone +423 3992 400
Fax +423 3992 618
E-Mail info@hoval.com
www.hoval.com

2024 - 04 | Subject to modifications

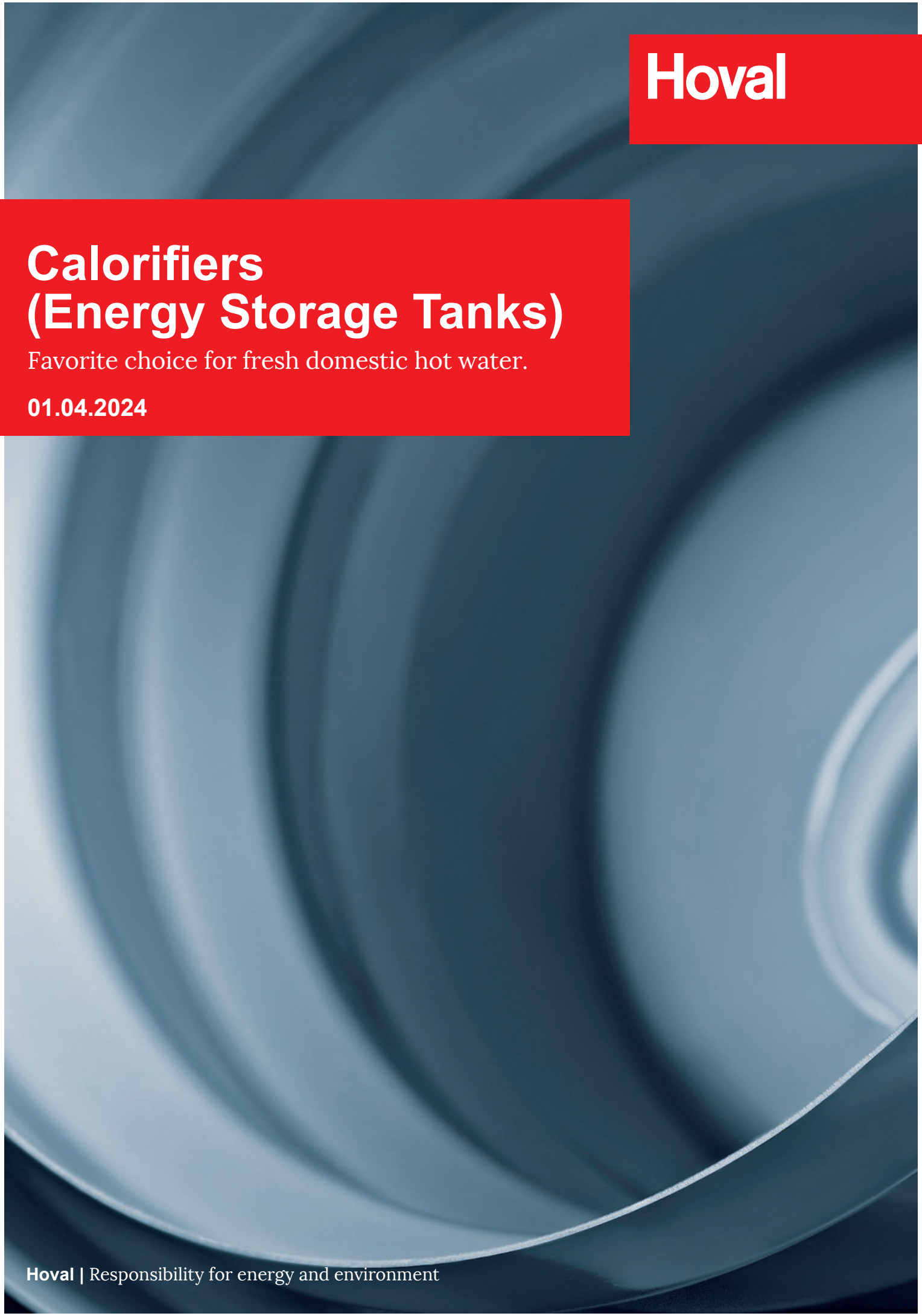
Your Hoval partner

Hoval

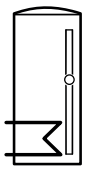
Calorifiers (Energy Storage Tanks)

Favorite choice for fresh domestic hot water.

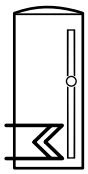
01.04.2024



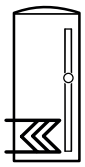
Calorifiers
Enamelled



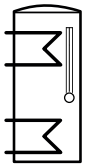
Hoval CombiVal ER **200-1000 l**



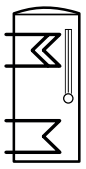
Hoval CombiVal ESR **200-400 l**



Hoval CombiVal ESSR **500-1000 l**



Hoval MultiVal ERR **300-500 l**



Hoval MultiVal ESRR **500-1000 l**

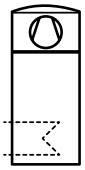
Coil:

standard

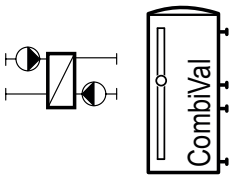
large

specially large

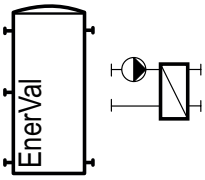
Calorifier - heat pump



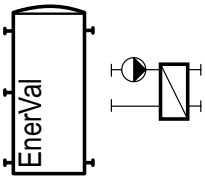
Calorifier charging systems



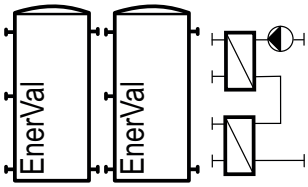
Fresh water modules



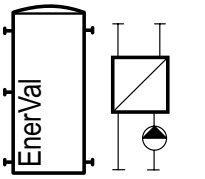
Hoval fresh water module TransTherm® aqua F **50-275 kW**



Hoval fresh water module TransTherm® aqua F **350-700 kW**

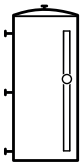


Hoval fresh water module TransTherm® aqua FS **50-717 kW**

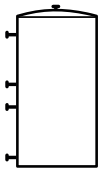


Hoval fresh water module TransTherm® aqua FT TransTherm® aqua FTC

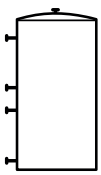
Buffer storage tanks



Hoval EnerVal **100-2000 l**



Hoval EnerVal G **800-6000 l**



Hoval EnerVal G cool **800-6000 l**

Hoval calorifier CombiVal ER (200-500)

- Calorifier made of steel enamelled inside
- Plain-tube coil enamelled, permanently installed
- Magnesium protection anode built in
- Flange for electric heating element
- Thermal insulation made of polyurethane hard foam foamed on the calorifier
- Dismountable foil casing, red coloured, ERW (200) white coloured
- Including thermometer
- Sensor channel

On request
- Flange-mounted electric heating element

Delivery
- Calorifier with foil casing installed

Hoval calorifier CombiVal ER (800,1000)

- Calorifier made of steel, enamelled inside
- Plain-tube coil enamelled, permanently installed
- 2 magnesium protection anodes built in
- Flange below as cleaning flange or for the installation as flange-mounted electric heating element or blank flange with immersion sleeve
- Flange above as additional cleaning flange
- Flange for electric heating element or immersion sleeve
- Thermal insulation made of polyester fleece with foil jacket, red coloured
- With thermometer
- Two terminal bars for contact sensor

On request
- Flange-mounted electric heating element
- Flange including immersion sleeve

Delivery
- Calorifier and thermal insulation completely installed (can be removed for installation)

ER (200-500) ER (800,1000)

Range
CombiVal type

ER	(200)	B
ERW	(200)	B
ER	(300)	B
ER	(400)	B
ER	(500)	B
ER	(800)	
ER	(1000)	

Calorifier

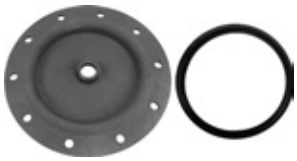
CombiVal ER (200-1000)

Calorifier made of steel enamelled inside.
With built-in, enamelled plain-tube coil.

CombiVal ER type		Volume dm³	Heating surface m²	Part No.
(200)	B	196	0.95	7015 960
(200) ERW (white)	B	196	0.95	7015 961
(300)	B	302	1.45	7015 962
(400)	B	382	1.80	7015 963
(500)	B	473	1.90	7015 964
(800)		735	3.70	7014 422
(1000)		968	4.50	7014 423

Electric heating elements
see chapter “Electric heating elements”

Accessories



Flange cover 180 - ¾″ — 2077 035
for the installation of the Correx®
impressed current anode in flange
Ø 180/110 mm,
enamelled on the inside with Rp ¾″
sleeve
Seal included

Flange with immersion sleeve — 6028 468
for temperature sensor made of steel.
On domestic water side, enamelled
inside.
Flange dimensions:
- Outer Ø 180 mm,
- Pitch circle Ø 150 mm, 8 x M10
Immersion sleeve dimensions:
- Installation length = 120 mm,
- Outer Ø: 24 mm, inner Ø: 20 mm

Kit Correx® impressed current anode UP2.3-919-L395/1 — 684 760
for long-term corrosion protection for
installation in the enamelled calorifier
with reduction R 1¼″ (ET) – Rp 1″ (IT)
and R 1″ (ET) – Rp ¾″ (IT)
Installation length: 395 mm
Connection cable length: 1 x 2000 mm
1 Correx® impressed current anode

In every case, **either** a Correx® impressed current anode **or** one/two magnesium anodes are allowed to be used.

		Part No.
	**Immersion sensor TF/2P/5/6T, L = 5.0 m with plug** for TopTronic® E controller modules/ module expansions with exception of basic module district heating/fresh water or basic module district heating com, cable length: 5 m with plug sensor sleeve diameter: 6 x 50 mm, dewpoint-proof, operating temperature: -20…105 °C, protection class: IP67	2056 788
	**Immersion sensor TF/2P/5/6T, L = 5.0 m** for TopTronic® E controller modules/ module expansions with exception of basic module district heating/fresh water or basic module district heating com, cable length: 5 m without plug sensor sleeve diameter: 6 x 50 mm, dewpoint-proof, operating temperature: -20…105 °C, protection class: IP67	2055 888
	**Immersion sensor TF/12N/2.5/6T, L = 2.5 m** for gas boiler with RS-OT Cable length: 2.5 m Sensor sleeve diameter: 6 x 50 mm, dewpoint-proof, operating temperature: -20…105 °C, protection class: IP67	2056 791
	At TopTronic® E, immersion sensor is included in the boiler controller or in the heating controller set.	
	**Calorifier thermostat control TW 12** Universal thermostat controller for thermostatic pump charge demand, setting in casing, visible from outside. 15-95 °C, switching difference 6 K, capillar length 700 mm incl. fastening material for Hoval calorifier, can be used with integrated immersion sleeve	6010 080
	Thermal water mixer see “Various system components”	

Services

Commissioning
Commissioning by works service or Hoval trained authorised serviceman/company is condition for warranty.

For commissioning and other services please contact your Hoval sales office.

CombiVal ER (200-500)

Type		(200)	(300)	(400)	(500)
• Volume	l	196	302	382	473
• Max. operating/test pressure SVGW	bar	6/12	6/12	6/12	6/12
• Max. operating/test pressure DVGW	bar	10/13	10/13	10/13	10/13
• Max. operating temperature	°C	95	95	95	95
• Thermal insulation PU-foam foamed onto calorifier	mm	75	50	75	75
• Thermal insulation λ	W/mK	0.027	0.027	0.027	0.027
• Fire protection class		B2	B2	B2	B2
• Heat loss at 65 °C	W	49	67	65	76
• Transport weight	kg	77	104	134	146
• U value	W/m^2K	0.328	0.404	0.307	0.308
Heating battery (built in)					
• Heating surface	m^2	0.95	1.45	1.80	1.90
• Heating water	l	6.4	9.9	12.2	12.8
• Flow resistance [1)]	z value	7	10	12	13
• Max. operating/test pressure SVGW	bar	8/13	8/13	8/13	8/13
• Max. operating/test pressure DVGW	bar	10/13	10/13	10/13	10/13
• Max. operating temperature	°C	110	110	110	110
• Dimensions		see table of dimensions			

[1)] Flow resistance heating battery in mbar = flow rate $(m^3/h)^2$ x z (1 mbar = 0.1 kPa)

CombiVal ER (800,1000)

Type		(800)	(1000)
• Volume	l	735	968
• Max. operating/test pressure SVGW	bar	6/12	6/12
• Max. operating/test pressure DVGW	bar	10/13	10/13
• Max. operating temperature	°C	95	95
• Thermal insulation made of polyester fleece	mm	100	100
• Thermal insulation λ	W/mK	0.040	0.040
• Fire protection class		B2	B2
• Heat loss at 65 °C	W	127	142
• Transport weight	kg	251	324
• U value	W/m^2K	0.376	0.370
Heating battery (built in)			
• Heating surface	m^2	3.70	4.50
• Heating water	l	34.2	40.6
• Flow resistance [1)]	z value	6	8
• Max. operating/test pressure SVGW	bar	8/13	8/13
• Max. operating/test pressure DVGW	bar	10/13	10/13
• Max. operating temperature	°C	110	110
• Dimensions		see table of dimensions	

[1)] Flow resistance heating battery in mbar = flow rate $(m^3/h)^2$ x z (1 mbar = 0.1 kPa)

Performance figure

Selection of the calorifier type
at a hot water temperature of 45 °C

Reading example
see engineering

	Comfort [1]			Standard [2]		
T >	60 °C	70 °C	80 °C	60 °C	70 °C	80 °C
NL v						
1	200			200		
2	300	200		300	200	
3			200			200
4	400			400		
5	500	300		500	300	
6			300			300
7						
8						
9	800	400				
10	1000	500		800	400	
11			400	1000	500	
12			500			
13						400
14						500
15						
16						
17						
18						
19						
20						
21						
22		800				
23						
24						
25						
26		1000				
27						
28					800	
29						
30			800			
31						
32						
33					1000	
34						
35			1000			
36						
37						
38						800
39						
40						
41						
42						
43						
44						
45						1000
46						
47						
48						
49						
50						

	Comfort [1]			Standard [2]		
T >	60 °C	70 °C	80 °C	60 °C	70 °C	80 °C
NL v						
51						
52						
53						
54						
55						
56						
57						
58						
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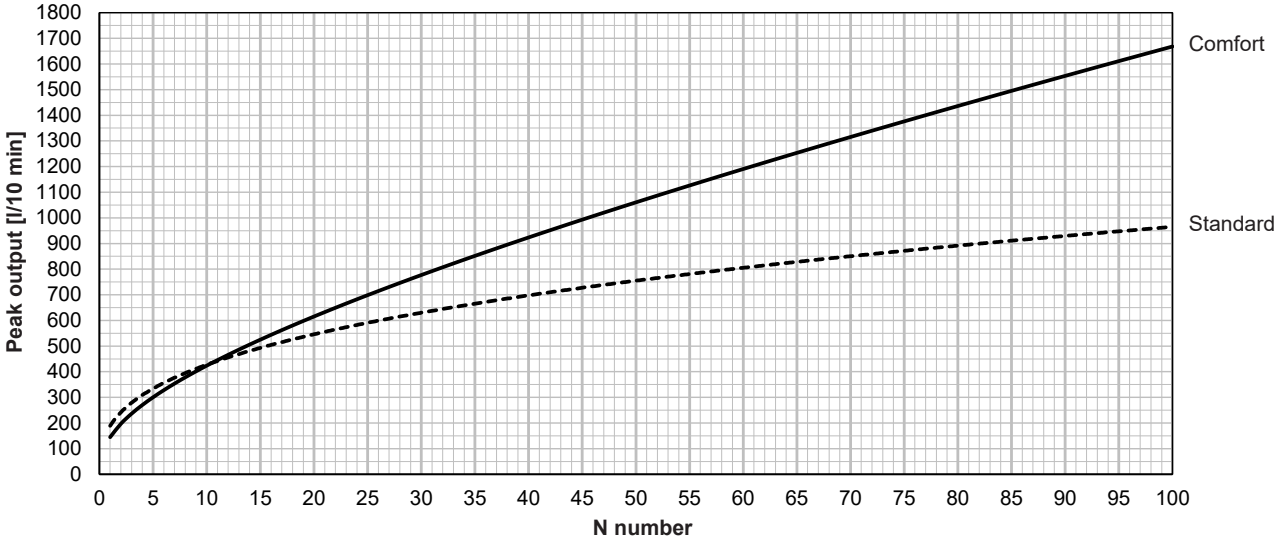
98						
99						
100						

T = Heating flow
NL = Performance figure
Performance figure NL acc. to DIN 4708 = number of flats which can be supplied with domestic hot water when the calorifier is heated and permanently reheated with the heat generator (standard flat: 1 bathroom - 4 rooms - 3.5 persons)
[1] Calculation with simultaneity factor according to DIN 4708 (preferred for Switzerland)
[2] Calculation with simultaneity factor according to Dresden Technical University

10 min peak output/N number with domestic hot water 45 °C

according to DIN 4708 (Comfort) and Dresden Technical University (Standard)

Reading example
see Engineering



CombiVal ER (200)

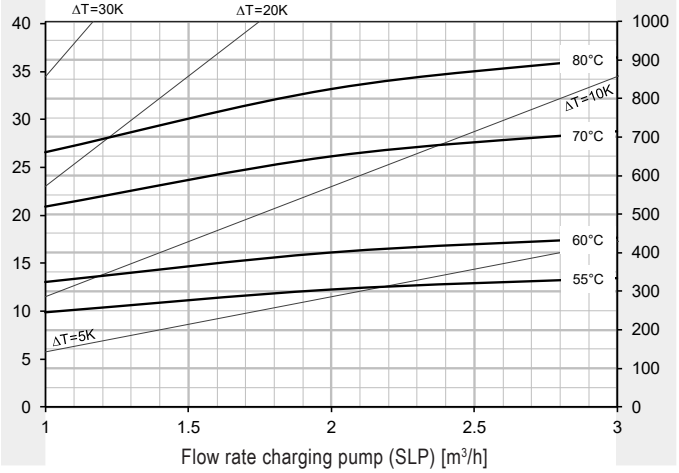
Hot water output
Continuous output

Reading example
see engineering

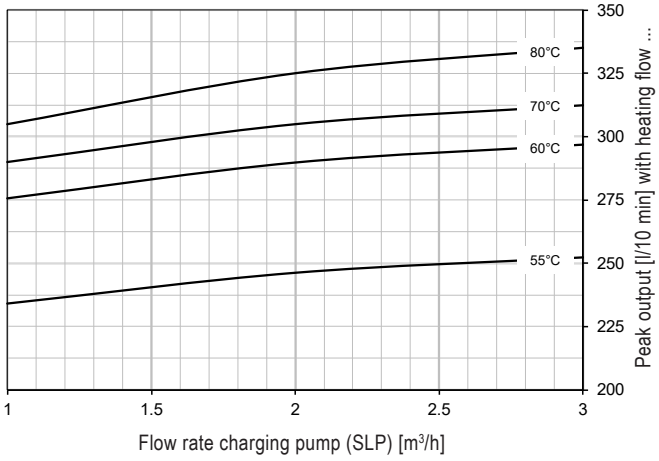
Heat input [kW]

Continuous output [l/h] with heating flow ...

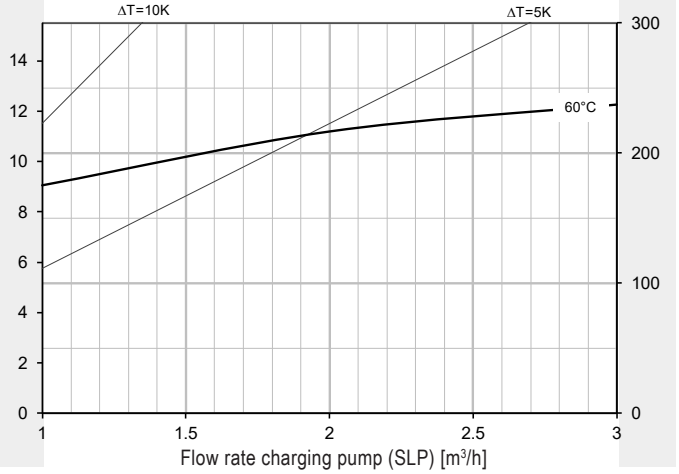
Hot water 45 °C



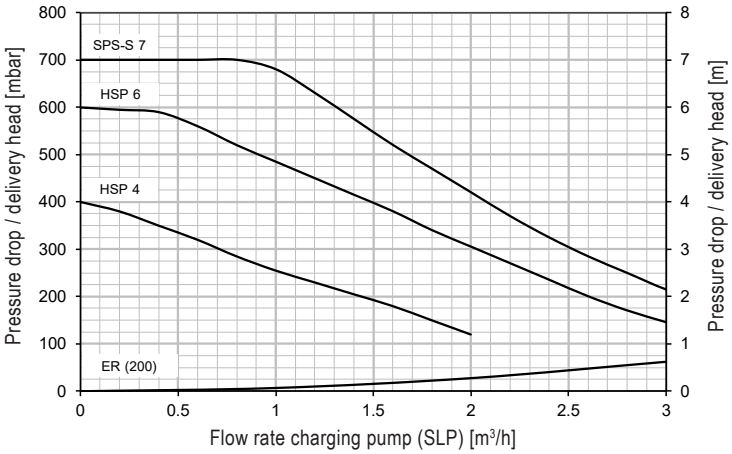
10 min peak output - hot water 45 °C *



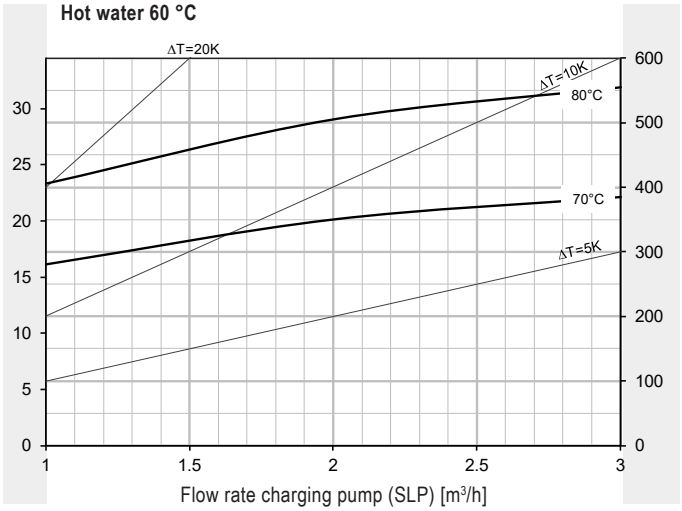
Hot water 55 °C



Pressure drop heating coil - delivery head charging pump



Hot water 60 °C



* Calorifier heated to 60 °C

CombiVal ER (300)

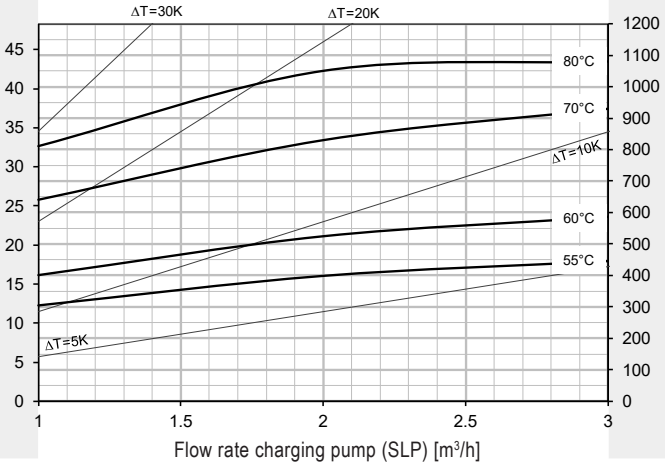
Hot water output
Continuous output

Reading example
see engineering

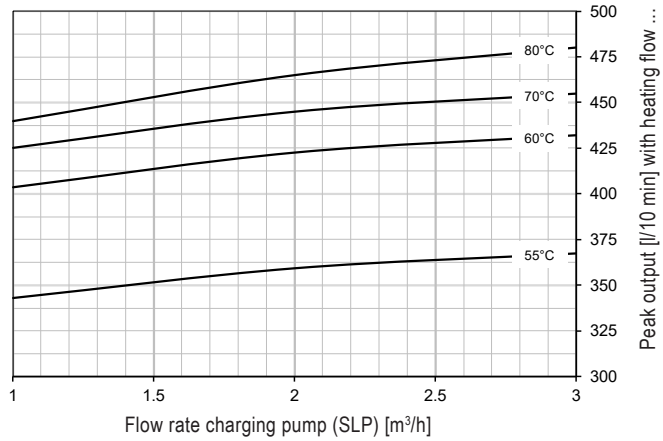
Heat input [kW]

Continuous output [l/h] with heating flow ...

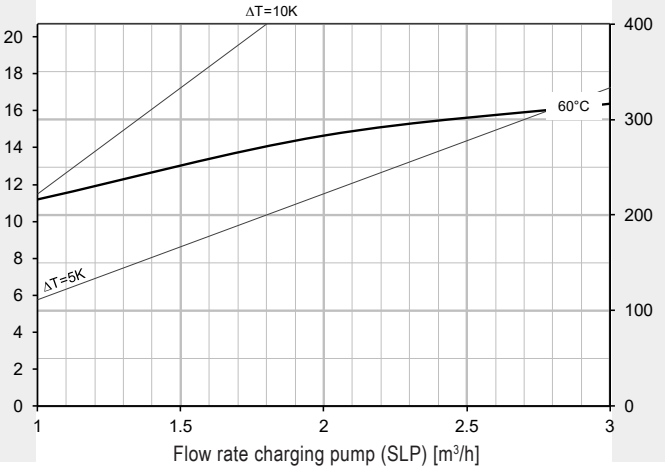
Hot water 45 °C



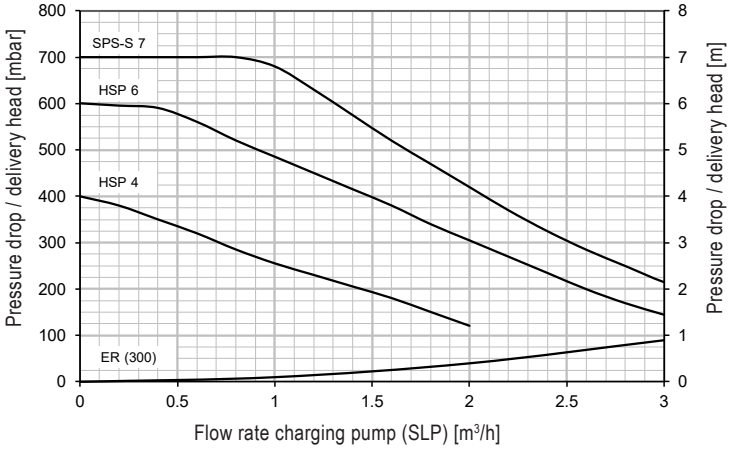
10 min peak output - hot water 45 °C *



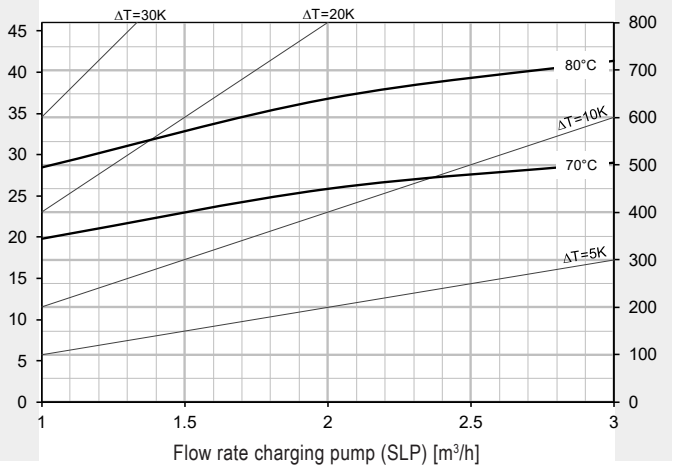
Hot water 55 °C



Pressure drop heating coil - delivery head charging pump



Hot water 60 °C



* Calorifier heated to 60 °C

CombiVal ER (400)

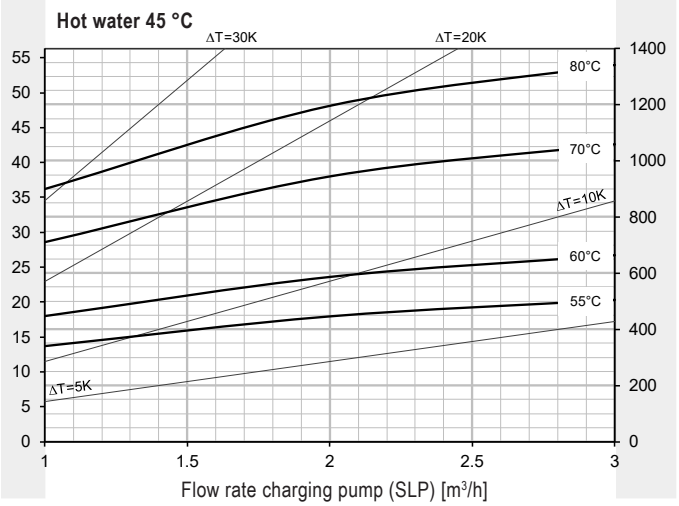
Hot water output
Continuous output

Reading example
see engineering

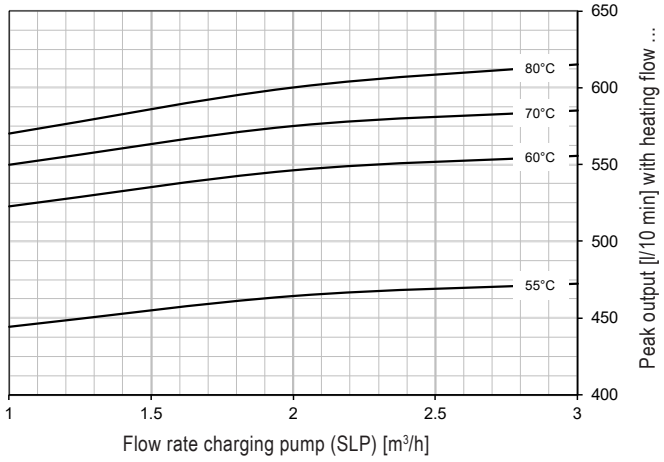
Heat input [kW]

Continuous output [l/h] with heating flow ...

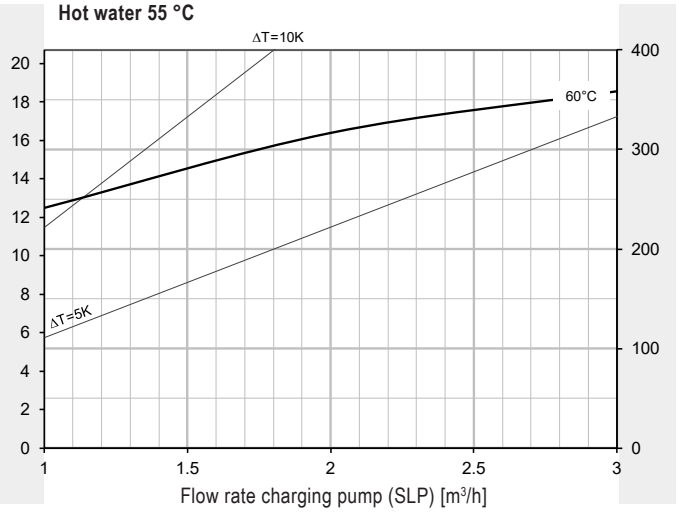
Hot water 45 °C



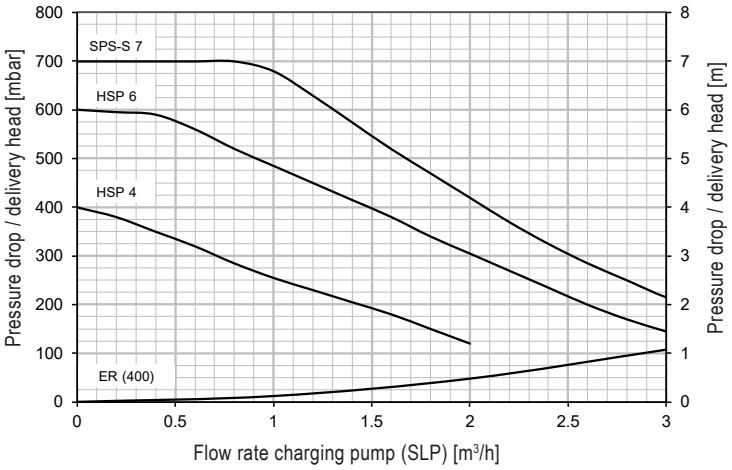
10 min peak output - hot water 45 °C *



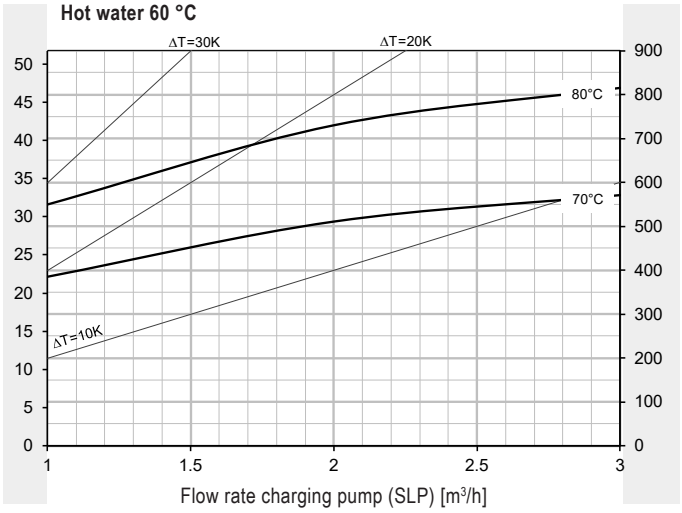
Hot water 55 °C



Pressure drop heating coil - delivery head charging pump



Hot water 60 °C



* Calorifier heated to 60 °C

CombiVal ER (500)

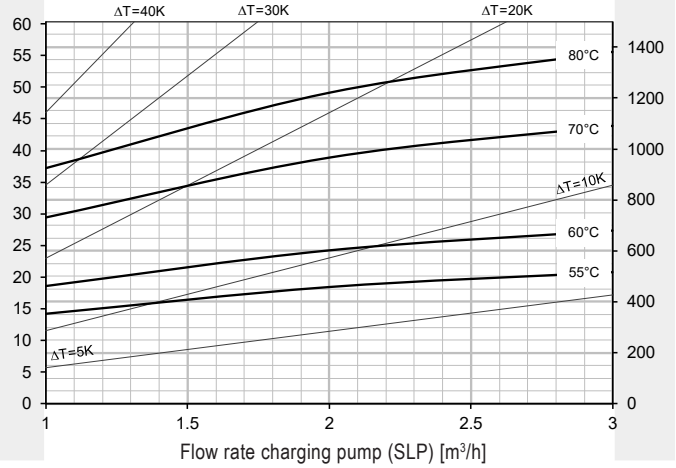
Hot water output
Continuous output

Reading example
see engineering

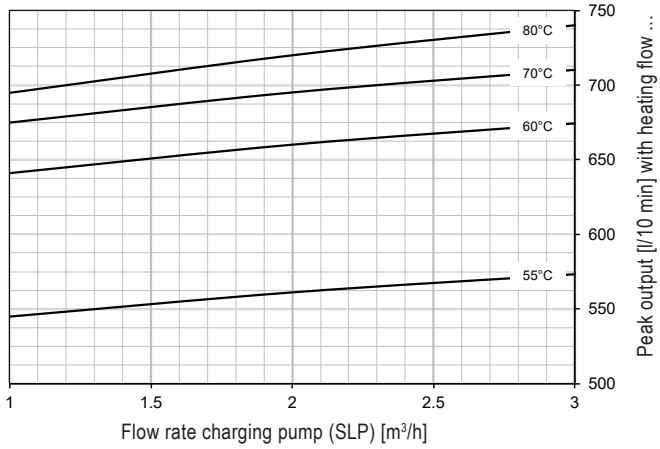
Heat input [kW]

Continuous output [l/h] with heating flow ...

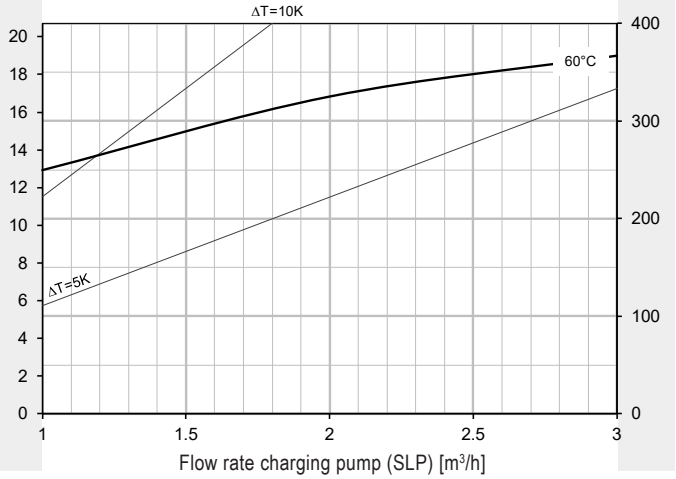
Hot water 45 °C



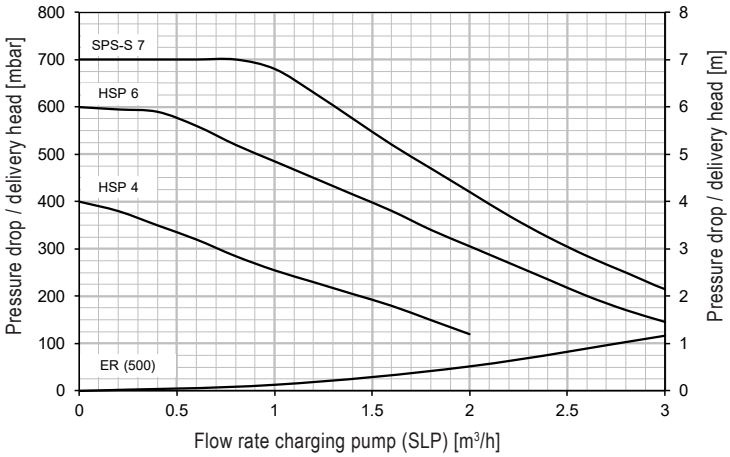
10 min peak output - hot water 45 °C *



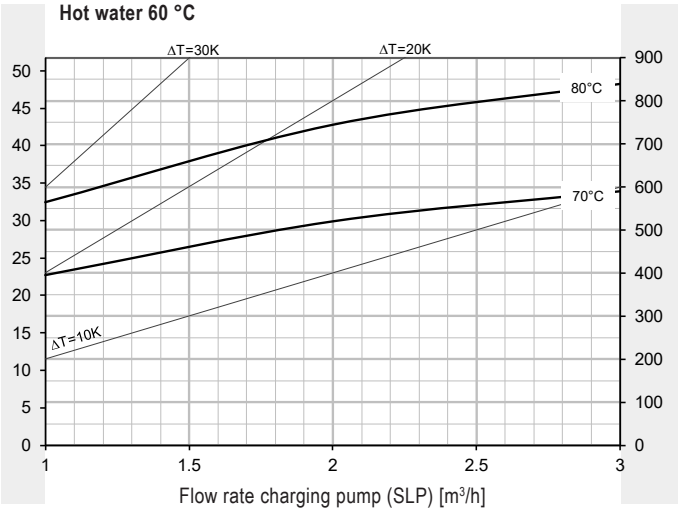
Hot water 55 °C



Pressure drop heating coil - delivery head charging pump



Hot water 60 °C



* Calorifier heated to 60 °C

CombiVal ER (800)

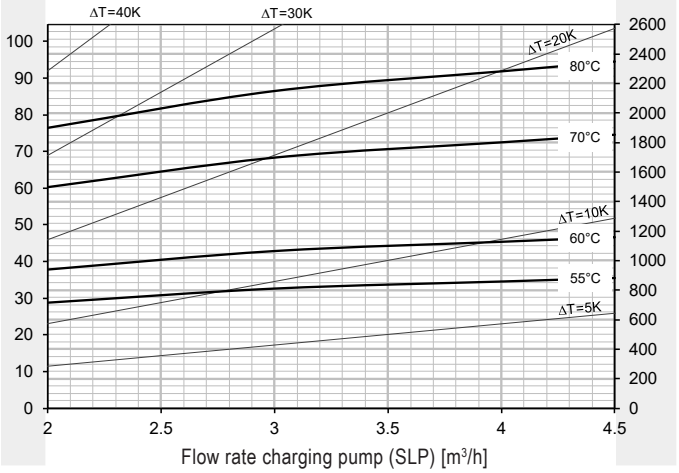
Hot water output
Continuous output

Reading example
see engineering

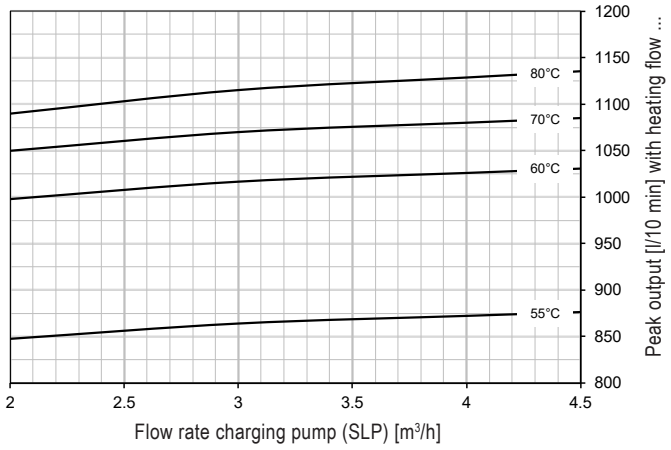
Heat input [kW]

Continuous output [l/h] with heating flow ...

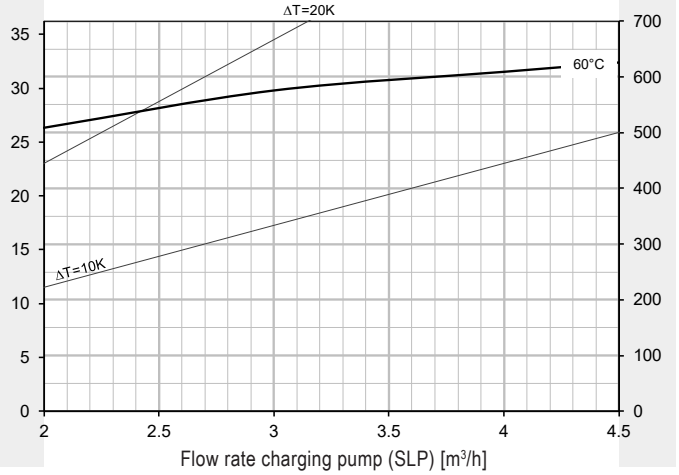
Hot water 45 °C



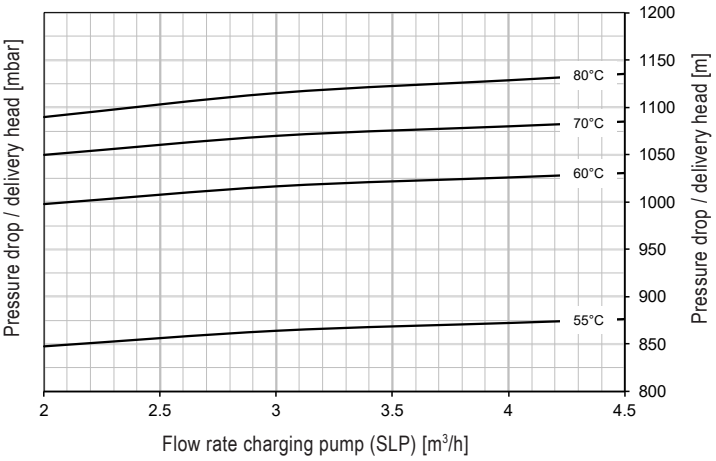
10 min peak output - hot water 45 °C *



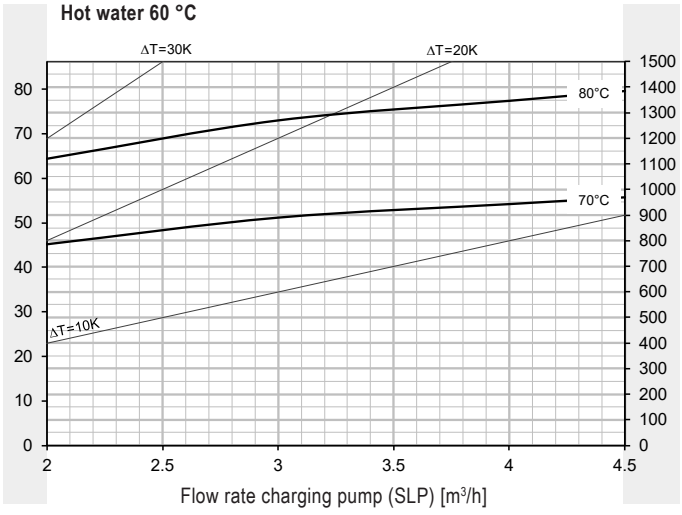
Hot water 55 °C



Pressure drop heating coil - delivery head charging pump



Hot water 60 °C



* Calorifier heated to 60 °C

CombiVal ER (1000)

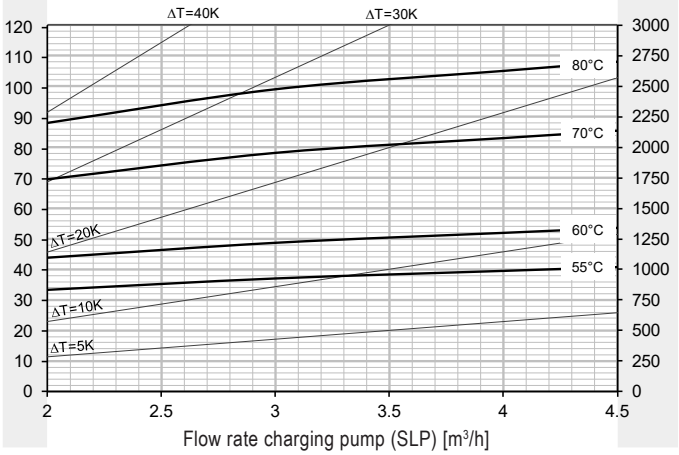
Hot water output
Continuous output

Reading example
see engineering

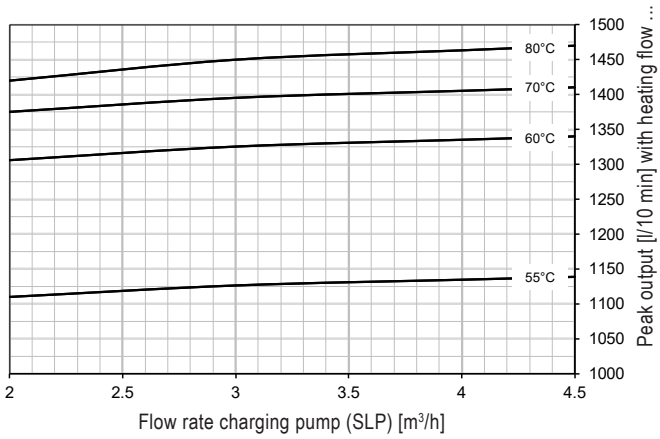
Heat input [kW]

Continuous output [l/h] with heating flow ...

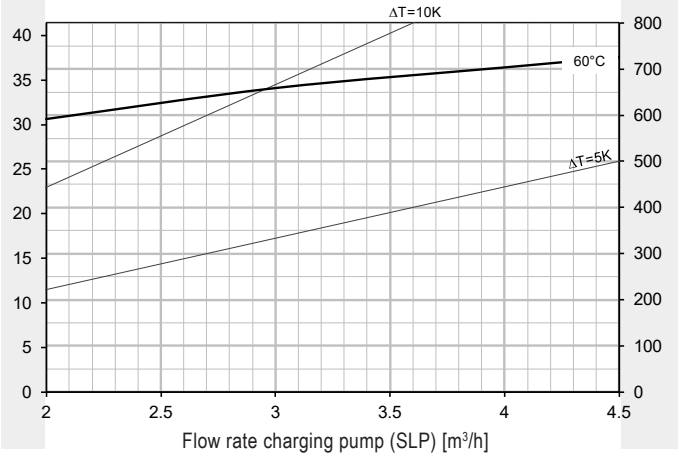
Hot water 45 °C



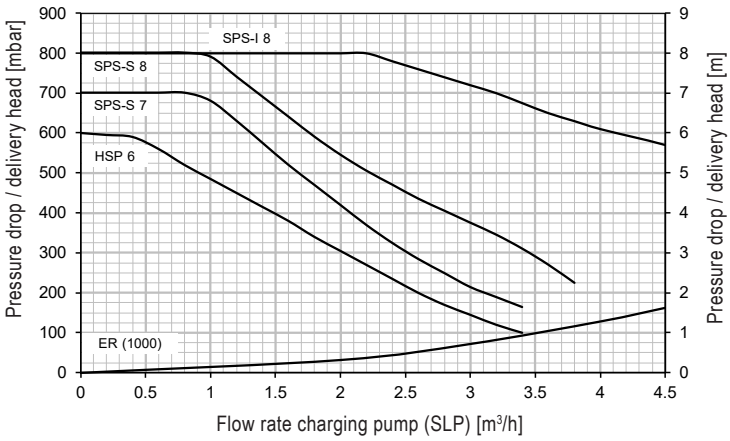
10 min peak output - hot water 45 °C *



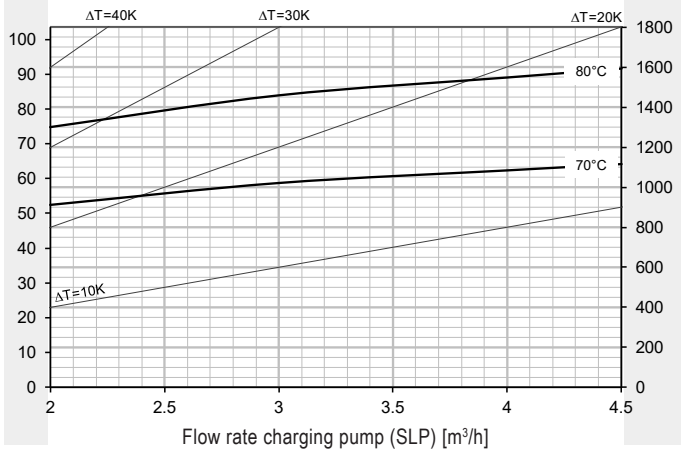
Hot water 55 °C



Pressure drop heating coil - delivery head charging pump



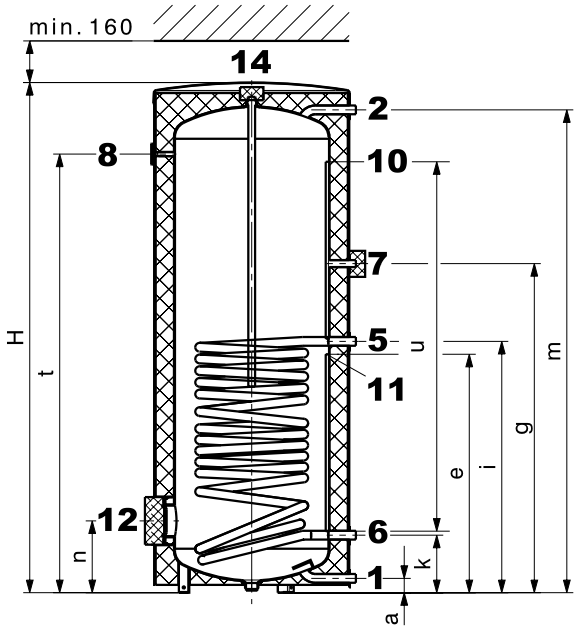
Hot water 60 °C

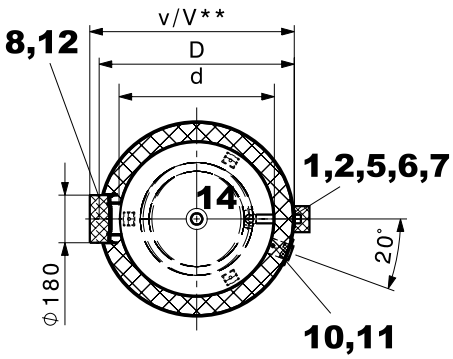


* Calorifier heated to 60 °C

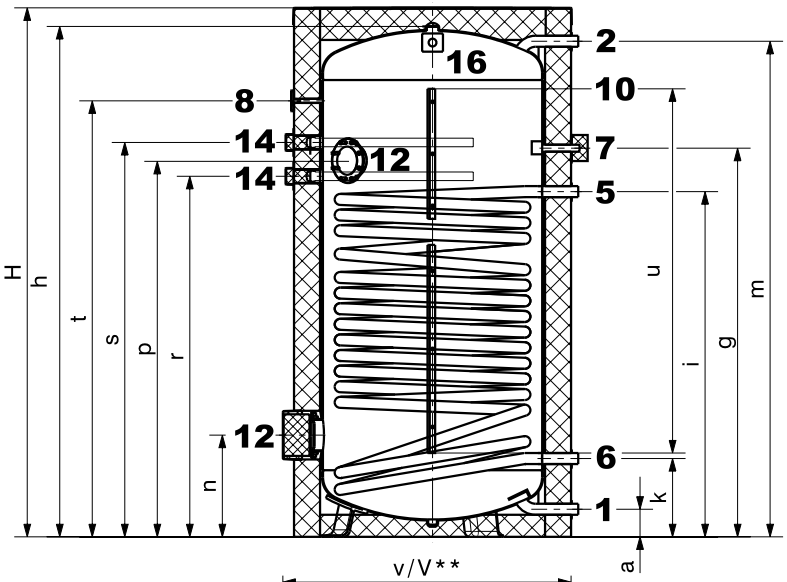
CombiVal ER (200-500)

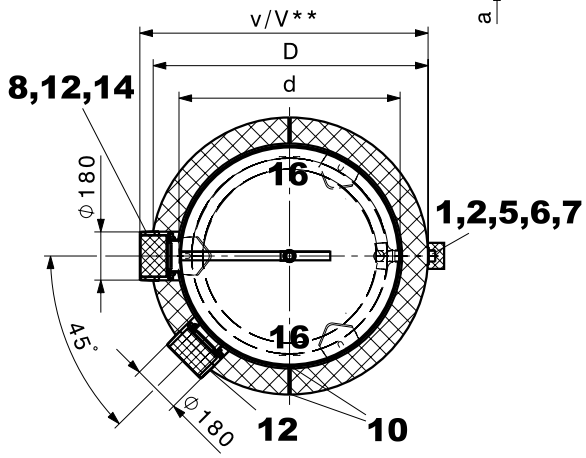
(Dimensions in mm)





CombiVal ER (800,1000)





1	Cold water	type (200)	G ¾″	(ET)
		type (300-500)	G 1″	(ET)
		type (800,1000)	G 1¼″	(ET)
2	Domestic hot water	type (200)	G ¾″	(ET)
		type (300-500)	G 1″	(ET)
		type (800,1000)	G 1¼″	(ET)
5	Heating flow	type (200-500)	G 1″	(ET)
		type (800,1000)	G 1¼″	(ET)
6	Heating return	type (200-500)	G 1″	(ET)
		type (800,1000)	G 1¼″	(ET)
7	Circulation (removable insulated cap Ø 100 mm)		G ¾″	(ET)
8	Thermometer			

Variation because of the production tolerance possible
Dimension +/- 10 mm

10	Sensor channel, inner Ø 11 mm	type (200-500)	
	Sensor terminal strip (zip fastener)	type (800,1000)	
11	Removable cap (Ø 60 mm) for positioning the sensor in the sensor channel	type (200-500)	
12	Hand-hole flange (flange-mounted electric heating element) Ø 180/120 mm, hole circle 150 mm, 8 x M10 (Mounting of a flange-mounted electric heating element: - bottom, possible. - top, not possible.)		
14	Anode sleeve	type (200-500)	Rp 1″ (IT)
		type (800,1000)	Rp 1¼″ (IT)
	Screw connection uninsulated		
16	Transport strap	type (800,1000)	

CombiVal ER type	D	d	H	h	a	e	g	i	k	m	n	p	r	s	t	u	v	V**	Tilting dimension
(200)	600	450	1464	-	55	680	902	689	194	1373	249	-	-	-	1229	1060	635	650	1583
(300)	700	597	1326	-	55	609	921	721	221	1229	276	-	-	-	1069	860	795	810	1524
(400)	750	597	1623	-	55	747	1112	909	221	1526	276	-	-	-	1356	1060	795	810	1788
(500)	750	597	1953	-	55	917	1265	966	221	1856	276	-	-	-	1686	1360	795	810	2093
(800)	950	750	2040	1937	105	-	1422	1319	293	1891	383	1408	1348	1478	1648	1400	975	1020	1962
(1000)	1050	850	2063	1962	106	-	1494	1327	301	1905	391	1446	1386	1516	1676	1400	1075	1120	1991

** when using a flange-mounted electric heating element

Hoval calorifier CombiVal ESR (200-400)

- Calorifier made of steel enamelled inside
- Large plain-tube coil enamelled, permanently installed
- Magnesium protection anode built in
- Flange for electric heating element
- Thermal insulation made of polyurethane hard foam foamed on the calorifier
- Dismantable foil casing, red coloured
- Including thermometer
- Sensor channel

On request
- Flange-mounted electric heating element

Delivery
- Calorifier with foil casing installed

Range
CombiVal type

ESR	(200)	B
ESR	(300)	B
ESR	(400)	B

Calorifier

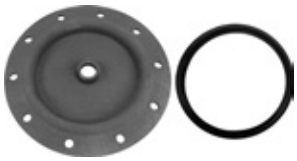
CombiVal ESR (200-400)

Calorifier made of steel, enamelled on the inside, with permanently installed plain-tube coil.

CombiVal ESR type		Volume dm³	Heating surface m²	Part No.
(200)	B	193	1.8	7015 965
(300)	B	298	2.6	7015 966
(400)	B	379	3.8	7015 967

Electric heating elements
see chapter “Electric heating elements”

Accessories



Flange cover 180 - ¾″
for the installation of the Correx® impressed current anode in flange Ø 180/110 mm,
enamelled on the inside with Rp ¾″ sleeve
Seal included

2077 035

Flange with immersion sleeve
for temperature sensor made of steel.
On domestic water side, enamelled inside.
Flange dimensions:
- Outer Ø 180 mm,
- Pitch circle Ø 150 mm, 8 x M10
Immersion sleeve dimensions:
- Installation length = 120 mm,
- Outer Ø: 24 mm, inner Ø: 20 mm

6028 468

Kit Correx® impressed current anode UP2.3-919-L395/1
for long-term corrosion protection for installation in the enamelled calorifier with reduction R 1¼″ (ET) – Rp 1″ (IT) and R 1″ (ET) – Rp ¾″ (IT)
Installation length: 395 mm
Connection cable length: 1 x 2000 mm
1 Correx® impressed current anode

684 760

In every case, **either** a Correx® impressed current anode **or** one/two magnesium anodes are allowed to be used.

		Part No.
	**Immersion sensor TF/2P/5/6T, L = 5.0 m with plug** for TopTronic® E controller modules/ module expansions with exception of basic module district heating/fresh water or basic module district heating com, cable length: 5 m with plug sensor sleeve diameter: 6 x 50 mm, dewpoint-proof, operating temperature: -20…105 °C, protection class: IP67	2056 788
	**Immersion sensor TF/2P/5/6T, L = 5.0 m** for TopTronic® E controller modules/ module expansions with exception of basic module district heating/fresh water or basic module district heating com, cable length: 5 m without plug sensor sleeve diameter: 6 x 50 mm, dewpoint-proof, operating temperature: -20…105 °C, protection class: IP67	2055 888
	**Immersion sensor TF/12N/2.5/6T, L = 2.5 m** for gas boiler with RS-OT Cable length: 2.5 m Sensor sleeve diameter: 6 x 50 mm, dewpoint-proof, operating temperature: -20…105 °C, protection class: IP67	2056 791
	At TopTronic® E, immersion sensor is included in the boiler controller or in the heating controller set.	
	**Calorifier thermostat control TW 12** Universal thermostat controller for thermostatic pump charge demand, setting in casing, visible from outside. 15-95 °C, switching difference 6 K, capillar length 700 mm incl. fastening material for Hoval calorifier, can be used with integrated immersion sleeve	6010 080
	Thermal water mixer see “Various system components”	

Services

Commissioning
Commissioning by works service or Hoval trained authorised serviceman/company is condition for warranty.

For commissioning and other services please contact your Hoval sales office.

CombiVal ESR (200-400)

Type		(200)	(300)	(400)
• Volume	l	193	298	379
• Max. operating/test pressure SVGW	bar	6/12	6/12	6/12
• Max. operating/test pressure DVGW	bar	10/13	10/13	10/13
• Max. operating temperature	°C	95	95	95
• Thermal insulation PU-foam, foamed onto calorifier	mm	75	50	75
• Thermal insulation λ	W/mK	0.027	0.027	0.027
• Fire protection class		B2	B2	B2
• Heat loss at 65 °C	W	48	68	68
• Transport weight	kg	91	118	156
• U value	W/m^2K	0.32	0.41	0.32
Heating battery (built in)				
• Heating surface	m^2	1.8	2.6	3.8
• Heating water content	l	12.2	16	34
• Flow resistance [1)]	z value	13	17	6
• Max. operating/test pressure SVGW	bar	8/13	8/13	8/13
• Max. operating/test pressure DVGW	bar	10/13	10/13	10/13
• Max. operating temperature	°C	110	110	110
• Dimensions			see table of dimensions	

[1)] Flow resistance heating battery in mbar = flow rate $(m^3/h)^2$ x z (1 mbar = 0.1 kPa)

Performance figure

Selection of the calorifier type
at a hot water temperature of 45 °C

Reading example
see engineering

	Comfort [1]			Standard [2]		
T >	60 °C	70 °C	80 °C	60 °C	70 °C	80 °C
NL v						
1				200		
2	200					
3						
4	300			300		
5		200			200	
6	400		200	400		200
7						
8						
9		300				
10			300		300	
11						300
12						
13						
14		400				
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17					400	
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	Comfort [1]			Standard [2]		
T >	60 °C	70 °C	80 °C	60 °C	70 °C	80 °C
NL v						
51						
52						
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54						
55						
56						
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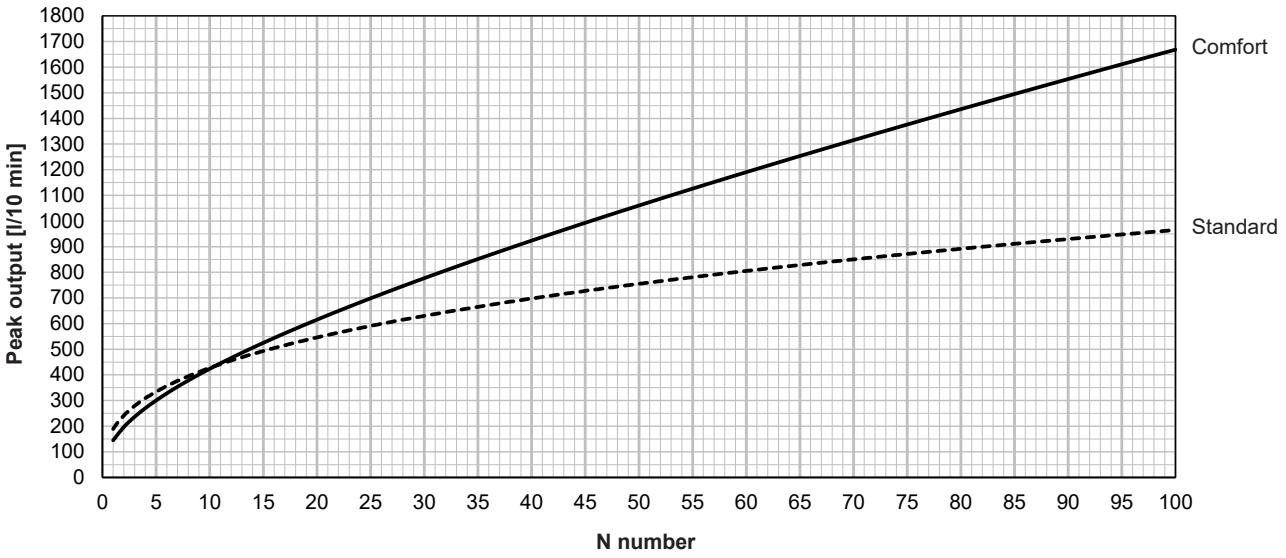
T = heating flow
NL = performance figure
Performance figure NL acc. to DIN 4708 = number of flats which can be supplied with domestic hot water when the calorifier is heated and permanently reheated with the heat generator (standard flat: 1 bathroom - 4 rooms - 3.5 persons)
[1] Calculation with simultaneity factor according to DIN 4708 (preferred for Switzerland)
[2] Calculation with simultaneity factor according to Dresden Technical University

10 min peak output/N number with domestic hot water 45 °C

according to DIN 4708 (Comfort) and Dresden Technical University (Standard)

Reading example
see Engineering



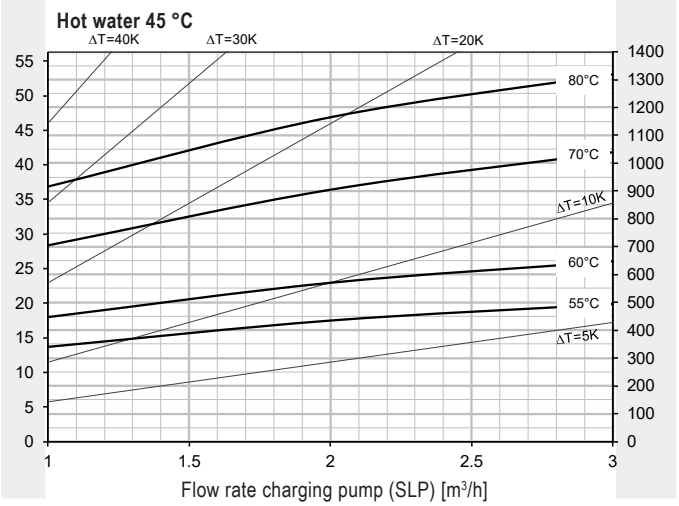
CombiVal ESR (200)

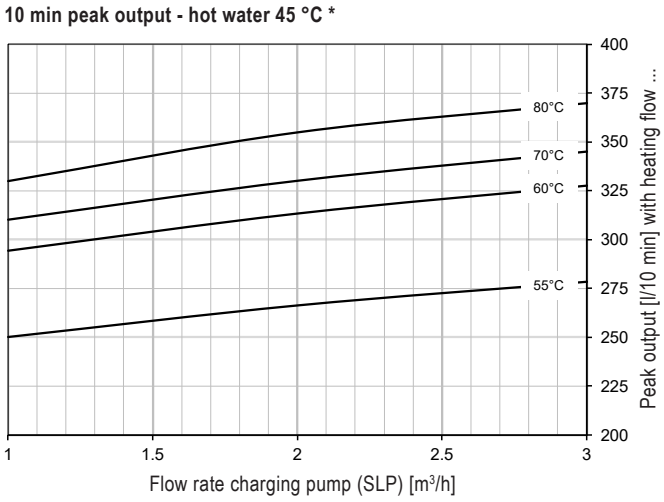
Hot water output
Continuous output

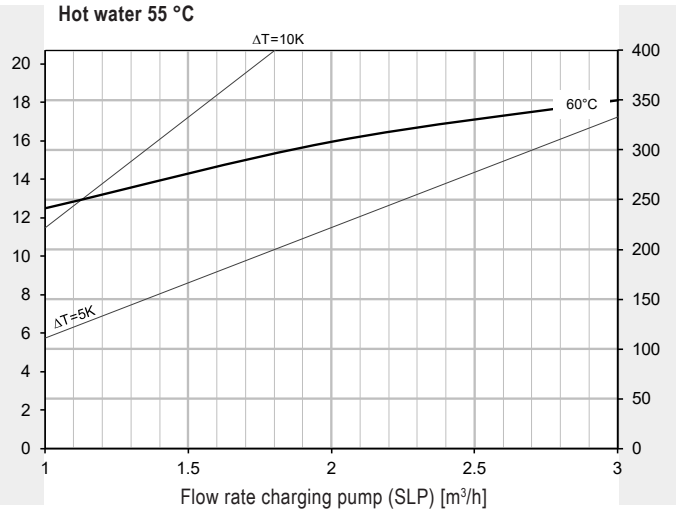
Reading example
see engineering

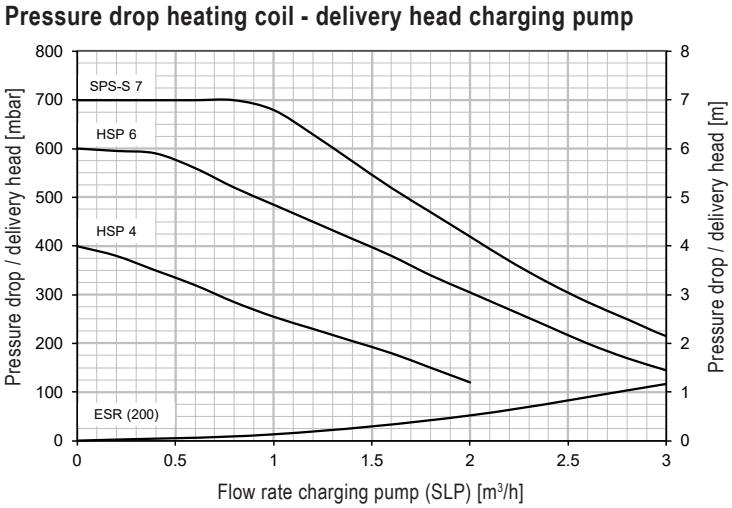
Heat input [kW]

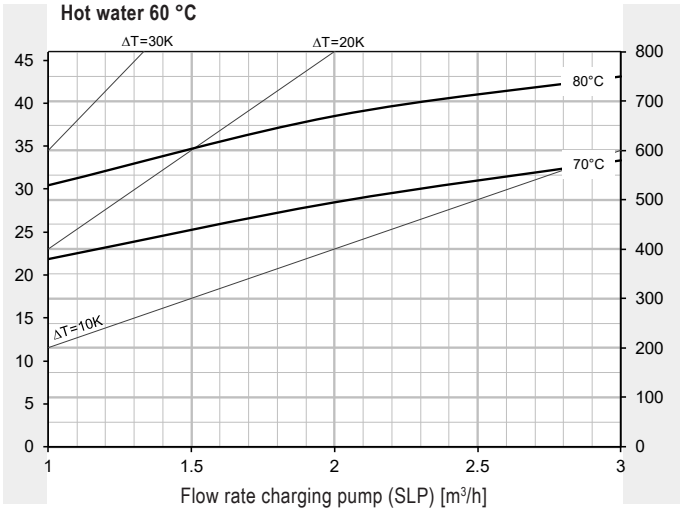
Continuous output [l/h] with heating flow ...











* Calorifier heated to 60 °C

CombiVal ESR (300)

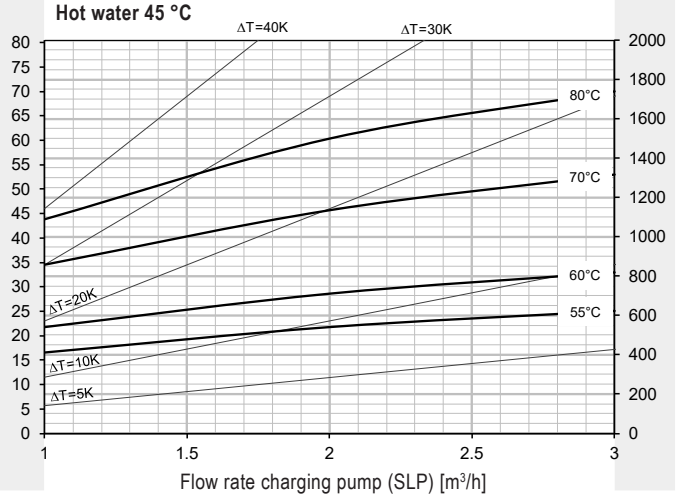
Hot water output
Continuous output

Reading example
see engineering

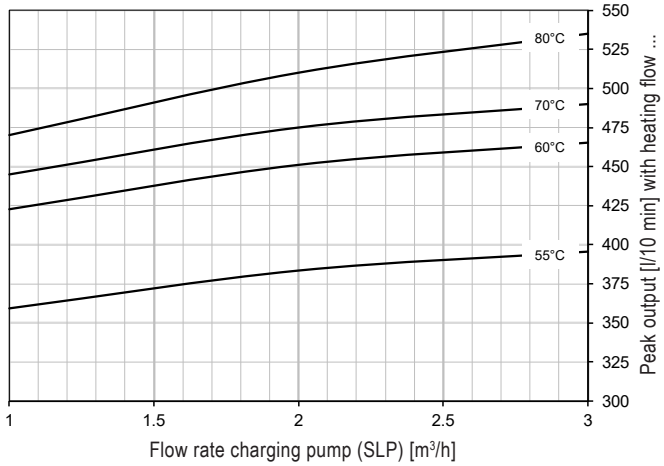
Heat input [kW]

Continuous output [l/h] with heating flow ...

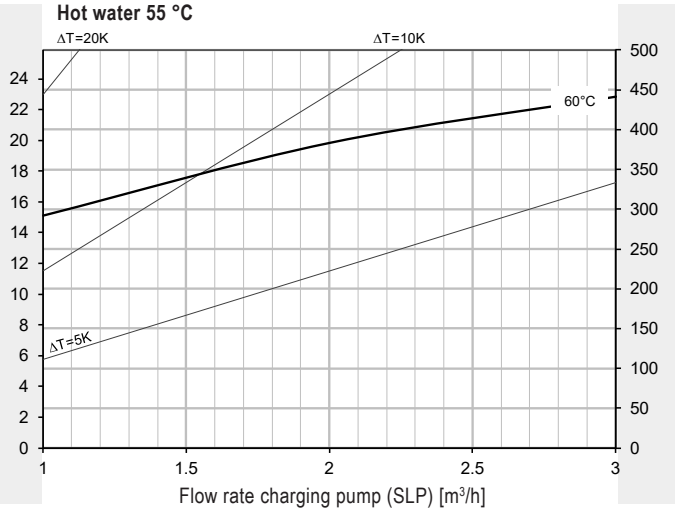
Hot water 45 °C



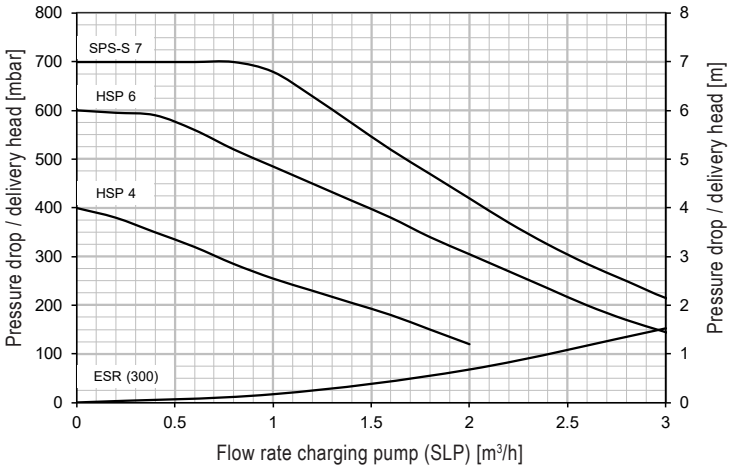
10 min peak output - hot water 45 °C *



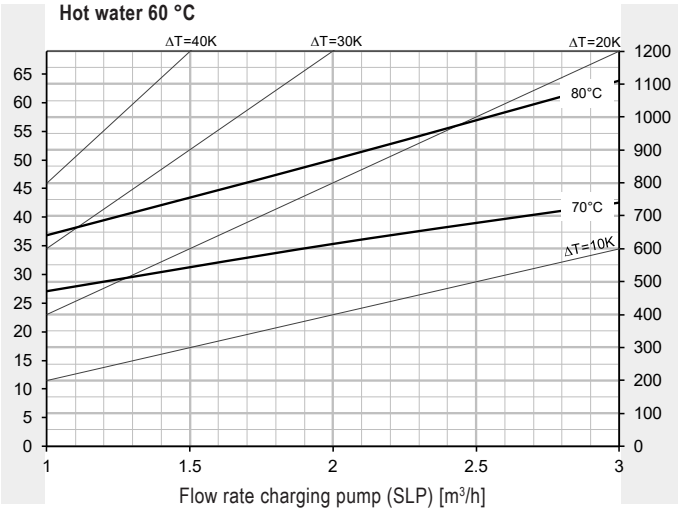
Hot water 55 °C



Pressure drop heating coil - delivery head charging pump



Hot water 60 °C



* Calorifier heated to 60 °C

CombiVal ESR (400)

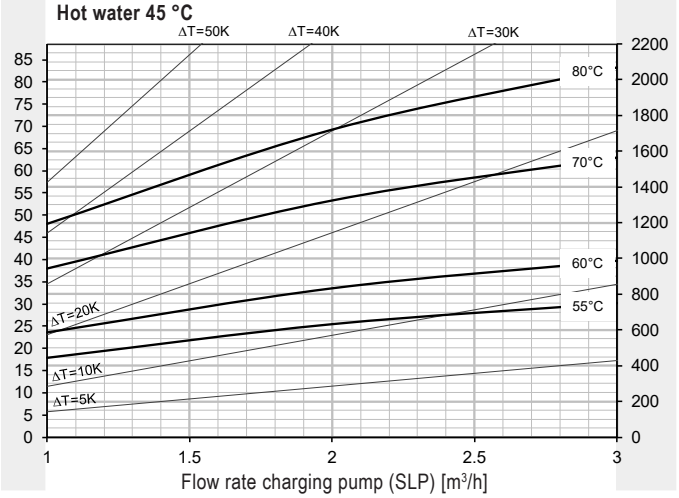
Hot water output
Continuous output

Reading example
see engineering

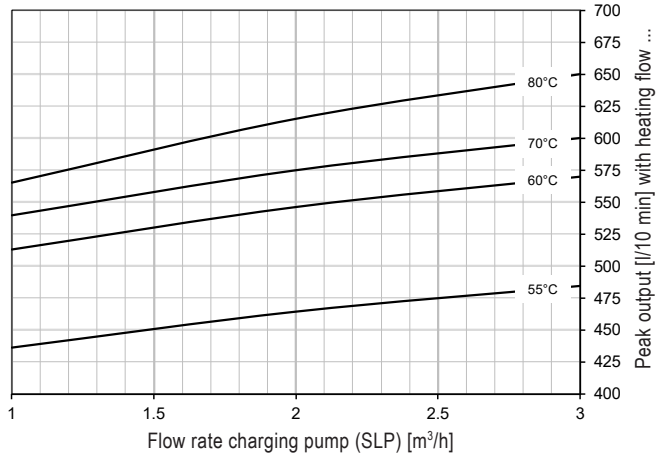
Heat input [kW]

Continuous output [l/h] with heating flow ...

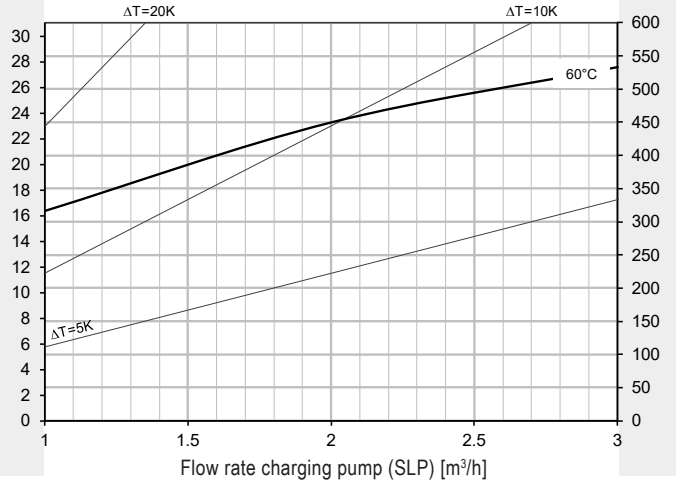
Hot water 45 °C



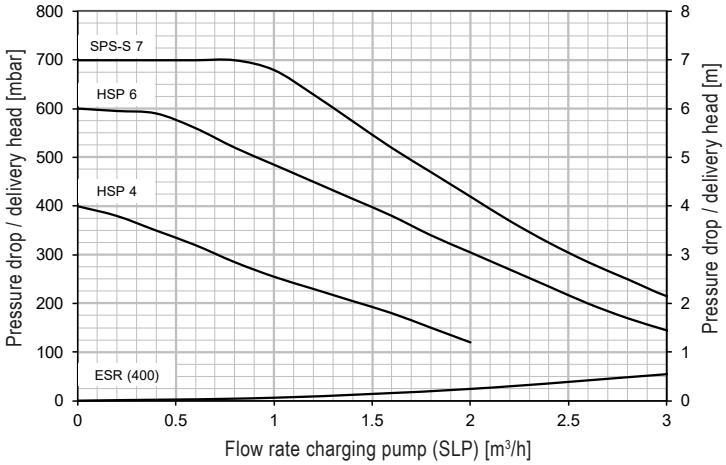
10 min peak output - hot water 45 °C *



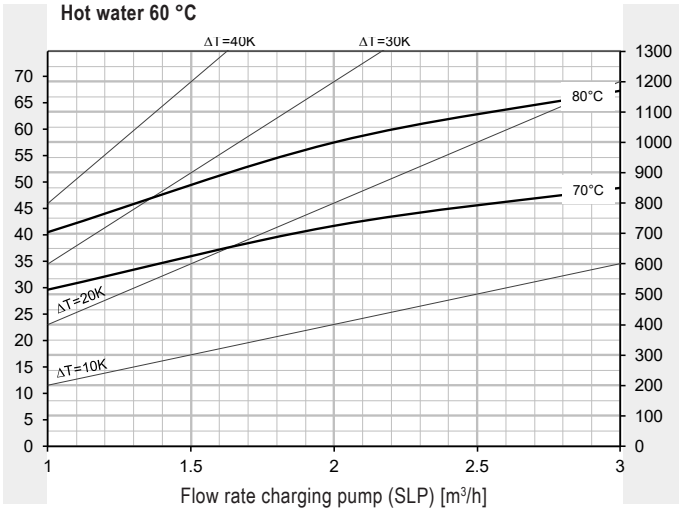
Hot water 55 °C



Pressure drop heating coil - delivery head charging pump



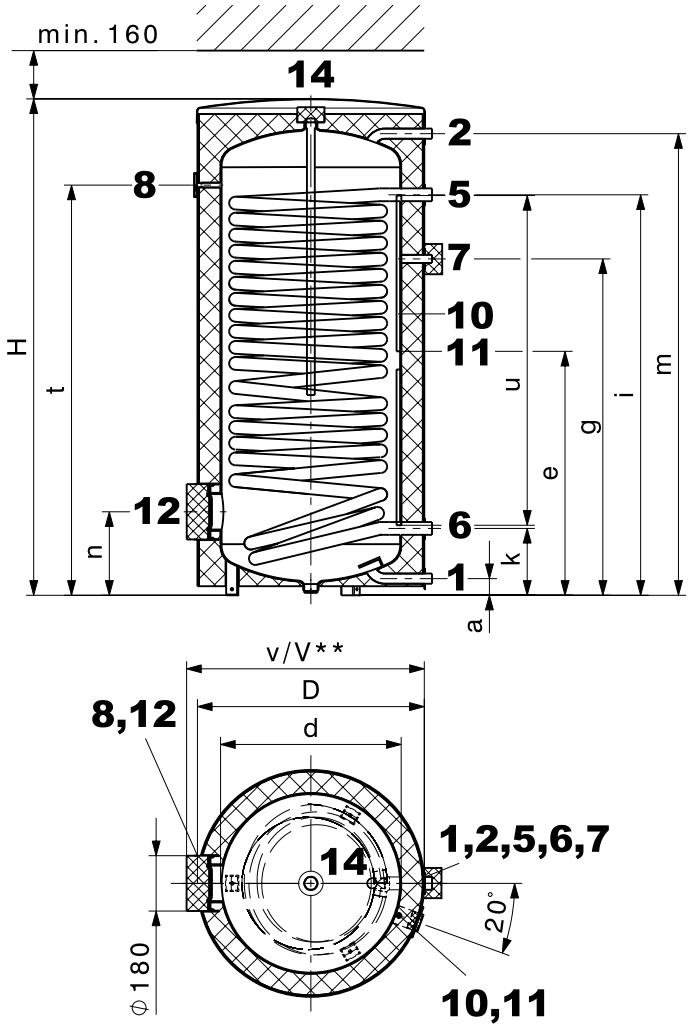
Hot water 60 °C



* Calorifier heated to 60 °C

CombiVal ESR (200-400)

(Dimensions in mm)



1	Cold water	type (200)	G ¾″	(ET)	10	Sensor channel, inner Ø 11 mm
		type (300,400)	G 1″	(ET)	11	Removable cap (Ø 60 mm)
2	Domestic hot water	type (200)	G ¾″	(ET)		for positioning the sensor in the sensor channel
		type (300,400)	G 1″	(ET)	12	Hand-hole flange (flange-mounted electric heating element)
5	Heating flow	type (200,300)	G 1″	(ET)		Ø 180/120 mm, pitch circle 150 mm, 8 x M10
		type (400)	G 1¼″	(ET)	14	Anode sleeve Rp 1″ (IT)
6	Heating return	type (200,300)	G 1″	(ET)		Screw connection uninsulated
		type (400)	G 1¼″	(ET)		
7	Circulation		G ¾″	(ET)		
	(removable insulated cap Ø 100 mm)					
8	Thermometer					

Variation because of the production tolerance possible
Dimension +/- 10 mm

CombiVal ESR type	D	d	H	a	e	g	i	k	m	n	t	u	v	V**	Tilting dimension
(200)	600	450	1464	55	740	789	902	194	1373	249	1229	1060	635	650	1583
(300)	700	597	1326	55	669	850	991	221	1229	276	1069	860	745	760	1524
(400)	750	597	1629	55	807	1112	1324	221	1526	276	1359	1060	795	810	1788

** when using a flange-mounted electric heating element

Hoval calorifier CombiVal ESSR (500)

- Calorifier made of steel enamelled inside
- Plain-tube coil, with very large heating surface, enamelled, permanently installed
- Magnesium protection anode built in
- Flange for electric heating element
- Thermal insulation made of polyurethane hard foam foamed on the calorifier
- Dismantable foil casing, red coloured
- Sensor channel
- Including thermometer

On request
- Flange-mounted electric heating element
- Screw-in electric heating element 1½"

Delivery
- Calorifier with foil casing installed

Hoval calorifier CombiVal ESSR (800,1000)

- Calorifier made of steel, enamelled inside
- Plain-tube coil, with very large heating surface, enamelled, permanently installed
- Correx® potentiostat included
- 2 impressed current anodes incl. connecting cable integrated
- Flange below as cleaning flange or for the installation of a flange-mounted electric heating element or blank flange with immersion sleeve
- Flange above as additional cleaning flange or for the installation of a flange-mounted electric heating element
- Thermal insulation made of polyester fleece with foil jacket, red coloured
- Two terminal bars for contact sensor
- Including thermometer

On request
- Flange-mounted electric heating element

Delivery
- Calorifier and thermal insulation completely installed (can be removed for installation)

Range
CombiVal type

ESSR	(500)	B
ESSR	(800)	
ESSR	(1000)	

Calorifier

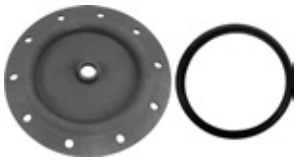
CombiVal ESSR (500-1000)

Calorifier made of steel enamelled inside.
With built-in, enamelled plain-tube coil.

CombiVal ESSR type		Volume dm³	Heating surface m²	Part No.
(500)	B	465	5.90	7015 970
(800)		733	7.00	7018 051
(1000)		961	9.15	7018 052

Electric heating elements
see chapter “Electric heating elements”

Accessories



Flange cover 180 - ¾″ — 2077 035
for the installation of the Correx®
impressed current anode in flange
Ø 180/110 mm,
enamelled on the inside with Rp ¾″
sleeve
Seal included

Flange with immersion sleeve — 6028 468
for temperature sensor made of steel.
On domestic water side, enamelled
inside.
Flange dimensions:
- Outer Ø 180 mm,
- Pitch circle Ø 150 mm, 8 x M10
Immersion sleeve dimensions:
- Installation length = 120 mm,
- Outer Ø: 24 mm, inner Ø: 20 mm

Kit Correx® impressed current anode UP2.3-919-L395/1 — 684 760
for long-term corrosion protection for
installation in the enamelled calorifier
with reduction R 1¼″ (ET) – Rp 1″ (IT)
and R 1″ (ET) – Rp ¾″ (IT)
Installation length: 395 mm
Connection cable length: 1 x 2000 mm
1 Correx® impressed current anode

Included in the scope of delivery for ESSR (800,1000).

In every case, **either** a Correx® impressed current anode **or** one/two magnesium anodes are allowed to be used.

		Part No.
	**Immersion sensor TF/2P/5/6T, L = 5.0 m with plug** for TopTronic® E controller modules/ module expansions with exception of basic module district heating/fresh water or basic module district heating com, cable length: 5 m with plug sensor sleeve diameter: 6 x 50 mm, dewpoint-proof, operating temperature: -20…105 °C, protection class: IP67	2056 788
	**Immersion sensor TF/2P/5/6T, L = 5.0 m** for TopTronic® E controller modules/ module expansions with exception of basic module district heating/fresh water or basic module district heating com, cable length: 5 m without plug sensor sleeve diameter: 6 x 50 mm, dewpoint-proof, operating temperature: -20…105 °C, protection class: IP67	2055 888
	**Immersion sensor TF/12N/2.5/6T, L = 2.5 m** for gas boiler with RS-OT Cable length: 2.5 m Sensor sleeve diameter: 6 x 50 mm, dewpoint-proof, operating temperature: -20…105 °C, protection class: IP67	2056 791
	At TopTronic® E, immersion sensor is included in the boiler controller or in the heating controller set.	
	**Calorifier thermostat control TW 12** Universal thermostat controller for thermostatic pump charge demand, setting in casing, visible from outside. 15-95 °C, switching difference 6 K, capillar length 700 mm incl. fastening material for Hoval calorifier, can be used with integrated immersion sleeve	6010 080
	Thermal water mixer see “Various system components”	

Services

Commissioning
Commissioning by works service or Hoval trained authorised serviceman/company is condition for warranty.

For commissioning and other services please contact your Hoval sales office.

CombiVal ESSR (500-1000)

Type		(500)	(800)	(1000)
• Volume	l	465	733	961
• Max. operating/test pressure SVGW	bar	6/12	6/12	6/12
• Max. operating/test pressure DVGW	bar	10/13	10/13	10/13
• Max. operating temperature	°C	95	95	95
• Thermal insulation PU foam, foamed onto calorifier	mm	75	-	-
• Thermal insulation polyester fleece	mm	-	100	100
• Thermal insulation λ	W/mK	0.027	0.027	0.027
• Fire protection class		B2	B2	B2
• Heat loss at 65 °C	W	78	126	144
• Transport weight	kg	232	304	387
• U value	W/m^2K	0.316	0.374	0.375
Heating battery (built in)				
• Heating surface	m²	5.9	7	9.15
• Heating water	l	41	49.4	64.6
• Flow resistance [1)]	z value	10	11	14
• Max. operating/test pressure SVGW	bar	8/13	8/13	8/13
• Max. operating/test pressure DVGW	bar	10/13	10/13	10/13
• Max. operating temperature	°C	110	110	110
• Dimensions		see table of dimensions		

[1)] Flow resistance heating battery in mbar = flow rate (m³/h)² x z (1 mbar = 0.1 kPa)

Performance figure

Selection of the calorifier type
at a hot water temperature of 45 °C

Reading example
see engineering

	Comfort [1]			Standard [2]		
T >	60 °C	70 °C	80 °C	60 °C	70 °C	80 °C
NL v						
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						
11						
12	500					
13						
14				500		
15						
16						
17						
18	800					
19						
20						
21		500				
22				800		
23						
24	1000					
25						
26					500	
27						
28			500			
29						
30						
31						
32						
33						
34						
35						
36				1000		500
37						
38		800				
39						
40						
41						
42						
43						
44			800			
45						
46						
47						
48		1000				
49					800	
50						

	Comfort [1]			Standard [2]		
T >	60 °C	70 °C	80 °C	60 °C	70 °C	80 °C
NL v						
51						
52						
53						
54						
55						
56						
57						800
58			1000			
59						
60						
61						
62						
63					1000	
64						
65						
66						
67						
68						
69						
70						
71						
72						
73						
74						
75						
76						1000
77						
78						
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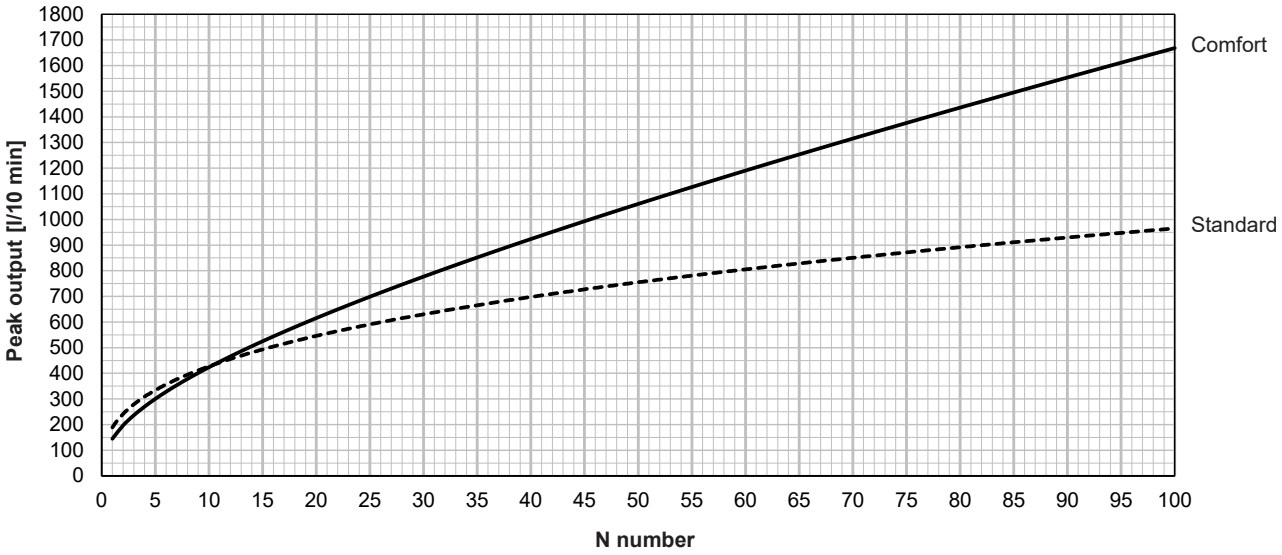
80						
81						
82						
83						
84						
85						
86						
87						
88						
89						
90						
91						
92						
93						
94						
95						
96						
97						
98						
99						
100						

T = heating flow
NL = performance figure
Performance figure NL acc. to DIN 4708 = number of flats which can be supplied with domestic hot water when the calorifier is heated and permanently reheated with the heat generator (standard flat: 1 bathroom - 4 rooms - 3.5 persons)
[1] Calculation with simultaneity factor according to DIN 4708 (preferred for Switzerland)
[2] Calculation with simultaneity factor according to Dresden Technical University

10 min peak output/N number with domestic hot water 45 °C

according to DIN 4708 (Comfort) and Dresden Technical University (Standard)

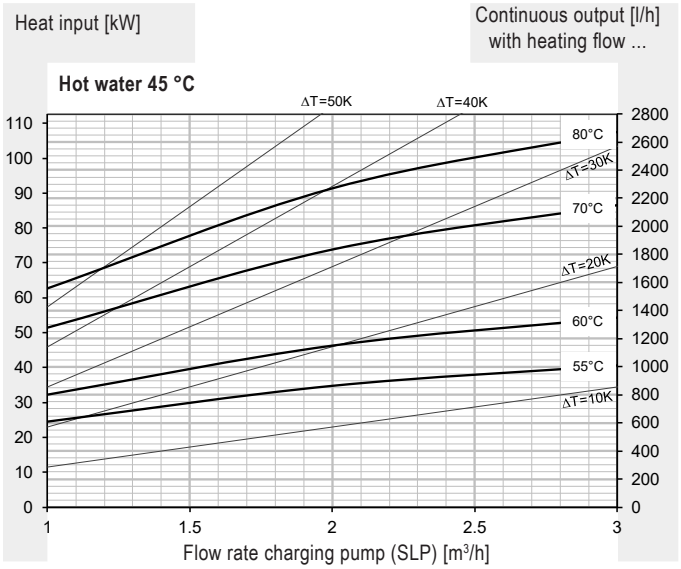
Reading example
see Engineering

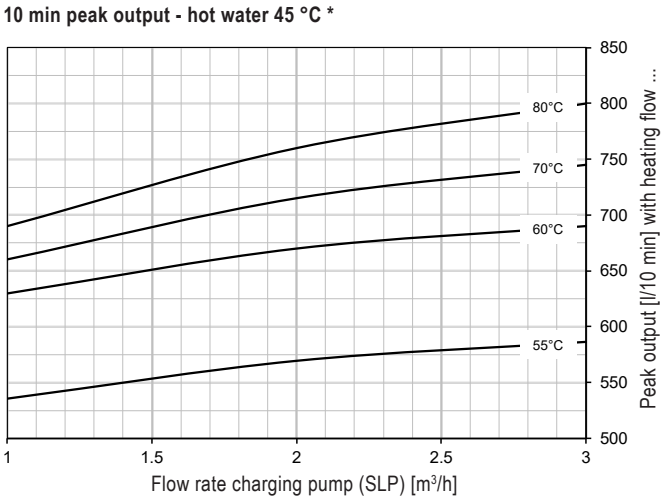


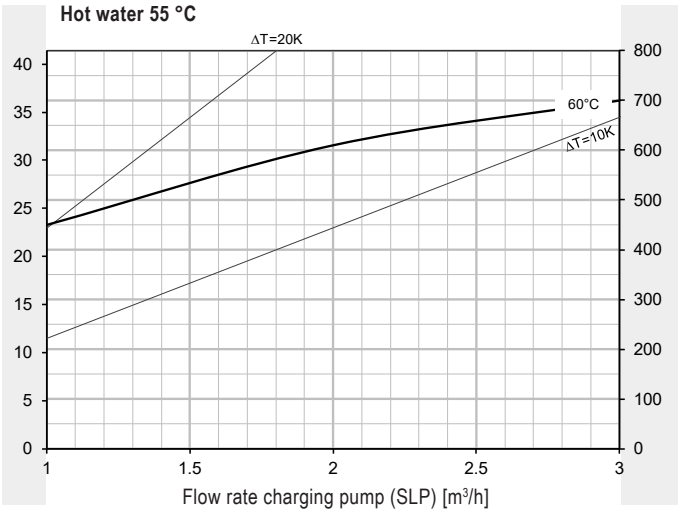
CombiVal ESSR (500)

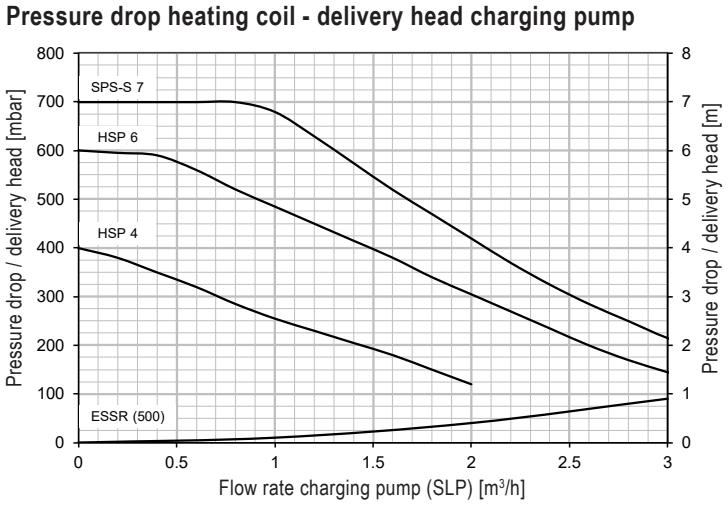
Hot water output
Continuous output

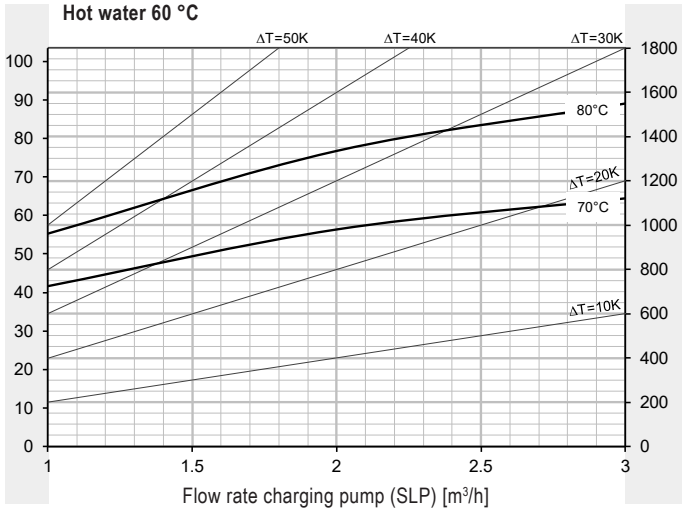
Reading example
see engineering











* Calorifier heated to 60 °C

CombiVal ESSR (800)

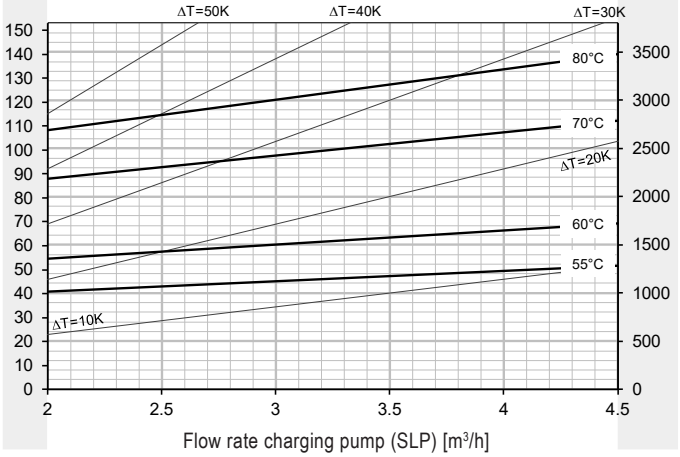
Hot water output
Continuous output

Reading example
see engineering

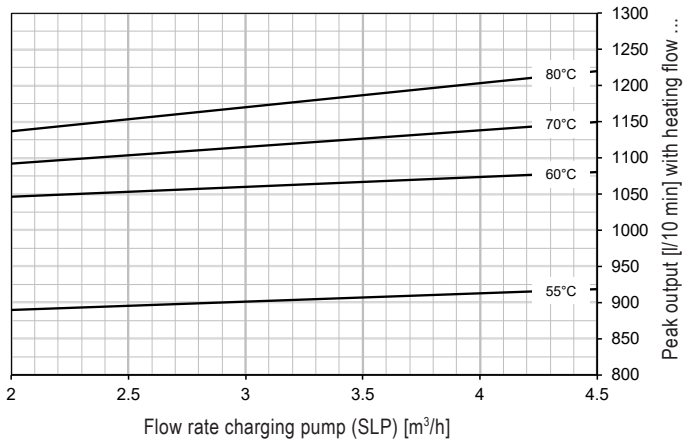
Heat input [kW]

Continuous output [l/h] with heating flow ...

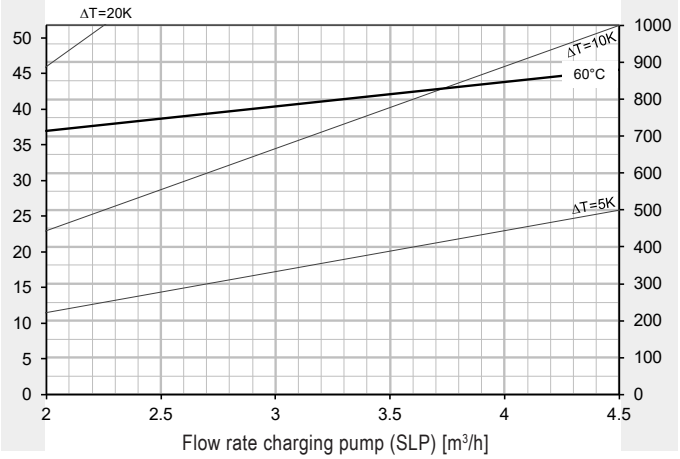
Hot water 45 °C



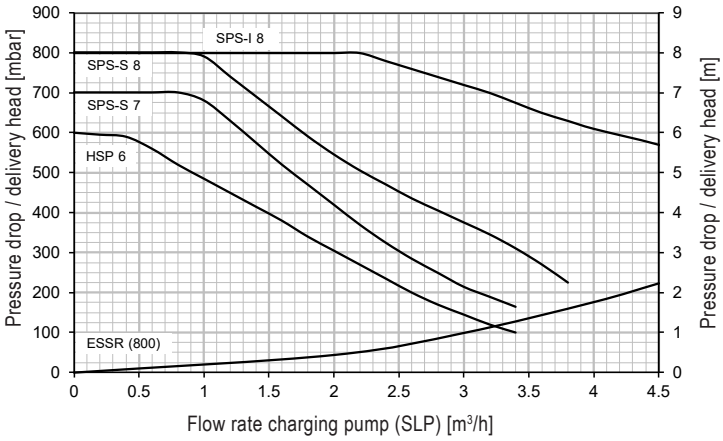
10 min peak output - hot water 45 °C *



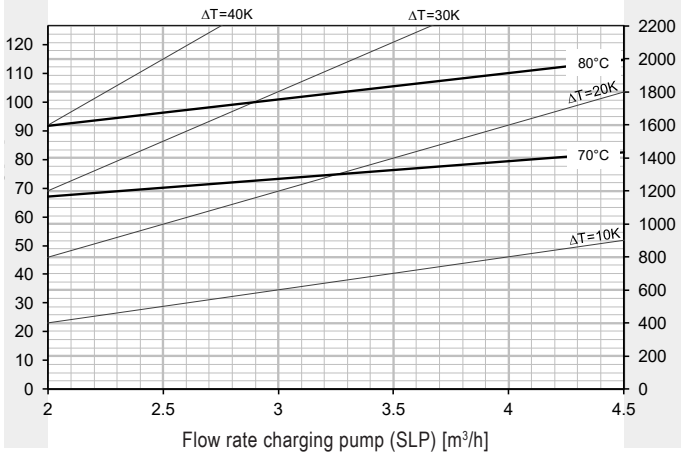
Hot water 55 °C



Pressure drop heating coil - delivery head charging pump



Hot water 60 °C



* Calorifier heated to 60 °C

CombiVal ESSR (1000)

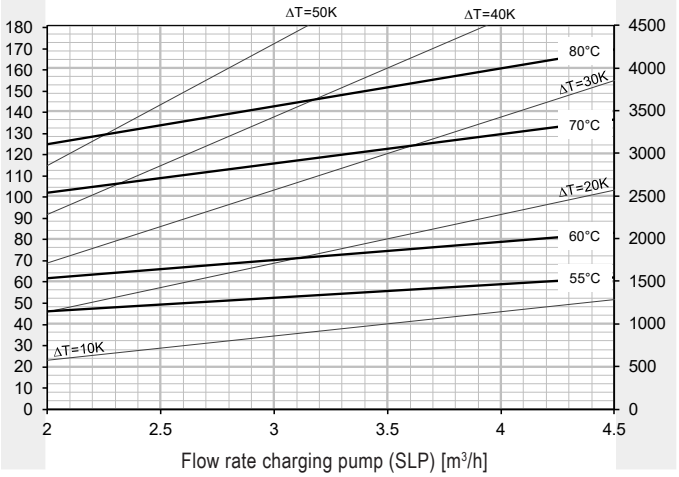
Hot water output
Continuous output

Reading example
see engineering

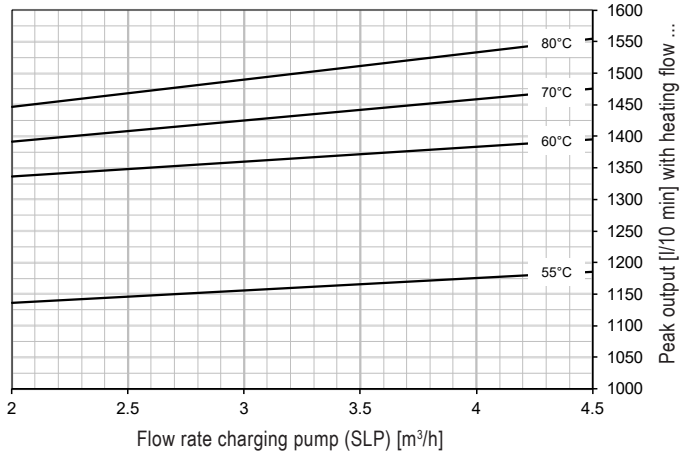
Heat input [kW]

Continuous output [l/h] with heating flow ...

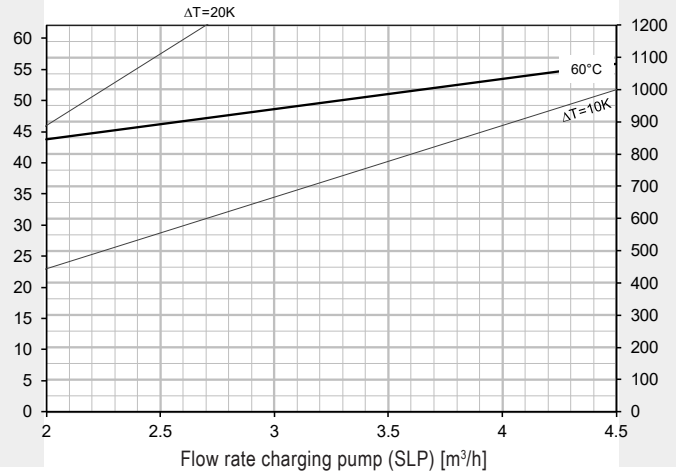
Hot water 45 °C



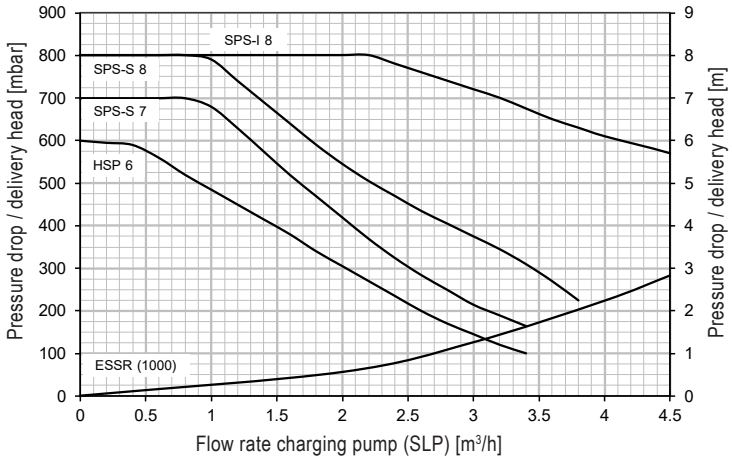
10 min peak output - hot water 45 °C *



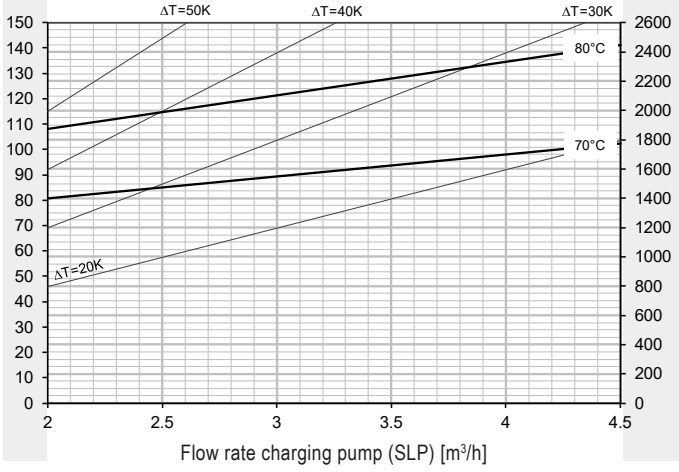
Hot water 55 °C



Pressure drop heating coil - delivery head charging pump



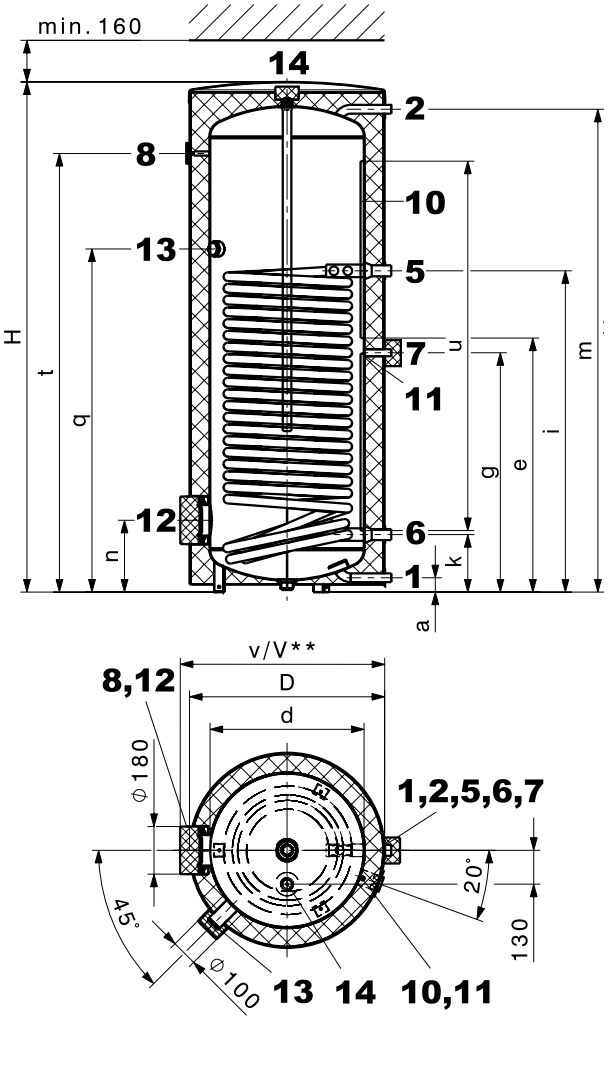
Hot water 60 °C



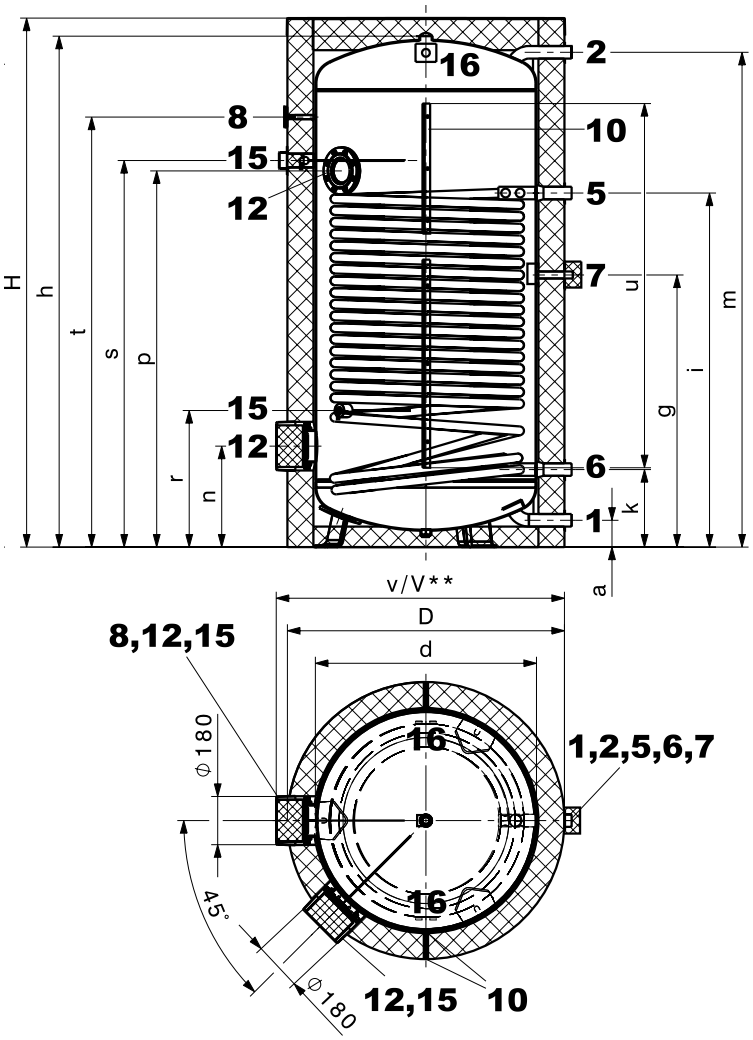
* Calorifier heated to 60 °C

CombiVal ESSR (500)

(Dimensions in mm)



CombiVal ESSR (800,1000)



1	Cold water	type (500)	G 1″	(ET)
		type (800,1000)	G 1½″	(ET)
2	Domestic hot water	type (500)	G 1″	(ET)
		type (800,1000)	G 1½″	(ET)
5	Heating flow	type (500)	G 1¼″	(ET)
		type (800,1000)	G 1½″	(ET)
6	Heating return	type (500)	G 1¼″	(ET)
		type (800,1000)	G 1½″	(ET)
7	Circulation (removable insulated cap Ø 100 mm)		G ¾″	(ET)
8	Thermometer			

10	Sensor channel, inner Ø 11 mm Sensor terminal strip (zip fastener)	type (500) type (800,1000)	
11	Removable cap (Ø 60 mm) for positioning the sensor in the sensor channel	type (500)	
12	Hand-hole flange (flange-mounted electric heating element) Ø 180/120 mm, pitch circle 150 mm, 8 x M10		
13	Connection for screw-in electric heating element (cap Ø 100 mm)	type (500)	Rp 1½″ (IT)
14	Anode sleeve Screw connection uninsulated	type (500)	Rp 1¼″ (IT)
15	Correx® impressed current anode sleeve	type (800,1000)	Rp ¾″ (IT)
16	Transport strap	type (800,1000)	

Variation because of the production tolerance possible
Dimension +/- 10 mm

CombiVal ESSR

type	D	d	H	h	a	e	g	i	k	m	n	p	r	q	s	t	u	v	V**	Tilting dimension
(500)	750	597	1953	-	55	977	920	1235	221	1856	276	-	-	1319	-	1686	1360	795	810	2093
(800)	950	750	2033	1937	104	-	995	1265	292	1890	382	1413	520	-	1497	1647	1400	975	1020	1962
(1000)	1050	850	2063	1963	103	-	1046	1361	298	1902	388	1446	525	-	1486	1653	1400	1075	1120	1991

** when using a flange-mounted electric heating element

Hoval calorifier MultiVal ERR (300-500)

- Calorifier made of steel enamelled inside
- 2 plain-tube coils enamelled, permanently installed
  - for alternative use at the bottom
  - for additional heating with an oil, gas or wood boiler at the top
- Magnesium protection anode built in
- Flange for electric heating element
- Thermal insulation made of polyurethane hard foam hulls, foamed on the calorifier
- Dismantable foil casing, red coloured
- Sensor channel
- Immersion sleeve welded in
- Including thermometer
- 1½" sleeve for a screw-in electric heating element

Delivery
- Calorifier with foil casing, pre-installed

On request
- Screw-in electric heating element
- Flange-mounted electric heating element

Range

MultiVal type		
ERR	(300)	B
ERR	(400)	B
ERR	(500)	B

Calorifier

MultiVal ERR (300-500)

Made of enamelled steel, with 2 plain-tube coils.

MultiVal ERR type		Volume dm³	Heating surface top m²	Heating surface bottom m²	Part No.
(300)	B	295	0.80	1.55	7015 971
(400)	B	381	1.00	2.15	7016 752
(500)	B	471	1.30	2.15	7016 753

Electric heating elements
see chapter “Electric heating elements”

Accessories

Flange cover 180 - ¾″ — 2077 035
for the installation of the Correx® impressed current anode in flange Ø 180/110 mm,
enamelled on the inside with Rp ¾″ sleeve
Seal included

Flange with immersion sleeve — 6028 468
for temperature sensor made of steel.
On domestic water side, enamelled inside.
Flange dimensions:
- Outer Ø 180 mm,
- Pitch circle Ø 150 mm, 8 x M10

Immersion sleeve dimensions:
- Installation length = 120 mm,
- Outer Ø: 24 mm, inner Ø: 20 mm

Kit Correx® impressed current anode UP2.3-919-L395/1 — 684 760
for long-term corrosion protection for installation in the enamelled calorifier with reduction R 1¼″ (ET) – Rp 1″ (IT) and R 1″ (ET) – Rp ¾″ (IT)
Installation length: 395 mm
Connection cable length: 1 x 2000 mm
1 Correx® impressed current anode

In every case, **either** a Correx® impressed current anode **or** one/two magnesium anodes are allowed to be used.

		Part No.
	**Immersion sensor TF/2P/5/6T, L = 5.0 m with plug** for TopTronic® E controller modules/ module expansions with exception of basic module district heating/fresh water or basic module district heating com, cable length: 5 m with plug sensor sleeve diameter: 6 x 50 mm, dewpoint-proof, operating temperature: -20…105 °C, protection class: IP67	2056 788
	**Immersion sensor TF/2P/5/6T, L = 5.0 m** for TopTronic® E controller modules/ module expansions with exception of basic module district heating/fresh water or basic module district heating com, cable length: 5 m without plug sensor sleeve diameter: 6 x 50 mm, dewpoint-proof, operating temperature: -20…105 °C, protection class: IP67	2055 888
	**Immersion sensor TF/12N/2.5/6T, L = 2.5 m** for gas boiler with RS-OT Cable length: 2.5 m Sensor sleeve diameter: 6 x 50 mm, dewpoint-proof, operating temperature: -20…105 °C, protection class: IP67	2056 791
	At TopTronic® E, immersion sensor is included in the boiler controller or in the heating controller set.	
	**Calorifier thermostat control TW 12** Universal thermostat controller for thermostatic pump charge demand, setting in casing, visible from outside. 15-95 °C, switching difference 6 K, capillar length 700 mm incl. fastening material for Hoval calorifier, can be used with integrated immersion sleeve	6010 080
	Thermal water mixer see “Various system components”	

Services

Commissioning
Commissioning by works service or Hoval trained authorised serviceman/company is condition for warranty.

For commissioning and other services please contact your Hoval sales office.

MultiVal ERR (300-500)

Type		(300)	(400)	(500)
• Volume	l	295	381	471
• Max. operating/test pressure SVGW	bar	6/12	6/12	6/12
• Max. operating/test pressure DVGW	bar	10/13	10/13	10/13
• Max. operating temperature	°C	95	95	95
• Expanded PU hard foam thermal insulation	mm	75	75	75
• Thermal insulation λ	W/mK	0.027	0.027	0.027
• Fire protection class		B2	B2	B2
• Heat loss at 65 °C	W	61	69	78
• Transport weight	kg	128	149	170
• U value	W/m^2K	0.307	0.326	0.316
Heating battery bottom		Plain tube heat exchanger for solar use		
• Heating surface	m²	1.55	2.15	2.15
• Heating water	l	10.3	15.1	15.1
• Flow resistance[1] water	z value	10	3.6	3.6
• Flow resistance[1] water/glycol 50 %	z value	13	3.9	3.9
• Max. operating/test pressure SVGW	bar	8/13	8/13	8/13
• Max. operating/test pressure DVGW	bar	10/13	10/13	10/13
• Max. operating temperature	°C	110	110	110
• For flat collectors up to [2]	m^2	8	10	11
Heating battery top		Plain tube heat exchanger for supplemental heating		
• Heating surface	m²	0.80	1.00	1.30
• Heating water	l	5.7	6.95	8.9
• Flow resistance [1]	z value	6	8	9
• Max. operating/test pressure SVGW	bar	8/13	8/13	8/13
• Max. operating/test pressure DVGW	bar	10/13	10/13	10/13
• Max. operating temperature	°C	110	110	110
• Dimensions		see table of dimensions		

[1] Flow resistance heating battery in mbar = flow rate $(m^3/h)^2$ x z (1 mbar = 0.1 kPa)

[2] Collector surface area, with regard to coil heating surface only

Performance figure

Selection of the calorifier type
at a hot water temperature of 45 °C

Reading example
see engineering

	Comfort [1]			Standard [2]		
T >	60 °C	70 °C	80 °C	60 °C	70 °C	80 °C
NL v						
1	300/400			300/400		
2	500	300	300	500	300	300
3		400	400		400	400
4		500	500		500	500
5						
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12						
13						
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50						

	Comfort [1]			Standard [2]		
T >	60 °C	70 °C	80 °C	60 °C	70 °C	80 °C
NL v						
51						
52						
53						
54						
55						
56						
57						
58						
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64						
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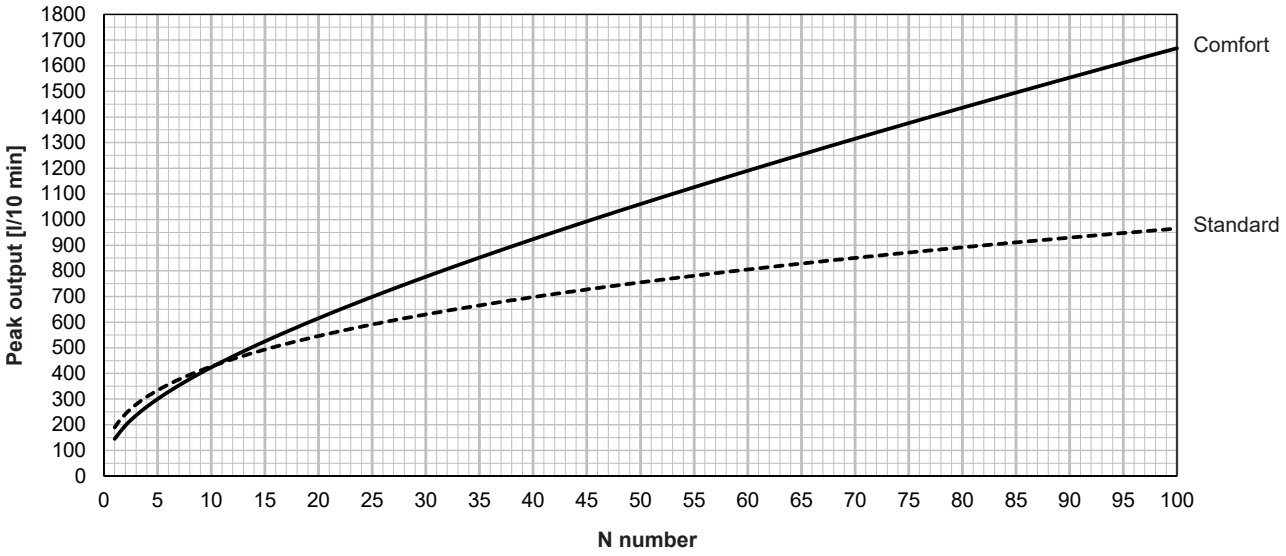
100						

T = heating flow
NL = performance figure
Performance figure NL acc. to DIN 4708 = number of flats which can be supplied with domestic hot water when the calorifier is heated and permanently reheated with the heat generator (standard flat: 1 bathroom - 4 rooms - 3.5 persons)
[1] Calculation with simultaneity factor according to DIN 4708 (preferred for Switzerland)
[2] Calculation with simultaneity factor according to Dresden Technical University

10 min peak output/N number with domestic hot water 45 °C

according to DIN 4708 (Comfort) and Dresden Technical University (Standard)

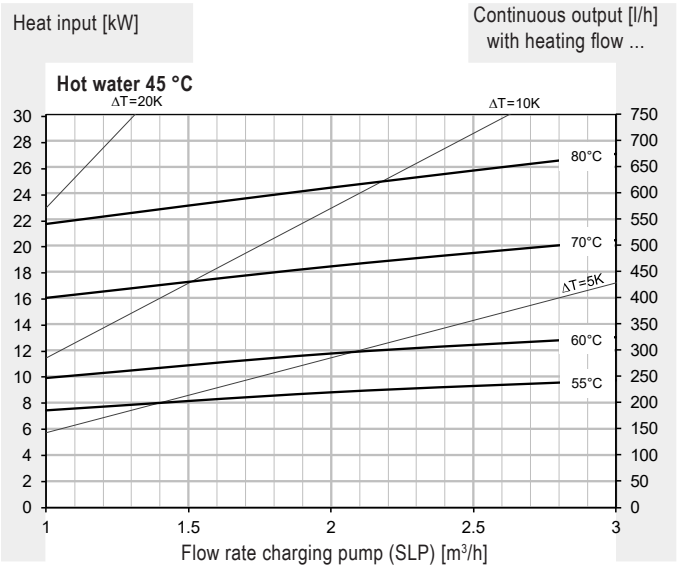
Reading example
see Engineering

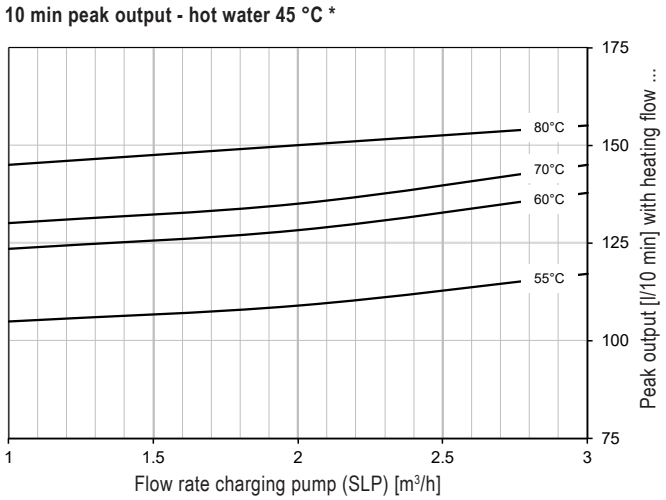


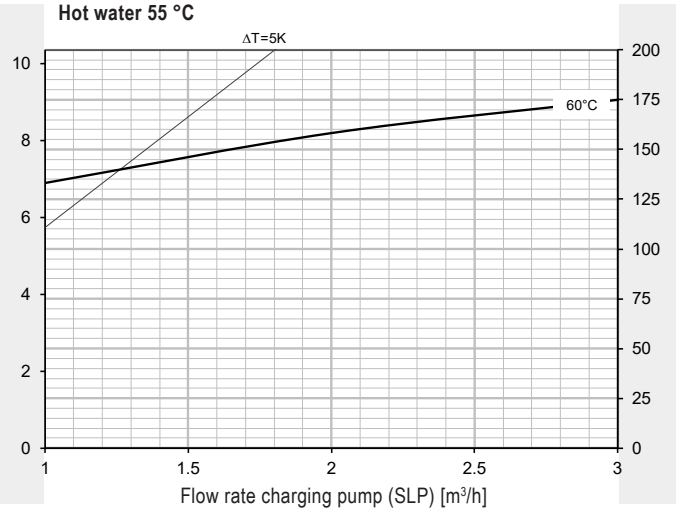
MultiVal ERR (300)

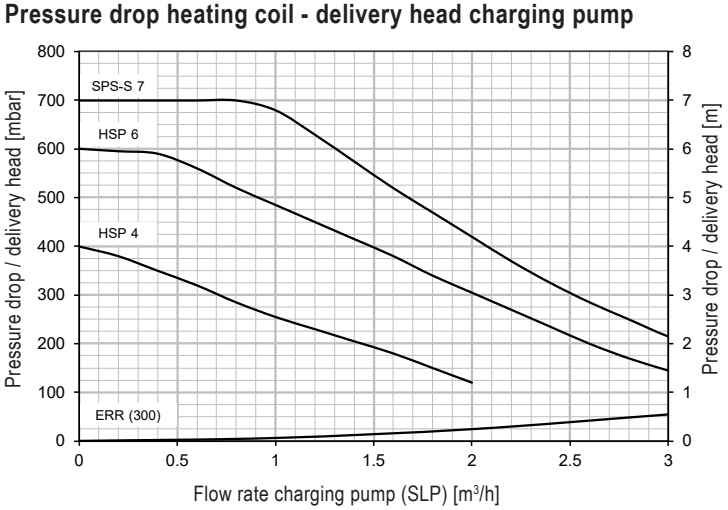
Hot water output
Continuous output

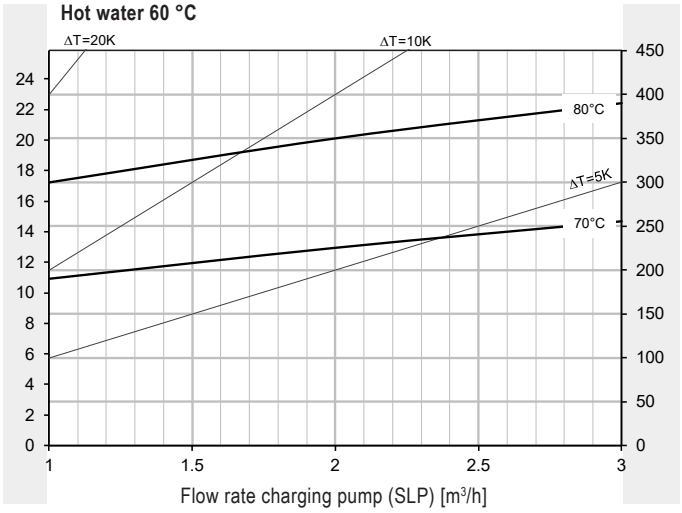
Reading example
see engineering











* Calorifier heated to 60 °C

MultiVal ERR (400)

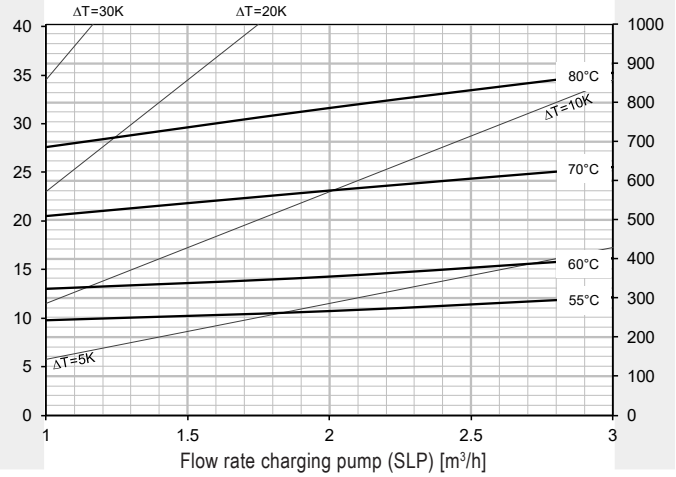
Hot water output
Continuous output

Reading example
see engineering

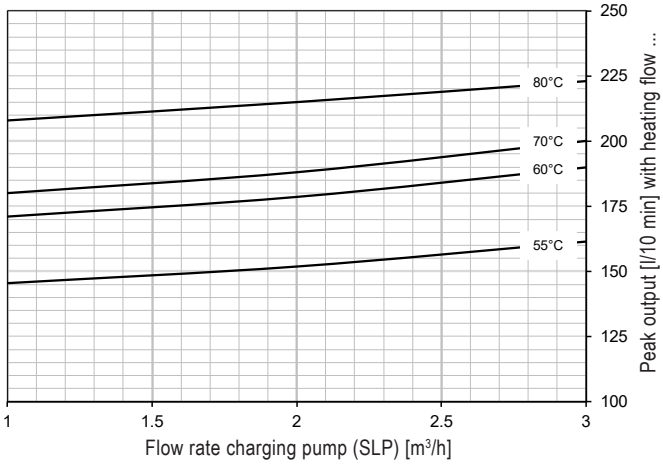
Heat input [kW]

Continuous output [l/h] with heating flow ...

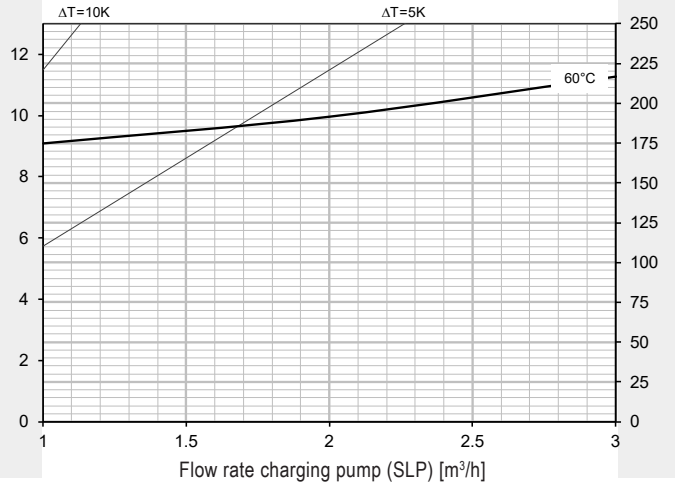
Hot water 45 °C



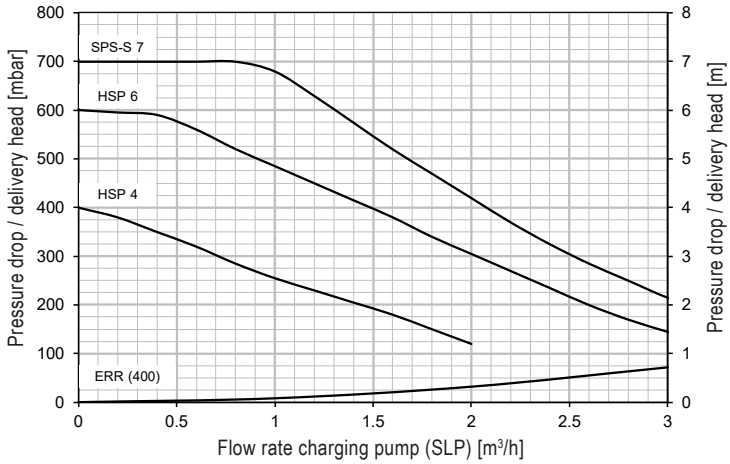
10 min peak output - hot water 45 °C *



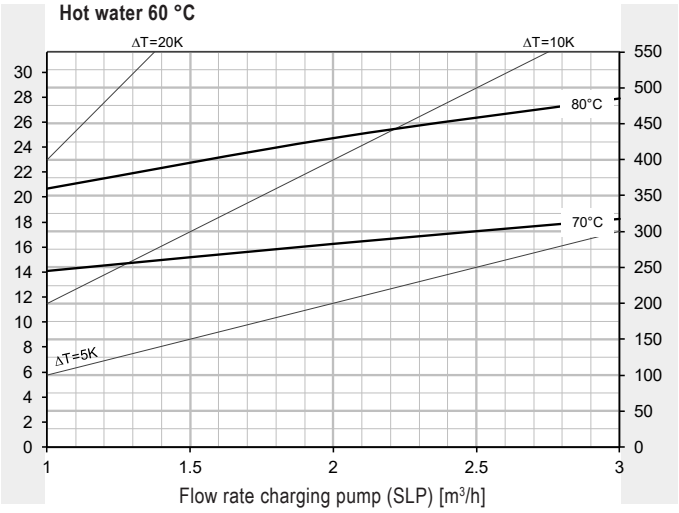
Hot water 55 °C



Pressure drop heating coil - delivery head charging pump



Hot water 60 °C



* Calorifier heated to 60 °C

MultiVal ERR (500)

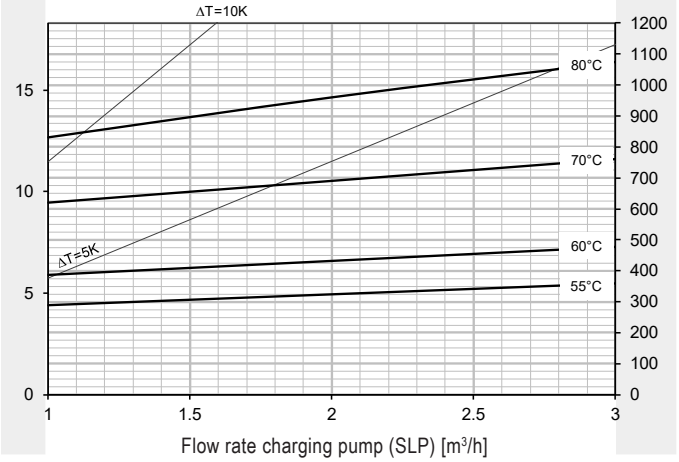
Hot water output
Continuous output

Reading example
see engineering

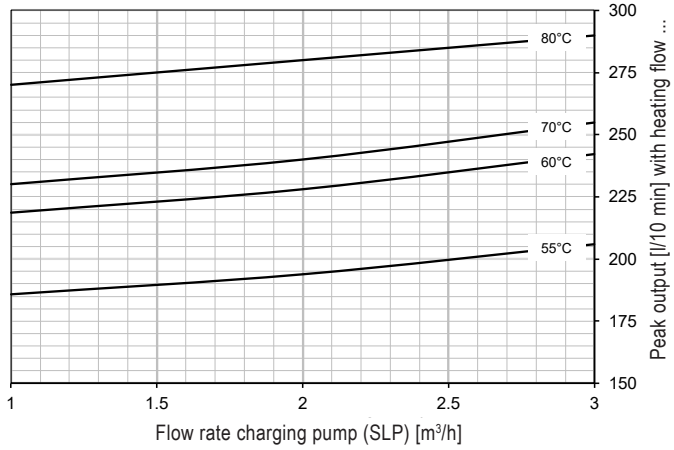
Heat input [kW]

Continuous output [l/h] with heating flow ...

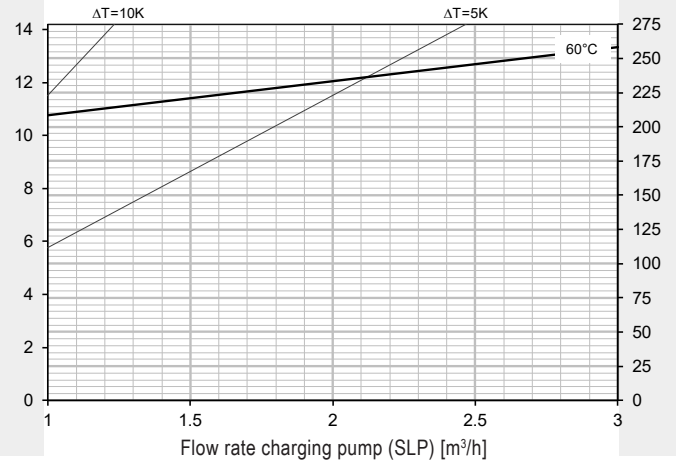
Hot water 45 °C



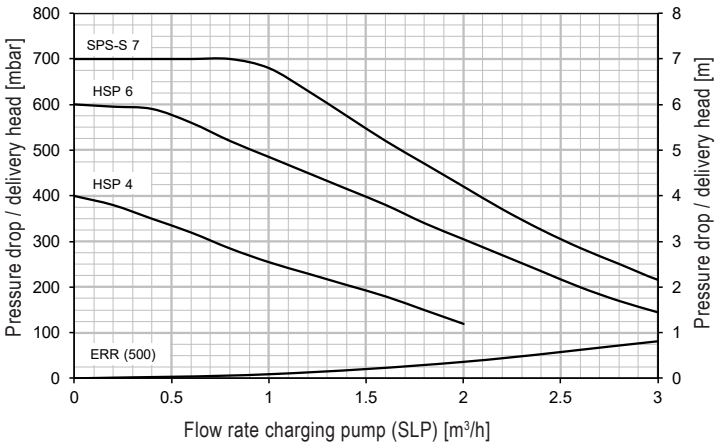
10 min peak output - hot water 45 °C *



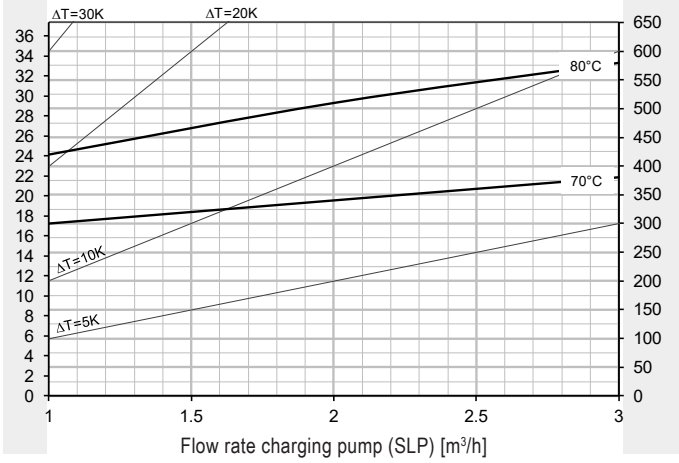
Hot water 55 °C



Pressure drop heating coil - delivery head charging pump



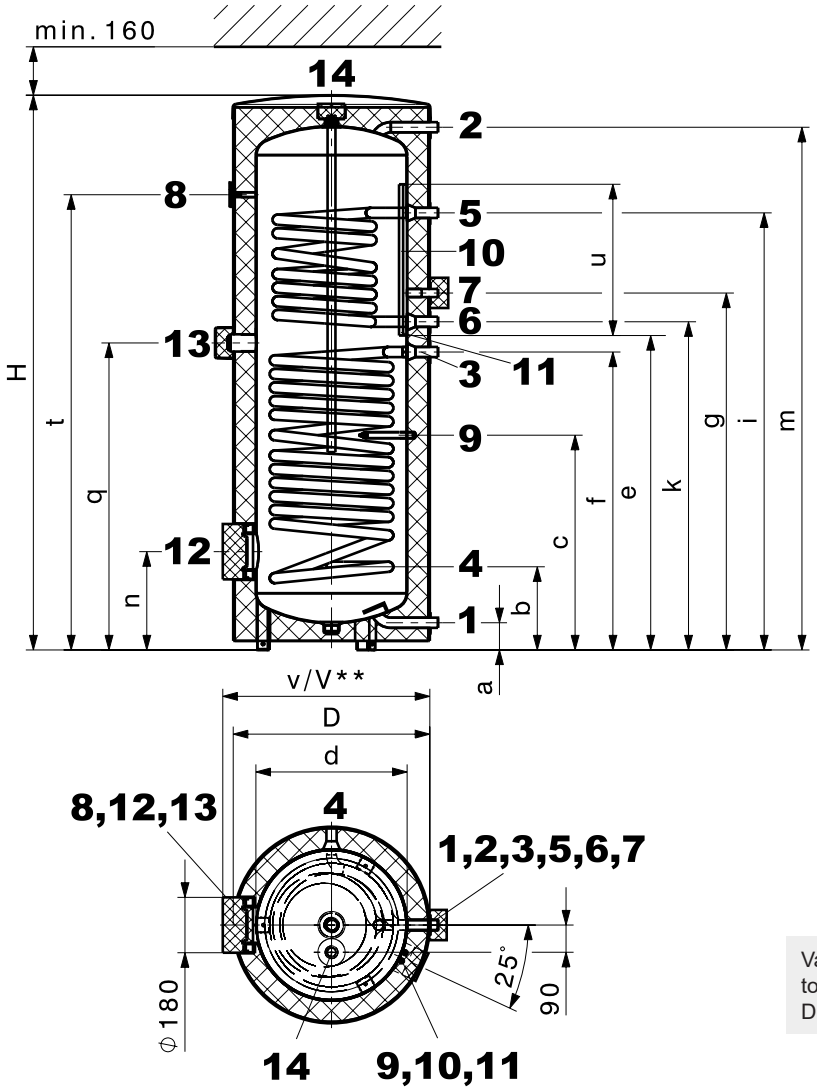
Hot water 60 °C



* Calorifier heated to 60 °C

MultiVal ERR (300)

(Dimensions in mm)



Variation because of the production tolerance possible
Dimension +/- 10 mm

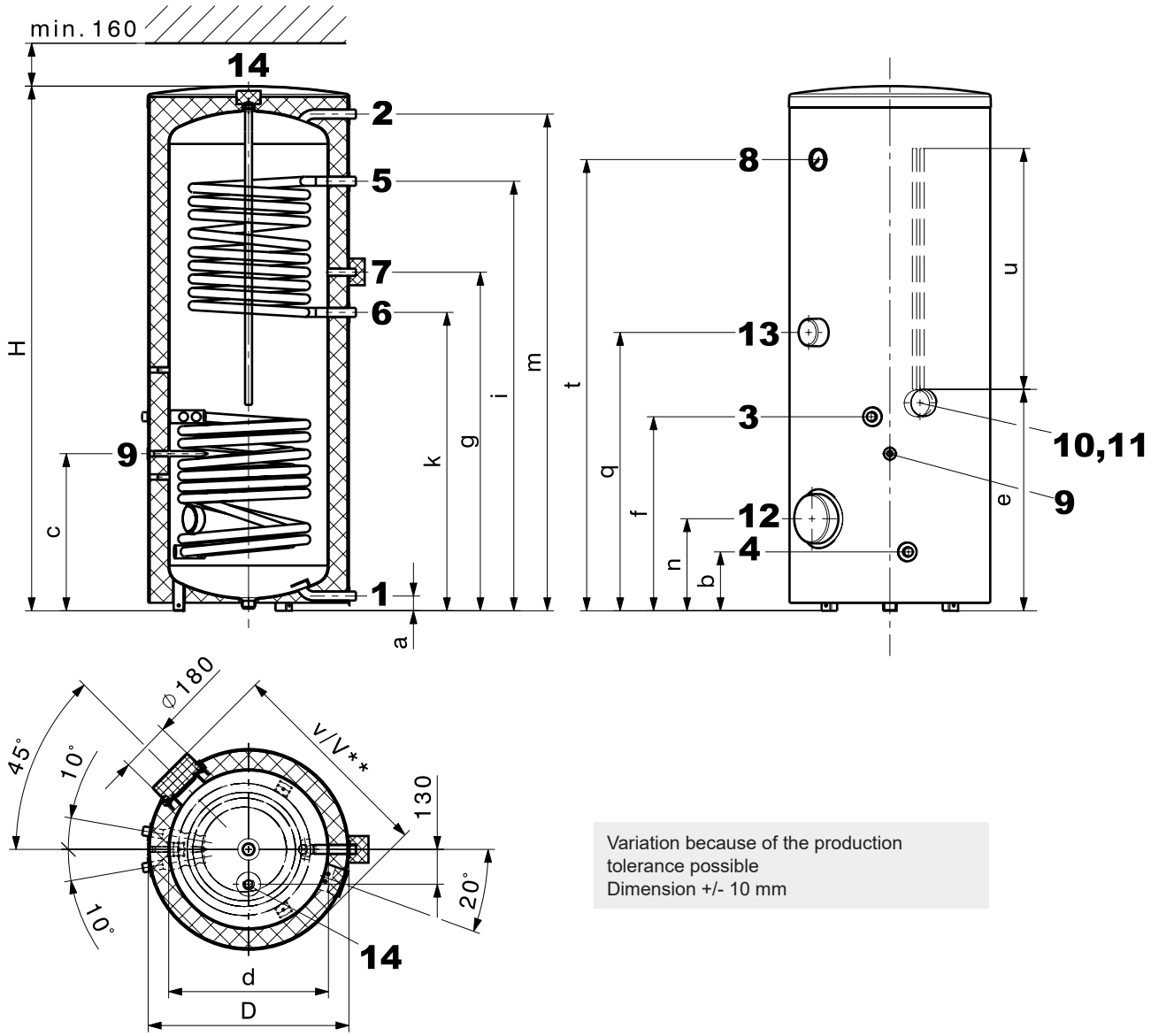
1	Cold water	G 1″ (ET)
2	Domestic hot water	G 1″ (ET)
3	Solar circuit flow	G 1″ (ET)
4	Solar circuit return	G 1″ (ET)
5	Flow supplemental heating	G 1″ (ET)
6	Return supplemental heating	G 1″ (ET)
7	Circulation (removable insulated cap Ø 100 mm)	G ¾″ (ET)
8	Thermometer	
9	Connection for sensor/thermostat, inner Ø 16 mm (turned through 25° in section)	
10	2 sensor channels inner Ø 11 mm	
11	Removable cap (Ø 100 mm) for positioning the sensor in the sensor channel	
12	Hand-hole flange (flange-mounted electric heating element) Ø 180/120 mm, pitch circle 150 mm, 8 x M10	
13	Connection for screw-in electric heating element (cap Ø 100 mm)	Rp 1½″ (IT)
14	Anode sleeve Screw connection uninsulated	Rp 1″ (IT)

MultiVal ERR type	D	d	H	a	b	c	e	f	g	i	k	m	n	q	t	u	v	V**	Tilting dimension
(300)	650	500	1835	90	275	710	1040	985	1180	1445	1085	1728	325	1015	1505	500	695	710	2093

** when using a flange-mounted electric heating element

MultiVal ERR (400,500)

(Dimensions in mm)



Variation because of the production tolerance possible
Dimension +/- 10 mm

1	Cold water	G 1″ (ET)
2	Domestic hot water	G 1″ (ET)
3	Solar circuit flow	G 1″ (ET)
4	Solar circuit return	G 1″ (ET)
5	Flow supplemental heating	G 1″ (ET)
6	Return supplemental heating	G 1″ (ET)
7	Circulation (removable insulated cap Ø 100 mm)	G ¾″ (ET)
8	Thermometer	
9	Connection for sensor/thermostat, inner Ø 16 mm	
10	2 sensor channels inner Ø 11 mm	
11	Removable cap (Ø 100 mm) for positioning the sensor in the sensor channel	
12	Hand-hole flange (flange-mounted electric heating element) Ø 180/120 mm, pitch circle 150 mm, 8 x M10	
13	Connection for screw-in electric heating element (cap Ø 100 mm)	Rp 1½″ (IT)
14	Anode sleeve Screw connection uninsulated	Rp 1″ (IT)

MultiVal ERR type	D	d	H	a	b	c	e	f	g	i	k	m	n	q	t	u	v	V**	Tilting dimension
(400)	750	597	1624	55	220	587	862	725	1112	1355	1007	1526	344	958	1356	500	791	831	1731
(500)	750	597	1951	55	220	587	820	725	1265	1605	1115	1856	344	1040	1686	900	791	831	2029

** when using a flange-mounted electric heating element

Hoval calorifier MultiVal ESRR (500)

- Calorifier made of steel enamelled inside
- 2 plain-tube coils enamelled, permanently installed
  - at the bottom: for solar use
  - for heating with heat pumps
- Magnesium protection anode or impressed current anode built in
- Flange for electric heating element
- Thermal insulation made of polyurethane hard foam hulls, foamed on the calorifier, dismantable foil casing, colour red
- Sensor channel
- Immersion sleeve welded in
- With thermometer
- 1½" sleeve for a screw-in electric heating element

Delivery
- Calorifier with foil casing, pre-installed

On request
- Flange-mounted electric heating element

Hoval calorifier MultiVal ESRR (800-1000)

- Calorifier made of steel enamelled inside
- 2 plain-tube coils enamelled, permanently installed
  - at the bottom: for solar use
  - for heating with heat pumps
- Correx® potentiostat included
- 2 impressed current anodes incl. connecting cable integrated
- Flange below as cleaning flange or for the installation of a flange-mounted electric heating element or blank flange with immersion sleeve
- Flange above as additional cleaning flange or for the installation of a flange-mounted electric heating element
- Thermal insulation made of polyester fleece with foil jacket, colour red
- Two terminal bars for contact sensor
- With thermometer

Delivery
- Calorifier and thermal insulation completely installed (can be removed for installation)

On request
- Flange-mounted electric heating element

MultiVal ESRR (500) MultiVal ESRR (800,1000)

Range
MultiVal type

ESRR	(500)	B
ESRR	(800)	
ESRR	(1000)	

Calorifier

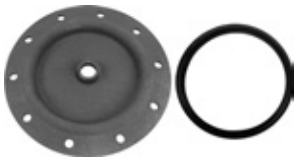
MultiVal ESRR (500-1000)

Made of enamelled steel, with 2 plain-tube coils.

MultiVal ESRR type		Volume dm³	Heating surface top m²	Heating surface bottom m²	Part No.
(500)	B	463	4.30	2.15	7016 754
(800)		731	5.20	2.60	7018 053
(1000)		958	6.10	3.40	7018 054

Electric heating elements
see chapter “Electric heating elements”

Accessories



Flange cover 180 - ¾″ — 2077 035
for the installation of the Correx®
impressed current anode in flange
Ø 180/110 mm,
enamelled on the inside with Rp ¾″
sleeve
Seal included

Flange with immersion sleeve — 6028 468
for temperature sensor made of steel.
On domestic water side, enamelled
inside.
Flange dimensions:
- Outer Ø 180 mm,
- Pitch circle Ø 150 mm, 8 x M10
Immersion sleeve dimensions:
- Installation length = 120 mm,
- Outer Ø: 24 mm, inner Ø: 20 mm

Kit Correx® impressed current anode UP2.3-919-L395/1 — 684 760
for long-term corrosion protection for
installation in the enamelled calorifier
with reduction R 1¼″ (ET) – Rp 1″ (IT)
and R 1″ (ET) – Rp ¾″ (IT)
Installation length: 395 mm
Connection cable length: 1 x 2000 mm
1 Correx® impressed current anode

Included in the scope of delivery
of ESRR (800,1000)

In every case, **either** a Correx® impressed current anode **or** one/two magnesium anodes are allowed to be used.

		Part No.
	**Immersion sensor TF/2P/5/6T, L = 5.0 m with plug** for TopTronic® E controller modules/ module expansions with exception of basic module district heating/fresh water or basic module district heating com, cable length: 5 m with plug sensor sleeve diameter: 6 x 50 mm, dewpoint-proof, operating temperature: -20…105 °C, protection class: IP67	2056 788
	**Immersion sensor TF/2P/5/6T, L = 5.0 m** for TopTronic® E controller modules/ module expansions with exception of basic module district heating/fresh water or basic module district heating com, cable length: 5 m without plug sensor sleeve diameter: 6 x 50 mm, dewpoint-proof, operating temperature: -20…105 °C, protection class: IP67	2055 888
	**Immersion sensor TF/12N/2.5/6T, L = 2.5 m** for gas boiler with RS-OT Cable length: 2.5 m Sensor sleeve diameter: 6 x 50 mm, dewpoint-proof, operating temperature: -20…105 °C, protection class: IP67	2056 791
	At TopTronic® E, immersion sensor is included in the boiler controller or in the heating controller set.	
	**Calorifier thermostat control TW 12** Universal thermostat controller for thermostatic pump charge demand, setting in casing, visible from outside. 15-95 °C, switching difference 6 K, capillar length 700 mm incl. fastening material for Hoval calorifier, can be used with integrated immersion sleeve	6010 080
	Thermal water mixer see “Various system components”	

Services

Commissioning
Commissioning by works service or Hoval trained authorised serviceman/company is condition for warranty.

For commissioning and other services please contact your Hoval sales office.

MultiVal ESRR (500-1000)

Type		(500)	(800)	(1000)
• Volume	l	463	731	958
• Max. operating/test pressure SVGW	bar	6/12	6/12	6/12
• Max. operating/test pressure DVGW	bar	10/13	10/13	10/13
• Max. operating temperature	°C	95	95	95
• Thermal insulation PU hard foam, foam-lined	mm	75	-	-
• Thermal insulation polyester fleece	mm	-	100	100
• Thermal insulation λ	W/mK	0.027	0.04	0.04
• Fire protection class		B2	B2	B2
• Heat loss at 65 °C	W	81	128	144
• Transport weight	kg	234	301	383
• U value	W/m^2K	0.333	0.38	0.375
Heating battery low (built in)		Plain tube heat exchanger for solar use		
• Heating surface	m^2	2.15	2.6	3.4
• Heating water content	l	15.1	17.8	24.1
• Flow resistance[1] water	z value	3.6	4.5	7.5
• Flow resistance[1] water/glycol 50 %	z value	3.9	5.8	10
• Max. operating/test pressure SVGW	bar	8/13	8/13	8/13
• Max. operating/test pressure DVGW	bar	10/13	10/13	10/13
• Max. operating temperature	°C	110	110	110
• For flat collectors up to [2]	m^2	11	15	20
Heating battery up (built in)		Plain tube heat exchanger for heat pumps		
• Heating surface	m^2	4.3	5.2	6.1
• Heating water content	l	30.1	36.1	42.6
• Flow resistance [1]	z value	8	8	10
• Max. operating/test pressure SVGW	bar	8/13	8/13	8/13
• Max. operating/test pressure DVGW	bar	10/13	10/13	10/13
• Max. operating temperature	°C	110	110	110
• Dimensions		see table of dimensions		

[1] Flow resistance heating battery in mbar = flow rate $(m^3/h)^2$ x z (1 mbar = 0.1 kPa)

[2] Collector surface area, with regard to coil heating surface only

Performance figure

Selection of the calorifier type
at a hot water temperature of 45 °C

Reading example
see engineering

	Comfort [1]			Standard [2]		
T >	60 °C	70 °C	80 °C	60 °C	70 °C	80 °C
NL ˅						
1						
2						
3						
4						
5						
6						
7						
8						
9	500					
10				500		
11						
12	800					
13	1000					
14				800		
15				1000		
16						
17		500				
18						
19			500			
20						
21					500	
22						
23						500
24		800				
25						
26		1000				
27			800			
28						
29						
30					800	
31			1000			
32						
33					1000	
34						800
35						
36						
37						
38						
39						
40						1000
41						
42						
43						
44						
45						
46						
47						
48						
49						
50						

	Comfort [1]			Standard [2]		
T >	60 °C	70 °C	80 °C	60 °C	70 °C	80 °C
NL ˅						
51						
52						
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54						
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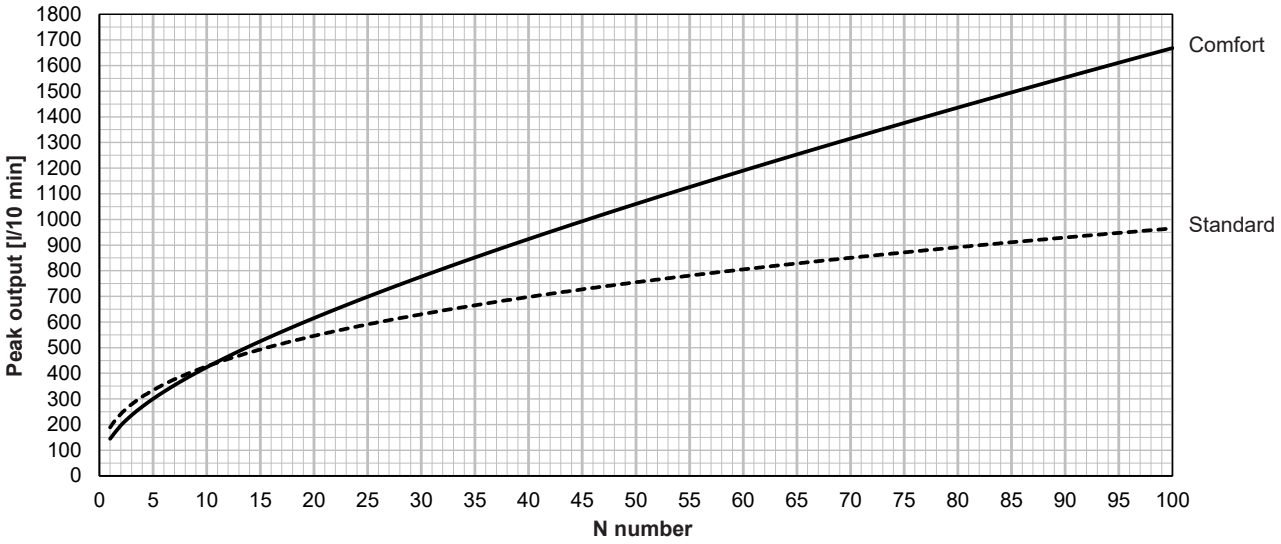
T = heating flow
NL = performance figure
Performance figure NL acc. to DIN 4708 = number of flats which can be supplied with domestic hot water when the calorifier is heated and permanently reheated with the heat generator (standard flat: 1 bathroom - 4 rooms - 3.5 persons)
[1] Calculation with simultaneity factor according to DIN 4708 (preferred for Switzerland)
[2] Calculation with simultaneity factor according to Dresden Technical University

10 min peak output/N number with domestic hot water 45 °C

according to DIN 4708 (Comfort) and Dresden Technical University (Standard)

Reading example
see Engineering



MultiVal ESRR (500)

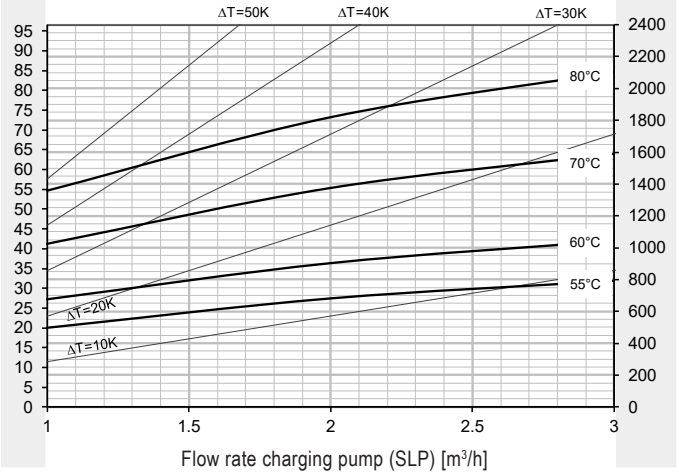
Hot water output
Continuous output

Reading example
see engineering

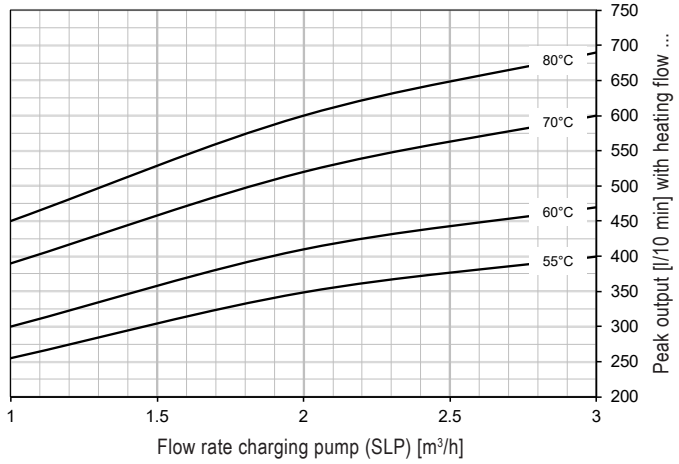
Heat input [kW]

Continuous output [l/h] with heating flow ...

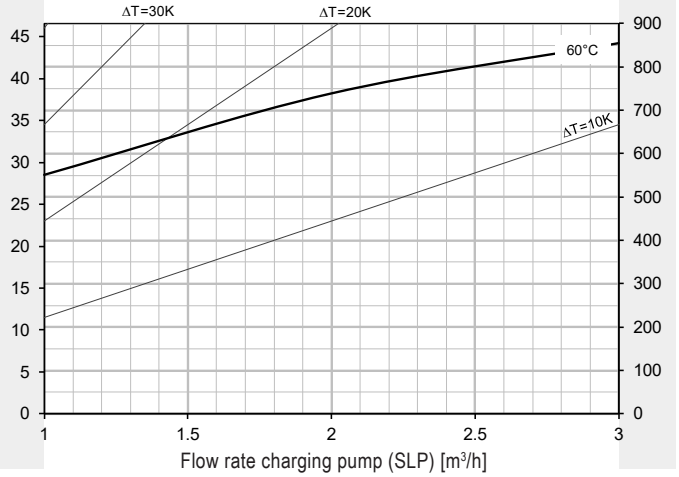
Hot water 45 °C



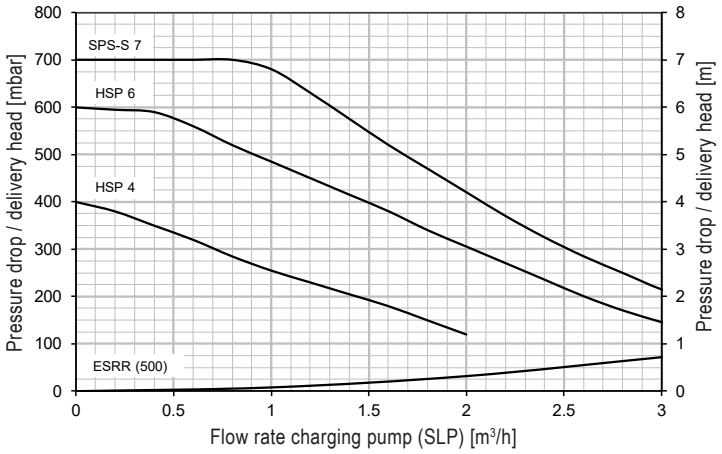
10 min peak output - hot water 45 °C *



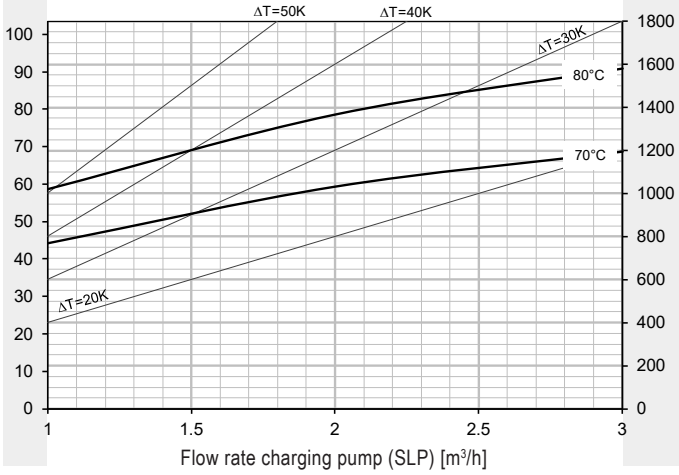
Hot water 55 °C



Pressure drop heating coil - delivery head charging pump



Hot water 60 °C



* Calorifier heated to 60 °C

MultiVal ESRR (800)

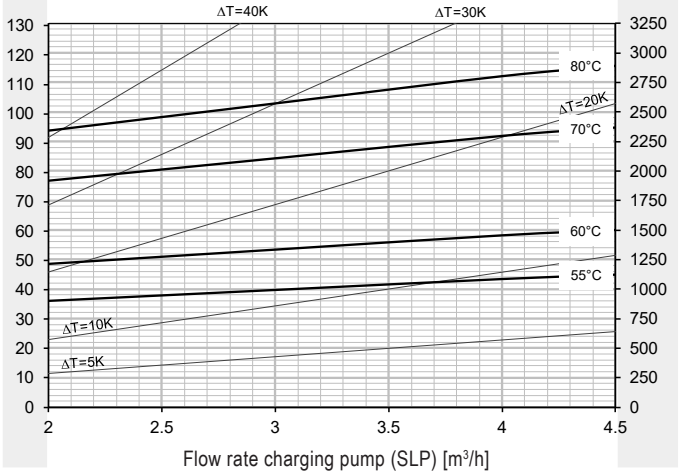
Hot water output
Continuous output

Reading example
see engineering

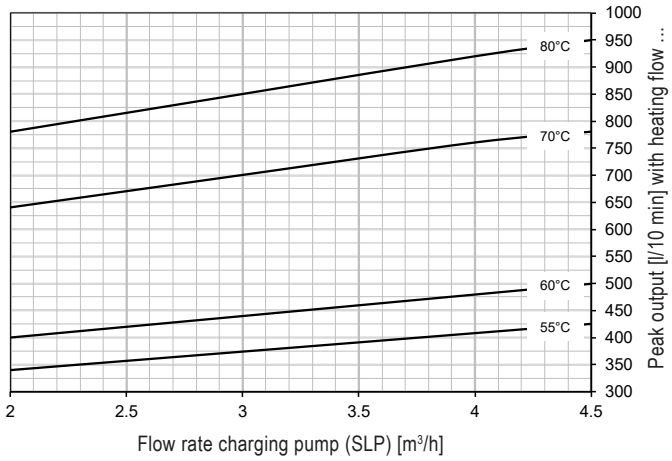
Heat input [kW]

Continuous output [l/h] with heating flow ...

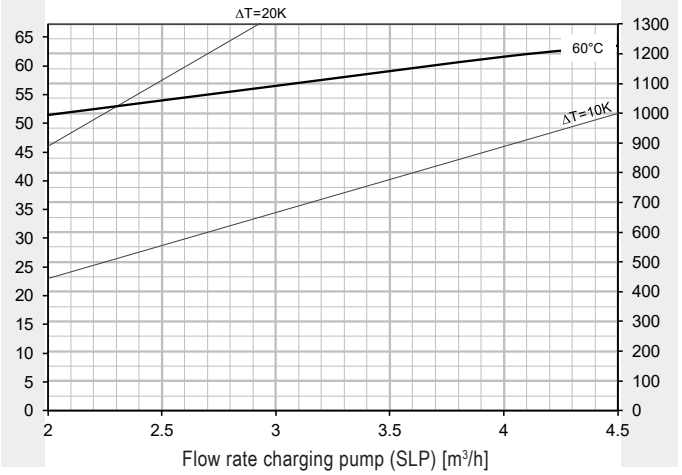
Hot water 45 °C



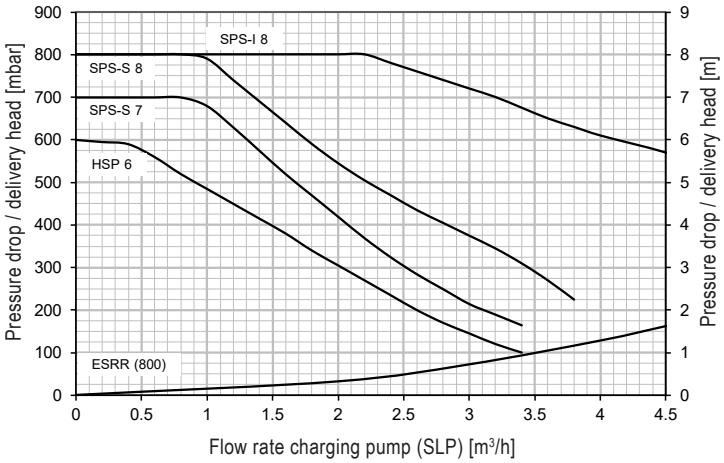
10 min peak output - hot water 45 °C *



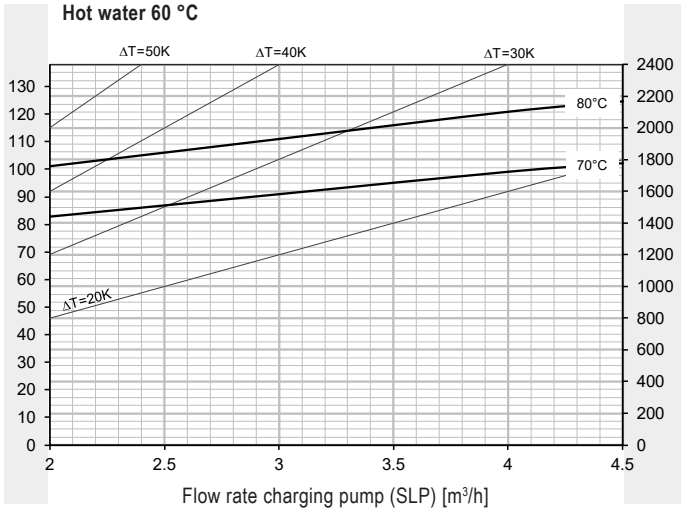
Hot water 55 °C



Pressure drop heating coil - delivery head charging pump



Hot water 60 °C



* Calorifier heated to 60 °C

MultiVal ESRR (1000)

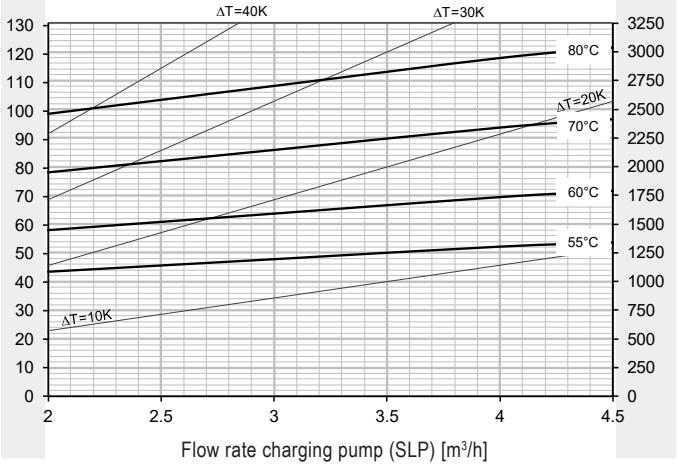
Hot water output
Continuous output

Reading example
see engineering

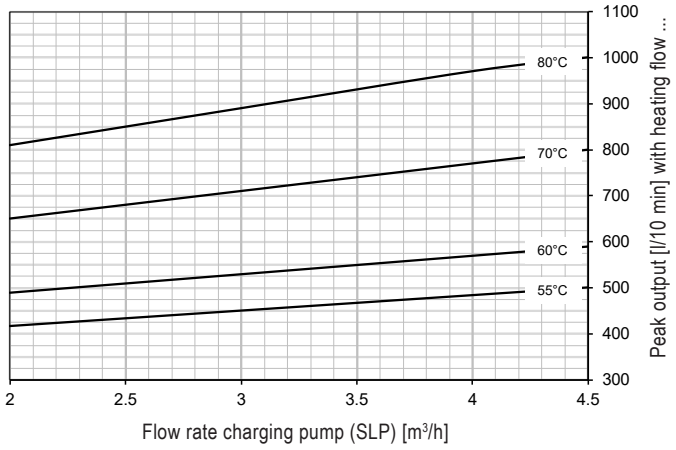
Heat input [kW]

Continuous output [l/h] with heating flow ...

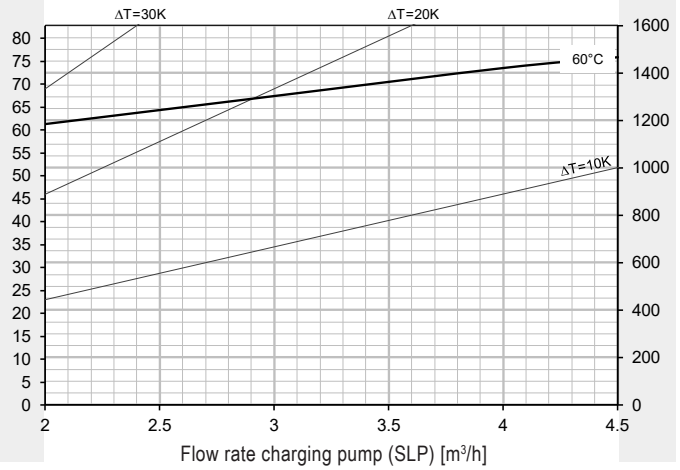
Hot water 45 °C



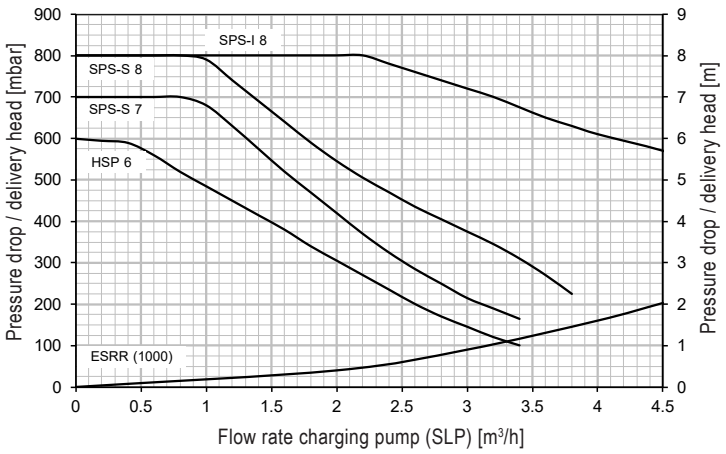
10 min peak output - hot water 45 °C *



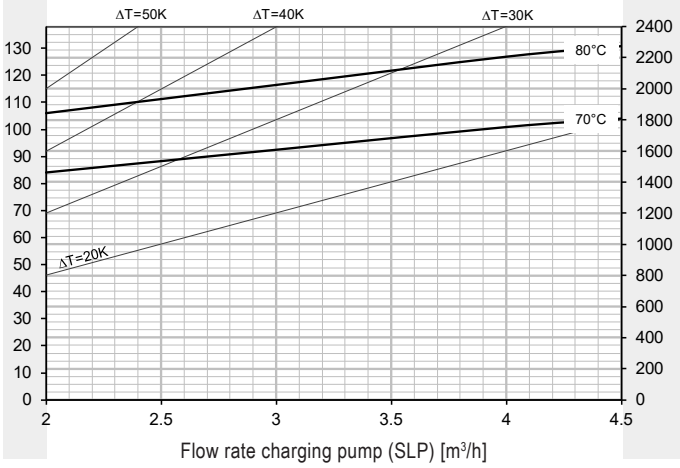
Hot water 55 °C



Pressure drop heating coil - delivery head charging pump



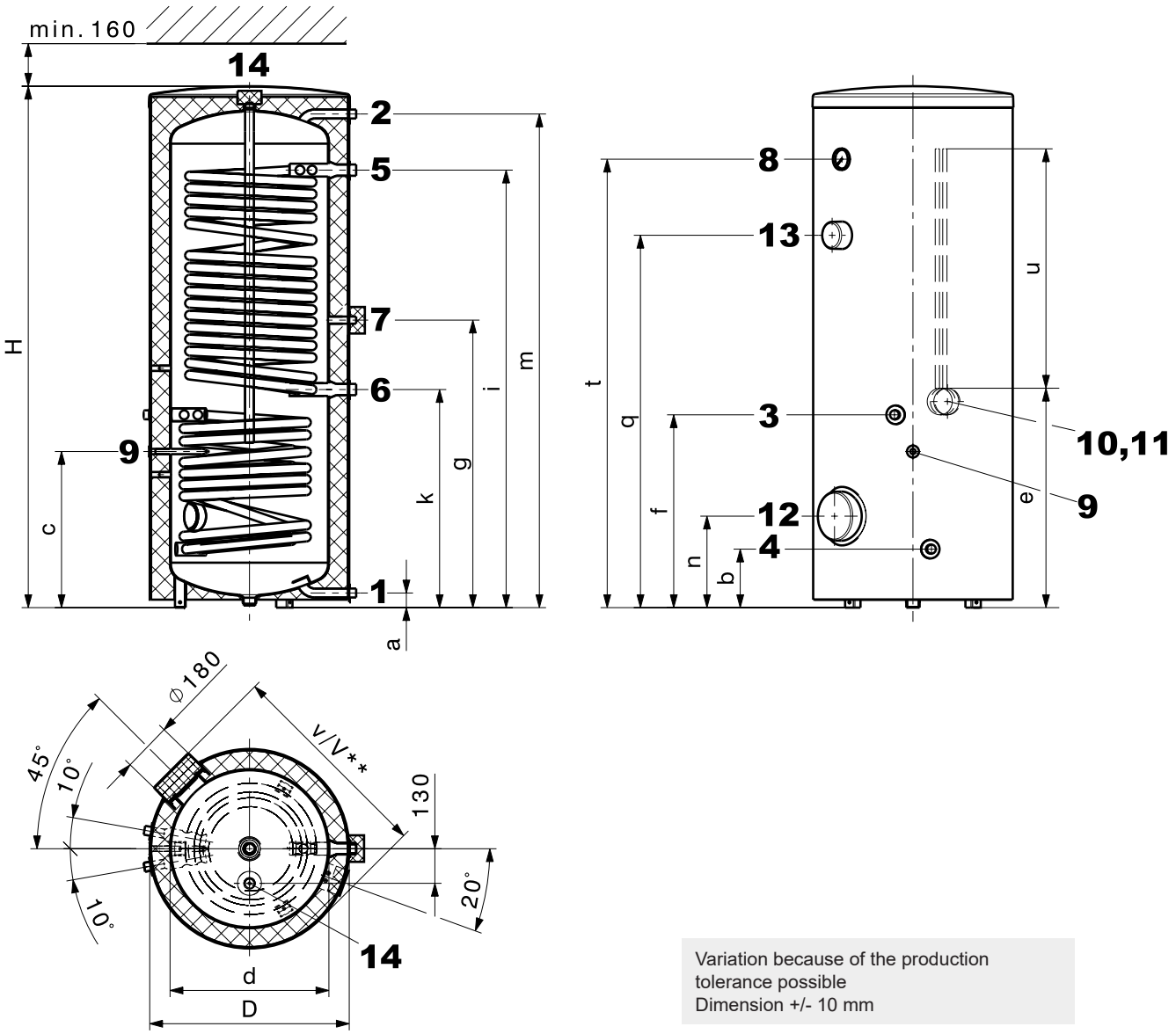
Hot water 60 °C



* Calorifier heated to 60 °C

MultiVal ESRR (500)

(Dimensions in mm)



Variation because of the production tolerance possible
Dimension +/- 10 mm

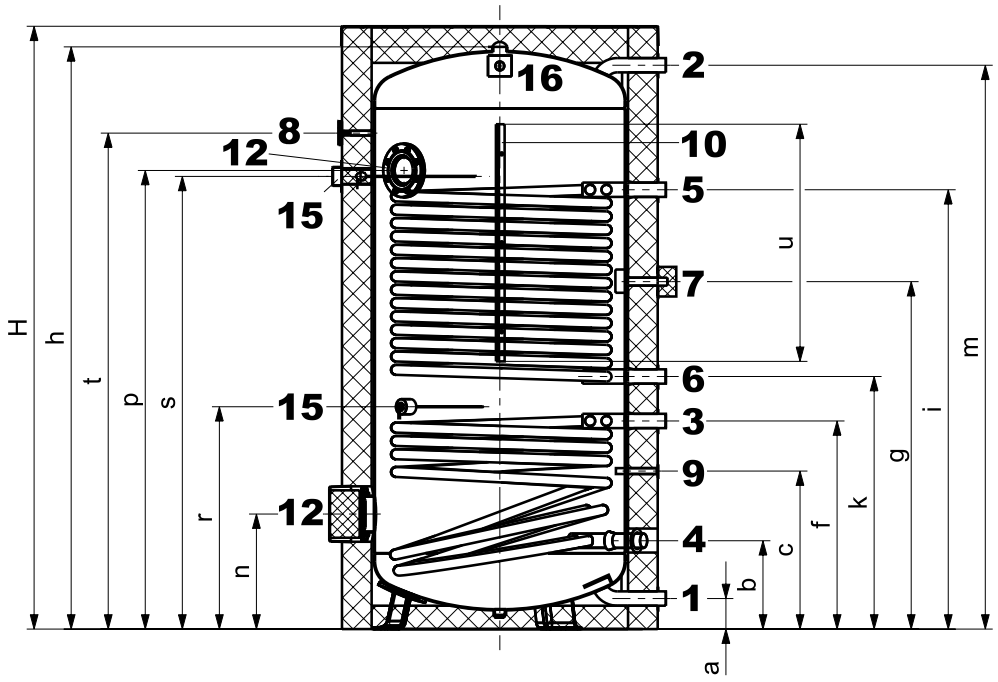
1	Cold water	G 1″	(ET)
2	Domestic hot water	G 1″	(ET)
3	Solar circuit flow	G 1″	(ET)
4	Solar circuit return	G 1″	(ET)
5	Flow supplemental heating	G 1¼″	(ET)
6	Return supplemental heating	G 1¼″	(ET)
7	Circulation (removable insulated cap Ø 100 mm)	G ¾″	(ET)
8	Thermometer		
9	Connection for sensor/thermostat, inner Ø 16 mm	Rp 1½″	(ET)
10	2 sensor channels inner Ø 11 mm		
11	Removable cap (Ø 100 mm) for positioning the sensor in the sensor channel		
12	Hand-hole flange (flange-mounted electric heating element) Ø 180/120 mm, pitch circle Ø 150 mm, 8 x M10		
13	Connection for screw-in electric heating element (cap Ø 100 mm)	Rp 1½″	(IT)
14	Anode sleeve Screw connection uninsulated	Rp 1¼″	(IT)

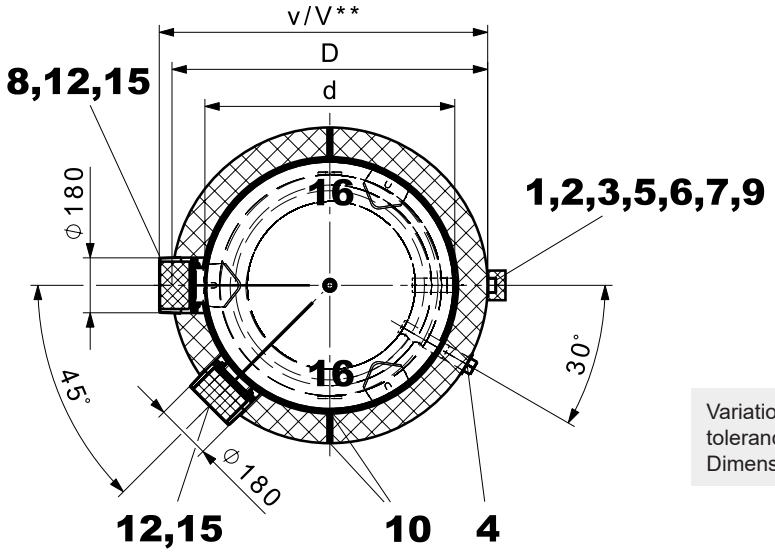
MultiVal ESRR type	D	d	H	a	b	c	e	f	g	i	k	m	n	q	t	u	v	V**	Tilting dimension
(500)	750	597	1951	55	220	587	820	725	1081	1645	820	1856	344	1400	1686	900	791	831	2029

** when using a flange-mounted electric heating element

MultiVal ESRR (800,1000)

(Dimensions in mm)





Variation because of the production tolerance possible
Dimension +/- 10 mm

1	Cold water	G 1½″ (ET)
2	Domestic hot water	G 1½″ (ET)
3	Solar circuit flow	G 1½″ (ET)
4	Solar circuit return (turned through 30° in section)	G 1½″ (ET)
5	Flow supplemental heating	G 1½″ (ET)
6	Return supplemental heating	G 1½″ (ET)
7	Circulation (removable insulated cap Ø 100 mm)	G ¾″ (ET)
8	Thermometer	
9	Connection for sensor/thermostat, inner Ø 16 mm	
10	Sensor terminal strip (zip fastener)	
12	Hand-hole flange (flange-mounted electric heating element) Ø 180/120 mm, pitch circle Ø 150 mm, 8 x M10	
15	Correx® impressed current anode sleeve	Rp ¾″ (IT)
16	Transport strap	

MultiVal ESRR type	D	d	H	h	a	b	c	f	g	i	k	m	n	p	r	s	t	u	v	V**	Tilting dimension
(800)	950	750	2033	1936	104	290	527	650	1120	1430	800	1890	382	1540	750	1455	1647	800	975	1020	1962
(1000)	1050	850	2063	1963	103	298	533	702	1172	1482	852	1902	388	1547	750	1527	1673	800	1075	1120	1991

** when using a flange-mounted electric heating element

Hoval CombiVal WPE, WPER, WPEF

Compact device for domestic hot water

Air/water heat pump

- With fully hermetic reciprocating compressor, aluminium helical tube condenser in double shell, lamellar tube evaporator (Cu/Al) and thermostatic expansion valve
- Fan (2-stage)
- Air inlet/outlet top front/top rear
- Air intake/outlet aperture Ø 160 mm
- Refrigerant R134a
- Recirculated air/outside air mode
- Microprocessor comfort control. Different possibilities of combination of heat generators (heat pump, electric heating element and boiler). Independent fan functions for ventilation. Automatic legionella program, alarm with error display
- Defrosting operation
- Can be used in conjunction with photovoltaic (Smart Grid ready)
- Air temperature range -10 °C to +35 °C

Calorifier

- Calorifier made of steel with double enamel coating
- Volume 270 l
- WPER with plain-tube coil enamelled for boiler operation (permanently installed)
- Magnesium protective anode
- Electric heating 2.0 kW
- Thermal insulation from polyurethane, not removable
- Attractive red casing; upper cover and front panel black
- WPER (300): with integrated heater battery
- WPEF (300): with cleaning flange on the end

Delivery

- Heat pump with calorifier assembled, insulated, installed and electrically wired
- Ready for operation
- Metal base available at extra charges

On site

- Charging pump and sensor for heating boiler operation
- Air ducting

Range

CombiVal type			Refrigerant	Output kW
WPE	(300)	A+	R134a	1.78
WPER	(300) [1)]	A+	R134a	1.78
WPEF	(300) [2)]	A+	R134a	1.78

[1] With integrated heating battery
[2] With cleaning flange on the front

Calorifier heat pump

Hoval CombiVal WPE, WPER, WPEF

Recirculated air/outside air mode. Air/water heat pump for water heating. Calorifier made of steel with double enamelled coating and electric heating built in
WPER: with integrated heating register
WPEF: with cleaning flange on the end
Installed and ready-to-connect. Defrosting operation and microprocessor comfort control included

CombiVal type		Persons [1] approx.	Output kW	Heating surface m^2	Part No.
WPE	A+	4	1.78	-	7016 339
WPER	A+	4	1.78	1.00	7016 340
WPEF	A+	4	1.78	-	7016 341

[1] Persons = number of persons who can be supplied with domestic hot water (approximate values).

Tests

Hoval CombiVal WPE (300)
Test number WPZ-B-111-16-11

Accessories (only for Hoval CombiVal WPER (300))

Immersion sensor TF/2P/5/6T, L = 5.0 m with plug — 2056 788
for TopTronic® E controller modules/ module expansions with exception of basic module district heating/fresh water or basic module district heating com,
cable length: 5 m with plug
sensor sleeve diameter: 6 x 50 mm,
dewpoint-proof,
operating temperature: -20…105 °C,
protection class: IP67

Immersion sensor TF/2P/5/6T, L = 5.0 m — 2055 888
for TopTronic® E controller modules/ module expansions with exception of basic module district heating/fresh water or basic module district heating com,
cable length: 5 m without plug
sensor sleeve diameter: 6 x 50 mm,
dewpoint-proof,
operating temperature: -20…105 °C,
protection class: IP67

Immersion sensor TF/12N/2.5/6T, L = 2.5 m — 2056 791
for gas boiler with RS-OT
Cable length: 2.5 m
Sensor sleeve diameter: 6 x 50 mm,
dewpoint-proof,
operating temperature: -20…105 °C,
protection class: IP67

At TopTronic® E, immersion sensor is included in the boiler controller or in the heating controller set.

Service

Commissioning
Commissioning by works service or Hoval trained authorised serviceman/company is condition for warranty.

For commissioning and other services please contact your Hoval sales office.

CombiVal WPE, WPER, WPEF (300)

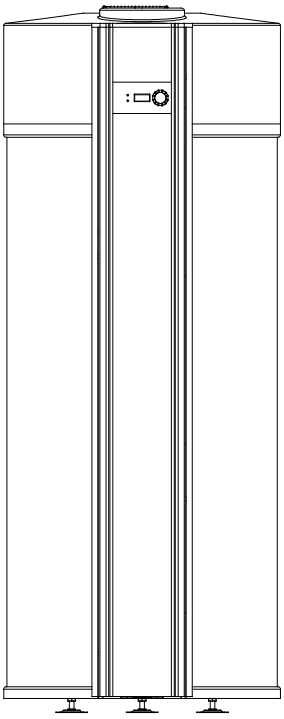
Type		WPE (300)	WPER (300)	WPEF (300)
• Volume	l	270	258	270
• Operating/test pressure	bar	6/12	6/12	6/12
Max. operating temperature				
• Max. heat pump operation	°C	62	62	62
• Heat generator operation	°C	65	65	65
• Electric operation	°C	65	65	65
Recommended economy temp.				
• Heat pump operation	°C	48	48	48
• Polystyrene foam thermal insulation	mm	80	80	80
• Electrical power dissipation at 55 °C (EN16147:2011)	Watt	20	20	20
• Transport weight	kg	137	160	137
Dimensions				
• Height	mm	1780	1780	1780
• Diameter	mm	710	710	710
• Depth	mm	720	720	720
• Air inlet/outlet Ø	mm	160	160	160
Heater coils (integral)				
• Heating surface	m^2	-	1.0	-
• Heating water	l	-	5.9	-
• Flow resistance at 1 m^3/h	mbar	-	25	-
• Operating pressure	bar	-	3	-
• Flow temperature maximum	°C	-	80	-
Heat pump				
• Refrigerant		R 134a	R 134a	R 134a
• Filling	kg	0.9	0.9	0.9
• Average heat output [1)]	kW	1.78	1.78	1.78
• Average electrical power consumption[1)]	kW	0.49	0.49	0.49
• Performance [1)]	COP	3.61	3.61	3.61
• Power consumption	A	2.0	2.0	2.0
• Max. starting current	A	9.6	9.6	9.6
• Electric fuse protection	A	13 T	13 T	13 T
• Max. supply air temperature	°C	35	35	35
• Min. supply air temperature	°C	-10	-10	-10
Nominal air quantity (not under load)				
• Stage 1	m^3/h	200	200	200
• Stage 2	m^3/h	300	300	300
Maximum external pressure				
• Stage 1	Pa	160	160	160
• Stage 2	Pa	90	90	90
• Sound power level	dB(A)	59	59	59
Sound pressure level 1 m				
• Stage 1	dB(A)	49	49	49
• Stage 2	dB(A)	55	55	55
• Electrical immersion heater 230 V	kW	2.0	2.0	2.0
• Electric connection (device) voltage/frequency	V/Hz	230/50	230/50	230/50
• Hot water output/day [2)]	number of persons	4	4	4

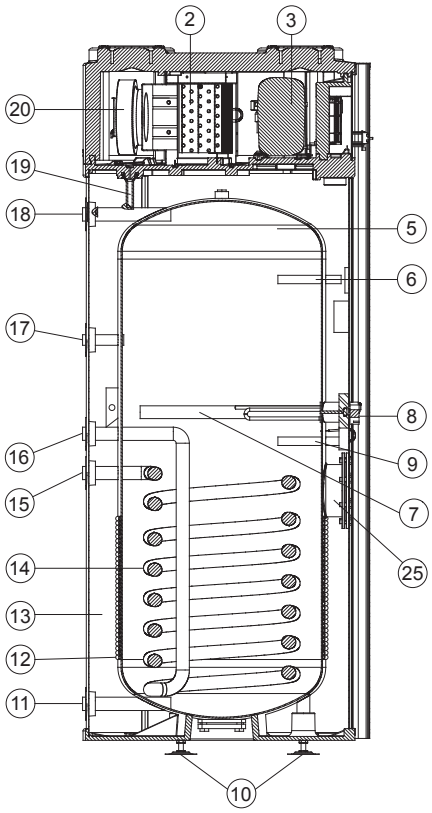
[1)] According to the following standards: EN16147:2011, EHPA Testing Regulation V1.8 A20 / W10-53 (60 % r.h.), EN12102 und EN9614-2

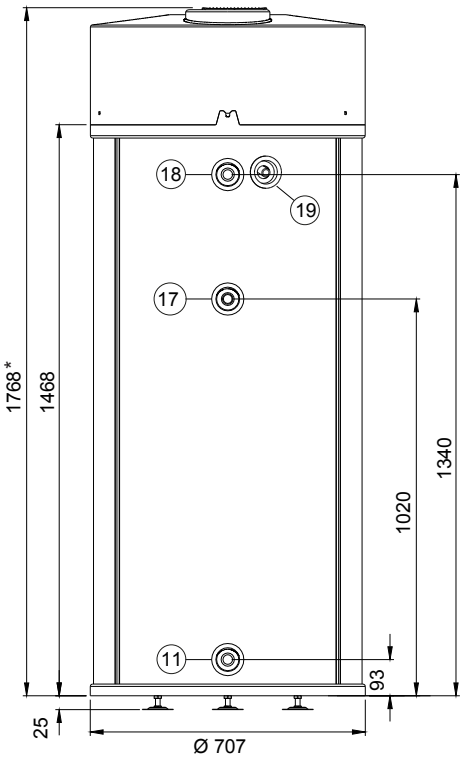
[2)] Number of persons who can be supplied with hot water at the plants without hot water circulation (approximate values without recharge).

Hoval CombiVal WPE, WPER, WPEF

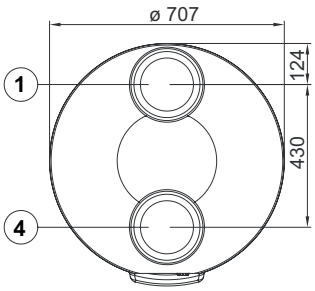
(Dimensions in mm)

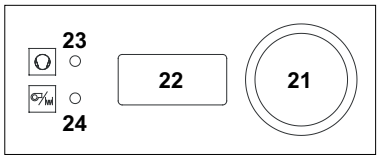






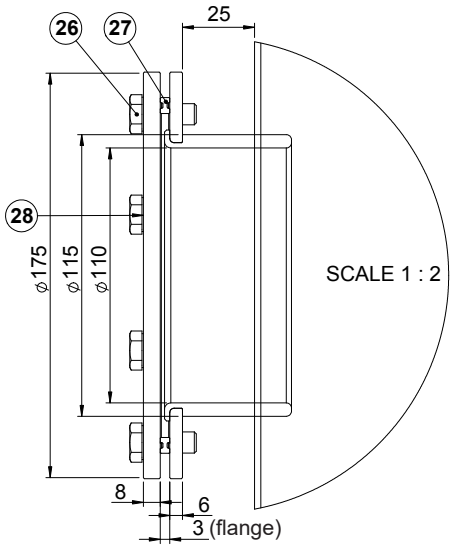
* with adjustable foot set 1890-1920 mm
Tilting dimension with standard feet 1930 mm





1 Air outlet Ø 160 mm
2 Evaporator
3 Compressor
4 Air inlet Ø 160 mm
5 Enamelled tank
6 Immersion tube for sensor Ø 15 mm, length 160 mm
7 Anode
8 Heating element
9 Immersion tube for operating sensor Ø 15 mm, length 160 mm
10 Adjustable feet
11 Cold water inlet R 1″
12 Safety condenser
13 Thermal insulation
14 Heating coil (only WPER)
15 Inlet heating coil (only WPER) R 1″
16 Outlet heating coil (only WPER) R 1″
17 Circulation nozzle R ¾″
18 Hot water outlet R 1″
19 Condensate discharge (plastic, Ø DN 15)
20 Fan
21 Operating button - rotary push-button
22 Control panel (display)
23 Operating/warning light heat pump
24 Operating/warning light auxiliary heating
25 Cleaning flange Ø 110 mm (only WPEF)
26 Screw M12 x 25-8.8-Fe/Zn8 (PN-EN ISO 4017)
27 Flange seal Ø 174 x 3
28 Dummy flange

Cleaning flange with CombiVal WPEF



Deviations possible as a result of manufacturing tolerances. Dimensions +/- 10 mm

Regulations and guidelines

The following regulations and guidelines should be complied with:

- technical information and installation guide of Hoval company
- DIN EN 1736: Refrigerating systems and heat pumps
- DIN EN 378: Refrigerating systems and heat pumps - Safety and environmental requirements
- DIN EN 13313: Refrigerating systems and heat pumps - Competence of personnel
- VDI Directive 2035: Protection against corrosion and boiler scale in heating and domestic hot water systems.
- Technical instructions on noise (TA-Lärm)
- Chemicals climate protection regulation

Ecology

Ordinance on substances (federal)

- Handling of refrigerant art. 45 (professional authorisation)
- List of refrigerant and heat carrier fluids according to VWF (regulation about protection of waters from water-hazardous liquids) regulation article 22, Paragraph 2
- Sound protection regulation 814.331
- SN (Swiss norms) 253 120 (definitions of refrigerant)
- Local regulations

Electric connection

- VSE (Association of Swiss Engineers) recommendations for connection of heat pump plants for heating and water heating to the network of electric power stations (2.29d, September 1983).
- Regulations of local electric power stations
- VDE directives
- Technical connection condition (TAB 2019) for connecting to the low voltage grid

Planning and construction

- Low loss header
- Regulations of SVGW (Swiss Association for Gas and Water Supply) (especially guideline W3), as well as regulation of local water supply
- SN 253 130 Requirements to installation place
- Local fire police regulations as well as country-specific regulations
- Fire protection regulations of the VKF (Association of Cantonal Insurance Companies)
- Guidelines of SWKI (Swiss Association of Heat and Climate Engineers) 91-1 and aeration and deaeration of the heating room
- FWS (Swiss Society for Promotion of Heat Pumps) and AWP (Working Committee for Heat Pumps) guidelines and leaflets
- Guidelines “Procal corrosion and boiler scale protection in heating and industrial water plants”.
- The LRV (air purity regulation) regulations must be kept (bivalent plants)
- Regulations concerning operating pressure and temperature
- EN 806 “Technical rules for drinking water installation”.
- ÖNORM B 2531 (national supplement to EN 806).

Installation

Hoval calorifier heat pumps type CombiVal WPE, WPER can be installed without a base in any unheated room with a floor drain for the condensate. The room temperature must not be below 6 °C with devices without additional heating system. Minimum room size 20 m³. The intake air should not contain any aggressive substances (ammonia, sulphur, chlorine, halogens, etc.).

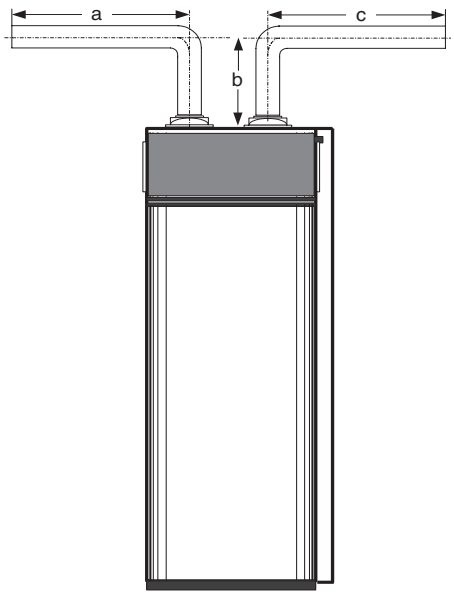
Air connection

Intake on top at front
Outlet on top at the back
(see Dimensions)

- The length of air tubes with max. 2 bows amounts to:

Intake/blow pipeline	total length
Ø 160 mm	max. 3 m
with extension to 200 mm:	
Ø 200 mm	max. 7 m

- *The indicated total length should not be exceeded!*



Maximum total length = a + b + c + b

Plumbing installation

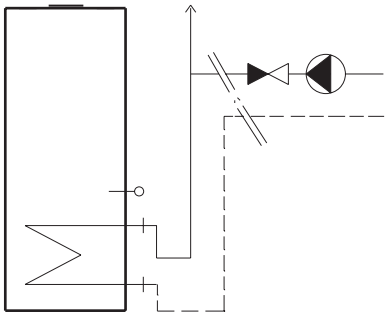
- If possible the DHW distribution system should be without circulation.
- Select short pipeline configurations.
- Pay attention to compatibility of water pipelines and calorifier.

Using copper and galvanised steel tubes always pay attention to the succession of flow direction: copper after galvanised steel.

- The hot-water pipes must be thermally insulated in accordance with the local regulations, as well as the currently valid building energy legislation.
- If water pipeline pressure is higher than 5 bar, a pressure reduction valve is to be fitted into the cold water pipeline.
- The condensate connection (at the rear of the heat pump, R ½") must be routed to the wastewater drain with plastic pipes via a siphon.
- The condensate drain can also be combined with the drain of the expansion water from the safety valve. Depending on the air humidity, up to 0.3 l/h condensate can occur.

Heating assembly (WPER)

- The auxiliary heating coil must be equipped with a charging pump on site.
- There should be installed an automatic aspirator in the heating water flow.
- Flow and return should be connected in such a way, that with switched off charging pump (heating with heat pump or electrically) no back circulation and no gravity circulation can take place.
- Expansion of heating water must be always ensured (also during electric charging resp. heat pump operation).

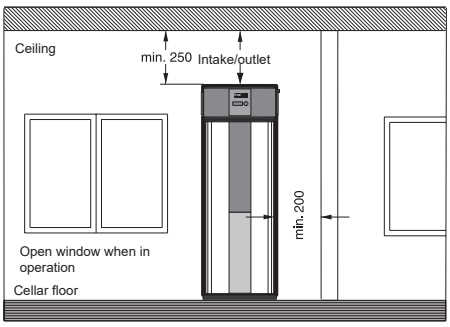


Electric connection

- Ready-for-use wiring (plug with 2 m cable) (230 V socket or 230 V/50 Hz Schuko socket)

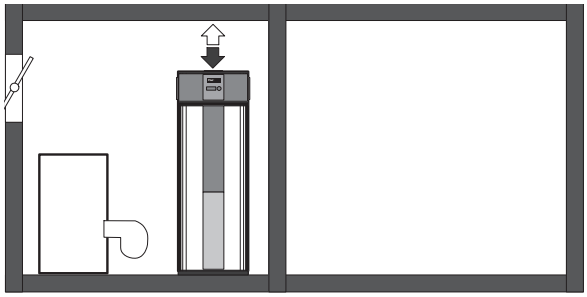
Required space

- Installation area diameter 700 mm
- Minimum distance to the walls min. 200 mm
- Required space operation side min. 600 mm
- Minimum distance to the ceiling: 250 mm



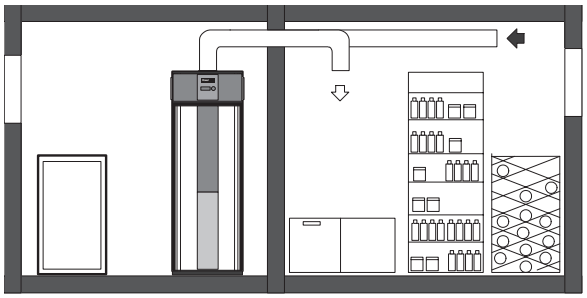
Installation in the heating room

- *Air ducting*
  Air drawn from and blown into the room
- Recovery of unusable waste heat



Installation in the heating room with heating only heat pump

- *Air ducting*
  Air drawn from and blown into the neighbouring room
- Min. room volume 25 m³
- Cooling, dehumidification (wine cellar, storeroom)

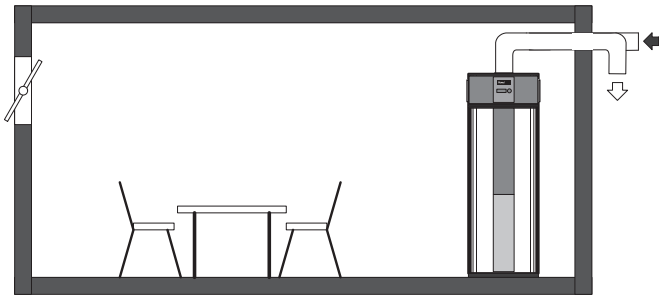


Installation in the utility room

- *Air ducting*
  Air drawn from and blown into the room
- Min. room volume 20 m³
- Dehumidification, use heat of condensate (laundry room)
- Air intake grille must be cleaned monthly
- Clean evaporator at least 1 time per year

Installation in recreation room

- *Air ducting*
  Inflow and outflow of air either from the room or from outdoors
- min. room volume 20 m³
  If the air guide shown in the drawing is used, the window can remain closed.



Air duct pipelines

- Intake/blow pipes made of plain tube, min. Ø 160 or 200 mm.
- Max. total length of pipeline should be 3 or 7 m, with max. 2 bows (90°). (For each further bow the total length of pipe must be reduced by 1 m.)
- Supply of pipeline incl. accessories by the customer (ventilating pipe made of plastic, aluminium or galvanised sheet steel).

Calorifier charging system
Consisting of:
- calorifier charging module TransTherm® aqua L
- hot water charging tank CombiVal E or CombiVal C (optional)

Calorifier charging module TransTherm® aqua L

- Fully assembled station with plate heat exchanger for the provision of domestic hot water using the tank storage principle
- Intended for wall installation
- The primary side (heating side) contains the three-way valve, high-efficiency pump, air-bleeding, contact sensor and the filling and drain valve, line balancing valve. These components ensure a constant flow temperature at the plate heat exchanger. Pipes made from steel
- The secondary side (DHW side) contains the safety valve (10 bar), non-return valve, filling/drain valves and balancing valve. A flow sensor ensures the correct charging temperature for the hot process water storage tank. Pipes made from stainless steel
- Stainless steel plate heat exchanger 1.4404, copper-soldered or copper-free
- EPP insulation, 30 mm, for the heat exchanger
- Switch-on and switch-off of the charging pump is regulated via two sensors (included in the scope of delivery) in the storage tank.
- Mount tank sensor on the tank on site and connect it to the controller
- T-piece with dummy plug for on-site connection of the circulation group. Connect the pump to the controller on site.
- TopTronic® E control with integrated thermal disinfection of the DHW storage tank (anti-legionella circuit)

Delivery
- The storage tank required is not included in the scope of delivery

On site
- Installation of a circulation unit; the necessary connection is provided.
- Electrical connection of the controller

Suitable hot water charging tanks
see next page

TopTronic® E controller

TopTronic® E basic module district heating/ fresh water
- Control unit for controlling district heating systems in non-communicative networks and the corresponding consumers with integrated control functions for
  - primary valve control
  - cascade management
  - 1 heating/cooling circuit with mixer
  - 1 heating/cooling circuit without mixer
  - 1 hot water charging circuit
  - various additional functions

Range
Calorifier charging module

TransTherm® aqua L type	Output kW
(1-10)	50
(1-16)	90
(1-20)	115
(1-30)	175
(1-40)	230
(1-50)	275

Range
Hot water charging tank

CombiVal E		Content l
(300)	B	301
(500)	B	475
(800)		747
(1000)		968
(1500)		1472
(2000)		2000

CombiVal C		Content l
(200)	B	212
(300)	B	289
(400)	B	411
(500)	B	490
(750)		756
(1000)		990
(1500)		1415
(2000)		1975
(2500)		2450

- Various functions for hot water:
  - selection of different basic programs (week programs, economy mode, holiday until, etc.)
  - various operating modes (e.g. accumulator priority or parallel mode)
  - buffer storage circuit on the primary or secondary side
  - adjustable loading criteria (e.g. adjustable loading times, undershooting the minimum nominal value, etc.)
  - adjustable switch-off criteria (e.g. achieving the setpoint valve, achieving the lower sensor setpoint value, etc.)
  - adjustable loading block (if the loading flow temperature is too low, the setpoint temperature is not reached, differential temperature-dependent solar circuit control)
- Definable switching times for recirculation pump control
- Outdoor sensor
- Immersion sensor (calorifier sensor)
- Contact sensor (flow temperature sensor)
- Complete plug set for DH module
- RPM-regulated pumps

No further module expansions or controller modules can be installed in the control panel!

Option

TopTronic® E control module
- Simple, intuitive operating concept
- Display of the most important operating states
- Configurable start screen
- Operating mode selection
- Configurable day and week programs
- Operation of all connected Hoval CAN bus modules
- Commissioning wizard
- Service and maintenance function
- Fault message management
- Analysis function
- Weather display (with HovalConnect option)
- Adaptation of the heating strategy based on the weather forecast (with HovalConnect option)

Notice
The TopTronic® E control module for operating the basic module district heating/fresh water must be ordered separately!

Further information about the TopTronic® E
see “Controls”

Delivery
- All armatures required for operation, such as flow balancing and shut-off valves, backflow preventer, air-bleeding and drain valve are fitted.

Caution
As a result of thermal disinfection of the domestic hot water for legionella protection, increased water temperatures (at least 65-70 °C) occur. Depending on the water quality, this may result in increased calcification at the installed armatures and heat exchangers and also brings the risk of scalding at the tapping points. Corresponding protective measures must be implemented on site.

CombiVal C (200-2500)

- Charging tank made from stainless steel (without built-in heating coil) for combination with calorifier charging module TransTherm® aqua L
- (200-1000) with one flange
  (1500-2000) with two flanges
  (2500) with one manhole
  in each case with installed dummy flange plate for maintenance or, for types (200-2000), installation of a flange-mounted electric heating element
- Thermal insulation: Neodul® insulation (EPS rigid foam outside and 20 mm polyester fibre fleece inside) with zip, outer jacket made of polypropylene, colour red
  (200-1000) 2-piece
  (1500) 3-piece
  (2000-2500) 4-piece
- Thermometer incl. immersion sleeve loose (packed with the product)
- Sensor terminal bar
- Observe limit values for chloride content in domestic water - see “Engineering”.

Delivery

- (200-1000) with thermal insulation completely installed (can be removed for bringing in)
- (1500-2500) thermal insulation separately packed

Design on request

- (200-2000) Flange-mounted electric heating element

On site

- Installation of immersion sleeve for thermometer
- (1500-2500) Installation of the thermal insulation and attaching the protection rosettes

CombiVal E (300-2000)

- Charging tank made of steel, enamelled inside (without built-in heating coil) for combination with calorifier charging module TransTherm® aqua L
- (300-1000) with one flange
  (1500,2000) with two flanges
  in each case with installed dummy flange plate for maintenance or installation of a flange-mounted electric heating element
- (300-1000) one built-in magnesium protection anode (1500,2000) two built-in magnesium protection anodes
- Thermal insulation made of
  - (300,500) polyurethane rigid foam, directly foamed, with dismantable foil casing, 1-part, red coloured
  - (800-2000) polyester fleece with foil jacket, completely removable, red coloured
    (800-1500) 2-part
    (2000) 3-part
- With thermometer
- (300,500) sensor channel (800-2000) two terminal bars for contact sensor

Delivery

- (300,500) with foil casing completely mounted
- (800-2000) with thermal insulation fully installed (removable)

Design on request

- Flange-mounted electric heating element

On site

- Installation of the thermometer
- Attachment of the glue-on protection rosettes to the thermal insulation

Water quality
see end of this brochure

Calorifier charging module

TransTherm® aqua L

Fully assembled station with plate heat exchanger for the provision of domestic hot water using the storage tank charging principle and built-in Hoval TopTronic® E control
The required storage tank is not supplied.

TransTherm® aqua L	Output kW	Part No.
(1-10)	50	8005 864
(1-16)	90	8005 865
(1-20)	115	8005 866
(1-30)	175	8005 867
(1-40)	230	8005 868
(1-50)	275	8005 869

Version with copper-free heat exchanger

TransTherm® aqua L

with copper-free heat exchanger

TransTherm® aqua L	Output kW	Part No.
(1-10)	50	8006 491
(1-16)	90	8006 492
(1-20)	115	8006 493
(1-30)	175	8006 494
(1-40)	230	8006 495
(1-50)	275	8006 496

Electric heating elements
see chapter “Electric heating elements”

Accessories

	Part No.
	
TopTronic® E control module black with 4.3″ colour touchscreen For operation of all controller modules connected to the bus system (basic, solar, buffer modules etc.) Connection to the Hoval bus system via RJ45 plug connection or via plug terminals (max. 0.75 mm²), flat design with flexible installation option Installation: - in control panel of the heat generator - in the Hoval wall casing - in the control panel front, black high-gloss cover, customer-specific configurable start screen, Display of current weather or weather forecast (only possible in combination with HovalConnect) Consisting of: - TopTronic® E control module black - Clamping device set control module - RJ45-RAST 5 CAN cable, L = 500	6043 844
	
Return changeover valve set Consisting of: - temperature sensor - changeover valve - drive (8 sec.) DN 20-DN 40 - drive (30 sec.) DN 50-DN 80 - seals - screw connections	

Nominal diameter	Output kW	kvs m³/h	
DN 20	50-90	6.3	7010 832
DN 25	115-175	10	7010 836
DN 32	230-275	16	7011 009
DN 40	350	25	7011 025
DN 50	450	40	7016 331
DN 65	580	63	7016 332
DN 80	700	100	7016 333

Notice
When using a circulation set with integration at the heat exchanger (also on-site circulating pump), it is imperative to install a return switching valve set.

Circulation set
for TransTherm® aqua L, F
Piping of parts in contact with domestic water in stainless steel and gunmetal
Consisting of:
- temperature sensor PT1000
- recirculation pump Wilo Yonos PARA
- recirculation pump Wilo Para MAXO
- regulating valve
- non-return valve

Connection	Flow rate m³/h	Recirculation pump	
DN 20 ¾″ Rp	1.9	Z15/7.0 RKC	8005 279
DN 25 1″ Rp	3.4	Z25/180/08/F02	8005 280
DN 32 1¼″ Rp	5.8	Z25/180/08/F02	8005 281

		Part No.
	**Test valve DN 8 G ¼″** for TransTherm® aqua L, F, FS Test valve suitable for flame treatment for hygienic-microbiologic tests.	2049 861
	**Sludge separator with magnet MB3/L DN 25...DN 50** Fast and continuous removal of ferromagnetic and non-magnetic dirt and sludge particles Sludge separation up to a particle size of 5 µm Brass housing Max. operating pressure: 6 bar Max. flow temperature: 110 °C	
	Type / Connection / Flow rate m³/h at 1 m/s flow speed	
	MB3 DN 25 / Rp 1″ / 2.0	2062 165
	MBL DN 32 / Rp 1¼″ / 3.6	2062 166
	MBL DN 40 / Rp 1½″ / 5.0	2062 167
	MBL DN 50 / Rp 2″ / 7.5	2062 168
	Additional sludge separators see “Various system components”	
	**Temperature monitor 0…120 °C** for TransTherm® aqua L, F, FS	2048 299
	**Safety temperature monitor 70…130 °C** for TransTherm® aqua L, F, FS	2048 300
	**Safety temperature limiter 70…130 °C** for TransTherm® aqua L, F, FS	2049 619
	**Immersion sleeve G ½″ stainless steel for thermostat** for TransTherm® aqua L, F, FS Installation length = 100 mm Outer Ø: 8 mm, inner Ø: 6.5 mm	2048 285
	**Immersion sleeve G ½″ stainless steel for 2 thermostats** for TransTherm® aqua L, F, FS Installation length = 100 mm Outer Ø: 15 mm, inner Ø: 13.5 mm	2048 288

Hot water charging tank

CombiVal E

Enamelled charging tank
(without heating coil)

CombiVal E (300-1000) with one flange
CombiVal E (1500,2000) with two flanges
- (300,500) thermal insulation mounted with foil casing
- (800-2000) Thermal insulation fully installed (removable)

CombiVal type		Content l	Part No.
E (300)	B	301	6044 187
E (500)	B	475	6044 188
E (800)		747	6044 189
E (1000)		968	6044 190
E (1500)		1472	6044 191
E (2000)		2000	6044 192

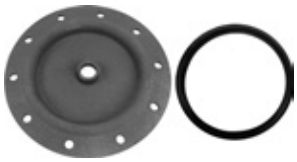
CombiVal C

Stainless steel charging tank
(without heating coil)

CombiVal C (200-1000) with one flange
CombiVal C (1500-2000) with two flanges
CombiVal C (2500) with one manhole thermal insulation
- (200-1000) completely mounted (removable)
- (1500-2000) separately packed

CombiVal type		Content l	Part No.
C (200)	B	212	6049 693
C (300)	B	289	6049 694
C (400)	B	411	6049 695
C (500)	B	490	6049 696
C (750)		756	6049 697
C (1000)		990	6049 698
C (1500)		1415	6049 699
C (2000)		1975	6049 700
C (2500)		2450	6049 701

For CombiVal E (300-2000)



Flange cover 180 - ¾″
for the installation of the Correx® impressed current anode in flange Ø 180/110 mm,
enamelled on the inside with Rp ¾″ sleeve
Seal included

Part No. 2077 035

UP 2.3-919

Kit Correx® impressed current anode UP2.3-919-L395/1
for long-term corrosion protection for installation in the enamelled calorifier
with reduction R 1¼″ (ET) – Rp 1″ (IT)
and R 1″ (ET) – Rp ¾″ (IT)
Installation length: 395 mm
Connection cable length: 1 x 2000 mm
1 Correx® impressed current anode

Part No. 684 760

Either a Correx® impressed current anode **or** one/two magnesium anodes may be used.

For CombiVal C (200-2500)

Flange cover 180 - 1½″
for the installation of the Correx® impressed current anode
in flange Ø 180/110 mm,
stainless steel with Rp 1½″ sleeve
Seal and screws included

Part No. 2077 911

UP 1.9-924

Kit Correx® impressed current anode UP1.9-924-L395/1
for long-term corrosion protection for installation in the stainless steel calorifier
with reduction R 1½″ - Rp ¾″
Installation length: 395 mm
Connection cable length: 1 x 3500 mm
1 Correx® impressed current anode (up to 800 l)

Part No. 6031 813

The flange cover 180 - 1½″ must also be ordered for installation of the impressed current anode set.

Services

Commissioning
Commissioning by works service or Hoval trained authorised serviceman/company is condition for warranty.

For commissioning and other services please contact your Hoval sales office.

Performance data

TransTherm® aqua L (1-10 to 1-50)

Domestic water secondary	TransTherm® aqua L		Flow temperature heating water: 55 °C (1-...) (10)	(16)	(20)	(30)	(40)	(50)	60 °C (1-...) (10)	(16)	(20)	(30)	(40)	(50)
60/5 °C	T return primary	°C	-	-	-	-	-	-	-	-	-	-	-	-
	V̇ primary	**m³/h**	-	-	-	-	-	-	-	-	-	-	-	-
	Q max.	kW	-	-	-	-	-	-	-	-	-	-	-	-
	V̇ secondary	**m³/h**	-	-	-	-	-	-	-	-	-	-	-	-
60/10 °C	T return primary	°C	-	-	-	-	-	-	-	-	-	-	-	-
	V̇ primary	**m³/h**	-	-	-	-	-	-	-	-	-	-	-	-
	Q max.	kW	-	-	-	-	-	-	-	-	-	-	-	-
	V̇ secondary	**m³/h**	-	-	-	-	-	-	-	-	-	-	-	-
60/15 °C	T return primary	°C	-	-	-	-	-	-	-	-	-	-	-	-
	V̇ primary	**m³/h**	-	-	-	-	-	-	-	-	-	-	-	-
	Q max.	kW	-	-	-	-	-	-	-	-	-	-	-	-
	V̇ secondary	**m³/h**	-	-	-	-	-	-	-	-	-	-	-	-
60/20 °C	T return primary	°C	-	-	-	-	-	-	-	-	-	-	-	-
	V̇ primary	**m³/h**	-	-	-	-	-	-	-	-	-	-	-	-
	Q max.	kW	-	-	-	-	-	-	-	-	-	-	-	-
	V̇ secondary	**m³/h**	-	-	-	-	-	-	-	-	-	-	-	-
55/5 °C	T return primary	°C	-	-	-	-	-	-	30	30	30	30	30	30
	V̇ primary	**m³/h**	-	-	-	-	-	-	**1.25**	**2.04**	**2.51**	**3.71**	**4.76**	**5.66**
	Q max.	kW	-	-	-	-	-	-	43	70	86	127	163	194
	V̇ secondary	**m³/h**	-	-	-	-	-	-	**0.74**	**1.2**	**1.48**	**2.18**	**2.8**	**3.33**
55/10 °C	T return primary	°C	-	-	-	-	-	-	30	30	30	30	30	30
	V̇ primary	**m³/h**	-	-	-	-	-	-	**1.11**	**2.04**	**2.51**	**3.71**	**4.76**	**5.63**
	Q max.	kW	-	-	-	-	-	-	38	70	86	127	163	193
	V̇ secondary	**m³/h**	-	-	-	-	-	-	**0.73**	**1.34**	**1.64**	**2.43**	**3.12**	**3.69**
55/15 °C	T return primary	°C	-	-	-	-	-	-	30	30	30	30	30	30
	V̇ primary	**m³/h**	-	-	-	-	-	-	**0.76**	**1.46**	**1.95**	**3.06**	**4.23**	**5.4**
	Q max.	kW	-	-	-	-	-	-	26	50	67	105	145	185
	V̇ secondary	**m³/h**	-	-	-	-	-	-	**0.56**	**1.08**	**1.44**	**2.26**	**3.12**	**3.98**
55/20 °C	T return primary	°C	-	-	-	-	-	-	30	30	30	30	30	30
	V̇ primary	**m³/h**	-	-	-	-	-	-	**0.47**	**0.9**	**1.17**	**1.9**	**2.63**	**3.36**
	Q max.	kW	-	-	-	-	-	-	16	31	40	65	90	115
	V̇ secondary	**m³/h**	-	-	-	-	-	-	**0.39**	**0.76**	**0.99**	**1.6**	**2.22**	**2.83**
50/5 °C	T return primary	°C	30	30	30	30	30	30	30	30	30	30	30	30
	V̇ primary	**m³/h**	**1.29**	**2.03**	**2.51**	**3.67**	**4.72**	**5.66**	**1.28**	**2.04**	**2.51**	**3.71**	**4.76**	**5.63**
	Q max.	kW	37	58	72	105	135	162	44	70	86	127	163	193
	V̇ secondary	**m³/h**	**0.71**	**1.11**	**1.37**	**2**	**2.58**	**3.09**	**0.84**	**1.34**	**1.64**	**2.43**	**3.12**	**3.69**
50/10 °C	T return primary	°C	30	30	30	30	30	30	30	30	30	30	30	30
	V̇ primary	**m³/h**	**1.29**	**2.03**	**2.51**	**3.67**	**4.72**	**5.66**	**1.28**	**2.04**	**2.51**	**3.73**	**4.81**	**5.69**
	Q max.	kW	38	58	72	105	135	162	44	70	86	128	165	195
	V̇ secondary	**m³/h**	**0.82**	**1.25**	**1.77**	**2.26**	**2.9**	**3.48**	**0.95**	**1.51**	**1.85**	**2.75**	**3.55**	**4.19**
50/15 °C	T return primary	°C	30	30	30	30	30	30	30	30	30	30	30	30
	V̇ primary	**m³/h**	**1.29**	**2.03**	**2.51**	**3.67**	**4.72**	**5.66**	**1.11**	**1.95**	**2.48**	**3.76**	**4.76**	**5.69**
	Q max.	kW	37	58	72	105	135	162	38	67	85	129	163	195
	V̇ secondary	**m³/h**	**0.91**	**1.43**	**1.77**	**2.58**	**3.32**	**3.99**	**0.94**	**1.65**	**2.09**	**3.18**	**4.01**	**4.8**
50/20 °C	T return primary	°C	30	30	30	30	30	30	30	30	30	30	30	30
	V̇ primary	**m³/h**	**1.15**	**2.03**	**2.55**	**3.7**	**4.75**	**5.69**	**0.96**	**1.69**	**2.13**	**3.24**	**3.63**	**5.16**
	Q max.	kW	33	58	73	106	136	163	33	58	73	111	145	177
	V̇ secondary	**m³/h**	**0.95**	**1.67**	**2.1**	**3.05**	**3.91**	**4.69**	**0.95**	**1.67**	**2.1**	**3.19**	**4.17**	**5.09**

T return primary	°C	Return temperature primary
V̇ primary	**m³/h**	Flow rate primary
Q max.	kW	Output
V̇ secondary	**m³/h**	Flow rate secondary

The specified technical data relate to the full load of the module in each case.

Performance data

TransTherm® aqua L (1-10 to 1-50)

Domestic water secondary	TransTherm® aqua L		Flow temperature heating water: 65 °C (1-...) (10)	(16)	(20)	(30)	(40)	(50)	70 °C (1-...) (10)	(16)	(20)	(30)	(40)	(50)
60/5 °C	T return primary	°C	30	30	30	30	30	30	30	30	30	30	30	30
	V̇ primary	**m³/h**	**1.08**	**1.88**	**2.5**	**3.73**	**4.84**	**5.77**	**1.32**	**2.09**	**2.59**	**3.76**	**4.82**	**5.72**
	Q max.	kW	43	75	100	149	193	230	60	95	118	171	219	260
	V̇ secondary	**m³/h**	**0.67**	**1.17**	**1.55**	**2.33**	**3.01**	**3.59**	**0.94**	**1.48**	**1.84**	**2.67**	**3.42**	**4.06**
60/10 °C	T return primary	°C	30	30	30	30	30	30	30	30	30	30	30	30
	V̇ primary	**m³/h**	**0.8**	**1.5**	**2.01**	**3.16**	**4.34**	**5.39**	**1.08**	**1.94**	**2.48**	**3.77**	**4.95**	**5.92**
	Q max.	kW	32	60	80	126	173	215	50	90	115	175	230	275
	V̇ secondary	**m³/h**	**0.55**	**1.03**	**1.38**	**2.17**	**2.98**	**3.7**	**0.86**	**1.54**	**1.98**	**3.01**	**3.95**	**4.73**
60/15 °C	T return primary	°C	30	30	30	30	30	30	30	30	30	30	30	30
	V̇ primary	**m³/h**	**0.55**	**1.05**	**1.38**	**2.13**	**3.08**	**3.96**	**0.97**	**1.8**	**2.37**	**3.73**	**4.84**	**5.72**
	Q max.	kW	22	42	55	85	123	158	44	82	108	170	220	260
	V̇ secondary	**m³/h**	**0.42**	**0.8**	**1.05**	**1.63**	**2.35**	**3.02**	**0.84**	**1.57**	**2.08**	**3.24**	**4.21**	**4.98**
60/20 °C	T return primary	°C	30	30	30	30	30	30	30	30	30	30	30	30
	V̇ primary	**m³/h**	**0.3**	**0.6**	**0.8**	**1.28**	**1.75**	**2.33**	**0.62**	**1.14**	**2.05**	**2.4**	**3.43**	**4.22**
	Q max.	kW	12	24	32	51	70	93	28	52	68	109	156	192
	V̇ secondary	**m³/h**	**0.26**	**0.52**	**0.69**	**1.1**	**1.51**	**2**	**0.6**	**1.12**	**1.47**	**2.36**	**3.36**	**4.14**
55/5 °C	T return primary	°C	30	30	30	30	30	30	30	30	30	30	30	30
	V̇ primary	**m³/h**	**0.8**	**1.5**	**2.01**	**3.16**	**4.34**	**5.39**	**1.08**	**2.09**	**2.53**	**3.74**	**4.84**	**5.76**
	Q max.	kW	32	60	80	126	173	215	50	95	115	170	220	262
	V̇ secondary	**m³/h**	**0.55**	**1.03**	**1.38**	**2.17**	**2.98**	**3.7**	**0.86**	**1.63**	**1.97**	**2.92**	**3.78**	**4.5**
55/10 °C	T return primary	°C	30	30	30	30	30	30	30	30	30	30	30	30
	V̇ primary	**m³/h**	**1.3**	**2.06**	**2.53**	**3.71**	**4.81**	**5.64**	**1.08**	**1.87**	**2.42**	**3.74**	**4.84**	**5.72**
	Q max.	kW	52	82	101	148	192	225	49	85	110	170	220	260
	V̇ secondary	**m³/h**	**0.99**	**1.57**	**1.93**	**2.83**	**3.67**	**4.3**	**0.94**	**1.62**	**2.1**	**3.24**	**4.21**	**4.98**
55/15 °C	T return primary	°C	30	30	30	30	30	30	30	30	30	30	30	30
	V̇ primary	**m³/h**	**0.97**	**1.65**	**2.11**	**3.71**	**4.81**	**5.64**	**1.1**	**1.88**	**2.41**	**3.74**	**4.22**	**5.1**
	Q max.	kW	44	75	96	148	192	225	44	75	96	148	192	232
	V̇ secondary	**m³/h**	**0.95**	**1.61**	**2.07**	**3.19**	**4.13**	**4.84**	**0.94**	**1.62**	**2.1**	**3.19**	**4.21**	**5**
55/20 °C	T return primary	°C	30	30	30	30	30	30	30	30	30	30	30	30
	V̇ primary	**m³/h**	**0.95**	**1.68**	**2.13**	**3.23**	**4.24**	**5.14**	**0.84**	**1.47**	**1.87**	**2.84**	**3.72**	**4.51**
	Q max.	kW	38	67	85	129	169	205	38	67	85	129	169	205
	V̇ secondary	**m³/h**	**0.94**	**1.65**	**2.09**	**3.18**	**4.16**	**5.05**	**0.94**	**1.65**	**2.09**	**3.18**	**4.16**	**5.05**
50/5 °C	T return primary	°C	30	30	30	30	30	30	30	30	30	30	30	30
	V̇ primary	**m³/h**	**1.25**	**2.06**	**2.53**	**3.71**	**4.81**	**5.64**	**1.08**	**1.87**	**2.42**	**3.56**	**4.84**	**5.72**
	Q max.	kW	50	82	101	148	192	225	49	85	110	162	220	260
	V̇ secondary	**m³/h**	**0.95**	**1.57**	**1.93**	**2.83**	**3.67**	**4.3**	**0.94**	**1.62**	**2.1**	**3.09**	**4.21**	**4.98**
50/10 °C	T return primary	°C	30	30	30	30	30	30	30	30	30	30	30	30
	V̇ primary	**m³/h**	**1.1**	**1.88**	**2.41**	**3.71**	**4.81**	**5.64**	**0.97**	**1.65**	**2.11**	**3.25**	**4.22**	**5.1**
	Q max.	kW	44	75	96	148	192	225	44	75	96	148	192	232
	V̇ secondary	**m³/h**	**0.95**	**1.61**	**2.07**	**3.19**	**4.13**	**4.84**	**0.95**	**1.61**	**2.07**	**3.19**	**4.13**	**5**
50/15 °C	T return primary	°C	30	30	30	30	30	30	30	30	30	30	30	30
	V̇ primary	**m³/h**	**0.95**	**1.68**	**2.13**	**3.23**	**4.24**	**5.14**	**0.84**	**1.47**	**1.87**	**2.84**	**3.72**	**4.51**
	Q max.	kW	38	67	85	129	169	205	38	67	85	129	169	205
	V̇ secondary	**m³/h**	**0.94**	**1.65**	**2.09**	**3.18**	**4.16**	**5.05**	**0.94**	**1.65**	**2.09**	**3.18**	**4.16**	**5.05**
50/20 °C	T return primary	°C	30	30	30	30	30	30	30	30	30	30	30	30
	V̇ primary	**m³/h**	**0.83**	**1.45**	**1.81**	**2.44**	**3.63**	**4.44**	**0.73**	**1.28**	**1.61**	**2.44**	**3.19**	**3.89**
	Q max.	kW	33	58	73	111	145	177	33	58	73	111	145	177
	V̇ secondary	**m³/h**	**0.95**	**1.67**	**2.1**	**3.19**	**4.17**	**5.09**	**0.95**	**1.67**	**2.1**	**3.19**	**4.17**	**5.09**

T return primary	°C	Return temperature primary
V̇ primary	**m³/h**	Flow rate primary
Q max.	kW	Output
V̇ secondary	**m³/h**	Flow rate secondary

The specified technical data relate to the full load of the module in each case.

Performance data

TransTherm® aqua L (1-10 to 1-50)

Temperature primary 70 °C flow/30 °C return

Domestic water heating

			Cold water 10 °C Domestic water 60 °C					
		TransTherm® aqua L	(10)	(16)	(20)	(30)	(40)	(50)
		kW	50	90	115	175	230	275
		m³/h	0.86	1.54	1.97	3.00	3.94	4.71
		l/min	14.3	25.7	32.9	50.0	65.7	78.6
		l/s	0.2	0.4	0.5	0.8	1.1	1.3
Tank size l								
200	**V̇s**	**l/10 min**	343	457	529	-	-	-
	Hourly output	l/h at 60 °C	1057	1743	2171	-	-	-
	NL index		13	22	29	-	-	-
300	**V̇s**	**l/10 min**	443	557	629	800	-	-
	Hourly output	l/h at 60 °C	1157	1843	2271	3300	-	-
	NL index		21	31	39	57	-	-
400	**V̇s**	**l/10 min**	543	657	729	900	-	-
	Hourly output	l/h at 60 °C	1257	1943	2371	3400	-	-
	NL index		23	41	49	69	-	-
500	**V̇s**	**l/10 min**	643	757	829	1000	1157	-
	Hourly output	l/h at 60 °C	1357	2043	2471	3500	4443	-
	NL index		25	44	56	80	100	-
800	**V̇s**	**l/10 min**	943	1057	1129	1300	1457	-
	Hourly output	l/h at 60 °C	1657	2343	2771	3800	4743	-
	NL index		33	52	64	94	123	-
1000	**V̇s**	**l/10 min**	1143	1257	1329	1500	1657	1786
	Hourly output	l/h at 60 °C	1857	2543	2971	4000	4943	5714
	NL index		38	57	69	100	128	152
1500	**V̇s**	**l/10 min**	-	1757	1829	2000	2157	2286
	Hourly output	l/h at 60 °C	-	3043	3471	4500	5443	6214
	NL index		-	71	83	114	143	167
2000	**V̇s**	**l/10 min**	-	2257	2329	2500	2657	2786
	Hourly output	l/h at 60 °C	-	3543	3971	5000	5943	6714
	NL index		-	84	97	128	158	182
2500	**V̇s**	**l/10 min**	-	2757	2829	3000	3157	3286
	Hourly output	l/h at 60 °C	-	4043	4471	5500	6443	7214
	NL index		-	99	115	144	174	198

V̇s **l/10 min** 10 minutes peak flow rate at 60 °C

NL index Performance figure in accordance with DIN 4708 = number of flats which can be supplied with domestic hot water when the calorifier is heated and permanently reheated with the heat generator (standard flat: 1 bath - 4 rooms - 3.5 persons)

Performance data

TransTherm® aqua L (1-10 to 1-50)

Tapping point (mixing temperature)

			Cold water 10 °C Domestic water 45 °C					
		TransTherm® aqua L	(10)	(16)	(20)	(30)	(40)	(50)
		kW	50	90	115	175	230	275
		m³/h	1.22	2.20	2.82	4.29	5.63	6.73
		l/min	20.4	36.7	46.9	71.4	93.9	112.2
		l/s	0.3	0.6	0.8	1.2	1.6	1.9
Tank size l								
200	**V̇s**	**l/10 min**	490	653	755	-	-	-
	Hourly output	l/h at 45 °C	1510	2490	3102	-	-	-
	NL index		13	22	29	-	-	-
300	**V̇s**	**l/10 min**	633	796	898	1143	-	-
	Hourly output	l/h at 45 °C	1653	2633	3245	4714	-	-
	NL index		21	31	39	57	-	-
400	**V̇s**	**l/10 min**	776	939	1041	1286	-	-
	Hourly output	l/h at 45 °C	1796	2776	3388	4857	-	-
	NL index		23	41	49	69	-	-
500	**V̇s**	**l/10 min**	918	1082	1184	1429	1653	-
	Hourly output	l/h at 45 °C	1939	2918	3531	5000	6347	-
	NL index		25	44	56	80	100	-
800	**V̇s**	**l/10 min**	1347	1510	1612	1857	2082	-
	Hourly output	l/h at 45 °C	2367	3347	3959	5429	6776	-
	NL index		33	52	64	94	123	-
1000	**V̇s**	**l/10 min**	1633	1796	1898	2143	2367	2551
	Hourly output	l/h at 45 °C	2653	3633	4245	5714	7061	8163
	NL index		38	57	69	100	128	152
1500	**V̇s**	**l/10 min**	-	2510	2612	2857	3082	3265
	Hourly output	l/h at 45 °C	-	4347	4959	6429	7776	8878
	NL index		-	71	83	114	143	167
2000	**V̇s**	**l/10 min**	-	3224	3327	3571	3796	3980
	Hourly output	l/h at 45 °C	-	5061	5673	7143	8490	9592
	NL index		-	84	97	128	158	182
2500	**V̇s**	**l/10 min**	-	3939	4041	4286	4510	4694
	Hourly output	l/h at 45 °C	-	5776	6388	7857	9204	10306
	NL index		-	99	115	144	174	198

V̇s **l/10 min** 10 minutes peak flow rate at 45 °C

NL index Performance figure in accordance with DIN 4708 = number of flats which can be supplied with domestic hot water when the calorifier is heated and permanently reheated with the heat generator (standard flat: 1 bath - 4 rooms - 3.5 persons)

Hot water charging tank CombiVal E (300-2000)

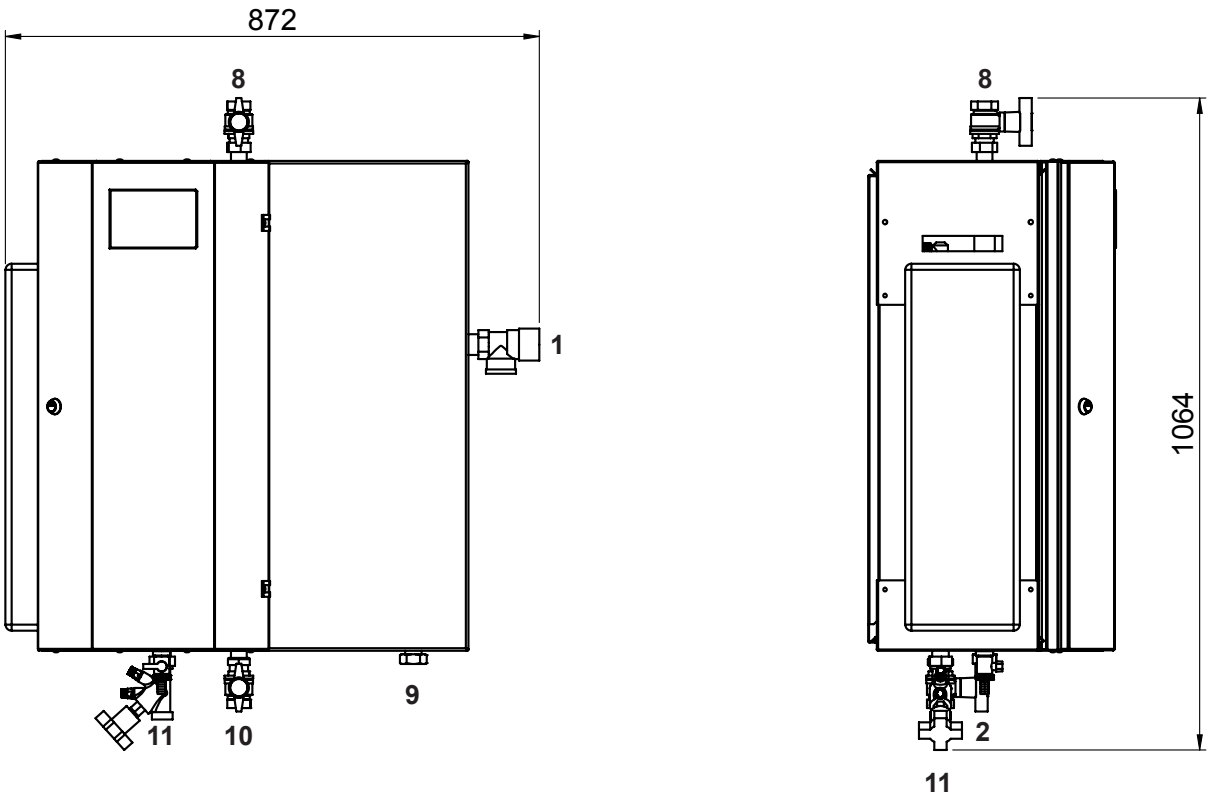
Type		(300)	(500)	(800)	(1000)	(1500)	(2000)
• Volume	l	301	475	747	968	1472	2000
• Max. operating/test pressure SVGW	bar	6/12	6/12	6/12	6/12	6/12	6/12
• Max. operating/test pressure DVGW	bar	10/13	10/13	10/13	10/13	10/13	10/13
• Max. operating temperature	°C	95	95	95	95	95	95
• Thermal insulation PU hard foam, foam-lined	mm	75	75	-	-	-	-
• Thermal insulation polyester fleece	mm	-	-	100	100	120	120
• Thermal insulation λ	W/mK	0.027	0.027	0.040	0.040	0.040	0.040
• Fire protection class		B2	B2	B2	B2	B2	B2
• Heat loss at 65 °C	W	58	75	128	139	170	190
• Transport weight	kg	97	126	205	264	400	600
• U value	W/m^2K	0.290	0.303	0.381	0.362	0.339	0.325

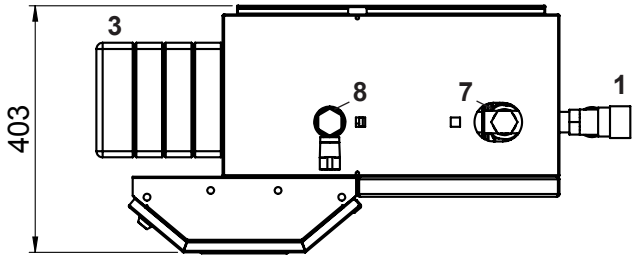
Hot water charging tank CombiVal C (200-2500)

Type		(200)	(300)	(400)	(500)	(750)	(1000)	(1500)	(2000)	(2500)
• Volume	l	212	289	411	490	756	990	1415	1975	2450
• Max. operating/test pressure SVGW	bar	6/12	6/12	6/12	6/12	6/12	6/12	6/12	6/12	6/12
• Max. operating temperature	°C	95	95	95	95	95	95	95	95	95
• Thermal insulation		Neodul® insulation (EPS rigid foam outside and polyester fibre fleece inside)								
	mm	100	100	100	100	100	100	120	120	120
• Thermal insulation λ	W/mK	0.0316	0.0316	0.0316	0.0316	0.0316	0.0316	0.0316	0.0316	0.0316
• Fire protection class		B2	B2	B2	B2	B2	B2	B2	B2	B2
• Heat loss at 65 °C	W	62	68	77	82	120	140	162	180	206
• Transport weight	kg	55	70	83	85	119	150	215	265	445
• U value	W/m^2K	0.329	0.329	0.329	0.329	0.329	0.329	0.273	0.273	0.273

Charging module TransTherm® aqua L (1-10)

(Dimensions in mm)





1 Safety valve
Hot water 10 bar
2 Filling/drain valve
3 Heat exchanger

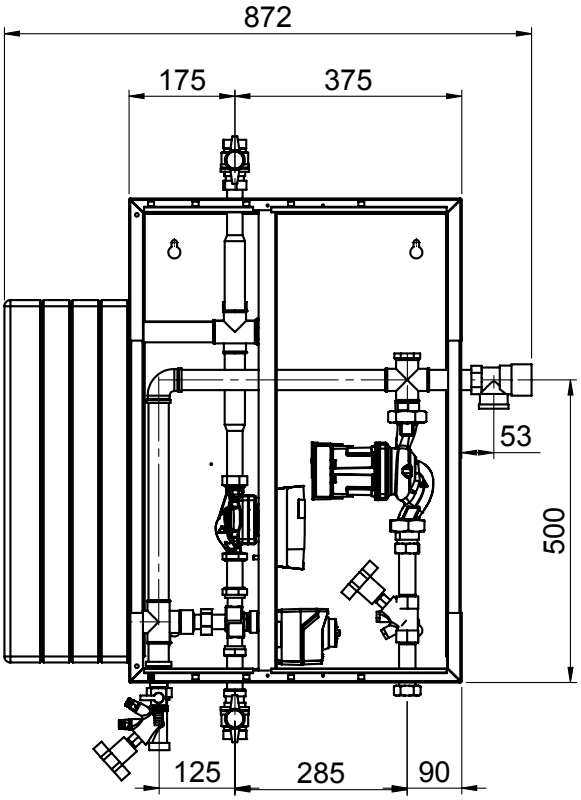
		(1-10)
7	Circulation	DN 25, Rp 1″ (20, Rp ¾″) (IT)
8	Hot water	DN 25, Rp 1″ (IT)
9	Cold water	DN 20, Gp 1″ (IT)
10	Flow heating water	DN 25, Rp 1″ (IT)
11	Return heating water	DN 25, Gp 1″ (IT)

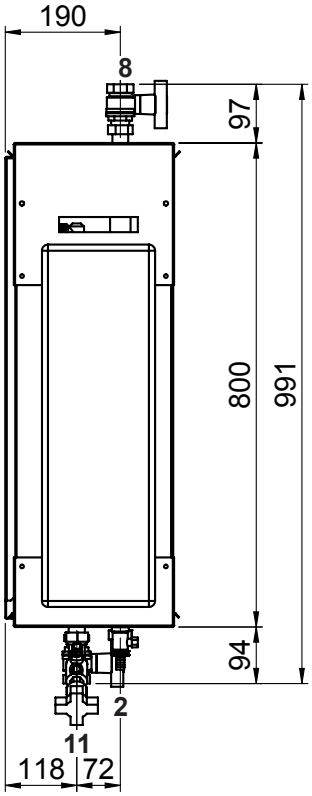
Gp = straight internal thread

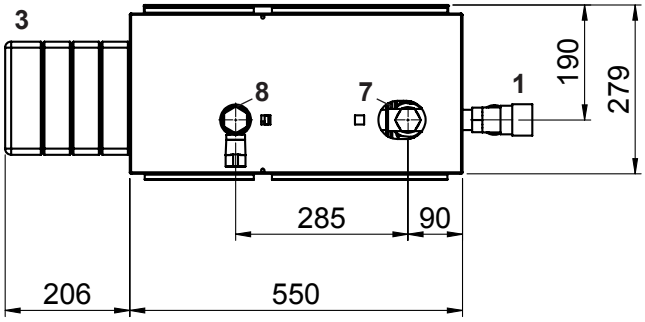
TransTherm® aqua L	Weight in kg
(1-10)	56

Charging module TransTherm® aqua L (1-10)

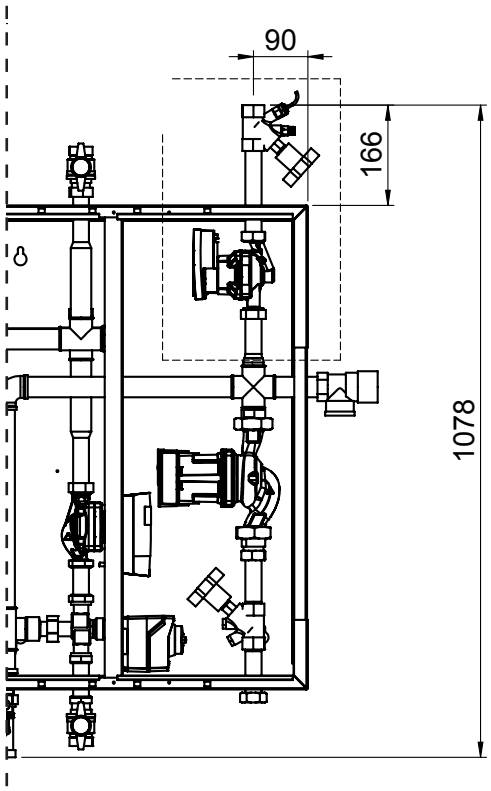
(Dimensions in mm)







Version incl. circulation set



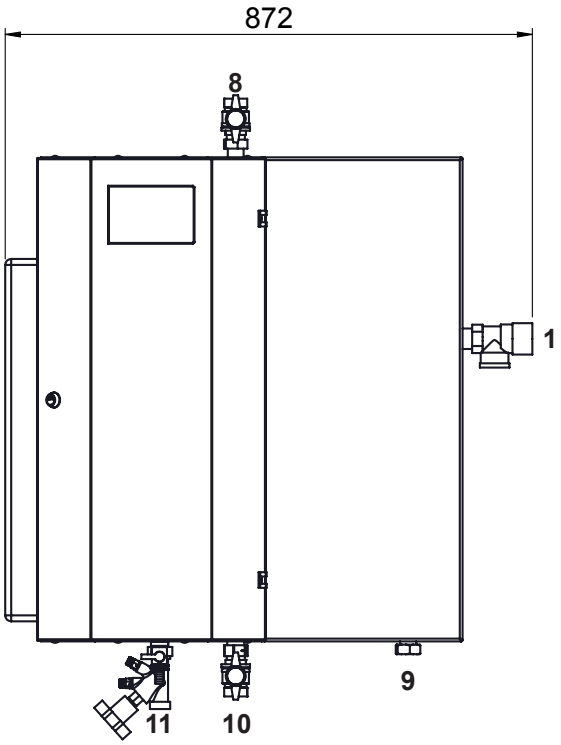
1 Safety valve
Hot water 10 bar
2 Filling/drain valve
3 Heat exchanger
4 Primary three-way valve
5 Primary circulating pump
6 Secondary circulating pump

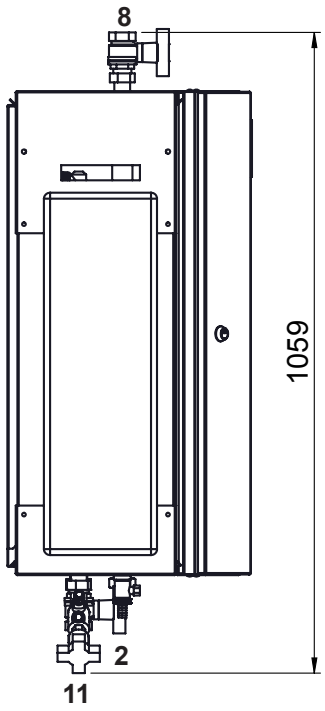
		(1-10)
7	Circulation	DN 25, Rp 1″ (20, Rp ¾″) (IT)
8	Hot water	DN 25, Rp 1″ (IT)
9	Cold water	DN 20, Gp 1″ (IT)
10	Flow heating water	DN 25, Rp 1″ (IT)
11	Return heating water	DN 25, Gp 1″ (IT)

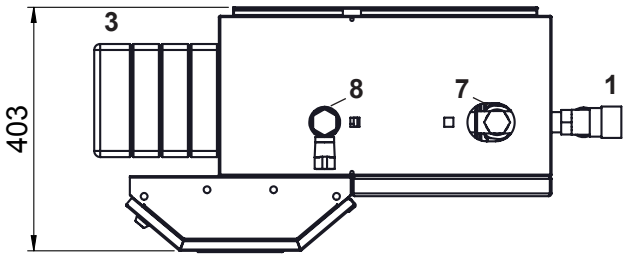
Gp = straight internal thread

Charging module TransTherm® aqua L (1-16, 1-20)

(Dimensions in mm)







1 Safety valve
Hot water 10 bar
2 Filling/drain valve
3 Heat exchanger

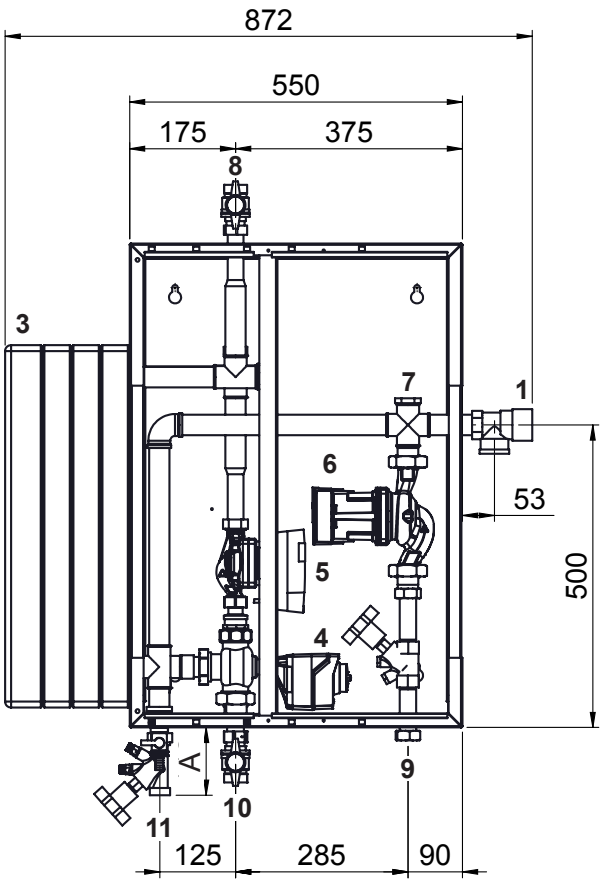
		(1-16) (1-20)
7	Circulation	DN 25, Rp 1″ (20, Rp ¾″) (IT)
8	Hot water	DN 25, Rp 1″ (IT)
9	Cold water	DN 20, Gp 1″ (IT)
10	Flow heating water	DN 25, Rp 1″ (IT)
11	Return heating water	DN 25, Gp 1″ (IT)

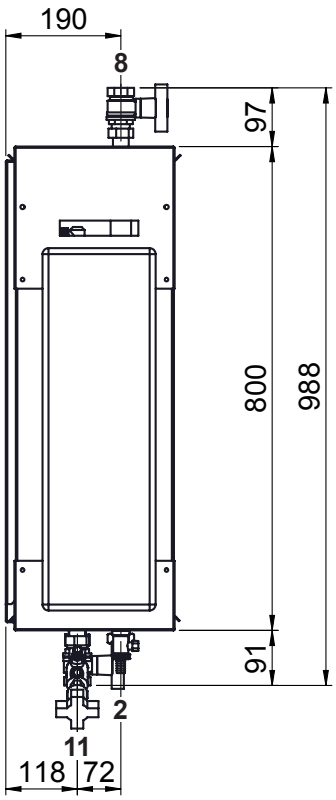
Gp = straight internal thread

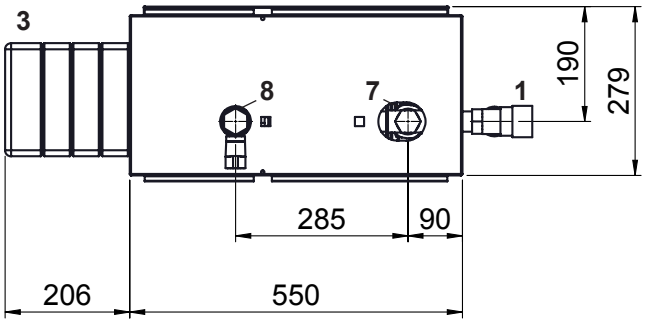
TransTherm® aqua L	Weight in kg
(1-16)	58
(1-20)	60

Charging module TransTherm® aqua L (1-16, 1-20)

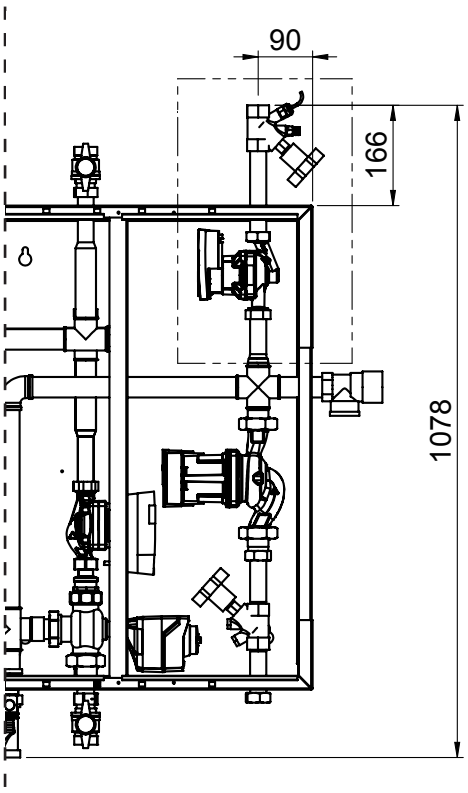
(Dimensions in mm)







Version incl. circulation set



1 Safety valve
Hot water 10 bar
2 Filling/drain valve
3 Heat exchanger
4 Three-way valve primary
5 Primary circulating pump
6 Secondary circulating pump

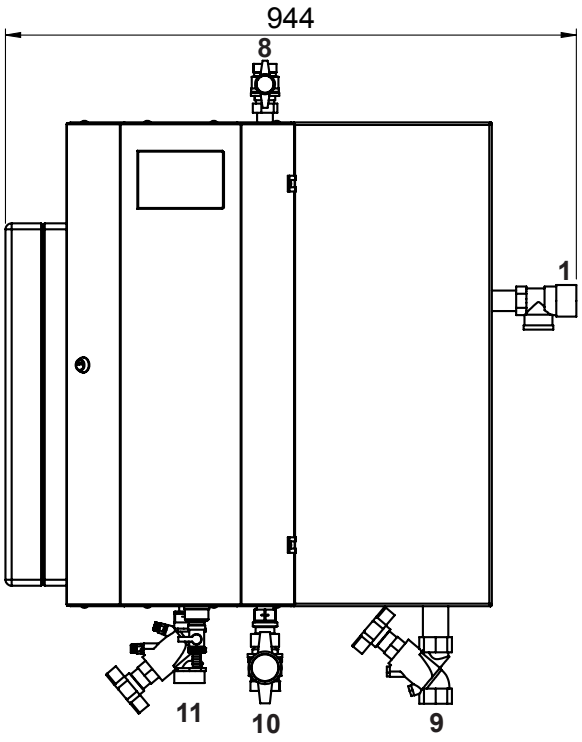
		(1-16) (1-20)
7	Circulation	DN 25, Rp 1″ (20, Rp ¾″) (IT)
8	Hot water	DN 25, Rp 1″ (IT)
9	Cold water	DN 20, Gp 1″ (IT)
10	Flow heating water	DN 25, Rp 1″ (IT)
11	Return heating water	DN 25, Gp 1″ (IT)

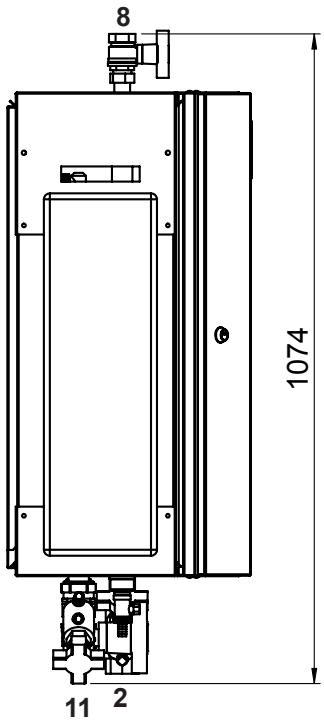
	A	B	C
(1-16)	112	166	1078
(1-20)	128	193	1121

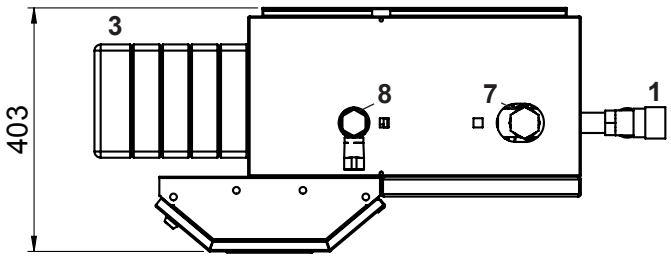
Gp = straight internal thread

Charging module TransTherm® aqua L (1-30 to 1-50)

(Dimensions in mm)







1 Safety valve Hot water 10 bar
2 Filling/drain valve
3 Heat exchanger

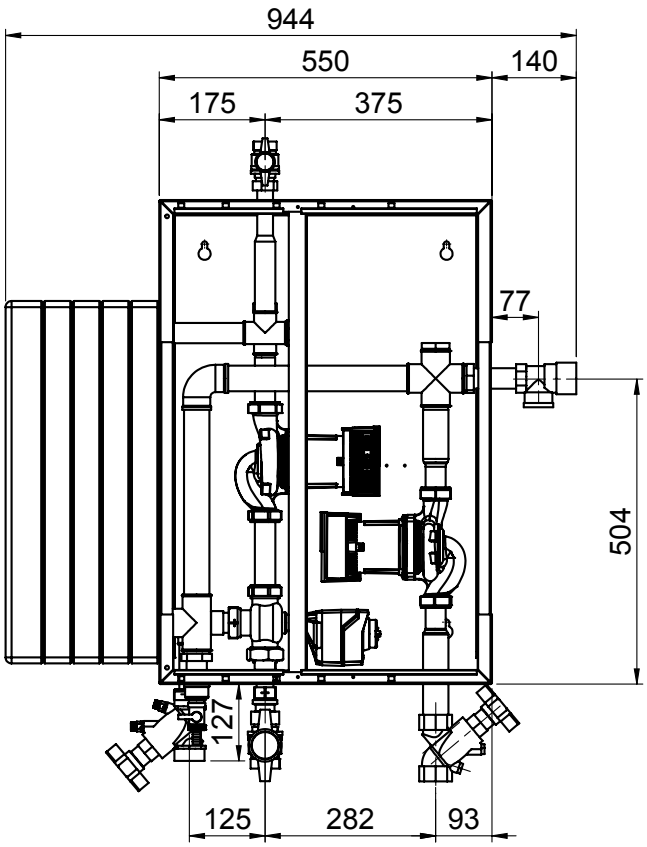
		(1-30) (1-40) (1-50)
7	Circulation	DN 32, Rp 1¼″ (25, Rp 1″) (20, Rp ¾″) (IT)
8	Hot water	DN 32, Rp 1¼″ (IT)
9	Cold water	DN 32, Rp 1¼″ (IT)
10	Flow heating water	DN 32, Rp 1¼″ (IT)
11	Return heating water	DN 32, Gp 1½″ (IT)

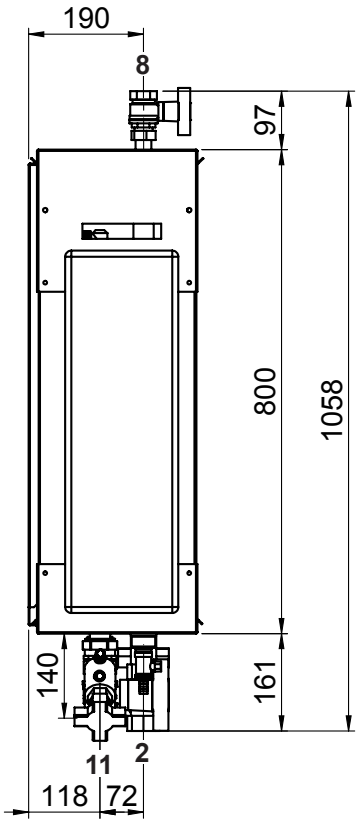
TransTherm® aqua L	Weight in kg
(1-30)	66
(1-40)	68
(1-50)	70

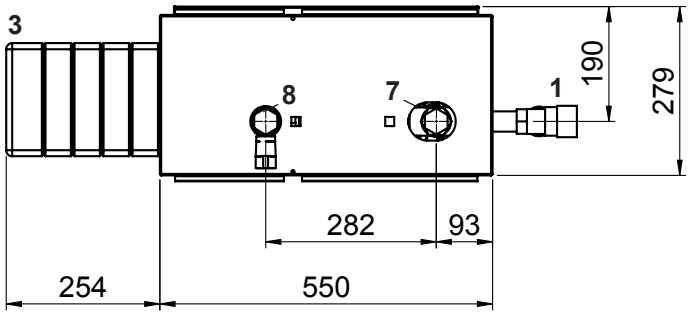
Gp = straight internal thread

Charging module TransTherm® aqua L (1-30 to 1-50)

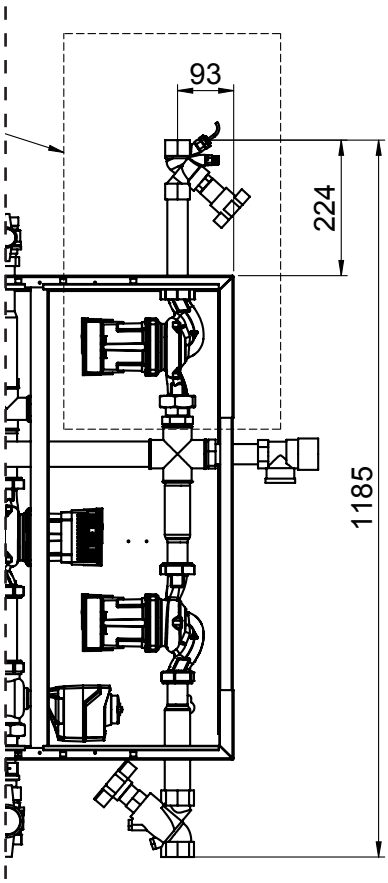
(Dimensions in mm)







Version incl. circulation set



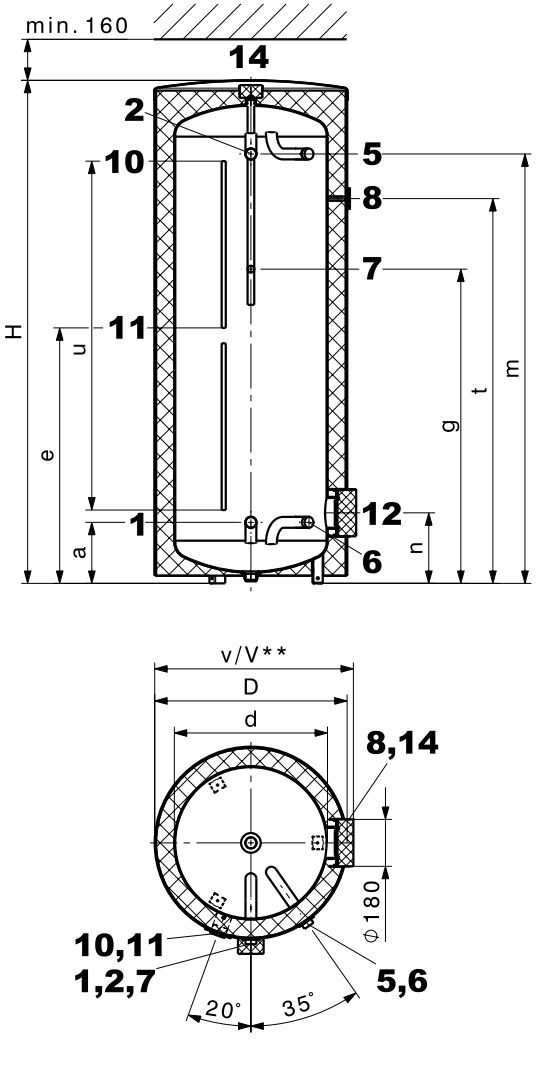
1 Safety valve
Hot water 10 bar
2 Filling/drain valve
3 Heat exchanger
4 Primary three-way valve
5 Primary circulating pump
6 Secondary circulating pump

		(1-30) (1-40) (1-50)
7	Circulation	DN 32, Rp 1¼″ (25, Rp 1″) (20, Rp ¾″) (IT)
8	Hot water	DN 32, Rp 1¼″ (IT)
9	Cold water	DN 32, Rp 1¼″ (IT)
10	Flow heating water	DN 32, Rp 1¼″ (IT)
11	Return heating water	DN 32, Gp 1½″ (IT)

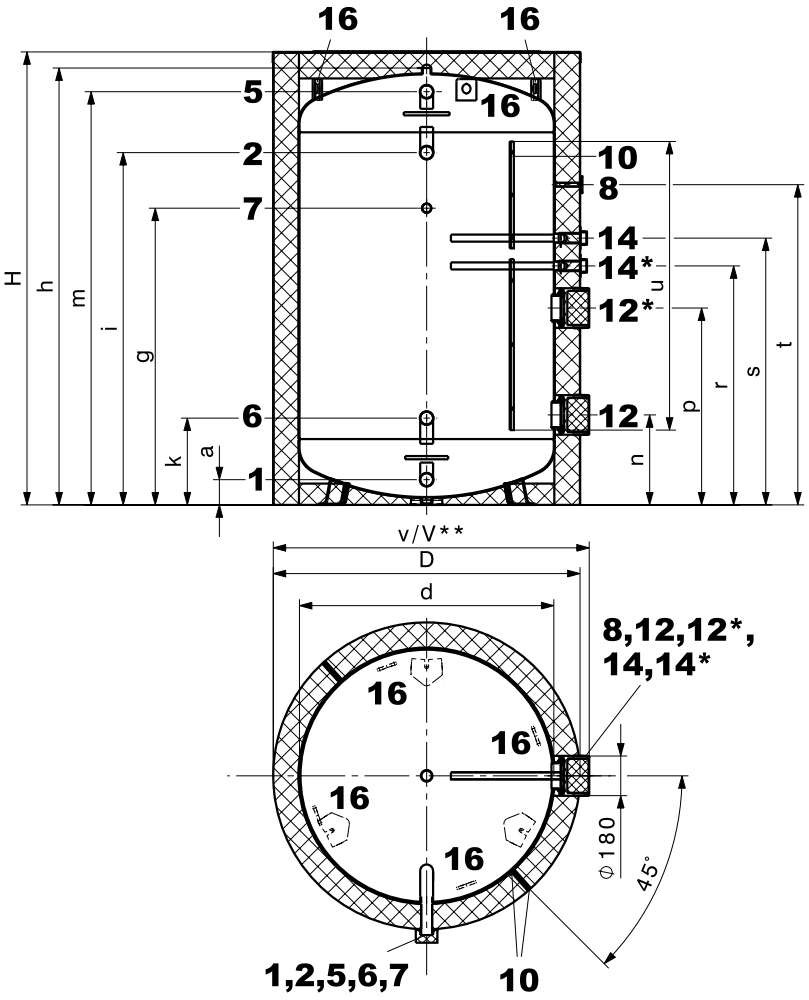
Gp = straight internal thread

CombiVal E (300,500)

(Dimensions in mm)



CombiVal E (800-2000)



1	Cold water	type (300,500)	G 1¼″	(ET)
		type (800-2000)	G 2″	(ET)
2	Domestic hot water	type (300,500)	G 1¼″	(ET)
		type (800-2000)	G 2″	(ET)
5	Charging flow – hot	type (300,500)	G 1¼″	(ET)
		type (800-2000)	G 2″	(ET)
6	Charging return – cold	type (300,500)	G 1¼″	(ET)
		type (800-2000)	G 2″	(ET)
7	Circulation (removable insulated cap Ø 100 mm)	type (300,500)	G ¾″	(ET)
		type (800-2000)	G 1¼″	(ET)

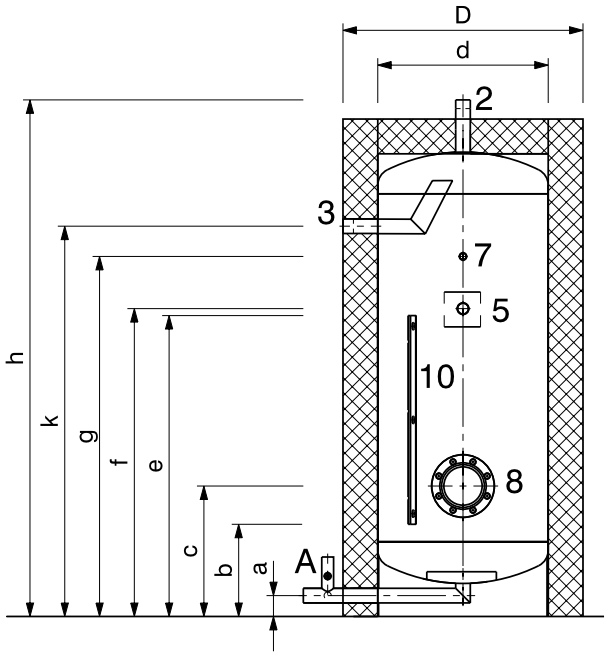
Variation because of the production tolerance possible
Dimension +/- 10 mm

8	Thermometer			
10	Sensor channel, inner Ø 11 mm	type (300,500)		
	Sensor terminal strip (zip fastener)	type (800-2000)		
11	Removable cap (Ø 60 mm) for positioning the sensor in the sensor channel	type (300,500)		
12	Hand-hole flange (flange-mounted electric heating element) Ø 180/120 mm, pitch circle 150 mm, 8 x M10			
12*	**Attention:** type (800,1000) does not have a second flange			
14	Anode sleeve	type (300,500)	G 1″	(IT)
		type (800-2000)	G 1¼″	(IT)
14*	Anode sleeve Screw connection uninsulated	type (1500,2000)	G 1¼″	(IT)
16	Transport strap	type (800-2000)		

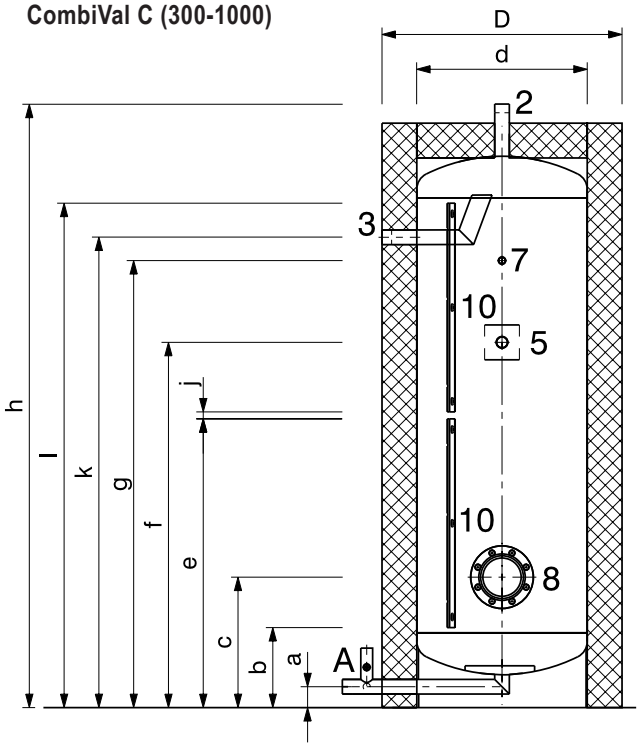
CombiVal E type	D	d	H	h	a	k	e	g	m	n	p	r	s	t	u	v	V**	Tilting dimension
(300)	650	500	1850	-	235	-	945	1160	1584	325	-	-	-	1505	1360	745	785	1961
(500)	750	597	1960	-	238	-	996	1225	1674	275	-	-	-	1500	1360	745	785	2082
(800)	950	750	2030	1938	101	347	-	1150	1893	352	-	-	1336	1505	1400	975	1020	1960
(1000)	1050	850	2060	1968	100	355	-	1158	1910	360	-	-	1331	1500	1400	1075	1120	2000
(1500)	1240	1000	2240	2133	105	375	-	1357	2049	390	890	1167	1521	1657	1450	1265	1310	2370
(2000)	1440	1200	2150	2044	118	406	-	1388	1933	421	921	1118	1248	1498	1350	1465	1510	2350

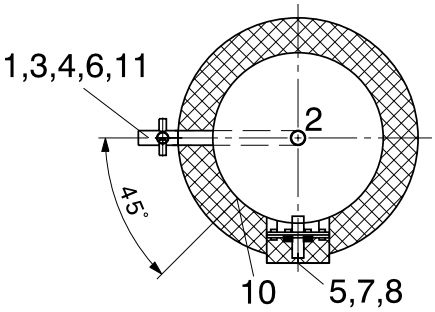
** when using a flange-mounted electric heating element

CombiVal C (200)
(Dimensions in mm)

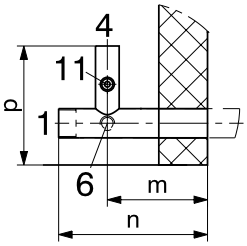


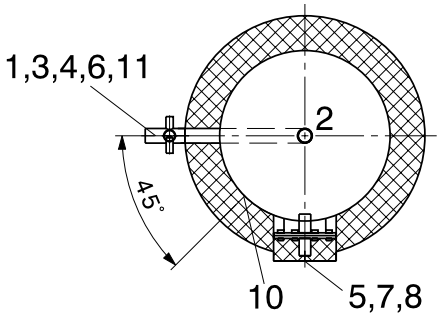
CombiVal C (300-1000)





Detail A





1	Cold water with baffle plate	type (200,300)	Rp 1 ¼″	(IT)
		type (400,500)	Rp 1 ½″	(IT)
		type (750,1000)	Rp 2″	(IT)
2	Hot water	type (200,300)	Rp 1 ¼″	(IT)
		type (400,500)	Rp 1 ½″	(IT)
		type (750,1000)	Rp 2″	(IT)
3	Charging flow - hot	type (200-500)	Rp 1″	(IT)
		type (750,1000)	Rp 1 ¼″	(IT)
4	Charging return - cold	type (200-500)	Rp 1″	(IT)
		type (750,1000)	Rp 1 ¼″	(IT)
5	Circulation with baffle plate	type (200-500)	Rp 1″	(IT)
		type (750,1000)	Rp 1 ¼″	(IT)
6	Drain	type (200-500)	Rp ½″	(IT)
		type (750,1000)	Rp ¾″	(IT)

7 Sleeve (Rp ½″ (IT)) for mountable immersion sleeve and thermometer (L = 100 mm, inner Ø = 8 mm)
8 Hand-hole flange (17.7 Nm)
Ø 180/120 mm, pitch circle 150 mm, 8 x M10 or optional:
- flange-mounted electric heating element or
- impressed current anode set with flange cover, 180 - 1½″ (IT)

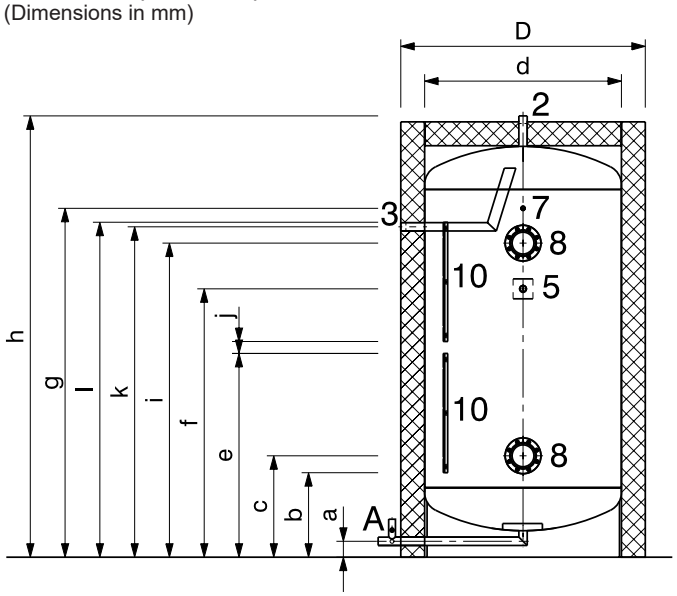
10 Sensor terminal bar 600 x 30 mm
1 x type (200), 2 x type (300-1000)

11 Immersion sleeve M16 x 1.5 for sensor/thermostat

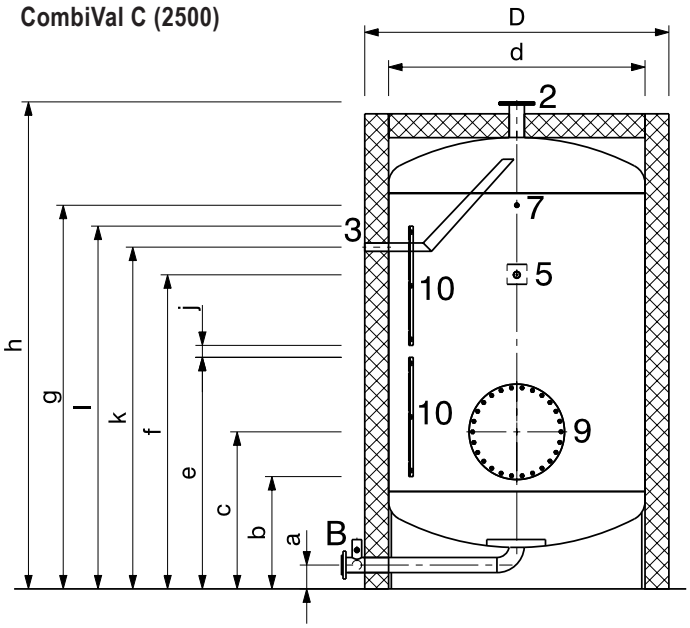
Variation because of the production tolerance possible
Dimension +/- 10 mm

CombiVal C type	a	b	c	d	D	e	f	g	h	j	k	l	m	n	p	Tilting dimension
(200)	60	240	375	490	690	840	885	1035	1485	-	1125	-	130	190	174	1515
(300)	60	240	375	490	690	840	1050	1285	1735	20	1355	1460	135	205	174	1765
(400)	70	285	420	590	790	885	1095	1330	1745	20	1365	1505	135	205	184	1780
(500)	80	295	430	640	840	895	1105	1340	1765	20	1375	1515	130	190	194	1805
(750)	80	335	470	740	940	935	1310	1590	2085	60	1665	1595	135	205	194	2130
(1000)	80	365	500	890	1090	965	1215	1495	1890	20	1384	1585	135	205	203	1950

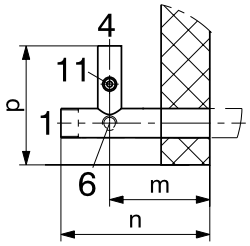
CombiVal C (1500,2000)
(Dimensions in mm)

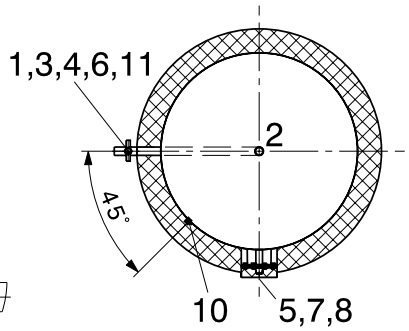


CombiVal C (2500)

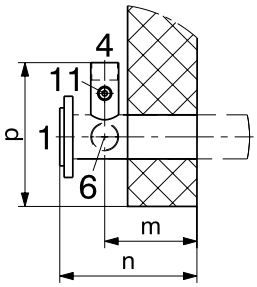


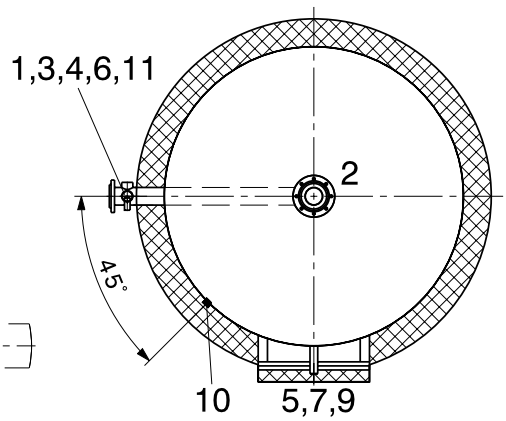
Detail A





Detail B





1	Cold water with baffle plate	type (1500,2000)	Rp 2″	(IT)
		type (2500)	DN 65/PN 10	
2	Hot water	type (1500,2000)	Rp 2″	(IT)
		type (2500)	DN 65/PN 10	
3	Charging flow - hot	type (1500-2000)	Rp 1 ½″	(IT)
4	Charging return - cold	type (1500-2000)	Rp 1 ½″	(IT)
5	Circulation with baffle plate	type (1500-2000)	Rp 1 ½″	(IT)
6	Drain	type (1500-2000)	Rp ¾″	(IT)

7 Sleeve (Rp ½″ (IT)) for mountable immersion sleeve and thermometer (L = 100 mm, inner Ø = 8 mm)

8 Hand-hole flange (17.7 Nm)
Ø 180/120 mm, pitch circle 150 mm, 8 x M10 or optional:
- flange-mounted electric heating element or
- impressed current anode set with flange cover, 180 - 1½″ (IT)

9 Manhole flange (40 Nm)
Ø 400/480 mm, pitch circle 445 mm, 26 x M14 or optional
Flange adapter:
- for electric heating element or
- for impressed current anode set with flange cover, 180 - 1½″ (IT)

10 Sensor terminal bar 600 x 30 mm
2 x type (1500-2500)

11 Immersion sleeve M16 x 1.5 for sensor/thermostat

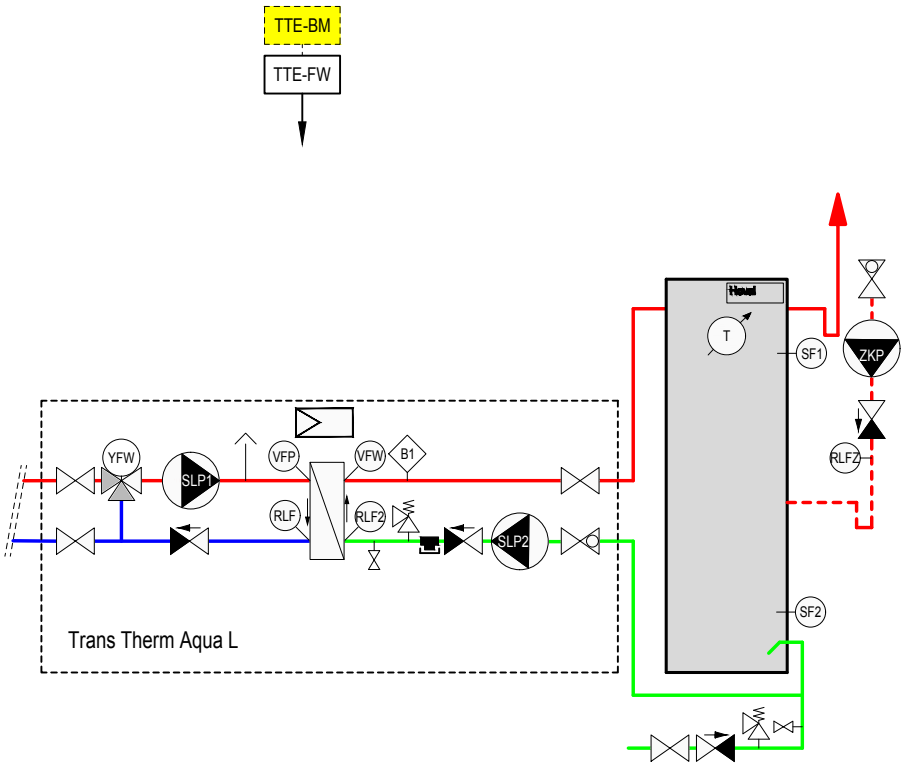
Variation because of the production tolerance possible
Dimension +/- 10 mm

CombiVal C type	a	b	c	d	D	e	f	g	h	i	j	k	m	n	p	Tilting dimension
(1500)	80	375	510	990	1230	975	1350	1755	2220	1580	60	1674	165	235	203	2300
(2000)	80	405	530	1090	1330	1005	1580	2035	2525	1860	165	1909	165	235	203	2610
(2500)	120	515	790	1290	1530	1115	1580	1930	2450	-	60	1719	165	250	243	2570

Water heating

TransTherm® aqua L

- Circulation via storage tank
- Storage tank charging system



TTE-FW	Basic module district heating/fresh water
B1	Flow temperature monitor (if required)
VFP	Primary flow sensor
VFW	Flow sensor domestic hot water
RLF	Primary return sensor
RLF2	Return sensor domestic cold water
SF1	Calorifier sensor 1
SF2	Calorifier sensor 2
RLFZ	Circulation sensor
PF1	Buffer sensor 1
SLP1	Calorifier charging pump primary
SLP2	Calorifier charging pump secondary
YFW	Three-way valve with actuator
ZKP	Recirculation pump

Option

BM	TopTronic® E control module

Notice
A safety valve (6 bar) must be installed in the cold water line. The loading module is already protected with a safety valve (10 bar).

Calorifier continuous flow system

Consisting of:
- fresh water module TransTherm® aqua F
- buffer storage tank (option)

Fresh water module TransTherm® aqua F

- Fully installed station with plate heat exchanger for the provision of domestic hot water using the continuous flow principle
- Intended for wall installation
- The primary side (heating side) contains the three-way valve, high-efficiency pump, ventilation, filling/drain valves and balancing valve. These components ensure a constant flow temperature at the plate heat exchanger. Pipes made from steel
- The secondary side (DHW side) contains the safety valve (10 bar), non-return valve and a filling/drain valve. A flow sensor ensures the correct hot water temperature. Pipes made from stainless steel
- Stainless steel plate heat exchanger 1.4404, copper-soldered or copper-free
- EPP insulation, 30 mm, for the heat exchanger
- Flow sensor
- Switch-on and switch-off of the charging pump is regulated via two sensors (included in the scope of delivery) in the storage tank
- Mount tank sensor on the tank on site and connect it to the controller
- T-piece with dummy plug for on-site connection of the circulation group. Connect the pump to the controller on site.
- TopTronic® E control with integrated thermal disinfection of the DHW storage tank (anti-legionella circuit)

Delivery
- The buffer storage tank required is not included in the scope of delivery

On site
- Installation of a circulation unit; the necessary connection is provided
- Electrical connection of the controller

TopTronic® E controller

TopTronic® E basic module district heating/fresh water
- Control unit for controlling district heating systems in non-communicative networks and the corresponding consumers with integrated control functions for
  - primary valve control
  - cascade management
  - 1 heating/cooling circuit with mixer
  - 1 heating/cooling circuit without mixer
  - 1 hot water charging circuit
  - various additional functions

- Various functions for hot water:
  - selection of different basic programs (week programs, economy mode, holiday until, etc.)
  - various operating modes (e.g. accumulator priority or parallel mode)
  - buffer storage circuit on the primary or secondary side
  - adjustable loading criteria (e.g. adjustable loading times, undershooting the minimum nominal value, etc.)
  - adjustable switch-off criteria (e.g. achieving the setpoint valve, achieving the lower sensor setpoint value, etc.)
  - adjustable loading block (if the loading flow temperature is too low, the setpoint temperature is not reached, differential temperature-dependent solar circuit control)
- Definable switching times for recirculation pump control
- Outdoor sensor
- Immersion sensor (calorifier sensor)
- Contact sensor (flow temperature sensor)
- Complete plug set for DH module
- RPM-regulated pumps

No further module expansions or controller modules can be installed in the control panel!

Option

TopTronic® E control module
- Simple, intuitive operating concept
- Display of the most important operating states
- Configurable start screen
- Operating mode selection
- Configurable day and week programs
- Operation of all connected Hoval CAN bus modules
- Commissioning wizard
- Service and maintenance function
- Fault message management
- Analysis function
- Weather display (with HovalConnect option)
- Adaptation of the heating strategy based on the weather forecast (with HovalConnect option)

Notice
The TopTronic® E control module for operating the basic module district heating/fresh water must be ordered separately!

Further information about the TopTronic® E
see “Controls”

Delivery
- All armatures required for operation, such as flow balancing and shut-off valves, backflow preventer, air-bleeding and drain valve are fitted.

Caution
As a result of thermal disinfection of the domestic hot water for legionella protection, increased water temperatures (at least 65-70 °C) occur. Depending on the water quality, this may result in increased calcification at the installed armatures and heat exchangers and also brings the risk of scalding at the tapping points. Corresponding protective measures must be implemented on site.

Range
Fresh water module

TransTherm® aqua F type	Output kW
(6-10)	50
(6-16)	90
(6-20)	115
(6-30)	175
(6-40)	230
(6-50)	275

Fresh water module

TransTherm® aqua F

Fully assembled station with plate heat exchanger for the provision of domestic hot water using the continuous flow principle and built-in Hoval TopTronic® E control
The required buffer storage tank is not supplied.

TransTherm® aqua F	Output kW	Part No.
(6-10)	50	8006 387
(6-16)	90	8006 388
(6-20)	115	8006 389
(6-30)	175	8006 390
(6-40)	230	8006 391
(6-50)	275	8006 392

Version with copper-free heat exchanger

TransTherm® aqua F

with copper-free heat exchanger

TransTherm® aqua F	Output kW	Part No.
(6-10)	50	8006 521
(6-16)	90	8006 522
(6-20)	115	8006 523
(6-30)	175	8006 524
(6-40)	230	8006 525
(6-50)	275	8006 526

Accessories

	Part No.
	
TopTronic® E control module black with 4.3″ colour touchscreen For operation of all controller modules connected to the bus system (basic, solar, buffer modules etc.) Connection to the Hoval bus system via RJ45 plug connection or via plug terminals (max. 0.75 mm²), flat design with flexible installation option Installation: - in control panel of the heat generator - in the Hoval wall casing - in the control panel front, black high-gloss cover, customer-specific configurable start screen, Display of current weather or weather forecast (only possible in combination with HovalConnect) Consisting of: - TopTronic® E control module black - Clamping device set control module - RJ45-RAST 5 CAN cable, L = 500	6043 844
	
Return changeover valve set Consisting of: - temperature sensor - changeover valve - drive (8 sec.) DN 20-DN 40 - drive (30 sec.) DN 50-DN 80 - seals - screw connections	

Nominal diameter	Output kW	kvs m³/h	Part No.
DN 20	50-90	6.3	7010 832
DN 25	115-175	10	7010 836
DN 32	230-275	16	7011 009
DN 40	350	25	7011 025
DN 50	450	40	7016 331
DN 65	580	63	7016 332
DN 80	700	100	7016 333

Notice
When using a circulation set (also on-site recirculation pump), it is imperative to install a return switching valve set.

Circulation set
for TransTherm® aqua L, F
Piping of parts in contact with domestic water in stainless steel and gunmetal
Consisting of:
- temperature sensor PT1000
- recirculation pump Wilo Yonos PARA
- recirculation pump Wilo Para MAXO
- regulating valve
- non-return valve

Connection	Flow rate m³/h	Recirculation pump	Part No.
DN 20 ¾″ Rp	1.9	Z15/7.0 RKC	8005 279
DN 25 1″ Rp	3.4	Z25/180/08/F02	8005 280
DN 32 1¼″ Rp	5.8	Z25/180/08/F02	8005 281

		Part No.
	**Test valve DN 8 G ¼″** for TransTherm® aqua L, F, FS Test valve suitable for flame treatment for hygienic-microbiologic tests.	2049 861
	**Sludge separator with magnet MB3/L DN 25...DN 50** Fast and continuous removal of ferromagnetic and non-magnetic dirt and sludge particles Sludge separation up to a particle size of 5 µm Brass housing Max. operating pressure: 6 bar Max. flow temperature: 110 °Ca	
	Type: MB3 DN 25 — Connectiona: Rp 1″ — Flow rate m³/h at 1 m/s flow speed: 2.0	2062 165
	Type: MBL DN 32 — Connectiona: Rp 1¼″ — Flow rate m³/h at 1 m/s flow speed: 3.6	2062 166
	Type: MBL DN 40 — Connectiona: Rp 1½″ — Flow rate m³/h at 1 m/s flow speed: 5.0	2062 167
	Type: MBL DN 50 — Connectiona: Rp 2″ — Flow rate m³/h at 1 m/s flow speed: 7.5	2062 168
	Additional sludge separators see “Various system components”	
	**Temperature monitor 0…120 °C** for TransTherm® aqua L, F, FS	2048 299
	**Safety temperature monitor 70…130 °C** for TransTherm® aqua L, F, FS	2048 300
	**Safety temperature limiter 70…130 °C** for TransTherm® aqua L, F, FS	2049 619
	**Immersion sleeve G ½″ stainless steel for thermostat** for TransTherm® aqua L, F, FS Installation length = 100 mm Outer Ø: 8 mm, inner Ø: 6.5 mm	2048 285
	**Immersion sleeve G ½″ stainless steel for 2 thermostats** for TransTherm® aqua L, F, FS Installation length = 100 mm Outer Ø: 15 mm, inner Ø: 13.5 mm	2048 288

Part No.

Services

Commissioning
Commissioning by works service or Hoval trained authorised serviceman/company is condition for warranty.

For commissioning and other services please contact your Hoval sales office.

Performance data

TransTherm® aqua F (6-10 to 6-50)

Domestic water secondary	TransTherm® aqua F		Flow temperature heating water 55 °C (6-...)						60 °C (6-...)					
			(10)	(16)	(20)	(30)	(40)	(50)	(10)	(16)	(20)	(30)	(40)	(50)
60/5 °C	T return primary	°C	-	-	-	-	-	-	-	-	-	-	-	-
	V̇ primary	**m³/h**	-	-	-	-	-	-	-	-	-	-	-	-
	Q max.	kW	-	-	-	-	-	-	-	-	-	-	-	-
	V̇ secondary	**m³/h**	-	-	-	-	-	-	-	-	-	-	-	-
60/10 °C	T return primary	°C	-	-	-	-	-	-	-	-	-	-	-	-
	V̇ primary	**m³/h**	-	-	-	-	-	-	-	-	-	-	-	-
	Q max.	kW	-	-	-	-	-	-	-	-	-	-	-	-
	V̇ secondary	**m³/h**	-	-	-	-	-	-	-	-	-	-	-	-
60/15 °C	T return primary	°C	-	-	-	-	-	-	-	-	-	-	-	-
	V̇ primary	**m³/h**	-	-	-	-	-	-	-	-	-	-	-	-
	Q max.	kW	-	-	-	-	-	-	-	-	-	-	-	-
	V̇ secondary	**m³/h**	-	-	-	-	-	-	-	-	-	-	-	-
60/20 °C	T return primary	°C	-	-	-	-	-	-	-	-	-	-	-	-
	V̇ primary	**m³/h**	-	-	-	-	-	-	-	-	-	-	-	-
	Q max.	kW	-	-	-	-	-	-	-	-	-	-	-	-
	V̇ secondary	**m³/h**	-	-	-	-	-	-	-	-	-	-	-	-
55/5 °C	T return primary	°C	-	-	-	-	-	-	30	30	30	30	30	30
	V̇ primary	**m³/h**	-	-	-	-	-	-	**1.25**	**2.04**	**2.51**	**3.71**	**4.76**	**5.66**
	Q max.	kW	-	-	-	-	-	-	43	70	86	127	163	194
	V̇ secondary	**m³/h**	-	-	-	-	-	-	**0.74**	**1.2**	**1.48**	**2.18**	**2.8**	**3.33**
55/10 °C	T return primary	°C	-	-	-	-	-	-	30	30	30	30	30	30
	V̇ primary	**m³/h**	-	-	-	-	-	-	**1.11**	**2.04**	**2.51**	**3.71**	**4.76**	**5.63**
	Q max.	kW	-	-	-	-	-	-	38	70	86	127	163	193
	V̇ secondary	**m³/h**	-	-	-	-	-	-	**0.73**	**1.34**	**1.64**	**2.43**	**3.12**	**3.69**
55/15 °C	T return primary	°C	-	-	-	-	-	-	30	30	30	30	30	30
	V̇ primary	**m³/h**	-	-	-	-	-	-	**0.76**	**1.46**	**1.95**	**3.06**	**4.23**	**5.4**
	Q max.	kW	-	-	-	-	-	-	26	50	67	105	145	185
	V̇ secondary	**m³/h**	-	-	-	-	-	-	**0.56**	**1.08**	**1.44**	**2.26**	**3.12**	**3.98**
55/20 °C	T return primary	°C	-	-	-	-	-	-	30	30	30	30	30	30
	V̇ primary	**m³/h**	-	-	-	-	-	-	**0.47**	**0.9**	**1.17**	**1.9**	**2.63**	**3.36**
	Q max.	kW	-	-	-	-	-	-	16	31	40	65	90	115
	V̇ secondary	**m³/h**	-	-	-	-	-	-	**0.39**	**0.76**	**0.99**	**1.6**	**2.22**	**2.83**
50/5 °C	T return primary	°C	30	30	30	30	30	30	30	30	30	30	30	30
	V̇ primary	**m³/h**	**1.29**	**2.03**	**2.51**	**3.67**	**4.72**	**5.66**	**1.28**	**2.04**	**2.51**	**3.71**	**4.76**	**5.63**
	Q max.	kW	37	58	72	105	135	162	44	70	86	127	163	193
	V̇ secondary	**m³/h**	**0.71**	**1.11**	**1.37**	**2**	**2.58**	**3.09**	**0.84**	**1.34**	**1.64**	**2.43**	**3.12**	**3.69**
50/10 °C	T return primary	°C	30	30	30	30	30	30	30	30	30	30	30	30
	V̇ primary	**m³/h**	**1.29**	**2.03**	**2.51**	**3.67**	**4.72**	**5.66**	**1.28**	**2.04**	**2.51**	**3.73**	**4.81**	**5.69**
	Q max.	kW	38	58	72	105	135	162	44	70	86	128	165	195
	V̇ secondary	**m³/h**	**0.82**	**1.25**	**1.77**	**2.26**	**2.9**	**3.48**	**0.95**	**1.51**	**1.85**	**2.75**	**3.55**	**4.19**
50/15 °C	T return primary	°C	30	30	30	30	30	30	30	30	30	30	30	30
	V̇ primary	**m³/h**	**1.29**	**2.03**	**2.51**	**3.67**	**4.72**	**5.66**	**1.11**	**1.95**	**2.48**	**3.76**	**4.76**	**5.69**
	Q max.	kW	37	58	72	105	135	162	38	67	85	129	163	195
	V̇ secondary	**m³/h**	**0.91**	**1.43**	**1.77**	**2.58**	**3.32**	**3.99**	**0.94**	**1.65**	**2.09**	**3.18**	**4.01**	**4.8**
50/20 °C	T return primary	°C	30	30	30	30	30	30	30	30	30	30	30	30
	V̇ primary	**m³/h**	**1.15**	**2.03**	**2.55**	**3.7**	**4.75**	**5.69**	**0.96**	**1.69**	**2.13**	**3.24**	**3.63**	**5.16**
	Q max.	kW	33	58	73	106	136	163	33	58	73	111	145	177
	V̇ secondary	**m³/h**	**0.95**	**1.67**	**2.1**	**3.05**	**3.91**	**4.69**	**0.95**	**1.67**	**2.1**	**3.19**	**4.17**	**5.09**
45/5 °C	T return primary	°C	19	18	18	18	18	17	17	16	16	16	16	15
	V̇ primary	**m³/h**	**0.86**	**1.91**	**2.9**	**2.9**	**3.8**	**4.61**	**0.86**	**1.92**	**2.91**	**2.91**	**3.82**	**4.63**
	Q max.	kW	35	80	123	123	162	199	42	95	145	145	192	235
	V̇ secondary	**m³/h**	**0.76**	**1.73**	**2.65**	**2.65**	**3.50**	**4.27**	**0.90**	**2.05**	**3.13**	**3.13**	**4.14**	**5.05**
45/10 °C	T return primary	°C	21	21	20	20	20	20	20	19	19	19	18	18
	V̇ primary	**m³/h**	**0.86**	**1.91**	**2.89**	**2.89**	**3.81**	**4.62**	**0.86**	**1.92**	**2.84**	**2.84**	**3.63**	**4.32**
	Q max.	kW	33	74	114	114	151	185	39	89	133	133	172	207
	V̇ secondary	**m³/h**	**0.81**	**1.84**	**2.81**	**2.81**	**3.74**	**4.56**	**0.97**	**2.20**	**3.29**	**3.29**	**4.25**	**5.09**
45/15 °C	T return primary	°C	24	23	23	23	23	23	23	22	21	21	21	21
	V̇ primary	**m³/h**	**0.86**	**1.91**	**2.91**	**2.91**	**3.81**	**4.62**	**0.87**	**1.8**	**2.61**	**2.61**	**3.33**	**3.98**
	Q max.	kW	30	69	106	106	139	170	37	78	115	115	148	178
	V̇ secondary	**m³/h**	**0.88**	**1.99**	**3.05**	**3.05**	**4.02**	**4.90**	**1.07**	**2.26**	**3.31**	**3.31**	**4.26**	**5.12**
45/20 °C	T return primary	°C	27	26	26	26	26	26	25	26	24	24	24	24
	V̇ primary	**m³/h**	**0.86**	**1.92**	**2.91**	**2.91**	**3.71**	**4.41**	**0.85**	**1.63**	**2.36**	**2.36**	**3.02**	**3.61**
	Q max.	kW	27	63	96	96	124	148	33	65	96	96	123	148
	V̇ secondary	**m³/h**	**0.96**	**2.18**	**3.33**	**3.33**	**4.28**	**5.13**	**1.16**	**2.27**	**3.32**	**3.32**	**4.28**	**5.14**

T return primary	°C	Return temperature primary
V̇ primary	**m³/h**	Flow rate primary
Q max.	kW	Output
V̇ secondary	**m³/h**	Flow rate secondary

The specified technical data relate to the full load of the module in each case.

Performance data

TransTherm® aqua F (6-10 to 6-50)

Domestic water secondary	TransTherm® aqua F		Flow temperature heating water 65 °C (6-...) (10)	(16)	(20)	(30)	(40)	(50)	70 °C (6-...) (10)	(16)	(20)	(30)	(40)	(50)
60/5 °C	T return primary	°C	30	30	30	30	30	30	30	30	30	30	30	30
	V̇ primary	**m³/h**	**1.08**	**1.88**	**2.5**	**3.73**	**4.84**	**5.77**	**1.32**	**2.09**	**2.59**	**3.76**	**4.82**	**5.72**
	Q max.	kW	43	75	100	149	193	230	60	95	118	171	219	260
	V̇ secondary	**m³/h**	**0.67**	**1.17**	**1.55**	**2.33**	**3.01**	**3.59**	**0.94**	**1.48**	**1.84**	**2.67**	**3.42**	**4.06**
60/10 °C	T return primary	°C	30	30	30	30	30	30	30	30	30	30	30	30
	V̇ primary	**m³/h**	**0.8**	**1.5**	**2.01**	**3.16**	**4.34**	**5.39**	**1.08**	**1.94**	**2.48**	**3.77**	**4.95**	**5.92**
	Q max.	kW	32	60	80	126	173	215	50	90	115	175	230	275
	V̇ secondary	**m³/h**	**0.55**	**1.03**	**1.38**	**2.17**	**2.98**	**3.7**	**0.86**	**1.54**	**1.98**	**3.01**	**3.95**	**4.73**
60/15 °C	T return primary	°C	30	30	30	30	30	30	30	30	30	30	30	30
	V̇ primary	**m³/h**	**0.55**	**1.05**	**1.38**	**2.13**	**3.08**	**3.96**	**0.97**	**1.8**	**2.37**	**3.73**	**4.84**	**5.72**
	Q max.	kW	22	42	55	85	123	158	44	82	108	170	220	260
	V̇ secondary	**m³/h**	**0.42**	**0.8**	**1.05**	**1.63**	**2.35**	**3.02**	**0.84**	**1.57**	**2.08**	**3.24**	**4.21**	**4.98**
60/20 °C	T return primary	°C	30	30	30	30	30	30	30	30	30	30	30	30
	V̇ primary	**m³/h**	**0.3**	**0.6**	**0.8**	**1.28**	**1.75**	**2.33**	**0.62**	**1.14**	**2.05**	**2.4**	**3.43**	**4.22**
	Q max.	kW	12	24	32	51	70	93	28	52	68	109	156	192
	V̇ secondary	**m³/h**	**0.26**	**0.52**	**0.69**	**1.1**	**1.51**	**2**	**0.6**	**1.12**	**1.47**	**2.36**	**3.36**	**4.14**
55/5 °C	T return primary	°C	30	30	30	30	30	30	30	30	30	30	30	30
	V̇ primary	**m³/h**	**0.8**	**1.5**	**2.01**	**3.16**	**4.34**	**5.39**	**1.08**	**2.09**	**2.53**	**3.74**	**4.84**	**5.76**
	Q max.	kW	32	60	80	126	173	215	50	95	115	170	220	262
	V̇ secondary	**m³/h**	**0.55**	**1.03**	**1.38**	**2.17**	**2.98**	**3.7**	**0.86**	**1.63**	**1.97**	**2.92**	**3.78**	**4.5**
55/10 °C	T return primary	°C	30	30	30	30	30	30	30	30	30	30	30	30
	V̇ primary	**m³/h**	**1.3**	**2.06**	**2.53**	**3.71**	**4.81**	**5.64**	**1.08**	**1.87**	**2.42**	**3.74**	**4.84**	**5.72**
	Q max.	kW	52	82	101	148	192	225	49	85	110	170	220	260
	V̇ secondary	**m³/h**	**0.99**	**1.57**	**1.93**	**2.83**	**3.67**	**4.3**	**0.94**	**1.62**	**2.1**	**3.24**	**4.21**	**4.98**
55/15 °C	T return primary	°C	30	30	30	30	30	30	30	30	30	30	30	30
	V̇ primary	**m³/h**	**0.97**	**1.65**	**2.11**	**3.71**	**4.81**	**5.64**	**1.1**	**1.88**	**2.41**	**3.74**	**4.22**	**5.1**
	Q max.	kW	44	75	96	148	192	225	44	75	96	148	192	232
	V̇ secondary	**m³/h**	**0.95**	**1.61**	**2.07**	**3.19**	**4.13**	**4.84**	**0.94**	**1.62**	**2.1**	**3.19**	**4.21**	**5**
55/20 °C	T return primary	°C	30	30	30	30	30	30	30	30	30	30	30	30
	V̇ primary	**m³/h**	**0.95**	**1.68**	**2.13**	**3.23**	**4.24**	**5.14**	**0.84**	**1.47**	**1.87**	**2.84**	**3.72**	**4.51**
	Q max.	kW	38	67	85	129	169	205	38	67	85	129	169	205
	V̇ secondary	**m³/h**	**0.94**	**1.65**	**2.09**	**3.18**	**4.16**	**5.05**	**0.94**	**1.65**	**2.09**	**3.18**	**4.16**	**5.05**
50/5 °C	T return primary	°C	30	30	30	30	30	30	30	30	30	30	30	30
	V̇ primary	**m³/h**	**1.25**	**2.06**	**2.53**	**3.71**	**4.81**	**5.64**	**1.08**	**1.87**	**2.42**	**3.56**	**4.84**	**5.72**
	Q max.	kW	50	82	101	148	192	225	49	85	110	162	220	260
	V̇ secondary	**m³/h**	**0.95**	**1.57**	**1.93**	**2.83**	**3.67**	**4.3**	**0.94**	**1.62**	**2.1**	**3.09**	**4.21**	**4.98**
50/10 °C	T return primary	°C	30	30	30	30	30	30	30	30	30	30	30	30
	V̇ primary	**m³/h**	**1.1**	**1.88**	**2.41**	**3.71**	**4.81**	**5.64**	**0.97**	**1.65**	**2.11**	**3.25**	**4.22**	**5.1**
	Q max.	kW	44	75	96	148	192	225	44	75	96	148	192	232
	V̇ secondary	**m³/h**	**0.95**	**1.61**	**2.07**	**3.19**	**4.13**	**4.84**	**0.95**	**1.61**	**2.07**	**3.19**	**4.13**	**5**
50/15 °C	T return primary	°C	30	30	30	30	30	30	30	30	30	30	30	30
	V̇ primary	**m³/h**	**0.95**	**1.68**	**2.13**	**3.23**	**4.24**	**5.14**	**0.84**	**1.47**	**1.87**	**2.84**	**3.72**	**4.51**
	Q max.	kW	38	67	85	129	169	205	38	67	85	129	169	205
	V̇ secondary	**m³/h**	**0.94**	**1.65**	**2.09**	**3.18**	**4.16**	**5.05**	**0.94**	**1.65**	**2.09**	**3.18**	**4.16**	**5.05**
50/20 °C	T return primary	°C	30	30	30	30	30	30	30	30	30	30	30	30
	V̇ primary	**m³/h**	**0.83**	**1.45**	**1.81**	**2.44**	**3.63**	**4.44**	**0.73**	**1.28**	**1.61**	**2.44**	**3.19**	**3.89**
	Q max.	kW	33	58	73	111	145	177	33	58	73	111	145	177
	V̇ secondary	**m³/h**	**0.95**	**1.67**	**2.1**	**3.19**	**4.17**	**5.09**	**0.95**	**1.67**	**2.1**	**3.19**	**4.17**	**5.09**
45/5 °C	T return primary	°C	16	15	14	14	14	13	15	13	13	13	12	12
	V̇ primary	**m³/h**	**0.87**	**1.83**	**2.64**	**2.64**	**3.38**	**4.03**	**0.84**	**1.62**	**2.35**	**2.35**	**3.01**	**3.59**
	Q max.	kW	48	104	152	152	196	236	52	104	152	152	196	236
	V̇ secondary	**m³/h**	**1.04**	**2.24**	**3.27**	**3.27**	**4.23**	**5.07**	**1.13**	**2.24**	**3.28**	**3.28**	**4.23**	**5.07**
45/10 °C	T return primary	°C	19	17	17	17	17	16	17	16	16	16	15	15
	V̇ primary	**m³/h**	**0.87**	**1.69**	**2.45**	**2.45**	**3.13**	**3.73**	**0.77**	**1.49**	**2.17**	**2.17**	**2.78**	**3.32**
	Q max.	kW	45	91	134	134	172	206	46	91	133	133	172	206
	V̇ secondary	**m³/h**	**1.13**	**2.25**	**3.30**	**3.30**	**4.24**	**5.09**	**1.13**	**2.24**	**3.29**	**3.29**	**4.24**	**5.09**
45/15 °C	T return primary	°C	21	20	20	20	20	19	20	19	19	19	19	18
	V̇ primary	**m³/h**	**0.8**	**1.55**	**2.24**	**2.24**	**2.87**	**3.43**	**0.71**	**1.36**	**1.98**	**1.98**	**2.54**	**3.03**
	Q max.	kW	39	78	115	115	148	178	40	78	114	114	148	177
	V̇ secondary	**m³/h**	**1.14**	**2.27**	**3.31**	**3.31**	**4.26**	**5.11**	**1.16**	**2.26**	**3.30**	**3.30**	**4.26**	**5.10**
45/20 °C	T return primary	°C	24	23	23	23	23	23	23	23	22	22	22	22
	V̇ primary	**m³/h**	**0.72**	**1.4**	**2.02**	**2.02**	**2.59**	**3.1**	**0.63**	**1.22**	**1.78**	**1.78**	**2.29**	**2.73**
	Q max.	kW	33	66	96	96	123	148	33	65	96	96	124	148
	V̇ secondary	**m³/h**	**1.16**	**2.29**	**3.32**	**3.32**	**4.28**	**5.13**	**1.15**	**2.27**	**3.32**	**3.32**	**4.29**	**5.13**

T return primary	°C	Return temperature primary
V̇ primary	**m³/h**	Flow rate primary
Q max.	kW	Output
V̇ secondary	**m³/h**	Flow rate secondary

The specified technical data relate to the full load of the module in each case.

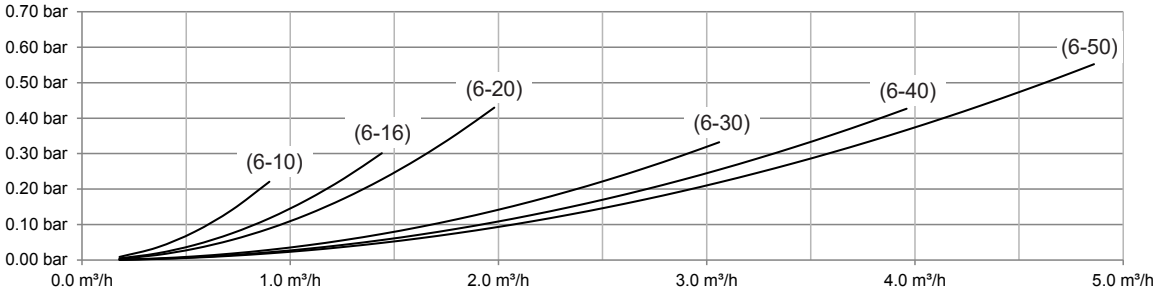
Performance data

TransTherm® aqua F

Residential units standard apartment according to DIN 4708	Peak heat demand standard apartment according to DIN 4708 with preparation 10 min	Sum flow rate domestic hot water calculation flow rate according to DIN 4708	Simultaneity factor according to DIN 4708	Peak flow rate (DHW)	Peak flow rate (DHW)	Peak flow rate (DHW)	Peak output (DHW)	Peak flow rate TransTherm® aqua F (DHW)	Peak flow rate TransTherm® aqua F (DHW)	Peak flow rate TransTherm® aqua F (DHW)	DHW calorifier output TransTherm® aqua F	TransTherm® aqua F	Required hot water volume at 70/30 °C (40 K)	Required hot water buffer storage tank volume at 70/30 °C (40 K)	Hot water buffer storage tank 1 EnerVal	Required recharging capacity	Required recharging capacity	Required recharging capacity
N	Preparation	∑ VR at DHW 60 °C	g	$\dot{V}s$ at DHW 60 °C	$\dot{V}s$ at DHW 60 °C	$\dot{V}s$ at DHW 60 °C		$\dot{V}s$ at DHW 60 °C	$\dot{V}s$ at DHW 60 °C	$\dot{V}s$ at DHW 60 °C	Q at HT 70/30 °C DHW 10/60 °C	Type			Type	Time: 20 min 70/30 °C (40 K)	Time: 30 min 70/30 °C (40 K)	Time: 60 min 70/30 °C (40 K)
	[Wh]	[l/s]		[l/s]	[l/min]	[m³/h]	[kW]	[l/s]	[l/min]	[m³/h]	[kW]		[m³]	[m³]		[kW]	[kW]	[kW]
1	5820	0.17	1.00	0.17	10.01	0.60	35	0.24	14.3	0.86	50	(6-10)	0.13	0.16	(200)	23	15	8
2	11640	0.33	0.680	0.23	13.61	0.82	47	0.24	14.3	0.86	50	(6-10)	0.17	0.22	(200)	31	21	10
3	17460	0.50	0.544	0.27	16.33	0.98	57	0.43	25.8	1.55	90	(6-16)	0.20	0.27	(300)	37	25	12
4	23280	0.67	0.466	0.31	18.66	1.12	65	0.43	25.8	1.55	90	(6-16)	0.23	0.30	(300)	42	28	14
5	29100	0.83	0.415	0.35	20.77	1.25	72	0.43	25.8	1.55	90	(6-16)	0.26	0.34	(500)	47	31	16
6	34920	1.00	0.377	0.38	22.64	1.36	79	0.43	25.8	1.55	90	(6-16)	0.28	0.37	(500)	51	34	17
7	40740	1.17	0.349	0.41	24.45	1.47	85	0.43	25.8	1.55	90	(6-16)	0.31	0.40	(500)	55	37	18
8	46560	1.33	0.349	0.47	27.94	1.68	97	0.55	33.0	1.98	115	(6-20)	0.35	0.45	(500)	63	42	21
9	52380	1.50	0.308	0.46	27.74	1.66	97	0.55	33.0	1.98	115	(6-20)	0.35	0.45	(500)	63	42	21
10	58200	1.67	0.292	0.49	29.23	1.75	102	0.55	33.0	1.98	115	(6-20)	0.37	0.47	(500)	66	44	22
11	64020	1.83	0.279	0.51	30.72	1.84	107	0.55	33.0	1.98	115	(6-20)	0.38	0.50	(500)	70	46	23
12	69840	2.00	0.268	0.54	32.19	1.93	112	0.55	33.0	1.98	115	(6-20)	0.40	0.52	(500)	73	49	24
13	75660	2.17	0.258	0.56	33.57	2.01	117	0.55	33.0	1.98	115	(6-20)	0.42	0.55	(500)	76	51	25
14	81480	2.34	0.249	0.58	34.89	2.09	122	0.84	50.2	3.01	175	(6-30)	0.44	0.57	(500)	79	53	26
15	87300	2.50	0.242	0.61	36.33	2.18	127	0.84	50.2	3.01	175	(6-30)	0.45	0.59	(800)	82	55	27
16	93120	2.67	0.235	0.63	37.63	2.26	131	0.84	50.2	3.01	175	(6-30)	0.47	0.61	(800)	85	57	28
17	98940	2.84	0.228	0.65	38.79	2.33	135	0.84	50.2	3.01	175	(6-30)	0.49	0.63	(800)	88	59	29
18	104760	3.00	0.223	0.67	40.17	2.41	140	0.84	50.2	3.01	175	(6-30)	0.50	0.65	(800)	91	61	30
19	110580	3.17	0.217	0.69	41.27	2.48	144	0.84	50.2	3.01	175	(6-30)	0.52	0.67	(800)	94	62	31
20	116400	3.34	0.212	0.71	42.44	2.55	148	0.84	50.2	3.01	175	(6-30)	0.53	0.69	(800)	96	64	32
21	122220	3.50	0.208	0.73	43.72	2.62	153	0.84	50.2	3.01	175	(6-30)	0.55	0.71	(800)	99	66	33
22	128040	3.67	0.204	0.75	44.92	2.70	157	0.84	50.2	3.01	175	(6-30)	0.56	0.73	(800)	102	68	34
23	133860	3.84	0.200	0.77	46.04	2.76	161	0.84	50.2	3.01	175	(6-30)	0.58	0.75	(800)	104	70	35
24	139680	4.00	0.196	0.78	47.08	2.82	164	0.84	50.2	3.01	175	(6-30)	0.59	0.77	(800)	107	71	36
25	145500	4.17	0.193	0.80	48.29	2.90	168	0.84	50.2	3.01	175	(6-30)	0.60	0.78	(800)	110	73	37
26	151320	4.34	0.190	0.82	49.44	2.97	173	0.84	50.2	3.01	175	(6-30)	0.62	0.80	(800)	112	75	37
27	157140	4.50	0.187	0.84	50.53	3.03	176	0.84	50.2	3.01	175	(6-30)	0.63	0.82	(800)	115	76	38
28	162960	4.67	0.184	0.86	51.56	3.09	180	0.84	50.2	3.01	175	(6-30)	0.64	0.84	(800)	117	78	39
29	168780	4.84	0.181	0.88	52.54	3.15	183	1.10	65.8	3.95	230	(6-40)	0.66	0.85	(800)	119	79	40
30	174600	5.00	0.179	0.90	53.75	3.22	188	1.10	65.8	3.95	230	(6-40)	0.67	0.87	(1000)	122	81	41
31	180420	5.17	0.176	0.91	54.61	3.28	191	1.10	65.8	3.95	230	(6-40)	0.68	0.89	(1000)	124	83	41
32	186240	5.34	0.174	0.93	55.73	3.34	194	1.10	65.8	3.95	230	(6-40)	0.70	0.91	(1000)	126	84	42
33	192060	5.50	0.172	0.95	56.81	3.41	198	1.10	65.8	3.95	230	(6-40)	0.71	0.92	(1000)	129	86	43
34	197880	5.67	0.170	0.96	57.85	3.47	202	1.10	65.8	3.95	230	(6-40)	0.72	0.94	(1000)	131	87	44
35	203700	5.84	0.168	0.98	58.85	3.53	205	1.10	65.8	3.95	230	(6-40)	0.74	0.96	(1000)	133	89	44
36	209520	6.01	0.166	1.00	59.81	3.59	209	1.10	65.8	3.95	230	(6-40)	0.75	0.97	(1000)	136	90	45
37	215340	6.17	0.164	1.01	60.73	3.64	212	1.10	65.8	3.95	230	(6-40)	0.76	0.99	(1000)	138	92	46
38	221160	6.34	0.163	1.03	61.99	3.72	216	1.10	65.8	3.95	230	(6-40)	0.78	1.01	(1000)	141	94	47
39	226980	6.51	0.161	1.05	62.84	3.77	219	1.10	65.8	3.95	230	(6-40)	0.79	1.02	(1000)	143	95	48
40	232800	6.67	0.159	1.06	63.65	3.82	222	1.10	65.8	3.95	230	(6-40)	0.80	1.03	(1000)	144	96	48
41	238620	6.84	0.158	1.08	64.84	3.89	226	1.10	65.8	3.95	230	(6-40)	0.81	1.05	(1000)	147	98	49
42	244440	7.01	0.156	1.09	65.58	3.93	229	1.10	65.8	3.95	230	(6-40)	0.82	1.07	(1000)	149	99	50
43	250260	7.17	0.155	1.11	66.71	4.00	233	1.10	65.8	3.95	230	(6-40)	0.83	1.08	(1000)	151	101	50
44	256080	7.34	0.154	1.13	67.82	4.07	237	1.31	78.8	4.73	275	(6-50)	0.85	1.10	(1500)	154	103	51
45	261900	7.51	0.152	1.14	68.46	4.11	239	1.31	78.8	4.73	275	(6-50)	0.86	1.11	(1500)	155	104	52
46	267720	7.67	0.151	1.16	69.52	4.17	243	1.31	78.8	4.73	275	(6-50)	0.87	1.13	(1500)	158	105	53
47	273540	7.84	0.150	1.18	70.56	4.23	246	1.31	78.8	4.73	275	(6-50)	0.88	1.15	(1500)	160	107	53
48	279360	8.01	0.149	1.19	71.58	4.29	250	1.31	78.8	4.73	275	(6-50)	0.89	1.16	(1500)	162	108	54
49	285180	8.17	0.148	1.21	72.58	4.35	253	1.31	78.8	4.73	275	(6-50)	0.91	1.18	(1500)	165	110	55
50	291000	8.34	0.146	1.22	73.06	4.38	255	1.31	78.8	4.73	275	(6-50)	0.91	1.19	(1500)	166	110	55
51	296820	8.51	0.145	1.23	74.01	4.44	258	1.31	78.8	4.73	275	(6-50)	0.93	1.20	(1500)	168	112	56
52	302640	8.67	0.144	1.25	74.94	4.50	261	1.31	78.8	4.73	275	(6-50)	0.94	1.22	(1500)	170	113	57
53	308460	8.84	0.143	1.26	75.86	4.55	265	1.31	78.8	4.73	275	(6-50)	0.95	1.23	(1500)	172	115	57
54	314280	9.01	0.142	1.28	76.75	4.60	268	1.31	78.8	4.73	275	(6-50)	0.96	1.25	(1500)	174	116	58

Residential units standard apartment according to DIN 4708	Peak heat demand standard apartment according to DIN 4708 with preparation 10 min	Sum flow rate domestic hot water calculation flow rate according to DIN 4708	Simultaneity factor according to DIN 4708	Peak flow rate (DHW)	Peak flow rate (DHW)	Peak flow rate (DHW)	Peak output (DHW)	Peak flow rate TransTherm® aqua F (DHW)	Peak flow rate TransTherm® aqua F (DHW)	Peak flow rate TransTherm® aqua F (DHW)	DHW calorifier output TransTherm® aqua F	TransTherm® aqua F	Required hot water volume at 70/30 °C (40 K)	Required hot water buffer storage tank volume at 70/30 °C (40 K)	Hot water buffer storage tank 1 EnerVal	Required recharging capacity	Required recharging capacity	Required recharging capacity
N	Preparation	∑ VR at DHW 60 °C	g	$\dot{V}s$ at DHW 60 °C	$\dot{V}s$ at DHW 60 °C	$\dot{V}s$ at DHW 60 °C		$\dot{V}s$ at DHW 60 °C	$\dot{V}s$ at DHW 60 °C	$\dot{V}s$ at DHW 60 °C	Q at HT 70/30 °C DHW 10/60 °C	Type			Type	Time: 20 min 70/30 °C (40 K)	Time: 30 min 70/30 °C (40 K)	Time: 60 min 70/30 °C (40 K)
	[Wh]	[l/s]		[l/s]	[l/min]	[m³/h]	[kW]	[l/s]	[l/min]	[m³/h]	[kW]		[m³]	[m³]		[kW]	[kW]	[kW]
55	320100	9.17	0.141	1.29	77.62	4.66	271	1.31	78.8	4.73	275	(6-50)	0.97	1.26	(1500)	176	117	59
56	325920	9.34	0.140	1.31	78.47	4.71	274	1.31	78.8	4.73	275	(6-50)	0.98	1.28	(1500)	178	119	59
57	331740	9.51	0.140	1.33	79.87	4.79	279	1.31	78.8	4.73	275	(6-50)	1.00	1.30	(1500)	181	121	60
58	337560	9.67	0.139	1.34	80.69	4.84	282	1.69	101.2	6.07	350	(6-60)	1.01	1.31	(1500)	183	122	61
59	343380	9.84	0.138	1.36	81.49	4.89	284	1.69	101.2	6.07	350	(6-60)	1.02	1.32	(1500)	185	123	62
60	349200	10.01	0.137	1.37	82.27	4.94	287	1.69	101.2	6.07	350	(6-60)	1.03	1.34	(1500)	187	124	62
61	355020	10.18	0.136	1.38	83.03	4.98	290	1.69	101.2	6.07	350	(6-60)	1.04	1.35	(1500)	188	126	63
62	360840	10.34	0.135	1.40	83.77	5.03	292	1.69	101.2	6.07	350	(6-60)	1.05	1.36	(1500)	190	127	63
63	366660	10.51	0.135	1.42	85.12	5.11	297	1.69	101.2	6.07	350	(6-60)	1.06	1.38	(1500)	193	129	64
64	372480	10.68	0.134	1.43	85.83	5.15	299	1.69	101.2	6.07	350	(6-60)	1.07	1.40	(1500)	195	130	65
65	378300	10.84	0.133	1.44	86.52	5.19	302	1.69	101.2	6.07	350	(6-60)	1.08	1.41	(1500)	196	131	65
66	384120	11.01	0.132	1.45	87.19	5.23	304	1.69	101.2	6.07	350	(6-60)	1.09	1.42	(1500)	198	132	66
67	389940	11.18	0.132	1.48	88.52	5.31	309	1.69	101.2	6.07	350	(6-60)	1.11	1.44	(1500)	201	134	67
68	395760	11.34	0.131	1.49	89.16	5.35	311	1.69	101.2	6.07	350	(6-60)	1.11	1.45	(1500)	202	135	67
69	401580	11.51	0.130	1.50	89.78	5.39	313	1.69	101.2	6.07	350	(6-60)	1.12	1.46	(1500)	204	136	68
70	407400	11.68	0.130	1.52	91.08	5.46	318	1.69	101.2	6.07	350	(6-60)	1.14	1.48	(1500)	207	138	69
71	413220	11.84	0.129	1.53	91.67	5.50	320	1.69	101.2	6.07	350	(6-60)	1.15	1.49	(1500)	208	139	69
72	419040	12.01	0.128	1.54	92.24	5.53	322	1.69	101.2	6.07	350	(6-60)	1.15	1.50	(1500)	209	139	70
73	424860	12.18	0.128	1.56	93.52	5.61	326	1.69	101.2	6.07	350	(6-60)	1.17	1.52	(1500)	212	141	71
74	430680	12.34	0.127	1.57	94.06	5.64	328	1.69	101.2	6.07	350	(6-60)	1.18	1.53	(1500)	213	142	71
75	436500	12.51	0.127	1.59	95.33	5.72	333	1.69	101.2	6.07	350	(6-60)	1.19	1.55	(1500)	216	144	72
76	442320	12.68	0.126	1.60	95.84	5.75	334	1.69	101.2	6.07	350	(6-60)	1.20	1.56	(1500)	217	145	72
77	448140	12.84	0.126	1.62	97.10	5.83	339	1.69	101.2	6.07	350	(6-60)	1.21	1.58	(1500)	220	147	73
78	453960	13.01	0.125	1.63	97.58	5.86	340	1.69	101.2	6.07	350	(6-60)	1.22	1.59	(1500)	221	148	74
79	459780	13.18	0.124	1.63	98.04	5.88	342	1.69	101.2	6.07	350	(6-60)	1.23	1.59	(1500)	222	148	74
80	465600	13.34	0.124	1.65	99.29	5.96	346	1.69	101.2	6.07	350	(6-60)	1.24	1.61	(2000)	225	150	75
81	471420	13.51	0.123	1.66	99.72	5.98	348	1.69	101.2	6.07	350	(6-60)	1.25	1.62	(2000)	226	151	75
82	477240	13.68	0.123	1.68	100.95	6.06	352	1.69	101.2	6.07	350	(6-60)	1.26	1.64	(2000)	229	153	76
83	483060	13.85	0.122	1.69	101.35	6.08	354	1.69	101.2	6.07	350	(6-60)	1.27	1.65	(2000)	230	153	77
84	488880	14.01	0.122	1.71	102.57	6.15	358	2.17	130.0	7.80	450	(6-70)	1.28	1.67	(2000)	233	155	78
85	494700	14.18	0.121	1.72	102.94	6.18	359	2.17	130.0	7.80	450	(6-70)	1.29	1.67	(2000)	233	156	78
86	500520	14.35	0.121	1.74	104.15	6.25	363	2.17	130.0	7.80	450	(6-70)	1.30	1.69	(2000)	236	157	79
87	506340	14.51	0.120	1.74	104.49	6.27	365	2.17	130.0	7.80	450	(6-70)	1.31	1.70	(2000)	237	158	79
88	512160	14.68	0.120	1.76	105.69	6.34	369	2.17	130.0	7.80	450	(6-70)	1.32	1.72	(2000)	240	160	80
89	517980	14.85	0.120	1.78	106.89	6.41	373	2.17	130.0	7.80	450	(6-70)	1.34	1.74	(2000)	242	162	81
90	523800	15.01	0.119	1.79	107.19	6.43	374	2.17	130.0	7.80	450	(6-70)	1.34	1.74	(2000)	243	162	81
91	529620	15.18	0.119	1.81	108.38	6.50	378	2.17	130.0	7.80	450	(6-70)	1.36	1.76	(2000)	246	164	82
92	535440	15.35	0.118	1.81	108.65	6.52	379	2.17	130.0	7.80	450	(6-70)	1.36	1.77	(2000)	246	164	82
93	541260	15.51	0.118	1.83	109.83	6.59	383	2.17	130.0	7.80	450	(6-70)	1.37	1.79	(2000)	249	166	83
94	547080	15.68	0.117	1.83	110.07	6.60	384	2.17	130.0	7.80	450	(6-70)	1.38	1.79	(2000)	250	166	83
95	552900	15.85	0.117	1.85	111.25	6.67	388	2.17	130.0	7.80	450	(6-70)	1.39	1.81	(2000)	252	168	84
96	558720	16.01	0.117	1.87	112.42	6.74	392	2.17	130.0	7.80	450	(6-70)	1.41	1.83	(2000)	255	170	85
97	564540	16.18	0.116	1.88	112.62	6.76	393	2.17	130.0	7.80	450	(6-70)	1.41	1.83	(2000)	255	170	85
98	570360	16.35	0.116	1.90	113.78	6.83	397	2.17	130.0	7.80	450	(6-70)	1.42	1.85	(2000)	258	172	86
99	576180	16.51	0.116	1.92	114.94	6.90	401	2.17	130.0	7.80	450	(6-70)	1.44	1.87	(2000)	261	174	87
100	582000	16.68	0.115	1.92	115.10	6.91	402	2.17	130.0	7.80	450	(6-70)	1.44	1.87	(2000)	261	174	87

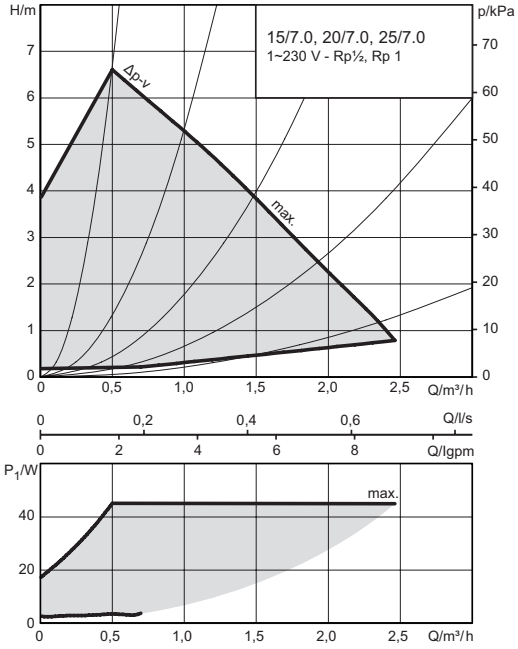
Pressure drop (ΔP / Q max) - domestic water side (secondary)



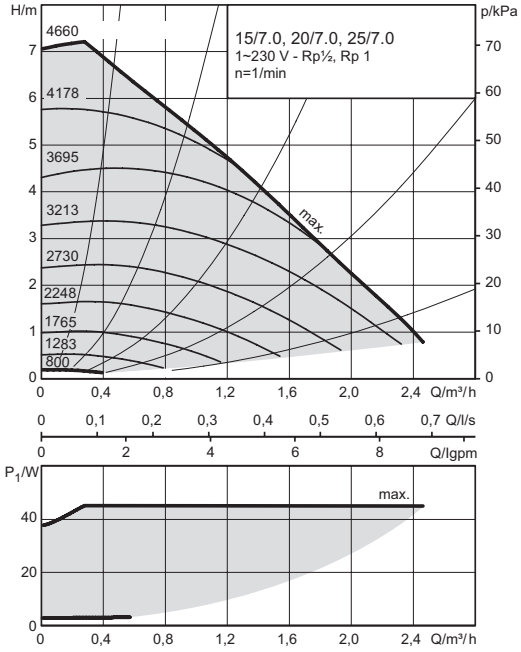
Circulating pumps characteristic curves

for circulation set ¾"

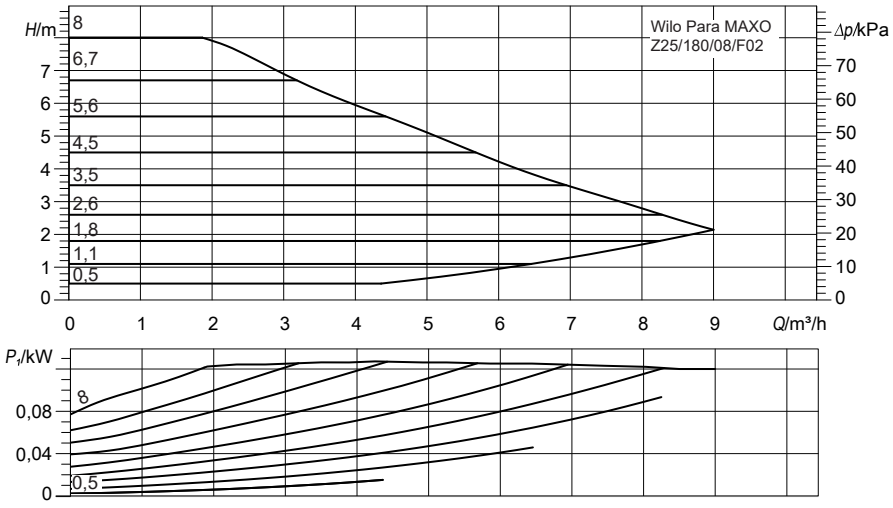
Δp-v (variable)



Constant speed

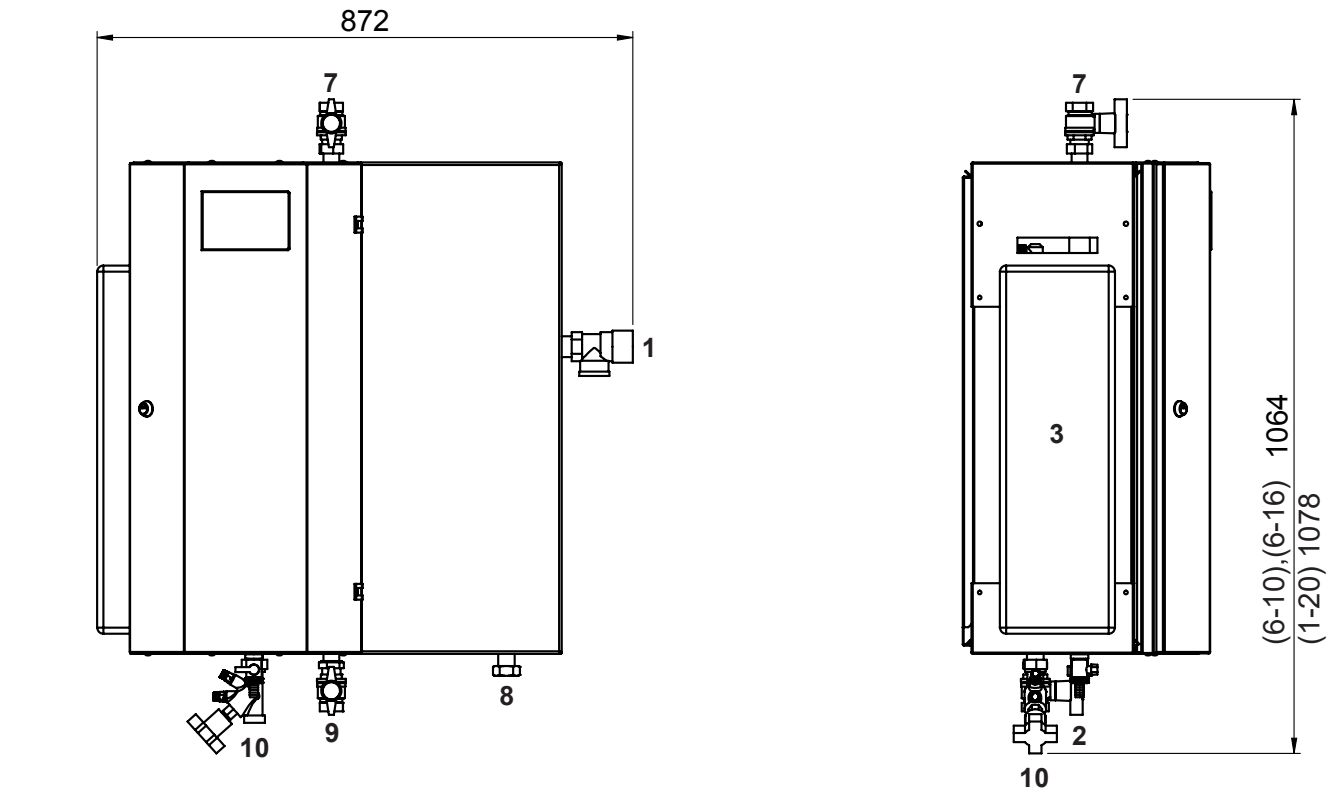


for circulation set 1" and 1 ¼"



Fresh water module TransTherm® aqua F (6-10 to 6-20)

(Dimensions in mm)



1 Safety valve
Hot water 10 bar
2 Filling/drain valve
3 Heat exchanger

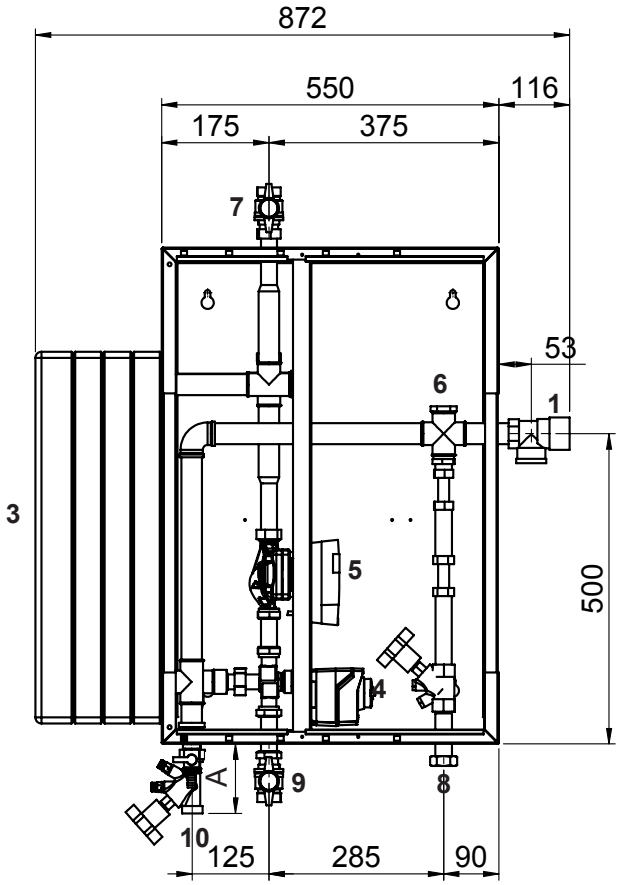
		(6-10) (6-16) (6-20)
6	Circulation	DN 25, Rp 1″ (20, Rp ¾″) (IT)
7	Hot water	DN 25, Rp 1″ (IT)
8	Cold water	DN 25, Gp 1″ (IT)
9	Flow heating water	DN 25, Rp 1″ (IT)
10	Return heating water	DN 20, Gp 1″ (IT)

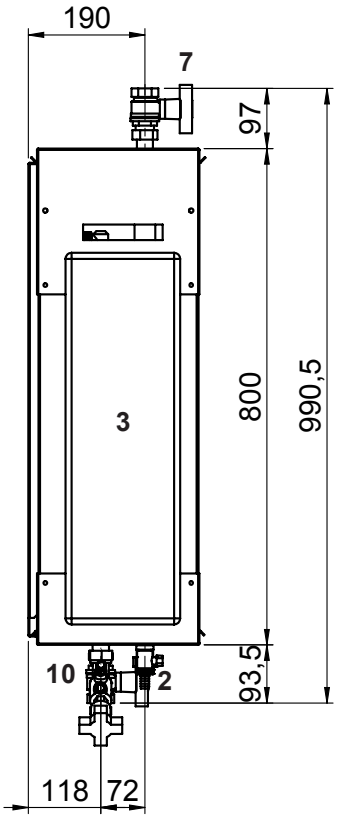
Gp = straight internal thread

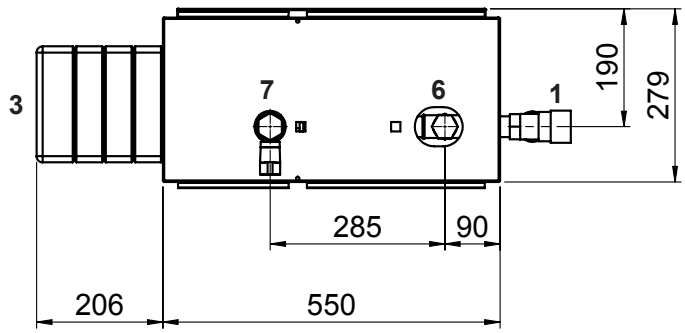
TransTherm® aqua F	Weight in kg
(6-10)	52
(6-16)	54
(6-20)	56

Fresh water module TransTherm® aqua F (6-10 to 6-20)

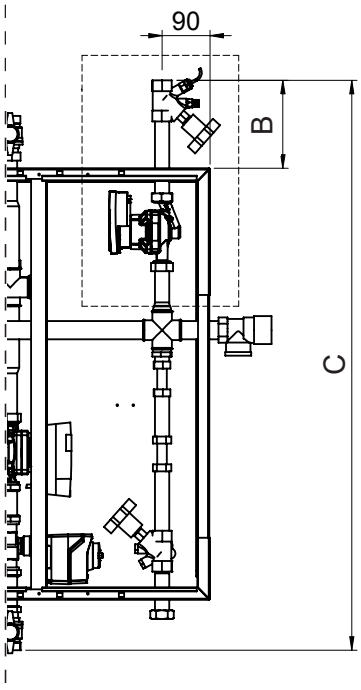
(Dimensions in mm)







Version incl. circulation set



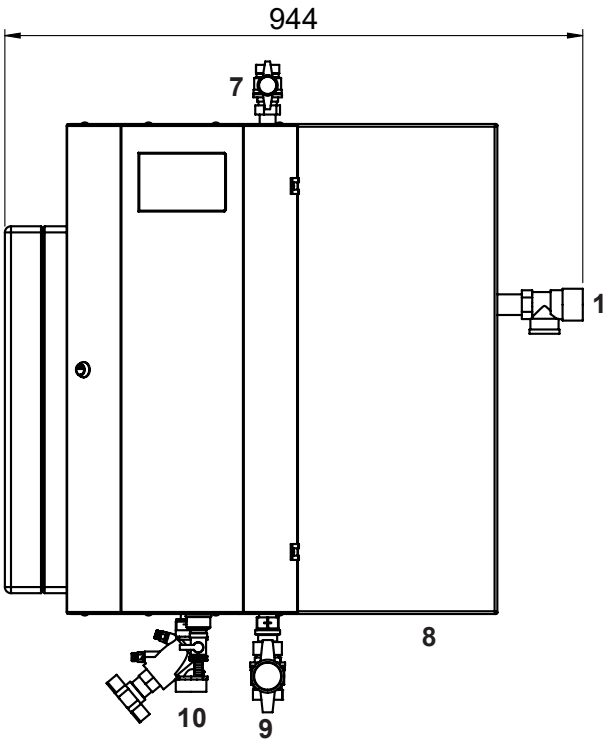
	A	B	C
(6-10)	112	163	1056
(6-16)	112	163	1045
(6-20)	133	246	1143

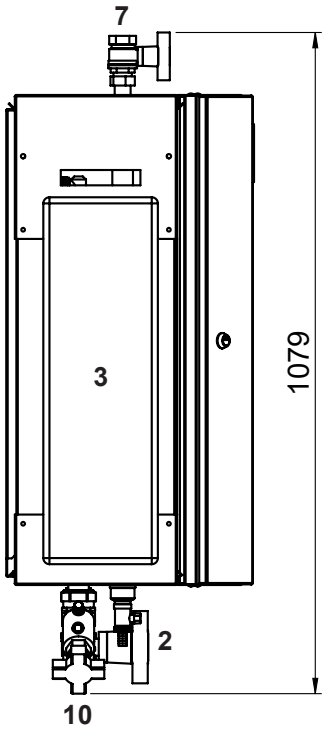
		(6-10) (6-16) (6-20)
1	Safety valve Hot water 10 bar	
2	Filling/drain valve	
3	Heat exchanger	
4	Primary three-way valve	
5	Primary circulating pump	
6	Circulation	DN 25, Rp 1″ (20, Rp ¾″) (IT)
7	Hot water	DN 25, Rp 1″ (IT)
8	Cold water	DN 25, Gp 1″ (IT)
9	Flow heating water	DN 25, Rp 1″ (IT)
10	Return heating water	DN 20, Gp 1″ (IT)

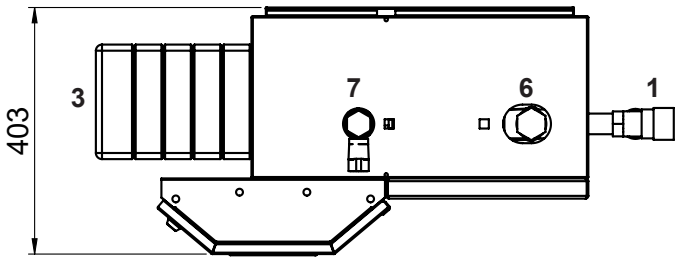
Gp = straight internal thread

Fresh water module TransTherm® aqua F (6-30 to 6-50)

(Dimensions in mm)







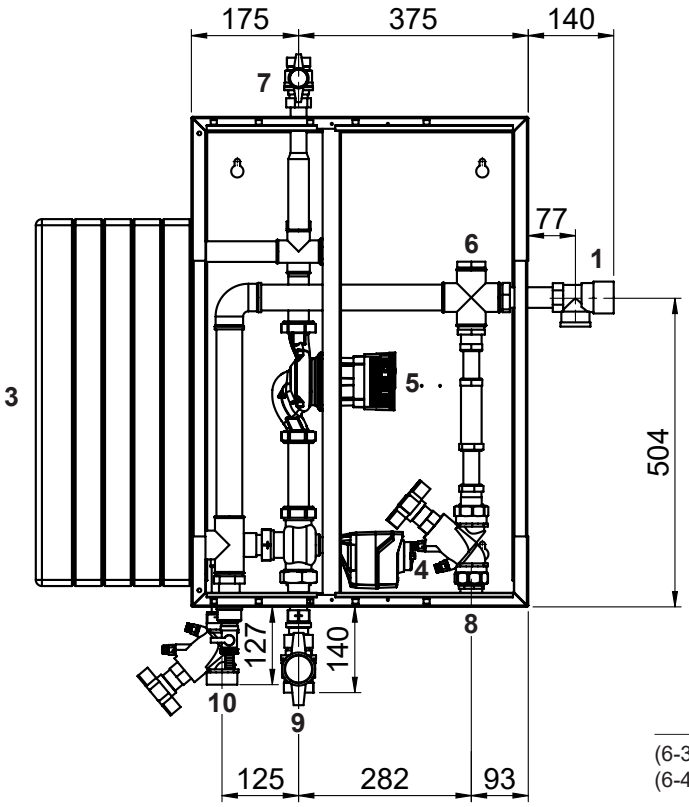
1 Safety valve
Hot water 10 bar
2 Filling/drain valve
3 Heat exchanger

		(6-30) (6-40) (6-50)
6	Circulation	DN 32, Rp 1 ¼″ (25 Rp 1″) (20 Rp ¾″) (IT)
7	Hot water	DN 32, Rp 1 ¼″ (IT)
8	Cold water	DN 32, Rp 1 ¼″ (IT)
9	Flow heating water	DN 32, Rp 1 ¼″ (IT)
10	Return heating water	DN 32, Rp 1 ¼″ (IT)

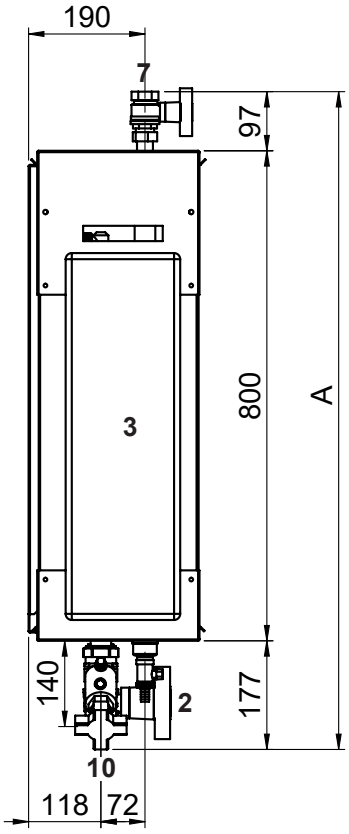
TransTherm® aqua F	Weight in kg
(6-30)	62
(6-40)	64
(6-50)	66

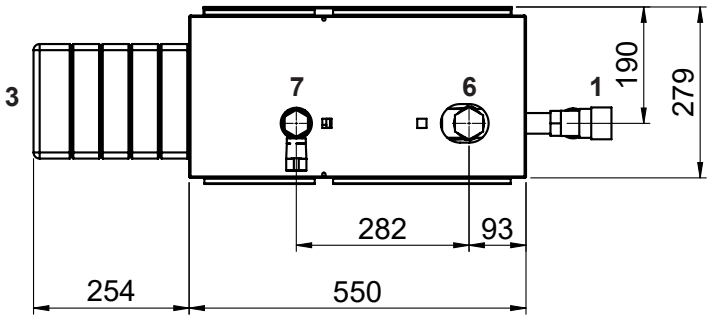
Fresh water module TransTherm® aqua F (6-30 to 6-50)

(Dimensions in mm)

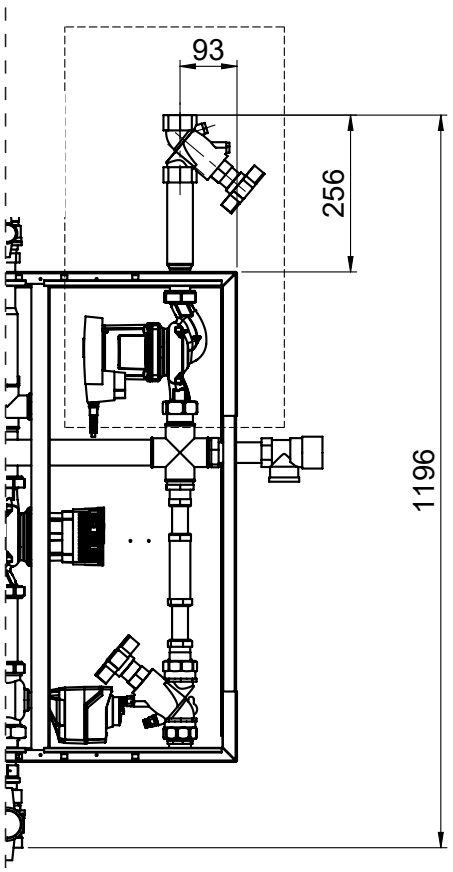


	A
(6-30)	140
(6-40), (6-50)	101



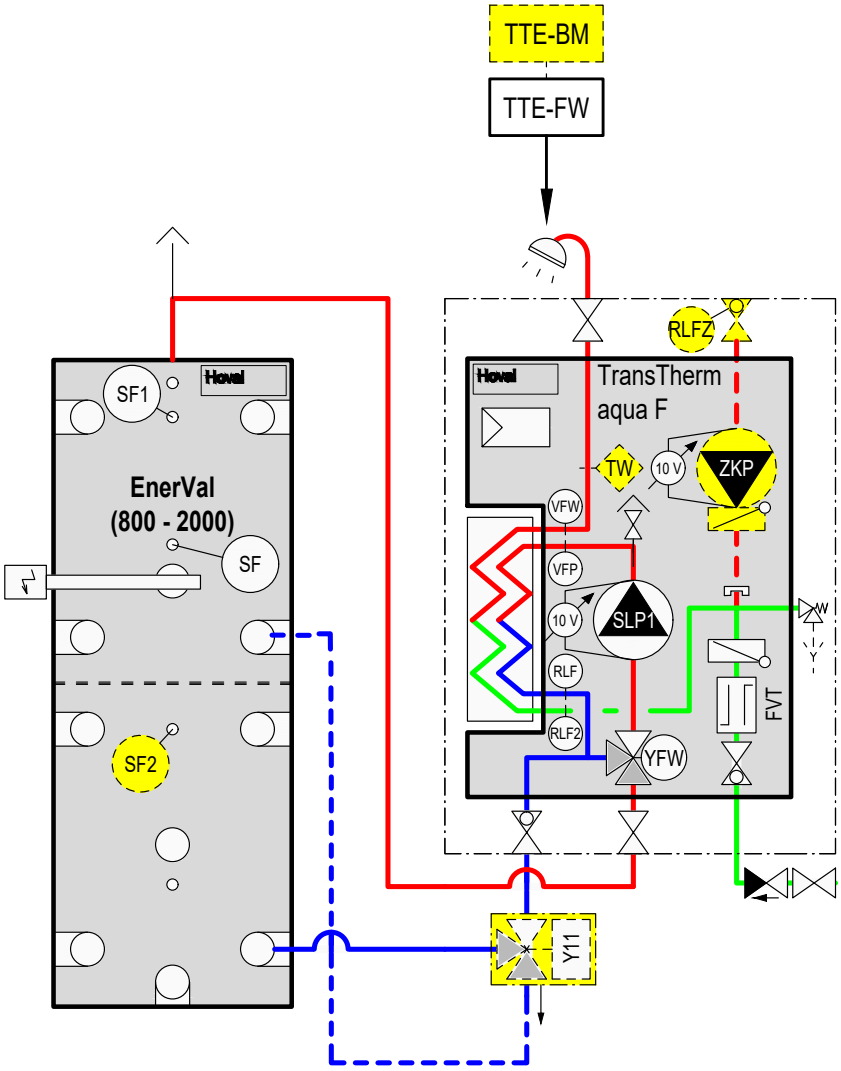


Version incl. circulation set



		(6-30) (6-40) (6-50)
1	Safety valve Hot water 10 bar	
2	Filling/drain valve	
3	Heat exchanger	
4	Primary three-way valve	
5	Primary circulating pump	
6	Circulation	DN 32, Rp 1 ¼″ (25 Rp 1″) (20 Rp ¾″) (IT)
7	Hot water	DN 32, Rp 1 ¼″ (IT)
8	Cold water	DN 32, Rp 1 ¼″ (IT)
9	Flow heating water	DN 32, Rp 1 ¼″ (IT)
10	Return heating water	DN 32, Rp 1 ¼″ (IT)

Water heating
TransTherm® aqua F



TTE-FW	Basic module district heating/fresh water
TW	Flow temperature monitor (if required)
VFP	Flow sensor primary
VFW	Flow sensor DHW
RLF	Return sensor primary
RLF2	Return sensor domestic cold water
SF	Calorifier sensor
SF1	Calorifier sensor 1
RLFZ	Circulation sensor
SLP1	Calorifier charging pump primary
FVT	Flow rate sensor
YFW	Three-way valve with actuator
ZKP	Recirculation pump
Y11	Return switching with actuator

Option

BM	TopTronic® E control module
SF2	Calorifier sensor 2

Calorifier continuous flow system

Consisting of:
- fresh water module TransTherm® aqua F
- buffer storage tank (option)

Fresh water module TransTherm® aqua F

- Fully installed station with plate heat exchanger for the provision of domestic hot water using the continuous flow principle
- Mounted on stand frame.
  Stand frame consisting of:
  - frame with corrosion protection coating RAL 9005
  - height-adjustable and vibration-damped feet
- The primary side (heating side) contains the three-way valve, high-efficiency pump, ventilation, filling/drain valves and balancing valve. These components ensure a constant flow temperature at the plate heat exchanger. Pipes made from steel
- The secondary side (DHW side) contains the safety valve (10 bar), non-return valve and a filling/drain valve. A flow sensor ensures the correct hot water temperature. Pipes made from stainless steel
- Stainless steel plate heat exchanger 1.4404, copper-soldered
- Flow rate sensor
- T-piece with dummy plug for on-site connection of the circulation group. Connect the pump to the controller on site.
- TopTronic® E control with integrated thermal disinfection of the DHW storage tank (anti-legionella circuit)

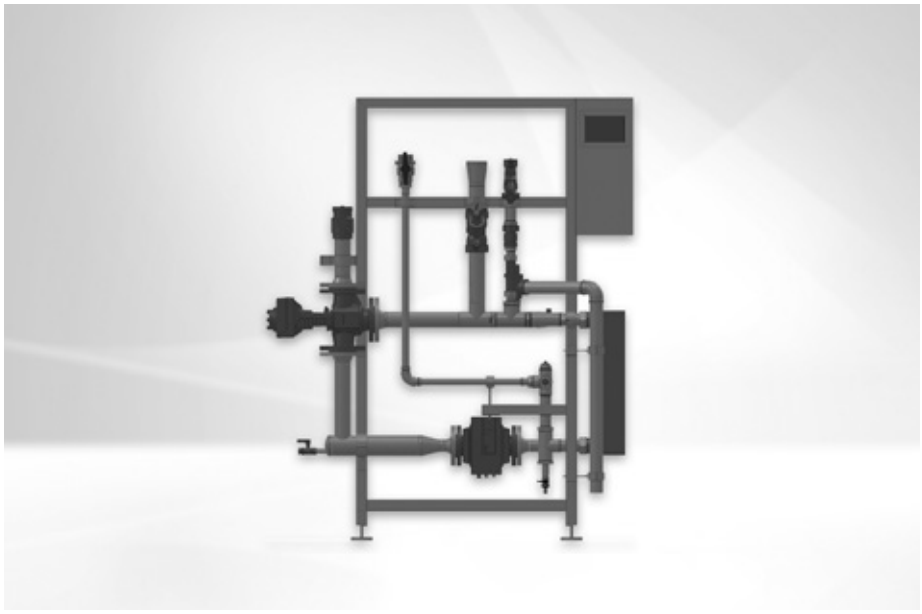
Thermal insulation consisting of:
- thermal insulation of the heat exchanger with 30-mm EPP mouldings
- thermal insulation of the pipes with EPP mouldings. Insulation thickness of 50 % according to EnEV
- deep black, similar to RAL 9005
- suitable for damp rooms
- CFC-free
- normal flammability according to DIN 4102-1 and EN 13501-1 (fuel class: B2)
- no bleaching and disintegration of the insulation under the influence of UV light

Delivery
- The buffer storage tank required is not included in the scope of delivery

On site
- Installation of a circulation unit;
  the necessary connection is provided.
- Electrical connection of the controller

TopTronic® E controller

TopTronic® E basic module district heating/ fresh water
- Control unit for controlling district heating systems in non-communicative networks and the corresponding consumers with integrated control functions for
  - primary valve control
  - cascade management
  - 1 heating/cooling circuit with mixer
  - 1 heating/cooling circuit without mixer
  - 1 hot water charging circuit
  - various additional functions



Range
Fresh water module

TransTherm® aqua F type	Output kW
(6-60)	350
(6-70)	450
(6-80)	580
(6-90)	700

- Various functions for hot water:
  - selection of different basic programs (week programs, economy mode, holiday until, etc.)
  - various operating modes (e.g. accumulator priority or parallel mode)
  - buffer storage circuit on the primary or secondary side
  - adjustable loading criteria (e.g.: adjustable loading times, undershooting the minimum nominal value, etc.)
  - adjustable switch-off criteria (e.g. achieving the setpoint valve, achieving the lower sensor setpoint value, etc.)
  - adjustable loading block (if the loading flow temperature is too low, the setpoint temperature is not reached, differential temperature-dependent solar circuit control)
- Definable switching times for recirculation pump control
- Outdoor sensor
- Immersion sensor (calorifier sensor)
- Contact sensor (flow temperature sensor)
- Complete plug set for DH module
- RPM-regulated pumps

No further module expansions or controller modules can be installed in the control panel!

Option

TopTronic® E control module
- Simple, intuitive operating concept
- Display of the most important operating states
- Configurable start screen
- Operating mode selection
- Configurable day and week programs
- Operation of all connected Hoval CAN bus modules
- Commissioning wizard
- Service and maintenance function
- Fault message management
- Analysis function
- Weather display (with HovalConnect option)
- Adaptation of the heating strategy based on the weather forecast (with HovalConnect option)

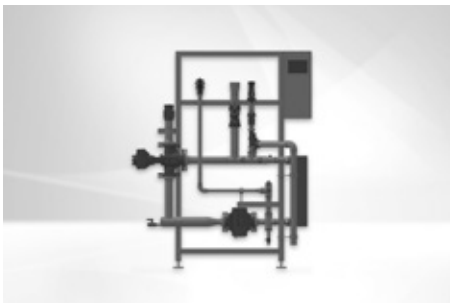
Notice
The TopTronic® E control module for operating the basic module district heating/fresh water must be ordered separately!

Further information about the TopTronic® E
see “Controls”

Delivery
- All armatures required for operation, such as strainers, flow balancing and shut-off valves, backflow preventer, air-bleeding and drain valve are fitted.

Caution
As a result of thermal disinfection of the domestic hot water for legionella protection, increased water temperatures (at least 65-70 °C) occur. Depending on the water quality, this may result in increased calcification at the installed armatures and heat exchangers and also brings the risk of scalding at the tapping points. Corresponding protective measures must be implemented on site.

Fresh water module



TransTherm® aqua F

Fully assembled station with plate heat exchanger for the provision of domestic hot water using the continuous flow principle and built-in Hoval TopTronic® E control
The required buffer storage tank is not supplied.

TransTherm® aqua F	Output kW	Part No.
(6-60)	350	8006 393
(6-70)	450	8006 394
(6-80)	580	8006 395
(6-90)	700	8006 396

Accessories

	Part No.
 **TopTronic® E control module black with 4.3″ colour touchscreen** For operation of all controller modules connected to the bus system (basic, solar, buffer modules etc.) Connection to the Hoval bus system via RJ45 plug connection or via plug terminals (max. 0.75 mm²), flat design with flexible installation option Installation: - in control panel of the heat generator - in the Hoval wall casing - in the control panel front, black high-gloss cover, customer-specific configurable start screen, Display of current weather or weather forecast (only possible in combination with HovalConnect) Consisting of: - TopTronic® E control module black - Clamping device set control module - RJ45-RAST 5 CAN cable, L = 500	6043 844
 **Return changeover valve set** Consisting of: - temperature sensor - changeover valve - drive (8 sec.) DN 20-DN 40 - drive (30 sec.) DN 50-DN 80 - seals - screw connections	

Nominal diameter	Output kW	kvs m³/h	
DN 20	50-90	6.3	7010 832
DN 25	115-175	10	7010 836
DN 32	230-275	16	7011 009
DN 40	350	25	7011 025
DN 50	450	40	7016 331
DN 65	580	63	7016 332
DN 80	700	100	7016 333

Notice
When using a circulation set (also on-site recirculation pump), it is imperative to install a return switching valve set.

Circulation set
for TransTherm® aqua L, F
Piping of parts in contact with domestic water in stainless steel and gunmetal
Consisting of:
- temperature sensor PT1000
- recirculation pump Wilo Yonos PARA
- recirculation pump Wilo Para MAXO
- regulating valve
- non-return valve

Connectiona	Flow rate m³/h	Recirculation pump	
DN 20 ¾″ Rp	1.9	Z15/7.0 RKC	8005 279
DN 25 1″ Rp	3.4	Z25/180/08/F02	8005 280
DN 32 1¼″ Rp	5.8	Z25/180/08/F02	8005 281

		Part No.
	**Test valve DN 8 G ¼″** for TransTherm® aqua L, F, FS Test valve suitable for flame treatment for hygienic-microbiologic tests.	2049 861
	**Sludge separator with magnet MB3/L DN 25...DN 50** Fast and continuous removal of ferromagnetic and non-magnetic dirt and sludge particles Sludge separation up to a particle size of 5 µm Brass housing Max. operating pressure: 6 bar Max. flow temperature: 110 °Ca	
	MB3 DN 25 — Rp 1″ — 2.0 m³/h	2062 165
	MBL DN 32 — Rp 1¼″ — 3.6 m³/h	2062 166
	MBL DN 40 — Rp 1½″ — 5.0 m³/h	2062 167
	MBL DN 50 — Rp 2″ — 7.5 m³/h	2062 168
	Additional sludge separators see “Various system components”	
	**Temperature monitor 0…120 °C** for TransTherm® aqua L, F, FS	2048 299
	**Safety temperature monitor 70…130 °C** for TransTherm® aqua L, F, FS	2048 300
	**Safety temperature limiter 70…130 °C** for TransTherm® aqua L, F, FS	2049 619
	**Immersion sleeve G ½″ stainless steel for thermostat** for TransTherm® aqua L, F, FS Installation length = 100 mm Outer Ø: 8 mm, inner Ø: 6.5 mm	2048 285
	**Immersion sleeve G ½″ stainless steel for 2 thermostats** for TransTherm® aqua L, F, FS Installation length = 100 mm Outer Ø: 15 mm, inner Ø: 13.5 mm	2048 288

Part No.

Services

Commissioning
Commissioning by works service or Hoval trained authorised serviceman/company is condition for warranty.

For commissioning and other services please contact your Hoval sales office.

Performance data

TransTherm® aqua F (6-60 to 6-90)

Domestic water secondary	TransTherm® aqua F		Flow temperature heating water: 52 °C (60)	52 °C (70)	52 °C (80)	52 °C (90)	55 °C (60)	55 °C (70)	55 °C (80)	55 °C (90)	60 °C (60)	60 °C (70)	60 °C (80)	60 °C (90)
60/5 °C	T return primary	°C	-	-	-	-	-	-	-	-	-	-	-	-
	V̇ primary	**m³/h**	-	-	-	-	-	-	-	-	-	-	-	-
	Q max.	kW	-	-	-	-	-	-	-	-	-	-	-	-
	V̇ secondary	**m³/h**	-	-	-	-	-	-	-	-	-	-	-	-
60/10 °C	T return primary	°C	-	-	-	-	-	-	-	-	-	-	-	-
	V̇ primary	**m³/h**	-	-	-	-	-	-	-	-	-	-	-	-
	Q max.	kW	-	-	-	-	-	-	-	-	-	-	-	-
	V̇ secondary	**m³/h**	-	-	-	-	-	-	-	-	-	-	-	-
60/15 °C	T return primary	°C	-	-	-	-	-	-	-	-	-	-	-	-
	V̇ primary	**m³/h**	-	-	-	-	-	-	-	-	-	-	-	-
	Q max.	kW	-	-	-	-	-	-	-	-	-	-	-	-
	V̇ secondary	**m³/h**	-	-	-	-	-	-	-	-	-	-	-	-
60/20 °C	T return primary	°C	-	-	-	-	-	-	-	-	-	-	-	-
	V̇ primary	**m³/h**	-	-	-	-	-	-	-	-	-	-	-	-
	Q max.	kW	-	-	-	-	-	-	-	-	-	-	-	-
	V̇ secondary	**m³/h**	-	-	-	-	-	-	-	-	-	-	-	-
55/5 °C	T return primary	°C	-	-	-	-	-	-	-	-	28	28	28	27
	V̇ primary	**m³/h**	-	-	-	-	-	-	-	-	**7.27**	**10.06**	**12.62**	**15.81**
	Q max.	kW	-	-	-	-	-	-	-	-	270	370	470	600
	V̇ secondary	**m³/h**	-	-	-	-	-	-	-	-	**4.68**	**6.42**	**8.15**	**10.4**
55/10 °C	T return primary	°C	-	-	-	-	-	-	-	-	30	29	29	29
	V̇ primary	**m³/h**	-	-	-	-	-	-	-	-	**7.30**	**9.04**	**11.82**	**14.63**
	Q max.	kW	-	-	-	-	-	-	-	-	255	320	420	530
	V̇ secondary	**m³/h**	-	-	-	-	-	-	-	-	**4.91**	**6.17**	**8.09**	**10.21**
55/15 °C	T return primary	°C	-	-	-	-	-	-	-	-	30	30	30	30
	V̇ primary	**m³/h**	-	-	-	-	-	-	-	-	**5.20**	**7.23**	**9.25**	**13.01**
	Q max.	kW	-	-	-	-	-	-	-	-	180	250	320	450
	V̇ secondary	**m³/h**	-	-	-	-	-	-	-	-	**3.90**	**5.42**	**6.94**	**9.75**
55/20 °C	T return primary	°C	-	-	-	-	-	-	-	-	30	30	30	30
	V̇ primary	**m³/h**	-	-	-	-	-	-	-	-	**3.18**	**4.34**	**5.78**	**7.51**
	Q max.	kW	-	-	-	-	-	-	-	-	110	150	200	260
	V̇ secondary	**m³/h**	-	-	-	-	-	-	-	-	**2.73**	**3.72**	**4.95**	**6.44**
50/5 °C	T return primary	°C	-	-	-	-	25	25	25	24	22	22	21	21
	V̇ primary	**m³/h**	-	-	-	-	**7.32**	**8.93**	**11.59**	**14.69**	**7.17**	**9.14**	**11.65**	**13.93**
	Q max.	kW	-	-	-	-	250	310	405	520	315	405	520	630
	V̇ secondary	**m³/h**	-	-	-	-	**4.82**	**5.97**	**7.80**	**10.02**	**6.07**	**7.80**	**10.02**	**12.14**
50/10 °C	T return primary	°C	-	-	-	-	27	27	27	26	24	24	24	23
	V̇ primary	**m³/h**	-	-	-	-	**7.17**	**8.95**	**11.64**	**14.45**	**6.78**	**8.62**	**11.52**	**13.16**
	Q max.	kW	-	-	-	-	230	290	380	480	280	360	485	560
	V̇ secondary	**m³/h**	-	-	-	-	**4.99**	**6.29**	**8.24**	**10.4**	**6.07**	**7.80**	**10.51**	**12.14**
50/15 °C	T return primary	°C	-	-	-	-	29	29	29	28	26	26	26	26
	V̇ primary	**m³/h**	-	-	-	-	**7.25**	**9.24**	**11.63**	**14.5**	**6.31**	**8.10**	**10.97**	**12.35**
	Q max.	kW	-	-	-	-	215	275	350	445	245	315	430	490
	V̇ secondary	**m³/h**	-	-	-	-	**5.33**	**6.81**	**8.67**	**11.02**	**6.07**	**7.80**	**10.65**	**12.14**
50/20 °C	T return primary	°C	-	-	-	-	30	30	30	30	30	29	29	29
	V̇ primary	**m³/h**	-	-	-	-	**5.03**	**6.59**	**9.02**	**11.96**	**6.00**	**7.6**	**10.35**	**11.6**
	Q max.	kW	-	-	-	-	145	190	260	345	210	270	370	420
	V̇ secondary	**m³/h**	-	-	-	-	**4.20**	**5.49**	**7.51**	**9.97**	**6.07**	**7.80**	**10.69**	**12.14**
45/5 °C	T return primary	°C	21	21	21	20	20	19	19	19	18	18	18	17
	V̇ primary	**m³/h**	**7.20**	**8.95**	**11.53**	**14.54**	**6.90**	**8.77**	**11.62**	**13.4**	**5.77**	**7.36**	**10.00**	**11.26**
	Q max.	kW	255	320	415	530	280	360	480	560	280	360	490	560
	V̇ secondary	**m³/h**	**5.53**	**6.94**	**9.00**	**11.50**	**6.07**	**7.80**	**10.4**	**12.14**	**6.07**	**7.80**	**10.62**	**12.14**
45/10 °C	T return primary	°C	23	23	23	23	22	22	22	21	20	20	20	19
	V̇ primary	**m³/h**	**7.12**	**9.21**	**11.51**	**14.45**	**6.44**	**8.23**	**11.13**	**12.57**	**5.27**	**6.77**	**9.24**	**10.28**
	Q max.	kW	235	305	385	490	245	315	430	490	245	315	430	490
	V̇ secondary	**m³/h**	**5.82**	**7.56**	**9.54**	**12.14**	**6.07**	**7.80**	**10.65**	**12.14**	**6.07**	**7.80**	**10.65**	**12.14**
45/15 °C	T return primary	°C	25	25	25	25	25	24	24	24	23	22	22	22
	V̇ primary	**m³/h**	**6.10**	**8.03**	**10.67**	**13.49**	**6.01**	**7.63**	**10.38**	**11.63**	**4.88**	**6.23**	**8.51**	**9.53**
	Q max.	kW	190	250	335	420	210	270	370	420	210	270	370	420
	V̇ secondary	**m³/h**	**5.49**	**7.23**	**9.68**	**12.14**	**6.07**	**7.80**	**10.69**	**12.14**	**6.07**	**7.80**	**10.69**	**12.14**
45/20 °C	T return primary	°C	25	25	25	25	27	27	27	27	25	25	25	25
	V̇ primary	**m³/h**	**2.73**	**3.53**	**4.66**	**6.42**	**5.46**	**6.97**	**9.57**	**10.65**	**4.37**	**5.59**	**7.68**	**8.57**
	Q max.	kW	85	110	145	200	175	225	310	350	175	225	310	350
	V̇ secondary	**m³/h**	**2.95**	**3.82**	**5.03**	**6.94**	**6.07**	**7.80**	**10.75**	**12.14**	**6.07**	**7.80**	**10.75**	**12.14**

T return primary	°C	Return temperature primary
V̇ primary	**m³/h**	Flow rate primary
Q max.	kW	Output
V̇ secondary	**m³/h**	Flow rate secondary

The specified technical data relate to the full load of the module in each case.

Performance data

TransTherm® aqua F (6-60 to 6-90)

Domestic water secondary	TransTherm® aqua F		Flow temperature heating water: 65 °C (60)	65 °C (70)	65 °C (80)	65 °C (90)	70 °C (60)	70 °C (70)	70 °C (80)	70 °C (90)
60/5 °C	T return primary	°C	30	30	30	29	26	26	25	25
	V̇ primary	**m³/h**	**7.15**	**9.17**	**11.72**	**14.69**	**7.42**	**9.40**	**11.66**	**14.64**
	Q max.	kW	290	370	480	610	375	480	600	760
	V̇ secondary	**m³/h**	**4.57**	**5.83**	**7.57**	**9.62**	**5.91**	**7.57**	**9.46**	**11.98**
60/10 °C	T return primary	°C	30	30	30	30	28	28	28	27
	V̇ primary	**m³/h**	**5.45**	**6.94**	**9.41**	**12.88**	**7.23**	**9.29**	**11.92**	**14.15**
	Q max.	kW	220	280	380	520	350	450	580	700
	V̇ secondary	**m³/h**	**3.82**	**4.86**	**6.59**	**9.02**	**6.07**	**7.80**	**10.06**	**12.14**
60/15 °C	T return primary	°C	30	30	30	30	30	30	30	30
	V̇ primary	**m³/h**	**3.72**	**4.83**	**6.44**	**8.67**	**6.72**	**8.78**	**11.73**	**13.49**
	Q max.	kW	150	195	260	350	310	405	540	630
	V̇ secondary	**m³/h**	**2.89**	**3.76**	**5.01**	**6.74**	**5.97**	**7.80**	**10.4**	**12.14**
60/20 °C	T return primary	°C	30	30	30	30	30	30	30	30
	V̇ primary	**m³/h**	**2.11**	**2.85**	**3.72**	**4.95**	**4.34**	**5.64**	**7.37**	**9.97**
	Q max.	kW	85	115	150	200	200	260	340	460
	V̇ secondary	**m³/h**	**1.84**	**2.49**	**3.25**	**4.34**	**4.34**	**5.64**	**7.37**	**9.97**
55/5 °C	T return primary	°C	24	24	23	23	22	21	21	21
	V̇ primary	**m³/h**	**7.42**	**9.24**	**11.64**	**14.38**	**6.30**	**8.03**	**10.99**	**12.26**
	Q max.	kW	350	440	560	700	350	450	620	700
	V̇ secondary	**m³/h**	**6.07**	**7.63**	**9.71**	**12.14**	**6.07**	**7.80**	**10.75**	**12.14**
55/10 °C	T return primary	°C	26	26	26	25	24	24	24	23
	V̇ primary	**m³/h**	**7.06**	**8.96**	**11.66**	**13.66**	**5.96**	**7.6**	**10.25**	**11.6**
	Q max.	kW	315	405	530	630	315	405	550	630
	V̇ secondary	**m³/h**	**6.07**	**7.80**	**10.21**	**12.14**	**6.07**	**7.80**	**10.6**	**12.14**
55/15 °C	T return primary	°C	29	28	28	27	27	26	26	26
	V̇ primary	**m³/h**	**6.67**	**8.48**	**11.48**	**12.91**	**5.62**	**7.16**	**9.70**	**10.96**
	Q max.	kW	280	360	490	560	280	360	490	560
	V̇ secondary	**m³/h**	**6.07**	**7.80**	**10.62**	**12.14**	**6.07**	**7.80**	**10.62**	**12.14**
55/20 °C	T return primary	°C	30	30	30	30	29	29	29	28
	V̇ primary	**m³/h**	**5.95**	**7.80**	**10.4**	**12.14**	**5.13**	**6.64**	**9.01**	**10.16**
	Q max.	kW	240	315	420	490	245	315	430	490
	V̇ secondary	**m³/h**	**5.95**	**7.80**	**10.4**	**12.14**	**6.07**	**7.80**	**10.65**	**12.14**
50/5 °C	T return primary	°C	20	20	19	19	18	18	17	17
	V̇ primary	**m³/h**	**6.06**	**7.72**	**10.43**	**11.77**	**5.30**	**6.74**	**9.05**	**10.27**
	Q max.	kW	315	405	550	630	315	405	550	630
	V̇ secondary	**m³/h**	**6.07**	**7.80**	**10.6**	**12.14**	**6.07**	**7.80**	**10.6**	**12.14**
50/10 °C	T return primary	°C	22	22	22	21	21	20	20	19
	V̇ primary	**m³/h**	**5.69**	**7.28**	**9.81**	**11.08**	**4.90**	**6.24**	**8.46**	**9.57**
	Q max.	kW	280	360	490	560	280	360	490	560
	V̇ secondary	**m³/h**	**6.07**	**7.80**	**10.62**	**12.14**	**6.07**	**7.80**	**10.62**	**12.14**
50/15 °C	T return primary	°C	25	25	24	24	23	23	22	22
	V̇ primary	**m³/h**	**5.30**	**6.74**	**9.14**	**10.29**	**4.52**	**5.76**	**7.82**	**8.83**
	Q max.	kW	245	315	430	490	245	315	430	490
	V̇ secondary	**m³/h**	**6.07**	**7.80**	**10.65**	**12.14**	**6.07**	**7.80**	**10.65**	**12.14**
50/20 °C	T return primary	°C	27	26	27	26	26	26	25	25
	V̇ primary	**m³/h**	**4.84**	**6.00**	**8.38**	**9.43**	**4.12**	**5.26**	**7.16**	**8.07**
	Q max.	kW	210	270	370	420	210	270	370	420
	V̇ secondary	**m³/h**	**6.07**	**7.80**	**10.69**	**12.14**	**6.07**	**7.80**	**10.69**	**12.14**
45/5 °C	T return primary	°C	16	16	16	15	15	14	14	13
	V̇ primary	**m³/h**	**4.99**	**6.34**	**8.58**	**9.69**	**4.39**	**5.59**	**7.59**	**8.58**
	Q max.	kW	280	360	490	560	280	360	490	560
	V̇ secondary	**m³/h**	**6.07**	**7.80**	**10.62**	**12.14**	**6.07**	**7.80**	**10.62**	**12.14**
45/10 °C	T return primary	°C	19	18	18	18	17	17	17	16
	V̇ primary	**m³/h**	**4.57**	**5.85**	**7.92**	**8.94**	**4.02**	**5.13**	**6.98**	**7.90**
	Q max.	kW	245	315	430	490	245	315	430	490
	V̇ secondary	**m³/h**	**6.07**	**7.80**	**10.65**	**12.14**	**6.07**	**7.80**	**10.65**	**12.14**
45/15 °C	T return primary	°C	21	21	21	20	20	20	20	19
	V̇ primary	**m³/h**	**4.15**	**5.30**	**7.24**	**8.15**	**3.64**	**4.66**	**6.37**	**7.18**
	Q max.	kW	210	270	370	420	210	270	370	420
	V̇ secondary	**m³/h**	**6.07**	**7.80**	**10.69**	**12.14**	**6.07**	**7.80**	**10.69**	**12.14**
45/20 °C	T return primary	°C	24	24	24	24	23	23	23	23
	V̇ primary	**m³/h**	**3.71**	**4.75**	**6.51**	**7.31**	**3.24**	**4.15**	**5.71**	**6.42**
	Q max.	kW	175	225	310	350	175	225	310	350
	V̇ secondary	**m³/h**	**6.07**	**7.80**	**10.75**	**12.14**	**6.07**	**7.80**	**10.75**	**12.14**

T return primary	°C	Return temperature primary
V̇ primary	**m³/h**	Flow rate primary
Q max.	kW	Output
V̇ secondary	**m³/h**	Flow rate secondary

The specified technical data relate to the full load of the module in each case.

Performance data

TransTherm® aqua F

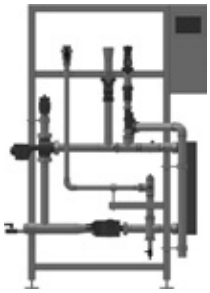
Residential units standard apartment according to DIN 4708	Peak heat demand standard apartment according to DIN 4708 with preparation 10 min	Sum flow rate domestic hot water calculation flow rate according to DIN 4708	Simultaneity factor according to DIN 4708	Peak flow rate (DHW)	Peak flow rate (DHW)	Peak flow rate (DHW)	Peak output (DHW)	Peak flow rate TransTherm® aqua F (DHW)	Peak flow rate TransTherm® aqua F (DHW)	Peak flow rate TransTherm® aqua F (DHW)	DHW calorifier output TransTherm® aqua F	TransTherm® aqua F	Required hot water volume at 70/30 °C (40 K)	Required hot water buffer storage tank volume at 70/30 °C (40 K)	Hot water buffer storage tank 1 EnerVal	Required recharging capacity	Required recharging capacity	Required recharging capacity
N	Preparation	∑ VR at DHW 60 °C	g	V̇s at DHW 60 °C	V̇s at DHW 60 °C	V̇s at DHW 60 °C		V̇s at DHW 60 °C	V̇s at DHW 60 °C	V̇s at DHW 60 °C	Q at HT 70/30 °C DHW 10/60 °C	Type			Type	Time: 20 min 70/30 °C (40 K)	Time: 30 min 70/30 °C (40 K)	Time: 60 min 70/30 °C (40 K)
	[Wh]	[l/s]		[l/s]	[l/min]	[m³/h]	[kW]	[l/s]	[l/min]	[m³/h]	[kW]		[m³]	[m³]		[kW]	[kW]	[kW]
1	5820	0.17	1.00	0.17	10.01	0.60	35	0.24	14.3	0.86	50	(6-10)	0.13	0.16	(200)	23	15	8
2	11640	0.33	0.680	0.23	13.61	0.82	47	0.24	14.3	0.86	50	(6-10)	0.17	0.22	(200)	31	21	10
3	17460	0.50	0.544	0.27	16.33	0.98	57	0.43	25.8	1.55	90	(6-16)	0.20	0.27	(300)	37	25	12
4	23280	0.67	0.466	0.31	18.66	1.12	65	0.43	25.8	1.55	90	(6-16)	0.23	0.30	(300)	42	28	14
5	29100	0.83	0.415	0.35	20.77	1.25	72	0.43	25.8	1.55	90	(6-16)	0.26	0.34	(500)	47	31	16
6	34920	1.00	0.377	0.38	22.64	1.36	79	0.43	25.8	1.55	90	(6-16)	0.28	0.37	(500)	51	34	17
7	40740	1.17	0.349	0.41	24.45	1.47	85	0.43	25.8	1.55	90	(6-16)	0.31	0.40	(500)	55	37	18
8	46560	1.33	0.349	0.47	27.94	1.68	97	0.55	33.0	1.98	115	(6-20)	0.35	0.45	(500)	63	42	21
9	52380	1.50	0.308	0.46	27.74	1.66	97	0.55	33.0	1.98	115	(6-20)	0.35	0.45	(500)	63	42	21
10	58200	1.67	0.292	0.49	29.23	1.75	102	0.55	33.0	1.98	115	(6-20)	0.37	0.47	(500)	66	44	22
11	64020	1.83	0.279	0.51	30.72	1.84	107	0.55	33.0	1.98	115	(6-20)	0.38	0.50	(500)	70	46	23
12	69840	2.00	0.268	0.54	32.19	1.93	112	0.55	33.0	1.98	115	(6-20)	0.40	0.52	(500)	73	49	24
13	75660	2.17	0.258	0.56	33.57	2.01	117	0.55	33.0	1.98	115	(6-20)	0.42	0.55	(500)	76	51	25
14	81480	2.34	0.249	0.58	34.89	2.09	122	0.84	50.2	3.01	175	(6-30)	0.44	0.57	(500)	79	53	26
15	87300	2.50	0.242	0.61	36.33	2.18	127	0.84	50.2	3.01	175	(6-30)	0.45	0.59	(800)	82	55	27
16	93120	2.67	0.235	0.63	37.63	2.26	131	0.84	50.2	3.01	175	(6-30)	0.47	0.61	(800)	85	57	28
17	98940	2.84	0.228	0.65	38.79	2.33	135	0.84	50.2	3.01	175	(6-30)	0.49	0.63	(800)	88	59	29
18	104760	3.00	0.223	0.67	40.17	2.41	140	0.84	50.2	3.01	175	(6-30)	0.50	0.65	(800)	91	61	30
19	110580	3.17	0.217	0.69	41.27	2.48	144	0.84	50.2	3.01	175	(6-30)	0.52	0.67	(800)	94	62	31
20	116400	3.34	0.212	0.71	42.44	2.55	148	0.84	50.2	3.01	175	(6-30)	0.53	0.69	(800)	96	64	32
21	122220	3.50	0.208	0.73	43.72	2.62	153	0.84	50.2	3.01	175	(6-30)	0.55	0.71	(800)	99	66	33
22	128040	3.67	0.204	0.75	44.92	2.70	157	0.84	50.2	3.01	175	(6-30)	0.56	0.73	(800)	102	68	34
23	133860	3.84	0.200	0.77	46.04	2.76	161	0.84	50.2	3.01	175	(6-30)	0.58	0.75	(800)	104	70	35
24	139680	4.00	0.196	0.78	47.08	2.82	164	0.84	50.2	3.01	175	(6-30)	0.59	0.77	(800)	107	71	36
25	145500	4.17	0.193	0.80	48.29	2.90	168	0.84	50.2	3.01	175	(6-30)	0.60	0.78	(800)	110	73	37
26	151320	4.34	0.190	0.82	49.44	2.97	173	0.84	50.2	3.01	175	(6-30)	0.62	0.80	(800)	112	75	37
27	157140	4.50	0.187	0.84	50.53	3.03	176	0.84	50.2	3.01	175	(6-30)	0.63	0.82	(800)	115	76	38
28	162960	4.67	0.184	0.86	51.56	3.09	180	0.84	50.2	3.01	175	(6-30)	0.64	0.84	(800)	117	78	39
29	168780	4.84	0.181	0.88	52.54	3.15	183	1.10	65.8	3.95	230	(6-40)	0.66	0.85	(800)	119	79	40
30	174600	5.00	0.179	0.90	53.75	3.22	188	1.10	65.8	3.95	230	(6-40)	0.67	0.87	(1000)	122	81	41
31	180420	5.17	0.176	0.91	54.61	3.28	191	1.10	65.8	3.95	230	(6-40)	0.68	0.89	(1000)	124	83	41
32	186240	5.34	0.174	0.93	55.73	3.34	194	1.10	65.8	3.95	230	(6-40)	0.70	0.91	(1000)	126	84	42
33	192060	5.50	0.172	0.95	56.81	3.41	198	1.10	65.8	3.95	230	(6-40)	0.71	0.92	(1000)	129	86	43
34	197880	5.67	0.170	0.96	57.85	3.47	202	1.10	65.8	3.95	230	(6-40)	0.72	0.94	(1000)	131	87	44
35	203700	5.84	0.168	0.98	58.85	3.53	205	1.10	65.8	3.95	230	(6-40)	0.74	0.96	(1000)	133	89	44
36	209520	6.01	0.166	1.00	59.81	3.59	209	1.10	65.8	3.95	230	(6-40)	0.75	0.97	(1000)	136	90	45
37	215340	6.17	0.164	1.01	60.73	3.64	212	1.10	65.8	3.95	230	(6-40)	0.76	0.99	(1000)	138	92	46
38	221160	6.34	0.163	1.03	61.99	3.72	216	1.10	65.8	3.95	230	(6-40)	0.78	1.01	(1000)	141	94	47
39	226980	6.51	0.161	1.05	62.84	3.77	219	1.10	65.8	3.95	230	(6-40)	0.79	1.02	(1000)	143	95	48
40	232800	6.67	0.159	1.06	63.65	3.82	222	1.10	65.8	3.95	230	(6-40)	0.80	1.03	(1000)	144	96	48
41	238620	6.84	0.158	1.08	64.84	3.89	226	1.10	65.8	3.95	230	(6-40)	0.81	1.05	(1000)	147	98	49
42	244440	7.01	0.156	1.09	65.58	3.93	229	1.10	65.8	3.95	230	(6-40)	0.82	1.07	(1000)	149	99	50
43	250260	7.17	0.155	1.11	66.71	4.00	233	1.10	65.8	3.95	230	(6-40)	0.83	1.08	(1000)	151	101	50
44	256080	7.34	0.154	1.13	67.82	4.07	237	1.31	78.8	4.73	275	(6-50)	0.85	1.10	(1500)	154	103	51
45	261900	7.51	0.152	1.14	68.46	4.11	239	1.31	78.8	4.73	275	(6-50)	0.86	1.11	(1500)	155	104	52
46	267720	7.67	0.151	1.16	69.52	4.17	243	1.31	78.8	4.73	275	(6-50)	0.87	1.13	(1500)	158	105	53
47	273540	7.84	0.150	1.18	70.56	4.23	246	1.31	78.8	4.73	275	(6-50)	0.88	1.15	(1500)	160	107	53
48	279360	8.01	0.149	1.19	71.58	4.29	250	1.31	78.8	4.73	275	(6-50)	0.89	1.16	(1500)	162	108	54
49	285180	8.17	0.148	1.21	72.58	4.35	253	1.31	78.8	4.73	275	(6-50)	0.91	1.18	(1500)	165	110	55
50	291000	8.34	0.146	1.22	73.06	4.38	255	1.31	78.8	4.73	275	(6-50)	0.91	1.19	(1500)	166	110	55
51	296820	8.51	0.145	1.23	74.01	4.44	258	1.31	78.8	4.73	275	(6-50)	0.93	1.20	(1500)	168	112	56
52	302640	8.67	0.144	1.25	74.94	4.50	261	1.31	78.8	4.73	275	(6-50)	0.94	1.22	(1500)	170	113	57
53	308460	8.84	0.143	1.26	75.86	4.55	265	1.31	78.8	4.73	275	(6-50)	0.95	1.23	(1500)	172	115	57
54	314280	9.01	0.142	1.28	76.75	4.60	268	1.31	78.8	4.73	275	(6-50)	0.96	1.25	(1500)	174	116	58

Residential units standard apartment according to DIN 4708	Peak heat demand standard apartment according to DIN 4708 with preparation 10 min	Sum flow rate domestic hot water calculation flow rate according to DIN 4708	Simultaneity factor according to DIN 4708	Peak flow rate (DHW)	Peak flow rate (DHW)	Peak flow rate (DHW)	Peak output (DHW)	Peak flow rate TransTherm® aqua F (DHW)	Peak flow rate TransTherm® aqua F (DHW)	Peak flow rate TransTherm® aqua F (DHW)	DHW calorifier output TransTherm® aqua F	TransTherm® aqua F	Required hot water volume at 70/30 °C (40 K)	Required hot water buffer storage tank volume at 70/30 °C (40 K)	Hot water buffer storage tank 1 EnerVal	Required recharging capacity	Required recharging capacity	Required recharging capacity
N	Preparation	∑ VR at DHW 60 °C	g	$\dot{V}s$ at DHW 60 °C	$\dot{V}s$ at DHW 60 °C	$\dot{V}s$ at DHW 60 °C		$\dot{V}s$ at DHW 60 °C	$\dot{V}s$ at DHW 60 °C	$\dot{V}s$ at DHW 60 °C	Q at HT 70/30 °C DHW 10/60 °C	Type			Type	Time: 20 min 70/30 °C (40 K)	Time: 30 min 70/30 °C (40 K)	Time: 60 min 70/30 °C (40 K)
	[Wh]	[l/s]		[l/s]	[l/min]	[m³/h]	[kW]	[l/s]	[l/min]	[m³/h]	[kW]		[m³]	[m³]		[kW]	[kW]	[kW]
55	320100	9.17	0.141	1.29	77.62	4.66	271	1.31	78.8	4.73	275	(6-50)	0.97	1.26	(1500)	176	117	59
56	325920	9.34	0.140	1.31	78.47	4.71	274	1.31	78.8	4.73	275	(6-50)	0.98	1.28	(1500)	178	119	59
57	331740	9.51	0.140	1.33	79.87	4.79	279	1.31	78.8	4.73	275	(6-50)	1.00	1.30	(1500)	181	121	60
58	337560	9.67	0.139	1.34	80.69	4.84	282	1.69	101.2	6.07	350	(6-60)	1.01	1.31	(1500)	183	122	61
59	343380	9.84	0.138	1.36	81.49	4.89	284	1.69	101.2	6.07	350	(6-60)	1.02	1.32	(1500)	185	123	62
60	349200	10.01	0.137	1.37	82.27	4.94	287	1.69	101.2	6.07	350	(6-60)	1.03	1.34	(1500)	187	124	62
61	355020	10.18	0.136	1.38	83.03	4.98	290	1.69	101.2	6.07	350	(6-60)	1.04	1.35	(1500)	188	126	63
62	360840	10.34	0.135	1.40	83.77	5.03	292	1.69	101.2	6.07	350	(6-60)	1.05	1.36	(1500)	190	127	63
63	366660	10.51	0.135	1.42	85.12	5.11	297	1.69	101.2	6.07	350	(6-60)	1.06	1.38	(1500)	193	129	64
64	372480	10.68	0.134	1.43	85.83	5.15	299	1.69	101.2	6.07	350	(6-60)	1.07	1.40	(1500)	195	130	65
65	378300	10.84	0.133	1.44	86.52	5.19	302	1.69	101.2	6.07	350	(6-60)	1.08	1.41	(1500)	196	131	65
66	384120	11.01	0.132	1.45	87.19	5.23	304	1.69	101.2	6.07	350	(6-60)	1.09	1.42	(1500)	198	132	66
67	389940	11.18	0.132	1.48	88.52	5.31	309	1.69	101.2	6.07	350	(6-60)	1.11	1.44	(1500)	201	134	67
68	395760	11.34	0.131	1.49	89.16	5.35	311	1.69	101.2	6.07	350	(6-60)	1.11	1.45	(1500)	202	135	67
69	401580	11.51	0.130	1.50	89.78	5.39	313	1.69	101.2	6.07	350	(6-60)	1.12	1.46	(1500)	204	136	68
70	407400	11.68	0.130	1.52	91.08	5.46	318	1.69	101.2	6.07	350	(6-60)	1.14	1.48	(1500)	207	138	69
71	413220	11.84	0.129	1.53	91.67	5.50	320	1.69	101.2	6.07	350	(6-60)	1.15	1.49	(1500)	208	139	69
72	419040	12.01	0.128	1.54	92.24	5.53	322	1.69	101.2	6.07	350	(6-60)	1.15	1.50	(1500)	209	139	70
73	424860	12.18	0.128	1.56	93.52	5.61	326	1.69	101.2	6.07	350	(6-60)	1.17	1.52	(1500)	212	141	71
74	430680	12.34	0.127	1.57	94.06	5.64	328	1.69	101.2	6.07	350	(6-60)	1.18	1.53	(1500)	213	142	71
75	436500	12.51	0.127	1.59	95.33	5.72	333	1.69	101.2	6.07	350	(6-60)	1.19	1.55	(1500)	216	144	72
76	442320	12.68	0.126	1.60	95.84	5.75	334	1.69	101.2	6.07	350	(6-60)	1.20	1.56	(1500)	217	145	72
77	448140	12.84	0.126	1.62	97.10	5.83	339	1.69	101.2	6.07	350	(6-60)	1.21	1.58	(1500)	220	147	73
78	453960	13.01	0.125	1.63	97.58	5.86	340	1.69	101.2	6.07	350	(6-60)	1.22	1.59	(1500)	221	148	74
79	459780	13.18	0.124	1.63	98.04	5.88	342	1.69	101.2	6.07	350	(6-60)	1.23	1.59	(1500)	222	148	74
80	465600	13.34	0.124	1.65	99.29	5.96	346	1.69	101.2	6.07	350	(6-60)	1.24	1.61	(2000)	225	150	75
81	471420	13.51	0.123	1.66	99.72	5.98	348	1.69	101.2	6.07	350	(6-60)	1.25	1.62	(2000)	226	151	75
82	477240	13.68	0.123	1.68	100.95	6.06	352	1.69	101.2	6.07	350	(6-60)	1.26	1.64	(2000)	229	153	76
83	483060	13.85	0.122	1.69	101.35	6.08	354	1.69	101.2	6.07	350	(6-60)	1.27	1.65	(2000)	230	153	77
84	488880	14.01	0.122	1.71	102.57	6.15	358	2.17	130.0	7.80	450	(6-70)	1.28	1.67	(2000)	233	155	78
85	494700	14.18	0.121	1.72	102.94	6.18	359	2.17	130.0	7.80	450	(6-70)	1.29	1.67	(2000)	233	156	78
86	500520	14.35	0.121	1.74	104.15	6.25	363	2.17	130.0	7.80	450	(6-70)	1.30	1.69	(2000)	236	157	79
87	506340	14.51	0.120	1.74	104.49	6.27	365	2.17	130.0	7.80	450	(6-70)	1.31	1.70	(2000)	237	158	79
88	512160	14.68	0.120	1.76	105.69	6.34	369	2.17	130.0	7.80	450	(6-70)	1.32	1.72	(2000)	240	160	80
89	517980	14.85	0.120	1.78	106.89	6.41	373	2.17	130.0	7.80	450	(6-70)	1.34	1.74	(2000)	242	162	81
90	523800	15.01	0.119	1.79	107.19	6.43	374	2.17	130.0	7.80	450	(6-70)	1.34	1.74	(2000)	243	162	81
91	529620	15.18	0.119	1.81	108.38	6.50	378	2.17	130.0	7.80	450	(6-70)	1.36	1.76	(2000)	246	164	82
92	535440	15.35	0.118	1.81	108.65	6.52	379	2.17	130.0	7.80	450	(6-70)	1.36	1.77	(2000)	246	164	82
93	541260	15.51	0.118	1.83	109.83	6.59	383	2.17	130.0	7.80	450	(6-70)	1.37	1.79	(2000)	249	166	83
94	547080	15.68	0.117	1.83	110.07	6.60	384	2.17	130.0	7.80	450	(6-70)	1.38	1.79	(2000)	250	166	83
95	552900	15.85	0.117	1.85	111.25	6.67	388	2.17	130.0	7.80	450	(6-70)	1.39	1.81	(2000)	252	168	84
96	558720	16.01	0.117	1.87	112.42	6.74	392	2.17	130.0	7.80	450	(6-70)	1.41	1.83	(2000)	255	170	85
97	564540	16.18	0.116	1.88	112.62	6.76	393	2.17	130.0	7.80	450	(6-70)	1.41	1.83	(2000)	255	170	85
98	570360	16.35	0.116	1.90	113.78	6.83	397	2.17	130.0	7.80	450	(6-70)	1.42	1.85	(2000)	258	172	86
99	576180	16.51	0.116	1.92	114.94	6.90	401	2.17	130.0	7.80	450	(6-70)	1.44	1.87	(2000)	261	174	87
100	582000	16.68	0.115	1.92	115.10	6.91	402	2.17	130.0	7.80	450	(6-70)	1.44	1.87	(2000)	261	174	87

Performance data

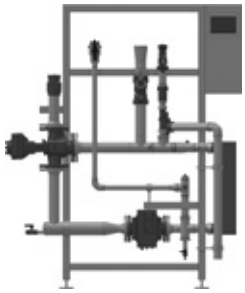
TransTherm® aqua F (6-60)

Performance data		Q	VS	VS	VS	Energy storage tank
primary	secondary	kW	l/s	l/min	m³/h	min. content in l [1]
70 °C/30 °C	10 °C/60 °C	350	1.67	100.33	6.02	1405
65 °C/30 °C	10 °C/60 °C	220	1.05	63.07	3.78	883
65 °C/30 °C	10 °C/55 °C	315	1.67	100.33	6.02	1405
65 °C/30 °C	10 °C/50 °C	280	1.67	100.33	6.02	1405
60 °C/30 °C	10 °C/55 °C	255	1.35	81.22	4.87	1137
60 °C/30 °C	10 °C/50 °C	280	1.67	100.33	6.02	1405
55 °C/30 °C	10 °C/50 °C	230	1.37	82.42	4.95	1154
55 °C/30 °C	10 °C/45 °C	245	1.67	100.33	6.02	1405



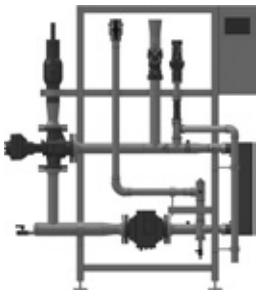
TransTherm® aqua F (6-70)

Performance data		Q	VS	VS	VS	Energy storage tank
primary	secondary	kW	l/s	l/min	m³/h	min. content in l [1]
70 °C/30 °C	10 °C/60 °C	450	2.15	129.00	7.74	1806
65 °C/30 °C	10 °C/60 °C	280	1.34	80.27	4.82	1124
65 °C/30 °C	10 °C/55 °C	405	2.15	129.00	7.74	1806
65 °C/30 °C	10 °C/50 °C	360	2.15	129.00	7.74	1806
60 °C/30 °C	10 °C/55 °C	320	1.70	101.93	6.12	1427
60 °C/30 °C	10 °C/50 °C	360	2.15	129.00	7.74	1806
55 °C/30 °C	10 °C/50 °C	290	1.73	103.92	6.24	1455
55 °C/30 °C	10 °C/45 °C	315	2.15	129.00	7.74	1806



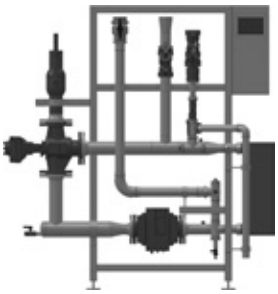
TransTherm® aqua F (6-80)

Performance data		Q	VS	VS	VS	Energy storage tank
primary	secondary	kW	l/s	l/min	m³/h	min. content in l [1]
70 °C/30 °C	10 °C/60 °C	580	2.77	166.27	9.98	2328
65 °C/30 °C	10 °C/60 °C	380	1.82	108.93	6.54	1525
65 °C/30 °C	10 °C/55 °C	530	2.81	168.81	10.13	2363
65 °C/30 °C	10 °C/50 °C	490	2.93	175.58	10.54	2458
60 °C/30 °C	10 °C/55 °C	420	2.23	133.78	8.03	1873
60 °C/30 °C	10 °C/50 °C	485	2.90	173.79	10.43	2433
55 °C/30 °C	10 °C/50 °C	380	2.27	136.17	8.17	1906
55 °C/30 °C	10 °C/45 °C	430	2.93	176.10	10.57	2465



TransTherm® aqua F (6-90)

Performance data		Q	VS	VS	VS	Energy storage tank
primary	secondary	kW	l/s	l/min	m³/h	min. content in l [1]
70 °C/30 °C	10 °C/60 °C	700	3.34	200.67	12.04	2809
65 °C/30 °C	10 °C/60 °C	520	2.48	149.07	8.94	2087
65 °C/30 °C	10 °C/55 °C	630	3.34	200.67	12.04	2809
65 °C/30 °C	10 °C/50 °C	560	3.34	200.67	12.04	2809
60 °C/30 °C	10 °C/55 °C	530	2.81	168.81	10.13	2363
60 °C/30 °C	10 °C/50 °C	560	3.34	200.67	12.04	2809
55 °C/30 °C	10 °C/50 °C	480	2.87	172.00	10.32	2408
55 °C/30 °C	10 °C/45 °C	490	3.34	200.67	12.04	2809



[1] The calculation for the content of the energy storage tank depends on the temperature spread.
Here, 0.7 has been set for the temperature spread and 2 for short non-draw-off times. See calculation of the required buffer volume

Performance data

Calculation of the required buffer volume

In order to provide the required energy for domestic water heating, a fresh water station is generally connected to a heating water puffer tank. The volume of the heating water buffer tank is determined by the domestic hot water requirement of the installation, the storage temperature in the heating water buffer tank and the user behaviour.

VP = V x t x (Tp/Tww) x Sn

VP	Required minimum volume of the heating water buffer tank
V	Calculated peak flow of the fresh water module
t	Time for which the peak flow is required. The value can be gear towards, for example the duration of the tub filling, user information or the standard value from DIN 4708 (10 min.)
(Tp/Tww)	For the temperature spread between the heating water buffer tank and domestic water
	0.5 for a high temperature spread (e.g. 90/45 °C)
	0.7 for a medium temperature spread (e.g. 70/45 °C)
	1 for a low temperature spread (e.g. 55/45 °C)
Sn	Safety factor for observing user behaviour
	1 normal non-draw-off times
	2 short non-draw-off times
	3…4 very short non-draw-off times

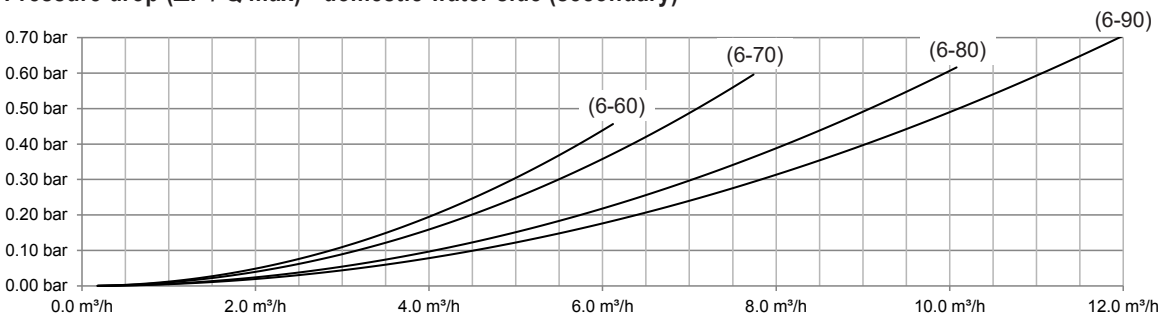
Example calculation

VP	V	t	(Tp/Tww)	Sn
(l)	(l/min)	(min)		
1576	78.8	10.0	1.0	2.0

Result

Input

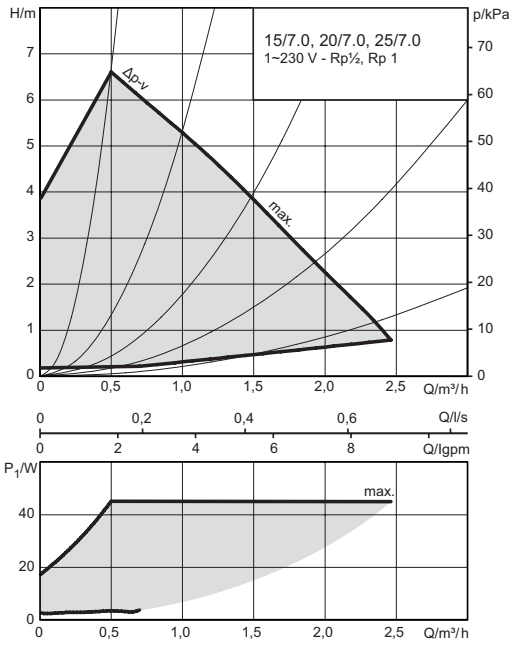
Pressure drop (ΔP / Q max) - domestic water side (secondary)



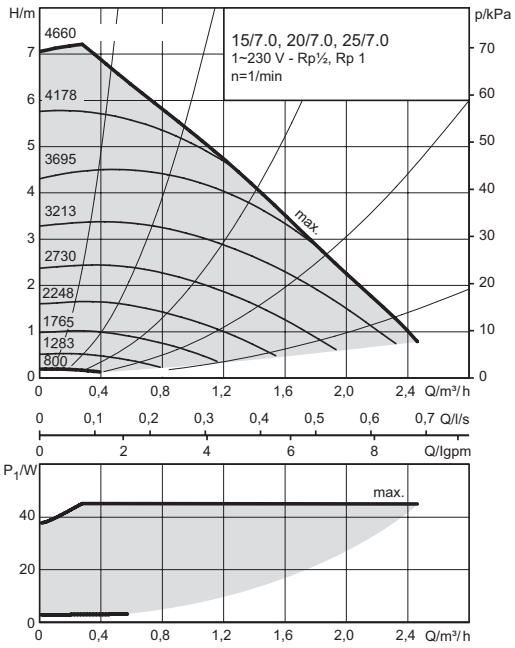
Circulating pump characteristic curves

for circulation set ¾″

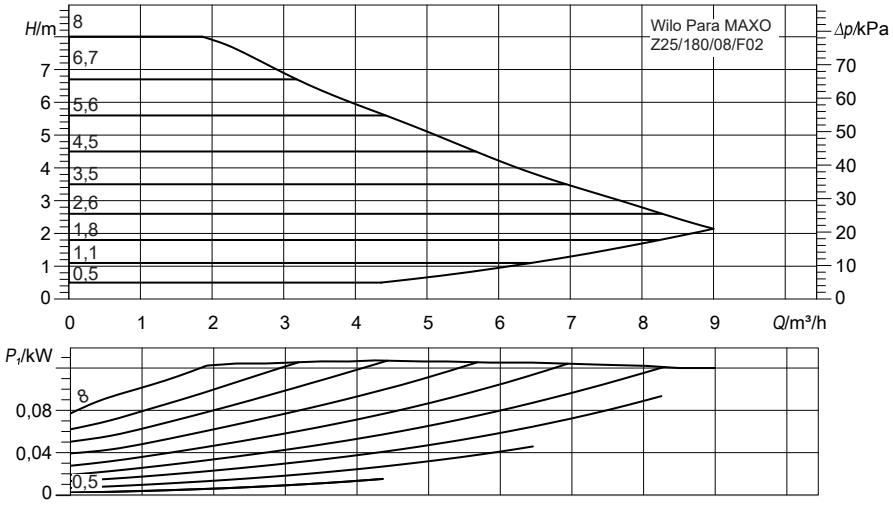
Δp-v (variable)



Constant speed

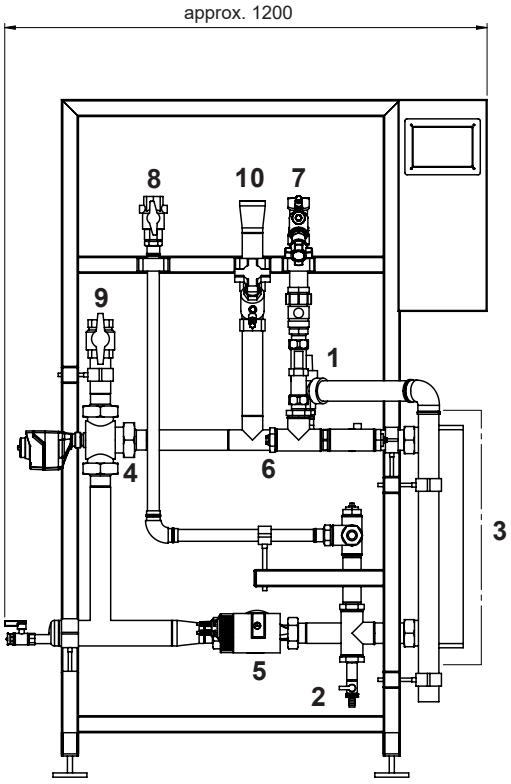


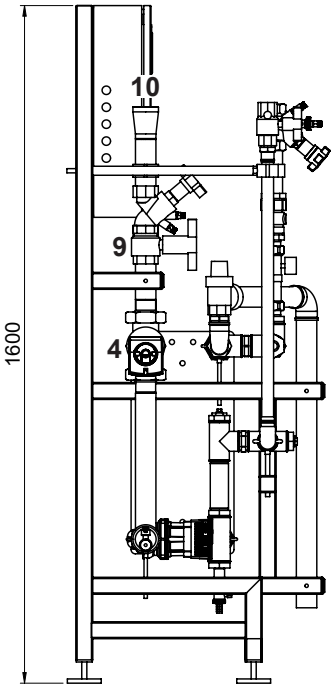
for circulation set 1″ and 1 ¼″

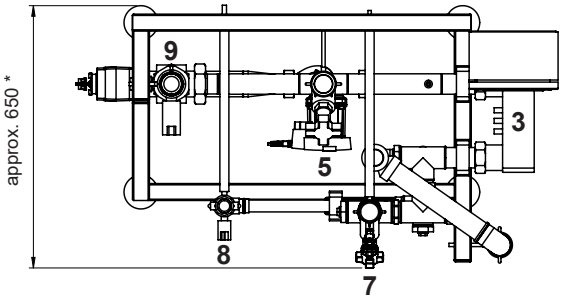


Fresh water module TransTherm® aqua F (6-60)

(Dimensions in mm)

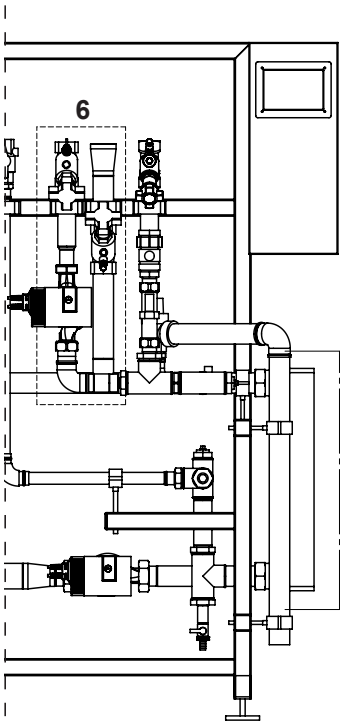






* with circulation 680

Version incl. circulation set

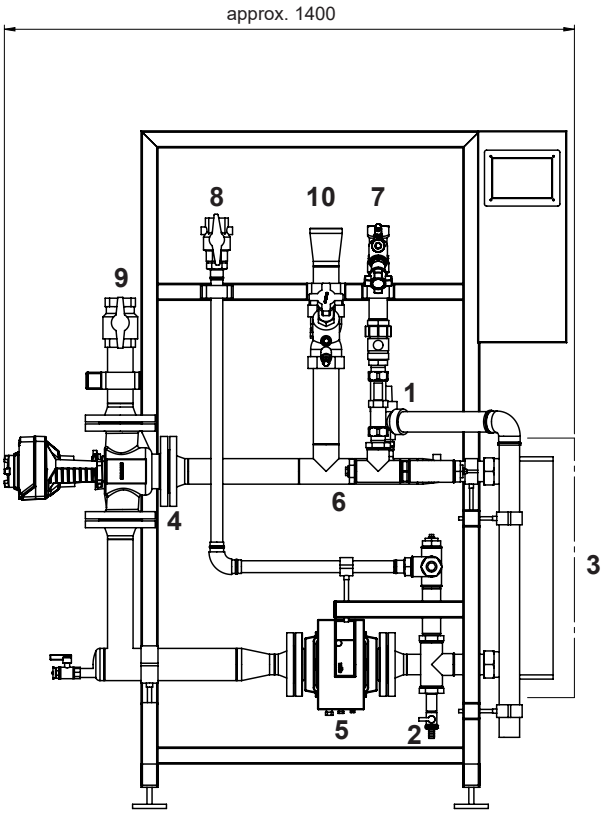


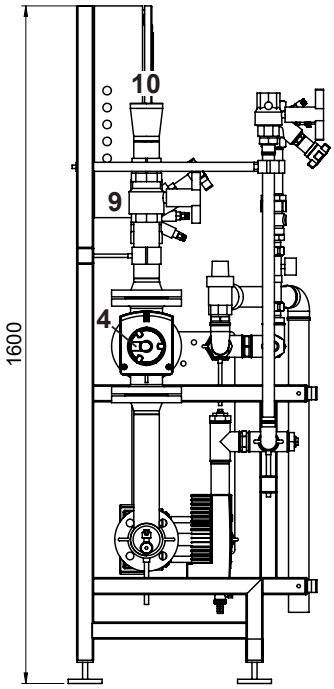
1	Safety valve Hot water 10 bar	
2	Filling/drain valve	
3	Heat exchanger	
4	Three-way valve	
5	Circulating pump	
6	Circulation	DN 32, Rp 1 ¼″ (DN 25, Rp 1″) (IT)
7	Cold water	DN 32, Rp 1 ¼″ (IT)
8	Hot water	DN 32, Rp 1 ¼″ (IT)
9	Flow heating water	DN 40, Rp 1 ½″ (IT)
10	Return heating water	DN 40, Rp 1 ½″ (IT)

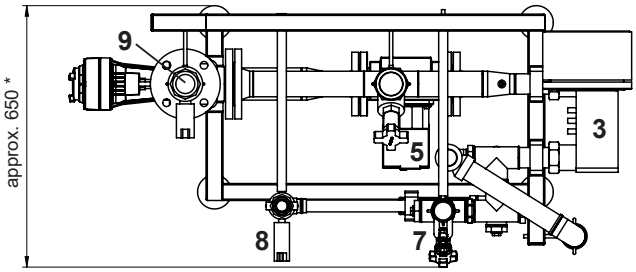
TransTherm® aqua F	Weight in kg
(6-60)	123

Fresh water module TransTherm® aqua F (6-70)

(Dimensions in mm)

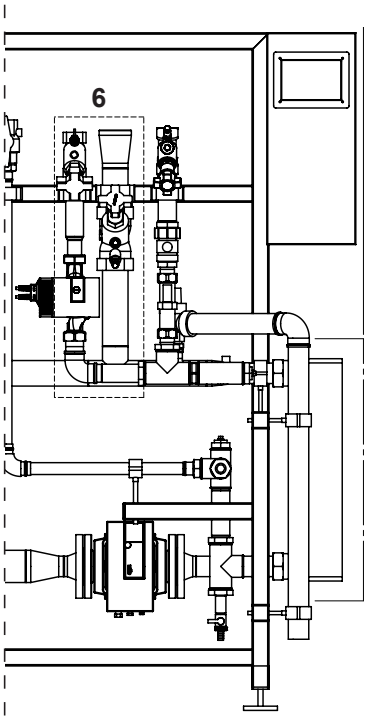






* with circulation 680

Version incl. circulation set

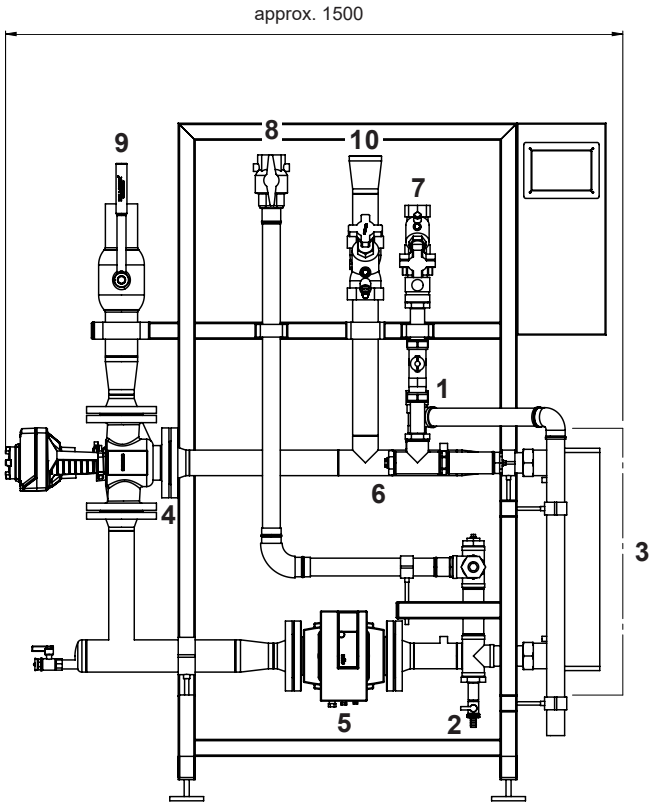


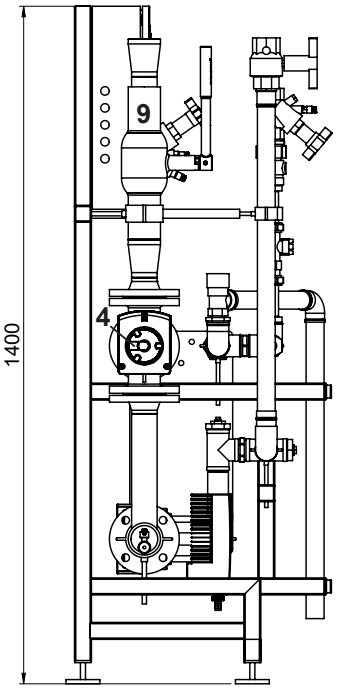
1	Safety valve Hot water 10 bar	
2	Filling/drain valve	
3	Heat exchanger	
4	Three-way valve	
5	Circulating pump	
6	Circulation	DN 32, Rp 1 ¼″ (DN 25, Rp 1″) (IT)
7	Cold water	DN 32, Rp 1 ¼″ (IT)
8	Hot water	DN 32, Rp 1 ¼″ (IT)
9	Flow heating water	DN 50, Rp 2″ (IT)
10	Return heating water	DN 50, Rp 2″ (IT)

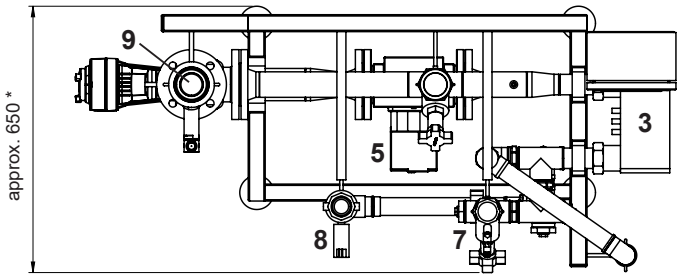
TransTherm® aqua F	Weight in kg
(6-70)	172

Fresh water module TransTherm® aqua F (6-80)

(Dimensions in mm)

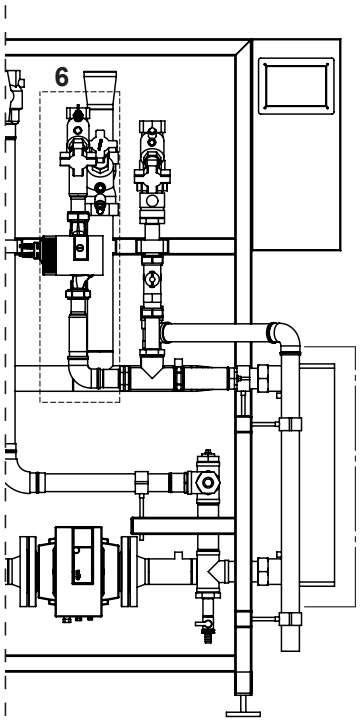






* with circulation 680

Version incl. circulation set

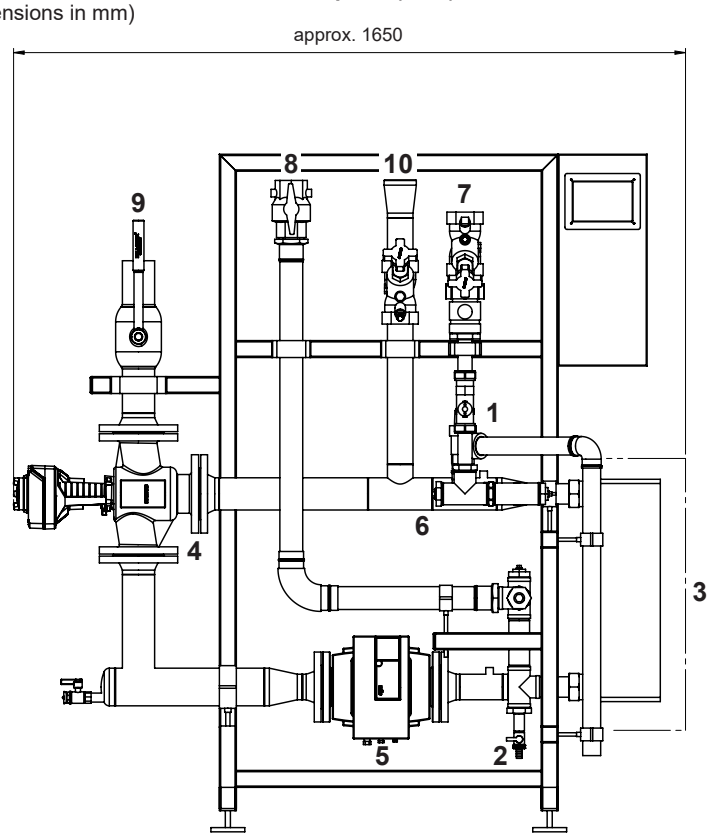


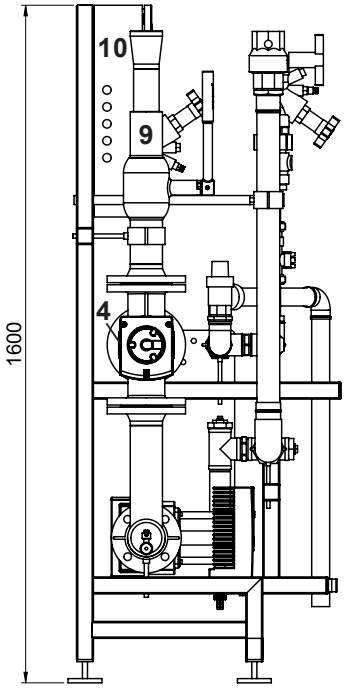
1	Safety valve Hot water 10 bar	
2	Filling/drain valve	
3	Heat exchanger	
4	Three-way valve	
5	Circulating pump	
6	Circulation	DN 32, Rp 1 ¼″ (DN 25, Rp 1″) (IT)
7	Cold water	DN 40, Rp 1 ½″ (IT)
8	Hot water	DN 40, Rp 1 ½″ (IT)
9	Flow heating water	DN 65 AE (weld-on end)
10	Return heating water	DN 65 AE (weld-on end)

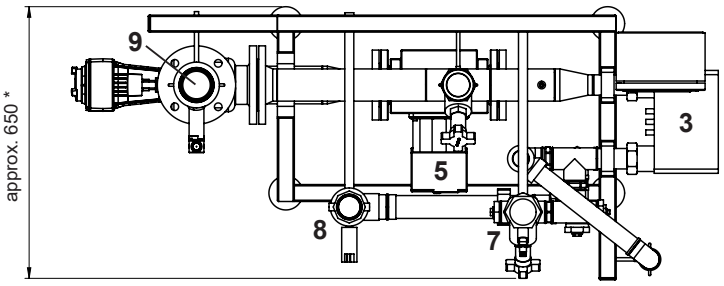
TransTherm® aqua F	Weight in kg
(6-80)	202

Fresh water module TransTherm® aqua F (6-90)

(Dimensions in mm)

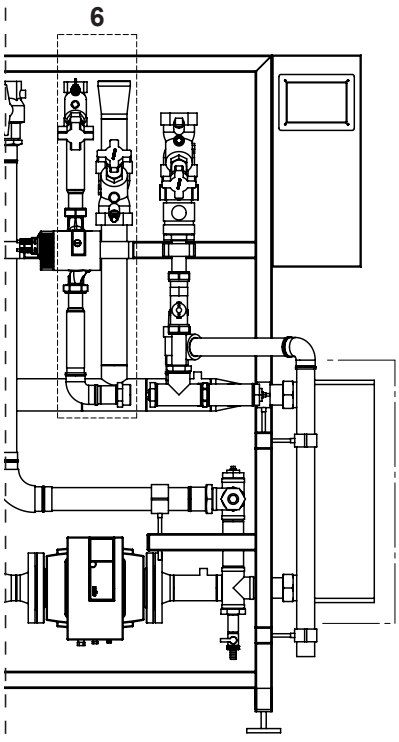






* with circulation 700

Version incl. circulation set

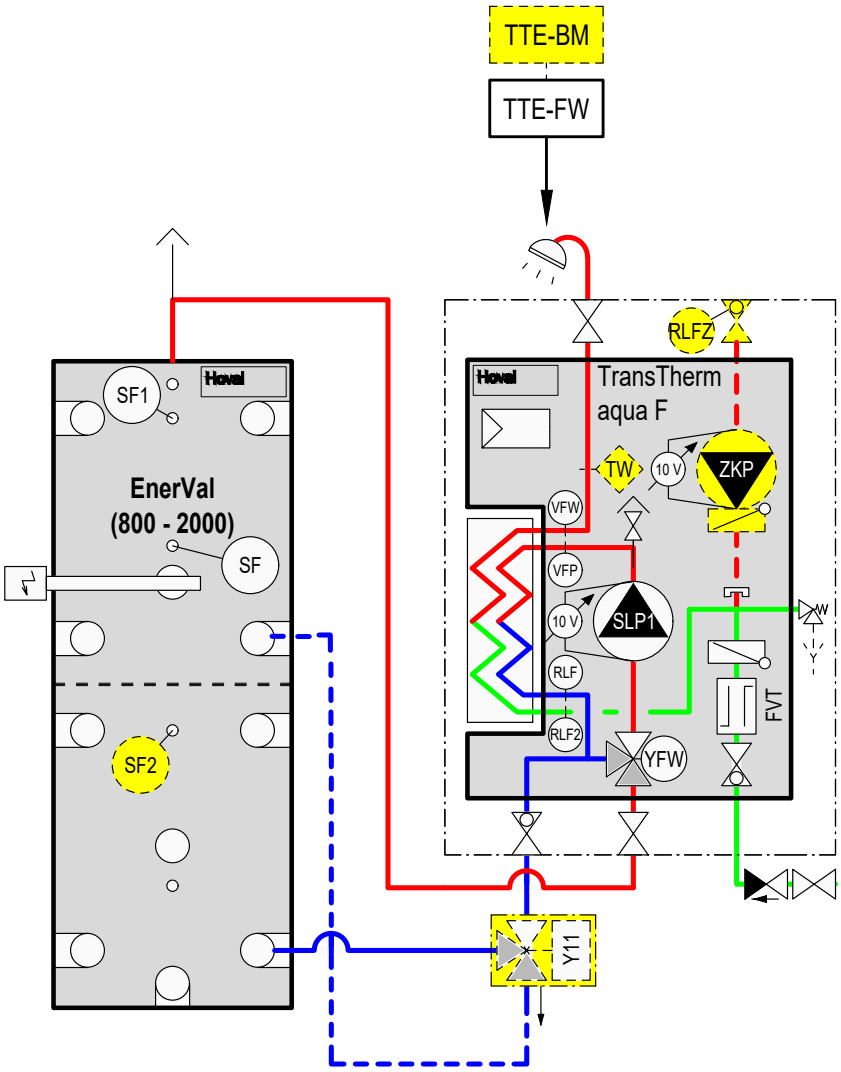


1	Safety valve Hot water 10 bar	
2	Filling/drain valve	
3	Heat exchanger	
4	Three-way valve	
5	Circulating pump	
6	Circulation	DN 32, Rp 1 ¼″ (DN 25, Rp 1″) (IT)
7	Cold water	DN 50, Rp 2″ (IT)
8	Hot water	DN 50, Rp 2″ (IT)
9	Flow heating water	DN 65 AE (weld-on end)
10	Return heating water	DN 65 AE (weld-on end)

TransTherm® aqua F	Weight in kg
(6-90)	214

Water heating

TransTherm® aqua F



TTE-FW	Basic module district heating/fresh water
TW	Flow temperature monitor (if required)
VFP	Flow sensor primary
VFW	Flow sensor DHW
RLF	Return sensor primary
RLF2	Return sensor domestic cold water
SF	Calorifier sensor
SF1	Calorifier sensor 1
RLFZ	Circulation sensor
SLP1	Calorifier charging pump primary
FVT	Flow rate sensor
YFW	Three-way valve with actuator
ZKP	Recirculation pump
Y11	Return switching with actuator

Option

BM	TopTronic® E control module
SF2	Calorifier sensor 2

Calorifier continuous flow system

Consisting of:
- fresh water module TransTherm® aqua FS
- buffer storage tank (option)

Fresh water module TransTherm® aqua FS

Consisting of:
Charging circuit flow:
- ball valve with thermometer handle
- 3-way valve
- drive Siemens SAT 61 (0-10 V)
- Stratos pump
- sleeve for cable sensor M10 x 1
- sleeve for AGFW sensor

Charging circuit high temperature return:
- flow rate limiter Hydrocontrol VTR
- test port OVENTROP set 2
- three-way valve
- drive Siemens SAT 61 (0-10 V)
- sleeve for cable sensor M10 x 1
- sleeve for AGFW sensor

Charging circuit low temperature return:
- flow rate limiter Hydrocontrol VTR
- test port OVENTROP set 2
- ball valve WESA 1533
- sleeve for cable sensor M10 x 1
- sleeve for AGFW sensor

Heat exchanger supplementary heater:
- plate heat exchanger DANFOSS

Heat exchanger preheater:
- plate heat exchanger DANFOSS

Domestic hot water DHW:
- ball valve OVENTROP Optibal TW
- bimetallic thermometer OVENTROP TW
- sampling valve OVENTROP Aquastrom P (optional)
- ball valve OVENTROP
- sleeve for AGFW sensor

Domestic hot water circulation DHWC:
- flow rate limiter Aquastrom
- sampling valve OVENTROP Aquastrom P
- measurement nozzle OVENTROP
- Circulating pump
- non-return valve TS73S
- sleeve for AGFW sensor

Domestic water DW:
- flow rate limiter Aquastrom C
- non-return valve ROSSWEINER
- adapter
- flow rate sensor HUBA
- ball valve OVENTROP
- sleeve for AGFW sensor
- diaphragm safety valve

Control panel control system:
- control panel casing SCHNEIDER
- control TTE-FW
- fuses
- sockets
- terminals

Stand frame:
- frame with corrosion protection coating RAL 9005
- height-adjustable and vibration-damped feet

Range
Fresh water module

TransTherm® aqua FS type	Output kW
(7-10)	50
(7-16)	90
(7-20)	130
(7-30)	175
(7-40)	220
(7-50)	275
(7-60)	358
(7-70)	453
(7-80)	569
(7-90)	717

Thermal insulation:
- thermal insulation of the heat exchanger with 30 mm EPP mouldings
- thermal insulation of the pipes with EPP mouldings. insulation thickness of 50 % according to EnEV
- deep black, similar to RAL 9005
- suitable for damp rooms
- CFC-free
- normal flammability according to DIN 4102-1 and EN 13501-1 (fuel class: B2)
- no bleaching or disintegration of the insulation under the influence of UV

Delivery
- The buffer storage tank required is not included in the scope of delivery

On site
- Electrical connection of the controller

Suitable buffer storage tanks
see separate chapter

TopTronic® E controller

TopTronic® E basic module
District heating/fresh water
- Control unit for controlling district heating systems in non-communicative networks and the corresponding consumers with integrated control functions for
  - primary valve control
  - cascade management
  - 1 heating circuit with mixer
  - 1 heating circuit without mixer
  - 1 hot water charging circuit
  - various additional functions
- Various functions for domestic hot water:
  - selection of different basic programs (week programs, eco mode, holiday, etc.)
  - various operating modes (e.g. accumulator priority or parallel mode)
  - buffer storage circuit on the primary or secondary side
  - adjustable loading criteria (e.g. adjustable loading times, undershooting the minimum nominal value, etc.)
  - adjustable switch-off criteria (e.g. achieving the set value, achieving the lower sensor set value, etc.)
  - adjustable loading block (if the loading flow temperature is too low, the setpoint temperature is not reached, differential temperature-dependent solar circuit control)
- Definable switching times for circulating pump control

- Outdoor sensor
- Immersion sensor (calorifier sensor)
- Contact sensor (flow temperature sensor)
- Complete plug set for district heating module
- Speed-controlled pumps

No further module expansions or controller modules can be installed in the control panel!

Option

TopTronic® E control module
- Simple, intuitive operating concept
- Display of the most important operating states
- Configurable start screen
- Operating mode selection
- Configurable day and week programmes
- Operation of all connected Hoval CAN bus modules
- Commissioning wizard
- Service and maintenance function
- Fault message management
- Analysis function
- Weather display (with HovalConnect option)
- Adaptation of the heating strategy based on the weather forecast (with HovalConnect option)

Notice
The TopTronic® E control module for operating the basic module district heating/fresh water must be ordered separately!

For further information about the TopTronic® E,
see “Controls”

Delivery
- Incl. thermometer, non-return valves, cut-off ball valves on the domestic water side
- All fittings required for operation, such as strainers, flow balancing and shut-off valves, non-return valves, air vent and drain valve are fitted

Caution
As a result of thermal disinfection of the domestic hot water for legionella protection, increased water temperatures (at least 65-70 °C) occur. Depending on the water quality, this may result in increased calcification at the installed fittings and heat exchangers and also brings the risk of scalding at the tapping points. Corresponding protective measures must be implemented on site.

Calorifier fresh water module

TransTherm® aqua FS

Fully assembled station with 2 plate heat exchangers for the provision of domestic hot water using the continuous flow principle and built-in Hoval TopTronic® E control.
The buffer storage tanks required for this are not included in the scope of delivery.

TransTherm® aqua FS	Output kW	Part No.
(7-10)	50	8008 017
(7-16)	90	8008 018
(7-20)	130	8008 019
(7-30)	175	8008 020
(7-40)	220	8008 021
(7-50)	275	8008 022
(7-60)	358	8008 023
(7-70)	453	8008 024
(7-80)	569	8008 025
(7-90)	717	8008 026

Version with copper-free heat exchanger

TransTherm® aqua FS

with copper-free heat exchanger

TransTherm® aqua FS	Output kW	Part No.
(7-10)	50	8008 027
(7-16)	90	8008 028
(7-20)	130	8008 029
(7-30)	175	8008 030
(7-40)	220	8008 031

		Part No.
	**TopTronic® E control module black with 4.3″ colour touchscreen** For operation of all controller modules connected to the bus system (basic, solar, buffer modules etc.) Connection to the Hoval bus system via RJ45 plug connection or via plug terminals (max. 0.75 mm²), flat design with flexible installation option Installation: - in control panel of the heat generator - in the Hoval wall casing - in the control panel front, black high-gloss cover, customer-specific configurable start screen, Display of current weather or weather forecast (only possible in combination with HovalConnect) Consisting of: - TopTronic® E control module black - Clamping device set control module - RJ45-RAST 5 CAN cable, L = 500	6043 844
	**Test valve DN 8 G ¼″** for TransTherm® aqua L, F, FS Test valve suitable for flame treatment for hygienic-microbiologic tests.	2049 861
	**Sludge separator with magnet MB3/L DN 25...DN 50** Fast and continuous removal of ferromagnetic and non-magnetic dirt and sludge particles Sludge separation up to a particle size of 5 µm Brass housing Max. operating pressure: 6 bar Max. flow temperature: 110 °C	

Type	Connection	Flow rate m³/h at 1 m/s flow speed	
MB3 DN 25	Rp 1″	2.0	2062 165
MBL DN 32	Rp 1¼″	3.6	2062 166
MBL DN 40	Rp 1½″	5.0	2062 167
MBL DN 50	Rp 2″	7.5	2062 168

Additional sludge separators
see “Various system components”

		Part No.
	**Temperature monitor 0…120 °C** for TransTherm® aqua L, F, FS	2048 299
	**Safety temperature monitor 70…130 °C** for TransTherm® aqua L, F, FS	2048 300
	**Safety temperature limiter 70…130 °C** for TransTherm® aqua L, F, FS	2049 619
	**Immersion sleeve G ½″ stainless steel for thermostat** for TransTherm® aqua L, F, FS Installation length = 100 mm Outer Ø: 8 mm, inner Ø: 6.5 mm	2048 285
	**Immersion sleeve G ½″ stainless steel for 2 thermostats** for TransTherm® aqua L, F, FS Installation length = 100 mm Outer Ø: 15 mm, inner Ø: 13.5 mm	2048 288

Services

Commissioning
Commissioning by works service or Hoval trained authorised serviceman/company is condition for warranty.

For commissioning and other services please contact your Hoval sales office.

Performance data

TransTherm® aqua FS (7-10 to 7-50)

Domestic water secondary	TransTherm® aqua FS		Flow temperature heating water 55 °C (6-...)						60 °C (6-...)					
			(10)	(16)	(20)	(30)	(40)	(50)	(10)	(16)	(20)	(30)	(40)	(50)
60/5 °C	T return primary	°C	-	-	-	-	-	-	-	-	-	-	-	-
	V̇ primary	**m³/h**	-	-	-	-	-	-	-	-	-	-	-	-
	Q max.	kW	-	-	-	-	-	-	-	-	-	-	-	-
	V̇ secondary	**m³/h**	-	-	-	-	-	-	-	-	-	-	-	-
60/10 °C	T return primary	°C	-	-	-	-	-	-	-	-	-	-	-	-
	V̇ primary	**m³/h**	-	-	-	-	-	-	-	-	-	-	-	-
	Q max.	kW	-	-	-	-	-	-	-	-	-	-	-	-
	V̇ secondary	**m³/h**	-	-	-	-	-	-	-	-	-	-	-	-
60/15 °C	T return primary	°C	-	-	-	-	-	-	-	-	-	-	-	-
	V̇ primary	**m³/h**	-	-	-	-	-	-	-	-	-	-	-	-
	Q max.	kW	-	-	-	-	-	-	-	-	-	-	-	-
	V̇ secondary	**m³/h**	-	-	-	-	-	-	-	-	-	-	-	-
60/20 °C	T return primary	°C	-	-	-	-	-	-	-	-	-	-	-	-
	V̇ primary	**m³/h**	-	-	-	-	-	-	-	-	-	-	-	-
	Q max.	kW	-	-	-	-	-	-	-	-	-	-	-	-
	V̇ secondary	**m³/h**	-	-	-	-	-	-	-	-	-	-	-	-
55/5 °C	T return primary	°C	-	-	-	-	-	-	30	30	30	30	30	30
	V̇ primary	**m³/h**	-	-	-	-	-	-	**1.25**	**2.04**	**2.51**	**3.71**	**4.76**	**5.66**
	Q max.	kW	-	-	-	-	-	-	43	70	86	127	163	194
	V̇ secondary	**m³/h**	-	-	-	-	-	-	**0.74**	**1.2**	**1.48**	**2.18**	**2.8**	**3.33**
55/10 °C	T return primary	°C	-	-	-	-	-	-	30	30	30	30	30	30
	V̇ primary	**m³/h**	-	-	-	-	-	-	**1.11**	**2.04**	**2.51**	**3.71**	**4.76**	**5.63**
	Q max.	kW	-	-	-	-	-	-	38	70	86	127	163	193
	V̇ secondary	**m³/h**	-	-	-	-	-	-	**0.73**	**1.34**	**1.64**	**2.43**	**3.12**	**3.69**
55/15 °C	T return primary	°C	-	-	-	-	-	-	30	30	30	30	30	30
	V̇ primary	**m³/h**	-	-	-	-	-	-	**0.76**	**1.46**	**1.95**	**3.06**	**4.23**	**5.4**
	Q max.	kW	-	-	-	-	-	-	26	50	67	105	145	185
	V̇ secondary	**m³/h**	-	-	-	-	-	-	**0.56**	**1.08**	**1.44**	**2.26**	**3.12**	**3.98**
55/20 °C	T return primary	°C	-	-	-	-	-	-	30	30	30	30	30	30
	V̇ primary	**m³/h**	-	-	-	-	-	-	**0.47**	**0.9**	**1.17**	**1.9**	**2.63**	**3.36**
	Q max.	kW	-	-	-	-	-	-	16	31	40	65	90	115
	V̇ secondary	**m³/h**	-	-	-	-	-	-	**0.39**	**0.76**	**0.99**	**1.6**	**2.22**	**2.83**
50/5 °C	T return primary	°C	30	30	30	30	30	30	30	30	30	30	30	30
	V̇ primary	**m³/h**	**1.29**	**2.03**	**2.51**	**3.67**	**4.72**	**5.66**	**1.28**	**2.04**	**2.51**	**3.71**	**4.76**	**5.63**
	Q max.	kW	37	58	72	105	135	162	44	70	86	127	163	193
	V̇ secondary	**m³/h**	**0.71**	**1.11**	**1.37**	**2**	**2.58**	**3.09**	**0.84**	**1.34**	**1.64**	**2.43**	**3.12**	**3.69**
50/10 °C	T return primary	°C	30	30	30	30	30	30	30	30	30	30	30	30
	V̇ primary	**m³/h**	**1.29**	**2.03**	**2.51**	**3.67**	**4.72**	**5.66**	**1.28**	**2.04**	**2.51**	**3.73**	**4.81**	**5.69**
	Q max.	kW	38	58	72	105	135	162	44	70	86	128	165	195
	V̇ secondary	**m³/h**	**0.82**	**1.25**	**1.77**	**2.26**	**2.9**	**3.48**	**0.95**	**1.51**	**1.85**	**2.75**	**3.55**	**4.19**
50/15 °C	T return primary	°C	30	30	30	30	30	30	30	30	30	30	30	30
	V̇ primary	**m³/h**	**1.29**	**2.03**	**2.51**	**3.67**	**4.72**	**5.66**	**1.11**	**1.95**	**2.48**	**3.76**	**4.76**	**5.69**
	Q max.	kW	37	58	72	105	135	162	38	67	85	129	163	195
	V̇ secondary	**m³/h**	**0.91**	**1.43**	**1.77**	**2.58**	**3.32**	**3.99**	**0.94**	**1.65**	**2.09**	**3.18**	**4.01**	**4.8**
50/20 °C	T return primary	°C	30	30	30	30	30	30	30	30	30	30	30	30
	V̇ primary	**m³/h**	**1.15**	**2.03**	**2.55**	**3.7**	**4.75**	**5.69**	**0.96**	**1.69**	**2.13**	**3.24**	**3.63**	**5.16**
	Q max.	kW	33	58	73	106	136	163	33	58	73	111	145	177
	V̇ secondary	**m³/h**	**0.95**	**1.67**	**2.1**	**3.05**	**3.91**	**4.69**	**0.95**	**1.67**	**2.1**	**3.19**	**4.17**	**5.09**
45/5 °C	T return primary	°C	19	18	18	18	18	17	177	16	16	16	16	15
	V̇ primary	**m³/h**	**0.86**	**1.91**	**2.9**	**2.9**	**3.8**	**4.61**	**0.86**	**1.92**	**2.91**	**2.91**	**3.82**	**4.63**
	Q max.	kW	35	80	123	123	162	199	42	95	145	145	192	235
	V̇ secondary	**m³/h**	**0.76**	**1.73**	**2.65**	**2.65**	**3.50**	**4.27**	**0.90**	**2.05**	**3.13**	**3.13**	**4.14**	**5.05**
45/10 °C	T return primary	°C	21	21	20	20	20	20	20	19	19	19	18	18
	V̇ primary	**m³/h**	**0.86**	**1.91**	**2.89**	**2.89**	**3.81**	**4.62**	**0.86**	**1.92**	**2.84**	**2.84**	**3.63**	**4.32**
	Q max.	kW	33	74	114	114	151	185	39	89	133	133	172	207
	V̇ secondary	**m³/h**	**0.81**	**1.84**	**2.81**	**2.81**	**3.74**	**4.56**	**0.97**	**2.20**	**3.29**	**3.29**	**4.25**	**5.09**
45/15 °C	T return primary	°C	24	23	23	23	23	23	23	22	21	21	21	21
	V̇ primary	**m³/h**	**0.86**	**1.91**	**2.91**	**2.91**	**3.81**	**4.62**	**0.87**	**1.8**	**2.61**	**2.61**	**3.33**	**3.98**
	Q max.	kW	30	69	106	106	139	170	37	78	115	115	148	178
	V̇ secondary	**m³/h**	**0.88**	**1.99**	**3.05**	**3.05**	**4.02**	**4.90**	**1.07**	**2.26**	**3.31**	**3.31**	**4.26**	**5.12**
45/20 °C	T return primary	°C	27	26	26	26	26	26	25	25	24	24	24	24
	V̇ primary	**m³/h**	**0.86**	**1.92**	**2.91**	**2.91**	**3.71**	**4.41**	**0.85**	**1.63**	**2.36**	**2.36**	**3.02**	**3.61**
	Q max.	kW	27	63	96	96	124	148	33	65	96	96	123	148
	V̇ secondary	**m³/h**	**0.96**	**2.18**	**3.33**	**3.33**	**4.28**	**5.13**	**1.16**	**2.27**	**3.32**	**3.32**	**4.28**	**5.14**

T return primary	°C	Return temperature primary
V̇ primary	**m³/h**	Flow rate primary
Q max.	kW	Output
V̇ secondary	**m³/h**	Flow rate secondary

The specified technical data relate to the full load of the module in each case.

Performance data

TransTherm® aqua FS (7-10 to 7-50)

Domestic water secondary	TransTherm® aqua FS		Flow temperature heating water: 65 °C (6-...) (10)	(16)	(20)	(30)	(40)	(50)	70 °C (6-...) (10)	(16)	(20)	(30)	(40)	(50)
60/5 °C	T return primary	°C	30	30	30	30	30	30	30	30	30	30	30	30
	V̇ primary	**m³/h**	**1.08**	**1.88**	**2.5**	**3.73**	**4.84**	**5.77**	**1.32**	**2.09**	**2.86**	**3.76**	**4.49**	**5.72**
	Q max.	kW	43	75	100	149	193	230	60	95	133	171	209	260
	V̇ secondary	**m³/h**	**0.67**	**1.17**	**1.55**	**2.33**	**3.01**	**3.59**	**0.94**	**1.48**	**2.29**	**2.67**	**3.59**	**4.06**
60/10 °C	T return primary	°C	30	30	30	30	30	30	30	30	30	30	30	30
	V̇ primary	**m³/h**	**0.8**	**1.5**	**2.01**	**3.16**	**4.34**	**5.39**	**1.08**	**1.94**	**2.80**	**3.77**	**4.73**	**5.92**
	Q max.	kW	32	60	80	126	173	215	50	90	130	175	220	275
	V̇ secondary	**m³/h**	**0.55**	**1.03**	**1.38**	**2.17**	**2.98**	**3.7**	**0.86**	**1.54**	**2.24**	**3.01**	**3.78**	**4.73**
60/15 °C	T return primary	°C	30	30	30	30	30	30	30	30	30	30	30	30
	V̇ primary	**m³/h**	**0.55**	**1.05**	**1.38**	**2.13**	**3.08**	**3.96**	**0.97**	**1.8**	**2.37**	**3.73**	**4.84**	**5.72**
	Q max.	kW	22	42	55	85	123	158	44	82	108	170	220	260
	V̇ secondary	**m³/h**	**0.42**	**0.8**	**1.05**	**1.63**	**2.35**	**3.02**	**0.84**	**1.57**	**2.08**	**3.24**	**4.21**	**4.98**
60/20 °C	T return primary	°C	30	30	30	30	30	30	30	30	30	30	30	30
	V̇ primary	**m³/h**	**0.3**	**0.6**	**0.8**	**1.28**	**1.75**	**2.33**	**0.62**	**1.14**	**2.05**	**2.4**	**3.43**	**4.22**
	Q max.	kW	12	24	32	51	70	93	28	52	68	109	156	192
	V̇ secondary	**m³/h**	**0.26**	**0.52**	**0.69**	**1.1**	**1.51**	**2**	**0.6**	**1.12**	**1.47**	**2.36**	**3.36**	**4.14**
55/5 °C	T return primary	°C	30	30	30	30	30	30	30	30	30	30	30	30
	V̇ primary	**m³/h**	**0.8**	**1.5**	**2.01**	**3.16**	**4.34**	**5.39**	**1.08**	**2.09**	**2.53**	**3.74**	**4.84**	**5.76**
	Q max.	kW	32	60	80	126	173	215	50	95	115	170	220	262
	V̇ secondary	**m³/h**	**0.55**	**1.03**	**1.38**	**2.17**	**2.98**	**3.7**	**0.86**	**1.63**	**1.97**	**2.92**	**3.78**	**4.5**
55/10 °C	T return primary	°C	30	30	30	30	30	30	30	30	30	30	30	30
	V̇ primary	**m³/h**	**1.3**	**2.06**	**2.53**	**3.71**	**4.81**	**5.64**	**1.08**	**1.87**	**2.42**	**3.74**	**4.84**	**5.72**
	Q max.	kW	52	82	101	148	192	225	49	85	110	170	220	260
	V̇ secondary	**m³/h**	**0.99**	**1.57**	**1.93**	**2.83**	**3.67**	**4.3**	**0.94**	**1.62**	**2.1**	**3.24**	**4.21**	**4.98**
55/15 °C	T return primary	°C	30	30	30	30	30	30	30	30	30	30	30	30
	V̇ primary	**m³/h**	**0.97**	**1.65**	**2.11**	**3.71**	**4.81**	**5.64**	**1.1**	**1.88**	**2.41**	**3.74**	**4.22**	**5.1**
	Q max.	kW	44	75	96	148	192	225	44	75	96	148	192	232
	V̇ secondary	**m³/h**	**0.95**	**1.61**	**2.07**	**3.19**	**4.13**	**4.84**	**0.94**	**1.62**	**2.1**	**3.19**	**4.21**	**5**
55/20 °C	T return primary	°C	30	30	30	30	30	30	30	30	30	30	30	30
	V̇ primary	**m³/h**	**0.95**	**1.68**	**2.13**	**3.23**	**4.24**	**5.14**	**0.84**	**1.47**	**1.87**	**2.84**	**3.72**	**4.51**
	Q max.	kW	38	67	85	129	169	205	38	67	85	129	169	205
	V̇ secondary	**m³/h**	**0.94**	**1.65**	**2.09**	**3.18**	**4.16**	**5.05**	**0.94**	**1.65**	**2.09**	**3.18**	**4.16**	**5.05**
50/5 °C	T return primary	°C	30	30	30	30	30	30	30	30	30	30	30	30
	V̇ primary	**m³/h**	**1.25**	**2.06**	**2.53**	**3.71**	**4.81**	**5.64**	**1.08**	**1.87**	**2.42**	**3.56**	**4.84**	**5.72**
	Q max.	kW	50	82	101	148	192	225	49	85	110	162	220	260
	V̇ secondary	**m³/h**	**0.95**	**1.57**	**1.93**	**2.83**	**3.67**	**4.3**	**0.94**	**1.62**	**2.1**	**3.09**	**4.21**	**4.98**
50/10 °C	T return primary	°C	30	30	30	30	30	30	30	30	30	30	30	30
	V̇ primary	**m³/h**	**1.1**	**1.88**	**2.41**	**3.71**	**4.81**	**5.64**	**0.97**	**1.65**	**2.11**	**3.25**	**4.22**	**5.1**
	Q max.	kW	44	75	96	148	192	225	44	75	96	148	192	232
	V̇ secondary	**m³/h**	**0.95**	**1.61**	**2.07**	**3.19**	**4.13**	**4.84**	**0.95**	**1.61**	**2.07**	**3.19**	**4.13**	**5**
50/15 °C	T return primary	°C	30	30	30	30	30	30	30	30	30	30	30	30
	V̇ primary	**m³/h**	**0.95**	**1.68**	**2.13**	**3.23**	**4.24**	**5.14**	**0.84**	**1.47**	**1.87**	**2.84**	**3.72**	**4.51**
	Q max.	kW	38	67	85	129	169	205	38	67	85	129	169	205
	V̇ secondary	**m³/h**	**0.94**	**1.65**	**2.09**	**3.18**	**4.16**	**5.05**	**0.94**	**1.65**	**2.09**	**3.18**	**4.16**	**5.05**
50/20 °C	T return primary	°C	30	30	30	30	30	30	30	30	30	30	30	30
	V̇ primary	**m³/h**	**0.83**	**1.45**	**1.81**	**2.44**	**3.63**	**4.44**	**0.73**	**1.28**	**1.61**	**2.44**	**3.19**	**3.89**
	Q max.	kW	33	58	73	111	145	177	33	58	73	111	145	177
	V̇ secondary	**m³/h**	**0.95**	**1.67**	**2.1**	**3.19**	**4.17**	**5.09**	**0.95**	**1.67**	**2.1**	**3.19**	**4.17**	**5.09**
45/5 °C	T return primary	°C	16	15	14	14	14	14	15	13	13	13	12	12
	V̇ primary	**m³/h**	**0.87**	**1.83**	**2.64**	**2.64**	**3.38**	**4.03**	**0.84**	**1.62**	**2.35**	**2.35**	**3.01**	**3.59**
	Q max.	kW	48	104	152	152	196	236	52	104	152	152	196	236
	V̇ secondary	**m³/h**	**1.04**	**2.24**	**3.27**	**3.27**	**4.23**	**5.07**	**1.13**	**2.24**	**3.28**	**3.28**	**4.23**	**5.07**
45/10 °C	T return primary	°C	19	17	17	17	17	16	17	16	16	16	15	15
	V̇ primary	**m³/h**	**0.87**	**1.69**	**2.45**	**2.45**	**3.13**	**3.73**	**0.77**	**1.49**	**2.17**	**2.17**	**2.78**	**3.32**
	Q max.	kW	45	91	134	134	172	206	46	91	133	133	172	206
	V̇ secondary	**m³/h**	**1.13**	**2.25**	**3.30**	**3.30**	**4.24**	**5.09**	**1.13**	**2.24**	**3.29**	**3.29**	**4.24**	**5.09**
45/15 °C	T return primary	°C	21	20	20	20	20	19	20	19	19	19	19	19
	V̇ primary	**m³/h**	**0.8**	**1.55**	**2.24**	**2.24**	**2.87**	**3.43**	**0.71**	**1.36**	**1.98**	**1.98**	**2.54**	**3.03**
	Q max.	kW	39	78	115	115	148	178	40	78	114	114	148	177
	V̇ secondary	**m³/h**	**1.14**	**2.27**	**3.31**	**3.31**	**4.26**	**5.11**	**1.16**	**2.26**	**3.30**	**3.30**	**4.26**	**5.10**
45/20 °C	T return primary	°C	24	23	23	23	23	23	23	23	22	22	22	22
	V̇ primary	**m³/h**	**0.72**	**1.4**	**2.02**	**2.02**	**2.59**	**3.1**	**0.63**	**1.22**	**1.78**	**1.78**	**2.29**	**2.73**
	Q max.	kW	33	66	96	96	123	148	33	65	96	96	124	148
	V̇ secondary	**m³/h**	**1.16**	**2.29**	**3.32**	**3.32**	**4.28**	**5.13**	**1.15**	**2.27**	**3.32**	**3.32**	**4.29**	**5.13**

T return primary	°C	Return temperature primary
V̇ primary	**m³/h**	Flow rate primary
Q max.	kW	Output
V̇ secondary	**m³/h**	Flow rate secondary

The specified technical data relate to the full load of the module in each case.

Performance data

TransTherm® aqua FS (7-60 to 7-90)

Domestic water secondary	TransTherm® aqua FS		Flow temperature heating water 52 °C (60)	52 °C (70)	52 °C (80)	52 °C (90)	55 °C (60)	55 °C (70)	55 °C (80)	55 °C (90)	60 °C (60)	60 °C (70)	60 °C (80)	60 °C (90)
60/5 °C	T return primary	°C	-	-	-	-	-	-	-	-	-	-	-	-
	V̇ primary	**m³/h**	-	-	-	-	-	-	-	-	-	-	-	-
	Q max.	kW	-	-	-	-	-	-	-	-	-	-	-	-
	V̇ secondary	**m³/h**	-	-	-	-	-	-	-	-	-	-	-	-
60/10 °C	T return primary	°C	-	-	-	-	-	-	-	-	-	-	-	-
	V̇ primary	**m³/h**	-	-	-	-	-	-	-	-	-	-	-	-
	Q max.	kW	-	-	-	-	-	-	-	-	-	-	-	-
	V̇ secondary	**m³/h**	-	-	-	-	-	-	-	-	-	-	-	-
60/15 °C	T return primary	°C	-	-	-	-	-	-	-	-	-	-	-	-
	V̇ primary	**m³/h**	-	-	-	-	-	-	-	-	-	-	-	-
	Q max.	kW	-	-	-	-	-	-	-	-	-	-	-	-
	V̇ secondary	**m³/h**	-	-	-	-	-	-	-	-	-	-	-	-
60/20 °C	T return primary	°C	-	-	-	-	-	-	-	-	-	-	-	-
	V̇ primary	**m³/h**	-	-	-	-	-	-	-	-	-	-	-	-
	Q max.	kW	-	-	-	-	-	-	-	-	-	-	-	-
	V̇ secondary	**m³/h**	-	-	-	-	-	-	-	-	-	-	-	-
55/5 °C	T return primary	°C	-	-	-	-	-	-	-	-	28	28	28	27
	V̇ primary	**m³/h**	-	-	-	-	-	-	-	-	**7.27**	**10.06**	**12.62**	**15.81**
	Q max.	kW	-	-	-	-	-	-	-	-	270	370	470	600
	V̇ secondary	**m³/h**	-	-	-	-	-	-	-	-	**4.68**	**6.42**	**8.15**	**10.4**
55/10 °C	T return primary	°C	-	-	-	-	-	-	-	-	30	29	29	29
	V̇ primary	**m³/h**	-	-	-	-	-	-	-	-	**7.30**	**9.04**	**11.82**	**14.63**
	Q max.	kW	-	-	-	-	-	-	-	-	255	320	420	530
	V̇ secondary	**m³/h**	-	-	-	-	-	-	-	-	**4.91**	**6.17**	**8.09**	**10.21**
55/15 °C	T return primary	°C	-	-	-	-	-	-	-	-	30	30	30	30
	V̇ primary	**m³/h**	-	-	-	-	-	-	-	-	**5.20**	**7.23**	**9.25**	**13.01**
	Q max.	kW	-	-	-	-	-	-	-	-	180	250	320	450
	V̇ secondary	**m³/h**	-	-	-	-	-	-	-	-	**3.90**	**5.42**	**6.94**	**9.75**
55/20 °C	T return primary	°C	-	-	-	-	-	-	-	-	30	30	30	30
	V̇ primary	**m³/h**	-	-	-	-	-	-	-	-	**3.18**	**4.34**	**5.78**	**7.51**
	Q max.	kW	-	-	-	-	-	-	-	-	110	150	200	260
	V̇ secondary	**m³/h**	-	-	-	-	-	-	-	-	**2.73**	**3.72**	**4.95**	**6.44**
50/5 °C	T return primary	°C	-	-	-	-	25	25	25	24	22	22	21	21
	V̇ primary	**m³/h**	-	-	-	-	**7.32**	**8.93**	**11.59**	**14.69**	**7.17**	**9.14**	**11.65**	**13.93**
	Q max.	kW	-	-	-	-	250	310	405	520	315	405	520	630
	V̇ secondary	**m³/h**	-	-	-	-	**4.82**	**5.97**	**7.80**	**10.02**	**6.07**	**7.80**	**10.02**	**12.14**
50/10 °C	T return primary	°C	-	-	-	-	27	27	27	26	24	24	24	23
	V̇ primary	**m³/h**	-	-	-	-	**7.17**	**8.95**	**11.64**	**14.45**	**6.78**	**8.62**	**11.52**	**13.16**
	Q max.	kW	-	-	-	-	230	290	380	480	280	360	485	560
	V̇ secondary	**m³/h**	-	-	-	-	**4.99**	**6.29**	**8.24**	**10.4**	**6.07**	**7.80**	**10.51**	**12.14**
50/15 °C	T return primary	°C	-	-	-	-	29	29	29	28	26	26	26	26
	V̇ primary	**m³/h**	-	-	-	-	**7.25**	**9.24**	**11.63**	**14.5**	**6.31**	**8.10**	**10.97**	**12.35**
	Q max.	kW	-	-	-	-	215	275	350	445	245	315	430	490
	V̇ secondary	**m³/h**	-	-	-	-	**5.33**	**6.81**	**8.67**	**11.02**	**6.07**	**7.80**	**10.65**	**12.14**
50/20 °C	T return primary	°C	-	-	-	-	30	30	30	30	30	29	29	29
	V̇ primary	**m³/h**	-	-	-	-	**5.03**	**6.59**	**9.02**	**11.96**	**6.00**	**7.6**	**10.35**	**11.6**
	Q max.	kW	-	-	-	-	145	190	260	345	210	270	370	420
	V̇ secondary	**m³/h**	-	-	-	-	**4.20**	**5.49**	**7.51**	**9.97**	**6.07**	**7.80**	**10.69**	**12.14**
45/5 °C	T return primary	°C	21	21	21	20	20	19	19	19	18	18	18	17
	V̇ primary	**m³/h**	**7.20**	**8.95**	**11.53**	**14.54**	**6.90**	**8.77**	**11.62**	**13.4**	**5.77**	**7.36**	**10.00**	**11.26**
	Q max.	kW	255	320	415	530	280	360	480	560	280	360	490	560
	V̇ secondary	**m³/h**	**5.53**	**6.94**	**9.00**	**11.50**	**6.07**	**7.80**	**10.4**	**12.14**	**6.07**	**7.80**	**10.62**	**12.14**
45/10 °C	T return primary	°C	23	23	23	23	22	22	22	21	20	20	20	19
	V̇ primary	**m³/h**	**7.12**	**9.21**	**11.51**	**14.45**	**6.44**	**8.23**	**11.13**	**12.57**	**5.36**	**6.86**	**9.27**	**7.24**
	Q max.	kW	235	305	385	490	245	315	430	490	245	315	430	490
	V̇ secondary	**m³/h**	**5.82**	**7.56**	**9.54**	**12.14**	**6.07**	**7.80**	**10.65**	**12.14**	**6.07**	**7.80**	**10.65**	**12.14**
45/15 °C	T return primary	°C	25	25	25	25	25	24	24	24	23	22	22	22
	V̇ primary	**m³/h**	**6.10**	**8.03**	**10.67**	**13.49**	**6.01**	**7.63**	**10.38**	**11.63**	**4.88**	**6.23**	**8.51**	**9.53**
	Q max.	kW	190	250	335	420	210	270	370	420	210	270	370	420
	V̇ secondary	**m³/h**	**5.49**	**7.23**	**9.68**	**12.14**	**6.07**	**7.80**	**10.69**	**12.14**	**6.07**	**7.80**	**10.69**	**12.14**
45/20 °C	T return primary	°C	25	25	25	25	27	27	27	27	25	25	25	25
	V̇ primary	**m³/h**	**2.73**	**3.53**	**4.66**	**6.42**	**5.46**	**6.97**	**9.57**	**10.65**	**4.37**	**5.59**	**7.68**	**8.57**
	Q max.	kW	85	110	145	200	175	225	310	350	175	225	310	350
	V̇ secondary	**m³/h**	**2.95**	**3.82**	**5.03**	**6.94**	**6.07**	**7.80**	**10.75**	**12.14**	**6.07**	**7.80**	**10.75**	**12.14**

T return primary	°C	Return temperature primary
V̇ primary	**m³/h**	Flow rate primary
Q max.	kW	Output
V̇ secondary	**m³/h**	Flow rate secondary

The specified technical data relate to the full load of the module in each case.

Performance data

TransTherm® aqua FS (7-60 to 7-90)

Domestic water secondary	TransTherm® aqua FS		Flow temperature heating water 65 °C (60)	65 °C (70)	65 °C (80)	65 °C (90)	70 °C (60)	70 °C (70)	70 °C (80)	70 °C (90)
60/5 °C	T return primary	°C	30	30	30	29	26	26	25	25
	V̇ primary	**m³/h**	**7.15**	**9.17**	**11.72**	**14.69**	**7.42**	**9.40**	**11.80**	**14.64**
	Q max.	kW	290	370	480	610	375	480	549	760
	V̇ secondary	**m³/h**	**4.57**	**5.83**	**7.57**	**9.62**	**5.91**	**7.57**	**9.44**	**11.98**
60/10 °C	T return primary	°C	30	30	30	30	28	28	28	27
	V̇ primary	**m³/h**	**5.45**	**6.94**	**9.41**	**12.88**	**7.23**	**9.29**	**12.23**	**15.42**
	Q max.	kW	220	280	380	520	358	453	569	717
	V̇ secondary	**m³/h**	**3.82**	**4.86**	**6.59**	**9.02**	**6.16**	**7.80**	**9.79**	**12.14**
60/15 °C	T return primary	°C	30	30	30	30	30	30	30	30
	V̇ primary	**m³/h**	**3.72**	**4.83**	**6.44**	**8.67**	**6.72**	**8.78**	**11.73**	**13.49**
	Q max.	kW	150	195	260	350	310	405	540	630
	V̇ secondary	**m³/h**	**2.89**	**3.76**	**5.01**	**6.74**	**5.97**	**7.80**	**10.4**	**12.14**
60/20 °C	T return primary	°C	30	30	30	30	30	30	30	30
	V̇ primary	**m³/h**	**2.11**	**2.85**	**3.72**	**4.95**	**4.34**	**5.64**	**7.37**	**9.97**
	Q max.	kW	85	115	150	200	200	260	340	460
	V̇ secondary	**m³/h**	**1.84**	**2.49**	**3.25**	**4.34**	**4.34**	**5.64**	**7.37**	**9.97**
55/5 °C	T return primary	°C	24	24	23	23	22	21	21	21
	V̇ primary	**m³/h**	**7.42**	**9.24**	**11.64**	**14.38**	**6.30**	**8.03**	**10.99**	**12.26**
	Q max.	kW	350	440	560	700	350	450	620	700
	V̇ secondary	**m³/h**	**6.07**	**7.63**	**9.71**	**12.14**	**6.07**	**7.80**	**10.75**	**12.14**
55/10 °C	T return primary	°C	26	26	26	25	24	24	24	23
	V̇ primary	**m³/h**	**7.06**	**8.96**	**11.66**	**13.66**	**5.96**	**7.6**	**10.25**	**11.6**
	Q max.	kW	315	405	530	630	315	405	550	630
	V̇ secondary	**m³/h**	**6.07**	**7.80**	**10.21**	**12.14**	**6.07**	**7.80**	**10.6**	**12.14**
55/15 °C	T return primary	°C	29	28	28	27	27	26	26	26
	V̇ primary	**m³/h**	**6.67**	**8.48**	**11.48**	**12.91**	**5.62**	**7.16**	**9.70**	**10.96**
	Q max.	kW	280	360	490	560	280	360	490	560
	V̇ secondary	**m³/h**	**6.07**	**7.80**	**10.62**	**12.14**	**6.07**	**7.80**	**10.62**	**12.14**
55/20 °C	T return primary	°C	30	30	30	30	29	29	29	28
	V̇ primary	**m³/h**	**5.95**	**7.80**	**10.4**	**12.14**	**5.13**	**6.64**	**9.01**	**10.16**
	Q max.	kW	240	315	420	490	245	315	430	490
	V̇ secondary	**m³/h**	**5.95**	**7.80**	**10.4**	**12.14**	**6.07**	**7.80**	**10.65**	**12.14**
50/5 °C	T return primary	°C	20	20	19	19	18	18	17	17
	V̇ primary	**m³/h**	**6.06**	**7.72**	**10.43**	**11.77**	**5.30**	**6.74**	**9.05**	**10.27**
	Q max.	kW	315	405	550	630	315	405	550	630
	V̇ secondary	**m³/h**	**6.07**	**7.80**	**10.6**	**12.14**	**6.07**	**7.80**	**10.6**	**12.14**
50/10 °C	T return primary	°C	22	22	22	21	21	20	20	19
	V̇ primary	**m³/h**	**5.69**	**7.28**	**9.81**	**11.08**	**4.90**	**6.24**	**8.46**	**9.57**
	Q max.	kW	280	360	490	560	280	360	490	560
	V̇ secondary	**m³/h**	**6.07**	**7.80**	**10.62**	**12.14**	**6.07**	**7.80**	**10.62**	**12.14**
50/15 °C	T return primary	°C	25	25	24	24	23	23	22	22
	V̇ primary	**m³/h**	**5.30**	**6.74**	**9.14**	**10.29**	**4.52**	**5.76**	**7.82**	**8.83**
	Q max.	kW	245	315	430	490	245	315	430	490
	V̇ secondary	**m³/h**	**6.07**	**7.80**	**10.65**	**12.14**	**6.07**	**7.80**	**10.65**	**12.14**
50/20 °C	T return primary	°C	27	26	27	26	26	26	25	25
	V̇ primary	**m³/h**	**4.84**	**6.00**	**8.38**	**9.43**	**4.12**	**5.26**	**7.16**	**8.07**
	Q max.	kW	210	270	370	420	210	270	370	420
	V̇ secondary	**m³/h**	**6.07**	**7.80**	**10.69**	**12.14**	**6.07**	**7.80**	**10.69**	**12.14**
45/5 °C	T return primary	°C	16	16	16	15	15	14	14	13
	V̇ primary	**m³/h**	**4.99**	**6.34**	**8.58**	**9.69**	**4.39**	**5.59**	**7.59**	**8.58**
	Q max.	kW	280	360	490	560	280	360	490	560
	V̇ secondary	**m³/h**	**6.07**	**7.80**	**10.62**	**12.14**	**6.07**	**7.80**	**10.62**	**12.14**
45/10 °C	T return primary	°C	19	18	18	18	17	17	17	16
	V̇ primary	**m³/h**	**4.57**	**5.85**	**7.92**	**8.94**	**4.02**	**5.13**	**6.98**	**7.90**
	Q max.	kW	245	315	430	490	245	315	430	490
	V̇ secondary	**m³/h**	**6.07**	**7.80**	**10.65**	**12.14**	**6.07**	**7.80**	**10.65**	**12.14**
45/15 °C	T return primary	°C	21	21	21	20	20	20	20	19
	V̇ primary	**m³/h**	**4.15**	**5.30**	**7.24**	**8.15**	**3.64**	**4.66**	**6.37**	**7.18**
	Q max.	kW	210	270	370	420	210	270	370	420
	V̇ secondary	**m³/h**	**6.07**	**7.80**	**10.69**	**12.14**	**6.07**	**7.80**	**10.69**	**12.14**
45/20 °C	T return primary	°C	24	24	24	24	23	23	23	23
	V̇ primary	**m³/h**	**3.71**	**4.75**	**6.51**	**7.31**	**3.24**	**4.15**	**5.71**	**6.42**
	Q max.	kW	175	225	310	350	175	225	310	350
	V̇ secondary	**m³/h**	**6.07**	**7.80**	**10.75**	**12.14**	**6.07**	**7.80**	**10.75**	**12.14**

T return primary	°C	Return temperature primary
V̇ primary	**m³/h**	Flow rate primary
Q max.	kW	Output
V̇ secondary	**m³/h**	Flow rate secondary

The specified technical data relate to the full load of the module in each case.

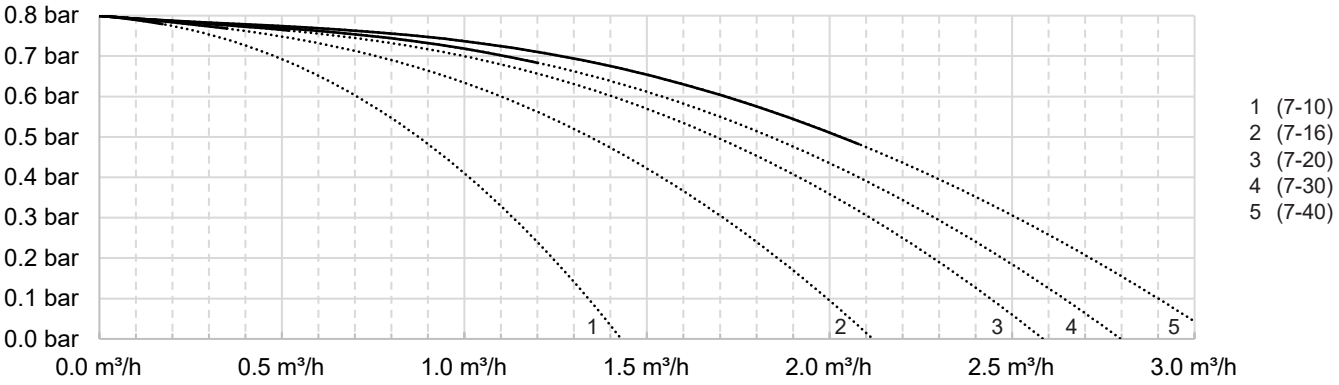
Performance data

TransTherm® aqua FS

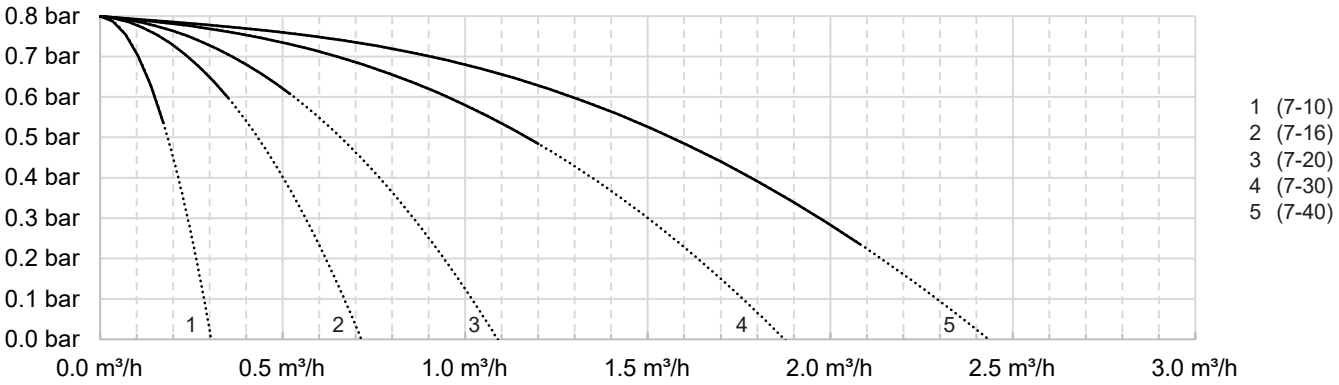
Residential units standard apartment according to DIN 4708	Peak heat demand standard apartment according to DIN 4708 with preparation 10 min	Sum flow rate domestic hot water calculation flow rate according to DIN 4708	Simultaneity factor according to DIN 4708	Peak flow rate (DHW)	Peak flow rate (DHW)	Peak flow rate (DHW)	Peak output (DHW)	Peak flow rate TransTherm® aqua FS (DHW)	Peak flow rate TransTherm® aqua FS (DHW)	Peak flow rate TransTherm® aqua FS (DHW)	DHW calorifier output TransTherm® aqua FS	TransTherm® aqua FS	Required hot water volume at 70/30 °C (40 K)	Required hot water buffer storage tank volume at 70/30 °C (40 K)	Hot water buffer storage tank 2 EnerVal	Required recharging capacity	Required recharging capacity	Required recharging capacity
N	Preparation	∑ VR at DHW 60 °C	g	V̇s at DHW 60 °C	V̇s at DHW 60 °C	V̇s at DHW 60 °C		V̇s at DHW 60 °C	V̇s at DHW 60 °C	V̇s at DHW 60 °C	Q at HT 70/30 °C DHW 10/60 °C	Type			Type	Time: 20 min 70/30 °C (40 K)	Time: 30 min 70/30 °C (40 K)	Time: 60 min 70/30 °C (40 K)
	[Wh]	[l/s]		[l/s]	[l/min]	[m³/h]	[kW]	[l/s]	[l/min]	[m³/h]	[kW]		[m³]	[m³]		[kW]	[kW]	[kW]
1	5820	0.17	1.00	0.17	10.01	0.60	35	0.24	14.3	0.86	50	(7-10)	0.13	0.16	(200)	23	15	8
2	11640	0.33	0.680	0.23	13.61	0.82	47	0.24	14.3	0.86	50	(7-10)	0.17	0.22	(200)	31	21	10
3	17460	0.50	0.544	0.27	16.33	0.98	57	0.43	25.8	1.55	90	(7-16)	0.20	0.27	(200)	37	25	12
4	23280	0.67	0.466	0.31	18.66	1.12	65	0.43	25.8	1.55	90	(7-16)	0.23	0.30	(200)	42	28	14
5	29100	0.83	0.415	0.35	20.77	1.25	72	0.43	25.8	1.55	90	(7-16)	0.26	0.34	(200)	47	31	16
6	34920	1.00	0.377	0.38	22.64	1.36	79	0.43	25.8	1.55	90	(7-16)	0.28	0.37	(200)	51	34	17
7	40740	1.17	0.349	0.41	24.45	1.47	85	0.43	25.8	1.55	90	(7-16)	0.31	0.40	(300)	55	37	18
8	46560	1.33	0.349	0.47	27.94	1.68	97	0.62	37.3	2.24	130	(7-20)	0.35	0.45	(300)	63	42	21
9	52380	1.50	0.308	0.46	27.74	1.66	97	0.62	37.3	2.24	130	(7-20)	0.35	0.45	(300)	63	42	21
10	58200	1.67	0.292	0.49	29.23	1.75	102	0.62	37.3	2.24	130	(7-20)	0.37	0.47	(300)	66	44	22
11	64020	1.83	0.279	0.51	30.72	1.84	107	0.62	37.3	2.24	130	(7-20)	0.38	0.50	(300)	70	46	23
12	69840	2.00	0.268	0.54	32.19	1.93	112	0.62	37.3	2.24	130	(7-20)	0.40	0.52	(500)	73	49	24
13	75660	2.17	0.258	0.56	33.57	2.01	117	0.62	37.3	2.24	130	(7-20)	0.42	0.55	(500)	76	51	25
14	81480	2.34	0.249	0.58	34.89	2.09	122	0.62	37.3	2.24	130	(7-20)	0.44	0.57	(500)	79	53	26
15	87300	2.50	0.242	0.61	36.33	2.18	127	0.62	37.3	2.24	130	(7-20)	0.45	0.59	(500)	82	55	27
16	93120	2.67	0.235	0.63	37.63	2.26	131	0.62	37.3	2.24	130	(7-20)	0.47	0.61	(500)	85	57	28
17	98940	2.84	0.228	0.65	38.79	2.33	135	0.84	50.2	3.01	175	(7-30)	0.49	0.63	(500)	88	59	29
18	104760	3.00	0.223	0.67	40.17	2.41	140	0.84	50.2	3.01	175	(7-30)	0.50	0.65	(500)	91	61	30
19	110580	3.17	0.217	0.69	41.27	2.48	144	0.84	50.2	3.01	175	(7-30)	0.52	0.67	(500)	94	62	31
20	116400	3.34	0.212	0.71	42.44	2.55	148	0.84	50.2	3.01	175	(7-30)	0.53	0.69	(500)	96	64	32
21	122220	3.50	0.208	0.73	43.72	2.62	153	0.84	50.2	3.01	175	(7-30)	0.55	0.71	(500)	99	66	33
22	128040	3.67	0.204	0.75	44.92	2.70	157	0.84	50.2	3.01	175	(7-30)	0.56	0.73	(500)	102	68	34
23	133860	3.84	0.200	0.77	46.04	2.76	161	0.84	50.2	3.01	175	(7-30)	0.58	0.75	(500)	104	70	35
24	139680	4.00	0.196	0.78	47.08	2.82	164	0.84	50.2	3.01	175	(7-30)	0.59	0.77	(500)	107	71	36
25	145500	4.17	0.193	0.80	48.29	2.90	168	0.84	50.2	3.01	175	(7-30)	0.60	0.78	(500)	110	73	37
26	151320	4.34	0.190	0.82	49.44	2.97	173	0.84	50.2	3.01	175	(7-30)	0.62	0.80	(500)	112	75	37
27	157140	4.50	0.187	0.84	50.53	3.03	176	0.84	50.2	3.01	175	(7-30)	0.63	0.82	(500)	115	76	38
28	162960	4.67	0.184	0.86	51.56	3.09	180	0.84	50.2	3.01	175	(7-30)	0.64	0.84	(500)	117	78	39
29	168780	4.84	0.181	0.88	52.54	3.15	183	1.05	63.1	3.78	220	(7-40)	0.66	0.85	(800)	119	79	40
30	174600	5.00	0.179	0.90	53.75	3.22	188	1.05	63.1	3.78	220	(7-40)	0.67	0.87	(800)	122	81	41
31	180420	5.17	0.176	0.91	54.61	3.28	191	1.05	63.1	3.78	220	(7-40)	0.68	0.89	(800)	124	83	41
32	186240	5.34	0.174	0.93	55.73	3.34	194	1.05	63.1	3.78	220	(7-40)	0.70	0.91	(800)	126	84	42
33	192060	5.50	0.172	0.95	56.81	3.41	198	1.05	63.1	3.78	220	(7-40)	0.71	0.92	(800)	129	86	43
34	197880	5.67	0.170	0.96	57.85	3.47	202	1.05	63.1	3.78	220	(7-40)	0.72	0.94	(800)	131	87	44
35	203700	5.84	0.168	0.98	58.85	3.53	205	1.05	63.1	3.78	220	(7-40)	0.74	0.96	(800)	133	89	44
36	209520	6.01	0.166	1.00	59.81	3.59	209	1.05	63.1	3.78	220	(7-40)	0.75	0.97	(800)	136	90	45
37	215340	6.17	0.164	1.01	60.73	3.64	212	1.05	63.1	3.78	220	(7-40)	0.76	0.99	(800)	138	92	46
38	221160	6.34	0.163	1.03	61.99	3.72	216	1.05	63.1	3.78	220	(7-40)	0.78	1.01	(800)	141	94	47
39	226980	6.51	0.161	1.05	62.84	3.77	219	1.05	63.1	3.78	220	(7-40)	0.79	1.02	(800)	143	95	48
40	232800	6.67	0.159	1.06	63.65	3.82	222	1.05	63.1	3.78	220	(7-40)	0.80	1.03	(800)	144	96	48
41	238620	6.84	0.158	1.08	64.84	3.89	226	1.31	78.8	4.73	275	(7-50)	0.81	1.05	(1000)	147	98	49
42	244440	7.01	0.156	1.09	65.58	3.93	229	1.31	78.8	4.73	275	(7-50)	0.82	1.07	(1000)	149	99	50
43	250260	7.17	0.155	1.11	66.71	4.00	233	1.31	78.8	4.73	275	(7-50)	0.83	1.08	(1000)	151	101	50
44	256080	7.34	0.154	1.13	67.82	4.07	237	1.31	78.8	4.73	275	(7-50)	0.85	1.10	(1000)	154	103	51
45	261900	7.51	0.152	1.14	68.46	4.11	239	1.31	78.8	4.73	275	(7-50)	0.86	1.11	(1000)	155	104	52
46	267720	7.67	0.151	1.16	69.52	4.17	243	1.31	78.8	4.73	275	(7-50)	0.87	1.13	(1000)	158	105	53
47	273540	7.84	0.150	1.18	70.56	4.23	246	1.31	78.8	4.73	275	(7-50)	0.88	1.15	(1000)	160	107	53
48	279360	8.01	0.149	1.19	71.58	4.29	250	1.31	78.8	4.73	275	(7-50)	0.89	1.16	(1000)	162	108	54
49	285180	8.17	0.148	1.21	72.58	4.35	253	1.31	78.8	4.73	275	(7-50)	0.91	1.18	(1000)	165	110	55
50	291000	8.34	0.146	1.22	73.06	4.38	255	1.31	78.8	4.73	275	(7-50)	0.91	1.19	(1000)	166	110	55
51	296820	8.51	0.145	1.23	74.01	4.44	258	1.31	78.8	4.73	275	(7-50)	0.93	1.20	(1000)	168	112	56
52	302640	8.67	0.144	1.25	74.94	4.50	261	1.31	78.8	4.73	275	(7-50)	0.94	1.22	(1000)	170	113	57
53	308460	8.84	0.143	1.26	75.86	4.55	265	1.31	78.8	4.73	275	(7-50)	0.95	1.23	(1000)	172	115	57
54	314280	9.01	0.142	1.28	76.75	4.60	268	1.31	78.8	4.73	275	(7-50)	0.96	1.25	(1000)	174	116	58
55	320100	9.17	0.141	1.29	77.62	4.66	271	1.31	78.8	4.73	275	(7-50)	0.97	1.26	(1000)	176	117	59

Residential units standard apartment according to DIN 4708	Peak heat demand standard apartment according to DIN 4708 with preparation 10 min	Sum flow rate domestic hot water calculation flow rate according to DIN 4708	Simultaneity factor according to DIN 4708	Peak flow rate (DHW)	Peak flow rate (DHW)	Peak flow rate (DHW)	Peak output (DHW)	Peak flow rate TransTherm® aqua FS (DHW)	Peak flow rate TransTherm® aqua FS (DHW)	Peak flow rate TransTherm® aqua FS (DHW)	DHW calorifier output TransTherm® aqua FS	TransTherm® aqua FS	Required hot water volume at 70/30 °C (40 K)	Required hot water buffer storage tank volume at 70/30 °C (40 K)	Hot water buffer storage tank 2 EnerVal	Required recharging capacity	Required recharging capacity	Required recharging capacity
N	Preparation	∑ VR at DHW 60 °C	g	$\dot{V}s$ at DHW 60 °C	$\dot{V}s$ at DHW 60 °C	$\dot{V}s$ at DHW 60 °C		$\dot{V}s$ at DHW 60 °C	$\dot{V}s$ at DHW 60 °C	$\dot{V}s$ at DHW 60 °C	Q at HT 70/30 °C DHW 10/60 °C	Type			Type	Time: 20 min 70/30 °C (40 K)	Time: 30 min 70/30 °C (40 K)	Time: 60 min 70/30 °C (40 K)
	[Wh]	[l/s]		[l/s]	[l/min]	[m³/h]	[kW]	[l/s]	[l/min]	[m³/h]	[kW]		[m³]	[m³]		[kW]	[kW]	[kW]
56	325920	9.34	0.140	1.31	78.47	4.71	274	1.31	78.8	4.73	275	(7-50)	0.98	1.28	(1000)	178	119	59
57	331740	9.51	0.140	1.33	79.87	4.79	279	1.31	78.8	4.73	275	(7-50)	1.00	1.30	(1000)	181	121	60
58	337560	9.67	0.139	1.34	80.69	4.84	282	1.71	102.6	6.16	358	(7-60)	1.01	1.31	(1000)	183	122	61
59	343380	9.84	0.138	1.36	81.49	4.89	284	1.71	102.6	6.16	358	(7-60)	1.02	1.32	(1000)	185	123	62
60	349200	10.01	0.137	1.37	82.27	4.94	287	1.71	102.6	6.16	358	(7-60)	1.03	1.34	(1000)	187	124	62
61	355020	10.18	0.136	1.38	83.03	4.98	290	1.71	102.6	6.16	358	(7-60)	1.04	1.35	(1000)	188	126	63
62	360840	10.34	0.135	1.40	83.77	5.03	292	1.71	102.6	6.16	358	(7-60)	1.05	1.36	(1000)	190	127	63
63	366660	10.51	0.135	1.42	85.12	5.11	297	1.71	102.6	6.16	358	(7-60)	1.06	1.38	(1000)	193	129	64
64	372480	10.68	0.134	1.43	85.83	5.15	299	1.71	102.6	6.16	358	(7-60)	1.07	1.40	(1000)	195	130	65
65	378300	10.84	0.133	1.44	86.52	5.19	302	1.71	102.6	6.16	358	(7-60)	1.08	1.41	(1000)	196	131	65
66	384120	11.01	0.132	1.45	87.19	5.23	304	1.71	102.6	6.16	358	(7-60)	1.09	1.42	(1000)	198	132	66
67	389940	11.18	0.132	1.48	88.52	5.31	309	1.71	102.6	6.16	358	(7-60)	1.11	1.44	(1000)	201	134	67
68	395760	11.34	0.131	1.49	89.16	5.35	311	1.71	102.6	6.16	358	(7-60)	1.11	1.45	(1000)	202	135	67
69	401580	11.51	0.130	1.50	89.78	5.39	313	1.71	102.6	6.16	358	(7-60)	1.12	1.46	(1000)	204	136	68
70	407400	11.68	0.130	1.52	91.08	5.46	318	1.71	102.6	6.16	358	(7-60)	1.14	1.48	(1000)	207	138	69
71	413220	11.84	0.129	1.53	91.67	5.50	320	1.71	102.6	6.16	358	(7-60)	1.15	1.49	(1000)	208	139	69
72	419040	12.01	0.128	1.54	92.24	5.53	322	1.71	102.6	6.16	358	(7-60)	1.15	1.50	(1500)	209	139	70
73	424860	12.18	0.128	1.56	93.52	5.61	326	1.71	102.6	6.16	358	(7-60)	1.17	1.52	(1500)	212	141	71
74	430680	12.34	0.127	1.57	94.06	5.64	328	1.71	102.6	6.16	358	(7-60)	1.18	1.53	(1500)	213	142	71
75	436500	12.51	0.127	1.59	95.33	5.72	333	1.71	102.6	6.16	358	(7-60)	1.19	1.55	(1500)	216	144	72
76	442320	12.68	0.126	1.60	95.84	5.75	334	1.71	102.6	6.16	358	(7-60)	1.20	1.56	(1500)	217	145	72
77	448140	12.84	0.126	1.62	97.10	5.83	339	1.71	102.6	6.16	358	(7-60)	1.21	1.58	(1500)	220	147	73
78	453960	13.01	0.125	1.63	97.58	5.86	340	1.71	102.6	6.16	358	(7-60)	1.22	1.59	(1500)	221	148	74
79	459780	13.18	0.124	1.63	98.04	5.88	342	1.71	102.6	6.16	358	(7-60)	1.23	1.59	(1500)	222	148	74
80	465600	13.34	0.124	1.65	99.29	5.96	346	1.71	102.6	6.16	358	(7-60)	1.24	1.61	(1500)	225	150	75
81	471420	13.51	0.123	1.66	99.72	5.98	348	1.71	102.6	6.16	358	(7-60)	1.25	1.62	(1500)	226	151	75
82	477240	13.68	0.123	1.68	100.95	6.06	352	1.71	102.6	6.16	358	(7-60)	1.26	1.64	(1500)	229	153	76
83	483060	13.85	0.122	1.69	101.35	6.08	354	1.71	102.6	6.16	358	(7-60)	1.27	1.65	(1500)	230	153	77
84	488880	14.01	0.122	1.71	102.57	6.15	358	1.71	102.6	6.16	358	(7-60)	1.28	1.67	(1500)	233	155	78
85	494700	14.18	0.121	1.72	102.94	6.18	359	1.71	102.6	6.16	358	(7-60)	1.29	1.67	(1500)	233	156	78
86	500520	14.35	0.121	1.74	104.15	6.25	363	2.16	129.9	7.79	453	(7-70)	1.30	1.69	(1500)	236	157	79
87	506340	14.51	0.120	1.74	104.49	6.27	365	2.16	129.9	7.79	453	(7-70)	1.31	1.70	(1500)	237	158	79
88	512160	14.68	0.120	1.76	105.69	6.34	369	2.16	129.9	7.79	453	(7-70)	1.32	1.72	(1500)	240	160	80
89	517980	14.85	0.120	1.78	106.89	6.41	373	2.16	129.9	7.79	453	(7-70)	1.34	1.74	(1500)	242	162	81
90	523800	15.01	0.119	1.79	107.19	6.43	374	2.16	129.9	7.79	453	(7-70)	1.34	1.74	(1500)	243	162	81
91	529620	15.18	0.119	1.81	108.38	6.50	378	2.16	129.9	7.79	453	(7-70)	1.36	1.76	(1500)	246	164	82
92	535440	15.35	0.118	1.81	108.65	6.52	379	2.16	129.9	7.79	453	(7-70)	1.36	1.77	(1500)	246	164	82
93	541260	15.51	0.118	1.83	109.83	6.59	383	2.16	129.9	7.79	453	(7-70)	1.37	1.79	(1500)	249	166	83
94	547080	15.68	0.117	1.83	110.07	6.60	384	2.16	129.9	7.79	453	(7-70)	1.38	1.79	(1500)	250	166	83
95	552900	15.85	0.117	1.85	111.25	6.67	388	2.16	129.9	7.79	453	(7-70)	1.39	1.81	(2000)	252	168	84
96	558720	16.01	0.117	1.87	112.42	6.74	392	2.16	129.9	7.79	453	(7-70)	1.41	1.83	(2000)	255	170	85
97	564540	16.18	0.116	1.88	112.62	6.76	393	2.16	129.9	7.79	453	(7-70)	1.41	1.83	(2000)	255	170	85
98	570360	16.35	0.116	1.90	113.78	6.83	397	2.16	129.9	7.79	453	(7-70)	1.42	1.85	(2000)	258	172	86
99	576180	16.51	0.116	1.92	114.94	6.90	401	2.16	129.9	7.79	453	(7-70)	1.44	1.87	(2000)	261	174	87
100	582000	16.68	0.115	1.92	115.10	6.91	402	2.16	129.9	7.79	453	(7-70)	1.44	1.87	(2000)	261	174	87

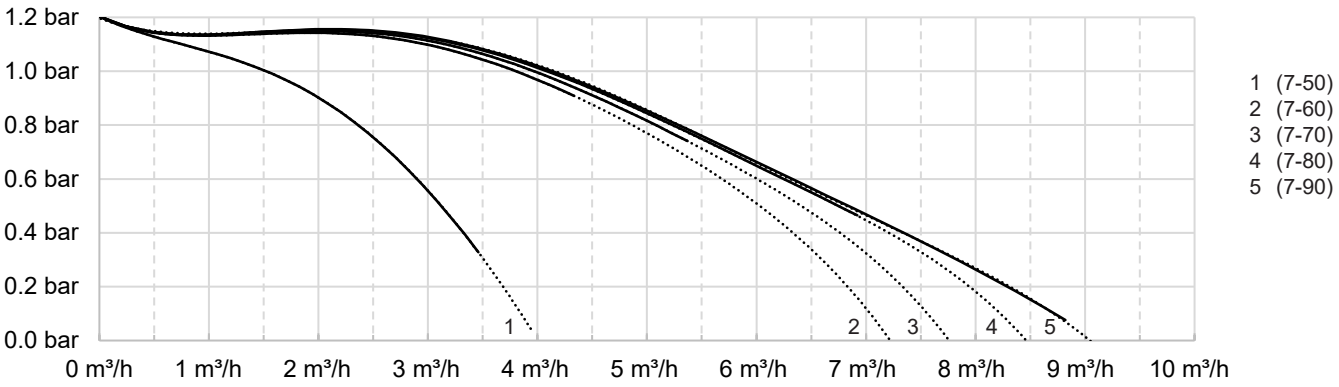
Residual overpressure / V domestic hot water circulation > draw-off standby



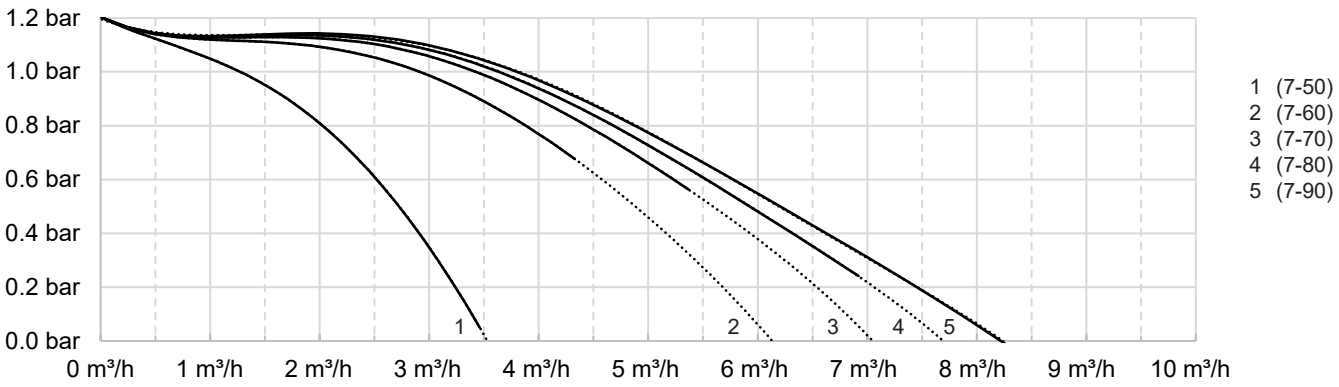
Residual overpressure / domestic hot water circulation > with draw-off Vs



Residual overpressure / V domestic hot water circulation > draw-off standby

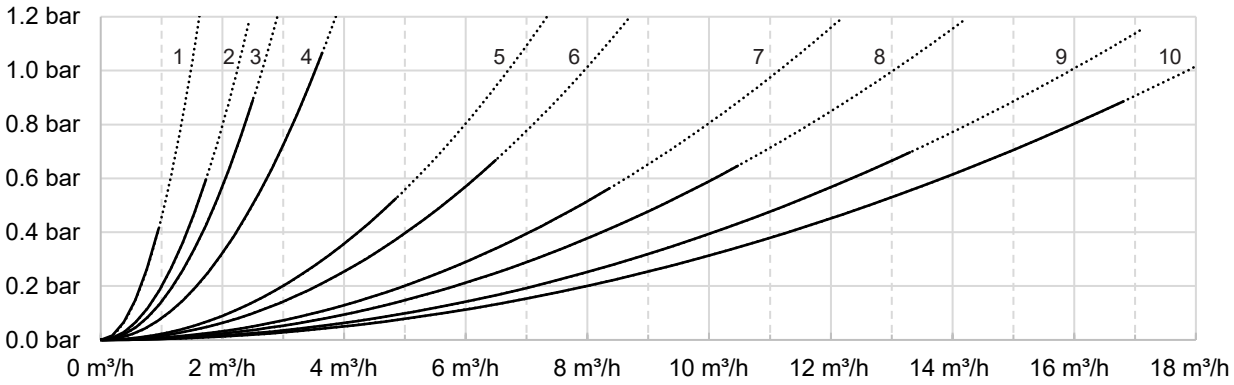


Residual overpressure / domestic hot water circulation > with draw-off Vs

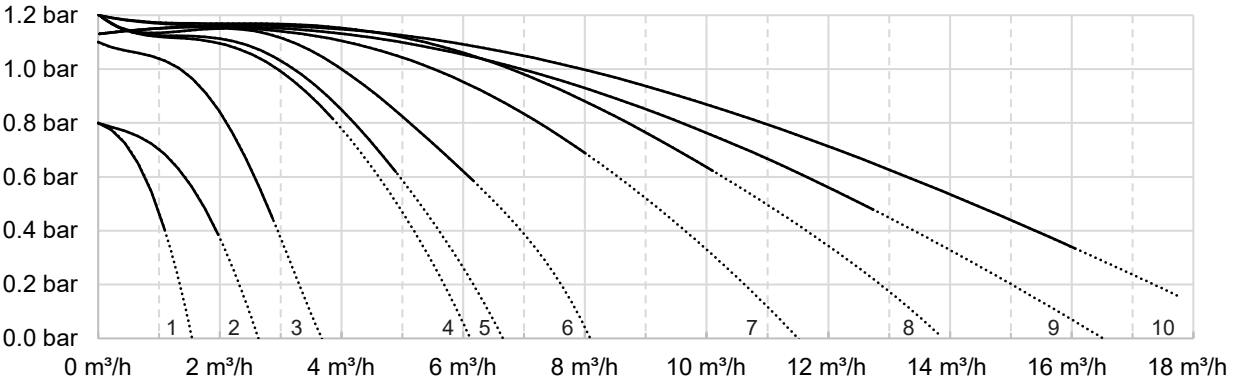


all values with open line balancing valve
dotted lines = values above nominal performance range

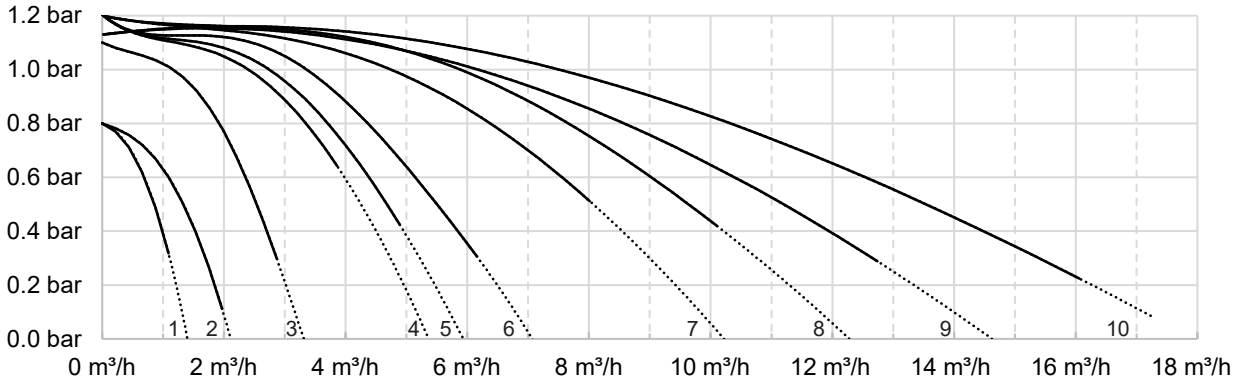
ΔP / V max / cold water > domestic hot water



Residual overpressure / charging circuit flow HT



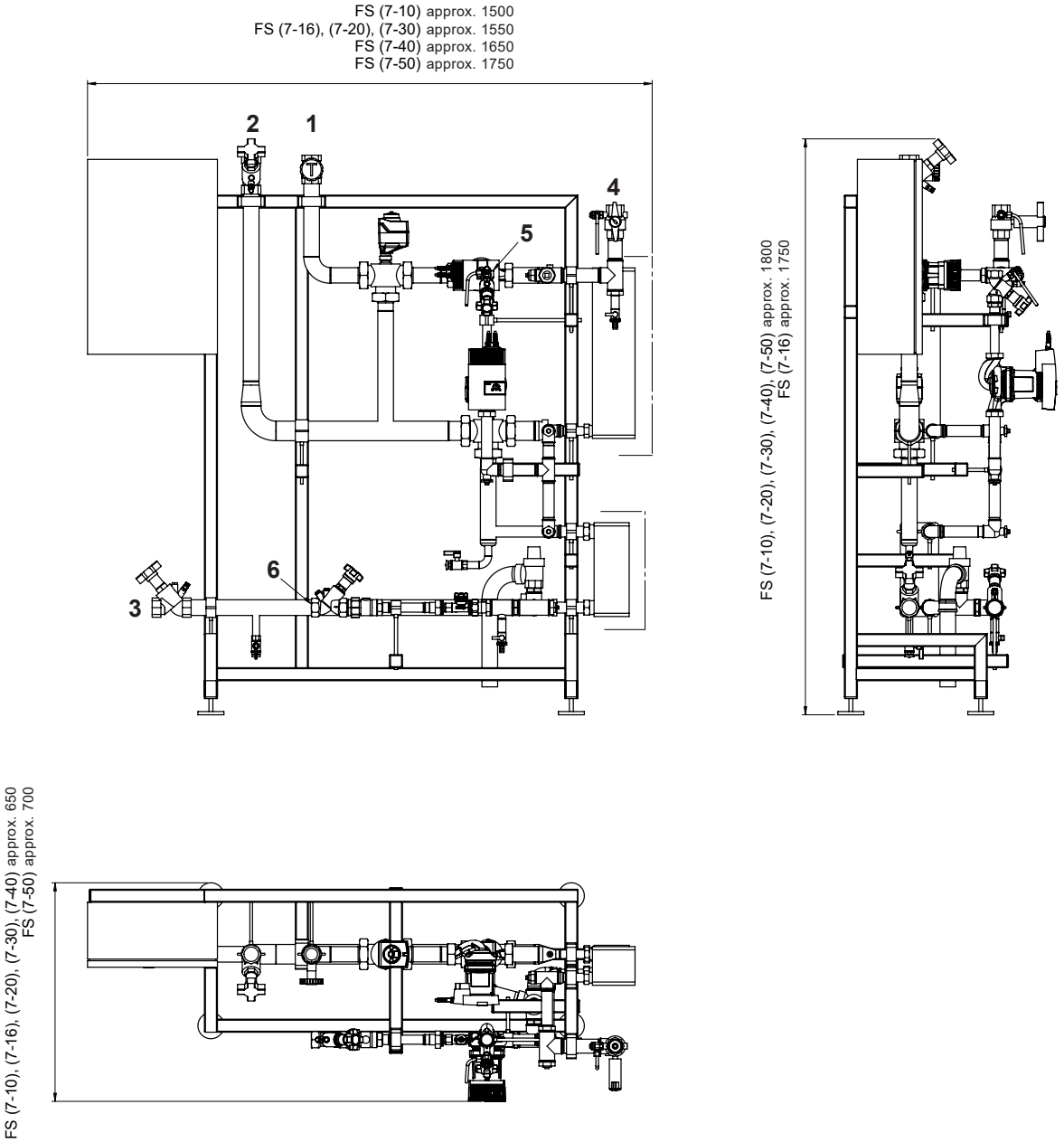
Residual overpressure / charging circuit flow LT



all values with open line balancing valve
dotted lines = values above nominal performance range

Fresh water module TransTherm® aqua FS (7-10 to 7-50)

(Dimensions in mm)

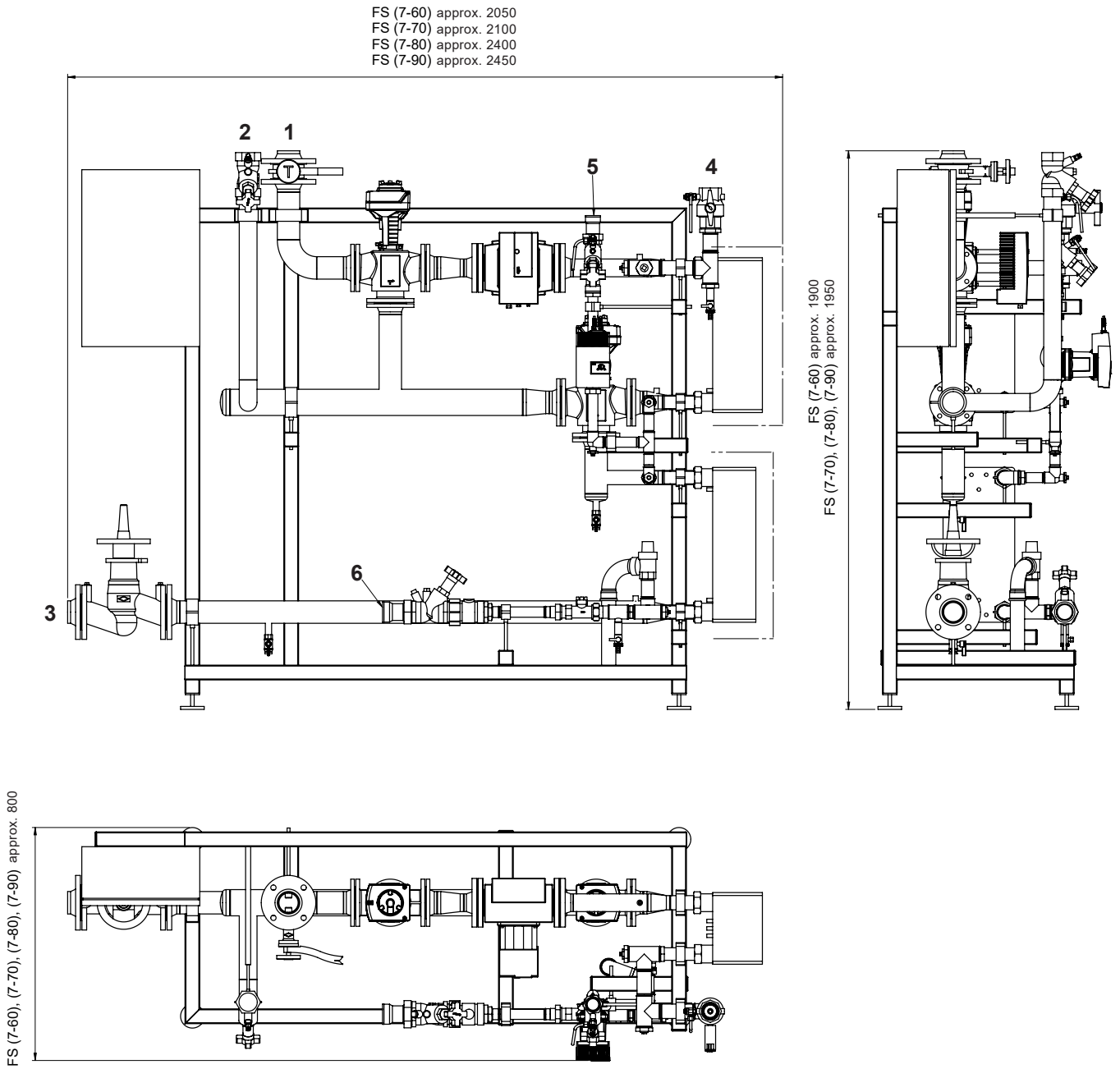


		(7-10)	(7-16)	(7-20) (7-30)	(7-40)	(7-50)
1	Charging circuit FL	DN 20, Rp ¾″	DN 25, Rp 1″	DN 32, Rp 1¼″	DN 32, Rp 1¼″	DN 40, Rp 1½″
2	Charging circuit HT RT	DN 20, Rp ¾″	DN 25, Rp 1″	DN 32, Rp 1¼″	DN 32, Rp 1¼″	DN 40, Rp 1½″
3	Charging circuit LT RT	DN 20, Rp ¾″	DN 25, Rp 1″	DN 32, Rp 1¼″	DN 32, Rp 1¼″	DN 40, Rp 1½″
4	Domestic hot water	DN 20, Rp ¾″	DN 20, Rp ¾″	DN 25, Rp 1″	DN 32, Rp 1¼″	DN 32, Rp 1¼″
5	Domestic hot water circulation	DN 20, Rp ¾″	DN 20, Rp ¾″	DN 20, Rp ¾″	DN 25, Rp 1″	DN 25, Rp 1″
6	Cold water	DN 20, Rp ¾″	DN 20, Rp ¾″	DN 25, Rp 1″	DN 32, Rp 1¼″	DN 32, Rp 1¼″

Rp = Internal thread

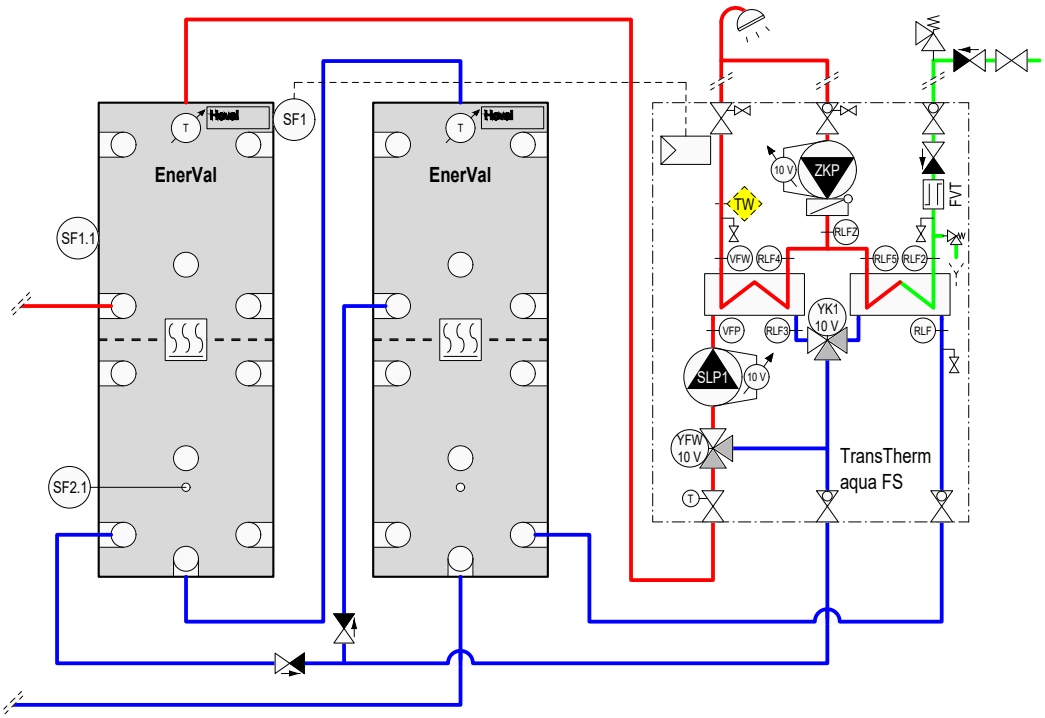
Fresh water module TransTherm® aqua FS (7-60 to 7-90)

(Dimensions in mm)



		(7-60) (7-70)		(7-80) (7-90)	
1	Charging circuit FL	DN 50, Rp 2″	(IT)	DN 65, Rp 2½″	(IT)
2	Charging circuit HT RT	DN 50, Rp 2″	(IT)	DN 65, Rp 2½″	(IT)
3	Charging circuit LT RT	DN 50, Rp 2″	(IT)	DN 65, Rp 2½″	(IT)
4	Domestic hot water	DN 40, Rp 1½″	(IT)	DN 50, Rp 2″	(IT)
5	Domestic hot water circulation	DN 32, Rp 1¼″	(IT)	DN 40, Rp 1½″	(IT)
6	Cold water	DN 40, Rp 1½″	(IT)	DN 50, Rp 2″	(IT)

Water heating
TransTherm® aqua FS



TTE-FW	Basic module district heating/fresh water
TW	Temperature monitor (if required)
VFW	Flow sensor DHW
RLF4	Return sensor DHW
RLF5	Return sensor DHW
RLF2	Return sensor domestic cold water
RLFZ	Return sensor domestic hot water circulation
SF1	Calorifier sensor
SF1.1	Calorifier sensor (heat generator)
SF2.1	Calorifier sensor (heat generator)
RLFZ	Circulation sensor
FVT	Flow rate sensor
VFP	Flow sensor primary
RLF3	Return sensor HT primary
RLF	Return sensor LT primary
SLP1	Calorifier charging pump
YFW	Three-way valve with drive (mixing valve)
YK1	Three-way valve with drive (distributor valve)
ZKP	Circulating pump

Option

BM	TopTronic® E control module

Notice
A safety valve (6 bar) must be installed in the cold water line.
The fresh water module is already protected with a safety valve (10 bar).

Fresh water module TransTherm® aqua FT/FTC

Fresh water module for hygienic water heating in the continuous flow principle for single- and two-family homes with:

- high-output, soldered stainless steel plate heat exchanger
  (heat exchanger solder - FT: copper, FTC: stainless steel)
- integrated heating water charging pump
- flow switch for heating water charging pump
- cut-off armatures
- thermostatic hot water temperature control
- stainless steel piping for quick assembly
- wall attachment
- ready-to-connect
- casing made of sheet steel painted in red or white
- base plate

The quick-acting hot water temperature sensor accelerates the closing function of the regulating valve and protects the heat exchanger against overheating and scaling.

Output	65 kW (27 l/min) 57 kW (23 l/min)

Circulation module

for TransTherm® aqua FT (65), FTC (57)

- Pre-assembled, for installation on-site, incl. cable and plug
- Recirculation pump with integrated timer and circulation temperature control, as well as with pre-mounted safety valve (option)

Minimum requirements on water quality for fresh water modules see engineering hot water

Fresh water module

TransTherm® aqua FT/FTC

Fresh water module for hygienic water heating with thermostatic control of the hot water temperature by means of quick-acting water temperature controller

Fresh water module TransTherm® aqua	Output kW	Part No.
FT (65)	65	6040 453
FTC (57)	57	6048 769

Accessories

Ball valve set DVGW
for TransTherm® aqua FT/FTC — 6040 456

Casing
for TransTherm® aqua FT/FTC
White colour — 6044 175

Casing
for TransTherm® aqua FT/FTC
Red colour — 6045 319

Circulation heat exchanger lance R 1″
is screwed into the buffer storage tank and integrated into the circulation line.
Material: Copper, tinned inside
Transmission power approx. 1 kW at 60 °C
Hot water temperature in the buffer storage tank without mixing through the storage tank temperature.
Circulation connections R ½″
Installation length 660 mm — 2038 434

Circulation module
for TransTherm® aqua FT/FTC
preassembled, for subsequent installation on the fresh water module comprising:
Circulation pump with timer switch
Integrated control of the temperature
Non-return flap, ball valve Rp ¾″
cable and plug,
safety valve 10 bar — 6040 455

Services

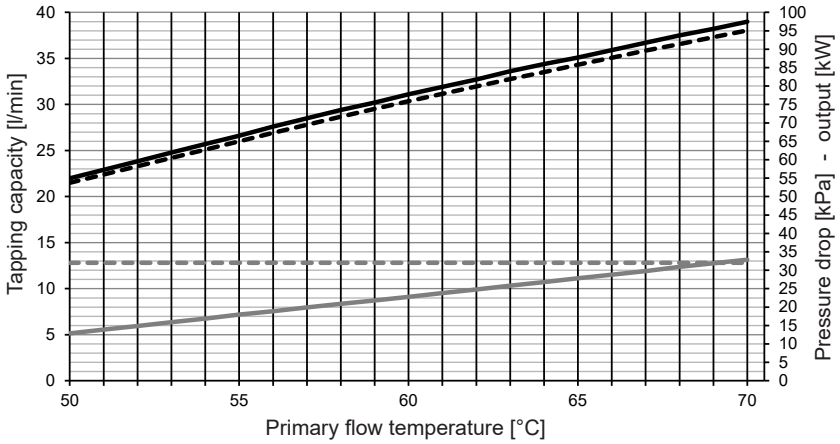
Commissioning
Commissioning by works service or Hoval trained authorised serviceman/company is condition for warranty.

For commissioning and other services please contact your Hoval sales office.

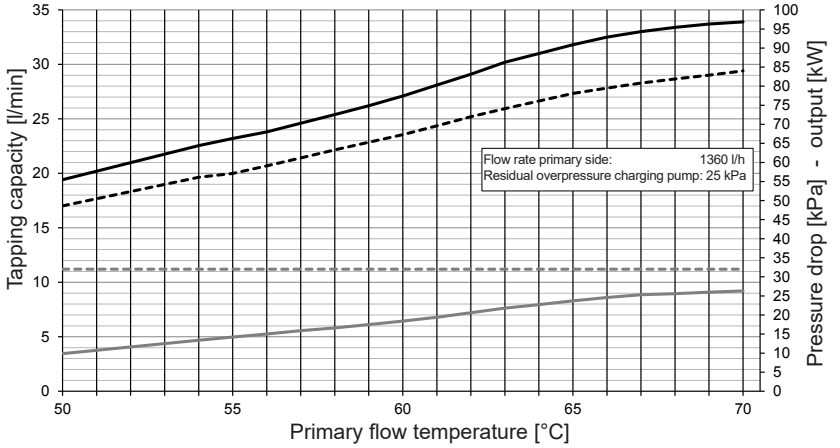
TransTherm® aqua FT/FTC

Type			FT (65)	FTC (57)
• Output		kW	65	57
• Connection dimension	Heating flow/return	Inches	G ¾″ (ext. thread)	
	Cold/hot water	Inches	G ¾″ (ext. thread)	
• Dimensions (W x H x D)	Without casing	mm	440 x 655 x 140	
	With casing	mm	450 x 715 x 150	
	With circulation	mm	440/450 x 940 x 140/150	
• Weight (incl. packaging)		kg	20	23
• Controller protection class			IP54	IP54
• Supply voltage		V	230	
• Plate heat exchanger stainless steel			copper-soldered	soldered stainless steel
Heat exchanger domestic water side				
• Operating pressure max.		bar	0.5	
• Test pressure		bar	10	
• Max. operating temperature		°C	70	
Design temperatures domestic water side				
• Cold water		°C	10	
• Hot water		°C	45	
• Continuous output		l/min	27	23
Heat exchanger heating side				
• Operating pressure max.		bar	10	
• Max. permissible operating temperature		°C	100	
Design temperatures heating side				
• Heating flow		°C	55	
• Heating return		°C	20	
• Flow resistance (at V = 1.5 m³/h)		kPa	34	

TransTherm® aqua FT (65)
Hot water temperature 45 °C: Tapping capacity - Output - Pressure drops



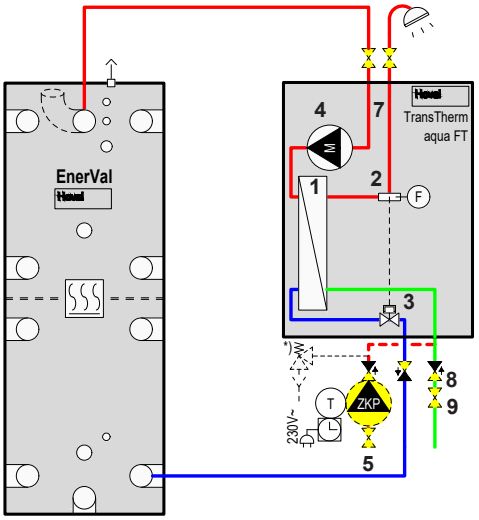
TransTherm® aqua FTC (57)
Hot water temperature 45 °C: Tapping capacity - Output - Pressure drops



Construction TransTherm® aqua FT/FTC

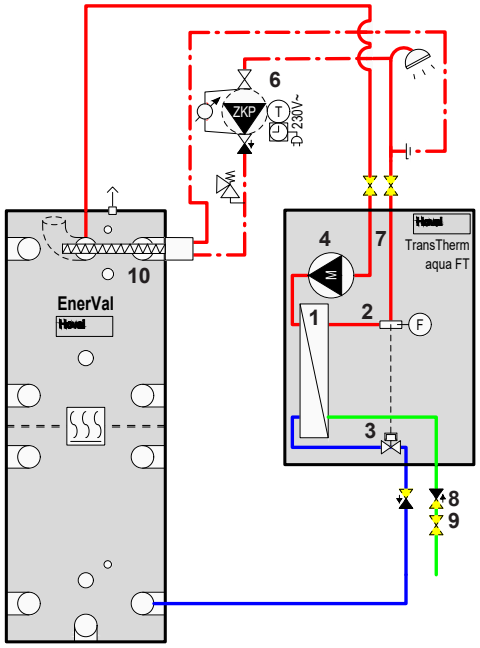
Buffer storage tank

Fresh water module with circulation module (accessories)



Buffer storage tank

Fresh water module with heat exchanger lance



1 Stainless steel plate heat exchanger
2 Hot water sensor, quick-acting
3 Thermostatic control
4 Heating water charging pump
5 Circulation incl. safety valve (optional)
6 Circulation (optional)
7 Flow switch
8 Non-return valve (optional)
9 Cut-off ball valve - flat-sealing (optional)
10 Heat exchanger lance

* Safety valve also necessary with recirculation pump on site

Installation of strainer on site

Functional description Hoval TransTherm® aqua FT/FTC

The Hoval fresh water module TransTherm® aqua FT/FTC, with all piping pre-installed and ready-to-connect, consists of a soldered stainless-steel plate heat exchanger (heat exchanger solder - FT: copper, FTC: stainless steel), an integrated heating water charging pump, a thermostatic controller with tapping detection and hot water temperature control and cut-off devices.

When a hot water tapping point is opened, the heating water charging pump is switched on via the flow detection device and the heating water transported from the buffer storage tank to the heat exchanger.

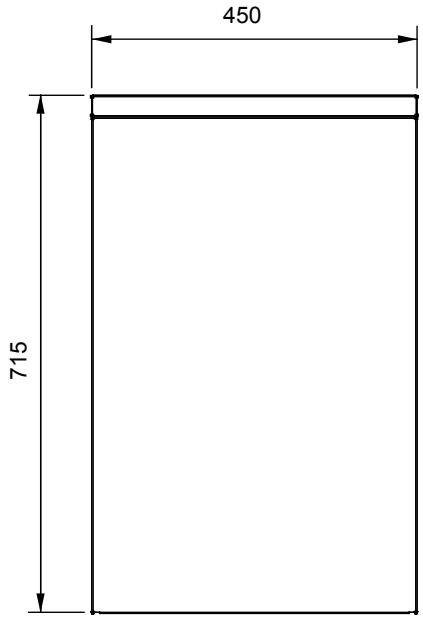
In the large-dimension plate heat exchanger, the hot water is heated in the counterflow principle, directly before removal and in a continuous flow process, from the cold water temperature to the desired DHW temperature.

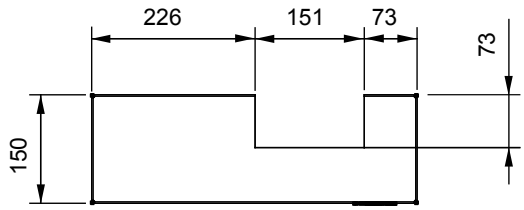
The quick-acting water temperature controller ensures maintenance of the desired hot water temperature, providing a constant tapping temperature and optimum maintenance of stratification in the buffer storage tank.

An optional recirculation pump with thermostat ensures that the circulating water maintains the desired temperature.

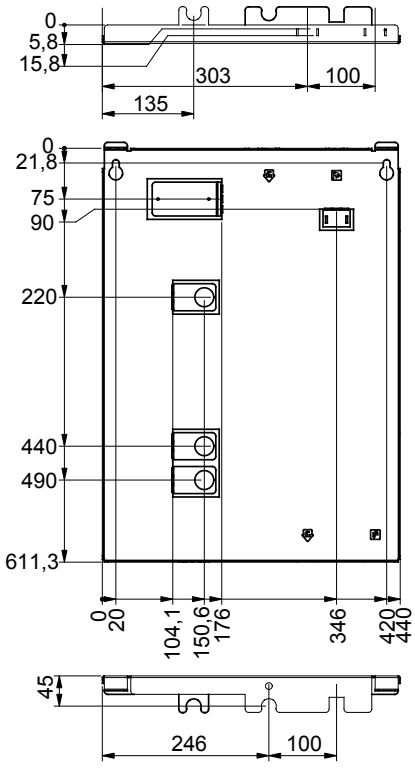
TransTherm® aqua FT/FTC
(Dimensions in mm)

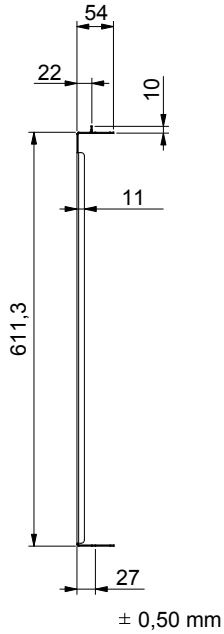
Casing

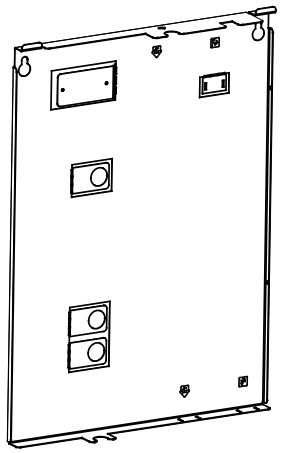




Base plate







Buffer storage tank EnerVal (100-300)

- Steel buffer storage tank for the hydraulic integration of energy generators
- Thermal insulation made of polyurethane hard foam, foamed on the storage
- Removable foil casing in red
- (100): 2 connection sleeves Rp 1 ½″, 2 connection nozzles R 1″
  (200): 5 connection sleeves Rp 1 ½″
  (300): 8 connection sleeves Rp 1 ½″
- 1 sleeve Rp ½″ with thermometer and immersion sleeve mounted
- 2 sensor channels

Delivery
- Buffer storage tank with foil casing completely mounted and packed

Buffer storage tank EnerVal (500)

- Steel buffer storage tank for the hydraulic integration of energy generators
- Thermal insulation made of polyurethane hard foam, foamed on the calorifier
- Removable foil casing in red
- 8 connection sleeves Rp 1 ½″
- 1 sleeve Rp 1 ½″ for screw-in electrical heating inset
- 1 sleeve Rp ½″ with thermometer and immersion sleeve mounted
- 2 sensor channels

Delivery
- Buffer storage tank with foil casing completely mounted and packed

Buffer storage tank EnerVal (800-2000)

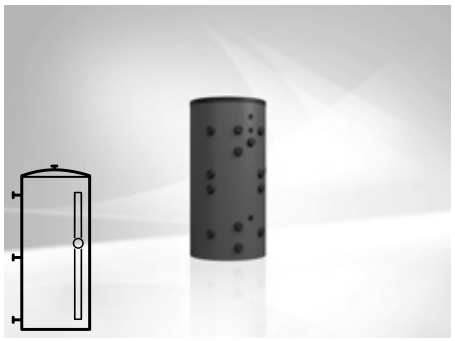
- Steel buffer storage tank for the hydraulic integration of energy generators
- Thermal insulation made of polyester fleece with foil jacket, colour red
- 10 connection sleeves G 2″ (IT)
- 2 sleeves G 1½″ (IT) for screw-in electric heating element
- 3 sleeves G ½″ (IT) for sensor/thermometer
- Terminal strips for contact sensors
- 1 sleeve G 1″ (IT) for circulation lance only with EnerVal (800,1000)
- 1 sleeve G 1″ (IT) for ventilation
- Perforated separating plate in the central area for separation of the temperature zones
- Flow diversions permanently installed
- 13 insulated cover caps made of EPP hard foam, 2-piece (can be broken out)

Delivery
- Buffer storage tank with foil casing completely mounted and packed
- Insulated cover caps already installed (can be removed and broken out)

Range

EnerVal type		Nominal content l	Operating pressure bar
(100)	A	117	3
(200)	B	222	3
(300)	B	283	3
(500)	B	473	3
(800)		781	3
(1000)		922	3
(1500)		1416	3
(2000)		2032	3

Buffer storage tank



EnerVal (100-2000)

Steel container raw on the inside,
EnerVal (100-500) pre-installed,
EnerVal (800-2000) thermal insulation pre-installed

EnerVal type		Nominal content l	Part No.
(100)	A	117	7016 826
(200)	B	222	7013 681
(300)	B	283	7015 975
(500)	B	473	7015 976
(800)		781	7019 129
(1000)		922	7019 130
(1500)		1416	7019 131
(2000)		2032	7019 132

Electric heating elements
see chapter “Electric heating elements”

Accessories

Protective tube immersion — 6061 045
sleeve set 200 ½″, 4 x
For installation of maximum 4 sensors
Nickel-plated brass
Installation length = 187 mm
Outer Ø: 18 mm, inner Ø: 16 mm
including 3 segment springs 90°,
1 Omega clamping spring

Protective tube immersion sleeve SB280 ½″ — 2018 837
Nickel-plated brass
Installation length = 280 mm
Outer Ø: 9 mm, inner Ø: 7 mm

Thermometer kit — 6052 107
for EnerVal (200-6000)
Thermometer 0-120 °C with
chromium plated edge and Hoval logo
Stem length: 80 mm, stem Ø: 9 (13) mm,
External Ø: 80 mm
incl. immersion sleeve ½″ nickel-plated
brass, installation length: 200 mm,
external Ø: 16 mm, internal Ø: 15 mm
and clamping spring

Inject lance — 6051 645
for EnerVal (200-500)
For horizontal installation in the
buffer storage tank.
For the decrease of the turbulence of
the attached water.
Screw-in depth: 450 mm
Connection: Rp 1½″

Part No.

Services

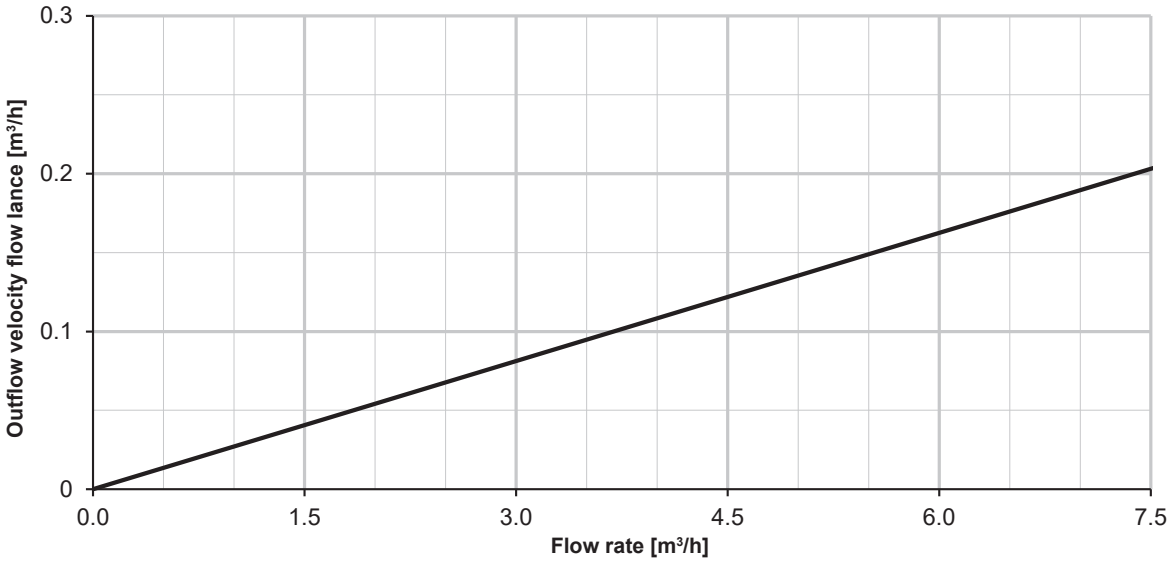
Commissioning
Commissioning by works service or Hoval trained authorised serviceman/company is condition for warranty.

For commissioning and other services please contact your Hoval sales office.

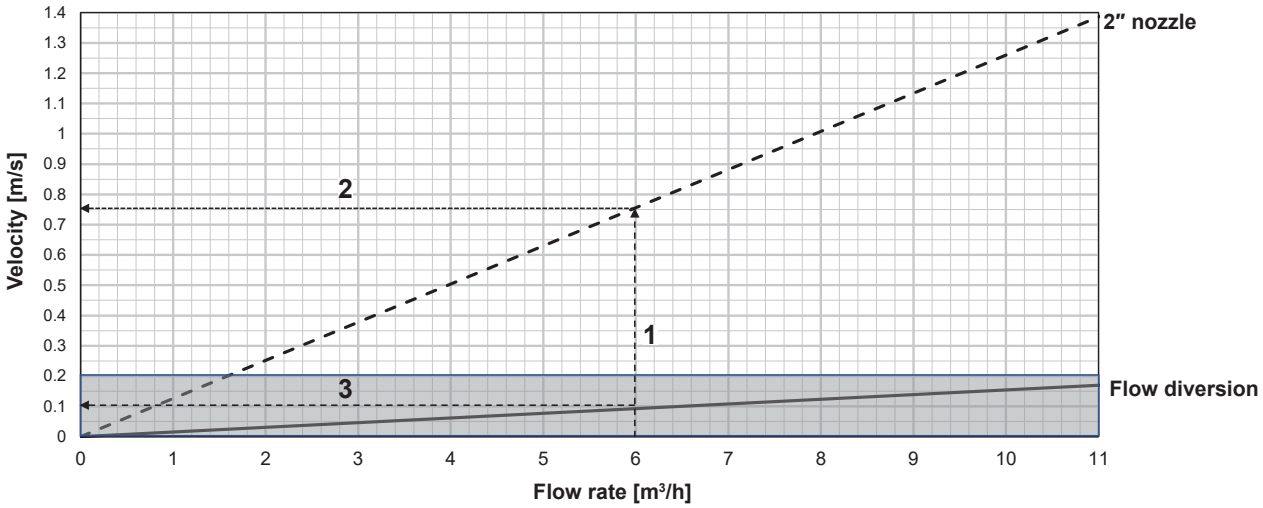
EnerVal (100-2000)

Type		(100)	(200)	(300)	(500)	(800)	(1000)	(1500)	(2000)
• Volume	litres	117	222	283	473	781	922	1416	2012
• Max. operating/test pressure	bar	3/4	3/4	3/4	3/4	3/4	3/4	3/4	3/4
• Min. operating temperature	°C	5	5	5	5	20	20	20	20
• Max. operating temperature	°C	95	95	95	95	95	95	95	95
• Thermal insulation PU rigid foam, foam-lined	mm	50	50	75	75	-	-	-	-
• Thermal insulation polyester fleece	mm	-	-	-	-	150	150	150	150
• Thermal insulation λ	W/mK	0.027	0.027	0.027	0.027	0.04	0.04	0.04	0.04
• Fire protection class		B2	B2	B2	B2	B2	B2	B2	B2
• Heat loss at 65 °C	W	51	53	54	72	119	130	158	185
• Transport weight	kg	41	59	79	111	165	180	284	515
• U value	W/m^2K	0.359	0.359	0.279	0.296	0.360	0.341	0.328	0.311
• Dimensions		see table of dimensions							

Outflow velocity flow lance DN 40

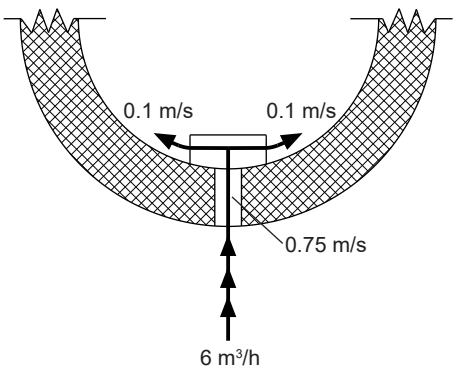


Velocity in the connection nozzles and inflow velocity with flow deflection in the EnerVal (800-2000)

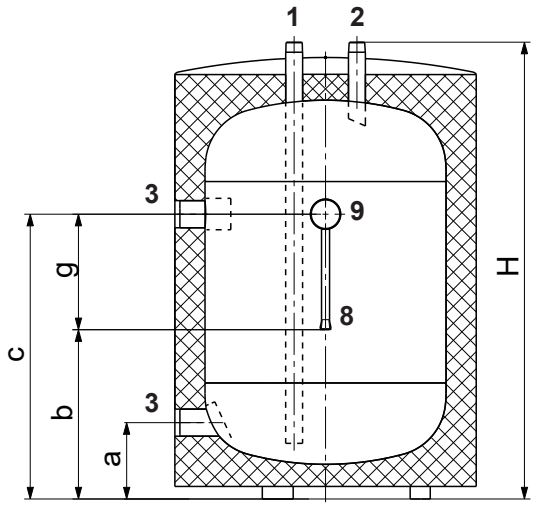


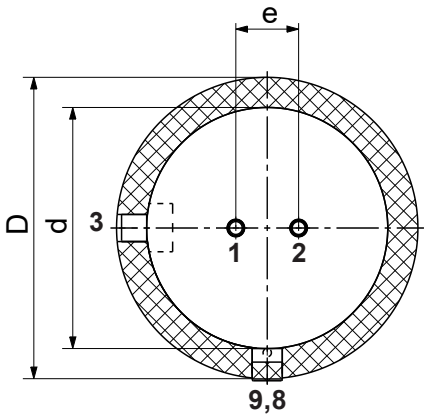
1 = flow rate
2 = velocity in the connection nozzles
3 = inflow velocity with flow deflection in the EnerVal

Example of inlet velocity distribution by flow diversions

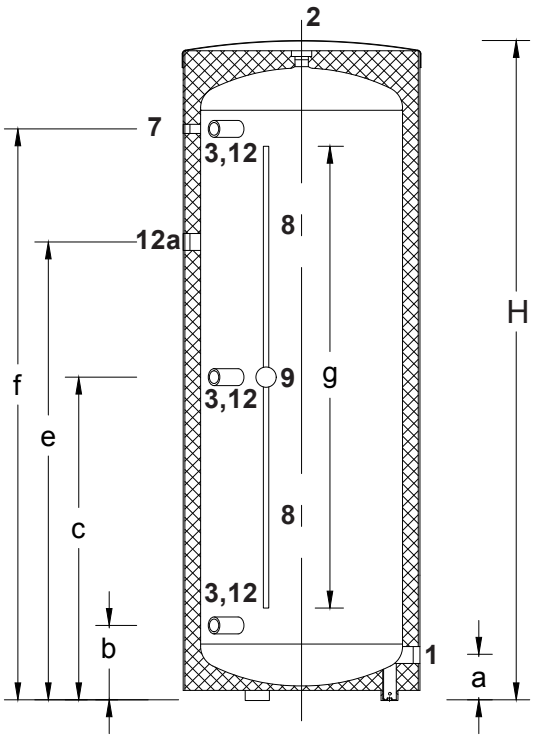


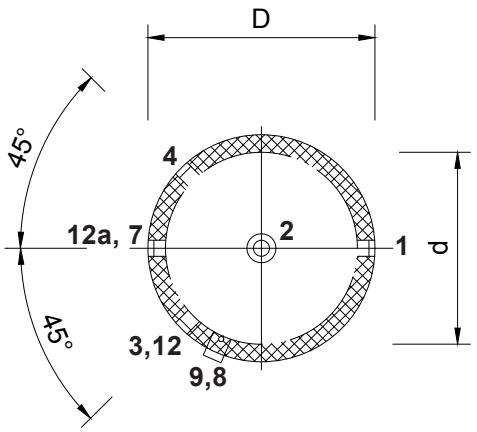
EnerVal (100)
(Dimensions in mm)





EnerVal (200-500)





			Type (100)	Type (200-500)
1	Heating connection	return discharge	R 1″ (ET)	G 1½″ (IT)
2	Heating connection	flow discharge	R 1″ (ET)	G 1½″ (IT)
3	Heat generator connection	flow/return	G 1½″ (IT)	G 1½″ (IT)
4	Heat generator connection	flow/return 3 x, only with EnerVal (300,500)		G 1½″ (IT)
7	Sleeve with mounted immersion sleeve and thermometer			
8	Sensor channel inner Ø 11 mm			
9	Removable cap (60 mm) for positioning the sensor in the sensor channel			
12	Connection for screw-in electric heating element (Positioning depends on the system, see hydraulic schematics of the heat generator)			G 1½″ (IT)
12a	Additional connection for screw-in electric heating element, only for EnerVal (500)			G 1½″ (IT)

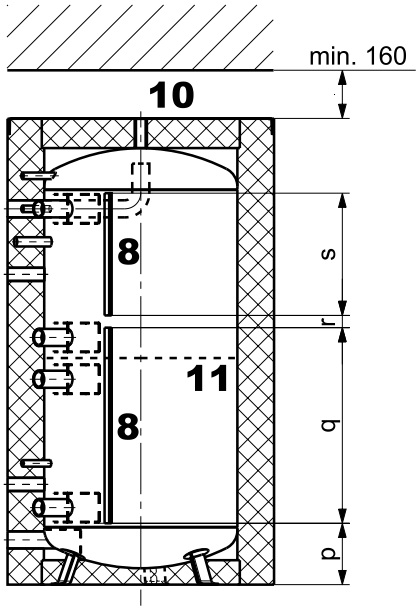
1 + 2 For EnerVal (100), suitable for direct installation of an armature group LG/HA 25-2 and 32-2

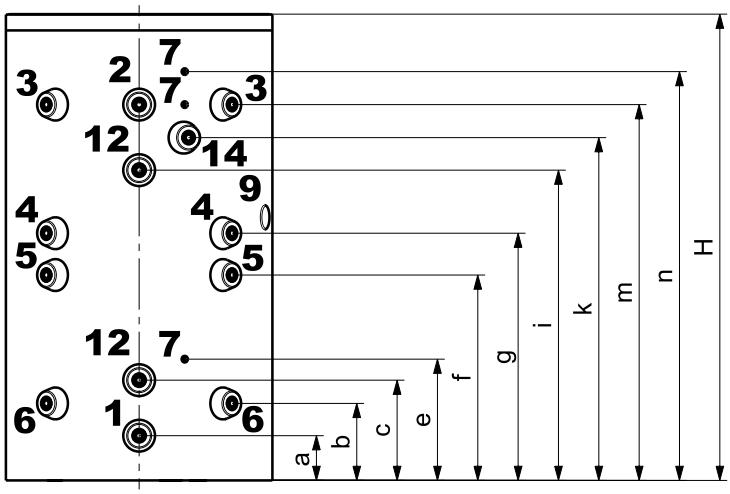
EnerVal type	D	d	H	a	b	c	e	f	g	Tilting dimension
(100)	600	480	910	152	337	567	125	-	230	985
(200)	600	480	1440	152	300	720	-	1140	860	1560
(300)	650	480	1780	152	300	890	-	1479	1285	1895
(500)	750	597	1921	127	220	946	1400	1670	1360	2025

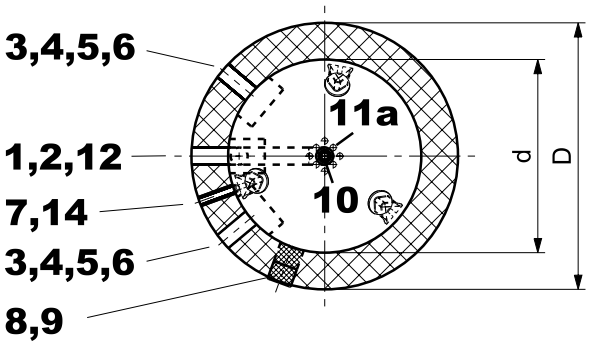
Variation because of the production tolerance possible
Dimension +/- 10 mm

EnerVal (800-2000)

(Dimensions in mm)







Variation because of the production tolerance possible
Dimension +/- 10 mm

1	Heating connection	return discharge (inflow restrictor)	G 2″ (IT)
2	Heating connection	flow discharge (single-layer elbow pipe)	G 2″ (IT)
3	Heat generator connection	flow top (inflow restrictor)	G 2″ (IT)
4	Heat generator connection	return top (inflow restrictor)	G 2″ (IT)
5	Heat generator connection	flow bottom (inflow restrictor)	G 2″ (IT)
6	Heat generator connection	return bottom (inflow restrictor)	G 2″ (IT)
7	Sleeve for immersion sleeve, thermostat or thermometer		G ½″ (IT)
8	Sensor terminal strip		2 x
9	Removable cap (100 mm) for positioning the sensor		
10	Possible air vent		G 1″ (IT)
11	Separating plate		
11a	Holes in the separating plate		12 x
12	Connection for electric heating element		G 1½″ (IT)
14	Connection for circulation lance, **attention:** only for type (800,1000)		G 1″ (IT)

EnerVal type	D	d	H	a	b	c	e	f	g	i	k	m	n	p	q	r	s	Tilting dimension
(800)	1090	790	1907	183	315	410	496	840	1011	1269	1402	1537	1672	251	800	50	500	1945
(1000)	1090	790	2197	183	369	468	569	970	1171	1472	1596	1759	1942	370	800	100	500	2230
(1500)	1300	1000	2135	220	368	451	549	941	1137	1431	-	1699	1839	339	800	100	500	2179
(2000)	1500	1200	2145	220	382	430	529	928	1127	1425	-	1672	1839	350	800	80	500	2210

Energy buffer storage tank EnerVal G (800,1000)

- Steel buffer storage tank for the hydraulic integration of energy generators
- Thermal insulation made of polyester fibre with foil jacket, colour red
- 8 connection flanges DN 65 (PN 16)
- 2 connection flanges DN 80 (PN 16)
- 2 flanges DN 110 for flange-mounted electric heating element
- 3 sleeves G ½″ (IT) for sensor/thermometer
- Terminal strips for contact sensors
- 1 sleeve G 1″ (IT) for circulation lance
- 1 sleeve G 1″ (IT) for ventilation
- Perforated separating plate in the central area for separation of the temperature zones
- Flow diversions permanently installed
- 12 insulated flange hoods
- 1 insulated cover cap made of EPP hard foam, 2-piece (can be broken out)

Delivery
- Buffer storage tank mounted and packed with foil jacket (can be removed for installation)
- Insulated flange hoods and cover cap already mounted (removable)

Range

EnerVal G type	Nominal content l	Operating pressure bar
(800)	788	6
(1000)	928	6
(1500)	1384	6
(2500)	2360	6
(4000)	4021	6
(6000)	5897	6

Energy buffer storage tank EnerVal G (1500,2500)

- Steel buffer storage tank for the hydraulic integration of energy generators
- Thermal insulation made of polyester fibre with foil jacket, colour red
- 8 connection flanges DN 80 (PN 16)
- 2 connection flanges DN 100 (PN 16)
- 2 flanges DN 180 for flange-mounted electric heating element
- 3 sleeves G ½″ (IT) for sensor/thermometer
- Terminal strips for contact sensors
- 1 sleeve G 1″ (IT) for ventilation
- Perforated separating plate in the central area for separation of the temperature zones
- Flow diversions permanently installed
- 12 insulated flange hoods

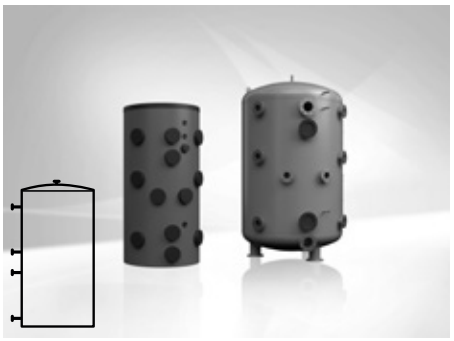
Delivery
- Buffer storage tank (1500) mounted and packed with foil jacket (can be removed for installation)
- Buffer storage tank (2500) thermal insulation separate
- Insulated flange hoods already mounted (removable)

Energy buffer storage tank EnerVal G (4000,6000)

- Steel buffer storage tank for the hydraulic integration of energy generators
- Without thermal insulation (on-site)
- 8 connection flanges DN 100 (PN 16)
- 2 connection flanges DN 125 (PN 16)
- 2 flanges DN 180 for flange-mounted electric heating element
- 3 sleeves G ½″ (IT) for sensor/thermometer
- Terminal strips for contact sensors
- 1 sleeve G 1″ (IT) for ventilation
- Perforated separating plate in the central area for separation of the temperature zones
- Flow diversions permanently installed

Delivery
- Buffer storage tank raw packed
- Thermal insulation to be provided on site

Buffer storage tank



EnerVal G (800-6000)

Steel tank raw on the inside
EnerVal G (800-1500) fully insulated;
EnerVal G (2500), separate thermal insulation;
EnerVal G (4000,6000) packaged raw,
thermal insulation to be provided on site

EnerVal G type	Nominal content l	Part No.
(800)	788	7019 133
(1000)	928	7019 134
(1500)	1384	7019 135
(2500)	2360	7019 136
(4000)	4021	6059 869
(6000)	5897	6059 870

Accessories

Protective tube immersion — 6061 045
sleeve set 200 ½", 4 x
For installation of maximum 4 sensors
Nickel-plated brass
Installation length = 187 mm
Outer Ø: 18 mm, inner Ø: 16 mm
including 3 segment springs 90°,
1 Omega clamping spring

Protective tube immersion sleeve SB280 ½" — 2018 837
Nickel-plated brass
Installation length = 280 mm
Outer Ø: 9 mm, inner Ø: 7 mm

Thermometer kit — 6052 107
for EnerVal (200-6000)
Thermometer 0-120 °C with
chromium plated edge and Hoval logo
Stem length: 80 mm, stem Ø: 9 (13) mm,
External Ø: 80 mm
incl. immersion sleeve ½" nickel-plated
brass, installation length: 200 mm,
external Ø: 16 mm, internal Ø: 15 mm
and clamping spring

Services

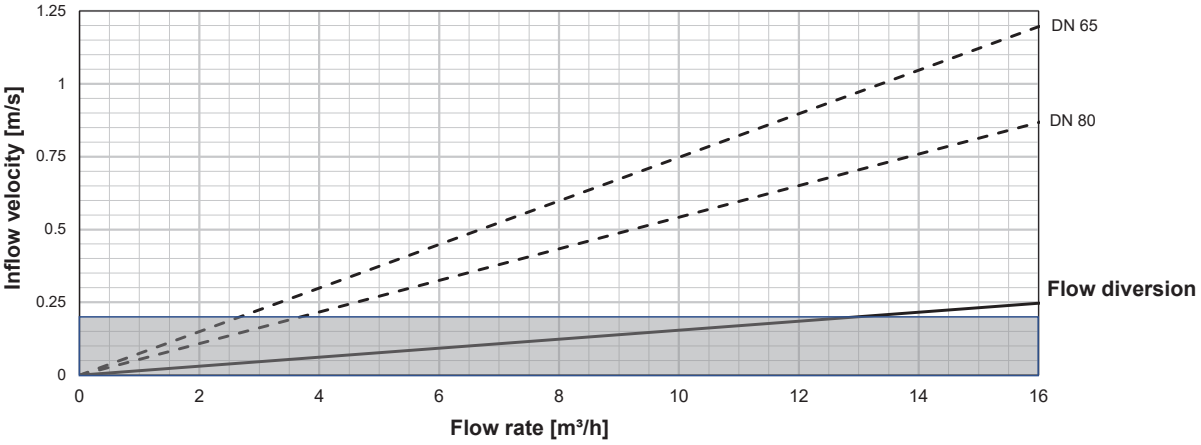
Commissioning
Commissioning by works service or Hoval trained authorised serviceman/company is condition for warranty.

For commissioning and other services please contact your Hoval sales office.

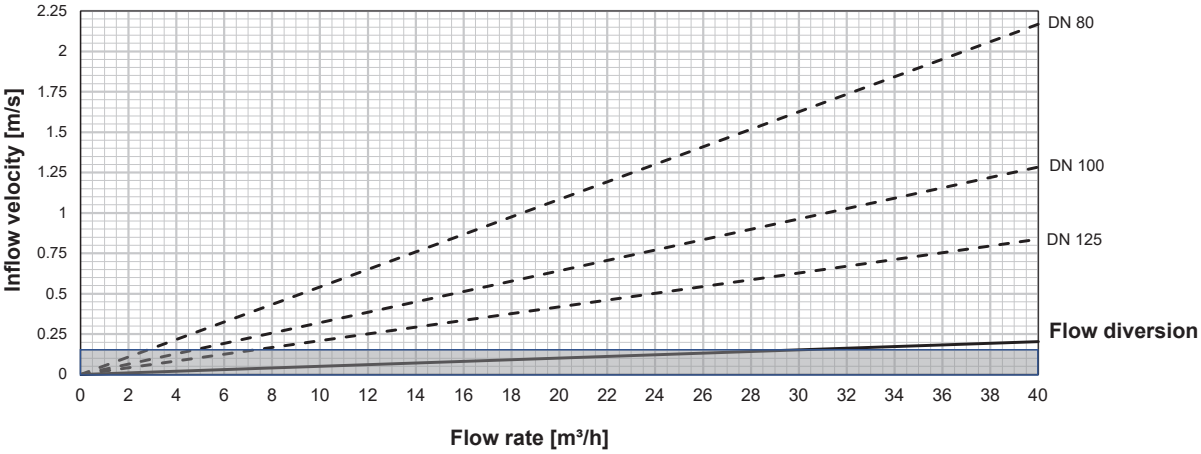
EnerVal G (800-6000)

Type		(800)	(1000)	(1500)	(2500)	(4000)	(6000)
• Volume	l	788	928	1384	2360	3907	5815
• Max. operating/test pressure	bar	6/8	6/8	6/8	6/8	6/8	6/8
• Min. operating temperature	°C	20	20	20	20	20	20
• Max. operating temperature	°C	95	95	95	95	95	95
• Thermal insulation made from polyester fleece	mm	150	150	150	150	-	-
• Thermal insulation λ	W/mK	0.040	0.040	0.040	0.040	-	-
• Fire protection class		B2	B2	B2	B2	-	-
• Heat loss at 65 °C	W	114	129	153	203	-	-
• Transport weight	kg	187	201	371	788	1233	1854
• U value	W/m^2K	0.357	0.341	0.328	0.295	-	-
• Dimensions				see dimensional drawing			

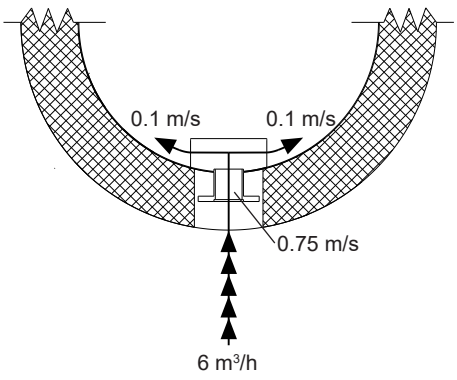
Velocity in the connection nozzles and inflow velocity with flow deflection in the EnerVal G (800,1000)



EnerVal G (1500-6000)

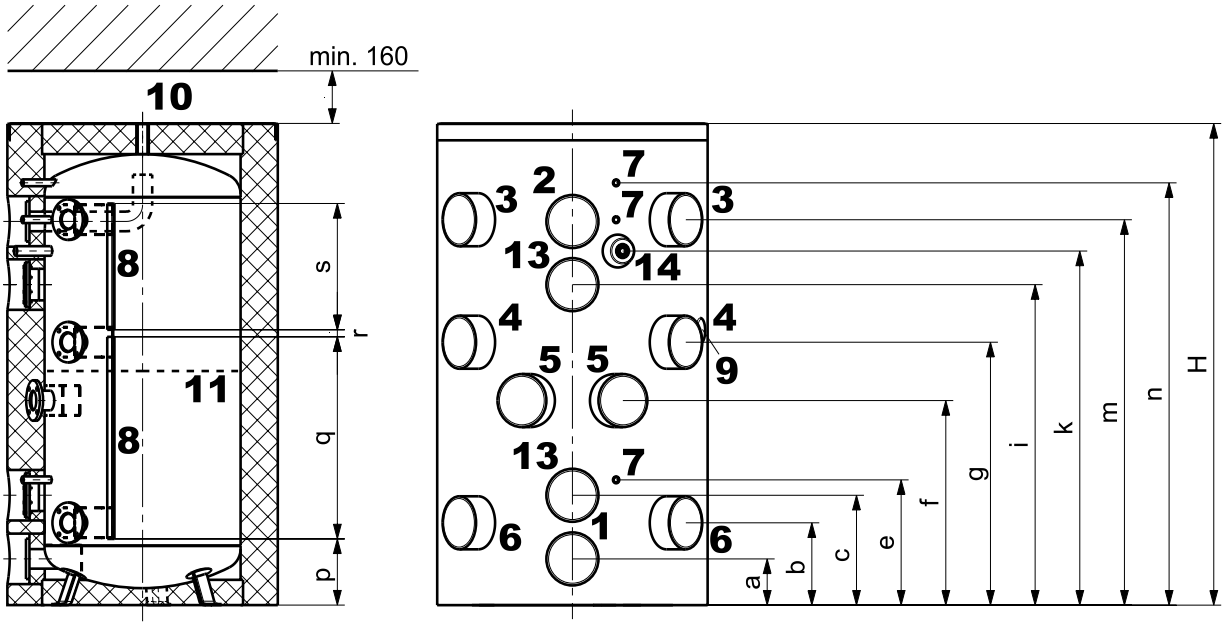


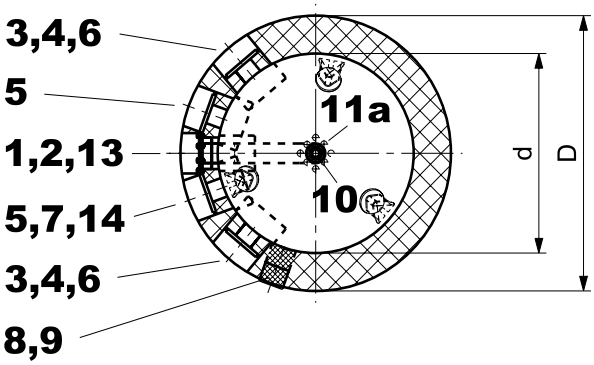
Example of inlet velocity distribution by flow diversions



EnerVal G (800-2500)

(Dimensions in mm)





Variation because of the production tolerance possible
Dimension +/- 10 mm

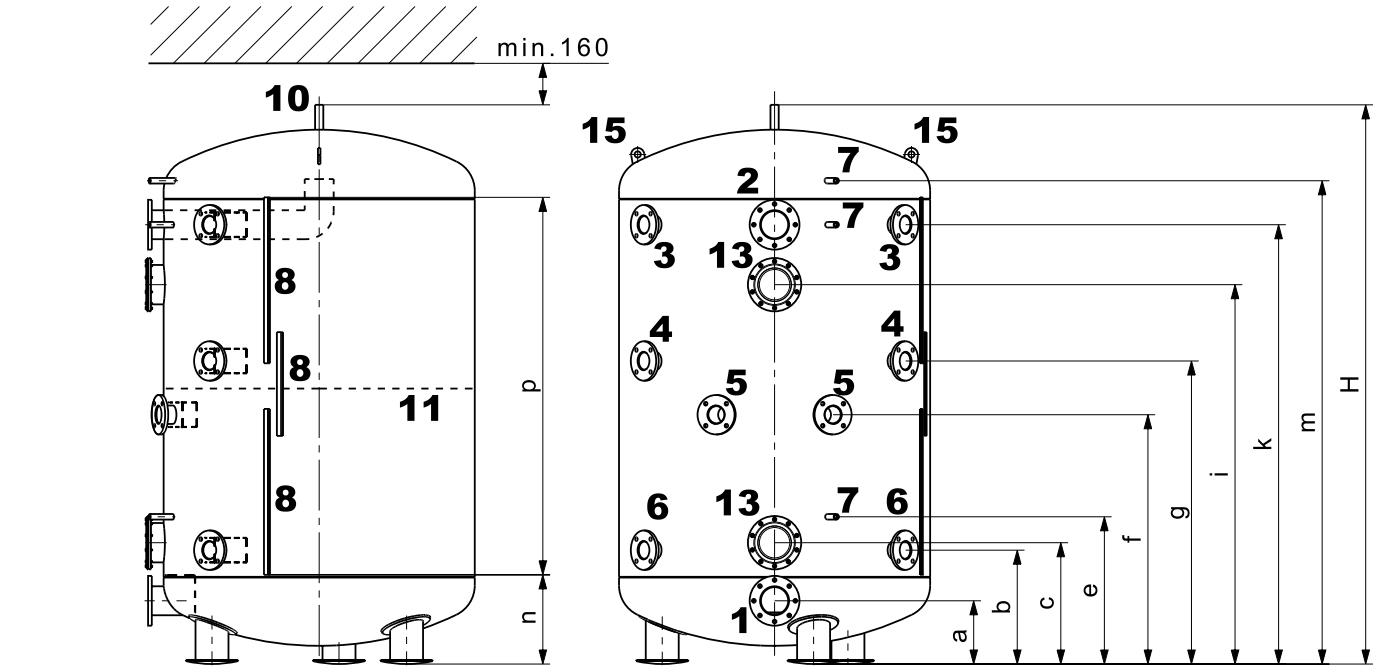
			Type (800,1000)	Type (1500,2500)
1	Heating connection	return discharge (inflow restrictor)	DN 80, 4 x M16*	DN 100, 4 x M16*
2	Heating connection	flow discharge (single-layer elbow pipe)	DN 80, 4 x M16*	DN 100, 4 x M16*
3	Heat generator connection	flow top (inflow restrictor)	DN 65, 4 x M12*	DN 80, 4 x M16*
4	Heat generator connection	return top (inflow restrictor)	DN 65, 4 x M12*	DN 80, 4 x M16*
5	Heat generator connection	flow bottom (inflow restrictor)	DN 65, 4 x M12*	DN 80, 4 x M16*
6	Heat generator connection	return bottom (inflow restrictor)	DN 65, 4 x M12*	DN 80, 4 x M16*
7	Sleeve for immersion sleeve, thermostat or thermometer		G ½″ (IT)	G ½″ (IT)
8	2 sensor terminal strips			
9	Removable cap (100 mm) for positioning the sensor			
10	Possible air vent		G 1″ (IT)	G 1″ (IT)
11	Separating plate			
11a	Holes in the separating plate		12 x	12 x
13	Hand-hole flange (flange-mounted electric heating element) (800,1000) Ø 180/120 mm, pitch circle Ø 150 mm, 8 x M10 (1500,2500) Ø 257/180 mm, pitch circle Ø 225 mm, 10 x M10			
14	Connection for circulation lance, **attention:** only for type (800,1000)		G 1″ (IT)	-

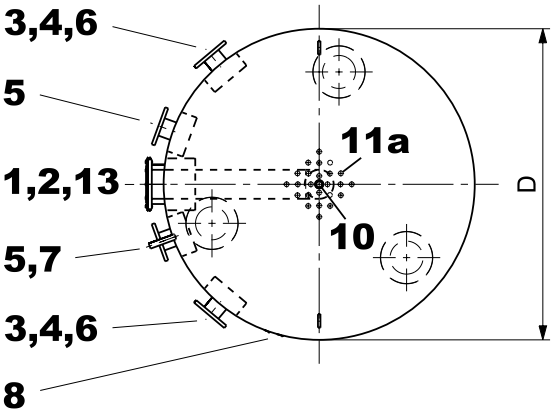
* The screw holes have threads

EnerVal G type	D	d	H	a	b	c	e	f	g	i	k	m	n	p	q	r	s	Tilting measure
(800)	1090	790	1907	183	326	435	496	810	1041	1269	1402	1526	1672	262	800	28	500	1945
(1000)	1090	790	2197	183	369	468	569	955	1186	1472	1596	1759	1942	370	800	100	500	2230
(1500)	1300	1000	2089	180	358	489	529	894	1144	1360	-	1679	1819	319	800	100	500	2154
(2500)	1500	1200	2500	250	435	560	645	1100	1352	1670	-	2003	2211	400	800	100	800	2567

EnerVal G (4000,6000)

(Dimensions in mm)





Variation because of the production tolerance possible
Dimension +/- 10 mm

1	Heating connection	return discharge (inflow restrictor)	DN 125, 8 x M16*
2	Heating connection	flow discharge (single-layer elbow pipe)	DN 125, 8 x M16*
3	Heat generator connection	flow top (inflow restrictor)	DN 100, 4 x M16*
4	Heat generator connection	return top (inflow restrictor)	DN 100, 4 x M16*
5	Heat generator connection	flow bottom (inflow restrictor)	DN 100, 4 x M16*
6	Heat generator connection	return bottom (inflow restrictor)	DN 100, 4 x M16*
7	Sleeve for immersion sleeve, thermostat or thermometer		G ½″ (IT)
8	3 sensor terminal strips		
10	Possible air vent		G 1″ (IT)
11	Separating plate		
11a	Holes in the separating plate		24 x
13	Hand-hole flange (flange-mounted electric heating element) Ø 257/180 mm, pitch circle Ø 225 mm, 10 x M10		
15	Transport strap		

* The screw holes have threads

EnerVal G type	D	H	a	b	c	e	f	g	i	k	m	n	p	Tilting measure
(4000)	1500	2696	305	549	585	710	1202	1461	1829	2118	2330	430	1820	2773
(6000)	1500	3802	302	625	805	985	1704	2064	2603	3142	3442	550	2700	3858

Buffer storage tank - cold storage tank EnerVal G cool (800,1000)

- Steel buffer storage tank for the hydraulic integration of energy generators, coating with water-based paint
- Cold insulation made of synthetic rubber (19 mm), glued on diffusion-proof, with plastic outer jacket (red)
- 8 connection flanges DN 65 (PN 16)
- 2 connection flanges DN 80 (PN 16)
- 1 sleeve G 1½″ (IT) for electric heating element
- 5 sleeves G ½″ (IT) for sensor/thermometer
- 1 sleeve G 1″ (IT) for circulation lance
- 1 sleeve G 1″ (IT) for ventilation
- Perforated separating plate in the central area for separation of the temperature zones
- Flow diversions permanently installed

Delivery
- Cold storage tank mounted with cold insulation (glued on diffusion-proof)

Buffer storage tank - cold storage tank EnerVal G cool (1500,2500)

- Steel buffer storage tank for the hydraulic integration of energy generators, coating with water-based paint
- Cold insulation made of synthetic rubber (19 mm), glued on diffusion-proof, with plastic outer jacket (red)
- 8 connection flanges DN 80 (PN 16)
- 2 connection flanges DN 100 (PN 16)
- 1 sleeve G 1½″ (IT) for electric heating element
- 5 sleeves G ½″ (IT) for sensor/thermometer
- 1 sleeve G 1″ (IT) for ventilation
- Perforated separating plate in the central area for separation of the temperature zones
- Flow diversions permanently installed

Delivery
- Cold storage tank mounted with cold insulation (glued on diffusion-proof)

Buffer storage tank - cold storage tank EnerVal G cool (4000,6000)

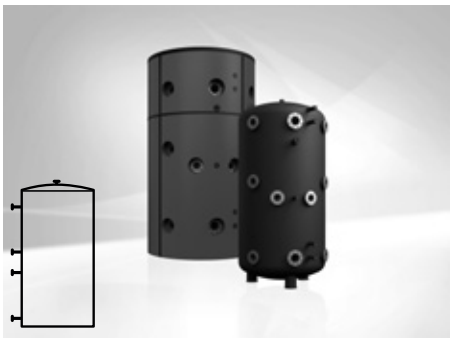
- Steel buffer storage tank for the hydraulic integration of energy generators, coating with water-based paint
- Cold insulation made of synthetic rubber (19 mm), glued on diffusion-proof, with plastic outer jacket (red)
- 8 connection flanges DN 100 (PN 16)
- 2 connection flanges DN 125 (PN 16)
- 1 sleeve G 1½″ (IT) for electric heating element
- 5 sleeves G ½″ (IT) for sensor/thermometer
- 1 sleeve G 1″ (IT) for ventilation
- Perforated separating plate in the central area for separation of the temperature zones
- Flow diversions permanently installed

Delivery
- Cold storage tank mounted with cold insulation (glued on diffusion-proof)

Range

EnerVal G cool type	Nominal content l	Operating pressure bar
(800)	793	6
(1000)	889	6
(1500)	1440	6
(2500)	2518	6
(4000)	4035	6
(6000)	5849	6

Buffer storage tank - cold storage tank



EnerVal G cool (800-6000)

Steel tank raw on the inside
Cold storage tank mounted with cold insulation

EnerVal G cool type	Nominal content l	Part No.
(800)	793	6059 871
(1000)	889	6059 872
(1500)	1440	6059 933
(2500)	2518	6059 934
(4000)	4035	6059 935
(6000)	5849	6059 936

Accessories

Protective tube immersion 6061 045
sleeve set 200 ½", 4 x
For installation of maximum 4 sensors
Nickel-plated brass
Installation length = 187 mm
Outer Ø: 18 mm, inner Ø: 16 mm
including 3 segment springs 90°,
1 Omega clamping spring

Protective tube immersion sleeve SB280 ½" 2018 837
Nickel-plated brass
Installation length = 280 mm
Outer Ø: 9 mm, inner Ø: 7 mm

Thermal insulation for EnerVal G cool
made of polyester fibre fleece
Outer plastic jacket colour red with patented aluminium sealing bracket

Type	Polyester fibre fleece	
(800)	120 mm	6061 134
(1000)	120 mm	6061 135
(1500)	140 mm	6061 136
(2500)	140 mm	6061 137
(4000)	140 mm	6061 138
(6000)	140 mm	6061 139

Services

Commissioning
Commissioning by works service or Hoval trained authorised serviceman/company is condition for warranty.

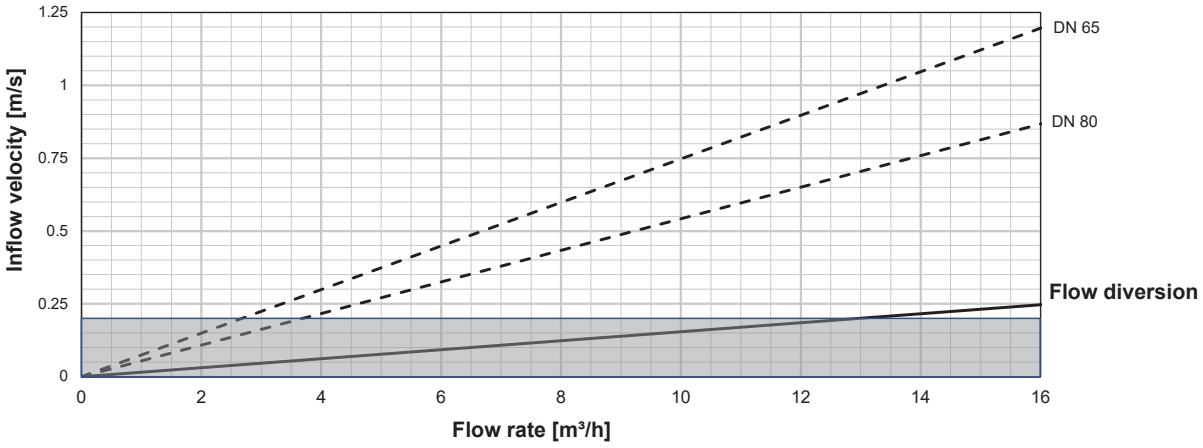
For commissioning and other services please contact your Hoval sales office.

EnerVal G cool (800-6000)

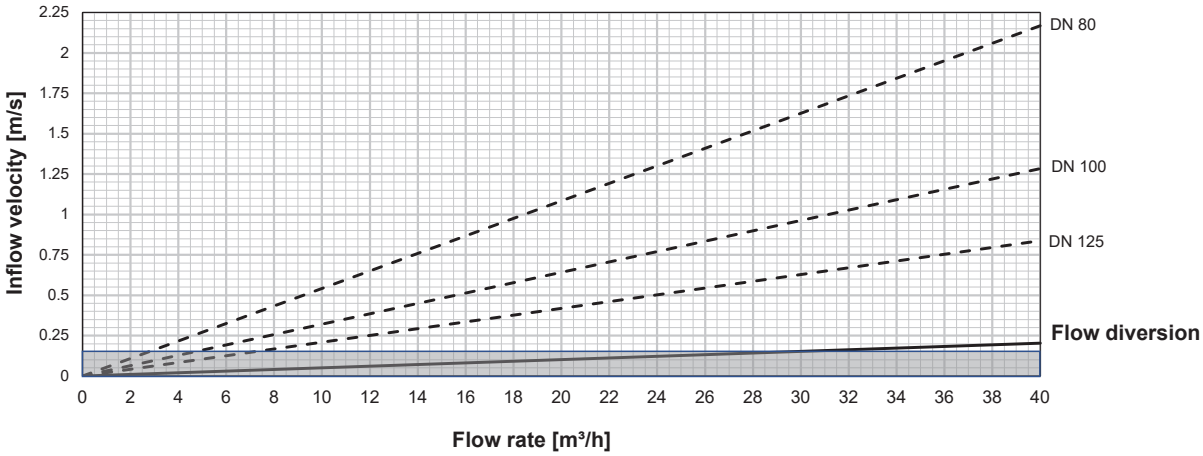
Type		(800)	(1000)	(1500)	(2500)	(4000)	(6000)
• Volume	l	793	889	1440	2518	4035	5849
• Max. operating/test pressure	bar	6	6	6	6	6	6
• Min. operating temperature	°C	5	5	5	5	5	5
• Max. operating temperature	°C	85	85	85	85	85	85
• Cold insulation synthetic rubber	mm	19	19	19	19	19	19
• Cold insulation λ 0 °C	W/mK	0.033	0.033	0.033	0.033	0.033	0.033
• Cold insulation λ 40 °C	W/mK	0.037	0.037	0.037	0.037	0.037	0.037
• Fire protection class		B-s3,d0	B-s3,d0	B-s3,d0	B-s3,d0	B-s3,d0	B-s3,d0
• Transport weight	kg	171	189	306	468	694	902
• Water vapour diffusion resistance μ		≥ 7000	≥ 7000	≥ 7000	≥ 7000	≥ 7000	≥ 7000
• Dimensions		see dimensional drawing					

Velocity into the connection nozzle and inflow velocity with flow diversion

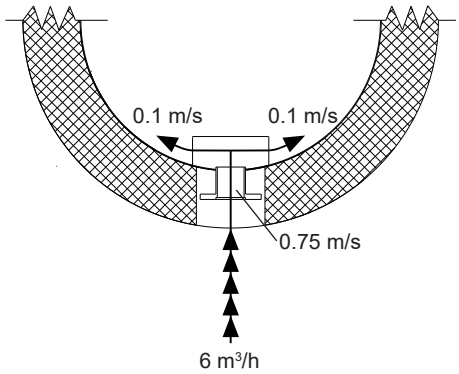
EnerVal G cool (800,1000)



EnerVal G cool (1500-6000)

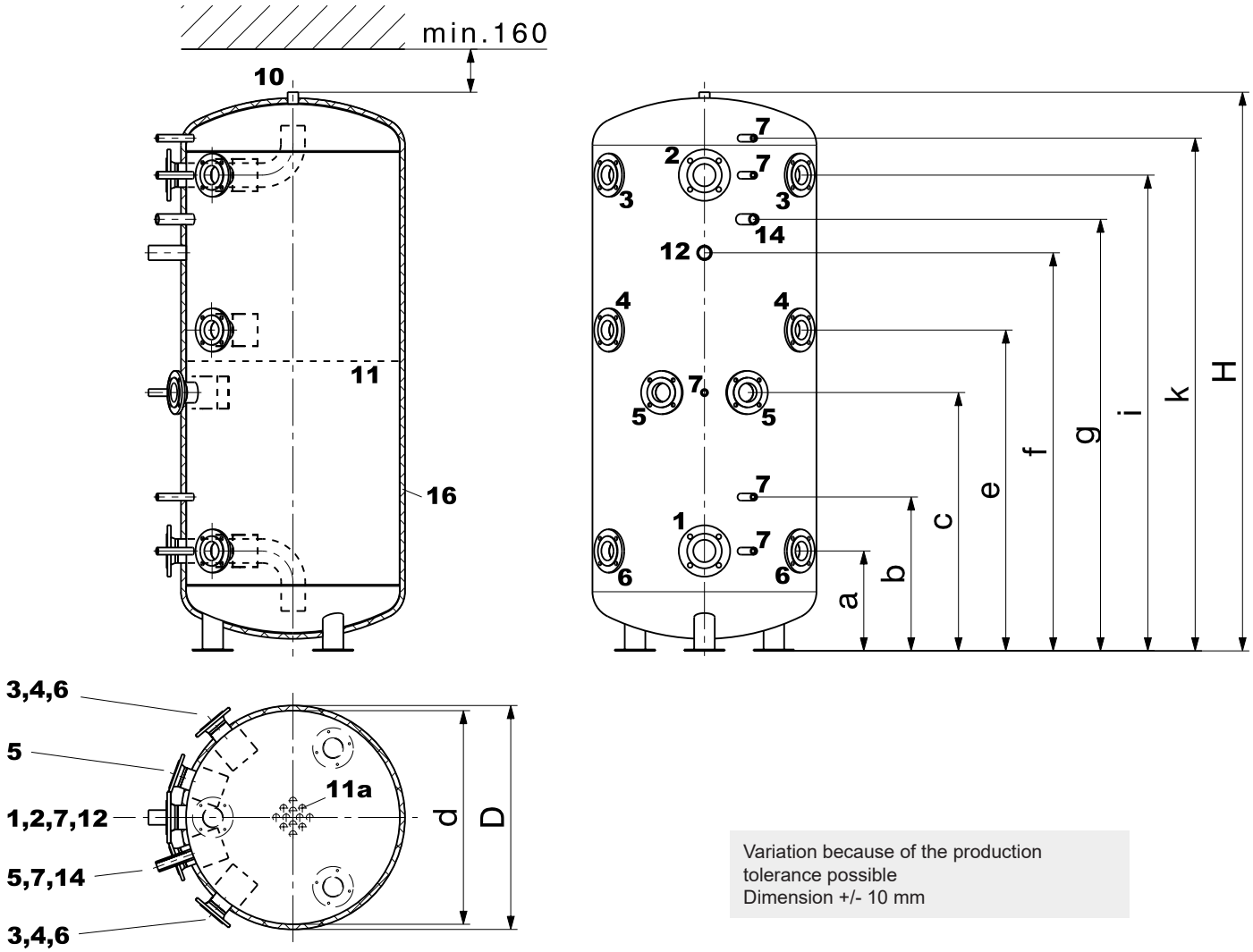


Example of inlet velocity distribution by flow diversions



EnerVal G cool (800-6000)

Dimensions incl. cold insulation (series)
(Dimensions in mm)



Variation because of the production tolerance possible
Dimension +/- 10 mm

			Type (800,1000)	Type (1500,2500)	Type (4000,6000)
1	Cooling connection	flow discharge (bend pipe)	DN 80, 4 x M16*	DN 100, 4 x M16*	DN 125, 8 x M16*
2	Cooling connection	return discharge (bend pipe)	DN 80, 4 x M16*	DN 100, 4 x M16*	DN 125, 8 x M16*
3	Cold generator connection	return top (inflow restrictor)	DN 65, 4 x M12*	DN 80, 4 x M16*	DN 100, 4 x M16*
4	Cold generator connection	flow top (inflow restrictor)	DN 65, 4 x M12*	DN 80, 4 x M16*	DN 100, 4 x M16*
5	Cold generator connection	return bottom (inflow restrictor)	DN 65, 4 x M12*	DN 80, 4 x M16*	DN 100, 4 x M16*
6	Cold generator connection	flow bottom (inflow restrictor)	DN 65, 4 x M12*	DN 80, 4 x M16*	DN 100, 4 x M16*
7	Sleeve for immersion sleeve, thermostat or thermometer		G ½″ (IT)	G ½″ (IG)	G ½″ (IT)
10	Possible air vent		G 1″ (IT)	G 1″ (IG)	G 1″ (IT)
11	Separating plate				
11a	Holes in the separating plate		12 x	12 x	24 x
12	Connection for electric heating element		G 1½″ (IT)	G 1½″ (IT)	G 1½″ (IT)
14	Connection for circulation lance, **attention:** only for type (800,1000)		G 1″ (IT)		
16	Cold insulation, thickness 19 mm				

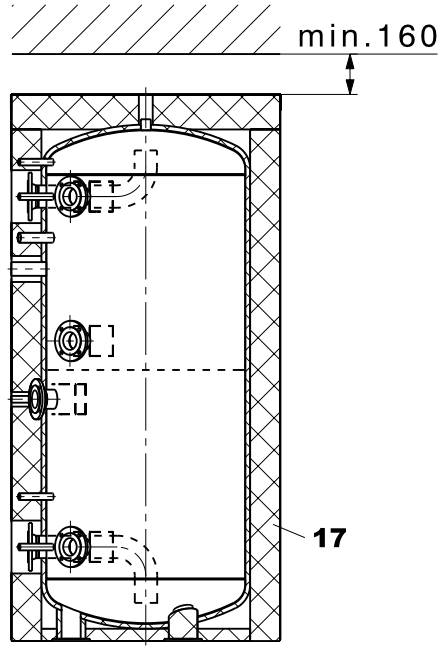
* The screw holes have threads

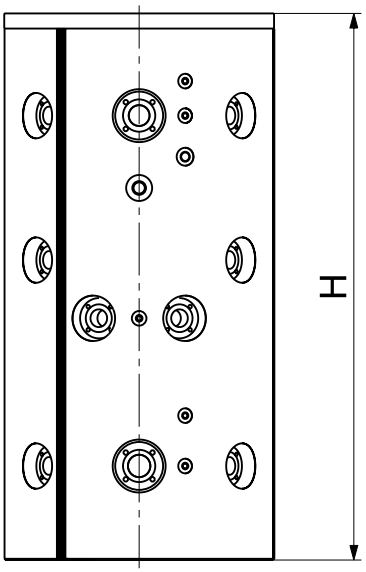
EnerVal G cool

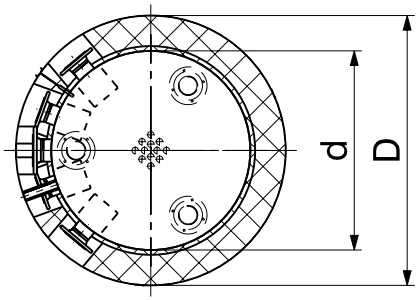
type	D	d	H	a	b	c	e	f	g	i	k	Tilting measure
(800)	828	790	1866	327	496	810	1041	1269	1402	1527	1684	1882
(1000)	828	790	2066	369	569	955	1186	1472	1596	1759	1894	2080
(1500)	1028	990	2140	378	549	914	1164	1380	-	1699	1916	2158
(2500)	1288	1250	2448	435	645	1050	1302	1595	-	1903	2211	2475
(4000)	1438	1400	2975	485	780	1386	1638	2227	-	2535	2735	2999
(6000)	1638	1600	3303	523	840	1473	1873	2523	-	2823	3023	3342

EnerVal G cool (800-6000)

Dimensions with thermal insulation (optional)
(Dimensions in mm)







Variation because of the production tolerance possible
Dimension +/- 10 mm

		Type (800,1000)	Type (1500,2500)	Type (4000,6000)
17	Thermal insulation, thickness (in addition to the 19 mm cold insulation)	120 mm	140 mm	140 mm

EnerVal G cool

type	D	d	H
(800)	1068	790	1961
(1000)	1068	790	2161
(1500)	1308	990	2255
(2500)	1568	1250	2563
(4000)	1718	1400	3090
(6000)	1918	1600	3418

VarioVal FLS (800,1000)
Stratified storage tank
(suitable for heat pumps)

Stratified storage tank
- For single family homes with approx. 4-6 persons
- Heating with solar, low-temperature heat generator (heat pumps) or for high-temperature heat generators
- Annual solar coverage rate depends on heat demand, collector field size, collector field storage ratio and location
- Stratified storage tank made of steel, primed on the outside, for heating support
- Water heating via fresh water module (option)
- With permanently installed plain-tube coil for connection to solar collectors.
  (800) up to 10 m^2 collector surface
  (1000) up to 15 m^2 collector surface
- Layer installations:
  - Stratification pipe (pipe in pipe)
  - Inflow restrictor
  - Guide tubes (bent upwards/downwards) for fresh water module connections
  - Heating flow/return guide tubes (also with return in layer channel)
  - Separating plate in the central area for separation of the temperature zone
- Sensor terminal blocks
- Thermometer (with capillary)
- Thermal insulation
  - Made of polyester fibre fleece 140 mm
  - Outer plastic jacket with patented aluminium sealing bracket, red
  - Insulated cover flap (can be knocked out) for heat exchanger connections

Delivery
Calorifier and thermal insulation completely installed (can be removed for installation)

Design on request
- Heating module HMV20-3BM/SPS-S 8 with thermal insulation box
- Can be expanded with
  - Heating armature group HAV20-3BM-R/SPS-S 8
  - Solar armature group SAV20/SPS-S 7
- Fresh water module
  - TransTherm® aqua FT/FTC: For direct storage tank mounting with supplied fixing bolts (not pre-assembled) and connection set
  - TransTherm® aqua F: wall installation (pipework on site)
- Circulation lance
- Screw-in electric heating element

VarioVal FLS

VarioVal FLS incl. TransTherm® aqua FT/FTC

Model range

VarioVal FLS type	Solar coil m^2	Solar coil dm^3
(800)	2	13.4
(1000)	3	18.9

Notice
SPF certificate stratification efficiency
SPF-18-009-SE

VarioVal FLS (800,1000) - selection table

Heat generator		Hydraulic components + necessary TopTronic® E modules								Additional accessories		
		1st mixer circuit	2nd mixer circuit		Solar armature group		Return switching	Buffer management	Fresh water module	Screw-in electric heating element	Electri-cal box	Circulation heat exchanger lance
		●	opt.		opt.		●	●	●	●	●	opt.
		Consisting of:										
		Heating module HMV20-3BM SPS-S 8	HA group HAV20-3BM-R SPS-S 8	TopTronic® E module expansion heating circuit	Solar group SAV20FR SPS-S 7 PM2	TopTronic® E solar module	Stratified charging set SLS32-3-H RL	TopTronic® E buffer module	TransTherm® aqua F TransTherm® aqua FT TransTherm® aqua FTC			
Air/water heat pumps:												
• UltraSource® B comfort C	(8,11)	●	●	●	●	●	●		●	●	opt.[2]	opt.
• Belaria® pro comfort	(8-15)	●	●	●	●	●	●		●	opt.	opt.[2]	opt.
• Belaria® comfort ICM	(8,13)	●	●	●	●	●	●		●	●	opt.[2]	opt.
Brine/water or water/water heat pumps:												
• UltraSource® T comfort	(8,13)	●	●	●	●	●	●		●	opt.	opt.[2]	opt.
• Thermalia® comfort	(8-13)	●	●	●	●	●	●		●	opt.	opt.[2]	opt.
• Thermalia® comfort H	(7,10)	●	●	●	●	●	●		●	opt.	opt.[2]	opt.
• Thermalia® twin H	(13)	●	●	●			●			opt.		opt.
TopGas® classic	(12-30)	●	●	●	●	●	[3]	●	●	opt.	opt.[2]	opt.
UltraGas®	(15-35)	●	●	●	●	●		●	●	opt.	opt.[2]	opt.
UltraOil®	(16-35)	●	●	●	●	●		●	●	opt.	opt.[2]	opt.
BioLyt	(13-25)	●	●	●	●	●		●	●	opt.	opt.[1]	opt.

[1] A module expansion or a controller module can be installed in the heat generator.
[2] Two TopTronic® E controller modules can be mounted in the heat generator or in the wall casing. If the storage tank is fully equipped, a separate electrical box must be ordered for an additional module.
[3] Return switching to be installed by the client.

Stratified storage tank

VarioVal FLS (800,1000)

Stratified storage tank made of steel, primed on the outside, for heating support
Water heating optionally via fresh water module. With permanently installed plain-tube coil for connection to solar collectors. Thermal insulation made of polyester fibre 140 mm and external plastic coating, colour red. Suitable for heat pumps up to 20 kW (up to 2500 l/h)

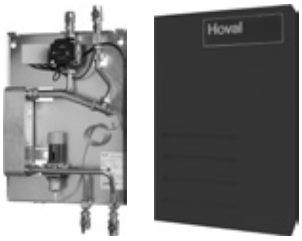
VarioVal FLS type	Total volume dm³	Solar coil m²	Solar coil dm³	Part No.
(800)	796	2	13.4	6046 238
(1000)	892	3	18.9	6046 239

Electric heating elements
see chapter “Electric heating elements”

Accessories

		Part No.
	**Heating module HMV20-3BM** with pressure distributor for 2 mixer circuits, incl. 1 heating armature group with 3-way motor mixer and pump SPS-S 8 and thermal insulation box	6046 091
	Notice In combination with heat pumps, always use the stratified charging set SLS32-3-H RL.	
	**Heating armature group HAV20-3BM-R** to extend the HMV20-3BM for a second mixer circuit Pump SPS-S 8	6046 092
	**Solar armature group SAV20FR** with PWM interface (TopTronic® E) inc. safety group 6 bar with manometer, FlowRotor and air vent Pump SPS-S 7 PM2	6046 093
	**Layer charge set SLS32-3-H RT** connection set for return switching for direct mounting on VarioVal for heat pumps up to 17 kW Connection set between tank and pressure distributer on heating module, layer charge set with 3-way valve incl. motor drive.	6048 003

Accessories



Fresh water module TransTherm® aqua FT/FTC
Fresh water module for hygienic water heating with thermostatic control of the hot water temperature by means of quick-acting water temperature controller. Incl. red casing and connection set AS20-FW for direct installation on the VarioVal FLS

Fresh water module TransTherm® aqua	Output kW	Part No.
FT (65)	65	6046 240
FTC (57)	57	6046 241

Accessories for TransTherm® aqua FT/FTC

Circulation heat exchanger lance R 1″ 2038 434
is screwed into the buffer storage tank and integrated into the circulation line.
Material: Copper, tinned inside
Transmission power approx. 1 kW at 60 °C
Hot water temperature in the buffer storage tank without mixing through the storage tank temperature.
Circulation connections R ½″
Installation length 660 mm

Accessories for TransTherm® aqua F

TransTherm® aqua F
Fully assembled station with plate heat exchanger for the provision of domestic hot water using the continuous flow principle and built-in Hoval TopTronic® E control
The required buffer storage tank is not supplied.

Fresh water module TransTherm® aqua F	Output kW	Part No.
(6-10)	50	8006 387
(6-16)	90	8006 388

Version with copper-free heat exchanger

Fresh water module TransTherm® aqua F	Output kW	Part No.
(6-10)	50	8006 521
(6-16)	90	8006 522

Return switching valve set DN 20 — Part No. 7010 832
for TransTherm® aqua F (50–90 kW)
Set consisting of temperature sensor, switching valve, drive, seals and screw fittings.

Test valve DN 8 G ¼″ — Part No. 2049 861
for TransTherm® aqua L, F, FS
Test valve suitable for flame treatment for hygienic-microbiologic tests.

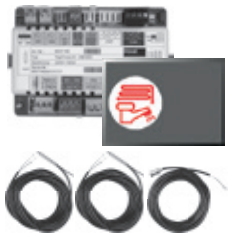
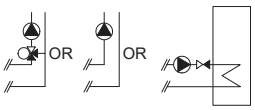
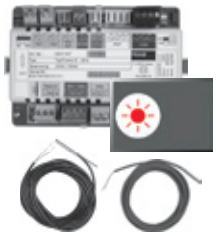
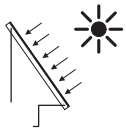
Sludge separator with magnet — Part No. 2062 165
Type: MB3 DN 25 Rp 1″
With variable connection for vertical or horizontal pipelines
Removal of ferromagnetic and non-magnetic dirt and sludge particles from heating or cooling circuits with the medium water or water/glycol (50/50 %)
Brass casing
Sludge separation up to a particle size of 5 µm
With unscrewable casing bottom part for cleaning and inspection work complete with sludge removal tap

Nominal diameter: DN 25
Pipe connection: Rp 1″ internal thread
Installation length: 90 mm
Max. operating pressure: 6 bar
Max. flow temperature: 110 °C
Max. throughput: 2.0 m³/h
Max. flow speed: 1.0 m/s
Max. pressure drop: 3.8 kPa
Contents: 0.36 l
Weight: 2.3 kg

Accessories

	Part No.
 **Sludge separator with magnet** Type: MBL DN 32 Rp 1¼″ With variable connection for vertical or horizontal pipelines Performance-enhancing magnetic assistance from removable, external magnet. Fast and continuous removal of ferromagnetic and non-magnetic dirt and sludge particles from heating or cooling circuits with the medium water or water/glycol (50/50 %) Brass casing Sludge separation up to a particle size of 5 micrometres - separation and sludge removal without interrupting operation by the spiral pipe insert With unscrewable casing bottom part for cleaning and inspection work complete with sludge removal tap. Nominal diameter: DN 32 Pipe connection: Rp 1¼″ (internal thread) Installation length: 128 mm Max. operating pressure: 10 bar Max. flow temperature: 110 °C Max. throughput: 3.6 m³/h Max. flow speed: 1.0 m/s Max. pressure drop: 2.2 kPa Contents: 0.75 l Weight: 3.6 kg Type: MBL DN 32 IT	2062 166
Additional sludge separators see “Various system components”	
Notice Information about engineering, space requirement, dimensioning table, dimensions, see “Hoval TransTherm® aqua F”	
 **TopTronic® E control module black with 4.3″ colour touchscreen** For operation of all controller modules connected to the bus system (basic, solar, buffer modules etc.) Connection to the Hoval bus system via RJ45 plug connection or via plug terminals (max. 0.75 mm²), flat design with flexible installation option Installation: - in control panel of the heat generator - in the Hoval wall casing - in the control panel front, black high-gloss cover, customer-specific configurable start screen, Display of current weather or weather forecast (only possible in combination with HovalConnect) Consisting of: - TopTronic® E control module black - Clamping device set control module - RJ45-RAST 5 CAN cable, L = 500	6043 844

TopTronic® E controller modules

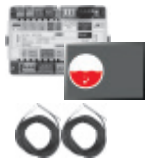
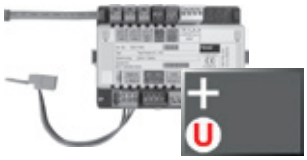
	Part No.
  **TopTronic® E heating circuit/hot water module TTE-HK/WW** Controller module for controlling consumers with integrated control functions for: - 1 heating/cooling circuit w/o mixer or - 1 heating/cooling circuit with mixer or - 1 hot water charging circuit - various additional functions Consisting of: - Fitting accessories - 2 x immersion sensor TF/2P/5/6T, L = 5 m - 1 contact sensor ALF/2P/4/T, L = 4 m - Basic plug set for controller module	6034 571
  **TopTronic® E solar module TTE-SOL** The controller module is suitable for use as temperature differential control, control of thermal solar plants, for domestic water heating and/or heating support. Controller module with integrated control functions for - solar circuit - collector cascade - storage tank cascade with up to 4 consumers - consumer loading, with type selection - temperature differential control - loading and unloading function for additional/reserve buffer tank - Integrated solar yield calculation Consisting of: - Fitting accessories - 1 immersion sensor TF/2P/5/6T, L = 5 m - 1 collector sensor TF/1.1P/2.5S/5.5T L = 2.5 m - Basic plug set for controller module	6037 058

Notice
In a standalone application, the control module for operating the solar module and a wall casing must be ordered separately!

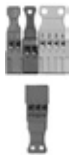
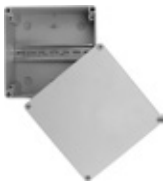
Notice
Depending on the complexity, module expansions are required for using the listed functions (max. 2 module expansion can be connected)!

Notice
The supplementary plug set may have to be ordered to implement functions differing from the standard!

TopTronic® E controller modules

	Part No.
 **TopTronic® E buffer module TTE-PS** Controller module with integrated control functions for: - heating buffer management or - cooling buffer management - var. additional functions Consisting of: - Fitting accessories - 2 immersion sensors TF/2P/5/6T L = 5 m - Basic plug set for controller module **Notice** If the controller module is used without Hoval heat generator then a TopTronic® E control module must be ordered separately! **Notice** Depending on the complexity, module expansions are required for using the listed functions (max. 2 module expansion can be connected)! **Notice** The supplementary plug set may have to be ordered to implement functions differing from the standard!	6037 057
 **TopTronic® E module expansion Universal TTE-FE UNI** Expansion to the inputs and outputs of a controller module (basic module heat generator, heating circuit/domestic hot water module, solar module, buffer module) for implementing various functions Consisting of: - Fitting accessories - Plug set FE module **Notice** Refer to the Hoval System Technology to find which functions and hydraulic arrangements can be implemented.	6034 575

Accessories for TopTronic® E

		Part No.
	**Supplementary plug set** for controller modules and module expansion TTE-FE HK	6034 503
	**TopTronic® E room control modules**	
	TTE-RBM TopTronic® E room control modules	
	easy white	6037 071
	comfort white	6037 069
	comfort black	6037 070
	**Enhanced language package TopTronic® E** one SD card required per control module Consisting of the following languages: HU, CS, SL, RO, PL, TR, ES, HR, SR, JA, DA	6039 253
	**HovalConnect**	
	HovalConnect LAN	6049 496
	HovalConnect WLAN	6049 498
	HovalConnect Modbus	6049 501
	HovalConnect KNX	6049 593
	TopTronic® E interface modules	
	GLT module 0-10 V	6034 578
	**TopTronic® E sensors**	
	AF/2P/K Outdoor sensor H x W x D = 80 x 50 x 28 mm	2055 889
	TF/2P/5/6T Immersion sensor, L = 5.0 m	2055 888
	ALF/2P/4/T Contact sensor, L = 4.0 m	2056 775
	TF/1.1P/2.5S/6T Collector sensor, L = 2.5 m	2056 776
	**Bivalent switch** for various release or switching functions	
	Bivalent switch 1-piece	2056 858
	Bivalent switch 2-piece	2061 826
	**System housing**	
	System housing 182 mm	6038 551
	System housing 254 mm	6038 552
	**TopTronic® E wall casing**	
	WG-190 Wall casing small	6052 983
	WG-360 Wall casing medium	6052 984
	WG-360 BM Wall casing medium with control module cut-out	6052 985
	WG-360-3 BM Wall casing compact with control module cut-out	6052 988
	WG-510 Wall casing large	6052 986
	WG-510 BM Wall casing large with control module cut-out	6052 987

Further information
see “Controls”

Part No.

Services

Commissioning
Commissioning by works service or Hoval trained authorised serviceman/company is condition for warranty.

For commissioning and other services please contact your Hoval sales office.

VarioVal FLS (800,1000)

Type		(800)	(1000)
Storage tank			
• Volume	l	796	892
• Max. operating/test pressure	bar	3/4.5	3/4.5
• Max. operating temperature	°C	95	95
• Transport weight	kg	228	233
• Dimensions		See Dimensions	
Thermal insulation			
• Thermal insulation polyester fibre fleece	mm	140	140
• Thermal conductance λ	W/mK	0.038	0.038
• Fire protection class		B2	B2
• Heat loss at 65 °C	W	91	100
• U value	W/(m^{2}K)	0.27	0.27
• Energy efficiency class		B	B
Solar coil (permanently installed)			
• Heating surface	m²	2	3
• Volume	l	13.4	18.9
• Max. operating/test pressure	bar	10/15	10/15
• Max. operating temperature	°C	110	110
• Flow resistance [1] water/glycol 50 %	z-value	19	25
• Number of collectors (max. - gross at 2.5 m²)	pieces	4	6
• For flat collectors [2] up to approx.	m²	10	15

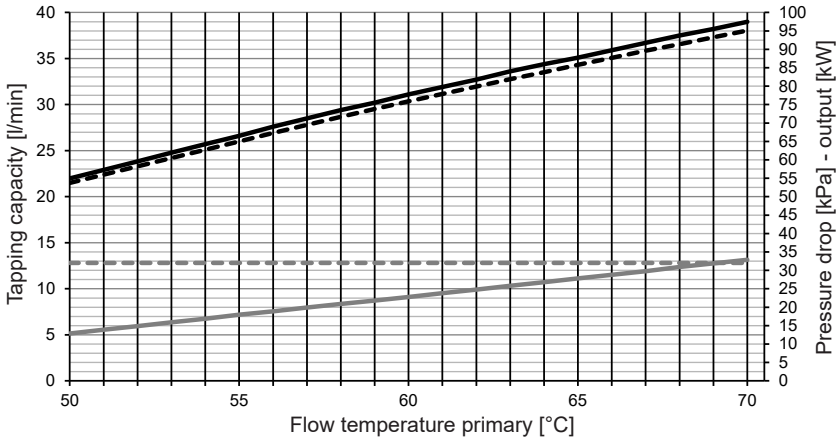
[1] Flow resistance of heating coil in mbar = flow rate (m³/h)² x z (1 mbar = 0.1 kPa)

[2] Collector surface area, with regard to coil heating surface only

Performance data

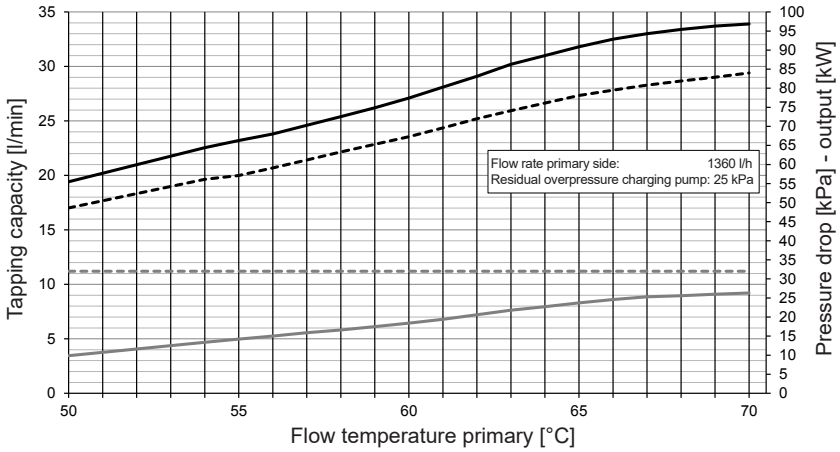
TransTherm® aqua FT/FTC

TransTherm® aqua FT (65)
Hot water temperature 45 °C: tapping capacity - output - pressure drops



Tapping capacity
Output
Pressure drop, secondary
Pressure drop, primary

TransTherm® aqua FTC (57)
Hot water temperature 45 °C: tapping capacity - output - pressure drops



Tapping capacity
Output
Pressure drop, secondary
Pressure drop, primary

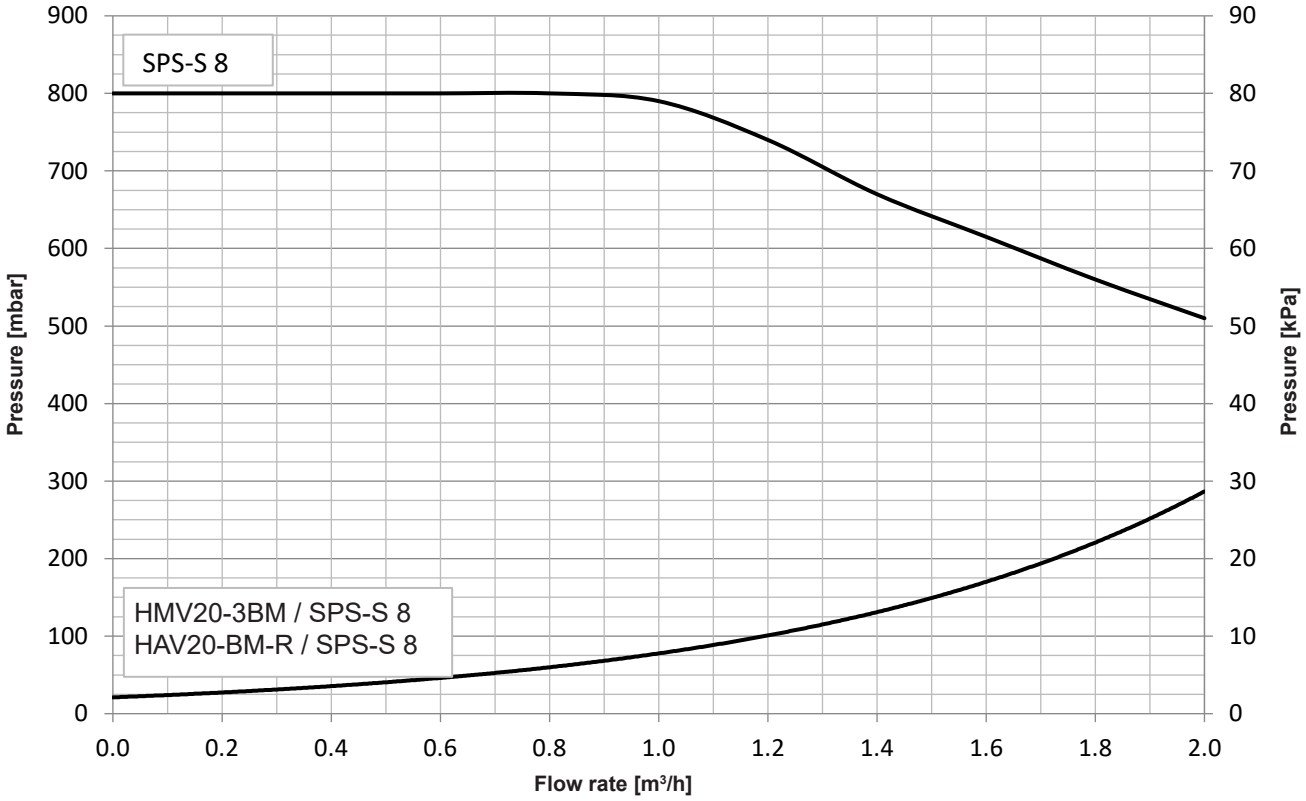
Performance data

TransTherm® aqua F (6-10 up to 6-16)

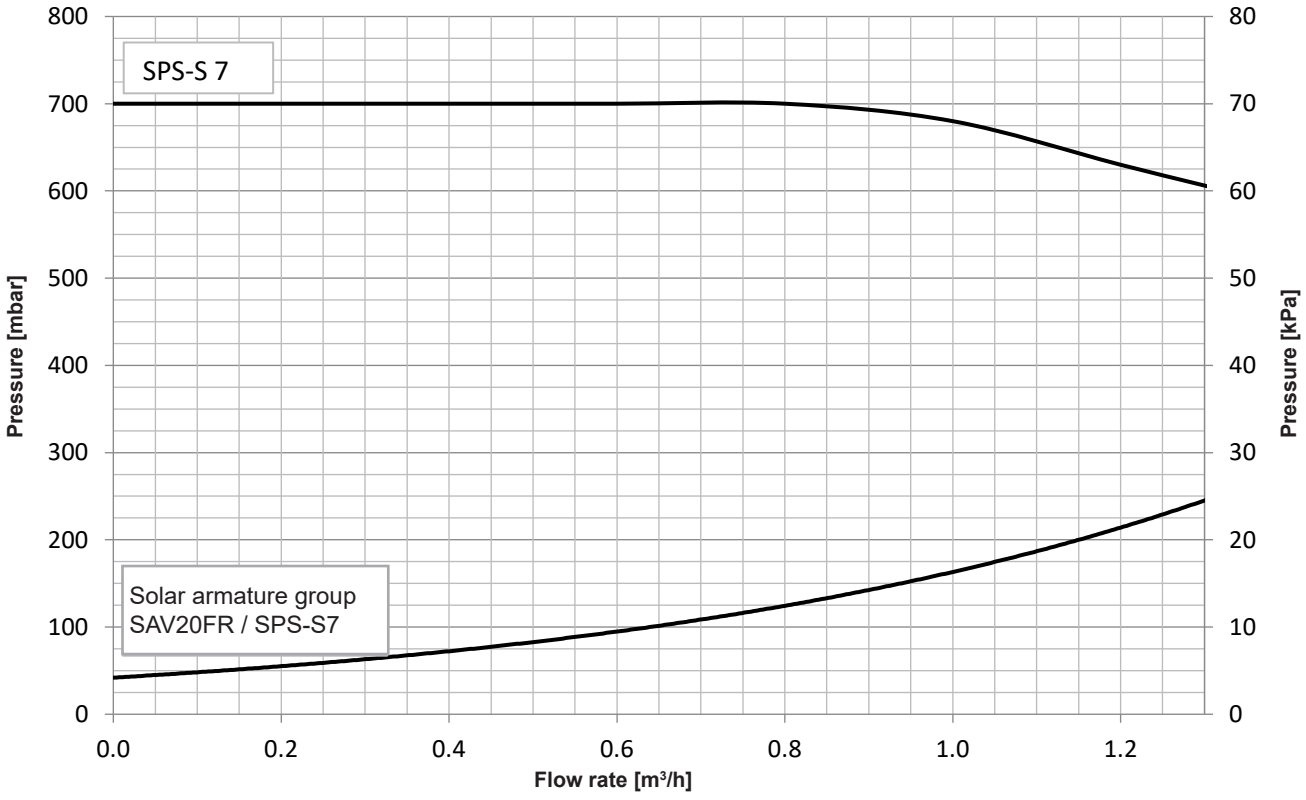
DHW secondary	TransTherm® aqua F		Flow temperature heating water: 55 °C (6-...) (10)	55 °C (6-...) (16)	60 °C (6-...) (10)	60 °C (6-...) (16)	65 °C (6-...) (10)	65 °C (6-...) (16)	70 °C (6-...) (10)	70 °C (6-...) (16)
60/5 °C	T return primary	°C	-	-	-	-	30	30	30	30
	V̇ primary	**m³/h**	-	-	-	-	**1.08**	**1.88**	**1.32**	**2.09**
	Q max.	kW	-	-	-	-	43	75	60	95
	V̇ secondary	**m³/h**	-	-	-	-	**0.67**	**1.17**	**0.94**	**1.48**
60/10 °C	T return primary	°C	-	-	-	-	30	30	30	30
	V̇ primary	**m³/h**	-	-	-	-	**0.8**	**1.5**	**1.08**	**1.94**
	Q max.	kW	-	-	-	-	32	60	50	90
	V̇ secondary	**m³/h**	-	-	-	-	**0.55**	**1.03**	**0.86**	**1.54**
60/15 °C	T return primary	°C	-	-	-	-	30	30	30	30
	V̇ primary	**m³/h**	-	-	-	-	**0.55**	**1.05**	**0.97**	**1.8**
	Q max.	kW	-	-	-	-	22	42	44	82
	V̇ secondary	**m³/h**	-	-	-	-	**0.42**	**0.8**	**0.84**	**1.57**
60/20 °C	T return primary	°C	-	-	-	-	**30**	**30**	30	30
	V̇ primary	**m³/h**	-	-	-	-	**0.3**	**0.6**	**0.62**	**1.14**
	Q max.	kW	-	-	-	-	12	24	28	52
	V̇ secondary	**m³/h**	-	-	-	-	**0.26**	**0.52**	**0.6**	**1.12**
55/5 °C	T return primary	°C	-	-	30	30	30	30	30	30
	V̇ primary	**m³/h**	-	-	**1.25**	**2.04**	**0.8**	**1.5**	**1.08**	**2.09**
	Q max.	kW	-	-	43	70	32	60	50	95
	V̇ secondary	**m³/h**	-	-	**0.74**	**1.2**	**0.55**	**1.03**	**0.86**	**1.63**
55/10 °C	T return primary	°C	-	-	30	30	30	30	30	30
	V̇ primary	**m³/h**	-	-	**1.11**	**2.04**	**1.3**	**2.06**	**1.08**	**1.87**
	Q max.	kW	-	-	38	70	52	82	49	85
	V̇ secondary	**m³/h**	-	-	**0.73**	**1.34**	**0.99**	**1.57**	**0.94**	**1.62**
55/15 °C	T return primary	°C	-	-	30	30	30	30	30	30
	V̇ primary	**m³/h**	-	-	**0.76**	**1.46**	**0.97**	**1.65**	**1.1**	**1.88**
	Q max.	kW	-	-	26	50	44	75	44	75
	V̇ secondary	**m³/h**	-	-	**0.56**	**1.08**	**0.95**	**1.61**	**0.94**	**1.62**
55/20 °C	T return primary	°C	-	-	30	30	30	30	30	30
	V̇ primary	**m³/h**	-	-	**0.47**	**0.9**	**0.95**	**1.68**	**0.84**	**1.47**
	Q max.	kW	-	-	16	31	38	67	38	67
	V̇ secondary	**m³/h**	-	-	**0.39**	**0.76**	**0.94**	**1.65**	**0.94**	**1.65**
50/5 °C	T return primary	°C	30	30	30	30	30	30	30	30
	V̇ primary	**m³/h**	**1.29**	**2.03**	**1.28**	**2.04**	**1.25**	**2.06**	**1.08**	**1.87**
	Q max.	kW	37	58	44	70	50	82	49	85
	V̇ secondary	**m³/h**	**0.71**	**1.11**	**0.84**	**1.34**	**0.95**	**1.57**	**0.94**	**1.62**
50/10 °C	T return primary	°C	30	30	30	30	30	30	30	30
	V̇ primary	**m³/h**	**1.29**	**2.03**	**1.28**	**2.04**	**1.1**	**1.88**	**0.97**	**1.65**
	Q max.	kW	38	58	44	70	44	75	44	75
	V̇ secondary	**m³/h**	**0.82**	**1.25**	**0.95**	**1.51**	**0.95**	**1.61**	**0.95**	**1.61**
50/15 °C	T return primary	°C	30	30	30	30	30	30	30	30
	V̇ primary	**m³/h**	**1.29**	**2.03**	**1.11**	**1.95**	**0.95**	**1.68**	**0.84**	**1.47**
	Q max.	kW	37	58	38	67	38	67	38	67
	V̇ secondary	**m³/h**	**0.91**	**1.43**	**0.94**	**1.65**	**0.94**	**1.65**	**0.94**	**1.65**
50/20 °C	T return primary	°C	30	30	30	30	30	30	30	30
	V̇ primary	**m³/h**	**1.15**	**2.03**	**0.96**	**1.69**	**0.83**	**1.45**	**0.73**	**1.28**
	Q max.	kW	33	58	33	58	33	58	33	58
	V̇ secondary	**m³/h**	**0.95**	**1.67**	**0.95**	**1.67**	**0.95**	**1.67**	**0.95**	**1.67**
45/5 °C	T return primary	°C	19	18	17	16	16	15	15	13
	V̇ primary	**m³/h**	**0.86**	**1.91**	**0.86**	**1.92**	**0.87**	**1.83**	**0.84**	**1.62**
	Q max.	kW	35	80	42	95	48	104	52	104
	V̇ secondary	**m³/h**	**0.76**	**1.73**	**0.90**	**2.05**	**1.04**	**2.24**	**1.13**	**2.24**
45/10 °C	T return primary	°C	21	21	20	19	19	17	17	16
	V̇ primary	**m³/h**	**0.86**	**1.91**	**0.86**	**1.92**	**0.87**	**1.69**	**0.77**	**1.49**
	Q max.	kW	33	74	39	89	45	91	46	91
	V̇ secondary	**m³/h**	**0.81**	**1.84**	**0.97**	**2.20**	**1.13**	**2.25**	**1.13**	**2.24**
45/15 °C	T return primary	°C	24	23	23	22	21	20	20	19
	V̇ primary	**m³/h**	**0.86**	**1.91**	**0.87**	**1.8**	**0.8**	**1.55**	**0.71**	**1.36**
	Q max.	kW	30	69	37	78	39	78	40	78
	V̇ secondary	**m³/h**	**0.88**	**1.99**	**1.07**	**2.26**	**1.14**	**2.27**	**1.16**	**2.26**
45/20 °C	T return primary	°C	27	26	25	25	24	23	23	23
	V̇ primary	**m³/h**	**0.86**	**1.92**	**0.85**	**1.63**	**0.72**	**1.4**	**0.63**	**1.22**
	Q max.	kW	27	63	33	65	33	66	33	65
	V̇ secondary	**m³/h**	**0.96**	**2.18**	**1.16**	**2.27**	**1.16**	**2.29**	**1.15**	**2.27**

T return primary °C Return temperature primary
V̇ primary **m³/h** Primary flow rate
Q max. kW Output
V̇ secondary **m³/h** Secondary flow rate
The specified technical data relates to the full load of the module in each case.

Residual overpressure heating module HMV20-3BM

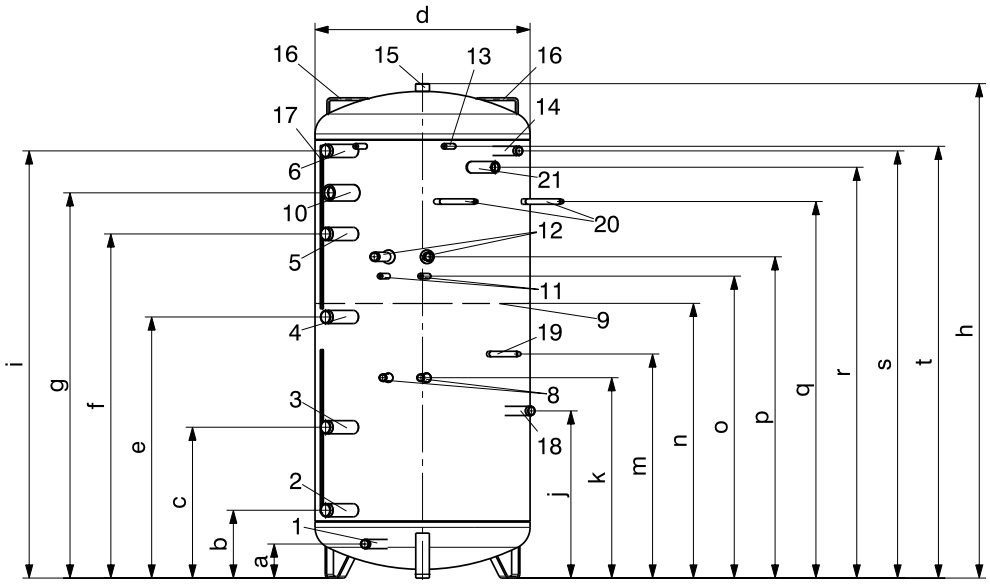


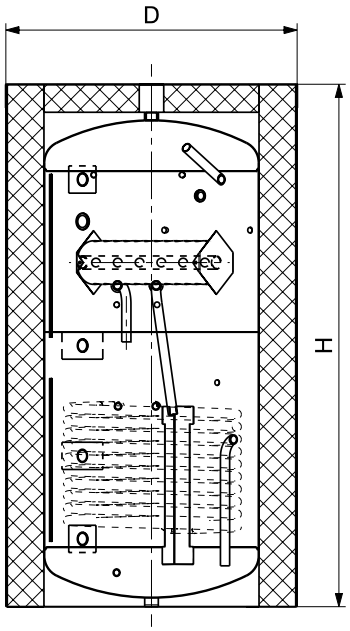
Residual overpressures solar armature group SAV20FR



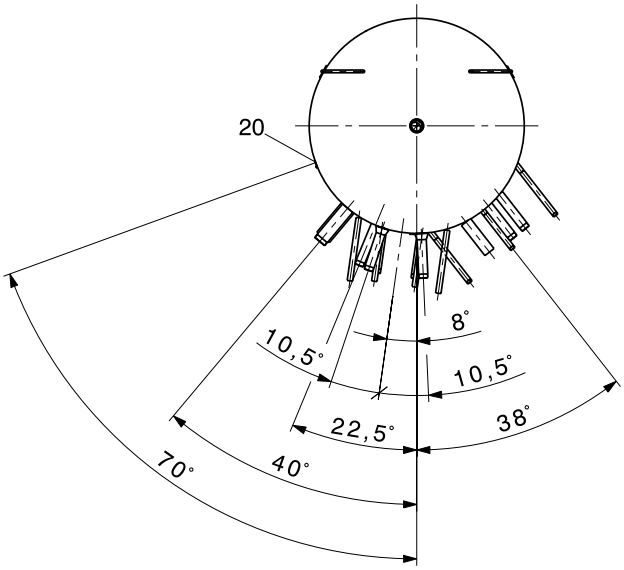
VarioVal FLS (800-1000)

(Dimensions in mm)





Deviations possible as a result of manufacturing tolerances.
Dimensions +/- 10 mm

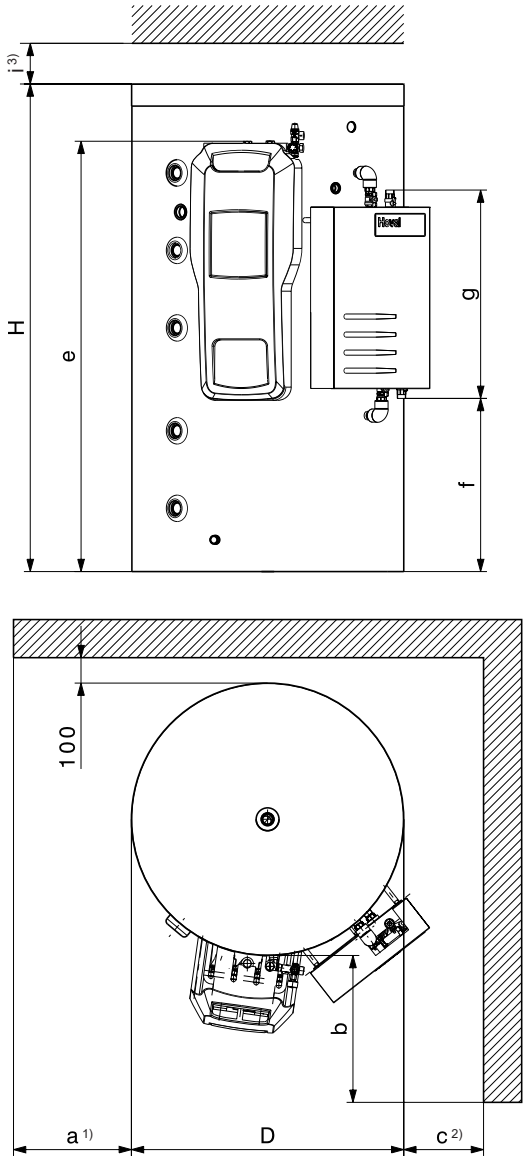


1	Drain	G 1″ (ext. thread)
2	Heat generator connection bottom (inflow restrictor)	G 1½″ (ext. thread)
3	Heat generator connection 2 - bottom (inflow restrictor)	G 1½″ (ext. thread)
4	Heat generator connection middle (inflow restrictor)	G 1½″ (ext. thread)
5	Heat generator connection 2 - top (stratification pipe)	G 1½″ (ext. thread)
6	Heat generator connection top (inflow restrictor)	G 1½″ (ext. thread)
8	Flow solar circuit (left) and return solar circuit (right)	G ¾″ (ext. thread)
9	Separating plate	
10	Connection for screw-in electric heating element	Rp 1½″ (int. thread)
11	Fixing bolts bottom left and right for heating module	M10 (int. thread)
12	Flow heating (left) and return heating (right)	G 1″ (ext. thread)
13	Fixing bolts top left and right for heating module	M10 (int. thread)
14	Flow heating water (connection for fresh water module)	G 1″ (ext. thread)
15	Possible air vent	Rp 1¼″ (int. thread)
16	Carry handle (2 x)	
17	Sensor terminal strip (type (800) 2 x, type (1000) 3 x)	
18	Return heating water (connection for fresh water module)	G 1″ (ext. thread)
19	Bolt bottom for fresh water module	
20	Fixing bolts top left and right for fresh water module	M10 (int. thread)
21	Connection for circulation heat exchanger lance	R 1″ (int. thread)

VarioVal FLS type	D	d	H	h	a	b	c	e	f	g	i	j	k	m	n	o	p	q	r	s	t	Tilting dimension
(800)	1070	790	1919	1816	125	249	554	959	1264	1415	1569	614	736	823	1009	1109	1180	1383	1509	1569	1586	1828
(1000)	1070	790	2119	2016	125	249	554	959	1264	1415	1569	814	870	1023	1009	1243	1314	1583	1709	1769	1720	2030

Space requirements

Installation example - VarioVal FLS
- Heating module HMV20-3BM
- Heating armature group HAV20-3BM-R
- Solar armature group SAV20FR
- Fresh water module TransTherm® aqua FT (65)



Notices on operation and accessibility
- Preferably place calorifier to the right of the heat generator.
- The operating side must be easily accessible.

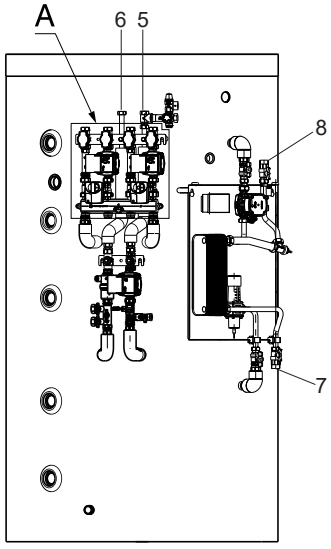
VarioVal type	a 1)	b	c 2)	D	e	f	g	H	i 3)
FLS (800)	≥ 650	≥ 1000	≥ 500	1070	1694	682	820	1919	≥ 160
FLS (1000)	≥ 650	≥ 1000	≥ 500	1070	1828	882	820	2119	≥ 160

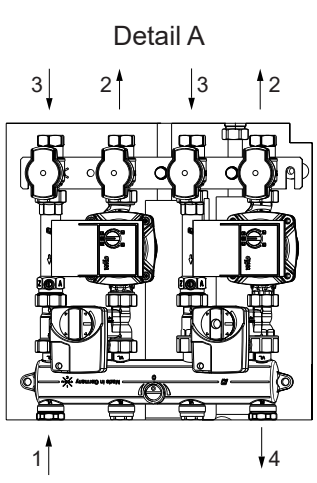
1) Clearance left according to heat generator:
- It must be possible to open the thermal insulation (necessary for positioning the sensors in the terminal strips).
- It must be possible to fit and remove the screw-in electric heating element (optional).

2) Clearance right:
- It must be possible to fit and remove the following:
  - Diaphragm pressure expansion tank
  - Cladding of the fresh water module (optional)
  - Hot domestic water and cold domestic water (fresh water module)

3) Clearance from the ceiling, top:
- It must be possible to fit a safety kit if required.

Hydraulic connections heating module, heating and solar armature group and fresh water module





1	Heating flow	G 1″ (ET)
2	Flow heating circuit	Rp ¾″ (IT)
3	Return heating circuit	Rp ¾″ (IT)
4	Heating return	G 1″ (ET)
5	Solar circuit return	G ¾″ (IT)
6	Solar circuit flow	G ¾″ (IT)
7	Domestic water cold	Rp ¾″ (IT)
8	Domestic water hot	Rp ¾″ (IT)

VarioVal RHS (800,1000)

Stratified combination storage tank
- For single family homes with approx. 4-6 persons
- Heating with solar and high-temperature heat generators
- Annual solar coverage rate depends on heat demand, collector field size, collector field storage ratio and location
- Stratified combination storage tank made of steel, primed on the outside, for heating support and water heating with a permanently installed corrugated tube coil.
- With permanently installed plain-tube coil for connection to solar collectors.
  (800) up to 10 m² collector surface
  (1000) up to 15 m² collector surface
- Layer installations:
  - Inflow restrictor
  - Heating flow/return guide tubes (also with return in layer channel)
- Sensor terminal blocks
- Thermometer (with capillary)
- Thermal insulation
  - Polyester fibre fleece thermal insulation 100 mm
  - Outer plastic jacket with patented aluminium sealing bracket, colour red
  - Insulated cover flap (can be knocked out) for heat exchanger connections

Domestic hot water calorifier
- Stainless-steel corrugated tube coil installed

Delivery
Calorifier and thermal insulation completely installed (can be removed for installation)

Design on request
- Heating module HMV20-3BM/SPS-S 8 with thermal insulation box
- Can be expanded with
  - Heating armature group HAV20-3BM-R/SPS-S 8
  - Solar armature group SAV20/SPS-S 7
- Circulation
- Screw-in electric heating element

Notice
SPF certificate stratification efficiency
SPF-18-009-SE

VarioVal RL (600)

Stratified combination storage tank
- For single family homes with approx. 4-6 persons
- Heating with low-temperature heat generator (heat pumps) or for high-temperature heat generators
- Stratified combination storage tank made of steel, primed on the outside, for heating support and water heating with a permanently installed corrugated tube coil.
- Layer installations:
  - Inflow restrictor
  - Heating flow/return guide tubes (also with return in layer channel)
  - Separating plate in the central area for separation of the temperature zone
- Sensor terminal blocks
- Thermometer (with capillary)
- Thermal insulation
  - Polyester fibre fleece thermal insulation 140 mm
  - Outer plastic jacket with patented aluminium sealing bracket, colour red
  - Insulated cover flap (can be knocked out) for heat exchanger connections

Domestic hot water calorifier
- Stainless-steel corrugated tube coil installed

Delivery
- Calorifier and thermal insulation completely installed (can be removed for installation)

Design on request
- Heating module HMV20-3BM/SPS-S 8 with thermal insulation box
- Can be expanded with heating armature group HAV20-3BM-R/SPS-S 8
- Circulation
- Screw-in electric heating element

VarioVal RLS (800-1000)

Stratified combination storage tank
- For single family homes with approx. 4-6 persons
- Heating with solar, low-temperature heat generator (heat pumps) or for high-temperature heat generators
- Annual solar coverage rate depends on heat demand, collector field size, collector field storage ratio and location
- Stratified combination storage tank made of steel, primed on the outside, for heating support and water heating with a permanently installed corrugated tube coil.
- With permanently installed plain-tube coil for connection to solar collectors.
  (800) up to 10 m² collector surface
  (1000) up to 15 m² collector surface
- Layer installations:
  - Inflow restrictor
  - Heating flow/return guide tubes (also with return in layer channel)
  - Separating plate in the central area for separation of the temperature zone
- Sensor terminal blocks
- Thermometer (with capillary)
- Thermal insulation
  - Made of polyester fibre fleece 140 mm
  - Outer plastic jacket with patented aluminium sealing bracket, colour red
  - Insulated cover flap (can be knocked out) for heat exchanger connections

Domestic hot water calorifier
- Stainless-steel corrugated tube coil installed

Delivery
Calorifier and thermal insulation completely installed (can be removed for installation)

Design on request
- Heating module HMV20-3BM/SPS-S 8 with thermal insulation box
- Can be expanded with
  - Heating armature group HAV20-3BM-R/SPS-S 8
  - Solar armature group SAV20/SPS-S 7
- Circulation
- Screw-in electric heating element

VarioVal RL (600) - selection table

Heat generator		Hydraulic components + necessary TopTronic® E modules							Additional accessories		
		1st mixer circuit	2nd mixer circuit		Solar armature group		Return switching	Buffer management	Screw-in electric heating element	Electrical box	Circulation set
		•	opt.				•	•	•	•	opt.
		Consisting of:									
		Heating module HMV20-3BM SPS-S 8	HA group HAV20-3BM-R SPS-S 8	TopTronic® E module expansion heating circuit	Solar group SAV20FR SPS-S 7 PM2	TopTronic® E solar module	Stratified charging set SLS32-3-H RL	TopTronic® E buffer module			
Air/water heat pumps:											
• UltraSource® B comfort C	(8,11)	•	•	•			•		•		opt.
• Belaria® pro comfort	(8-15)	•	•	•			•		opt.		opt.
• Belaria® comfort ICM	(8,13)	•	•	•			•		•		opt.
Brine/water or water/water heat pumps:											
• UltraSource® T comfort	(8,13)	•	•	•			•		opt.		opt.
• Thermalia® comfort	(8-13)	•	•	•			•		opt.		opt.
• Thermalia® comfort H	(7,10)	•	•	•			•		opt.		opt.
• Thermalia® twin H	(13)	•	•	•			•		opt.		opt.
TopGas® classic	(12-30)	•	•	•			[3]	•	opt.	opt.[2]	opt.
UltraGas®	(15-35)	•	•	•				•	opt.		opt.
UltraOil®	(16-35)	•	•	•				•	opt.		opt.
BioLyt	(13-23)	•	•	•				•	opt.	opt.[1]	opt.

VarioVal RLS (800,1000) - selection table

Heat generator		Hydraulic components + necessary TopTronic® E modules							Additional accessories		
		1st mixer circuit	2nd mixer circuit		Solar armature group		Return switching	Buffer management	Screw-in Electric heating element	Electrical box	Circulation set
		•	opt.		opt.		•	•	•	•	opt.
		Consisting of:									
		Heating module HMV20-3BM SPS-S 8	HA group HAV20-3BM-R SPS-S 8	TopTronic® E module expansion heating circuit	Solar group SAV20FR SPS-S 7 PM2	TopTronic® E solar module	Stratified charging set SLS32-3-H RL	TopTronic® E buffer module			
Air/water heat pumps:											
• UltraSource® B comfort C	(8,11)	•	•	•	•	•	•		•	opt.[2]	opt.
• Belaria® pro comfort	(8-15)	•	•	•	•	•	•		opt.	opt.[2]	opt.
• Belaria® comfort ICM	(8,13)	•	•	•	•	•	•		•	opt.[2]	opt.
Brine/water or water/water heat pumps:											
• UltraSource® T comfort	(8,13)	•	•	•	•	•	•		opt.	opt.[2]	opt.
• Thermalia® comfort	(8-13)	•	•	•	•	•	•		opt.	opt.[2]	opt.
• Thermalia® comfort H	(7,10)	•	•	•	•	•	•		opt.	opt.[2]	opt.
• Thermalia® twin H	(13)	•	•	•			•		opt.		opt.
TopGas® classic	(12-30)	•	•	•	•	•	[3]	•	opt.	opt.[2]	opt.
UltraGas®	(15-35)	•	•	•	•	•		•	opt.	opt.[2]	opt.
UltraOil®	(16-35)	•	•	•	•	•		•	opt.	opt.[2]	opt.
BioLyt	(13-25)	•	•	•	•	•		•	opt.	opt.[1]	opt.

VarioVal RHS (800,1000) - selection table

		Hydraulic components + necessary TopTronic® E modules							Additional accessories		
		1st mixer circuit	2nd mixer circuit		Solar armature group		Return switching	Buffer management	Screw-in electric heating element	Electrical box	Circulation set
		●	opt.		opt.			●	opt.	●	opt.
		Consisting of:									
Heat generator		Heating module HMV20-3BM SPS-S 8	HA group HAV20-3BM-R SPS-S 8	TopTronic® E module expansion heating circuit	Solar group SAV20FR SPS-S 7 PM2	TopTronic® E solar module	Stratified charging set SLS32-3-H RL	TopTronic® E buffer module			
TopGas® classic	(12-30)	●	●	●	●	●	[3]	●	opt.	opt. [2]	opt.
UltraGas®	(15-35)	●	●	●	●	●		●	opt.	opt. [2]	opt.
UltraOil®	(16-35)	●	●	●	●	●		●	opt.	opt. [2]	opt.
BioLyt	(13-25)	●	●	●	●	●		●	opt.	opt. [1]	opt.

[1] A module expansion or a controller module can be installed in the heat generator.
[2] Two TopTronic® E controller modules can be mounted in the heat generator or in the wall casing. If the storage tank is fully equipped, a separate electrical box must be ordered for an additional module.
[3] Return switching to be installed by the client

Stratified combination storage tank

Hoval VarioVal RHS (800,1000)

Stratified combination storage tank made of steel, primed on the outside, for heating support and water heating with a permanently installed corrugated tube coil.
With permanently installed plain-tube coil for connection to solar collectors. Thermal insulation made of polyester fibre 100 mm and external plastic coating, colour red

VarioVal RHS type	Total volume	Solar coil		Calorifier		Part No.
	dm^3	m^2	dm^3	m^2	dm^3	
(800)	796	2	18.6	5.5	30.0	6046 236
(1000)	892	3	20.4	6.7	36.3	6046 237

Hoval VarioVal RLS (800,1000)

Stratified combination storage tank made of steel, primed on the outside, for heating support and water heating with a permanently installed corrugated tube coil.
With permanently installed plain-tube coil for connection to solar collectors. Thermal insulation made of polyester fibre 100 mm and external plastic coating, colour red.
Suitable for heat pumps up to 20 kW (up to 2500 l/h).

VarioVal RHS type	Total volume	Solar coil		Calorifier		Part No.
	dm^3	m^2	dm^3	m^2	dm^3	
(800)	796	2	18.6	6.7	36.3	6046 234
(1000)	892	3	20.4	8.2	44.6	6046 235

Hoval VarioVal RL (600)

Stratified combination storage tank made of steel, primed on the outside, for heating support and water heating with a permanently installed corrugated tube coil. Thermal insulation made of polyester fibre 140 mm and external plastic coating, colour red.
Suitable for heat pumps up to 20 kW (up to 2500 l/h)

VarioVal RL/RLS type	Total volume	Solar coil		Calorifier		Part No.
	dm^3	m^2	dm^3	m^2	dm^3	
(600)	647	-	-	6.7	36.3	6046 233

Electric heating elements
see chapter “Electric heating elements”

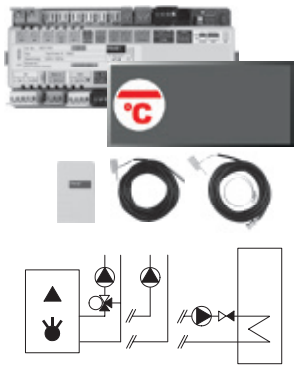
Accessories

		Part No.
	**Heating module HMV20-3BM** with pressure distributor for 2 mixer circuits, incl. 1 heating armature group with 3-way motor mixer and pump SPS-S 8 and thermal insulation box	6046 091
	Notice In combination with heat pumps, always use the stratified charging set SLS32-3-H RL.	
	**Heating armature group HAV20-3BM-R** to extend the HMV20-3BM for a second mixer circuit Pump SPS-S 8	6046 092
	**Solar armature group SAV20FR** with PWM interface (TopTronic® E) inc. safety group 6 bar with manometer, FlowRotor and air vent Pump SPS-S 7 PM2	6046 093
	**Layer charge set SLS32-3-H RT** connection set for return switching for direct mounting on VarioVal for heat pumps up to 17 kW Connection set between tank and pressure distributer on heating module, layer charge set with 3-way valve incl. motor drive.	6048 003
	Thermal water mixer see “Various system components”	

Accessories

		Part No.
	**Circulation set with reducer** for VarioVal RL, RLS and RHS polyethylene hose (cross-linked) fitting for securing the PE hose Y connection piece made of brass Rp 1″ - Rp 1″ - R ¾″ Reducer made of brass 1″ (ext. thread) - 1¼″ (int. thread)	2055 685
	**TopTronic® E control module black with 4.3″ colour touchscreen** For operation of all controller modules connected to the bus system (basic, solar, buffer modules etc.) Connection to the Hoval bus system via RJ45 plug connection or via plug terminals (max. 0.75 mm²), flat design with flexible installation option Installation: - in control panel of the heat generator - in the Hoval wall casing - in the control panel front, black high-gloss cover, customer-specific configurable start screen, Display of current weather or weather forecast (only possible in combination with HovalConnect) Consisting of: - TopTronic® E control module black - Clamping device set control module - RJ45-RAST 5 CAN cable, L = 500	6043 844

TopTronic® E controller modules



TopTronic® E basic module heat generator TTE-WEZ
Controller module for control of heat generators and the corresponding consumers with integrated control functions for:
- Heat generator management
- Additional heat generator management
- Cascade management
- 1 heating/cooling circuit without mixer
- 1 heating/cooling circuit with mixer
- 1 hot water charging circuit
- var. additional functions

Consisting of:
- Fitting accessories
- 1 outdoor sensor AF/2P/K
- 1 immersion sensor TF/2P/5/6T/S1
L = 5.0 with plug,
- 1 contact sensor ALF/2P/4/T/S1
L = 4.0 m with plug,
- Basic plug set for basic module

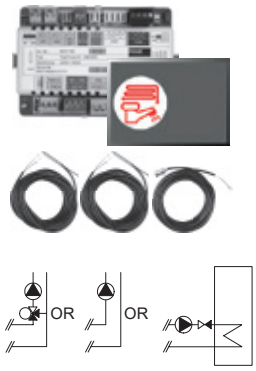
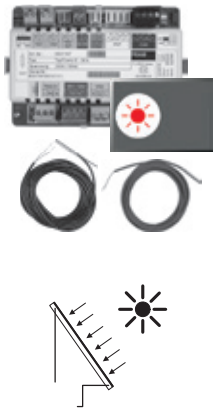
Notice
If the basic module is used without Hoval heat generator then a TopTronic® E control module must be ordered separately!

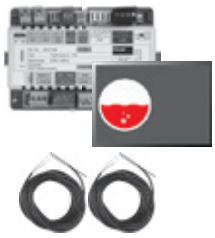
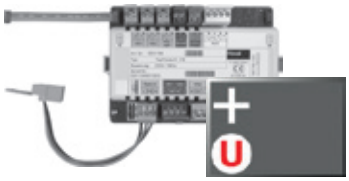
Notice
Depending on the complexity, module expansions are required for using the listed functions (max. 1 module expansion can be connected)!

Notice
The supplementary plug set may have to be ordered to implement functions differing from the standard!

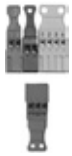
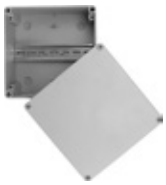
Part No.
6037 053

TopTronic® E controller modules

	Part No.
	6034 571
TopTronic® E heating circuit/hot water module TTE-HK/WW Controller module for controlling consumers with integrated control functions for: - 1 heating/cooling circuit w/o mixer or - 1 heating/cooling circuit with mixer or - 1 hot water charging circuit - various additional functions Consisting of: - Fitting accessories - 2 x immersion sensor TF/2P/5/6T, L = 5 m - 1 contact sensor ALF/2P/4/T, L = 4 m - Basic plug set for controller module	
	6037 058
TopTronic® E solar module TTE-SOL The controller module is suitable for use as temperature differential control, control of thermal solar plants, for domestic water heating and/or heating support. Controller module with integrated control functions for - solar circuit - collector cascade - storage tank cascade with up to 4 consumers - consumer loading, with type selection - temperature differential control - loading and unloading function for additional/reserve buffer tank - Integrated solar yield calculation Consisting of: - Fitting accessories - 1 immersion sensor TF/2P/5/6T, L = 5 m - 1 collector sensor TF/1.1P/2.5S/5.5T L = 2.5 m - Basic plug set for controller module	

	Part No.
 **TopTronic® E buffer module TTE-PS** Controller module with integrated control functions for: - heating buffer management or - cooling buffer management - var. additional functions Consisting of: - Fitting accessories - 2 immersion sensors TF/2P/5/6T L = 5 m - Basic plug set for controller module **Notice** If the controller module is used without Hoval heat generator then a TopTronic® E control module must be ordered separately! **Notice** Depending on the complexity, module expansions are required for using the listed functions (max. 2 module expansion can be connected)! **Notice** The supplementary plug set may have to be ordered to implement functions differing from the standard!	6037 057
 **TopTronic® E module expansion Universal TTE-FE UNI** Expansion to the inputs and outputs of a controller module (basic module heat generator, heating circuit/domestic hot water module, solar module, buffer module) for implementing various functions Consisting of: - Fitting accessories - Plug set FE module **Notice** Refer to the Hoval System Technology to find which functions and hydraulic arrangements can be implemented.	6034 575

Accessories for TopTronic® E

		Part No.
	**Supplementary plug set** for controller modules and module expansion TTE-FE HK	6034 503
	**TopTronic® E room control modules**	
	TTE-RBM TopTronic® E room control modules	
	easy white	6037 071
	comfort white	6037 069
	comfort black	6037 070
	**Enhanced language package TopTronic® E** one SD card required per control module Consisting of the following languages: HU, CS, SL, RO, PL, TR, ES, HR, SR, JA, DA	6039 253
	**HovalConnect**	
	HovalConnect LAN	6049 496
	HovalConnect WLAN	6049 498
	HovalConnect Modbus	6049 501
	HovalConnect KNX	6049 593
	TopTronic® E interface modules	
	GLT module 0-10 V	6034 578
	**TopTronic® E sensors**	
	AF/2P/K Outdoor sensor H x W x D = 80 x 50 x 28 mm	2055 889
	TF/2P/5/6T Immersion sensor, L = 5.0 m	2055 888
	ALF/2P/4/T Contact sensor, L = 4.0 m	2056 775
	TF/1.1P/2.5S/6T Collector sensor, L = 2.5 m	2056 776
	**Bivalent switch** for various release or switching functions	
	Bivalent switch 1-piece	2056 858
	Bivalent switch 2-piece	2061 826
	**System housing**	
	System housing 182 mm	6038 551
	System housing 254 mm	6038 552
	**TopTronic® E wall casing**	
	WG-190 Wall casing small	6052 983
	WG-360 Wall casing medium	6052 984
	WG-360 BM Wall casing medium with control module cut-out	6052 985
	WG-360-3 BM Wall casing compact with control module cut-out	6052 988
	WG-510 Wall casing large	6052 986
	WG-510 BM Wall casing large with control module cut-out	6052 987

Further information
see “Controls”

Services

Commissioning
Commissioning by works service or Hoval trained authorised serviceman/company is condition for warranty.

For commissioning and other services please contact your Hoval sales office.

Part No.

VarioVal RHS (800,1000)
VarioVal RL (600), VarioVal RLS (800,1000)

Type		RHS (800)	RHS (1000)	RL (600)	RLS (800)	RLS (1000)
Storage tank						
• Volume	l	796	892	647	796	892
• Max. operating/test pressure	bar	3/4.5	3/4.5	3/4.5	3/4.5	3/4.5
• Max. operating temperature	°C	95	95	95	95	95
• Transport weight	kg	213	234	179	226	255
• Dimensions				See Dimensions		
Thermal insulation						
• Thermal insulation polyester fibre fleece	mm	100	100	140	140	140
• Fire protection class		B2	B2	B2	B2	B2
• Thermal conductance λ	W/mK	0.038	0.038	0.038	0.038	0.038
• U value		0.4	0.4	0.27	0.27	0.27
• Heat loss at 65 °C	W	120	128	80	91	100
• Energy efficiency class		C	C	B	B	B
Calorifier (corrugated pipe firmly installed)						
• Heating surface	m²	5.5	6.7	6.7	6.7	8.2
• Contents	l	30.0	36.3	36.3	36.3	44.6
• Max. operating/test pressure	bar	6/10	6/10	6/10	6/10	6/10
• Max. operating temperature	°C	95	95	95	95	95
• Flow resistance [1] water	(z-value)	46	56	56	56	69
• Performance figure NL [2]	NL	1.6	2.1	1.4	1.7	2.4
Solar coil (permanently installed)						
• Heating surface	m²	2	3	-	2	3
• Contents	l	13.4	18.9	-	13.4	18.9
• Max. operating/test pressure	bar	10/15	10/15	-	10/15	10/15
• Max. operating temperature	°C	110	110	-	110	110
• Flow resistance [1] water/glycol 50 %	(z-value)	19	25	-	19	25
• Number of collectors (max. - gross at 2.5 m²)	pieces	4	6	-	4	6
• For flat plate collector [3] up to approx.	m²	10	15	-	10	15

[1] Flow resistance in mbar = flow rate $(m^3/h)^2$ x z (1 mbar = 0.1 kPa)

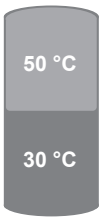
[2] Performance figure NL with hot water 10/45 °C, stocking 50 % with 60 °C / 50 % with 30 °C, without supplemental heating

[3] Collector surface area, with regard to coil heating surface only

Hot water outputs 45 °C

Heating function with heat generator, heating flow 50 °C

Domestic water: 10 °C/45 °C



Output capacity/tapping capacity/fitting flow rate 10 l/min

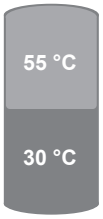
Supplemental heating output [kW]	Tapping volume [l/h]				
	VarioVal RHS		VarioVal RL	VarioVal RLS	
	800	1000	600	800	1000
0			110	140	180
5			140	170	230
10			190	230	300
15			290	360	470
20			540	600	600
25			600	600	600
30			600	600	600
35			600	600	600

Output capacity/tapping capacity/fitting flow rate 15 l/min

Supplemental heating output [kW]	Tapping volume [l/h]				
	VarioVal RHS		VarioVal RL	VarioVal RLS	
	800	1000	600	800	1000
0			60	70	110
5			70	90	130
10			90	100	150
15			110	130	190
20			140	170	240
25			200	240	340
30			320	380	540
35			590	690	900

Heating function with heat generator, heating flow 55 °C

Domestic water: 10 °C/45 °C



Output capacity/tapping capacity/fitting flow rate 10 l/min

Supplemental heating output [kW]	Tapping volume [l/h]				
	VarioVal RHS		VarioVal RL	VarioVal RLS	
	800	1000	600	800	1000
0	220	270	180	230	280
5	280	340	230	290	360
10	370	460	310	400	480
15	570	600	480	540	600
20	600	600	600	600	600
25	600	600	600	600	600
30	600	600	600	600	600
35	600	600	600	600	600

Output capacity/tapping capacity/fitting flow rate 15 l/min

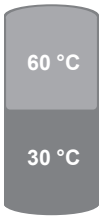
Supplemental heating output [kW]	Tapping volume [l/h]				
	VarioVal RHS		VarioVal RL	VarioVal RLS	
	800	1000	600	800	1000
0	150	190	130	170	210
5	170	220	150	190	250
10	200	260	180	230	300
15	250	320	220	280	370
20	330	420	280	360	480
25	470	590	400	520	670
30	700	900	600	800	900
35	900	900	900	900	900

Output capacity/tapping capacity/fitting flow rate 20 l/min

Supplemental heating output [kW]	Tapping volume [l/h]				
	VarioVal RHS		VarioVal RL	VarioVal RLS	
	800	1000	600	800	1000
0	80	110	70	100	150
5	90	120	80	110	160
10	100	140	90	120	190
15	110	160	110	140	210
20	130	190	130	170	250
25	160	230	150	200	300
30	200	300	190	260	380
35	270	400	260	340	520

Heating function with heat generator, heating flow 60 °C

Domestic water: 10 °C/45 °C



Output capacity/tapping capacity/fitting flow rate 10 l/min

Supplemental heating output [kW]	Tapping volume [l/h]				
	VarioVal RHS		VarioVal RL	VarioVal RLS	
	800	1000	600	800	1000
0	290	350	240	310	370
5	360	440	310	390	470
10	490	600	420	520	570
15	600	600	600	600	600
20	600	600	600	600	600
25	600	600	600	600	600
30	600	600	600	600	600
35	600	600	600	600	600

Output capacity/tapping capacity/fitting flow rate 15 l/min

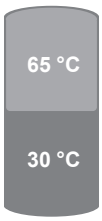
Supplemental heating output [kW]	Tapping volume [l/h]				
	VarioVal RHS		VarioVal RL	VarioVal RLS	
	800	1000	600	800	1000
0	220	280	190	240	300
5	250	320	220	280	350
10	300	380	260	330	410
15	370	480	320	410	510
20	480	620	420	530	660
25	690	880	580	740	800
30	900	900	900	900	900
35	900	900	900	900	900

Output capacity/tapping capacity/fitting flow rate 20 l/min

Supplemental heating output [kW]	Tapping volume [l/h]				
	VarioVal RHS		VarioVal RL	VarioVal RLS	
	800	1000	600	800	1000
0	160	220	130	170	230
5	180	240	150	190	260
10	200	270	170	220	290
15	230	310	190	250	340
20	270	370	230	290	400
25	320	440	280	350	480
30	400	560	350	440	600
35	540	740	460	590	800

Heating function with heat generator, heating flow 65 °C

Domestic water: 10 °C/45 °C



Output capacity/tapping capacity/fitting flow rate 10 l/min

Supplemental heating output [kW]	Tapping volume [l/h]				
	VarioVal RHS		VarioVal RL	VarioVal RLS	
	800	1000	600	800	1000
0	360	430	300	380	450
5	450	550	380	480	570
10	550	600	510	580	600
15	600	600	600	600	600
20	600	600	600	600	600
25	600	600	600	600	600
30	600	600	600	600	600
35	600	600	600	600	600

Output capacity/tapping capacity/fitting flow rate 15 l/min

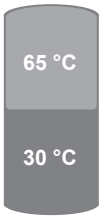
Supplemental heating output [kW]	Tapping volume [l/h]				
	VarioVal RHS		VarioVal RL	VarioVal RLS	
	800	1000	600	800	1000
0	290	360	250	310	380
5	330	420	290	360	440
10	400	500	340	430	520
15	490	610	420	530	650
20	640	800	540	690	840
25	900	900	770	820	900
30	900	900	900	900	900
35	900	900	900	900	900

Output capacity/tapping capacity/fitting flow rate 20 l/min

Supplemental heating output [kW]	Tapping volume [l/h]				
	VarioVal RHS		VarioVal RL	VarioVal RLS	
	800	1000	600	800	1000
0	220	290	190	250	320
5	250	330	210	280	350
10	280	370	240	320	400
15	320	430	280	360	460
20	380	500	330	430	540
25	460	600	400	520	650
30	580	750	500	650	820
35	780	1000	650	850	1000

Hot water outputs 60 °C

Heating function with heat generator, heating flow 65 °C (stratification variant 1)



Domestic water: 10 °C/60 °C

Output capacity/tapping capacity/fitting flow rate 10 l/min

Supplemental heating output [kW]	Tapping volume [l/h]				
	VarioVal RHS		VarioVal RL	VarioVal RLS	
	800	1000	600	800	1000
0	70	110	70	90	130
5	90	140	90	120	160
10	130	180	120	160	210
15	200	280	190	240	330
20	380	540	370	470	570
25	600	600	600	600	600
30	600	600	600	600	600
35	600	600	600	600	600

Output capacity/tapping capacity/fitting flow rate 15 l/min

Supplemental heating output [kW]	Tapping volume [l/h]				
	VarioVal RHS		VarioVal RL	VarioVal RLS	
	800	1000	600	800	1000
0	30	60	35	50	70
5	35	70	40	60	85
10	40	80	50	70	100
15	50	100	60	90	130
20	60	130	70	110	170
25	90	180	110	160	240
30	140	290	170	260	380
35	250	530	310	470	650

Heating function with heat generator, heating flow 65 °C (stratification variant 2)

Domestic water: 10 °C/60 °C

Output capacity/tapping capacity/fitting flow rate 10 l/min

Supplemental heating output [kW]	Tapping volume [l/h]				
	VarioVal RHS		VarioVal RL	VarioVal RLS	
	800	1000	600	800	1000
0	40	70	40	60	80
5	50	90	50	70	100
10	60	120	70	100	140
15	100	180	100	150	220
20	190	340	200	300	420
25	490	600	500	600	600
30	600	600	600	600	600
35	600	600	600	600	600

Output capacity/tapping capacity/fitting flow rate 15 l/min

Supplemental heating output [kW]	Tapping volume [l/h]				
	VarioVal RHS		VarioVal RL	VarioVal RLS	
	800	1000	600	800	1000
0	30	35	35	35	40
5	30	35	35	35	50
10	30	40	35	40	60
15	30	50	35	50	80
20	30	70	40	70	100
25	30	100	50	100	150
30	40	160	60	150	240
35	80	300	100	280	430

Heating function with heat generator, heating flow 70 °C

Domestic water: 10 °C/60 °C

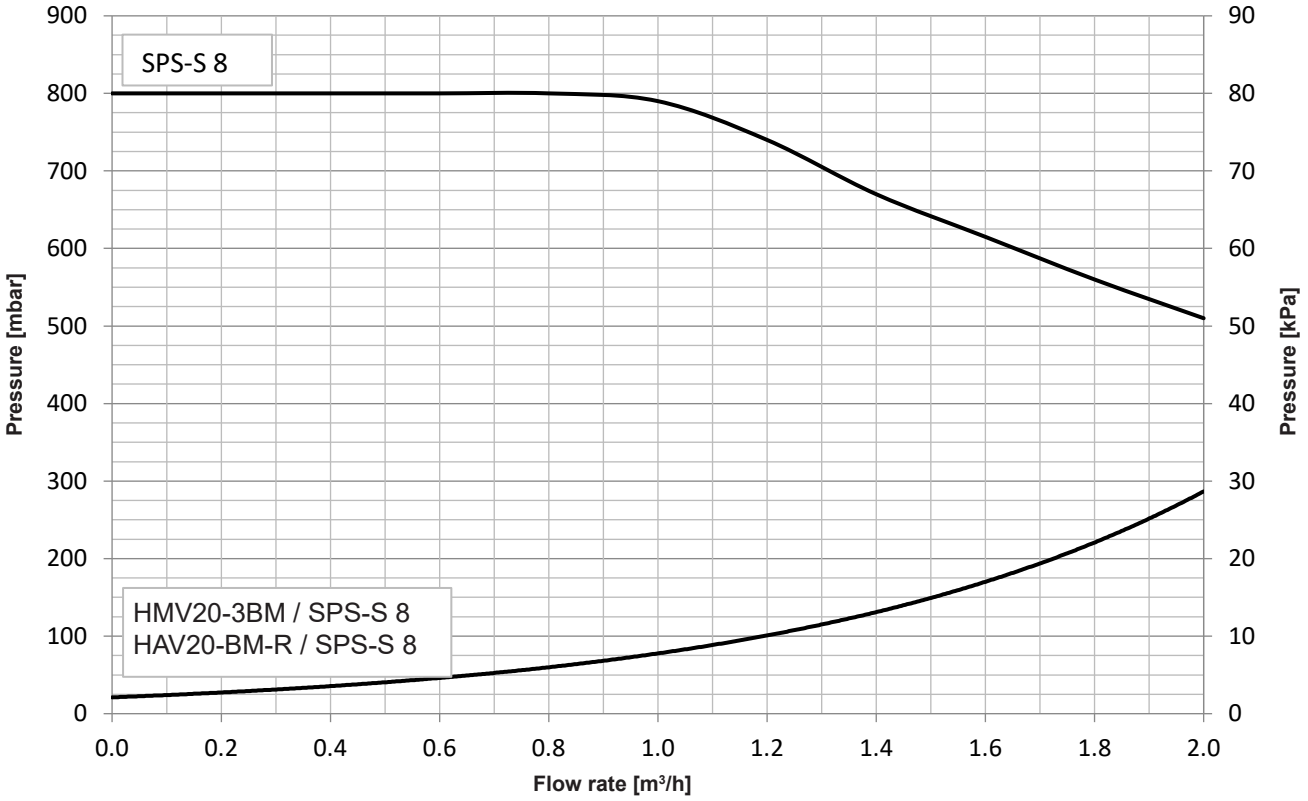
Output capacity/tapping capacity/fitting flow rate 10 l/min

Supplemental heating output [kW]	Tapping volume [l/h]				
	VarioVal RHS		VarioVal RL	VarioVal RLS	
	800	1000	600	800	1000
0	80	120	70	90	130
5	100	150	90	120	160
10	140	200	130	160	220
15	210	310	190	240	340
20	410	590	370	470	600
25	600	600	600	600	600
30	600	600	600	600	600
35	600	600	600	600	600

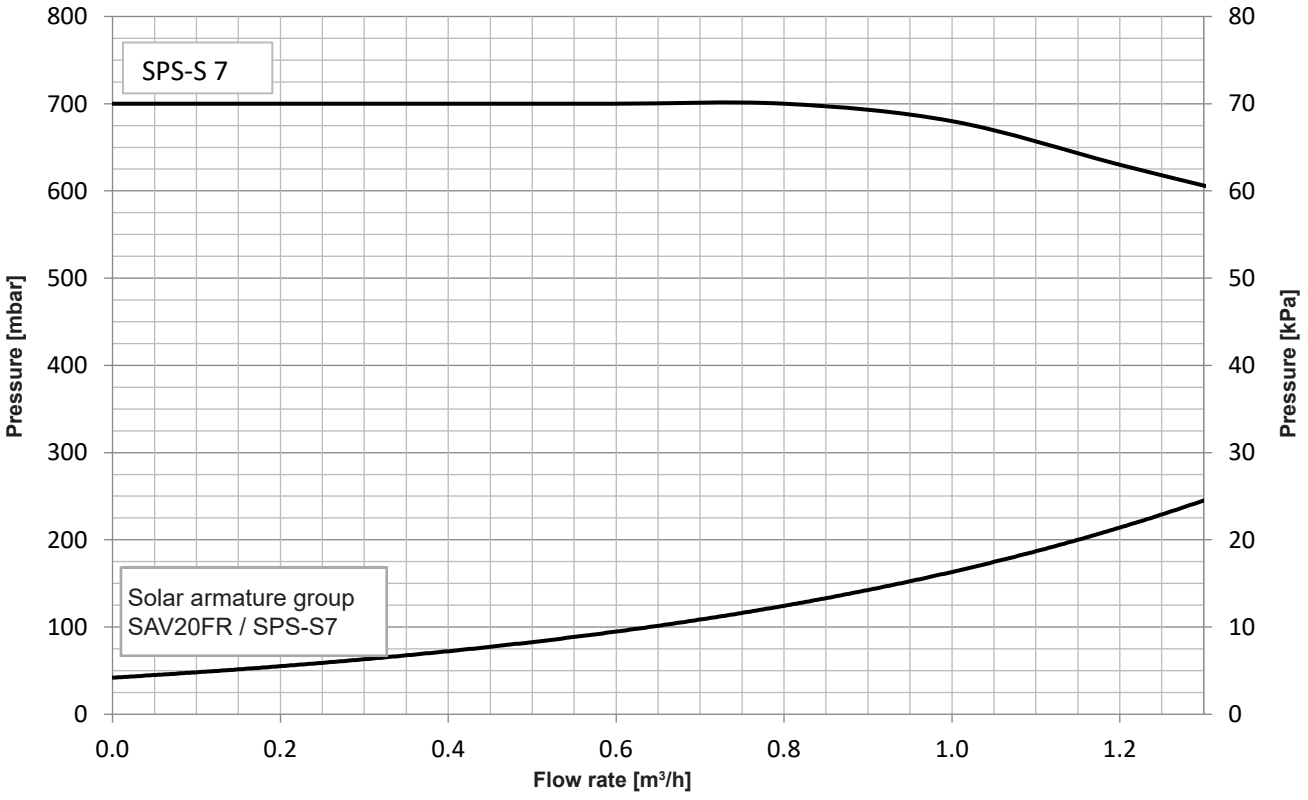
Output capacity/tapping capacity/fitting flow rate 15 l/min

Supplemental heating output [kW]	Tapping volume [l/h]				
	VarioVal RHS		VarioVal RL	VarioVal RLS	
	800	1000	600	800	1000
0	30	70	35	40	80
5	30	80	40	50	90
10	40	100	50	60	110
15	50	120	60	70	140
20	70	160	80	100	180
25	100	220	110	140	260
30	170	350	180	220	420
35	300	600	330	400	750

Residual overpressure heating module HMV20-3BM

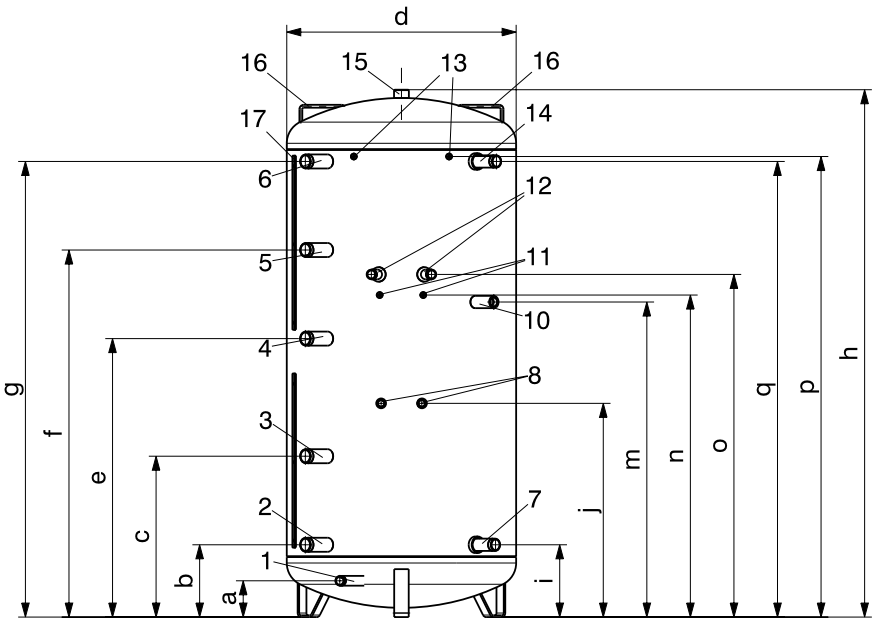


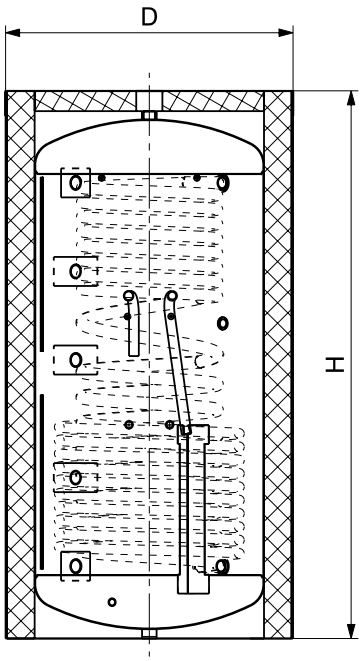
Residual overpressures solar armature group SAV20FR

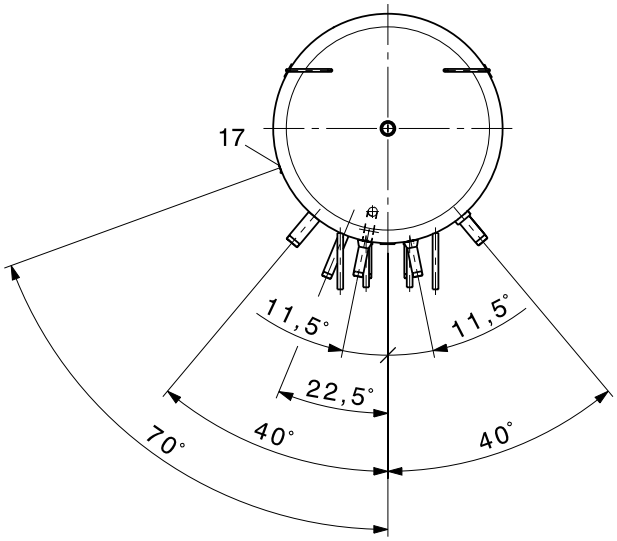


VarioVal RHS (800,1000)

(Dimensions in mm)







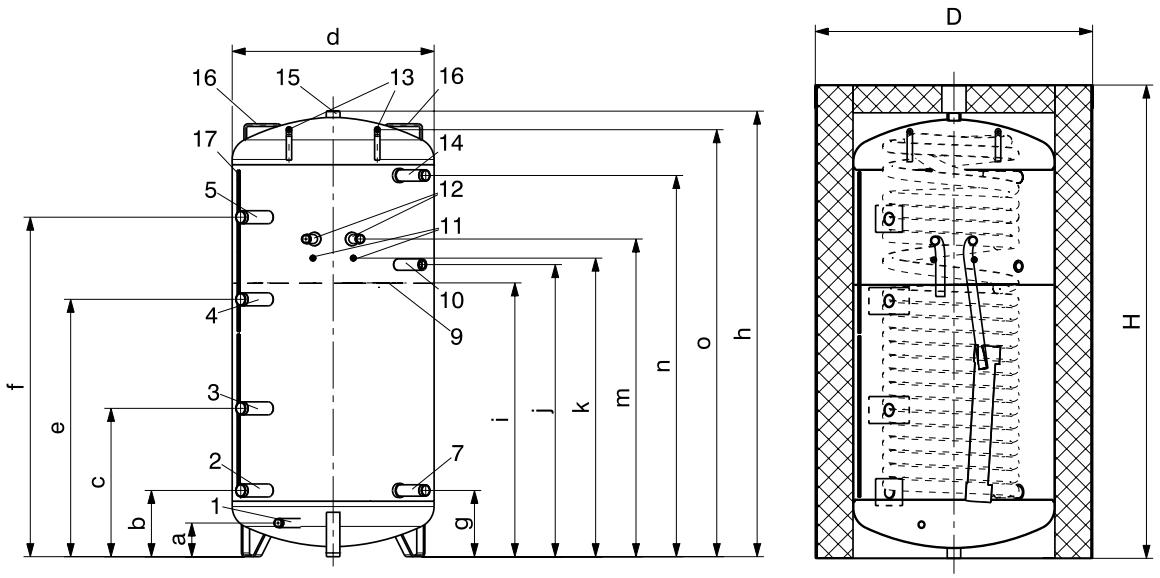
1	Drain	G 1″ (ext. thread)
2	Heat generator connection bottom (inflow restrictor)	G 1½″ (ext. thread)
3	Heat generator connection 2 - bottom (inflow restrictor)	G 1½″ (ext. thread)
4	Heat generator connection middle (inflow restrictor)	G 1½″ (ext. thread)
5	Heat generator connection 2 - top (single-layer pipe)	G 1½″ (ext. thread)
6	Heat generator connection top (inflow restrictor)	G 1½″ (ext. thread)
7	Domestic water cold (corrugated pipe)	R 1¼″ (ext. thread)
8	Flow solar circuit (left) and return solar circuit (right)	G ¾″ (ext. thread)
10	Connection for screw-in electric heating element	Rp 1½″ (int. thread)
11	Fixing bolts bottom left and right for heating module	M10 (int. thread)
12	Flow heating (left) and return heating (right)	G 1″ (ext. thread)
13	Fixing bolts top left and right for heating module	M10 (int. thread)
14	Hot domestic water (corrugated tube, connection for circulation kit with reducer)	R 1¼″ (ext. thread)
15	Possible air vent	Rp 1¼″ (int. thread)
16	Carry handle (2 x)	
17	Sensor terminal strip (type (800) 2 x, type (1000) 3 x)	

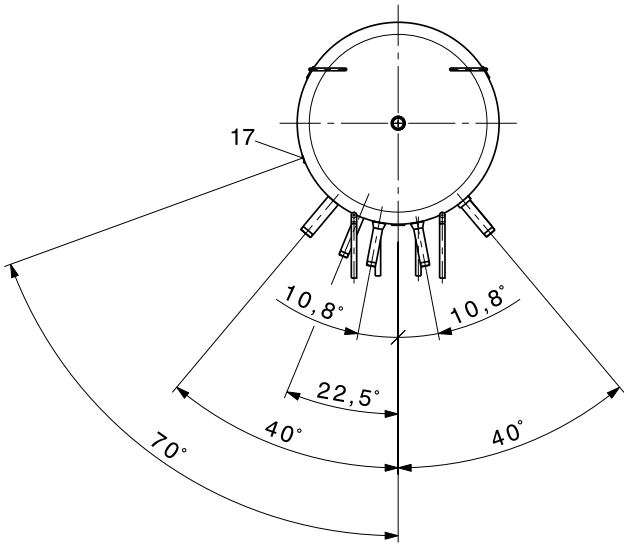
Deviations possible as a result of manufacturing tolerances.
Dimensions +/- 10 mm

VarioVal RHS type	D	d	H	h	a	b	c	e	f	g	i	j	m	n	o	p	q	Tilting dimension
(800)	990	790	1886	1816	125	249	554	959	1264	1569	249	736	1085	1109	1180	1586	1569	1828
(1000)	990	790	2086	2016	125	249	554	959	1264	1569	249	870	1085	1243	1314	1720	1769	2030

VarioVal RL (600)

(Dimensions in mm)





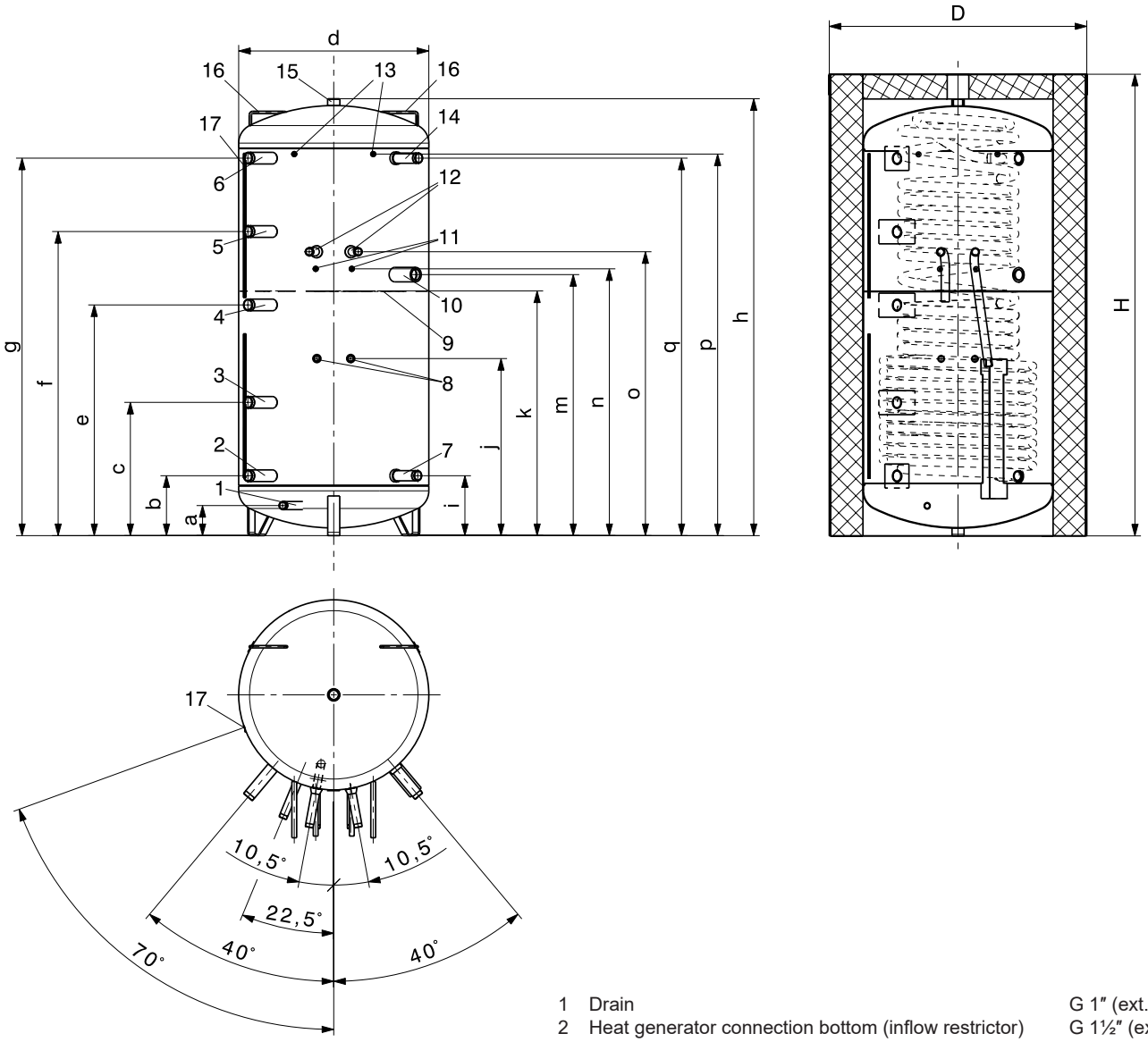
1	Drain	G 1″ (ext. thread)
2	Heat generator connection bottom (inflow restrictor)	G 1½″ (ext. thread)
3	Heat generator connection 2 - bottom (inflow restrictor)	G 1½″ (ext. thread)
4	Heat generator connection middle (inflow restrictor)	G 1½″ (ext. thread)
5	Heat generator connection 2 - top (single-layer pipe)	G 1½″ (ext. thread)
7	Domestic water cold (corrugated pipe)	R 1¼″ (ext. thread)
9	Separating plate	
10	Connection for screw-in electric heating element	Rp 1½″ (int. thread)
11	Fixing bolts bottom left and right for heating module	M10 (int. thread)
12	Flow heating (left) and return heating (right)	G 1″ (ext. thread)
13	Fixing bolts top left and right for heating module	M10 (int. thread)
14	Hot domestic water (corrugated tube, connection for circulation kit with reducer)	R 1¼″ (ext. thread)
15	Possible air vent	Rp 1¼″ (int. thread)
16	Carry handle (2 x)	
17	Sensor terminal bar (2 x)	

Deviations possible as a result of manufacturing tolerances.
Dimensions +/- 10 mm

VarioVal RL type	D	d	H	h	a	b	c	e	f	g	i	j	k	m	n	o	Tilting dimension
(600)	1030	750	1758	1655	125	246	551	956	1261	246	1017	1085	1109	1180	1416	1586	1670

VarioVal RLS (800,1000)

(Dimensions in mm)



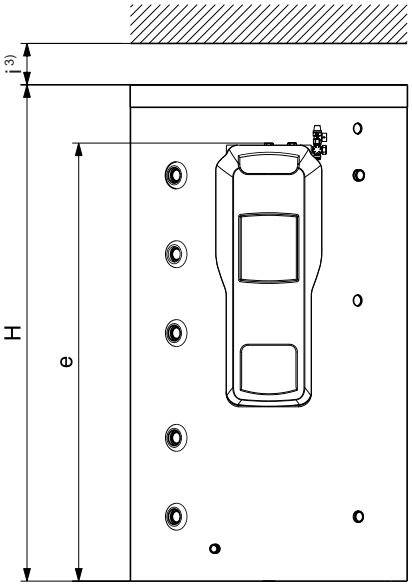
1	Drain	G 1″ (ext. thread)
2	Heat generator connection bottom (inflow restrictor)	G 1½″ (ext. thread)
3	Heat generator connection 2 - bottom (inflow restrictor)	G 1½″ (ext. thread)
4	Heat generator connection middle (inflow restrictor)	G 1½″ (ext. thread)
5	Heat generator connection 2 - top (single-layer pipe)	G 1½″ (ext. thread)
6	Heat generator connection top (inflow restrictor)	G 1½″ (ext. thread)
7	Domestic water cold (corrugated pipe)	R 1¼″ (ext. thread)
8	Flow solar circuit (left) and return solar circuit (right)	G ¾″ (ext. thread)
9	Separating plate	
10	Connection for screw-in electric heating element	Rp 1½″ (int. thread)
11	Fixing bolts bottom left and right for heating module	M10 (int. thread)
12	Flow heating (left) and return heating (right)	G 1″ (ext. thread)
13	Fixing bolts top left and right for heating module	M10 (int. thread)
14	Hot domestic water (corrugated tube, connection for circulation kit with reducer)	Rp 1¼″ (int. thread)
15	Possible air vent	Rp 1¼″ (int. thread)
16	Carry handle (2 x)	
17	Sensor terminal strip (type (800) 2 x, type (1000) 3 x)	

Deviations possible as a result of manufacturing tolerances.
Dimensions +/- 10 mm

VarioVal RLS type	D	d	H	h	a	b	c	e	f	g	i	j	k	m	n	o	p	q	Tilting dimension
(800)	1070	790	1919	1816	125	249	554	959	1264	1569	249	736	1017	1085	1109	1180	1586	1569	1828
(1000)	1070	790	2119	2016	125	249	554	959	1264	1569	249	870	1009	1085	1243	1314	1720	1769	2030

Space requirements

Installation example - VarioVal RLS:
- Heating module HMV20-3BM
- Heating armature group HAV20-3BM-R
- Solar armature group SAV20FR



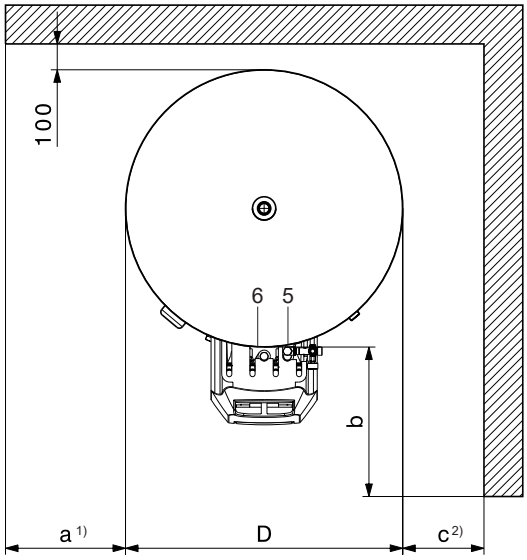
Notices on operation and accessibility
- Preferably place calorifier to the right of the heat generator.
- The operating side must be easily accessible.

VarioVal type	a 1)	b	c 2)	D	e	H	i 3)
RL (600)	≥ 300	≥ 1000	≥ 650	1030	1694	1758	≥ 160
RLS (800)	≥ 300	≥ 1000	≥ 650	1070	1694	1919	≥ 160
RLS (1000)	≥ 300	≥ 1000	≥ 650	1070	1828	2119	≥ 160
RHS (800)	≥ 300	≥ 1000	≥ 650	990	1694	1886	≥ 160
RHS (1000)	≥ 300	≥ 1000	≥ 650	990	1828	2086	≥ 160

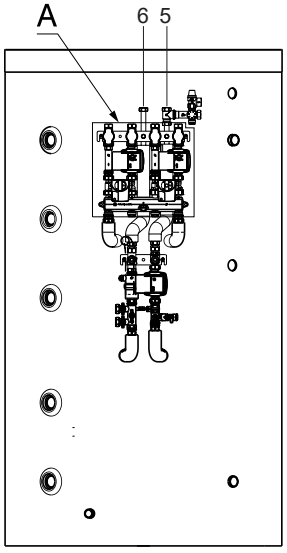
1) Clearance left according to heat generator:
- It must be possible to open the thermal insulation (necessary for positioning the sensors in the terminal strips).

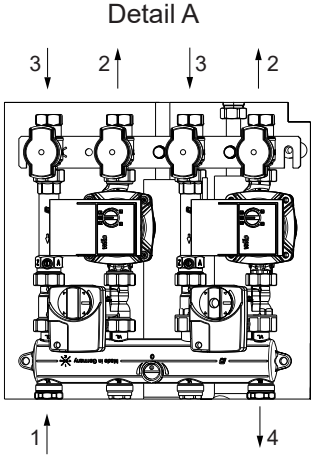
2) Clearance right:
- It must be possible to fit and remove the following:
  - Diaphragm pressure expansion tank
  - Screw-in electric heating element (option)
  - Hot domestic water and cold domestic water (corrugated tube)

3) Clearance from the ceiling, top:
- It must be possible to fit a safety kit if required.



Hydraulic connections heating module, heating and solar armature group





1	Heating flow	G 1″ (ET)
2	Flow heating circuit	Rp ¾″ (IT)
3	Return heating circuit	Rp ¾″ (IT)
4	Heating return	G 1″ (ET)
5	Solar circuit return	G ¾″ (IT)
6	Solar circuit flow	G ¾″ (IT)

Hoval electric heating element

Screw-in electric heating element
Type EP 2.5 to EP 5
The electric heating element consists of three U-shaped round heating rods and a thermostat protection tube mounted in a 1½″ brass nipple, a flat seal is included in the scope of delivery. Due to the insulated installation of the round heating rods, the units are also suitable for enamelled calorifiers. The unheated zone is 150 mm for all outputs.

Flange-mounted electric heating element
Type EFHK-E/-C 4 to 9
The electric heating element consists of three U-shaped round heating rods, each pressed into a press nipple. These are screwed onto a stainless steel flange with thermostat protection tube, a flange seal (EPDM) is included in the scope of delivery. A food-safe plastic disc (PVDF) serves as insulation. The unheated zone is 100 mm for all outputs.

Features for all electric heating element types
- TR: Electromechanical temperature controller
- STB: Electromechanical safety temperature limiter
- Rotary knob with temperature display
- Incoloy® alloy 825 heating rods
- Connection 3 x 400 V
- Not suitable for exclusively electric heating (risk of limescale buildup)

Delivery
Included in separate packaging

On site
Installation of the electric heating element

EP EFHK-E/C

Range type	Output kW	Installation length mm
Screw-in electric heating element for enamelled calorifiers, stainless steel calorifiers and buffer storage tank		
EP-2.5-1½″	2.35	390
EP-3.5-1½″	3.6	500
EP-5.0-1½″	4.9	620
EP-7.5-1½″	7.5	850
Flange-mounted electric heating element for enamelled calorifiers and buffer storage tank		
EFHK-E-4-180	4.0	380
EFHK-E-6-180	6.0	460
EFHK-E-9-180	9.0	615
Flange-mounted electric heating element for stainless steel calorifier		
EFHK-C-4-180	4.0	380
EFHK-C-6-180	6.0	460
EFHK-C-9-180	8.5	670

Electric heating elements

Screw-in electric heating element
for enamelled calorifiers, stainless steel calorifiers and buffer storage tank
- Incoloy® alloy 825 heating rods
- Brass nipple G 1½"
- Medium: DHW and heating water
- Unheated zone: 150 mm
- Setting range: 7...34...80 °C
- Safety temperature limiter: 95 °C
- Protection class: IP54
- Casing: approx. 90 x 90 x 140 mm
- Max. operating pressure: 10 bar
- Delivered separately, installation on site
- Not suitable for exclusively electric heating (risk of limescale buildup).

EP type	Heat output kW	Output levels V	Installation length mm	Part No.
2.5	2.35	3 x 400 (1 x 230)	390	6059 778
3.5	3.6	3 x 400	500	6059 779
5.0	4.9	3 x 400	620	6059 780
7.5	7.5	3 x 400	850	6059 781

Flange-mounted electric heating element
for enamelled calorifiers and buffer storage tanks
- Incoloy® alloy 825 heating rods
- Stainless steel flange Ø 180 mm
- Medium: DHW and heating water
- Unheated zone: 100 mm
- Setting range: 7...34...80°C
- Safety temperature limiter: 95 °C
- Protection class: IPX0
- Casing: approx. Ø 185 x 103 mm
- Max. operating pressure: 10 bar
- Delivered separately, installation on site
- Not suitable for exclusively electric heating (risk of limescale buildup).

EFHK-E type	Heat output 3 x 400 V kW	changeable to	Installation length mm	Part No.
4-180	4.0		380	6053 353
		2.6 kW/3 x 400 V		
		2.0 kW/3 x 400 V		
		1.3 kW/3 x 400 V		
		1.3 kW/1 x 230 V		
6-180	6.0		460	6053 354
		4.0 kW/3 x 400 V		
		3.0 kW/3 x 400 V		
		2.0 kW/3 x 400 V		
		2.0 kW/1 x 230 V		
9-180	9.0		615	6052 438
		5.7 kW/3 x 400 V		
		4.2 kW/3 x 400 V		
		2.8 kW/3 x 400 V		
		2.8 kW/1 x 230 V		

	Part No.
 **E-flange radiator EFHK-E-9-250** Output 8.5 kW, 3 x 400 V For horizontal installation in the enamelled calorifier with flange diameter 257 mm, pitch circle 225 mm Consisting of: 1 adjustable temperature controller 3 heating rods made of material 2.4858 1 safety temperature limiter 1 glue-on rosette Technical data: Output 8.5 kW Connection 3 x 400 V Plastic cover Installation length 615 mm Suitable for EnerVal G (1500-6000)	6053 355

Services

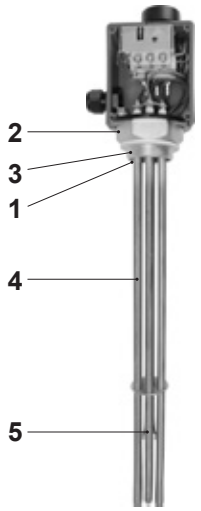
Commissioning
Commissioning by works service or Hoval trained authorised serviceman/company is condition for warranty.

For commissioning and other services please contact your Hoval sales office.

Type		Screw-in electric heating element EP 2.5 to 5	Flange-mounted electric heating element EFHK-E / -C 4 to 9
Temperature setting range	°C	7...34...80	7...34...80
Switch-off temperature	°C	95	95
Ambient temperature at the switchgear	°C	max. 80	max. 80
Thermal switching difference	K	8 ± 4	8 ± 4
Ambient temperature during storage and transport	°C	-12...+80	-12...+80
Flange/thread size		G 1½″ (conical)	External Ø 180 mm, pitch circle Ø 150 mm, 8 x M10
Flange/thread connection material		Brass (CuZn40Pb2)	stainless steel (1.4404) Seal: EPDM (KTW approval)
Round heating rods		Incoloy® alloy 825, 2.4858	Incoloy® alloy 825, 2.4858
Surface load	W/cm²	approx. 7	approx. 5
Electrical connection		Screw terminals, PG screwed cable gland	Spring-cage terminals, strain relief, lead-through
Operating pressure	bar	Max. 10	Max. 10
Casing top part		Polycarbonate, RAL 3000 (red)	ABS, black
Type of protection		IP54	IPX0
Dimensions		See dimensional drawing	See dimensional drawing

Screw-in electric heating element

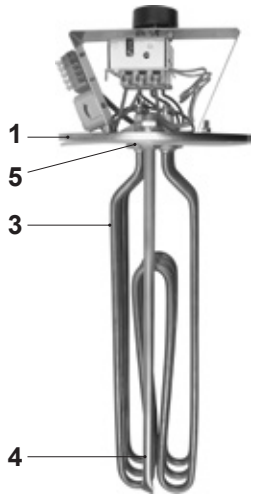
1. Screw-in electric heating element with insulated installation of the round heating rods which are suitable for enamelled as well as black steel calorifiers and, thanks to DIP switch, also for stainless steel calorifiers
2. Standard hexagon profile for secure tightening with 60 mm open-end spanner
3. Cylindrical thread for precise casing position and tight mounting
4. Surface load 7 W/cm²
5. Sensor position in the immersion tube for identical temperature detection of safety temperature limiter and temperature controller



Shown without cover

Flange-mounted electric heating element

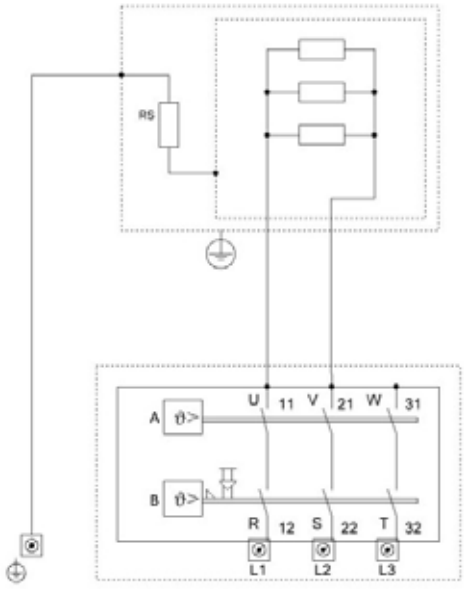
1. Standard flange Ø 180 mm, EFHK-E suitable for enamelled as well as black steel calorifiers and, with EFHK-C, also suitable for stainless steel calorifiers thanks to mounted plastic insulating plate
2. Delivery incl. EPDM flat seal (enclosed loose)
3. Low surface load 5 W/cm², for less calcification
4. Sensor position in the immersion tube for identical temperature detection of safety temperature limiter and temperature controller
5. Insulated mounting of the heating rods for reduced corrosion



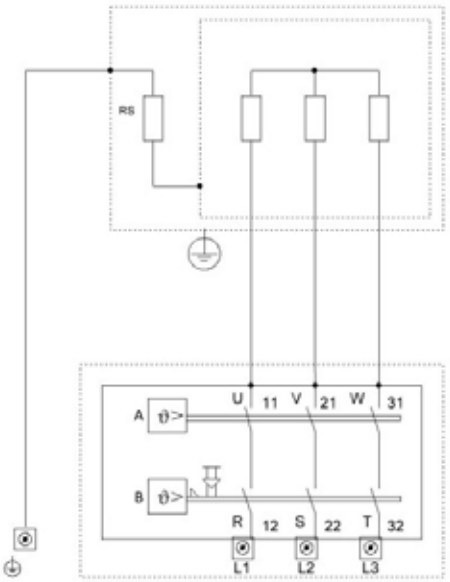
Shown without cover

Connection diagram screw-in electric heating element

230 V: P to L1 / N to L2



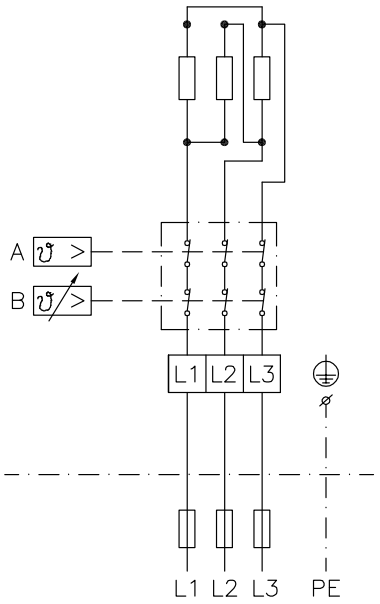
3 ~ 400 V: L1 / L2 / L3



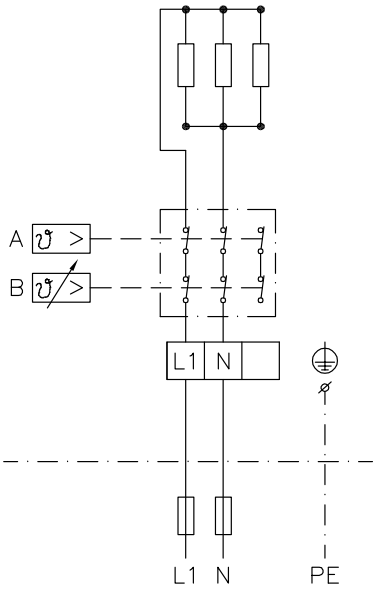
A) Temperature controller
B) Safety temperature limiter

Connection diagram flange-mounted electric heating element

3 x 400 V Δ: L1 / L2 / L3

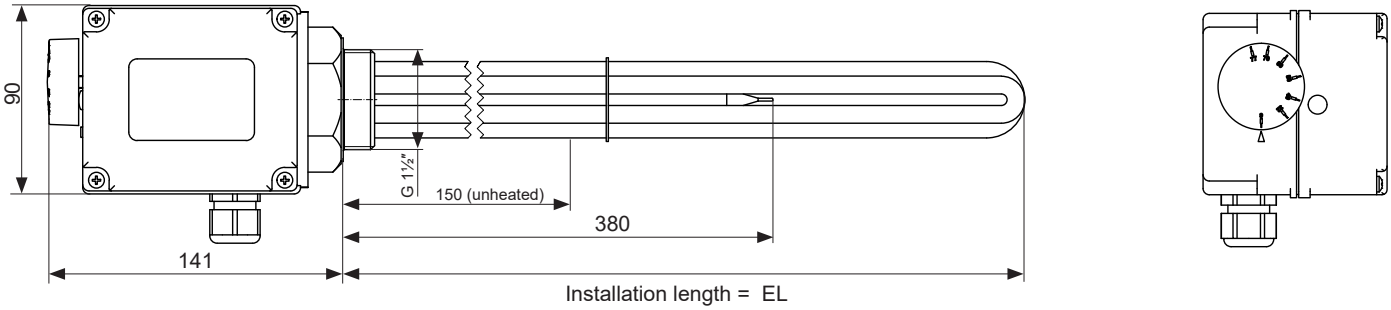


230 V Δ: L1 su N

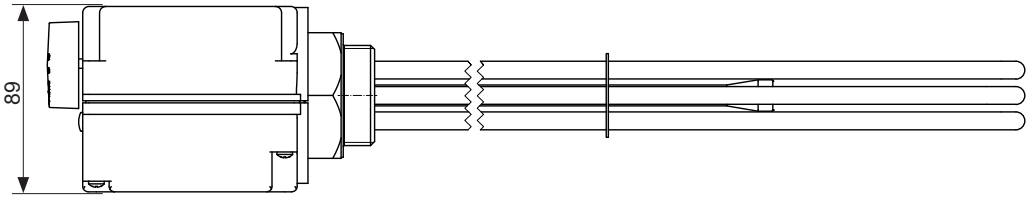


Screw-in electric heating element
(Dimensions in mm)

EP 2.5 / 3.5 / 5.0 / 7.5
for enamelled calorifiers, stainless steel calorifiers and buffer storage tanks

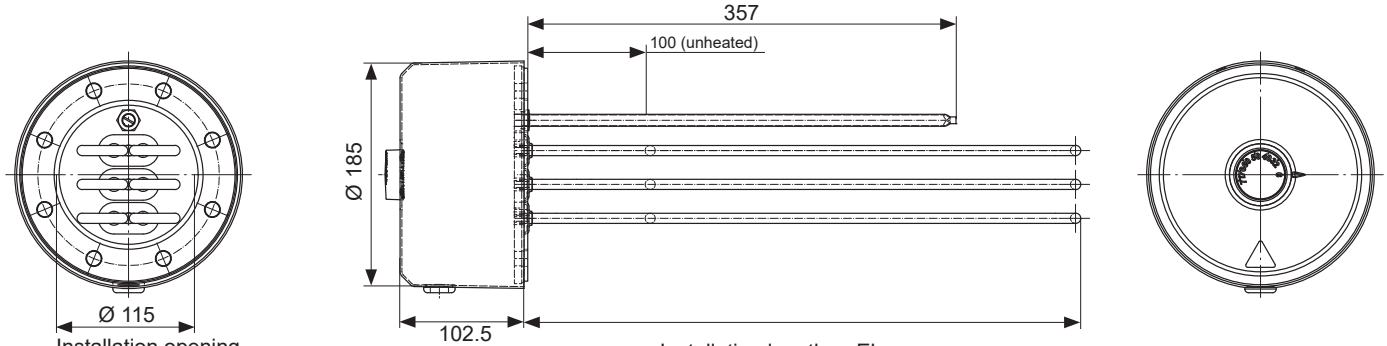


Installation length =	EL
EP 2.5	390
EP 3.5	500
EP 5.0	620
EP 7.5	850



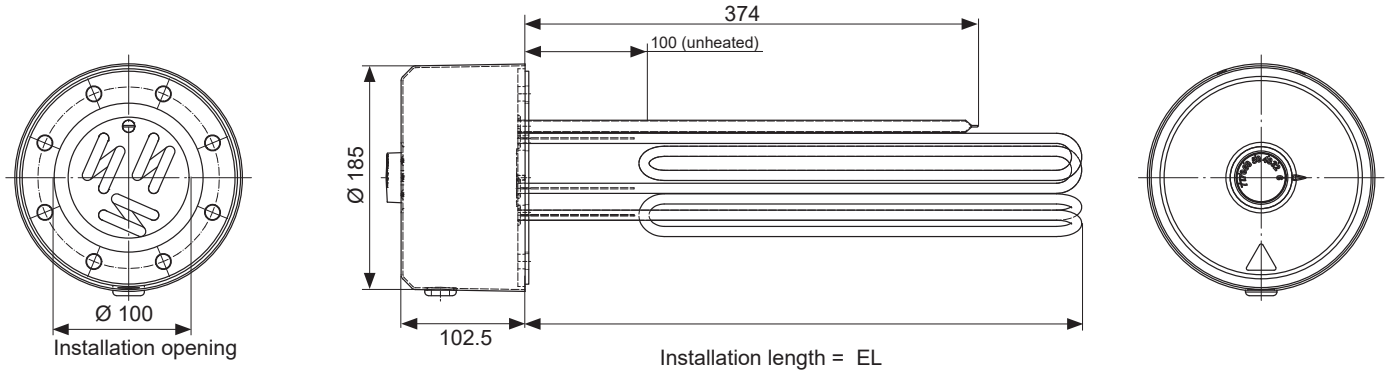
Flange-mounted electric heating element
(Dimensions in mm)

EFHK-E-4 / 6 / 9-180
for enamelled calorifiers and buffer storage tanks



Installation length =	EL
EFHK-E-4-180	380
EFHK-E-6-180	460
EFHK-E-9-180	615

EFHK-C-4 / 6 / 9-180
for stainless steel calorifiers



Installation length =	EL
EFHK-C-4-180	380
EFHK-C-6-180	460
EFHK-C-9-180	670

Calorifier / storage tank	Flange-mounted electric heating element												Screw-in electric heating element			
	EFHK-E-4-180 4.0 kW		EFHK-E-6-180 6.0 kW		EFHK-E-9-180 8.5 kW		EFHK-C-4-180 4.0 kW		EFHK-C-6-180 6.0 kW		EFHK-C-9-180 9.0 kW		EP 2.5 2.35 kW	EP 3.5 3.6 kW	EP 5 4.9 kW	EP 7.5 7.5 kW
Installation type	Flange Ø 180												Sleeve 1½"			
Installation position	top	bottom	top	bottom	top	bottom	top	bottom	top	bottom	top	bottom				
Stainless steel calorifier																
CombiVal C																
CombiVal C (200)								●		●						
CombiVal C (300)								●		●						
CombiVal C (400)								●		●						
CombiVal C (500)								●		●						
CombiVal C (750)								●		●		●				
CombiVal C (1000)								●		●		●				
CombiVal C (1500)							●	●	●	●	●	●				
CombiVal C (2000)							●	●	●	●	●	●				
CombiVal C (2500)								●		●		●				
CombiVal CR																
CombiVal CR (200)								●		●			●	●		
CombiVal CR (300)								●		●			●	●		
CombiVal CR (500)								●		●			●	●	●	
CombiVal CR (800)							●	●	●	●	●	●				
CombiVal CR (1000)							●	●	●	●	●	●				
CombiVal CSR																
CombiVal CSR (300)								●		●			●	●		
CombiVal CSR (400)								●		●			●	●	●	
CombiVal CSR (500)								●		●			●	●	●	
CombiVal CSR (800)							●	●	●	●	●	●				
CombiVal CSR (1000)							●	●	●	●	●	●				
CombiVal CSR (1250)							●	●	●	●	●	●				
CombiVal CSR (1500)							●	●	●	●	●	●				
CombiVal CSR (2000)							●	●	●	●	●	●				
MultiVal CRR																
MultiVal CRR (500)								●		●			●	●	●	
MultiVal CRR (800)							●	●	●	●	●	●				
MultiVal CRR (1000)							●	●	●	●	●	●				
MultiVal CSRR																
MultiVal CSRR (500)								●		●			●	●	●	
MultiVal CSRR (800)							●	●	●	●	●	●				
MultiVal CSRR (1000)							●	●	●	●	●	●				
MultiVal CSRR (1500)							●	●	●	●	●	●				
MultiVal CSRR (2000)							●	●	●	●	●	●				
Enamelled calorifier																
CombiVal E																
CombiVal E (300)		●		●												
CombiVal E (500)		●		●												
CombiVal E (800)		●		●		●										
CombiVal E (1000)		●		●		●										
CombiVal E (1500)	●	●	●	●	●	●										
CombiVal E (2000)	●	●	●	●	●	●										
CombiVal ER																
CombiVal ER (200)		●														
CombiVal ERW (200)		●														
CombiVal ER (300)		●		●												
CombiVal ER (400)		●		●												
CombiVal ER (500)		●		●												
CombiVal ER (800)		●		●		●										
CombiVal ER (1000)		●		●		●										
CombiVal ESR																
CombiVal ESR (200)		●														
CombiVal ESR (300)		●		●												
CombiVal ESR (400)		●		●												
CombiVal ESSR																
CombiVal ESSR (500)		●		●									●	●	●	
CombiVal ESSR (800)	●	●	●	●	●	●										
CombiVal ESSR (1000)	●	●	●	●	●	●										
CombiVal ERR																
MultiVal ERR (300)		●											●	●		
MultiVal ERR (400)		●		●									●	●	●	
MultiVal ERR (500)		●		●									●	●	●	
CombiVal ESRR																
MultiVal ESRR (500)		●		●									●	●		
MultiVal ESRR (800)	●	●	●	●	●	●										
MultiVal ESRR (1000)	●	●	●	●	●	●										

Calorifier / storage tank	Flange-mounted electric heating element												Screw-in electric heating element							
	EFHK-E-4-180 4.0 kW		EFHK-E-6-180 6.0 kW		EFHK-E-9-180 8.5 kW		EFHK-C-4-180 4.0 kW		EFHK-C-6-180 6.0 kW		EFHK-C-9-180 9.0 kW		EP 2.5 2.35 kW		EP 3.5 3.6 kW		EP 5 4.9 kW		EP 7.5 7.5 kW	
Installation type	Flange Ø 180												Sleeve 1½″							
Installation position	top	bottom	top	bottom	top	bottom	top	bottom	top	bottom	top	bottom	top	bottom	top	bottom	top	bottom	top	bottom
Buffer storage tank and combination storage tank																				
EnerVal																				
EnerVal (200)													●		●					
EnerVal (300)													●		●					
EnerVal (500)													●	●	●	●	●	●		
EnerVal (800)													●	●	●	●	●	●	●	●
EnerVal (1000)													●	●	●	●	●	●	●	●
EnerVal (1500)													●	●	●	●	●	●	●	●
EnerVal (2000)													●	●	●	●	●	●	●	●
EnerVal G																				
EnerVal G (800)	●	●	●	●	●	●														
EnerVal G (1000)	●	●	●	●	●	●														
EnerVal G (1500)	EFHK-E-9-250 8.5 kW Flange Ø 257 Installation position: top and bottom																			
EnerVal G (2000)																				
EnerVal G (2500)																				
EnerVal G (4000)																				
EnerVal G (6000)																				
EnerVal G cool																				
EnerVal G cool (800)													●		●		●		●	
EnerVal G cool (1000)													●		●		●		●	
EnerVal G cool (1500)													●		●		●		●	
EnerVal G cool (2500)													●		●		●		●	
EnerVal G cool (4000)													●		●		●		●	
EnerVal G cool (6000)													●		●		●		●	
VarioVal FLS/Rxx																				
VarioVal FLS (800)													●		●		●			
VarioVal FLS (1000)													●		●		●			
VarioVal RHS (800)													●		●		●			
VarioVal RHS (1000)													●		●		●			
VarioVal RL (600)													●		●		●			
VarioVal RLS (800)													●		●		●			
VarioVal RLS (1000)													●		●		●			

Photovoltaic electric heating element

Screw-in electric heating element type EP 3.5 bis EP 5.2
Screw-in electric heating element EP: The electric heating element consists of three U-shaped round heating rods, which are mounted in a conical brass nipple 1½″ insulated by means of food-safe plastic sleeves. Thanks to the insulated installation of the round heating elements, the devices are also suitable for enamelled storage tanks. The unheated zone is 150 mm for all outputs.

Flange-mounted electric heating element type EFHK-E / -C 3.5 bis 5.2
Flange-mounted electric heating element EFHK: The electric heating element consists of three U-shaped round heating rods, each pressed into a press nipple. These are screwed with the immersion sleeve onto a steel flange. A food-safe plastic disc serves as insulation. The unheated zone is 70 mm for all outputs.

Application
- As supplementary heating of service and heating water in photovoltaic systems.
- For optimisation of the internal consumption of PV energy.
- To minimise the switch-ons/cycles of the main heat generator e.g. exclusively hot water production in summer.

Features
- TR: Electromechanical temperature controller according to EN 14597, not unbreakable.
- STB: Electromechanical temperature limiter according to EN 14597, unbreakable, if the excess temperature is exceeded, the switchgear switches OFF and remains locked in this position. Unlocking is done manually after the sensor tube has cooled down by approx. 10 K.
  - Time constant of the sensor tube according to EN 14597
  - Mode of operation TR type 2 B according to EN 14597
  - Mode of operation STB type 2 BK according to EN 14597

Connections
The screw-in electric heating element is equipped with 4 connection sockets.
The flange-mounted electric heating element is equipped with 4 connection sockets.
All necessary plugs are included in the scope of delivery. After initial connection or commissioning by a qualified electrician, the device can be completely disconnected from the mains and the connection to the control unit by pulling out the plugs.

Function modes
Analog modes (0-10 V control signal)
The electric heating element can be controlled with a 0-10 V signal in 7 power levels.
From a voltage of 1.25 V, the device switches to the first heating stage. Each additional stage requires a voltage increase of 1.25 V.
From a voltage of 8.75 V, the device switches to the seventh heating stage. To avoid flickering, a hysteresis of 0.25 V is programmed in.

EP-PV EFHK-E/C-PV

Range type	Output kW	Installation length mm
Photovoltaic screw-in electric heating element for enamelled calorifiers and stainless steel calorifiers		
EP-3.5-1½″-PV	3.5	600
EP-4.4-1½″-PV	4.4	700
EP-5.2-1½″-PV	5.2	750
Photovoltaic flange-mounted electric heating element for enamelled calorifiers, stainless steel calorifiers and buffer storage tanks		
EFHK-E/C-3.5-180-PV	3.5	360
EFHK-E/C-4.4-180-PV	4.4	420
EFHK-E/C-5.8-180-PV	5.8	540

Modbus TCP
In this function, the device obtains an IP address via a local DHCP server (router). After the electric heating element has been integrated into the network, it can be controlled in 7 power levels and the temperature of the sensors can be read out. The power levels can be controlled via a value 0-7 or via a setpoint value specification (here the electric heating element independently selects the suitable power level).

Legionella protection
The automatic legionella protection automatically heats the system to min. 65 °C daily/weekly or fortnightly. If the temperature of 65 °C is reached within the interval, regardless of the legionella protection program, the interval timer starts over from this point.
The parameters can be configured via Modbus or MQTT.

Request contact of the main heat generator
If a heat pump is available, the device can be used as a supplementary heater. The heat pump is controlled via a digital input, which activates the full heating output (level 7).

Emergency operation
The device has a push-button with which the full heating power (level 7) can be switched on and off manually at any time. This function is automatically deactivated after 24 hours of continuous operation.

Corrosion protection
The setting must be selected depending on the storage type:
- Leave buffer storage tank or enamelled tanks slide switch in position “2” (factory setting)
- Stainless steel tank
  slide switch to be set to “ON” position

Failure to observe this may result in corrosion damage to the device and storage tank.

Web interface
- Setting setpoint temperatures for minimum temperature, request temperature, legionella protection temperatures, low-tariff temperature
- Reading out the control signals
- Reading out actual temperatures
- Reading out operating hours
- Setting up the Modbus configuration or direct communication with SMA or SENEC

Photovoltaic electric heating elements

Photovoltaic screw-in electric heating element
for enamelled calorifiers and
stainless steel calorifiers
- Incoloy® alloy 825 heating rods
- Brass nipple R 1½″
- LAN, Modbus TCP, 0-10 V DC
- Medium: DHW and heating water
- Voltage: 3 x 400 V
- Unheated zone: 150 mm
- Setting range: 0…60…85 °C
- Safety temperature limiter: 110 °C
- Protection class: IP41
- Casing: 126 x 135 mm
- Max. operating pressure: 10 bar
- Delivered separately, installation on site
- Not suitable for exclusively electric heating (risk of limescale buildup).

EP type	Heat output 3 x 400 V kW	Output levels kW	Installation length mm	Part No.
3.5-1½″-PV	3.5	7 x 0.50	600	6058 066
4.4-1½″-PV	4.4	7 x 0.65	700	6058 067
5.2-1½″-PV	5.2	7 x 0.75	750	6058 068

Photovoltaic flange-mounted electric heating element
for enamelled calorifiers, stainless steel calorifiers and buffer storage tanks
- Incoloy® alloy 825 heating rods
- Ø 180 mm flange
- LAN, Modbus TCP, 0-10 V DC
- Medium: DHW and heating water
- Voltage: 3 x 400 V
- Unheated zone: 70 mm
- Setting range: 0…60…85 °C
- Safety temperature limiter: 110 °C
- Protection class: IP21
- Casing: Ø 186 mm
- Max. operating pressure: 10 bar
- Delivered separately, installation on site
- Not suitable for exclusively electric heating (risk of limescale buildup).

EFHK-E/C type	Heat output 3 x 400 V kW	Output levels kW	Installation length mm	Part No.
3.5-180-PV	3.5	7 x 0.50	360	6058 063
4.4-180-PV	4.4	7 x 0.65	420	6058 064
5.8-180-PV	5.8	7 x 0.83	540	6058 065

Services

Commissioning
Commissioning by works service or Hoval trained authorised serviceman/company is condition for warranty.

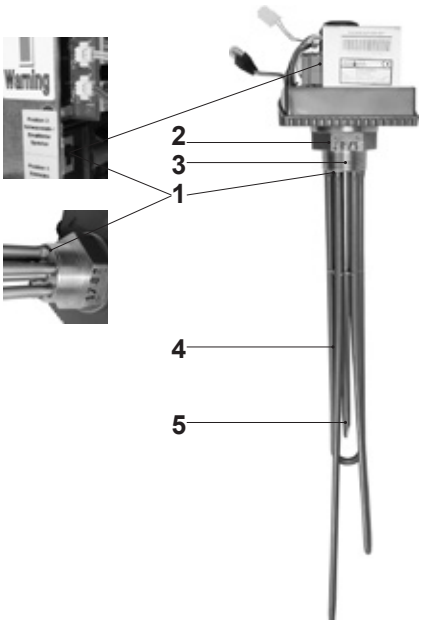
For commissioning and other services please contact your Hoval sales office.

Photovoltaic electric heating element

		Photovoltaic screw-in electric heating element	Photovoltaic flange-mounted electric heating element
Temperature setting range	°C	28...85	28...85
Switch-off temperature	°C	110	110
Ambient temperature at the switchgear	°C	max. 50	max. 50
Thermal switching difference	K	11.0 ± 5.5	11.0 ± 5.5
Ambient temperature during storage and transport	°C	-30...+90	-30...+90
Flange/thread size		R 1½″ (conical)	External Ø 180 mm, pitch circle Ø 150 mm, 8 x M12
Flange/thread connection material		Brass (CuZn40Pb2)	Black steel (St 37/1.0038, painted) Seal: EPDM (KTW approval)
Round heating rods		Incoloy® alloy 825, 2.4858	Incoloy® alloy 825, 2.4858
Surface load	W/cm²	8-9	7
Electrical connection		Connector plug with screw contacts	Connector plug with screw contacts
Operating pressure	bar	Max. 10	Max. 10
Casing top part		Polycarbonate, RAL 7035 (light grey)	Polycarbonate, RAL 7035 (light grey)
Casing bottom part		Polycarbonate, RAL 7016 (anthracite grey)	Polycarbonate, RAL 7016 (anthracite grey)
Type of protection		IP41	IP21
Dimensions		See dimensional drawing	See dimensional drawing

Photovoltaic screw-in electric heating element

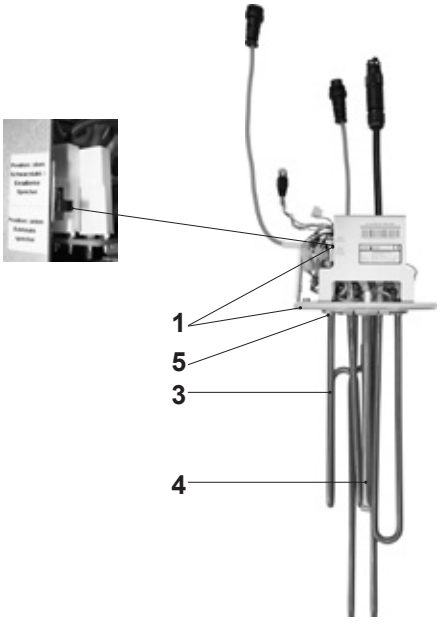
1. Screw-in electric heating element with insulated installation of the round heating rods which are suitable for enamelled as well as black steel calorifiers and, thanks to DIP switch, also for stainless steel calorifiers
2. Standard hexagon profile for secure tightening with 60 mm open-end spanner
3. Conical thread for precise casing position and tight mounting (1½″ standard)
4. Surface load 8-9 W/cm², suitable for heating water
5. Optimum sensor position in the oval immersion tube for identical temperature detection of safety temperature limiter and temperature controller



Illustrations without cover

Photovoltaic flange-mounted electric heating element

1. Standard flange Ø 180 mm, suitable for enamelled as well as black steel calorifiers and, thanks to DIP switch, also for stainless steel calorifiers
2. Delivery incl. flat seal (included separately)
3. Deep surface load 7 W/cm², for lower limescale buildup
4. Optimum sensor position
5. Insulated mounting of the heating rods for reduced corrosion



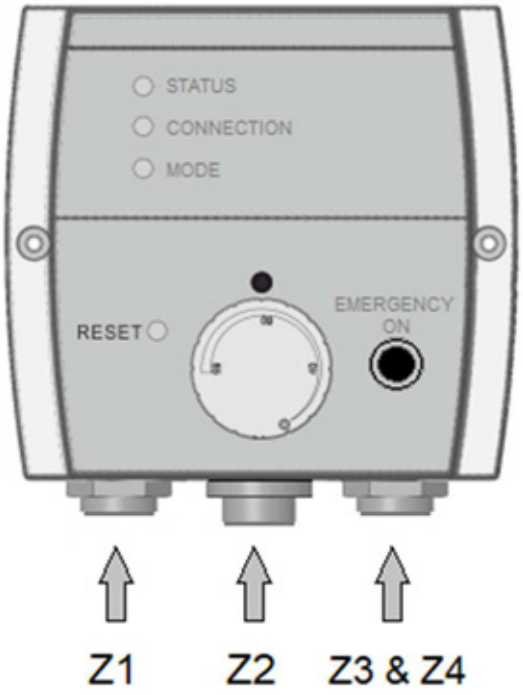
Connection diagram photovoltaic screw-in electric heating element

Plug Z1 – mains supply
For power supply to the heating rods and internal circuit boards
Wieland RST 5-pin plug, IP66
Screw connections max. 2.5 mm² (up to 1.5 mm² end ferrules can be used)
Capacity: 16 A, 250/400 V

Plug Z2 – sensors and analog input
Connection possibilities of the external sensors and 0-10 V analog signal
Bulgin Mini Buccaneer 6-pin plug, IP68
Screw connections max. 1.0 mm² (18 AWG)
Capacity: 3 A, 250 V~

Plug Z3 – communication and relay signal
Connection possibilities for communication via RJ485 interface
Bulgin Mini Buccaneer 6-pin plug, IP68
Screw connections max. 1.0 mm² (18 AWG)
Capacity: 3 A, 250 V~

Plug Z4 – RJ45 connection socket
Network connection via LAN connection possible



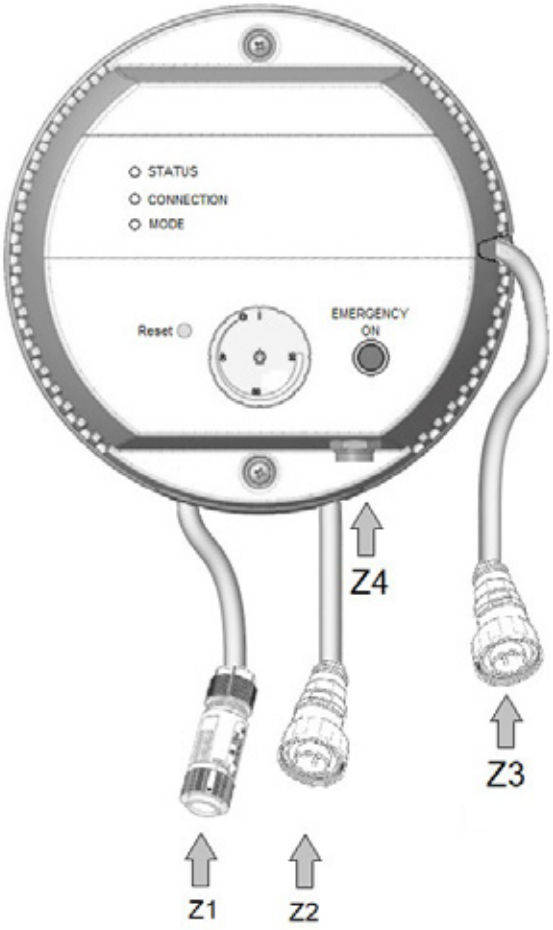
Connection plugs photovoltaic flange-mounted electric heating element

Plug Z1 – mains supply
For power supply to the heating rods and internal circuit boards
Wieland RST 5-pin plug, IP66
Screw connections max. 2.5 mm² (up to 1.5 mm² end ferrules can be used)
Capacity: 16 A, 250/400 V

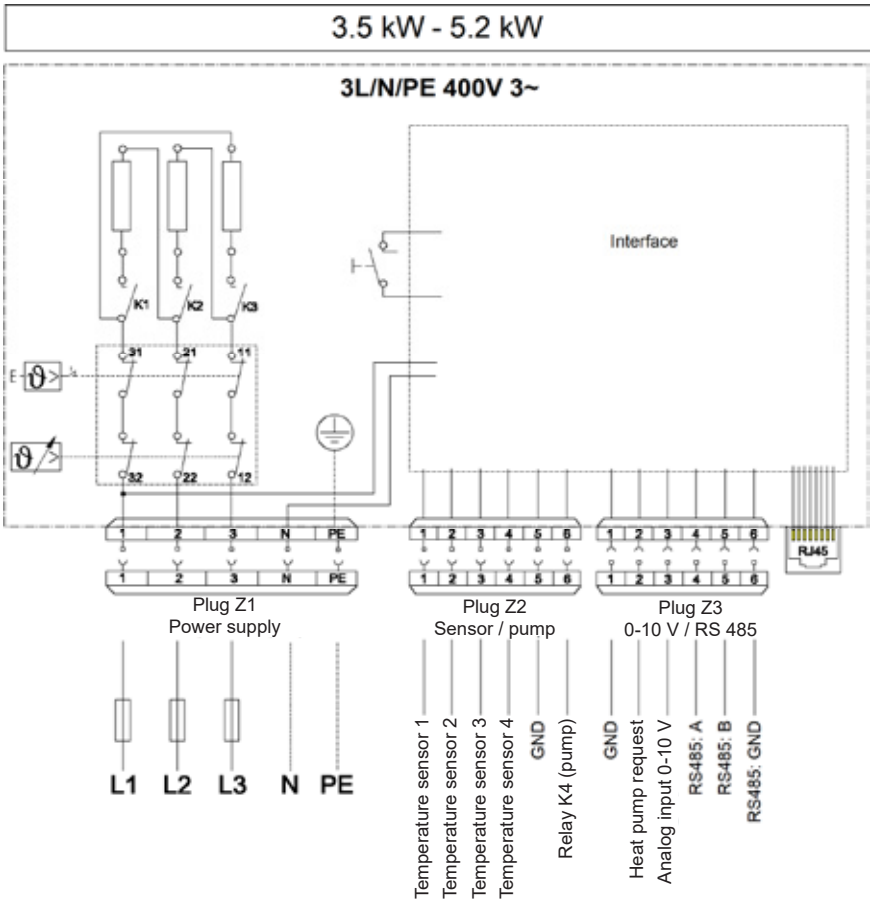
Plug Z2 – sensors and analog input
Connection possibilities of the external sensors 1-3
Bulgin Mini Buccaneer 6-pin plug, IP68
Screw connections max. 1.0 mm² (18 AWG)
Capacity: 3 A, 250 V~

Plug Z3 – communication and relay signal
Connection possibilities of the analog signal (0-10 V) and the heat pump release:
Bulgin Mini Buccaneer 6-pin plug, IP68
Screw connections max. 1.0 mm² (18 AWG)
Capacity: 3 A, 250 V~

Plug Z4 – RJ45 connection socket
Network connection via LAN connection possible



Connection diagram photovoltaic screw-in electric heating element

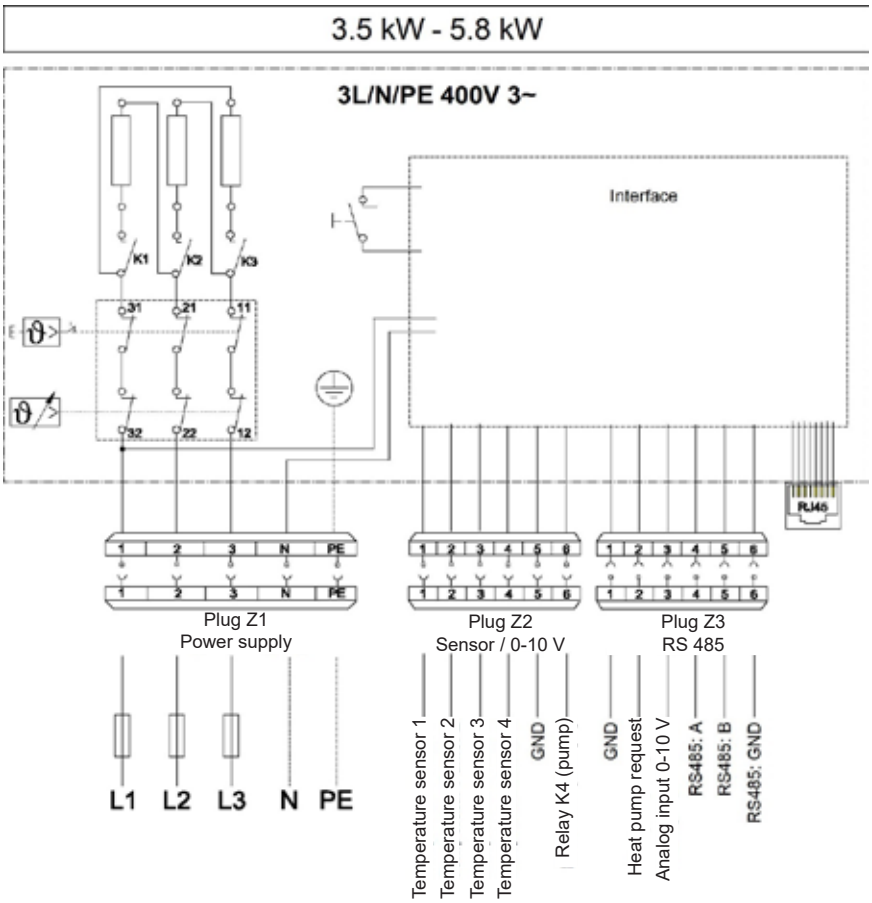


No external switching device (e.g. contactor or relay) is required, the heating element is switched exclusively via the integrated interfaces (e.g. Modbus, 0-10 V, switching contact, etc.).

Heat Pump Request =
Potential-free request contact of the main heat generator

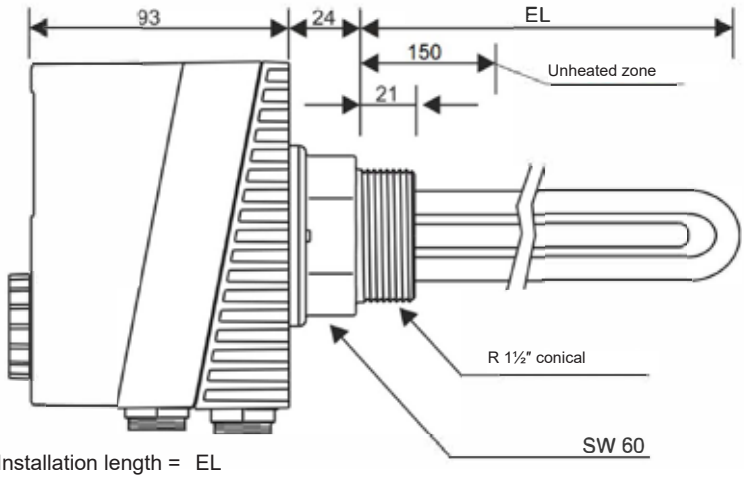
Relais K4 (pump) =
Circulating pump switch contact when used in a flow cartridge

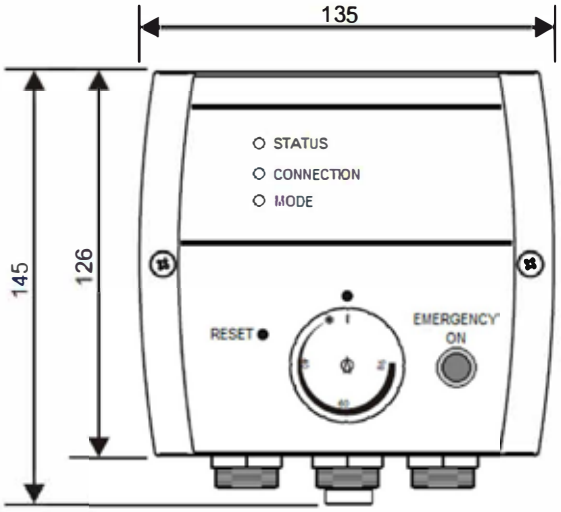
Connection diagram photovoltaic flange-mounted electric heating element



Photovoltaic screw-in electric heating element

(Dimensions in mm)

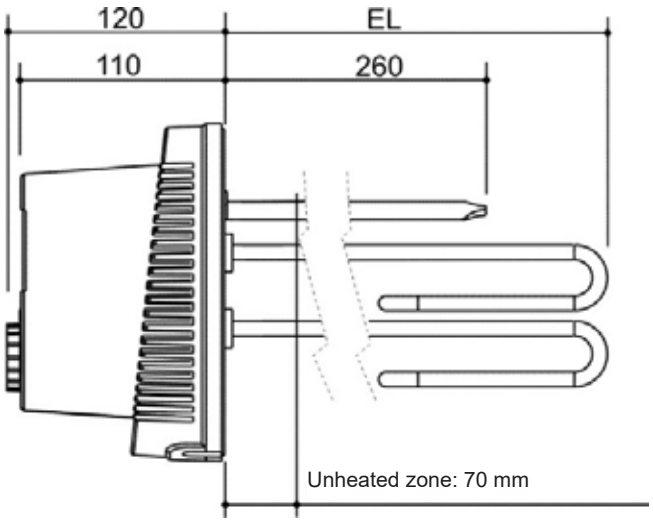




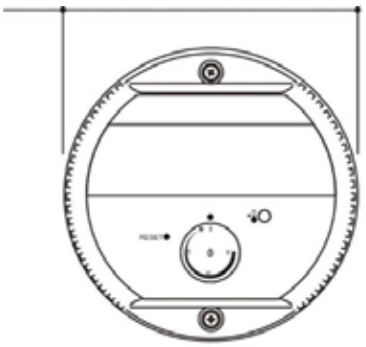
Installation length =	EL
EP-3.5-1½"-PV	600
EP-4.4-1½"-PV	700
EP-5.2-1½"-PV	750

Photovoltaic flange-mounted electric heating element

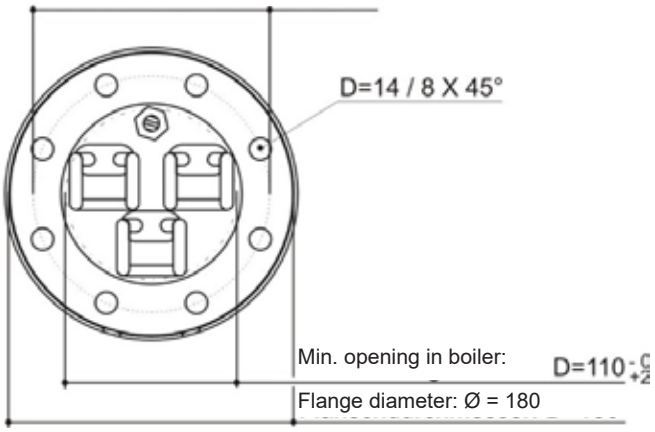
(Dimensions in mm)



Casing diameter: Ø = 186



Pitch circle diameter: Ø = 150



Installation length =	EL
EFHK-E/C-3.5-180-PV	360
EFHK-E/C-4.4-180-PV	420
EFHK-E/C-5.8-180-PV	540

Calorifier / storage tank	Photovoltaic flange-mounted electric heating element						Photovoltaic screw-in electric heating element		
	EFHK-E/C-PV-3.5-180 3.5 kW		EFHK-E/C-PV-4.4-180 4.4 kW		EFHK-E/C-PV-5.8-180 5.8 kW		EP-PV-3.5 3.5 kW	EP-PV-4.4 4.4 kW	EP 5.2 5.25 kW
Installation type	Flange Ø 180						Sleeve 1½"		
Installation position	top	bottom	top	bottom	top	bottom			
Stainless steel calorifier									
CombiVal C									
CombiVal C (200)		●		●					
CombiVal C (300)		●		●					
CombiVal C (400)		●		●		●			
CombiVal C (500)		●		●		●			
CombiVal C (750)		●		●		●			
CombiVal C (1000)		●		●		●			
CombiVal C (1500)	●	●	●	●	●	●			
CombiVal C (2000)	●	●	●	●	●	●			
CombiVal C (2500)		●		●		●			
CombiVal CR									
CombiVal CR (200)		●		●		●			
CombiVal CR (300)		●		●					
CombiVal CR (500)		●		●		●	●		
CombiVal CR (800)	●	●	●	●	●	●			
CombiVal CR (1000)	●	●	●	●	●	●			
CombiVal CSR									
CombiVal CSR (300)		●		●					
CombiVal CSR (400)		●		●		●	●		
CombiVal CSR (500)		●		●		●	●		
CombiVal CSR (800)	●	●	●	●	●	●			
CombiVal CSR (1000)	●	●	●	●	●	●			
CombiVal CSR (1250)	●	●	●	●	●	●			
CombiVal CSR (1500)	●	●	●	●	●	●			
CombiVal CSR (2000)	●	●	●	●	●	●			
MultiVal CRR									
MultiVal CRR (500)		●		●		●	●		
MultiVal CRR (800)	●	●	●	●	●	●			
MultiVal CRR (1000)	●	●	●	●	●	●			
MultiVal CSRR									
MultiVal CSRR (500)		●		●		●	●		
MultiVal CSRR (800)	●	●	●	●	●	●			
MultiVal CSRR (1000)	●	●	●	●	●	●			
MultiVal CSRR (1500)	●	●	●	●	●	●			
MultiVal CSRR (2000)	●	●	●	●	●	●			
Enamelled calorifier									
CombiVal E									
CombiVal E (300)		●		●					
CombiVal E (500)		●		●		●			
CombiVal E (800)	●	●	●	●	●	●			
CombiVal E (1000)	●	●	●	●	●	●			
CombiVal E (1500)	●	●	●	●	●	●			
CombiVal E (2000)	●	●	●	●	●	●			
CombiVal ER									
CombiVal ER (200)		●							
CombiVal ERW (200)		●							
CombiVal ER (300)		●		●					
CombiVal ER (400)		●		●					
CombiVal ER (500)		●		●					
CombiVal ER (800)		●		●		●			
CombiVal ER (1000)		●		●		●			
CombiVal ESR									
CombiVal ESR (200)		●							
CombiVal ESR (300)		●		●					
CombiVal ESR (400)		●		●					
CombiVal ESSR									
CombiVal ESSR (500)		●		●			●		
CombiVal ESSR (800)	●	●	●	●	●	●			
CombiVal ESSR (1000)	●	●	●	●	●	●			

Calorifier / storage tank	Photovoltaic flange-mounted electric heating element						Photovoltaic screw-in electric heating element		
	EFHK-E/C-PV-3.5-180 3.5 kW		EFHK-E/C-PV-4.4-180 4.4 kW		EFHK-E/C-PV-5.8-180 5.8 kW		EP-PV-3.5 3.5 kW	EP-PV-4.4 4.4 kW	EP 5.2 5.25 kW
Installation type	Flange Ø 180						Sleeve 1½″		
Installation position	top	bottom	top	bottom	top	bottom			
CombiVal ERR									
MultiVal ERR (300)		●							
MultiVal ERR (400)		●		●			●		
MultiVal ERR (500)		●		●			●		
CombiVal ESRR									
MultiVal ESRR (500)		●		●					
MultiVal ESRR (800)	●	●	●	●	●	●			
MultiVal ESRR (1000)	●	●	●	●	●	●			
CombiVal WPEF									
CombiVal WPEF (300)		●		●					

Calorifier / storage tank	Photovoltaic flange-mounted electric heating element						Photovoltaic screw-in electric heating element					
	EFHK-E/C-PV-3.5-180 3.5 kW		EFHK-E/C-PV-4.4-180 4.4 kW		EFHK-E/C-PV-5.8-180 5.8 kW		EP-PV-3.5 3.5 kW		EP-PV-4.4 4.4 kW		EP 5.2 5.25 kW	
Installation type	Flange Ø 180						Sleeve 1½″					
Installation position	top	bottom	top	bottom	top	bottom	top	bottom	top	bottom	top	bottom
Buffer storage tank and combination storage tank												
EnerVal												
EnerVal (200)												
EnerVal (300)												
EnerVal (500)							●	●				
EnerVal (800)							●	●	●	●	●	●
EnerVal (1000)							●	●	●	●	●	●
EnerVal (1500)							●	●	●	●	●	●
EnerVal (2000)							●	●	●	●	●	●
EnerVal G												
EnerVal G (800)	●	●	●	●	●	●						
EnerVal G (1000)	●	●	●	●	●	●						
EnerVal G (1500)	Procurement on site											
EnerVal G (2000)												
EnerVal G (2500)												
EnerVal G (4000)												
EnerVal G (6000)												
EnerVal G cool												
EnerVal G cool (800)							●		●		●	
EnerVal G cool (1000)							●		●		●	
EnerVal G cool (1500)							●		●		●	
EnerVal G cool (2500)							●		●		●	
EnerVal G cool (4000)							●		●		●	
EnerVal G cool (6000)							●		●		●	
VarioVal FLS/Rxx												
VarioVal FLS (800)							●		●		●	
VarioVal FLS (1000)							●		●		●	
VarioVal RHS (800)							●					
VarioVal RHS (1000)							●					
VarioVal RL (600)							●		●			
VarioVal RLS (800)							●		●			
VarioVal RLS (1000)							●		●			

Instructions and guidelines

The following instructions and guidelines have to be observed:

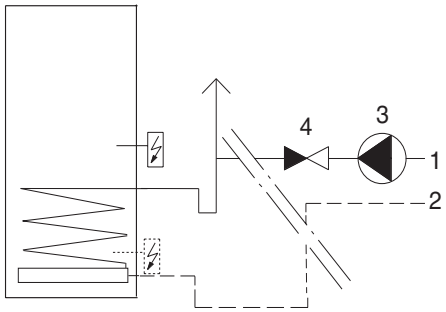
- technical data and mounting instructions of Hoval
- hydraulic regulations and those pertaining to instrumentation and control of Hoval
- instructions of the local fire police as well as country specific instructions
- instructions of the power station (concerning heat input of the electric heating element)
- fire protection instructions
- VDI 2035 Prevention of damage from corrosion and stone formation in hot water plants
- VDE 0100
- instructions concerning operating pressure and operating temperature
- DIN 4708 Central domestic hot water systems, page 1-3

Plumbing

- For electrical heating a hot water distribution system without circulation is to be planned if possible.
- Maximum safety adjustment: 1 bar less than the maximum operating pressure
- Please select the material of the connection components (pipes, sealing, safety valve,...) so that it can't get damaged by excessive temperatures caused by a malfunction of the temperature control circuit.

Assembly of the heating system

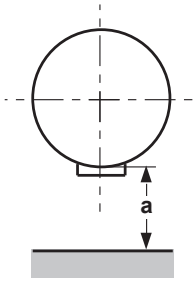
- The calorifier or additional heater coils must be provided with charging pump.
- An automatic deaerator must be installed at the highest point in the hot water flow.
- Flow and return pipes are to be attached in such way that with turned off charging pump and during electrical heating no back circulation and force of gravity circulation can occur.
- Expansion of heating water must be always ensured (also during electric charging resp. heat pump operation).



1 Flow
2 Return
3 Charging pump
4 Non-return valve

Necessary space

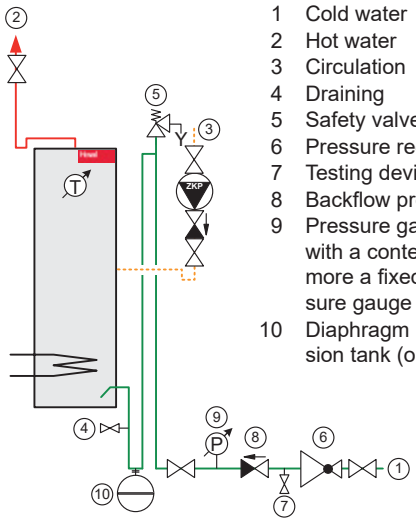
- The inspection opening has to be well accessible.
- Distance to the wall for the installation and removal of the electric heating element (a)



Calorifier		Type	a
CombiVal	ER/ESR/ESSR	200-500	≥ 600
MultiVal	ERR	300-500	≥ 750
CombiVal	ER/ESSR	800-1000	≥ 950
MultiVal	ESRR	800-1000	≥ 950
CombiVal	CR	200-500	≥ 750
MultiVal	CRR/CSRR	300-500	≥ 750
CombiVal	CR	800-2000	≥ 950
MultiVal	CRR/CSRR	800-2000	≥ 950
CombiVal	CSR	300-500	≥ 750
CombiVal	CSR	800-1000	≥ 950

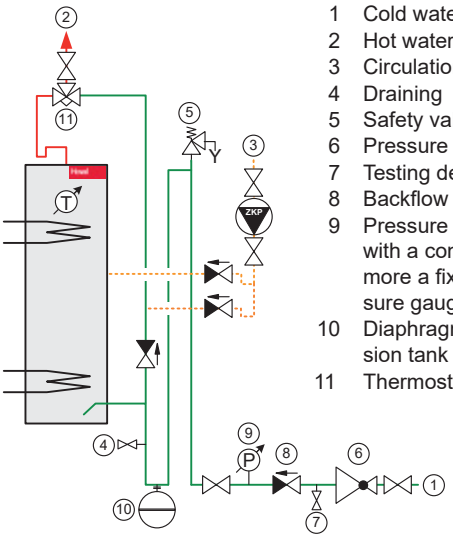
Notice on request contact:
When the main heat generator is requested via the "Heat Pump Request" switch contact, note that the PV heating rods are programmed with only 55 °C as the standard request temperature in the factory setting. The parameter must be adapted to the specific system in the web interface.

Calorifier with one coil



1 Cold water
2 Hot water
3 Circulation
4 Draining
5 Safety valve
6 Pressure reducing valve
7 Testing device
8 Backflow preventer
9 Pressure gauge connection; with a content of 1000 l and more a fixed installed pressure gauge is required.
10 Diaphragm pressure expansion tank (optional)

Calorifier with two coils (incl. solar)



1 Cold water
2 Hot water
3 Circulation
4 Draining
5 Safety valve
6 Pressure reducing valve
7 Testing device
8 Backflow preventer
9 Pressure gauge connection; with a content of 1000 l and more a fixed installed pressure gauge is required.
10 Diaphragm pressure expansion tank (optional)
11 Thermostatic water mixer

Reading examples for the design of the storage tank size

for Hoval CombiVal CSR
Domestic hot water temperature 45 °C

1) **Comfort** design
Calculation with simultaneity factor according to **DIN 4708**

(1) Performance figure NL = 23
(2) Heating flow T = 60 °C
► CombiVal CSR (500)
(3) Heating flow T = 70 °C
► CombiVal CSR (400)
(4) Heating flow T = 80 °C
► CombiVal CSR (300)

2) **Standard** design
Calculation with simultaneity factor according to **Dresden Technical University**

(1) Performance figure NL = 23
(5) Heating flow T = 60 °C
► CombiVal CSR (400)
(6) Heating flow T = 70 °C
► CombiVal CSR (300)
(7) Heating flow T = 80 °C
► CombiVal CSR (300)

	Comfort 1)			Standard 2)		
T >	60 °C	70 °C	80 °C	60 °C	70 °C	80 °C
NL v	(2)	(3)	(4)	(5)	(6)	(7)
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						
13	300					
14						
15				300		
16						
17						
18						
19						
20						
21	400	300				
22						
23 (1)						
24						
25						
26				(400)	(300)	
27						
28						
29			(300)			
30	(500)	(400)				
31						
32						
33						
34						
35						
36						
37						300
38				500	400	

Calculation of the continuous domestic hot water output for Hoval CombiVal CSR (500)

Reading example 2: domestic hot water output at 60 °C with flow temperature 70 °C

(1) Assumption of the charging flow rate 2 m³/h

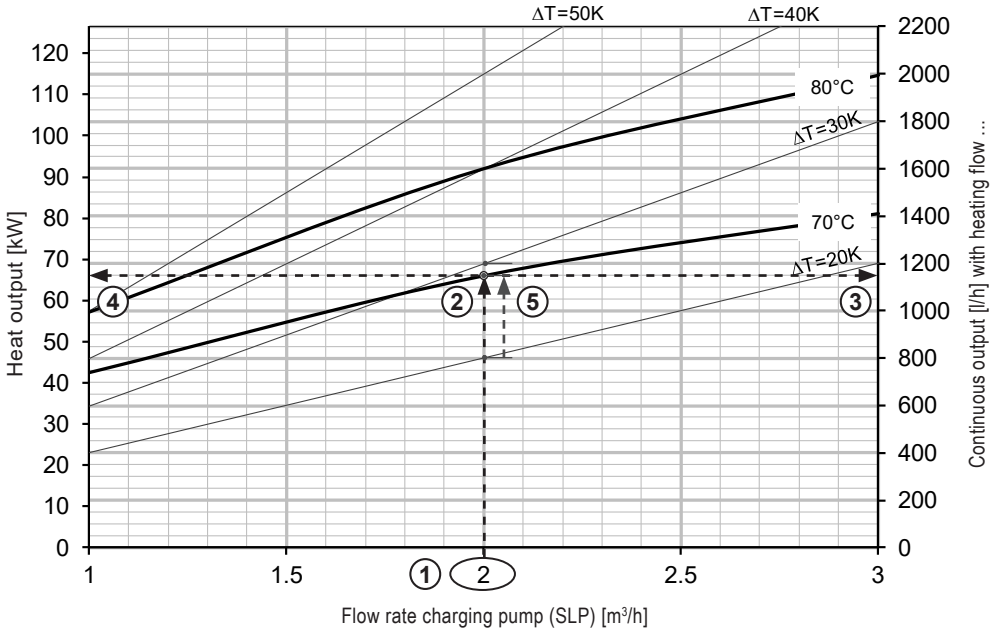
(2) Intersection with curve $T_{heating\ flow}$ = 70 °C

(3) ► Continuous output of approx. 1150 l/h

(4) ► Heat output of approx. 66 kW without boiler supplement

(5) Read the spread between flow and return, approx. 28 K, i.e. return flow is at approx. 42 °C)

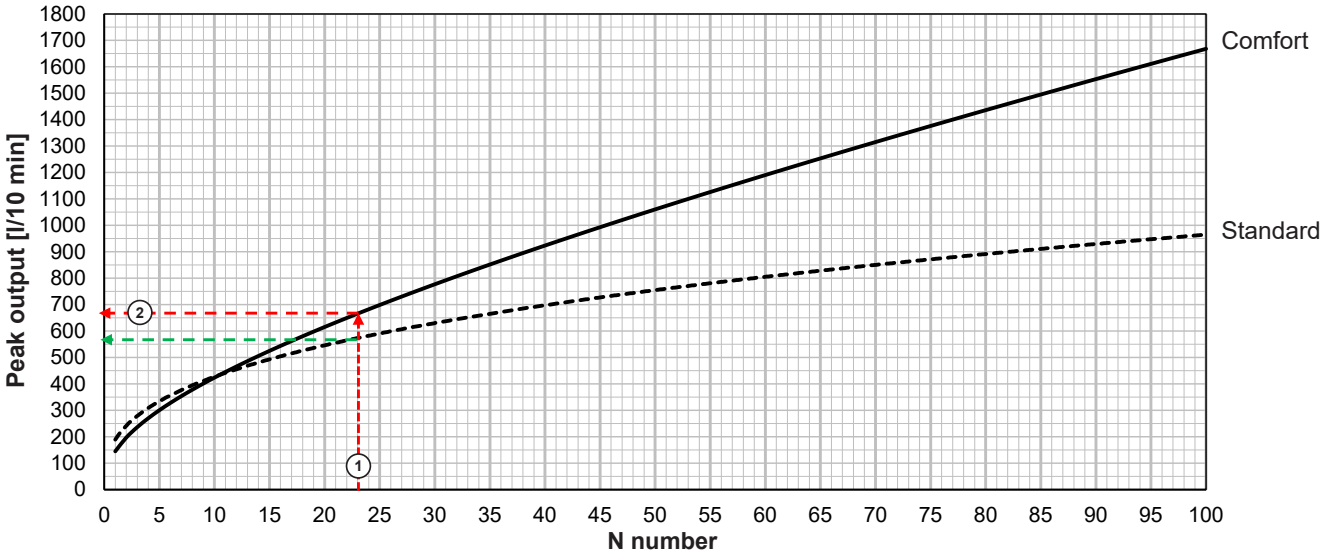
Domestic hot water 60 °C

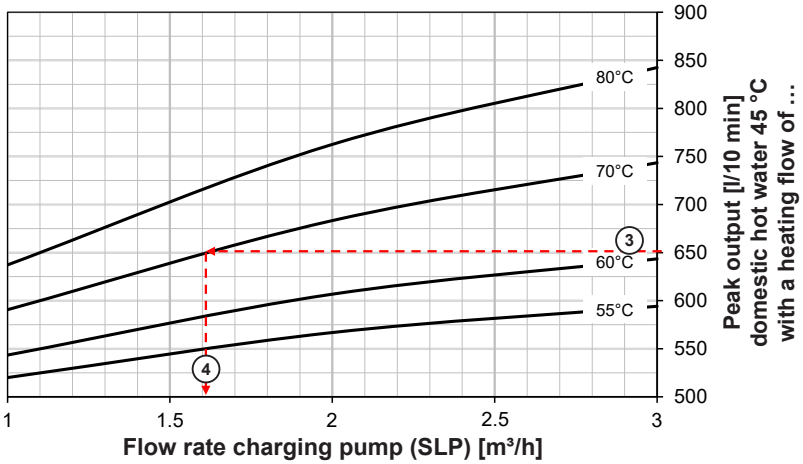


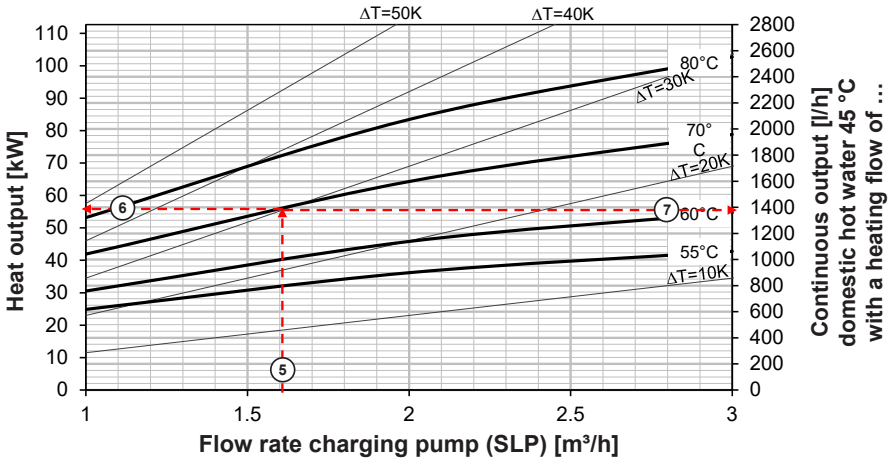
Reading example Comfort

for Hoval CombiVal CSR (400)
N number = 23 = 650 l/10 min 45 °C
Heating flow T = 70 °C
Cold water inlet 10 °C

10 min peak output/N number with domestic hot water 45 °C
according to DIN 4708 (Comfort) and Dresden Technical University (Standard)





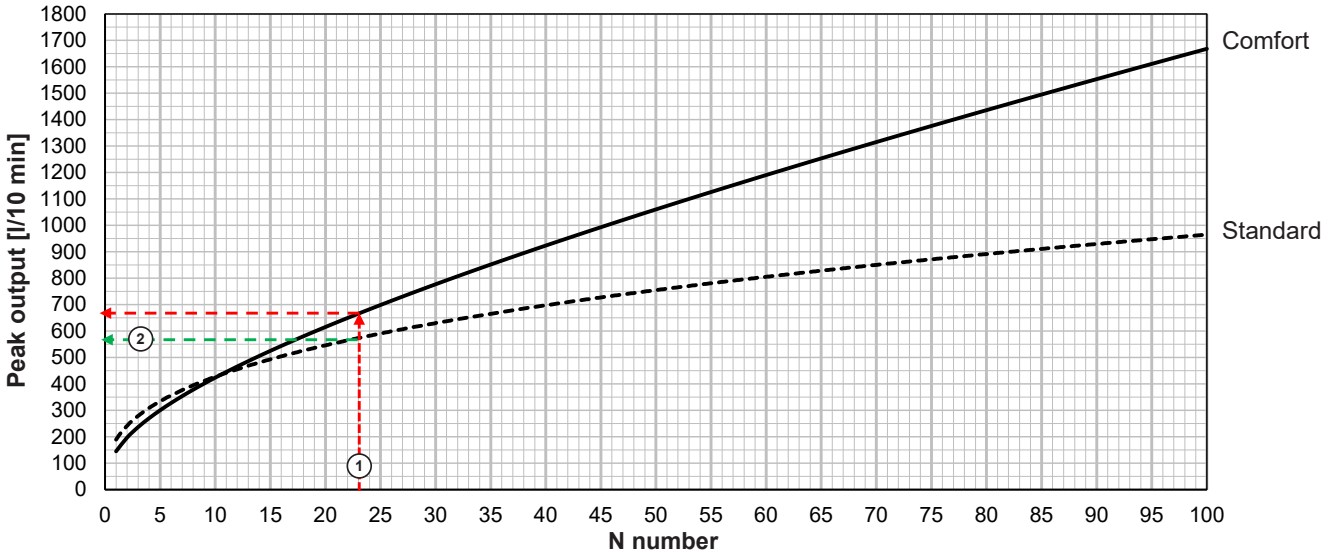


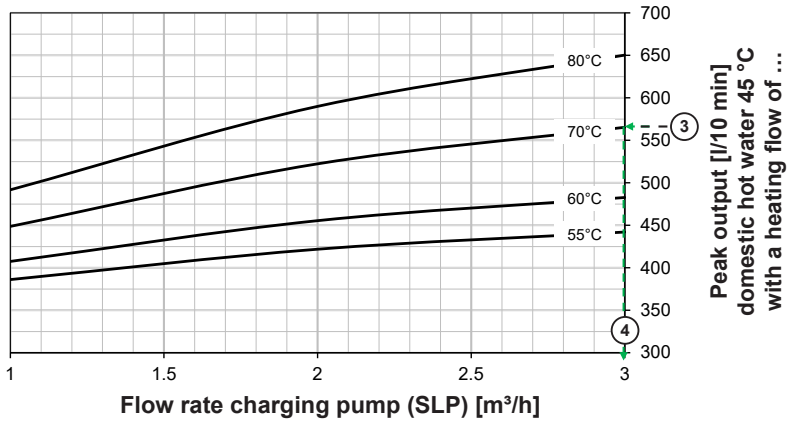
1. Transfer performance figure NL 23 to curve sheet
2. Read off peak output [l/10 min] from Comfort curve in the curve sheet
3. Transfer peak output [l/10 min] to the curve sheet up to intersection FL 70 °C
4. Read off flow rate charging pump (SLP) on curve sheet
5. Transfer flow rate charging pump to curve sheet intersection FL 70 °C
6. Read off heat output
7. Read off continuous output [l/h]

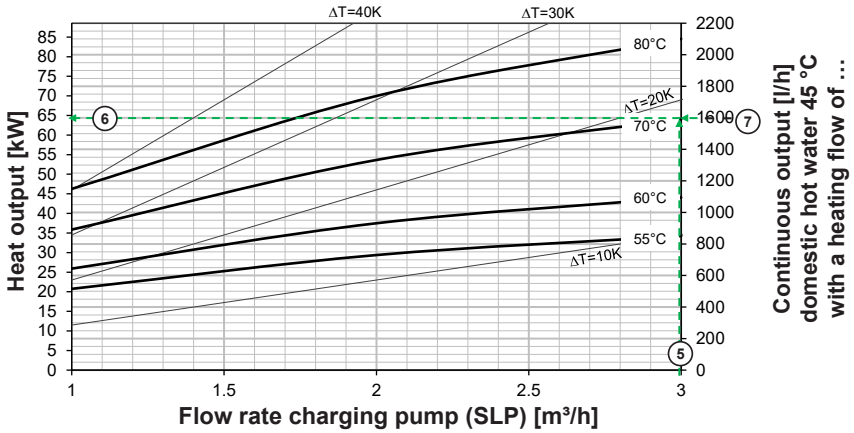
Reading example Standard

for Hoval CombiVal CSR (300)
N number = 23 = 555 l/10 min 45 °C
Heating flow T = 70 °C
Cold water inlet 10 °C

10 min peak output/N number with domestic hot water 45 °C
according to DIN 4708 (Comfort) and Dresden Technical University (Standard)







1. Transfer performance figure NL 23 to curve sheet
2. Read off peak output [l/10 min] from Comfort curve in the curve sheet
3. Transfer peak output [l/10 min] to the curve sheet up to intersection FL 70 °C
4. Read off flow rate charging pump (SLP) on curve sheet
5. Transfer flow rate charging pump to curve sheet intersection FL 70 °C
6. Read off heat output
7. Read off continuous output [l/h]

Fundamental selection criteria

Enamelled calorifiers must not be used where the water is completely softened.
If the pH value is below the balance pH value, the water is aggressive to metals. If the pH value is more than 0.3 below the balance pH value, an enamelled calorifier should not be used.
The water must comply with the limit values specified in the current drinking water ordinance.

Enamelled calorifiers

- If the **conductance** [1)] is < 200 µS/cm, enamelled calorifiers are no longer adequately protected by a magnesium anode. If the conductance is < 100 µS/cm, a Correx® impressed current anode also no longer offers adequate protection.
- If the **total hardness** [2)] is < 1 mmol/l, enamelled calorifiers are not adequately protected by a magnesium anode. If the total hardness is < 0.5 mmol/l, a Correx® impressed current anode also no longer offers adequate protection.
- Enamelled calorifiers must not be used where the water is completely softened. If the **residual hardness** [3)] is > 1 mmol/l or higher than 50 % of the total hardness of the crude water, a Correx® impressed current anode can help.
- If the **pH value** [4)] is more than 0.3 below the balance pH value, enamelled calorifiers should no longer be used. If the pH value is 0.1-0.3 below the balance pH value, a Correx® impressed current anode can help.
- Damage may result if the copper content is above 0.05 mg/l. The copper content must comply with the limit value specified in the current drinking water ordinance.

Limit values (in tabular form):

Type	Design	Corrosion protection	Conductance [1]	Total hardness [2]	Residual hardness [3] in proportion to total hardness of the tap water		pH value [4] below the balance pH value
			µS/cm	mmol/l	mmol/l	%	-
CombiVal ER (200-500)	S	1 Mg anode	> 200	> 1.0	> 1.0	> 50	< 0.3
	W	1 Correx® impressed current anode	> 100	> 0.5	> 1.0	> 50	0.1-0.3
CombiVal ER (800,1000)	S	2 Mg anodes	> 200	> 1.0	> 1.0	> 50	< 0.3
	W	1 Correx® impressed current anode	> 100	> 0.5	> 1.0	> 50	0.1-0.3
CombiVal ESR (200-400)	S	1 Mg anode	> 200	> 1.0	> 1.0	> 50	< 0.3
	W	1 Correx® impressed current anode	> 100	> 0.5	> 1.0	> 50	0.1-0.3
CombiVal ESSR (500)	S	1 Mg anode	> 200	> 1.0	> 1.0	> 50	< 0.3
	W	1 Correx® impressed current anode	> 100	> 0.5	> 1.0	> 50	0.1-0.3
CombiVal ESSR (800,1000)	S	2 Correx® impressed current anodes	> 100	> 0.5	> 1.0	> 50	0.1-0.3
MultiVal ERR (300-500)	S	1 Mg anode	> 200	> 1.0	> 1.0	> 50	< 0.3
	W	1 Correx® impressed current anode	> 100	> 0.5	> 1.0	> 50	0.1-0.3
MultiVal ESRR (500)	S	1 Mg anode	> 200	> 1.0	> 1.0	> 50	< 0.3
	W	1 Correx® impressed current anode	> 100	> 0.5	> 1.0	> 50	0.1-0.3
MultiVal ESRR (800,1000)	S	2 Correx® impressed current anodes	> 100	> 0.5	> 1.0	> 50	0.1-0.3
CombiVal E (300-1000)	S	1 Mg anode	> 200	> 1.0	> 1.0	> 50	< 0.3
	W	1 Correx® impressed current anode	> 100	> 0.5	> 1.0	> 50	0.1-0.3
CombiVal E (1500,2000)	S	2 Mg anodes	> 200	> 1.0	> 1.0	> 50	< 0.3
	W	1 Correx® impressed current anode	> 100	> 0.5	> 1.0	> 50	0.1-0.3
TopVal (130,160)	S	1 Mg anode	> 200	> 1.0	> 1.0	> 50	< 0.3

If the values are outside of the limit values, a stainless steel calorifier must be used.

W Customised design
S Standard design

In every case, either a Correx® impressed current anode or one/two magnesium anodes are allowed to be used.

Stainless steel calorifiers

- The storage tank must be properly earthed separately.
- Possible functional separating gap (e.g. insulating screw)
- If insulating screw fittings are used, do not connect the earth cable.
- The chloride content of the cold water must be below 40 mg/l.
- No material that can release chlorides (e.g. seals) must be used.
- The pH value must not fall below 4.0.
- Ferritic deposits must not get onto or into the stainless component (CrNi).
- Water softeners > 20 fH0 are recommended, the hardness must not fall below 12 fH0.
- The storage tank must be maintained in line with the “water composition”, according to the rules of technology and the protective anodes used must be checked/replaced.
- Cleaning must be carried out with suitable tools. Do not use steel tools for stainless steel calorifiers.
- The flange screws must be tightened to the correct torque.

Limit values domestic water:

Type	Design	Corrosion protection	Max. chloride content mg/l
CombiVal CR (200-800)	S	-	< 40
	W	1 Correx® impressed current anode	< 200
CombiVal CR (1000)	S	-	< 40
	W	2 Correx® impressed current anodes	< 200
CombiVal CSR (300-800)	S	-	< 40
	W	1 Correx® impressed current anode	< 200
CombiVal CSR (1000-2000)	S	-	< 40
	W	2 Correx® impressed current anodes	< 200
MutliVal CRR (500-800)	S	-	< 40
	W	1 Correx® impressed current anode	< 200
MutliVal CRR (1000)	S	-	< 40
	W	2 Correx® impressed current anodes	< 200
MutliVal CSRR (500-800)	S	-	< 40
	W	1 Correx® impressed current anode	< 200
MutliVal CSRR (1000-2000)	S	-	< 40
	W	2 Correx® impressed current anodes	< 200
CombiVal C (200-2500)	S	-	< 40
	W	1 Correx® impressed current anode	< 200

W Customised design (on site)
S Standard design

Limit value filling and replacement water heating:
According to our heat generator project engineering.

Plate heat exchangers

Information about the quality of the plant water on the heating side and the tap water where plate heat exchangers are used.
Heat exchangers that do not contain non-ferrous metals should be used if corrosion problems affecting copper-soldered heat exchangers or copper pipes are known in the area of the drinking water supply where the plate heat exchangers will be used.

Heating water side:
The following applies:
- VDI 2035
- In addition, the EN 14868 standard must be applied, as well as the manufacturer-specific specifications

Domestic water side:
- All parts of the heat exchanger which come into contact with water are made of copper or stainless steel.
- To prevent deposits and abrasion, a filter < 100 µm must be installed upstream of the heat exchanger.
- The maximum temperature on the domestic water side is 60 °C, whereby the **total hardness** [3] of the water must not exceed 14 °dH (2.5 mmol/l). If, for hygiene reasons, hot water temperatures of over 60 °C are required, measures must be implemented to prevent the formation of deposits (calcification). However, a hot water temperature of 70 °C must never be exceeded.
- The **pH value** [2] of the domestic water must be between 7 and 9.
- Due to the risk of corrosion, the **sum of the chloride, nitrate and sulphate content** [1] of the domestic water must not exceed a total of 100/300 mg/l. The **maximum free chloride concentration** [4] is 0.5 mg/l.
- Due to the risk of deposits forming, the **mineral content** [5] of the tap water must not exceed 250 mg/l. The maximum **conductance** [6] is 500/1000 µS/cm.
- **Softened water** [7] must be blended with at least 50 % tap water to ensure that the ratio of [Ca^{2+} und Mg^{2+}] to [HCO_3^-] is over 0.5.
- If the sulphate [SO_4]$^{2-}$ content exceeds the carbonate [HCO_3^-] content, copper-soldered heat exchangers must not be used.

Limit values (in tabular form)

		Cu-soldered		Without non-ferrous metals
		Plate heat exchanger heating water side	Plate heat exchanger domestic water side	Plate heat exchanger domestic water side
Conductance [6] of the tap water	µS/cm	-	< 500	< 1000
Residual hardness [7]	mmol/l	-	> 0.5	-
in relation to the total hardness of the tap water	%	-	> 50	-
pH value [2]	-	8.2 ... 10	7 ... 9	6 ... 10
Max. free chloride concentration [4]	mg/l	-	< 0.5	< 0.5
Chloride	mg/l	< 30	< 50	< 100
Nitrate	mg/l	< 50	< 100	< 300
Sulphate	mg/l	< 30	< 100	< 300
Sum of chloride, nitrate and sulphate content [1]	mg/l	< 50	< 100	< 300
Mineral content [5] of the tap water	mg/l	-	< 250	< 250
Total hardness [3]	°dH	-	< 14	< 15
	mmol/l	-	< 2.5	< 2.6

Electric heating elements

The electric heating elements are equipped with a temperature controller and a safety temperature limiter.

Safety temperature limiter
Switch-off temperature 98 °C - 6 K.
If the sanitary system cannot withstand these temperatures, a thermostatic water mixer must be built in.

1. General

1.1 The following Terms and Conditions shall apply to all our present and future contracts for deliveries and other services (even if the said Terms and Conditions are not specifically mentioned in verbal, telephonic or fax communications).

1.2 All deviations from the present Terms and Conditions, ancillary verbal agreements and subsequent contractual amendments shall only be valid if they have been confirmed by us in writing.

1.3 Buying terms and conditions of the client shall not be valid even if they are not specifically rejected by us. Our Standard Terms and Conditions of Delivery shall be regarded as accepted at the latest upon receipt of our goods and services by the client.

1.4 If a provision of the present Terms and Conditions of Delivery proves to be wholly or partially invalid, the contracting parties shall replace the aforesaid provision by a new provision which comes as close as possible to the legal and economic intention of the invalid provision.

2. Offers

2.1 Our offers shall be subject to change without notice.

2.2 Orders shall only be regarded as accepted when they have been confirmed by us in writing.

2.3 Illustrations, drawings and all technical details in catalogues and printed material shall be approximate values as customary within the industry. They shall only be binding if specific reference is made to them in the contract. We shall also reserve the right to make technical and design changes after the conclusion of the contract.

2.4 Cost estimates, drawings and other documents shall remain our property and shall be subject to copyright protection; they may not be made available to third parties.

3. Regulations in the country of destination

3.1 At the latest at the time of the order, the buyer shall draw our attention to the regulations and standards in force in the country of destination relating to the design of the delivered goods and the operation thereof and also to the execution of services.

3.2 Our deliveries and services shall comply with the regulations and standards in the country of destination provided the buyer has drawn our attention thereto in accordance with Section 3.1.

3.3 The buyer shall duly inform us of any special application features of goods ordered from us if these differ from our general recommendations.

4. Prices

4.1 Our prices shall be ex works, net, excluding packaging.

4.2 All ancillary costs, e.g. freight, insurance, export, transit, import and other approvals, licenses and authentications, shall be for the account of the buyer. The buyer shall also bear all taxes, charges, customs duty, etc., which are levied in connection with the contract.

4.3 We shall reserve the right to make price adjustments if wage rates or material prices change between the date of the order confirmation and the contractual performance of the contract. Price increases shall normally be notified three months in advance. We shall be bound to the price stated in the order confirmation for a period of three months after the effective date of the price increase.

5. Payment terms

5.1 Unless otherwise agreed in writing, our invoices shall be payable within thirty days with no cash discount. Payment shall be deemed to have been made when the amount in question is at our unrestricted disposal on our account in Swiss Franks.

5.2 Payment dates shall be observed even if any delays whatsoever occur after shipment of the goods from our works. The buyer shall not be permitted to reduce or withhold payments on account of complaints or counterclaims not recognised by us.

5.3 Payments shall also be made if insignificant components are missing but usage of the delivered goods is not rendered impossible as a result or if rectification work has to be carried out on the delivery. We shall be entitled to reject rectification of the defect as long as the buyer has not discharged his/its obligations to us.

5.4 If the buyer fails to comply with the agreed payment dates, default interest shall be paid from the agreed due date without a reminder being issued; the aforesaid interest shall be based on the interest rates prevailing at the domicile of the buyer, but shall be not less than four percent above the current discount rate of the Swiss Central Bank.

5.5 We shall be entitled to make deliveries of pending orders dependent upon settlement of outstanding claims.

6. Reservation of title

6.1 Delivered goods shall remain our property (reserved goods) pending full and complete payment of all present and future claims to which we are entitled regardless of their legal cause. This shall also apply if payments are made in settlement of specifically designated claims.

6.2 The buyer shall be entitled to process and sell reserved goods in the ordinary course of business.

6.3 If our reserved goods are combined or intermingled with other goods, the buyer shall hereby transfer his/its ownership rights in the new goods or chattels to us upon the conclusion of the contract in the amount of the invoice value of the reserved goods.

6.4 If the goods are resold by the buyer, he/it shall hereby transfer to us upon the conclusion of the contract with us his/its claims arising from the aforesaid resale in the amount of the invoice value of the reserved goods.

6.5 If the reserved goods are used by the buyer to perform a works or works delivery contract, his/its claim from the aforesaid works or works delivery contract shall hereby be assigned to us in the same amount and on the same date as for the purchase price claim (Section 6.4).

6.6 As long as he/it is honouring his/its payment obligations, the buyer shall, however, be authorised to collect his/its resale claim which has been assigned to us. He/it may not dispose of such claims by way of assignment to third parties, however. The empowerment of the buyer to collect the claim may be revoked by us at any time. We shall be entitled to notify third party debtors of the assignment. The buyer shall be entitled to provide us with the necessary information and documents in order to enable us to enforce our rights.

6.7 If the value of our securities exceeds our total claims by more than 10 %, we shall be obliged to release securities of our choice at the request of the buyer.

6.8 The buyer shall inform us immediately of any pledge or other impediment to our property enforced by third parties.

6.9 The buyer shall be obliged to collaborate in measures required to protect our title. He/it shall, in particular, empower us upon the conclusion of the contract to make entries or prior notice of the reservation of title at his/its cost in public registers, books and documents, etc., in accordance with the relevant national laws and shall perform all formalities in this respect.

6.10 The buyer shall maintain the reserved goods at his/its cost for the duration of the reservation of title and shall insure the said goods against theft, breakage, fire, water and other risks in our favour. He/it shall also take all steps to ensure that our property claims are neither adversely affected nor rescinded.

7. Delivery periods

7.1 Delivery periods and deadlines stated by us shall be approximate unless we have given an express written confirmation of a deadline as binding.

7.2 Delivery periods shall be deemed to have been met if notification of readiness to deliver has been sent to the buyer before the end of the delivery period.

7.3 The delivery period shall be prolonged if details required for the performance of the contract are not received on time or if they are subsequently changed by the buyer.

7.4 The delivery period shall also be reasonably prolonged if impediments arise which we cannot avert despite exercise of the necessary care (e.g. major operational disruptions, industrial disputes, delayed or defective deliveries, force majeure, etc.).

7.5 If an agreed delivery date is met by more than 14 days, the buyer shall be obliged to set us a reasonable period of grace. The buyer may only withdraw from the contract if our goods have not been delivered by the end of the said period of grace. Compensation claims for non-performance, delayed performance or any consequential losses shall be excluded unless there was gross negligence on our part.

8. Transfer of risk

8.1 Unless expressly agreed otherwise in writing, our “ex works” deliveries shall be made in accordance with the international rules on the interpretation of commercial clauses of the International Chamber of Commerce (Incoterms) in the version in force on the date of the order confirmation.

8.2 The transfer of risk shall be determined by the aforesaid Incoterms.

8.3 Insurance against damages of any kind shall be the responsibility of the buyer.

8.4 Complaints in connection with the transport shall be immediately notified by the buyer to the last carrier upon receipt of the delivery.
8.5 If despatch is delayed at the request of the buyer or for any other reasons not attributable to us, the risk shall pass to the buyer on the original date envisaged for the “ex works” delivery. We shall be entitled to demand payment from this date onwards.

9. Delivery inspection

9.1 The buyer shall be required to inspect deliveries immediately. If the goods do not comply with the order or the delivery note or if visible defects are identified, he/it shall be obliged to notify the aforesaid to us in writing within eight days of receipt. Later complaints shall not be recognised. (Regarding transport damages, cf. Section 8.4)

10. Assembly and operations

10.1 The assembly, putting into operation, operation and maintenance of the delivered goods shall be carried out in accordance with our guidelines. They may be executed by our staff or by appropriately trained third parties as agreed with the buyer.
10.2 If we require a commissioning certificate for certain product groups, warranty claims for the proper functioning of the equipment can only be enforced if a proper hand-over has been documented by a confirmed commissioning certificate received by us within one month of the hand-over.

11. Warranty

11.1 Warranty period

11.1.1 The general warranty period shall be 12 months from the first commissioning but no longer than 18 months from the date on which the relevant goods left our works.
If despatch is delayed for reasons not attributable to us, the warranty shall lapse no later than 18 months after notification of the readiness to deliver.
The general warranty period shall exclude electrical components for which the warranty period shall be 6 months from the first commissioning but no later than 12 months from the date of shipment from our works.

11.1.2 We refer to Section 11.6.1 with regard to the warranty period for third party products.

11.1.3 The warranty period for components which we have repaired during the warranty period or have delivered as replacement shall be 12 months from the completion of our repair or from the date of the replacement delivery but no longer than the end of a period equivalent to twice the original warranty period as per Section 11.1.1.

11.2 Liability for material, design and workmanship defects

11.2.1 The contractual condition of the goods shall be based on the condition upon the transfer of risk.

11.2.2 Defects shall be notified to us immediately in writing.

11.2.3 We shall be liable for all components which can be shown to have become defective or unusable before the end of the warranty period as a result of defective materials, defective design or defective workmanship, with such components being repaired or replaced ex works immediately at our choice.

11.3 Liability for warranted qualities

11.3.1 Warranted qualities shall only be those which are specifically designated as such in the order confirmation or in the relevant specifications.

11.3.2 The aforesaid assurance shall apply at the latest until the end of the warranty period. If a taking-over test has been agreed with the buyer, the assurance shall be deemed as performed if proof of the relevant qualities is furnished during the aforesaid test.

11.3.3 If the warranted qualities are not performed or only partially performed, the buyer shall be entitled to an immediate rectification. The buyer shall grant us the necessary time and opportunity for this purpose.

11.3.4 If the rectification is abortive or only partially successful, the buyer shall be entitled to a reasonable reduction of the purchase price. If the defect is so serious that it cannot be rectified within a reasonable period of time, and if deliveries or services for the notified purpose are not usable or are only usable to a much lesser extent, the buyer shall be entitled to refuse acceptance of the defective component or to withdraw from the contract if part-acceptance is economically unreasonable. We shall only be obliged to refund amounts which have been paid to us for the components affected by the aforesaid withdrawal.

11.4 Exclusion of liability for defects

11.4.1 Our liability shall exclude damages which cannot be proved to have been sustained as a result of defective material, defective design or defective workmanship.

11.4.2 Damages shall therefore be excluded for example which were caused by
- improper work of other persons with regard to planning, site preparation, assembly, operation and maintenance;
- plant concepts and designs which do not comply with the latest state of the art;
- non-observance of our guidelines for planning, assembly, commissioning, operations and maintenance;
- force majeure (e.g. thunderstorms).

11.4.3 The following shall be excluded in particular
- corrosion damages (e.g. as a result of aggressive water, unsuitable water treatment, oxygen intakes, emptying the plant over a longer period of time, falling below the dew point, chemical or electrochemical effects, etc.);
- damages caused by air pollution (e.g. the accumulation of intense dust, aggressive vapours, etc.);
- damages caused by unsuitable equipment and fuels;
- damages caused by overcharging, excessive water pressure, scaling, improper electrical connections and inadequate fuse protection.

11.4.4 Components shall also be excluded from the warranty which are subject to natural wear and tear (e.g. burner nozzles, combustion chamber inserts, ignition and monitoring components in contact with fire, fireclay and wall facings, fuses, seals and flexible tubes).

11.5 Commissioning certificate

11.5.1 We hereby draw attention to the due and proper hand-over and - if envisaged - the commissioning certificate in accordance with Section 10.2 as prerequisites for our warranty.

11.6 Deliveries and services of sub-contractors

11.6.1 Our liability for third party products which form a major part of the delivered goods (e.g. warehouse and conveying equipment, burners, measuring and control equipment, electrical components, flue gas and waste water cleaning equipment) shall - if permissible - be limited to an assignment of our claims against the suppliers of the said third party products.

12. Exclusion of further liability

12.1 The buyer shall have no rights and claims for materials, design and workmanship defects or the lack of warranted qualities unless specifically mentioned in Sections 11.1 to 11.6.

12.2 All claims for compensation, reduction in the contract price, rescission of the contract or withdrawal from the contract shall be excluded in particular unless these are specifically mentioned. Under no circumstances shall the buyer have any compensation claim for damages which were not sustained by the delivered goods themselves (e.g. replacement costs, cost for establishing the cause of the damage, expertises, production stoppages, production losses, lost orders, lost profit and other direct or indirect damages). The aforesaid liability exclusion shall not apply in the event of gross negligence on our part.

12.3 The exclusion as per Section 12.2 shall apply for all breaches of contract and all claims of the buyer regardless of why they were lodged from a legal point of view. It shall therefore also apply for a breach of any ancillary obligations (e.g. inadequate advice, etc.).

13. Jurisdiction

13.1 **The place of jurisdiction for the buyer and for us shall be Vaduz.** We shall be entitled to bring action against the buyer at his/its domicile, however.

13.2 The legal relationship between the parties shall be governed by the substantive laws of Switzerland. The application of the UN convention on contracts for the international sale of goods (CISG) shall be excluded.

Hoval quality.
You can count on us.

Hoval

Hoval is one of the leading international companies for heating and indoor climate solutions. Drawing on more than 75 years of experience and benefiting from a close-knit team culture, the Hoval Group delivers exciting solutions and develops technically superior products. This leadership role requires a sense of responsibility for energy and the environment, which is expressed in an intelligent combination of different heating technologies and customised indoor climate solutions.

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Hoval heating and indoor climate solutions are currently exported to more than 50 countries.

Responsibility for energy and environment

Hoval Aktiengesellschaft
Austrasse 70
FL-9490 Vaduz
Principality of Liechtenstein
(Swiss customs territory)
Phone +423 3992 400
Fax +423 3992 618
E-Mail info@hoval.com
www.hoval.com

2024 - 04 | Subject to modifications

Your Hoval partner

Hoval

Accessories

Matching components to ensure proper system function.

01.04.2024

Heating armature/ charging groups

Configurable heating distributors

Heating armature group for mixer circuit

- Suitable for wall distributor construction
- With 3-way motor mixer
- 2 ball valves with thermometer
- Heat-insulating box made of EPP half shells
- Heating flow/pump left

HA20-3BM-R (¾"), HA25-3BM-R (1"), HA32-3BM-R (1¼")
Fully assembled and electrically wired with:
- connecting cable with plug for TopTronic® controller
- 3-way motor mixer with integrated bypass, adjustable from 0-50 %
- gravity brake with deaeration adjusting screw
- pump (enclosed separately)

Optional
- Type HA25 and HA32 are also available without pump

HA40-3M-R (1½"), HA50-3M-R (2")
Without connecting cable and plug, electrically unwired with:
- gravity brake with deaeration adjusting screw
- without pump (must be ordered separately)

Delivery
- Heating armature group completely packaged
- Pump separately
- Optional bypass valve available

On site
- Conversion option to heating flow/pump right
- Installation of the pump (DN 20-DN 32)
- Mounting of the bypass valve (DN 20-DN 32, option)

Heating armature group HA-3BM-L for mixer circuit

- Design as heating armature group HA-3BM-R, but: heating flow/pump right

Charging group LG-2 Heating armature group HA-2

- For the connection of a side calorifier or as heating circuit without mixer
- Suitable for wall distributor construction
- 2 ball valves with thermometer
- Heat-insulating box made of EPP half shells
- Heating flow/pump left

LG/HA20-2 (¾"), LG/ HA25-2 (1"), LG/HA32-2 (1¼")
Fully assembled and electrically wired with:
- connecting cable with plug for TopTronic® controller
- gravity brake (enclosed separately)
- pump (enclosed separately)

Optional
- Type LG/HA25-2 and LG/HA32-2 are also available without pump.

LG/HA40-2 (1½"), LG/ HA50-2 (2")
Without connecting cable and plug, electrically unwired with:
- gravity brake with deaeration adjusting screw
- without pump (must be ordered separately)

Delivery
- Armature group completely packaged
- Pump separately

On site
- Conversion option to heating flow/pump right
- Installation of the pump (DN 20-DN 32)

Charging group LG25-2 Compact for the direct installation at side calorifier

- For the connection of a side calorifier
- Installation directly on the calorifier ER (200-500), CR (200-1000) or without connecting bend in the feed line or at the boiler
- 1 ball valve pressure-side with gravity brake
- 1 ball valve suction-side with thermometer completely assembled and electrically wired with:
  - connecting cable with plug for TopTronic® controller
  - pump (enclosed separately)
- Heat-insulating box made of EPP half shells
- Fully isolated connection bend with screw joint (enclosed separately)

Delivery
- Charging group with connection bend completely packaged.
- Pump (enclosed separately)

On site
- Installation of the connection bend
- Installation of the pump

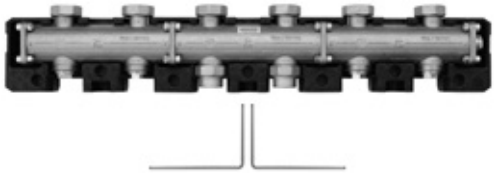
Information relating to pumps
see "Circulating pumps"

Bypass group
BG25-3 (1″)
- Bypass with fittings
- Without pump
- Suitable for the installation under the wall distributor

Standard pressure distributor WV-S
Not upgradeable
WV-S 25-2/3 (1″)

- Pressure distributor (bronze) for
  - 2 armature groups DN25 on the top
  - 1 armature group DN25 at the bottom (in connection with the connection set WV-S 25-U)
- Thermal insulation made of EPP shells
- Bracket for installation
- Variable connections boiler-side

System pressure distributor WV-M
Upgradeable
WV-M 20 (¾″), WV-M 25 (1″), WV-M 32 (1¼″), WV-M 40 (1½″), WV-M 50 (2″)



- Bronze pressure distributor
- Thermal insulation made of EPP shells; DN 20 (¾″) with heat-insulating caps; the actual insulation is done by the heat-insulating box of the HA group
- Bracket for installation, DN 40 and 50 without bracket
- Variable connections boiler-side

On site
- Upgrade options for additional armature groups
- Conversion to pressureless design possible (only DN 20-32)

Mounting console for wall installation
MKW-WV 40

For installing the pressure distributor WV-M 40 on the wall. 1 set 2 pieces each

For wall distributors with more than 4 HA groups absolutely use console for floor installation!

Mounting console for floor installation
MKW-WV 40/50

For installing the pressure distributor WV-M 40 and WV-M 50 on the floor. 1 set 2 pieces each

For wall distributors with up to 4 HA groups 1 set, for wall distributors with more than 5 HA groups 2 sets required!

Upgrade module EW-WV

DN 20 without thermal insulation, a new insulation must be ordered for the upgraded distributor.
DN 25-50 with thermal insulation

Steel pressure distributor SWV
Not upgradeable
SWV 25 (1″), SWV 32 (1¼″)

- Pressure distributor made of steel, galvanised
- Thermal insulation made of EPP shells
- Bracket for installation
- Variable connections boiler-side

Selection recommendation heating armature group (HA)

HA...-2 direct heating circuit											
Flow rate	Dimension	Pressure drop	Output [kW] at ΔT of …			Residual overpressure [mbar]					
V̇ [m³/h]	[DN]	ΔP [mbar]	15 [K]	20 [K]	25 [K]	HSP 4	HSP 6	SPS-S 7	SPS-S 8	SPS-I 8	SPS-I 12
0.2		2	3.5	4.6	6	378	593	698	798		
0.4		7	6.9	9.2	12	333	588	693	793		
0.6		16	10	14	17	294	564	684	784		
0.8		29	14	18	23	256	491	671	771		
1.0	20	45	17	23	29	210	440	635	755		
1.2		65	21	28	35		385	565	675		
1.4		89	24	32	40		321	491	571		
1.6		116	28	37	46		264	394	484		
1.6		49	28	37	46		331	461	551	751	
1.8		63	31	42	52		278	398	498	738	
2.0	25	77	35	46	58			353	433	723	
2.2		93	38	51	64				367	707	
2.4		111	42	55	69				309	669	
2.4		25	42	55	69				395	755	
2.6		30	45	60	75				360	730	
2.8		34	49	65	81				316	706	
3.0		39	52	69	87					681	
3.2		45	55	74	92					655	
3.4	32	51	59	79	98					619	
3.6		57	62	83	104					593	
3.8		63	66	88	110					577	
4.0		70	69	92	116					540	
4.5		89	78	104	130					481	
5.0		110	87	116	145					410	
5.0		31	87	116	145					489	1119
5.5		38	95	127	159					442	1062
6.0		45	104	139	173					365	965
6.5		53	113	150	188					327	897
7.0		61	121	162	202						839
7.5	40	70	130	173	217						780
8.0		80	139	185	231						700
8.5		90	147	197	246						640
9.0		101	156	208	260						549
9.5		113	165	220	275						487
10.0		125	173	231	289						415
5.0		26	87	116	145					494	1124
5.5		31	95	127	159					449	1069
6.0		37	104	139	173					373	973
6.5		43	113	150	188					337	907
7.0		50	121	162	202						850
7.5	50	58	130	173	217						792
8.0		66	139	185	231						714
8.5		74	147	197	246						656
9.0		83	156	208	260						567
9.5		93	165	220	275						507
10.0		103	173	231	289						437
10.5		113	182	243	303						357

Example: *The pressure drop must be matched with the residual overpressure of the pump used.*

Direct (without mixer) circuit 18 kW at ΔT 20 K, results in a heating armature group HA 20-2.

With a HSP 4-pump, there is a residual overpressure of 256 mbar.

Selection recommendation heating armature group (HA)

HA...-3 mixed heating circuit													
Flow rate	Dimension	Pressure drop	Output [kW] at ΔT of …					Residual overpressure [mbar]					
V̇ [m³/h]	[DN]	ΔP [mbar]	7 [K]	10 [K]	15 [K]	20 [K]	kvs	HSP 4	HSP 6	SPS-S 7	SPS-S 8	SPS-I 8	SPS-I 12
0.2	20	3	1.6	2.3	3.5	4.6	3.7	377	592	697	797		
0.4		12	3.2	4.6	6.9	9.2	3.7	328	583	688	788		
0.6		26	4.9	6.9	10	14	3.7	284	554	674	774		
0.8		47	6.5	9.2	14	18	3.7	238	473	653	753		
1.0		73	8.1	12	17	23	3.7		412	607	727		
1.2		105	10	14	21	28	3.7		345	525	635		
1.2	25	40	10	14	21	28	6.0		410	590	700	760	
1.4		54	11	16	24	32	6.0		356	526	606	746	
1.6		71	13	18	28	37	6.0		309	439	529	729	
1.8		90	15	21	31	42	6.0		250	370	470	710	
2.0		111	16	23	35	46	6.0			319	399	689	
2.0	32	39	16	23	35	46	10.1			391	471	761	1111
2.2		47	18	25	38	51	10.1			303	413	753	1103
2.4		56	19	28	42	55	10.1				364	724	1094
2.6		66	21	30	45	60	10.1				324	694	1084
2.8		77	23	32	49	65	10.1					663	1073
3.0		88	24	35	52	69	10.1					632	1062
3.2		100	26	37	55	74	10.1					600	1050
3.4		113	28	39	59	79	10.1					557	1037
3.4	40	37	28	39	59	79	17.7					633	1113
3.6		41	29	42	62	83	17.7					609	1109
3.8		46	31	44	66	88	17.7					594	1104
4.0		51	32	46	69	92	17.7					559	1099
4.5		65	36	52	78	104	17.7					505	1085
5.0		80	40	58	87	116	17.7					440	1070
5.5		97	45	64	95	127	17.7					383	1003
6.0		115	49	69	104	139	17.7					295	895
6.0	50	55	49	69	104	139	25.7					355	955
6.5		64	53	75	113	150	25.7					316	886
7.0		74	57	81	121	162	25.7						826
7.5		85	61	87	130	173	25.7						765
8.0		97	65	92	139	185	25.7						683
8.5		109	69	98	147	197	25.7						621
9.0		123	73	104	156	208	25.7						527

Example: *The pressure drop must be matched with the residual overpressure of the pump used.*

Mixer circuit 18 kW at Δt 10 K, results in a heating armature group HA 25-3.

With a HSP 6-pump, there is a residual overpressure of 309 mbar.

Selection recommendation wall distributor (WV)

Flow rate	Output [kW] at ΔT of …				Distributors WV-M..-2					Distributors WV-M..-3					Distributors WV-M..-4					Distributors WV-M..-5				
					Residual overpressure [mbar]					Residual overpressure [mbar]					Residual overpressure [mbar]					Residual overpressure [mbar]				
					DN					DN					DN					DN				
[m³/h]	7 [K]	10 [K]	15 [K]	20 [K]	20	25	32	40	50	20	25	32	40	50	20	25	32	40	50	20	25	32	40	50
0.2	1.6	2.3	3.5	4.6	1					1					1					1				
0.4	3.2	4.6	6.9	9.2	3					3					3					2				
0.6	4.9	6.9	10	14	7					6					6					5				
0.8	6.5	9.2	14	18	13					11					10					10				
1.0	8.1	12	17	23	20					16					16					15				
1.2	10	14	21	28	29					24					23					22				
1.4	11	16	24	32	39					32					31					30				
1.6	13	18	28	37	51	8				42	6				40	5				39	5			
1.8	15	21	31	42		10					7				51	7				49	6			
2.0	16	23	35	46		12					9					8					8			
2.2	18	25	38	51		15					11					10					9			
2.4	19	28	42	55		18	5	5	2		13	4	6	2		12	4	6	3		11	4	6	3
2.6	21	30	45	60		21	6	6	3		15	5	7	3		14	5	8	3		13	5	8	3
2.8	23	32	49	65		24	7	7	3		18	6	8	3		16	5	9	4		15	5	9	4
3.0	24	35	52	69		28	8	8	4		20	7	9	4		19	6	10	4		17	6	10	4
3.2	26	37	55	74		32	9	10	4		23	7	10	4		21	7	11	5		19	7	11	5
3.4	28	39	59	79		36	10	11	5		26	8	11	5		24	8	13	5		22	8	13	5
3.6	29	42	62	83		40	11	12	5		29	9	13	5		27	9	14	6		24	9	14	6
3.8	31	44	66	88		45	12	13	6		33	11	14	6		30	10	16	7		27	10	16	7
4.0	32	46	69	92		49	14	15	6		36	12	16	7		33	11	18	7		30	11	18	7
4.5	36	52	78	104			18	19	8			15	20	8		42	14	23	9		38	14	23	9
5.0	40	58	87	116			22	23	10			18	25	10			17	28	12		47	17	28	12
5.5	45	64	95	127			26	28	12			22	30	13			21	34	14			21	34	14
6.0	49	69	104	139			31	33	14			26	35	15			25	40	17			25	40	17
6.5	53	75	113	150			37	39	17			31	42	18			29	47	19			29	47	19
7.0	57	81	121	162			42	46	20			36	48	20			34		23			34		23
7.5	61	87	130	173			49		22			41		24			39		26			39		26
8.0	65	92	139	185					25			47		27			44		29			44		29
8.5	69	98	147	197					29					30			50		33			50		33
9.0	73	104	156	208					32					34					37					37
9.5	77	110	165	220					36					38					42					42
10.0	81	116	173	231					40					42					46					46

Total flow rate = 0.8 + 1.6 = 2.4 m³/h.
The next largest flow rate is selected.
This results in a distributor WV-M 25-2, with a total pressure drop of 18 mbar.

The distributor should have at least the nominal diameter of the largest HA groups.

Selection recommendation steel pressure distributor (SWV)

Flow rate	Output [kW] at ΔT of …					Heating wall distributor SWV..-2		Heating wall distributor SWV..-3	
						Residual overpressure [mbar]		Residual overpressure [mbar]	
						DN		DN	
[m³/h]	7 [K]	10 [K]	15 [K]	20 [K]	25 [K]	25	32	25	32
1.2	10	14	21	28	35	3		3	
1.4	11	16	24	32	40	4		4	
1.6	13	18	28	37	46	5		5	
1.8	15	21	31	42	52	6		6	
2.0	16	23	35	46	58	7		7	
2.2	18	25	38	51	64	9		9	
2.4	19	28	42	55	69	11	2	11	2
2.6	21	30	45	60	75	13	3	13	2
2.8	23	32	49	65	81	15	3	15	3
3.0	24	35	52	69	87	17	3	17	3
3.2	26	37	55	74	92	19	4	19	4
3.4	28	39	59	79	98	22	4	22	4
3.6	29	42	62	83	104	24	5	24	5
3.8	31	44	66	88	110	27	5	27	5
4.0	32	46	69	92	116	30	6	30	6
4.5	36	52	78	104	130	38	8	38	7
5.0	40	58	87	116	145	47	9	47	9
5.5	45	64	95	127	159		11		11
6.0	49	69	104	139	173		13		13
6.5	53	75	113	150	188		16		15
7.0	57	81	121	162	202		18		18
7.5	61	87	130	173	217		21		20
8.0	65	92	139	185	231		24		23
8.5	69	98	147	197	246		27		26
9.0	73	104	156	208	260		30		29
9.5	77	110	165	220	275		34		33
10.0	81	116	173	231	289		37		36

Heating armature groups

Heating armature group HA-3BM-R

with 3-way motor mixer and heat-insulating box.
Installation right (flow left)

HA group/pump	Speed control					EEI ≤	Part No.
	Δp-v	ENF		Δp-c	Constant speed		
DN 20 (¾″)							
HA20-3BM-R/HSP 4	•			•	•	0.18	6051 715
HA20-3BM-R/HSP 6	•			•	•	0.20	6051 716
HA20-3BM-R/SPS-S 7	•	•		•	•	0.20	6049 541
HA20-3BM-R/SPS-S 8	•	•		•	•	0.20	6049 542
DN 25 (1″)							
HA25-3BM-R/HSP 6	•			•	•	0.20	6051 717
HA25-3BM-R/SPS-S 7	•	•		•	•	0.20	6049 545
HA25-3BM-R/SPS-S 8	•	•		•	•	0.20	6049 546
HA25-3BM-R	without pump						6046 642
Pumps for HA25-3BM-R see “Circulating pumps”. Pump installation dimensions 1½″ x 180 mm							
DN 32 (1¼″)							
HA32-3BM-R/SPS-S 7	•	•		•	•	0.20	6049 549
HA32-3BM-R/SPS-S 8	•	•		•	•	0.20	6049 550
HA32-3BM-R/SPS-I 8	•	•	•	•	•	0.20	6059 328
HA32-3BM-R/SPS-I 12 PM1	•		•	•		0.23	6046 619
HA32-3BM-R	without pump						6046 643
Pumps for HA32-3BM-R see “Circulating pumps”. Pump installation dimensions 2″ x 180 mm							
DN 40 (1½″)							
HA40-3M-R/SPS-I 8	•		•	•	•	0.20	6059 327
HA40-3M-R/SPS-I 12 PM1	•		•	•		0.23	6040 904
HA40-3M-R	without pump						6014 867
Pumps for HA40-3M see “Circulating pumps”. Pump installation dimensions DN 40/PN 6 x 250 mm							
DN 50 (2″)							
HA50-3M-R/SPS-I 12 PM1	•		•	•		0.23	6040 905
HA50-3M-R	without pump						6014 869
Pumps for HA50-3M-R see “Circulating pumps”. Pump installation dimensions DN 50/PN 6 x 280 mm							

Speed control legend	
Δp-v	Variable differential pressure
ENF	Vent function 10 min.
	PWM control signal heating
Δp-c	Constant differential pressure
	Constant speed

Heating armature groups

Heating armature group HA-3BM-L
with 3-way motor mixer and heat-insulating box.
Installation left (flow right)

HA group/pump	Speed control					EEI ≤	Part No.
	Δp-v	ENF	PWM	Δp-c	Constant rotational speed		
DN 20 (¾")							
HA20-3BM-L/HSP 4	•			•	•	0.18	6051 718
HA20-3BM-L/HSP 6	•			•	•	0.20	6051 719
HA20-3BM-L/SPS-S 7	•	•		•	•	0.20	6049 543
HA20-3BM-L/SPS-S 8	•	•		•	•	0.20	6049 544
DN 25 (1")							
HA25-3BM-L/HSP 6	•			•	•	0.20	6051 720
HA25-3BM-L/SPS-S 7	•	•		•	•	0.20	6049 547
HA25-3BM-L/SPS-S 8	•	•		•	•	0.20	6049 548
HA25-3BM-L	without pump						6046 644

Pumps for HA25-3BM-L
see "Circulating pumps".
Pump installation dimensions 1½" x 180 mm

DN 32 (1¼")							
HA32-3BM-L/SPS-S 7	•	•		•	•	0.20	6049 551
HA32-3BM-L/SPS-S 8	•	•		•	•	0.20	6049 552
HA32-3BM-L/SPS-I 8	•	•	•	•	•	0.20	6059 329
HA32-3BM-L/SPS-I 12 PM1	•		•	•		0.23	6046 631
HA32-3BM-L	without pump						6046 645

Pumps for HA32-3BM-L
see "Circulating pumps".
Pump installation dimensions 2" x 180 mm

Speed control legend	
Δp-v	Variable differential pressure
ENF	Vent function 10 min.
	PWM control signal heating
Δp-c	Constant differential pressure
	Constant rotational speed

Heating armature groups

Charging group LG-2
Heating armature group HA-2
For the connection of a side calorifier or as heating circuit without mixer, with heat-insulating box. Installation right (flow left).

Charging/HA group/pump	Speed control					EEI ≤	Part No.
DN 20 (¾")							
LG/HA20-2/HSP 4	•			•	•	0.18	6051 743
LG/HA20-2/HSP 6	•			•	•	0.20	6051 744
LG/HA20-2/SPS-S 7	•	•		•	•	0.20	6040 906
LG/HA20-2/SPS-S 8	•	•		•	•	0.20	6040 907
DN 25 (1")							
LG/HA25-2/HSP 6	•			•	•	0.20	6051 745
LG/HA25-2/SPS-S 7	•	•		•	•	0.20	6049 553
LG/HA25-2/SPS-S 8	•	•		•	•	0.20	6049 554
LG/HA25-2	without pump						6046 646

Pumps for LG/HA25-2
see "Circulating pumps".
Pump installation dimensions 1½" x 180 mm

DN 32 (1¼")							
LG/HA32-2/SPS-S 8	•	•		•	•	0.20	6049 555
LG/HA32-2/SPS-I 8	•	•	•	•	•	0.20	6059 330
LG/HA32-2	without pump						6046 647

Pumps for LG/ HA32-2
see "Circulating pumps".
Pump installation dimensions 2" x 180 mm

DN 40 (1½")							
HA40-2/SPS-I 8	•	•	•	•	•	0.20	6059 331
HA40-2/SPS-I 12 PM1	•		•	•		0.23	6040 915
HA40-2	without pump						6014 868

Pumps for HA40-2
see "Circulating pumps".
Pump installation dimensions DN 40/PN 6 x 250 mm

DN 50 (2")							
HA50-2/SPS-I 12 PM1	•		•	•		0.23	6040 916
HA50-2	without pump						6014 870

Pumps for HA50-2
see "Circulating pumps".
Pump installation dimensions DN 50/PN 6 x 280 mm

Speed control legend	
Δp-v	Variable differential pressure
ENF	Vent function 10 min.
	PWM control signal heating
Δp-c	Constant differential pressure
	Constant rotational speed

Heating armature groups

Compact charging group LG-2
With heat-insulating box for the direct installation on the CombiVal with 1″-nozzle, in the feed line or on the boiler.

Charging group/pump	Speed control					EEI ≤	Part No.
DN 25 (1″)							
LG 25-Compact/HSP 4	•			•	•	0.18	6051 746
LG 25-Compact/HSP 6	•			•	•	0.20	6051 747
LG 25-Compact/SPS-S 7	•	•		•	•	0.20	6049 556

Speed control legend	
Δp-v	Variable differential pressure
ENF	Vent function 10 min.
	PWM control signal heating
Δp-c	Constant differential pressure
	Constant rotational speed

Installation section for heat meters
for installation in the return of the direct (unmixed) heating armature group DN 25
Set consisting of:
- Fitting tube with connections G 1″ on both sides, incl. adapter for installation of meter with G ¾″ x 110 mm or G 1″ x 130 mm
- Pump ball valve G 1″ with gravity brake and union nut Rp 1″
- Flat seals

6006 990

Installation section for heat meters
for installation in the return of the mixed heating armature group DN 25
Set consisting of:
- Fitting tube with connections G 1″ on both sides, incl. adapter for installation of meter with G ¾″ x 110 mm or G 1″ x 130 mm
- Flat seals

6006 991

Heating armature groups

		Part No.
	**Differential pressure relief valve DN 20** for installation in a HA group DN 20 Angle version, both ends ½″ external thread Self-sealing with O-ring and screw connections Operating pressure: max. 10 bar Operating temperature: max. 110 °C Setting range: 0.1-0.6 bar Connections: ¾″ internal thread/ ¾″ external thread Centre distance: 90 mm Casing and spring hood made of brass Spring made of stainless steel Seals made of EPDM Setting handle made of plastic with hexagon socket fastening screw	6013 684
	**Differential pressure relief valve DN 25** for installation in a HA group DN 25 both ends 1″ external thread Self-sealing with O-ring and screw connections Operating pressure: max. 10 bar Operating temperature: max. 110 °C Setting range: 0.1-0.6 bar Connections: 1″ internal thread/ 1″ external thread Centre distance: 125 mm Casing and spring hood made of brass Spring made of stainless steel Seals made of EPDM Setting handle made of plastic with hexagon socket fastening screw	6046 875
	**Differential pressure relief valve DN 32** for installation in a HA group DN 32 both ends 1¼″ external thread Self-sealing with O-ring and screw connections Operating pressure: max. 10 bar Operating temperature: max. 110 °C Setting range: 0.1-0.6 bar Connections: 1¼″ internal thread/ 1¼″ external thread Centre distance: 125 mm Casing and spring hood made of brass Spring made of stainless steel Seals made of EPDM Setting handle made of plastic with hexagon socket fastening screw	6014 849
	**Fastening plate** for flat-seal installation of a connection set AS, or a pump group LG-2 or HA-2 Consisting of: - Fastening plate - 2 seals, asbestos-free - 2 1½″ nuts/2″ nuts	

Type	A mm	H mm	
DN 25	125	60	2022 446
DN 32	125	70	2022 447

Heating armature groups

Wall bracket
for the installation of a Hoval armature group on the wall.

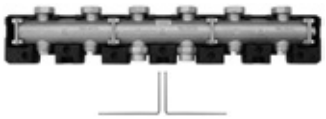
Type	Dimens. between centre lines	Connection top	Connection bottom	Wall distance	Part No.
	mm	inches	inches	mm	
DN 20	90	Rp 1″	R 1″	70,85,100	6019 209
DN 25	125	Rp 1½″	R 1″	87-162	6019 210
DN 32	125	Rp 2″	R 1½″	142,167	6025 295

Wall distributors

Standard pressure distributor WV-S 25-2/3 6031 809
DN 25 (1″)
wall distributor (not expandable) of brass
for 2 armature groups on the top,
with heat insulation made of EPP shells,
including brackets.

Screw fittings brass VSM21 6007 004
Version brass incl. seals
2 x screw fittings
External thread: G 1½″
Internal thread: Rp 1″

Wall distributors



System pressure distributor expandable
Bronze wall distributor for 2 or 3 armature groups on top (expandable).
DN 20 without thermal insulation,
DN 25-DN 50 with thermal insulation.
DN 20-DN 32 including brackets,
DN 40/50 without brackets.
Variable connections boiler-side.
With separate components attachment of additional armature groups and conversion to pressureless operation possible.

Wall distributor type	HA groups	Part No.
DN 20 (¾″)		
WV-M 20-2	2 HA groups	6013 694
WV-M 20-3	3 HA groups	6013 695
DN 25 (1″)		
WV-M 25-2	2 HA groups	6046 648
WV-M 25-3	3 HA groups	6046 649
DN 32 (1¼″)		
WV-M 32-2	2 HA groups	6046 650
WV-M 32-3	3 HA groups	6046 651
DN 40 (1½″)		
WV-M 40-2	2 HA groups	6015 116
WV-M 40-3	3 HA groups	6015 117
DN 50 (2″)		
WV-M 50-2	2 HA groups	6015 143

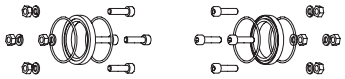
Coupling console
For the installation of a HA group DN 25 below at the system pressure distributor

HA 25 for WV-M 25	2012 818
HA 32 for WV-M 32	2012 835

Console for wall installation MKW-WV 40 6015 119
for installing a pressure distributor WV-M 40 on the wall
Set (2 pieces)

For wall distributors with more than 4 HA groups absolutely use console for floor installation!

Wall distributors

	Part No.
 **Console for floor installation MKB-WV 40/50** for installing the pressure distributor WV-M 40 or WV-M 50 supported on the floor Set (2 pieces)	6015 120
For wall distributors with up to 4 HA groups 1 set, for wall distributors with 5 or more HA groups 2 sets necessary!	
 **Upgrade module EW-WV-M** For wall distributors for the additional installation of an armature group. DN 20 without thermal insulation, DN 25-DN 50 including thermal insulation.	
EW-WV-M 20 DN 20	6013 696
EW-WV-M 25 DN 25	6046 251
EW-WV-M 32 DN 32	6046 252
EW-WV-M 40 DN 40	6015 118
EW-WV-M 50 DN 50	6015 145
 **Pressureless kit** For the installation in system distributors WV-M for pressureless operation	
DN 20	6012 738
DN 25	6046 341
DN 32	6046 342
 **Thermal insulation** EPP thermal insulation jacket for system wall distributor WV-M 25,32. Only required for expanding the system wall distributor.	
Wall distributor type — HA groups	
DN 25 (1″)	
WV-M 25-3 For 3 HA groups	6006 956
WV-M 25-4 For 4 HA groups	6006 957
WV-M 25-5 For 5 HA groups	6008 872
WV-M 25-6 For 6 HA groups	6008 880
DN 32 (1¼″)	
WV-M 32-3 For 3 HA groups	6006 958
WV-M 32-4 For 4 HA groups	6006 959
WV-M 32-5 For 5 HA groups	6008 883

Wall distributors

Steel pressure distributor
Wall distributor made of welded steel profiles for 2 or 3 armature groups on top (not expandable).
DN 25-DN 32 with thermal insulation, incl. supports.
Variable connections boiler-side.

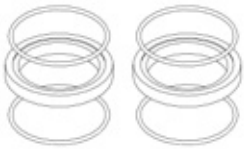
Steel distributor - type	HA groups	Part No.
DN 25 (1″)		
SWV 25-2	for 2 HA groups	6046 652
SWV 25-3	for 3 HA groups	6046 653
DN 32 (1¼″)		
SWV 32-2	for 2 HA groups	6046 654
SWV 32-3	for 3 HA groups	6046 655

Adapter set DN 20-DN 25
for the installation of the HA group DN 20 to a wall distributor DN 25 or a connection set DN 25.
Installation height: 120 mm
6013 693

Adapter fitting DN 25-DN 32
for the installation of the HA group DN 25 to a wall distributor DN 32.
6006 954

Adapter fitting DN 25-DN 40
for the installation of the HA group DN 25 to a wall distributor DN 40.
6014 852

Adapter fitting DN 25-DN 50
for the installation of the HA group DN 25 to a wall distributor DN 50.
6014 864



Adapter set DN 32-DN 25
for the installation of the HA group DN 32 to a wall distributor DN 25.
6006 953

Adapter set DN 32-DN 25
for the installation of the HA group DN 32 to a connection set DN 25.
6007 191

Adapter fitting DN 32-DN 40
for the installation of the HA group DN 32 to a wall distributor DN 40 or a connection set AS 40-S/NT/HT.
6014 863

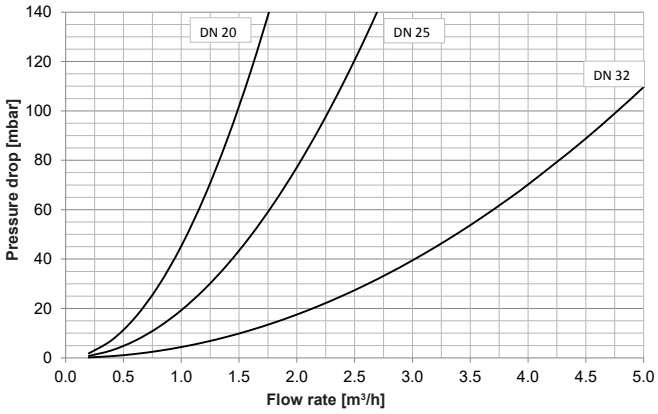
Adapter fitting DN 32-DN 50
for the installation of the HA group DN 32 to a wall distributor DN 50.
6014 865

Adapter fitting DN 40-DN 50
for the installation of the HA group DN 40 to a wall distributor DN 50.
6014 866

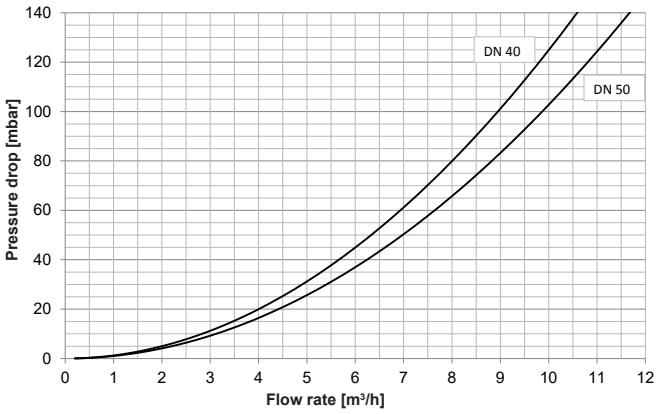
Pressure drop heating armature groups

HA-2 heating circuit without mixer

DN 20, DN 25, DN 32

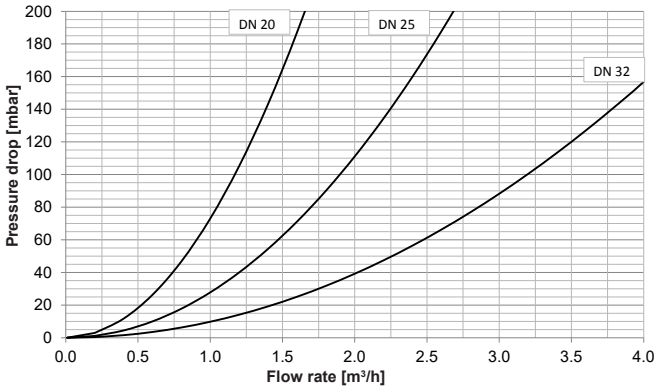


DN 40, DN 50

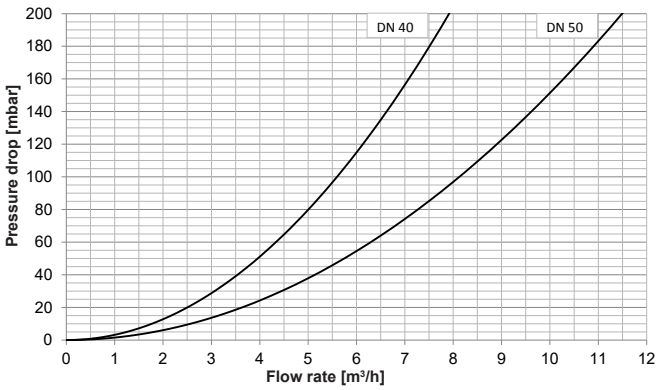


HA-3 heating circuit with mixer

DN 20, DN 25, DN 32

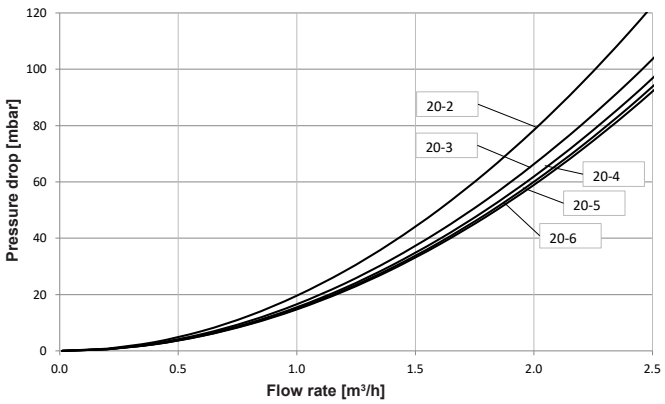


DN 40, DN 50

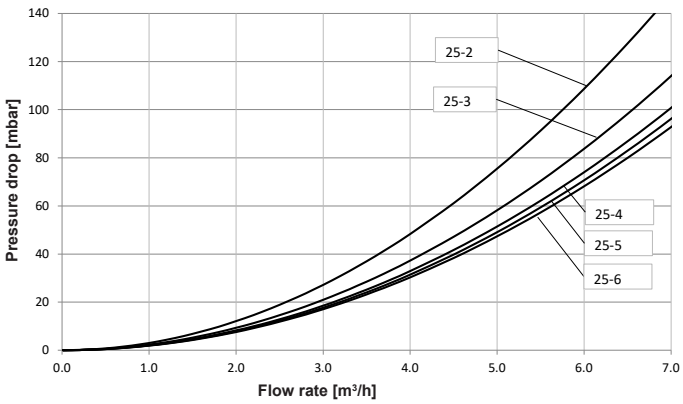


Pressure drop system wall distributor

WV-M 20-2,-3,-4,-5,-6

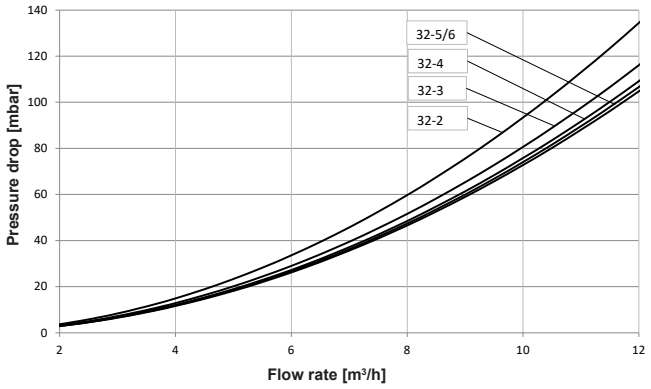


WV-M 25-2,-3,-4,-5,-6/WV-S 25-2/3

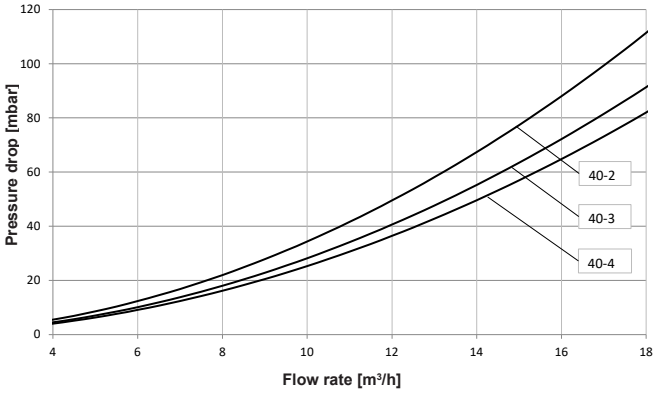


Pressure drop system wall distributor

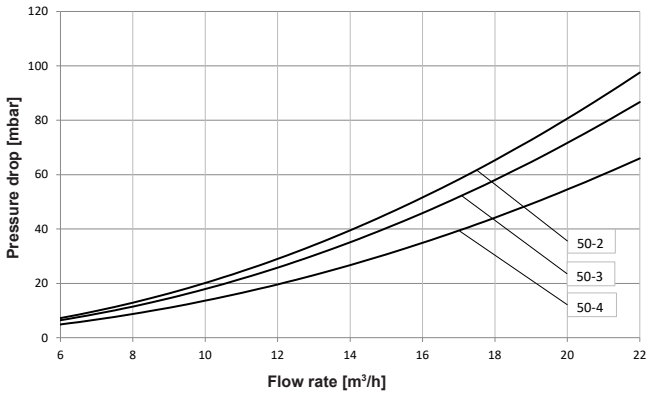
WV-M 32-2,-3,-4,-5,-6



WV-M 40-2,-3,-4

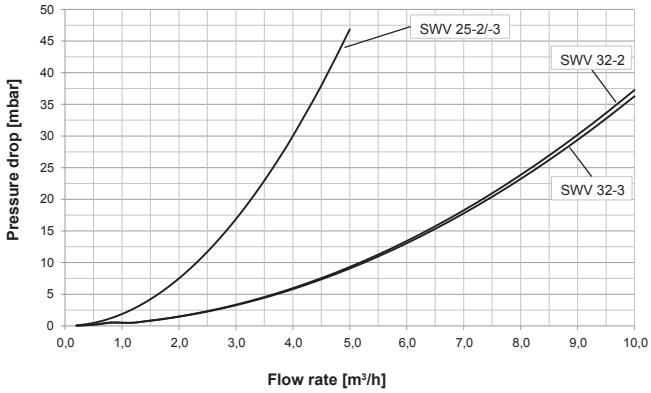


WV-M 50-2,-3

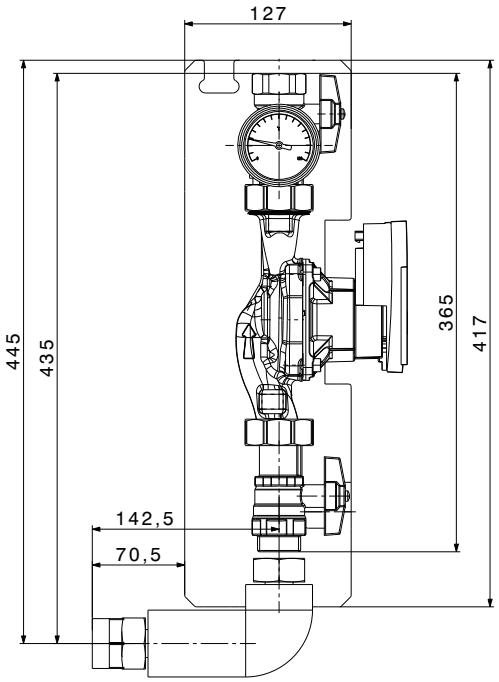


Pressure drop steel pressure distributor

SWV 25-2, -3

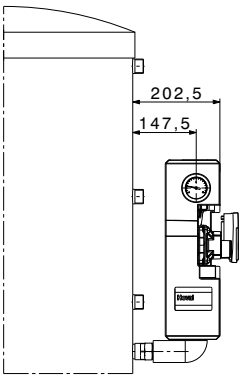


Charging group LG25-2 Compact

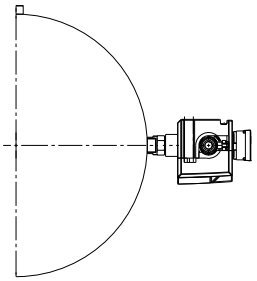


Example charging group LG25-2 Compact installed at calorifier

Side view

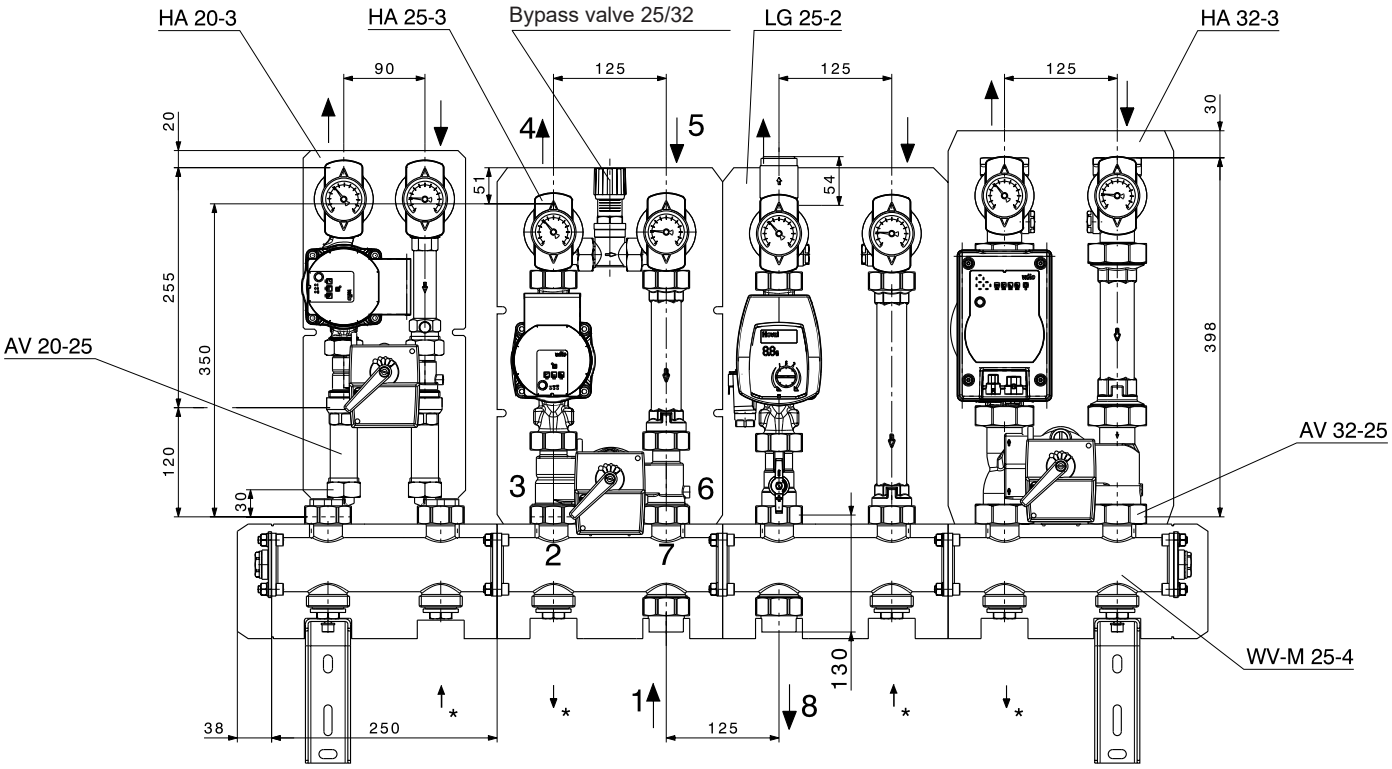


View from above

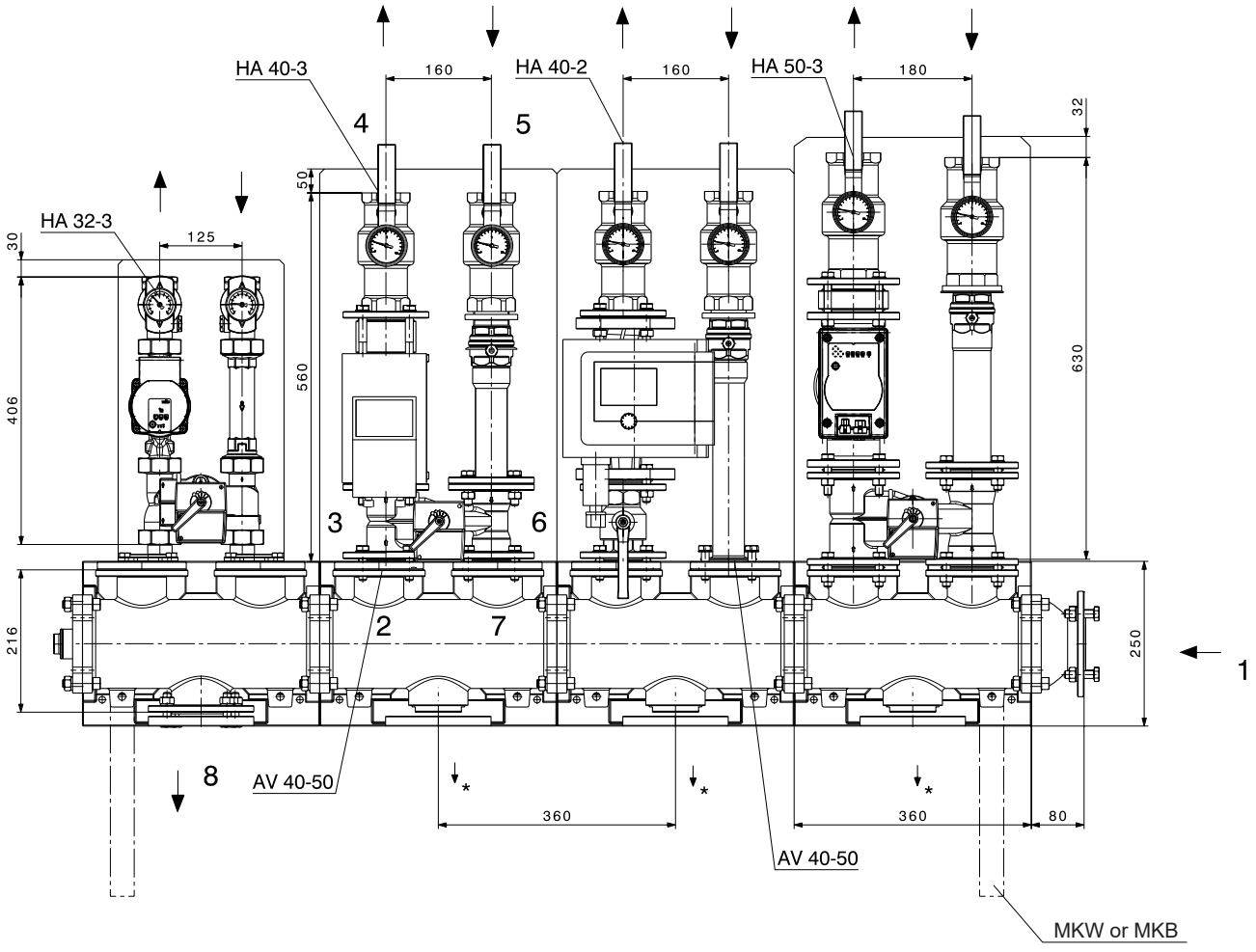


System wall distributor WV and heating armature groups for boiler or wall installation

with heating armature group HA or charging group LG

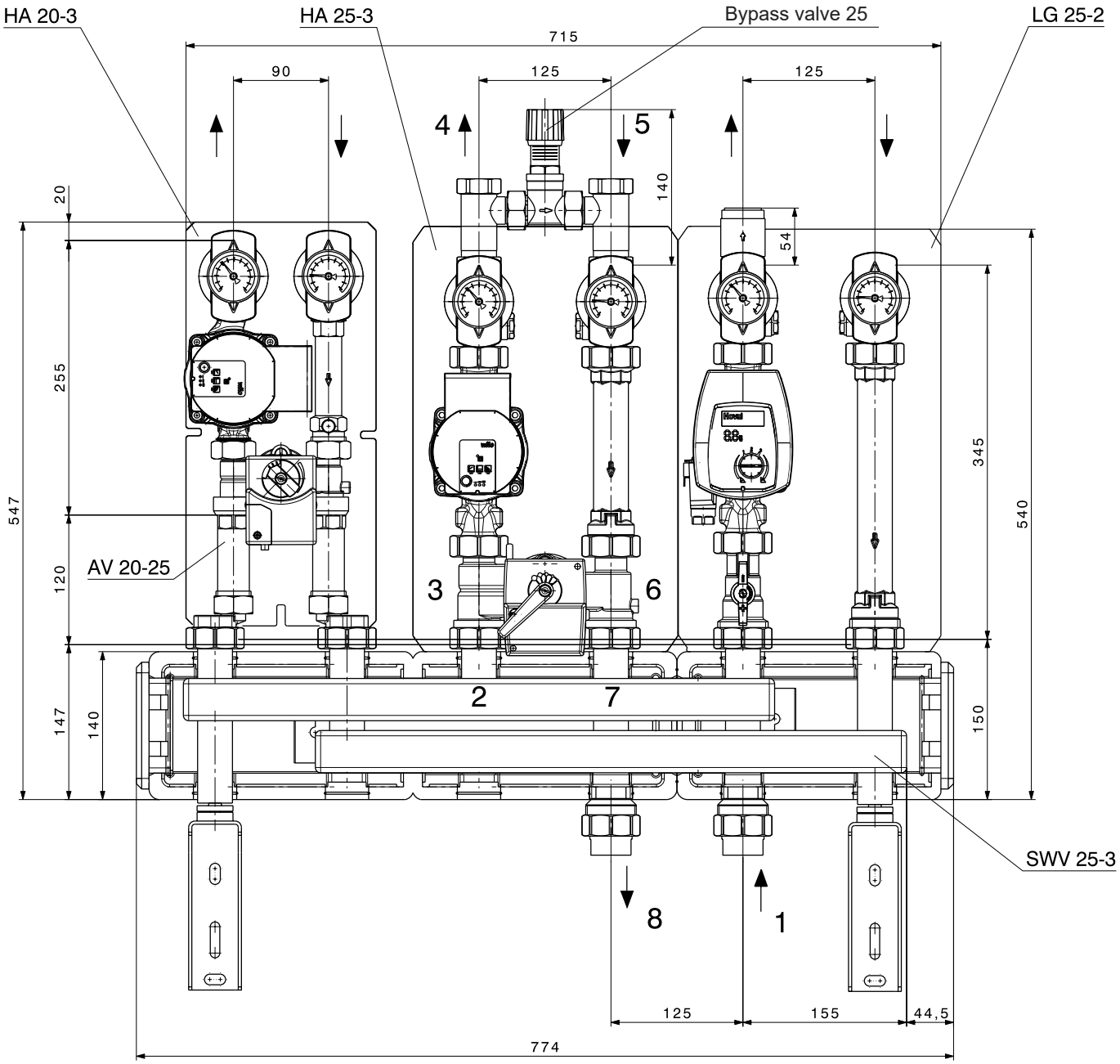


* Closed with plugs/variable connections



* Closed with plugs/variable connections

Steel pressure distributor SWV and heating armature groups for boiler or wall installation
with heating armature group HA or charging group LG



Heating armature groups

Type	Notation	Max. pressure	Max. temp.	kvs value	Dimension between centre lines	Installation height without insulation	Installation width including insulation	Height of insulation	Primary 3 flow - 6 return	Secondary 4 flow - 5 return	Overall pump dimensions
		bar	°C	m^3/h	mm	mm	mm	mm			connection x mm
LG/HA 20-2	Charging group to calorifier or heating circuit without mixer	6	110	4.7	90	255	180	385	G 1″	Rp ¾″	1″ x 130
LG/HA 25-2				7.2	125	340	250	383	G 1½″	Rp 1″	1½″ x 180
LG/HA 32-2				15.1	125	400	250	441	G 2″	Rp 1¼″	2″ x 180
HA 40-2				28.3	160	560	320	610	DN 40/PN 6	Rp 1½″	DN 40/PN 6 x 250
HA 50-2				31.2	180	630	360	660	DN 50/PN 6	Rp 2″	DN 50/PN 6 x 280
HA 20-3B…	Heating circuit with mixer	6		3.7	90	255	180	385	G 1″	Rp ¾″	1″ x 130
HA 25-3B...				6.0	125	340	250	383	G 1½″	Rp 1″	1½″ x 180
HA 32-3B...				10.1	125	400	250	441	G 2″	Rp 1¼″	2″ x 180
HA 40-3B...				17.7	160	560	320	610	DN 40/PN 6	Rp 1½″	DN 40/PN 6 x 250
HA 50-3B...				25.7	180	630	360	660	DN 50/PN 6	Rp 2″	DN 50/PN 6 x 280

Heating wall distributors

Type	Notation	Max. pressure	Max. temp.	kvs value	Dimension between centre lines	Installation height without insulation	Installation width including insulation	Height of insulation	Primary 1 flow - 8 return	Secondary 2 flow - 7 return
		bar	°C	m^3/h	mm	mm	mm	mm		
WV-M 20-2	Heating wall distributor	6	110	7.1	90	80	440	85	Rp ¾″	G 1″
WV-M 20-3				7.8			620			
WV-M 25-2				16.0	125	128	625	137	Rp 1″	G 1½″
WV-M 25-3				21.0			875			
WV-M 32-2				34.0	125	156	625	156	Rp 1¼″	G 2″
WV-M 32-3				37.0			875			
WV-M 40-2				32.8	160	179	740	190	DN 50/PN 6	DN 40/PN 6
WV-M 40-3				31.9			1060			
WV-M 50-2				50.1	180	225	840	220	DN 65/PN 6	DN 50/PN 6

Steel pressure distributors

Type	Notation	Max. pressure	Max. temp.	kvs value	Dimension between centre lines	Installation height without insulation	Installation width including	Height of insulation	Primary 1 flow - 8 return	Secondary 2 flow - 7 return
		bar	°C	m^3/h	mm	mm	mm	mm		
SWV 25-2	Heating wall distributor	6	110	23.1	125	175	524	140	Rp 1″	G 1½″
SWV 25-3							774			
SWV 32-2				51.8		215	524	184	Rp 1¼″	G 2″
SWV 32-3				52.5			774			

Hoval TransShare

- Flexible heating distributor in a fully welded configuration, mounted without vibration on a stand frame.
- The type of connection to the heat generator can be freely selected prior to production and is either on the left or right facing up.
- The heating distributor design can include a controller and an electric control panel. The TopTronic® E controller and all electrical field devices (drive and sensor) are then wired and ready to connect.
- For cold applications below the dew point, we offer the TransShare cold distributor with the appropriate valves, double corrosion protection coating and optional cold insulation.
- The system is designed and manufactured in line with the generally recognised codes of practice and is certified according to ISO 9001.
- Various hydraulic variants are possible, e.g.:
  - with domestic water heating in the buffer storage principle
  - Set-up with several mixers and/or direct heating circuits
  - Set-up with two return flow collectors (high temperature and low temperature)
- Setting up with two return collectors is to be recommended if there is a high or medium-temperature heating circuit and a low-temperature heating circuit. The lower return temperature leads to higher efficiency levels in condensing boilers and a greater heat energy content in the buffer storage tank. Planning of the TransShare heating distributor is always carried out in relation to the building, and is adapted to the corresponding output values, temperatures and flow rates.
- Complete preassembly shortens installation times and minimises the amount of work involved.
- Thermal insulation in EPP or mineral wool with galvanised sheet steel.
- 3D CAD drawing on request

TransShare with thermal insulation made of mineral wool and jacket made of galvanised sheet steel

TransShare with EPP thermal insulation

Nominal pressures up to PN 10 and maximum temperatures up to 110 °C are possible

Further information and prices
on request

TransShare heating circuit distributor

	Flow rate V [m³/h]	Distributor DN	max. output at ΔT 15 K [kW]	ΔT 20 K [kW]	ΔT 25 K [kW]	ΔT 30 K [kW]	ΔT 40 K [kW]
Freely configured	1.49	25	25.8	34.5	43.1	51.7	68.9
	2.54	32	44.0	58.7	73.4	88.1	117.5
	3.41	40	59.1	78.8	98.6	118.3	157.7
	5.46	50	94.7	126.2	157.8	189.4	252.5
	9.08	65	157.5	209.9	262.4	314.9	419.9
	12.51	80	216.9	289.2	361.6	433.9	578.5
Standard design configuration	21.08	100	365.5	487.4	609.2	731.1	974.8
Freely configured	31.88	125	552.8	737.1	921.4	1105.7	1474.2
Standard design configuration	46.64	150	808.8	1078.4	1348.0	1617.6	2156.8
Freely configured	78.37	200	1359.0	1812.0	2265.0	2718.0	3624.0
	124.62	250	2161.0	2881.4	3601.7	4322.1	5762.8
	176.27	300	3056.7	4075.6	5094.5	6113.4	8151.2
	214.21	350	3714.6	4952.8	6191.0	7429.2	9905.7
	277.82	400	4817.7	6423.6	8029.5	9635.4	12847.2

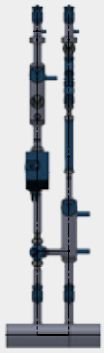
Flow rate - nominal diameter - ΔT output at max. 0.65 m/s

TransShare heating circuits

	Flow rate V [m³/h]	HC DN	max. output at ΔT 7 K [kW]	ΔT 10 K [kW]	ΔT 15 K [kW]	ΔT 20 K [kW]	ΔT 25 K [kW]
Standard design configuration	1.35	20	10.9	15.6	23.4	31.2	39.0
	2.63	25	21.0	30.0	46.0	61.0	76.0
	5.09	32	41.0	59.0	88.0	118.0	147.0
	6.83	40	55.0	79.0	118.0	158.0	197.0
	10.92	50	88.0	126.0	189.0	252.0	316.0
Freely configured	18.17	65	147.0	210.0	315.0	420.0	525.0
	25.02	80	202.0	289.0	434.0	578.0	723.0
	42.16	100	341.0	487.0	731.0	975.0	1218.0
	63.75	125	516.0	737.0	1105.0	1474.0	1842.0
	93.28	150	755.0	1078.0	1618.0	2157.0	2696.0
	153.74	200	1244.0	1777.0	2666.0	3555.0	4443.0
	249.24	250	2017.0	2811.0	4322.0	5763.0	7203.0

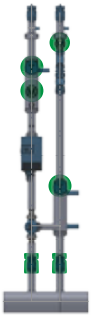
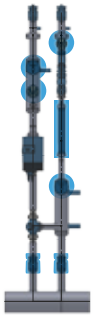
Flow rate - nominal diameter - ΔT output at max. 1.3 m/s

VERSIONS
of the heating circuits in standard design

Direct charging heating circuit	Direct heating circuit	Mixer heating circuit	Mixer heating circuit dB (with direct admixture)
			

All heating circuits shown in standard design **Premium**.

Equipment of the heating circuits, taking the example of a mixer heating circuit

Basis	Comfort	Premium
		
• Three-way valve • Pump • 2 shut-off valves • 2 thermometers • Non-return valve • Strainer	• Three-way valve • Pump • 4 shut-off valves • 2 thermometers (Ø 63 mm) • Non-return valve • Strainer • 2 pressure gauges (Ø 63 mm) • Fill and drain valve	• Three-way valve • Pump • 3 shut-off valves • 2 thermometers (Ø 100 mm) • Non-return valve • Strainer • 2 pressure gauges (Ø 100 mm) • Fill and drain valve • Heat meter adapter • Flow rate limiter

Standard design for
DN 25 | DN 32 | DN 40 | DN 50

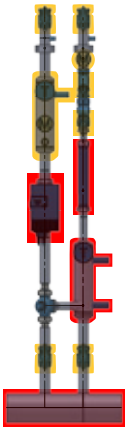
Free configuration also for:
DN 25 | DN 32 | DN 40 | DN 50
and > DN 50 | ...

The planning according to the plant
of the selected standard design

Premium

Standard

- Shut-off valves
- Thermometer
- Non-return valve
- Flow rate limiter
- Fill and drain valve
- Strainer



Planned (according to system data)

- Pump
- Three-way valve with drive
- Heat meter adapter
- Thermal insulation*
  - Insulation EPP 50 %
  - Insulation EPP 100 %
- TopTronic® E, TopTronic® E-FW incl. sensors, wiring and control panel*
- Power supply
- Distributor/collector

* not illustrated

2-way and 3-way valves

Through valves
YVG48.., VVG41.50, VVF22..

Three-way valves
YXG48.., VXG41.50, VXF22.., VXF32.150

3-way mixers

Three-way valves and motor drives
B3G460 / NR 230..

Thermo-mixers
TM200, JRG

2-way and 3-way ball valves

Straight-way ball valves
VAG60..

Switching ball valves
VBI60...L

Motor drives and butterfly valves

Motor drives

Bufferfly valves

Thread

Through valve YVG48..
Size DN 15-40, PN 16, 130 °C

- Valve body made from cast iron EN-JL 1030 with threaded connection, incl. seals and screw connections
- Parabolic cone of stainless steel 1.4021 with soft seat seal
- Use as control or safety shut-off valve
- Through-flow characteristics (A-AB, B-AB) linear
- Leakage rate class IV - S1 acc. to EN 1349 (< 0.0005 % Kvs)
- Control ratio: min. 50 : 1
- Gland seal O-ring EPDM
- DN 15-40
  Kvs value: 2.5-25 m^3/h
  Nominal stroke: 5.5 mm

Suitable motor drives SSC319, SAS31.00, SAS31.03, SAS61.03

Through valve VVG41.50
Size DN 50, PN 16, 130 °C

- Valve body made from gunmetal with threaded connection, incl. seals and screw connections
- Use as control or safety shut-off valve
- DN 50
  Kvs value: 40 m^3/h
  Nominal stroke: 20 mm

Suitable motor drives SAX319.00, SAX319.03, SAX619.03

Zone valve VC4613
Size DN 15-25, 95 °C

- Through valve with gunmetal valve body with internal thread and motor-based drive with 1-wire control.
- Operating voltage 230 V/50 Hz
- 1 built-in volt-free limit switch with 1 changeover contact max. 6 A

Flange

Through valve VVF22..
Size DN 25-100, PN 6, 130 °C

- Valve body made from grey cast iron with flange connection incl. counter flanges, screws and seals
- Use as control or safety shut-off valve
- DN 25-80
  Kvs value: 6.3-100 m^3/h
  Nominal stroke: 20 mm
- DN 100
  Kvs value: 160 m^3/h
  Nominal stroke: 40 mm

Suitable motor drives SAX319.00, SAX319.03, SKC32.60, SAX619.03, SKC60

Through valves PN 16, 130 °C, thread

Through valve YVG48..
DN 15-40, PN 16, 130 °C

- Valve body made from cast iron EN-JL 1030 with threaded connection, incl. seals and screw connections
- Parabolic cone of stainless steel 1.4021 with soft seat seal
- Use as control or safety shut-off valve
- Through-flow characteristics (A-AB, B-AB) linear
- Leakage rate class IV - S1 acc. to EN 1349 (< 0.0005 % Kvs)
- Control ratio: min. 50 : 1
- Gland seal O-ring EPDM
- Nominal stroke: 5.5 mm

DN	Connection valve inches	Connection fitting inches	kvs m³/h	V̇ at ΔP 120 mbar m³/h	Sv	Part No.
15	G 1″	Rp ½″	2.5	0.87	> 50	6045 733
15	G 1″	Rp ½″	4.0	1.39	> 50	6045 734
20	G 1¼″	Rp ¾″	6.3	2.18	> 50	6045 735
25	G 1½″	Rp 1″	10	3.46	> 50	6045 736
32	G 2″	Rp 1¼″	16	5.54	> 50	6045 737
40	G 2¼″	Rp 1½″	25	8.66	> 50	6045 738

Notice
Through valves do not become three-way valves by removing the dummy flange!

Suitable motor drives

Type	Voltage	Control signal	Actuator run time	Part No.
SSC319	230 V / 50/60 Hz	3-point	150 s	245 236
SAS31.00	230 V / 50/60 Hz	3-point	120 s	2064 157
SAS31.03	230 V / 50/60 Hz	3-point	30 s	2064 158
SAS61.03	AC 24 V / DC 24 V	0-10 V	30 s	2064 161

Notice
The SAS61.03 motor drive can not be supplied with voltage by the TopTronic® E. Provide a separate 24 V supply.

kvs = nominal flow rate of water (5-30 °C) across the fully opened valve (H100) at a differential pressure of 1 bar
Sv = setting ratio kvs/kvr
ΔPmax. = maximum permitted pressure difference across the valve
kvr = minimum kv value at which the characteristic tolerance is still maintained at a differential pressure of 100 kPa (1 bar)

Selection table valve/motor drive

DN	SSC319	SAS31.00 SAS31.03 SAS61.03
	ΔPmax. mbar	
15	1000	4000
20	1000	3500
25	1000	2000
32	625	1100
40	313	600

Through valve VVG41.50
DN 15-50, PN 16, 120 °C

- Valve body made from gunmetal with threaded connection, incl. seals and screw connections
- Use as control or safety shut-off valve
- Nominal stroke: 20 mm

DN	Connection valve inches	fitting inches	kvs m³/h	V̇ at ΔP 120 mbar m³/h	Sv	Part No.
50	G 2¾″	Rp 2″	40	13.86	> 100	6045 739

Notice
Through valves do not become three-way valves by removing the dummy flange!

Suitable motor drives

Type	Voltage	Control signal	Actuator run time	Part No.
SAX319.00	230 V / 50/60 Hz	3-point	120 s	2048 444
SAX319.03	230 V / 50/60 Hz	3-point	30 s	2048 445
SAX619.03	AC 24 V / DC 24 V	0-10 V	30 s	2048 446

kvs = nominal flow rate of water (5-30 °C) across the fully opened valve (H100) at a differential pressure of 1 bar
Sv = setting ratio kvs/kvr
ΔPmax. = maximum permitted pressure difference across the valve
kvr = minimum kv value at which the characteristic tolerance is still maintained at a differential pressure of 100 kPa (1 bar)

Notice
The SAX619.03 motor drive can not be supplied with voltage by the TopTronic® E. Provide a separate 24 V supply.

Selection table valve/motor drive

DN	SAX319.00	SAX319.03	SAX619.03
		ΔPmax. mbar	
50	1750	1750	1750

Zone valves

Zone valve VC4613
DN 15-25, 95 °C

- Through valve with gunmetal valve body with internal thread and motor-based drive with 1-wire control
- Operating voltage 230 V/50 Hz
- 1 built-in volt-free limit switch with 1 changeover contact max. 6 A
- Max. operating pressure 4 bar, opens in 7.2 s

DN	Screw connection inches	kvs [1]	Part No.
15	Rp ½″	3.0	2012 049
20	Rp ¾″	5.0	2012 050
25	Rp 1″	6.0	2012 051

[1] Flow rate in m³/h with a pressure drop of 1 bar.

Through valves PN 6, 130 °C, flange

Through valve VVF22..
DN 25-100, PN 6, 130 °C

- Valve body made from grey cast iron with flange connection, incl. counter flanges, screws and seals
- Use as control or safety shut-off valve
- DN 25 ... 80 nominal stroke: 20 mm
- DN 100 nominal stroke: 40 mm

DN	Connection valve	Connection flange	kvs m³/h	V̇ at ΔP 120 mbar m³/h	Sv	Part No.
25	FL	AE	6.3	2.18	> 50	6045 741
25	FL	AE	10	3.46	> 50	6045 743
40	FL	AE	16	5.54	> 100	6045 744
40	FL	AE	25	8.66	> 100	6045 745
50	FL	AE	40	13.66	> 100	6045 746
65	FL	AE	63	21.82	> 100	6045 747
80	FL	AE	100	34.64	> 100	6045 748
100	FL	AE	160	55.43	> 100	6045 749

Notice
Through valves do not become three-way valves by removing the dummy flange!

Suitable motor drives

Type	Voltage	Control signal	Actuator run time	Part No.
SAX319.00	230 V / 50/60 Hz	3-point	120 s	2048 444
SKC32.60	230 V / 50/60 Hz	3-point	120 s	2048 451
SAX319.03	230 V / 50/60 Hz	3-point	30 s	2048 445
SAX619.03	AC 24 V / DC 24 V	0-10 V	30 s	2048 446
SKC60	AC 24 V / DC 24 V	0-10 V	120/20 s	2048 453

kvs = nominal flow rate of water (5-30 °C) across the fully opened valve (H100) at a differential pressure of 1 bar
Sv = setting ratio kvs/kvr
ΔPmax. = maximum permitted pressure difference across the valve
FL = Flange type 21 form B
AE = Weld-on end
kvr = minimum kv value at which the characteristic tolerance is still maintained at a differential pressure of 100 kPa (1 bar)

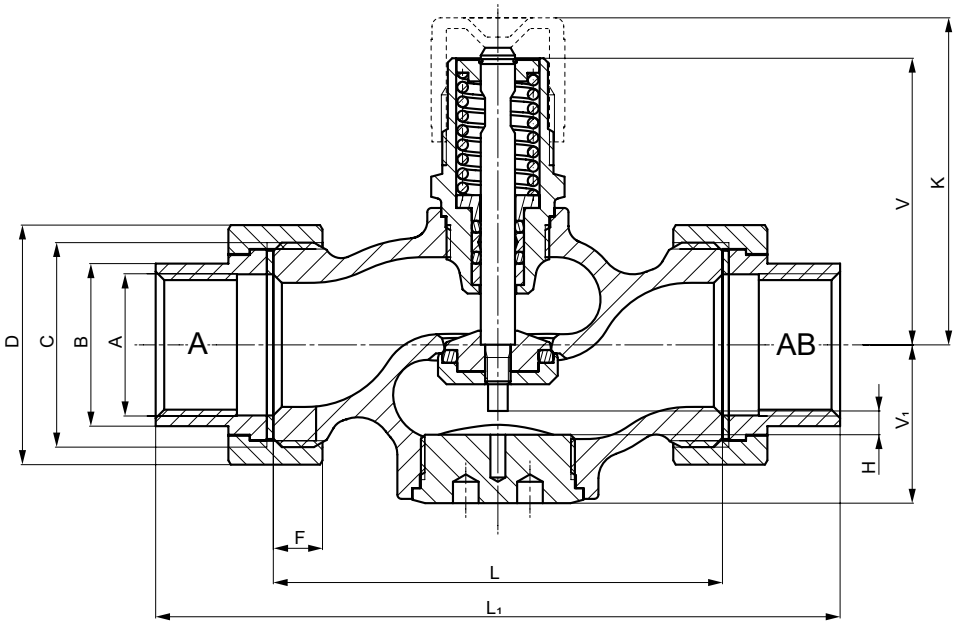
Notice
The SAX619.03 and SKC60 motor drive can not be supplied with voltage by the TopTronic® E. Provide a separate 24 V supply.

Selection table valve/motor drive

DN	SAX319.00 SAX619.03	SAX319.03	SKC32.60 SKC60
		ΔPmax. mbar	
25	3000	3000	-
40	3000	3000	-
50	3000	3000	-
65	1500	1500	-
80	750	750	-
100	-	-	2500

Through valve YVG48..
DN 15-40, PN 16, 130 °C

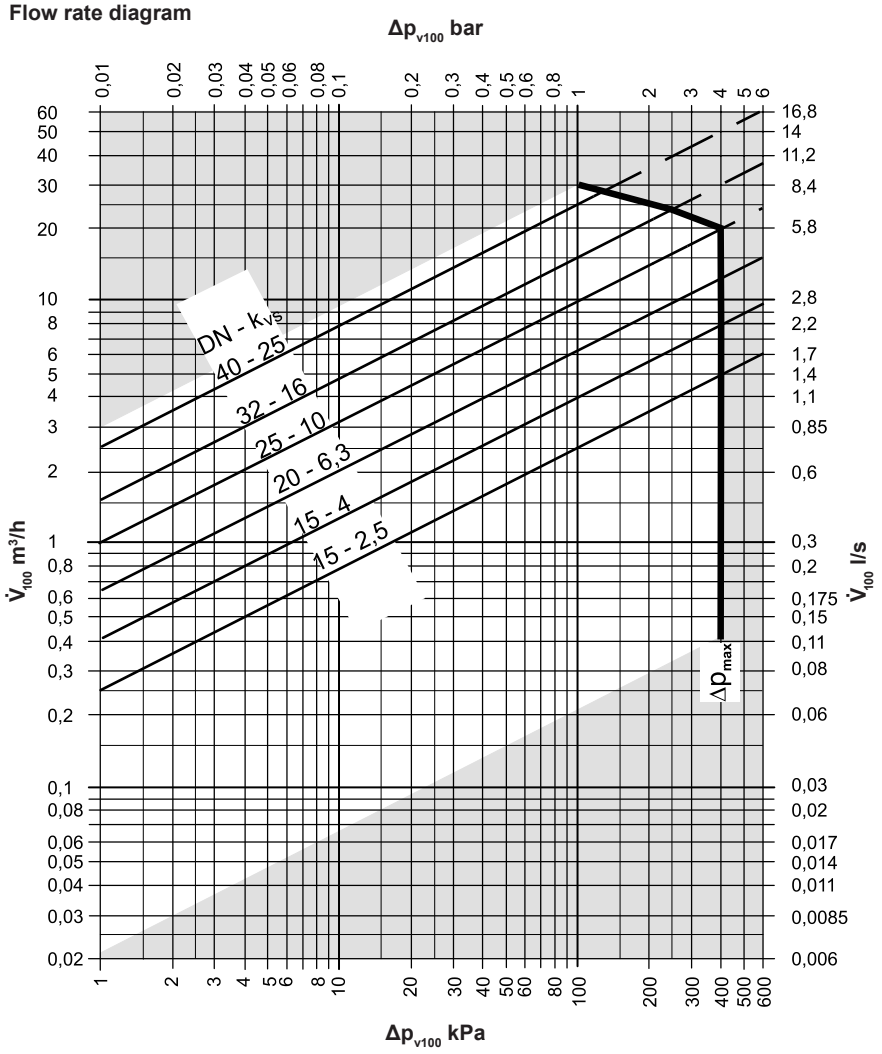
- Valve body made from cast iron EN-JL 1030 with threaded connection, incl. seals and screw connections
- Parabolic cone of stainless steel 1.4021 with soft seat seal
- Use as control or safety shut-off valve
- Through-flow characteristics (A-AB, B-AB) linear
- Leakage rate class IV - S1 acc. to EN 1349 (< 0.0005 % Kvs)
- Control ratio: min. 50 : 1
- Gland seal O-ring EPDM
- DN 15-40
  Kvs value: 2.5-25 m^3/h
  Nominal stroke: 5.5 mm
- Can be fitted with motor drives SSC319 and SAS..
- Max. operating temperature 130 °C



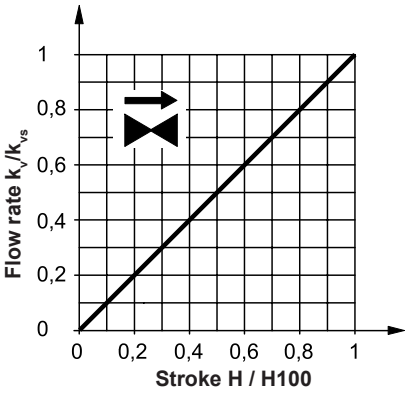
DN	L	L_1	V	V_1	K	A	B	C	D	F	H	H (SAX..)	m 2-way
	mm	mm	mm	mm	mm	inches	mm	inches	mm	mm	mm	mm	kg
15	100	146	67	36.5	77	Rp ½″	25	G 1″	41	9	5.5	> 381	1.15
20	100	149	67	36.5	77	Rp ¾″	32	G 1¼″	51	10	5.5	> 396	1.45
25	105	160	67	37	77	Rp 1″	38	G 1½″	56	11	5,5	> 399	1.70
32	130	193	78	49	88	Rp 1¼″	47	G 2″	71	12	5.5	> 406	3.00
40	140	207	78	49	88	Rp 1½″	53	G 2¼″	76	14	5.5	> 409	3.50

H (SAX..) = overall height of the actuator plus minimum distance to the wall or ceiling for installation, connection, operation, maintenance etc.

Flow rate diagram

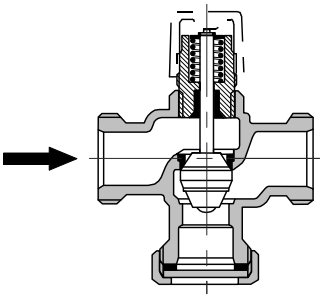


Valve characteristic curve



Passage:
0-100 % linear according to VDI/VDE2173

Valve section



Δp$_{max}$ = maximum permitted pressure difference across the control path of the valve for the entire setting range of the valve-motor drive unit

Δp$_{v100}$ = differential pressure across the fully opened valve and above the control path at a flow rate V$_{100}$

V$_{100}$ = flow rate through the fully opened valve (H100)

100 kPa = 1 bar ≈ 10 mWC

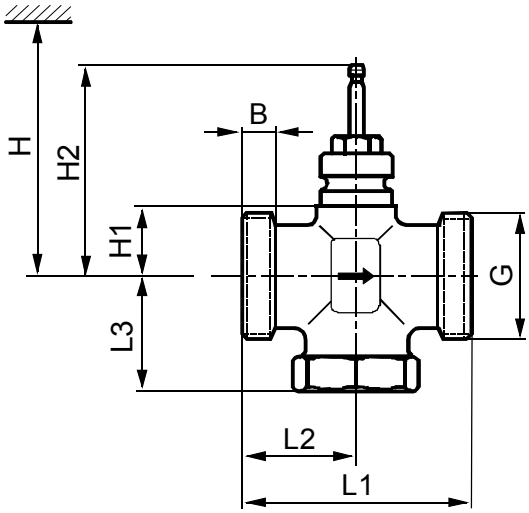
1 m³/h = 0.278 l/s water of 20 °C

- Guided parabolic plug, firmly connected with the valve tappet
- The seat is pressed into the casing together with special sealing material.

Notice
Through valves do not become three-way valves by removing the dummy flange!

Through valves VVG41.50
DN 50, PN 16, 120 °C

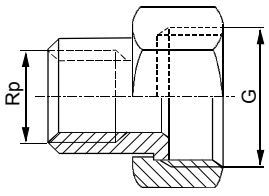
- Valve body made from gunmetal with threaded connection, incl. seals and screw connections
- Use as control or safety shut-off valve
- DN 50
- Kvs value: 40 m³/h
- Can be fitted with motor drives SAX..
- Max. operating temperature 130 °C



DN	B	G	L1	L2	L3	H1	H2	H (SAX..)
	mm	inches	mm	mm	mm	mm	mm	mm
50	16	G 2¾″	150	75	83	46	142.5	> 488

H (SAX..) = overall height of the actuator plus minimum distance to the wall or ceiling for installation, connection, operation, maintenance etc.

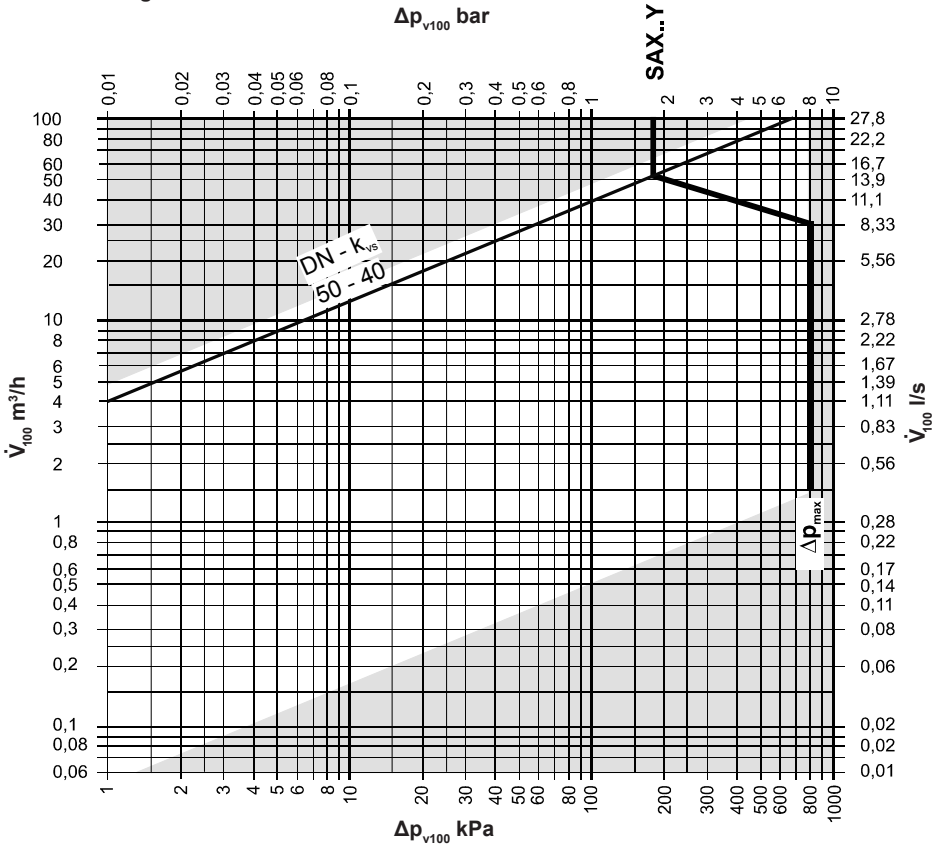
Fittings



DN	G inches	Rp inches
VVG41.50	G 1″	Rp ½″

- Valve side with cylindrical thread according to ISO 228-1
- Tube side with cylindrical thread according to ISO 7-1
- Fittings up to 100 °C media temperature

Flow rate diagram



Δp$_{max}$ = maximum permitted pressure difference across the control path of the valve for the entire setting range of the valve-motor drive unit

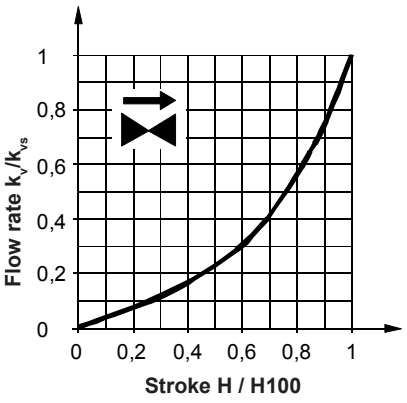
Δp$_{v100}$ = differential pressure across the fully opened valve and above the control path at a flow rate V$_{100}$

V$_{100}$ = flow rate through the fully opened valve (H100)

100 kPa = 1 bar ≈ 10 mWC

1 m³/h = 0.278 l/s water of 20 °C

Valve characteristic curve

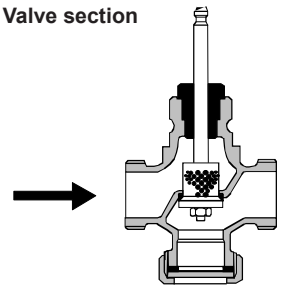


Passage:

0-30 % = linear

30-100 % = equal percentage
n$_{ep}$ = 3 according to VDI/VDE 2173

Valve section

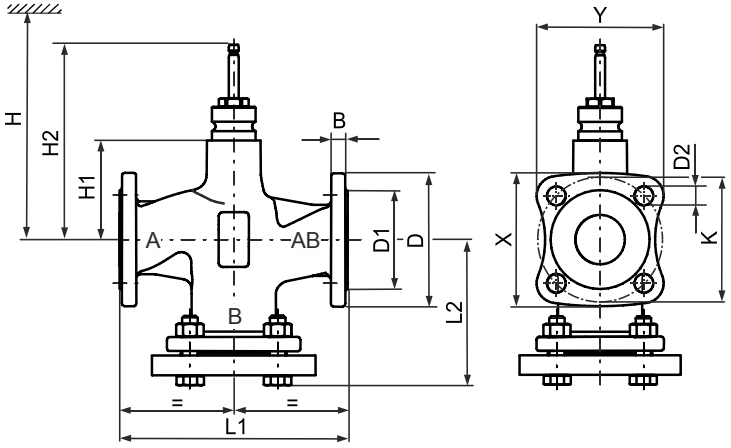


Notice

Through valves do not become three-way valves by removing the dummy flange!

Through valve VVF22..
DN 25-100, PN 6, 130 °C

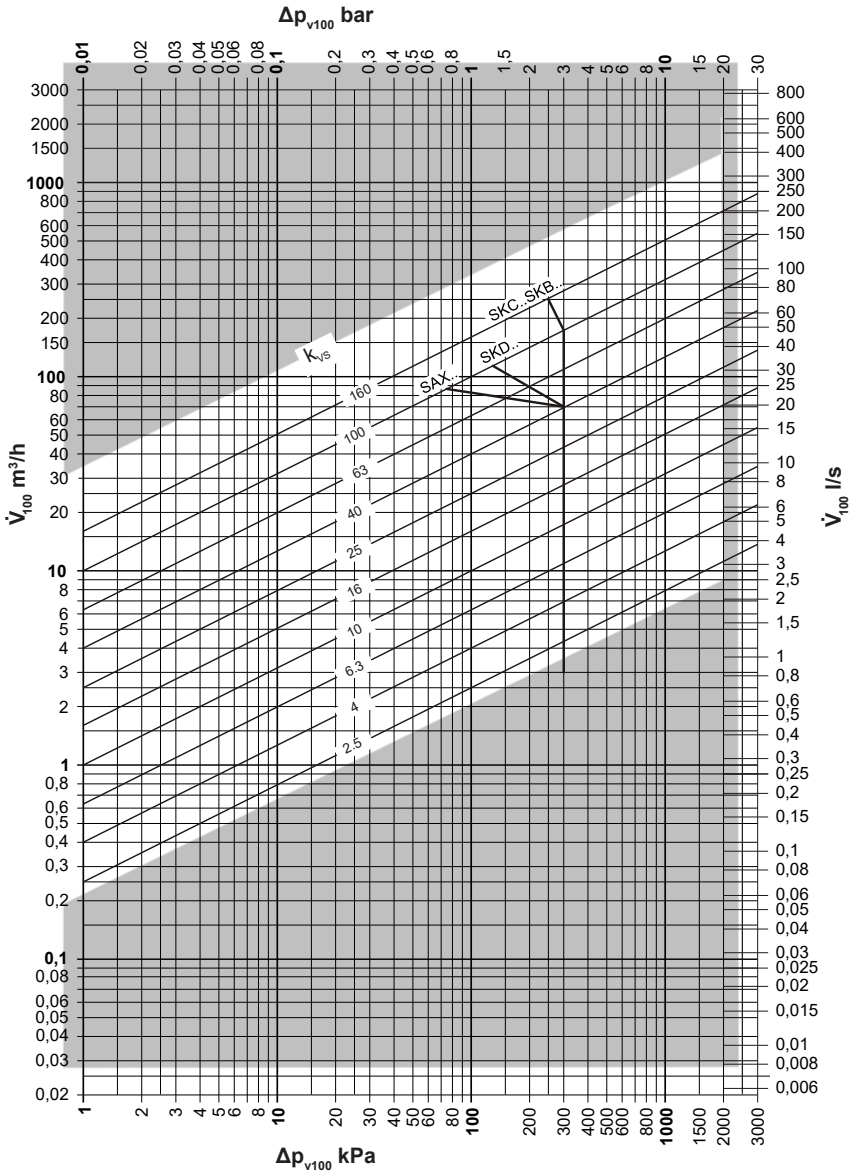
- Valve body made from grey cast iron with flange connection incl. counter flanges, screws and seals
- DN 25-100
- Kvs value: 6.3-160 m³/h
- Flange type 21, flange form B
- Can be fitted with motor drives SAX.. or SKC..
- Max. operating temperature 130 °C



DN	m	B	Ø D	Ø D1	Ø D2	L1	L2	Ø K	x	y	H1	H2	H (SAX..)	H (SKC..)
	kg	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm
25	4.1	11	100	58	11 (4x)	150	99	75	82	78	37	133.5	479	-
40	6.5	13	130	78	14 (4x)	180	116	100	106	101	37	133.5	479	-
50	8	14	140	88	14 (4x)	200	128	110	114	108	50	146.5	492	-
65	11.9	14	160	108	14 (4x)	240	142.5	130	129	122	75	171.55	517	-
80	17.1	16	190	124	19 (4x)	260	157	150	154	146	75	171.55	517	-
100	24.2	16	210	144	19 (4x)	300	179	170	170	160	110	226.5	-	685

H (SAX../SKC..) = overall height of the actuator plus minimum distance to the wall or ceiling for installation, connection, operation, maintenance etc.

Flow rate diagram



Δp$_{max}$ = maximum permitted pressure difference across the control path of the valve for the entire setting range of the valve-motor drive unit

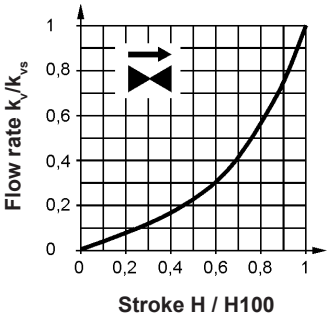
Δp$_{v100}$ = differential pressure across the fully opened valve and above the control path at a flow rate V$_{100}$

V$_{100}$ = flow rate through the fully opened valve (H100)

100 kPa = 1 bar ≈ 10 mWC

1 m³/h = 0.278 l/s water of 20 °C

Valve characteristic curve



0-30 % = linear

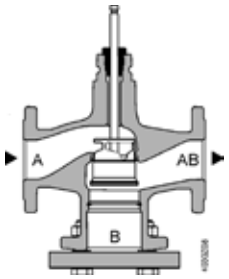
30-100 % = equal percentage
n$_{ep}$ = 3 according to VDI/VDE 2173

For elevated kvs values, the valve characteristic curve is optimised for a maximum flow rate k$_{v100}$.

Valve section

Liquids

Closing against the pressure



A → AB

With all drives

Thread

Three-way valve YXG48..
Size DN 15-40, PN 16, 130 °C

- Valve body made from grey cast iron EN-JL 1030 with threaded connection, incl. seals and screw connections
- Parabolic cone of stainless steel 1.4021 with soft seat seal
- For distribution, switching or mixing
- Through-flow characteristics (A-AB, B-AB) linear
- Leakage rate class IV - S1 acc. to EN 1349 (< 0.0005 % Kvs)
- Control ratio: min. 50 : 1
- Gland seal O-ring EPDM
- DN 15 ... 40
  Kvs value: 2.5 ... 25 m^3/h
  Nominal stroke: 5.5 mm

Suitable motor drives SSC319, SAS31.00, SAS31.03, SAS61.03

Three-way valve VXG41.50
Size DN 50, PN 16, 130 °C

- Valve body made from gunmetal with threaded connection, incl. seals and screw connections
- For distribution, switching or mixing
- Leakage rate:
  - Passage 0-0.02 % of the Kvs value according to DIN EN 1349
  - Bypass 0.5-2 % of the Kvs value
- DN 50
  Kvs value: 40 m^3/h
  Nominal stroke: 20 mm

Suitable motor drives SAX319.00, SAX319.03, SAX619.03

Flange

Three-way valve VXF22..
Size DN 25-100, PN 6, 130 °C

- Valve body made from grey cast iron with flange connection incl. counter flanges, screws and seals
- For distribution, switching or mixing
- Leakage rate:
  - Passage 0-0.02 % of the Kvs value
  - Bypass 0.5-2 % of the Kvs value (Kvs ≥ 6.3), 0.5-4 % of the Kvs value (Kvs 2.5; 4)
- DN 25-80
  Kvs value: 6.3-100 m^3/h
  Nominal stroke: 20 mm
- DN 100
  Kvs value: 160 m^3/h
  Nominal stroke: 40 mm

Suitable motor drives SAX319.00, SAX319.03, SKC32.60, SAX619.03, SKC60

Three-way valve VXF32.150
Size DN 150, PN 10, 130 °C

- Valve body made from grey cast iron with flange connection incl. counter flanges, screws and seals
- For distribution, switching or mixing
- Leakage rate:
  - Passage 0-0.02 % of the Kvs value
  - Bypass 0.5-2 % of the Kvs value (Kvs ≥ 6.3), 0.5-3 % of the Kvs value (Kvs 1.6; 2.5; 4)
- DN 150
  Kvs value: 400 m^3/h
  Nominal stroke: 40 mm

Suitable motor drives for switching SKC32.60, SKC60

Three-way valves PN 16, 130 °C, thread

Three-way valve YXG48..
DN 15-40, PN 16, 130 °C

- Valve body made from grey cast iron EN-JL 1030 with threaded connection, incl. seals and screw connections
- Parabolic cone of stainless steel 1.4021 with soft seat seal
- For distribution, switching or mixing
- Through-flow characteristics (A-AB, B-AB) linear
- Leakage rate class IV - S1 acc. to EN 1349 (< 0.0005 % Kvs)
- Control ratio: min. 50 : 1
- Gland seal O-ring EPDM
- Nominal stroke: 5.5 mm

DN	Connection valve inches	Connection fitting inches	kvs m^3/h	$\dot{V}$ at ΔP 120 mbar m^3/h	Sv	Part No.
15	G 1″	Rp ½″	2.5	0.87	> 50	6045 750
15	G 1″	Rp ½″	4	1.39	> 50	6045 751
20	G 1¼″	Rp ¾″	6.3	2.18	> 50	6045 753
25	G 1½″	Rp 1″	10	3.46	> 50	6045 754
32	G 2″	Rp 1¼″	16	5.54	> 50	6045 755
40	G 2¼″	Rp 1½″	25	8.66	> 50	6045 756

Suitable motor drives

Type	Voltage	Control signal	Actuator run time	Part No.
SSC319	230 V / 50/60 Hz	3-point	150 s	245 236
SAS31.00	230 V / 50/60 Hz	3-point	120 s	2064 157
SAS31.03	230 V / 50/60 Hz	3-point	30 s	2064 158
SAS61.03	AC 24 V / DC 24 V	0-10 V	30 s	2064 161

kvs = nominal flow rate of water (5-30 °C) across the fully opened valve (H100) at a differential pressure of 1 bar
Sv = setting ratio kvs/kvr
$\Delta P_{max.}$ = maximum permitted pressure difference across the valve
kvr = minimum kv value at which the characteristic tolerance is still maintained at a differential pressure of 100 kPa (1 bar)

Notice
The SAS61.03 motor drive can not be supplied with voltage by the TopTronic® E. Provide a separate 24 V supply.

Selection table valve/motor drive

DN	SSC319	SAS31.00 SAS31.03 SAS61.03
	$\Delta P_{max.}$ mbar	
15	1000	4000
20	1000	3500
25	1000	2000
32	625	1100
40	313	600

Three-way valves PN 16, 130 °C, thread

Three-way valve VXG41.50
DN 15-50, PN 16, 120 °C

- Valve body made from gunmetal with threaded connection, incl. seals and screw connections
- For distribution, switching or mixing
- Nominal stroke: 20 mm

DN	Connection valve inches	Connection fitting inches	kvs m^3/h	V̇ at ΔP 120 mbar m^3/h	Sv	Part No.
50	G 2¾″	Rp 2″	40	13.86	> 100	6045 757

Suitable motor drives

Type	Voltage	Control signal	Actuator run time	Part No.
SAX319.00	230 V / 50/60 Hz	3-point	120 s	2048 444
SAX319.03	230 V / 50/60 Hz	3-point	30 s	2048 445
SAX619.03	AC 24 V / DC 24 V	0-10 V	30 s	2048 446

kvs = nominal flow rate of water (5-30 °C) across the fully opened valve (H100) at a differential pressure of 1 bar
Sv = setting ratio kvs/kvr
ΔPmax. = maximum permitted pressure difference across the valve
kvr = minimum kv value at which the characteristic tolerance is still maintained at a differential pressure of 100 kPa (1 bar)

Notice
The SAX619.03 motor drive can not be supplied with voltage by the TopTronic® E. Provide a separate 24 V supply.

Selection table valve/motor drive

DN	SAX319.00	SAX319.03	SAX619.03
		ΔPmax. mbar	
50	1750	1750	1750

Three-way valves PN 6/10, 130 °C, flange

Three-way valve VXF22..
DN 25-100, PN 6, 130 °C

- Valve body made from grey cast iron with flange connection, incl. counter flanges, screws and seals
- For distribution, switching or mixing
- DN 25 ... 80 nominal stroke: 20 mm
- DN 100 nominal stroke: 40 mm

DN	Connection valve	Connection flange	kvs m³/h	V̇ bei ΔP 120 mbar m³/h	Sv	Part No.
25	FL	AE	6.3	2.18	> 50	6045 758
25	FL	AE	10	3.46	> 50	6045 759
40	FL	AE	16	5.54	> 100	6045 760
40	FL	AE	25	8.66	> 100	6045 761
50	FL	AE	40	13.86	> 100	6045 762
65	FL	AE	63	21.82	> 100	6045 763
80	FL	AE	100	34.64	> 100	6045 764
100	FL	AE	160	55.43	> 100	6045 765

Suitable motor drives

Type	Voltage	Control signal	Actuator run time	Part No.
SAX319.00	230 V / 50/60 Hz	3-point	120 s	2048 444
SAX319.03	230 V / 50/60 Hz	3-point	30 s	2048 445
SKC32.60	230 V / 50/60 Hz	3-point	120 s	2048 451
SAX619.03	AC 24 V / DC 24 V	0-10 V	30 s	2048 446
SKC60	AC 24 V / DC 24 V	0-10 V	120/20 s	2048 453

kvs = nominal flow rate of water (5-30 °C) across the fully opened valve (H100) at a differential pressure of 1 bar
Sv = setting ratio kvs/kvr
ΔPmax. = maximum permitted pressure difference across the valve
FL = flange type 21 form B
AE = weld-on end
kvr = minimum kv value at which the characteristic tolerance is still maintained at a differential pressure of 100 kPa (1 bar)

Notice
The SAX619.03 and SKC60 motor drive can not be supplied with voltage by the TopTronic® E. Provide a separate 24 V supply.

Selection table valve/motor drive

DN	SAX319.00 SAX619.03	SAX319.03	SKC32.60 SKC60
		ΔPmax. mbar	
25	3000	3000	-
40	3000	3000	-
50	3000	3000	-
65	1500	1500	-
80	750	750	-
100	-	-	2500
150	-	-	500

Three-way valve VXF32.150
DN 150, PN 10, 130 °C
Valve body made from grey cast iron with flange connection, incl. counter flanges, screws and seals
For distribution, switching or mixing
DN 150 nominal stroke: 40 mm

DN	Connection valve	Connection flange	kvs m³/h	V̇ bei ΔP 120 mbar m³/h	Sv	Part No.
150	FL	AE	400	138.56	> 100	6045 766

Suitable motor drives

Type	Voltage	Control signal	Actuator run time	Part No.
SKC32.60	230 V / 50/60 Hz	3-point	120 s	2048 451
SKC60	AC 24 V / DC 24 V	0-10 V	120/20 s	2048 453

kvs = nominal flow rate of water (5-30 °C) across the fully opened valve (H100) at a differential pressure of 1 bar
Sv = setting ratio kvs/kvr
ΔPmax. = maximum permitted pressure difference across the valve
FL = flange type 21 form B
AE = weld-on end
kvr = minimum kv value at which the characteristic tolerance is still maintained at a diffe rential pressure of 100 kPa (1 bar)

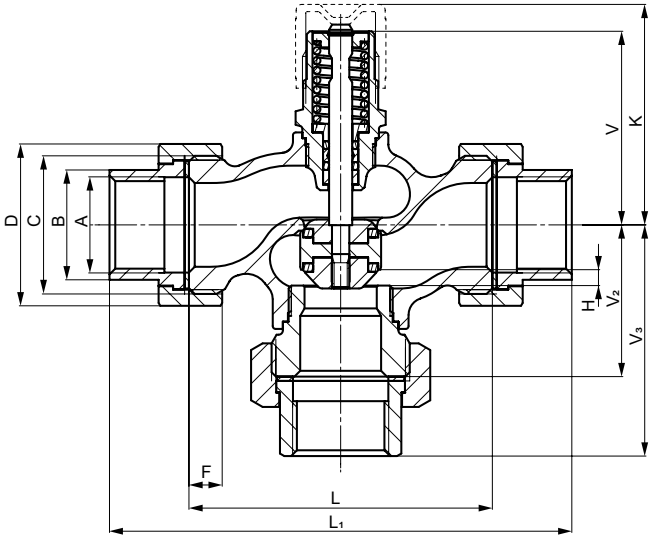
Notice
The SKC60 motor drive can not be supplied with voltage by the TopTronic® E. Provide a separate 24 V supply.

Selection table valve/motor drive

DN	SKC32.60 SKC60 ΔPmax. mbar
25	-
40	-
50	-
65	-
80	-
100	2500
150	500

Three-way valve YXG48
Size DN 15-40, PN 16, 130 °C

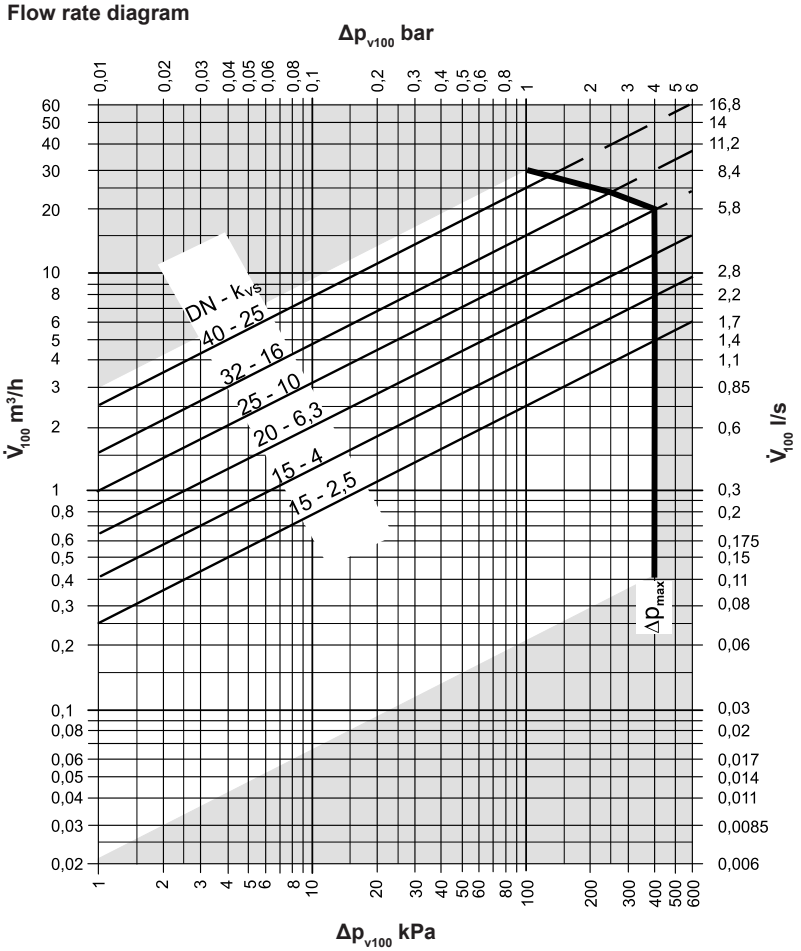
- Valve body made from grey cast iron EN-JL 1030 with threaded connection, incl. seals and screw connections
- Parabolic cone of stainless steel 1.4021 with soft seat seal
- For distribution, switching or mixing
- Through-flow characteristics (A-AB, B-AB) linear
- Leakage rate class IV - S1 acc. to EN 1349 (< 0.0005 % Kvs)
- Control ratio: min. 50 : 1
- Gland seal O-ring EPDM
- DN 15-40
  Kvs 0.25-25 m^3/h
- Manual adjustment via mounted rotary button
- Can be fitted with motor drives SSY319 and SAS..
- Max. operating temperature 130 °C



DN	L	L_1	V	V_1	V_2	V_3	K	A	B	C	D	F	H	H (SAX..)	m 3-way
	mm	mm	mm	mm	mm	mm	mm	Inches	mm	Inches	mm	mm	mm	mm	kg
15	100	146	67	36.5	50	73	77	Rp ½″	25	G 1″	41	9	5.5	> 381	1.35
20	100	149	67	36.5	50	74.5	77	Rp ¾″	32	G 1¼″	51	10	5.5	> 396	1.75
25	105	160	67	37	52.5	80	77	Rp 1″	38	G 1½″	56	11	5.5	> 399	2.15
32	130	193	78	49	65	96.5	88	Rp 1¼″	47	G 2″	71	12	5.5	> 406	3.80
40	140	207	78	49	70	103.5	88	Rp 1½″	53	G 2¼″	76	14	5.5	> 409	4.40

H (SAX..) = overall height of the actuator plus minimum distance to the wall or ceiling for installation, connection, operation, maintenance etc.

Flow rate diagram



Δp_{max} = maximum permitted pressure difference across the control path of the valve for the entire setting range of the valve-motor drive unit

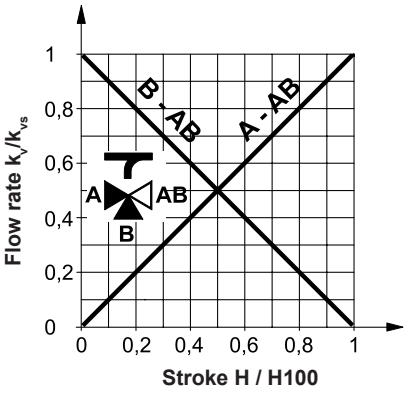
Δp_{v100} = differential pressure across the fully opened valve and above the control path at a flow rate V_{100}

V_{100} = flow rate through the fully opened valve (H100)

100 kPa = 1 bar ≈ 10 mWC

1 m³/h = 0.278 l/s water of 20 °C

Valve characteristic curve

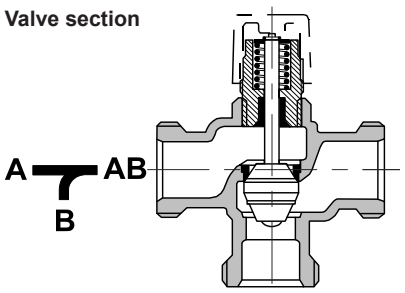


Valve characteristic curve:

Passage	=	linear according to VDI/VDE2173
Bypass	=	linear according to VDI /VDE2173
Mixing:		Flow from gate A and gate B to gate AB
Distribution:		Flow from gate AB to gate A and gate B
Gate AB	=	constant flow rate
Gate A	=	variable flow
Gate B	=	bypass (variable flow)

The three-way valve should be preferably used as mixing valve.

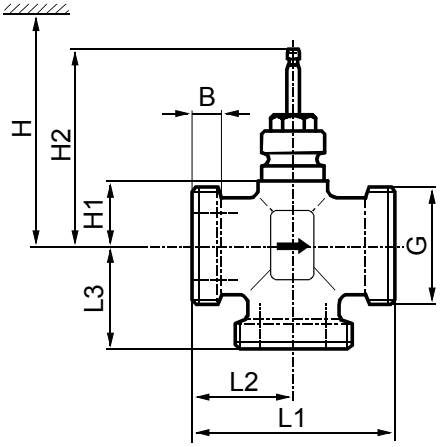
Valve section



Guided parabolic plug (from DN 25), firmly connected with the valve tappet
The seat is pressed in the passage and integrated directly in the casing in the bypass. From DN 25, the seat is integrated in the casing in the passage and the seating ring is pressed in the bypass.

Three-way valve VXG41.50
Size DN 50, PN 16, 130 °C

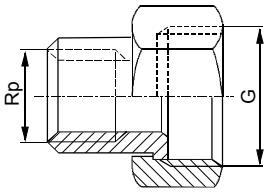
- Valve body made from gunmetal with threaded connection, incl. seals and screw connections
- For distribution, switching or mixing
- DN 50
  Kvs 40 m³/h
- Can be fitted with motor drives SAX..
- Max. operating temperature 130 °C



DN	B mm	G inches	L1 mm	L2 mm	L3 mm	H1 mm	H2 mm	H (SAX..) mm	m kg
50	16	G 2¾″	150	75	75	46	142.5	> 488	3.90

H (SAX..) = overall height of the actuator plus minimum distance to the wall or ceiling for installation, connection, operation, maintenance etc.

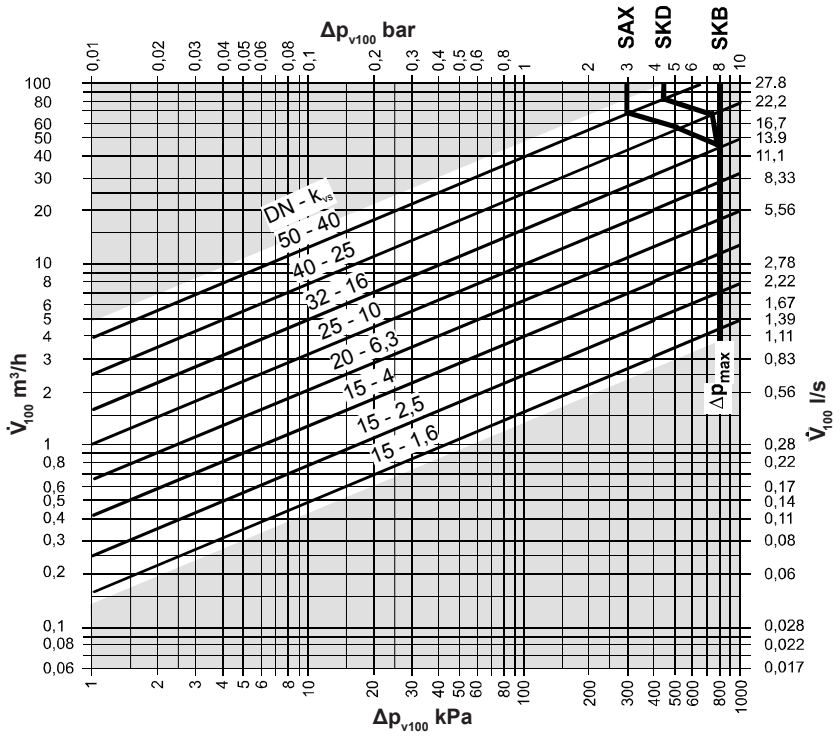
Fittings



DN	G inches	Rp inches
VXG41.50	G 2¾″	Rp 2″

- Valve side with cylindrical thread according to ISO 228-1
- Tube side with cylindrical thread according to ISO 7-1
- Fittings up to 100 °C media temperature

Flow rate diagram



Δp_{max} = maximum permitted pressure difference across the control path of the valve for the entire setting range of the valve-motor drive unit

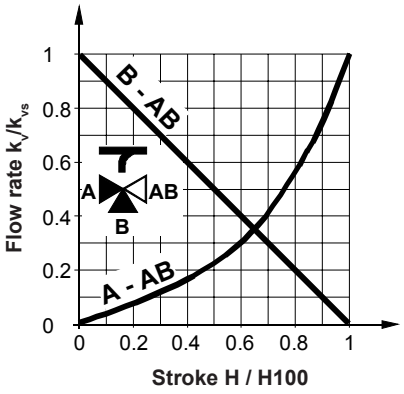
Δp_{v100} = differential pressure across the fully opened valve and above the control path at a flow rate V_{100}

V_{100} = flow rate through the fully opened valve (H100)

100 kPa = 1 bar ≈ 10 mWC

1 m³/h = 0.278 l/s water of 20 °C

Valve characteristic curve



Passage

0-30 % = linear

30-100 % = equal percentage n_{ep} = 3 according to VDI/VDE 2173

Bypass

0-100 % = linear

Mixing Flow from gate A and gate B to gate AB

Distribution Flow from gate AB to gate A and gate B

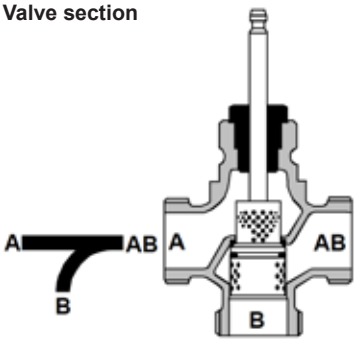
Gate AB = constant flow rate

Gate A = variable flow

Gate B = bypass (variable flow)

The three-way valve should be preferably used as mixing valve.

Valve section

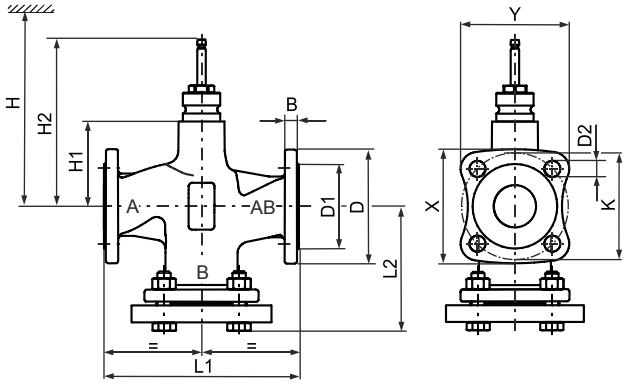


Guided perforated plug, firmly connected with the valve tappet

The seat A-AB is pressed into the casing together with special sealing material.

Three-way valve VXF22.. with flange connection, PN 6, 130 °C

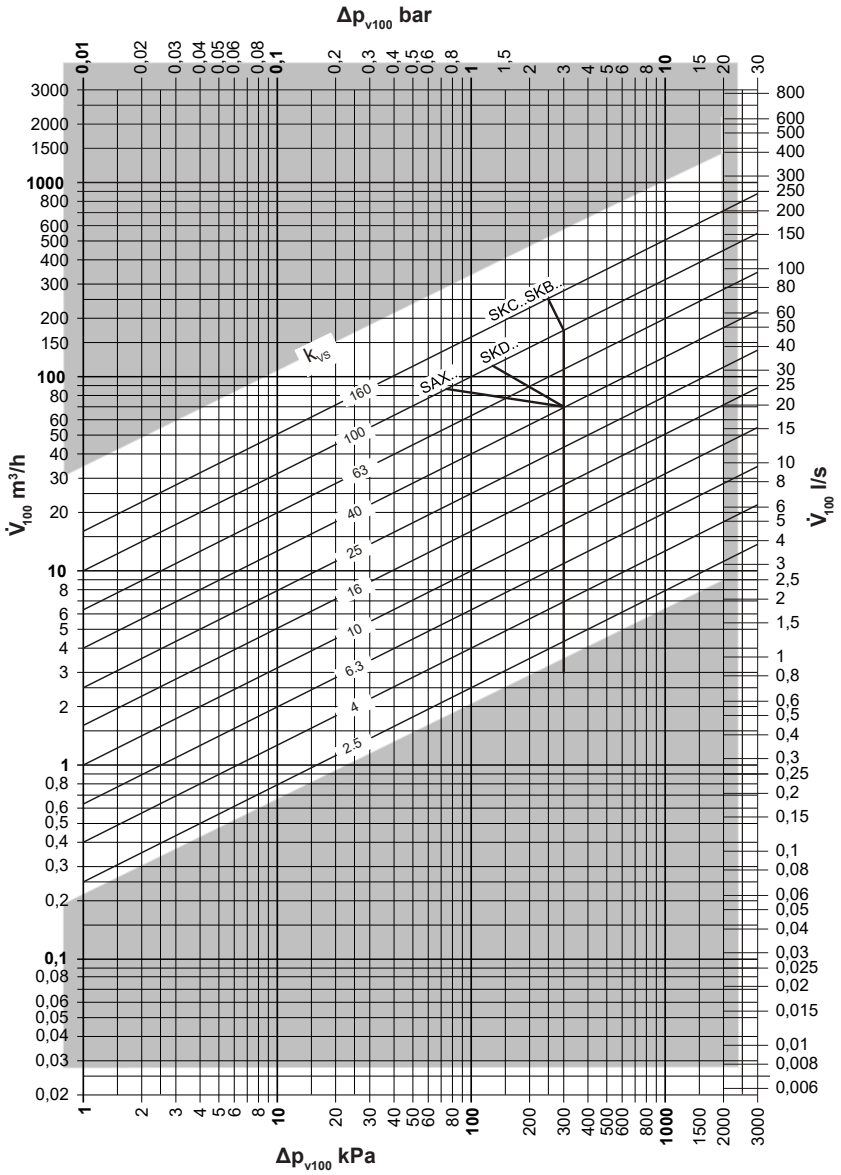
- Valve body made from grey cast iron with flange connection incl. counter flanges, screws and seals
- DN 25-100
  Kvs 2.5-160 m³/h
- Flange type 21, flange form B
- Can be fitted with motor drives SAX.. or SKC..
- Max. operating temperature 130 °C



DN	m	B	Ø D	Ø D1	Ø D2	L1	L2	Ø K	X	Y	H1	H2	H	
													(SAX..)	(SKC..)
	kg	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm
25	3	11	100	58	11 (4 x)	150	75	75	82	78	37	133.5	479	-
40	4.8	13	130	78	14 (4 x)	180	90	100	106	101	37	133.5	479	-
50	6.2	14	140	88	14 (4 x)	200	100	110	114	108	50	146.5	492	-
65	9.5	14	160	108	14 (4 x)	240	120	130	129	122	75	171.5	517	-
80	13.1	16	190	124	19 (4 x)	260	130	150	154	146	75	171.5	517	-
100	24.2	16	210	144	19 (4 x)	300	150	170	170	160	110	226.5	-	685

H (SAX../SKC..) = overall height of the actuator plus minimum distance to the wall or ceiling for installation, connection, operation, maintenance etc.

Flow rate diagram



Δp$_{max}$ = maximum permitted pressure difference across the control path of the valve for the entire setting range of the valve-motor drive unit

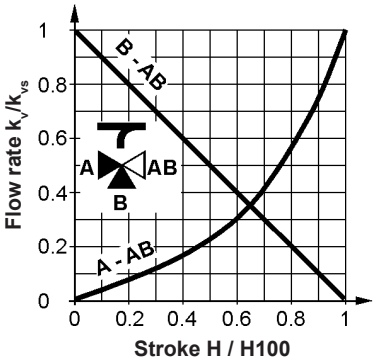
Δp$_{v100}$ = differential pressure across the fully opened valve and above the control path at a flow rate V$_{100}$

V$_{100}$ = flow rate through the fully opened valve (H100)

100 kPa = 1 bar ≈ 10 mWC

1 m³/h = 0.278 l/s water of 20 °C

Valve characteristic curve



Passage A-AB

0-30 % = linear

30-100 % = equal percentage
n$_{ep}$ = 3 according to VDI/VDE 2173

For elevated kvs values, the valve characteristic curve is optimised for a maximum flow rate k$_{v100}$.

Bypass B-AB

0-100 % = linear

Gate AB = constant flow rate

Gate A = variable flow

Gate B = bypass (variable flow)

Mixing Flow from gate A and gate B to gate AB

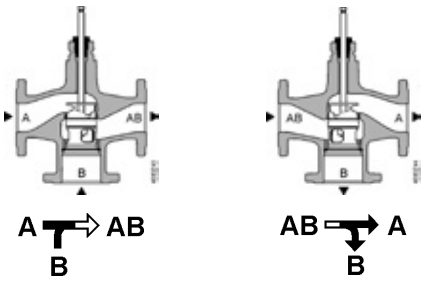
Distribution Flow from gate AB to gate A and gate B

Valve section

Liquids

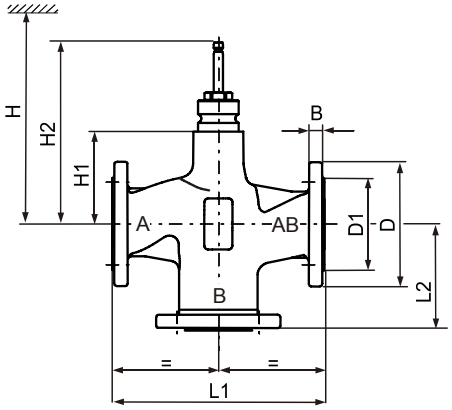
Mixing valve (preferred)

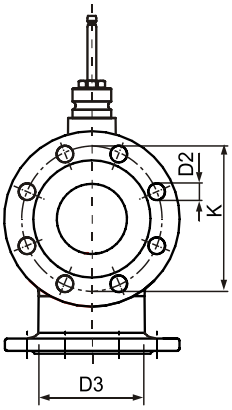
Diverting valve



Three-way valve VXF32.150

- Valve body made from grey cast iron with flange connection incl. counter flanges, screws and seals
- DN 150
  Kvs 400 m³/h
- Flange type 21, flange form B
- Can be fitted with motor drives SKC..
- Max. operating temperature 130 °C

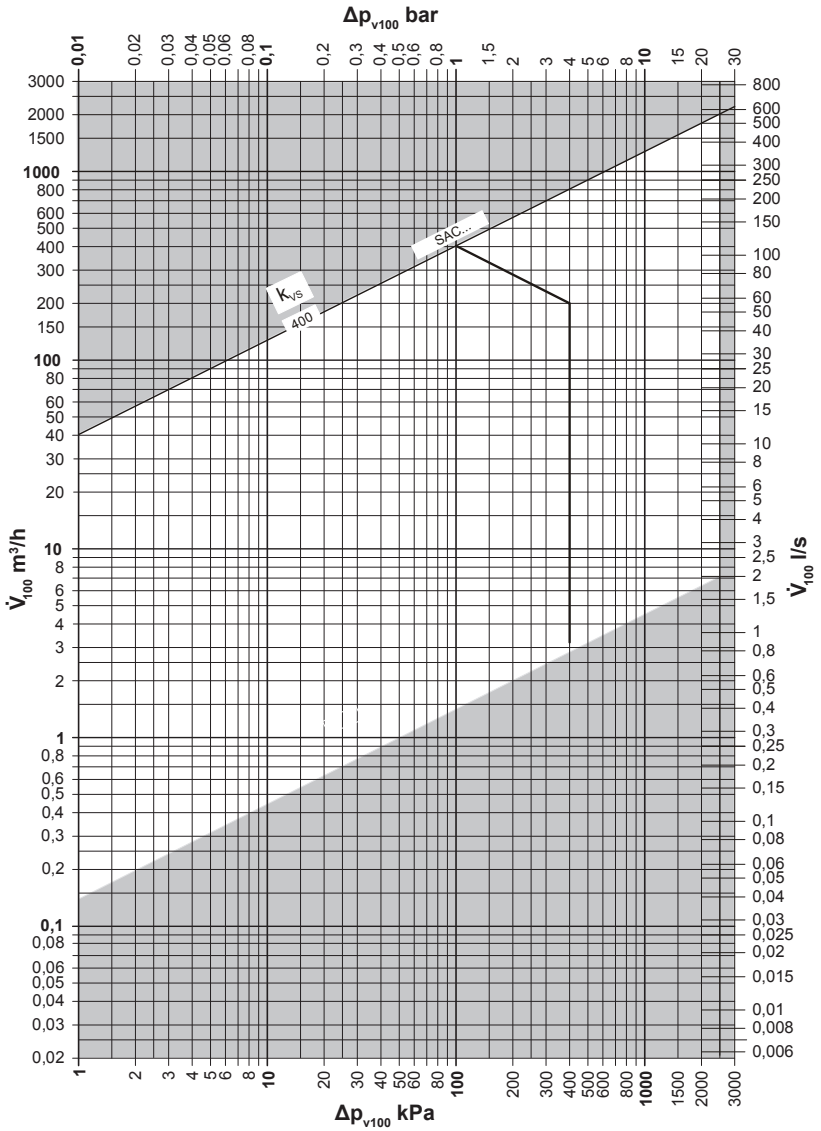




DN	m	B	Ø D	Ø D1	Ø D2	Ø D3	L1	L2	X	Y	Ø K	H1	H2	H (SKC..)
	kg	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm
150	62.1	17	284	211	23 (8 x)	174	480	240	-	-	240	150.5	267	726

H (SKC..) = overall height of the actuator plus minimum distance to the wall or ceiling for installation, connection, operation, maintenance etc.

Flow rate diagram



Δp$_{max}$ = maximum permitted pressure difference across the control path of the valve for the entire setting range of the valve-motor drive unit

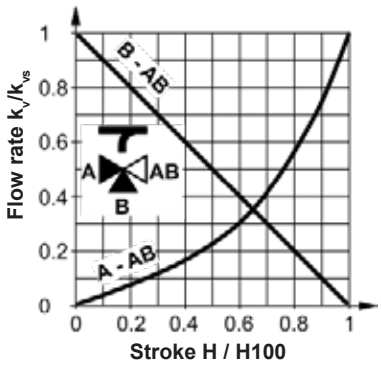
Δp$_{v100}$ = differential pressure across the fully opened valve and above the control path at a flow rate V$_{100}$

V$_{100}$ = flow rate through the fully opened valve (H100)

100 kPa = 1 bar ≈ 10 mWC

1 m³/h = 0.278 l/s water of 20 °C

Valve characteristic curve



Passage A-AB

0-30 % = linear

30-100 % = equal percentage
n$_{ep}$ = 3 according to VDI/VDE 2173

For elevated kvs values, the valve characteristic curve is optimised for a maximum flow rate k$_{v100}$.

Bypass B-AB

0-100 % = linear

Gate AB = constant flow rate

Gate A = variable flow

Gate B = bypass (variable flow)

Mixing Flow from gate A and gate B to gate AB

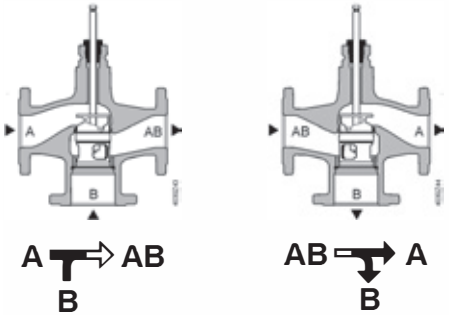
Distribution Flow from gate AB to gate A and gate B

Valve section

Liquids

Mixing valve (preferred)

Diverting valve

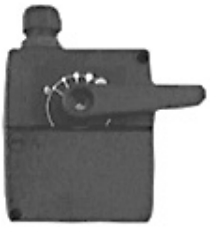


Three-way valve B3G460

Dimension DN 15-50, PN 10, 110 °C

- Three-way valve in brass
- Connections with internal thread
- Casing, cover, shaft and segment made of brass, maintenance-free O-ring seal
- Installation possible on the left and right side
- Operating pressure 10 bar
- Max. operating temperature +110 °C

Motor drives



Motor drive NR 230-20B

- 230 V ~
- 2-wire control. Actuation time 140 s, control force 10 Nm
- Ambient temperature 0 °C/50 °C

Motor drive NR 230-20S

- As for drive NR 230-20B
- With auxiliary switch 230 V, 0.5 A and connecting cable 2.0 m

Motor drive NR 230E-20

- 230 V
- Single-wire control. Actuation time 140 s, control force 10 Nm
- Ambient temperature 0 °C/50 °C

Motor drive NR 230E-20S

- As for drive NR 230E-20
- With auxiliary switch 230 V, 0.5 A and connecting cable 2.0 m

Three-way valves

Three-way valve B3G460 PN 10
with internal thread, brass
for manual operation or operation with motor drive NR.., case, cap, shaft and segment made of brass, maintenance-free O-ring seal.
Mounting optionally on left or right side.
Operating pressure 10 bar.
Max. operating temperature +110 °C

Type	DN	Screw connection inches	kvs m^3/h	Operating pressure bar	Part No.
B3G460	15	Rp ½″	2.5	10	2039 167
B3G460	20	Rp ¾″	6.0	10	2039 168
B3G460	25	Rp 1″	12.0	10	2039 169
B3G460	32	Rp 1¼″	18.0	10	2039 170
B3G460	40	Rp 1½″	26.0	10	2039 171
B3G460	50	Rp 2″	40.0	10	2039 172

Motor drive for three-way valves DN 15 to DN 50

For valves B3G460.
Operating voltage 230 V/50 Hz,
torque 10 Nm, actuation time 140 s,
manual/automatic positioning,
reversible scale for position indicator 0-10.

		Part No.
Motor drive for three-way valves: 2-wire control	**NR 230-20B**	245 209
Motor drive for three-way valves: 2-wire control with auxiliary switch	**NR 230-20S**	245 212
Motor drive for three-way valves: Single-wire control	**NR 230E-20**	245 235
Motor drive for three-way valves: Single-wire control with auxiliary switch	**NR 230E-20S**	245 215

Installation notices

- The device must not be installed with the motor facing downwards.
- The three-way valve can be used both for mixing as well as for distributing.
- The permitted pressure difference Δp max. may not be exceeded.

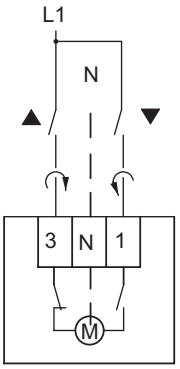
Installation

- Observe the installation instructions when assembling drive and mixing valve.
- The black adapter sleeve must be used for the three-way valve.

Electrical connection

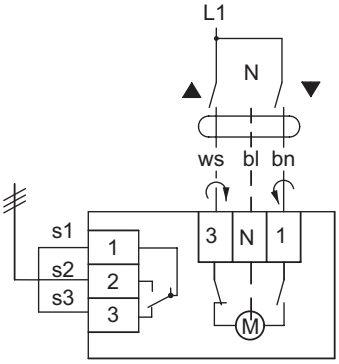
1 x 230 V, 50 Hz, 3.5 W

Type NR 230-20B



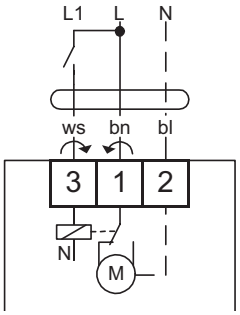
Type NR 230-20S

with 2 m connecting cable.
With auxiliary switch 230 V, 0.5 A. Function is adjustable.



Type NR 230E-20

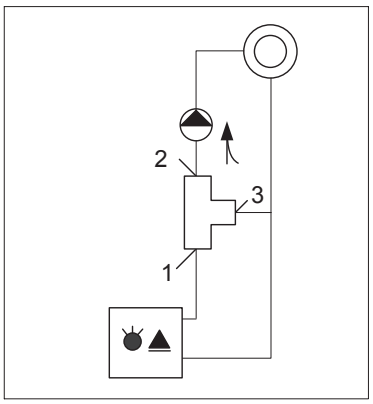
with 2 m connecting cable.
Without auxiliary switch 230 V, 0.5 A. Function is adjustable.

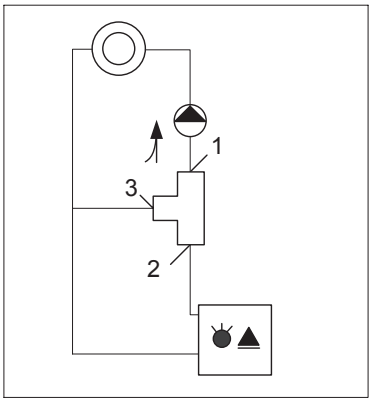


Rotate clockwise to open
Rotate anti-clockwise to open

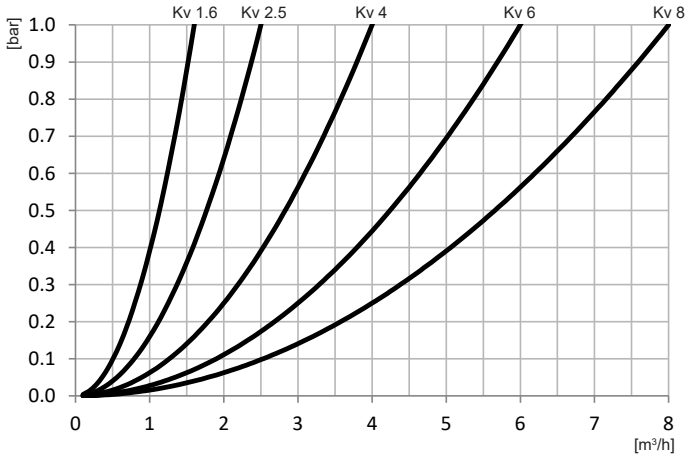
Installation position type B3G460

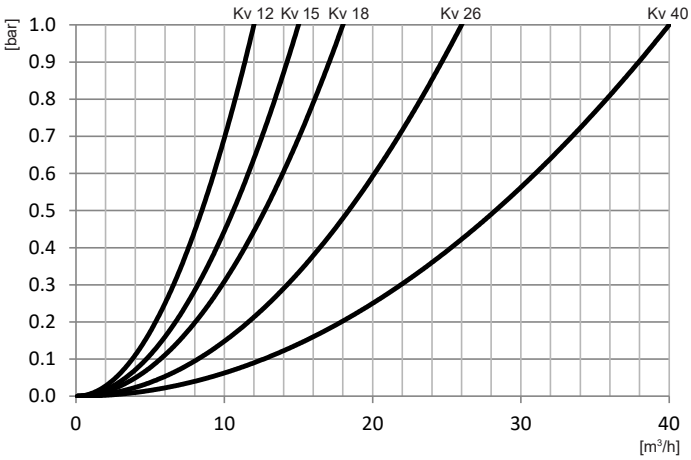
The direction of motor rotation is anti-clockwise





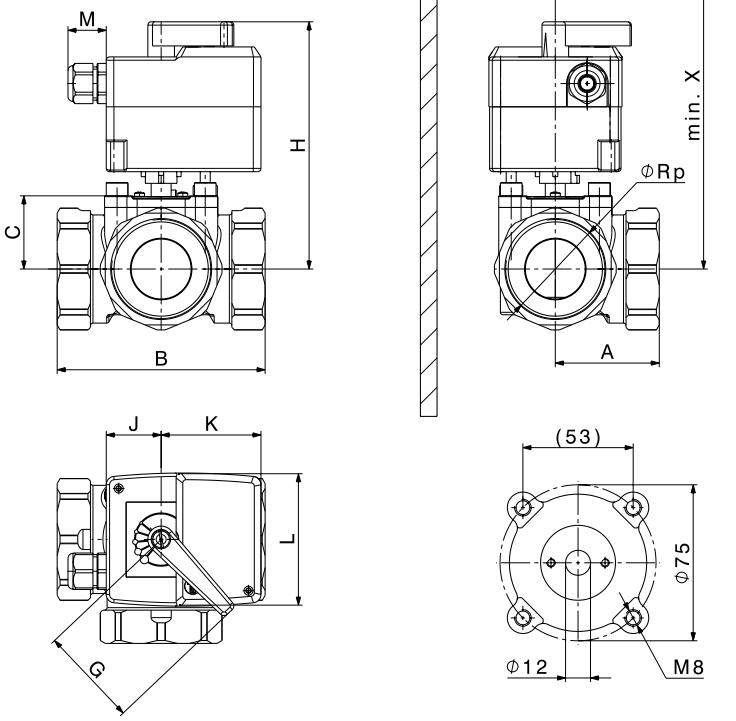
Notice:
Numbers correspond to numbers on the valve





Motorised three-way valve B3G460/ NR 230-20

- Three-way valves made of brass, connections with internal thread
- Max. operating temperature +110 °C
- Operating pressure PN 10
- Motor drive, 230 V, 50 Hz
- Actuation time 140 s
- Control force 10 Nm
- Lever for manual operation
- Ambient temperature 0/+50 °C



DN	Screw connection inches	kvs [1] m³/h	A mm	B mm	C mm	G mm	H mm	J mm	K mm	L mm	M mm	X mm	Y mm	m kg
15	Rp ½″	2.5	40	80	34.5	60	139.5	33	60	80	23	220	50	1.07
20	Rp ¾″	6	41	81	34.5	60	139.5	33	60	80	23	220	50	1.13
25	Rp 1″	12	41	82	34.5	60	142	33	60	80	23	230	50	1.27
32	Rp 1 ¼″	18	42.5	85	37	60	142	33	60	80	23	230	50	1.63
40	Rp 1 ½″	26	58	116	41.5	60	147	33	60	80	23	240	50	2.66
50	Rp 2″	40	62.5	125	42.5	60	147	33	60	80	23	240	50	2.81

[1] = flow rate m³/h at a flow resistance of 1 bar

Thermostatic water mixer TM200

3-way mixing valve made of brass for domestic water temperature regulation.

- Connection fittings R ¾″
- Water temperature max. 90 °C
- Setting range 30-60 °C
- Throughput quantity 27 l/min (at Δp = 1 bar)
- kvs value 1.62 m³/h

Part numbers

Thermostatic water mixer

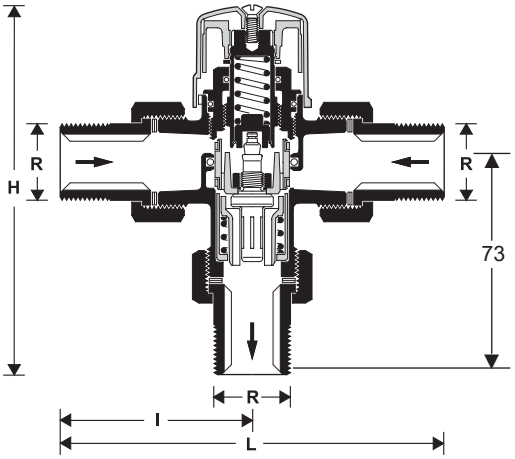
Thermostatic water mixer TM200
3-way mixer
for regulation of the water temperature
Material: brass
Connection size: R ¾“
Hot water: max. 90 °C
Setting range: 30-60 °C
Flow rate: 27 l/min
(at Δ p = 1 bar)
kvs value: 1.62 m³/h

Part No.
2005 915

Thermostatic water mixer TM200
(Dimensions in mm)

3-way mixing valve made of brass for domestic water temperature regulation.

- Operating pressure max. 10 bar
- Max. pressure difference 2.5 bar
- Installation position as required
- Water temperature max. 90 °C
- Connection fitting R ¾″
- Setting range 30-60 °C
  Factory setting for 40 °C
- Throughput quantity
  at Δp = 1 bar 27 l/min
- kvs value 1.62 m³/h
- Adjustment precision <± 4 K



	H mm	L mm	l mm	R Ø mm	Connection inches
TM200	128	134	67	22	R ¾″

Thermostatic mixing valve JRG

3-way mixing valve made of gunmetal for regulation of the domestic and heating water temperature

- Domestic hot water max.
  JRG 25,50,65: 90 °C
  JRG 32,40: 105 °C
- Setting range: 45-65 °C
- Factory-set to: 55 °C
- Operating pressure: max. 10 bar
- Connections:
  JRG 25-50: external thread
  incl. screw connections
  JRG 65: flanges with flange seals

JRG 25-50

JRG 65

■ **Part No.**

Part No.

Thermostatic mixing valve

Thermostatic mixing valve JRG
3-way mixing valve made of gunmetal for regulation of the water temperature
Domestic hot water max.
JRG 25,50,65: 90 °C
JRG 32,40: 105 °C
Setting range: 45-65 °C
Factory-set to: 55 °C
Operating pressure: max. 10 bar
Connections:
JRG 25-50: external thread
incl. screw connections
JRG 65: flanges with flange seals

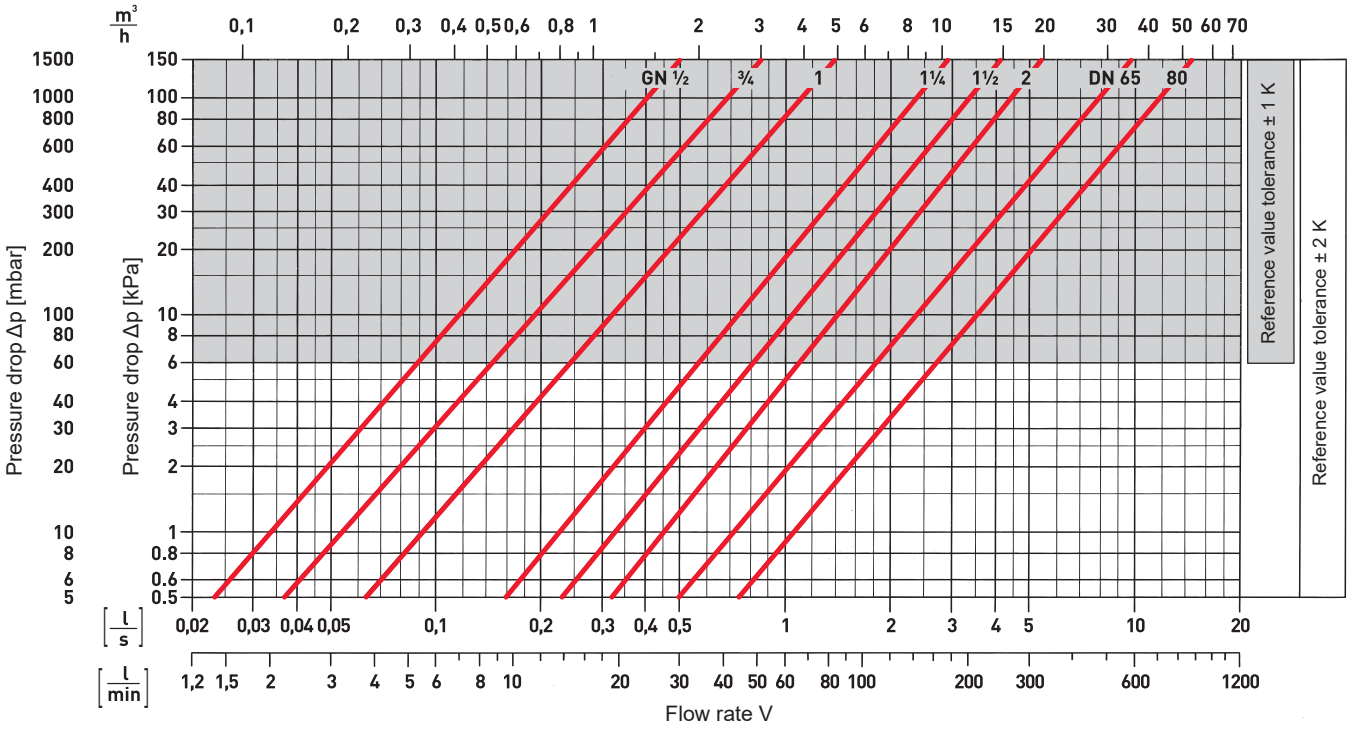
Type	Connection size	kvs m^3/h	
JRG 25	1″	4.0	2061 407
JRG 32	1¼″	8.5	2061 408
JRG 40	1½″	12.0	2061 409
JRG 50	2″	16.0	2061 410
JRG 65	DN 65	28.0	2038 638

Thermostatic mixing valve JRG

3-way mixing valve made of gunmetal for regulation of the domestic and heating water temperature

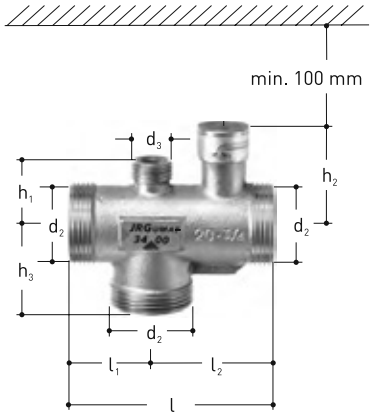
- Domestic hot water max.
  JRG 25,50,65: 90 °C
  JRG 32,40: 105 °C
- Setting range: 45-65 °C
- Factory-set to: 55 °C
- Operating pressure: max. 10 bar
- Connections:
  JRG 25-50: external thread
  incl. screw connections
  JRG 65: flanges with flange seals

Pressure drop diagram



JRG 25-50

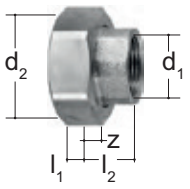
(Dimensions in mm)



DN	d2 inches	d3 inches	h1 mm	h2 mm	h3 mm	l mm	l1 mm	l2 mm	°C	Max. temp. °C	kg
25	G 1½″	G ¾″	36	51	43	110	43	67	55	90	0.87
32	G 2″	G ¾″	41	75	52	130	52	78	55	105	1.60
40	G 2¼″	G ¾″	50	77	58	150	58	92	55	105	2.10
50	G 2¾″	G ¾″	60	85	70	180	70	110	55	90	3.37

Screw connection

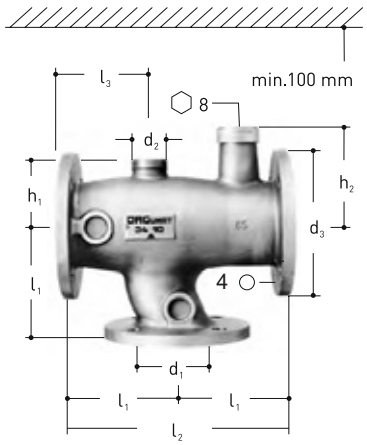
made of gunmetal with internal thread and seal



d1 inches	d2 inches	l1 mm	l2 mm	z mm
Rp 1″	G 1½″	9.0	27.0	10.0
Rp 1¼″	G 2″	10.0	29.0	10.0
Rp 1½″	G 2¼″	11.0	33.0	14.0
Rp 2″	G 2¾″	13.5	35.5	11.5

JRG 65

(Dimensions in mm)



DN	d1 mm	d2 inches	d3 mm	h1 mm	h2 mm	l1 mm	l2 mm	l3 mm	°C	Max. temp. °C	kg
65	65	G 1½″	185	82	121	145	290	112	55	90	23.00

Straight-way ball valve VAG60..
Size DN 15-50, PN 16, 120 °C

- Ball valve body made of brass, incl. seals, screw connections and cap
- Angle of rotation 90°
- Switching ball valve
- DN 15-50
  Kvs 9-96 m³/h

Suitable motor drive GLB341.9E

■ **Part No.**

Straight-way ball valves PN 16, 120 °C, thread

Straight-way ball valve VAG60..
DN 15-50, PN 16, 120 °C

- Straight-way ball valve made of brass with threaded connection
- incl. seals and screw connections

DN	Connection valve inches	Connection fitting inches	kvs m³/h	V̇ at ΔP 50 mbar m³/h	Part No.
15	G 1″	Rp ½″	9	2.01	6046 579
20	G 1¼″	Rp ¾″	17	3.80	6046 580
25	G 1½″	Rp 1″	22	4.92	6046 581
32	G 2″	Rp 1¼″	35	7.83	6046 582
40	G 2¼″	Rp 1½″	68	15.21	6046 593
50	G 2¾″	Rp 2″	96	21.47	6046 594

Motor drive GLB341.9E 2070 331
For straight-way ball valves VAG60.. and switching ball valves VBI60.. DN 15-50
Operating voltage: 230 V, 50/60 Hz
Control signal 2-point/3-point
Single-wire/2 wire control
Operating time: 150 s
Nominal torque: 10 Nm
Permitted ambient temperature:
-32 °C to +55 °C

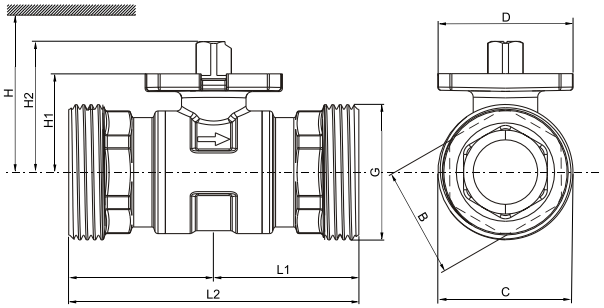
Selection table valve/motor drive

DN	GLB341.9E 10 Nm ΔPmax. mbar
15	3500
20	3500
25	3500
32	3500
40	3500
50	3500

kvs = nominal flow rate of water (5-30 °C) across the fully opened valve (H100) at a differential pressure of 1 bar
Sv = setting ratio kvs/kvr
ΔPmax. = maximum permitted pressure difference across the valve, low-noise operation up to 2000 mbar
kvr = minimum kv value at which the characteristic tolerance is still maintained at a differential pressure of 100 kPa (1 bar)

Straight-way ball valve VAG60..
with threaded connection PN 16, 120 °C

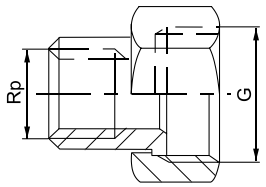
- Ball valve body made of brass
- DN 15-50
- Kvs 9-96 m^3/h
- Angle of rotation 90°
- Max. operating temperature 120 °C
- Can be fitted with motor drives GLB..9E



DN	m	B	C	D	G	L1	L2	H1	H2	H (GLB..9E)
	kg	mm	mm	mm	inches	mm	mm	mm	mm	mm
15	0.36	27	33	42	G 1″ B	43.5	87	27.6	37.6	> 300
20	0.55	35	42	42	G 1¼″ B	44.7	89.4	30.5	40.5	> 300
25	0.57	35	48	42	G 1½″ B	44.7	89.4	30.5	40.5	> 320
32	0.84	38	59.7	42	G 2″ B	50.1	100.2	34.3	44.3	> 320
40	1.29	49	65.7	42	G 2¼″ B	58.3	116.6	39.8	49.8	> 320
50	1.98	61	81.6	42	G 2¾″ B	62	124	52.8	62.8	> 335

H (GLB..9E) = overall height of the actuator plus minimum distance to the wall or ceiling for installation, connection, operation, maintenance etc.

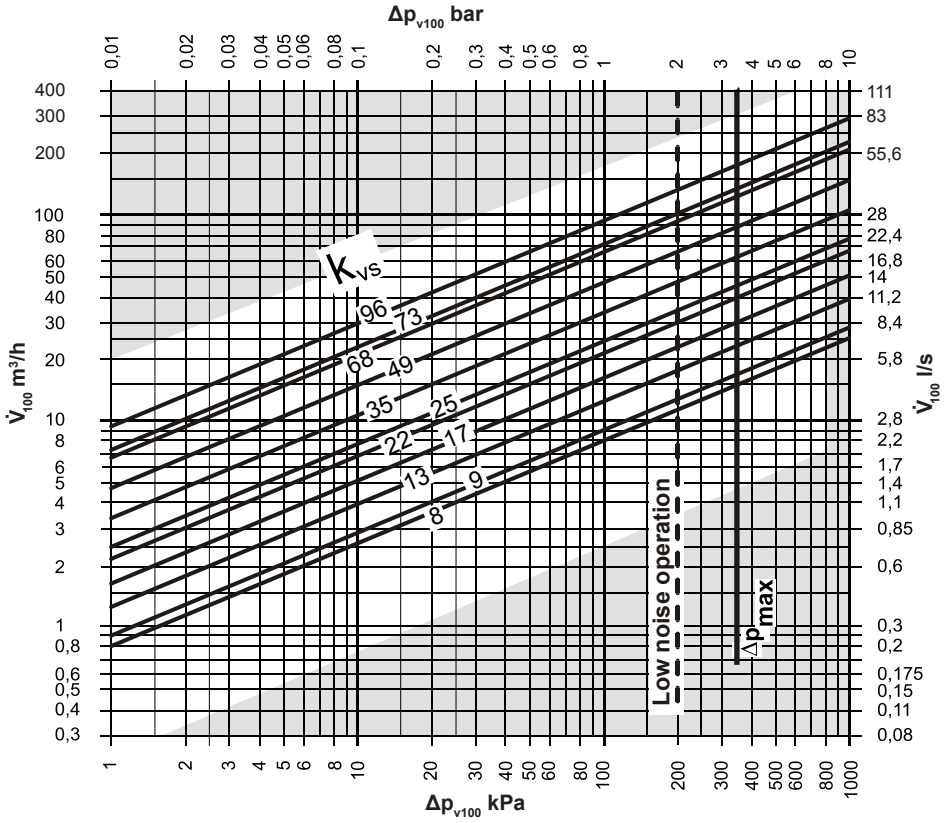
Fittings



DN	G inches	Rp inches
VAG60.15	G 1″ B	Rp ½″
VAG60.20	G 1¼″ B	Rp ¾″
VAG60.25	G 1½″ B	Rp 1″
VAG60.32	G 2″ B	Rp 1¼″
VAG60.40	G 2¼″ B	Rp 1½″
VAG60.50	G 2¾″ B	Rp 2″

- Valve side with cylindrical thread according to ISO 228-1
- Tube side with cylindrical thread according to ISO 7-1
- Fittings up to 100 °C media temperature

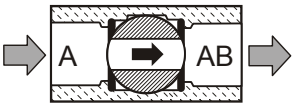
Flow rate diagram



Δp_{max}	=	maximum permitted pressure difference across the control path of the valve for the entire setting range of the valve-motor drive unit
Δp_{v100}	=	differential pressure across the fully opened valve and above the control path at a flow rate V_{100}
V_{100}	=	flow rate through the fully opened valve (H100)
100 kPa	=	1 bar ≈ 10 mWC
1 m³/h	=	0.278 l/s water of 20 °C

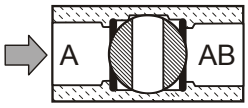
Valve section

Position at delivery



A – AB = 100 %

Turned through 90° (clockwise)



A – AB = 0 %

Switching ball valve VBI60..L
Size DN 15-50, PN 40, -10-120 °C

- Ball valve body made of brass
- Connections with internal thread Rp acc. to ISO 7-1
- Leakage rate: 0-0.0001% of Kvs value
- DN 15-50
  Kvs 5-37 m³/h

Suitable motor drive GLB341.9E

■ **Part No.**

Switching ball valves PN 40, 120 °C, thread

Switching ball valve VBI60..L
DN 15-50, PN 40, 120 °C

DN	Connection inches	kvs m³/h	Part No.
15	Rp ½″	5	6052 422
20	Rp ¾″	9	6052 443
25	Rp 1″	9	6052 444
32	Rp 1¼″	13	6052 445
40	Rp 1½″	25	6052 446
50	Rp 2″	37	6052 447

Motor drive GLB341.9E — Part No. 2070 331
For straight-way ball valves VAG60.. and switching ball valves VBI60.. DN 15-50
Operating voltage: 230 V, 50/60 Hz
Control signal 2-point/3-point
Single-wire/2 wire control
Operating time: 150 s
Nominal torque: 10 Nm
Permitted ambient temperature:
-32 °C to +55 °C

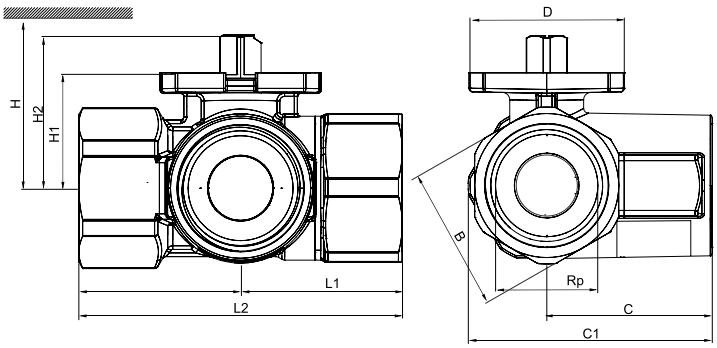
Selection table valve/motor drive

DN	GLB341.9E 10 Nm ΔPmax. mbar
15	3500
20	3500
25	3500
32	3500
40	3500
50	3500

kvs = nominal flow rate of water (5-30 °C) across the fully opened valve (H100) at a differential pressure of 1 bar
Sv = setting ratio kvs/kvr
ΔPmax. = maximum permitted pressure difference across the valve, low-noise operation up to 2000 mbar
kvr = minimum kv value at which the characteristic tolerance is still maintained at a differential pressure of 100 kPa (1 bar)

Switching ball valve VBI60..L with threaded connection PN 40, -10-120 °C

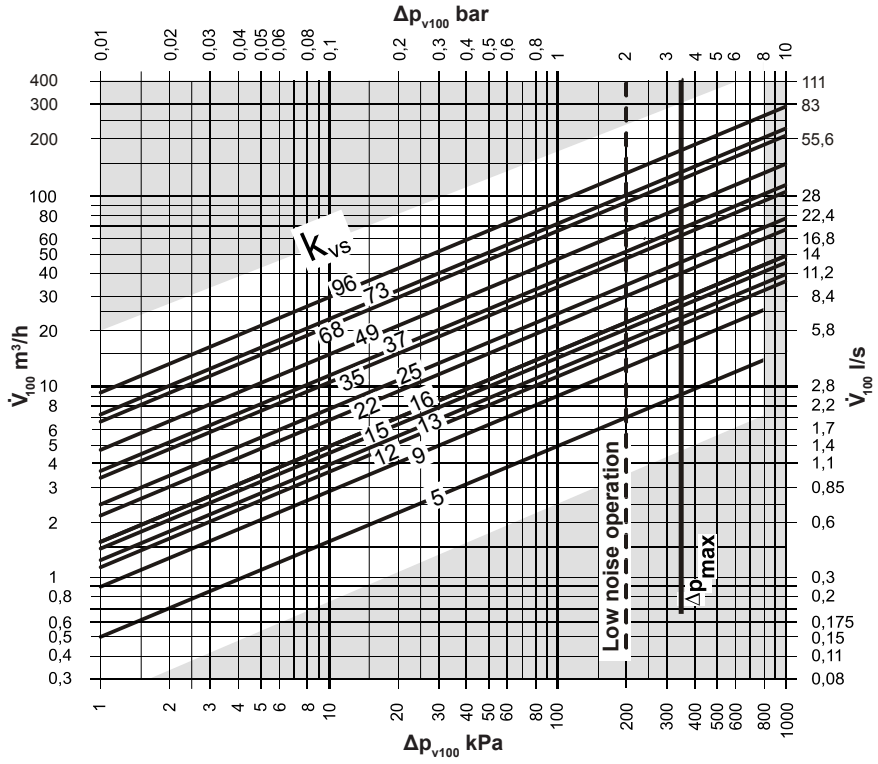
- Ball valve body made of brass
- valve body made of brass
- Connections with internal thread Rp acc. to ISO 7-1
- Leakage rate: 0-0.0001% of Kvs value
- DN 15-50
  Kvs 5-37 m^3/h



Type	DN	B	C	C1	D	Rp	L1	L2	H1	H2	H (GLB..)
		mm	mm	mm	mm	inches	mm	mm	mm	mm	mm
VBI60.15-5L	15	26	34	49.5	42	Rp ½″	33.3	66.6	27.6	37.6	> 300
VBI60.20-9L	20	39	39.8	61.05	42	Rp ¾″	40.2	80.4	30.5	40.5	> 300
VBI60.25-9L	25	39	44.8	66.5	42	Rp 1″	42.7	85.4	30.5	40.5	> 320
VBI60.32-13L	32	48	52.6	78.6	42	Rp 1¼″	49.6	99.2	34.3	44.3	> 320
VBI60.40-25L	40	55	57.1	87.6	42	Rp 1½″	54.8	109.6	39.8	49.8	> 320
VBI60.50-37L	50	67	68.9	105.9	42	Rp 2″	65.7	131.4	52.8	62.8	> 335

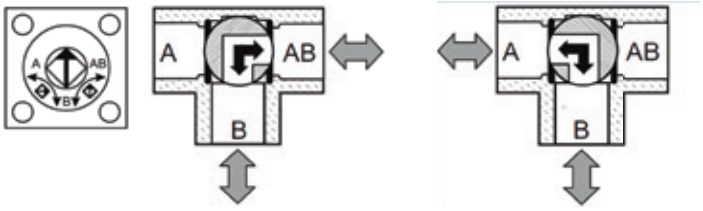
H (GLB..) = overall height of the actuator plus minimum distance to the wall or ceiling for installation, connection, operation, maintenance etc.

Flow rate diagram



Δp_{max}	=	maximum permitted pressure difference across the control path of the valve for the entire setting range of the valve-motor drive unit
Δp_{v100}	=	differential pressure across the fully opened valve and above the control path at a flow rate V_{100}
V_{100}	=	flow rate through the fully opened valve (H100)
100 kPa	=	1 bar ≈ 10 mWC
1 m³/h	=	0.278 l/s water of 20 °C

Valve section



B – AB (AB – B) = 100 %

A – B (B – A) = 100 %

Motor drive GLB341.9E
Motor drives for 2-point, 3-point control
Operating voltage 230 V, 50/60 Hz
- Control signal 2-point/3-point
- Single-wire/two-wire control
- Nominal torque 10 Nm
- Actuator run time 150 s
- Manual adjustment
- Permitted ambient temperature -32 °C to +55 °C
- For straight-way ball valves VAG60.. and switching ball valves VBI60.. DN 15-50

Motor drive SAX319.00
Operating voltage 230 V, 50/60 Hz
- Control signal 3-point
- Actuator run time 120 s
- Actuator force 800 N
- Stroke 20 mm
- For direct installation on valves without setting work
- Permitted ambient temperature -5 °C to +55 °C
- For VVF22.., VXF22.., VVG41.50 and VXG41.50 valves up to DN 80

Motor drive SAX319.03
Operating voltage 230 V, 50/60 Hz
- Control signal 3-point
- Actuator run time 30 s
- Actuator force 800 N
- Stroke 20 mm
- For direct installation on valves without setting work
- Permitted ambient temperature -5 °C to +55 °C
- For VVF22.., VXF22.. VVG41.50 and VXG41.50 valves up to DN 80

Motor drive SKC32.60
Operating voltage 230 V, 50/60 Hz
- Control signal 3-point
- Actuator run time 120 s
- Actuator force 2800 N
- For direct installation on valves without setting work
- With manual adjustment and position display
- Permitted ambient temperature -15 °C to +55 °C
- Stroke 40 mm
- For VVF22.., VXF22.. and VXF32.. valves from DN 100

Motor drive SSC319
Operating voltage 230 V, 50/60 Hz
- Control signal 3-point
- Actuator run time 150 s
- Actuator force 300 N
- Stroke 5.5 mm
- For direct installation without tools via union nut
- Permitted ambient temperature 5 °C to +55 °C
- For YVG48.. and YXG48 valves

Motor drive SAS31.00
Operating voltage 230 V, 50/60 Hz
- Control signal 3-point
- Actuator run time 120 s
- Actuator force 400 N
- Stroke 5.5 mm
- For direct installation on valves without setting work
- Permitted ambient temperature -5 °C to +55 °C
- For YVG48.. and YXG48 valves

Motor drive SAS31.03
Operating voltage 230 V, 50/60 Hz
- Control signal 3-point
- Actuator run time 30 s
- Actuator force 400 N
- Stroke 5.5 mm
- For direct installation on valves without setting work
- Permitted ambient temperature -5 °C to +55 °C
- For YVG48.. and YXG48 valves

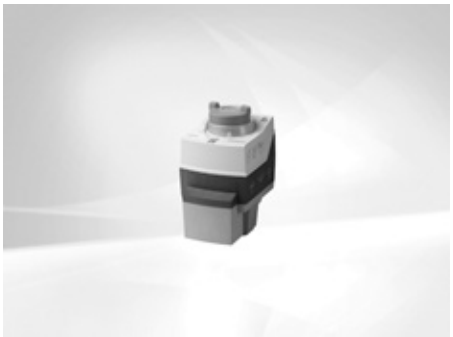
Motor drive SAX619.03
Operating voltage 24 V AC
- Control signal 0-10 V
- Actuator run time 30 s
- Actuator force 800 N
- Stroke 20 mm
- For direct installation on valves without setting work
- Permitted ambient temperature -5 °C to +55 °C
- For VVF22.., VXF22.. VVG41.50 and VXG41.50 valves up to DN 80

Notice
The SAX619.03 motor drive can not be supplied with voltage by the TopTronic® E. Provide a separate 24 V supply.

Motor drive SKC60
Operating voltage 24 V AC
- Control signal 0-10 V
- Actuator force 2800 N
- Actuator run time, open 120 s/close 20 s
- For direct installation on valves without setting work
- With manual adjustment and position display
- Permitted ambient temperature -15 °C to +55 °C
- Stroke 40 mm
- For VVF22.., VXF22.. and VXF32.. valves from DN 100

Notice
The SKC60 motor drive can not be supplied with voltage by the TopTronic® E. Provide a separate 24 V supply.

Motor drive SAS61.03
Operating voltage 24 V AC
- Control signal 0-10 V
- Actuator run time 30 s
- Actuator force 400 N
- Stroke 5.5 mm
- For direct installation on valves without setting work
- Permitted ambient temperature -5 °C to +55 °C
- For YVG48.. and YXG48 valves



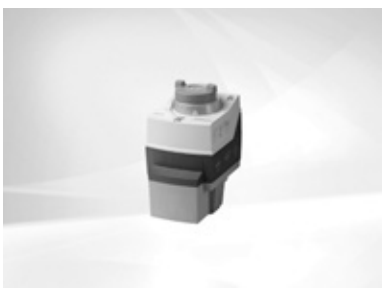
Notice
The SAS61.03 motor drive can not be supplied with voltage by the TopTronic® E. Provide a separate 24 V supply.

Notice
Electrical connection
see data sheet of the particular drive

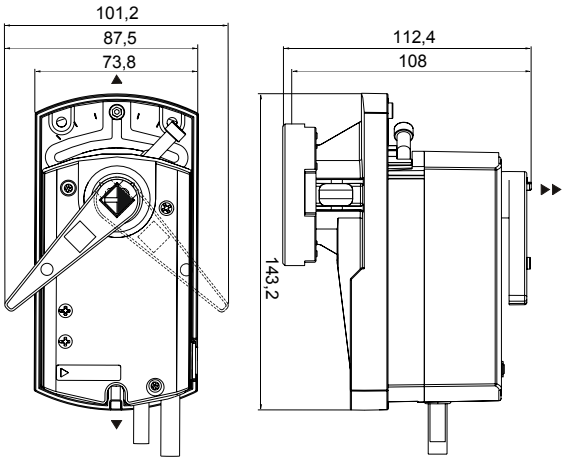
Motor drives

		Part No.
	**Motor drive GLB341.9E** For straight-way ball valves VAG60.. and switching ball valves VBI60.. DN 15-50 Operating voltage: 230 V, 50/60 Hz Control signal 2-point/3-point Single-wire/2 wire control Operating time: 150 s Nominal torque: 10 Nm Permitted ambient temperature: -32 °C to +55 °C	2070 331
	**Motor drive SAX319.00** Operating voltage: 230 V, 50/60 Hz Control signal: 3-point Operating time: 120 s Actuator force: 800 N Nominal stroke: 20 mm Permitted ambient temperature: -5 °C to +55 °C For through and three-way valves VVG41.50, VVF22.., VXG41.. VXF22..DN 15-80	2048 444
	**Motor drive SAX319.03** Operating voltage: 230 V, 50/60 Hz Control signal: 3-point Operating time: 30 s Actuator force: 800 N Nominal stroke: 20 mm Permitted ambient temperature: -5 °C to +55 °C For through and three-way valves VVG41.50, VVF22.., VXG41.. VXF22..DN 15-80	2048 445
	**Motor drive SKC32.60** Operating voltage: 230 V, 50/60 Hz Control signal: 3-point Operating time: 120 s Actuator force: 2800 N Nominal stroke: 40 mm Permitted ambient temperature: -15 °C to +55 °C For through and three-way valves VVF22.., VXF22.., VXF32.. from DN 100	2048 451
	**Motor drive SSC319** Operating voltage: 230 V, 50/60 Hz Control signal: 3-point Operating time: 150 s Actuator force: 300 N Nominal stroke: 5.5 mm Permitted ambient temperature: 0 °C to +55 °C For through and three-way valves YVG48.., YXG48..	245 236

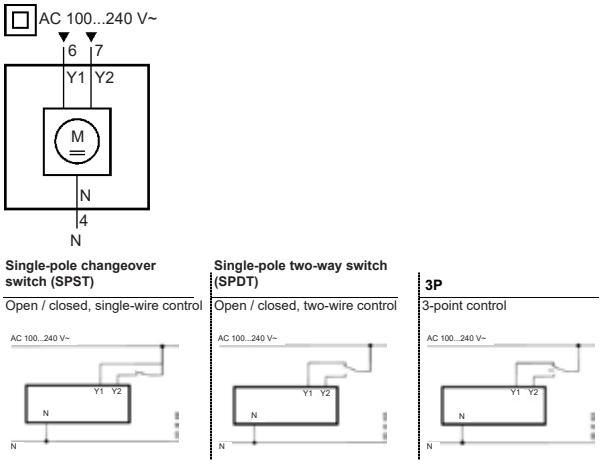
Motor drives

		Part No.
	**Motor drive SAS31.00** Operating voltage: 230 V, 50/60 Hz Control signal: 3-point Operating time: 120 s Actuator force: 400 N Nominal stroke: 5.5 mm Permitted ambient temperature: -5 °C to +55 °C For through and three-way valves YVG48.., YXG48..	2064 157
	**Motor drive SAS31.03** Operating voltage: 230 V, 50/60 Hz Control signal: 3-point Operating time: 30 s Actuator force: 400 N Nominal stroke: 5.5 mm Permitted ambient temperature: -5 °C to +55 °C For through and three-way valves YVG48.., YXG48..	2064 158
	**Motor drive SAX619.03** Operating voltage: 24 V AC Control signal 0-10 V Operating time: 30 s Actuator force: 800 N Nominal stroke: 20 mm Permitted ambient temperature: -5 °C to +55 °C For through and three-way valves VVG41.50, VVF22.., VXG41.., VXF22.. DN 15-80	2048 446
Notice The SAX619.03 motor drive can not be supplied with voltage by the TopTronic® E. Provide a separate 24 V supply.		
	**Motor drive SKC60** Operating voltage: 24 V AC Control signal 0-10 V Operating time: open 120 s/close 20 s Actuator force: 2800 N Nominal stroke: 40 mm Permitted ambient temperature: -15 °C to +55 °C For through and three-way valves VVF22.., VXF22.., VXF32.. from DN 100	2048 453
Notice The SKC60 motor drive can not be supplied with voltage by the TopTronic® E. Provide a separate 24 V supply.		
	**Motor drive SAS61.03** Operating voltage: 24 V AC Control signal 0-10 V Operating time: 30 s Actuator force: 400 N Nominal stroke: 5.5 mm Permitted ambient temperature: -5 °C to +55 °C For through and three-way valves YVG48.., YXG48..	2064 161
Notice The SAS61.03 motor drive can not be supplied with voltage by the TopTronic® E. Provide a separate 24 V supply.		

Motor drive GLB341.9E
(Dimensions in mm)

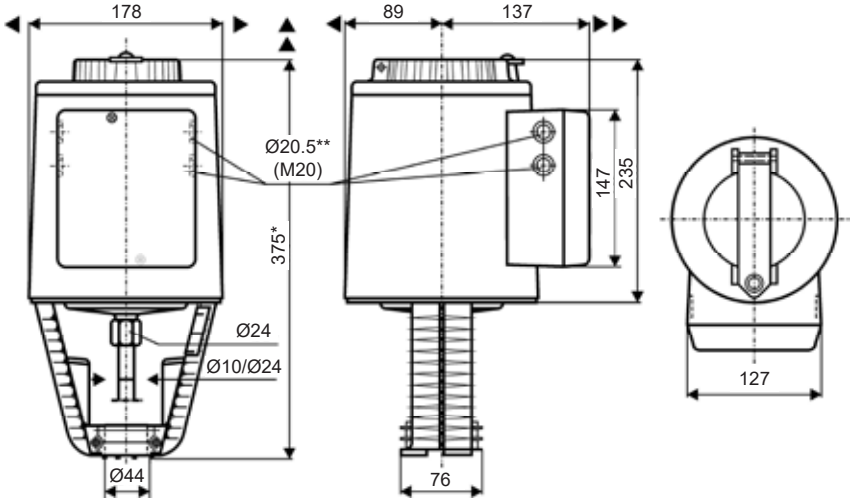


Electrical connection
AC 100…240 V ~

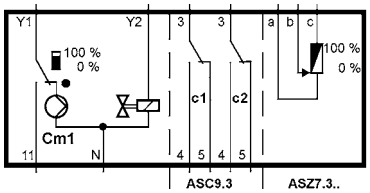


Connection	Code	No.	Colour	Abbreviation	Meaning
Drives	N	4	light blue	BU	Neutral conductor
AC 100...240 V ~	Y1	6	black	BK	Setting signal AC 100…240 V ~ “clockwise” (GLB341.9E)
	Y2	7	white	WH	Setting signal AC 100…240 V ~ “anticlockwise” (GLB341.9E)

Motor drives SKC32.60/SKC60
(Dimensions in mm)



Electrical connection for SKC32.60
AC 230 V, 3-point



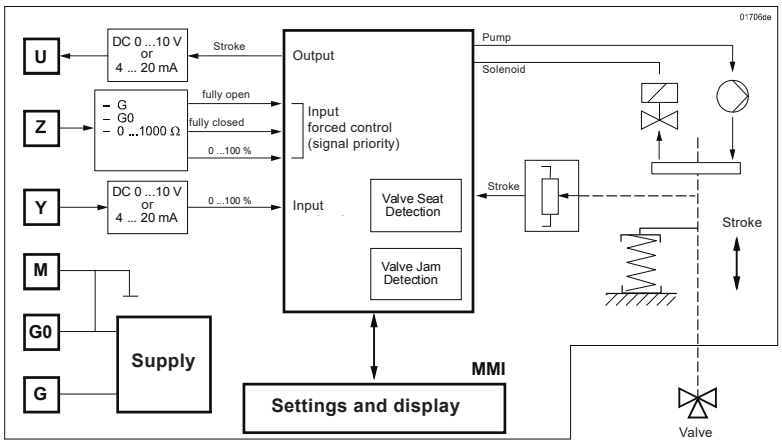
Cm1	Limit switch
n	Bypass valve
c1, c2	ASC9.3 auxiliary switch pair
a, b, c	ASZ7..potentiometer
Y1	Setting signal “open”
Y2	Setting signal “close”
21	Emergency control function
N	Neutral conductor

** SKC..U: for ½″ tube connections (Ø 21.5 mm)

▶ = > 100 mm Minimum distance to the wall or ceiling for installation,

▶▶ = > 200 mm connection, operation, maintenance etc.

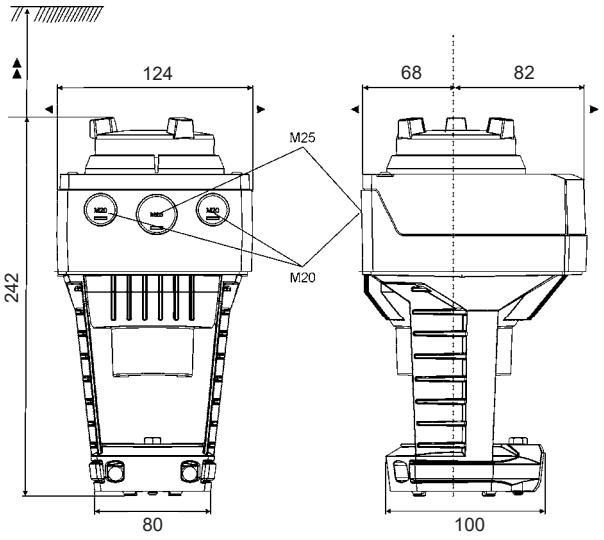
Electrical connection SKC60
AC 24 V, DC 0…10 V, 4…20 mA, 0…1000



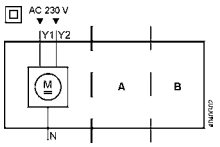
U	Position response
Z	Forced control input
Y	Setting signal
M	Measuring neutral
G0	Operating voltage AC 24 V: system ground
G	Operating voltage AC 24 V: system potential switch to dead voltage to emergency control function

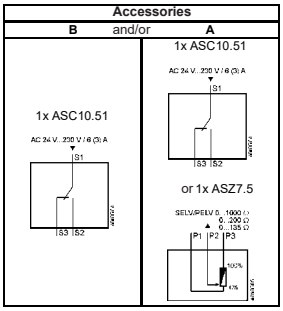
Motor drives SAX319.00/SAX319.03

(Dimensions in mm)



Electrical connection



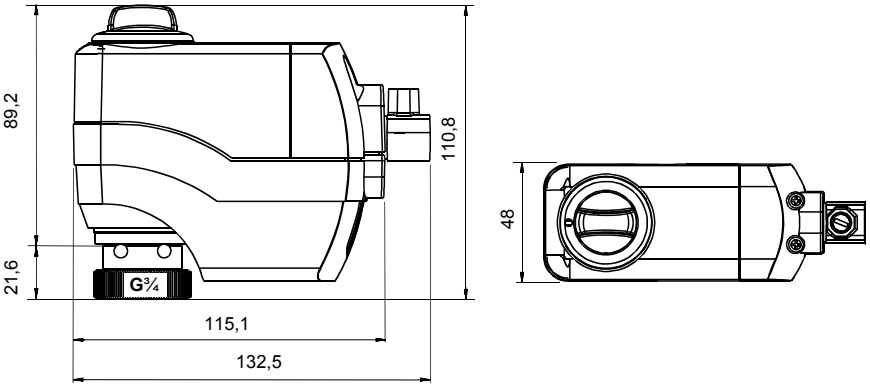


Connection terminals (AC 230 V, 3-point)

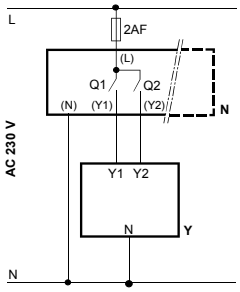
N	System ground (SG)
Y1	Setting signal (actuator's stem extends)
Y2	Setting signal (actuator's stem retracts)

Motor drive SSC319

(Dimensions in mm)



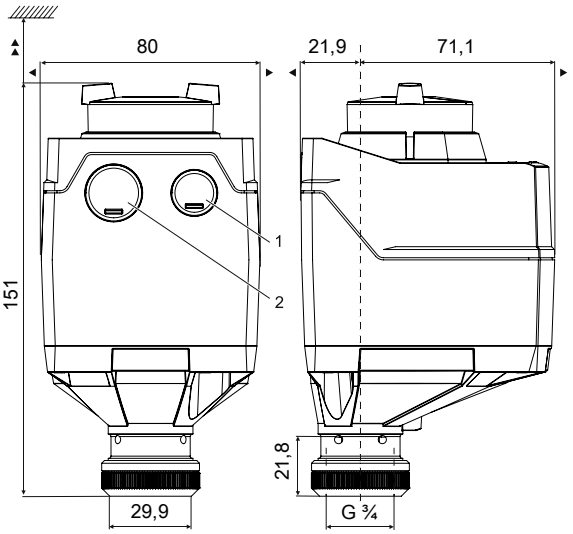
Electrical connection



N	Controller
Y	Motor drive
L	System potential AC 230 V
N	System ground
Y1, Y2	Setting signals OPEN, CLOSED
Q1, Q2	Controller contacts

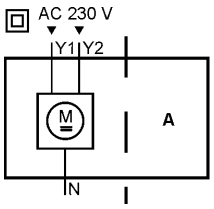
Motor drives SAS31.00/SAS31.03/SAS61.03

(Dimensions in mm)

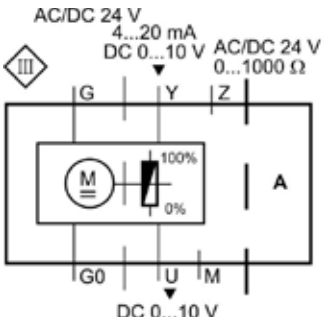


▶ = > 100 mm Minimum distance to the wall or ceiling for installation,
▶▶ = > 200 mm connection, operation, maintenance etc.

Electrical connection for SAS31.00 and SAS31.03



Electrical connection for SAS61.03



Butterfly valve
Size DN 65-150, PN 6/10/16, -10-120 °C

- Armature made of EN-JS1030 (GGG 40)
- Closing body: DIN/EN 1.4301 (stainless steel)
- Leakage rate: A tight (EN 12266-1)
- DN 65-150

Suitable motor drives
SR230A-R-5 (2-/3-point)
GR230A-5
DR230A-5
DR230A-7
PRCA-S2-T (2-/3-point)

■ **Part No.**

Part No.

Butterfly valves DN 65-150, PN 6-16

Butterfly valve
Without motor
Nominal pressure: PN 6-16

Connection size	kvs m³/h	Part No.
DN 65	170	2031 065
DN 80	260	2031 066
DN 100	520	2031 067
DN 125	880	2031 068
DN 150	1400	2076 008

Motor drives
Control: 2-point (open-close)/partly 3-point
Nominal voltage: AC 100-240 V, 50/60 Hz

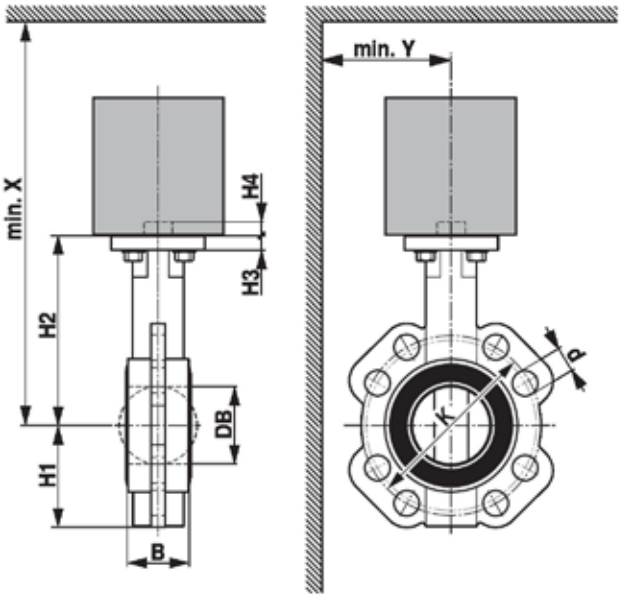
Type	Control	Nm	s	Part No.
SR230A-R-5	2-/3-point	20	90	2044 276
GR230A-5	2-point	40	150	2061 515
DR230A-5	2-point	< 90	150	2082 321
DR230A-7	2-point	< 90	150	2061 483
PRCA-S2-T	2-/3-point	160	35	2082 322

Recommended use

	SR230A-	GR230A-5	DR230A-5	DR230A7	PRCA-S2T
DN 65	•				
DN 80		•			
DN 100		•	•		
DN 125				•	
DN 150				•	•

Butterfly valve
Size DN 65-150, PN 6/10/16, -10-120 °C

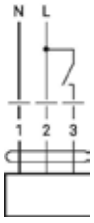
- Armature made of EN-JS1030 (GGG 40)
- Closing body: DIN/EN 1.4301 (stainless steel)
- Leakage rate: A tight (EN 12266-1)
- DN 65-150



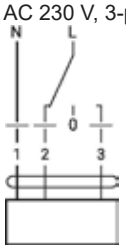
Type	DN	B	DB	H1	H2	H3	H4	d	K	d	K	d	K	X	Y	Weight
								PN 6		PN 10		PN 16				
		mm	mm	mm	mm	mm	mm		mm		mm		mm	mm	mm	kg
D665N	65	46	64	81	147	11	13	4 x 14	130	4 x 19	145	4 x 19	145	380	170	3.0
D680N	80	46	78	96	158	11	13	4 x 19	150	8 x 19	160	8 x 19	160	390	180	3.3
D6100N	100	52	103	106	170	11	13	4 x 19	170	8 x 19	180	8 x 19	180	410	190	4.0
D6125N	125	56	155	122	194	15	19	8 x 19	200	8 x 19	210	8 x 19	210	530	210	6.7
D6150N	150	56	155	140	202	15	19	8 x 19	225	8 x 23	240	8 x 23	240	540	220	7.4

Electrical connection for SR230A-5, GR230A-5

AC 230 V, open/closed



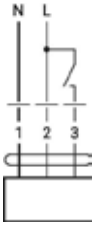
AC 230 V, 3-point



1	2	3	
			A - AB = 0%
			A - AB = 100%
			stop
			A - AB = 100%

Electrical connection for DR230A-5, -7

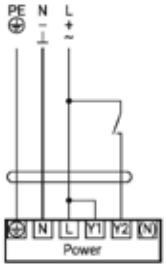
AC 230 V, open/closed

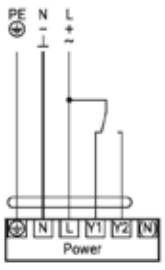


1	2	3	
			A - AB = 0%
			A - AB = 100%

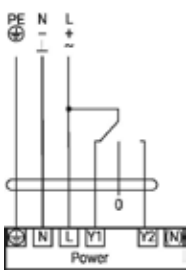
Electrical connection for PRCA-S2-T

AC 24-240 V / DC 24-125 V, open/closed

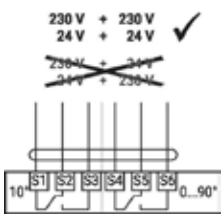




AC 24-240 V / DC 24-125 V, 3-point



Auxiliary switch



Diaphragm pressure expansion tanks

Reflex
- For closed heating and cooling water systems
- Works on the static pressure maintenance principle using a nitrogen buffer. The gas chamber and water chamber are separated from each other by a diaphragm.
- Non-exchangeable half-diaphragm according to DIN EN 13831
- With threaded or flange connectors
- Permissible operating temperature 70 °C
- For anti-freeze additive at least 25 to 50 %
- Durable epoxy resin coating
- Max. permitted system temperature 120 °C
- According to Pressure Equipment Directive 2014/68/EU

Reflex N
- Vessel nominal volume 8-1000 litres
- Permissible operating pressure N 8-35 4 bar, N 50-1000 6 bar
- N 8-35 for wall installation, N 50-1000 with feet (wall installation possible up to N 80)

Reflex S
- Especially for solar installations and also for heating and cooling water systems
- Vessel nominal volume 8-600 litres
- For frost protection additive up to 50 %
- Permissible operating pressure 10 bar
- For wall installation, from type S 50 with feet

Reflex F
- Space-saving flat-form vessel nominal volume 18, 24 litres
- Permissible operating pressure 3 bar
- With fastening lug for wall installation

Reflex C
- Vessel in disc shape, nominal volume 18-80 litres
- For frost protection additive up to 50 %
- Butyl membrane acc. to DIN 4807 T3
- Permissible operating pressure 3 bar
- Integrated suspension lug for wall mounting

Delivery
- Diaphragm pressure expansion tank delivered separately packed

On site
- Safety valve/pressure gauge

Reflex in-line vessel V
- Made of sheet steel from V 40 on feet
- Necessary for plants with return flow temperatures > 70 °C
- Can also be used as buffer storage tank
- Admissible operating temperature 120 °C
- For operating pressure up to 10 bar

Delivery
- Series-connected container delivered separately packed.

Approval

acc. to Pressure Vessels Directive 2014/68/EU

Reflex N wall vessel

N 8
N 12
N 18
N 25

Reflex N with feet

N 35
N 50
N 80
N 100
N 140
N 200
N 250
N 300
N 400
N 500
N 600
N 800
N 1000

Reflex S wall vessel

S 8
S 12
S 18
S 25
S 33

Reflex S with feet

S 50
S 80
S 100
S 140
S 200
S 250
S 300
S 400
S 500
S 600

Reflex F flat-form vessel

F 18
F 24

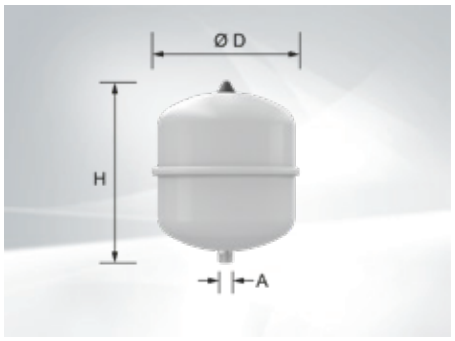
Reflex C disc shape

C 18
C 25
C 35
C 50
C 80

Reflex V series-connected container

V 6
V 12
V 20
V 40
V 60
V 200
V 300
V 350

Diaphragm pressure expansion tanks



8-25 litres

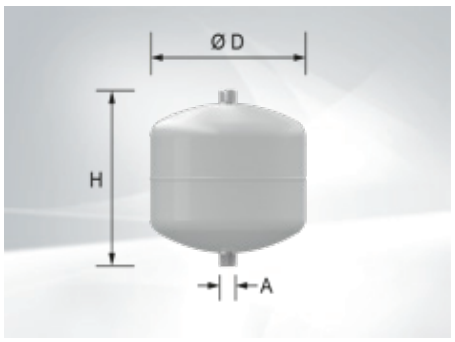
35-1000 litres

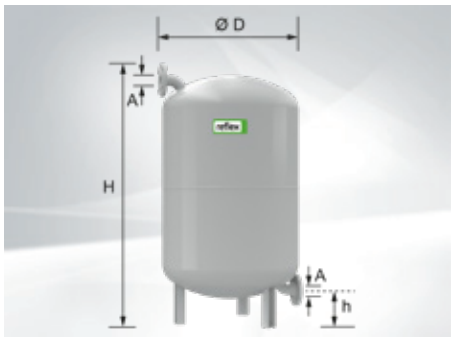
Reflex N
Vessel for wall installation. Reflex N 8-25.
For wall installation with clamping band
(clamping band see accessories)

Vessel with feet. Reflex N 35-1000

Permitted operating temperature of
vessel/diaphragm 120 °C/70 °C.
Gas inlet pressure at the factory: 1.5 bar
Permitted operating pressure:
N 8-35 4 bar, N 50-1000 6 bar.

Reflex type	Ø D mm	H mm	h mm	A inches	Weight kg	Part No.
N 8	272	236	-	R ¾″	2.3	2078 738
N 12	272	317	-	R ¾″	2.7	2078 739
N 18	308	360	-	R ¾″	3.6	2078 740
N 25	308	477	-	R ¾″	4.3	2078 741
N 35	376	466	130	R ¾″	5.6	2078 742
N 50	441	487	175	R ¾″	9.6	2078 743
N 80	512	558	172	R 1″	13.3	2078 744
N 100	512	669	172	R 1″	15.9	2078 745
N 140	512	890	172	R 1″	19.9	2078 746
N 200	634	758	205	R 1″	23.8	242 797
N 250	634	888	205	R 1″	24.7	242 798
N 300	634	1092	235	R 1″	30	242 799
N 400	740	1102	245	R 1″	47	242 800
N 500	740	1321	245	R 1″	52	242 801
N 600	740	1531	245	R 1″	66	2006 651
N 800	740	1996	245	R 1″	96	2006 652
N 1000	740	2413	245	R 1″	118	2006 653

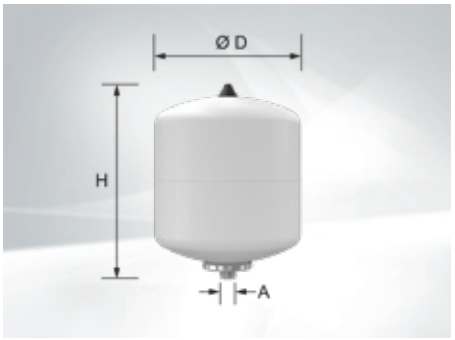




Reflex V
In-line vessel made of sheet steel,
from Reflex V 40 on feet.
Designed for operating pressures up to 10 bar.
Type V 6-20 for wall installation with clamping
band (clamping band see accessories).
V 200-300 flange PN 16

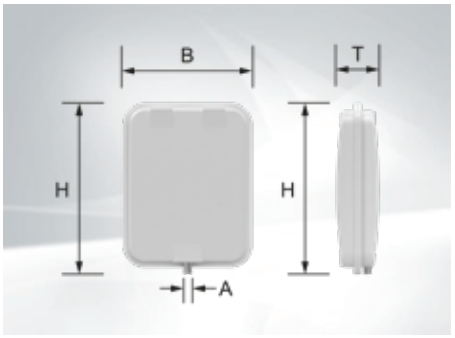
Reflex type	Ø D mm	H mm	h mm	A inches	Weight kg	Part No.
V 6	206	244	-	R ¾″	4	2032 084
V 12	280	287	-	R ¾″	3.3	2032 085
V 20	280	360	-	R ¾″	3.3	2032 086
V 40	409	562	113	R 1″	9.7	2057 249
V 60	409	732	172	R 1″	12.4	2006 864
V 200	634	901	142	DN 40	35.2	242 824
V 300	634	1201	142	DN 40	48	242 825
V 350	640	1341	210	DN 40	51	242 827

Diaphragm pressure expansion tanks



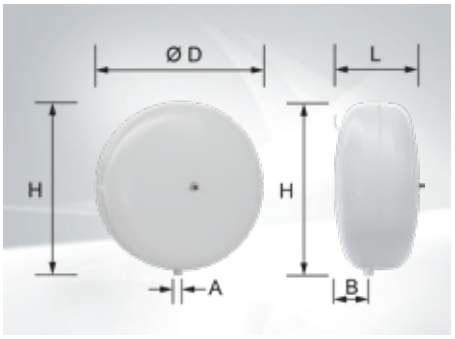
Reflex S
Especially for solar installations and also for heating and cooling water systems.
For frost protection additive up to 50 %.
Permitted operating pressure 10 bar.
Permitted operating temperature of vessel/diaphragm 120 °C/70 °C.
Type S 8-25 for wall installation with clamping band (clamping band see accessories).
Type S 8-33 for wall installation with lugs.
Type S 50-600 with feet.
Gas inlet pressure at the factory:
type S 8-33 1.5 bar and type S 50-600 3 bar

Reflex type	Ø D mm	H mm	h mm	A inches	Weight kg	Part No.
S 8	206	332	-	G ¾″	1.8	2006 634
S 12	280	300	-	G ¾″	2.2	2006 635
S 18	280	409	-	G ¾″	3	2006 636
S 25	280	518	-	G ¾″	3.7	2006 637
S 33	354	455	-	G ¾″	4.8	2006 638
S 50	415	469	158	R ¾″	8	2006 639
S 80	486	562	166	R 1″	12.1	2006 640
S 100	486	667	166	R 1″	12.9	2006 641
S 140	486	886	172	R 1″	19	2017 376
S 200	640	758	205	R 1″	27.5	2006 642
S 250	640	888	205	R 1″	32.4	2017 384
S 300	640	1092	235	R 1″	47	2006 643
S 400	746	1102	245	R 1″	61	2017 385
S 500	746	1321	245	R 1″	72	2006 644
S 600	746	1559	245	R 1″	87	2017 386



Reflex F
Flat-form vessel for wall installation with fastening lug. Permitted operating pressure up to 3 bar. Permitted operating temperature of vessel/diaphragm 120 °C/70 °C.
Gas inlet pressure at the factory: 1.5 bar

Reflex type	H mm	B mm	T mm	A inches	Weight kg	Part No.
F 18	444	350	158	G ¾″	7.7	2006 627
F 24	444	350	180	G ¾″	9.1	2006 628



Reflex C
Vessel in disc shape for wall mounting incl. wall holder. For frost protection additive up to 50 %. Permitted operating pressure 3 bar.
Permitted operating temperature of vessel/diaphragm 120 °C/70 °C.
Gas inlet pressure at the factory:
type C 50,80 1.5 bar

Reflex type	Ø D mm	H mm	A inches	L mm	B mm	Weight kg	Part No.
C 18	354	362	R ¾″	222	76	4.1	
C 25	409	419	R ¾″	239	93	5.1	2036 400
C 35	480	457	R ¾″	240	97	6.5	2036 401
C 50	480	457	R ¾″	318	125	8	2036 402
C 80	634	612	R ¾″	325	135	15.7	2036 403
							2036 404

Accessories

		Part No.
	**Console with strap** for Reflex N 8-25, S 8-25, V 6-20 vertical installation Vessel connection top or bottom	242 878
	**Quick connection SU R ¾″ x ¾″** for diaphragm pressure expansion tanks in closed heating and cooling water plants. With shut-off valve against unintended closing and drain according to DIN 4751 Part 2, tested by TÜV Connection R ¾″ PN 10/120 °C	242 771
	**Quick connection SU R 1″ x 1″** for diaphragm pressure expansion tanks in closed heating and cooling water plants. With shut-off valve against unintended closing (check ball) and drain according to DIN 4751 Part 2 tested by TÜV Connection R 1″ PN 10/120 °C	242 772

Sludge separator

- Type Rp 1″, 1¼″, 1½″, 2″
- Casing made of brass, PN 16
- Max. operating pressure 16 bar
- Max. operating temperature 110 °C
- Sieve made of stainless steel, size of mesh 0.5 mm

Delivery

- Sludge separator packed and supplied separately

Sludge separator with magnet MB3/L DN 25-50 IT

- With variable connection for vertical or horizontal pipelines
- Performance-enhancing magnetic assistance from removable, external magnet.
- Fast and continuous removal of ferromagnetic and non-magnetic dirt and sludge particles from heating or cooling circuits with the medium water or water/glycol (50/50 %)
- Brass casing, sludge separation up to a particle size of 5 µm - separation and sludge removal without interrupting operation by the spiral pipe insert
- With unscrewable casing bottom part for cleaning and inspection work
- Complete with sludge removal tap.
- Pipe connection: internal thread
- Max. operating pressure: 6 bar
- Max. flow temperature: 110 °C
- Optionally with insulating half shells

Delivery

- Sludge separator packed and supplied separately

Sludge separator with magnet BE DN 50-100 FM

- Sludge separator with magnet for continuous removal of magnetic and non-magnetic dirt and sludge particles from heating and cooling circuits.
- With built-in magnet in Dry-Pocket design for fast separation of magnetic particles.
- Integrated cone for neutralising the magnetic field in sludge removal.
- Flexible pull-off mechanism for cleaning the magnetic field in sludge removal without increased installation height.
- Medium water and water/glycol (50/50 %)
- Steel casing St 37.2
- Sludge separation up to a particle size of 5 µm - separation and sludge removal without interrupting operation by the spiral pipe insert and magnet, complete with sludge removal tap.
- Pipe connection: PN 16, welded-on flange
- Max. operating pressure: 10 bar
- Max. flow temperature: 110 °C
- Optional: insulating shells

Delivery

- Sludge separator packed and supplied separately

System water protection filter FGM025...050-200

- For filtration of heating and cooling water, with high filtration capacity for corrosion particles and dirt without significant pressure drop.
- for horizontal installation in return
- Consisting of:
  - Filter head and bowl in brass
  - Magnetic insert (nickel-neodymium)
  - 2 pressure gauges
- Very large filter surface in stainless steel
- Filter fineness 200 µm
- With drain valve
- Connections Rp 1″ and 2″: internal thread with integrated shut-off valves and union connection (outlet)
- Water temperature: max. 90 °C
- Incl. steam diffusion-tight insulating shells

FF050-200

- Casing and cover made of cast iron GGG-50
- Cover with clip lock
- Filter strainer insert made of stainless steel
- Cover seal made of NBR
- 2 magnetic insert (nickel-neodymium)
- 2 pressure gauges
- Very large filter surface in stainless steel
- Filter fineness 200 µm
- With filling and drain valve
- Connections flange DN 50

Heating system filling station

- Type: FS-BA15-¾″
- For permanent connection with the heating plant according to DIN EN 1717 with DIN DVGW approval, consisting of: lock, system separator BA, pressure reducer, strainer, pressure gauge, drain funnel
- Connection fittings ¾″
- Max. operating pressure: 10 bar
- Min. input pressure: 1.5 bar
- Output pressure: 0.5-4 bar
- Drainage funnel: DN 40
- Pressure drop: 1.1 bar
- Max. filling capacity: 1270 l/h
- Max. entry temperature: 30 °C
- Max. outlet temperature: 65 °C

Delivery

- Filling station packed and supplied separately

Low loss headers with deaerator MHK (25), MHK (32)

- Air and gas separator with dirt and mud backstop, for permanent degassing and clearing of the heating medium of mud
- With low loss header for the isolation of the delivered flows in the boiler
- Welded pressure vessel made of steel with connecting pieces, union nuts and seals
- Cleaning opening in the soil
- Automatic venting unit with automatic shut-off and draining device
- Cladding incl. thermal insulation

Armatures

Strainer
Casing made of brass, PN 16
Max. operating temperature 110 °C
Sieve made of stainless steel,
size of mesh 0.5 mm

Type	Connection inches	kv value m³/h	Part No.
DN 25	Rp 1″	7.8	2046 978
DN 32	Rp 1¼″	15	2046 980
DN 40	Rp 1½″	21	2046 982
DN 50	Rp 2″	34	2046 984

Sludge separator with magnet
MB3/L DN 25-50
Fast and continuous removal of ferromagnetic and non-magnetic dirt and sludge particles.
Sludge separation up to a particle size of 5 µm.
Brass housing
Max. operating pressure: 6 bar
Max. flow temperature: 110 °C

Type	Connection inches	Flow rate at 1 m/s flow speed m³/h	Part No.
MB3 DN 25	Rp 1″	2.0	2062 165
MBL DN 32	Rp 1¼″	3.6	2062 166
MBL DN 40	Rp 1½″	5.0	2062 167
MBL DN 50	Rp 2″	7.5	2062 168

Insulations for sludge separator
MB3/L DN 25-50

Type	suitable for sludge separator	Material	Part No.
TUR100	MB3 DN 25	EPP	2062 191
TUR125	MBL DN 32	EPP	2062 192
TUR150	MBL DN 40	EPP	2062 245
TUR200	MBL DN 50	EPP	2062 246

Sludge separator with magnet
BE DN 50-100 FM
Sludge separator with magnet for continuous removal of magnetic and non-magnetic dirt and sludge particles from heating and cooling circuits.
Steel casing (St 37.2)
Sludge separation up to a particle size of 5 µm.
Pipe connection: PN 16, welded-on flange
Max. operating pressure: 10 bar
Max. flow temperature: 110 °C

Type	Connection	Flow rate at 1.5 m/s flow speed m³/h	Part No.
BE DN 50 FM	DN 50	12.5	2062 169
BE DN 65 FM	DN 65	20.0	2062 170
BE DN 80 FM	DN 80	27.0	2062 171
BE DN 100 FM	DN 100	47.0	2062 172

Insulations for sludge separator BE DN 50-100 FM

Type	suitable for sludge separator	Material	Part No.
TB050	BE 50 FM - BE 65 FM	PUR	2050 617
TB080	BE 80 FM - BE100 FM	PUR	2050 618

System water protection filter FGM025...050-200

For horizontal installation in return for filtration of heating and cooling water, with high filtration capacity for corrosion particles and dirt without significant pressure drop.
Consisting of:
- Filter head and bowl in brass
- Magnetic insert (nickel-neodymium)
- 2 pressure gauges
- Very large filter surface made of stainless steel
- Filter fineness 200 µm
- With drain valve
- Connections Rp 1″ and Rp 2″:
Internal thread with integrated shut-off valves and union connection (outlet)
- Water temperature: max. 90 °C
- incl. steam diffusion-tight insulating shells

FF050-200

Casing and cover made of cast iron GGG-50
Cover with clip lock
- Filter strainer insert made of stainless steel
- Cover seal made of NBR
- 2 magnetic insert (nickel-neodymium)
- 2 pressure gauges
- Very large filter surface in stainless steel
- Filter fineness 200 µm
- With filling and drain valve
- Connections flange DN 50

Type	Connection	Flow rate at Δp < 0.1 bar pressure drop m^3/h	Part No.
FGM025	Rp 1″	5.5	6058 256
FGM050	Rp 2″	7.2	6058 257
FF050	DN 50	18.0	2076 376

		Part No.
	**Filling group FS-BA15-¾″** for stationary connection with the heating plant according to DIN EN 1717 with DIN DVGW approval Casing made of brass Consisting of lock, system separator BA, pressure reducer, strainer, pressure gauge, drain funnel incl. connection fittings ¾″ Max. operating pressure: 10 bar Min. inlet pressure: 1.5 bar Outlet pressure: 0.5-4 bar Drain funnel: DN 40 Pressure drop: 1.1 bar Max. filling capacity: 1270 l/h Max. entry temperature: 30 °C Max. outlet temperature: 65 °C	6017 054
	**Automatic, lockable quick air vent ⅜″** with removable cover for inspection Casing and cover made of brass CW617N Float made of polyethylene Seal between tank and cover with reinforced polyamide seal Connection G ⅜″ DIN-ISO228/1 Maximum operating pressure: 12 bar Maximum operating temperature: 160 °C Also suitable for water with additives (glycol up to 50 %) With automatic shut-off valve with air breaker made of brass CW617N Seal made of FKM, air breaker made of heat-resistant polymer Spring made of stainless steel	2054 183
	**Automatic, lockable quick air vent G ½″** with removable cover for inspection Casing and cover made of brass CW617N Float made of polyethylene Seal between tank and cover with reinforced polyamide seal Connection G ½″ DIN-ISO228/1 Maximum operating pressure: 12 bar Maximum operating temperature: 160 °C Also suitable for water with additives (glycol up to 50 %) With automatic shut-off valve with air breaker made of brass CW617N Seal made of FKM, air breaker made of heat-resistant polymer Spring made of stainless steel	2024 763
	**Safety set** Complete with safety valve (3 bar). Pressure gauge and autom. aspirator with shut-off valve. Connection internal thread	
	DN 15 - 1″, area of application to 50 kW	641 184
	DN 20 - 1″, area of application to 100 kW	6014 390
	DN 25 - 1″, area of application to 200 kW	6018 709
	DN 32 - 1¼″, area of application to 350 kW	6018 710

Syr water level limiter
The water level limiting device 933 incorporates the magnetic transmission of the float movement to a micro-switch which enables a check to be made without lowering the water level. The electrical switching unit can be rotated by 360° and replaced without the need to drain the plant.
The water level limiting device 933.1 locks on being switched off. When the interruption has been removed, the plant can be reactivated with the help of the release button on the device.

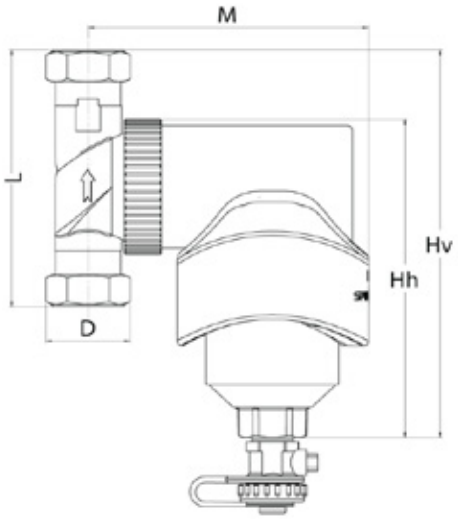
	Part No.
Syr water level limiter 933.1 with locking	2000 117

Syr water level limiter

- Operating overpressure max. 10 bar
- Operating temperature max. 120 °C
- Type of protection IP 65 according to DIN 40050
- Micro-switch two-way contact 1 pin
- Installation position main axis vertical
- Power-handling capacity 10 (3) A/250 V
- Component approval number TÜV-HWB-01-190
- Registration number 10074

Sludge separator with magnet MB3/L DN 25-50 IT

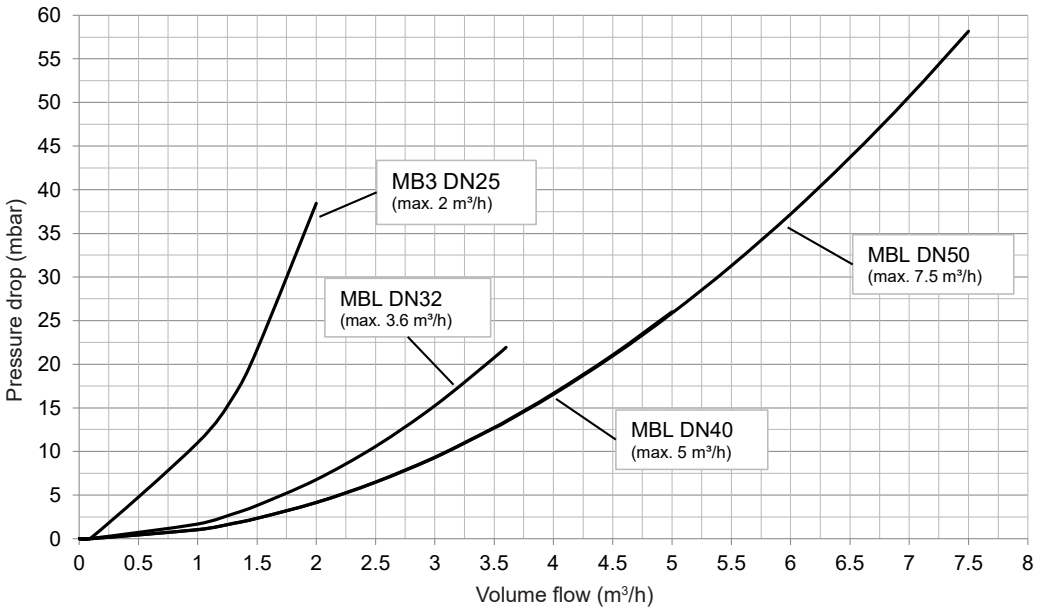
(Dimensions in mm)



- With variable connection for vertical or horizontal pipelines
- Performance-enhancing magnetic assistance from removable, external magnet.
- Fast and continuous removal of ferromagnetic and non-magnetic dirt and sludge particles from heating or cooling circuits with the medium water or water/glycol (50/50 %)
- Brass casing, sludge separation up to a particle size of 5 micrometres - separation and sludge removal without interrupting operation by the spiral pipe insert
- With unscrewable casing bottom part for cleaning and inspection work
- Complete with sludge removal tap.
- Pipe connection: internal thread
- Max. operating pressure: 6 bar
- Max. flow temperature: 110 °C
- Optionally with insulating half shells

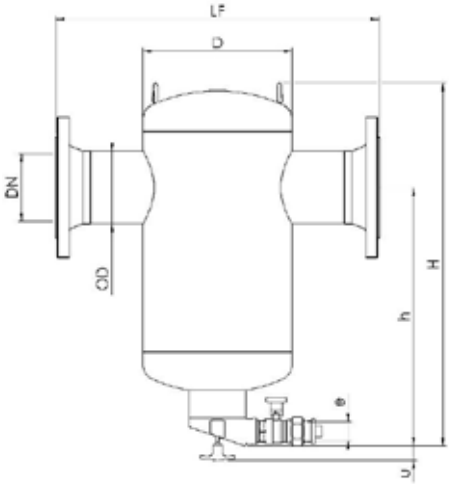
Type	Connection	Dimensions				Volume	Weight	max. flow rate at 1 m/s	Pressure drop
	D inches	L mm	M mm	Hh mm	Hv mm	l	kg	m³/h	mbar
MB3 DN25	Rp 1″	90	120	148	164	0.39	2.30	2.0	38
MBL DN32	Rp 1¼″	128	138	210	224	0.75	3.57	3.6	22
MBL DN40	Rp 1½″	128	141	210	224	0.75	3.67	5.0	58
MBL DN50	Rp 2″	128	148	210	224	0.75	3.85	7.5	58

Pressure drop diagram



Sludge separator with magnet BE DN 50-100 FM

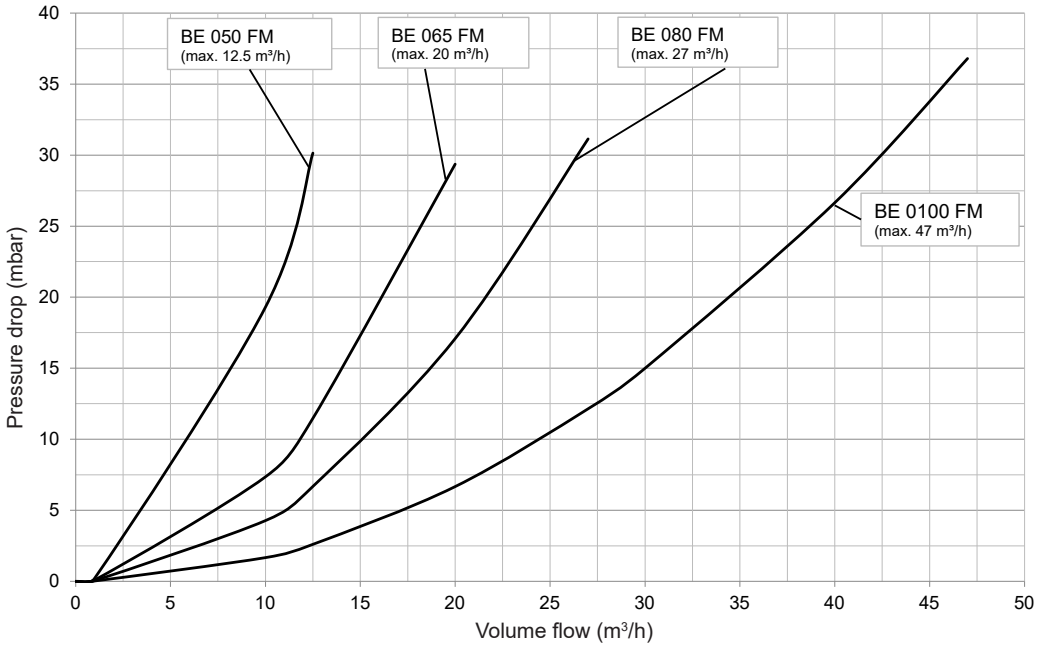
(Dimensions in mm)



- Sludge separator with magnet for continuous removal of magnetic and non-magnetic dirt and sludge particles from heating and cooling circuits.
- With built-in magnet in Dry-Pocket design for fast separation of magnetic particles.
- Integrated cone for neutralising the magnetic field in sludge removal.
- Flexible pull-off mechanism for cleaning the magnetic field in sludge removal without increased installation height.
- Medium water and water/glycol (50/50 %)
- Steel casing St 37.2
- Sludge separation up to a particle size of 5 micrometres - separation and sludge removal without interrupting operation by the spiral pipe insert and magnet, complete with sludge removal tap.
- Pipe connection: PN 16, welded-on flange
- Max. operating pressure: 10 bar
- Max. flow temperature: 110 °C
- Optional: insulating shells

Type	Connection	Dimensions							Volume	m	max. flow rate at 1.5 m/s	Pressure drop
		OD mm	H mm	h mm	D mm	LF mm	e inches	u mm	l	kg	m³/h	mbar
BE DN050 FM	DN 50	60.3	449	319	159	350	1″	23	5	15	12.5	30
BE DN065 FM	DN 65	76.1	449	311	159	350	1″	23	5	16	20	29
BE DN080 FM	DN 80	88.9	570	418	219	470	1″	23	17	26	27	31
BE DN100 FM	DN 100	114.3	570	406	219	475	1″	23	17	28	47	37

Pressure drop diagram



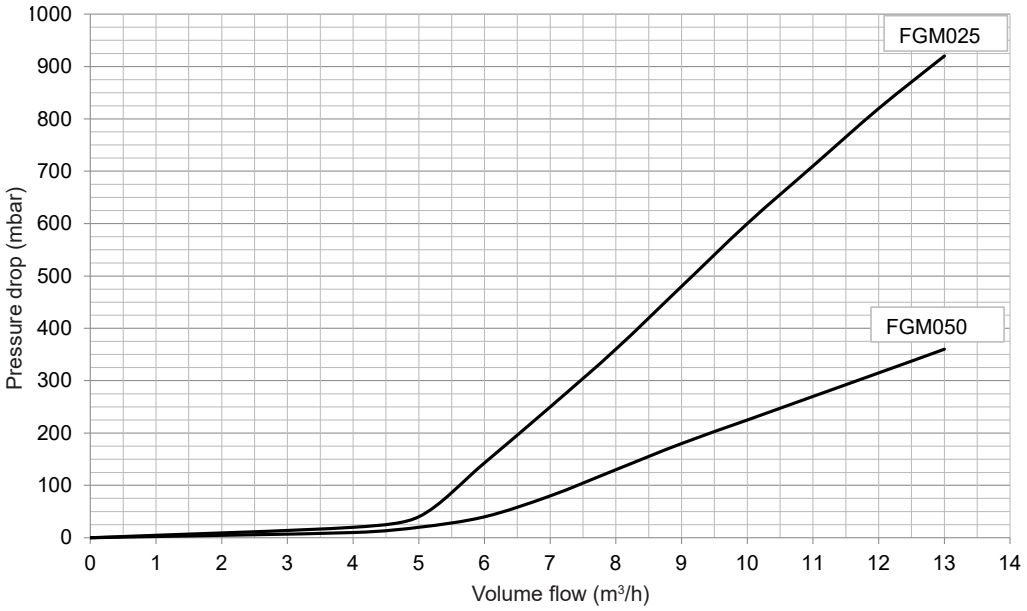
System water protection filter: FGM025...050-200

(Dimensions in mm)

- for filtration of heating and cooling water, with high filtration capacity for corrosion particles and dirt without significant pressure drop.
- for horizontal installation in return
- Consisting of:
  - Filter head and bowl in brass
  - Magnetic insert (nickel-neodymium)
  - 2 pressure gauges
- Very large filter surface in stainless steel
- Filter fineness 200 µm
- With drain valve
- Connections Rp 1″ and 2″: internal thread with integrated shut-off valves and union connection (outlet)
- Water temperature: max. 90 °C
- incl. steam diffusion-tight insulating shells

Type	inlet/outlet	Install. length (without thread)	Dimensions overall height with pressure gauge	Sieve removal height	Weight
	inches	mm	mm	mm	kg
FGM025	Rp 1″/G 1″	240	420	535	6.8
FGM050	Rp 2″/G 2″	240	420	535	6.9

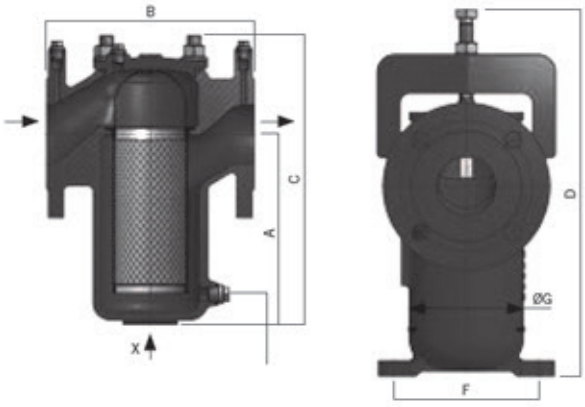
Pressure drop diagram



System water protection filter FF050-200

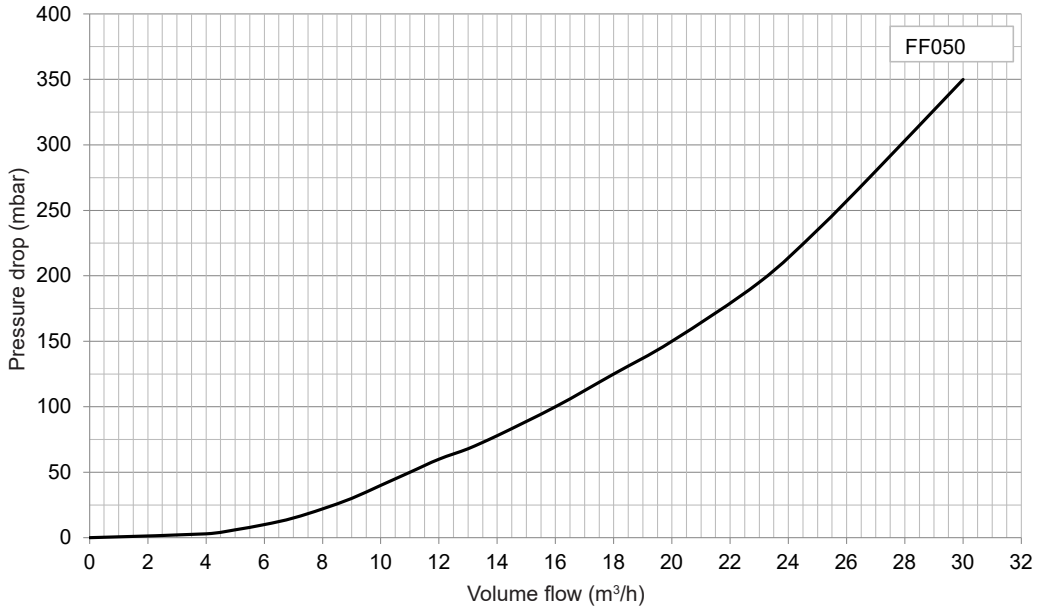
(Dimensions in mm)

- Casing and cover made of cast iron GGG-50
- Cover with clip lock
- Filter strainer insert made of stainless steel
- Cover seal made of NBR
- 2 magnetic insert (nickel-neodymium)
- 2 pressure gauges
- Very large filter surface in stainless steel
- Filter fineness 200 µm
- With filling and drain valve
- Connections flange DN 50



Type	Connection	Dimensions							
		G	A	B	C	D	Shut-off flaps	Counter flanges	Total installation length
		mm	mm	mm	mm	mm	mm	mm	mm
FF050	DN 50	102	164	535	250	340	47	45	524

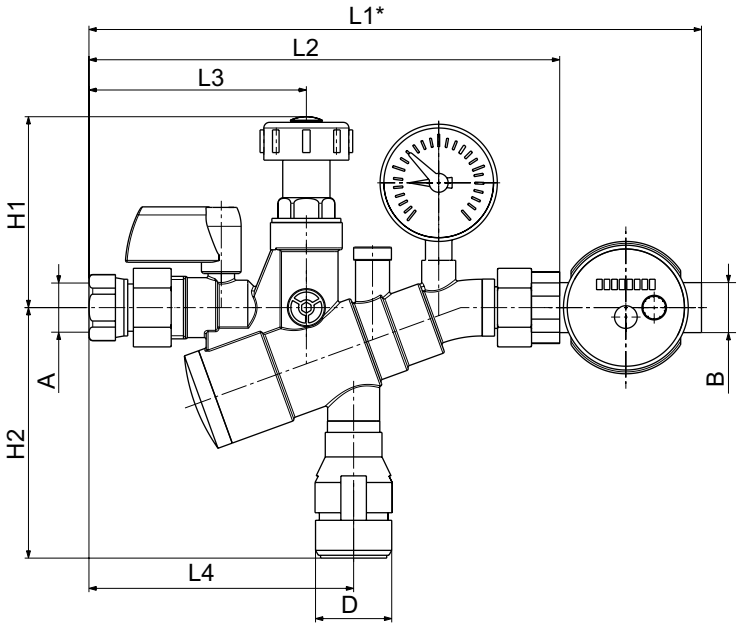
Pressure drop diagram



Heating system filling station

(Dimensions in mm)

- Type: FS-BA15-¾″
- For permanent connection with the heating plant according to DIN EN 1717 with DIN DVGW approval, consisting of:
  lock, system separator BA, pressure reducer, strainer, pressure gauge, drain funnel
- Connection fittings ¾″
- Max. operating pressure: 10 bar
- Min. input pressure: 1.5 bar
- Output pressure: 0.5-4 bar
- Drainage funnel: DN 40
- Pressure drop: 1.1 bar
- Max. filling capacity: 1270 l/h
- Max. entry temperature: 30 °C
- Max. outlet temperature: 65 °C

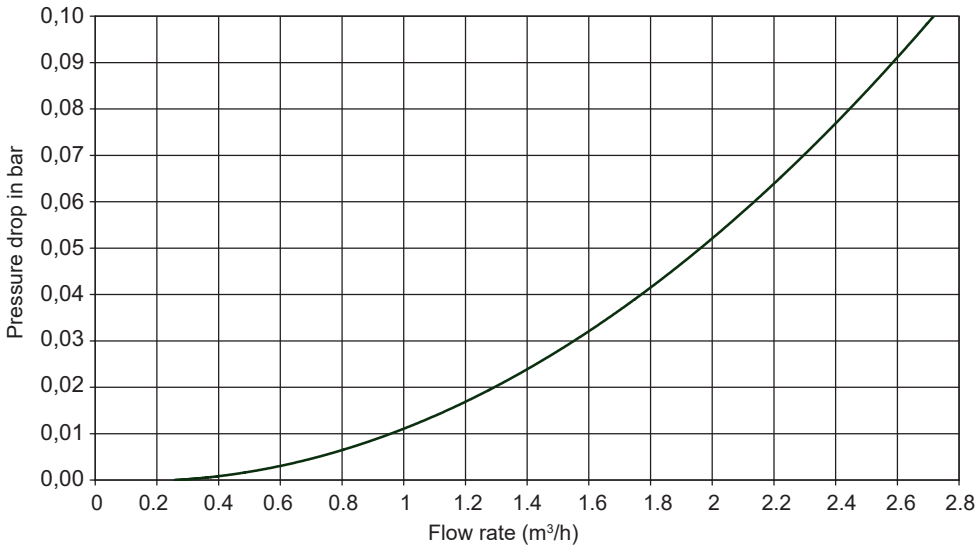


Type	A inches	B inches	D mm	L1 mm	L2 mm	L3 mm	L4 mm	H1 mm	H2 mm
FS-BA15-¾″	Rp ¾″ internal	R ¾″ external	40	324	249	115	140	101	133

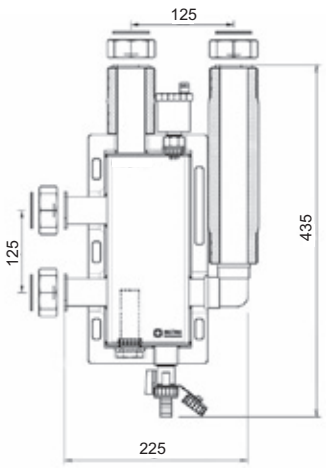
Low loss header MHK (25,32)

Type		(25)	(32)
• Output at Δt = 20 K	kW	50	70
• Delivery	m³/h	2	3
• Pressure drops		see flow characteristic	
• Connection dimension		Rp 1½″	Rp 2″
• Cleaning opening		1″	1″
• Emptying mechanism		1″	1″
• Rinsing system		-	-
• Sleeve with immersion pocket for temperature sensor		-	-
• Sleeve for magnetite separator		2 x ¾″	2 x ¾″
• Operating/test pressure	bar	6/9	6/9
• Max. operating temperature	°C	110	110

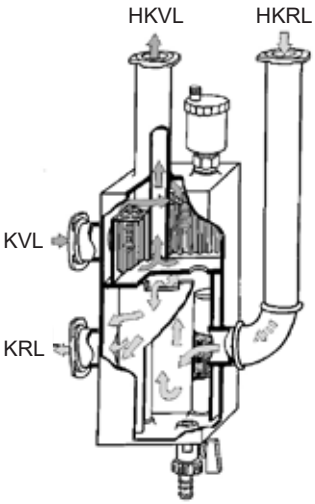
Flow characteristic
Low loss headers MHK (25), MHK (32)



Low loss headers MHK (25), MHK (32)



Connection technology
Low loss headers MHK (25), MHK (32)



KVL = Boiler flow
KRL = Boiler return
HKVL = Heating circuit flow
HKRL = Heating circuit return

Looking for the appropriate hydraulic schematic?
Please contact your local Hoval partner.

Diaphragm safety valve
The diaphragm safety valve type 1915 is designed to protect closed heating systems from over pressurisation according to DIN EN 12828. The connection size of the valve is to be determined in accordance with the capacity of the heat generator to be protected. The maximum operating pressure of the installation and the corresponding maximum response pressure of the safety valve must be observed. The valve is equipped with a separate seat seal ahead of the diaphragm. The valve can be lifted by means of a twist grip. Its body is made of high-quality, low-lead brass alloy (DN 15-DN 32) resp. low-lead red brass alloy resistant to dezincification (DN 40-DN 50). Spring cap, diaphragm and other interior parts are made of highly heat-proof and non-ageing rubbery-elastic synthetic material. The spring is made of corrosion resistant spring steel wire. Max. admissible temperature 120 °C.

Type	G1/ DN 1 entry side	G2/DN 2 exit side	Response pressure	Part No.
1915-1″ 3 bar	1″	DN 32 - 1¼″	3 bar	2034 775
1915-1″ 4 bar	1″	DN 32 - 1¼″	4 bar	2034 352
1915-1″ 5 bar	1″	DN 32 - 1¼″	5 bar	2034 777
1915-1″ 6 bar	1″	DN 32 - 1¼″	6 bar	2034 365
1915-1″ 8 bar	1″	DN 32 - 1¼″	8 bar	2034 776
1915-1″ 10 bar	1″	DN 32 - 1¼″	10 bar	2034 778
1915-1¼″ 4 bar	1¼″	DN 40 - 1½″	4 bar	2034 780
1915-1¼″ 6 bar	1¼″	DN 40 - 1½″	6 bar	2034 782
1915-1½″ 6 bar	1½″	DN 50 - 2″	6 bar	2034 353
1915-2″ 6 bar	2″	DN 65 - 2½″	6 bar	2034 364

Safety valves on heat generators

acc. to DIN EN 12828, TRD 721***

Code letter H, blow-off pressure pSV 2.5 and 3.0 bar for heat generator output levels ≤ 900

G1/G2	½-¾"	¾-1"	1-1¼"	1¼-1½"	1½-2"	2-2½"
pSV/bar	Blow-off power/kW					
2.5	≤ 50	≤ 100	≤ 200	≤ 350	≤ 600	≤ 900
3.0						

Code letter D/G/H, for heat generator output levels > 900 kW [1]

DN 1/DN 2	20 x 32	25 x 40	32 x 50	40 x 65	50 x 80 [4]	65 x 100	80 x 125	100 x 150	125 x 200	150 x 250
pSV/bar	Blow-off line/kW									
2.5	198	323	514	835	1291	2199	3342	5165	5861	9484
3.0 [2]	225	367	583	948	1466 [3]	2493	3793	5864	6654	10824
3.5	252	411	652	1061	1640	2790	4245	6662	7446	12112
4.0	276	451	717	1166	1803	3067	4667	7213	8185	13315
4.5	302	492	782	1272	1966	3344	5088	7865	8924	14518
5.0	326	533	847	1377	2129	3621	5510	8516	9663	15720
5.5	352	574	912	1482	2292	3898	5931	9168	10403	16923
6.0	375	612	972	1580	2443	4156	6322	9773	11089	18040
7.0	423	690	1097	1783	2757	4690	7135	11029	12514	20359
8.0	471	769	1222	1987	3071	5224	7948	12286	13941	22679
9.0	519	847	1346	2190	3385	5759	8761	13542	15366	24998
10.0	563	920	1462	2378	3676	6253	9514	14705	16686	27146

Legend:

G1/G2	Dimension in inches inlet/outlet safety valve
DN 1/DN 2	Dimension in DN inlet/outlet safety valve
pSV	Response pressure safety valve in bar
Blow-off line	Dimension inlet, outlet safety valve in DN or G (thread in inch)
kW	Maximum output in kW heat generator

*** Safety valves must:**

- have a minimum diameter of DN 15.
- open at a pressure that does not exceed the maximum configuration pressure of the system and must be capable of preventing the maximum operating pressure from being exceeded by more than 10 %, although exceeding the level by 0.5 bar is permitted if the maximum operating pressures are not more than 3 bar.

Example:

[1] Hoval UltraGas® 1000, max. system pressure 2.5 bar according to the output (1000 kW), a valve with code letters D/G/H must be selected

[2] Selection of response pressure for safety valve (pSV), generally pSV - 0.5 bar or 3 bar 10 % of system pressure *
in the example max. system pressure 2.5 bar + 0.5 bar = 3 bar

[3] Selection of boiler output/in example 1000 kW

[4] Selection of blow-off power, i.e. inlet and outlet dimension of safety valve

Pressure switch
The pressure switch DFC 17B76 F001 is used for monitoring and limiting the pressure in liquids. The robust, splash-proof, light-alloy casing and the vibration-proof snap switch enable the monitor to be used in heavy-duty applications. The product is tested to VdTÜV, pressure 100/1 and, therefore, are also suitable for use in steam-boiler (TRD604) and hot-water installations (DIN 4751). The upper and lower switching points can be set separately. The pressure sensor is made of brass for non-aggressive media.

Setting range	Min. switching difference	Max. value sensor	Weight	Part No.
0-10 bar	0.5 bar	40 bar	70 °C	1.1 kg	2024 278

Boiler fill and drain valve URS 1372
Heavy model with external, cap and chain, without key, made of brass, max. operating temperature 90 °C, max. operating pressure 10 bar.

Type	Operating temperature	Operating pressure	Connection	Part No.
URS 1372	90 °C	10 bar	½″	240 219

Reduction sleeve for drain valve
ATUSA reduction sleeve No. 240 black, malleable cast iron fitting with internal thread.

Type	Connection	Part No.
Nr. 240	1½″ - ½″	2029 767

Boiler type	1″ - ½″	1½″ - ½″	2″ - ½″
Uno-3 (50-90)	•		
Uno-3 (110-125)	•		
Uno-3 (160-360)		•	
Max-3 (420-2700)		•	
Max-3 plus (420-2700)		•	

Pressure gauge
Pressure gauge with adjustable red-branded needle, adjustable at the dial, split bar, diameter 80 mm, connection vertical ½″.

Operating pressure	Connection	Diameter	Part No.
0-6.0 bar	½″	80 mm	2029 769
0-10.0 bar	½″	80 mm	2000 118

Push-button cock for pressure gauge
Push-button cock made of brass, nickel-plated, max. operating temperature 100 °C, max. operating pressure 25 bar.

Operating pressure	Operating temperature	Connection	Part No.
25 bar	100 °C	½″	2024 276

Thermometer
Thermometer TBH 80, casing made of stainless steel 1.4301, sight glass made of normal glass, error margin class 1 DIN 16203, diameter 80 mm.
Accessories: screw-in- and shrink-wrap sheath tube. Use for insulated tubes up to max. 2″ (60.3 mm).

Type	Length mm	Part No.
0-100 °C	88	2029 770

Welding bush
Welding bush TBH, for thermometer TBH, made of steel

Length mm	Part No.
88	2025 204

Thermometer type TMOV 2002 059
including immersion sleeve ½″ x 110
0-120 °C

Plate heat exchanger Danfoss

- Plate heat exchanger with the new Micro Plate™ technology
- A new plate embossing that can transfer heat more efficiently, with lower pressure drop and longer service life
- Heat exchanger brazed with copper (XB37...: stainless steel) solder under vacuum for heating and cooling applications with approval according to the Pressure Equipment Directive 97/23/EC
- Operating pressure: max. 25/16 bar
- Min./max. temperature: -10/180 °C
- Suitable for circulation water/water containing glycol with up to 50 % glycol proportion, ethylene glycol/propylene glycol-water mixtures, ethanol-water solutions and other suitable heat transfer fluids
- Connection type: cylindrical external thread according to DIN ISO 228/1
- Plates made of stainless steel, material number 1.4404

Plate heat exchanger Sondex

- SONDEX® plate heat exchanger screwed
- Consisting of profiled heat exchanger plates, clamped together by clamping bolts between stand and pressure plate and secured on upper and lower carrying rod
- With additional support profile for correct installation and removal of the mobile pressure plate and the plate pack
- With exclusive use of seals without adhesive in the SONDER LOCK or HANG ON process (simple seal change on site)
- Steel frame, primer-coated and painted blue (RAL 5010)
- Produced according to the DS/EN ISO 9001:2000 quality assurance system and according to the Pressure Equipment Directive 2014/68/EU (PED)
- Pressure test and leak test with works certificate included
- Operating pressure: max. 10 bar
- Operating temperature: 90/110 °C
- Plate material: 0.5 mm AISI 316
- Sealing material: NITRIL HT HANG ON (H)
- Including: Support for screwed plate heat exchanger, as stable foot construction

The brazed plate heat exchangers XB, S...A are designed for use in district heating systems, for heating and air conditioning technology and for domestic water heating. Type-tested in accordance with the Pressure Equipment Directive (PED)

Type	XB06L-1	XB12L-1	XB52M-1	XB61L-1	XB37L-1	XB37M-1	S8A IG16	S8A IT10	S14A	S19A
MicroPlate™ technology	x									
SONDEX® (bolted) [1]							x			
Max. operating pressure [bar]	25					16	10			
Max. medium temperature [°C]	180						90		110	
Min. medium temperature [°C]	-10						-20			
Flow medium	Circuit water/water-glycol mixtures up to 50 %									
Volume capacity per channel [l]	0.025	0.045	0.163	0.239	0.102	0.07	0.21		0.35	0.60
Connection size of external thread	G ¾″	G 1¼″	G 2″		G 1″		DN 32		DN 50	DN 65
Plate/connections material	Stainless steel, mat. No. 1.4404 (AISI 316L)									
Solder/connections material [1]	Copper					Stainless steel	Nitril HT HANG ON (H)			
Thermal insulation	Thermal insulation made of PU rigid foam, 2-part, temperature-resistant up to 130 °C (up to 150 °C for short periods)						On site			

Reading example:

XB37 = type
M = variant
-1- = number of channels
40 = number of plates

Plate heat exchanger Danfoss

Type	Connection	Part No.
XB06L-1-16	G ¾″	2080 139
XB06L-1-20	G ¾″	2080 140
XB06L-1-26	G ¾″	2080 141
XB06L-1-30	G ¾″	2080 142
XB06L-1-36	G ¾″	2080 143
XB06L-1-50	G ¾″	2080 144
XB12L-1-20	G 1¼″	2080 152
XB12L-1-26	G 1¼″	2080 153
XB12L-1-30	G 1¼″	2080 147
XB12L-1-36	G 1¼″	2080 148
XB12L-1-40	G 1¼″	2080 120
XB12L-1-50	G 1¼″	2080 149
XB12L-1-70	G 1¼″	2080 150
XB12L-1-80	G 1¼″	2080 151
XB37M-1-20	G 1″	2080 154
XB37M-1-26	G 1″	2080 155
XB37M-1-30	G 1″	2080 156
XB37M-1-36	G 1″	2080 157
XB37M-1-40	G 1″	2080 158
XB37M-1-50	G 1″	2080 159
XB37M-1-70	G 1″	2080 160
XB37M-1-80	G 1″	2080 161
XB37L-1-100	G 1″	2080 162
XB52M-1-90	G 2″	2080 121
XB52M-1-110	G 2″	2080 145
XB52M-1-140	G 2″	2080 146
XB61L-SB-1-40	G 2″	2080 135
XB61L-SB-1-50	G 2″	2080 136
XB61L-SB-1-60	G 2″	2080 137
XB61L-SB-1-70	G 2″	2080 122
XB61L-SB-1-80	G 2″	2080 138

Plate heat exchanger Sondex

Type	Connection	Part No.
S8A-IT10-18-TL	DN 32	2080 181
S8A-IT10-22-TL	DN 32	2080 182
S8A-IT10-36-TL	DN 32	2080 183
S8A-IG16-60-TL	DN 32	2080 184
S14A-ST16-50-TL	DN 50	2080 185
S14A-ST16-72-TL	DN 50	2080 186
S19A-IG16-86-TL	DN 65	2080 187
S19A-IG16-152-TL	DN 65	2080 188

Accessories

Thermal insulation for plate heat exchangers
Material: polyurethane (PU)
Thermal conductivity: 0.035 W/mK
Thickness: 20 mm

Suitable for plate heat exchanger type	Number of plates variant H	M	L	Part No.
XB06			08-26	2080 123
XB06			30-48	2080 124
XB06			50	2083 874
XB12	10-52	10-40	10-36	2080 125
XB12	60-100	50-92	40-72	2080 126
XB12	110-140	100-110	80-100	2080 127
XB52		72-104		2080 128
XB52		106-140		2083 875

Notice:
Not for cooling applications

Thermal insulation for plate heat exchangers
Material: mineral wool
Thermal conductivity: 0.029 W/mK
Thickness: 30 mm

Suitable for plate heat exchanger type	Number of plates variant H	M	L	Part No.
XB61	30-90	30-90	30-50	2080 129
XB61	91-160	71-120	51-100	2080 130

Notice:
Not for cooling applications

Screw connection set for plate heat exchangers
containing two end pieces
with union nuts and seals
Material: brass

Suitable for plate heat exchanger type	Connection inches	Part No.
XB04, XB06, XB24	G ¾″ E - G 1″ E	2080 131
XB12	G 1¼″ E - G 1″ E	2080 132
XB12	G 1¼″ E - G 1½″ E	2080 133

Notice:
Two sets are necessary

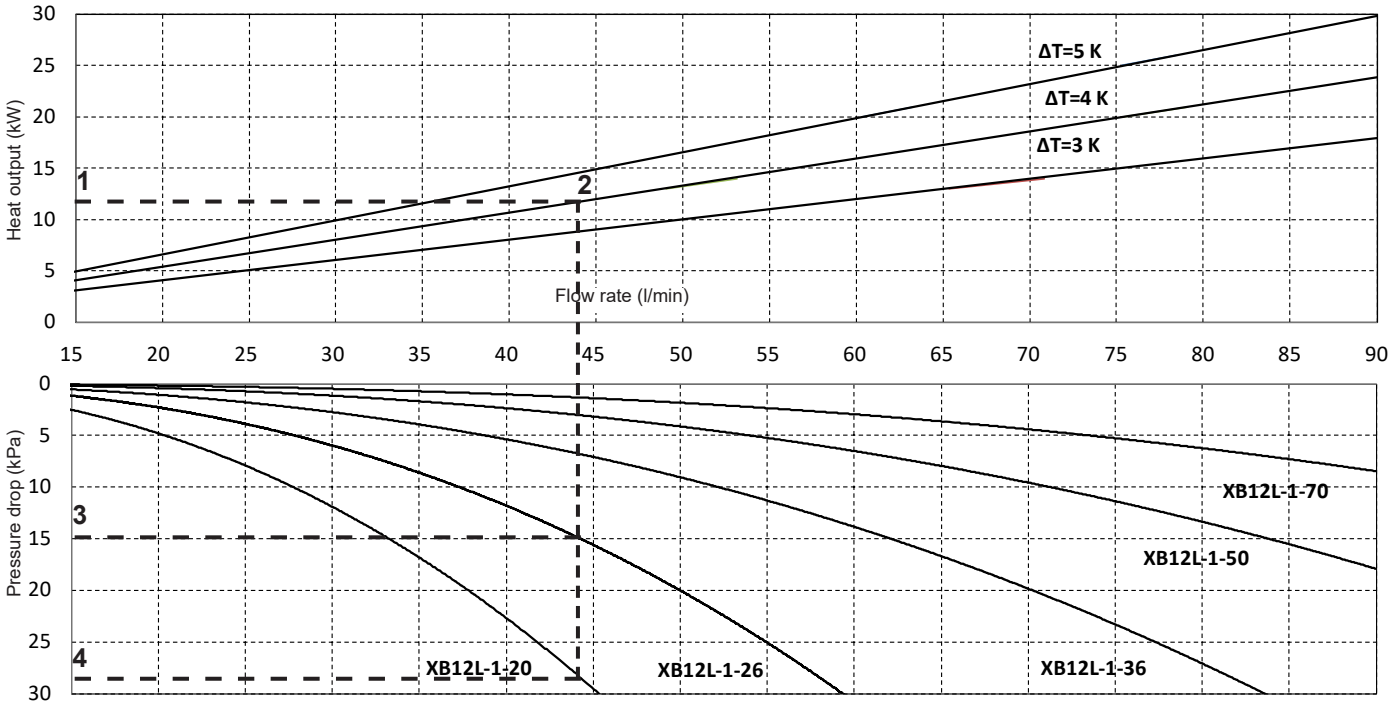
Set with 2 welding ends G 2″ A/DN 40 with union nuts and seals — 2080 134
suitable for the types:
XB51, 52, 59 M-1, 61-SB-1
Diameter: 1½″
Operating pressure: max. 25 bar
Material: 1.0308

Notice:
Two sets are necessary

Selection recommendation plate heat exchanger

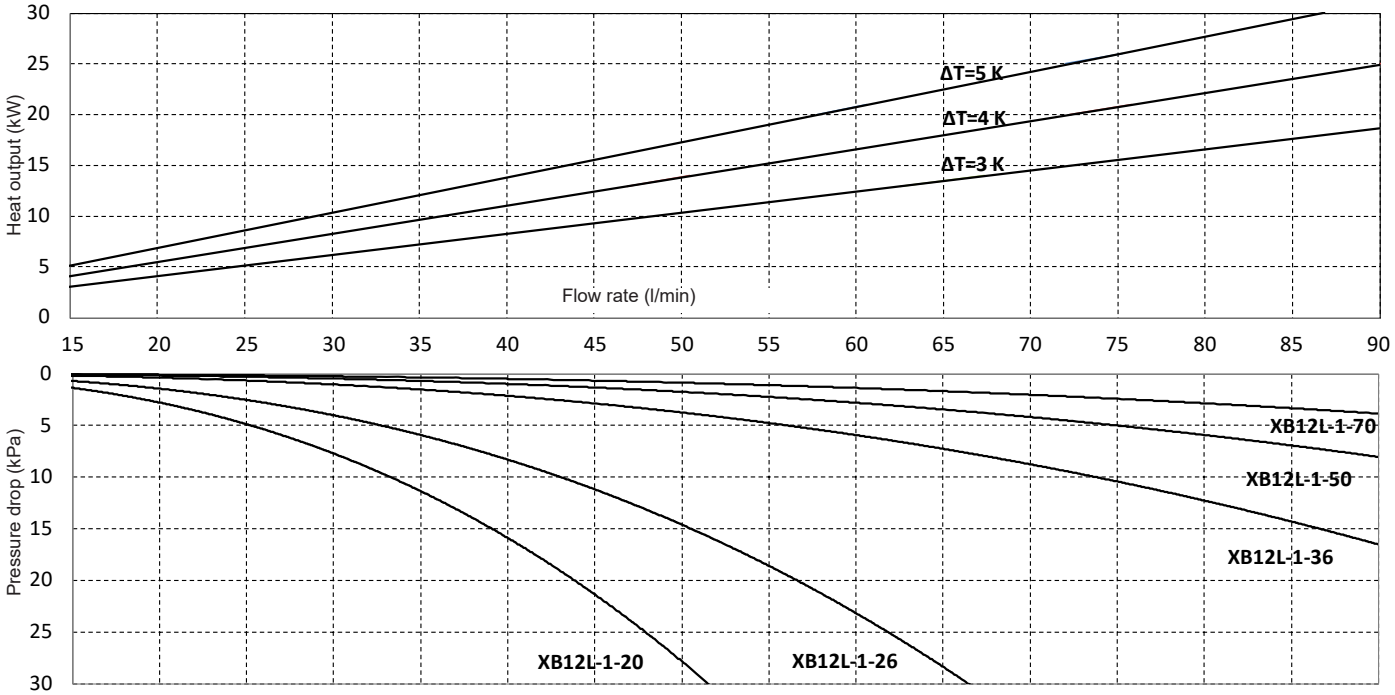
Notice
The diagrams below are only intended for preliminary selection of a suitable plate heat exchanger. A more precise design is recommended before ordering.

Heating < 30 kW, ΔT 5/4/3 K (e.g. primary side 39/33 °C, secondary side 35/29 °C at ΔT 4 K)
Primary circuit (30 % propylene glycol)

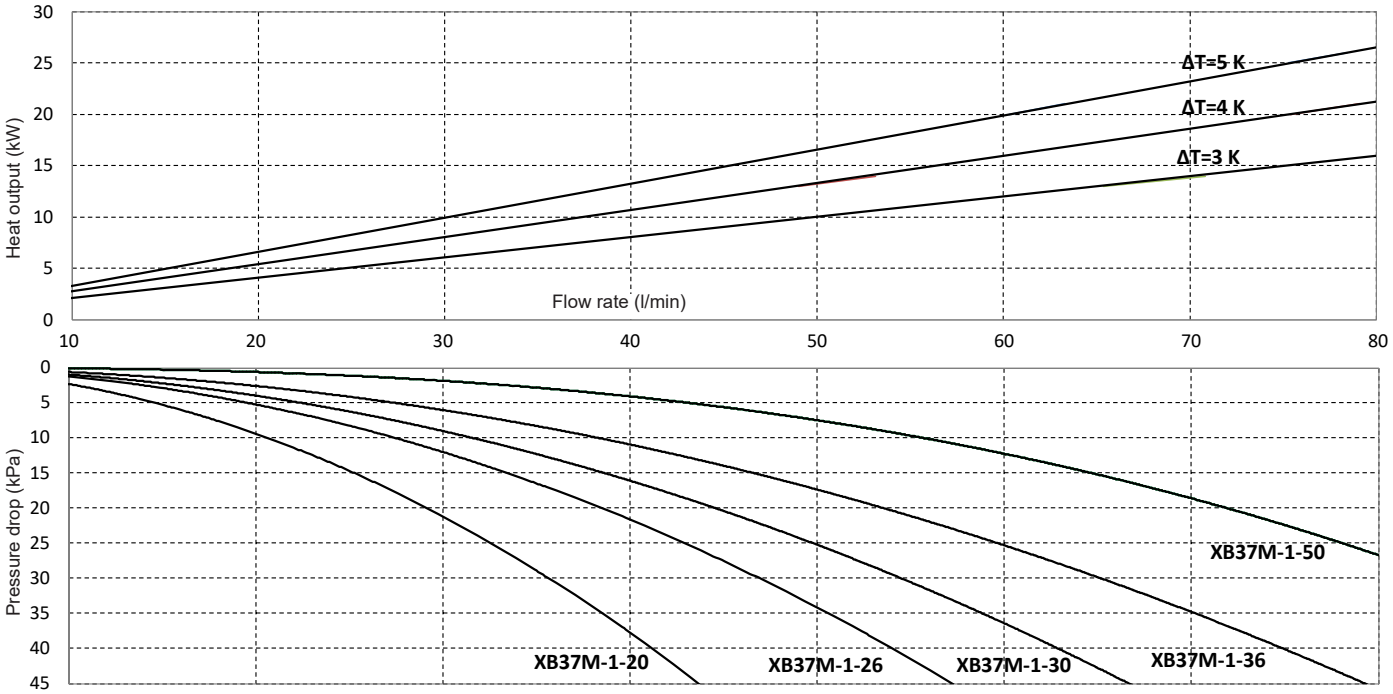


Selection example:
With a heat output of approx. 12 kW (1) and a desired ΔT of 4 K (2), the plate heat exchanger XB12L-1-26 can be used with a pressure drop of approx. 15 kPa (3) or XB12L-1-20 with a pressure drop of approx. 28 kPa (4).

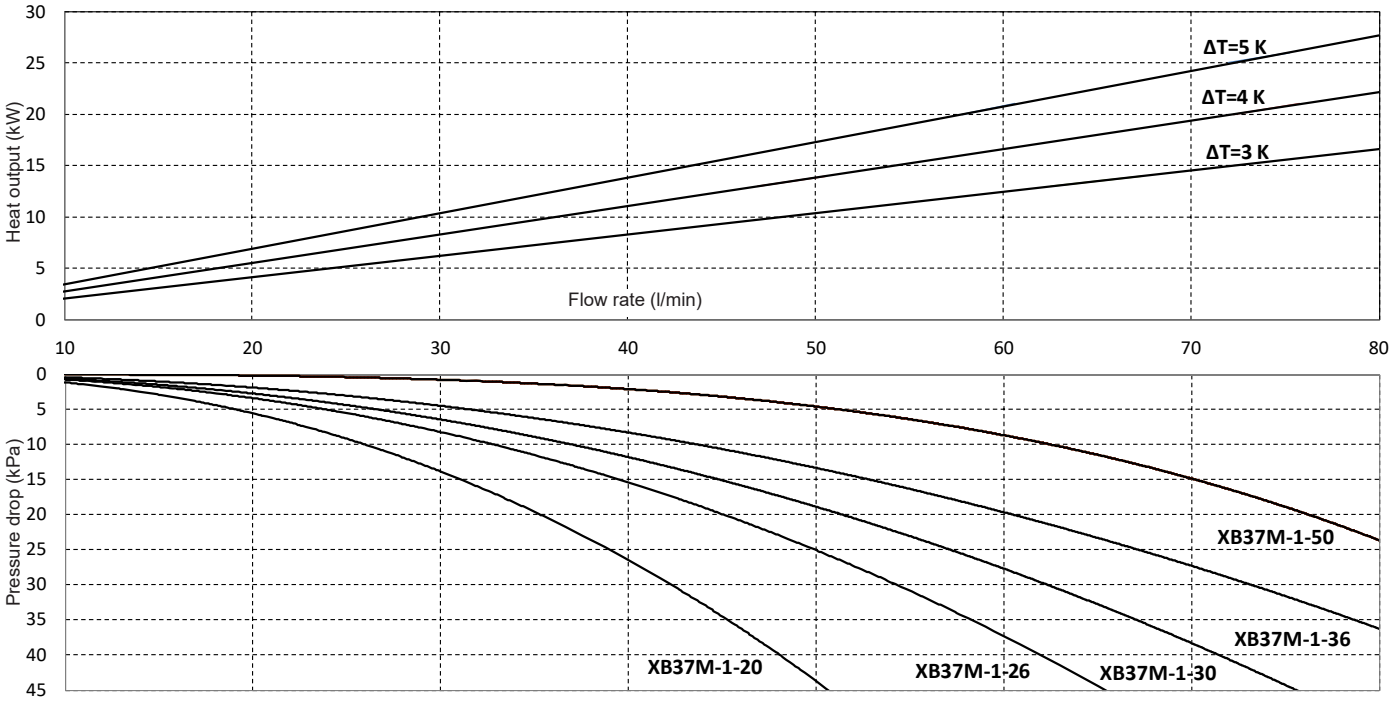
Secondary circuit (water)



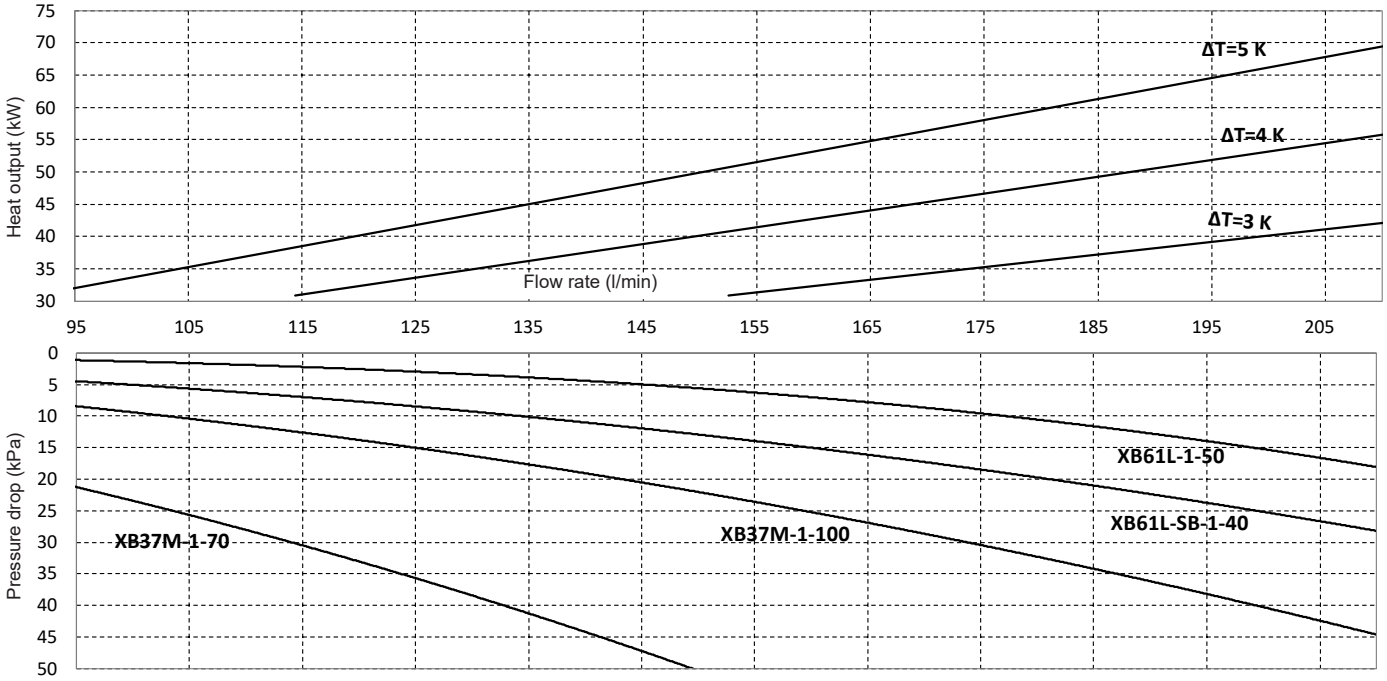
Heating < 30 kW
Primary circuit (30 % propylene glycol)



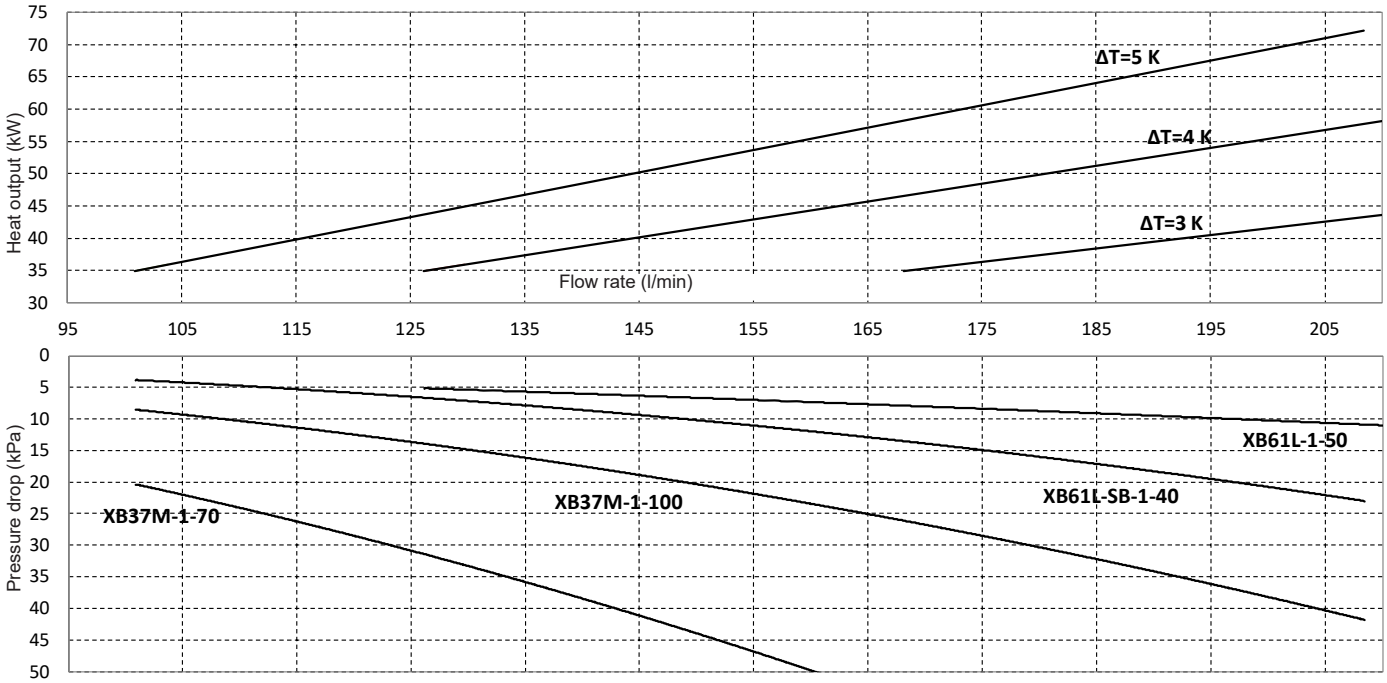
Secondary circuit (water)



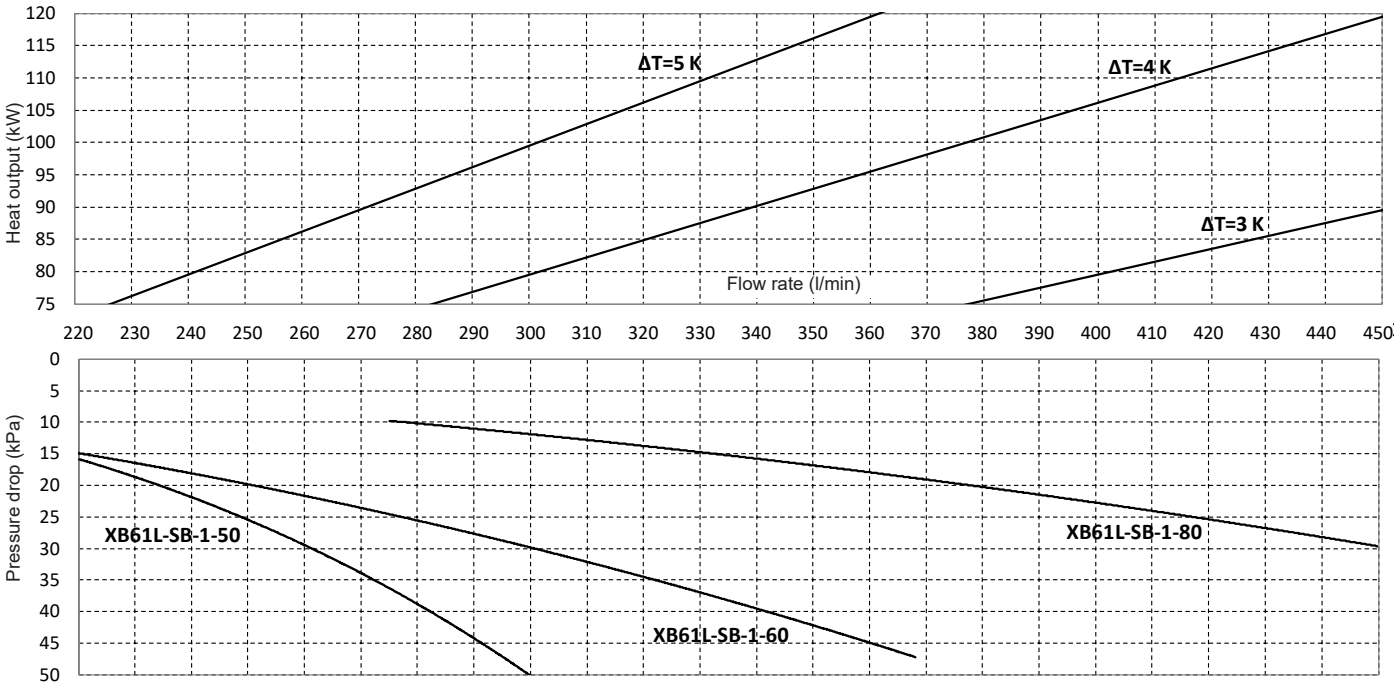
Heating 30-70 kW
Primary circuit (30 % propylene glycol)



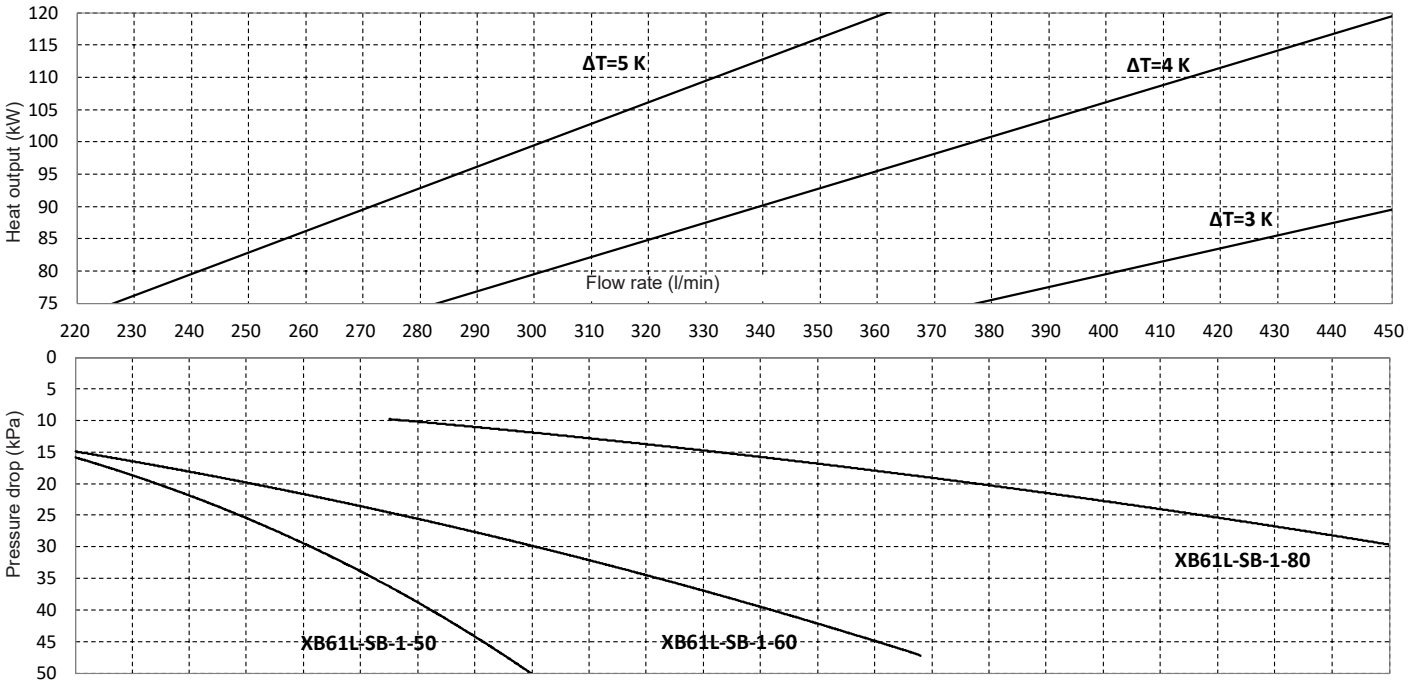
Secondary circuit (water)



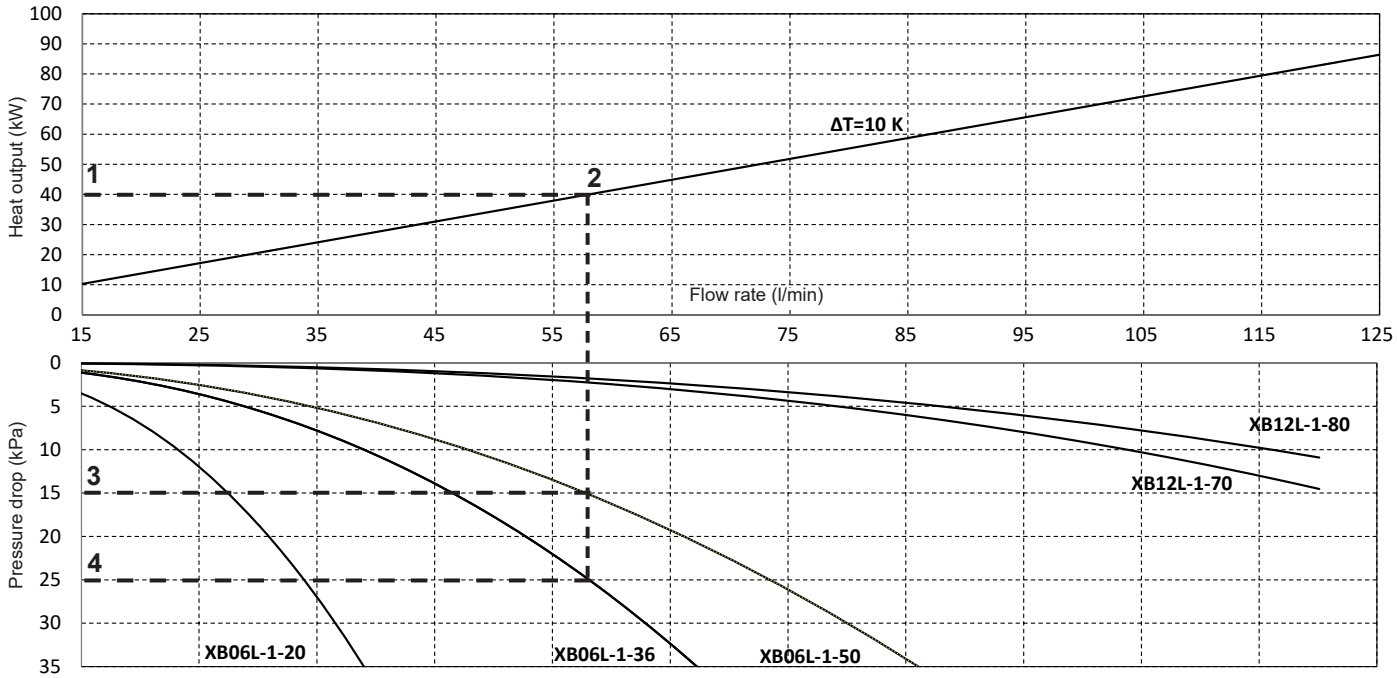
Heating 70-120 kW
Primary circuit (30 % propylene glycol)



Secondary circuit (water)

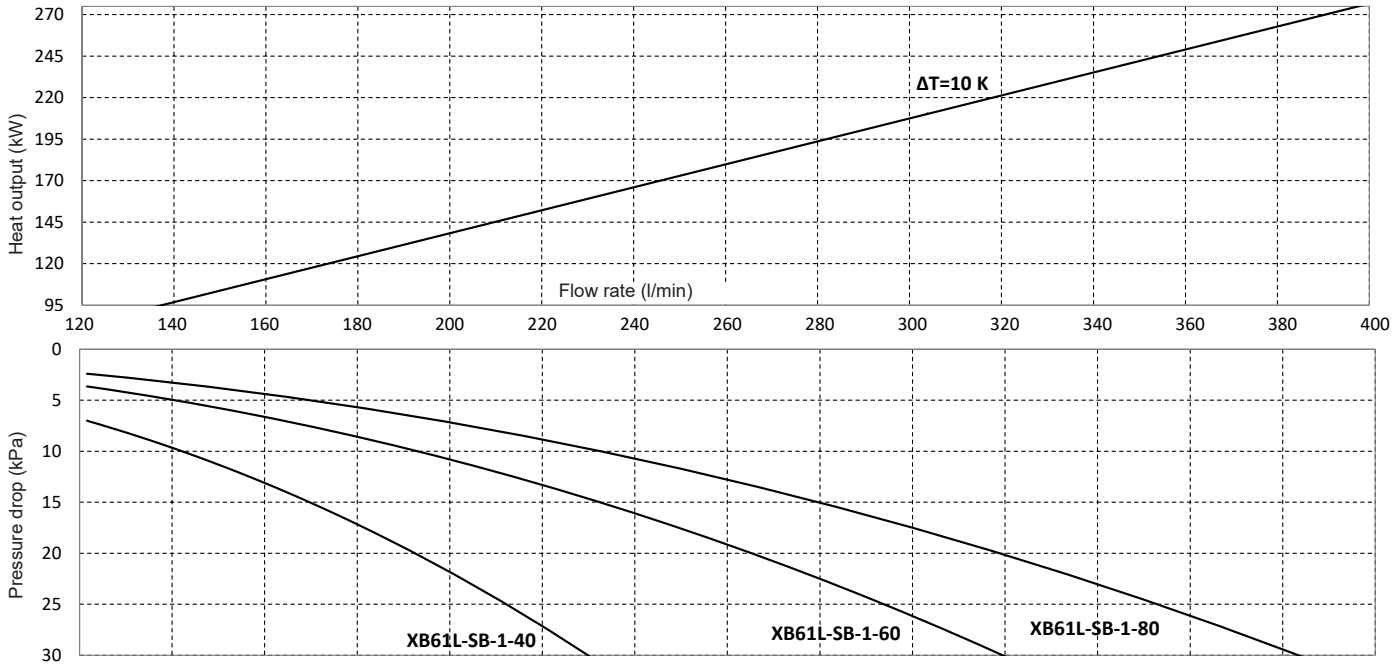


Heating < 90 kW, ΔT 10 K (e.g. primary side 45/35 °C, secondary side 40/30 °C)
Medium: primary/secondary: water/water

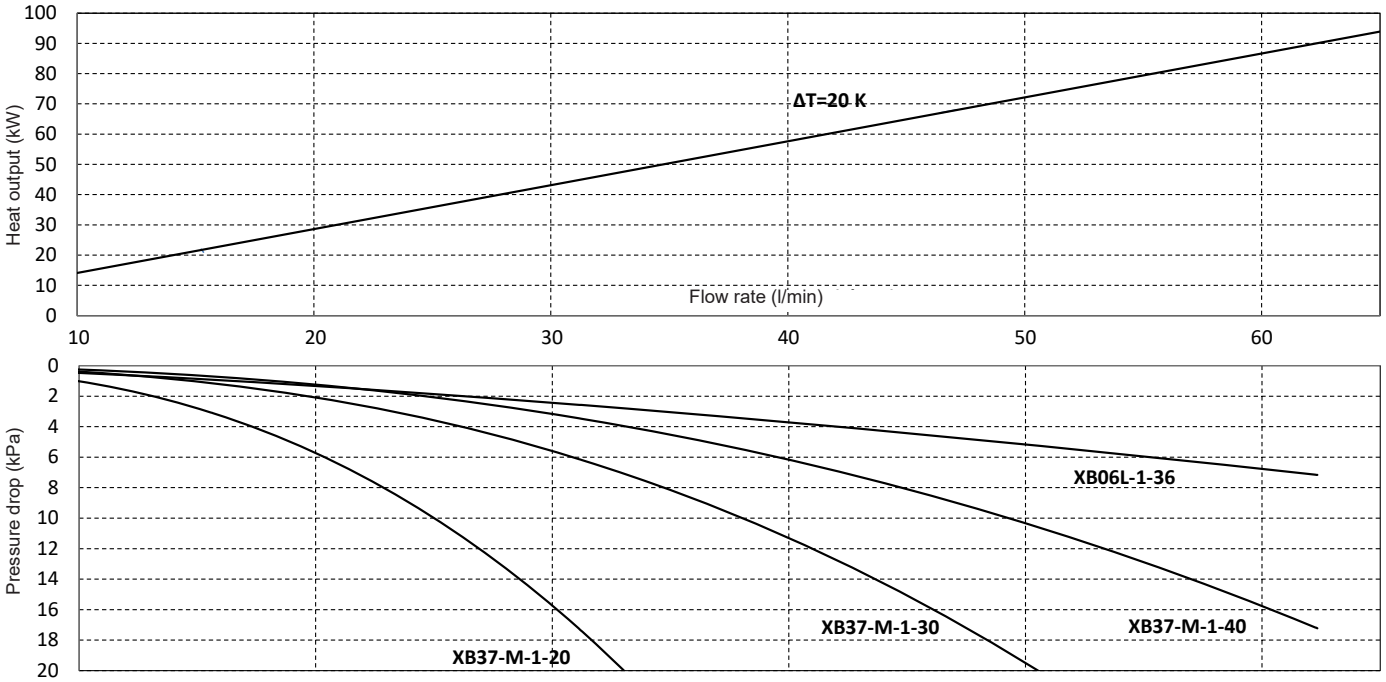


Selection example:
With a heat output of approx. 40 kW (1) and a specified ΔT of 10 K (2), the plate heat exchanger XB06L-1-50 can be used with a pressure drop of approx. 15 kPa (3) or XB06L-1-36 with a pressure drop of approx. 25 kPa (4).

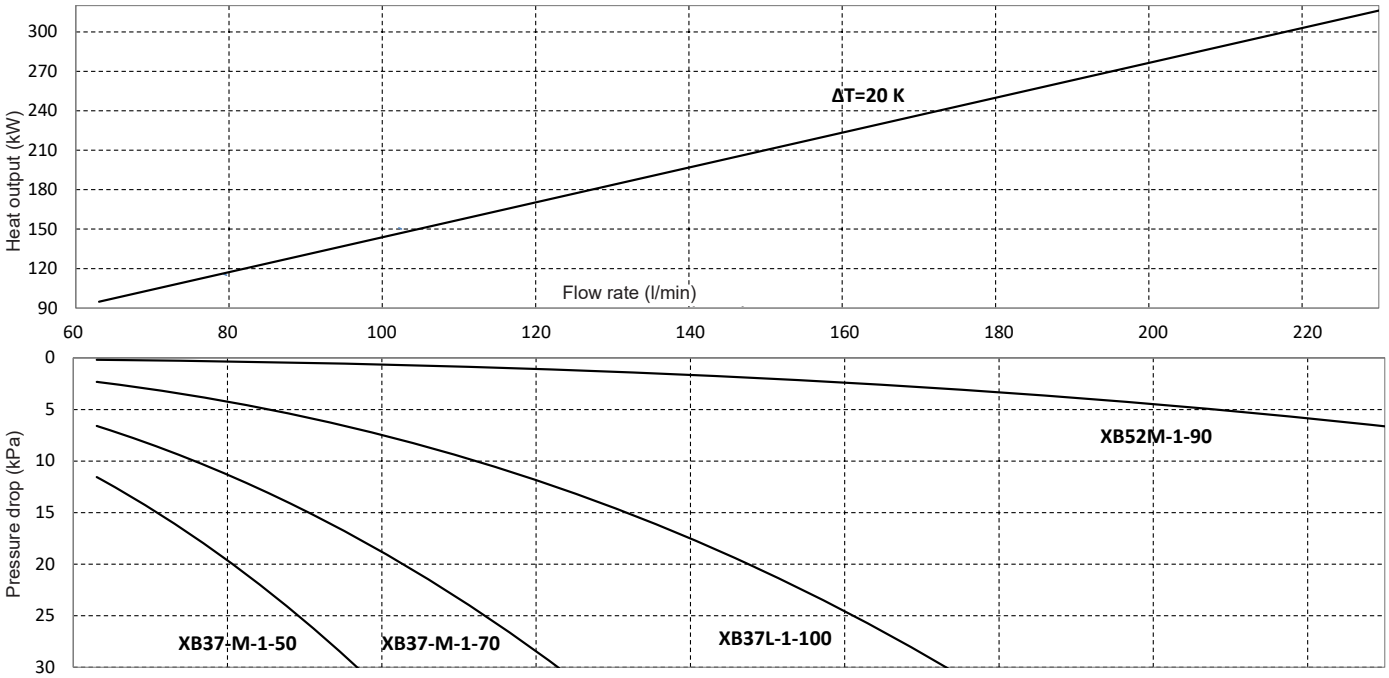
Heating 90-270 kW, ΔT 10 K (e.g. primary side 45/35 °C, secondary side 40/30 °C)
Medium: primary/secondary: water/water



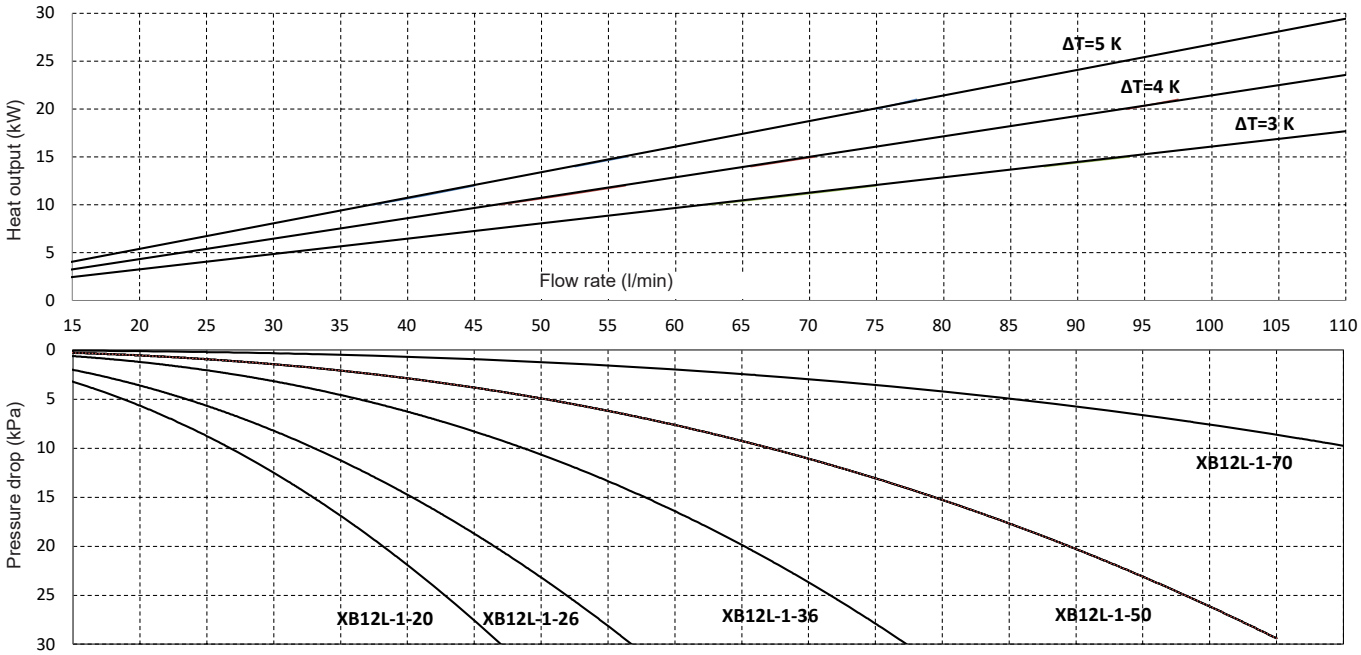
Heating < 90 kW, ΔT 20 K (e.g. primary side 75/55 °C, secondary side 70/50 °C)
Medium: primary/secondary: water/water



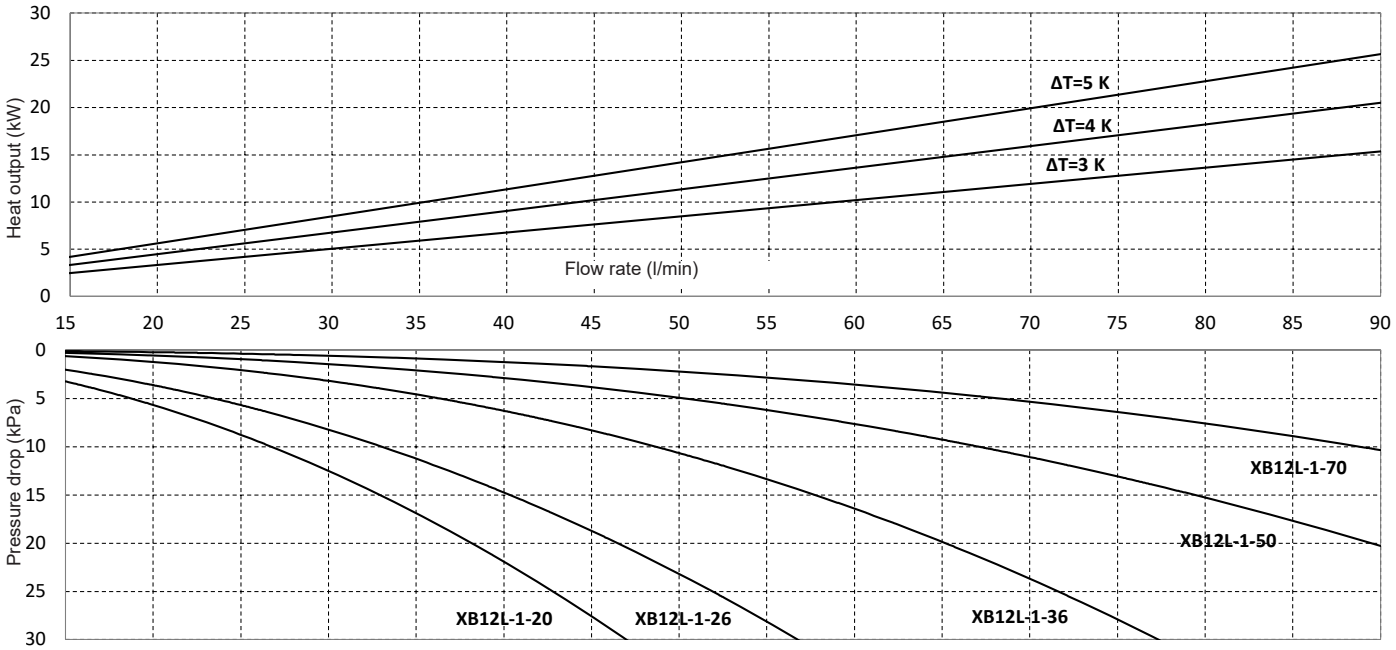
Heating 90-270 kW, ΔT 20 K (e.g. primary side 75/55 °C, secondary side 70/50 °C)
Medium: primary/secondary: water/water



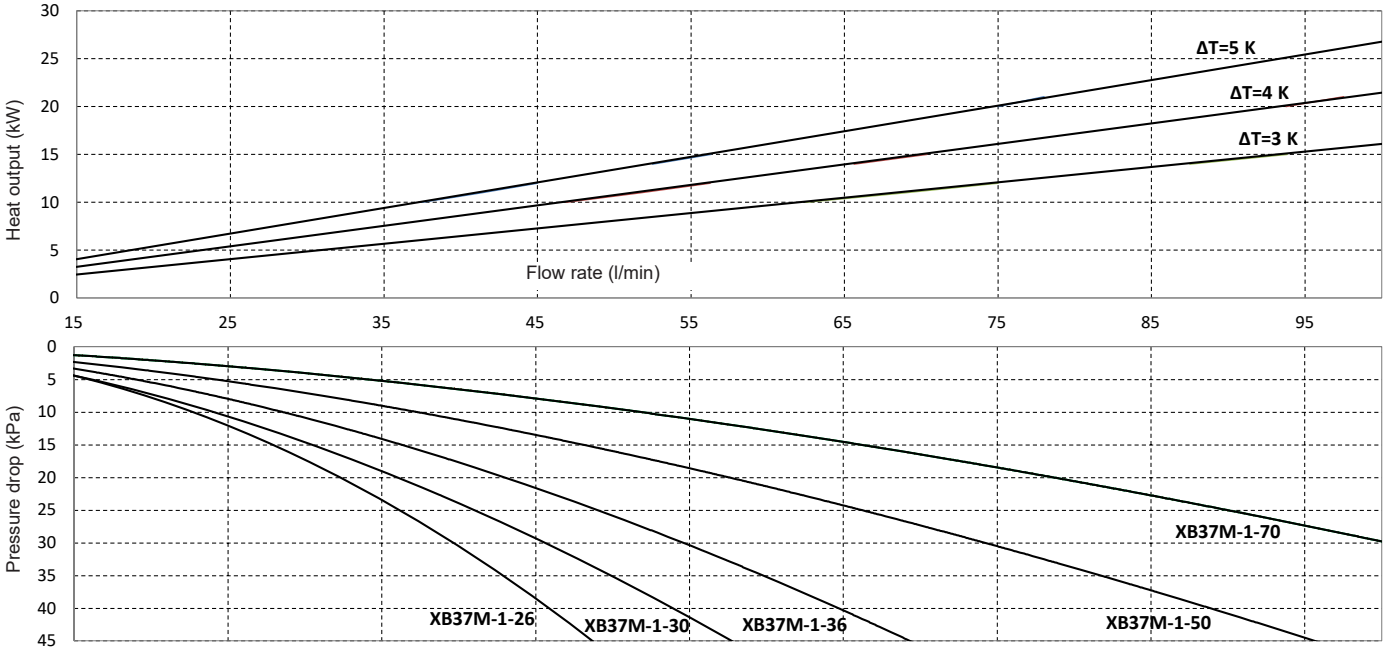
Cooling < 30 kW
Primary circuit (30 % propylene glycol)



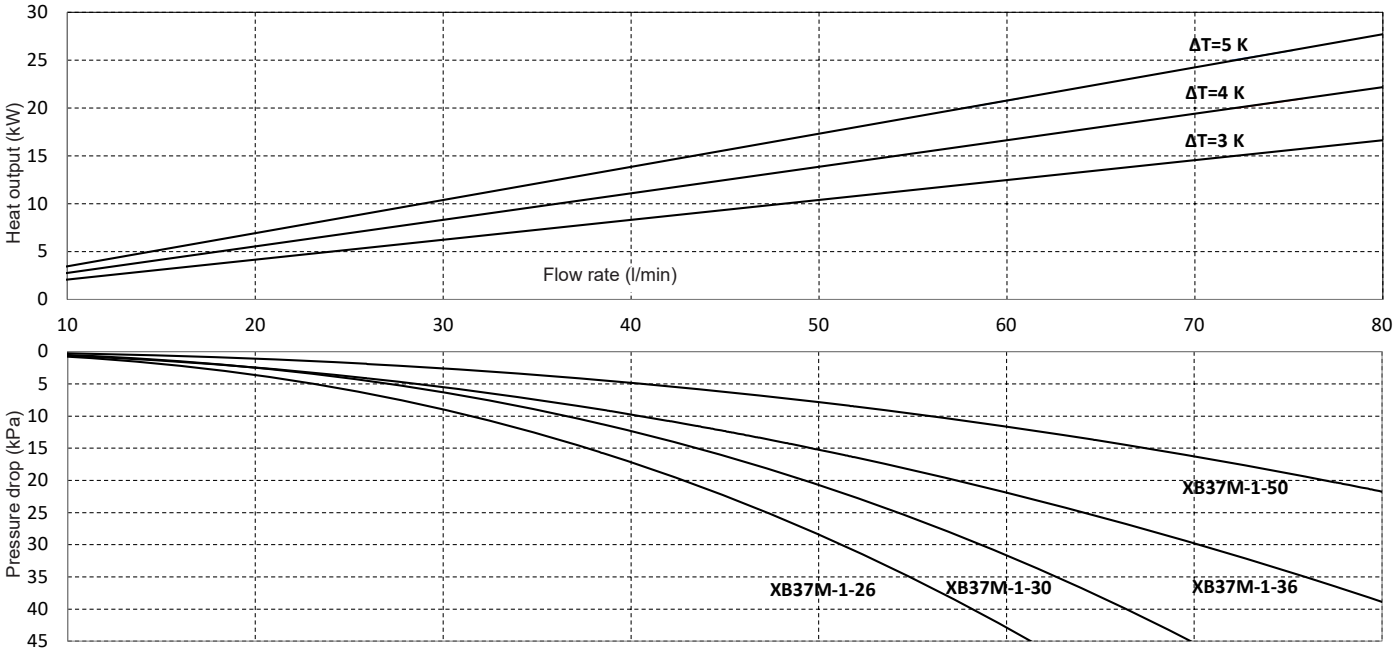
Secondary circuit (water)



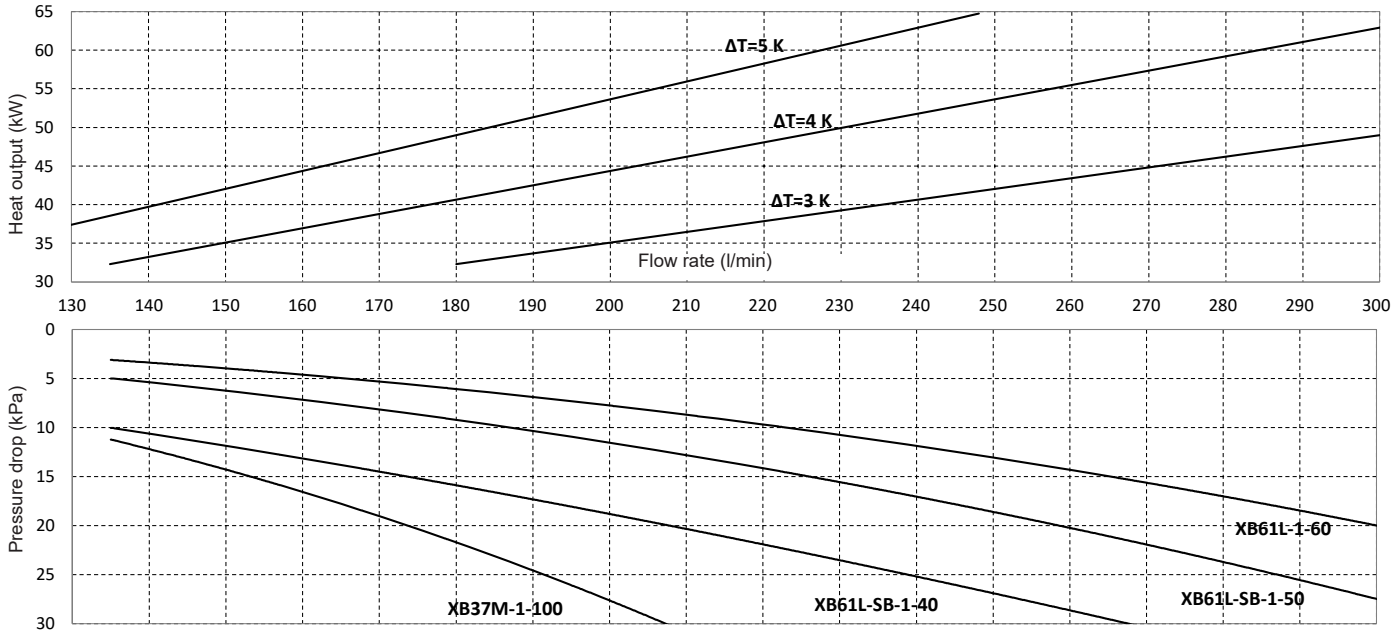
Cooling < 30 kW
Primary circuit (30 % propylene glycol)



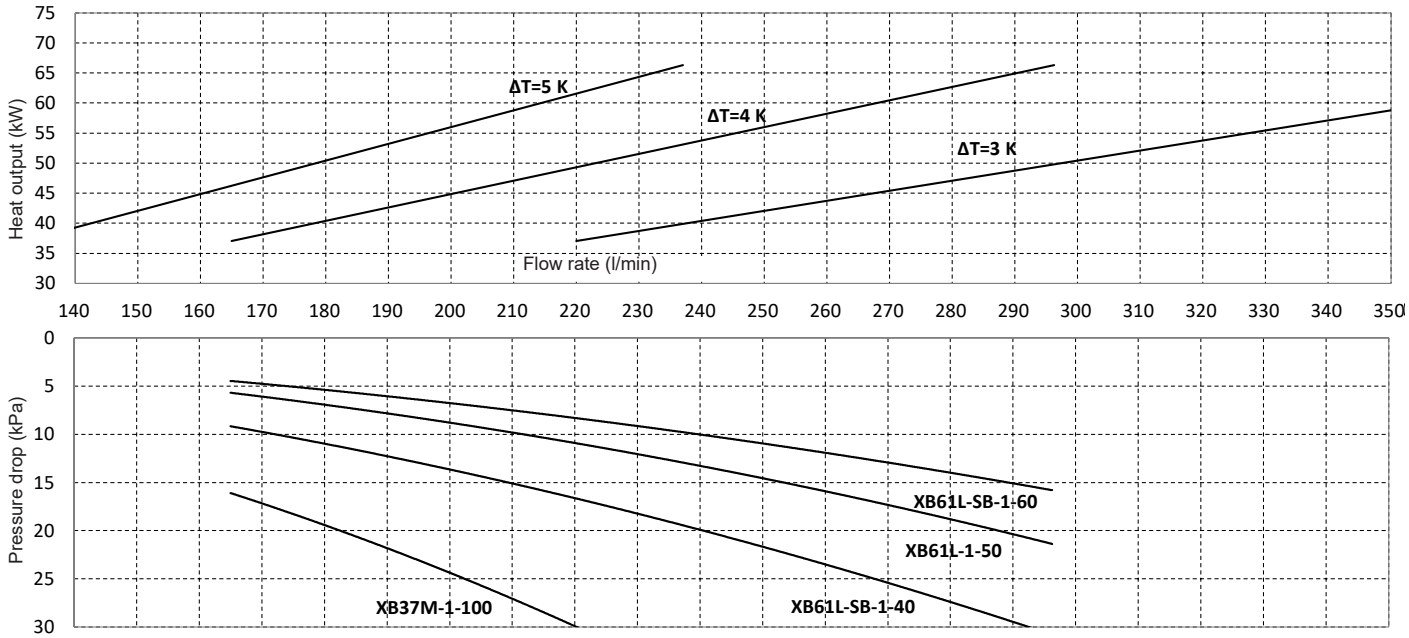
Secondary circuit (water)



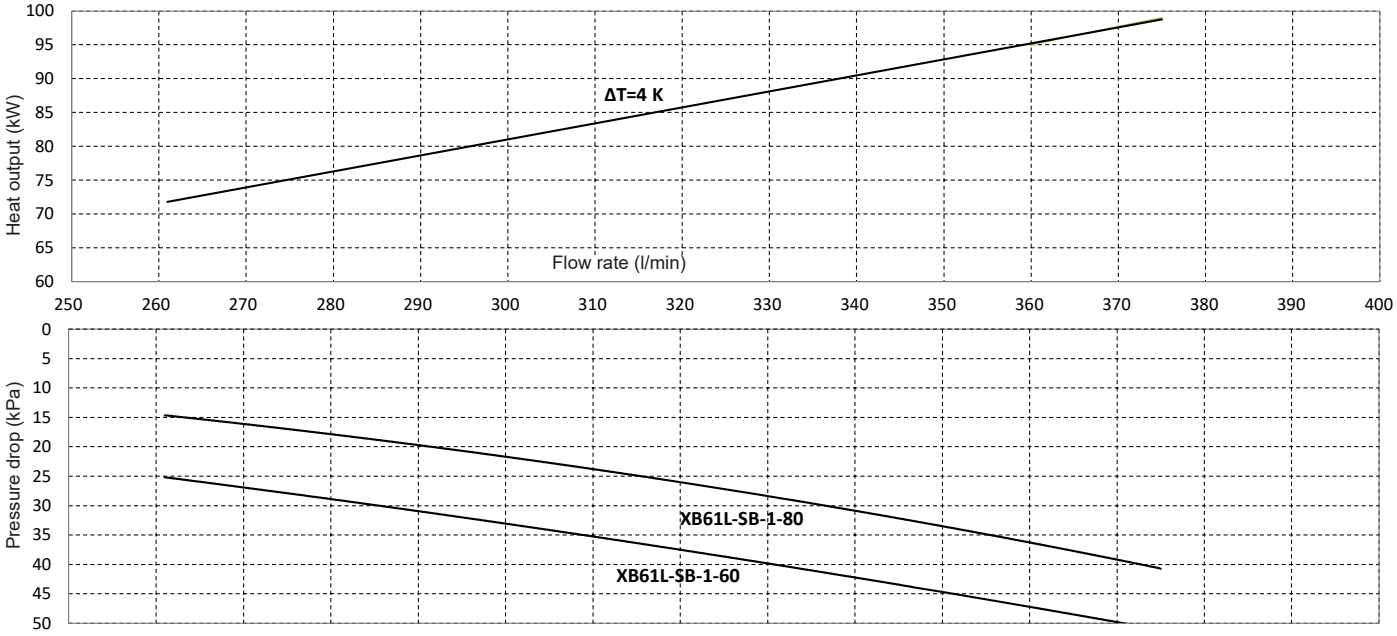
Cooling 30-65 kW
Primary circuit (30 % propylene glycol)



Cooling 30-70 kW
Secondary circuit (water)



Cooling 65-100 kW
Primary circuit (30 % propylene glycol)



Cooling 70-120 kW
Secondary circuit (water)

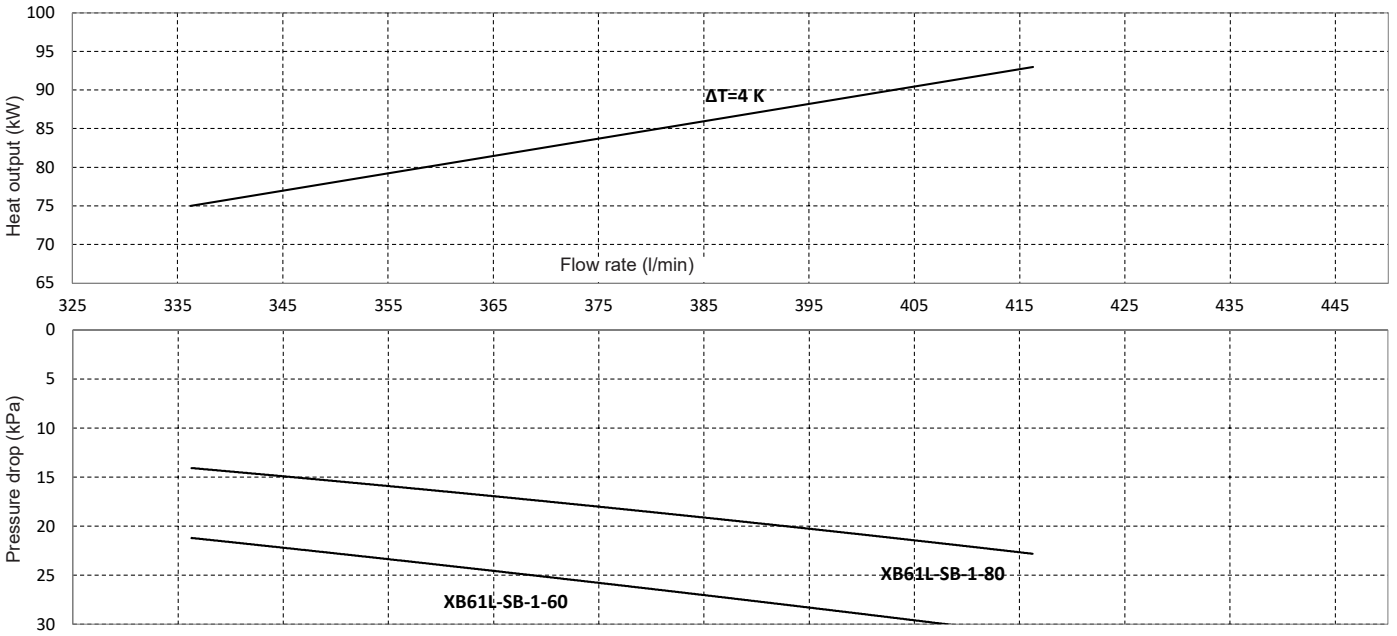
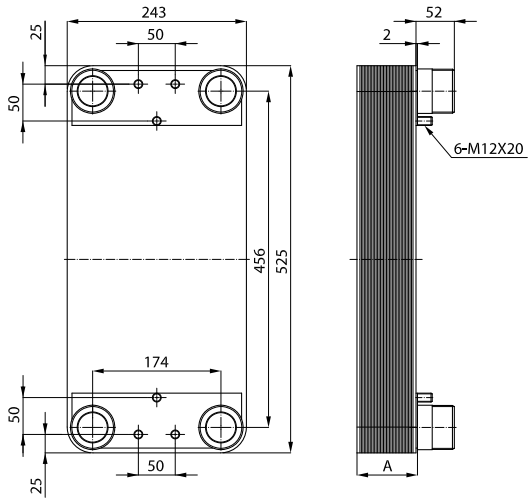


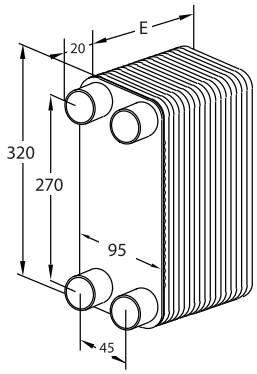
Plate heat exchanger XB61L



A mm	Volume/channel l	Water volume on the primary side l
12 + 2.24 x n	0.239	(n / 2) - 1 x volume/channel

n = number of plates

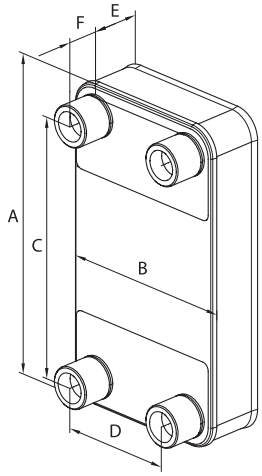
Plate heat exchanger XB06L



E mm	Water volume on the primary side l
7 + 1.6 x n	0.025 x n

n = number of plates

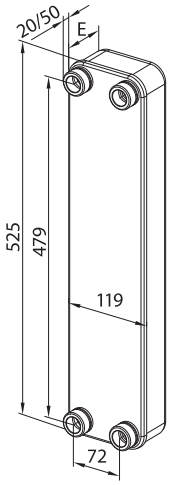
Plate heat exchanger XB52M



E (approx.) mm	Water content on the primary side l	A mm	B mm	C mm	D mm	F mm
15.2 + 1.75 x n	0.163 x n	466	256	379	170	50

n = number of plates

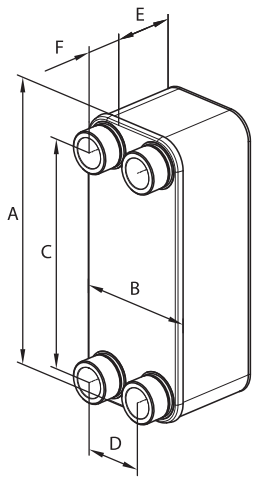
Plate heat exchanger XB37L/M



	E mm	Water volume on the primary side l
M	10 + 1.68 x n	0.07 x n
L	10 + 2.21 x n	0.102 x n

n = number of plates

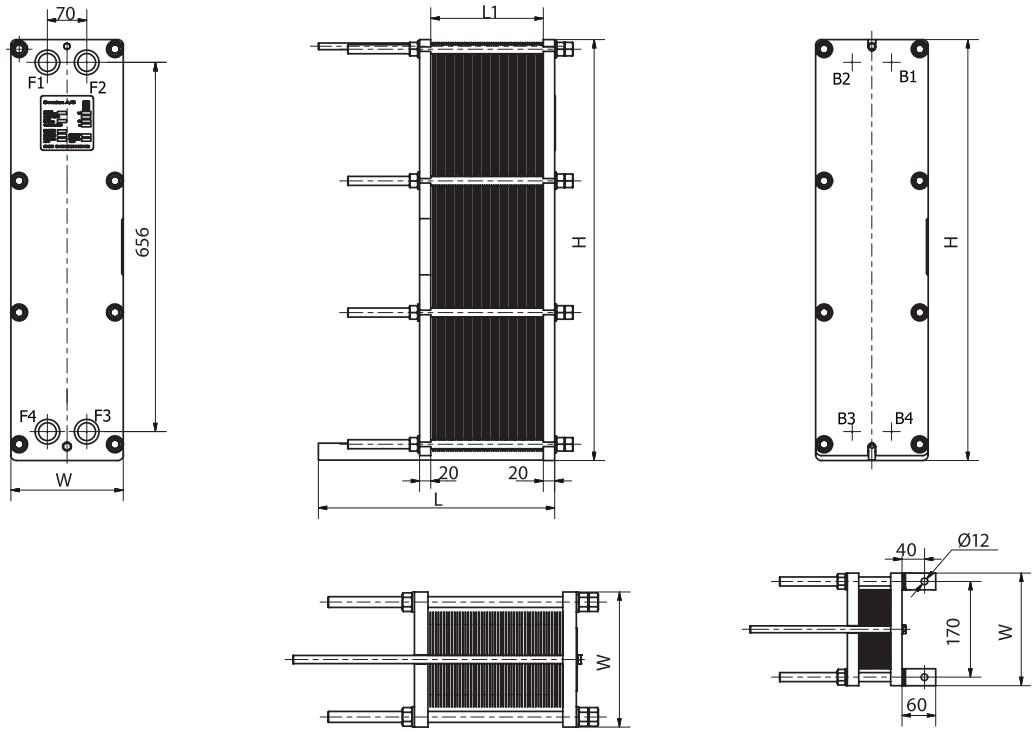
Plate heat exchanger XB12L



E (approx.) mm	Water volume on the primary side l	A mm	B mm	C mm	D mm	F mm
10 + 1.75 x n	0.045 x n	289	118	234	63	25

n = number of plates

Plate heat exchanger S8A



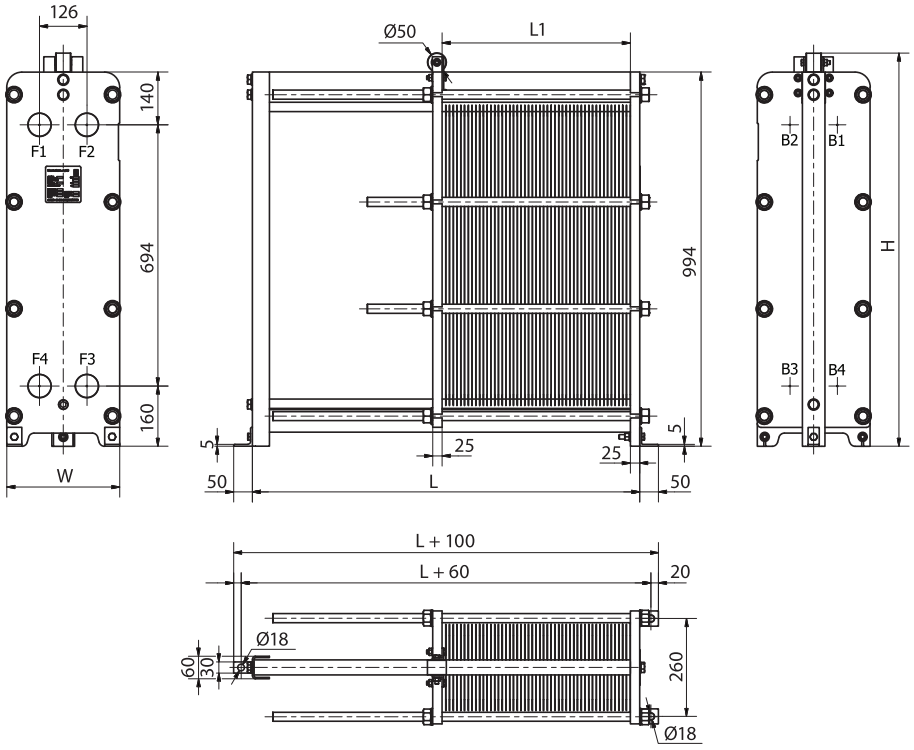
Type	Number of plates [1]	L (frame length) mm	W mm	H mm	Weight max., empty [2] kg	Water volume on the primary side l
S8A IG16	7-34	270		748	68	
S8A IG16	35-45	320		748	74	
S8A IG16	46-68	420		748	86	
S8A IG16	69-90	520	200	748	98	0.21 x n
S8A IT10	7-13	100		736	38	
S8A IT10	14-36	200		736	50	
S8A IT10	37-47	250		736	56	

n = number of plates

[1] The indicated maximum number of plates is based on the minimum plate thickness allowable for the PN level of the plate heat exchanger.

[2] The maximum weight of the empty plate heat exchanger with the maximum allowable number of plates

Plate heat exchanger S14A



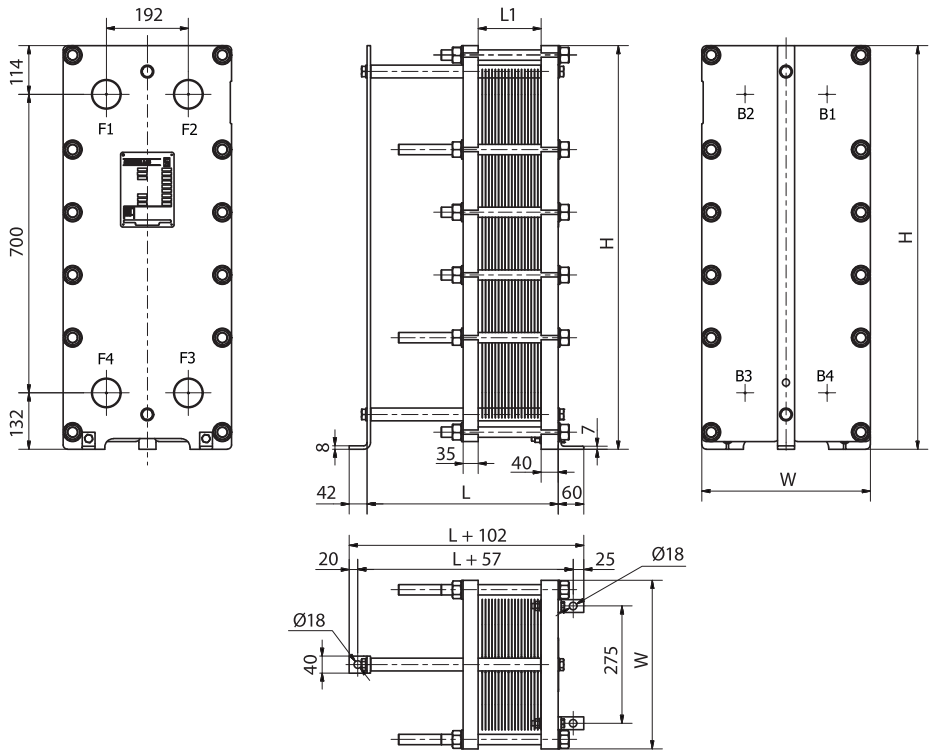
Type	Number of plates [1]	L (frame length) mm	W mm	H mm	Weight max., empty [2] kg	Water volume on the primary side l
S14A ST16	7-40	437			144	
S14A ST16	41-59	537	283	896	159	0.35 x n
S14A ST16	60-77	637			175	

n = number of plates

[1] The indicated maximum number of plates is based on the minimum plate thickness allowable for the PN level of the plate heat exchanger.

[2] The maximum weight of the empty plate heat exchanger with the maximum allowable number of plates

Plate heat exchanger S19A



Type	Number of plates [1]	L (frame length) mm	W mm	H mm	Weight max., empty [2] kg	Water volume on the primary side l
S19A IG16	7-59	443			255	
S19A IG16	60-79	643			277	
S19A IG16	80-100	643	395	946	301	0.6 x n
S19A IG16	101-130	793			333	
S19A IG16	131-181	1043			389	

n = number of plates

[1] The indicated maximum number of plates is based on the minimum plate thickness allowable for the PN level of the plate heat exchanger.

[2] The maximum weight of the empty plate heat exchanger with the maximum allowable number of plates

Swiss Association for Technical Inspections

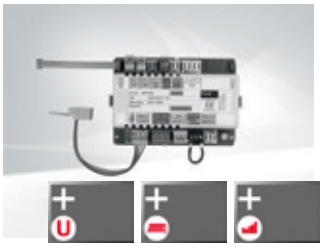
Boiler inspection
Pressure test certificate issued by the independent authority “Swiss Association for Technical Inspections” (ASIT). If you should need a pressure test certificate, please contact your area manager.

Article	Pressure test certificate	Part No.
Modul-plus	ASIT acceptance	2075 434
Boiler < 3000 kW	ASIT acceptance	2075 435
Boiler > 3000 kW	ASIT acceptance	2075 436

Basic modules

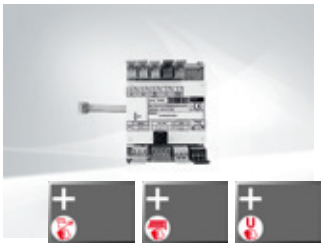
Controller modules

Module expansions



Hoval TopTronic® E module expansions

Heating circuit
Heat balancing
Universal

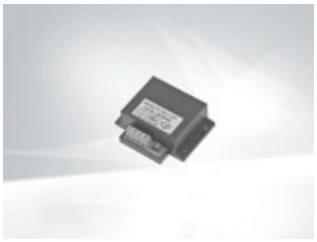


Hoval TopTronic® E module expansions district heating

Heating circuit
Hot water
Universal

Digital products

Accessories



Hoval energy/ heat quantity balancing

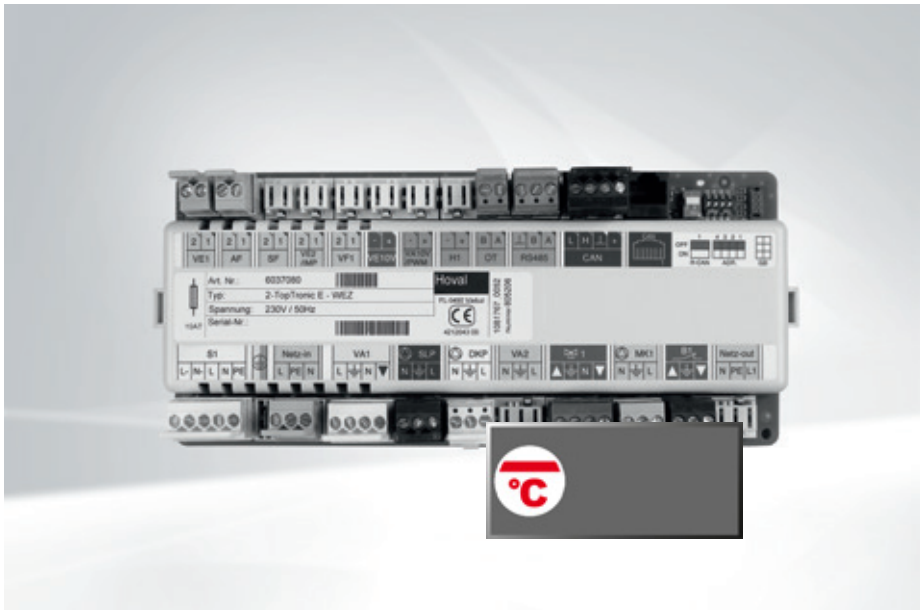
Heating/hot water circuits

Engineering

TopTronic® E basic module heat generator

- Controller module for controlling heat generators and the associated consumers with integrated control functions for:
  - Heat generator management
  - Add. heat generator management
  - Cascade management
  - 1 heating/cooling circuit without mixer
  - 1 heating/cooling circuit with mixer
  - 1 hot water charging circuit
  - Various additional functions
- Connection technology executed as plug-in screw terminals in coded RAST 5 design
- Update capability of the controller software
- Time and date via integrated RTC, multi-year spring reserve
- Fine fuse 10 A
- Controller module suitable for cabinet installation thanks to ability to install on DIN rail 35 x 15 x 2.2 mm
- Expansion possibilities via Hoval CAN bus:
  - max. 16 controller modules in the bus system
  - Cascade connection of 8 different heat generators possible
  - can be extended to up to 48 heating circuits

Notice
Operation of the controller module is generally via the TopTronic® E control module installed in the heat generator!
In a standalone application, the control module for operating the basic module heat generator must be ordered separately!



Notice
Max. 1 module expansion can be connected.

TopTronic® E module expansion heating circuit

TopTronic® E module expansion heat balancing

TopTronic® E module expansion Universal

Inputs and outputs
- Communication to an extremely wide range of automatic function units (oil, gas, HP, biomass) via RS485 interface
- OpenTherm interface for connecting an automatic gas firing unit
- 0-10 V input, e.g. for connecting to heat zone control systems
- 0-10 V or PWM output for controlling a variable-speed pump or for connecting an additional heat generator via 0-10 V interface (e.g.: solid-fuel boiler, etc.)
- Connection of a flow rate sensor (pulse sensor), e.g. for heat metering at the heat generator, on the heating circuit or with hot water
- 230 V 3-point output, e.g. for controlling the mixer
- 230 V output, e.g. for controlling the recirculation pump
- 230 V optocoupler input connected in series to the variable 230 V output, e.g. for connecting a flow temperature guard for monitoring underfloor heating systems
- Variable inputs and outputs:
  - variable 230 V output plus continuous phase (e.g.: connection of a HW gate)
  - variable 230 V output (e.g.: connection of the direct circuit pump)
  - extra-low voltage output (12 V) (e.g. controlling a signal LED)
  - variable input for connection of a sensor
  - variable input for connection of a sensor or pulse sensor
- Connection plug for simple connection of a main switch

Option
- Can be expanded by max. 1 module expansion (expansion of the inputs/outputs):
  - Module expansion heating circuit (1 heating/cooling circuit with/without mixer) or
  - Module expansion heat balancing (heat balancing in the heating system) or
  - Module expansion Universal (various special functions)

Functions
- Simple configuration and parameter setting of the plant by predefined hydraulic and function applications
- Weather-supported flow temperature controller for cooling operation with or without room influence taking account of building characteristics and switch-on optimisation
- Optimisation of the heating circuit flow temperatures and improvement in the room climate taking account of the weather forecast (only possible in combination with Hoval-Connect)
- Different basic programs (week programs, economy mode, holiday until, etc.) can be defined for each heating/cooling circuit plus ability to activate manual operation (construction site mode)
- Separate switching time programs for each heating/cooling circuit as well as for hot water with
  - 2 individually preset week programs comprising
    - 5 different - individually preset - day programs with
    - 6 switching points per day
- Different temperatures can be set for each switching cycle
- Various functions for hot water:
  - Selection of different basic programs (week programs, economy mode, holiday until, etc.)
  - various operating modes (e.g. accumulator priority or parallel mode)
  - adjustable storage tank pump post-operation
  - Storage tank discharge protection
  - Limiting and protection functions
- Definable switching times for recirculation pump control
- Automatic changeover of summer/winter time
- Heating characteristic adaptation possible for each individual heating circuit
- Screed drying function for underfloor heating
- Requirement contact for constant requirements (ventilation, swimming pool, ...)
- Modem switching function
- Free timer switch channel
- Pump anti-blocking protection
- Frost protection function
- Heat balancing for heat generator, heat circuit or hot water
- Plant flow control (3-point mixer for controlling the plant reference temperature)
- Cleaning and maintenance function
- Smart Grid functions
- Optimum adaptation of the control characteristics for various heat generators
- Integration of an additional heat generator via 0-10 V or switching contact

- Cascade management that is activated following the combination with other basic modules (up to 8 heat generators)
- Definition of priorities for switching over between heating, cooling and hot water operation
- Operating hours and pulse counter
- Heat generator forced removal
- Constant return increase
- Minimum value override
- Emission measurement with adjustable duration
- Collective fault message output
- Output of the current temperature or current output via 0-10 V possible
- Thermostat function for bivalent plants
- Self-test with error diagnosis and error memory
- Relay test for each output can be activated separately
- Functions that can be implemented with module expansions:
  - Heating/cooling circuits without mixer
  - Heating/cooling circuits with mixer or hot water charging circuits
  - Various additional functions

Notice
Depending on the complexity, module expansions are required for using the listed functions (max. 1 module expansion can be connected)!

Use
- Heat generator with automatic function device fitted
  - Connection either via the RS485, OpenTherm or 0-10 V interface
  - Automatic firing units can be configured with 1/2-stage or modulating
- Heat pump systems with active/passive cooling function
- Control for multiple heat generator systems by integrated cascade management
- Control of an additional heat generator by release contact (solid-fuel boiler), 0-10 V temperature request or 0-10 V output requirement
- For room heating/cooling and hot water charging circuit
- For optimisation of the room climate by control algorithm taking account of the weather forecast (only possible in combination with HovalConnect)
- Upstream control for technical systems such as ventilation, air conditioning systems, etc. or also for heating zone control systems
- For decentralised assembly - remote from the control module - directly at the sensors and actuators:
  - Installation in wall casing/control panel
  - Connection to the operating unit via Hoval CAN bus
- With significant expansion capability by controller modules via the Hoval CAN bus
- For flexible integration of heat generators in modern communication systems via different interfaces
- For remote connection of heat generators via HovalConnect

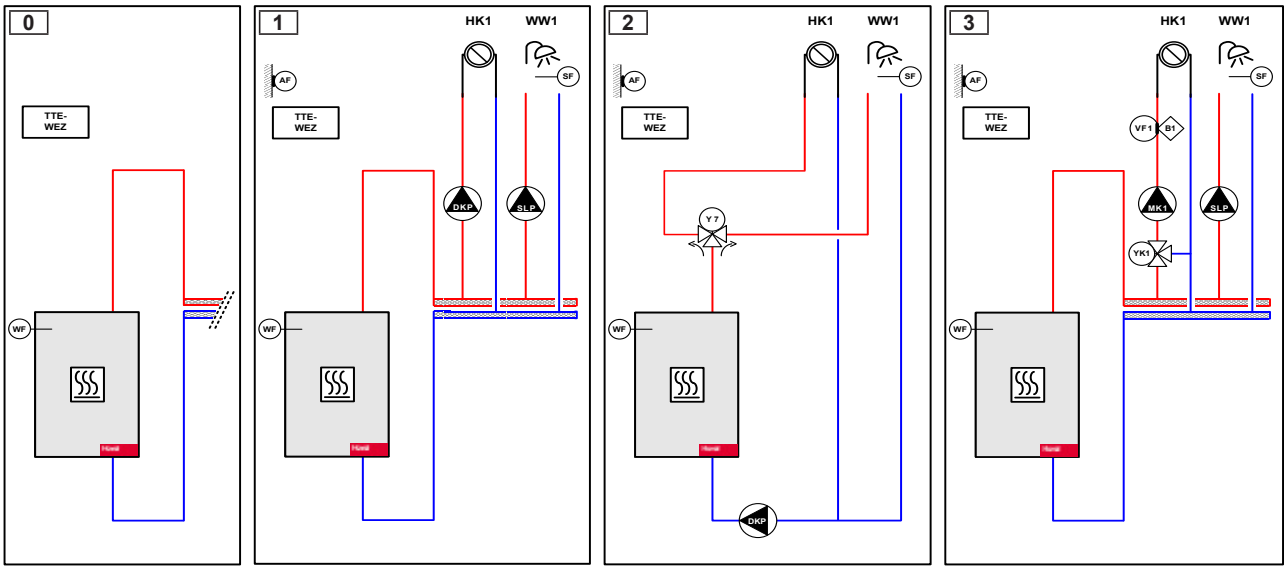
Delivery
- TopTronic® E basic module heat generator
- 2 mounting clips for DIN rail attachment
- 1 outdoor sensor AF/2P/K
- 1 immersion sensor TF/2P/5/6T/S1, L = 5.0 m with plug
- 1 contact sensor ALF/2P/4/T/S1, L = 4.0 m with plug
- Basic plug set for basic module
  - Plug for buffer storage pump (SLP), direct circuit pump (DKP), mixer circuit pump (MK1), mixer (YK1), flow temperature guard (B1), variable output (VA1)
  - 2 plugs for sensor (AF/SF)
  - Various plugs for internal wiring (mains in, mains out, connection of automatic firing device, bus connector RS485, bus connector OpenTherm, CAN bus)

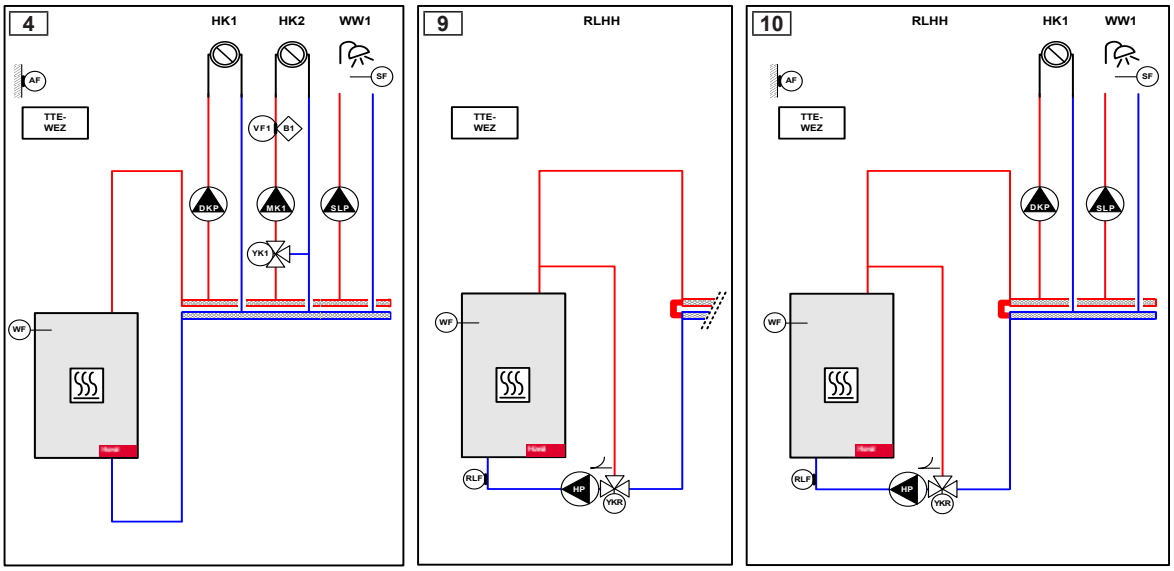
Notice
The supplementary plug set may have to be ordered to implement functions differing from the standard!

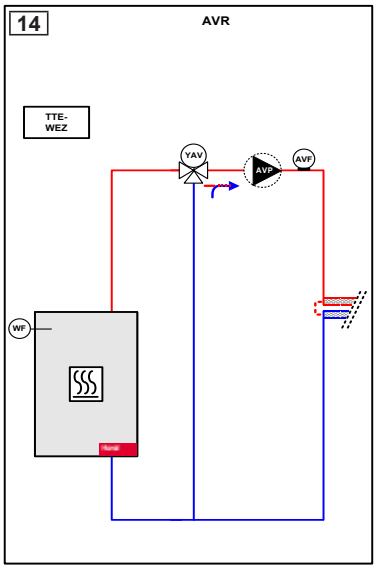
Functions that can be implemented

TopTronic® E basic module heat generator

TTE-WEZ	1 heat generator	1 heat generator with return temperature control	1 additional heat generator	Plant flow control	1 direct heating circuit	1 mixed heating circuit	2 mixed heating circuits	1 calorifier	1 calorifier with changeover unit
Hydr. 0	•								
Hydr. 1	•				•			•	
Hydr. 2	•				•				•
Hydr. 3	•					•		•	
Hydr. 4	•				•	•		•	
Hydr. 5	•						•	•	
Hydr. 6	•				•		•	•	
Hydr. 9		•							
Hydr. 10		•			•			•	
Hydr. 11		•				•		•	
Hydr. 12		•			•	•		•	
Hydr. 14	•			•					
Hydr. 15	•			•	•			•	
Hydr. 16	•			•		•		•	
Hydr. 17	•			•	•	•		•	
Hydr. 19	•		•						
Hydr. 20	•		•			•		•	
Hydr. 22	•				•				
Hydr. 23	•					•			



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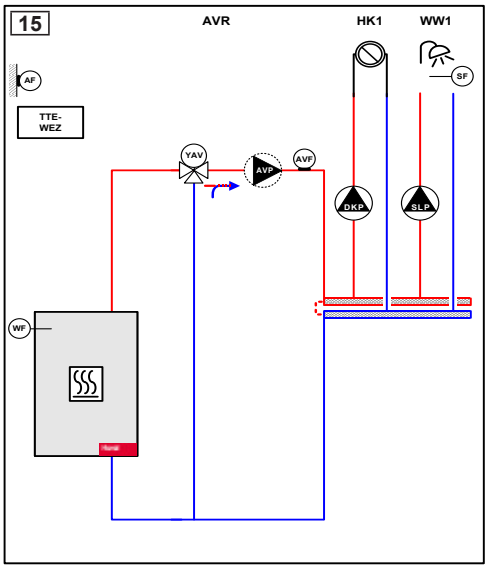
AVR
TTE-
WEZ
YAV
AVP
AVF
WF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WW1
AF
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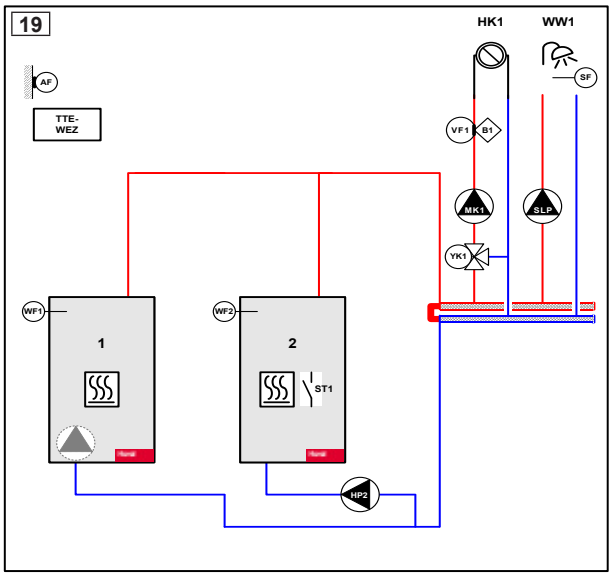
WEZ
YAV
AVP
AVF
DKP
SLP
SF
WF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HK1
WW1
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TTE-
WEZ
VF1
B1
MK1
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YK1
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WF2
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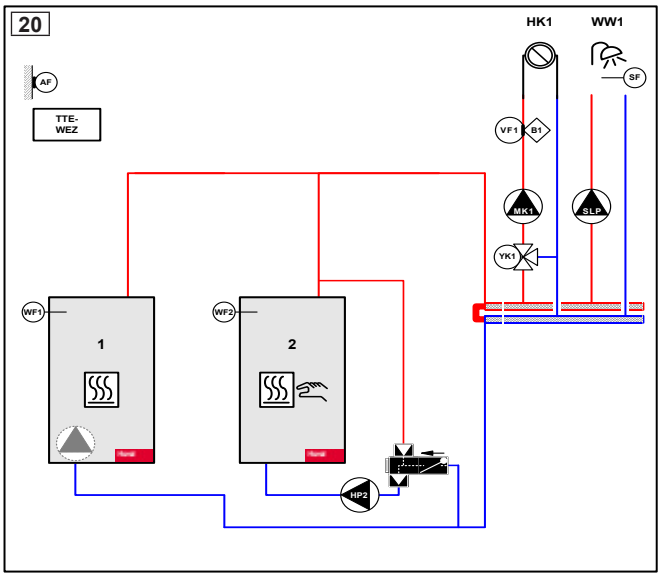
2
ST1
HP2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HK1
WW1
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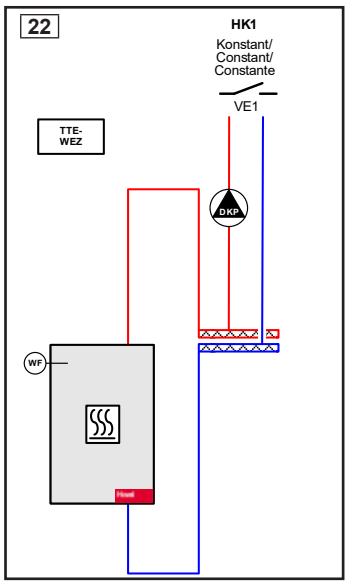
22
HK1
Konstant/
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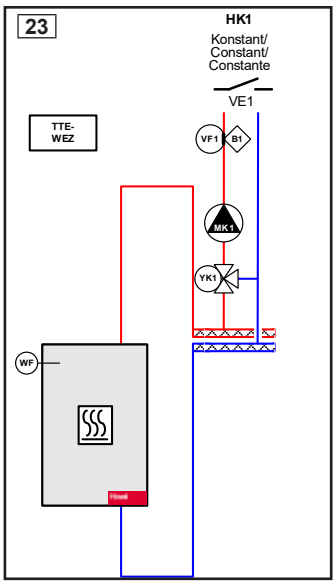
VE1
TTE-
WEZ
DKP
WF


23
HK1
Konstant/
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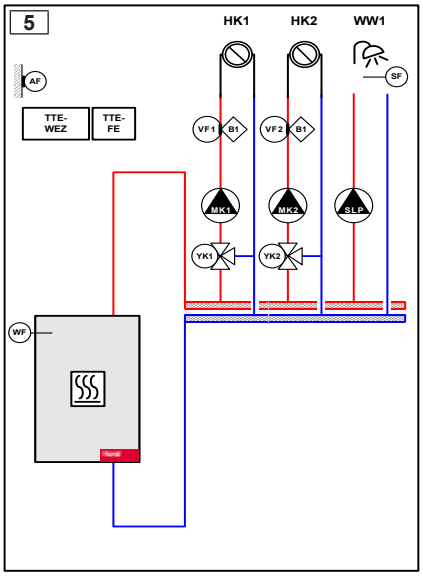
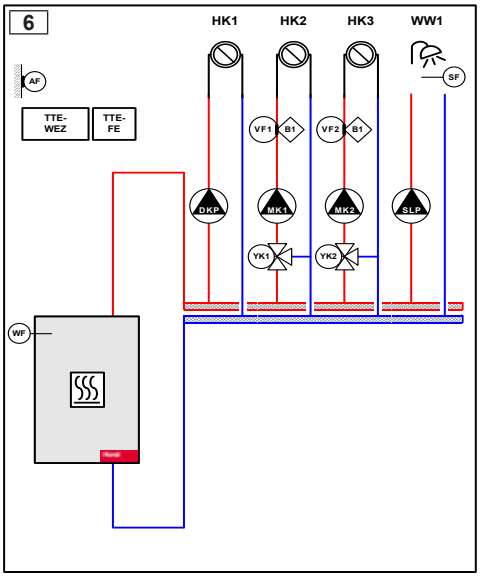
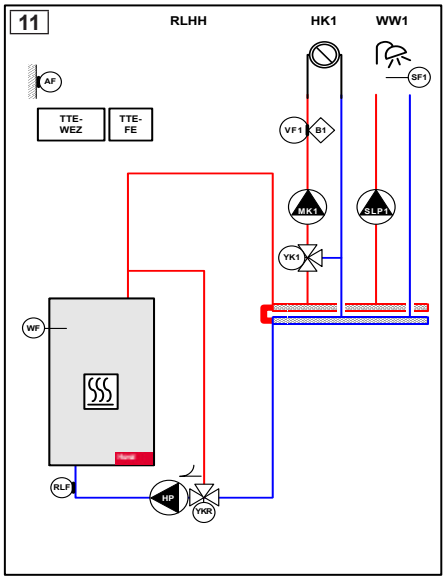
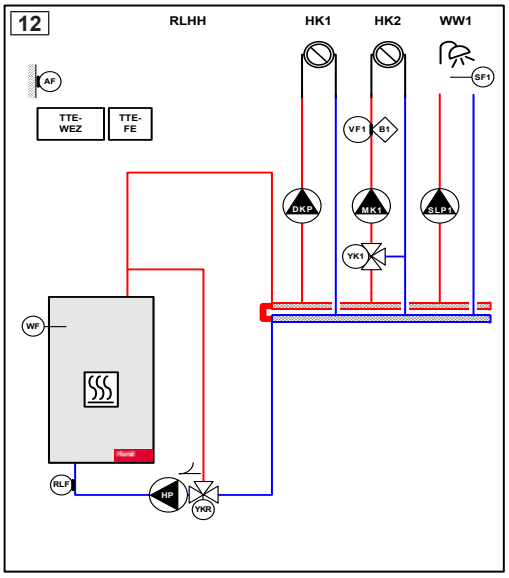
VE1
TTE-
WEZ
VF1
B1
MK1
YK1
WF

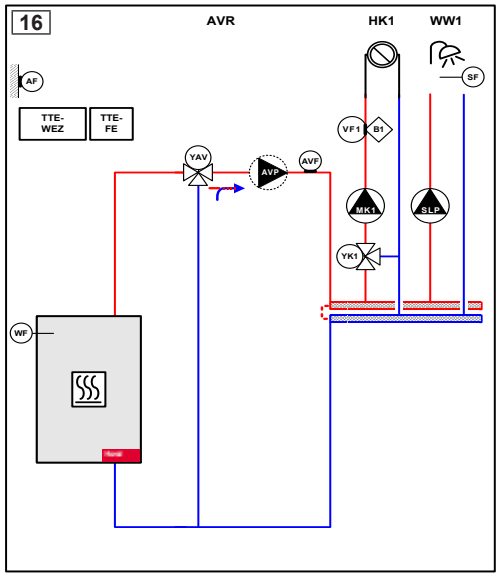
TopTronic® E basic module heat generator and 1 module expansion

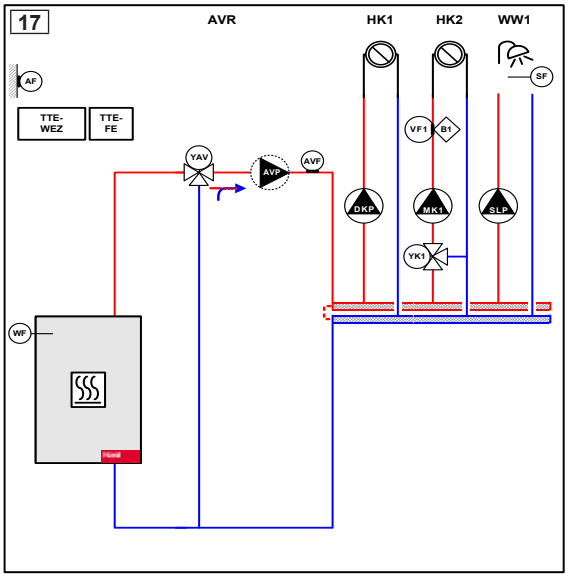




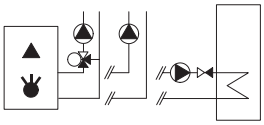








TopTronic® E basic module



TopTronic® E basic module heat generator TTE-WEZ
Controller module for control of heat generators and the corresponding consumers with integrated control functions for:
- Heat generator management
- Additional heat generator management
- Cascade management
- 1 heating/cooling circuit without mixer
- 1 heating/cooling circuit with mixer
- 1 hot water charging circuit
- var. additional functions

Consisting of:
- Fitting accessories
- 1 outdoor sensor AF/2P/K
- 1 immersion sensor TF/2P/5/6T/S1
L = 5.0 with plug,
- 1 contact sensor ALF/2P/4/T/S1
L = 4.0 m with plug,
- Basic plug set for basic module

Notice
If the basic module is used without Hoval heat generator then a TopTronic® E control module must be ordered separately!

Notice
Depending on the complexity, module expansions are required for using the listed functions (max. 1 module expansion can be connected)!

Notice
To implement functions differing from the standard the supplementary plug set may have to be ordered!

Part No.
6037 053

Supplementary plug set
for TTE-WEZ heat generator
Consisting of RAST 5 mating plugs for connecting further sensors and actuators on the basic module heat generator.
The controller module is already equipped with a basic plug set, the supplementary plug set is required for advanced functions.

Consisting of:
- plug for 230 V output (VA2) (variable output)
- plug for sensor (VE2) (variable input)
- plug for 0-10 V input (VE10V)
- plug for 0-10 V/PWM output (VA10V)
- plug for low-voltage output (H1)

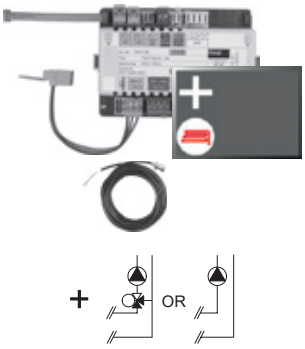
Part No.
6034 499

TopTronic® E module expansions

for TopTronic® E basic module heat generator

Part No.

Max. 1 module expansion can be connected.

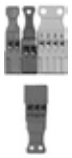


TopTronic® E module expansion heating circuit TTE-FE HK
Expansion to the inputs and outputs of the basic module heat generator or the heating circuit/domestic hot water module for implementing the following functions:
- 1 heating/cooling circuit w/o mixer or
- 1 heating/cooling circuit with mixer

Consisting of:
- Fitting accessories
- 1 contact sensor ALF/2P/4/T, L = 4.0 m
- Basic plug set FE module

6034 576

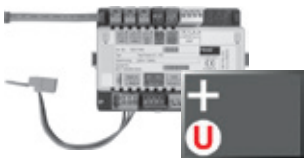
Notice
To implement functions differing from the standard the supplementary plug set may have to be ordered!



Supplementary plug set for controller modules and module expansion TTE-FE HK
Consisting of RAST 5 mating plugs for connecting further sensors and actuators on the controller module or on the module expansion.
The controller module is already equipped with a basic plug set, the supplementary plug set is required for advanced functions.

Consisting of:
- Plug for mains out (230 V)
- Plug for sensor (VE3) (variable input)
- Plug for 0-10 V input (VE10V)
- Plug for flow rate sensor input (FVT)

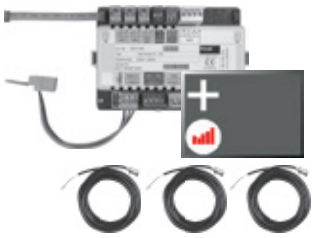
6034 503



TopTronic® E module expansion Universal TTE-FE UNI
Expansion to the inputs and outputs of a controller module (basic module heat generator, heating circuit/domestic hot water module, solar module, buffer module) for implementing various functions
Consisting of:
- Fitting accessories
- Plug set FE module

6034 575

Notice
Refer to the Hoval System Technology to find which functions and hydraulic arrangements can be implemented.



TopTronic® E module expansion heating circuit incl. energy balancing
TTE-FE HK-EBZ
Expansion to the inputs and outputs of the basic module heat generator or the heating circuit/domestic hot water module for implementing the following functions:
- 1 heating/cooling circuit w/o mixer or
- 1 heating/cooling circuit with mixer

incl. energy balancing in each case
Consisting of:
- Fitting accessories
- 3 contact sensors

ALF/2P/4/T, L = 4.0 m
- Plug set FE module

Part No.
6037 062

Notice
The continuous flow sensor set must be ordered as well.

Sets flow rate sensor
- Used in combination with the module expansion heat balancing or var. controller modules for heat metering
- Flow sensor supplies the current flow rate as well as the current temperature to the measuring point

Consisting of:
- flow rate sensor
- connection cable
- RAST 5 plug for connecting to TopTronic® E

Plastic housing

Unit of measure	Connection	Flow rate l/min	Part No.
DN 8	G ¾″	0.9-15	6038 526
DN 10	G ¾″	1.8-32	6038 507
DN 15	G 1″	3.5-50	6038 508
DN 20	G 1¼″	5-85	6038 509
DN 25	G 1½″	9-150	6038 510

Brass housing

Unit of measure	Connection	Flow rate l/min	Part No.
DN 10	G 1″	2-40	6042 949
DN 32	G 1½″	14-240	6042 950
DN 40	G 2″	22-400	6055 092

Further information
See “Hoval TopTronic® E module expansions” chapter

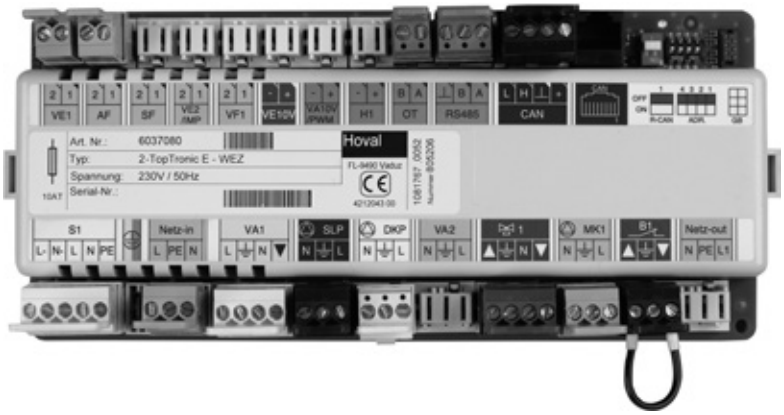
TopTronic® E controller modules, control/room control modules, HovalConnect, wall casing, sensor
see separate chapter

TopTronic® E basic module heat generator

Type		TTE-WEZ
• Max. Power supply		230 V AC +6/-10 %
• Frequency	Hz	50-60
• Max. power consumption incl. bus supply, module expansions, approx.	W	18.9
• Min. power consumption (only basic module)	W	0.8
• Max. power consumption (only basic module)	W	7.8
• Fuse		T 10 A H 250 V
Output (low voltage)		
• Electromechanical relays		7
Output (extra-low voltage)		
• Signal output PWM or 0-10 V		1
Switching capacity		
• Electromechanical relays	A	3
Input (low voltage)		
• Optocoupler input		1
Inputs (extra-low voltage)		
• Input 0-10 V		1
• Inputs sensors		4
• Inputs flow rate sensor		0
• Pulse input (can be switched over to sensor)		1
• Voltage measuring circuit, with protective isolation 2.9 kV	V	15
Expansion (module expansion)		
• Max. number		1
Casing		
• Installation		Top hat rail mounting
• Dimensions (W x H x D) incl. plug	mm	230 x 100 x 75
• Ambient temperature (during operation)	°C	0…50
• Humidity (in operation), non-condensing	% RH	20...80
• Storage temperature	°C	-20…60
Bus system (Hoval CAN bus)		
• Capacity		max. 4 control modules/3 control modules + 1 gateway
• Bus supply		yes
• Bus line		4-wire bus
• Max. bus length twisted, shielded	m	100 (greater distances possible with engineering of additional measures)
• Min. line cross-section	mm²	0.5
• Cable type (recommended)		JY-(ST)Y 2 x 2 x 0.8
Other bus interfaces		Internal unit bus (master) RS485 OpenTherm (< 30 m)
Miscellaneous		
• Spring reserve		approx. 10 years, battery buffered
• Type of protection		IP20
• Protection class		I – EN 60730
• Plug types		RAST 5 (coloured, coded)

Electrical connection

TopTronic® E basic module heat generator

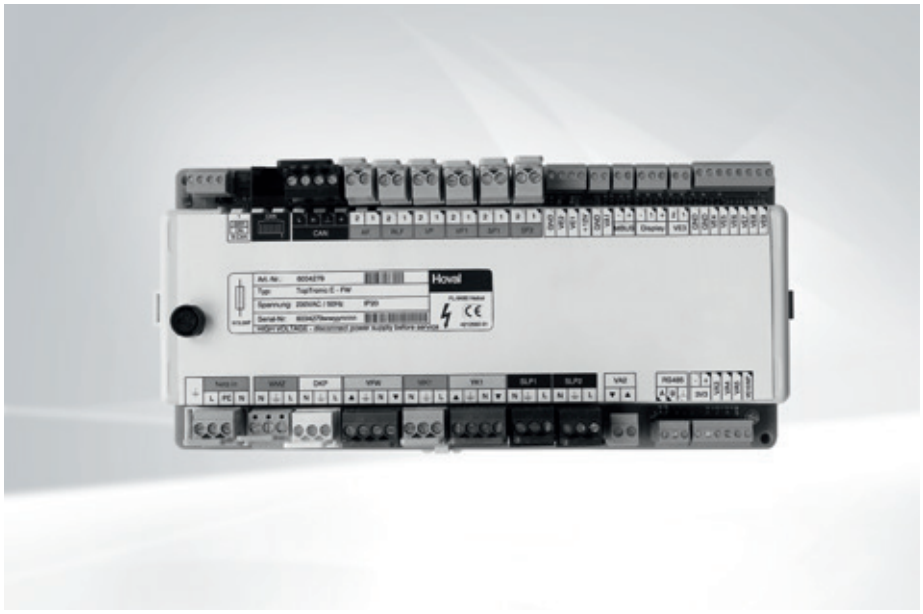


TopTronic® E basic module district heating/fresh water com IP

- Controller module for controlling district heating systems in non-communicative and IP-communicative networks (for the latter, a separately available Ethernet connection is required). Control of the associated consumers with integrated functions for:
  - Primary valve control
  - Cascade management
  - 1 heating circuit with mixer
  - 1 Heater circuit without mixer
  - 1 hot water charging circuit
  - Various additional functions
- Connection technology partially executed as plug-in screw terminals in coded RAST 5 design as well as conventional plug-in screw terminal technology
- Update capability of the controller software
- Time and date via integrated RTC, multi-day spring reserve via capacitor
- Fine fuse 5 A
- Controller module suitable for cabinet installation thanks to ability to install on DIN rail 35 x 15 x 2.2 mm or 35 x 7.5 x 2.2 mm
- Multiple expansion possibilities via Hoval CAN bus:
  - max. 16 controller modules in the bus system
  - Cascade connection with up to 8 different heat generators possible
  - Cascade connection with up to 10 different transfer stations possible
  - can be extended to up to 48 heating circuits

Notice
Operation of the controller module is generally via the TopTronic® E control module installed in the heat generator or in the station! If the control module is used without Hoval heat generator, the control module for operating the basic module district heating/fresh water and a wall casing must be ordered separately!

Inputs and outputs
- 230 V 3-point output for activating the primary valve or pilot control of a buffer storage solution
- 230 V 3-point output, e.g. for controlling the mixer
- 230 V output, e.g. for controlling the recirculation pump
- 230 V continuous phase, e.g. for supplying the heat meter
- Volt-free contact for outputting an alarm message
- 0-10 V input, e.g. for connecting to heating zone control systems or for integrating and additional heat generator via 0-10 V interface or switching contact (e.g.: solid-fuel boiler, etc.)
- 0-10 V or PWM output for controlling a variable-speed pump
- 0-10 V outputs for controlling continuous valves (e.g. for a primary valve and a mixing circuit valve)
- Variable inputs and outputs:
  - 230 V output, e.g. for controlling the direct circuit pump, feed pump
  - 230 V output, e.g. for controlling the buffer storage pump
  - 230 V output, e.g. for controlling the recirculation pump
  - 2 analogue inputs 4-20 mA/0-10 V for reference value specification
  - 1 analogue output 4-20 mA
- M-Bus interface for reading out heat meters (max. 16 M-Bus participants)



Notice
Max. 5 module expansions can be connected, of these, max. 3 module expansions heating circuit district heating

Option
- Can be expanded by max. 5 module expansions (expansion of the inputs/outputs), of these, max. 3 module expansions heating circuit district heating:
  - Module expansion heating circuit district heating (1 heating circuit with/without mixer) or
  - Module expansion hot water district heating (1 hot water charging circuit) or
  - Module expansion Universal district heating (various special functions)

Functions
- Weather-supported flow temperature controller for heating operation with or without room influence taking account of building characteristics and switch-on optimisation
- Optimisation of the heating circuit flow temperatures and improvement in the room climate taking account of the weather forecast (only possible in combination with HovalConnect)
- Different basic programs (week programs, economy mode, holiday until, etc.) can be defined for each heating circuit plus ability to activate manual operation (construction site mode)
- Separate switching time programs for each heating circuit as well as for hot water with
  - 2 individually preset week programs comprising
    - 5 different - individually preset - day programs with
    - 6 switching points per day
- Different temperatures can be set for each switching cycle
- Various functions for hot water:
  - Selection of different basic programs (week programs, economy mode, holiday until, etc.)
  - various operating modes (e.g. accumulator priority or parallel mode)
  - Buffer storage circuit on the primary or secondary side
  - adjustable loading criteria (e.g.: adjustable loading times, undershooting the minimum nominal value, etc.)
  - adjustable switch-off criteria (e.g. achieving the setpoint valve, achieving the lower sensor setpoint value, etc.)
  - adjustable loading block (if the loading flow temperature is too low, the setpoint temperature is not reached, differential temperature-dependent solar circuit control)
- Definable switching times for recirculation pump control
- Automatic changeover of summer/winter time
- Heating characteristic adaptation possible for each individual heating circuit
- Screed drying function for underfloor heating
- Requirement contact for constant requirements (ventilation, swimming pool, etc.)
- Modem switching function
- Pump anti-blocking protection
- Frost protection function

TopTronic® E
module expansion heating circuit district heating

TopTronic® E
module expansion
hot water district heating

TopTronic® E
module expansion
Universal district heating

- Cascade management that is activated following the combination with other basic modules (up to 8 heat generators)
- Cascade connection of 10 district heating stations in master/slave combination possible
- Definition of priorities for switching over between heating and hot water operation
- Operating hours and pulse counter
- Electronic output power limit by heat meter
- Outside temperature-dependent return limitation
- Reduction characteristic curve for network protection
- Integrated event memory
- Buffer storage circuit can be connected on the primary or secondary side of the heat exchanger
- Warm water input circuit
- Self-test with error diagnosis and error memory
- Relay test for each output can be activated separately
- Zero passage circuit
  The TopTronic® E basic module district heating/fresh water has a special zero passage circuit of the fitted relays. This is used for reducing the load on the switching contacts, and thus increases the service life of the relays
- Functions that can be implemented with module expansions:
  - Heating circuit without mixer
  - Heating circuit with mixer or
  - hot water charging circuits
  - Various additional functions

Notice
Depending on the complexity, module expansions are required for using the listed functions (max. 5 module expansions can be connected)!

Use
- Control of district heating stations or other transfer stations (buffer storage solutions) in a very wide power range
- Control for multiple heat generator/district heating systems by integrated cascade management:
  - 10 district heating stations by master/slave connection or
  - 8 different heat generators
- For room heating and hot water charging circuit
- For optimisation of the room climate by control algorithm taking account of the weather forecast (only possible in combination with HovalConnect)
- Upstream control for technical systems such as ventilation, air conditioning systems, etc. or also for heating zone control systems
- For decentralised assembly - remote from the control module - directly at the sensors and actuators:
  - Installation in wall casing/control panel
  - Connection to the operating unit via Hoval CAN bus
- With significant expansion capability by controller modules via the Hoval CAN bus
- For flexible integration of heat generators in modern communication systems via different interfaces
- For remote connection of heat generators via HovalConnect

Delivery
- TopTronic® E basic module district heating/fresh water com IP
- 2 mounting clips for DIN rail attachment
- 1 outdoor sensor AF/1.1P/K
- 1 immersion sensor TF/1.1P/2.5/6T, L = 2.5 m
- 1 contact sensor ALF/1.1P/2.5/T, L = 2.5 m
- Complete plug set for district heating module

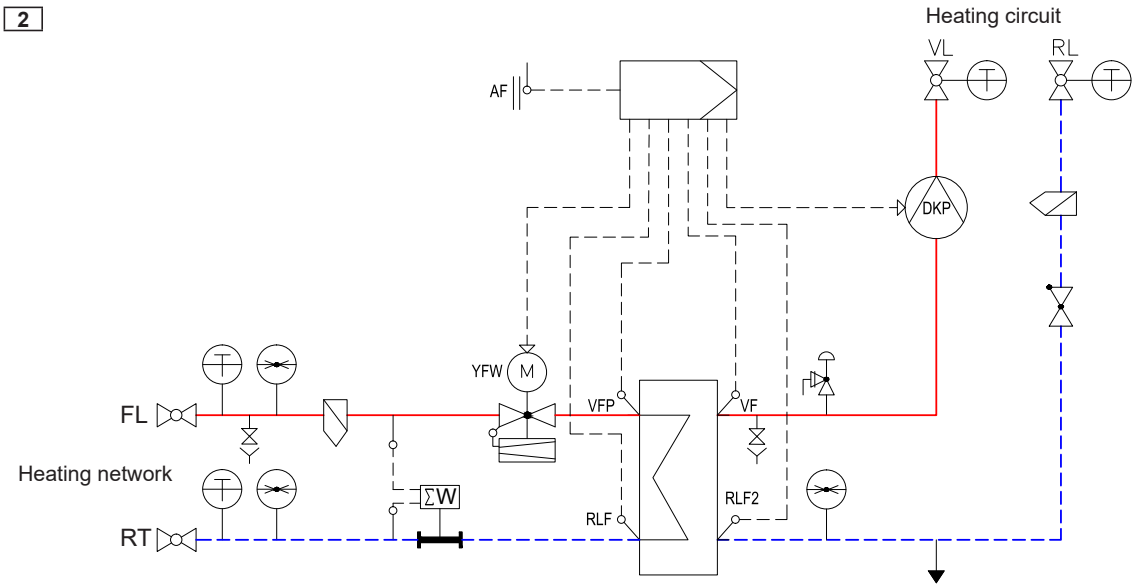
Notice
The supplementary plug set may have to be ordered to implement functions differing from the standard!

Functions that can be implemented

TopTronic® E basic module district heating/fresh water com IP and district heating com

TTE-FW com IP/ FW com	1 heat exchanger	1 direct heating circuit	1 mixed heating circuit	2 mixed heating circuit	1 hot water charging circuit direct primary	1 hot water charging circuit direct secondary	1 DHW mixing charging circuit secondary
Hydr. 2	•	•					
Hydr. 4	•	•			•		
Hydr. 5	•		•		•		
Hydr. 9	•	•					•
Hydr. 11	•		•				•
Hydr. 12	•	•				•	
Hydr. 13	•		•			•	
Hydr. 15	•	•	•				
Hydr. 25	•	•	•			•	
Hydr. 26	•	•	•				•
Hydr. 27	•		•	•		•	
Hydr. 28	•		•	•			•

2



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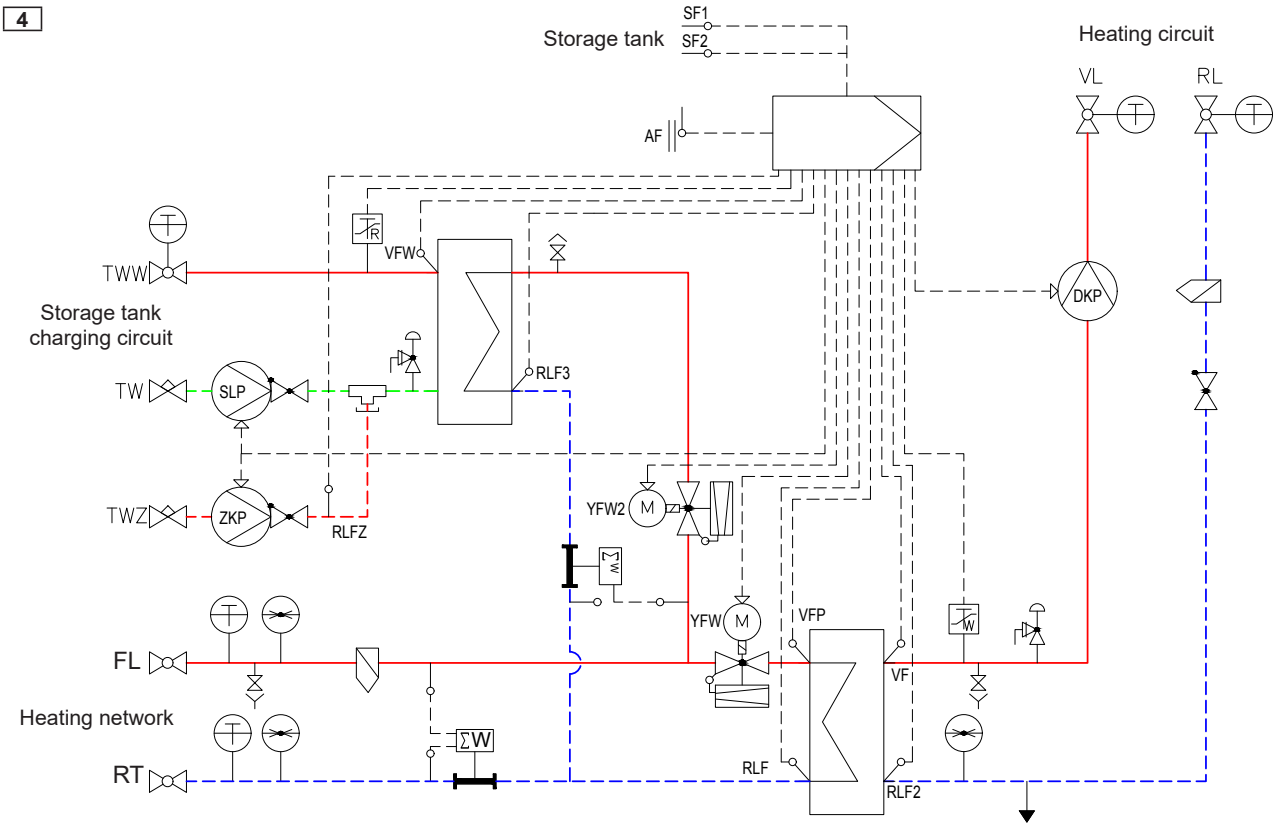

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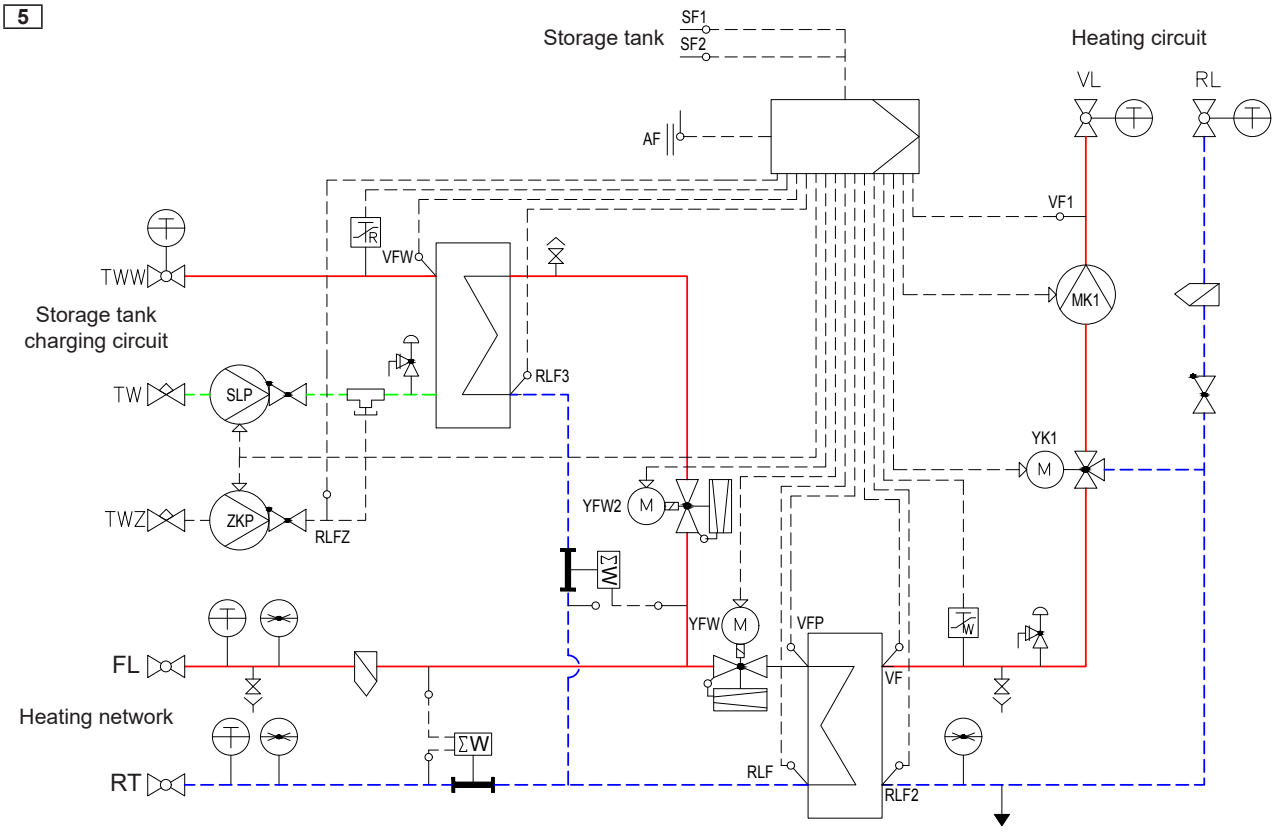
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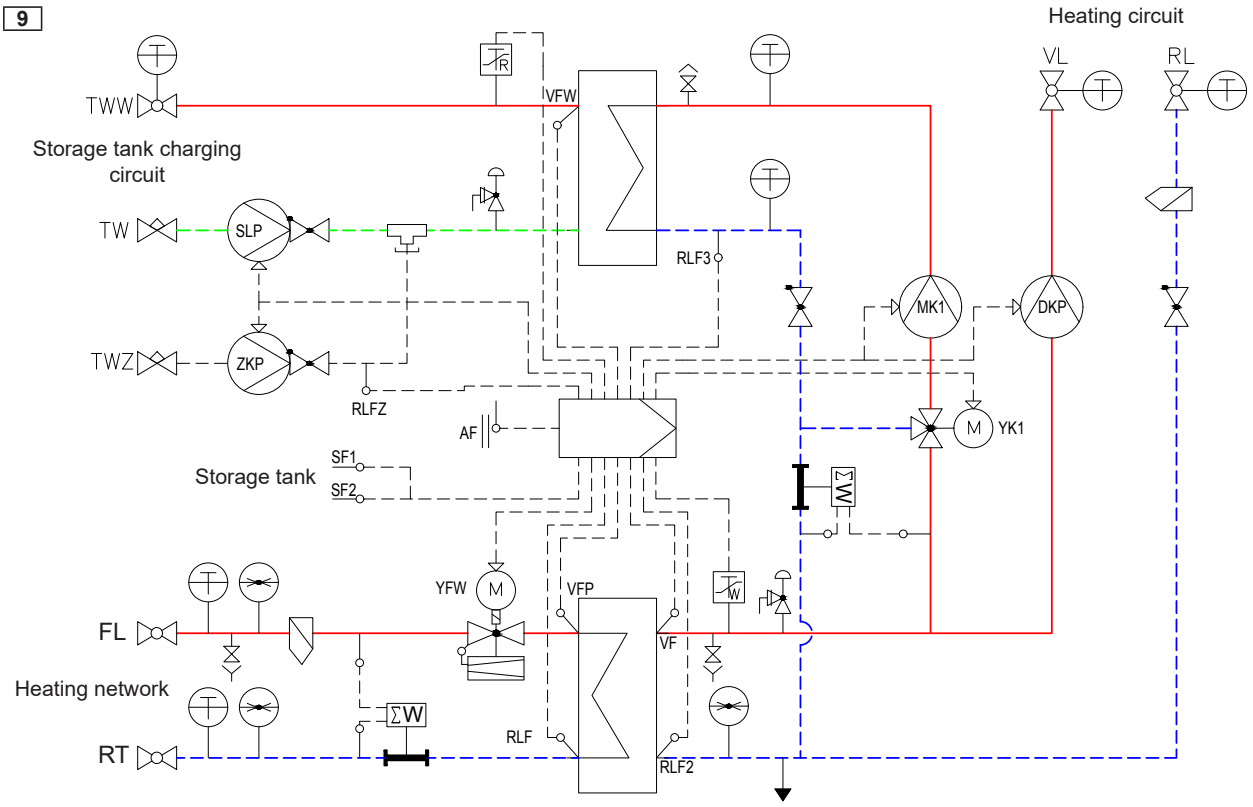
SF1
SF2
Heating circuit
VL
RL
AF
VF1
TWW
VFW
MK1
Storage tank charging circuit
TW
SLP
RLF3
YK1
TWZ
ZKP
RLFZ
YFW2
M
YFW
VFP
VF
FL
Heating network
RT
RLF
RLF2

9


Heating circuit
VL
RL
TWW
VFW
Storage tank charging circuit
TW
SLP
RLF3
MK1
DKP
TWZ
ZKP
RLFZ
AF
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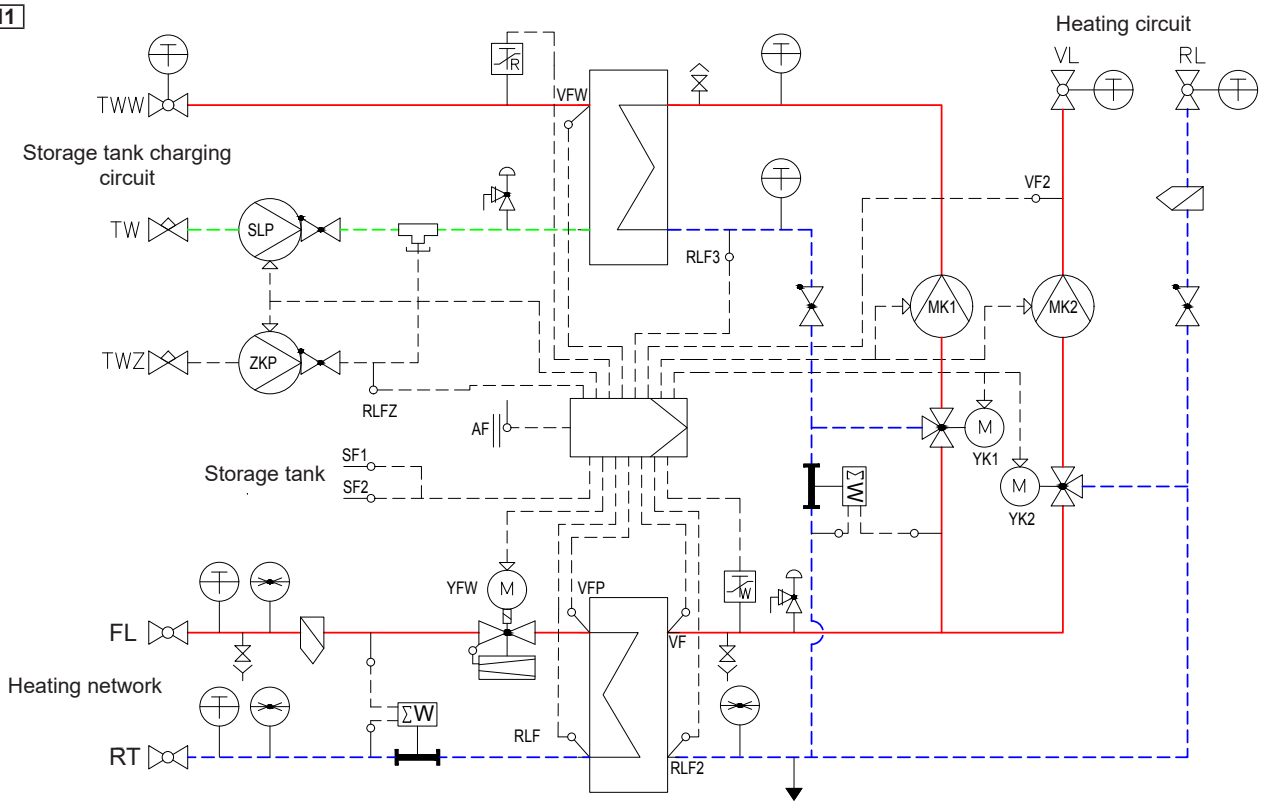
YK1
Storage tank
SF1
SF2
YFW
VFP
VF
FL
Heating network
RT
RLF
RLF2

11


Heating circuit
VL
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TWW
Storage tank charging circuit
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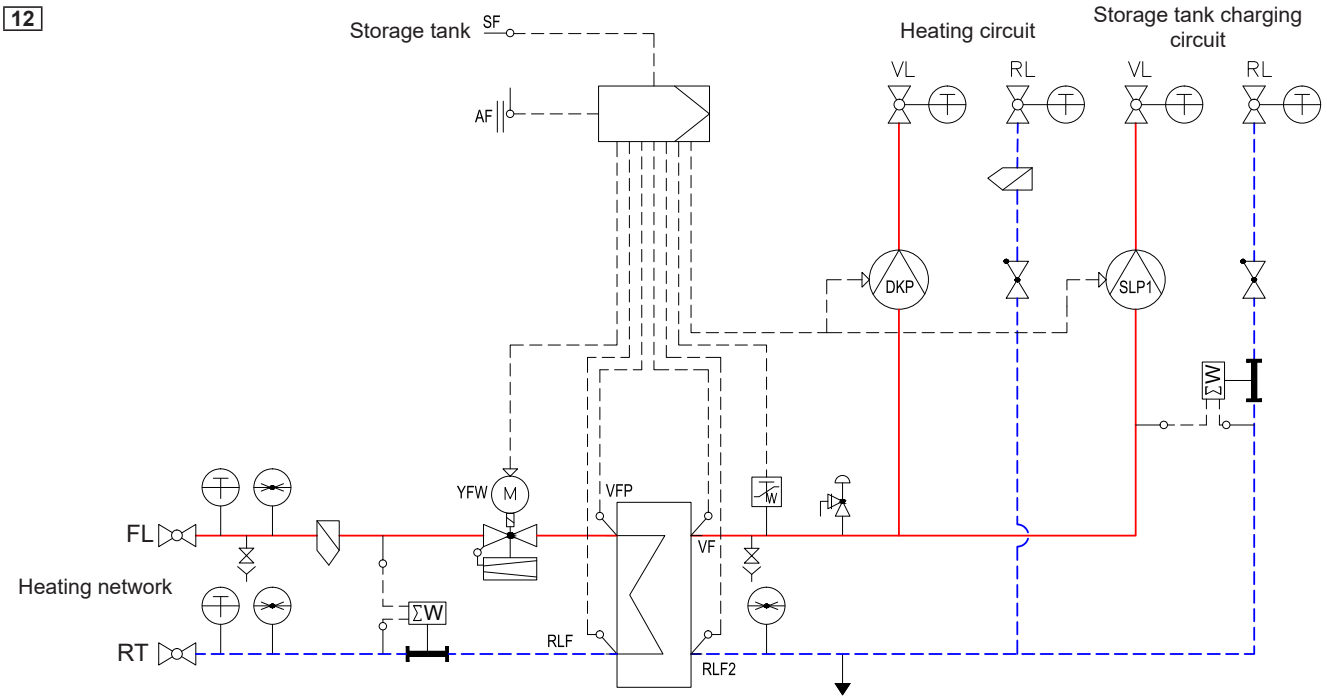
SLP
TWZ
ZKP
RLFZ
VFW
RLF3
VF2
MK1
MK2
M
YK1
YK2
AF
Storage tank
SF1
SF2
YFW
VFP
VF
FL
Heating network
RT
RLF
RLF2

12


Storage tank
SF
AF
Heating circuit
Storage tank charging circuit
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RL
DKP
SLP1
YFW
VFP
VF
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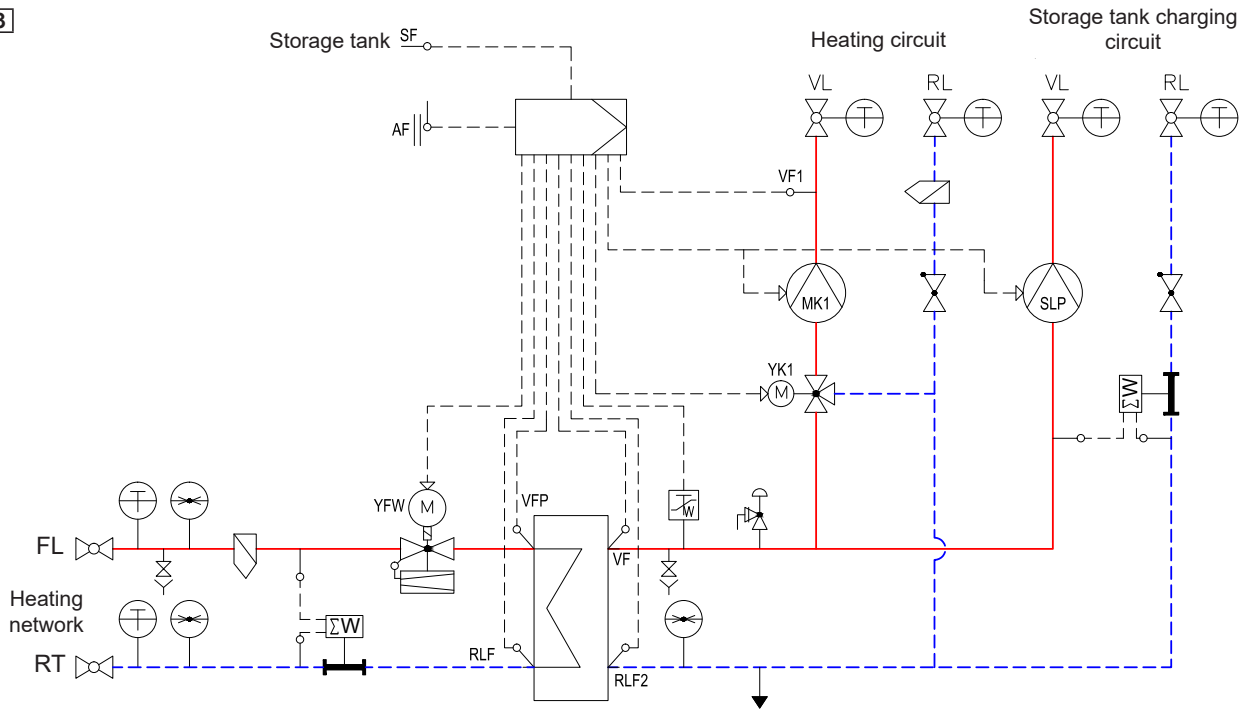
Heating network
RT
RLF
RLF2

13


Storage tank
SF
AF
Heating circuit
Storage tank charging circuit
VL
RL
VL
RL
VF1
MK1
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ΣW
YFW
M
VFP
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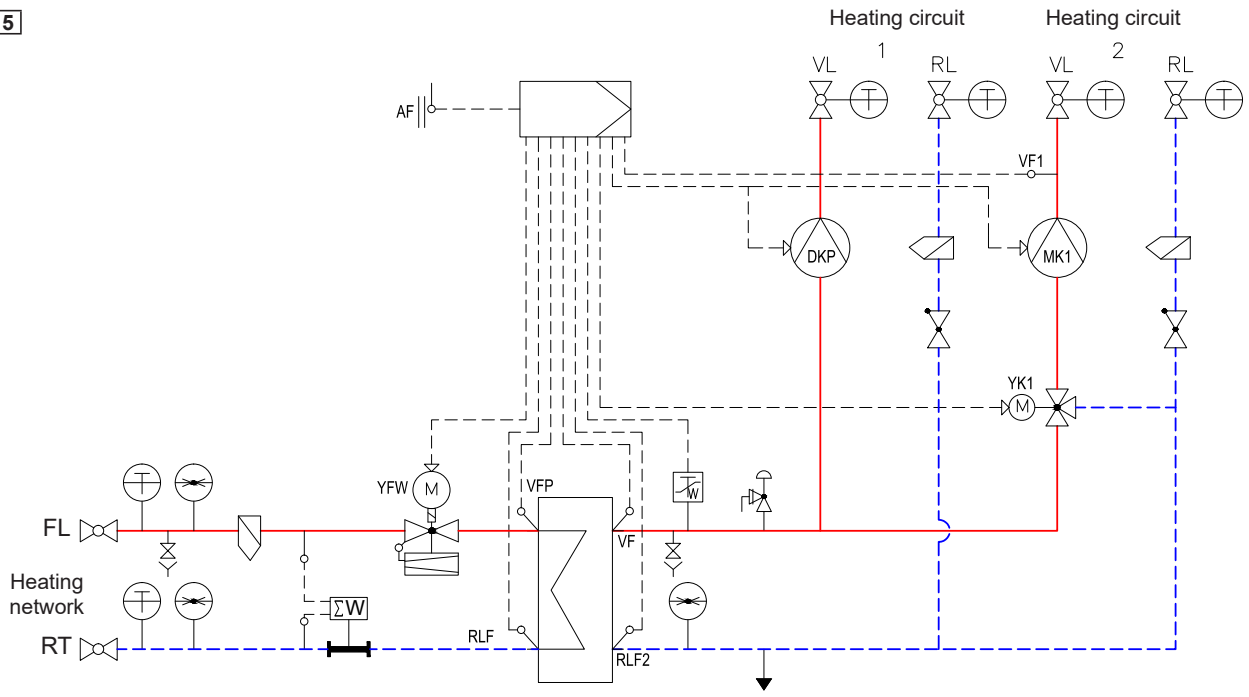
FL
VF
Heating network
RT
ΣW
RLF
RLF2

15


Heating circuit 1
Heating circuit 2
AF
VL
RL
VL
RL
VF1
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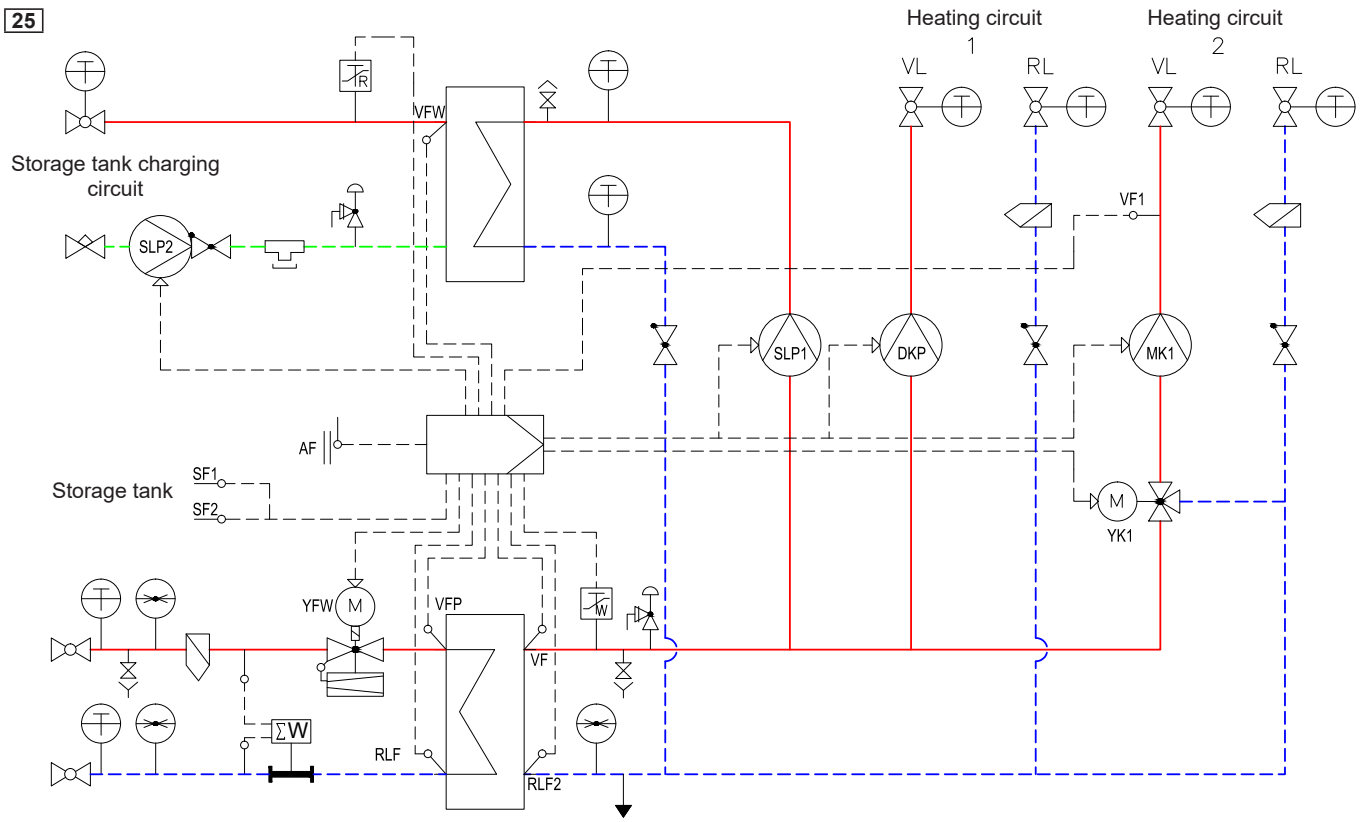
MK1
YK1
M
YFW
M
VFP
W
FL
VF
Heating network
RT
ΣW
RLF
RLF2

25


Heating circuit 1
Heating circuit 2
VL
RL
VL
RL
VFW
Storage tank charging circuit
SLP2
VF1
SLP1
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Storage tank
SF1
SF2
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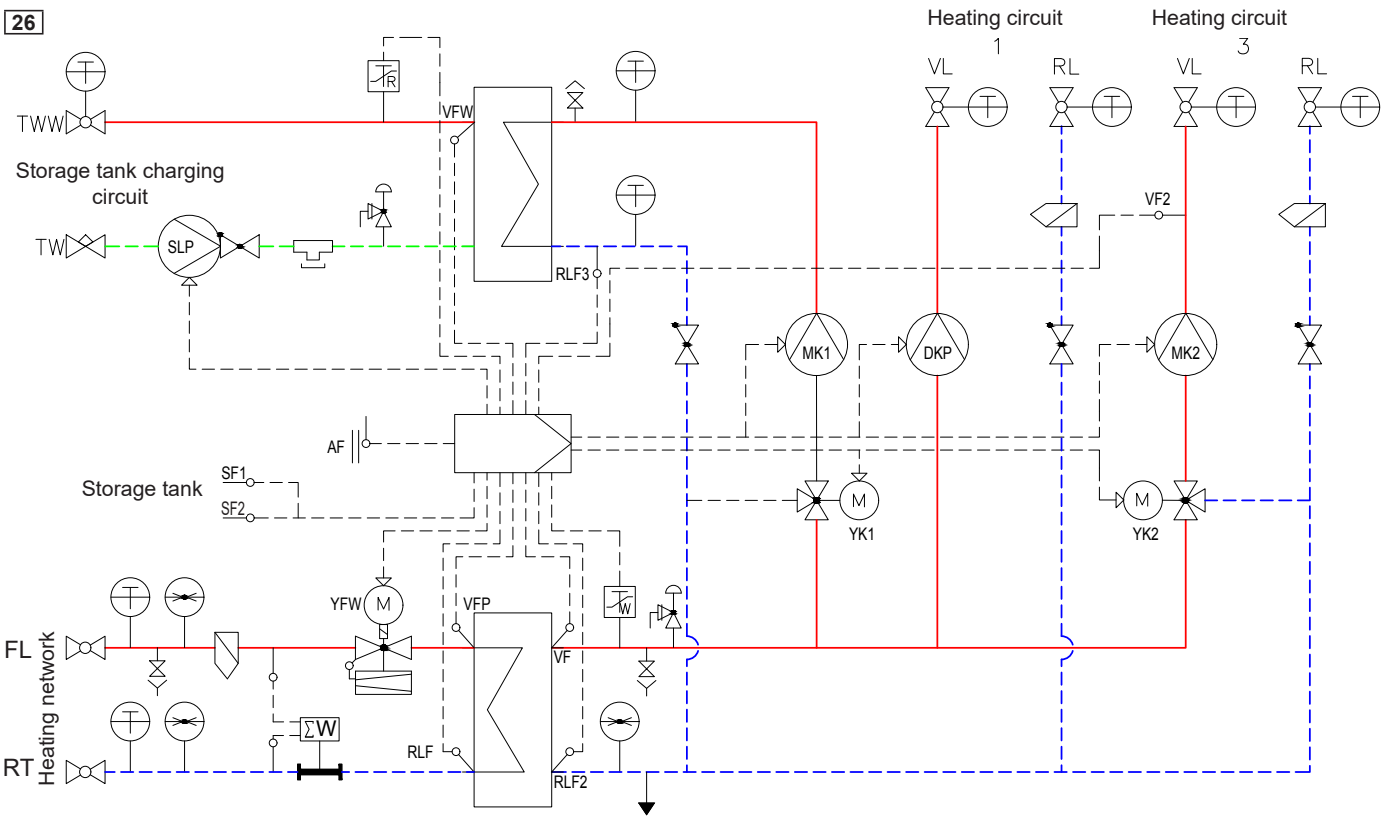
YK1
YFW
M
VFP
VF
RLF
RLF2

26


Heating circuit 1
Heating circuit 3
VL
RL
VL
RL
TWW
VFW
Storage tank charging circuit
TW
SLP
VF2
RLF3
MK1
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MK2
AF
Storage tank
SF1
SF2
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YK1
M
YK2
YFW
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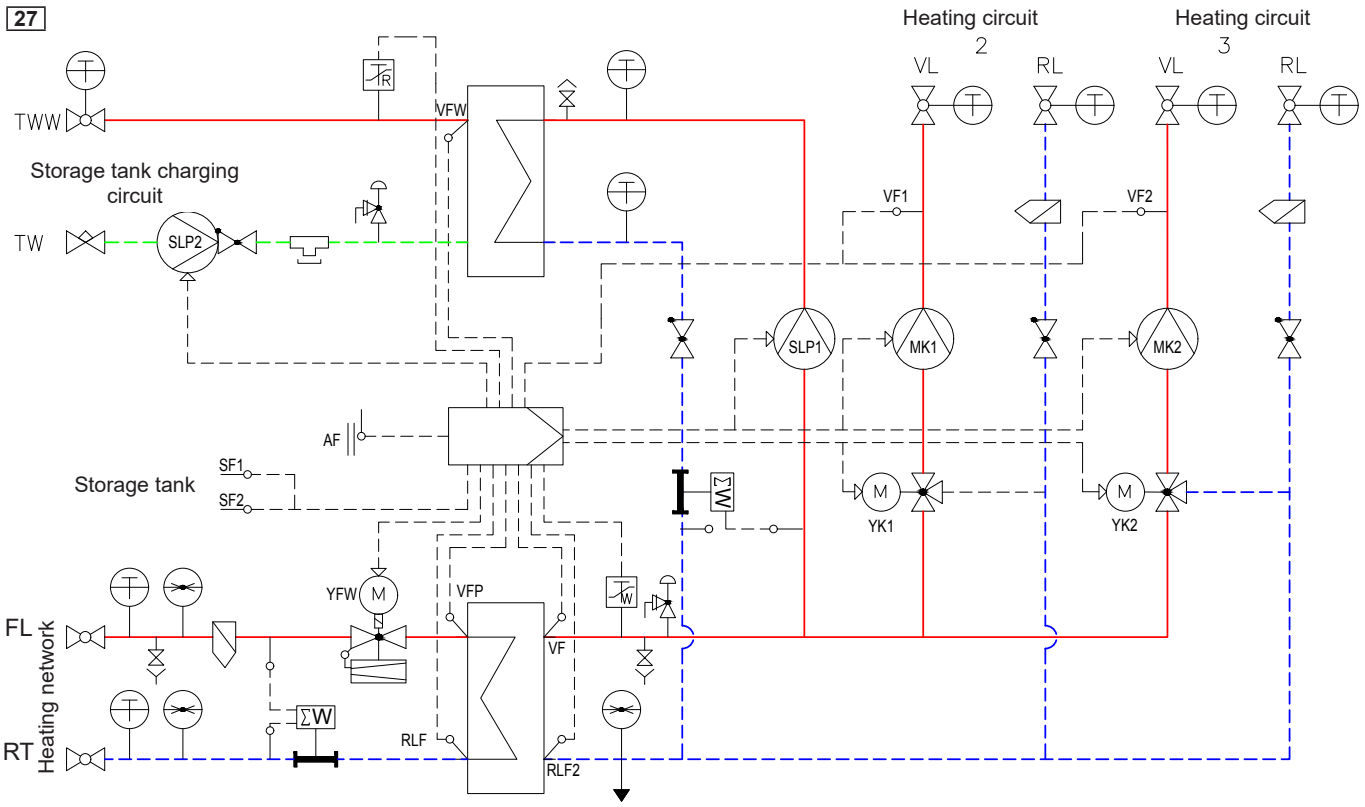
VFP
VF
FL
Heating network
RT
RLF
RLF2

27


Heating circuit 2
Heating circuit 3
VL
RL
VL
RL
TWW
VFW
Storage tank charging circuit
TW
SLP2
VF1
VF2
SLP1
MK1
MK2
AF
Storage tank
SF1
SF2
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M
YK2
YFW
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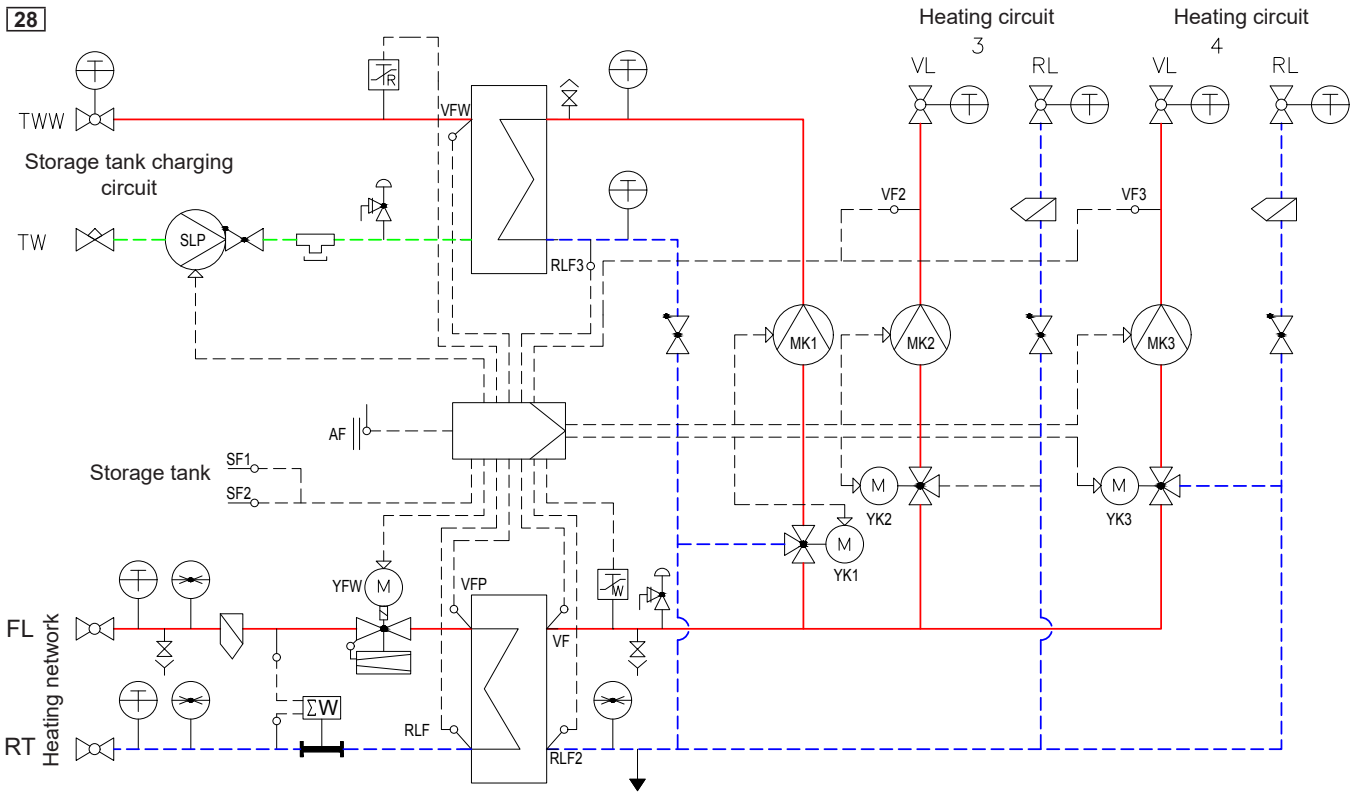
VFP
VF
FL
Heating network
RT
RLF
RLF2

28


Heating circuit 3
Heating circuit 4
VL
RL
VL
RL
TWW
VFW
Storage tank charging circuit
TW
SLP
RLF3
VF2
VF3
MK1
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MK3
AF
Storage tank
SF1
SF2
M
YK2
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YK3
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YFW
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VFP
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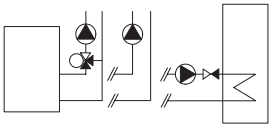
Heating network
RT
RLF
RLF2

TopTronic® E basic module



TopTronic® E basic module district heating/fresh water TTE-FW com IP
Controller module for controlling district heating systems in non-communicative and IP-communicative networks (for the latter, a separately available Ethernet connection is required) and the associated consumers with integrated control functions for:
- Primary valve control
- Cascade management
- 1 heating circuit without mixer
- 1 heating circuit with mixer
- 1 hot water charging circuit
- various additional functions

Consisting of:
- Fitting accessories
- 1 outdoor sensor AF/1.1P/K
- 1 immersion sensor TF/1.1P/2.5/6T
L = 2.5 m
- 1 contact sensor ALF/1.1P/2.5/T
L = 2.5 m
- Plug set for fresh water module

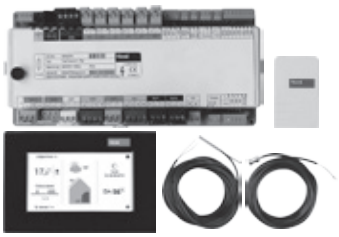
Notice
If the basic module is used without Hoval heat generator then a TopTronic® E control module must be ordered separately!

Notice
Depending on the complexity, module expansions are required for using the listed functions (max. 5 module expansions can be connected)!

Part No.

6059 489

TopTronic® E district heating controller set



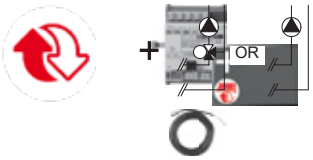
TopTronic® E IP communicative district heating controller set
Consisting of:
- TopTronic® E basic module district heating/fresh water com IP
- TopTronic® E control module black
- Plug set for DH module
- Outdoor sensor AF/1.1P/K
- Immersion sensor TF/1.1P/2.5/6T, L = 2.5 m
- Contact sensor ALF/1.1P/2.5/T, L = 2.5 m

6059 490

TopTronic® E module expansions
for TopTronic® E basic module district heating/fresh water com IP

Part No.

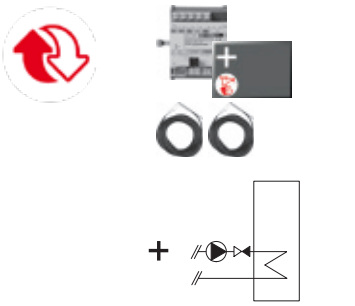
Max. 5 module expansions can be connected, of these, max. 3 module expansions heating circuit district heating



TopTronic® E module expansion district heating circuit TTE-FE HK FW — 6038 119

Expansion to the inputs and outputs of a controller module (basic module district heating/fresh water, basic module district heating com) for carrying out various functions.
Refer to the Hoval System Technology to find which functions and hydraulic arrangements can be implemented.

Consisting of:
- Fitting accessories
- Ribbon cable for connecting the device bus to the controller module,
- Connection set for connecting the controller module to the mains voltage,
- 1 x contact sensor ALF/1.1P/2.5/T L = 2.5 m,
- Plug set - district heating expansion



TopTronic® E module expansion hot water district heating TTE-FE WW FW — 6038 120

Expansion to the inputs and outputs of the basic module district heating/fresh water or basic module district heating com for implementing a hot water circuit.

Consisting of:
- fitting accessories
- 2 immersion sensors TF/1.1P/2.5/6T, L = 2.5 m

TopTronic® E module expansion Universal district heating TTE-FE UNI FW — 6038 117

Expansion to the inputs and outputs of the basic module district heating/fresh water or basic module district heating com for implementing various functions.

Consisting of:
- Fitting accessories

Notice
Refer to the Hoval System Technology to find which functions and hydraulic arrangements can be implemented.

Further information
See “Hoval TopTronic® E module expansions district heating” chapter

TopTronic® E controller modules, control/room control modules, HovalConnect, wall casing, sensor
see separate chapter

TopTronic® E basic module district heating/fresh water com IP

Type		TTE-FW
• Power supply max.		230 V AC +6/-10 %
• Frequency	Hz	50-60
• Max. power consumption incl. bus supply, module expansions, approx.	W	18.3
• Min. power consumption	W	0.7
• Max. power consumption	W	5.4
• Fuse		F 5 A H 250 V
Output (low voltage)		
• Electromechanical relays		9
Output (extra-low voltage)		
• Signal output PWM or 0-10 V		4
Switching capacity		
• Electromechanical relays	A	5
Input (low voltage)		
• Optocoupler input		0
Inputs (extra-low voltage)		
• Input 0-10 V		4
• Inputs sensors		11
• Inputs flow rate sensor		0
• Pulse input		1
Expansion (module expansion)		
• Max. number (of these, max. 3 module expansions heating circuit district heating)		5
Casing		
• Installation		Top hat rail mounting
• Dimensions (W x H x D) incl. plug	mm	250 x 120 x 75
• Ambient temperature (during operation)	°C	0…50
• Humidity (in operation), non-condensing	%, RH	20...80
• Storage temperature	°C	-20…60
Bus system (Hoval CAN bus)		
• Capacity		max. 4 control modules/3 control modules + 1 gateway
• Bus supply		yes
• Bus line		4-wire bus
• Max. bus length twisted, shielded	m	100 (greater distances possible with engineering of additional measures)
• Min. line cross-section	mm²	0.5
• Cable type (recommended)		JY-(ST)Y 2 x 2 x 0.8
Other bus interfaces		Internal unit bus (master) M-Bus (Master) RS485 TCP/IP optional
Miscellaneous		
• Spring reserve		approx. 96 hours (supercapacitor)
• Schutzart		IP20
• Protection class		I – EN 60730
• Plug types		RAST 5 (coloured, coded), alternative plug-in terminal technology

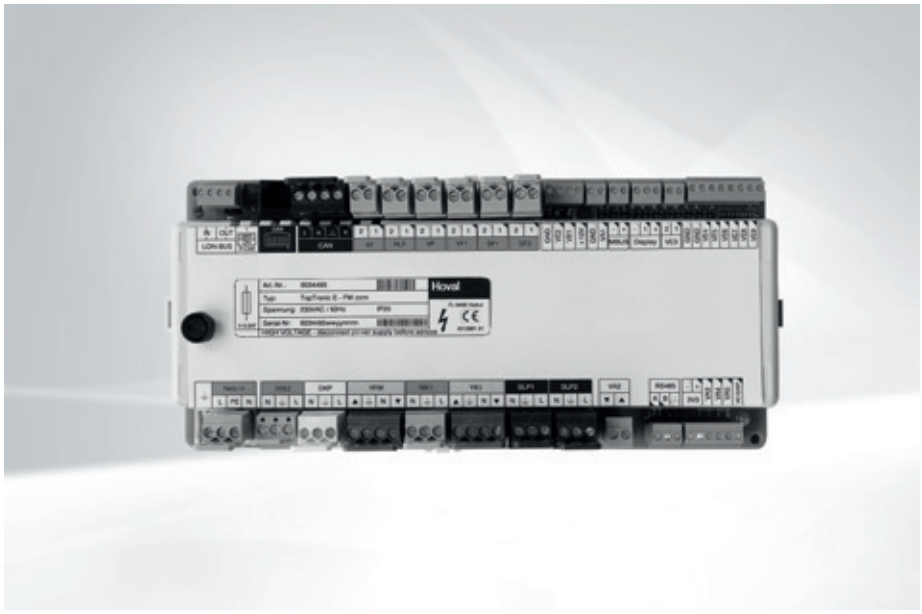
Electrical connection

TopTronic® E basic module district heating/fresh water com IP

TopTronic® E basic module district heating com

- Controller module for controlling district heating systems in communicative networks (communication interface for management system) and the corresponding consumers with integrated control functions for
  - Primary valve control
  - Cascade management
  - 1 heating circuit with mixer
  - 1 heating circuit without mixer
  - 1 hot water charging circuit
  - Various additional functions
- Connection technology partially executed as plug-in screw terminals in coded RAST 5 design as well as conventional plug-in screw terminal technology
- Update capability of the controller software
- Time and date via integrated RTC, multi-day spring reserve via capacitor
- Microfuse 5 A
- Controller module suitable for cabinet installation thanks to ability to install on DIN rail 35 x 15 x 2.2 mm or 35 x 7.5 x 2.2 mm
- Multiple expansion possibilities via Hoval CAN bus:
  - max. 16 controller modules in the bus system
  - Cascade connection with up to 8 different heat generators possible
  - Cascade connection with up to 10 different transfer stations possible
  - can be extended to up to 48 heating circuits

Notice
Operation of the controller module is generally via the TopTronic® E control module installed in the heat generator!
If the controller module is used without Hoval heat generator then the control module for operating the basic module district heating com and a wall casing with control module cut-out must be ordered separately!



Notice
Max. 5 module expansions can be connected to the TopTronic® E basic module, thereof max. 3 module expansions for heating circuits district heating (i.e. max. 4 mixer circuits, 1 direct heating circuit). However, a maximum of 4 control modules can be installed per basic module district heating. This means that not every heating circuit can be equipped with a control module! Room control is possible only for the direct and 2 mixed heating circuits. In the master/slave group, an additional mixer circuit with room control function can be used on the slave controller. If further heating circuits with control modules are required, heating circuit/hot water modules can also be combined with the basic module district heating (max. 48 heating circuits).

TopTronic® E
module expansion
Heating circuit district heating

TopTronic® E
Module expansion
hot water district heating

TopTronic® E
module expansion
Universal district heating

Inputs and outputs
- 230 V 3-point output for activating the primary valve or pilot control of a buffer storage solution
- 230 V 3-point output, e.g. for controlling the mixer
- 230 V output, e.g. for controlling the recirculation pump
- 230 V continuous phase, e.g. for supplying the heat meter
- Volt-free contact for outputting an alarm message
- 0-10 V input, e.g. for connecting to heating zone control systems or for integrating and additional heat generator via 0-10 V interface or switching contact (e.g.: solid-fuel boiler, etc.)
- 0-10 V or PWM output for controlling a variable-speed pump
- 0-10 V outputs for controlling continuous valves (e.g. for a primary valve and a mixing circuit valve)
- Variable inputs and outputs:
  - 230 V output, e.g. for controlling the direct circuit pump, feed pump
  - 230 V output, e.g. for controlling the storage tank charging pump
  - 230 V output, e.g. for controlling the recirculation pump
  - 2 analog inputs 4-20 mA/0-10 V for reference value specification
  - 1 analog output 4-20 mA
- M-Bus interface for reading out max. 16 M-Bus meters
- LON bus interface for communication with the HovalSupervisor management system

Option
- Can be expanded by max. 5 module expansions (expansion of the inputs/outputs), there of max. 3 module expansions heating circuit district heating:
  - Module expansion heating circuit district heating (1 heating circuit with/without mixer) or
  - Module expansion hot water district heating (1 hot water charging circuit) or
  - Module expansion Universal district heating (various special functions)
- Can be expanded with various accessories:
  - Ethernet connection TTE-FW com
  - Repeater TTE-FW com LON-Bus
  - Router TTE-FW com CAN bus
  - Data socket 13-pin TTE-FW com LON-Bus and lightning protection
  - various software licences for HovalSupervisor
  - various services for HovalSupervisor

Functions
- Update capability of the controller software via central data network
- 100 % parameter setting capability of the complete controller via the HovalSupervisor central management system
- Weather-supported flow temperature controller for heating operation with or without room influence taking account of building characteristics and switch-on optimisation
- Optimisation of the heating circuit flow temperatures and improvement in the room climate taking account of the weather forecast (only possible in combination with HovalConnect)
- Different basic programs (week programs, eco mode, holiday, etc.) can be defined for each heating circuit plus ability to activate manual operation (construction site mode)
- Separate switching time programs for each heating circuit as well as for hot water with
  - 2 individually preset week programs comprising
    - 5 different - individually preset - day programs with
    - 6 switching points per day
- Different temperatures can be set for each switching cycle

- Various functions for hot water:
  - Selection of different basic programs (week programs, eco mode, holiday, etc.)
  - various operating modes (e.g. accumulator priority or parallel mode)
  - Buffer storage circuit on the primary or secondary side
  - adjustable loading criteria (e.g.: adjustable loading times, undershooting the minimum nominal value, etc.)
  - adjustable switch-off criteria (e.g. achieving the setpoint value, achieving the lower sensor setpoint value, etc.)
  - adjustable loading block (if the loading flow temperature is too low, the setpoint temperature is not reached, differential temperature-dependent solar circuit control)
- Definable switching times for recirculation pump control
- Automatic changeover of summer/winter time
- Heating characteristic adaptation possible for each individual heating circuit
- Screed drying for underfloor heating
- Requirement contact for constant requirements (ventilation, swimming pool, ...)
- Modem switching function
- Pump anti-blocking protection
- Frost protection function
- Cascade management that is activated following the combination with other basic modules (up to 8 heat generators)
- Cascade connection of 10 district heating stations in master/slave combination possible
- Definition of priorities for switching over between heating and hot water operation
- Operating hours and pulse counter
- Electronic output power limit by heat meter
- Outdoor temperature-dependent return limitation
- Reduction characteristic curve for network protection
- Integrated event memory
- Buffer storage circuit can be connected on the primary or secondary side of the heat exchanger
- Warm water input circuit
- Self-test with error diagnosis and error memory
- Relay test for each output can be activated separately
- Zero passage circuit
  The TopTronic® E basic module district heating com has a special zero passage circuit of the fitted relays. This is used for reducing the load on the switching contacts, and thus increases the service life of the relays.
- Functions that can be implemented with module expansions:
  - heating circuit without mixer
  - heating circuit with mixer or
  - hot water charging circuits
  - various additional functions

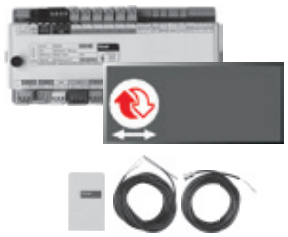
Notice
Depending on the complexity, module expansions are required for using the listed functions (max. 5 module expansions can be connected)!

Application
- Control of district heating stations or other transfer stations (buffer storage solutions) in a very wide power range
- Control for multiple heat generator/district heating systems by integrated cascade management:
  - 10 district heating stations by master/slave connection or
  - 8 different heat generators
- Flexible connection to the management system
- For room heating and hot water charging circuit
- For optimisation of the room climate by control algorithm taking account of the weather forecast (only possible in combination with HovalConnect)
- Upstream control for technical systems such as ventilation, air conditioning systems, etc. or also for heating zone control systems
- For decentralised assembly - remote from the control module - directly at the sensors and actuators:
  - Installation in wall casing/control panel
  - Connection to the operating unit via Hoval CAN bus
- With significant expansion capability by controller modules via the Hoval CAN bus
- For flexible integration of heat generators in modern communication systems via different interfaces
- For remote connection of heat generators via HovalConnect

Delivery
- TopTronic® E basic module district heating com
- 2 mounting clips for DIN rail attachment
- 1 outdoor sensor AF/1.1P/K
- 1 immersion sensor TF/1.1P/2.5/6T, L = 2.5 m
- 1 contact sensor ALF/1.1P/2.5/T, L = 2.5 m
- Complete plug set for district heating module

Functions that can be implemented
see TopTronic® E basic module district heating/fresh water/hydraulic applications

TopTronic® E basic module



TopTronic® E basic module district heating com TTE-FW com
Controller module for controlling district heating systems in communicative networks (communication interface to the I&C system) and the corresponding consumers with integrated control functions for:
- primary valve control
- cascade management
- 1 heating circuit without mixer
- 1 heating circuit with mixer
- 1 hot water charging circuit
- various additional functions

Consisting of:
- Fitting accessories
- 1 outdoor sensor AF/1.1P/K,
- 1 immersion sensor TF/1.1P/2.5/6T L = 2.5 m,
- 1 contact sensor ALF/1.1P/2.5/T L = 2.5 m,
- Plug set for district heating module

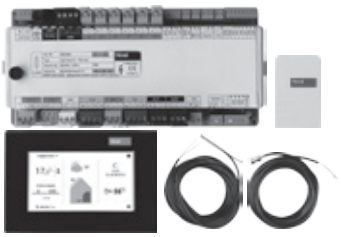
Notice
If the basic module is used without Hoval heat generator then a TopTronic® E control module must be ordered separately!

Notice
Depending on the complexity, module expansions are required for using the listed functions (max. 5 module expansions can be connected)!

Part No.

6034 570

TopTronic® E district heating controller set



TopTronic® E communicative district heating controller set incl. control module
Consisting of:
- TopTronic® E basic module district heating com,
- TopTronic® E control module black, plug set for DH module,
- fresh air sensor AF/1.1P/K,
- immersion sensor TF/1.1P/2.5/6T, L = 2.5 m,
- contact sensor ALF/1.1P/2.5/T, L = 2.5 m

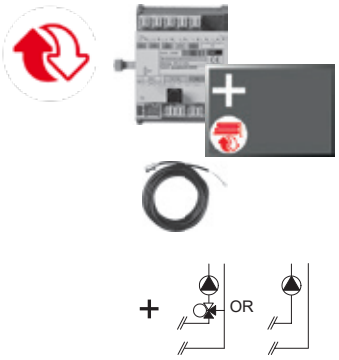
6038 524

TopTronic® E module expansions

for TopTronic® E basic module district heating com

Part No.

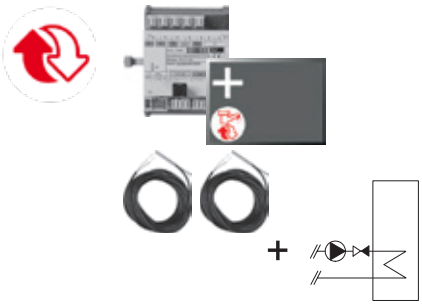
Max. 5 module expansions can be connected, thereof max. 3 module expansions heating circuit district heating



TopTronic® E module expansion district heating circuit TTE-FE HK FW — 6038 119

Expansion to the inputs and outputs of a controller module (basic module district heating/fresh water, basic module district heating com) for carrying out various functions.
Refer to the Hoval System Technology to find which functions and hydraulic arrangements can be implemented.

Consisting of:
- Fitting accessories
- Ribbon cable for connecting the device bus to the controller module,
- Connection set for connecting the controller module to the mains voltage,
- 1 x contact sensor ALF/1.1P/2.5/T L = 2.5 m,
- Plug set - district heating expansion



TopTronic® E module expansion hot water district heating TTE-FE WW FW — 6038 120

Expansion to the inputs and outputs of the basic module district heating/fresh water or basic module district heating com for implementing a hot water circuit.

Consisting of:
- fitting accessories
- 2 immersion sensors TF/1.1P/2.5/6T, L = 2.5 m

TopTronic® E module expansion Universal district heating TTE-FE UNI FW — 6038 117

Expansion to the inputs and outputs of the basic module district heating/fresh water or basic module district heating com for implementing various functions.

Consisting of:
- Fitting accessories

Further information
See “Hoval TopTronic® E module expansions” chapter

Notice
Refer to the Hoval System Technology to find which functions and hydraulic arrangements can be implemented.

		Part No.
	**Ethernet connection** TopTronic® E district heating com R2 - Communications module expansion for TopTronic® E basic module district heating com - TCP/IP interface for communication with the HovalSupervisor management system - Top hat rail mounting directly adjacent to the basic module - Connection to the basic module via Ribbon cable - Dimensions (L x W x H): 96 x 48 x 42.3 **Notice** An industrial Ethernet switch is available in the “Accessories” section for professional connection of several Ethernet links.	6057 388
	**TopTronic® E district heating com LON-Bus repeater** - Repeater as electrical signal booster of the LON-Bus network - Used for boosting the range of the signal when there are long distances between the control centre and the individual TopTronic® E basic module district heating com controller modules - Positioning of the repeaters depending on the data network (routing type, cable type, length, etc.) at different positions in the network - Electrical power supply 230 V AC - Dimensions (L x W x H): 71 x 92 x 60 **Notice** After 5 repeaters, a router must be used for boosting the signal. Article on request.	6061 947
	**Router TopTronic® E district heating com TTE-FWR - CAN bus** - Interface between the Hoval LON-Bus network and HovalSupervisor - Interface between the Hoval TCP/IP network and HovalSupervisor - Serves as a physical interface between the data stream of the district heating network and e.g a master computer with TCP/IP interface - Possibility of connecting differential pressure sensors variable inputs 0-10 V or 0/4-20 mA - Router can be installed in control panel with DIN-rail mounting - Temperature and pressure control for up to five strands or 5 heating circuits - Dimensions (L x W x H): 355 x 120 x 75 TopTronic® E control module black for operating the router (optional) and mating connector set must be ordered separately.	6047 303

Data socket TopTronic® E district heating com
LON-Bus and lightning protection
- Data socket for connecting the telecommunication cable at the building connection
- Connection must be made according to the appropriate applicable regulations
- Data sockets must also be installed with dummy connections
- 1 input block 13-pin
- 2 output blocks each 13-pin
- 2 outputs 3-pin
for controller and repeater
- Wet room socket IP55
Dimensions (L x W x H):
180 x 140 x 75
incl. 10 stepped nipples

TopTronic® E controller modules, Room control modules, HovalConnect, wall casings, sensors
see separate chapters

Part No.
2061 738

TopTronic® E basic module district heating com

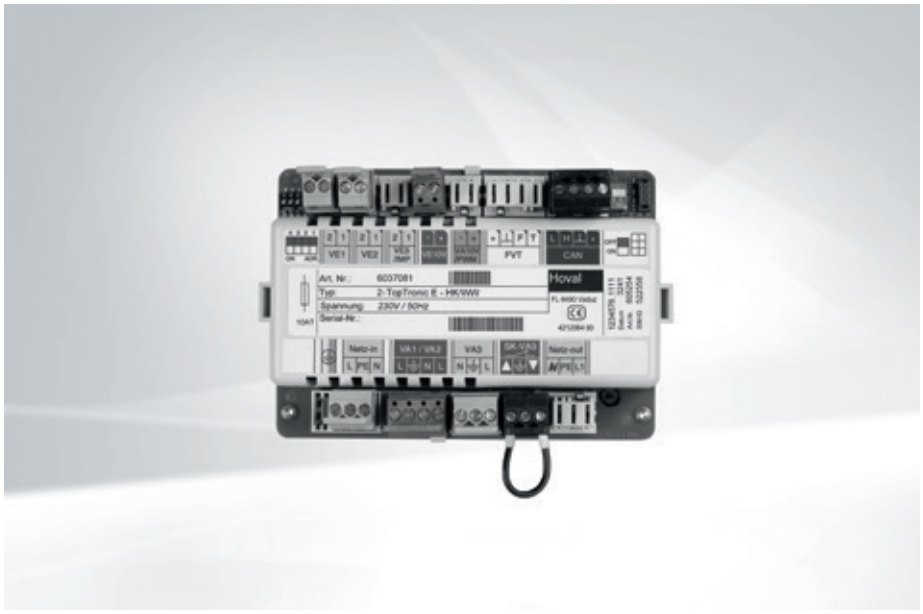
Type		TTE-FW com
• Power supply max		230 V AC +6/-10 %
• Frequency	Hz	50-60
• Max. power consumption incl. bus supply, module expansions, approx.	W	18.3
• Min. power consumption	W	0.7
• Max. power consumption	W	5.4
• Fuse		F 5 A H 250 V
Output (low voltage)		
• Electromechanical relays		9
Output (extra-low voltage)		
• Signal output PWM or 0-10 V		4
Switching capacity		
• Electromechanical relays	A	5
Input (low voltage)		
• Optocoupler input		0
Inputs (extra-low voltage)		
• Input 0-10 V		4
• Inputs sensors		11
• Inputs flow rate sensor		0
• Pulse input		1
Expansion (module expansion)		
• Max. number (thereof max. 3 module expansions heating circuit district heating)		5
Casing		
• Installation		Top hat rail mounting
• Dimensions (W x H x D) incl. plug	mm	250 x 120 x 75
• Ambient temperature (during operation)	°C	0…50
• Humidity (in operation), non-condensing	%, RH	20...80
• Storage temperature	°C	0…50
Bus system (Hoval CAN bus)		
• Capacity		Max. 4 control modules/3 control modules + 1 gateway
• Bus supply		yes
• Bus line		4-wire bus
• Bus length max twisted, shielded	m	100 (greater distances possible with engineering of additional measures)
• Line cross-section	mm²	0.5
• Cable type (recommended)		JY-(ST)Y 2 x 2 x 0.8
Other bus interfaces		Internal unit bus (master) M-Bus (master) LON (slave, encrypted) RS485 TCP/IP optional
Miscellaneous		
• Spring reserve		Approx. 96 hours (supercapacitor)
• Type of protection		IP 20
• Protection class		I – EN 60730
• Plug types		RAST 5 (coloured, coded), alternative plug-in terminal technology

Electrical connection

TopTronic® E basic module district heating com

TopTronic® E heating circuit/ hot water module

- Controller module for controlling consumers with integrated control functions for:
  - 1 heating/cooling circuit with mixer or
  - 1 heating/cooling circuit without mixer or
  - 1 hot water charging circuit
  - Various additional functions
- Connection technology executed as plug-in screw terminals in coded RAST 5 design
- Update capability of the controller software
- Time and date via integrated RTC, multi-year spring reserve
- Fine fuse 10 A
- Controller module suitable for cabinet installation thanks to ability to install on DIN rail 35 x 15 x 2.2 mm
- Expansion possibilities via Hoval CAN bus:
  - max. 16 controller modules in the bus system
  - max. 16 heating circuit/hot water modules in the bus system



Notice
Operation of the controller module is generally via the TopTronic® E control module installed in the heat generator!
If the control module is used without Hoval heat generator, the control module for operating the heating circuit/domestic hot water module and a wall casing with control module cut-out must be ordered separately!

Notice
Max. 2 module expansions can be connected.

TopTronic® E module expansion heating circuit

TopTronic® E module expansion Universal

Inputs and outputs
- 3 variable sensor inputs:
  - 2 x variable input for connection of a sensor
  - 1 x variable input for connection of a sensor or pulse sensor
- 0-10 V input, e.g. for connecting to heat zone control systems
- 0-10 V or PWM output for controlling a variable-speed pump
- Connection of a flow rate sensor (or pulse sensor), e.g. for heat metering at the heat generator or with hot water
- Variable 230 V 3-point output, e.g. for controlling the mixer
- Variable 230 V output, e.g. for controlling the recirculation pump
- 230 V optocoupler input connected in series to the variable 230 V output, e.g. for connecting a flow temperature guard for monitoring underfloor heating systems

Option
- Can be expanded by max. 2 module expansions (expansion of the inputs/outputs):
  - Module expansion heating circuit (1 heating/cooling circuit with/without mixer) or
  - Module expansion Universal (various special functions)

Functions
- Simple configuration and parameter setting of the plant by predefined hydraulic and function applications
- Weather-supported flow temperature controller for cooling operation with or without room influence taking account of building characteristics and switch-on optimisation
- Optimisation of the heating circuit flow temperatures and improvement in the room climate taking account of the weather forecast (only possible in combination with HovalConnect)
- Different basic programs (week programs, economy mode, holiday until, etc.) can be defined for each heating/cooling circuit plus ability to activate manual operation (construction site mode)
- Separate switching time programs for each heating/cooling circuit as well as for hot water with
  - 2 individually preset week programs comprising
    - 5 different - individually preset - day programs with
    - 6 switching points per day
- Different temperatures can be set for each switching cycle
- Various functions for hot water:
  - Selection of different basic programs (week programs, economy mode, holiday until, etc.)
  - various operating modes (e.g. accumulator priority or parallel mode)
  - adjustable storage tank pump post-operation
  - Storage tank discharge protection
  - Limiting and protection functions
- Definable switching times for recirculation pump control
- Automatic changeover of summer/winter time
- Heating characteristic adaptation possible for each individual heating circuit
- Screed drying function for underfloor heating
- Requirement contact for constant requirements (ventilation, swimming pool, etc.)
- Modem switching function
- Free timer switch channel
- Pump anti-blocking protection
- Frost protection function
- Heat balancing for heat circuit or hot water
- Plant flow control (3-point mixer for controlling the plant reference temperature)
- Thermostat function
- Self-test with error diagnosis and error memory
- Relay test for each output can be activated separately
- Functions that can be implemented with module expansions:
  - Heating/cooling circuits without mixer
  - Heating/cooling circuits with mixer or
  - hot water charging circuits

Notice
Depending on the complexity, module expansions are required for using the listed functions (max. 2 module expansions can be connected)!

Use
- For room heating/cooling or hot water charging circuit
- For optimisation of the room climate by control algorithm taking account of the weather forecast (only possible in combination with HovalConnect)
- Upstream control for technical systems such as ventilation, air conditioning systems, etc. or also for heating zone control systems

- For decentralised assembly - remote from the control module - directly at the sensors and actuators (regulating armature located a long way away):
  - Installation in wall casing/control panel
  - Connection to the operating unit via Hoval CAN bus
- With significant expansion capability by controller modules via the Hoval CAN bus
- For flexible integration in modern communication systems via different interfaces
- For remote connection via HovalConnect

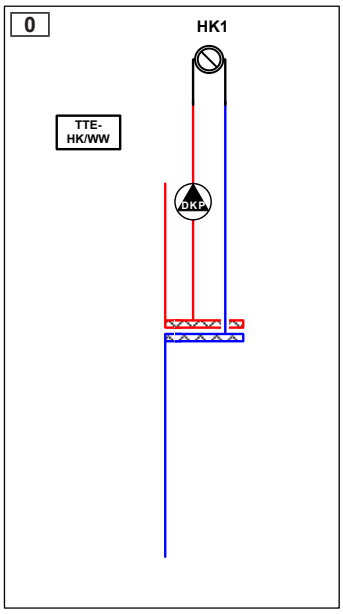
Delivery
- TopTronic® E heating circuit/hot water module incl. 2 x mounting clips for DIN rail attachment
- DIN rail with fitting accessories
- 2 immersion sensors TF/2P/5/6T, L = 5.0 m
- 1 contact sensor ALF/2P/4/T, L = 4.0 m
- Basic plug set for controller module
  - Mains in
  - Plug for 230 V output (VA3) (direct circuit pump, mixer circuit pump)
  - Plug for 2 x 230 V output (mixer) (VA1/VA2)
  - Plug for optocoupler input (SK-VA3) (flow temperature guard)
  - 2 plugs for sensor (VE1/VE2)
  - Plug for 0-10 V or PWM output (VA10 V)
  - Plug for Hoval CAN bus

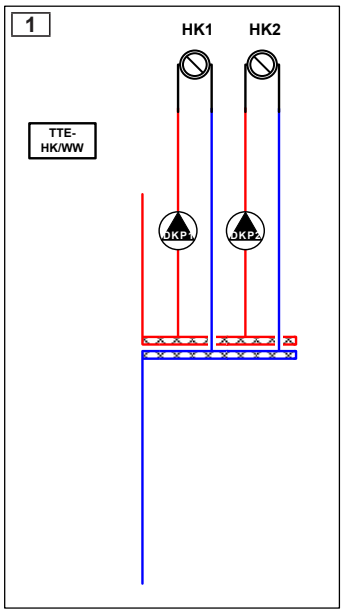
Notice
The supplementary plug set may have to be ordered to implement functions differing from the standard!

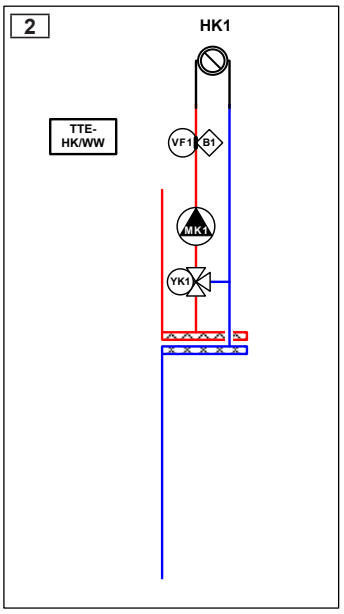
Functions that can be implemented

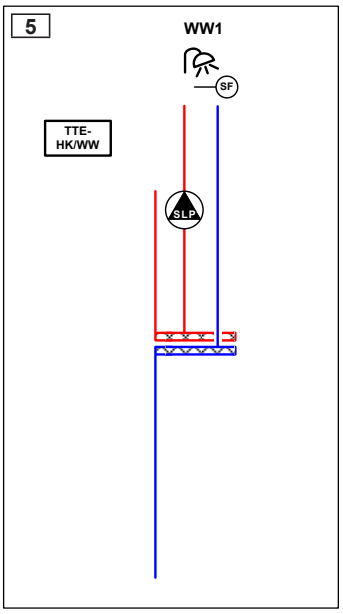
TopTronic® E heating circuit/hot water module

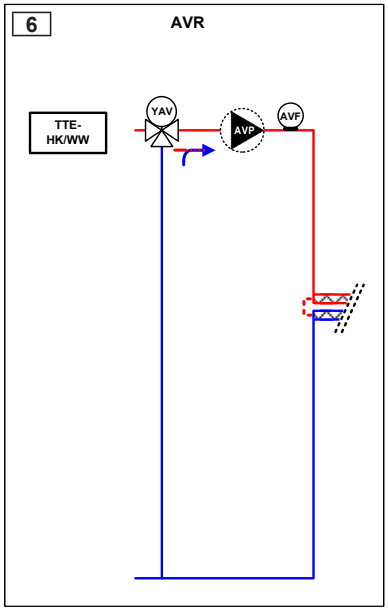
TTE-HK/WW	Plant flow control	1 direct heating circuit	2 direct heating circuits	1 mixed heating circuit	2 mixed heating circuits	3 mixed heating circuits	1 calorifier
Hydr. 0		•					
Hydr. 1			•				
Hydr. 2				•			
Hydr. 3					•		
Hydr. 4						•	
Hydr. 5							•
Hydr. 6	•						
Hydr. 7		•					•
Hydr. 8			•				•
Hydr. 9				•			•
Hydr. 10					•		•
Hydr. 11		•		•			•
Hydr. 12	•	•					
Hydr. 13	•		•				
Hydr. 14	•			•			
Hydr. 15	•				•		
Hydr. 16	•	•					•
Hydr. 17	•		•				•
Hydr. 18	•			•			•
Hydr. 19	•	•		•			•

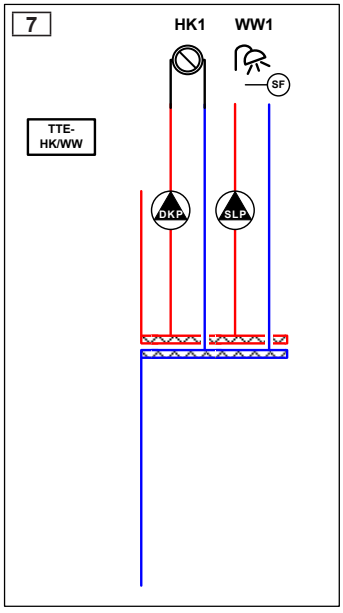


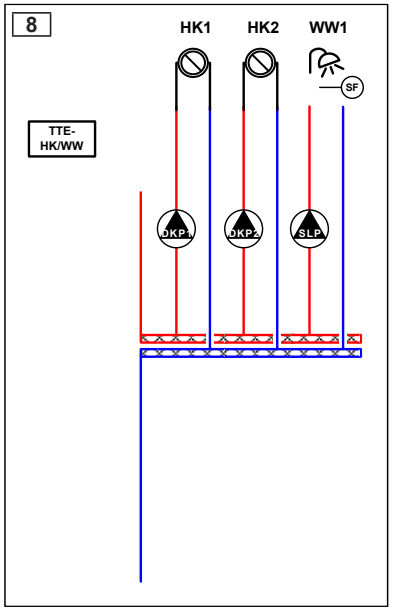




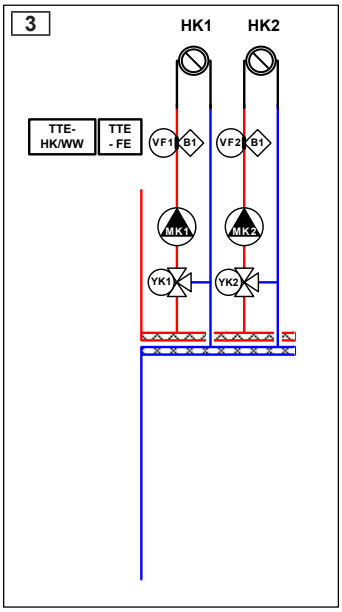


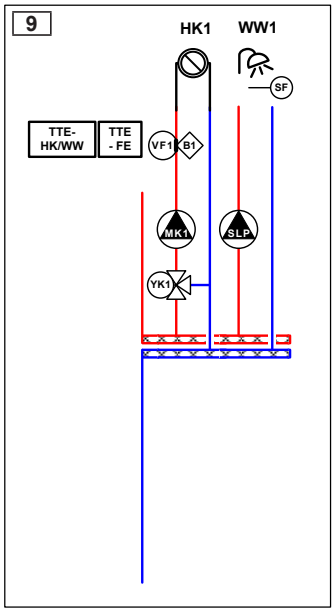


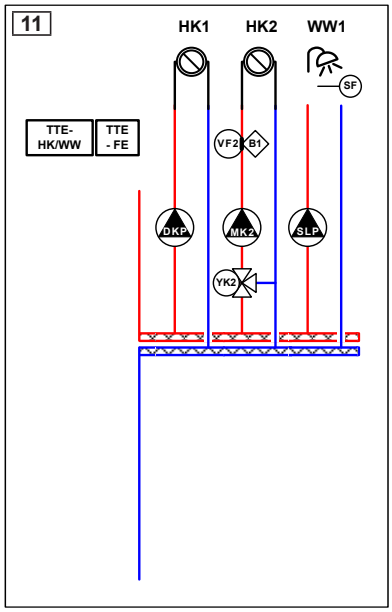


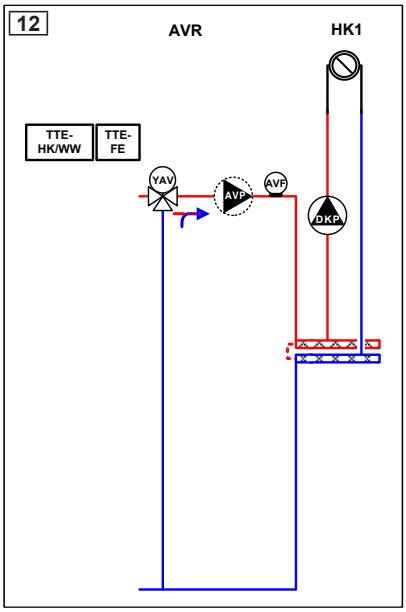


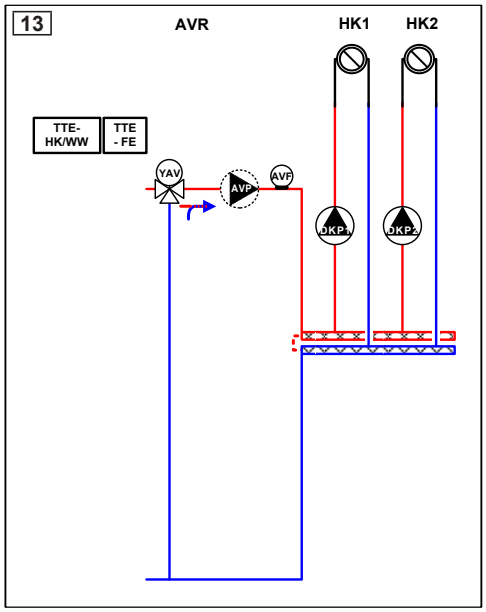
TopTronic® E heating circuit/hot water module and 1 module expansion

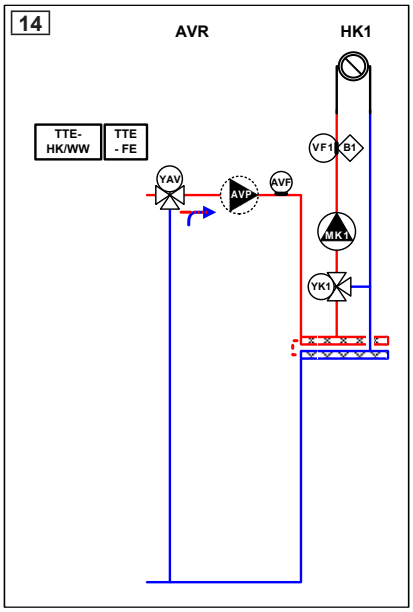


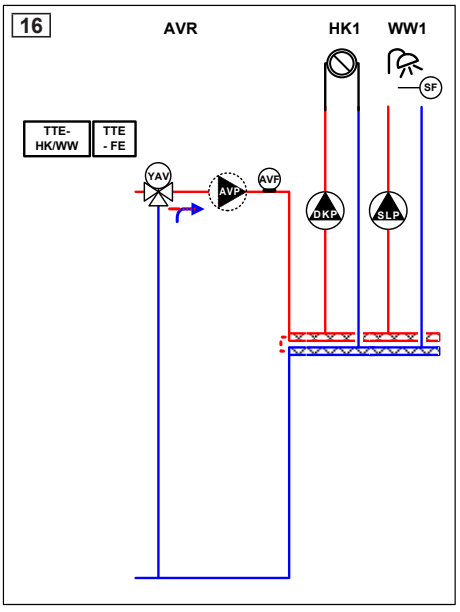


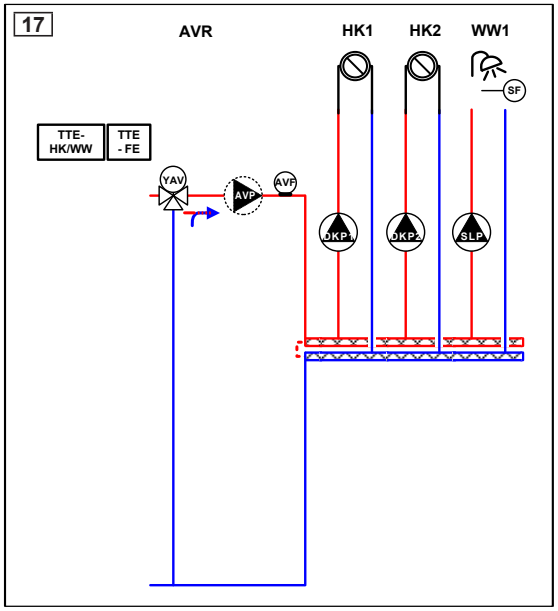




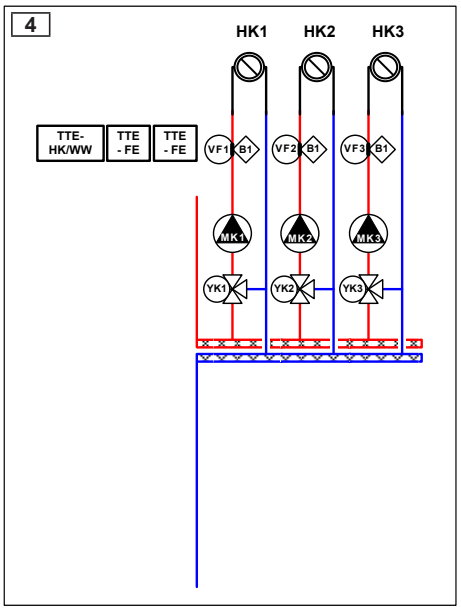


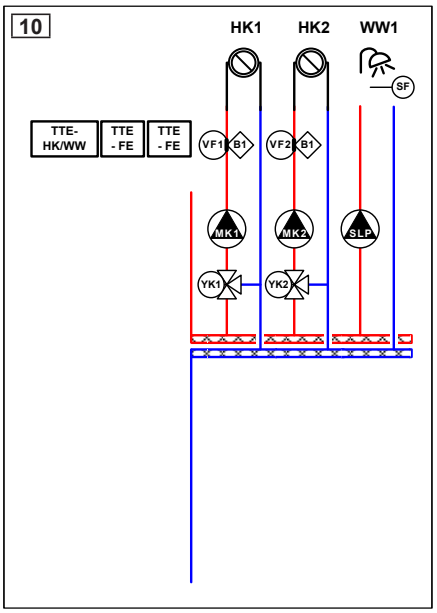


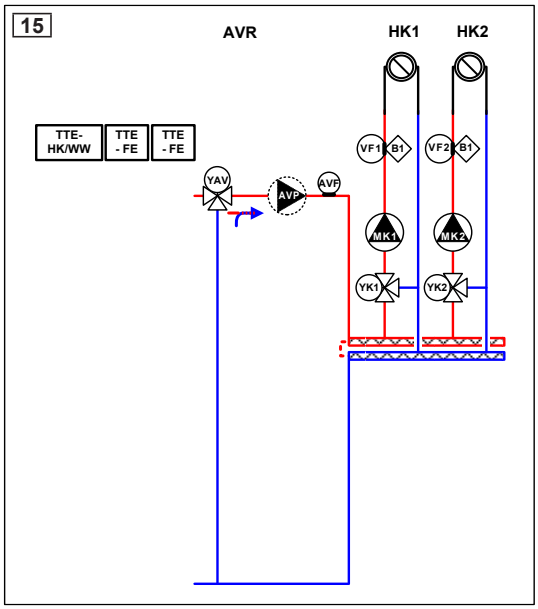


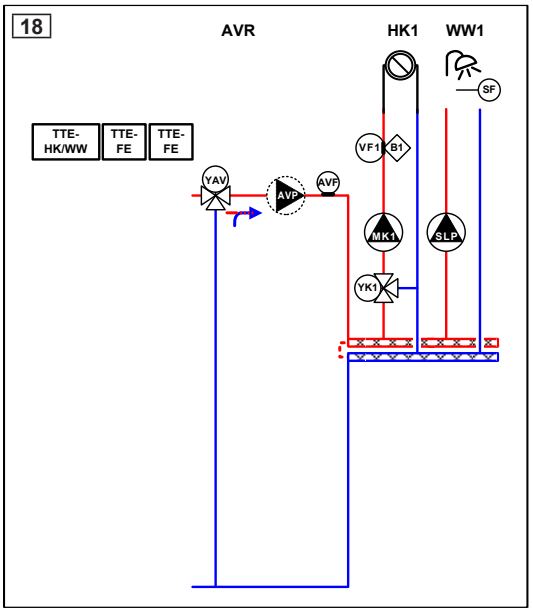


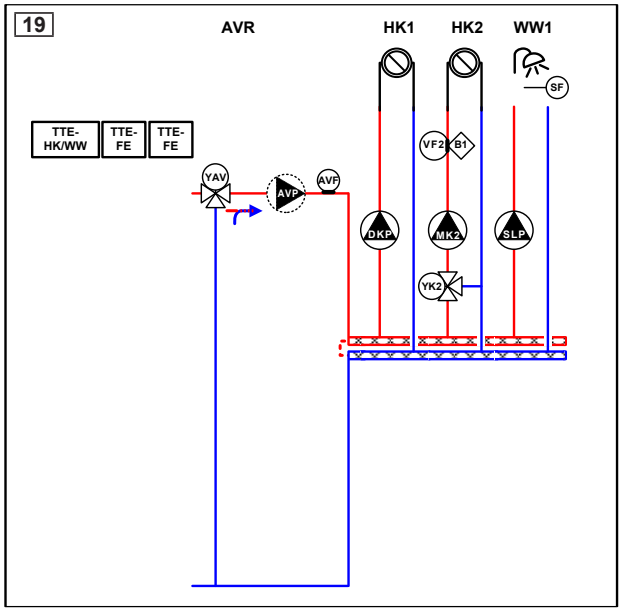
TopTronic® E heating circuit/hot water module and 2 module expansions



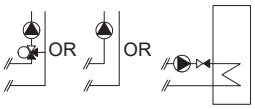








TopTronic® E controller module



TopTronic® E heating circuit/hot water module TTE-HK/WW
Controller module for controlling consumers with integrated control functions for:
- 1 heating/cooling circuit w/o mixer or
- 1 heating/cooling circuit with mixer
or
- 1 hot water charging circuit
- various additional functions
Consisting of:
- Fitting accessories
- 2 x immersion sensor TF/2P/5/6T, L = 5 m
- 1 contact sensor ALF/2P/4/T, L = 4 m
- Basic plug set for controller module

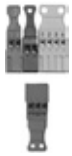
Notice
If the controller module is used without Hoval heat generator then a TopTronic® E control module must be ordered separately!

Notice
Depending on the complexity, module expansions are required for using the listed functions (max. 2 module expansions can be connected)!

Notice
The supplementary plug set may have to be ordered to implement functions differing from the standard!

Part No.

6034 571



Supplementary plug set for controller modules and module expansion TTE-FE HK
Consisting of RAST 5 mating plugs for connecting further sensors and actuators on the controller module or on the module expansion.
The controller module is already equipped with a basic plug set, the supplementary plug set is required for advanced functions.

Consisting of:
- Plug for mains out (230 V)
- Plug for sensor (VE3)
(variable input)
- Plug for 0-10 V input (VE10V)
- Plug for flow rate sensor input
(FVT)

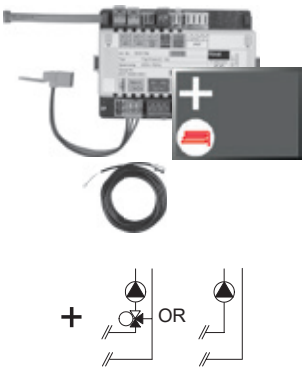
6034 503

TopTronic® E module expansions

for TopTronic® E heating circuit/hot water module

Part No.

Max. 2 expansions can be connected.

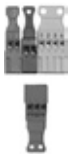


TopTronic® E module expansion heating circuit TTE-FE HK
Expansion to the inputs and outputs of the basic module heat generator or the heating circuit/domestic hot water module for implementing the following functions:
- 1 heating/cooling circuit w/o mixer or
- 1 heating/cooling circuit with mixer

Consisting of:
- Fitting accessories
- 1 contact sensor ALF/2P/4/T, L = 4.0 m
- Basic plug set FE module

6034 576

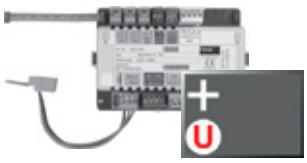
Notice
The supplementary plug set may have to be ordered to implement functions differing from the standard!



Supplementary plug set for controller modules and module expansion TTE-FE HK
Consisting of RAST 5 mating plugs for connecting further sensors and actuators on the controller module or on the module expansion.
The controller module is already equipped with a basic plug set, the supplementary plug set is required for advanced functions.

Consisting of:
- Plug for mains out (230 V)
- Plug for sensor (VE3) (variable input)
- Plug for 0-10 V input (VE10V)
- Plug for flow rate sensor input (FVT)

6034 503



TopTronic® E module expansion Universal TTE-FE UNI
Expansion to the inputs and outputs of a controller module (basic module heat generator, heating circuit/domestic hot water module, solar module, buffer module) for implementing various functions
Consisting of:
- Fitting accessories
- Plug set FE module

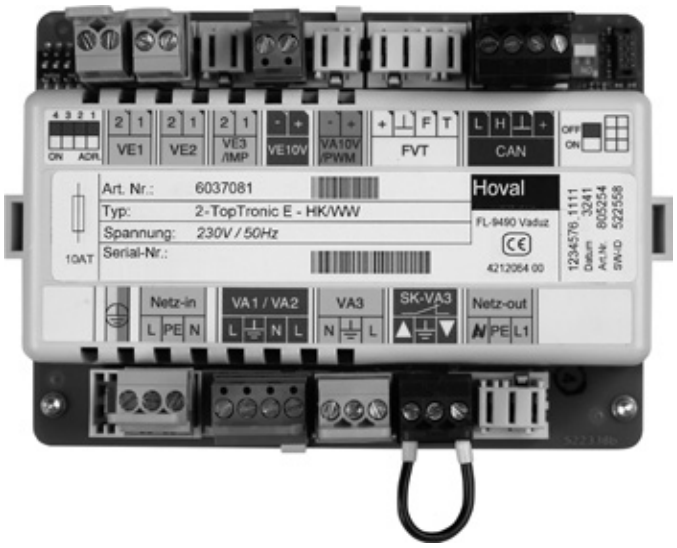
6034 575

Further information
See “Hoval TopTronic® E module expansions” chapter

TopTronic® E controller modules, control/room control modules, HovalConnect, wall casing, sensor
see separate chapter

TopTronic® E heating circuit/hot water module

Type		TTE-HK/WW
• Power supply max		230 V AC +6/-10 %
• Frequency	Hz	50-60
• Max. power consumption incl. bus supply, module expansions, approx.	W	18.9
• Min. power consumption	W	0.8
• Max. power consumption	W	7.8
• Fuse		T 10 A H 250 V
Output (low voltage)		
• Electromechanical relays		3
Output (extra-low voltage)		
• Signal output PWM or 0-10 V		1
Switching capacity		
• Electromechanical relays	A	3
Input (low voltage)		
• Optocoupler input		1
Inputs (extra-low voltage)		
• Input 0-10 V		1
• Inputs sensors		2
• Inputs flow rate sensor		1
• Pulse input (can be switched over to sensor)		1
• Voltage measuring circuit, with protective isolation 2.9 kV	V	15
Expansion (module expansion)		
• Max. number		2
Casing		
• Installation		Top hat rail mounting
• Dimensions (W x H x D) incl. plug	mm	150 x 100 x 75
• Ambient temperature (during operation)	°C	0…50
• Humidity (in operation), non-condensing	%, RH	20...80
• Storage temperature	°C	0…50
Bus system (Hoval CAN bus)		
• Capacity		Max. 4 control modules/3 control modules + 1 gateway
• Bus supply		yes
• Bus line		4-wire bus
• Bus length max twisted, shielded	m	100 (greater distances possible with engineering of additional measures)
• Line cross-section	mm²	0.5
• Cable type (recommended)		JY-(ST)Y 2 x 2 x 0.8
Other bus interfaces		Internal unit bus (master)
Miscellaneous		
• Spring reserve		approx. 10 years, battery buffered
• Type of protection		IP20
• Protection class		I – EN 60730
• Plug types		RAST 5 (coloured, coded)



Electrical connection

TopTronic® E heating circuit/hot water module

TopTronic® E solar module

- The controller module is suitable for use as differential temperature control, control of thermal solar plants, for heating process water and/or heating support.
- The controller module contains predefined hydraulic applications for different applications or plants.
- The solar yield calculation calculates the current output, the split yield in kWh as well as the total yield in MWh.
- Controller module with integrated regulating functions for:
  - One/two circuit solar energy plants
  - integrated heat balancing
  - Various additional functions
- Connection technology executed as plug-in screw terminals in coded RAST 5 design
- Update capability of the controller software
- Time and date via integrated RTC, multi-year spring reserve
- Fine fuse 10 A
- Controller module suitable for cabinet installation thanks to ability to install on DIN rail 35 x 15 x 2.2 mm
- Expansion possibilities via Hoval CAN bus:
  - max. 16 controller modules in the bus system
  - max. 16 solar modules in the bus system

Notice
Operation of the controller module is generally via the TopTronic® E control module installed in the heat generator!
If the control module is used without Hoval heat generator, the control module for operating the solar module and a wall casing with control module cut-out must be ordered separately!

Notice
Max. 2 module expansions can be connected.

TopTronic® E module expansion Universal

TopTronic® E module expansion Universal

Inputs and outputs
- 3 variable sensor inputs:
  - 2 variable inputs for connection of a sensor
  - 1 variable input for connection of a sensor or pulse sensor
- 0-10 V input
- 0-10 V or PWM output for controlling a variable-speed pump
- Connection of a flow rate sensor (or pulse sensor), e.g. for heat metering
- Variable 230 V 3-point output
- Variable 230 V output, e.g. for controlling a solar charging pump
- 230 V optocoupler input connected in series to the variable 230 V output

Option
- Can be expanded by max. 2 module expansions (expansion of the inputs/outputs):
  - Module expansion Universal

Functions
- Simple configuration and parameter setting of the plant by predefined hydraulic and function applications
- 41 pre-programmed basic variants
- Differential temperature control
- Integrated solar yield calculation
- Storage tank cascade with up to 4 consumers
- Loading and unloading function for buffer
- Cooling down function
- Overheating and frost protection
- Forced energy/high-temperature discharge
- Collector cascade with up to 2 collector fields
- Charging via plate heat exchanger
- Heat exchanger cascade
- Additional functions, e.g. recharging function, recirculation pump, etc.
- Start help function
- Consumer loading with type selection
- High temperature discharge
- Fault reporting output
- Return flow increase
- Forced energy/high-temperature discharge on storage tank or buffer maximum temperature
- Relay test for each output can be activated separately
- Self-test with error diagnosis and error memory
- Functions that can be implemented with module expansions:
  - Multi-circuit solar plants with up to 4 consumers
  - 2 collector fields
  - misc. application functions acc. to heating system diagrams

Notice
Depending on the complexity of the corresponding system hydraulics, module expansions are required for using the listed functions (max. 2 module expansions can be connected)!

Use

- Control of thermal solar plants with differential temperature control for heating process water and/or heating support
- For one/two-circuit solar plants with varying complexity with integrated heat balancing
- For decentralised assembly - remote from the control module - directly at the sensors and actuators (solar regulating armature located a long way away):
  - Installation in wall casing/control panel
  - Connection to the operating unit via Hoval CAN bus
- With significant expansion capability by controller modules via the Hoval CAN bus
- For flexible integration in modern communication systems via different interface modules
- For remote connection via HovalConnect

Delivery

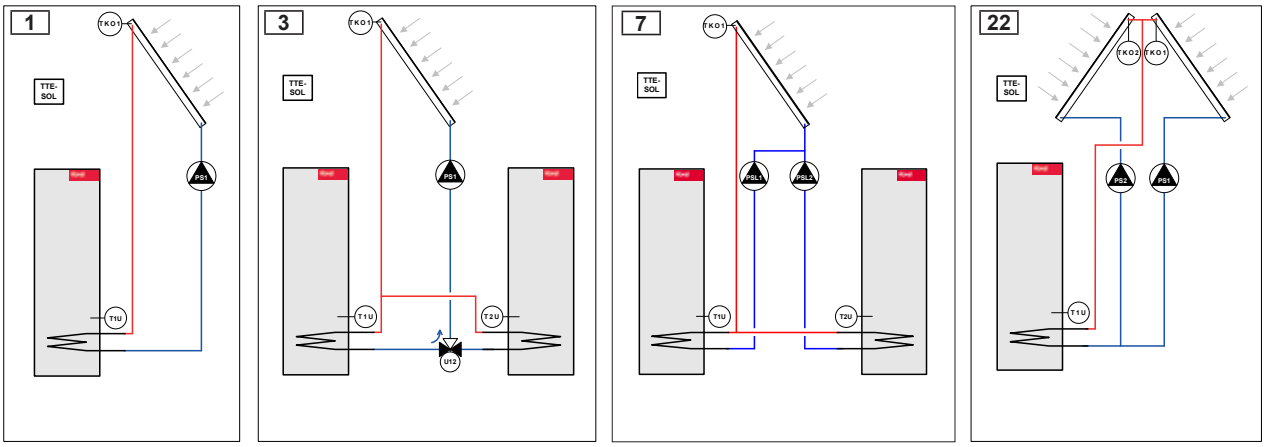
- TopTronic® E solar module incl. 2 mounting clips for DIN rail attachment
- DIN rail with fitting accessories
- 1 immersion sensor TF/2P/5/6T, L = 5.0 m
- 1 collector sensor TF/1.1P/2.5S/5.5T, L = 2.5 m
- Basic plug set for controller module
  - Mains in
  - Plug for 230 V output (VA3)
  - Plug for 2 230 V outputs (VA1/VA2)
  - Plug for optocoupler input (SK-VA3)
  - 2 plugs for sensor (VE1/VE2)
  - Plug for 0-10 V output (VA10V/PWM)
  - Plug for Hoval CAN bus

Notice
The supplementary plug set may have to be ordered to implement functions differing from the standard!

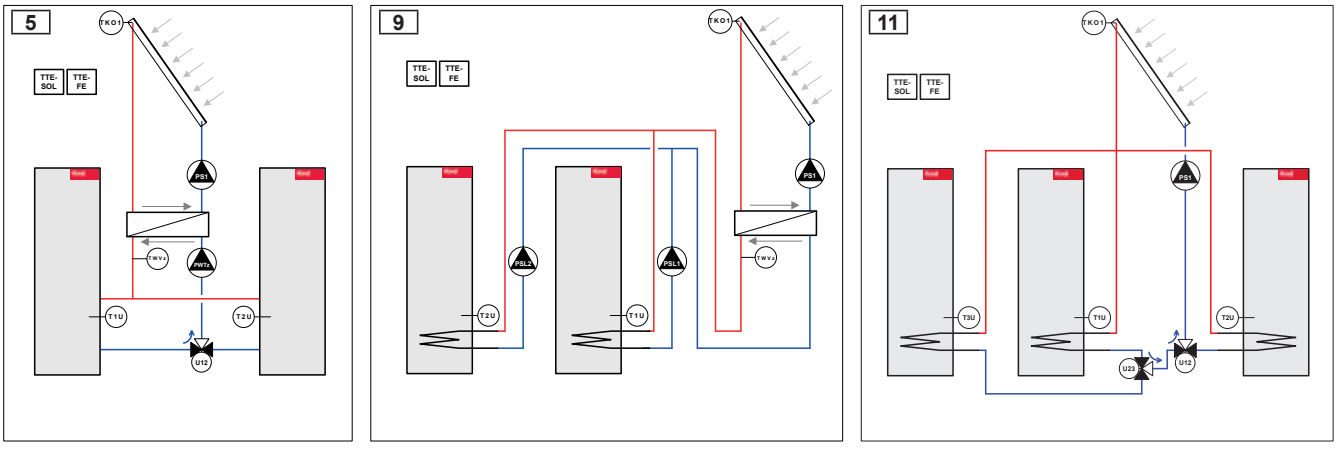
Functions that can be implemented

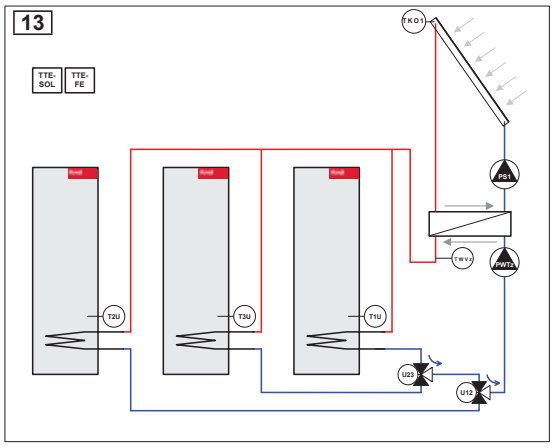
TopTronic® E solar module

TTE-SOL	1 collector	2 collectors	Ext. HE	1 consumer	2 consumers	3 consumers	4 consumers	Change-over unit	Shut-off unit
Hydr. 1	●			●					
Hydr. 3	●			●	●			●	
Hydr. 5	●		●	●	●			●	
Hydr. 7	●			●	●				
Hydr. 9	●		●	●	●				
Hydr. 11	●			●	●	●		●	
Hydr. 13	●		●	●	●	●		●	
Hydr. 15	●			●	●	●			
Hydr. 17	●		●	●	●	●			
Hydr. 19	●			●	●	●	●	●	
Hydr. 20	●		●	●	●	●	●	●	
Hydr. 21	●			●	●	●	●		
Hydr. 22		●		●					
Hydr. 24		●		●	●			●	
Hydr. 26		●	●	●	●			●	
Hydr. 28		●	●	●	●				
Hydr. 30		●		●	●	●		●	
Hydr. 32		●	●	●	●	●		●	
Hydr. 34		●		●	●	●	●	●	
Hydr. 35		●	●	●	●	●	●	●	
Hydr. 36	●		●	●	●				●
Hydr. 37	●		●	●	●	●			●
Hydr. 38	●		●	●	●	●	●		●
Hydr. 39		●	●	●	●				●
Hydr. 40		●	●	●	●	●			●
Hydr. 41		●	●	●	●	●	●		●



TopTronic® E solar module and 1 module expansion

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TTE-FE
TKO1
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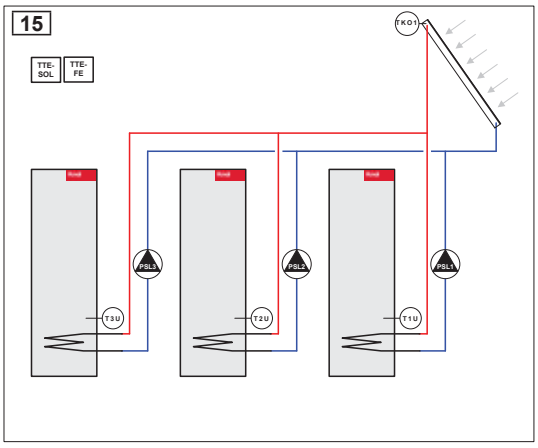
TWV1
PWT2
T2U
T3U
T1U
U23
U12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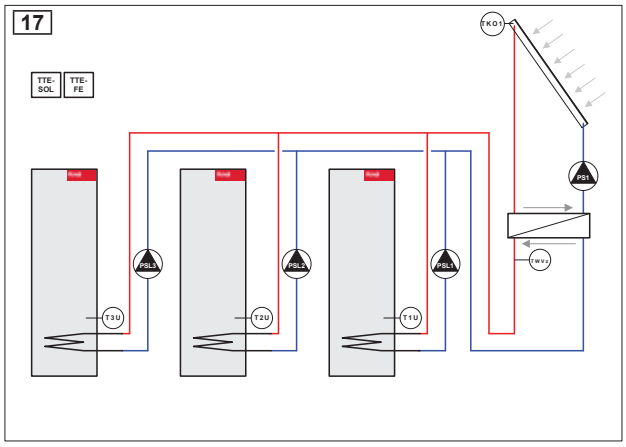
PSL3
T3U
T2U
T1U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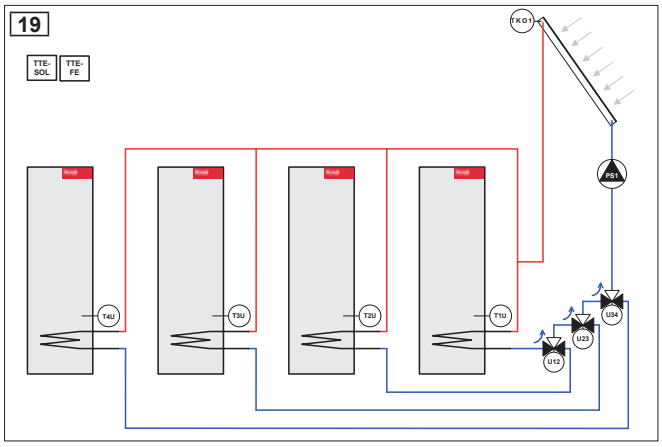
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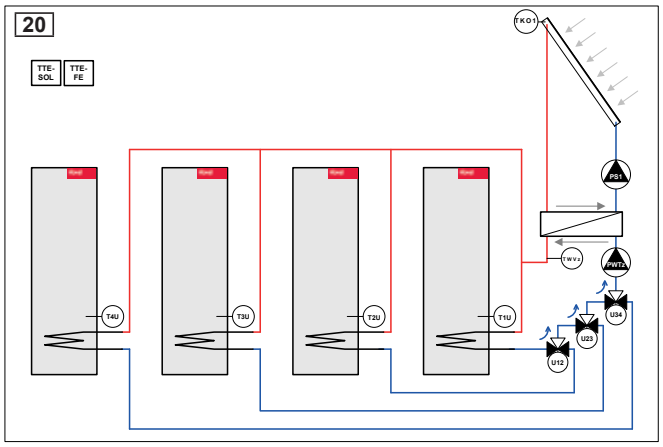
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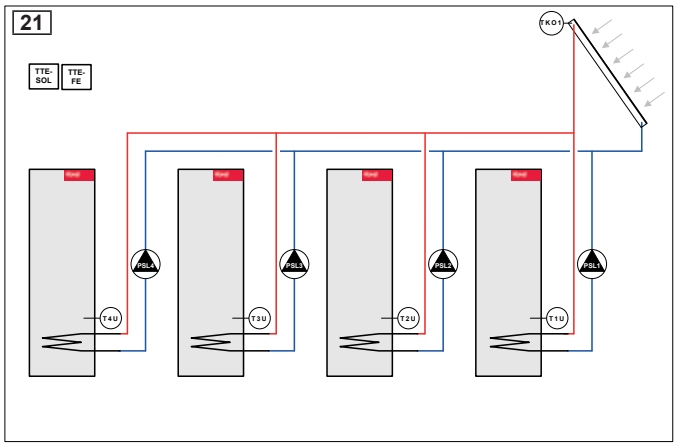
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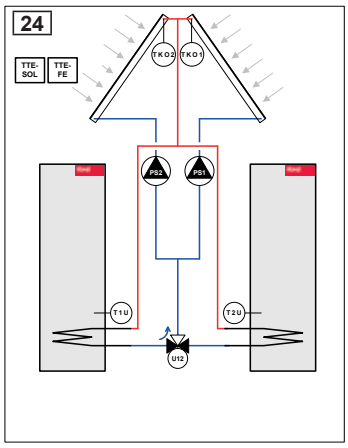
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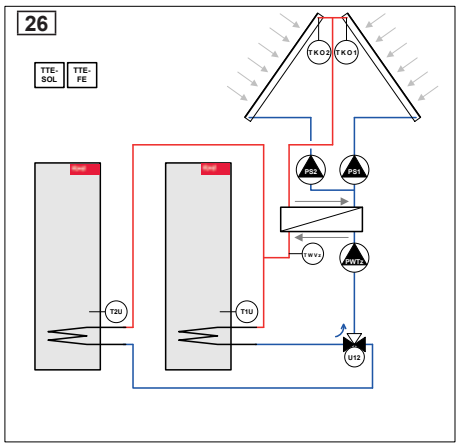
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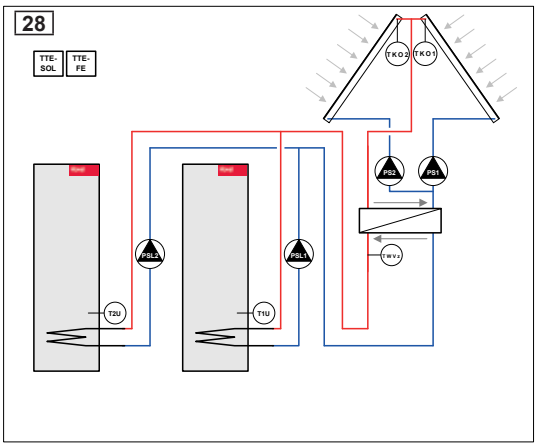
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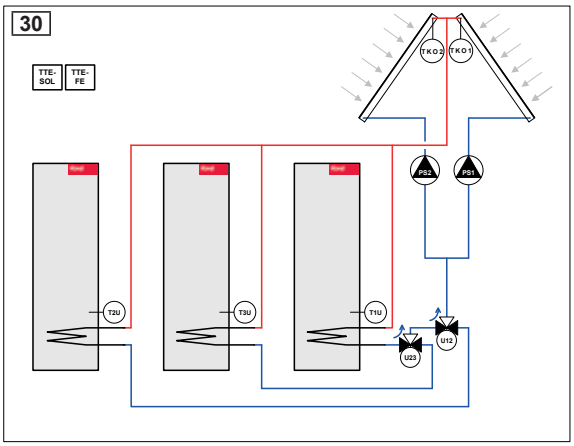
T1U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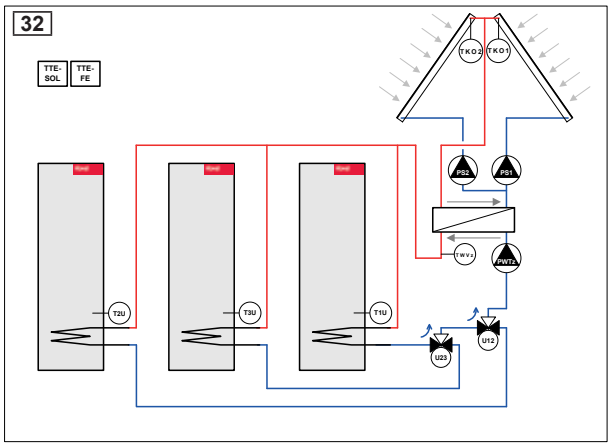
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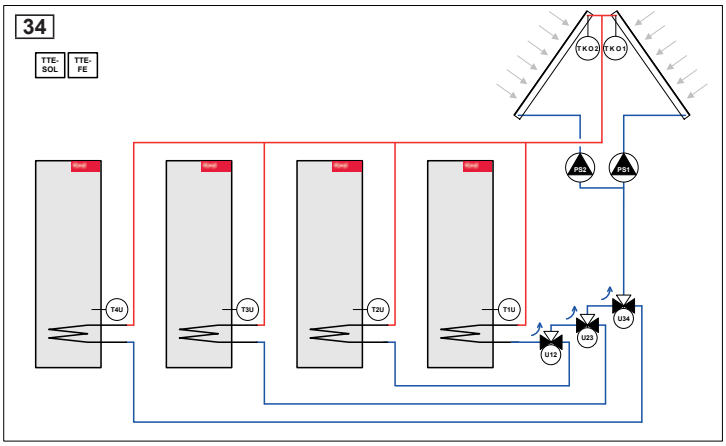
U23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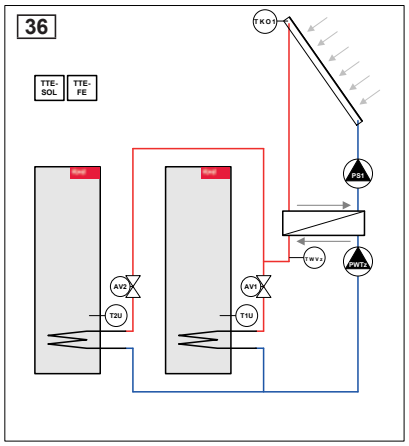
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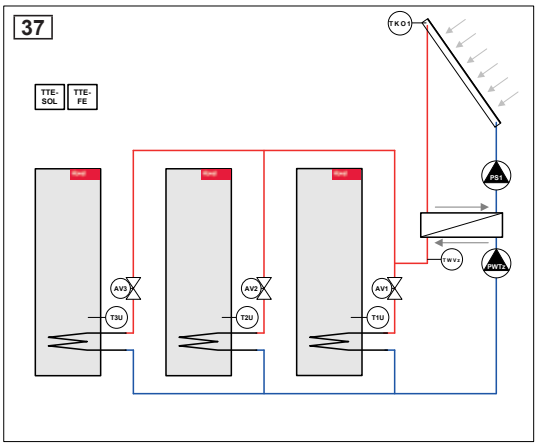
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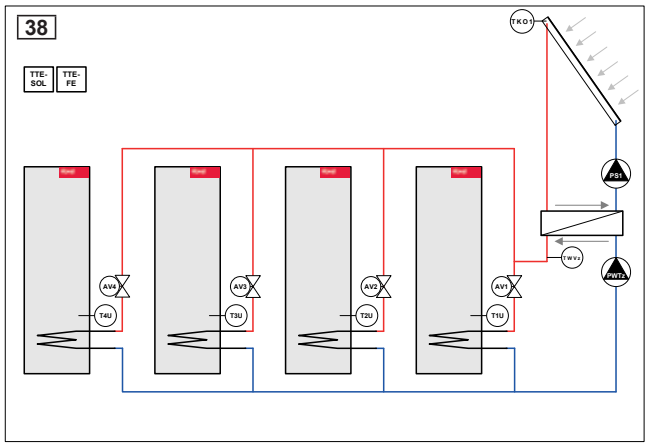
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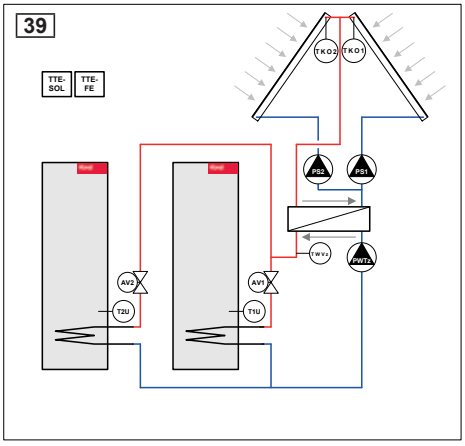
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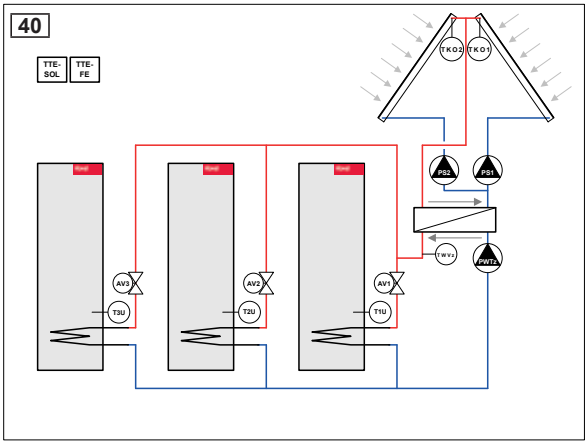
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TTE-FE
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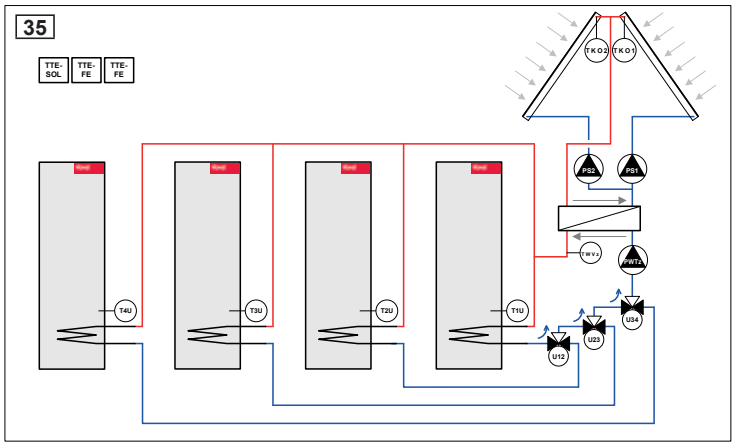
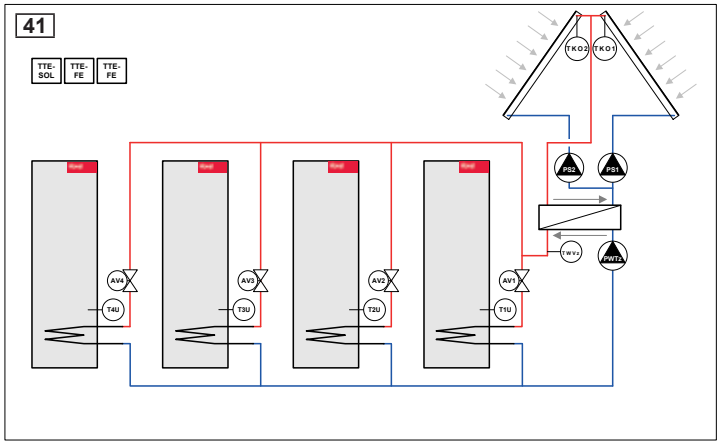
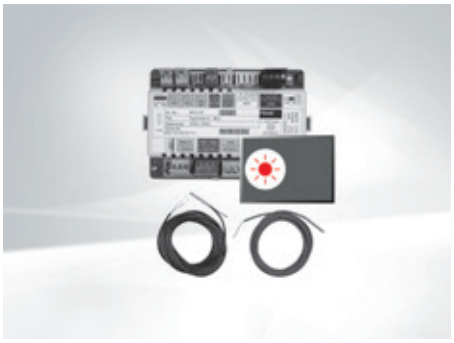
T2U
T1U

TopTronic® E solar module and 2 module expansions



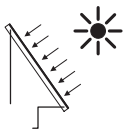


TopTronic® E controller module

	Part No.
	6037 058

TopTronic® E solar module TTE-SOL
The controller module is suitable for use as temperature differential control, control of thermal solar plants, for domestic water heating and/or heating support.
Controller module with integrated control functions for
- solar circuit
- collector cascade
- storage tank cascade with up to 4 consumers
- consumer loading, with type selection
- temperature differential control
- loading and unloading function for additional/reserve buffer tank
- Integrated solar yield calculation

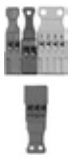
Consisting of:
- Fitting accessories
- 1 immersion sensor TF/2P/5/6T, L = 5 m
- 1 collector sensor TF/1.1P/2.5S/5.5T L = 2.5 m
- Basic plug set for controller module



Notice
In a standalone application, the control module for operating the solar module and a wall casing must be ordered separately!

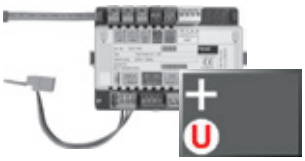
Notice
Depending on the complexity, module expansions are required for using the listed functions (max. 2 module expansions can be connected)!

Notice
The supplementary plug set may have to be ordered to implement functions differing from the standard!



Supplementary plug set for controller modules and module expansion TTE-FE HK Consisting of RAST 5 mating plugs for connecting further sensors and actuators on the controller module or on the module expansion. The controller module is already equipped with a basic plug set, the supplementary plug set is required for advanced functions. Consisting of: - Plug for mains out (230 V) - Plug for sensor (VE3) (variable input) - Plug for 0-10 V input (VE10V) - Plug for flow rate sensor input (FVT)	6034 503

TopTronic® E module expansion
for TopTronic® E solar module



Max. 2 expansions can be connected.

TopTronic® E module expansion Universal TTE-FE UNI
Expansion to the inputs and outputs of a controller module (basic module heat generator, heating circuit/domestic hot water module, solar module, buffer module) for implementing various functions
Consisting of:
- Fitting accessories
- Plug set FE module

Notice
Refer to the Hoval System Technology to find which functions and hydraulic arrangements can be implemented.

Further information
See “Hoval TopTronic® E module expansions” chapter

TopTronic® E controller modules, control/room control modules, HovalConnect, wall casing, sensor
see separate chapter

Part No.
6034 575

TopTronic® E solar module

Type		TTE-SOL
• Power supply max		230 V AC +6/-10 %
• Frequency	Hz	50-60
• Max. power consumption incl. bus supply, module expansions, approx.	W	18.9
• Min. power consumption	W	0.8
• Max. power consumption	W	7.8
• Fuse		T 10 A H 250 V
Output (low voltage)		
• Electromechanical relays		3
Output (extra-low voltage)		
• Signal output PWM or 0-10 V		1
Switching capacity		
• Electromechanical relays	A	3
Input (low voltage)		
• Optocoupler input		1
Inputs (extra-low voltage)		
• Input 0-10 V		1
• Inputs sensors		2
• Inputs flow rate sensor		1
• Pulse input (can be switched over to sensor)		1
• Voltage measuring circuit, with protective isolation 2.9 kV	V	15
Expansion (module expansion)		
• Max. number		2
Casing		
• Installation		Top hat rail mounting
• Dimensions (W x H x D) incl. plug	mm	150 x 100 x 75
• Ambient temperature (during operation)	°C	0…50
• Humidity (in operation), non-condensing	%, RH	20...80
• Storage temperature	°C	0…50
Bus system (Hoval CAN bus)		
• Capacity		Max. 4 control modules/3 control modules + 1 gateway
• Bus supply		yes
• Bus line		4-wire bus
• Bus length max twisted, shielded	m	100 (greater distances possible with engineering of additional measures)
• Line cross-section	mm²	0.5
• Cable type (recommended)		JY-(ST)Y 2 x 2 x 0.8
Other bus interfaces		Internal unit bus (master)
Miscellaneous		
• Spring reserve		approx. 10 years, battery buffered
• Type of protection		IP20
• Protection class		I – EN 60730
• Plug types		RAST 5 (coloured, coded)

Electrical connection

TopTronic® E solar module

TopTronic® E buffer module

- Controller module with integrated regulating functions for:
  - Heating buffer management or
  - Cooling buffer management
  - Various additional functions
- Connection technology executed as plug-in screw terminals in coded RAST 5 design
- Update capability of the controller software
- Time and date via integrated RTC, multi-year spring reserve
- Fine fuse 10 A
- Controller module suitable for cabinet installation thanks to ability to install on DIN rail 35 x 15 x 2.2 mm
- Expansion possibilities via Hoval CAN bus:
  - max. 16 controller modules in the bus system
  - max. 2 buffer modules
  - max. 1 active heating butter and max. 1 active cooling buffer function

Notice
Operation of the controller module is generally via the TopTronic® E control module installed in the heat generator!
If the control module is used without Hoval heat generator, the control module for operating the buffer module and a wall casing with control module cut-out must be ordered separately!

Notice
Max. 2 module expansions can be connected.

TopTronic® E module expansion Universal

TopTronic® E module expansion Universal

Inputs and outputs
- 3 variable sensor inputs:
  - 2 variable inputs for connection of a sensor
  - 1 variable input for connection of a sensor or pulse sensor
- 0-10 V input, e.g. for setpoint connection
- 0-10 V or PWM output for controlling a variable-speed pump
- Connection of a flow sensor (or pulse sensor)
- Variable 230 V 3-point output
- Variable 230 V output, e.g. for controlling a buffer charging pump
- 230 V optocoupler input connected in series to the variable 230 V output

Option
- Can be expanded by max. 2 module expansions (expansion of the inputs/outputs):
  - Module expansion Universal

Functions
- Simple configuration and parameter setting of the plant by predefined hydraulic and function applications
- Heating buffer loading controls:
  - 1 or 2 buffer sensors
  - Stratified charge mixing valve with separate buffer loading sensor
  - Modulating buffer charging pump (0-10 V/PWM) constant or Δ T-controlled
- Heating buffer discharge control with
  - 1 buffer sensor
  - Changeover element or discharging mixer valve with separate buffer discharging sensor
- Cooling buffer loading control with 1 or 2 cooling buffer sensors
- External requirement contacts for constant requirement
- External requirement contacts for reference value increase/reduction for implementing tariff charging, Smart Grid, etc.
- Separate differential controls and thermostat functions for changeover in multiple buffer applications
- Pump anti-blocking protection
- Heat quantity balancing
- Buffer charging or buffer discharging
- Relay test for each output can be activated separately
- Self-test with error diagnosis and error memory
- Thermostat function
- Functions that can be implemented with module expansions:
  - misc. special functions acc. to heating system diagrams

Notice
Depending on the complexity, module expansions are required for using the listed functions (max. 2 module expansions can be connected)!

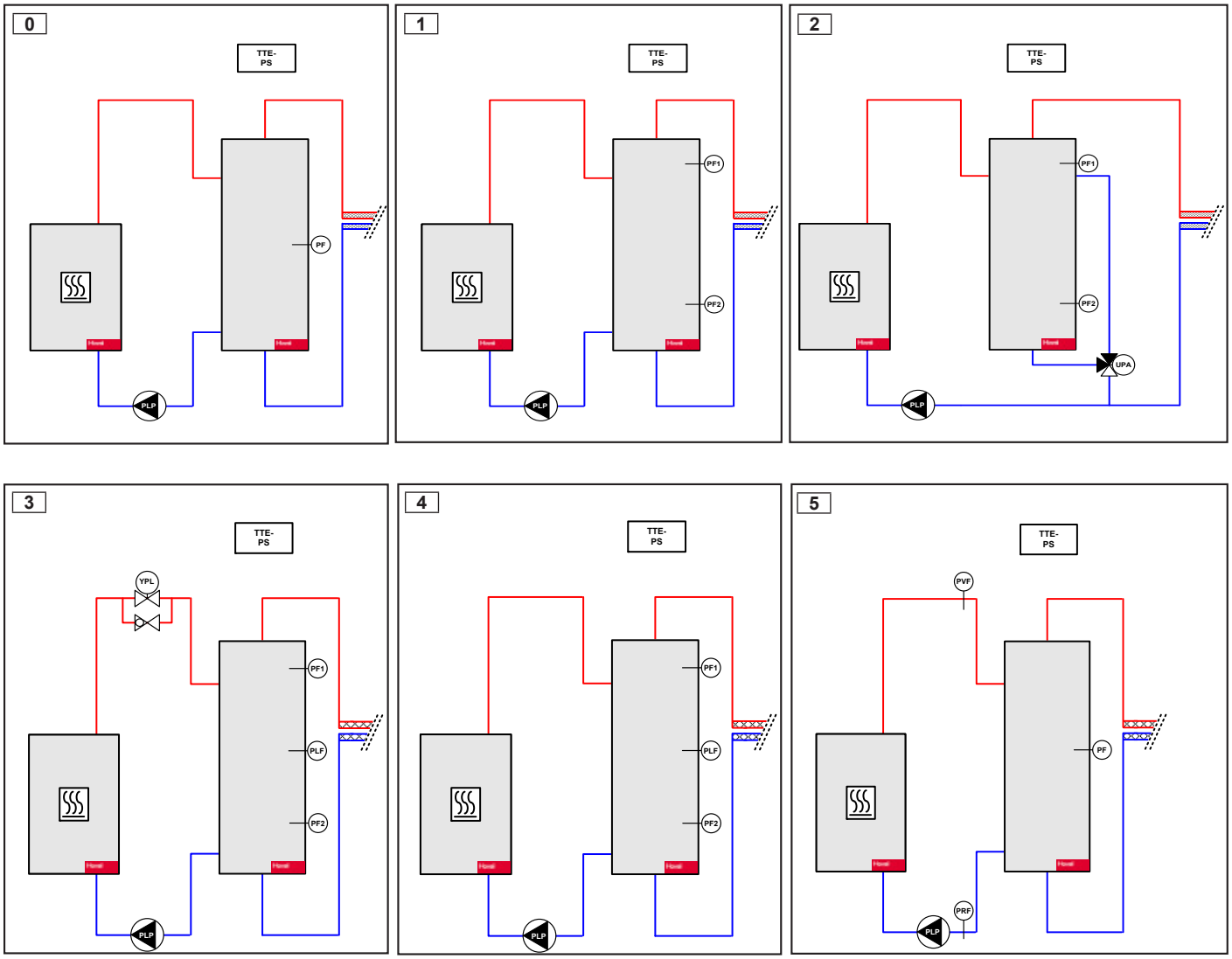
Use
- For energy management of heating and cooling buffers in simply and complex heating systems
- For optimising the energy efficiency of the overall system by various functions such as tariff charging, Smart Grid function, etc.
- For decentralised assembly - remote from the control module - directly at the sensors and actuators (buffer storage tank located a long way away)
  - Installation in wall casing/control panel
  - Connection to the operating unit via Hoval CAN bus
- With significant expansion capability by controller modules via the Hoval CAN bus
- For flexible integration in modern communication systems via different interfaces
- For remote connection via HovalConnect

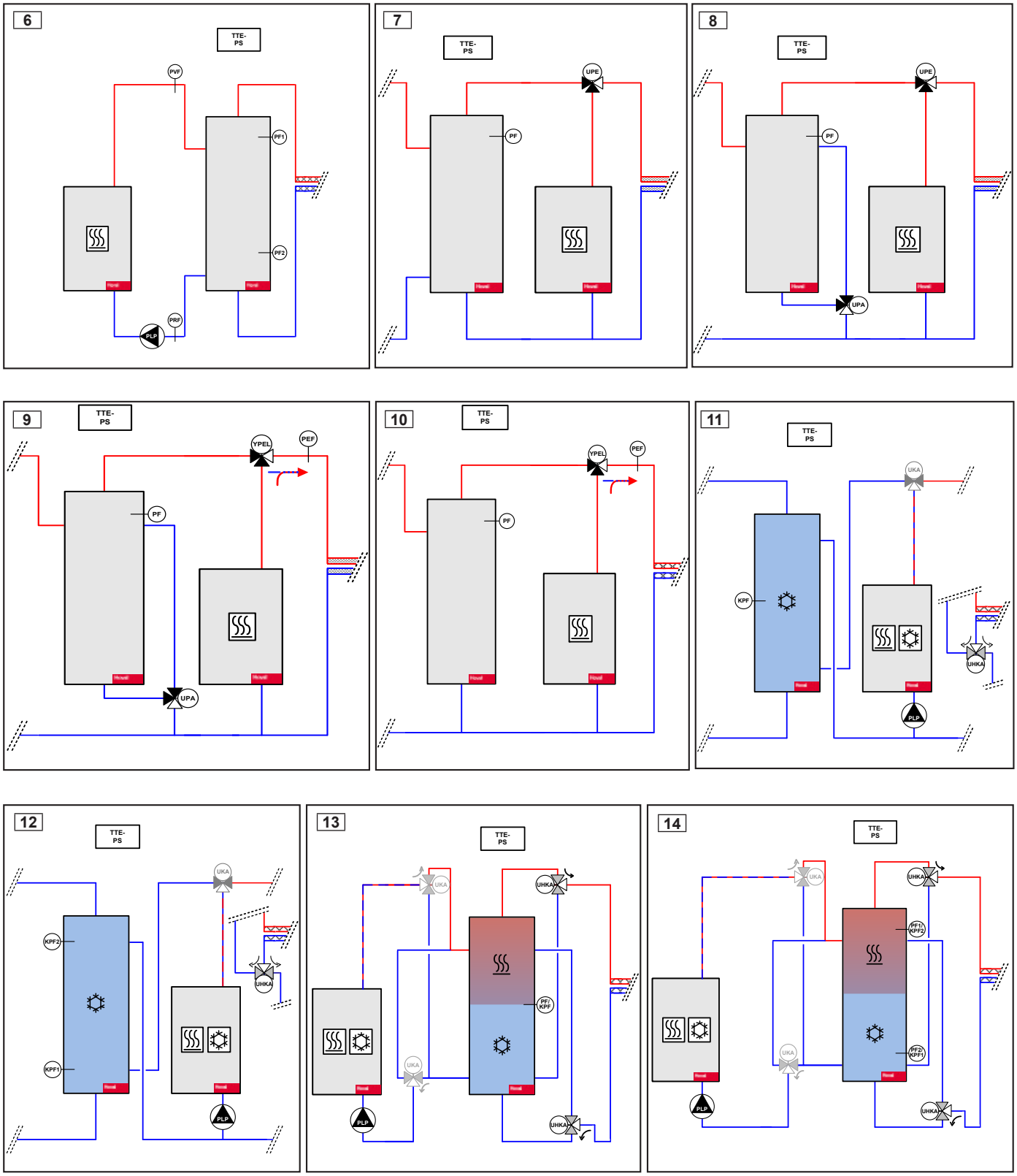
Delivery

- TopTronic® E buffer module incl. 2 x mounting clips for DIN rail attachment
- DIN rail with fitting accessories
- 2 x immersion sensor TF/2P/5/6T, L = 5.0 m
- Basic plug set for controller module
  - Mains in
  - Plug for 230 V output (VA3) (direct circuit pump, mixer circuit pump)
  - Plug for 2 x 230 V output (mixer) (VA1/VA2)
  - Plug for optocoupler input (SK/VA3) (flow temperature controller)
  - 2 x plug for sensor (VE1/VE2)
  - Plug for 0-10 V or PWM output (VA10V)
  - Plug for Hoval CAN bus

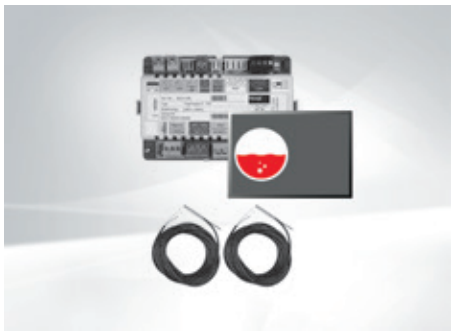
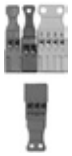
Notice
The supplementary plug set may have to be ordered to implement functions differing from the standard!

TTE-PS	Heating buffer charging control					Heating buffer charging control			Cooling buffer charging control	
	1 buffer sensor	2 buffer sensors	Charging mixing valve	Modulating charging pump constant	Modulating charging pump ΔT	Change-over unit	Discharging mixer	Buffer start-up release	1 buffer sensor	2 buffer sensors
Hydr. 0	•									
Hydr. 1		•						•		
Hydr. 2		•								
Hydr. 3		•	•							
Hydr. 4		•		•						
Hydr. 5	•				•					
Hydr. 6		•			•					
Hydr. 7						•				
Hydr. 8						•		•		
Hydr. 9							•	•		
Hydr. 10							•			
Hydr. 11									•	
Hydr. 12										•
Hydr. 13	•								•	
Hydr. 14		•								•



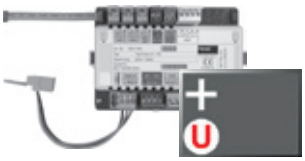

6
TTE-PS
PVF
PF1
PF2
PRF
PLP
7
TTE-PS
UPE
PF
8
TTE-PS
UPE
PF
UPA
9
TTE-PS
YPEL
PEF
PF
UPA
10
TTE-PS
YPEL
PEF
PF
11
TTE-PS
UKA
KPF
UHKA
PLP
12
TTE-PS
UKA
KPF2
KPF1
UHKA
PLP
13
TTE-PS
UKA
UHKA
PF/KPF
PLP
14
TTE-PS
UKA
UHKA
PF1/KPF2
PF2/KPF1
PLP

TopTronic® E controller module

	Part No.
 **TopTronic® E buffer module TTE-PS** Controller module with integrated control functions for: - heating buffer management or - cooling buffer management - var. additional functions Consisting of: - Fitting accessories - 2 immersion sensors TF/2P/5/6T L = 5 m - Basic plug set for controller module	6037 057
Notice If the controller module is used without Hoval heat generator then a TopTronic® E control module must be ordered separately!	
Notice Depending on the complexity, module expansions are required for using the listed functions (max. 2 module expansions can be connected)!	
Notice The supplementary plug set may have to be ordered to implement functions differing from the standard!	
 **Supplementary plug set for controller modules and module expansion TTE-FE HK** Consisting of RAST 5 mating plugs for connecting further sensors and actuators on the controller module or on the module expansion. The controller module is already equipped with a basic plug set, the supplementary plug set is required for advanced functions. Consisting of: - Plug for mains out (230 V) - Plug for sensor (VE3) (variable input) - Plug for 0-10 V input (VE10V) - Plug for flow rate sensor input (FVT)	6034 503

TopTronic® E module expansion

for TopTronic® E buffer module



Max. 2 expansions can be connected.

TopTronic® E module expansion Universal TTE-FE UNI
Expansion to the inputs and outputs of a controller module (basic module heat generator, heating circuit/domestic hot water module, solar module, buffer module) for implementing various functions
Consisting of:
- Fitting accessories
- Plug set FE module

Notice
Refer to the Hoval System Technology to find which functions and hydraulic arrangements can be implemented.

Further information
See “Hoval TopTronic® E module expansions” chapter

TopTronic® E controller modules, control/room control modules, HovalConnect, wall casing, sensor
see separate chapter

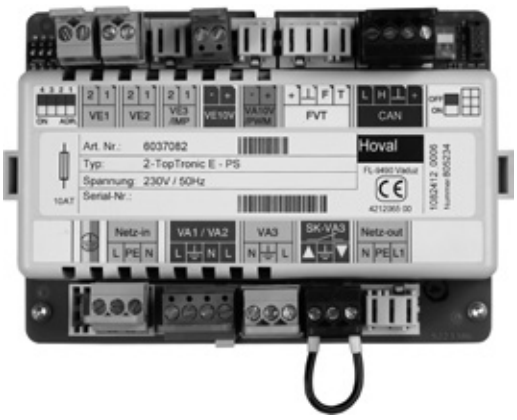
Part No.
6034 575

TopTronic® E buffer module

Type		TTE-PS
• Power supply max		230 V AC +6/-10 %
• Frequency	Hz	50-60
• Max. power consumption incl. bus supply, module expansions, approx.	W	18.9
• Min. power consumption	W	0.8
• Max. power consumption	W	7.8
• Fuse		T 10 A H 250 V
Output (low voltage)		
• Electromechanical relays		3
Output (extra-low voltage)		
• Signal output PWM or 0-10 V		1
Switching capacity		
• Electromechanical relays	A	3
Input (low voltage)		
• Optocoupler input		1
Inputs (extra-low voltage)		
• Input 0-10 V		1
• Inputs sensors		2
• Inputs flow rate sensor		1
• Pulse input (can be switched over to sensor)		1
• Voltage measuring circuit, with protective isolation 2.9 kV	V	15
Expansion (module expansion)		
• Max. number		2
Casing		
• Installation		Top hat rail mounting
• Dimensions (W x H x D) incl. plug	mm	150 x 100 x 75
• Ambient temperature (during operation)	°C	0…50
• Humidity (in operation), non-condensing	% RH	20...80
• Storage temperature	°C	0…50
Bus system (Hoval CAN bus)		
• Capacity		Max. 4 control modules/3 control modules + 1 gateway
• Bus supply		yes
• Bus line		4-wire bus
• Bus length max twisted, shielded	m	100 (greater distances possible with engineering of additional measures)
• Line cross-section	mm²	0.5
• Cable type (recommended)		JY-(ST)Y 2 x 2 x 0.8
Other bus interfaces		Internal unit bus (master)
Miscellaneous		
• Spring reserve		approx. 10 years, battery buffered
• Type of protection		IP20
• Protection class		I – EN 60730
• Plug types		RAST 5 (coloured, coded)

Electrical connection

TopTronic® E buffer module



TopTronic® E measuring module

- Controller module with M-Bus interface for reading out heat, gas and electricity meters (max. 16 M-Bus meters)
- Counter values can be used in different functions in the controller system, and displayed
- Voltage: 12 V DC 120 mA
- Type of protection: IP20
- Connection technology executed as plug-in screw terminals
- Update capability of the controller software
- Controller module suitable for cabinet installation by ability to install on DIN rail 35 x 15 x 2.2 mm or 35 x 7.5 x 2.2 mm
- Many possible uses via the Hoval CAN bus

Notice
Operation of the controller module is generally via the TopTronic® E control module installed in the heat generator!

Inputs and outputs
- M-Bus interface for reading out max. 16 M-Bus meters

Notice
If an electrical power supply is required for the M-Bus meter, it is not provided by the TopTronic® E measuring module.

Use
- For accommodating different M-Bus-capable meters in the bus system

Notice
Electrical power supply via the Hoval CAN bus, i.e. using the measuring module reduces the max. number of room control modules that can be connected to the bus system!
List of compatible M-Bus devices see chapter “Energy/heat quantity balancing”.

Delivery
- TopTronic® E measuring module incl. 2 x mounting clips for DIN rail attachment
- Plug set for controller module
  - Plug for M-Bus
  - Plug for Hoval CAN bus
- DIN rail with fitting accessories

TopTronic® E controller module

TopTronic® E measuring module TTE-MWA
Controller module with M-Bus interface
for reading out heat meters
(max. 16 M-Bus participants)

Consisting of:
- Fitting accessories
- Plug set for controller module

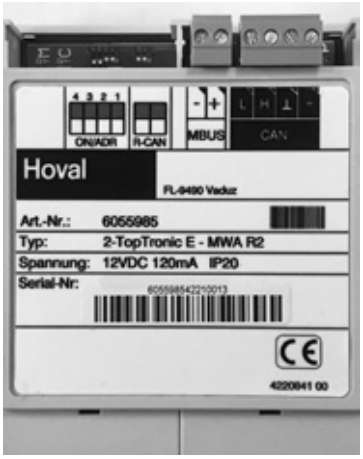
Part No.
6034 574

TopTronic® E measuring module

Type		TTE-MWA
• Power supply max		12 V DC +6/-10 %
• Min. power consumption	W	0.6
• Max. power consumption	W	< 2.5
Casing		
• Installation		DIN rail mounting
• Dimensions (W x H x D) incl. plug	mm	70 x 92 x 35
• Ambient temperature (during operation)	°C	0…50
• Humidity (in operation), non-condensing	% RH	20...80
• Storage temperature	°C	0…50
Bus system (Hoval CAN bus)		
• Capacity		120 mA, > 120 mA external lectrical power supply required, depending on the M-Bus terminal units
• Bus supply		No
• Bus line		4-wire bus
• Bus length max twisted, shielded	m	100 (greater distances possible with engineering of additional measures)
• Line cross-section	mm²	0.5
• Cable type (recommended)		JY-(ST)Y 2 x 2 x 0.8
M-Bus interface		
• M-Bus voltage	V	30
• Transfer rate	baud	300 to 2400
• Electrical isolation		No
• Capacity		maximum 16 terminal units (standard loads 1.5 mA each)
• M-Bus protocol		according to list of Hoval documentation
• Max. bus length twisted, shielded		500 m with line cross section 0.8 mm²
• Min. line cross-section	mm²	0.8
Miscellaneous		
• Type of protection		IP20
• Protection class		II – EN 60730
• Plug types		Plug-in terminal technology

Electrical connection

TopTronic® E measuring module



TopTronic® E module expansion heating circuit

- Expansion to the inputs and outputs of a TopTronic® E basic module heat generator or the heating circuit/hot water module for implementing the following functions:
  - 1 heating/cooling circuit without mixer or
  - 1 heating/cooling circuit with mixer
- Max. 1 module expansion possible per basic module heat generator
- Max. 2 module expansions per heating circuit/hot water module possible
- Connection technology executed as plug-in screw terminals in coded RAST 5 design
- Connection to basic module using ribbon cable and mains connector set (max. distance between basic module and module expansion 10 cm)
- Controller module suitable for cabinet installation (mounting on DIN rail 35 x 15 x 2.2 mm)
- Protection via the basic module (10 A microfuse)

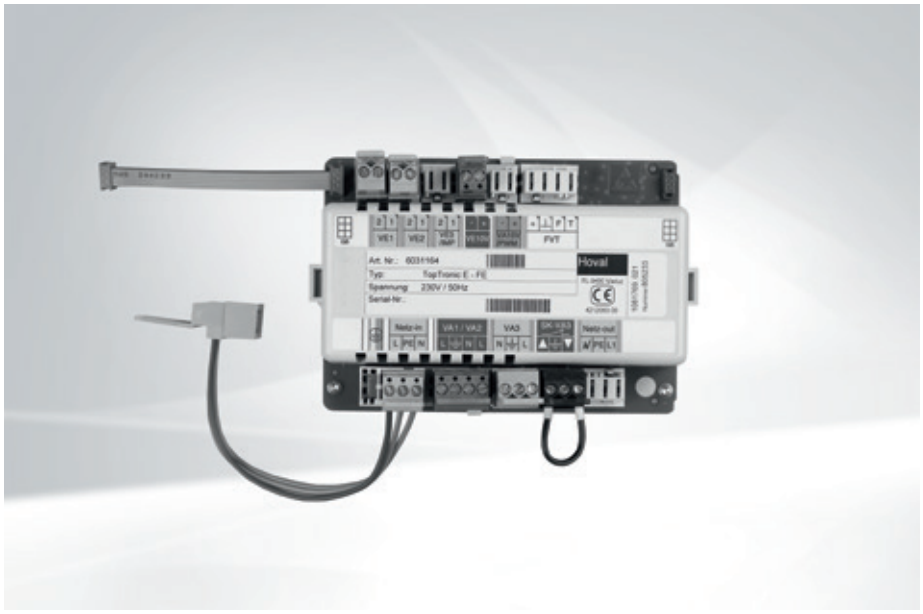
Notice
Module expansions must be installed directly next to the controller module!

Inputs and outputs
- 3 variable sensor inputs:
  - 2 variable inputs for connection of a sensor
  - 1 variable input for connection of a sensor or pulse sensor
- 0-10 V input, e.g. for connecting to heat zone control systems
- 0-10 V or PWM output for controlling a variable-speed pump
- Connection of a flow rate sensor (or pulse sensor), e.g. for heat metering at the heating circuit
- Variable 230 V 3-point output, e.g. for controlling the mixer
- Variable 230 V output, e.g. for controlling the recirculation pump
- 230 V optocoupler input connected in series to the variable 230 V output, e.g. for connecting a flow temperature guard for monitoring underfloor heating systems

Functions
- Refer to the product description of the controller module to which the module expansion is attached to find which functions can be implemented

Use
- For expanding the functions on the connected controller module
- Refer to the Hoval System Technology to find which functions and hydraulic arrangements can be implemented

Delivery
- TopTronic® E module expansion
- DIN rail with fitting accessories
- Ribbon cable for connecting the device bus to the controller module
- Connection set for connecting the controller module to the mains voltage
- 1 contact sensor ALF/2P/4/T, L = 4.0 m
- Basic connector set for module expansions
  - Plug for 230 V output (VA3) (direct circuit pump, mixer circuit pump)
  - Plug for 2 230 V outputs (mixer) (VA1/VA2)
  - Plug for optocoupler input (SK-VA3) (flow temperature controller)
  - 2 plugs for sensor (VE1/VE2)
  - Plug for 0-10 V or PWM output (VA10V)




TopTronic® E module expansion heating circuit


TopTronic® E module expansion heat balancing


TopTronic® E module expansion Universal

Notice
The supplementary plug set may have to be ordered to implement functions differing from the standard!

TopTronic® E module expansion heat balancing

- Expansion to the inputs and outputs of a TopTronic® E basic module heat generator for implementing the following function
  - Calculation of the total energy consumption
  - Calculation of the heat generator energy for heating
  - Calculation of the heat generator energy for hot water
- Max. 1 module expansion possible per TopTronic® E basic module heat generator
- Connection technology executed as plug-in screw terminals in coded RAST 5 design
- Connection to basic module using ribbon cable and mains connector set (max. distance between basic module and module expansion 10 cm)
- Controller module suitable for cabinet installation (mounting on DIN rail 35 x 15 x 2.2 mm)
- Protection via the basic module (10 A microfuse)

Notice
Module expansions must be installed directly next to the controller module!

Inputs and outputs
- 3 variable sensor inputs
  - 2 variable inputd for connection of a sensor
  - 1 variable input for connection of a sensor or pulse sensor
- 0-10 V input
- 0-10 V or PWM output
- Connection of a flow rate sensor (vortex or pulse sensor), e.g. for heat metering
- Variable 230 V 3-point output
- Variable 230 V output
- 230 V optocoupler input connected in series to the variable 230 V output

Functions
- Refer to the product description of the controller module to which the module expansion is attached to find which functions can be implemented

Use
- For expanding the functions on the connected controller module
- Refer to the Hoval System Technology to find which functions and hydraulic arrangements can be implemented

Delivery
- TopTronic® E module expansion
- DIN rail with fitting accessories
- Ribbon cable for connecting the device bus to the controller module
- Connection set for connecting the controller module to the mains voltage
- 3 contact sensors ALF/2P/4/T, L = 4.0 m
- Complete plug set for module expansions

Notice
Flow rate sensor DN 8-32 must be ordered separately (depending on the maximum output to be measured)

TopTronic® E module expansion Universal

- Expansion to the inputs and outputs of a TopTronic® E basic module heat generator or a controller module (heating circuit/hot water module, solar module, buffer module) for implementing various functions
- Max. 1 module expansion possible per TopTronic® E basic module heat generator
- Max. 2 module expansions per heating circuit/hot water module, solar module, buffer module possible
- Connection technology executed as plug-in screw terminals in coded RAST 5 design
- Connection to controller module using ribbon cable and mains connector set (max. distance between basic module and module expansion 10 cm)
- Controller module suitable for cabinet installation (mounting on DIN rail 35 x 15 x 2.2 mm)
- Protection via the basic module (10 A microfuse)

Notice
Module expansions must be installed directly next to the controller module!

Inputs and outputs
- 3 variable sensor inputs:
  - 2 variable inputs for connection of a sensor
  - 1 variable input for connection of a sensor or pulse sensor
- 0-10 V input
- 0-10 V or PWM output for controlling a variable-speed pump
- Connection of a flow sensor (or pulse sensor)
- Variable 230 V 3-point output
- Variable 230 V output
- 230 V optocoupler input connected in series to the variable 230 V output

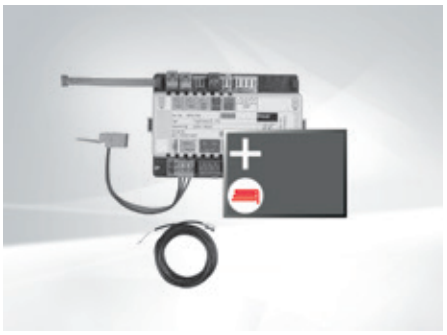
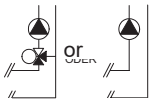
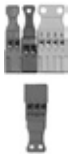
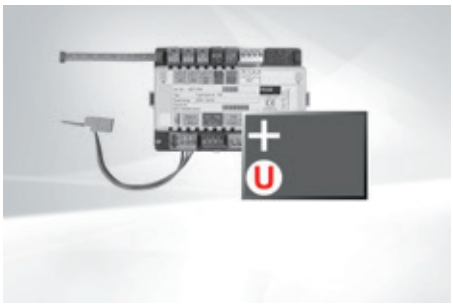
Functions
- Refer to the product description of the controller module to which the module expansion is attached to find which functions can be implemented

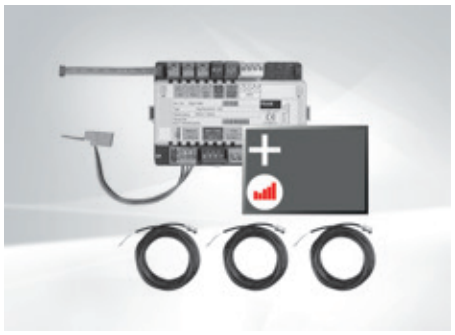
Use
- For expanding the functions on the connected controller module
- Refer to the Hoval System Technology to find which functions and hydraulic arrangements can be implemented

Delivery
- TopTronic® E module expansion
- DIN rail with fitting accessories
- Ribbon cable for connecting the device bus to the controller module
- Connection set for connecting the controller module to the mains voltage
- Complete plug set for module expansion

TopTronic® E module expansions

Heating circuit, heat balancing, Universal

	Part No.
  **TopTronic® E module expansion heating circuit TTE-FE HK** Expansion to the inputs and outputs of the basic module heat generator or the heating circuit/domestic hot water module for implementing the following functions: - 1 heating/cooling circuit w/o mixer or - 1 heating/cooling circuit with mixer Consisting of: - Fitting accessories - 1 contact sensor ALF/2P/4/T, L = 4.0 m - Basic plug set FE module **Notice** The supplementary plug set may have to be ordered to implement functions differing from the standard!	6034 576
 **Supplementary plug set for controller modules and module expansion TTE-FE HK** Consisting of RAST 5 mating plugs for connecting further sensors and actuators on the controller module or on the module expansion. The controller module is already equipped with a basic plug set, the supplementary plug set is required for advanced functions. Consisting of: - Plug for mains out (230 V) - Plug for sensor (VE3) (variable input) - Plug for 0-10 V input (VE10V) - Plug for flow rate sensor input (FVT)	6034 503
 **TopTronic® E module expansion Universal TTE-FE UNI** Expansion to the inputs and outputs of a controller module (basic module heat generator, heating circuit/domestic hot water module, solar module, buffer module) for implementing various functions Consisting of: - Fitting accessories - Plug set FE module **Notice** Refer to the Hoval System Technology to find which functions and hydraulic arrangements can be implemented.	6034 575



TopTronic® E module expansion heating circuit incl. energy balancing
TTE-FE HK-EBZ
Expansion to the inputs and outputs of the basic module heat generator or the heating circuit/domestic hot water module for implementing the following functions:
- 1 heating/cooling circuit w/o mixer or
- 1 heating/cooling circuit with mixer

incl. energy balancing in each case
Consisting of:
- Fitting accessories
- 3 contact sensors

ALF/2P/4/T, L = 4.0 m
- Plug set FE module

Part No. 6037 062

Notice
The continuous flow sensor set must be ordered as well.

Sets flow rate sensor
- Used in combination with the module expansion heat balancing or var. controller modules for heat metering
- Flow sensor supplies the current flow rate as well as the current temperature to the measuring point

Consisting of:
- flow rate sensor
- connection cable
- RAST 5 plug for connecting to TopTronic® E

Plastic housing

Unit of measure	Connection	Flow rate l/min	Part No.
DN 8	G ¾″	0.9-15	6038 526
DN 10	G ¾″	1.8-32	6038 507
DN 15	G 1″	3.5-50	6038 508
DN 20	G 1¼″	5-85	6038 509
DN 25	G 1½″	9-150	6038 510

Brass housing

Unit of measure	Connection	Flow rate l/min	Part No.
DN 10	G 1″	2-40	6042 949
DN 32	G 1½″	14-240	6042 950
DN 40	G 2″	22-400	6055 092

TopTronic® E module expansions

Heating circuit, heat balancing, universal

Type		TTE-FE HK / TTE-WMZ/EBZ / TTE-FE UNI
• Power supply max		230 V AC +6/-10 %
• Frequency	Hz	50-60
• Min. power consumption	W	0.2
• Max. power consumption	W	1.8
• Fuse		none - protection via controller module
Output (low voltage)		
• Electromechanical relays		3
Output (extra-low voltage)		
• Signal output PWM or 0-10 V		1
Switching capacity		
• Electromechanical relays	A	3
Input (low voltage)		
• Optocoupler input		1
Inputs (extra-low voltage)		
• Input 0-10 V		1
• Inputs sensors		2
• Inputs flow rate sensor		1
• Pulse input (can be switched over)		1
• Voltage measuring circuit, with protective isolation 2.9 kV	V	15
Expansion (module expansion)		
• Max. number		-
Casing		
• Installation		Top hat rail mounting
• Dimensions (W x H x D) incl. plug	mm	150 x 100 x 75
• Ambient temperature (during operation)	°C	0…50
• Humidity (in operation), non-condensing	% RH	20...80
• Storage temperature	°C	0…50
Other bus interfaces		Internal unit bus (slave)
Miscellaneous		
• Type of protection		IP20
• Protection class		I – EN 60730
• Plug types		RAST 5 (coloured, coded)

Electrical connection

TopTronic® E module expansions

TopTronic® E module expansion heating circuit

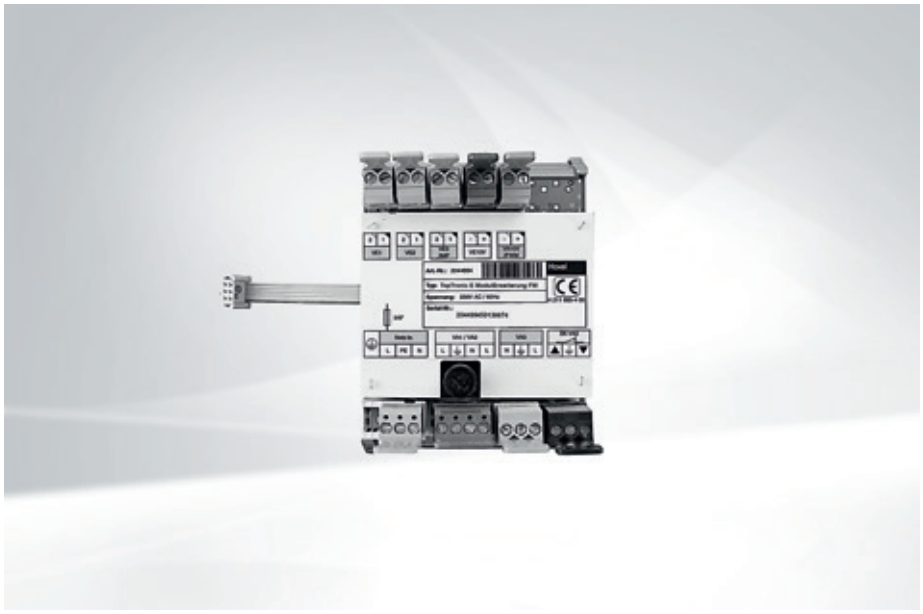
TopTronic® E module expansion heat balancing

TopTronic® E module expansion Universal

TopTronic® E module expansion heating circuit district heating

- Expansion to the inputs and outputs of a basic module (basic module district heating/ fresh water, basic module district heating com) for carrying out various functions
  - 1 heating circuit without mixer
  - 1 heating circuit with mixer
- Max. 5 module expansions possible per basic module
- Connection technology executed as plug-in screw terminals in coded RAST 5 design
- Ribbon cable for connecting the device bus to the controller module
- Controller module suitable for cabinet installation (mounting on DIN rail, dimensions of controller module W x H x D 93 x 125 x 95 mm)
- Protection via the basic module

Notice
Module expansions must be installed directly next to the controller module!



Inputs and outputs
- 3 variable sensor inputs
  - 2 variable inputs for connection of a sensor
  - 1 variable input for connection of a sensor or pulse sensor
- 0-10 V input
- 0-10 V output for controlling a continuous valve (e.g. mixing circuit valve)
- Variable 230 V 3-point output, e.g. for controlling the mixer
- Variable 230 V output, e.g. for controlling the recirculation pump
- 230 V optocoupler input connected in series to the variable 230 V output, e.g. for connecting a flow temperature guard for monitoring underfloor heating systems

Functions
- Refer to the product description of the controller module to which the module expansions are attached to find which functions can be implemented

Use
- For expanding the functions on the connected controller module
- Refer to the Hoval System Technology to find which functions and hydraulic arrangements can be implemented

Delivery
- TopTronic® E module expansion district heating
- DIN rail with fitting accessories
- Ribbon cable for connecting the device bus to the controller module
- Connection set for connecting the controller module to the mains voltage
- 1 contact sensor ALF/1.1P/2.5/T, L = 2.5 m
- Basic plug set for module expansion district heating
  - Mains_in
  - Plug for 230 V output (direct circuit pump, mixer circuit pump)
  - Plug for 2 230 V outputs (mixer)
  - Plug for optocoupler input (flow temperature controller)
  - 2 plugs for sensor
  - Plug for 0-10 V input


TopTronic® E module expansion heating circuit district heating


TopTronic® E module expansion hot water district heating


TopTronic® E module expansion Universal district heating

Notice
The supplementary plug set may have to be ordered to implement functions differing from the standard!

TopTronic® E module expansion hot water district heating

- Expansion to the inputs and outputs of a TopTronic® E basic module district heating/ fresh water, district heating com for implementing a hot water circuit
- Max. 5 module expansions per TopTronic® E basic module district heating/fresh water, district heating possible
- Connection technology executed as plug-in screw terminals in coded RAST 5 design
- Connection to basic module using ribbon cable
- Controller module suitable for cabinet installation (mounting on DIN rail 93 x 125 x 95 mm)
- Protection via the basic module

Notice
Module expansions must be installed directly next to the controller module!

Inputs and outputs
- 3 variable sensor inputs:
  - 2 variable inputs for connection of a sensor
  - 1 variable input for connection of a sensor or pulse sensor
- 0-10 V input
- Variable 230 V 3-point output
- Variable 230 V output, e.g. for controlling the hot water pump
- 230 V optocoupler input connected in series to the variable 230 V output

Functions
- Refer to the product description of the controller module to which the module expansion is attached to find which functions can be implemented

Use
- For expanding the functions on the connected controller module
- Refer to the Hoval System Technology to find which functions and hydraulic arrangements can be implemented

Delivery
- TopTronic® E module expansion district heating
- DIN rail with fitting accessories
- Ribbon cable for connecting the device bus to the controller module
- Connection set for connecting the controller module to the mains voltage
- 2 immersion sensors TF/1.1P/2.5/6T, L = 2.5 m
- Basic plug set for module expansion district heating
  - Mains_in
  - Plug for 230 V output (direct circuit pump, mixer circuit pump)
  - Plug for 2 230 V outputs (mixer)
  - Plug for optocoupler input (flow temperature controller)
  - 2 plugs for sensor
  - Plug for 0-10 V input

Notice
The supplementary plug set may have to be ordered to implement functions differing from the standard!

TopTronic® E module expansion Universal district heating
- Expansion to the inputs and outputs of a basic module district heating or a basic module district heating/fresh water for implementing various functions
- Max. 5 module expansions are possible per basic module
- Connection technology executed as plug-in screw terminals in coded RAST 5 design
- Connection to controller module using ribbon cable
- Controller module suitable for cabinet installation (mounting on DIN rail, dimensions of controller module W x H x D 93 x 125 x 95 mm)
- Protection via the basic module

Notice
Module expansions must be installed directly next to the controller module!

Inputs and outputs
- 3 variable sensor inputs:
  - 2 variable inputs for connection of a sensor
  - 1 variable input for connection of a sensor or pulse sensor
- 0-10 V input
- 0-10 V output for controlling a continuous valve (e.g. mixing circuit valve)
- Variable 230 V 3-point output
- Variable 230 V output
- 230 V optocoupler input connected in series to the variable 230 V output

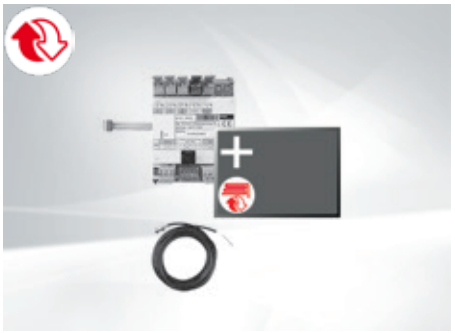
Functions
- Refer to the product description of the controller module to which the module expansion is attached to find which functions can be implemented

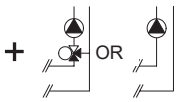
Use
- For expanding the functions on the connected controller module
- Refer to the Hoval System Technology to find which functions and hydraulic arrangements can be implemented

Delivery
- TopTronic® E module expansion district heating
- DIN rail with fitting accessories
- Ribbon cable for connecting the device bus to the controller module
- Connection set for connecting the controller module to the mains voltage
- Complete plug set for module expansions

TopTronic® E module expansions
Heating circuit, hot water,
Universal district heating

Part No.

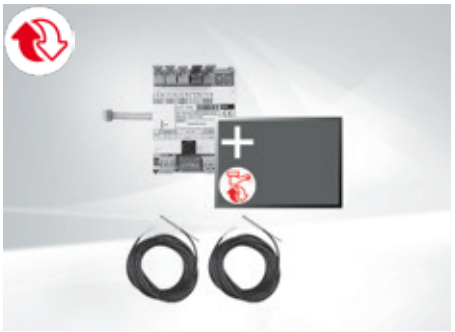


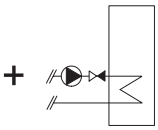


TopTronic® E module expansion district heating circuit TTE-FE HK FW
Expansion to the inputs and outputs of a controller module (basic module district heating/fresh water, basic module district heating com) for carrying out various functions.
Refer to the Hoval System Technology to find which functions and hydraulic arrangements can be implemented.

Consisting of:
- Fitting accessories
- Ribbon cable for connecting the device bus to the controller module,
- Connection set for connecting the controller module to the mains voltage,
- 1 x contact sensor ALF/1.1P/2.5/T L = 2.5 m,
- Plug set - district heating expansion

6038 119

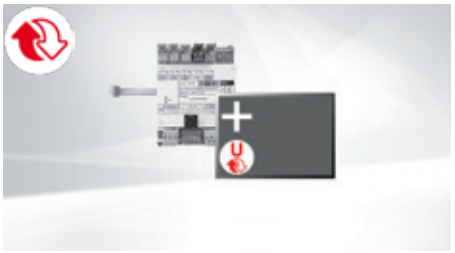




TopTronic® E module expansion hot water district heating TTE-FE WW FW
Expansion to the inputs and outputs of the basic module district heating/fresh water or basic module district heating com for implementing a hot water circuit.

Consisting of:
- fitting accessories
- 2 immersion sensors TF/1.1P/2.5/6T, L = 2.5 m

6038 120



TopTronic® E module expansion Universal district heating TTE-FE UNI FW
Expansion to the inputs and outputs of the basic module district heating/fresh water or basic module district heating com for implementing various functions.

Consisting of:
- Fitting accessories

6038 117

Notice
Refer to the Hoval System Technology to find which functions and hydraulic arrangements can be implemented.

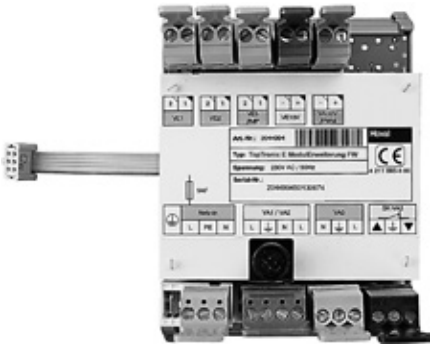
TopTronic® E module expansions district heating

Heating circuit direct heating circuit, hot water direct heating, universal district heating

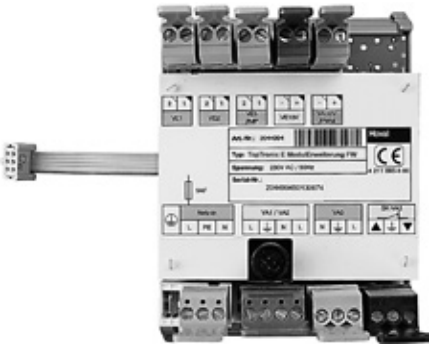
Type		TTE-FE FW HK / TTE-FE FW WW / TTE-FE FW UNI
• Power supply max		230 V AC +6/-10 %
• Frequency	Hz	50-60
• Min. power consumption	W	1.6
• Max. power consumption	W	1.8
• Fuse		F 5 A H 250 V
Output (low voltage)		
• Electromechanical relays		3
Switching capacity		
• Electromechanical relays	A	5
Input (low voltage)		
• Optocoupler input		-
Inputs (extra-low voltage)		
• Input 0-10 V		1
• Inputs sensors		3
• Pulse input (can be switched over)		-
Expansion (module expansion)		
• Max. number		-
Casing		
• Installation		Top hat rail mounting
• Dimensions (W x H x D) incl. plug	mm	95 x 125 x 95
• Ambient temperature (during operation)	°C	0…50
• Humidity (in operation), non-condensing	% RH	20...80
• Storage temperature	°C	0…50
Other bus interfaces		Internal unit bus (slave)
Miscellaneous		
• Type of protection		IP10
• Protection class		II – EN 60730
• Plug types		RAST 5 (coloured, coded)

Electrical connection

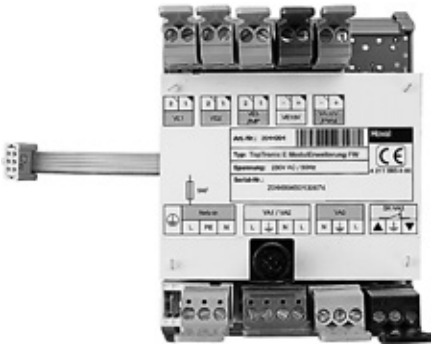
TopTronic® E module expansions



TopTronic® E module expansion
heating circuit district heating



TopTronic® E module expansion
hot water district heating



TopTronic® E module expansion
Universal district heating

Digital products - overview

Hoval offers suitable digital solutions for remote access to the system for different customer groups.

The range includes the intuitive, easy-to-use app for owners of detached houses, and the comprehensive, professional control system with individual visualisation for large energy suppliers or contracting companies.

With HovalConnect, Hoval offers simple and intuitive solutions for end customers, providing a clear possibility for operating their systems.

HovalSupervisor cloud is available for more demanding applications in the commercial sector and for district heating projects. The professional control system offers detailed visualisation, evaluation and analysis options for the corresponding systems.

Furthermore, Hoval offers its customers almost unlimited possibilities through open interfaces and cooperation arrangements such as with the smart home system manufacturer Loxone; these make it possible for them to intelligently and profitably network their Hoval system through building automation.

HovalConnect

Access to specific functions of the TopTronic® E system via smartphone app for end users.

- Simplified operation of various functions via smartphone from home or while travelling
- High data security by encryption of communication between the plant and Hoval server
- Simple changing of the required heating circuit temperature/domestic hot water temperature, or programs
- Simple selection of the ventilation programs
- With the help of HovalConnect, weather data is obtained via the Internet
- This allows the use of various, innovative functions, such as the display of the weather forecast, a predictive adjustment of the flow temperature (“Energy Centre” function) and the EnergyManager PV smart.
- Triggering alarms in case of faults on the heating system
- Energy accounting for graphical representation of a system’s solar data and heat quantity metering

HovalSupervisor cloud

Professional online control system for visualisation and support of energy systems via browser on smartphone, tablet and PC for commercial applications (including residential construction, hotel industry).

- Configured visualisation of systems with TopTronic® E system control, e.g. heat pumps, biomass boilers, gas boilers, district heating transfer stations, drinking water systems, cascades, etc. (CS/Configured Solution view)
- Customised visualisation of systems with TopTronic® E system control, PLC control or external data sources (ES/Engineered Solution view)
- Creation of system reports with delivery by e-mail, fully customisable or from standard templates
- Extensive options for graphical analysis of plant locations using map functions
- SMS fault messages
- and much else besides

● included ○ optional □ limited

	HovalConnect	HovalSupervisor cloud		
		TTE sub	Engineered Solution Abo	DHN sub
Costs				
One-time license costs	●			
Recurrent subscription costs		●	●	●
Customer segment				
Private customers	●			
Commercial customers		●	●	●
General				
Several languages	●	●	●	●
User management/user roles	●			
Extended user management/user roles		●	●	●
Project/system subdivision	□	●	●	●
Global search	●	●	●	●
Data recording	□	●	●	●
Geo map views with live data		●	●	●
Geo map heatmaps				●
Online weather data display	●	●	●	●
Alarm management	□	●	●	●
Log (who did what & when)		●	●	●
Custom menu		●	●	●
Backup management		●	●	●
Write/read data points (parameter-tree)		●	●	●
System visualisation		●	●	●
Installation and access				●
Browserbasierend/Mobile Ready (Responsive Webdesign)		●	●	●
Native Mobile-App	●			
Cloud-Installation	●	●	●	●
On-Premise Installation		○	○	○
E-mail notifications	●	●	●	●
Alarms (time & group-controlled)	□	●	●	●
Reports		●	●	●
Dashboard	●	●	●	●
Global dashboards		●	●	●
Project-related dashboards		●	●	●
Customer administration		●	●	●
System management		●	●	●
Data export		●	●	●
CSV		●	●	●
XML		●	●	●
JSON		●	●	●
REST API		●	●	●
Administration/monitoring		●	●	●
Communication monitoring		●	●	●
System status		●	●	●
Backup status				
Database status				
Connectivity				
HovalConnect	●			
HovalConnect LAN gateway module	●			
HovalConnect WLAN gateway module	●			
HovalConnect Modbus gateway module	●			
HovalConnect KNX gateway module	●			
DHN (District Heating Network) [1]				●
Hoval DHN LON-Bus				●
Hoval DHN TCP/IP				●
Hoval FWR (district heating router)			●	●
CS (Configured Solution) [2]		●	●	
GatewayModul OPC UA (CAN2OPC)	●	●	●	
ES (Engineered Solution) [3]			●	
Hoval Beckhoff-SPS (VPN)			●	
Modbus TCP (VPN)			○	
MQTT			○	
OPC UA			●	
OPC (VPN)			●	
BACnet (VPN)			○	
CAN bus (VPN)			○	
KNX (VPN)			○	
Siemens S5/S7 (VPN)			○	
EtherNet/IP (VPN)			○	
REST-APIs			●	

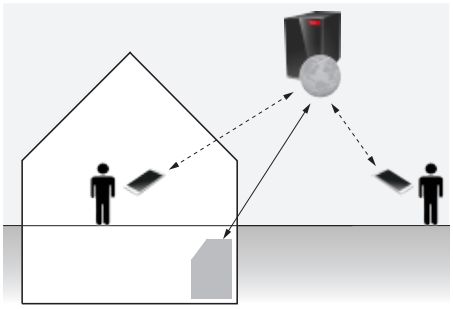
	HovalSupervisor cloud		
	TTE sub	Engineered solution sub	DHN sub
DHN view - District Heating Network			
Dashboards			●
Customer/system search			●
Customer/system notes			●
Read/modify system parameters			●
Graphical system visualisation			●
Efficiency/CO_2 display			●
Counter data			●
Weather forecast			●
Graphical statistics			●
Table statistics			●
Min./max. evaluations			●
Monthly consumptions			●
Parameter report			●
Relay test			●
Parameter comparison with another system			●
Users can position graphical elements themselves			●
Evaluations			●
Graphical (trends)			●
Tables			●
Customer/system overview			●
Efficiency overview (bubble chart)			●
Period consumption analysis			●
Flow rate management			●
Domestic hot water charging time overview			●
Heating circuits/switching times overview			●
Compare 2 customers/systems graphically			●
Compare 2 customers/systems in a table			●
Data export (CSV, XML, JSON)			●
Project overview			●
Heat meter consumption analysis			●
Weather			●
Communication monitoring			●
Configurable tables & charts			●
QM reports			●
Geo maps view			●
Geo maps heatmap			●
Global controller control			●
HTML/PDF reports			●
CS view - Configured Solution			
TTE systems	●	○	
Own data points	●	○	
Elements/images freely configurable	●	○	
Read/write system parameters	●	○	
Parameter report	●	○	
System notes	●	○	
Extensive element/image library	●	○	
System visualisation	●	○	
History configuration	●	○	
Export	●	○	
Evaluations	●	○	
Graphical (trends)	●	○	
Geo maps view	●	○	
Table	●	○	
Users can position graphical elements themselves	●	○	
ES view - Engineered Solution			
Free data point selection (by Hoval technician)		●	
Elements/images freely configurable (by Hoval technician)		●	
Read/write system parameters		●	
Parameter report		●	
System notes		●	
Extensive element/image library		●	
System visualisation		●	
History configuration		●	
Export		●	

New designation for HovalSupervisor cloud corresponds to the view:
[1] **DH** for HovalSupervisor
[2] **EP** for HovalSupervisor
[3] **PS** for HovalSupervisor

HovalConnect

HovalConnect enables access to specific functions of the TopTronic® E system via smartphone app.

Added value for plant owner
- Simplified operation of various functions via smartphone from home or while travelling
- High data security by encryption of communication between the plant and Hoval server
- With the help of HovalConnect, weather data is obtained via the Internet
- This allows the use of various, innovative functions, such as a predictive adjustment of the flow temperature (“Energy Centre” function) or the EnergyManager PV smart.
- Simple changing of the required heating circuit temperature/domestic hot water temperature, or programs
- Simple selection of the ventilation programs
- Triggering alarms in case of faults on the heating system (e-mail, push notification)
- Energy accounting for graphical representation of a plant’s solar data and heat quantity metering
- Up to 4 heating circuits/domestic hot water circuits (basic module TTE FW) or 5 heating circuits/domestic hot water circuits (basic module TTE H-Gen) can be operated



Access to HovalConnect
The app can be downloaded free of charge via the Apple App Store for iOS devices and via the Google Play Store for Android devices.

- Minimum requirements of the smartphone operating system (last version and 2 versions previous to that):
  - Android
  - iOS

Connection of HovalConnect
- The heating system / TopTronic® E is connected to the Internet either via a LAN cable or a WLAN-enabled gateway
  - Simple installation and configuration of the gateway
  - Customer creates his/her personal account on the Hoval server and registers his/her plant
- One gateway is required/authorised per Hoval bus system
- Update capability of the gateway software
- Gateway is either mounted on the wall or placed on a surface without mounting
- Type of protection: IP20

EnergyManager PV smart
If the HovalConnect gateway is used together with a Hoval heat pump (TopTronic® E required), the free EnergyManager PV smart feature is available. This allows the heat pump to be operated preferentially at times of higher solar radiation. The feature uses online weather data on the current solar radiation for this purpose and can be adjusted by means of an associated threshold value. The self-consumption of electricity from an existing photovoltaic plant is thus increased and the purchase of grid electricity is reduced. This results in a lasting and significant cost-saving potential without further investment costs for the customer

Notice
A heat pump can be controlled with the EnergyManager PV smart. No other consumers can be controlled.

HovalConnect demo version
Download the HovalConnect app from the app store of your choice (Apple App Store or Google Play Store) or take a picture of the QR code below with your smartphone and a QR code-enabled app to gain an insight into the demo version of HovalConnect:

Designs

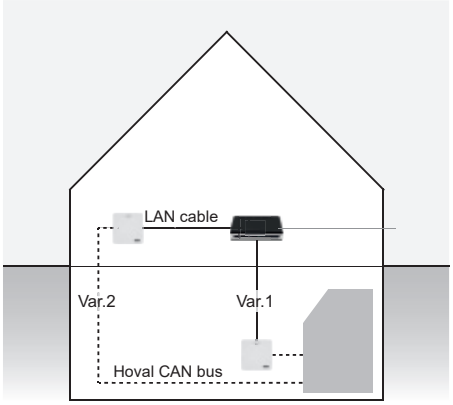
HovalConnect LAN
- The heating system is connected to the Internet by cable.

Delivery
- Gateway
- Wall mounting adapter white
- License for HovalConnect Cover for Gateway
- Fitting accessories for covering the gateway

HovalConnect WLAN
- Version same as HovalConnect LAN. Connection is wireless via WLAN, however.

Delivery
- Gateway
- Wall mounting adapter white
- License for HovalConnect WLAN antenna (matching Gateway)
- Cover for Gateway
- Fitting accessories for covering the gateway
- Mains adapter 12 V/6 W with cable, L = 1800 mm

HovalConnect



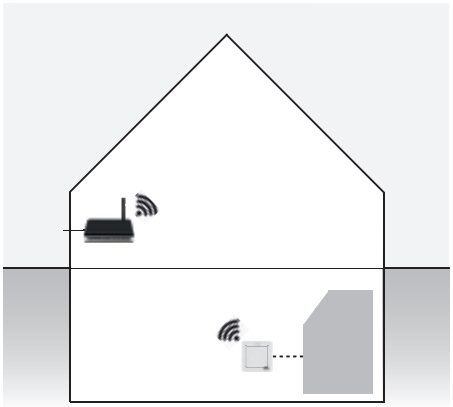
2 installation possibilities of the Gateway:
Var. 1: Installation in the basement, i.e. LAN cable to the router
Var. 2: Installation in the living area, i.e. 4-wire cable (Hoval CAN bus) into the basement

Notice
Please be sure to observe the specifications in the **Engineering** section!

HovalConnect LAN
The app enables simplified operation of the Hoval heating system via smartphone from home or while travelling.
Simple changing of the required room temperature, day or basic program.
Additional functions accessible via browser (Hoval website with login)
LAN interface for connection of the Gateway to the router of the home network.
Operating system minimum requirements smartphone and browser:
more detailed information online

Consisting of:
Gateway
Wall-mounting adapter white
License for HovalConnect
Cover for Gateway
Fitting accessories for covering the Gateway

Part No.
6049 496

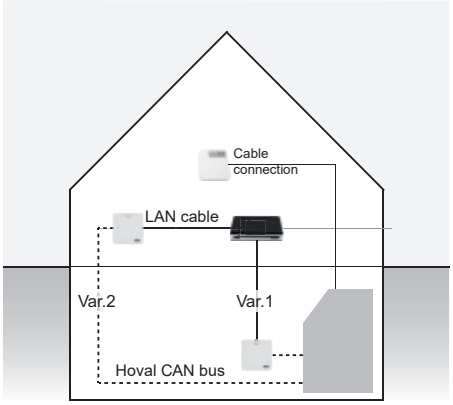


Notice
Please be sure to observe the specifications in the **Engineering** section!

HovalConnect WLAN
The app enables simplified operation of the Hoval heating system via smartphone from home or while travelling.
Simple changing of the required room temperature, day or basic program.
Additional functions accessible via browser (Hoval website with login)
LAN or WLAN interface for connection of the Gateway to the router of the home network.
Operating system minimum requirements smartphone and browser: more detailed information online

Consisting of:
Gateway
Wall-mounting adapter white
License for HovalConnect
WLAN antennae (matching Gateway)
Cover for Gateway
Fitting accessories for covering the gateway
Power supply 12 V/6 W with cable, L = 1800 mm

Part No.
6049 498



2 installation possibilities of the Gateway:
Var. 1: Installation in the basement, i.e. LAN cable to the router
Var. 2: Installation in the living area, i.e. 4-wire cable (Hoval CAN bus) into the basement

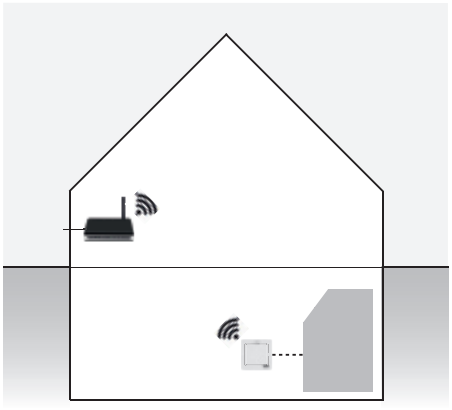
Notice
Please be sure to observe the specifications in the **Engineering** section!

HovalConnect LAN kit with room sensor
The app enables simplified operation of the Hoval heating system via smartphone from home or while travelling
Simple changing of the required room temperature, day or basic program.
LAN interface for connection of the gateway to the router of the home network.
Minimum requirements on the operating system of the smartphone see more detailed information online
Room sensor for measuring the actual room temperature enables a room influence (sensor input on the controller must be present) even without room control module

A cable connection is required from the room to the heat generator for the connection of the room sensor.

Kit consisting of:
Gateway
Wall mounting adapter white
Licence for HovalConnect
Cover for gateway
Fitting accessories for covering the Hoval connect LAN gateway
Room sensor PT1000

Part No.
6062 352



Notice
Please be sure to observe the specifications in the **Engineering** section!

HovalConnect WLAN kit with room sensor
The app enables simplified operation of the Hoval heating system via smartphone from home or while travelling
Simple changing of the required room temperature, day or basic program.
LAN or WLAN interface for connection of the gateway to the router of the home network.
Minimum requirements on the operating system of the smartphone see more detailed information online
Room sensor for measuring the actual room temperature enables a room influence (sensor input on the controller must be present) even without room control module

A cable connection is required from the room to the heat generator for the connection of the room sensor.

Kit consisting of:
Gateway
Wall mounting adapter white
Licence for HovalConnect
WLAN antenna (matching gateway)
Cover for gateway
Fitting accessories for covering the Hoval connect LAN gateway
Mains adapter 12 V/6 W with cable, L = 1800 mm
Room sensor PT1000

Part No.
6062 353

	Part No.
 **Mains adapter for Gateway** - Plug-in mains adapter for external power supply of the Gateway required if the device is not powered via the Hoval CAN bus - Supply via the Hoval CAN bus unless the max. number of control modules is exceeded - For the WLAN version, the electrical power supply must be provided via the supplied mains adapter - Connection to Gateway via a DC plug 5.5 x 2.1 x 10 mm I/O 100-240 V AC/12 V DC 1A Only required as spare part.	2076 328
Top hat rail mounting set incl. top hat rail for Gateway For mounting the Gateway in the heat generator, in a wall casing or in a control panel Consisting of: - Top hat rail with fixing accessories - Top hat rail mounting adapter	6035 800

HovalConnect - Gateway

Casing		
• Mounting		Top hat rail mounting
• Dimensions LAN/WLAN (W x H x D), (incl. top-hat rail 42 mm)	mm	100 x 100 x 27
• Dimensions Modbus (W x H x D) (terminal block incl. top-hat rail 55 mm)	mm	155 x 100 x 47
• Dimensions KNX (W x H x D), (incl. top-hat rail 68 mm)	mm	160 x 100 x 53
• Material		plastic
• Weight (approx.) LAN/WLAN	g	150
• Weight (approx.) Modbus	g	500
• Weight (approx.) KNX	g	500
Electrical safety		
• Protection type (according to EN 60529)		IP20
• Complies with EN 50491-3		
• Safety extra-low voltage		SELV 24 V DC
EMC requirements		
• Complies with EN 61000-6-2, EN 61000-6-3, EN 50491-5-1, EN 50491-5-2 and EN 50491-5-3		
• According to EMC Directive (residential and functional building)		
Ambient conditions		
• Ambient temperature (during operation)	°C	0…45
• Storage temperature	°C	-20…60
• Humidity (in operation)	%, RH	20...80
Power supply		
• External supply		LAN gateway: CAN bus WLAN gateway: mains adapter 12 V DC Modbus gateway: CAN bus KNX gateway: mains adapter 12 V DC
• Power consumption		< 800 mW
Ethernet		
• 10BASE-T (10 Mbit/s)		
• Supported protocols: UDP/IP, TCP/IP, DHCP and static IP		

General information

One gateway is required per Hoval bus system.

Attention
The gateway must be installed in an easily accessible place outside the plant so that the colour codes of the front LEDs can be read easily (e.g. wall installation).

Activation

Each gateway must be approved by Hoval. The owner's e-mail address must be provided for this purpose. This owner's e-mail address must then also be used for registration on HovalConnect so that the plant can be accessed.

Internet access

Internet access is required for installation (broadband Internet connection with min. 512 kbps and public IPv4). If necessary, the corresponding ports must be enabled in the customer's firewall. (For more details, refer to the commissioning instructions and the assembly instructions). The monthly data volumes can be from 150 to 300 MB.

Fault messages

An e-mail alarm by HovalConnect does not replace a fault monitoring system in case of critical applications.

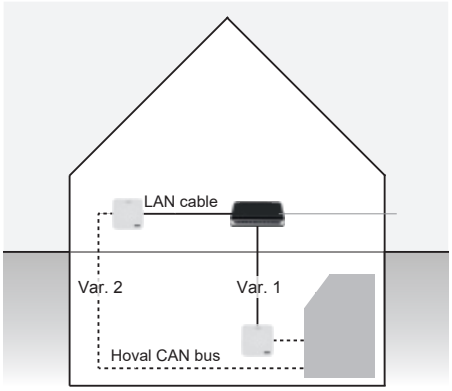
EnergyManager PV smart

The EnergyManager PV smart uses online weather data as the basis for energy management and does not communicate with inverters or any installed electricity meters. This means it is compatible with every PV plant.
It exclusively controls the operation of the heat pump and does not offer any interfaces for other consumers.

Notice
No connection to Smart Home systems is possible with HovalConnect LAN/WLAN. Please provide HovalConnect KNX or HovalConnect Modbus for this purpose. HovalConnect Modbus is suitable for connection to a building management system or an external energy management system.

HovalConnect LAN

- Var. 1, installation of the gateway in the basement via a LAN cable to the router or
- Var. 2, installation in the living area via a 4-wire cable (Hoval CAN bus) int the basement.



Electrical power supply

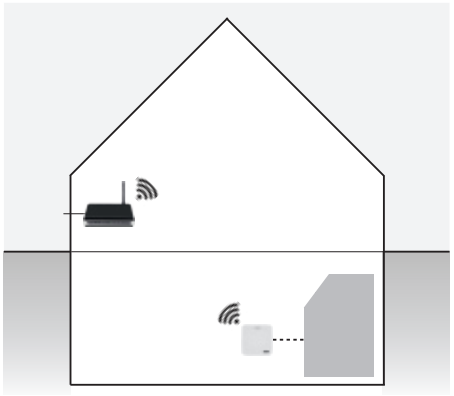
- Electrical power supply: 12 V DC 100 mA
- The electrical power supply is via the Hoval CAN bus, i.e. using the module reduces the max. number of (room) control modules that can be connected to the bus system.

Top hat rail mounting

The top hat rail mounting set must be ordered separately if, as an exception, a LAN gateway has to be installed in the control panel.

HovalConnect WLAN

- The heating system is connected to the home network via a WLAN-capable gateway.
- Take account of maximum WLAN range of the router!



Electrical power supply

- Electrical power supply: 12 V DC 200 mA
- The electrical power supply must not be provided via the Hoval CAN bus, but must be guaranteed via a power supply unit (included in the scope of delivery).

Attention
Only the LAN version allows a power supply via the Hoval CAN bus.

WLAN connection

All of the following requirements must be met in order for HovalConnect to function without problems:
- Frequency band only 2.4 GHz
- Minimum signal strength -60 dBm
- Encryption only WPA or WPA2 (only PSK method)
- Only characters from the ASCII character set for the PSK

Hoval strongly recommends checking the WLAN signal strength directly at the gateway (e.g. using a corresponding smartphone application).

Attention
The gateway must never be installed in the heat generator or in a control panel.

HovalConnect Modbus

- Communication module for data exchange from Hoval TopTronic® E control systems with building management systems, external energy management or Smart Home systems, via Modbus TCP or Modbus RS485
- 1 Modbus module per cascade group required
- Refer to the data point table for data points and addressing
- Voltage: 12 V DC 100 mA
- Type of protection: IP20
- Connection is made, for one thing, either using RJ12 (Modbus RS485) or, for another, using a supplied connection cable via RJ45 plug connections (Modbus TCP)
- Update capability of the controller software
- Device suitable for cabinet installation by ability to install on DIN rail 35 x 15 x 2.2 mm or 35 x 7.5 x 2.2 mm

Notice
Electrical power supply via the Hoval CAN bus, i.e. using the module reduces the max. number of room control modules that can be connected to the bus system!

Inputs and outputs

- RJ12 plug connection for connecting to Modbus RS485
- RJ45 plug connection for connecting to Modbus TCP
- Connection to Hoval CAN bus via terminals or RJ45
- Terminals for connection to Modbus RS485

Use

- Controller module for connecting plants with TopTronic® E (heat generators, cascades, district heating systems, comfort ventilation) to a higher-level building management system
- For self-consumption optimisation in connection with external energy management or for integration into a Smart Home via Modbus RS485 or Modbus TCP

Notice
The HovalConnect Modbus Gateway can be connected to HovalConnect - see necessary specifications in the description of the “HovalConnect” chapter

Delivery

- Gateway Modbus incl. mounting cover for DIN rail attachment
- DIN rail with fitting accessories
- Connection cable for connecting to Modbus RS485
- Licence for HovalConnect

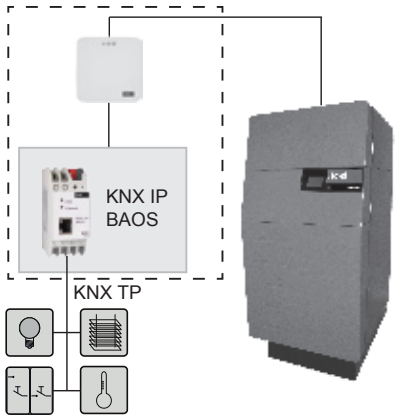
HovalConnect Modbus
Communication module for data exchange from Hoval TopTronic® E control systems with building management systems, external energy management or Smart Home systems, via Modbus TCP or Modbus RS485.
Incl. functions HovalConnect LAN

Consisting of:
- Gateway module ModBus TCP/RS485 incl. mounting cover for top hat rail attachment
- Top hat rail with fitting accessories
- License for HovalConnect

Part No.
6049 501

HovalConnect KNX

- Communication module for data exchange from Hoval TopTronic® E control systems with building management systems via KNX TP



- Gateway module KNX consisting of
  - Coupling module
  - Gateway KNX
  - Mains adapter

KNX bus connection

- 1 HovalConnect KNX Gateway is required per Hoval bus system
- Refer to the data point table for data points and addressing
- Voltage: 230 V AC
- Power consumption: approx. 1 W
- Type of protection: IP20
- Connection made via terminals (mains voltage, KNX TP)
- Operating elements: teach-in button for KNX
- Display elements:
  - Teach-in LED (red)
  - LED indicator (green) for KNX
  - LED indicator (green) for LAN
- Device suitable for cabinet installation by ability to install on DIN rail 35 x 15 x 2.2 mm or 35 x 7.5 x 2.2 mm

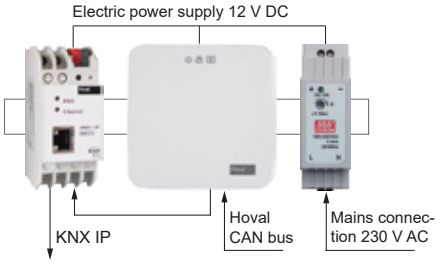
Use

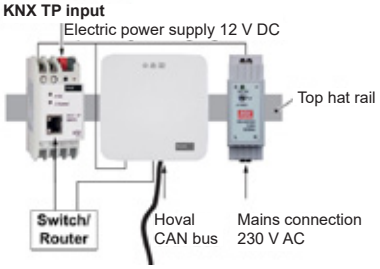
- Controller module for connecting the heat generator or TopTronic® E bus system to a building management system using KNX

Notice
The gateway KNX can be connected to HovalConnect - see necessary specifications in the description of the “HovalConnect” chapter

Delivery

- Gateway KNX incl. mounting cover for DIN rail attachment
- Coupling module to KNX twisted pair
- Mains adapter
- DIN rail with fitting accessories
- Licence for HovalConnect





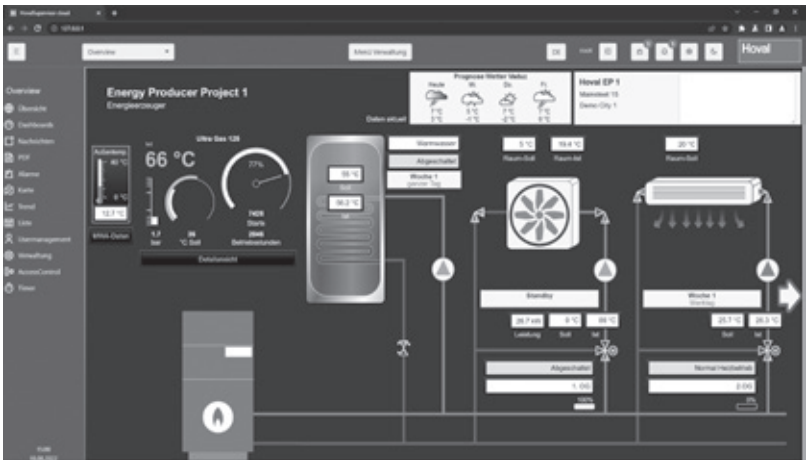
HovalConnect KNX
Communication module for data exchange from Hoval TopTronic® E control systems with building management systems via KNX TP
Incl. functions HovalConnect LAN

Consisting of:
- GatewayModul KNX incl. mounting cover for top hat rail attachment
- Coupling module on KNX twisted pair
- Power supply unit
- Top hat rail with fitting accessories
- License for HovalConnect

Part No.
6049 593

Instrumentation & control system HovalSupervisor cloud

HovalSupervisor cloud is a professional online control system for visualisation and support of energy systems via browser on smartphone, tablet and PC for commercial applications (including residential construction, hotel industry), as well as district heating networks.
It is used for visualising system states, error messages, actual and target values, in order to be able to carry out analyses of processes and further optimisations on this basis.



https://hsc-demo.hoval.com

User name: Hoval
Password: 123hoval456

Basic functions

- Extensive basic functional scope corresponds to HovalSupervisor (see HovalSupervisor description), but excluding the view/functionality for district heating networks
- Configured visualisation of systems with TopTronic® E system control, e.g. heat pumps, biomass boilers, gas boilers, district heating transfer stations, drinking water systems, cascades, etc. (CS/Configured Solution view)
- Customised visualisation of systems with TopTronic® E system control, PLC control or external data sources (ES/Engineered Solution view)
- Subscription model with annual billing and all the benefits of a flexible online solution
- Creation of system reports with delivery by e-mail, fully customisable or from standard templates
- Extensive options for graphical analysis of plant locations using map functions
- Complete overview of the system with display of the hydraulic schematic (symbolic) with the values contained in it
- Statistical evaluation of recorded and archived data via graph plotter and tables
- Recording of all adjustable parameters, switching times, counter data and sensor temperatures
- Display of the statuses of the individual components, i.e. visualisation of whether heat generators or pumps have switched on or off
- Complete alarm handling, i.e. logging of all alarms such as sensor break, communication fault, etc. with date and time, and forwarding of messages
- Export of all energy data in standard formats for further processing
- Weather forecast
- Energy balance for heat generators
- E-mail notifications of various system states
- Several users can access the system simultaneously (more can be booked as an option)
- Data can be exchanged between various systems (ERP or higher-level systems) using an OPC UA server
- All functions are subject to the user rights check, with different levels available

Optional functions

- Connection of external data sources via Modbus, BACnet, KNX, MQTT, OPC, OPC UA, such as heat or cold generators from other manufacturers or building management systems/smart home systems
- Connection of Siemens, Rockwell and Mitsubishi programmable logic controllers (PLCs)
- Adding additional users, data points, or data points that are actively displayed at the same time (CCDs)
- SMS notifications of various system states and fault messages
- Creation of system-related, individual diagrams for the system with the existing heat generators, system components, buffer storage tanks, pumps, etc.
- Display of other information such as various sensor values in the visualisation for better indication of the current situation of the system
- Further commissioning to conclude all activities for establishing correct operation of the instrumentation & control system, and a project-specific solution
- Display of warning messages from leakage warning devices
- Graphical efficiency overview of the systems

Application

- Energy-efficient operation of heat generators and the entire energy system through transparent presentation, analysis and optimisation options
- Integration of all Hoval systems, as well as various third-party systems, into a uniform, clear visualisation system
- Ideal solution for housing cooperatives, private housing associations, pension funds and hotel operators for quick access to the system, and cost-efficient and reliable operation in any situation
- Customised solutions for contracting companies and utilities to ensure efficient management of the systems under their care and to guarantee optimal operation with comprehensive analysis tools and reports
- Visualisation of system statuses, error messages and the actual and setpoint values of district heating systems and energy centres, including graphical display of the energy centre and grid control, possibility of analysing processes and further optimisations

		Part No.
Setup		
	**HovalSupervisor cloud - debtor setup** Create and set up debtor - Required once for access to HovalSupervisor cloud - Prerequisite for system connection - 1500 CCDs included per debtor (actively displayed data points for all concurrent users)	4507 063
Abo Basis		
	**HovalSupervisor cloud - TTE sub** Remote access, visualization, historization, trends, evaluations and alarming for your Hoval TTE system - Subscription fee for each TopTronic® E standard system - An OPC UA gateway from Hoval is required for operation - For visualisation of the system statuses, error messages, actual and nominal values of the entire system - For graphical display of the entire plant control system, in order to complete an analysis of sequences and subsequently to be able to perform an optimisation - Integrated continuous line recorder for a restricted period (3 years) - Integrated alarm management - Multi-user system: simultaneous access, two users included per plant - The respective valid conditions of use and the service level agreement (SLA) apply, which can be retrieved online. - 1 year term - Max. 50 data points historicised - Paid support during business hours (only for the software, not for the system)	4506 957

	Part No.
HovalSupervisor cloud - Engineered solution sub Remote access, visualization, historization, trends, evaluations and alarming - Subscription fee per system with Engineered Solution: PLC, TopTronic® E FWR/WEZ etc. - Individual visualisation according to customer requirements - For visualisation of the system statuses, error messages, actual and nominal values of the entire district heating system - For graphical display of the entire plant control system, in order to complete an analysis of sequences and subsequently to be able to perform an optimisation - Integrated continuous line recorder for a restricted period (3 years) - Integrated alarm management - Multi-user system: simultaneous access, two users included per plant - The respective valid conditions of use and the service level agreement (SLA) apply, which can be retrieved online. - 1 year term - Max. 150 data points historicised - Paid support during business hours (only for the software, not for the system)	4506 958

	Part No.
HovalSupervisor cloud - DHN sub (DHN = District Heating Network) Remote access, visualization, historization, trends, evaluations and alarming for the district heating network - Subscription fee per system in the district heating network - Grouping of all systems incl. energy centres of a district heating network - Including detailed visualisations with OSM (OpenStreetMap) - Network plan, municipal area or city plan with the location of each consumer by means of their coordinates and the possibility of showing additional layers - Display of the most important information (address, operating mode, obtained heat quantity, current supply and return temperatures) for this consumer in the overview of the plan - Geographical positioning of the energy centre in the overview - Possibility of directly accessing the consumer or the energy centre via the overview - Overview of customer systems with direct access and analysis options - Detailed tabular and graphical statistics: Customer and efficiency overviews, consumption analyses, flow management, DHW charging times, heating circuit switching times, customer comparison, heat meter consumption analysis, weather data, communication analysis, QM evaluation, detailed analysis options for the energy centre, data export and much more - The respective valid license conditions apply, which can be retrieved online. - 1 year term - Paid support during business hours (only for the software, not for the system)	4507 025

Abo Add-ons

	Part No.
HovalSupervisor cloud - External data source sub - Modbus, BACnet, KNX, MQTT, OPC, OPC UA, SPS Siemens, Rockwell, Mitsubishi - Connection in each case exclusively via TCP - If necessary, a VPN may have to be set up - Max. 3 different data sources - Max. 1500 data points in total - Only supplementary to TTE or Engineering subscription	4506 960
HovalSupervisor cloud - Additional package user/data points/ CCDs sub - 5 additional users - 150 additional data points - 500 additional CCDs (actively displayed data points for all concurrent users)	4506 961
HovalSupervisor cloud - SMS fault messages sub Activation per debtor 10000 SMS per month included	4506 962

Service

	Part No.
HovalSupervisor cloud - creation Visualisation GatewayModul OPC UA Create and set up plant Visualization creation through standardized visualization images with the following scope of services: - Up to 8 standard screens (CS view - Configured Solution) - Basic module TTE-WEZ: Visualization of the status of the fault signal input - Basic module TTE DH / MWA+ function: Visualisation of up to 8 message texts (30 predefined message texts) - Setup of standard statistics - Setup of standard alarms Requirements beyond this are charged via the article «Creation Visualisation engineering solution» - Preparatory measures for carrying out the activities without problems are a prerequisite - The clarifications of connection details (user names, passwords, Internet connection, IP addresses, etc.) must be carried out in advance by the customer. Any additional work required in this respect will be invoiced. - Without commissioning of control modules	4507 065
HovalSupervisor cloud system visualisation Ethernet/LON connection Create and set up system Visualization creation through standardized visualization images Without customer-specific adaptations Requirements beyond this are charged via the article “Creation visualisation engineering solution” - Preparatory measures for carrying out the activities without problems are a prerequisite - The clarifications of connection details (user names, passwords, Internet connection, IP addresses, etc.) must be carried out in advance by the customer. Any additional work required in this respect will be invoiced. - Without assembly, cabling and connection work	4507 066

	Part No.
HovalSupervisor cloud - creation Visualisation engineering solution Individual visualization creation by Hoval (for plants with exclusively engineering solution including plant creation and setup) - Creation of a plant-related schematic with the heat generators available on the plant, system components such as buffer storage tanks, pumps, etc. - Display of the statuses of the individual components, i.e. visualisation of whether heat generators or pumps have switched on or off - Display of other information such as various sensor values in the visualisation for better indication of the current situation of the system - This requires availability of the individual data points of individual heat generators and other system components - Integration of an external data source - Custom adaptations - Settlement based on costs incurred	4507 067
HovalSupervisor cloud - Extended commissioning Supplementary activities by the lead technician on site for the creation of an engineering solution - Function check of the corresponding data points - Further commissioning on site to conclude all activities for establishing correct operation of the instrumentation + control system, and a project-specific solution - Preparatory measures for carrying out the activities without problems are a prerequisite - Settlement based on costs incurred	4507 068
HovalSupervisor cloud - post-regulation Optimisation of the plant subsequent to commissioning acc. to specification of the customer or planner - Required for ensuring efficient and profitable operation of the plant under various operating conditions - If required, training of the customer on plant-specific topics - Minimum costs depending on the plant from approx. 1 hour - Settlement based on actual costs incurred	4507 069

	Part No.
HovalSupervisor cloud - Engineering services General engineering services according to customer requirement - Modifications to the visualisation - Activities subsequent to the actual commissioning - Settlement based on costs incurred	4507 070
HovalSupervisor cloud - General training Individual training for operating HovalSupervisor cloud - Training according to customer or project-specific requirements - Training duration by agreement - Billing according to daily rate	4507 071
HovalSupervisor cloud - Advanced training Individual training on advanced topics related to HovalSupervisor cloud, e.g.: - Training for independent performance of supplementary activities on site for the creation of an engineering solution - Training on how to create and set up a plant - Training for independent creation of visualizations on HovalSupervisor cloud by the customer - Training duration by agreement - Billing according to daily rate	4507 072

Accessories

Gateway module OPC UA Communication module for data exchange from Hoval TopTronic® E control systems with the Hoval OPC UA server. Commissioning requirement: Internet connection available on site Consisting of: Gateway module OPC UA incl. mounting cover for top hat rail attachment.	6049 594

Accessory
for the communicating district heating network with TopTronic® E basic module district heating com heating controller

		Part No.
	**Ethernet connection** TopTronic® E district heating com R2 - Communications module expansion for TopTronic® E basic module district heating com - TCP/IP interface for communication with the HovalSupervisor management system - Top hat rail mounting directly adjacent to the basic module - Connection to the basic module via Ribbon cable - Dimensions (L x W x H): 96 x 48 x 42.3 **Notice** An industrial Ethernet switch is available in the “Accessories” sectionfor professional connection of several Ethernet links.	6057 388
	**TopTronic® E district heating com LON-Bus repeater** - Repeater as electrical signal booster of the LON-Bus network - Used for boosting the range of the signal when there are long distances between the control centre and the individual TopTronic® E basic module district heating com controller modules - Positioning of the repeaters depending on the data network (routing type, cable type, length, etc.) at different positions in the network - Electrical power supply 230 V AC - Dimensions (L x W x H): 71 x 92 x 60 **Notice** After 5 repeaters, a router must be used for boosting the signal.	6061 947
	**Router TopTronic® E district heating com TTE-FWR - CAN bus** - Interface between the Hoval LON-Bus network and HovalSupervisor - Interface between the Hoval TCP/IP network and HovalSupervisor - Serves as a physical interface between the data stream of the district heating network and e.g a master computer with TCP/IP interface - Possibility of connecting differential pressure sensors variable inputs 0-10 V or 0/4-20 mA - Router can be installed in control panel with DIN-rail mounting - Temperature and pressure control for up to five strands or 5 heating circuits - Dimensions (L x W x H): 355 x 120 x 75 TopTronic® E control module black for operating the router (optional) and mating connector set must be ordered separately.	6047 303

Data socket TopTronic® E district heating com
LON-Bus and lightning protection
- Data socket for connecting the telecommunication cable at the building connection
- Connection must be made according to the appropriate applicable regulations
- Data sockets must also be installed with dummy connections
- 1 input block 13-pin
- 2 output blocks each 13-pin
- 2 outputs 3-pin
for controller and repeater
- Wet room socket IP55
Dimensions (L x W x H):
180 x 140 x 75
incl. 10 stepped nipples

Part No.
2061 738

Loxone

Control your Hoval heating system with TopTronic® E via the HovalConnect Modbus gateway also with your Loxone smart home system. The Hoval heating system can be controlled with the Modbus gateway both for Modbus RTU and via TCP and thus perfectly integrated into the Loxone system.

LOXONE

Modbus templates
Modbus templates for the Loxone configuration program Loxone Config are available on the Loxone Library (library.loxone.com).
These save you some configuration effort and time-consuming research work.

The Modbus templates are available for both Hoval heat generators and Hoval residential ventilation systems (HomeVent®).

- Hoval heat generator

Hoval

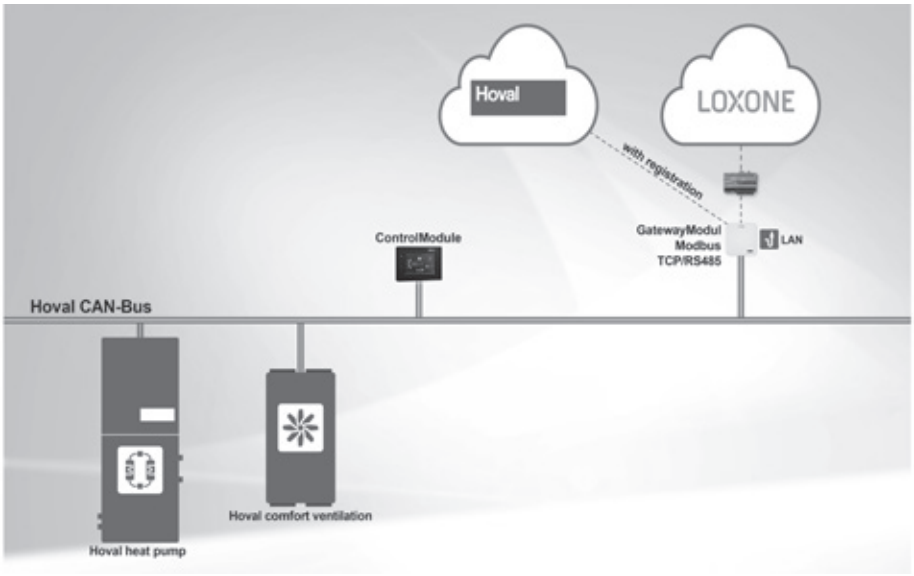
- Hoval residential ventilation (HomeVent®)

Hoval

Advantages of the integrated Hoval/Loxone system
There are numerous advantages if you combine your Hoval system with Loxone. A more detailed description of the use cases, as well as implementation instructions, can be found in the *Excel file* in the *Additional Downloads* section of the *Loxone Library* web pages linked above for the Modbus templates.

Advantages for heat generators
- One of the advantages is the combination of the Hoval heating circuit control with the convenient Loxone individual room control. You benefit from lower energy consumption due to lower average flow temperatures and the prevention of overheating of your rooms.
- If you have a Hoval heat pump with cooling function, you can also use the intelligent combination for the individual room control of the cooling.
- Your Hoval system with heat pump can also be combined with the Loxone Energy Manager and a photovoltaic system. Surplus electricity from a photovoltaic system is stored in hot water tanks, buffer tanks or in the room via a temperature increase. This thermal energy storage makes it possible to use energy when it is available, thus saving money. This is also possible in summer in cooling mode, slightly lowering the temperature in the buffer storage tank and/or in the room here.

Advantages of residential ventilation (HomeVent®)
- The Hoval HomeVent® system can be combined with the Loxone indoor climate sensor very advantageously. This results in a high-quality ventilation system with even more intelligent control mechanisms.
- It is possible to place one room climate sensor in one ventilation zone (e.g. in the most important room) or several room climate sensors (e.g. in each room).
- If there are several room climate sensors in a ventilation zone, the ventilation can be based on the room with the highest CO_2 concentration. It is also possible that ventilation is increased if several rooms have a higher CO_2 concentration. This allows for more comfortable and demand-oriented ventilation.
- Hoval HomeVent® in combination with ventilation dampers: in rooms with increased CO_2 concentration, Loxone can control ventilation dampers (e.g. with a 0-10 V control) and open them further. The Hoval HomeVent® system automatically adjusts the flow rate to the damper positions. This enables even more targeted ventilation, which further increases comfort and further reduces energy consumption for ventilation.
- HomeVent® can support building air conditioning in summer by cooling with ambient air. Ventilation is increasingly activated when the colder fresh air can be used to cool the rooms, e.g. at night. The comfort plus room control module must also be used when integrating the HomeVent® into a Loxone Smart Home.



TopTronic® E control module black

- Colour touchscreen 4.3 inch with black high-gloss trim
- Resolution: 480 x 320
- Connection to the Hoval bus system via RJ45 plug connection or plug terminals (max. 0.75 mm²)
- Flat design with flexible installation options
- Installation
  - in the control panel of the heat generator
  - in the Hoval wall casing
  - in the front of the control panel
  - on the wall with surface mounting frame (deep control module incl. frame approx. 25 mm)
  - on the wall using wall mounting plate with concealed sockets (deep control module incl. mounting plate approx. 12 mm)

Notice
Supplied accessories for installation of device in the front of the control panel. Take account of additional accessories for alternative installation!

- Commissioning wizard for simple configuration and parameter setting of the plant
- Operation of all controller modules connected to the bus system (basic, solar, buffer module, etc.)
- Emission measurement and manual mode
- LED for displaying the current system status
- Automatic dimming depending on the ambient light
- User-friendly user interface and menu system
- Activation of functions and display texts depending on the user level
- Plant-specific naming of heating and hot water circuits possible
- Display of all information in plain text and in different languages
- Display of detailed plant information
- Extensive fault message management by plain text and categories
- Service and maintenance function
- Operating mode selection incl. configurable week and day programs
- Operation of all heating and hot water circuits connected to the bus system
- Rights management for heating and hot water circuits incl. activation of the common operating mode
- Efficient control of the heating installation by simple working with day programs
- Analysis function (outside temperature, room temperature, solar yield curves, etc.)
- Customer-specifically configurable start screen for displaying
  - Time and date
  - Lunar phase
  - Heat generator temperature
  - Hot water temperature
  - Active day and basic program incl. temperature profile
  - Output and consumption of a heating/hot water circuit or of the heat generator (possible in combination with flow rate sensors)
  - Collector temperature (in combination with solar module)
- Display of the current weather or weather forecast (only possible in combination with HovalConnect)

TopTronic® E control module

TopTronic® E room control modules

easy white

comfort white

comfort black

Delivery
- TopTronic® E control module black
- Clamping device control module
- Clamping device adapter control module
- CAN cable RJ45/RAST 5, L = 5 m

TopTronic® E room control module

- Colour touchscreen 4.3 inch with high-gloss trim
  - Room control module easy white
  - Room control module comfort either white or black
- Resolution: 480 x 320
- Connection to the Hoval bus system via RJ45 plug connection or plug terminals (max. 0.75 mm²)
- Installation on the wall
  - with a surface mounting frame (deep room control module incl. frame approx. 25 mm)
  - with a wall mounting plate with concealed sockets (deep room control module incl. mounting plate approx. 12 mm)
- Optimum mounting height in the room: 1500-1600 mm
- LED for displaying the current system status
- Automatic dimming depending on the ambient light
- User-friendly user interface and menu system
- Plant-specific naming of heating and hot water circuits possible
- Display of all information in plain text and in different languages
- Display of detailed plant information
- Extensive fault message management by plain text and categories
- Service and maintenance function
- Operating mode selection incl. configurable week and day programs
- Room sensor installed

Delivery
- TopTronic® E room control module
- Surface-mounted assembly frame
- Design frame
- Wall mounting adapter
- Assembly material

TopTronic® E room control module easy white

- Room control module can only be allocated to a heating circuit
- Software with reduced range of functions for simple operation of the room temperature and selection of the basic program without problems

TopTronic® E room control module white or black

- Operation of all heating and hot water circuits connected to the bus system
- Rights management for heating and hot water circuits incl. activation of the common operating mode
- Efficient control of the heating installation by simple working with day programs
- Analysis function (outside temperature, room temperature, solar yield curves, etc.)
- Selection between different start-up screens possible during commissioning
- Customer-specifically configurable start screen for displaying
  - Time and date
  - Lunar phase
  - Heat generator temperature
  - Hot water temperature
  - Active day and basic program incl. temperature profile
  - Output and consumption of a heating/hot water circuit or of the heat generator (possible in combination with flow rate sensors)
  - Collector temperature (in combination with solar module)
- Display of the current weather or weather forecast (only possible in combination with HovalConnect)

Notice
The TopTronic® E room control module in white or black must be used to operate the Hoval HomeVent® comfort ventilation. For details, see “Comfort Ventilation”.

TopTronic® E control module

TopTronic® E control module black with 4.3″ colour touchscreen
For operation of all controller modules connected to the bus system (basic, solar, buffer modules etc.)
Connection to the Hoval bus system via RJ45 plug connection or via plug terminals (max. 0.75 mm²), flat design with flexible installation option
Installation:
- in control panel of the heat generator
- in the Hoval wall casing
- in the control panel front,
black high-gloss cover,
customer-specific configurable start screen,
Display of current weather or weather forecast (only possible in combination with HovalConnect)

Consisting of:
- TopTronic® E control module black
- Clamping device set control module
- RJ45-RAST 5 CAN cable, L = 500

Notice
Take account of additional accessories for alternative installation!

Part No.
6043 844

TopTronic® E room control modules

TopTronic® E room control module easy white with 4.3″ colour touchscreen
Room control module for one heating circuit
Software with reduced function range for simple operation of the room temperature and trouble-free choice of basic programme
Optimum mounting height: 1500-1600 mm
For installation on the wall
- with a surface-mounted assembly frame (depth room control module incl. frame approx. 25 mm)
- with a wall mounting plate for concealed sockets
(depth room control module incl. mounting plate approx. 12 mm),
Connection to the Hoval bus system via RJ45 plug connection or via plug terminals (max. 0.75 mm²),
white high-gloss cover

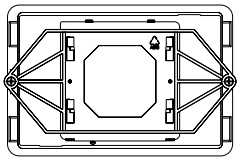
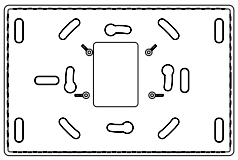
Consisting of:
- TopTronic® E room control module white
- Surface-mounted assembly frame white
- Designer frame white
- Wall mounting adapter
- Fitting accessories

Notice
Take account of additional accessories for alternative installation!

Part No.
6037 071

		Part No.
	**TopTronic® E room control module comfort white with 4.3″ colour** touchscreen Operation of all heating and hot water circuits connected to the bus system, Customer-specific configurable start screen, Display of current weather or weather forecast (only possible in combination with HovalConnect), Efficient control of the heating system by simple working with day programmes, Analysis function (outdoor temperature, room temperature, solar yield curves etc.) Optimum mounting height: 1500-1600 mm For installation on the wall - with a surface-mounted assembly frame (depth room control module incl. frame approx. 25 mm) - with a wall mounting plate for concealed sockets (depth room control module incl. mounting plate approx. 12 mm), Connection to the Hoval bus system via RJ45 plug connection or via plug terminals (max. 0.75 mm²), white high-gloss cover Consisting of: - TopTronic® E room control module white - Surface-mounted assembly frame white - Designer frame white - Wall mounting adapter - Fitting accessories	6037 069
Notice Take account of additional accessories for alternative installation!		
	**TopTronic® E room control module comfort black with 4.3″ colour** touchscreen Operation of all heating and hot water circuits connected to the bus system, Customer-specific configurable start screen, Display of current weather or weather forecast (only possible in combination with HovalConnect), Efficient control of the heating system by simple working with day programmes, Analysis function (outdoor temperature, room temperature, solar yield curves etc.) Optimum mounting height: 1500-1600 mm For installation on the wall - with a surface-mounted assembly frame (depth room control module incl. frame approx. 25 mm) - with a wall mounting plate for concealed sockets (depth room control module incl. mounting plate approx. 12 mm), Connection to the Hoval bus system via RJ45 plug connection or via plug terminals (max. 0.75 mm²), black high-gloss cover Consisting of: - TopTronic® E room control module black - Surface-mounted assembly frame white - Designer frame black - Wall mounting adapter - Fitting accessories	6037 070
Notice Take account of additional accessories for alternative installation!		

Accessories

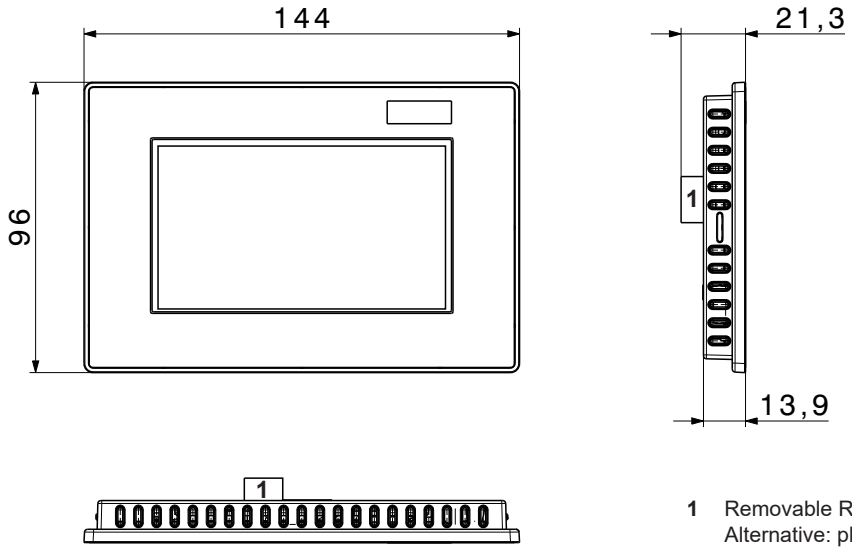
		Part No.
	**Enhanced language package TopTronic® E** one SD card required per control module Consisting of the following languages: HU, CS, SL, RO, PL, TR, ES, HR, SR, JA, DA	6039 253
	**Clamping device set for control module** Can be used for mounting the control module - in the Hoval wall casing - in front of the control panel, cut-out 136 x 88 mm with a material thickness of 0.5-6 mm, connection to the Hoval bus system either via RJ45 plug connection or via plug-in terminals (max. 0.75 mm²) Consisting of: - clamping device - clamping device adapter for 138 x 92 mm (wall casing) material thickness (0.5–3 mm) Included in the scope of delivery for the TopTronic® E control module.	6041 812
	**On-wall mounted installation frame black** Can be used for on-wall mounting of the control module/room control module black, depth of control module incl. on-wall mounted installation frame approx. 25 mm, colour matt black, connection to the Hoval bus system by RJ45 plug connection or plug-in terminals (max. 0.75 mm²) Consisting of: - On-wall mounting frame black - fixing accessories incl. screws for locking the control module Included in the scope of delivery for the TopTronic® E control module.	6035 797
	Wall installation adapter Can be used for wall installation of the control module/room control module black or white, very flat design possible depth of control module incl. on-wall mounted installation frame is only 13 mm, use requires an existing in-wall socket or connection to the Hoval bus system is by plug-in terminals (max. 0.75 mm²) Included in the scope of delivery for the TopTronic® E control module.	2053 488

TopTronic® E
control module / room control module

- Connection to the Hoval bus system via RJ45 plug connection or plug terminals (max. 0.75 mm²)
- Resolution: 480 x 320
- Voltage: 12 V DC 100 mA
- Humidity (in operation): 20...80 % RH, non-condensing

Dimensions

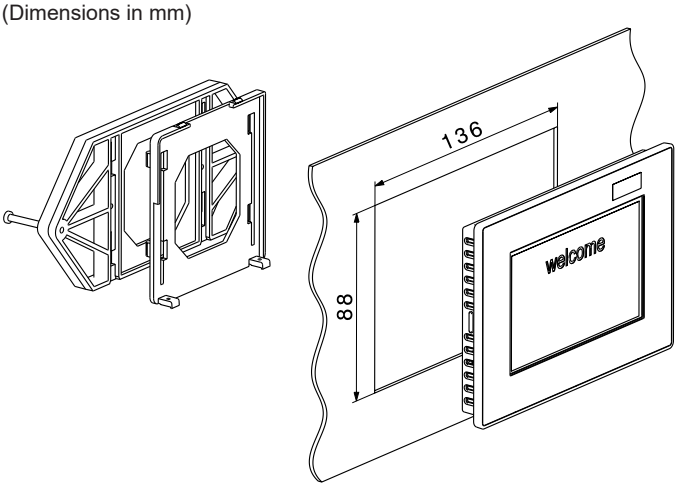
TopTronic® E
control module / room control module
(Dimensions in mm)



1 Removable RJ45 plug connection
Alternative: plug terminal (max. 0.75 mm²)

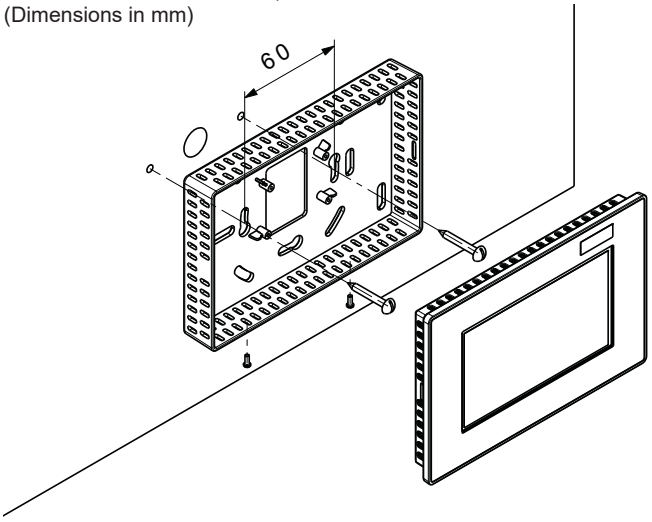
TopTronic® E
control module / room control module
Installation

Installation in control panel
(Clamping device is Included in the scope of delivery for the control module)
(Dimensions in mm)



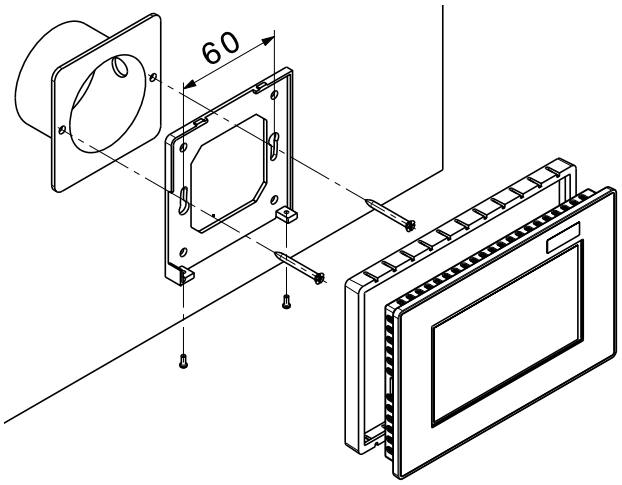
- Cut-out: 136 x 88 mm
- Material thickness: 0.5-6 mm
- Connection to the Hoval bus system either via RJ45 plug connection or plug terminals (max. 0.75 mm²)

Wall mounting with surface-mounting frame
(Surface-mounting frame is included in the scope of delivery for the room control modules)
(Dimensions in mm)



Wall mounting with wall mounting plate
with concealed sockets
(Wall mounting plate is included in the scope of delivery for the room control modules)
- Connection to the Hoval bus system via RJ45 plug connection or plug terminals (max. 0.75 mm²)

(Dimensions in mm)



Industrial mobile data router

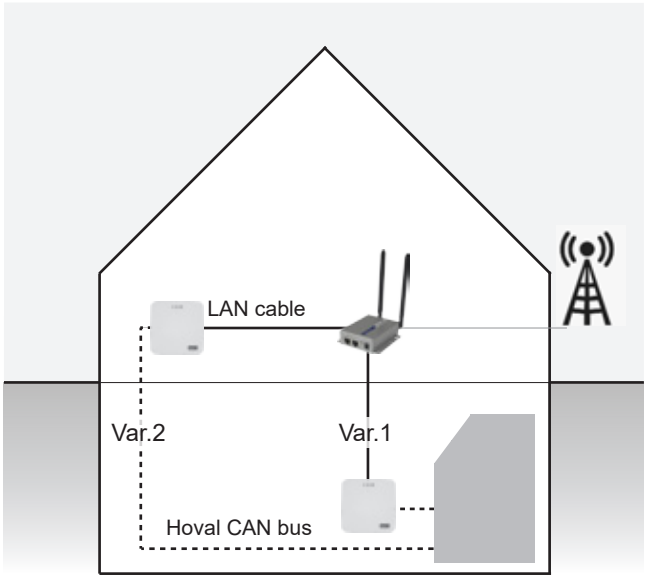
- Router for connecting a HovalConnect gateway or an Ethernet connection TopTronic® E district heating com to the Internet, via LAN or WLAN
- For mounting in a control panel (when using WLAN, it is essential to use an aerial extension cable)
- For installation in a control panel
- Configuration via web server
- 2G/3G/4G-LTE mobile data technology
- Version with sturdy metal casing
- Dimensions: L x W x H: 93 x 90 x 27 mm
- Connections:
  - 2 SMA antenna connections for mobile radio
  - 1 SMA antenna connection for WLAN
  - 2 x 10/100 Mbit Ethernet
  - 2 SIM card slots

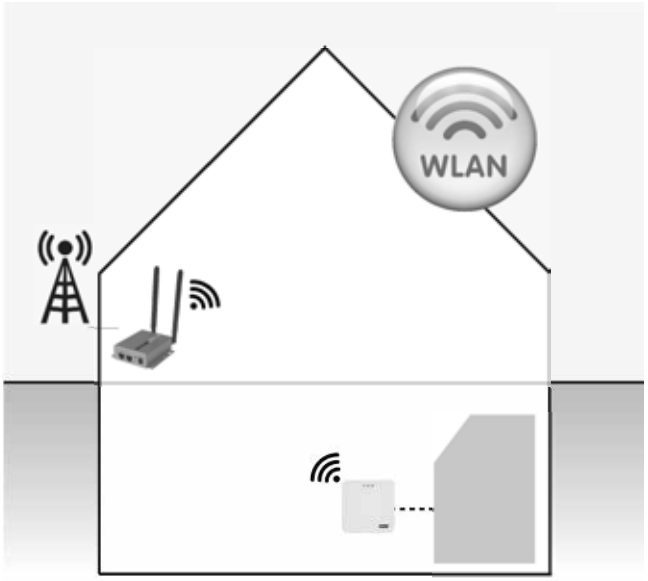
Delivery

- Router
- 2 LTE tilt-and-swivel antennas for direct router mounting
- 1 WLAN tilt-and-swivel antenna for direct router mounting
- Plug-in power supply Top hat rail mounting clips
- 1 x 1.5 m Ethernet cable

Notice
SIM card (micro) is not supplied and must be provided by the customer. Telephone network or provider can be selected as required.
See HovalConnect engineering for the minimum requirements for HovalConnect.

Suitable for HovalConnect LAN & HovalConnect WLAN





Industrial mobile data router

		Part No.
	**Industrial mobile data router** Industrial router for connecting the HovalConnect gateway or Ethernet TopTronic® E district heating com to the Internet via LAN/WLAN For control panel mounting, metal casing Without SIM card, free choice of phone network Configuration via web server Connections: 2 x 10/100 Mbit Ethernet, 2 x simcard slot SMA connections: 2 x mobile data, 1 x WLAN Consisting of: - Fitting accessories - Aerials: 2 x LTE, 1 x WLAN - Plug-in power supply	2076 329
	**Cellular antenna (2G/3G/4G-LTE/5G-ready)** for installation outdoors or indoors. Consisting of: 2G/3G/4G-LTE/5G-ready antenna, 5 m antenna cable with SMA-male plug, incl. metal mounting bracket. Frequencies: - 617-960/1710-6000 MHz - 698-960 MHz: 2 dBi max. gain - 1710-2700 MHz: 3.5 dBi max. gain - 3400-3800 MHz: 5 dBi max. gain - 4900-6000 MHz: 7 dBi max. gain Antenna length: approx. 82 mm Total height incl. mounting bracket: 164 mm Diameter: approx. 48 mm Temperature range: -40 °C to +85 °C For each router, an external omnidirectional antenna should be used which is suitable either for control panel mounting or mounting on a wall with metal brackets.	2078 889
	**Antenna extension cable - 5 m** Connections: SMA-male to SMA-female Cable type: HDF-195 Cable length: 5 metres To avoid excessive signal attenuation, only one extension cable should be used.	2073 750
	**Antenna extension cable - 10 m** Connections: SMA-male to SMA-female Cable type: HDF-195 Cable length: 10 metres To avoid excessive signal attenuation, only one extension cable should be used.	2073 751

Mobile data router

The mobile data router is used for connecting a HovalConnect gateway or an Ethernet connection TopTronic® E district heating com to the Internet and is provided for use in boiler rooms (control panel with top hat rail). The connection is established via the mobile data network, in which case the telephone network or provider can be selected as required (depending on the SIM card used).

Notice
The SIM card (micro) is not supplied with the device and must be provided separately.
For the connection of a HovalConnect Gateway, a tariff with at least around 150-300 MB/month must be provided (deviations possible depending on the size of the plant, equipment such as M-Bus meters and usage behaviour).
The data consumption of an TopTronic® E district heating com Ethernet connection is very high and can vary greatly (this must be determined on a case-by-case basis).

Notice
It is recommended for the router to be extended with an omnidirectional antenna and, if necessary, an extension cable from the accessories and for this antenna to be mounted outdoors. In this case, one of the enclosed antennas should be used indoors as the 2nd antenna. The antenna connection to the outside is labelled “Main”.
When extending antenna cables, it is important to note that each additional meter of cable also attenuates the signal. Therefore, extensions should be handled with care.

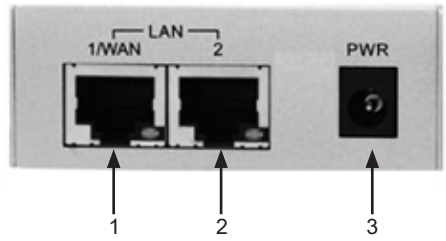
Notice
The strength of the mobile signal must be checked in advance at the planned location of the router aerial (e.g. using a mobile phone or a suitable app).

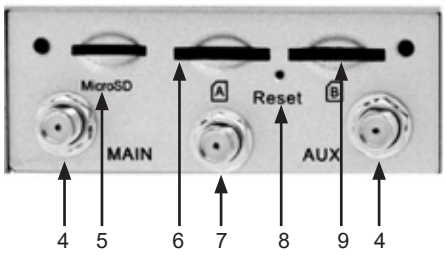
Dimensions
- L x W x H: 93 x 90 x 27 mm

Delivery
- Router
- 2 LTE tilt-and-swivel antennas for direct router mounting
- 1 WLAN tilt-and-swivel antenna for direct router mounting
- Plug-in power supply DC 5 V/2 A
- Top hat rail mounting clips
- RJ45 cable 1 x 1.5 m

Technical data
- Mobile data technology: 2G/3G/4G-LTE
- Frequenzen:
  LTE: 800/900/1800/2100/2300/2600 MHz,
  UMTS: 850/900/1900/2100 MHz,
  GPRS/EDGE: 850/900/1800/1900 MHz
- WLAN: 11N (2.4 GHz) WiFi Uplink
- Voltage supply range: 5 to 18 V DC
- Configuration: web server
- DHCP server
- Firewall / NAT
- IPSec, PPTP, L2TP, GRE, OpenVPN, DMVPN, L2TP over IPSec

Connections
- 2 SMA antenna connection for mobile radio
- 1 SMA antenna connection for WLAN
- 2 x 10/100 Mbit Ethernet
- 2 SIM card slots





1 LAN1/WAN
2 LAN2
3 Plug-in power supply
4 Cellphone aerial
5 MicroSD
6 SIM-A
7 WLAN aerial
8 Reset-Button
9 SIM-B

Ambient conditions:
- Temperature range between -30 °C and +70 °C
- Humidity: 10 % to 95 % (non-condensing)
- Type of protection: IP30

Omnidirectional antenna (2G/3G/4G-LTE/5G-ready)
- Frequencies: 698-960 / 1710-2700 MHz
- 2 dBi max gain @ 698-960 MHz
- 4 dBi max gain @ 1710-2700 MHz
- Antenna length: approx. 82 mm
- Total height including mounting bracket: 164 mm
- Diameter: approx. 48 mm
- Temperature range: between -40 °C and +80 °C

Antenna extension cable
- Cable type: Low-Loss HDF195
- Attenuation at 1GHz: approx. 0.36 dB per metre
- Connector type: SMA-male / SMA-female

Industrial Ethernet switch

- The Ethernet switch is used for connecting several Ethernet devices with an Internet access and is provided for use in boiler rooms. These devices are, for example, HovalConnect gateways or Ethernet connections TopTronic® E district heating com.
- For connection to the Internet, the Ethernet switch can be connected to an industrial mobile router or another router provided by the customer.
- The power supply must be provided via an existing control panel power supply unit and must be wired in advance by the customer.
- No configuration is necessary for the Ethernet connections, the connection is plug-and-play. If required, the existing relay output can be used for recording fault messages.
- 5-port unmanaged Ethernet switch for connecting up to four Ethernet devices to one Internet access point.
- For top hat rail mounting in a control panel
- Version with sturdy metal casing

Dimensions
- L x W x H: 95 x 30 x 120 mm

Connections
- 5 x RJ45 10/100 Mbit Ethernet
- 2 x 12-48 V DC voltage supply (redundant)
- 1 relay output for fault messages

Delivery
- Ethernet switch
- Top hat rail clip
- Quick reference guide

Notice
There is no power supply unit in the scope of delivery, the power supply must be provided via an existing control panel power supply unit. The wiring must be carried out on site in advance.

Ethernet Switch

Industrial Ethernet switch
5-port unmanaged Ethernet switch for connecting up to four Ethernet devices to one Internet access point.
Consisting of:
- Ethernet switch
- Top hat rail clip
- Quick reference guide

The power supply is not included and must be provided via an existing control panel power supply unit.

Part No.
2078 819

Industrial Ethernet switch

Ambient conditions		
• Type of protection		IP30
• Humidity (non-condensing)	%	10…95
• Temperature range	°C	-10...60
• Standard IEEE		802.3, 802.3u, 802.3x
• LAN		10/100Base-T (X)
• Transmission distance	m	up to 100
• Transmission speed	MBps	up to 100
• Power consumption	W	2.88
• MTBF (Mean Time Between Failures)	h	388 566
Integrated cross-polarity and surge voltage protection		
Certifications		
• Safety		UL 60950
• EMI		CE, FCC Class A
• EMS		EN 61000-4-2, EN 61000-4-3, EN 61000-4-4, EN 61000-4-5, EN 61000-4-6, EN 61000-4-8, shock load IEC 60068-2-27, free fall IEC 60068-2-32, vibration IEC 60068-2-6
Connections		5 x RJ45 10/100 Mbit Ethernet 2 x 12-48 V DC power supply (redundant) 1 relay output for fault messages
• Dimensions (L x W x H)	mm	95 x 30 x 120

BMS module 0-10 V / OT - OpenTherm TopGas® (building management system)

- BMS module for linking to the Hoval TopGas® classic and TopGas® (35-120) by connecting the control voltage (0-10 V).

Functions

- Interface converts the 0-10 V signal into a reference temperature value or a reference output value for controlling a TopGas®
- Specification of the reference temperature to the Hoval TopGas® condensing gas boiler
- Specification of the reference output to the Hoval TopGas® condensing gas boilers
- The type of control of the Hoval TopGas® can be configured by the DIP switches.

BMS module 0-10 V/OT - OpenTherm (building management system)
no control unit TopTronic® E or
RS-OT necessary
power supply via OT bus
Temp. control external with 0-10 V
0-1.0 V no request
1.0-9.5 V ... 0-100 °C
Cannot be installed in boiler control panel:
- TopGas® classic (12-30)
Can be installed in boiler control panel:
- TopGas® classic (35-120)

Only in combination with
TopGas® classic and TopGas® (35-120)
(OpenTherm bus)

Part No.
6016 725

BMS module 0-10 V / OT - OpenTherm (building master control system)

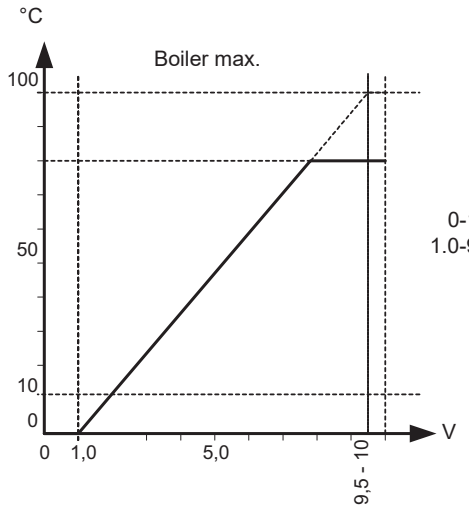
Only in combination with
TopGas® classic and TopGas® (35-60)
(OpenTherm bus)

- Dimensions: L x W x H
  68 x 45 x 23 mm
- Electrical power supply: via the OT bus

Temperature control

- DIP switch 1 = OFF
- Module converts an input signal at the input into a heat generator reference value.
- The signal conversion follows a straight line. 1.0 V = 0 °C to 9.5 V = 100 °C.
- Voltages below 1.0 V: no heat request

External temperature control with 0-10 V



0-1.0 V = No requirement
1.0-9.5 V = 0-100 °C

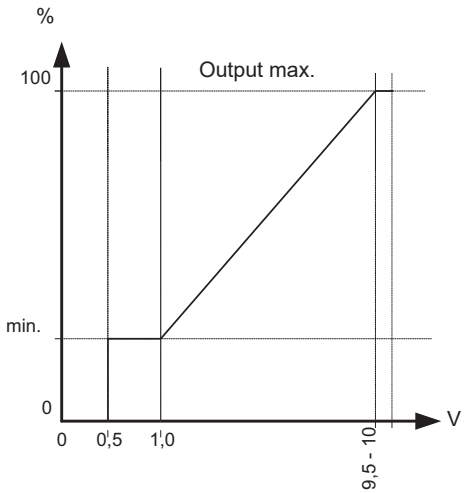
Output control

- DIP switch 1 = ON
- The module converts an input signal at the input into an output reference value.
- Limitation to the maximum flow temperature reference value

It is possible to differentiate between four different areas:

- 0-0.5 V No heat request
- 0.5-1 V Minimum output
- 1-9.5 V Output depending on 0-10 V signal
- 9.5-10 V Maximum output

Output control



TopTronic® E BMS module 0-10 V

- BMS module for linking to the Hoval CAN bus system for the following functions:
  - Connecting a control voltage (0-10 V) for specifying a reference temperature value to the heat generator or to the heat generator cascade or
  - Connecting a control voltage (0-10 V) for specifying a reference output value to an individual heat generator
- Temperature specification for heating, hot water and also cooling operation possible (module expansion may be required)
- Output specification for heating and cooling operation possible
- Configurable characteristics for connecting temperature or output (see diagrams below)
- Connection technology executed as plug-in screw terminals in coded RAST 5 design
- Update capability of the controller software
- Time and date via integrated RTC, multi-year spring reserve
- Fine fuse 10 A
- Controller module suitable for cabinet installation by ability to install on DIN rail 35 x 15 x 2.2 mm

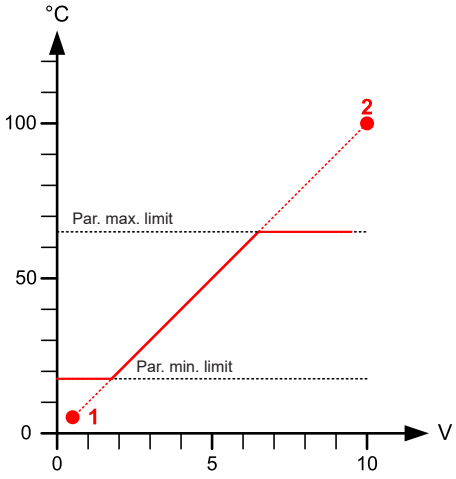
Inputs and outputs
- 3 variable sensor inputs
  - for heating / cooling change-over
  - for connecting information sensors
  - for connecting a reference value increase or reduction in the system
  - 1 x variable input for connection of a sensor or pulse sensor
- 0-10 V input for connecting the reference temperature/output value
- The connection to a flow rate sensor or a pulse sensor is not possible.
- Variable 230 V 3-point output, e.g. for outputting a reference value detection function for heating, hot water and cooling operation
- Variable 230 V output, e.g. for outputting an alarm message

Option
- Can be expanded by max. 2 module expansions (expansion of the inputs/outputs):
  - Module expansion Universal (connection of separate reference temperature values)

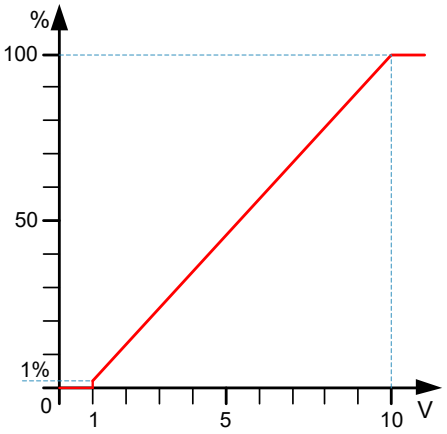
Use
- For connecting the heat generator or the heat generator cascade to a higher-level building management system using 0-10 V

Delivery
- TopTronic® E BMS module 0-10 V incl. 2 x mounting clips for DIN rail attachment
- DIN rail with fitting accessories
- Complete plug set for controller module

Example for temperature requirement
0-0.5 V = OFF = No requirement
0.5-10 V = 5-100 °C
The reference flow value is limited by the programmed min./max. limit.



Input signal output requirement
Using the 0 -10 V characteristic curve, an output is read in by means of linear conversion. The characteristic curve is set on the points {1 V, 1 %} and {10 V, 100 %}.



Voltages between 0 V and 0.9 V are interpreted as “OFF”. No requirement is transferred.

Voltages
0-0.9 V heat generator off
1-10 V heat generator required approx.
1 % to 100 % output, voltage produces reference output

Notice
A separate set value specification for heating and hot water is recommended. Therefore, a module expansion Universal is required in addition to the BMS module.

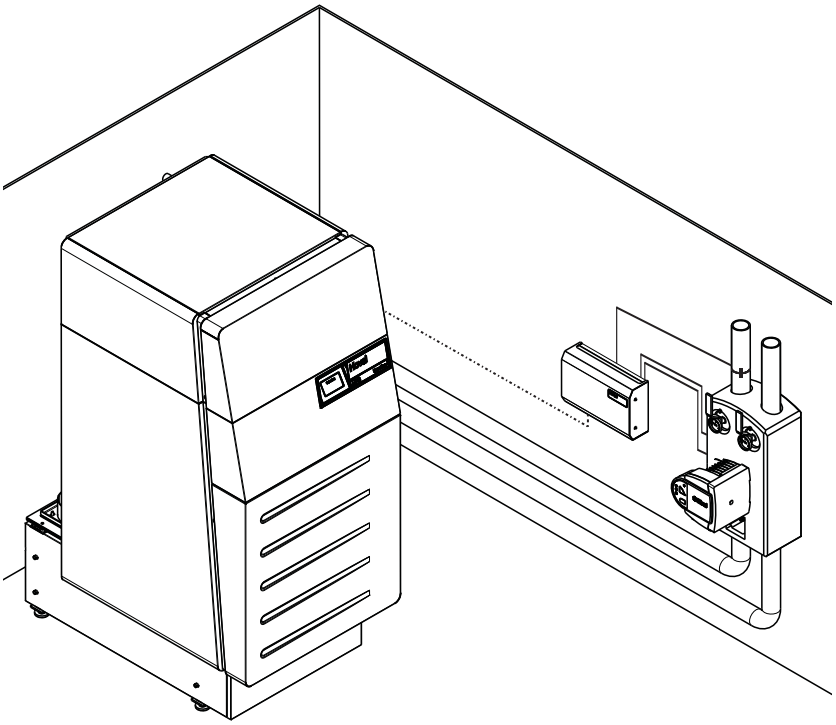
	Part No.
 **TopTronic® E GLT module 0-10 V** Communication module for connecting the heat generator or the heat generator cascade to a higher-level building management system using 0-10 V. Consisting of: TopTronic® E building management module 0-10 V incl. 2 mounting clips for top hat rail attachment Complete plug set for controller module, top hat rail with fitting accessories	6034 578

Hoval TopTronic® E wall casings

- Reduction in the wiring complexity on site thanks to installing the controller module directly at the sensors and actuators (e.g.: regulating armature)
- Flexible connection possibilities due to available cable introductions at the top and at the bottom
- Strain relief by cable ties and fastening points
- Material: powder-coated metal sheet
- Colour: flame red (RAL 3000)

Delivery
- Wall casing incl. built-in DIN rail
- Cable tie for strain relief
- Fastening material

On site
- Wiring between wall casing and calorifier according to diagram



Hoval TopTronic® E wall casings

	Part No.
 **Wall casing small WG-190** - Suitable for installing a controller module/ basic module - Operation of the controller module for control purposes using the control module in the heat generator - No installation of the TopTronic® E control module possible - Dimensions: 190 x 230 x 102 (L x W x H) - Protection class: IP20 Consisting of: - small wall casing incl. built-in top hat rail - cable ties for strain relief - fixing accessories	6052 983

 **Wall casing medium WG-360**
- Suitable for installing
  - 1 basic module w/o module expansion or
  - 1 controller module plus 1 module expansion or
  - 2 controller modules
- Operation of the controller module for control purposes using the control module in the heat generator
- No installation of the TopTronic® E control module possible
- Dimensions: 360 x 230 x 102 (L x W x H)
- Protection class: IP20
 	
Consisting of:
- medium wall casing incl. built-in top hat rail
- cable ties for strain relief
- fixing accessories
	6052 984

	Part No.

 **Wall casing medium with control module cut-out WG-360 BM**
- TopTronic® E control module for the controller module can be installed in the wall casing
- Suitable for installation of
  - 1 basic module w/o module expansion or
  - 1 controller module plus module expansion or
  - 2 controller modules
- Suitable for renovation works or for standalone systems, i.e. controller functioning independently from the heat generator (autonomous heating circuit control, solar plant, etc.)
- Dimensions: 360 x 230 x 102 (L x W x H)
- Protection class: IP20
 	
Consisting of:
- medium wall casing with control module cut-out incl. built-in top hat rail
- cable ties for strain relief
- fixing accessories
	6052 985

 **Wall casing compact with control module cut-out WG-360-3 BM**
- Suitable for the installation of
  - 1 basic module plus 1 module expansion or
  - 1 basic module plus 1 controller module or
  - 2 controller modules plus 1 module expansion or
  - 1 controller module plus 1 module expansion or
  - 3 controller modules
- Operation of the controller module for control purposes using the control module in the heat generator
- No installation of the TopTronic® E control module possible
- Dimensions: 360 x 300 x 102 (L x W x H)
- Protection class: IP20
 	
Consisting of:
- Wall casing compact incl. built-in top hat rail
- Cable tie for strain relief
- Fastening material
	6052 988

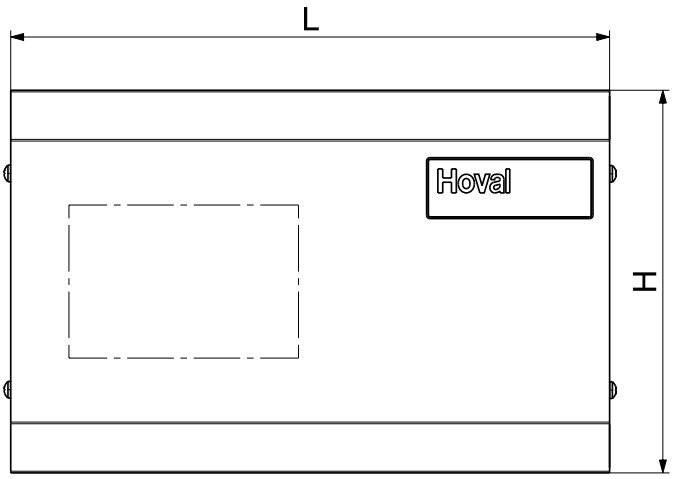
	Part No.

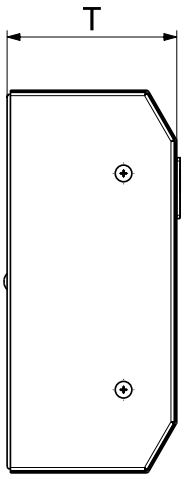
 **Wall casing large WG-510**
- Suitable for installing
  - 1 basic module plus 1 module expansion or
  - 1 basic module plus 1 controller module or
  - 2 controller modules plus 1 module expansion or
  - 1 controller module plus 2 module expansions or
  - 3 controller modules
- Operation of the controller module for control purposes using the control module in the heat generator
- No installation of the TopTronic® E control module possible
- Dimensions: 510 x 230 x 102 (L x W x H)
- Protection class: IP20
 	
Consisting of:
- large wall casing incl. built-in top hat rail
- cable ties for strain relief
- fixing accessories
	6052 986

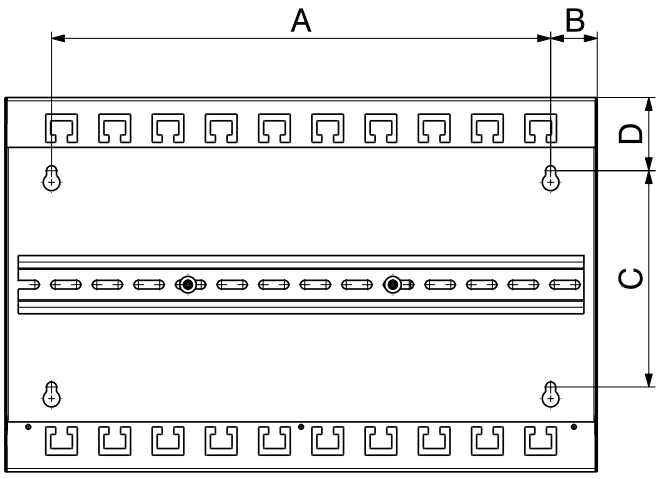
 **Wall casing large with control module cut-out WG-510 BM**
- TopTronic® E control module for the controller module can be installed in the wall casing
- Suitable for installing
  - 1 basic module plus 1 module expansion or
  - 1 basic module plus 1 controller module or
  - 2 controller modules plus 1 module expansion or
  - 1 controller module plus 2 module expansions or
  - 3 controller modules
- Dimensions: 510 x 230 x 102 (L x W x H)
- Protection class: IP20
 	
Consisting of:
- large wall casing incl. built-in top hat rail
- cable ties for strain relief
- fixing accessories
	6052 987

TopTronic® E wall casing

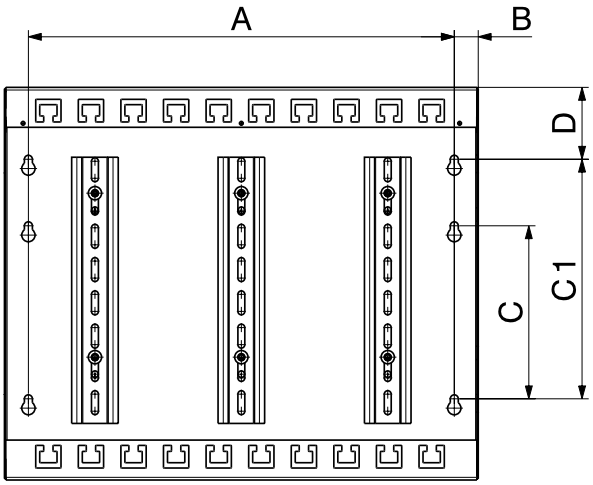
(Dimensions in mm)







WG-190/BM ... WG-510/BM



WG-360-3 BM

Wall casing	L	H	T	A	B	C	C1	D
WG-190	190	230	102	130	28	130	-	44
WG-360	360	230	102	300	28	130	-	44
WG-360 BM	360	230	102	300	28	130	-	44
WG-360-3 BM	360	300	102	320	18	130	180	54
WG-510	510	230	102	300	28	130	-	44
WG-510 BM	510	230	102	300	28	130	-	44

		Part No.
	**Single thermostat with setting in the casing** 15-95 °C externally visible setting in the casing, immersion depth 100/150 mm Differential gap 6 K, splash water-protected polymer casing, nickel-plated brass immersion sleeve with thread seal G ½″, max. operating pressure 10 bar. 1 changeover contact max. 6 A (ind.) at 230 V	
	Single thermostat - immersion depth 100 mm **RAKTW.1000B**	6010 081
	Single thermostat - immersion depth 150 mm **RAKTW.1000S**	6010 082
	Clamp-on flow temperature controller RAK-TW1000S 15-95°C, setting (visible from the outside) inside the housing cover, with tensioning band	242 902
	**Calorifier thermostat control TW 12** Universal thermostat controller for thermostatic pump charge demand, setting in casing, visible from outside. 15-95 °C, switching difference 6 K, capillar length 700 mm incl. fastening material for Hoval calorifier, can be used with integrated immersion sleeve	6010 080
	**Double thermostat ATH-22** Usable as minimal thermostat flow to open the loading pump. Usable as maximal thermostat to limit the flow. Bottom part of the casing made of die-cast aluminium with plastic cover, with rigid shaft 1 separate temperature adjustment each in the casing Type of protection IP54 Switching capacity: 230 V/10 A cos = 1 Control range 1.2: 0 °C … +100 °C Switching differential 1.2: 3-4 % of the scale range Immersion sleeve: G ½″, L = 150 mm, D = 15 mm Immersion sleeve brass nickel-plated Version according to DIN EN 14597	2054 650
	**Flue gas thermostat AGT 519** Switching temperature 80 °C (switching differential approx. 15 K) 1 switchover contact 10 A at 230 V/50 Hz ohm resistive load Simple screw fastening on flue gas pipe, with 2 m connecting cable. Tested according to DIN 3440	641 256
	**Temperature controller LAE LTR-5TSRE** Electronic 2 point temperature controller -50...+150 °C switching interval 1-25 K 1 switchover contact cable sensor 2 m/Ø 0.7 mm	2004 485

Sensors for heating technology

Outdoor sensor AF/2P/K
for TopTronic® E controller modules/ module expansions except for basic module district heating/fresh water or basic module district heating com, terminal connection, sensor may already be in included in scope of delivery of the heat generator, dimensions (H x W x D): 80 x 50 x 28 mm, sensor characteristics: KTY 81-210 (type 0), application temperature: -50…+80 °C, protection class: IP x 4, Including fitting accessories

Part No. 2055 889

Contact sensor
for TopTronic® E controller modules/module expansions with exception of basic module district heating/fresh water or basic module district heating com
Dewpoint-proof
Operating temperature: -35...105 °C
Protection class: IP67

Type	Length [m]	Accessories	Part No.
ALF/2P/2/T/K	L = 2.0	incl. connection box	2056 800
ALF/2P/4/T	L = 4.0	-	2056 775
ALF/2P/4/T/S1	L = 4.0	incl. plug	2056 801

mmersion sensor
for TopTronic® E controller modules/module expansions with exception of basic module district heating/fresh water or basic module district heating com
Dewpoint-proof
Sensor sleeve diameter: 6 x 50 mm
Operating temperature: -20...105 °C
Protection class: IP67

Type	Length [m]	Accessories	Part No.
TF/2P/2.5/6T	L = 2.5	-	2056 789
TF/2P/2.5/6T/S1	L = 2.5	incl. plug	2056 790
TF/2P/2.5S/6T Silikon	L = 2.5	-	2056 787
TF/2P/5/6T	L = 5.0	-	2055 888
TF/2P/5/6T	L = 5.0	incl. plug	2056 788

Immersion sensor TF/12N/2.5/6T, L = 2.5 m
for gas boiler with RS-OT
Cable length: 2.5 m
Sensor sleeve diameter: 6 x 50 mm, dewpoint-proof,
operating temperature: -20…105 °C,
protection class: IP67

Part No. 2056 791

Sensors for heating technology

		Part No.
	**Flue gas temperature sensor TF/ 1.1P/5/4/B, L = 5.0 m** for TopTronic® E controller modules/ module expansions with exception of basic module district heating/fresh water or basic module district heating com Cable length: 5 m without plug Sensor sleeve diameter: 4 x 200 mm dewpoint-proof Sensor characteristics: PT1000 Operating temperature: -20…105 °C Protection class: IP67 Supplied with fastening flange and screws	2056 794
	**Collector sensor TF/1.1P/2.5S/5.5T** L = 2.5 m silicone for TopTronic® E solar module, solar controllers ESR collector sensor for solar plants, cable length: 2.5 m (silicone) without plug sensor sleeve diameter: 6 x 50 mm, dewpoint-proof, sensor characteristics: PT1000, operating temperature: -50…200 °C, protection class: IP65	2056 776
	**Ground water immersion sensor TF/1.1P/5S/5T/H-WP L = 5 m silicone** Ground water sensor for heat pumps, Cable length: 5 m (silicone) without plug Sensor sleeve diameter: 5 x 60 mm Unaffected by condensation Sensor characteristic: PT1000 Circuit board construction Double-curved contact-pressure spring Operating temperature: -50…200 °C Protection class: IP65	6048 378

Sensors for district heating

		Part No.
	**Outdoor sensor AF/1.1P/K** for TopTronic® E basic module district heating/fresh water or basic module district heating com Sensor for district heating application (PT1000) Terminal connection Sensor may already be included in scope of supply of heat generator Dimensions (H x W x D),: 80 x 50 x 28 mm Operating temperature: -50…+80°C Protection class: IP x4 Incl. fitting accessories	2056 774
	**Immersion sensor TF/1.1P/2.5/6T, L = 2.5 m FW** for TopTronic® E basic module district heating/fresh water, basic module district heating com Sensor for district heating applications (PT1000) Cable length: 2.5 m without plug (plug supplied with controller module/ module expansion) Sensor sleeve diameter: 6 x 50 mm Dewpoint-proof Sensor may already be included in scope of supply of heat generator/controller module/module expansion Operating temperature: -50…105 °C Protection class: IP67	2056 777
	**Contact sensor ALF/1.1P/2.5/T, L = 2.5 m** for TopTronic® E basic module district heating/fresh water or basic module district heating com Sensor for district heating applications (PT1000) Cable length: 2.5 m without plug (plug supplied with controller module/ module expansion) Dewpoint-proof Sensor may already be included in scope of supply of heat generator/controller module/module expansion Operating temperature: -50…105 °C Protection class: IP67	2056 778

		Part No.
	**Fast sensor PT1000** with short response time e.g. for use in combination with speed control and instantaneous calorifiers with screw connection G ½″ incl. assembly instructions Sensor characteristics: PT1000 Cable length: 2 m Cable diameter: 4 mm	6058 451
	**Clamp connectors** for the extension of sensor lines	2037 954
	**Bivalent switch 1-piece** Can be used universally (incl. cooling enable, heating circuit enable, heat generator lock, etc.) Can be used in bivalent systems for priority switchover between heat generators Can be installed in TopTronic® E control panel, max. 2 bivalent switches can be installed at the same time Voltage: 230 V	2056 858
	**Bivalent switch 2-piece** Can be used universally with two functions (incl. cooling enable, heating circuit enable, heat generator lock, etc.) Priority switchover between heat generators Can be installed in TopTronic® E control panel 2-part switch for 2 functions, max. 1 bivalent switch can be installed Voltage: 230 V	2061 826

Hoval system components

		Part No.
	**System unit SB-K5 - TTE** For operation of external constant temperature/request/minimum value operation (ventilation/swimming pool, etc.). Without casing. Consisting of - Relay R1K - support/snap track (8 cm) - incl. fixing accessories for installation in boiler controllers - RAST 5 plug 2-pin, green, wired - RAST 5 plug 2-pin, yellow	6038 550
	**System component SB-K6** For combination of external calorifier demand with thermostat Without casing Consisting of: - relay R1K - support/snap track (8 cm) - incl. fastenings for installation in boiler controller - RAST 5 plug – 2 pin, green, wired	6013 067
	**System component SB-R1K (relay)** For universal implementation Relay with switchover contact 230 V/10 A Without casing Consisting of: - relay R1K - support/snap track (8 cm) - incl. fastenings for installation in boiler controller	6013 064
	**System module SB-R1K 16A (relay)** For universal application Contact material $AgSnO_2$ Relay with changeover contact 230 V/16 A Without casing Consisting of: - Relay R1K - Mounting/snap-on rail (8 cm) - incl. fastening material for installation in boiler controller	6050 604
	**System component SB-R3K 16 A (relay)** for universal use without casing Improved contact material $AgSnO_2$ Relay with 3 switchover contacts max. 400 V/16 A, control voltage 230 V Without housing Consisting of: - relay R3K - support/snap track (8 cm) - incl. fastenings for installation in boiler controller - Control voltage 230 V	6044 844

Hoval system components

		Part No.
	**System module SB-Y10 24 V (mains supply)** For universal application (e.g. mains supply for 24 V actuators) Mains adapter 230 V AC/24 V DC 0.63 A Without casing Consisting of: - Mains adapter 230 V AC/24 V DC 0.63 A - 3 modular terminal blocks - 2 RAST 5 plugs (2-pin blue, 3-pin green) wired up - Mounting/snap-on rail (8 cm) - incl. fastening material for installation in boiler controller	6050 603
	**System module SB-SM-BZ1** for passing on a volt-free operating and fault message. (for 1-stage/modulating H-Gens) Without casing - 2 relays R1K - Mounting/snap-on rail (8 cm) - incl. fastening material for installation in boiler controllers	6048 055
	**System module SB-SM-BZ1-2** for passing on a volt-free operating and fault message. (for 2-stage H-Gens) Without casing - 3 relays R1K - Mounting/snap-on rail (8 cm) - incl. fastening material for installation in boiler controllers	6048 056
	**System casing 182 mm - universal** Simple universal casing for installation of system modules or a controller module, if accommodating in the heat generator is not possible. Dimensions (H x W x D): 182 x 180 x 111 mm Colour: light grey Consisting of: - Top hat rail 180 mm - 6 x diaphragm lead-throughs M 20	6038 551
	**System casing 254 mm - universal** Simple universal casing for installation of system modules or a controller module (1 x basic module heat generator or 1 x controller module), if accommodating in the heat generator is not possible. Dimensions (H x W x D): 254 x 180 x 111 mm Colour: light grey Consisting of: - Top hat rail 250 mm - 10 x diaphragm lead-throughs M 20	6038 552

Balancing valve TN

- As a line balancing and shut-off valve with direct indication of the set flow rate on the sight glass
- Automatically blocking bypass routed parallel to the main flow, with measuring and indication section
- Measuring section with float and counter-spring
- Materials
  - Housing components: brass
  - Interior components: stainless steel, brass and polymer
  - Sight glass: borosilicate
  - Seals: EPDM
  - Internal thread (Rp) acc. to DIN 2999/ ISO 7

Size	Measuring range l/min
DN 20	2-12
DN 20	8-30
DN 25	10-40
DN 32	20-70

Flow rate sensor set

- Flow rate sensor according to the principle of the Kármán vortex street
- Used for limiting the heat quantity in conjunction with the heat balancing module expansion or various controller modules
- Flow rate sensor supplies the current flow rate as well as the current temperature at the measuring point
- No moving parts, therefore insensitive to dirt build-up
- Low pressure drop
- High accuracy
- Can be used up to 125 °C

Plastic housing

Size	Flow rate l/min
DN 8	0.9-15
DN 10	1.8-32
DN 15	3.5-50
DN 20	5-85
DN 25	9-150

Brass housing

Size	Flow rate l/min
DN 10	2-40
DN 32	14-240
DN 40	22-400

Solar balancing valve with bypass
As a line balancing and shut-off valve with direct indication of the set flow rate on the sight glass.
Maximum operating temperature 185 °C

Size	Measuring range l/min	Connection Rp x Rp	kvs m^3/h	Part No.
DN 20	2-12	¾″ x ¾″	2.2	2038 034
DN 20	8-30	¾″ x ¾″	5.0	2038 035
DN 25	10-40	1″ x 1″	8.1	2038 036
DN 32	20-70	1¼″ x 1¼″	17.0	2038 037

Sets flow rate sensor
- Used in combination with the module expansion heat balancing or var. controller modules for heat metering
- Flow sensor supplies the current flow rate as well as the current temperature to the measuring point

Consisting of:
- flow rate sensor
- connection cable
- RAST 5 plug for connecting to TopTronic® E

Plastic housing

Unit of measure	Connection	Flow rate l/min	Part No.
DN 8	G ¾″	0.9-15	6038 526
DN 10	G ¾″	1.8-32	6038 507
DN 15	G 1″	3.5-50	6038 508
DN 20	G 1¼″	5-85	6038 509
DN 25	G 1½″	9-150	6038 510

Brass housing

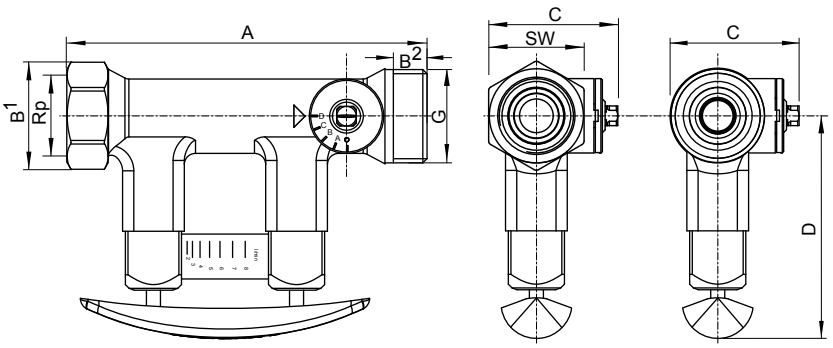
Unit of measure	Connection	Flow rate l/min	Part No.
DN 10	G 1″	2-40	6042 949
DN 32	G 1½″	14-240	6042 950
DN 40	G 2″	22-400	6055 092

Balancing valve TN
(Dimensions in mm)

- Type DN 20 - ¾″, DN 20 - ¾″, DN 25 - 1″, DN 32 - 1¼″
- Connections
  - DN 20 - Rp ¾″ x Rp ¾″
  - DN 20 - Rp ¾″ x Rp ¾″
  - DN 25 - Rp 1″ x Rp 1″
  - DN 32 - Rp 1¼″ x Rp 1¼″

  Measuring accuracy ±10 % of the display value
- Kvs values
  - 2.2 m³/h
  - 5.0 m³/h
  - 8.1 m³/h
  - 17.0 m³/h

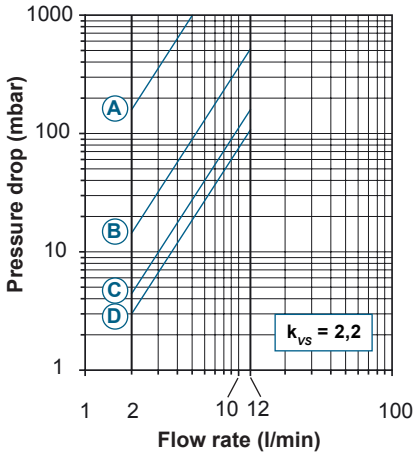
  at viscosity 1 mm²/s
- Measuring ranges
  - 2-12 l/min
  - 8-30 l/min
  - 10-40 l/min
  - 20-70 l/min
- In conjunction with sealing plugs
  Max. operating temperature 185 °C



DN	A	B1	C	D	SW	Rp
20	129	39	46	79	34	¾"
25	152	47	58	82	41	1"
32	161	56	65	84	49	1"

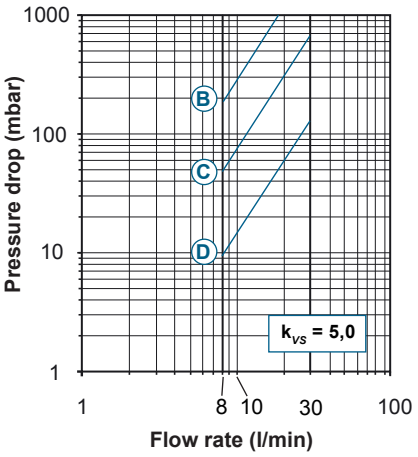
Pressure drop curves

DN 20 - Rp ¾″ x Rp ¾″ - 2-12 l/min



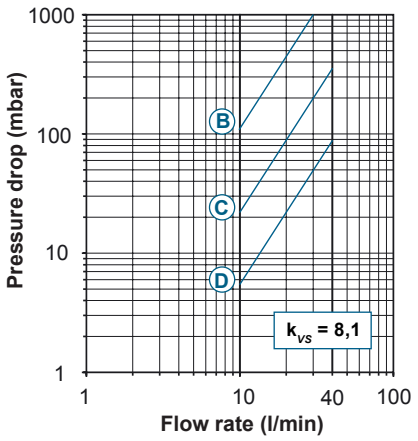
A–D Valve position

DN 20 - Rp ¾″ x Rp ¾″ - 8-30 l/min



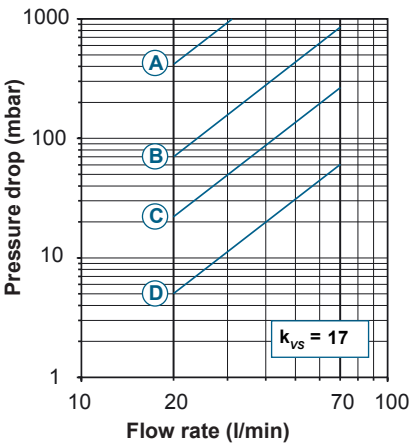
B–D Valve position

DN 25 - Rp 1″ x Rp 1″ - 10-40 l/min



B–D Valve position

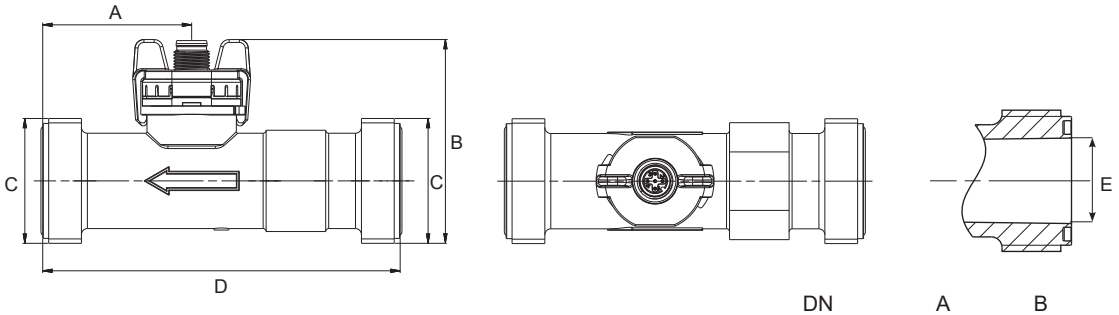
DN 32 - Rp 1¼″ x Rp 1¼″ - 20-70 l/min



A–D Valve position

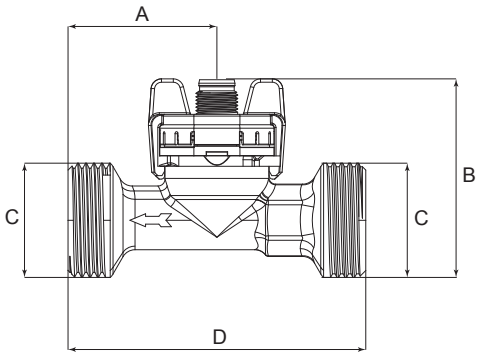
Hoval flow rate sensor sets
(Dimensions in mm)

Plastic housing



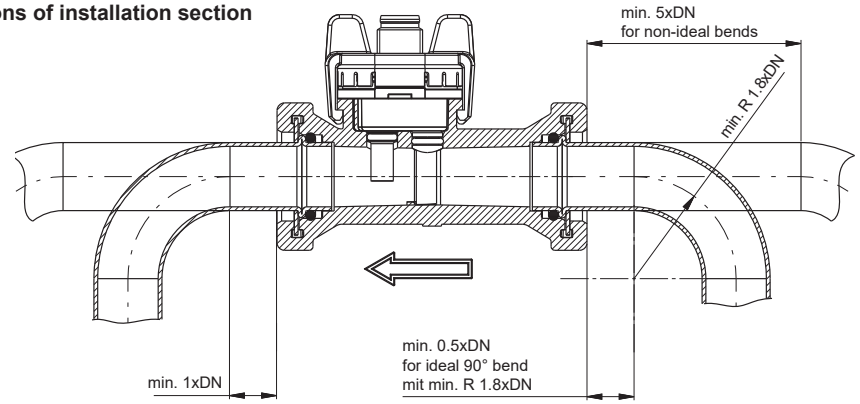
DN	A	B	C	D	E
8	48.2	55.7	G ¾″	86	11.5
10	39.5	54.1	G ¾″	90	11.5
15	41.6	59.5	G 1″	97	16.0
20	42.6	65.8	G 1¼″	117	20.0
25	56.0	71.3	G 1½″	132	26.0

Brass housing



DN	A	B	C	D
10	43	57.3	G 1″	86
32	50	74.9	G 1½″	134
40	67.3	83.6	G 2″	110

Dimensions of installation section



Application conditions

- Temperature
  - Media < +125 °C
  - Surroundings -15 ... +85 °C
  - Storage -30 ... +85 °C
- Maximum pressure at media temperature
  - over the life-time 12 bar at +40 °C
  - over the life-time 6 bar at +100 °C
  - for 600 hours 4 bar at +125 °C
  - for 2 hours 4 bar at +140 °C
  - maximum test pressure 18 bar at +40 °C
- Cavitation
  The following equation applies in order to avoid cavitation: $P_{abs\ outlet} / P_{difference > 5.5}$

Pressure drop

Plastic housing

	Flow rate l/min			Flow rate l/h			Pressure drop mbar		
	min.	mid.	max.	min.	mid.	max.	min.	mid.	max.
DN 8	0.9	7	15	54	420	900	1	42	190
DN 10	1.8	15	32	108	900	1920	1	50	230
DN 15	3.5	25	50	210	1500	3000	1	42	170
DN 20	5.0	38	85	300	2280	5100	1	37	180
DN 25	9.0	70	150	540	4200	9000	1	45	210

Brass housing

	Flow rate l/min			Flow rate l/h			Pressure drop mbar		
	min.	mid.	max.	min.	mid.	max.	min.	mid.	max.
DN 10	2	20	40	120	1200	2400	1	90	360
DN 32	14	120	240	840	7200	14400	1	36	140
DN 40	22	200	400	1320	12000	24000	1	70	360

SHARKY 775
Ultrasound compact heat meter

Compact heat meter consisting of ultrasound heat meter and calculation unit.

Ultrasound heat meter
- The heat meter measures the flow rate statically using the ultrasound measurement principle.
- The meter is characterised by long-term stability for energy measurements with maximum measurement accuracy.
- Insensitive to dirt build-up
- Any installation position (exceptions see “Technical data”)
- Sizes DN 15 to DN 100
- Nominal flow rates 1.5-60 qp
- Media temperature 5-130 °C
- Temperature sensor PT500, firmly connected with the calculation unit

Calculation unit
- Electronic calculation unit with 8-digit LCD display
- 3.6 V DC battery power supply or 230 V AC (50-60 Hz) mains supply
- The calculation unit is removable and can be mounted on the wall as on-wall version
- Temperature sensor PT500, firmly connected with the calculation unit
- Temperature measuring range 1...180 °C
- The consumption values measured by the meter can be read out on the meter on site.
- Mains supply version with integrated M-Bus module for connecting to the TopTronic® E basic module district heating or to the TopTronic® E measuring module

Application
- For collection of all payroll-relevant data for measurement of the energy consumption in heating and/or refrigeration plants

On site
- Installation of the calculation unit directly onto the volume measuring unit or the wall

Threaded version

Connection size	Nominal flow rate qp m³/h
R ¾″	1.5
R 1″	2.5
R 1¼″	6.0
R 2″	10

Flange version

Connection size	Nominal flow rate qp m³/h
DN 50	15
DN 65	25
DN 80	40
DN 100	60

Approval
MID (DE-10-MI004-PTB013) and PTB K 7.2

Heat meter SHARKY 775

Ultrasound compact heat meter SHARKY 775

- Flow rate measurement using the ultrasound measurement principle
- Calculation unit for compact and wall installation
- Two temperature sensors, firmly connected with the calculation unit
- The consumption values measured by the meter can be read out on the meter on site.
- Mains supply version with integrated M-Bus module for connecting to the TopTronic® E basic module district heating or to the TopTronic® E measuring module

Heat meter with external thread
without screw connections (max. 150 °C, PN 25)

Connection size	Nominal flow rate m^3/h	Install. length mm	kvs value m^3/h	Sensor	Sensor cable length m	Part No.
Battery power supply without M-Bus						
R ¾″	1.5	110	5.48	M10 × 1 [1]	2	2047 509
R 1″	2.5	130	7.91	M10 × 1 [1]	2	2047 511
R 1¼″	6.0	260	16.8	2 x ½″× 85 [2]	3	2059 660
R 2″	10	300	26.73	2 x ½″× 85 [2]	3	2059 661
Mains supply incl. M-Bus						
R ¾″	1.5	110	5.48	M10 × 1 [1]	2	2047 512
R 1″	2.5	130	7.91	M10 × 1 [1]	2	2047 513
R 1¼″	6.0	260	16.8	2 x ½″× 85 [2]	3	2047 516
R 2″	10	300	26.73	2 x ½″× 85 [2]	3	2047 517

Heat meter with flange connection
without counter flanges (max. 150 °C, PN 25)

Connection size	Nominal flow rate qp m^3/h	Install. length mm	kvs value m^3/h	Sensor	Sensor cable length m	Part No.
Battery power supply without M-Bus						
DN 50	15	270	40.09	2 x ½″ × 120 [2]	3	2059 662
Mains supply incl. M-Bus						
DN 50	15	270	40.09	2 x ½″ × 120 [2]	3	2047 518
DN 65	25	300	91.29	2 x ½″ × 120 [2]	3	2047 519
DN 80	40	300	141.42	2 x ½″ × 120 [2]	3	2047 520
DN 100	60	360	219.09	2 x ½″ × 120 [2]	3	2047 522

[1] Direct installation sensor
[2] Immersion sensor without immersion sleeve

Immersion sleeves must be ordered separately in the appropriate length.

Accessories

Immersion sleeve
with external thread

Connection size	Install. length mm	Part No.
G ½″	40	2047 503
G ½″	85	2047 505
G ½″	120	2047 506

Heat meter installation set
Consisting of:
2 ball valves with union nut
1 ball valve with sensor seat
1 pipe nipple, galvanised

Ball valve Rp	Union nut Rp	Pipe nipple G	Install. length mm	Part No.
¾″	¾″	¾″	110	2073 104
¾″	1″	1″	130	2073 105
1″	1¼″	1¼″	150	2073 106

Not suitable for installation in heating armature groups.

Heat meter accessories Diehl M. PT500 — 2059 953
Sensor pair PT500
Sensor M10x1
Cable lengths: 2.0 m
Only needed as spare part

M-Bus communication module — 2053 201
M-Bus module standardised acc. to EN 1434-3 with 2-pin terminal with “24” and “25” connections
reverse-polarity protected
M-Bus supply via the meter
Is needed as spare part
or M-Bus upgrade of battery meters.
Can also be used as 2nd module for additional M-Bus read-out
(e.g. on site GLT)

Flow rate sensor

Connection size	R	Inches	¾	1	1¼	2
Nominal flow rate	qp	m³/h	1.5	2.5	6	10
Nominal diameter	DN	mm	15	20	25	40
Installation length	L	mm	110	130	260	300
Starting value		l/h	2.5	4	10	20
Min. flow rate (DR 1:250)	qi	l/h	6	10	24	40 [1]
Min. flow rate (DR 1:100)	qi	l/h	15	25	60	100
Max. flow rate	qs	m³/h	3	5	12	20
Overload value		m³/h	4.6	6.7	18.4	24
Operating pressure	PN	bar	16/25	16/25	16/25	16/25
Pressure drop with qp	Δp	mbar	120	100	128	140
Heat meter temp. range		°C	5 ... 130	5 ... 130	5 ... 150	5 ... 150
Kvs value (Δp = Q²/Kvs²)			5.48	7.91	16.77	26.73

Connection size	DN		50	65	80	100
Nominal flow rate	qp	m³/h	15	25	40	60
Nominal diameter	DN	mm	50	65	80	100
Installation length	L	mm	270	300	300	360
Starting value		l/h	40	50	80	120
Min. flow rate (DR 1:250)	qi	l/h	60 [1]	100 [1]	160	240 [1]
Min. flow rate (DR 1:100)	qi	l/h	150	250	400	600
Max. flow rate	qs	m³/h	30	50	80	120
Overload value		m³/h	36	60	90	132
Operating pressure	PN	bar	16/25	16/25	16/25	16/25
Pressure drop with qp	Δp	mbar	140	75	80	75
Heat meter temp. range		°C	5 ... 150	5 ... 150	5 ... 150	5 ... 150
Kvs value (Δp = Q²/Kvs²)			40.09	91.29	141.42	219.09

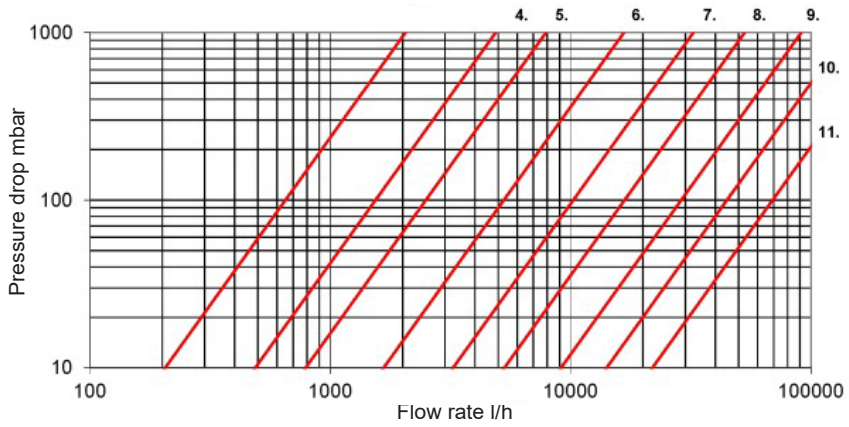
[1] Horizontal installation only

Pressure drop SHARKY 775

The pressure drop in a flow rate sensor is indicated as the maximum pressure drop with qp. According to EN 1434, the maximum pressure drop must not exceed 0.25 bar.

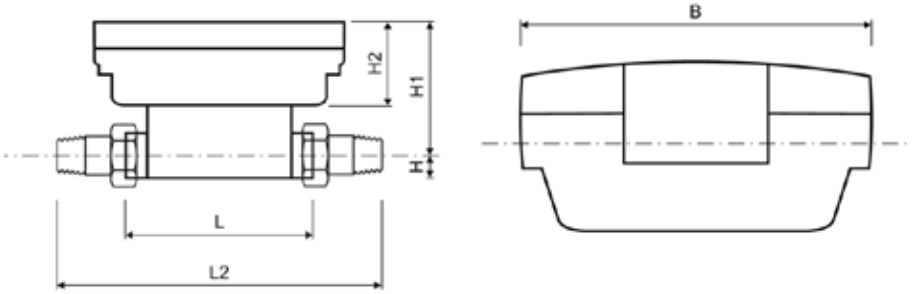
Curve	Nominal flow rate qp m³/h	Max. flow rate qs m³/h	Min. flow rate (DR 1:250) qi l/h	Min. flow rate (DR 1:100) qi l/h	Nominal diameter mm	Kvs value
4.	1.5	3.0	6	15	DN 15	5.48
5.	2.5	3.0	10	25	DN 20	7.91
6.	6	12	24	60	DN 25	16.77
7.	10	20	40 [1)]	100	DN 40	26.73
8.	15	30	60 [1)]	150	DN 50	40.09
9.	25	50	100 [1)]	250	DN 65	91.29
10.	40	80	160	400	DN 80	141.42
11.	60	120	240 [1)]	600	DN 100	219.09

[1)] Horizontal installation only



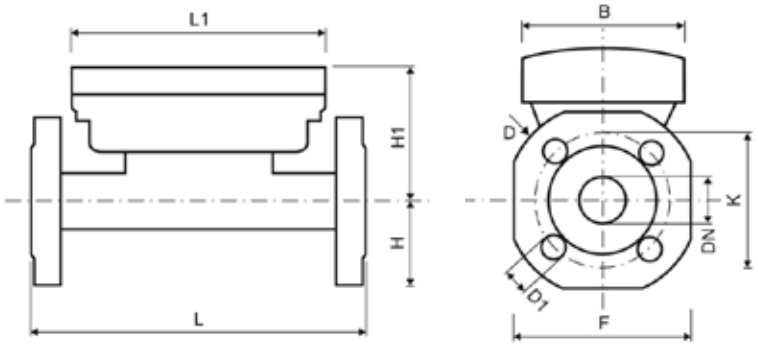
SHARKY 775
(Dimensions in mm)

Threaded version



Nominal flow rate	Nominal diameter	Installation length	Installation length with screw connection	Length calculation unit	Height	Height	Height calculation unit	Width calculation unit	Connection thread meter	Connection thread screw connection
qp	DN	L	L2	L1	H	H1	H2	B	F	D
m³/h	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm
1.5	15	110	190	150	14.5	82	54	100	G ¾B	R ½
2.5	20	130	230	150	18	84	54	100	G 1 B	R ¾
6	25	260	380	150	23	88.5	54	100	G 1¼B	R1
10	40	300	440	150	33	94	54	100	G 2 B	R 1½

Flange version



Nominal flow rate	Nominal diameter	Installa-tion length	Length calculation unit	Height	Height	Height calculation unit	Width calculation unit	Flange di-mensions	Flange diameter	Pitch circle diameter	Diame-ter	Number of flange drill holes
qp	DN	L	L1	H	H1	H2	B	F	D	K	D1	units
m³/h	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	
15	50	270	150	73.5	99	54	100	147	163	125	18	4
25	65	300	150	85	106.5	54	100	170	184	145	18	8
40	80	300	150	92.5	114	54	100	185	200	160	19	8
60	100	360	150	108	119	54	100	216	235	180 [1]/190	19 [1]/22	8

[1] Values for PN 16 casing

Electricity meter UEM40-2C

- Single-phase electricity meter with integrated M-Bus communication
- Direct connection up to 40 A
- Fully bi-directional 4-quadrant measurements for all energies and outputs
- 1 DIN module compact size
- Quick installation
- Class B according to EN 50470-3 (MID)
- S0 output for energy pulse emission
- MID certification

Electricity meter UEM80-D

- Three-phase electricity meter with integrated M-Bus communication
- Direct connection up to 80 A
- Fully bi-directional 4-quadrant measurements for all energies and powers
- For 4-wire networks with balanced or unbalanced load
- Class B according to EN 50470-3 (MID)
- S0 output for energy pulse emission
- MID certification

Electricity meter UEM1P5-D

- Three-phase electricity meter with integrated M-Bus communication
- For 1 or 5 A current transformer
- Programmable current transformer ratio
- Fully bi-directional 4-quadrant measurements for all energies and powers
- For 3/4 wire networks with balanced or unbalanced load
- Class B according to EN 50470-3 (MID)
- S0 output for energy pulse emission
- MID certification

Use

- Measurement of the electrical energy
- Readout with TopTronic® E basic module district heating / MWA module
- Use/display/representation with HovalSupervisor

Notice
The installation must be carried out by a specialist according to the given regulations.

Notice
An M-Bus connection via the following is recommended:
- TopTronic® E measuring module (TTE-MWA)
- TopTronic® E basic module district heating/fresh water (TTE-FW)
- TopTronic® E basic module district heating com (TTE-FW com),

although a connection via the pulse input (S0) of
- TopTronic® E basic module heat generator (TTE-WEZ)
- TopTronic® E basic module district heating/fresh water (TTE-FW)
- TopTronic® E basic module district heating com (TTE-FW com)

is also possible. When using the M-Bus connection, several data points are available, among others.

Electricity meters

		Part No.
	**Electricity meter UEM40-2C M-Bus** MID 40 A/1 ph MID certification, EN 50470-3 class B Direct connection to 40 A, 230 V AC, 50 Hz Bidirectional 4 quadrant meter Size according to DIN, 1 HU LCD display with 7 characters M-Bus connection, S0 connection	2073 566
	**Electricity meter UEM80-D M-Bus**MID 80A/3ph MID certification, EN 50470-3 class B Direct connection up to 80 A, 400 V AC, 50 Hz Bidirectional 4 quadrant meter Size according to DIN, 4 HUs Large LCD display with graphic symbols M-Bus connection, S0 connection	2073 565
	**Electricity meter UEM1P5-D M-Bus MID 6A/3ph** MID certification, EN 50470-3 class B Converter 1-10 000 A/1|5 A, 400 V AC, 50 Hz Bidirectional 4 quadrant meter Size according to DIN, 4 HUs Large LCD display with graphic symbols M-Bus connection, S0 connection Current transformer CT PRO XT optional	2073 567

Notice
For three-phase current measurement, the UEM80-D direct connection meter is recommended for currents up to 80 A. For higher currents, the UEM1P5-D model with matching current transformer should be provided.

Accessories

Current transformer CT PRO XT

- Accessories for current transformer UEM1P5
- Through-hole current transformer
- Accuracy: class 1

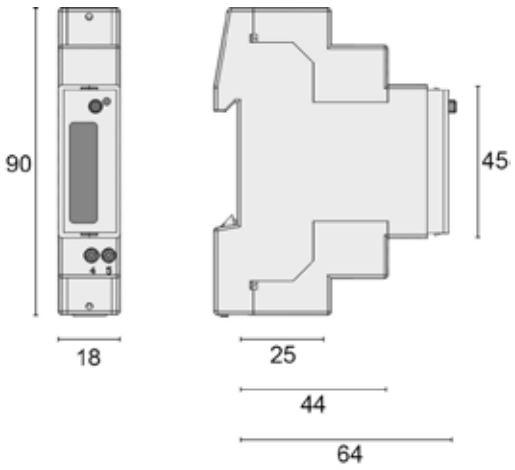
Consisting of:
- Current transformer
- Sealed terminal cover
- Installation accessories
- Self-tapping screw M5

	Nominal output (VA)	
CT PRO XT 100 / 100A-5A	3	2074 378
CT PRO XT 150 / 150A-5A	5	2074 379
CT PRO XT 200 / 200A-5A	5	2074 380

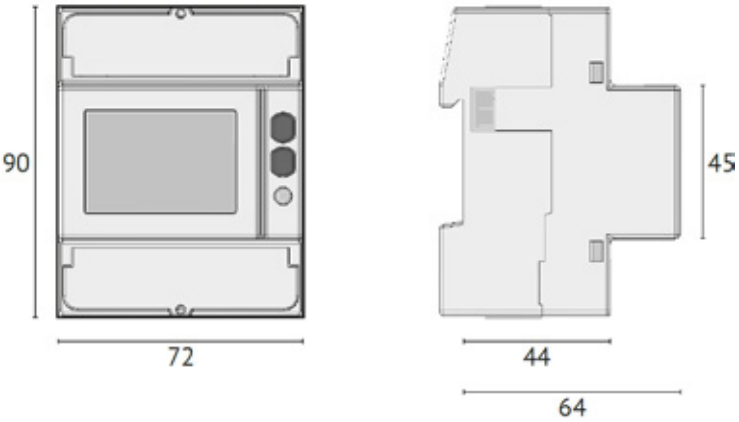
Notice
Required for measuring high currents and structurally difficult integration of a normal direct connection meter.

Type		UEM40-2C	UEM80-D	UEM1P5-D
Auxiliary voltage				
• Auxiliary voltage is taken from the measuring circuit				
• Nominal measurement voltage	%	±20	±20	±20
• Max. consumption (per phase) M-Bus model	W	1	0.5	1
• Nominal frequency	Hz	50/60	50/60	50/60
Voltage (range) & frequency				
• Nominal values	V	230	3x230/400...3x240/415	3x230/400...3x240/415
	Hz	50/60	50/60	50/60
Current				
• Inrush current I_{st}	mA	20	20	2
• Minimum current I_{min}	mA	250	250	10
• Suppressed leakage current I_{tr}	mA	500	500	50
• Reference current I_{ref} (Ib)	A	5	5	1
• Maximum currentI_{max}	A	40	80	6
Communication for M-Bus model				
• Interface		wired (EN 1434-3)	wired (EN 1434-3)	wired (EN 1434-3)
• Protocol		M-Bus	M-Bus	M-Bus
• Communication speed	bps	300,2400,9600	300...38400	300...38400
• Unit load		1	1	1
Accuracy				
• Active energy class B according to			EN 50470-3 (MID)	
• Reactive energy class 2 according to			IEC/EN62053-23	
S0 output (Passive opto-isolated)				
• Max. values (according to Directive EN 62053-31)		27 V DC - 27 mA	27 V DC - 27 mA	27 V DC - 27 mA
• Meter constant	imp/kWh	1000	100	1000 > CT = 1...4 200 > CT = 5...24 40 > CT = 25...124 8 > CT = 125...624 1 > CT = 625...3124 0.1 > CT = 3125...10000
• The measuring unit (imp/kWh, imp/kvarh, imp/kVAh) changes according to the assigned meters (kWh, kvarh, kVAh)				
• Pulse duration	ms	100 ±0.5	50 ±2 ON time min. 30 ±2 OFF time	50 ±2
Tariff input				
• Active opto-isolated		-	•	•
• Auxiliary voltage range for tariff 2	V AC-DC	-	80 ... 276	80 ... 276
Test LED for measuring technology				
• Meter constant	imp/kWh	5000	1000	10000
• Pulse duration	ms	4 ±0.1	10 ±2	10 ±2
Ambient conditions				
• Operating temperature range	°C	-25...+55	-25...+55	-25...+55
• Storage temperature range	°C	-40...+75	-25...+75	-25...+75
• Relative humidity (without condensation)	%	80	80	80
• Degree of protection - front side (only guaranteed if installed in a control panel with at least type of protection IP51)		IP51	IP51	IP51
• Terminal protection type		IP20	IP20	IP20

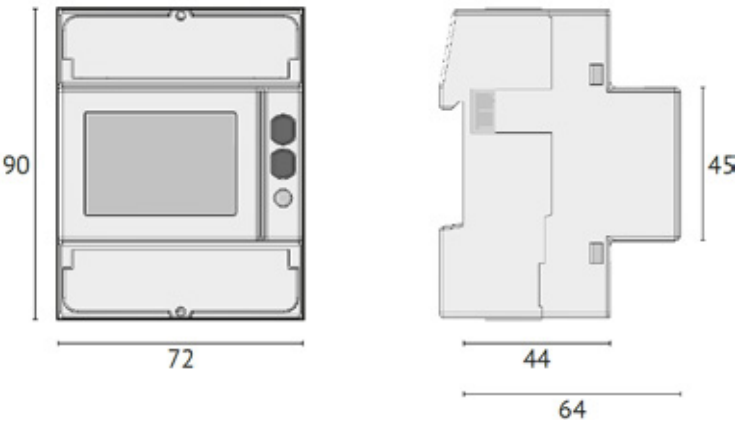
Electricity meter UEM40-2C
(Dimensions in mm)



Electricity meter UEM80-D
(Dimensions in mm)

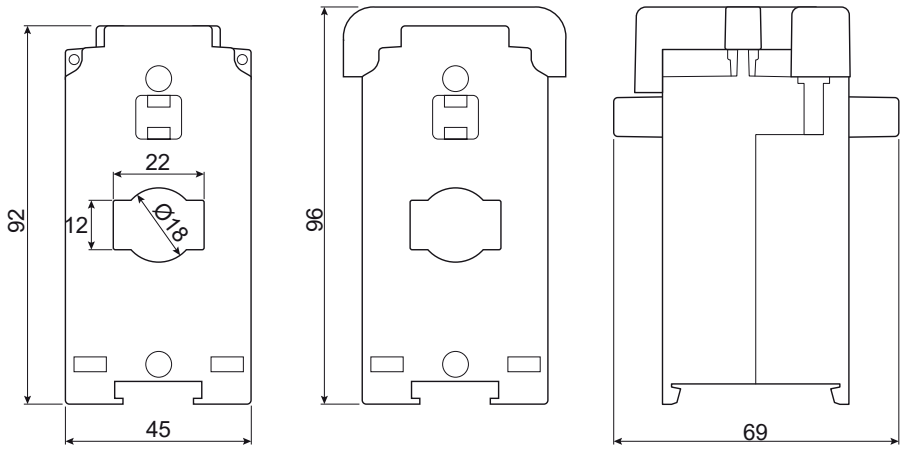


Electricity meter UEM1P5-D
(Dimensions in mm)



Current transformer CT PRO XT

(Dimensions in mm)



Electrical connection UEM80-D

4-wire connection

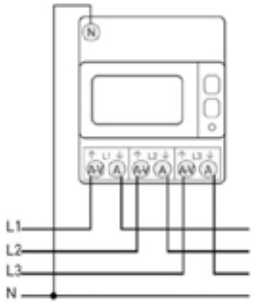


Fig. 01

Electrical connection UEM1P5-D

4-wire connection with measuring converter

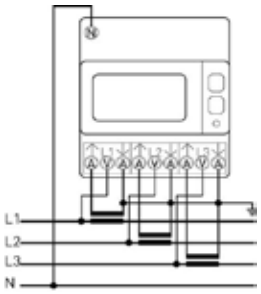


Fig. 02

M-Bus interface

The integrated M-Bus interface enables data to be read out according to the M-Bus compatibility list in the “Energy/heat balancing” chapter.

Further information
see chapter “Energy/heat quantity balancing”

Notice
It may be necessary to connect an MWA module to the TopTronic® system.

M-Bus connection UEM80-D / UEM1P5-D

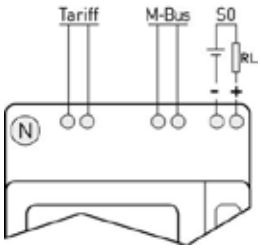


Fig. 03

M-Bus connection UEM40-2C

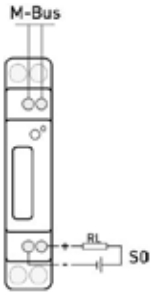


Fig. 04

M-Bus connection UEM80-D / UEM1P5-D

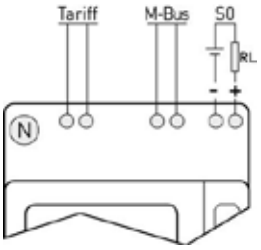


Fig. 05

M-Bus meter matching TopTronic® E control and its functions

	Gas meter		Electricity meter (only positive values are released)					Heat meter																														Water meter
Designation	Diehl AERIUS G4 M17 v0x30	Diehl AERIUS G4 M18 v0x30	NZR WSD 32 M	EMH DIZ-W1EL-00-KM0-0M-200010-E50/K	algodue UEM80-D M, v0x04	algodue UEM1P5-D M, v0x04	algodue UEM40-2C, v 0x04 (must be set to *algodue 1-phase* under configuration)	Hydrometer Sharky 775 M11 v0x2F	Kamstrup Multical® Compact v0x01	Kamstrup Multical® 602 v0x0F	Siemens UH50-A22C-AT06-F 0x04	Hydrometer SHARKY 775 M14 v0x20	Kamstrup 403 W 402 DB v0x34	Siemens WFZ 31 v0x3	Kamstrup Multical® 401 v0x02	Kamstrup Multical® 403 v0x34	Kamstrup Multical® 601 v0x01	Kamstrup Multical® 603 v0x35	Danfoss EEM-C manufacturer ID: KAM v0x01	Hydrometer Sharky 773 v0x2E	Kamstrup Multical® 66C v0x01	Kamstrup Multical® 402 v0x0B	Kamstrup ultrakon EWZ 810 manufacturer ID:KAM v0x01	Kamstrup Multical® 602 incl. pulse module v0x0F	Siemens UH50-A22C-AT06-F 0x04	Sontex Neovac Supercal531 v0x19 (Must be set to *Sontex* under configuration)	Sontex Superstatic 749 v0x0E (Must be set to *Sontex* under configuration)	Engelmann SensoStar2 v0x00	AQUA Metro Calec energy Master v0xD2	Amtron Sonic D15	ista Sensonic II / III M-Bus	Itron UltraMaXX MK HA, M-Bus	ista Ultego III perfect, M-Bus	Diehl Skylar INT-M v0xD0	Corona E
Current energy								●	●	●	●	●			●		●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●		
Current power								●	●	●	●				●		●	●	●	●		●	●	●	●	●	●		●	●	●	●	●	●	●		
Current flow rate	●	●						●	●	●	●				●	●	●	●	●	●		●	●	●	●	●		●	●	●	●	●	●	●	●		●
Current volume	●	●						●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●		●	●	●	●	●	●	●	●		●
Current flow temperature	●	●						●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●		●	●	●	●	●	●	●	●		
Current return temperature								●	●	●	●	●	●		●	●	●	●	●	●	●	●	●	●	●	●		●	●	●	●	●	●	●	●		
Current differential temperature								●	●	●	●	●	●		●	●	●	●	●	●	●	●	●	●	●	●		●	●	●	●	●	●	●	●		
Serial number	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●		●	●	●	●	●	●		●
Fault message/M-Bus status byte	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●		●		●	●			●	●	●	●	●	●			
Manufacturer	●	●	●	●	●	●	●	●	●	●	●	●	●		●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●		
Sort	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●		●
Current tariff register 1								●																●					●							
Current tariff register 2								●																					●							
Current date								●		●	●	●		●	●	●				●		●		●	●	●	●	●	●	●				●	●	
Current time								●		●	●	●		●	●	●				●		●		●	●	●	●	●	●	●				●	●	
Energy key date 1								●	●	●	●	●					●							●						●						
Volume 1								●	●	●	●	●		●			●			●			●							●						
Tariff register 1 / S1								●																						●						
Tariff register 2 / S1								●																						●						
Date 1								●	●	●	●	●	●	●		●	●	●	●	●					●					●						●
Date future key date 1												●		●						●																●
Energy key date 2								●			●	●																		●						
Volume 2								●			●	●		●																●						
Tariff register 1 / S2								●																						●						
Tariff register 2 / S2								●																						●						
Date 2								●				●		●						●										●						
Date future key date 2												●								●																
Current pulse input counter 1																																					●
Current pulse input counter 2																																					●
Version	●	●			●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●				●	●
Operating days								●	●	●	●	●	●			●	●	●	●	●	●	●	●	●	●					●						
Current energy cold										●														●													
Current output cold										●														●													
Current volume ltr	●	●						●	●	●	●	●	●		●	●	●	●	●																●	
Current active power L1 W					●	●																															
Current active power L2 W					●	●																															
Current active power L3 W					●	●																															
Current active power total W					●	●	●																														
Current reactive power L1 W					●	●																															
Current reactive power L2 W					●	●																															

	Gas meter		Electricity meter (only positive values are released)					Heat meter																														Water meter
Designation	Diehl AERIUS G4 M17 v0x30	Diehl AERIUS G4 M18 v0x30	NZR WSD 32 M	EMH DIZ-W1EL-00-KM0-0M-200010-E50/K	algodue UEM80-D M, v0x04	algodue UEM1P5-D M, v0x04	algodue UEM40-2C, v 0x04 (must be set to *algodue 1-phase* under configuration)	Hydrometer Sharky 775 M11 v0x2F	Kamstrup Multical® Compact v0x01	Kamstrup Multical® 602 v0x0F	Siemens UH50-A22C-AT06-F 0x04	Hydrometer SHARKY 775 M14 v0x20	Kamstrup 403 W 402 DB v0x34	Siemens WFZ 31 v0x3	Kamstrup Multical® 401 v0x02	Kamstrup Multical® 403 v0x34	Kamstrup Multical® 601 v0x01	Kamstrup Multical® 603 v0x35	Danfoss EEM-C manufacturer ID: KAM v0x01	Hydrometer Sharky 773 v0x2E	Kamstrup Multical® 66C v0x01	Kamstrup Multical® 402 v0x0B	Kamstrup ultrakon EWZ 810 manufacturer ID:KAM v0x01	Kamstrup Multical® 602 incl. pulse module v0x0F	Siemens UH50-A22C-AT06-F 0x04	Sontex Neovac Supercal531 v0x19 (Must be set to *Sontex* under configuration)	Sontex Superstatic 749 v0x0E (Must be set to *Sontex* under configuration)	Engelmann SensoStar2 v0x00	AQUA Metro Calec energy Master v0xD2	Amtron Sonic D15	ista Sensonic II / III M-Bus	Itron UltraMaXX MK HA, M-Bus	ista Ultego III perfect, M-Bus	Diehl Skylar INT-M v0xD0	Corona E
Current reactive power L3 W					●	●																															
Current reactive power total W					●	●	●																														
Current apparent power L1 W																																					
Current apparent power L2 W																																					
Current apparent power L3 W																																					
Current apparent power total W																																					
Active energy import 1 kWh			●	●	●	●	●																														
Active energy import 2 kWh																																					
Active energy export 1 kWh																																					
Active energy export 2 kWh																																					
Reactive energy import 1 kWh																																					
Reactive energy import 2 kWh																																					
Reactive energy export 1 kWh																																					
Reactive energy export kWh																																					
Current voltage L1			●	●	●	●	●																														
Current voltage L2					●	●																															
Current voltage L3					●	●																															
Current current L1			●	●	●	●																															
Current current L2					●	●																															
Current current L3					●	●																															
Current current total					●	●	●																														
Current cos phi L1					●	●																															
Current cos phi L2					●	●																															
Current cos phi L3					●	●																															
Current cos phi total			●		●	●	●																														
Current mains frequency 1			●		●	●	●																														
Current rate																																					

Notice
A guarantee for error-free communication and readout by TopTronic® E can only be given for the listed M-Bus meters.

Overview energy/heat quantity balancing

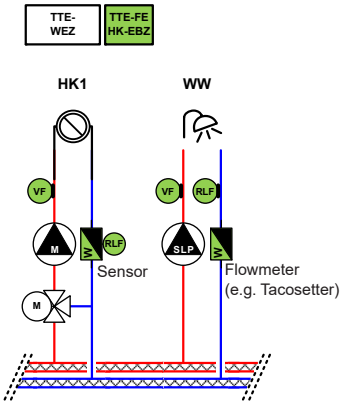
System	Consumer	Energy balancing (through-flow measuring method) Easy		Premium (calibrated)
		up to ~50 kW per circuit	more than ~50 kW per circuit	
EBZ_010	1 heating circuit + hot water	Flow rate sensor (according to the principle of the Kármán vortex street)		
EBZ_020		Water meter (with pulse output)		
EBZ_030				M-Bus meter
EBZ_040	2 heating circuits + hot water	Water meter (with pulse output)		
EBZ_050				M-Bus meter
EBZ_060	3 heating circuits + hot water	Water meter (with pulse output)		
EBZ_070				M-Bus meter
additional heating/consumer circuits on request				

Description of the system

EBZ_010	1 heating circuit + hot water	up to ~50 kW per circuit

Energy balancing for heating circuit by flow rate sensor
Energy balancing for domestic hot water using constant through-flow

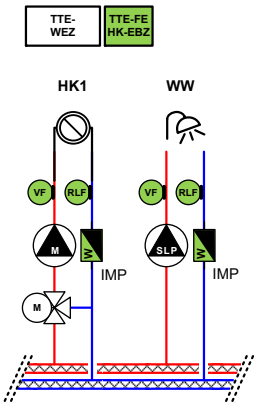
Components required:
- 1 x TopTronic® E basic module heat generator for controlling heating circuit 1 + hot water (usually installed in the heat generator)
- 1 x TopTronic® E module expansion heating circuit incl. energy balancing TTE-FE HK-EBZ (heating circuit 1)
- 1 x flow rate sensor set (for measuring flow rate heating circuit 1)
- 1 x balancing valve TN / flowmeter for setting the constant through-flow (for measuring hot water)



EBZ_020	1 heating circuit + hot water	up to and more than 50 kW per circuit

Energy balancing for heating circuit by water meter with pulse output
Energy balancing for hot water by water meter with pulse output

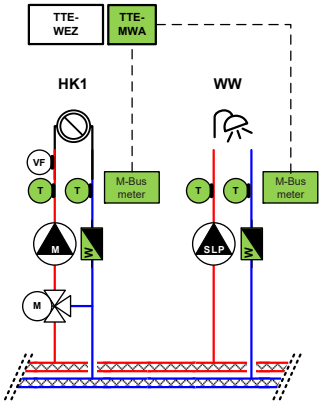
Components required:
- 1 x TopTronic® E basic module heat generator for controlling heating circuit 1 + hot water (usually installed in the heat generator)
- 1 x TopTronic® E module expansion heating circuit incl. energy balancing TTE-FE HK-EBZ (heating circuit 1)
- 2 x on-site water meters with pulse output (for heating circuit 1 + hot water, max. pulse value 10 ltr./pulse)



EBZ_030	1 heating circuit + hot water	calibrated measurement per circuit

Calibrated energy balancing for heating circuit by M-Bus meter
Calibrated energy balancing for hot water by M-Bus meter

Components required:
- 1 x TopTronic® E basic module heat generator for controlling heating circuit 1 + hot water (usually installed in the heat generator)
- 1 x TopTronic® E measuring module TTE-MWA
- 2 x M-Bus meter (for heating circuit 1 + hot water)

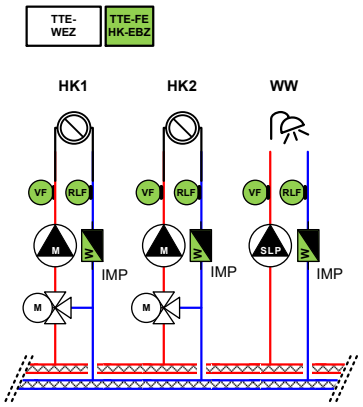


EBZ_040	2 heating circuits + hot water	up to/more than ~50 kW per circuit

Energy balancing for heating circuits by water meter with pulse output
Energy balancing for hot water by water meter with pulse output

Components required:

- 1 x TopTronic® E basic module heat generator for controlling heating circuit 1 + hot water (usually installed in the heat generator)
- 1 x TopTronic® E module expansion heating circuit incl. energy balancing TTE-FE HK-EBZ (heating circuit 2)
- 1 x contact sensor (hot water return)
- 3 x on-site water meters with pulse output (for heating circuit 1 + heating circuit 2 + hot water, max. pulse value 10 ltr./pulse)

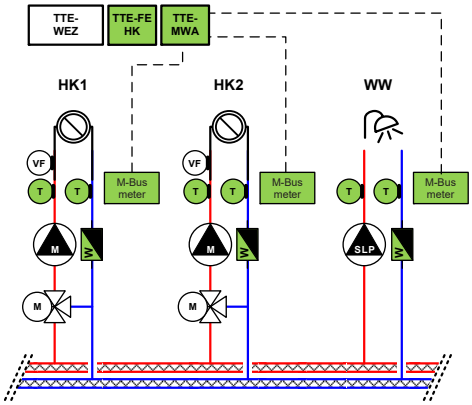


EBZ_050	2 heating circuits + hot water	calibrated measurement per circuit

Calibrated energy balancing for heating circuits by M-Bus meter
Calibrated energy balancing for hot water by M-Bus meter

Components required:

- 1 x TopTronic® E basic module heat generator for controlling heating circuit 1 + hot water (usually installed in the heat generator)
- 1 x TopTronic® E module expansion heating circuit for controlling heating circuit 2
- 1 x TopTronic® E measuring module TTE-MWA
- 3 x M-Bus meter (for heating circuit 1 + heating circuit 2 + hot water)

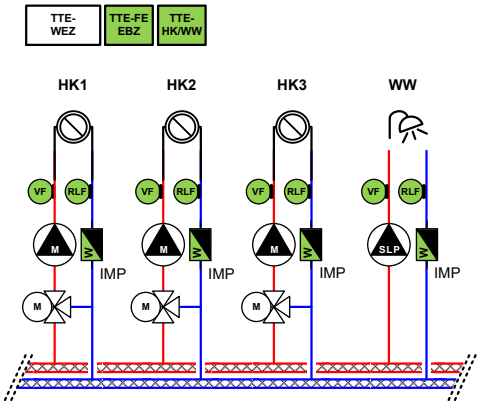


EBZ_060	3 heating circuits + hot water	up to/more than ~50 kW per circuit

Energy balancing for heating circuits by water meter with pulse output
Energy balancing for hot water by water meter with pulse output

Components required:

- 1 x TopTronic® E basic module heat generator for controlling heating circuit 1 + hot water (usually installed in the heat generator)
- 1 x TopTronic® E module expansion heating circuit incl. energy balancing TTE-FE HK-EBZ (heating circuit 2)
- 1 x TopTronic® E heating circuit/hot water module for controlling heating circuit 3
- 2 x contact sensors (hot water return + heating circuit 3)
- 4 x on-site water meters with pulse output (for heating circuit 1 + heating circuit 2 + heating circuit 3 + hot water, max. pulse value 10 ltr./pulse)

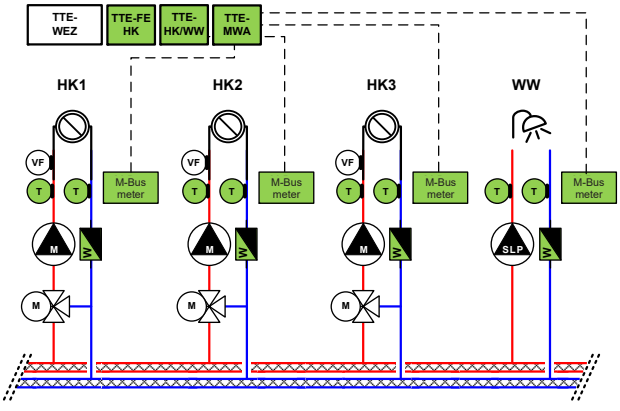


EBZ_070	3 heating circuits + hot water	calibrated measurement per circuit

Calibrated energy balancing for heating circuits by M-Bus meter
Calibrated energy balancing for hot water by M-Bus meter

Components required:

- 1 x TopTronic® E basic module heat generator for controlling heating circuit 1 + hot water (usually installed in the heat generator)
- 1 x TopTronic® E module expansion heating circuit for controlling heating circuit 2
- 1 x TopTronic® E heating circuit/hot water module for controlling heating circuit 3
- 1 x TopTronic® E measuring module
- 4 x M-Bus meter (for heating circuit 1 + heating circuit 2 + heating circuit 3 + hot water)



Assignment heat meter - TopTronic® E modules

					Basic module district heating/fresh water district heating com TTE-FW / TTE-FW com	Controller module (solar, buffer, etc.) TTE-SOL / TTE-PS	Module expansion incl. energy balancing TTE-FE	Measuring module TTE-MWA
					Available inputs			
					1 x FVT / 16 x M-Bus	1 x FVT / 1 x IMP		16 x M-Bus
								
Heat meter	FlowRotor		required inputs	FVT		•	•	
	Flow rate sensor set		required inputs	FVT	o	•	•	
	Heat meter		required inputs	M-Bus	•			•

o Only with TransTherm® aqua F

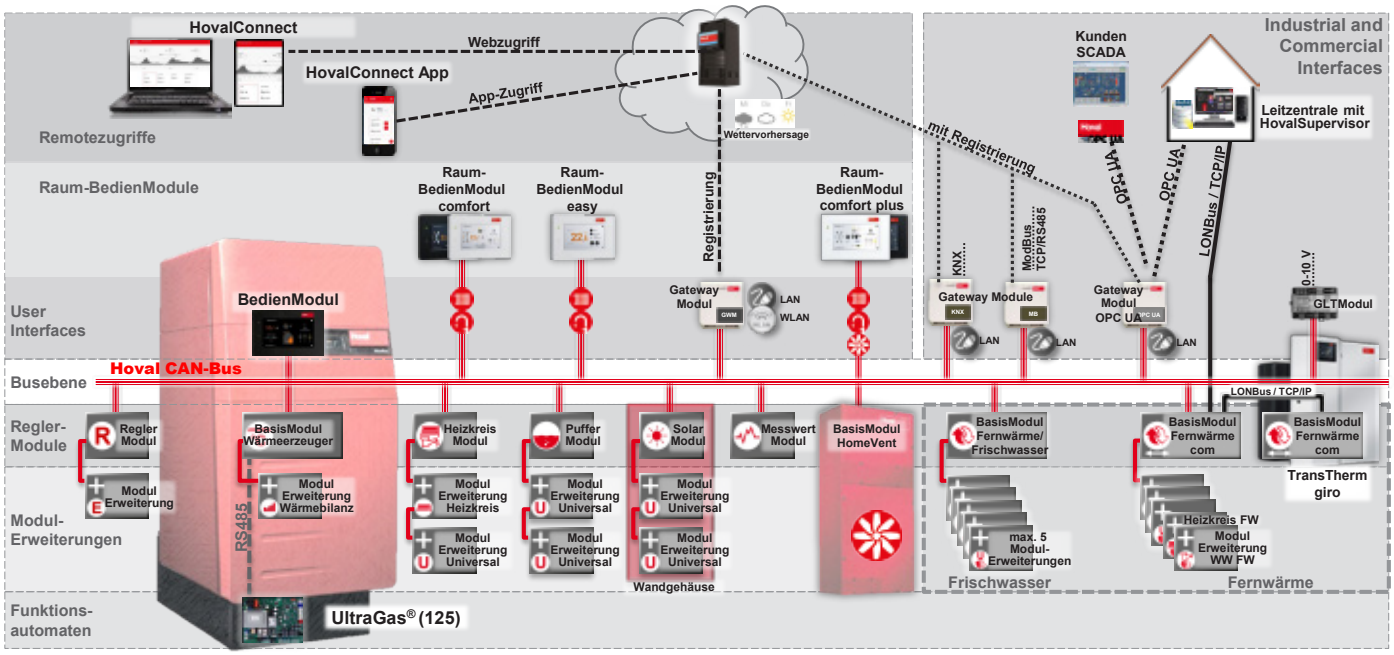
TopTronic® E

The TopTronic® E controller system is based on independent controller units (modules) that are connected together via the Hoval CAN bus. The individual modules are set using a central operating unit (master operation).

Max. 16 controller modules can be connected. Of these, max. 8 modules can be equipped as basic module heat generators (TTE H-Gen).

Max. 2 module expansions can be connected to the controller modules.

Notice
Max. 1 module expansion can be connected to the basic module heat generator (TTE-WEZ)!



* Hoval's new IoT platform, HovalConnect, will gradually replace the previous HovalDesk platform. Until the new platform is fully implemented, our customers can use the proven HovalDesk platform.

Number of TopTronic® E modules that can be installed in the heat generator:

TopTronic® E / Heat generator	Basic module heat generator (TTE-WEZ)	Heating circuit/hot water module (TTE-HK/WW) or buffer module (TTE-PS) or solar module (TTE-SOL) or module expansion (TTE-FE)*	Heating circuit/hot water module (TTE-HK/WW) or buffer module (TTE-PS) or solar module (TTE-SOL) or module expansion (TTE-FE)*	Heating circuit/hot water module (TTE-HK/WW) or buffer module (TTE-PS) or solar module (TTE-SOL) or module expansion (TTE-FE)*	Heating circuit/hot water module (TTE-HK/WW) or buffer module (TTE-PS) or solar module (TTE-SOL) or module expansion (TTE-FE)*
UltraSource® B	installed	•	•		
Belaria® comfort ICM	installed	•	•		
Belaria® pro	installed	•	•		
Belaria® twin I/IR	installed	•	•		
Belaria® twin A/AR (Electrical box option)	installed	•	•		
Belaria® dual AR (60) (Electrical box option)	installed	•	•		
UltraSource® T	installed	•	•		
Thermalia® comfort	installed	•	•		
Thermalia® twin	installed	•	•		
Thermalia® dual	installed	•	•		
BioLyt (13-43)	installed	•	•		
TopGas® combi	no modules can be installed				
TopGas® classic (12-30)	no modules can be installed				
TopGas® classic (35-80)	(can be installed)				
TopGas® classic (100,120)	(can be installed)				
UltraGas® (15-100)	installed	•	•		
UltraGas® 2 (125-230)	installed	•	•		
UltraGas® 2 (300-500)	installed	•	•	•	
UltraGas® 2 (530-1550)	installed	•	•	•	•
UltraGas® 2 D (250-460) (per boiler)	installed	•	•		
UltraGas® 2 D (600-1000) (per boiler)	installed	•	•	•	
UltraGas® 2 D (1060-3100) (per boiler)	installed	•	•	•	•
MultiJet® (12,16)	installed	•	•		
UltraOil® (16-80)	installed	•	•		
UltraOil® (110-300)	installed	•	•	•	
UltraOil® (320D-600D) (per boiler)	installed	•	•	•	
Max-3 (420-6000)	installed	•	•	•	

Notice
Alternatively, there is room for other TopTronic® E modules which have dimensions that are the same as or smaller than the modules mentioned above.

* Max. 2 module expansions can be connected to the controller modules.

Exception:
Max. 1 module expansion can be connected to the basic module heat generator!

TopTronic® E / Heat generator	Basic module district heating com (TTE-FW com)	Module expansion district heating (TTE-FE FW)	Module expansion district heating (TTE-FE FW)	Module expansion district heating (TTE-FE FW)	Module expansion district heating (TTE-FE FW)	Module expansion district heating (TTE-FE FW)	Ethernet connection
TransTherm® giro	installed	•	•				•
TransTherm® giro plus	installed						•
TransTherm® pro comfort	installed	no further modules can be installed					
TransTherm® pro S/RS	installed	•	•	•	•	•	•

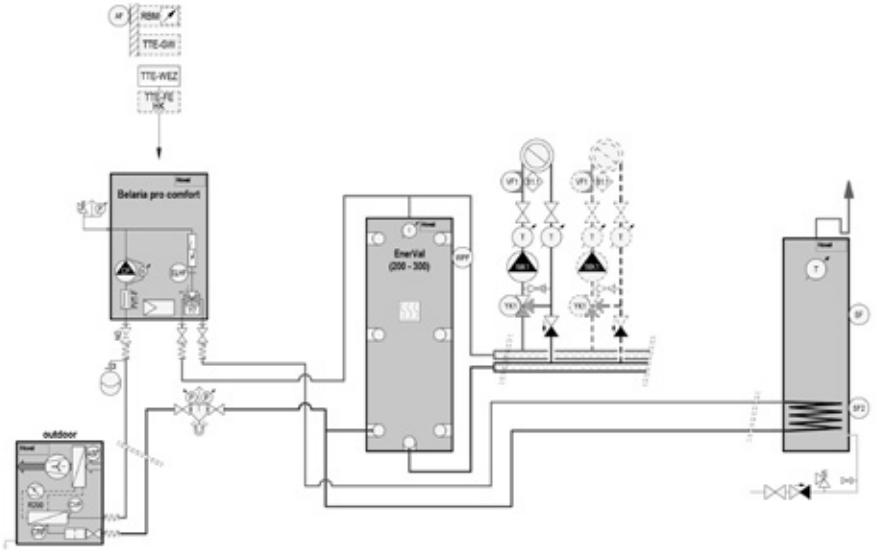
TopTronic® E / Calorifier charging module	Basic module district heating/ fresh water (TTE-FW)	Module expansion district heating (TTE-FE FW)	Module expansion district heating (TTE-FE FW)	Module expansion district heating (TTE-FE FW)
TransTherm® aqua L	installed	no further modules can be installed		
TransTherm® aqua F/FS	installed	no further modules can be installed		

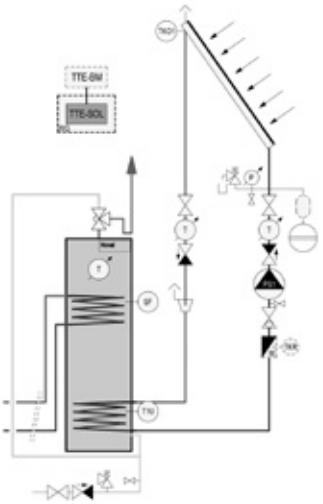
Sample order

TopTronic® E components

System	Belaria® pro comfort	Hot water Design/type Free-standing tank	Heating circuit assembly Connection type Calorifier before distributor 1 MC + 1-...MC
BBALE030			

System	Solar collectors	Hot water Design/type Free-standing tank (2 coils)
BAAE020		





Designation		Part No.	Functions
TTE-WEZ	**TopTronic® E basic module heat generator**	installed	
TTE-SOL	**TopTronic® E solar module**	6037 058	• Controller module with integrated regulating functions for: - One/two circuit solar energy plants - integrated heat balancing - Various additional functions
Optional			
RBM	**TopTronic® E room control module**		• Operation of the Hoval heating system from the living area
	TopTronic® E room control module easy white	6037 071	
	TopTronic® E room control module comfort white	6037 069	
	TopTronic® E room control module comfort black	6037 070	
TTE-GW	**TopTronic® Gateway**		• App or browser access permits access to the TopTronic® E system
	HovalConnect LAN	6049 496	
	HovalConnect WLAN	6049 498	
TTE-FE HK	**TopTronic® E module expansion heating circuit**	6034 576	• Expansion to the inputs and outputs of the basic module heat generator or the heating circuit/domestic hot water module for implementing the following functions: - 1 heating/cooling circuit w/o mixer or - 1 heating/cooling circuit with mixer

Further information
see separate chapter in the “Controls” chapter

Safety measures for EMC-compliant installation

- Cables carrying mains voltage must be routed separately from sensor or data bus cables. A minimum distance of 2 cm between the cables must be observed. Cable crossovers are permitted.

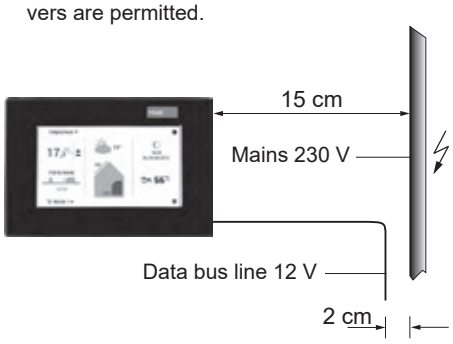


Fig. 1: Minimum distances for electrical installation

- In the case of controller modules with their own mains supply, it is imperative that cables carrying mains voltage are routed separately from sensor or data bus cables. If cable ducts are used, these must be provided with separator strips.
- When installing controller modules or room control modules, maintain a minimum clearance of 40 cm from other electrical devices with electromagnetic emissions, such as power contactors, motors, transformers, dimmers, microwave ovens and TV sets, loudspeakers, computers, mobile phones, etc.

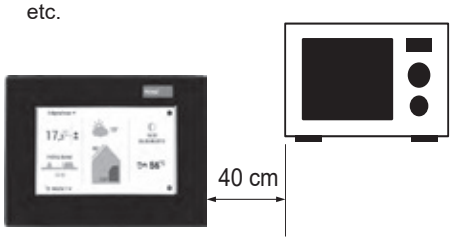
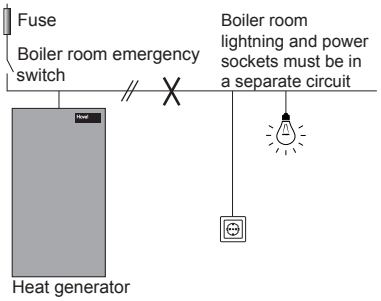


Fig. 2: Minimum distance from other electrical units

- Avoid unnecessary cable lengths, including in spare cables
- Coils of relays, contactors and other inductors in the panel, and possibly in the vicinity, must be connected. The connection can be made with RC elements, for example.
- Measures must be taken in the building and on electrical equipment to protect the devices against overvoltage caused by lightning strikes
- The mains connection for the heating system must be designed as an independent electrical circuit. Neither fluorescent lamps nor other sources of interference for the relevant machinery may be connected or capable of connection.



- Equipotential bonding must be established between the individual control components, control panels and the heating system
- Shielded cables must be used for the data cables.
  Recommended versions:
  J-Y(ST)Y 2 x 2 x 0.8 mm
- Shields of data cables, analog signal cables and power cables must be connected to earth over a large area with a highly conductive connection. The cable shields must be connected to a shield bar directly after the entry of the cable into the panel.
- Multiple earthing of a cable is not permitted (ripple pickup)

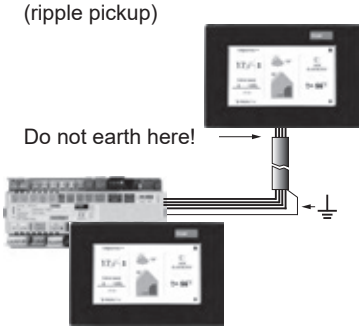


Fig. 4: One-sided earthing of the shielding

In the case of star-shaped data bus networks, double earthing is not permitted. The earthing must be effected one-sided at the star point!

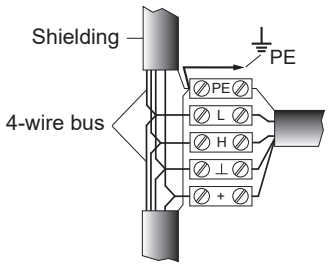


Fig. 5: Earthing for star-shaped data bus

- The outdoor sensor must not be fitted in the vicinity of transmitters and receivers (on garage walls near receivers for garage door openers, amateur radio antennae, radio alarm installations or in the immediate vicinity of large transmitters etc.).

Maximum permitted cable lengths for cables carrying sensor and low voltage (without PWM):

- Min. 0.5 mm² (e.g. J-Y(ST)Y 2 x 2 x 0.8 mm)
- Max. permitted cable length: 50 m
- Max. PWM cable length according to pump specification

Longer connecting cables should be avoided because of the danger of radiated interference!

Inter-building installations

- Inter-building installations and laying the bus line underground are not permitted without prior engineering and additional measures (see notice below).
- Where possible, avoid routing low-voltage and safety extra-low voltage cables (CAN bus line) in parallel in adjacent buildings (overbuildings) or through underground car parks. If this cannot be avoided, one or more of the following options should be selected to improve the decoupling:
  - Increase the spacing distance
  - Route cables in a metal cable tray or metal cable duct that is enclosed on all sides, and must be well earthed
  - Use high-quality twisted-pair cables
- Potential differences between CAN_H, CAN_L and ground must be kept low
- If there are higher potential differences, the frequency of errors will increase until the point when bus traffic is completely blocked

Dangers with installation across buildings without engineering

- Increased susceptibility to interference, communication problems
- Voltage surge damage

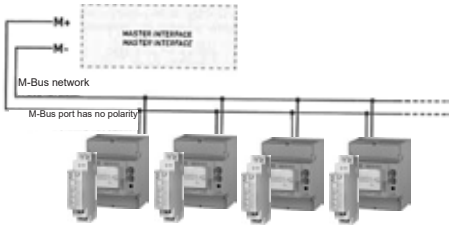
Notice
Engineering and additional measures for the Hoval CAN bus are mandatory for the following conditions:
- Solutions involving inter-building installations
- Cable lengths > 100 m in the building
- Stub lines/star cabling > 15 m
- Complex CAN bus topologies

These measures must be planned in advance by professional Hoval project support and include additional components such as CAN bus repeaters or CAN fibre optic converters.

To ensure correct electrical installation of unit connection and equipotential bonding (energy supply company and building installation), all applicable laws, regulations and standards must be complied with; in particular, the regulations of the responsible energy supply company. Common equipotential bonding must be carried out in accordance with the regulations and standards. The cable shield is not allowed to be used for equipotential bonding.
The work is only allowed to be carried out by qualified specialist personnel. It is the responsibility of the electrician to ensure appropriate EMC installation.

M-Bus interface

The connection of the stations to the M-Bus is possible in line or star topology. The wiring among the stations should be carried out with a cable with a cross-section not less than 0.5 mm². The use of a type J-Y(ST)Y n x 2 x 0.8 mm cable is recommended. The M-Bus cable is protected against reverse polarity, i.e. the wires can be swapped over.



Weather sensor

- Install 2/3 of the way up the facade, not above windows or under porch roofs
- Place on the side of the building where the rooms important for measuring the temperature are located, as follows:

Main rooms distributed

- Install the sensor on the north wall or the north-west corner

South-facing main rooms

- Install the sensor on the west wall if there are thermal radiator valves, otherwise on the south wall

East-facing main rooms

- Protect the sensor against the morning sunlight
- If the weather sensor is exposed to full sunlight for more than 2 hours, we recommend the sensor should be covered

Room air sensor

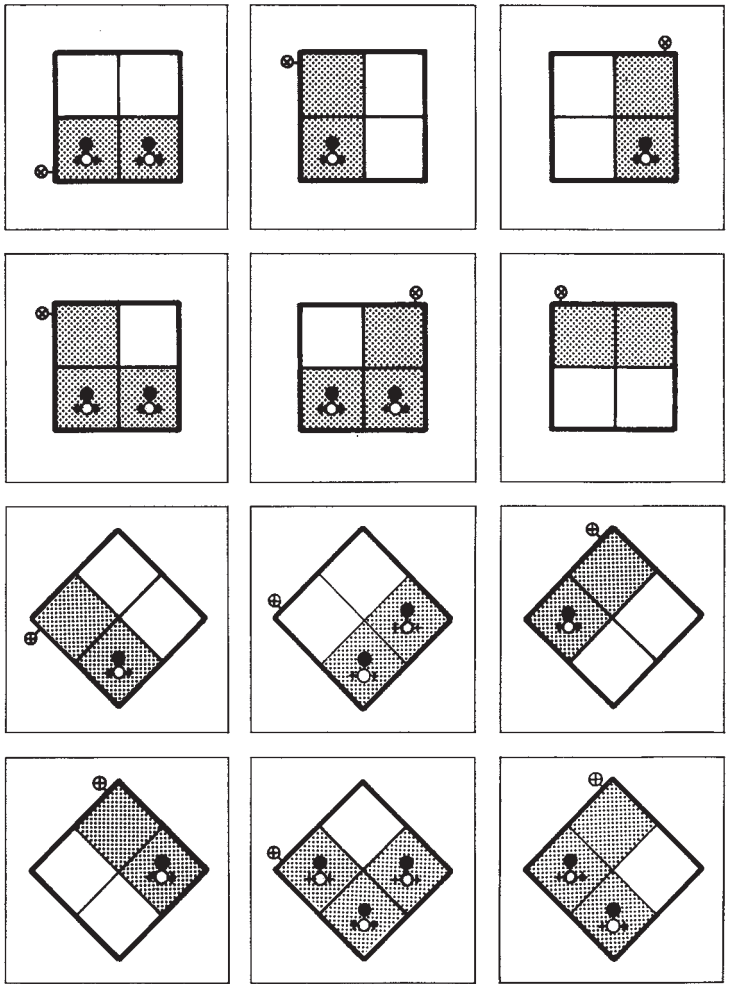
- Place on an interior wall in the main occupied room. Do not expose to sunlight or effects of other heat sources (chimney wall, proximity to radiators, draughts, TV set, light source)
- Do not cover by furniture or curtains
- Approx. 1.6 m above the floor
- Seal the installation pipe to prevent draughts
- No thermostatic valves are allowed to be used in the same room

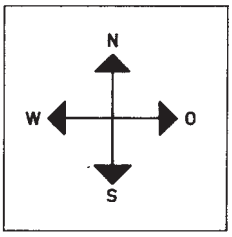
Flow temperature sensor

- Mount on the heating flow. If the pump is in the flow, mount it immediately after the pump. If the pump is in the return, mount approx. 1.5 m after the mixing point.
- Mount the contact sensor on the bare metal flow pipe
- Attach the immersion sensor in a pipe bend so the immersion sleeve is pointing opposite to the flow

Return temperature sensor

- Mount directly before the boiler return connection
- Mount the contact sensor on the bare metal pipe
- Attach the immersion sensor in a pipe bend so the immersion sleeve is pointing opposite to the flow





Outdoor jsensor

Thermostatic Radiator valve

Main rooms

1. General

1.1 The following Terms and Conditions shall apply to all our present and future contracts for deliveries and other services (even if the said Terms and Conditions are not specifically mentioned in verbal, telephonic or fax communications).

1.2 All deviations from the present Terms and Conditions, ancillary verbal agreements and subsequent contractual amendments shall only be valid if they have been confirmed by us in writing.

1.3 Buying terms and conditions of the client shall not be valid even if they are not specifically rejected by us. Our Standard Terms and Conditions of Delivery shall be regarded as accepted at the latest upon receipt of our goods and services by the client.

1.4 If a provision of the present Terms and Conditions of Delivery proves to be wholly or partially invalid, the contracting parties shall replace the aforesaid provision by a new provision which comes as close as possible to the legal and economic intention of the invalid provision.

2. Offers

2.1 Our offers shall be subject to change without notice.

2.2 Orders shall only be regarded as accepted when they have been confirmed by us in writing.

2.3 Illustrations, drawings and all technical details in catalogues and printed material shall be approximate values as customary within the industry. They shall only be binding if specific reference is made to them in the contract. We shall also reserve the right to make technical and design changes after the conclusion of the contract.

2.4 Cost estimates, drawings and other documents shall remain our property and shall be subject to copyright protection; they may not be made available to third parties.

3. Regulations in the country of destination

3.1 At the latest at the time of the order, the buyer shall draw our attention to the regulations and standards in force in the country of destination relating to the design of the delivered goods and the operation thereof and also to the execution of services.

3.2 Our deliveries and services shall comply with the regulations and standards in the country of destination provided the buyer has drawn our attention thereto in accordance with Section 3.1.

3.3 The buyer shall duly inform us of any special application features of goods ordered from us if these differ from our general recommendations.

4. Prices

4.1 Our prices shall be ex works, net, excluding packaging.

4.2 All ancillary costs, e.g. freight, insurance, export, transit, import and other approvals, licenses and authentications, shall be for the account of the buyer. The buyer shall also bear all taxes, charges, customs duty, etc., which are levied in connection with the contract.

4.3 We shall reserve the right to make price adjustments if wage rates or material prices change between the date of the order confirmation and the contractual performance of the contract. Price increases shall normally be notified three months in advance. We shall be bound to the price stated in the order confirmation for a period of three months after the effective date of the price increase.

5. Payment terms

5.1 Unless otherwise agreed in writing, our invoices shall be payable within thirty days with no cash discount. Payment shall be deemed to have been made when the amount in question is at our unrestricted disposal on our account in Swiss Franks.

5.2 Payment dates shall be observed even if any delays whatsoever occur after shipment of the goods from our works. The buyer shall not be permitted to reduce or withhold payments on account of complaints or counterclaims not recognised by us.

5.3 Payments shall also be made if insignificant components are missing but usage of the delivered goods is not rendered impossible as a result or if rectification work has to be carried out on the delivery. We shall be entitled to reject rectification of the defect as long as the buyer has not discharged his/its obligations to us.

5.4 If the buyer fails to comply with the agreed payment dates, default interest shall be paid from the agreed due date without a reminder being issued; the aforesaid interest shall be based on the interest rates prevailing at the domicile of the buyer, but shall be not less than four percent above the current discount rate of the Swiss Central Bank.

5.5 We shall be entitled to make deliveries of pending orders dependent upon settlement of outstanding claims.

6. Reservation of title

6.1 Delivered goods shall remain our property (reserved goods) pending full and complete payment of all present and future claims to which we are entitled regardless of their legal cause. This shall also apply if payments are made in settlement of specifically designated claims.

6.2 The buyer shall be entitled to process and sell reserved goods in the ordinary course of business.

6.3 If our reserved goods are combined or intermingled with other goods, the buyer shall hereby transfer his/its ownership rights in the new goods or chattels to us upon the conclusion of the contract in the amount of the invoice value of the reserved goods.

6.4 If the goods are resold by the buyer, he/it shall hereby transfer to us upon the conclusion of the contract with us his/its claims arising from the aforesaid resale in the amount of the invoice value of the reserved goods.

6.5 If the reserved goods are used by the buyer to perform a works or works delivery contract, his/its claim from the aforesaid works or works delivery contract shall hereby be assigned to us in the same amount and on the same date as for the purchase price claim (Section 6.4).

6.6 As long as he/it is honouring his/its payment obligations, the buyer shall, however, be authorised to collect his/its resale claim which has been assigned to us. He/it may not dispose of such claims by way of assignment to third parties, however. The empowerment of the buyer to collect the claim may be revoked by us at any time. We shall be entitled to notify third party debtors of the assignment. The buyer shall be entitled to provide us with the necessary information and documents in order to enable us to enforce our rights.

6.7 If the value of our securities exceeds our total claims by more than 10 %, we shall be obliged to release securities of our choice at the request of the buyer.

6.8 The buyer shall inform us immediately of any pledge or other impediment to our property enforced by third parties.

6.9 The buyer shall be obliged to collaborate in measures required to protect our title. He/it shall, in particular, empower us upon the conclusion of the contract to make entries or prior notice of the reservation of title at his/its cost in public registers, books and documents, etc., in accordance with the relevant national laws and shall perform all formalities in this respect.

6.10 The buyer shall maintain the reserved goods at his/its cost for the duration of the reservation of title and shall insure the said goods against theft, breakage, fire, water and other risks in our favour. He/it shall also take all steps to ensure that our property claims are neither adversely affected nor rescinded.

7. Delivery periods

7.1 Delivery periods and deadlines stated by us shall be approximate unless we have given an express written confirmation of a deadline as binding.

7.2 Delivery periods shall be deemed to have been met if notification of readiness to deliver has been sent to the buyer before the end of the delivery period.

7.3 The delivery period shall be prolonged if details required for the performance of the contract are not received on time or if they are subsequently changed by the buyer.

7.4 The delivery period shall also be reasonably prolonged if impediments arise which we cannot avert despite exercise of the necessary care (e.g. major operational disruptions, industrial disputes, delayed or defective deliveries, force majeure, etc.).

7.5 If an agreed delivery date is met by more than 14 days, the buyer shall be obliged to set us a reasonable period of grace. The buyer may only withdraw from the contract if our goods have not been delivered by the end of the said period of grace. Compensation claims for non-performance, delayed performance or any consequential losses shall be excluded unless there was gross negligence on our part.

8. Transfer of risk

8.1 Unless expressly agreed otherwise in writing, our “ex works” deliveries shall be made in accordance with the international rules on the interpretation of commercial clauses of the International Chamber of Commerce (Incoterms) in the version in force on the date of the order confirmation.

8.2 The transfer of risk shall be determined by the aforesaid Incoterms.

8.3 Insurance against damages of any kind shall be the responsibility of the buyer.

8.4 Complaints in connection with the transport shall be immediately notified by the buyer to the last carrier upon receipt of the delivery.
8.5 If despatch is delayed at the request of the buyer or for any other reasons not attributable to us, the risk shall pass to the buyer on the original date envisaged for the “ex works” delivery. We shall be entitled to demand payment from this date onwards.

9. Delivery inspection

9.1 The buyer shall be required to inspect deliveries immediately. If the goods do not comply with the order or the delivery note or if visible defects are identified, he/it shall be obliged to notify the aforesaid to us in writing within eight days of receipt. Later complaints shall not be recognised. (Regarding transport damages, cf. Section 8.4)

10. Assembly and operations

10.1 The assembly, putting into operation, operation and maintenance of the delivered goods shall be carried out in accordance with our guidelines. They may be executed by our staff or by appropriately trained third parties as agreed with the buyer.
10.2 If we require a commissioning certificate for certain product groups, warranty claims for the proper functioning of the equipment can only be enforced if a proper hand-over has been documented by a confirmed commissioning certificate received by us within one month of the hand-over.

11. Warranty

11.1 Warranty period
11.1.1 The general warranty period shall be 12 months from the first commissioning but no longer than 18 months from the date on which the relevant goods left our works.
If despatch is delayed for reasons not attributable to us, the warranty shall lapse no later than 18 months after notification of the readiness to deliver.
The general warranty period shall exclude electrical components for which the warranty period shall be 6 months from the first commissioning but no later than 12 months from the date of shipment from our works.
11.1.2 We refer to Section 11.6.1 with regard to the warranty period for third party products.
11.1.3 The warranty period for components which we have repaired during the warranty period or have delivered as replacement shall be 12 months from the completion of our repair or from the date of the replacement delivery but no longer than the end of a period equivalent to twice the original warranty period as per Section 11.1.1.
11.2 Liability for material, design and workmanship defects
11.2.1 The contractual condition of the goods shall be based on the condition upon the transfer of risk.
11.2.2 Defects shall be notified to us immediately in writing.
11.2.3 We shall be liable for all components which can be shown to have become defective or unusable before the end of the warranty period as a result of defective materials, defective design or defective workmanship, with such components being repaired or replaced ex works immediately at our choice.
11.3 Liability for warranted qualities
11.3.1 Warranted qualities shall only be those which are specifically designated as such in the order confirmation or in the relevant specifications.
11.3.2 The aforesaid assurance shall apply at the latest until the end of the warranty period. If a taking-over test has been agreed with the buyer, the assurance shall be deemed as performed if proof of the relevant qualities is furnished during the aforesaid test.
11.3.3 If the warranted qualities are not performed or only partially performed, the buyer shall be entitled to an immediate rectification. The buyer shall grant us the necessary time and opportunity for this purpose.
11.3.4 If the rectification is abortive or only partially successful, the buyer shall be entitled to a reasonable reduction of the purchase price. If the defect is so serious that it cannot be rectified within a reasonable period of time, and if deliveries or services for the notified purpose are not usable or are only usable to a much lesser extent, the buyer shall be entitled to refuse acceptance of the defective component or to withdraw from the contract if part-acceptance is economically unreasonable. We shall only be obliged to refund amounts which have been paid to us for the components affected by the aforesaid withdrawal.
11.4 Exclusion of liability for defects
11.4.1 Our liability shall exclude damages which cannot be proved to have been sustained as a result of defective material, defective design or defective workmanship.
11.4.2 Damages shall therefore be excluded for example which were caused by
- improper work of other persons with regard to planning, site preparation, assembly, operation and maintenance;
- plant concepts and designs which do not comply with the latest state of the art;
- non-observance of our guidelines for planning, assembly, commissioning, operations and maintenance;
- force majeure (e.g. thunderstorms).

11.4.3 The following shall be excluded in particular
- corrosion damages (e.g. as a result of aggressive water, unsuitable water treatment, oxygen intakes, emptying the plant over a longer period of time, falling below the dew point, chemical or electrochemical effects, etc.);
- damages caused by air pollution (e.g. the accumulation of intense dust, aggressive vapours, etc.);
- damages caused by unsuitable equipment and fuels;
- damages caused by overcharging, excessive water pressure, scaling, improper electrical connections and inadequate fuse protection.

11.4.4 Components shall also be excluded from the warranty which are subject to natural wear and tear (e.g. burner nozzles, combustion chamber inserts, ignition and monitoring components in contact with fire, fireclay and wall facings, fuses, seals and flexible tubes).
11.5 Commissioning certificate
11.5.1 We hereby draw attention to the due and proper hand-over and - if envisaged - the commissioning certificate in accordance with Section 10.2 as prerequisites for our warranty.
11.6 Deliveries and services of sub-contractors
11.6.1 Our liability for third party products which form a major part of the delivered goods (e.g. warehouse and conveying equipment, burners, measuring and control equipment, electrical components, flue gas and waste water cleaning equipment) shall - if permissible - be limited to an assignment of our claims against the suppliers of the said third party products.

12. Exclusion of further liability

12.1 The buyer shall have no rights and claims for materials, design and workmanship defects or the lack of warranted qualities unless specifically mentioned in Sections 11.1 to 11.6.
12.2 All claims for compensation, reduction in the contract price, rescission of the contract or withdrawal from the contract shall be excluded in particular unless these are specifically mentioned. Under no circumstances shall the buyer have any compensation claim for damages which were not sustained by the delivered goods themselves (e.g. replacement costs, cost for establishing the cause of the damage, expertises, production stoppages, production losses, lost orders, lost profit and other direct or indirect damages). The aforesaid liability exclusion shall not apply in the event of gross negligence on our part.
12.3 The exclusion as per Section 12.2 shall apply for all breaches of contract and all claims of the buyer regardless of why they were lodged from a legal point of view. It shall therefore also apply for a breach of any ancillary obligations (e.g. inadequate advice, etc.).

13. Jurisdiction

13.1 **The place of jurisdiction for the buyer and for us shall be Vaduz.** We shall be entitled to bring action against the buyer at his/its domicile, however.
13.2 The legal relationship between the parties shall be governed by the substantive laws of Switzerland. The application of the UN convention on contracts for the international sale of goods (CISG) shall be excluded.

Hoval quality.
You can count on us.

Hoval

Hoval is one of the leading international companies for heating and indoor climate solutions. Drawing on more than 75 years of experience and benefiting from a close-knit team culture, the Hoval Group delivers exciting solutions and develops technically superior products. This leadership role requires a sense of responsibility for energy and the environment, which is expressed in an intelligent combination of different heating technologies and customised indoor climate solutions.

Hoval also provides personal consultations and comprehensive customer service. With around 2200 employees in 16 companies around the world, Hoval sees itself not as a conglomerate, but as a large family that thinks and acts globally.
Hoval heating and indoor climate solutions are currently exported to more than 50 countries.

Responsibility for energy and environment

Hoval Aktiengesellschaft
Austrasse 70
FL-9490 Vaduz
Principality of Liechtenstein
(Swiss customs territory)
Phone +423 3992 400
Fax +423 3992 618
E-Mail info@hoval.com
www.hoval.com

2024 - 04 | Subject to modifications

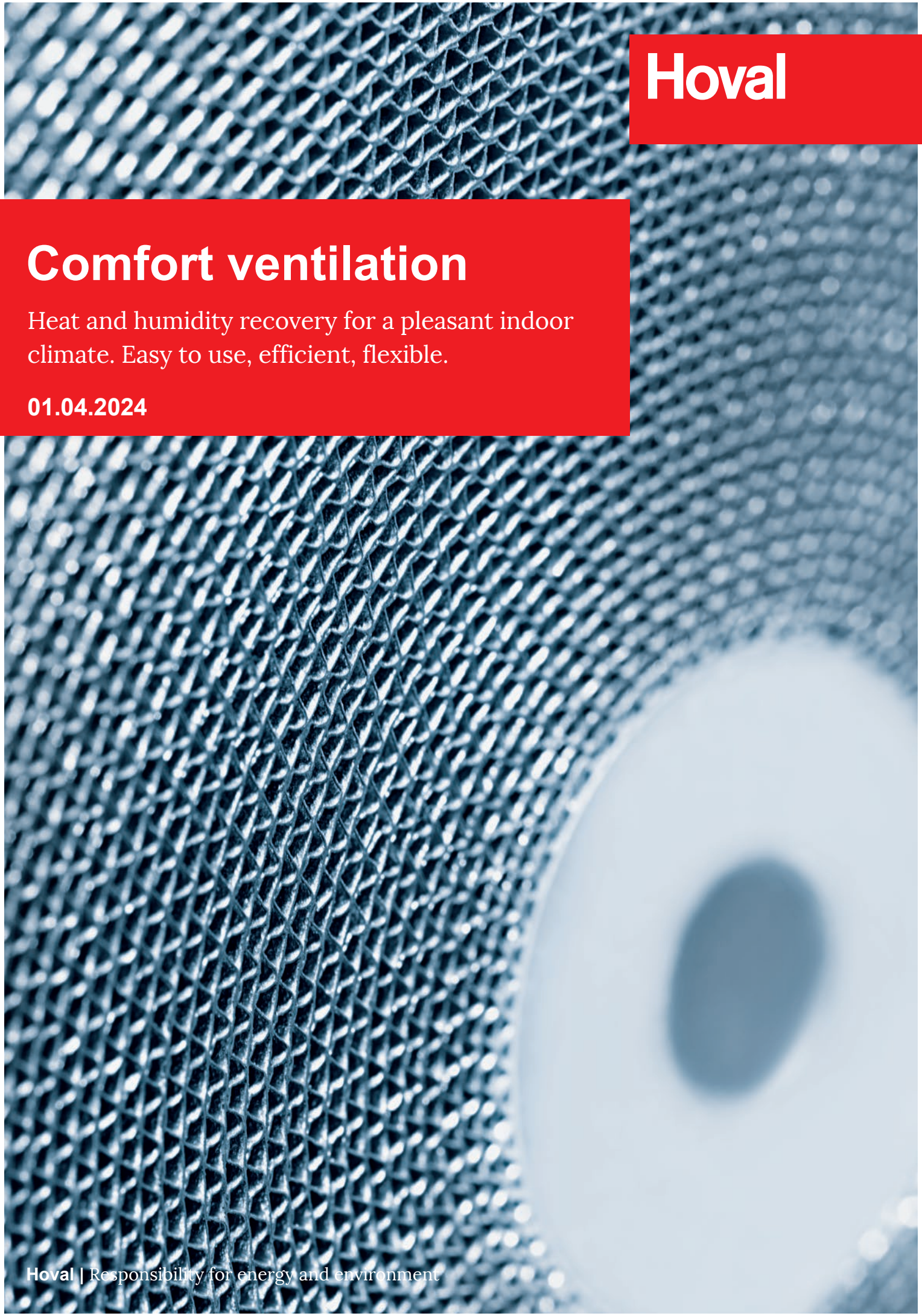
Your Hoval partner

Hoval

Comfort ventilation

Heat and humidity recovery for a pleasant indoor climate. Easy to use, efficient, flexible.

01.04.2024



Comfort ventilation

Engineering

Hoval HomeVent® ER (200-400)
Comfort ventilation unit

- Comfort ventilation unit with self-regulating heat and humidity recovery for any installation position.
- For use within or outside the insulated building shell.
- High-quality, heat and sound insulated inner casing made from EPP.
- External casing made of film-coated sheet steel (red).
- The casing is suitable for installation on both sides (accessible on both sides)
- Rotary enthalpy recovery unit with speed regulation
- Two backward-curved EC fans (continuously adjustable 15-100 %)
- High-quality large-area filters
  - supply air: $ePM_{1.0}$ 55 % (F7)
  - extract air: ePM_{10} 60 % (G4)
- Integrated prefilter
- Filter monitoring (timer)
- Ready-to-connect electronics
- No need for preheating or a condensate drain

Data
- Colour: red
- Dimensions:
  L x W x H: 560 x 374 x 1000 mm
  Weight: 31 kg
- Electrical connection: 230 V/50 Hz, IP40

Required accessories:
- Standard operator terminal BG02 E or
- TopTronic® E room control module comfort plus

Options
- Air quality sensor VOC or CO_2
- Active cool recovery (CoolVent® option)
- Mounting set, base, IsiCube
- Supply air activated carbon filter

Delivery
- Comfort ventilation unit pre-assembled and packed
  - Mains cable 3 m
  - RJ45 cable 3 m

On site
- 8-pin CAT 5 patch cable (parallel, not crossed) between comfort ventilation unit and operator terminal
- 230 V socket

Use
The HomeVent® comfort ventilation unit provides centralised supply and extract air handling for residential spaces.
This can be a single family home or a residential unit in a multi-family house.
The comfort ventilation unit is part of the HomeVent® ventilation system for comfort ventilation, which performs the following tasks:
- Supplies residential and commercial space with outdoor air
- Extracts used air (CO_2, aerosols, excess dampness, odours, etc.)
- Saves energy through intelligent latent heat recovery
- Cleans supply air using a fine dust filter

Tests
- TÜV SÜD according to EN 13141-7
- TÜV SÜD according to EN 60335-1

Model range

HomeVent® ER type		Flow rate m³/h	Heat recovery efficiency %
(200)	A+	30-200	90-130
(300)	A+	45-300	90-130
(400)	A	60-400	90-130

Energy recovery
The built-in enthalpy recovery unit withdraws energy from the extract air and transfers it to the supply air. This enables the intelligent (temperature) and the latent (humidity) energy to be transferred. The transmission performance is regulated depending on the outdoor temperature.

The advantages of the enthalpy recovery unit are:
- Temperature efficiency up to 90 %
- Degree of humidity recovery up to 95 %
- Steplessly controlled transmission performance
- No preheating required (down to -20 °C)
- No condensation
- No bypass required

Air filtration
The outdoor air goes through two cleaning stages, reaches the highest standard. A fine-meshed grate (washable) at the entry of the unit prevents insects, leaves, etc. from reaching the unit. When the outdoor air leaves the unit, it flows through a high-capacity fine pollen filter ($ePM_{1.0}$ 55 % (F7)). The operator receives a message when it is time to change the filter. The activated carbon filter can be inserted in place of the standard supply air filter. This is a high-capacity filter ($ePM_{2.5}$ 50 %) with high efficiency against particles (pollen, fine dust, etc.) and against gaseous pollutants and odours (agriculture, traffic, etc.).

Air delivery
Two backward-curved centrifugal fans with EC direct current motors deliver the air. The rotating wheel made of high-tech composite material is produced in one piece with optimised fluid mechanics, and ensures quiet operation of the unit. The electronics built into the engine enable the air volumes to be finely regulated between 15 and 100 %. The fans are arranged in such a way that no extract air can find its way to the supply air.

Suitability for winter
Due to the built-in enthalpy recovery unit, no condensate is formed in the unit. No preheating (electric air heater) is necessary for outdoor temperatures down to -20 °C. The flow rate ratio between supply and extract air is not changed.

Summer operation
The energy recovery is automatically reduced to a minimum at high outdoor temperatures. This enables night cooling (free cooling) in the summer as well as when the seasons change. It is not necessary to arrange for a bypass via dampers and a drive. In addition, the CoolVent® option can recover cold in air-conditioned buildings. The hot outdoor air is cooled and dried with the air-conditioned extract air.

Installation
The HomeVent® comfort ventilation unit is characterised by a compact design. It is possible to access the unit from both sides for servicing. No condensate forms in the unit, meaning that it can be installed in any position imaginable. We recommend the corresponding mounting sets with vibration dampers for the different installation positions.

Standard operator terminal BG02 E
The operator terminal consists of a plastic casing for on-wall mounting. The target air volume and the target air humidity can be set with two rotary knobs. With the party button, the air volume can be increased for a limited period of time. The connection to the HomeVent® comfort ventilation unit is made via RJ45 plug connection. The unit can also be installed in a secondary room.

TopTronic® E
room control module comfort plus
The TopTronic® E room control module comfort plus is available either with a black or white design, operated by a colour touchscreen (4.3 inch). The connection to the HomeVent® comfort ventilation unit is made via RJ45 plug connection or plug terminals (max. 0.75 mm^2). The unit can be installed on the wall with an on-wall mounted frame or with a wall-mounting plate and flush-mounted boxes. The unit can be installed in a secondary room.

Functional possibilities:
- Operation of all Hoval units connected to the bus.
- Authorisation management for operation.
- Efficient control of the ventilation system by working with day programmes.
- Selection between different start screens possible during commissioning.
- Customer-specific configuration of the screen for displaying the following elements:
  - Date and time
  - Moon phases
  - Current air volume in %
  - Maximum target humidity in %
  - Active day or week programme
  - Display of current room air quality (optional VOC or CO_2 air quality sensor must be installed for this purpose)
  - Display of the current weather or the weather forecast (only possible in combination with HovalConnect)

Air quality
Optionally, a VOC or CO_2 air quality sensor can be installed in the unit during commissioning. In addition, an activated carbon filter can be installed on the supply air side as an option. The VOC air quality sensor continuously monitors the extract air for volatile organic components and regulates the supplied or discharged air volume via the speed of the fans. This results in optimal air quality in the building with minimal energy input.

- VOC air quality sensor on the extract air side: The extract air is continuously monitored for odours, cleansing agents, etc. If the concentration of the extract air exceeds a certain value, the air volume is increased correspondingly. The sensitivity can be chosen. On the TopTronic® E room control module comfort plus, the air quality is displayed by a bar, which will either be green (good air), orange (slightly contaminated air) or red (bad air).

Cooling
The fresh air can be precooled using the CoolVent® option. However, this requires an air-conditioning system to be present in order to provide the necessary cooling in the room. The enthalpy recovery system extracts heat and humidity from the warm outdoor air and feeds it to the cold extract air. The energy consumption of the air-conditioning system is thereby reduced. The efficiency for this process is 85 %. The CoolVent® function can be activated during commissioning.

Function HomeVent® ER (200-400)

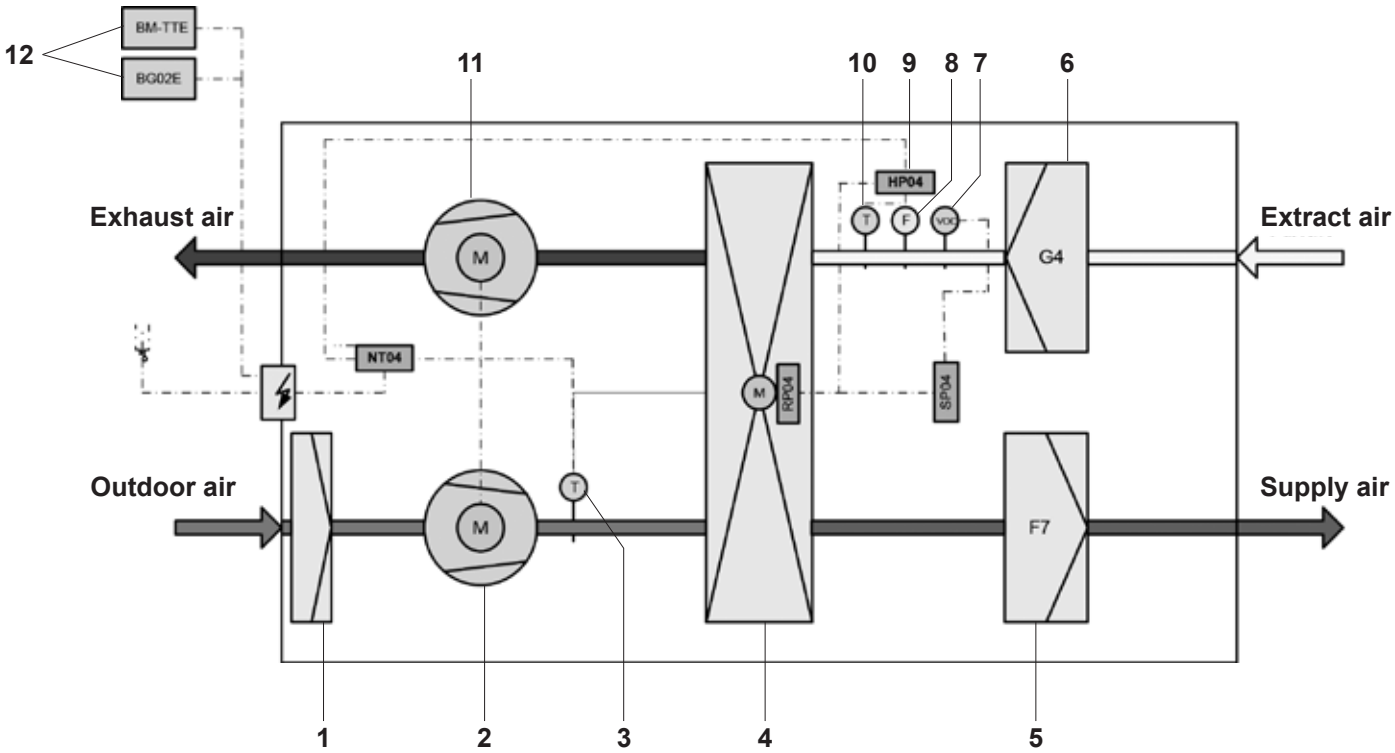
The outside air fan draws in outdoor air via the main line. In the first stage, this air is cleaned via a fine-meshed grate. In the enthalpy recovery system, the supply air is heated, depending on the temperature, and humidified. The extent to which heat and humidity are recovered is dependent on the temperature and humidity differences between the exhaust air and the outdoor air as well as on the rotor speed.
Then the pre-treated outdoor air is cleaned by means of a pollen fine dust filter. The exhaust air fan sucks in the used air via the coarse dust filter.

The enthalpy recovery system extracts heat and humidity from the air and passes these to the supply air.
The way the fans are positioned – with overpressure on the supply air side and underpressure on the extract air side – means that no extract air can find its way to the supply air.

The electronic controls and the operator terminal feature the following additional functions:

- The speed of the enthalpy recovery system is regulated by the outdoor temperature. In this way, the heat and humidity recovery is adjusted automatically.
- The humidity regulation changes the flow rate. Thus, if the humidity indoors is too high, for instance, more dry air is introduced from the outside.
- The functions of the unit are continuously monitored. In case of a malfunction, the device is switched to “fault” mode. The malfunction is displayed on the operator terminal.

1 Prefilter
2 Outside air fan
3 Outdoor sensor
4 Enthalpy recovery unit
5 Supply air filter
6 Extract air filter
7 VOC or CO_2 extract air sensor
8 Moisture sensor
9 Electronics
10 Extract air sensor
11 Exhaust air fan
12 Operator terminal BG02 E or TopTronic® E room control module comfort plus



Comfort ventilation unit

HomeVent® ER (200-400)

Comfort ventilation unit for ventilating a residential unit with high-efficiency heat and humidity recovery for any installation positions.

HomeVent® ER type		Nominal flow rate m^3/h	Ext. pressure Pa	Part No.
(200)	A+	200	100	7018 079
(300)	A+	300	100	7018 081
(400)	A	400	100	7018 665

Required accessories

Operator terminal BG02 E
for HomeVent® ER and ERT
Plastic housing for on-wall mounting.
Knob for flow rate and room air humidity.
Service and fault display.

2066 444

TopTronic® E room control module comfort plus white
for HomeVent® ER and ERT
Operation of all Hoval ventilation units, heating and hot water circuits connected to the bus system.
Customer-specific configurable start screen.

incl. fitting accessories

6037 072

TopTronic® E room control module comfort plus black
for HomeVent® ER and ERT
Operation of all Hoval ventilation units, heating and hot water circuits connected to the bus system.
Customer-specific configurable start screen.

incl. fitting accessories

6042 543

HovalConnect

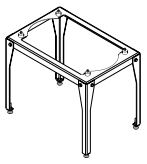
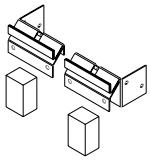
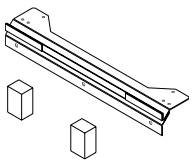
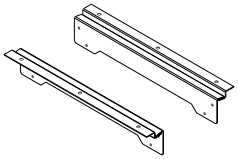
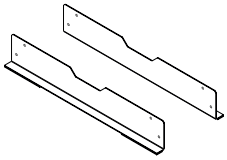
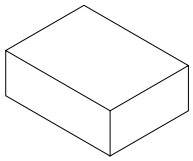
HovalConnect LAN 6049 496
HovalConnect WLAN 6049 498

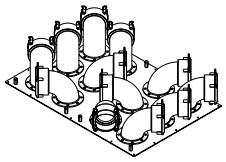
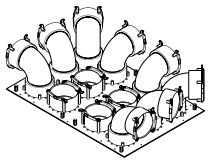
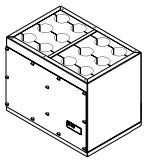
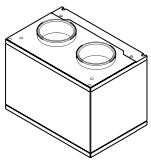
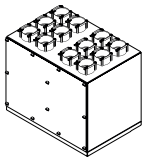
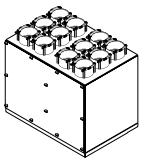
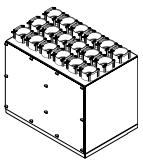
TopTronic® E interface modules

HovalConnect Modbus 6049 501
HovalConnect KNX 6049 593

Technical information
see separate chapter.

Recommended accessories

	Part No.
 **VOC air quality sensor** for HomeVent® ER and ERT Can be installed on extract air side Only in connection with the TopTronic® E room control module comfort plus.	6058 206
 **CO_2 air quality sensor** for HomeVent® ER and ERT Can be installed on extract air side Only in connection with the TopTronic® E room control module comfort plus.	6058 211
Notice CO_2 sensor cannot be combined with VOC sensor	
 **Unit base ER (200-400)** for HomeVent® ER Red painted steel (device colour) incl. 4 vibration dampers height-adjustable feet Height: 475-500 mm	6052 203
 **Horizontal wall mounting set** for HomeVent® ER Steel bracket red coated with vibration-damping support	6042 303
 **Vertical wall mounting set** for HomeVent® ER and ERT Steel bracket red coated with vibration-damping support	6046 215
 **Ceiling mounting set** for HomeVent® ER Steel bracket red coated with vibration-damping support	6042 305
 **Floor mounting set** for HomeVent® ER Steel bracket red coated with vibration-damping support	6042 306
 **Floor mounting set upright** for HomeVent® ER 4 vibration-damping supports 80 x 60 x 30 mm	6044 961

		Part No.
	**Plywood 12 x 75** consisting of: galvanised steel plate 12 90° elbows	6062 434
	**Plywood 12 x 90** consisting of: galvanised steel plate 8 90° elbows 4 straight nozzles	6050 554
	**Acoustic insulating box for plywood** for HomeVent® ER (200-400) Casing made from red foil-plated sheet steel Connection nozzles 2 x DN 160/180 Can be screwed onto plywood Acoustic insulating body on supply and extract air sides, access panel, incl. throttle orifices Dimensions (L x W x H): 440 x 560 x 374 mm	6061 472
	**Acoustic insulating box SDB-160-400** for HomeVent® ER (200-400) Casing made from red foil-plated sheet steel Connection nozzle 4 x DN 160/180 Acoustic insulating body on supply and extract air sides Dimensions (L x W x H): 400 x 560 x 374 mm	6051 854
	**Distribution box VTB-160 12 x 75** for HomeVent® ER (200-400) Casing made from red foil-plated sheet steel Connection nozzle 2 x DN 160/180 Connection nozzle 12 x DN 75 Acoustic insulating body on supply and extract air sides, access panel, incl. throttle orifices Dimensions (L x W x H): 480 x 560 x 374 mm	6051 800
	**Distribution box VTB-160 12 x 90** for HomeVent® ER (200-400) Casing made from red foil-plated sheet steel Connection nozzle 2 x DN 160/180 Connection nozzle 12 x DN 90 Acoustic insulating body on supply and extract air sides, access panel, incl. throttle orifices Dimensions (L x W x H): 480 x 560 x 374 mm	6051 802
	**Distribution box VTB-160 18 x 75** for HomeVent® ER (200-400) and acoustic insulating box SDB-160-400 Casing made from red foil-plated sheet steel Connection nozzle 2 x DN 160/180 Connection nozzle 18 x DN 75 Acoustic insulating body on supply and extract air sides, access panel, incl. throttle orifices Dimensions (L x W x H): 480 x 560 x 374 mm	6051 904

Notice
Use only in conjunction
with additional silencers.

Filter HomeVent® ER (200-400)

		Part No.
	**Supply air filter ER and FR** for HomeVent® ER and FR Filter class ISO 16890: $ePM_{1.0}$ 55% (F7)	5038 283
	**Activated carbon filter ER and FR** for HomeVent® ER and FR Protection against pollutants and odours Alternative to supply air filter Filter class ISO 16890: $ePM_{2.5}$ 50 %	5039 587
	**Extract air filter ER and FR** for HomeVent® ER and FR Filter class ISO 16890: ePM_{10} 60 % (G4)	5038 284

HomeVent® ER ventilation unit (200-400)

Type		(200)	(300)	(400)
• Max. flow rate (at 100 Pa external pressure)	m^3/h	200	300	400
• Air flow rate control range	m^3/h	30-200	45-300	60-400
• Humidity setpoint setting	%		30…65	
Electrical connection				
• Voltage (AC)	V		230	
• Frequency	Hz		50	
• Max. current consumption	A	0.7	1.1	1.6
• Type of protection			IP40	
• Power consumption (at 70 % of the max. flow rate, 50 Pa external pressure)	W	34	54	81
• Degree of heat processing (as per DIN 4719)	%		90-130	
• Temperature ratio (at 70 % of the max. flow rate)	%	84	83	82
• Humidity ratio (at 70 % of the max. flow rate)	%	90	88	86
• Specific fan power SFP (at 70 % of the max. flow rate)	$W/m^3/h$	0.24	0.24	0.28
Filter class (as per ISO-16890)				
• Supply air filter			$ePM_{1.0}$ 55 %	
• Extract air filter			ePM_{10} 60 %	
• Sound power level			see table on following page	
Leakage (as per EN 13141-7)				
• Leakage class	%		C1	
• Internal		0.1	0.1	0.1
• External	%	0.3	0.2	0.1
• Net weight	kg		31	
Application limits for device setup, weather-protected (EN 60721-3-3), 3K5 as per EN 50090-2-2				
• Ambient temperature	°C		-20...45	
• Ambient humidity	g/kg		max. 15	
• Dew point temp. in installation room	°C		< 15	
Air conditions (moderate outdoor climate EN 60721-2-1)				
• Outside air intake temperature	°C		-20...40	
• Outside air intake humidity	% r.h.		5…95	
• Extract air temperature	°C		18…35	
• Extract air humidity	% r.h.		5...80	
• Max. extract air humidity winter	g/kg		12	

Sound power: HomeVent® ER (200)

Casing

Flow rate	External pressure								Sound pressure level L_{WA}
SUP/EXT [m³/h]	[Pa]	125	250	500	1000	2000	4000	8000	125 Hz ... 8 kHz [dB(A)]
140	50	41.9	46.5	34.9	29.6	22.2	11.6	1.8	39.0
200	100	38.8	47.6	39.2	32.6	27.4	18.7	10.7	42.2

Fresh air

Flow rate	External pressure								Sound pressure level L_{WA}
[m³/h]	[Pa]	125	250	500	1000	2000	4000	8000	125 Hz ... 8 kHz [dB(A)]
140	50	49.6	55.1	46.0	45.0	40.2	35.1	28.7	51.1
200	100	50.1	60.7	54.2	47.7	46.4	43.2	38.8	57.2

Supply air

Flow rate	External pressure								Sound pressure level L_{WA}
[m³/h]	[Pa]	125	250	500	1000	2000	4000	8000	125 Hz ... 8 kHz [dB(A)]
140	50	47.9	50.4	38.4	32.9	23.9	17.2	16.3	42.9
200	100	49.0	53.3	45.7	37.0	29.9	21.3	16.5	47.9

Extract air

Flow rate	External pressure								Sound pressure level L_{WA}
[m³/h]	[Pa]	125	250	500	1000	2000	4000	8000	125 Hz ... 8 kHz [dB(A)]
140	50	44.3	54.6	37.0	34.9	23.4	17.6	16.3	45.8
200	100	47.4	57.5	45.9	39.2	29.4	22.4	17.0	51.3

Exhaust air

Flow rate	External pressure								Sound pressure level L_{WA}
[m³/h]	[Pa]	125	250	500	1000	2000	4000	8000	125 Hz ... 8 kHz [dB(A)]
140	50	45.5	56.1	48.2	43.5	39.2	33.7	23.4	50.5
200	100	48.4	59.0	54.1	49.0	45.2	41.1	32.6	56.0

Sound power: HomeVent® ER (200) + acoustic insulating box SDB-160-400

Supply air

Flow rate	External pressure								Sound pressure level L_{WA}
[m³/h]	[Pa]	125	250	500	1000	2000	4000	8000	125 Hz ... 8 kHz [dB(A)]
140	50	38.2	39.7	22.3	15.8	14.1	15.7	16.2	31.5
200	100	41.2	40.8	31.1	19.1	15.3	15.8	16.2	34.7

Extract air

Flow rate	External pressure								Sound pressure level L_{WA}
[m³/h]	[Pa]	125	250	500	1000	2000	4000	8000	125 Hz ... 8 kHz [dB(A)]
140	50	39.8	44.0	21.8	16.5	13.8	15.5	16.2	34.7
200	100	42.2	43.8	30.8	20.5	15.1	15.9	16.3	36.8

Sound power: HomeVent® ER (200) + distribution box VTB-160 12 x 75
Sound power: HomeVent® ER (200) + distribution box VTB-160 12 x 90

Supply air

Flow rate	External pressure								Sound pressure level L_{WA}
[m³/h]	[Pa]	125	250	500	1000	2000	4000	8000	125 Hz ... 8 kHz [dB(A)]
140	50	29.5	30.4	17.8	12.6	13.6	15.5	16.1	24.9
200	100	31.5	33.2	25.0	14.7	14.4	15.7	16.2	27.7

Extract air

Flow rate	External pressure								Sound pressure level L_{WA}
[m³/h]	[Pa]	125	250	500	1000	2000	4000	8000	125 Hz ... 8 kHz [dB(A)]
140	50	29.4	31.2	17.7	13.1	14.1	15.7	16.2	25.4
200	100	30.9	36.6	25.2	14.9	14.6	15.8	16.2	30.4

Sound power: HomeVent® ER (200) + IsiSound

Fresh air

Flow rate	External pressure								Sound pressure level L_{WA}
[m³/h]	[Pa]	125	250	500	1000	2000	4000	8000	125 Hz ... 8 kHz [dB(A)]
140	50	47.8	52.4	34.1	34.7	28.6	23.0	19.5	45.2
200	100	49.3	53.0	41.8	37.4	34.6	30.7	27.6	47.7

Exhaust air

Flow rate	External pressure								Sound pressure level L_{WA}
[m³/h]	[Pa]	125	250	500	1000	2000	4000	8000	125 Hz ... 8 kHz [dB(A)]
140	50	46.1	51.4	37.8	34.0	26.5	20.4	16.9	43.7
200	100	48.8	52.2	43.8	39.4	32.4	26.8	19.9	47.3

Sound power: HomeVent® ER (300)

Casing

Flow rate	External pressure								Sound pressure level L_{WA}
SUP/EXT [m³/h]	[Pa]	125	250	500	1000	2000	4000	8000	125 Hz ... 8 kHz [dB(A)]
210	50	39.9	49.9	36.0	31.6	24.6	14.5	6.4	42.8
300	100	44.6	47.5	46.2	38.5	32.4	25.2	18.0	45.5

Fresh air

Flow rate	External pressure								Sound pressure level L_{WA}
[m³/h]	[Pa]	125	250	500	1000	2000	4000	8000	125 Hz ... 8 kHz [dB(A)]
210	50	47.9	59.6	49.7	46.3	46.2	41.9	36.3	55.5
300	100	54.6	56.8	64.2	52.0	50.7	49.7	44.1	61.8

Supply air

Flow rate	External pressure								Sound pressure level L_{WA}
[m³/h]	[Pa]	125	250	500	1000	2000	4000	8000	125 Hz ... 8 kHz [dB(A)]
210	50	46.4	52.2	42.5	35.4	29.1	20.5	16.4	46.5
300	100	51.5	51.9	48.7	42.2	34.6	27.1	17.4	49.0

Extract air

Flow rate	External pressure								Sound pressure level L_{WA}
[m³/h]	[Pa]	125	250	500	1000	2000	4000	8000	125 Hz ... 8 kHz [dB(A)]
210	50	46.2	58.0	43.6	38.0	29.0	22.1	16.9	51.6
250	100	53.1	54.6	53.3	46.1	35.2	28.8	19.4	52.5

Exhaust air

Flow rate	External pressure								Sound pressure level L_{WA}
[m³/h]	[Pa]	125	250	500	1000	2000	4000	8000	125 Hz ... 8 kHz [dB(A)]
210	50	47.0	57.0	51.6	47.8	44.2	40.3	31.1	54.2
250	100	54.0	56.9	61.7	54.9	50.7	48.3	40.2	60.7

Sound power: HomeVent® ER (300) + acoustic insulating box SDB-160-400

Supply air

Flow rate	External pressure								Sound pressure level L_{WA}
[m³/h]	[Pa]	125	250	500	1000	2000	4000	8000	125 Hz ... 8 kHz [dB(A)]
210	50	39.8	38.5	26.0	18.0	15.2	16.0	16.3	31.8
300	100	44.6	39.6	35.2	25.1	17.5	16.4	16.3	35.6

Extract air

Flow rate	External pressure								Sound pressure level L_{WA}
[m³/h]	[Pa]	125	250	500	1000	2000	4000	8000	125 Hz ... 8 kHz [dB(A)]
210	50	41.2	41.9	27.1	19.4	15.0	15.9	16.4	34.7
300	100	45.1	40.9	37.8	27.5	17.2	17.1	16.9	37.2

Sound power: HomeVent® ER (300) + distribution box VTB-160 12 x 75

Supply air

Flow rate	External pressure								Sound pressure level L_{WA}
[m³/h]	[Pa]	125	250	500	1000	2000	4000	8000	125 Hz ... 8 kHz [dB(A)]
210	50	30.1	32.0	23.0	14.6	14.3	15.6	16.2	27.3
300	100	35.0	36.0	36.2	22.9	16.6	16.4	16.3	34.3

Extract air

Flow rate	External pressure								Sound pressure level L_{WA}
[m³/h]	[Pa]	125	250	500	1000	2000	4000	8000	125 Hz ... 8 kHz [dB(A)]
210	50	29.6	35.2	23.8	14.8	15.0	15.7	16.1	29.2
300	100	34.8	35.2	36.3	21.6	16.8	16.4	16.3	34.1

Sound power: HomeVent® ER (300) + IsiSound

Fresh air

Flow rate	External pressure								Sound pressure level L_{WA}
[m³/h]	[Pa]	125	250	500	1000	2000	4000	8000	125 Hz ... 8 kHz [dB(A)]
210	50	46.7	50.7	37.6	36	33.4	29.6	25.7	45.6
300	100	52.1	50.9	47.6	41.4	38.9	37.3	33.5	49.2

Exhaust air

Flow rate	External pressure								Sound pressure level L_{WA}
[m³/h]	[Pa]	125	250	500	1000	2000	4000	8000	125 Hz ... 8 kHz [dB(A)]
210	50	47.0	50.3	41.7	38.6	31.4	26.1	19.1	45.4
300	100	52.2	50.7	50.7	45.7	37.9	33.9	25.8	50.6

Sound power: HomeVent® ER (400)

Casing

Flow rate SUP/EXT [m³/h]	External pressure [Pa]	125	250	500	1000	2000	4000	8000	Sound pressure level L_{WA} 125 Hz ... 8 kHz [dB(A)]
280	50	41.5	47.1	43.6	37.0	30.1	22.4	14.7	43.7
400	100	45.6	50.0	51.5	40.7	36.6	30.2	24.3	49.9

Fresh air

Flow rate [m³/h]	External pressure [Pa]	125	250	500	1000	2000	4000	8000	Sound pressure level L_{WA} 125 Hz ... 8 kHz [dB(A)]
280	50	50.4	55.1	56.9	49.9	48.8	46.7	40.9	57.1
400	100	55.7	58.5	66.7	54.0	54.8	54.3	49.8	65.3

Supply air

Flow rate [m³/h]	External pressure [Pa]	125	250	500	1000	2000	4000	8000	Sound pressure level L_{WA} 125 Hz ... 8 kHz [dB(A)]
280	50	50.1	50.5	46.9	39.5	32.2	24.4	16.7	47.0
400	100	54.2	54.2	58.6	44.8	38.0	31.7	20.0	56.2

Extract air

Flow rate [m³/h]	External pressure [Pa]	125	250	500	1000	2000	4000	8000	Sound pressure level L_{WA} 125 Hz ... 8 kHz [dB(A)]
280	50	49.9	55.8	51.1	43.6	33.0	26.1	17.9	51.5
400	100	55.1	55.0	53.3	46.8	39.7	33.7	23.2	53.1

Exhaust air

Flow rate [m³/h]	External pressure [Pa]	125	250	500	1000	2000	4000	8000	Sound pressure level L_{WA} 125 Hz ... 8 kHz [dB(A)]
280	50	50.5	58.2	60.3	53.7	48.5	45.3	36.7	59.2
400	100	57.7	59.4	66.4	58.4	54.9	53.3	46.0	65.3

Sound power: HomeVent® ER (400) + acoustic insulating box SDB-160-400

Supply air

Flow rate [m³/h]	External pressure [Pa]	125	250	500	1000	2000	4000	8000	Sound pressure level L_{WA} 125 Hz ... 8 kHz [dB(A)]
280	50	44.9	38.4	33.8	23.3	16.4	16.2	16.3	34.2
400	100	48.5	43.4	38.0	27.5	20.7	18.0	16.7	39.3

Extract air

Flow rate [m³/h]	External pressure [Pa]	125	250	500	1000	2000	4000	8000	Sound pressure level L_{WA} 125 Hz ... 8 kHz [dB(A)]
280	50	43.2	40.4	38.6	25.4	16.2	16.5	16.6	36.9
400	100	47.9	43.8	36.8	28.4	21.2	19.5	18.5	39.3

Sound power: HomeVent® ER (400) + IsiSound

Fresh air

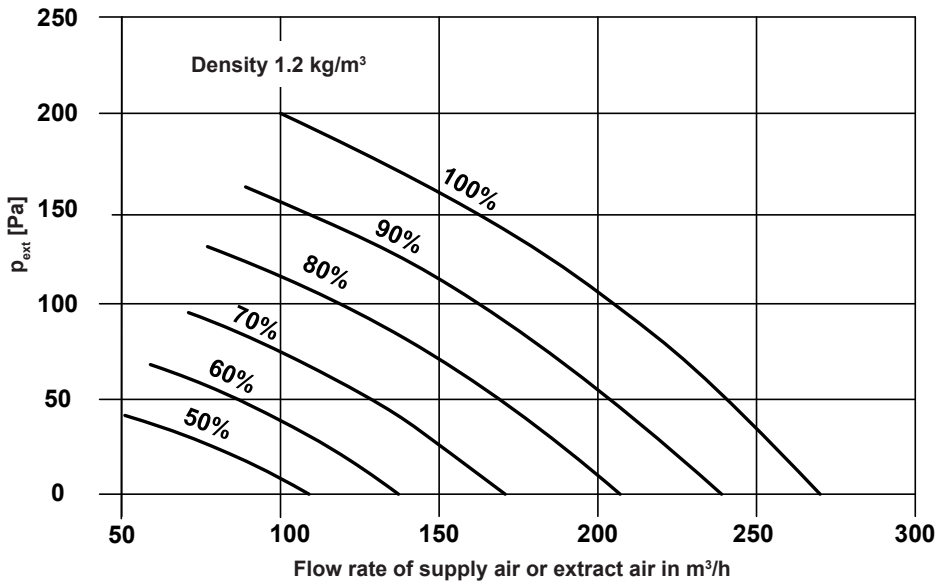
Flow rate	External pressure								Sound pressure level L_{WA}
[m³/h]	[Pa]	125	250	500	1000	2000	4000	8000	125 Hz ... 8 kHz [dB(A)]
280	50	49.2	49.7	44.7	39.8	37.2	34.7	30.2	47.3
400	100	54.5	54.5	53.1	43.9	43.2	42.3	39.5	53.5

Exhaust air

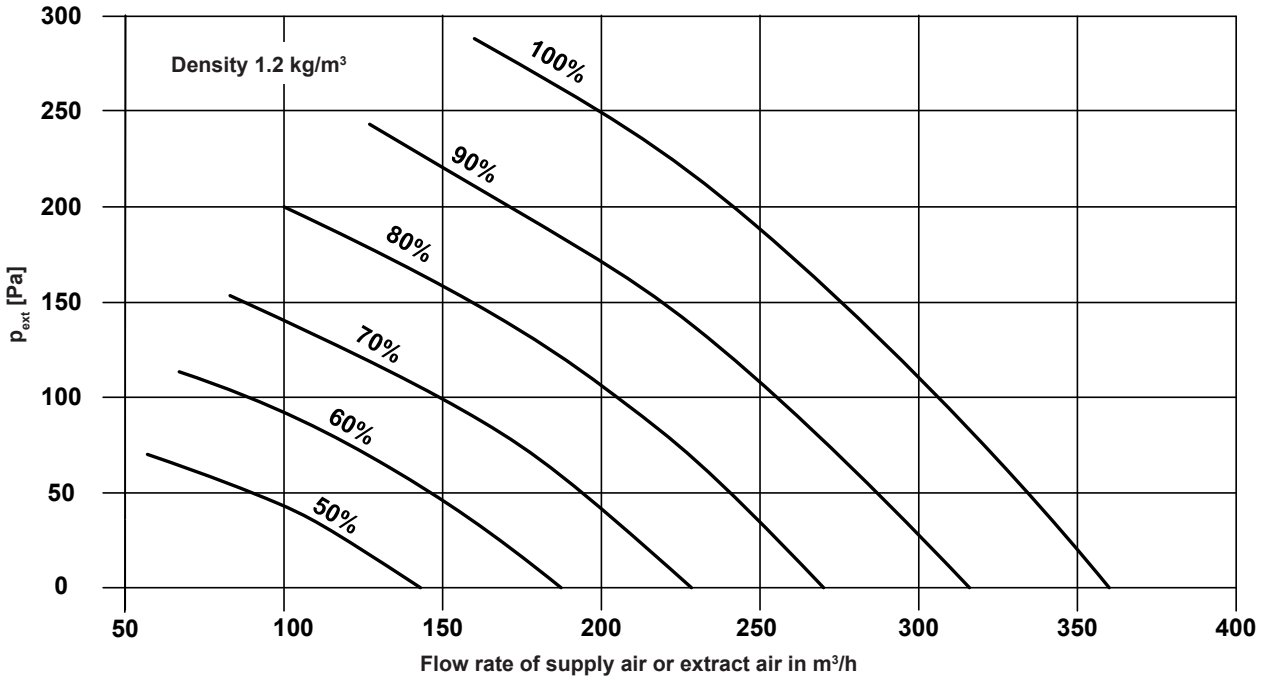
Flow rate	External pressure								Sound pressure level L_{WA}
[m³/h]	[Pa]	125	250	500	1000	2000	4000	8000	125 Hz ... 8 kHz [dB(A)]
280	50	49.7	49.6	47.2	44.0	35.7	30.9	22.8	48.3
400	100	57.0	54.1	56.2	49.2	42.3	38.8	31.2	55.5

Performance chart for air flow rate, HomeVent® ER (200)

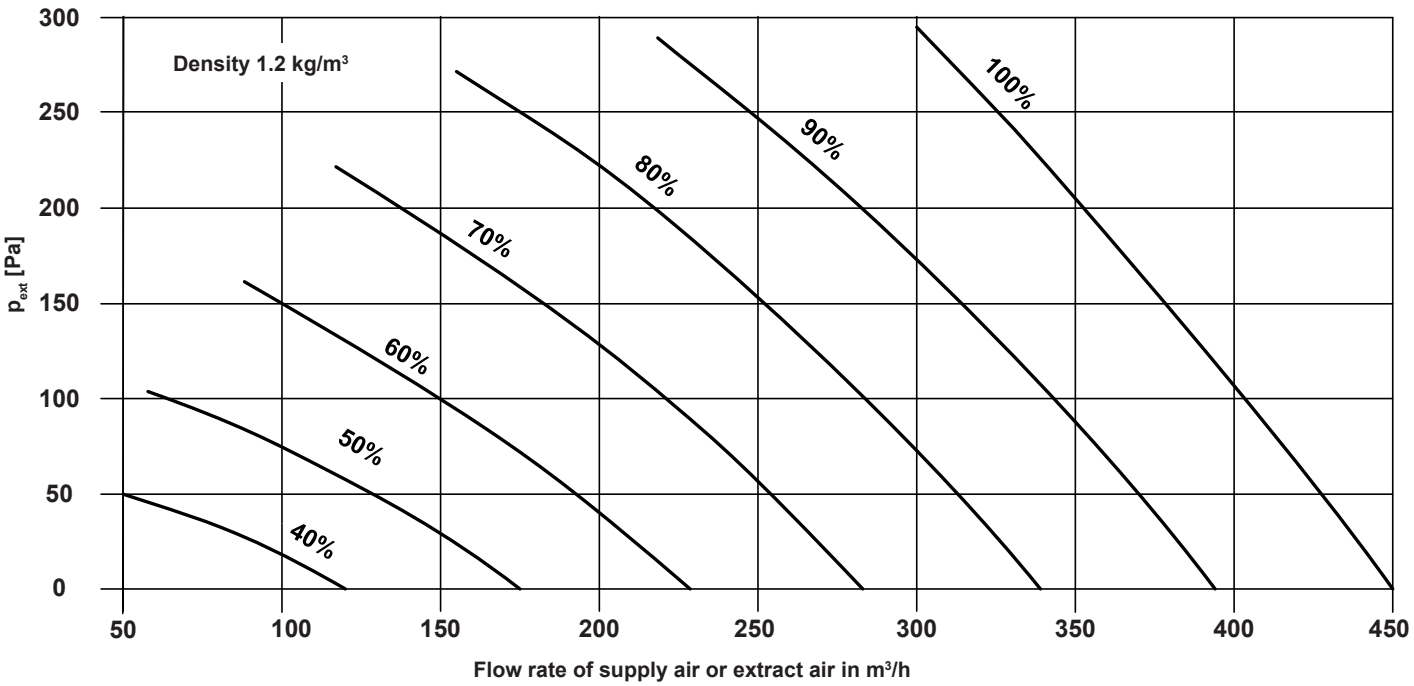
p_{ext} Sum of external pressure drops



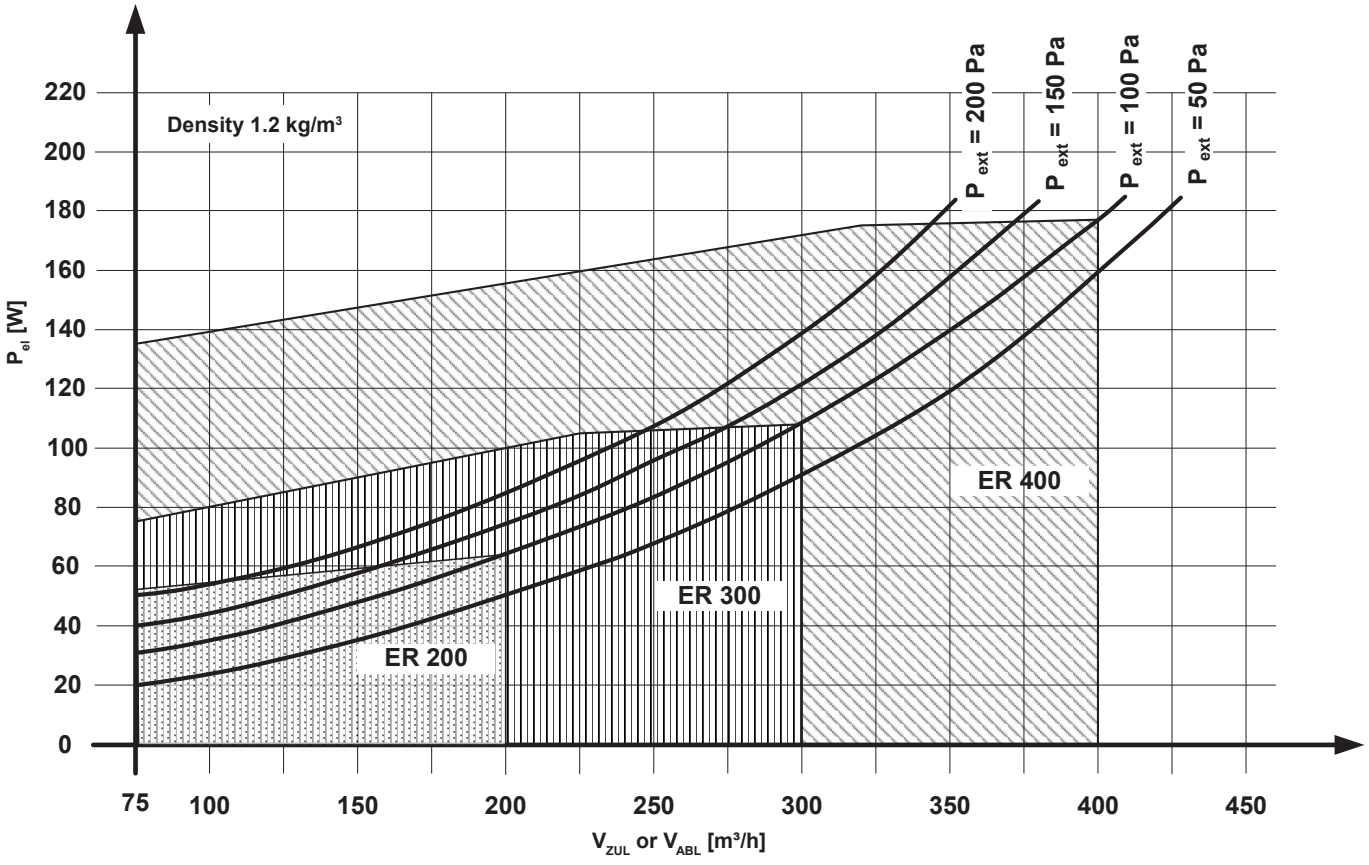
Performance chart for air flow rate, HomeVent® ER (300)



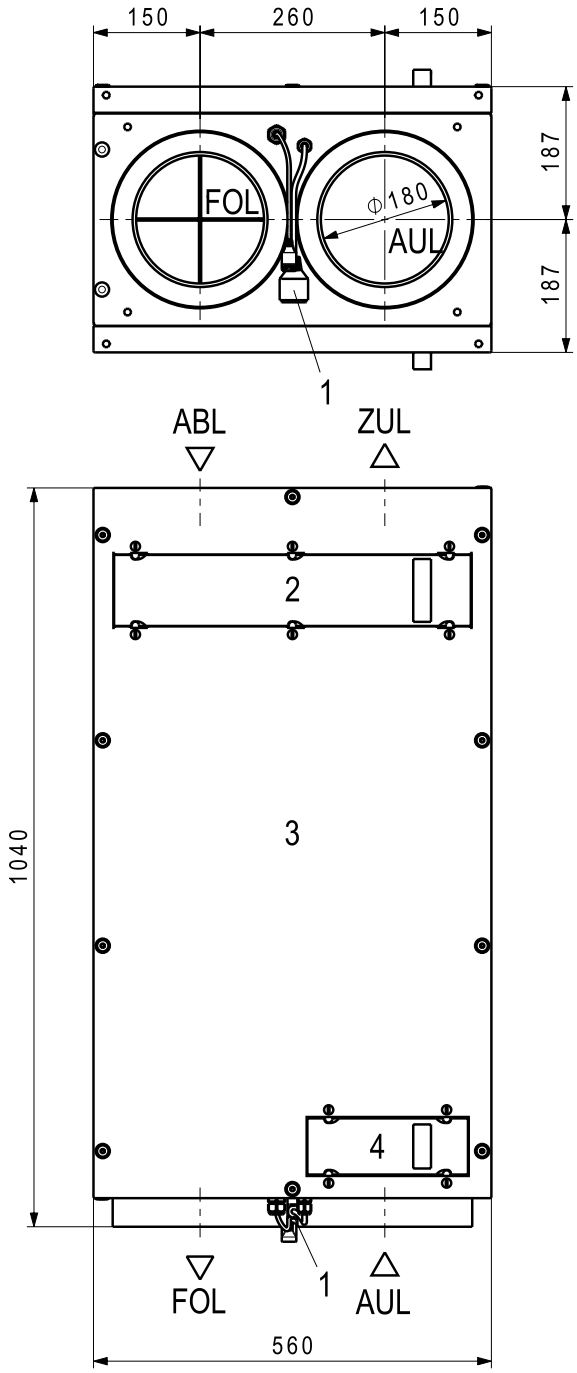
Performance chart for air flow rate, HomeVent® ER (400)



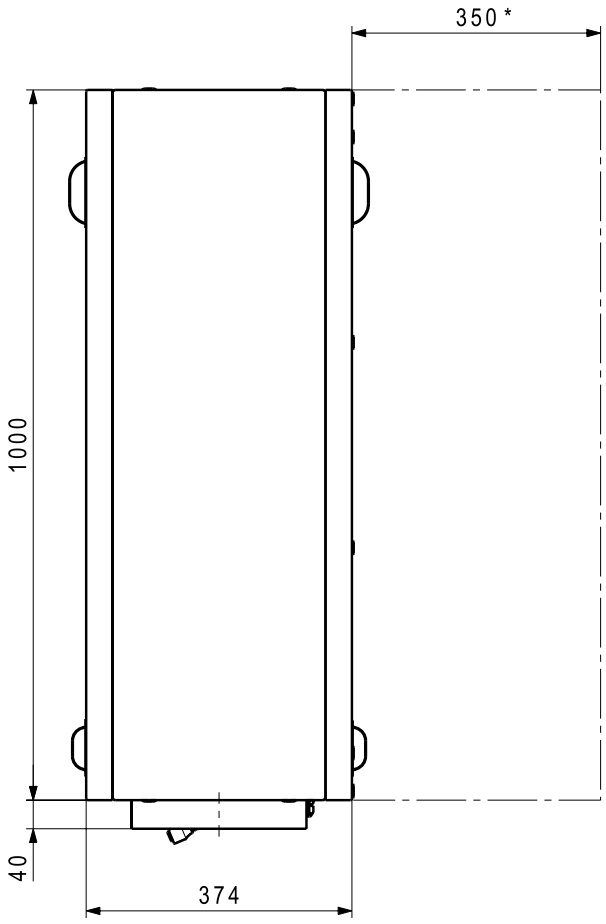
Electrical power consumption HomeVent® ER (200-400)

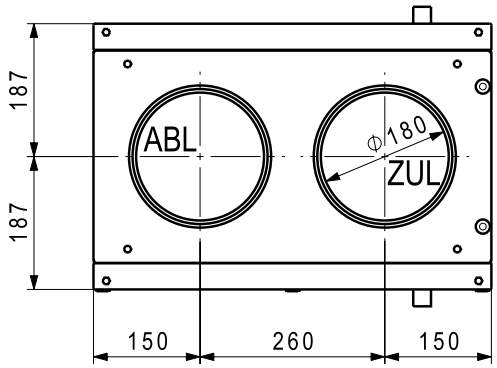


HomeVent® comfort ventilation unit



ZUL = supply air
ABL = extract air
FOL = exhaust air
AUL = fresh air

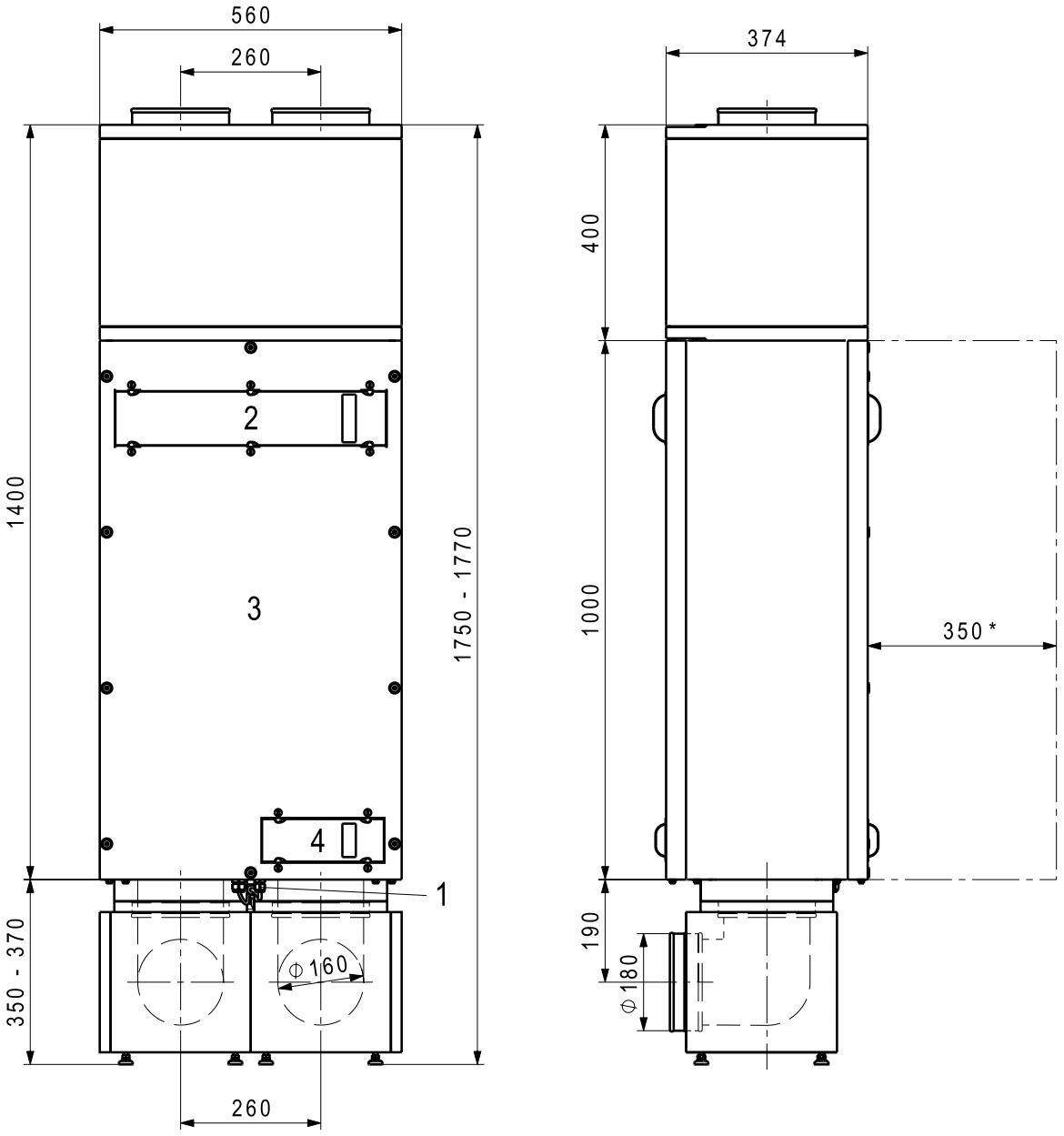


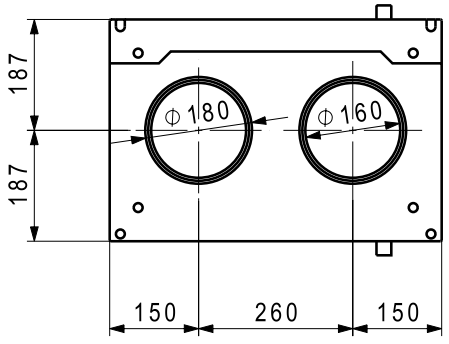


1 Electrical connection with microfuse
Space is required for changing the microfuse.
2 Filter cover for supply air filter/extract air filter
3 Access panel
4 Maintenance cover for prefilter

* Space required for filter exchange and service tasks, possible on both sides of the unit.

HomeVent® comfort ventilation unit with acoustic insulating box and IsiCube

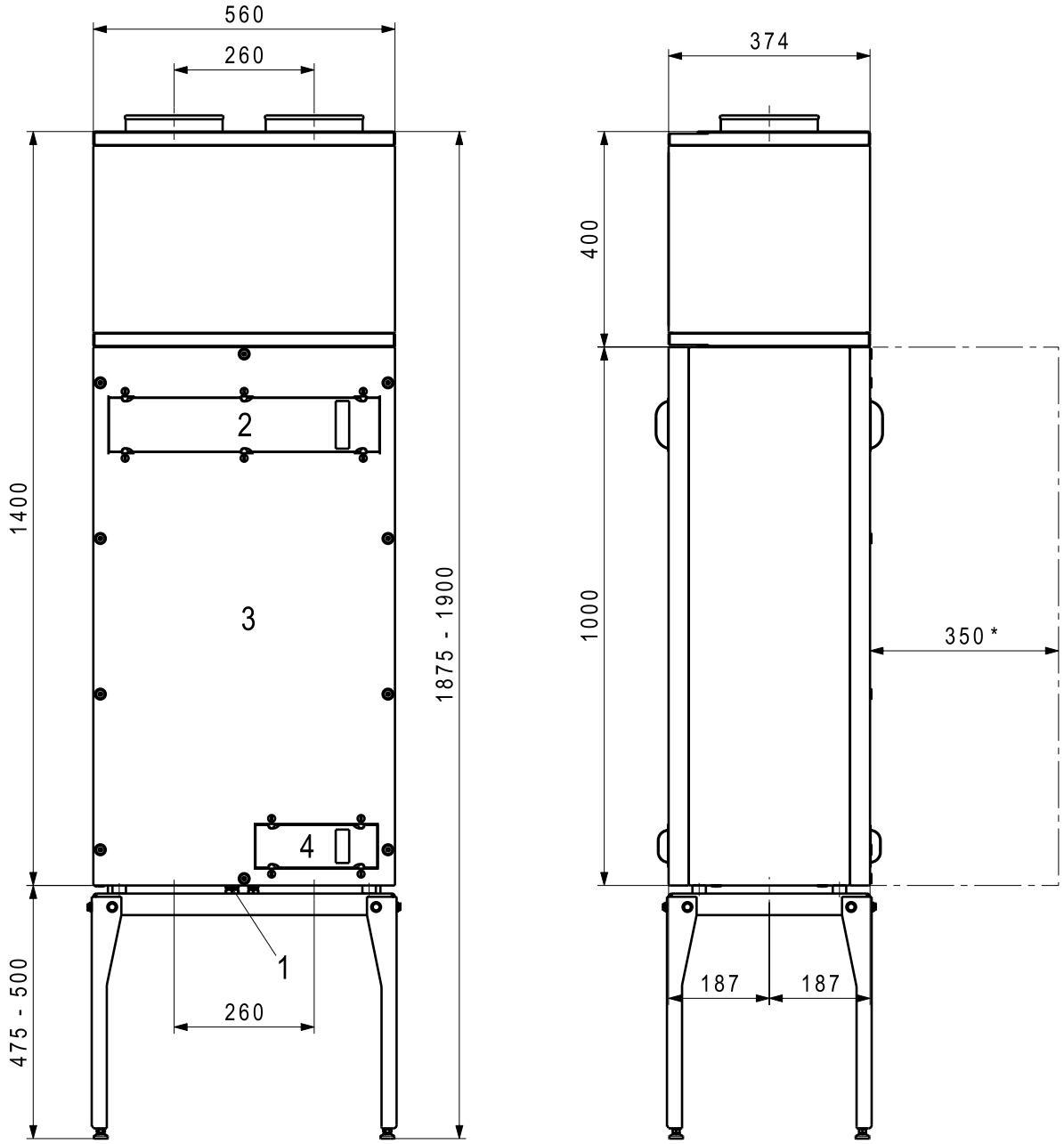


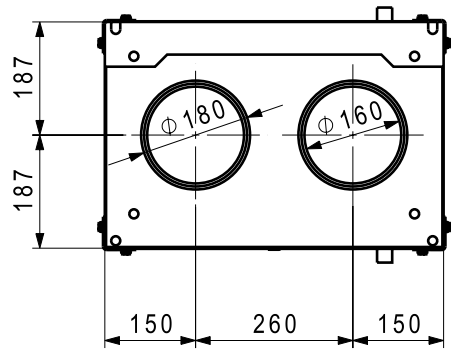


1 Electrical connection
Space is required for changing the microfuse.
2 Filter cover for supply air filter/extract air filter
3 Access panel
4 Maintenance cover for prefilter

* Space required for filter exchange and service tasks, possible on both sides of the unit.

HomeVent® comfort ventilation unit with acoustic insulating box



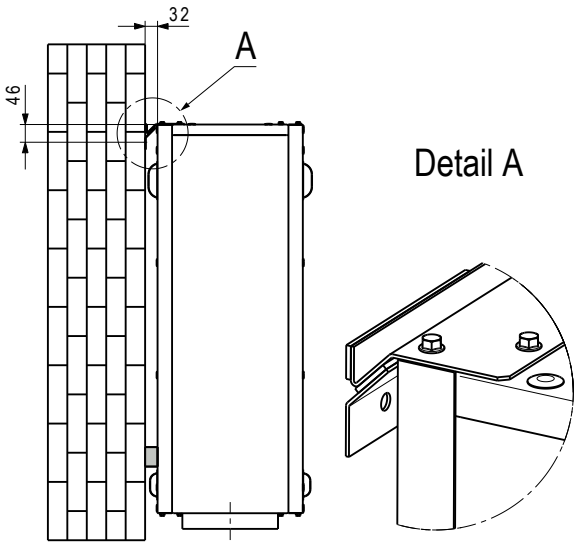


1 Electrical connection
Space is required for changing the microfuse.
2 Filter cover for supply air filter/extract air filter
3 Access panel
4 Maintenance cover for prefilter

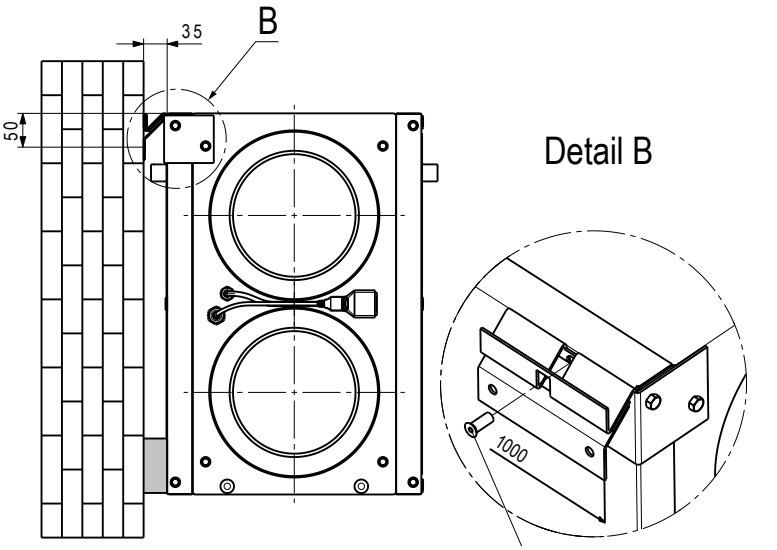
* Space required for filter exchange and service tasks, possible on both sides of the unit.

HomeVent® comfort ventilation unit
Installation with vibration dampers

Vertical wall installation: S-WV

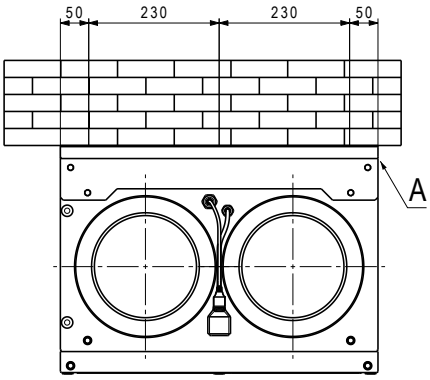


Horizontal wall installation: S-WH

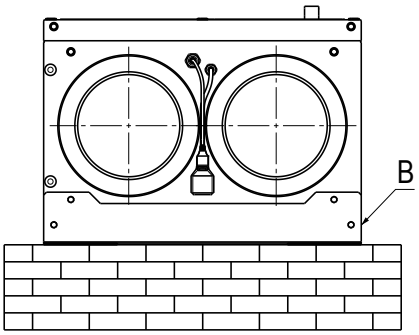


The sleeve nut is replaced by a supplied countersunk sleeve nut

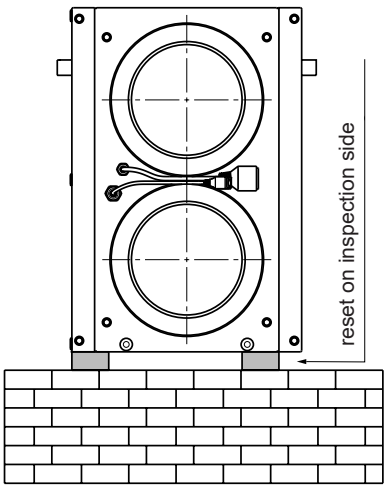
Ceiling installation: S-D



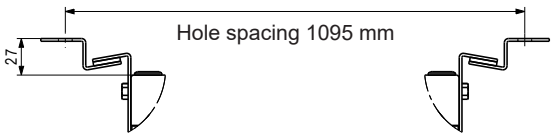
Floor installation: S-B



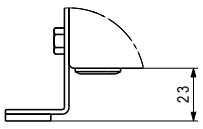
Floor installation: upright



Detail A



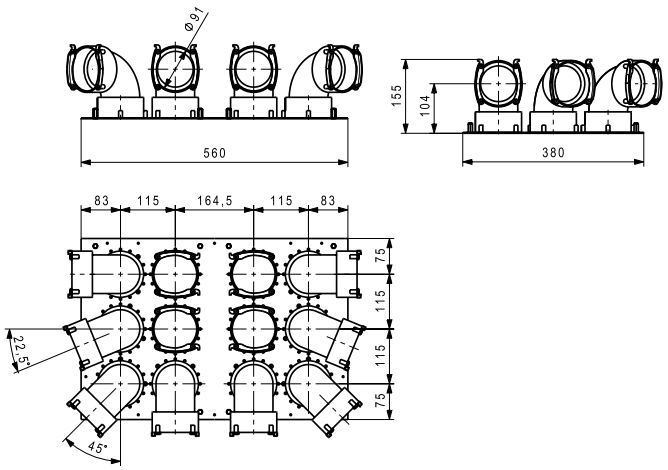
Detail B



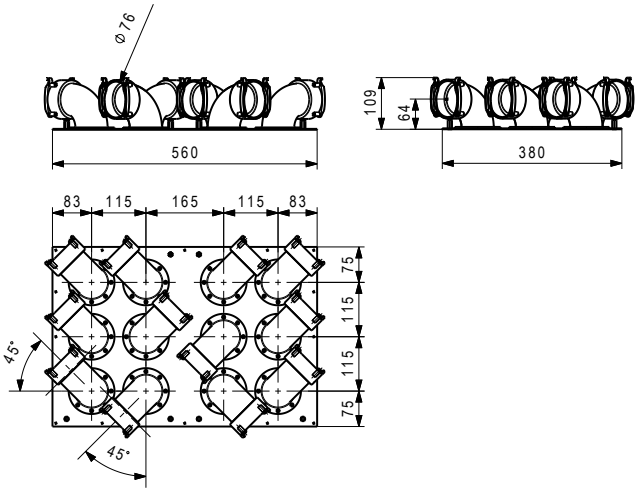
Can be installed in any position.

Acoustic insulating box for plywood 12 x 75 and 12 x 90
Casing made of red foiled sheet steel with sound insulation elements on supply air and extract air sides
Can be screwed onto plywood
Connection nozzles:
2 x DN 160/180

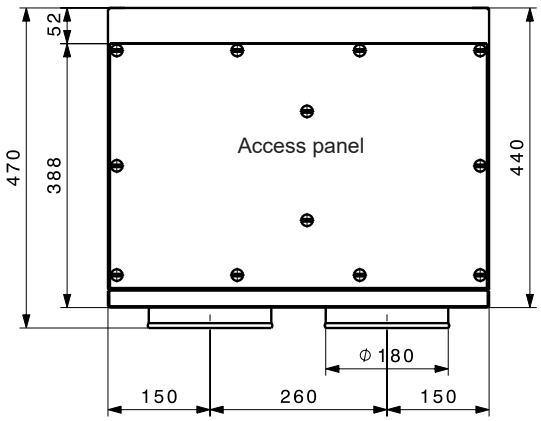
Plywood 12 x 90

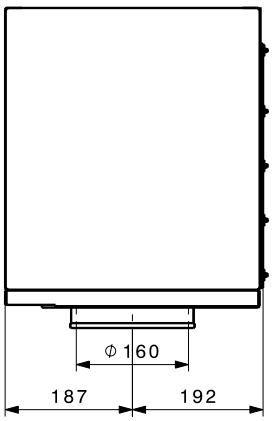


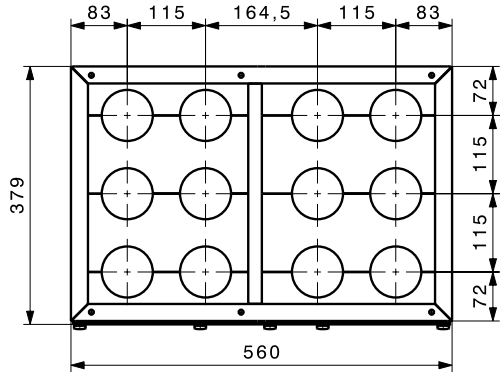
Plywood 12 x 75



Acoustic insulating box for plywood 12 x 75/90



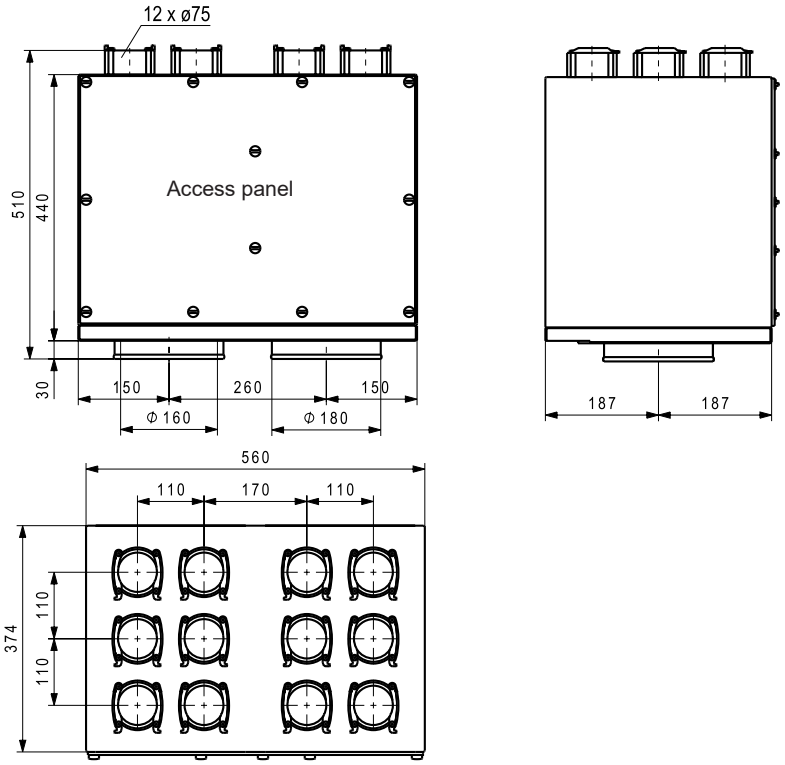




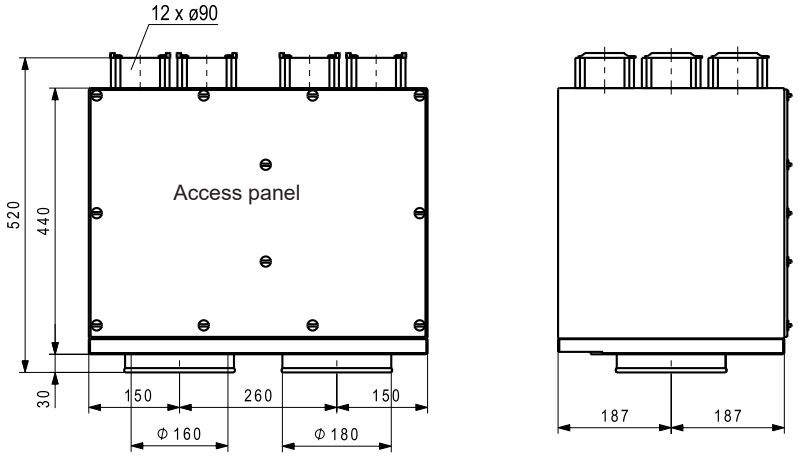
Distribution boxes DN 160

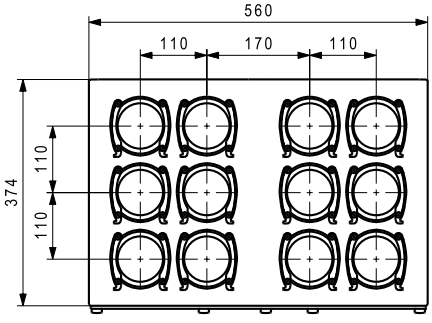
Distribution box VTB-160 12 x 75 resp. 90
Casing made of red foiled sheet steel with access panel.
Sound insulation elements on supply air side and extract air side.
Connection nozzles:
2 x DN 160/180
SUP 6 x 75, EXT 6 x 75
SUP 6 x 90, EXT 6 x 90
Included accessories: end caps and throttle orifices

Distribution box VTB-160 12 x 75

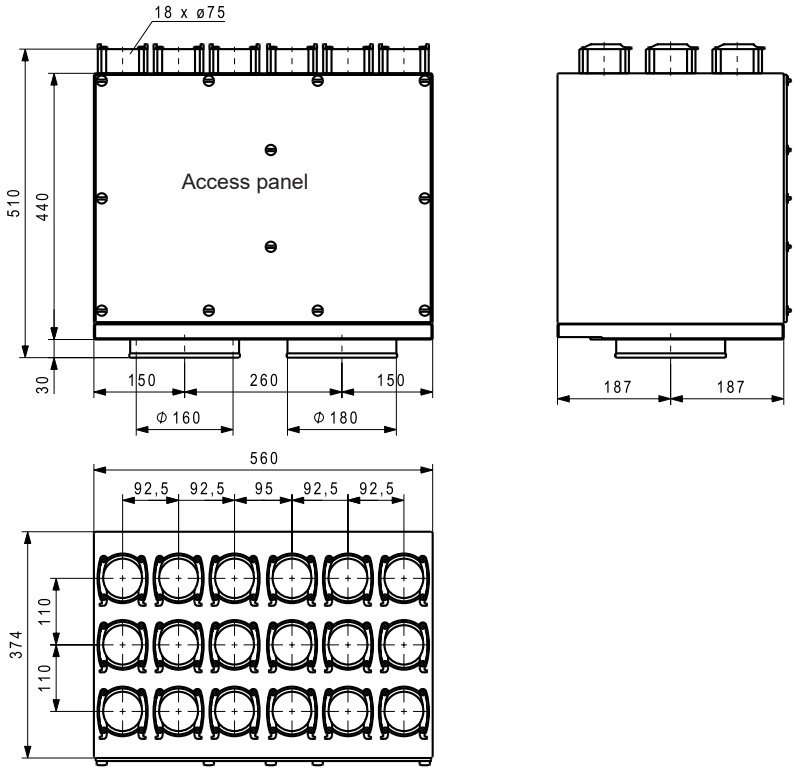


Distribution box VTB-160 12 x 90

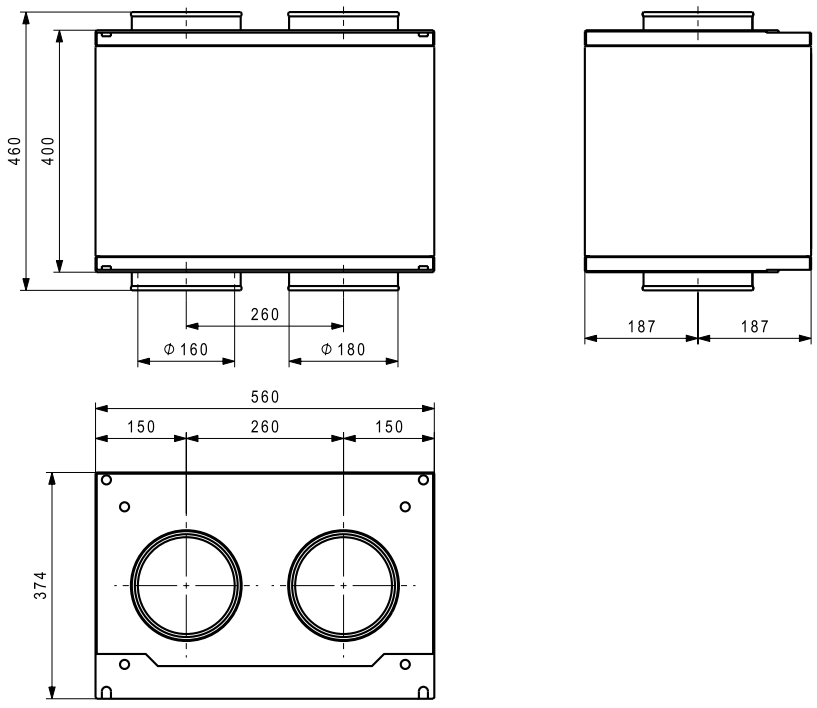




Distribution box VTB-160 18 x 75
Casing made of red foiled sheet steel with access panel.
Sound insulation elements on supply air side and extract air side.
Additional silencer recommended
Connection nozzles:
2 x DN 160/180
SUP 9 x 75, EXT 9 x 75
Included accessories: end caps and throttle orifices



Acoustic insulating box SDB-160-400
Casing made from red foil-plated sheet steel
Sound insulation elements on supply air side and extract air side



Hoval HomeVent® ERT (250-450) ventilation unit

- Comfort ventilation unit with self-adjusting heat and humidity recovery.
- For use within or outside the insulated building shell.
- High-quality, heat and sound insulated inner casing made from EPP.
- External casing made of film-coated sheet steel (red).
- Unit can be equipped with adjustable feet or can be installed upright using the mounting set.
- Rotary enthalpy recovery unit with speed regulation
- Two backward-curved EC fans (continuously adjustable 15-100 %)
- High-quality filters
  - supply air: ePM$_{1.0}$ 55 % (F7)
  - extract air: ePM$_{10}$ 60 % (G4)
- Integrated prefilter
- Filter monitoring (timer)
- Ready-to-connect electronics
- No need for preheating or a condensate drain

Data
- Colour: red
- Dimensions:
  L x W x H: 560 x 560 x 875 mm
  Weight: 35 kg
- Electrical connection: 230 V/50 Hz, IP40

Required accessories:
- Standard operator terminal BG02 E or
- TopTronic® E room control module comfort plus

Options
- Air quality sensor VOC or CO_2
- Active cool recovery (Option CoolVent®)
- Mounting set, IsiCube
- Supply air activated carbon filter

Delivery
- Comfort ventilation unit pre-assembled and packed
  - Mains cable 3 m
  - RJ45 cable 3 m

On site
- 8-pin CAT 5 patch cable (parallel, not crossed) between comfort ventilation unit and operator terminal
- RJ45 socket
- 230 V socket

Tests
- TÜV SÜD according to DIN EN 13141-7
- TÜV SÜD according to DIBt
- TÜV SÜD according to EN 60335-1

Model range

HomeVent® ERT type		Flow rate m³/h	Heat recovery efficiency %
(250)	A+	50-250	90-130
(350)	A+	70-350	90-130
(450)	A	80-450	90-130

Use

The HomeVent® comfort ventilation unit provides centralised supply and extract air handling for residential spaces.
This can be a single family home or a residential unit in a multi-family house.
Office rooms, conference rooms and cloakrooms are also ideal applications.
The comfort ventilation unit is part of the HomeVent® ventilation system for comfort ventilation, which performs the following tasks:
- Supplies residential and commercial space with outdoor air
- Extracts used air (CO_2, aerosols, excess dampness, odours, etc.)
- Saves energy through intelligent latent heat recovery
- Cleans supply air using a fine dust filter

Energy recovery
The built-in enthalpy recovery unit withdraws energy from the extract air and transfers it to the supply air. This enables the intelligent (temperature) and the latent (humidity) energy to be transferred. The transmission performance is regulated between 0 and 100 % depending on the outdoor temperature.

The advantages of the enthalpy recovery unit are:
- Temperature efficiency up to 90 %
- Degree of humidity recovery up to 95 %
- Steplessly controlled transmission performance
- No preheating required (down to -20 °C)
- No condensation
- No bypass required

Air filtration
The outdoor air goes through two cleaning stages, reaches the highest standard. A fine-meshed grate (washable) at the entry of the unit prevents insects, leaves, etc. from reaching the unit. When the outdoor air leaves the unit, it flows through a high-capacity fine pollen filter ($ePM_{1.0}$ 55 % (F7)). The operator receives a message when it is time to change the filter. The activated carbon filter can be inserted in place of the standard supply air filter. This is a high-capacity filter ($ePM_{2.5}$ 50 %) with high efficiency against particles (pollen, fine dust, etc.) and against gaseous pollutants and odours (agriculture, traffic, etc.).

Air delivery
Two backward-curved centrifugal fans with EC direct current motors deliver the air. The rotating wheel made of high-tech composite material is produced in one piece with optimised fluid mechanics, and ensures quiet operation of the unit. The electronics built into the engine enable the air volumes to be finely regulated between 15 and 100 %. The fans are arranged in such a way that no extract air can find its way to the supply air.

Suitability for winter
Due to the built-in enthalpy recovery unit, no condensate is formed in the unit. No preheating (electronic air heater) is necessary for outdoor temperatures down to -20 °C. The flow rate ratio between supply and extract air is not changed.

Summer operation
The energy recovery is automatically reduced to a minimum at high outdoor temperatures. This enables night cooling (free cooling) in the summer as well as when the seasons change. It is not necessary to arrange for a bypass via dampers and a drive. In addition, the CoolVent® option can recover cold in air-conditioned buildings. The hot outdoor air is cooled and dried with the air-conditioned extract air.

Installation
The HomeVent® comfort ventilation unit is characterised by a compact design. It is possible to access the unit from the front for servicing. No condensate forms in the unit. The unit is equipped with adjustable feet or can be installed upright on the wall using the mounting set.

Standard operator terminal BG02 E
The operator terminal consists of a plastic casing for on-wall mounting. The target air volume and the target air humidity can be set with two rotary knobs. With the party button, the air volume can be increased for a limited period of time. The connection to the HomeVent® comfort ventilation unit is made via RJ45 plug connection. The unit can also be installed in a secondary room.

TopTronic® E
room control module comfort plus
The TopTronic® E room control module comfort plus is available either with a black or white design, operated by a colour touchscreen (4.3 inch). The connection to the HomeVent® comfort ventilation unit is made via RJ45 plug connection or plug terminals (max. 0.75 mm^2). The unit can be installed on the wall with an on-wall mounted frame or with a wall-mounting plate and flush-mounted boxes. The unit can be installed in a secondary room.

Functional possibilities:
- Operation of all Hoval units connected to the bus.
- Authorisation management for operation.
- Efficient control of the ventilation system by working with day programmes
- Selection between different start screens possible during commissioning.
- Customer-specific configuration of the screen for displaying the following elements:
  - Date and time
  - Moon phases
  - Current air volume in %
  - Maximum target humidity in %
  - Active day or week programme
  - Display of current room air quality (optional VOC or CO_2 air quality sensor must be installed for this purpose)
  - Display of the current weather or weather forecast (only possible in combination with HovalConnect)

Air quality
Optionally, a VOC or CO_2 air quality sensor can be installed in the unit during commissioning. In addition, an activated carbon filter can be installed on the supply air side as an option. The VOC air quality sensor continuously monitors the extract air for volatile organic components and regulates the supplied or discharged air volume via the speed of the fans. This results in optimal air quality in the building with minimal energy input.

- VOC air quality sensor on the extract air side: The extract air is continuously monitored for odours, cleansing agents, etc. If the concentration of the extract air exceeds a certain value, the air volume is increased correspondingly. The sensitivity can be chosen. On the TopTronic® E room control module comfort plus, the air quality is displayed by a bar, which will either be green (good air), orange (slightly contaminated air) or red (bad air).

Cooling
The fresh air can be precooled using the CoolVent® option. However, this requires an air-conditioning system to be present in order to provide the necessary cooling in the room. The enthalpy recovery system extracts heat and humidity from the warm outdoor air and feeds it to the cold extract air. The energy consumption of the air-conditioning system is thereby reduced. The efficiency for this process is 85 %. The CoolVent® function can be activated during commissioning.

Function HomeVent® ERT (250-450)

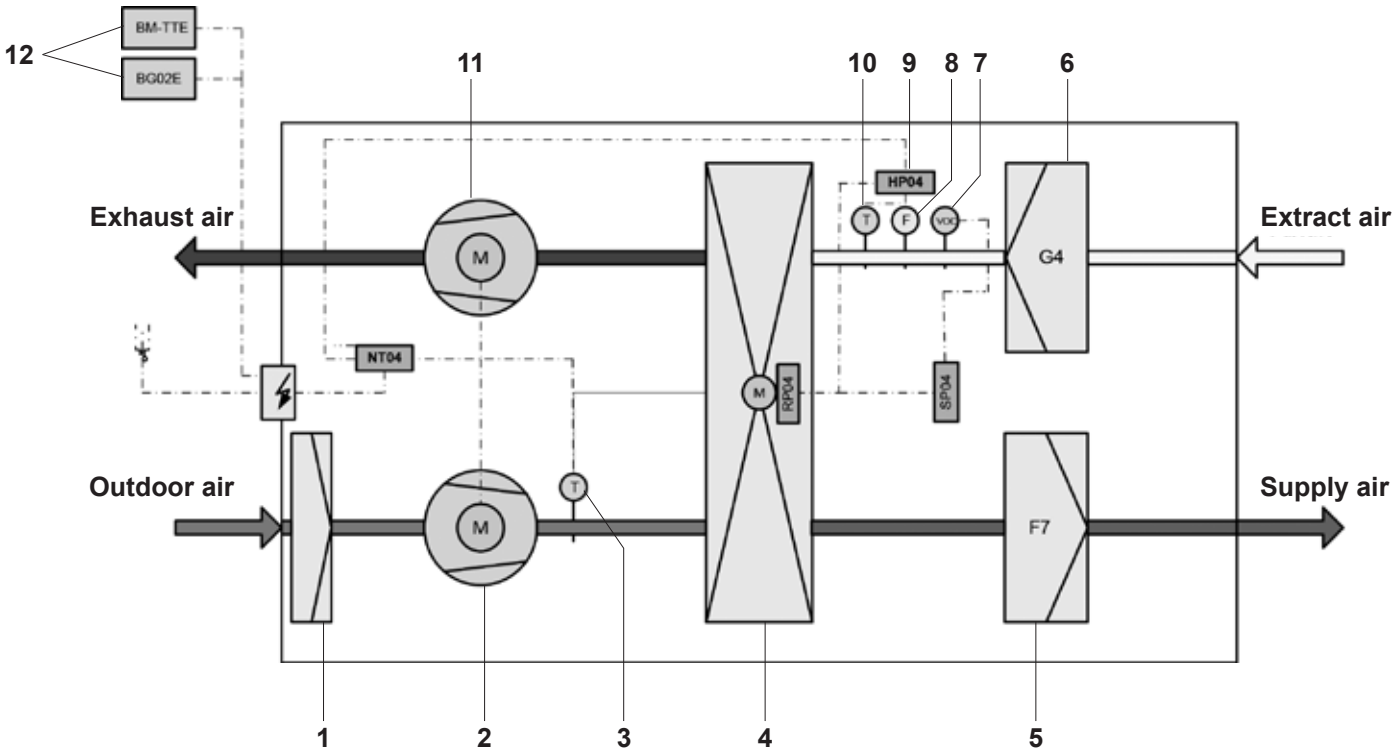
The outside air fan draws in outdoor air via the main line. In the first stage, this air is cleaned via a fine-meshed grate. In the enthalpy recovery system, the supply air is heated, depending on the temperature, and humidified. The extent to which heat and humidity are recovered is dependent on the temperature and humidity differences between the exhaust air and the outdoor air as well as on the rotor speed. Then the pre-treated outdoor air is cleaned by means of a pollen fine dust filter.

The exhaust air fan sucks in the used air via the coarse dust filter.
The enthalpy recovery system extracts heat and humidity from the air and passes these to the supply air.
The way the fans are positioned - with overpressure on the supply air side and underpressure on the extract air side - means that no extract air can find its way to the supply air.

The electronic controls and the operator terminal feature the following additional functions:

- The speed of the enthalpy recovery system is regulated by the outdoor temperature. In this way, the heat and humidity recovery is adjusted automatically.
- The humidity regulation changes the flow rate. Thus, if the humidity indoors is too high, for instance, more dry air is introduced from the outside.
- The functions of the unit are continuously monitored. In case of a malfunction, the device is switched to “fault” mode. The malfunction is displayed on the operator terminal.

1 Prefilter
2 Outside air fan
3 Outdoor sensor
4 Enthalpy recovery unit
5 Supply air filter
6 Extract air filter
7 VOC or CO_2 extract air sensor
8 Moisture sensor
9 Electronics
10 Extract air sensor
11 Exhaust air fan
12 Operator terminal BG02 E or TopTronic® E room control module comfort plus



Comfort ventilation units

HomeVent® ERT (250-450)

Comfort ventilation unit for ventilating a residential unit with high-efficiency heat and humidity recovery.

HomeVent® ERT type		Nominal flow rate m^3/h	Ext. pressure Pa	Part No.
(250)	A+	250	100	7019 029
(350)	A+	350	100	7019 030
(450)	A	450	100	7019 031

Required accessories

Operator terminal BG02 E
for HomeVent® ER and ERT
Plastic housing for on-wall mounting.
Knob for flow rate and room air humidity.
Service and fault display.

2066 444

TopTronic® E room control module comfort plus white
for HomeVent® ER and ERT
Operation of all Hoval ventilation units, heating and hot water circuits connected to the bus system.
Customer-specific configurable start screen.

incl. fitting accessories

6037 072

TopTronic® E room control module comfort plus black
for HomeVent® ER and ERT
Operation of all Hoval ventilation units, heating and hot water circuits connected to the bus system.
Customer-specific configurable start screen.

incl. fitting accessories

6042 543

HovalConnect

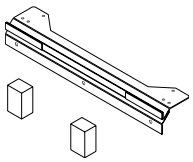
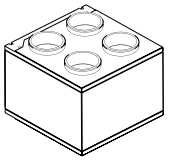
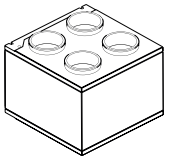
HovalConnect LAN	6049 496
HovalConnect WLAN	6049 498

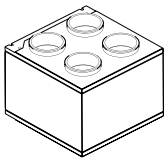
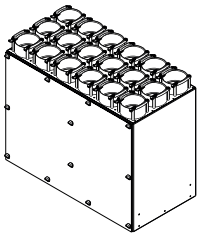
TopTronic® E interface modules

HovalConnect Modbus	6049 501
HovalConnect KNX	6049 593

Technical information
see separate chapter.

Recommended accessories

		Part No.
	**VOC air quality sensor** for HomeVent® ER and ERT Can be installed on extract air side Only in connection with the TopTronic® E room control module comfort plus.	6058 206
	**CO_2 air quality sensor** for HomeVent® ER and ERT Can be installed on extract air side Only in connection with the TopTronic® E room control module comfort plus.	6058 211
	Notice CO_2-sensor cannot be combined with VOC sensor	
	**Vertical wall mounting set** for HomeVent® ER and ERT Steel bracket red coated with vibration-damping support	6046 215
	**Acoustic insulating box ERT extract-supply air front** for HomeVent® ERT Casing made from red foil-plated sheet steel connection nozzles 4 x DN 160. Extract air front left, supply air front right Exhaust air back left, fresh air back right All 4 air ducts are sound-insulated. Dimensions (L x W x H): 400 x 560 x 560 mm	6046 018
	**Acoustic insulating box ERT extract air-supply air right** for HomeVent® ERT Casing made from red foil-plated sheet steel Connection nozzles 4 x DN 160. Extract air front right, supply air rear right Exhaust air front left, fresh air rear left All 4 air ducts are sound-insulated. Dimensions (L x W x H): 400 x 560 x 560 mm	6046 019

		Part No.
	**Acoustic insulating box ERT extract-supply air left** for HomeVent® ERT Casing made from red foil-plated sheet steel connection nozzles 4 x DN 160. Extract air rear left, supply air front left Exhaust air back right, fresh air front right All 4 air ducts are sound-insulated. Dimensions (L x W x H): 400 x 560 x 560 mm	6046 020
	**Distribution box ERT 18 x 75** for HomeVent® ERT Casing made from red foil-plated sheet steel Connections 2 x DN 180 (IsiFit) Connection nozzles 18 x DIN 75 Acoustic insulating body on supply and extract air sides, access panel, incl. throttle orifices Dimensions (L x W x H): 454 x 560 x 280 mm	6061 463

Filter HomeVent® ERT

	**Supply air filter ERT and FRT** for HomeVent® ERT and FRT Filter class ISO 16890: $ePM_{1.0}$ 55% (F7)	5043 550
	**Activated carbon filter ERT and FRT** for HomeVent® ERT and FRT Protection against pollutants and odours Alternative to supply air filter Filter class ISO 16890: $ePM_{2.5}$ 50 %	5043 778
	**Extract air filter ERT and FRT** for HomeVent® ERT and FRT Filter class ISO 16890: ePM_{10} 60 % (G4)	5043 611

HomeVent® comfort ERT (250-450)

Type		(250)	(350)	(450)
• Max. flow rate (at 100 Pa external pressure)	m^3/h	250	350	450
• Air flow rate control range	m^3/h	50-250	70-350	80-450
• Humidity setpoint setting	%		30…65	
Electrical connection				
• Voltage (AC)	V		230	
• Frequency	Hz		50	
• Max. current consumption	A	0.82	1.26	2.34
• Type of protection			IP40	
• Power consumption (at 70 % of the max. flow rate, 50 Pa external pressure)	W	42	63	94
• Degree of heat processing (as per DIN 4719)	%		90-130	
• Temperature ratio (at 70 % of the max. flow rate)	%	85	84	82
• Humidity ratio (at 70 % of the max. flow rate)	%	86	86	81
• Specific fan power SFP (at 70 % of the max. flow rate)	$W/m^3/h$	0.25	0.27	0.31
Filter class (as per ISO-16890)				
• Supply air filter			$ePM_{1.0}$ 55 %	
• Extract air filter			ePM_{10} 60 %	
• Sound power level			see table on following page	
Leakage (as per EN 13141-7)				
• Internal	%	0.1	0.1	0.1
• External	%	0.2	0.1	0.1
• Net weight	kg		35	
Application limits for device setup, weather-protected (EN 60721-3-3), 3K5 as per EN 50090-2-2				
• Ambient temperature	°C		-20...45	
• Ambient humidity	g/kg		max. 15	
• Dew point temp. in installation room	°C		< 15	
Air conditions (moderate outdoor climate EN 60721-2-1)				
• Outside air intake temperature	°C		-20...40	
• Outside air intake humidity	% r.h.		5…95	
• Extract air temperature	°C		18…35	
• Extract air humidity	% r.h.		5...80	
• Max. extract air humidity winter	g/kg		12	

Sound power: HomeVent® ERT (250)

Casing

Flow rate	External pressure	L_W [dB]							Sound pressure level L_{WA}
SUP/EXT [m³/h]	[Pa]	125	250	500	1000	2000	4000	8000	125 Hz ... 8 kHz [dB(A)]
175	50	40	49	34	22	14	10	10	40
250	100	45	51	45	28	20	11	11	45

Fresh air

Flow rate	External pressure	L_W [dB]							Sound pressure level L_{WA}
[m³/h]	[Pa]	125	250	500	1000	2000	4000	8000	125 Hz ... 8 kHz [dB(A)]
175	50	48	54	49	40	37	31	23	49
250	100	55	56	56	47	44	39	33	55

Supply air

Flow rate	External pressure	L_W [dB]							Sound pressure level L_{WA}
[m³/h]	[Pa]	125	250	500	1000	2000	4000	8000	125 Hz ... 8 kHz [dB(A)]
175	50	44	52	48	39	34	27	18	48
250	100	49	52	55	46	41	35	26	53

Extract air

Flow rate	External pressure	L_W [dB]							Sound pressure level L_{WA}
[m³/h]	[Pa]	125	250	500	1000	2000	4000	8000	125 Hz ... 8 kHz [dB(A)]
175	50	47	54	42	33	32	23	18	46
250	100	51	54	50	34	38	32	26	50

Exhaust air

Flow rate	External pressure	L_W [dB]							Sound pressure level L_{WA}
[m³/h]	[Pa]	125	250	500	1000	2000	4000	8000	125 Hz ... 8 kHz [dB(A)]
175	50	45	51	43	43	39	34	17	48
250	100	51	55	57	48	46	43	29	56

Sound power: HomeVent® ERT (250) + acoustic insulating box ERT

Casing

Flow rate	External pressure	L_W [dB]							Sound pressure level LWA
SUP/EXT [m³/h]	[Pa]	125	250	500	1000	2000	4000	8000	125 Hz ... 8 kHz [dB(A)]
175	50	40	49	34	22	14	10	10	40
250	100	44	51	44	28	19	10	11	45

Fresh air

Flow rate	External pressure	L_W [dB]							Sound pressure level LWA
[m³/h]	[Pa]	125	250	500	1000	2000	4000	8000	125 Hz ... 8 kHz [dB(A)]
175	50	34	38	29	15	14	15	16	31
250	100	38	39	31	20	18	17	17	63

Supply air

Flow rate	External pressure	L_W [dB]							Sound pressure level LWA
[m³/h]	[Pa]	125	250	500	1000	2000	4000	8000	125 Hz ... 8 kHz [dB(A)]
175	50	33	39	28	15	14	15	16	32
250	100	38	40	37	21	17	16	16	36

Extract air

Flow rate	External pressure	L_W [dB]							Sound pressure level LWA
[m³/h]	[Pa]	125	250	500	1000	2000	4000	8000	125 Hz ... 8 kHz [dB(A)]
175	50	33	37	26	15	15	15	16	30
250	100	39	41	36	22	19	16	16	36

Exhaust air

Flow rate	External pressure	L_W [dB]							Sound pressure level LWA
[m³/h]	[Pa]	125	250	500	1000	2000	4000	8000	125 Hz ... 8 kHz [dB(A)]
175	50	34	38	28	17	15	15	11	31
250	100	40	41	36	23	21	18	12	36

Sound power: HomeVent® ERT (350)

Casing

Flow rate	External pressure	L_W [dB]							Sound pressure level L_{WA}
SUP/EXT [m³/h]	[Pa]	125	250	500	1000	2000	4000	8000	125 Hz ... 8 kHz [dB(A)]
245	50	42	52	38	24	17	10	12	44
350	100	48	48	46	31	24	13	8	45

Fresh air

Flow rate	External pressure	L_W [dB]							Sound pressure level L_{WA}
[m³/h]	[Pa]	125	250	500	1000	2000	4000	8000	125 Hz ... 8 kHz [dB(A)]
245	50	50	54	52	43	41	37	29	52
350	100	58	55	62	50	49	45	39	60

Supply air

Flow rate	External pressure	L_W [dB]							Sound pressure level L_{WA}
[m³/h]	[Pa]	125	250	500	1000	2000	4000	8000	125 Hz ... 8 kHz [dB(A)]
245	50	48	56	51	43	39	33	23	52
350	100	53	54	61	50	46	41	33	59

Extract air

Flow rate	External pressure	L_W [dB]							Sound pressure level L_{WA}
[m³/h]	[Pa]	125	250	500	1000	2000	4000	8000	125 Hz ... 8 kHz [dB(A)]
245	50	48	53	46	38	36	30	22	48
350	100	53	53	52	43	42	37	31	52

Exhaust air

Flow rate	External pressure	L_W [dB]							Sound pressure level L_{WA}
[m³/h]	[Pa]	125	250	500	1000	2000	4000	8000	125 Hz ... 8 kHz [dB(A)]
245	50	48	54	48	47	44	41	24	53
350	100	54	53	61	53	51	48	36	60

Sound power: HomeVent® ERT (350) + acoustic insulating box ERT

Casing

Flow rate	External pressure	L_W [dB]							Sound pressure level L_{WA}
SUP/EXT [m³/h]	[Pa]	125	250	500	1000	2000	4000	8000	125 Hz ... 8 kHz [dB(A)]
245	50	42	52	38	24	17	10	12	44
350	100	48	48	46	31	24	13	8	45

Fresh air

Flow rate	External pressure	L_W [dB]							Sound pressure level L_{WA}
[m³/h]	[Pa]	125	250	500	1000	2000	4000	8000	125 Hz ... 8 kHz [dB(A)]
245	50	36	39	32	17	16	16	16	33
350	100	41	38	41	24	21	20	20	38

Supply air

Flow rate	External pressure	L_W [dB]							Sound pressure level L_{WA}
[m³/h]	[Pa]	125	250	500	1000	2000	4000	8000	125 Hz ... 8 kHz [dB(A)]
245	50	36	39	32	18	15	15	16	33
350	100	43	39	41	25	20	17	16	39

Extract air

Flow rate	External pressure	L_W [dB]							Sound pressure level L_{WA}
[m³/h]	[Pa]	125	250	500	1000	2000	4000	8000	125 Hz ... 8 kHz [dB(A)]
245	50	35	39	29	19	17	16	16	33
350	100	42	40	38	26	24	17	16	37

Exhaust air

Flow rate	External pressure	L_W [dB]							Sound pressure level L_{WA}
[m³/h]	[Pa]	125	250	500	1000	2000	4000	8000	125 Hz ... 8 kHz [dB(A)]
245	50	38	40	32	20	18	17	11	34
350	100	45	41	42	28	25	22	14	40

* Additional sound insulation measures are necessary for noise-sensitive rooms.

Sound power: HomeVent® ERT (450)

Casing

Flow rate	External pressure	L_W [dB]							Sound pressure level L_{WA}
SUP/EXT [m³/h]	[Pa]	125	250	500	1000	2000	4000	8000	125 Hz ... 8 kHz [dB(A)]
315	50	46	48	44	29	21	10	11	44
450	100	49	51	49	33	28	16	8	49

Fresh air

Flow rate	External pressure	L_W [dB]							Sound pressure level L_{WA}
[m³/h]	[Pa]	125	250	500	1000	2000	4000	8000	125 Hz ... 8 kHz [dB(A)]
315	50	52	53	58	50	45	42	35	56
450	100	59	57	62	53	52	50	44	61

Supply air

Flow rate	External pressure	L_W [dB]							Sound pressure level L_{WA}
[m³/h]	[Pa]	125	250	500	1000	2000	4000	8000	125 Hz ... 8 kHz [dB(A)]
315	50	50	52	58	47	43	38	29	56
450	100	56	56	62	53	50	46	38	61

Extract air

Flow rate	External pressure	L_W [dB]							Sound pressure level L_{WA}
[m³/h]	[Pa]	125	250	500	1000	2000	4000	8000	125 Hz ... 8 kHz [dB(A)]
315	50	50	52	50	41	39	34	27	50
450	100	55	55	53	45	45	41	36	54

Exhaust air

Flow rate	External pressure	L_W [dB]							Sound pressure level L_{WA}
[m³/h]	[Pa]	125	250	500	1000	2000	4000	8000	125 Hz ... 8 kHz [dB(A)]
315	50	50	52	56	50	48	45	30	56
450	100	57	56	61	54	54	53	42	62

Sound power: HomeVent® ERT (450) + acoustic insulating box ERT

Casing

Flow rate	External pressure	L_W [dB]							Sound pressure level L_{WA}
SUP/EXT [m³/h]	[Pa]	125	250	500	1000	2000	4000	8000	125 Hz ... 8 kHz [dB(A)]
315	50	46	48	44	29	21	10	11	44
450	100	41	51	49	33	28	16	8	49

Fresh air

Flow rate	External pressure	L_W [dB]							Sound pressure level L_{WA}
[m³/h]	[Pa]	125	250	500	1000	2000	4000	8000	125 Hz ... 8 kHz [dB(A)]
315	50	39	36	39	22	18	18	18	36
450	100	46	41	43	27	25	24	25	41

Supply air

Flow rate	External pressure	L_W [dB]							Sound pressure level L_{WA}
[m³/h]	[Pa]	125	250	500	1000	2000	4000	8000	125 Hz ... 8 kHz [dB(A)]
315	50	40	37	39	22	17	16	16	36
450	100	47	42	43	28	24	20	18	41

Extract air

Flow rate	External pressure	L_W [dB]							Sound pressure level L_{WA}
[m³/h]	[Pa]	125	250	500	1000	2000	4000	8000	125 Hz ... 8 kHz [dB(A)]
315	50	38	38	35	22	19	16	16	34
450	100	45	42	39	29	27	19	17	39

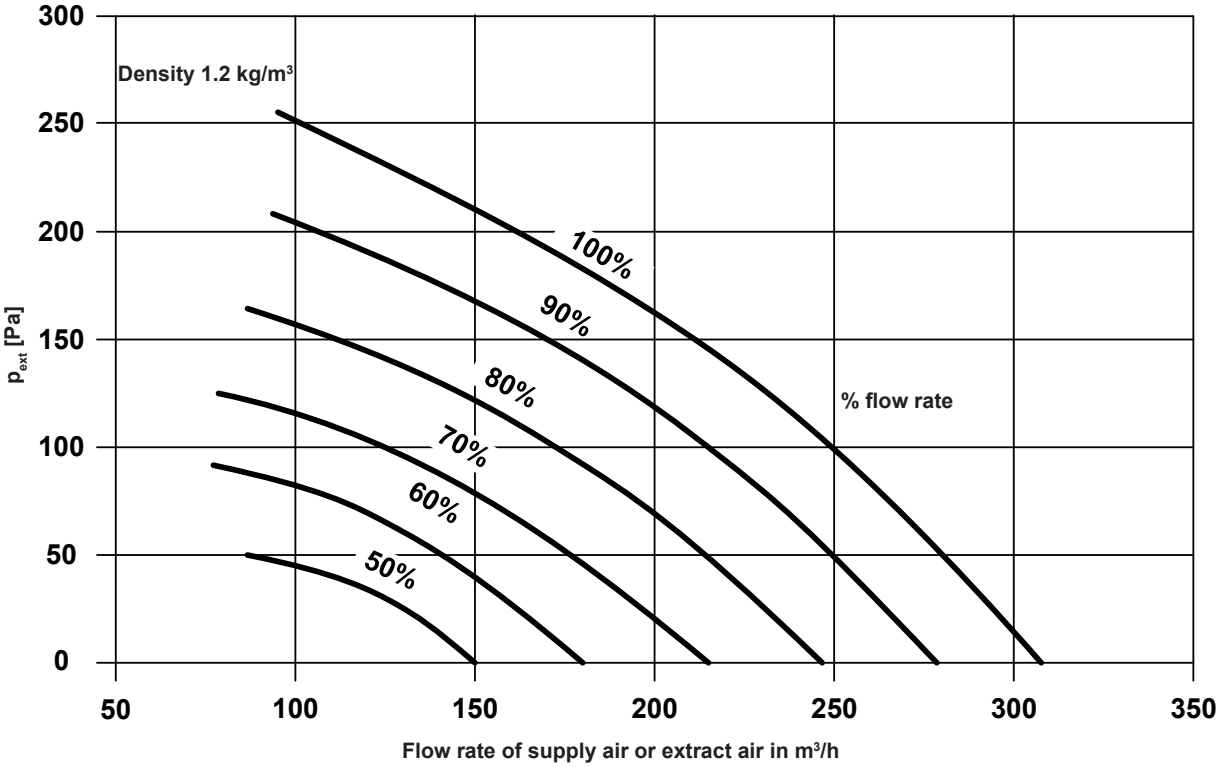
Exhaust air

Flow rate	External pressure	L_W [dB]							Sound pressure level L_{WA}
[m³/h]	[Pa]	125	250	500	1000	2000	4000	8000	125 Hz ... 8 kHz [dB(A)]
315	50	42	39	38	25	21	19	12	37
450	100	49	45	43	32	29	26	18	43

* Additional sound insulation measures are necessary for noise-sensitive rooms.

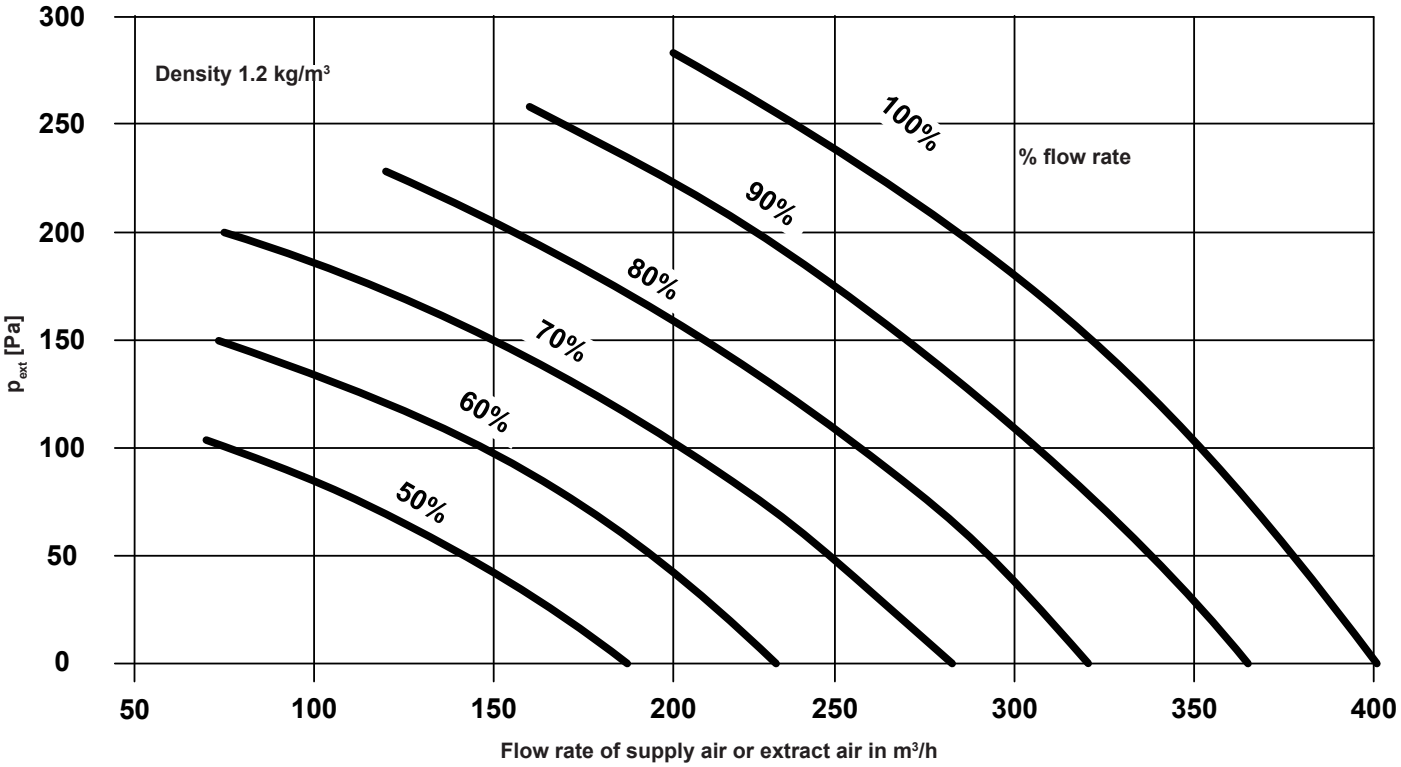
Performance chart for air flow rate, HomeVent® ERT (250)

p_{ext} Sum of external pressure drops



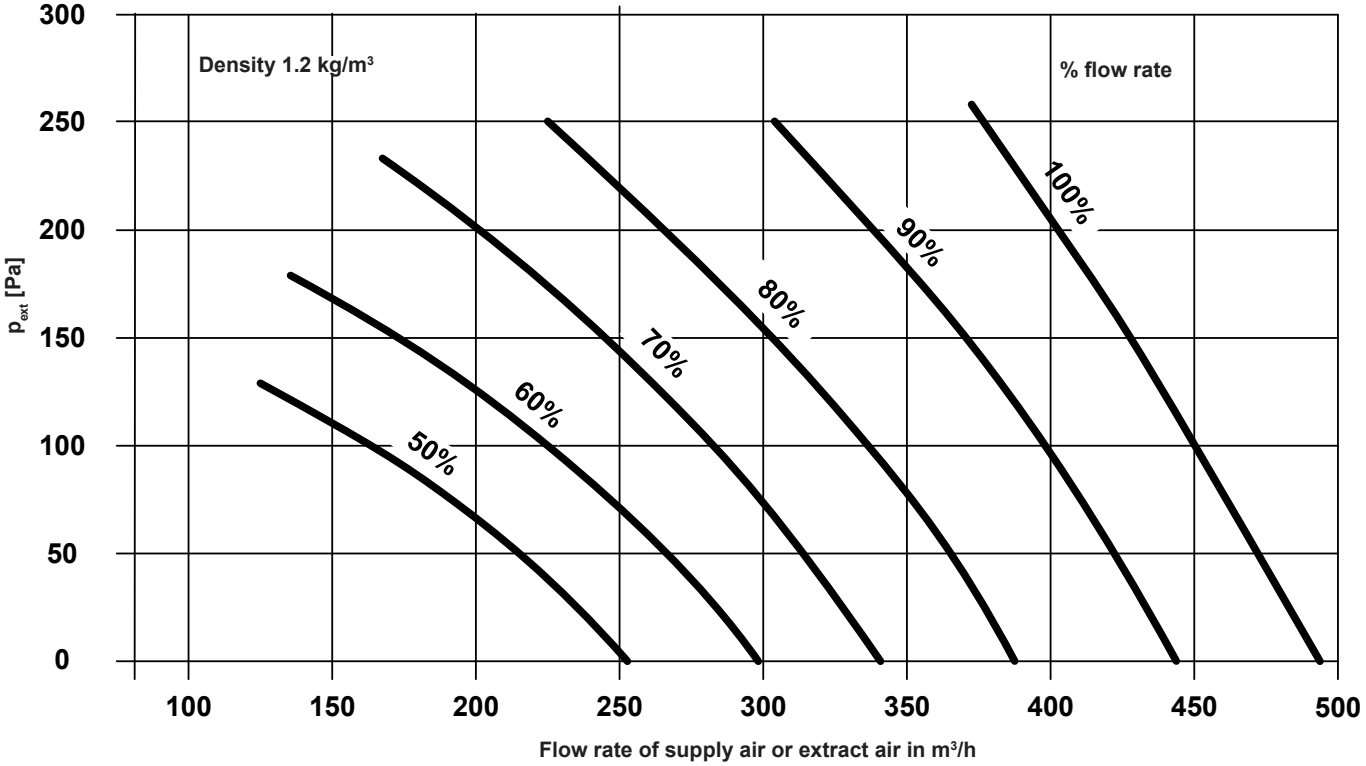
Performance chart for air flow rate, HomeVent® ERT (350)

p_{ext} Sum of external pressure drops

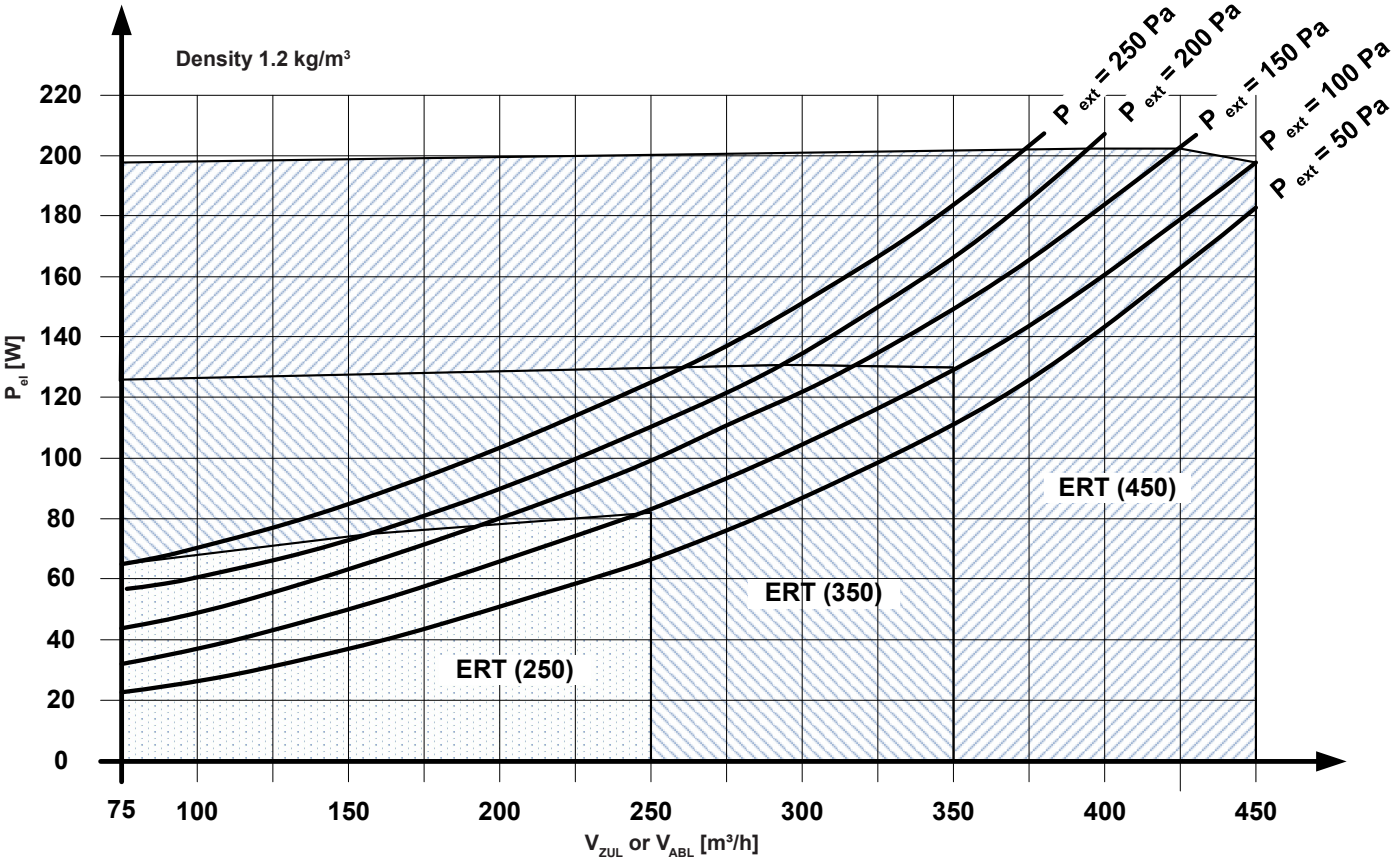


Performance chart for air flow rate HomeVent® ERT (450)

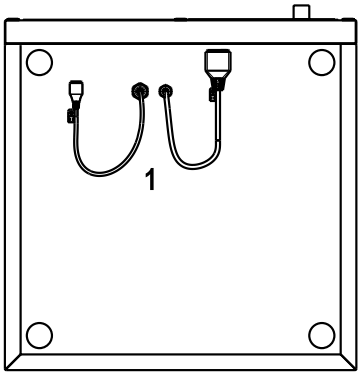
p_{ext} Sum of external pressure drops

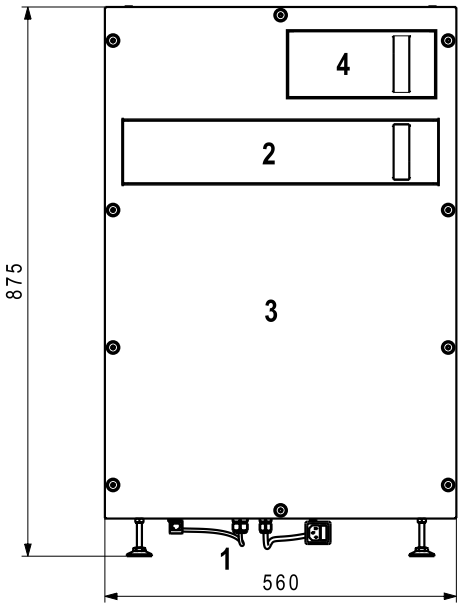


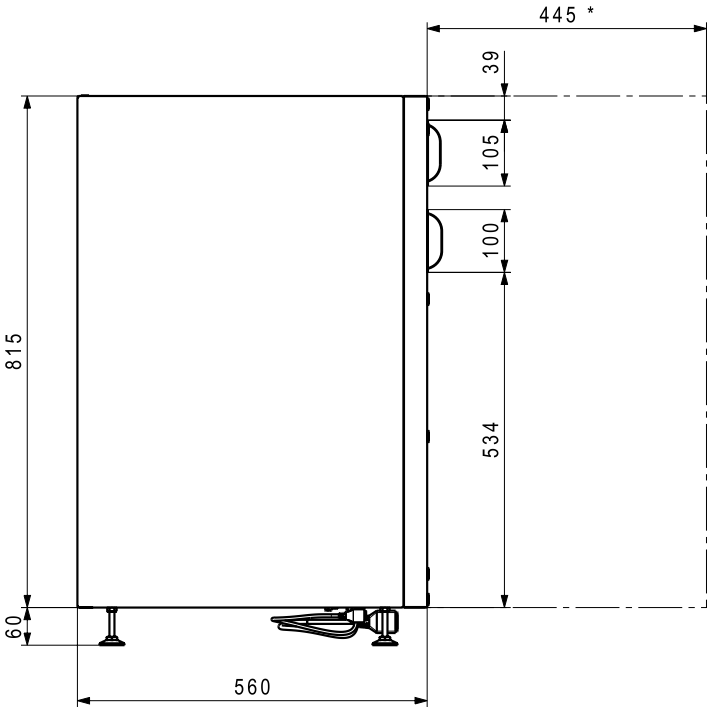
Electrical power consumption HomeVent® ERT (250-450)

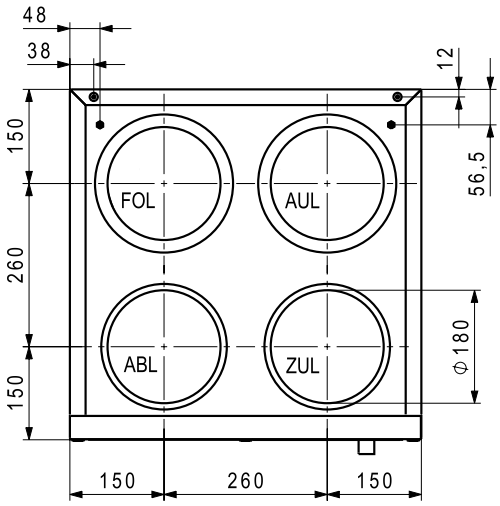


HomeVent® comfort ventilation unit





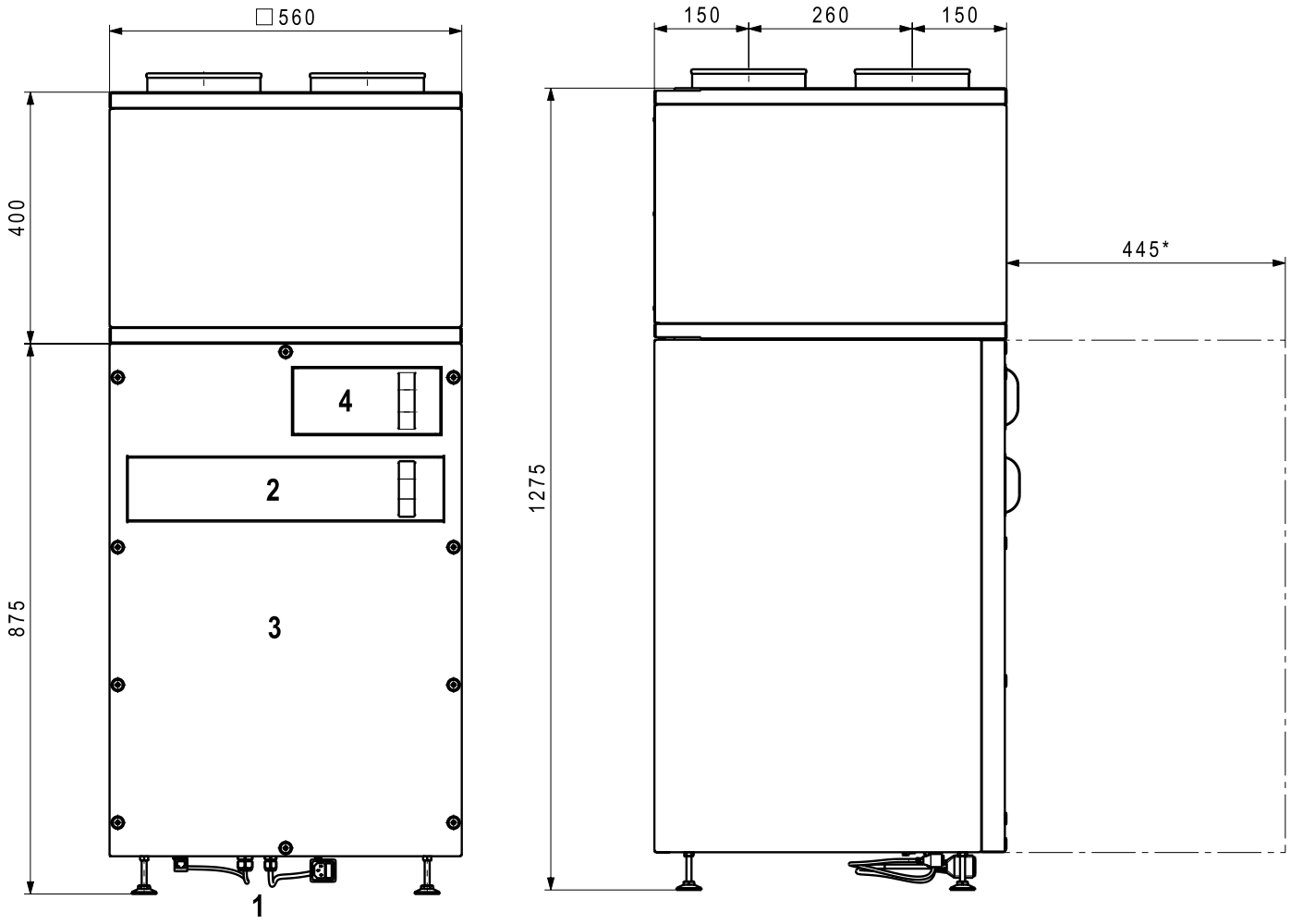


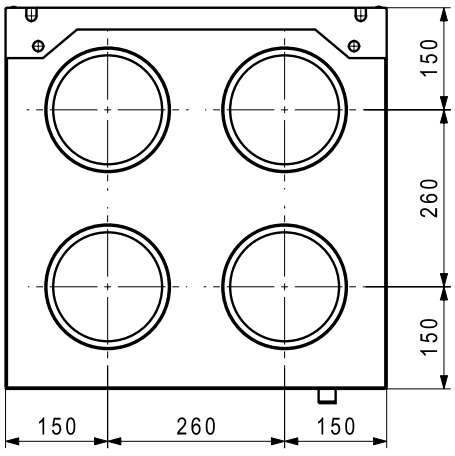


1 Electrical connection with microfuse
Space is required for changing the microfuse.
2 Filter cover for supply air filter/extract air filter
3 Access panel
4 Maintenance cover for prefilter

* Space requirements for filter change and service tasks

HomeVent® comfort ventilation unit with acoustic insulating box





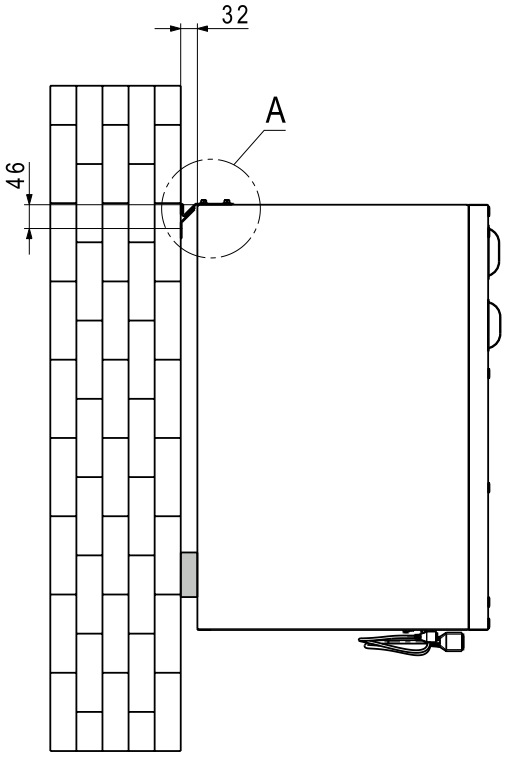
1 Electrical connection with microfuse
Space is required for changing the microfuse.
2 Filter cover for supply air filter/extract air filter
3 Access panel
4 Maintenance cover for prefilter

* Space requirements for filter change and service tasks

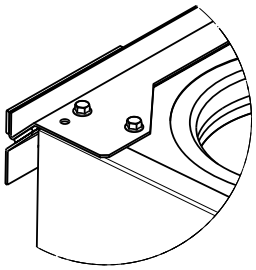
Space requirements

HomeVent® comfort ventilation unit

Installation with installation set



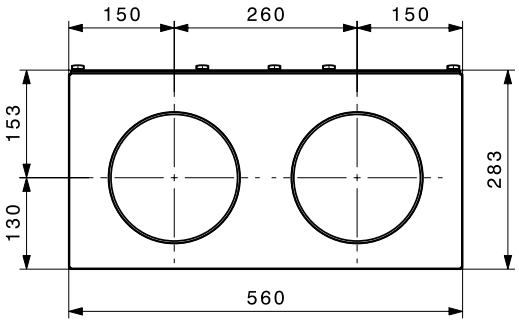
Detail A

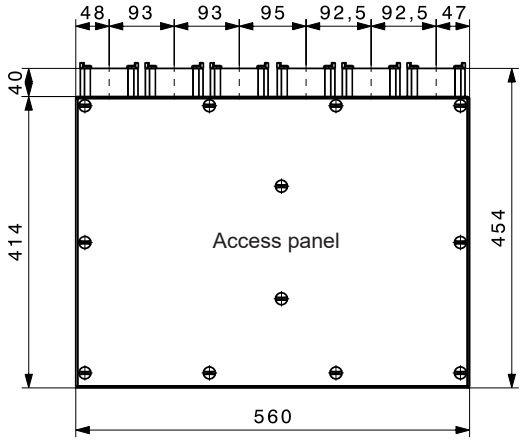


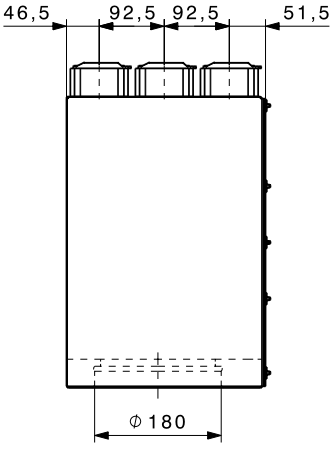
Distribution boxes DN 180

Distribution box VTB-180 18 x 75

for HomeVent® ERT (250)
Casing made from aluzinc sheet with sound insulation element supply air and extract air side, access panel incl. throttle orifices.
Additional silencer recommended.
Connection nozzles:
2 x DN 180
SUP 9 x 75, EXT 9 x 75
Included accessories:
6 end caps and throttle orifices

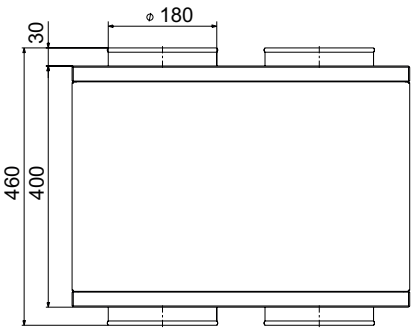


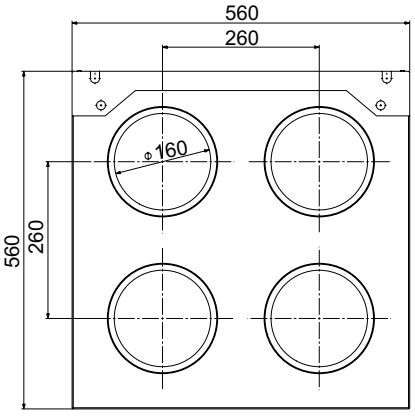




Acoustic insulating box ERT

Casing made from red insulated sheet steel.
All 4 air ducts are sound-insulated.
Connection nozzles:
4 x DN 160





Pressure drop at 100 % air flow rate: ERT (250) 100 %	
Silencer, straight	
ZUL [Δp Pa]	1
AUL [Δp Pa]	0
FOL [Δp Pa]	0
ABL [Δp Pa]	1

ERT (250) 100 %	
Silencer, on the left/right	
ZUL [Δp Pa]	14
AUL [Δp Pa]	8
FOL [Δp Pa]	11
ABL [Δp Pa]	10

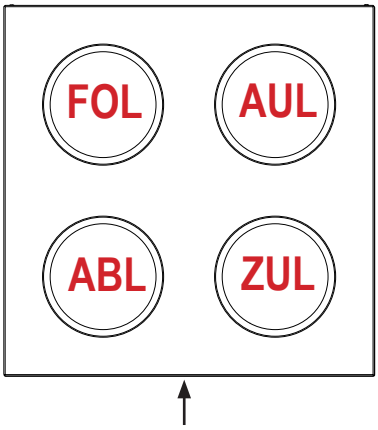
ERT (350) 100 %	
Silencer, straight	
ZUL [Δp Pa]	7
AUL [Δp Pa]	1
FOL [Δp Pa]	2
ABL [Δp Pa]	6

ERT (350) 100 %	
Silencer, on the left/right	
ZUL [Δp Pa]	27
AUL [Δp Pa]	26
FOL [Δp Pa]	21
ABL [Δp Pa]	23

ERT (450) 100 %	
Silencer, straight	
ZUL [Δp Pa]	19
AUL [Δp Pa]	4
FOL [Δp Pa]	10
ABL [Δp Pa]	19

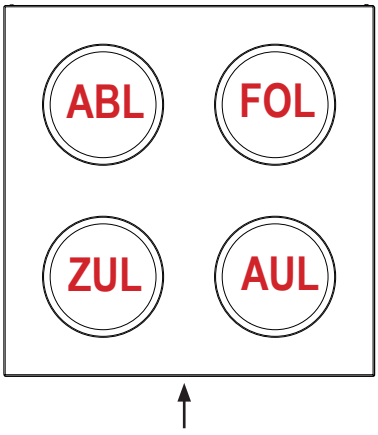
ERT (450) 100 %	
Silencer, on the left/right	
ZUL [Δp Pa]	41
AUL [Δp Pa]	35
FOL [Δp Pa]	31
ABL [Δp Pa]	37

Acoustic insulating box ERT straight

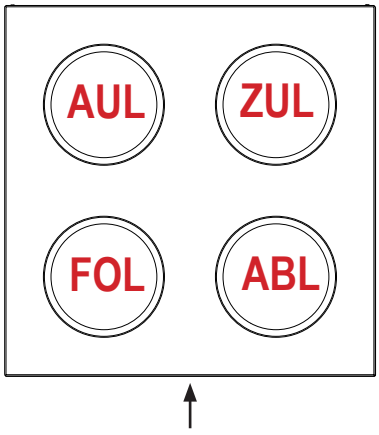


Service page;
wall mounting opposite if necessary

Acoustic insulating box ERT left



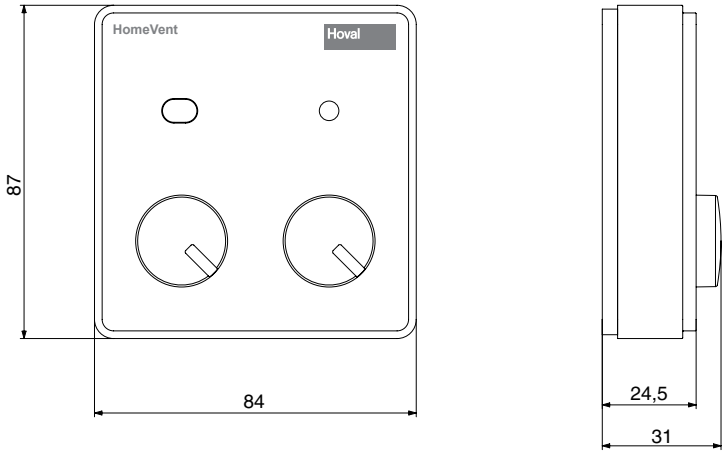
Acoustic insulating box ERT right



FOL = Exhaust air
AUL = Fresh air
ABL = Extract air
ZUL = Supply air

Dimensions

HomeVent® standard operator terminal BG02 E on-wall



Operator terminals BG02 E

Connection for RJ 45 plug
CAT5 patch (8-pin) connection cable
(parallel, not crossed)

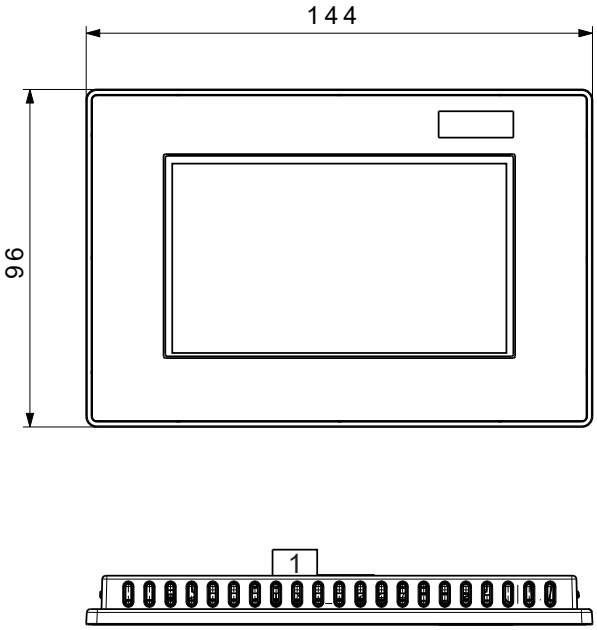
Electrical connection	
• Voltage (DC)	24 V
Type of protection	IP20
Application limits	
• No use of further peripheral components (bus connection, air quality sensors, HovalConnect)	
3K3 as per EN 50090-2-2, residential rooms, office	
• Temperature range	15…40 °C
• Humidity range	5…85 % r.h.

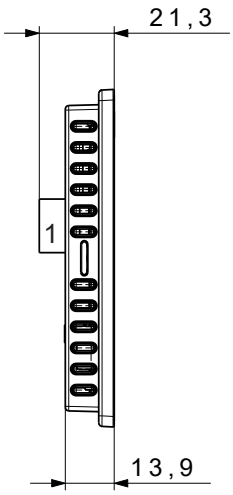
TopTronic® E
Room control module comfort plus

- Colour touchscreen 4.3 inch
- Resolution: 480 x 320
- Connection to the Hoval bus system via RJ45 plug connection or plug terminals (max. 0.75 mm²)
- Voltage: 12 V DC 100 mA
- Humidity (in operation): 20...80 %, non-condensing

Dimensions

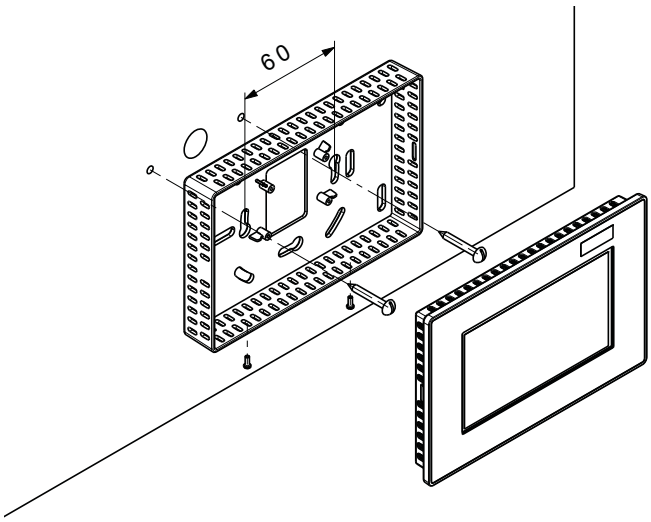
(Dimensions in mm)



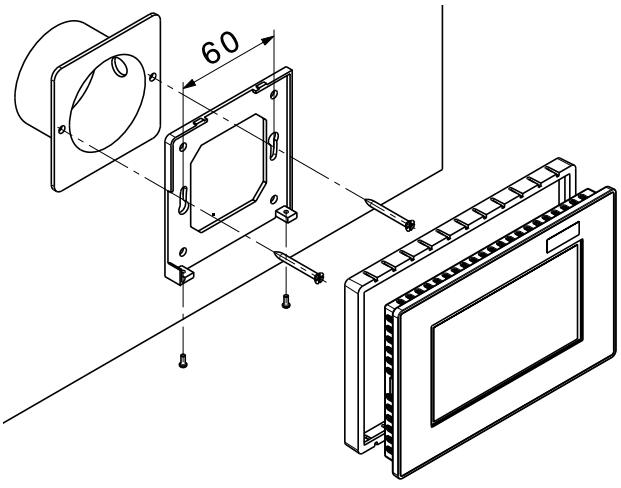


1 Removable RJ45 plug connection
Alternative: plug terminal (max. 0.75 mm²)

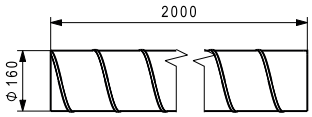
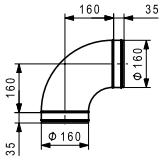
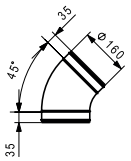
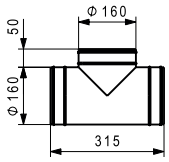
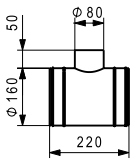
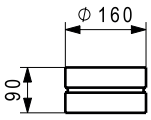
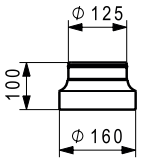
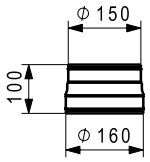
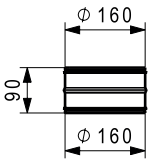
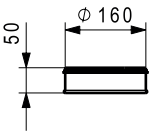
Wall mounting with surface-mounting frame
(On-wall mounted frame is included in the scope of delivery)

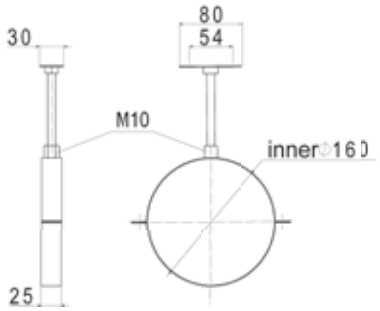


Wall mounting with wall mounting plate
with concealed sockets
(Wall-mounting plate is included in the scope of delivery)



Pipe system DN 160 of sheet steel

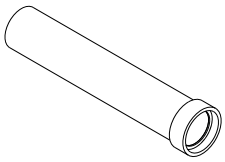
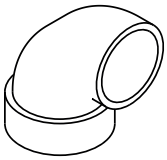
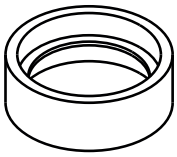
		Part No.
	**Spiral-seam tube WFR-160** of galvanised sheet steel DN 160, length: 2 m	2074 487
	**Pipe bend BU-160-90** 90° bend of galvanised sheet steel with double lip seal DN 160	2074 488
	**Pipe bend BU-160-45** 45° bend of galvanised sheet steel with double lip seal DN 160	2074 489
	**T-piece TCPU-160-160** of galvanised sheet steel with double lip seal DN 160/DN 160/DN 160	2074 490
	**T-piece TCPU-160-80** of galvanised sheet steel with double lip seal DN 160/DN 80/DN 160	2074 491
	**Sleeve MF-160** of galvanised sheet steel DN 160	2074 492
	**Reduction/extension RCFU-160-125** of galvanised sheet steel with double lip seal DN 160 sleeve/DN 125 nipple	2074 493
	**Reduction/extension RCU-160-150** of galvanised sheet steel with double lip seal DN 160 nipple/DN 150 nipple	2024 260
	**Nipple NPU-160** of galvanised sheet steel with double lip seal DN 160	2074 504
	**End cover ED-160** of galvanised sheet steel with double lip seal DN 160	2074 505

		Part No.
	**Pipe clamp ROS-160** of galvanised steel 2-section pipe clamp with insulation insert, threaded rod 0.2 m and ground plate. DN 160	6050 007

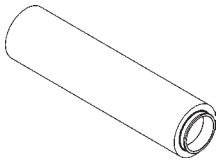
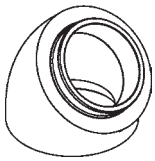
Thermal insulation DN 160

	**Thermal insulation tube IS 160-25** for spiral-seam tube WFR 160 made of steam-tight EPDM 3 tubes of 2 m each Insulation thickness: 25 mm	2074 507
	**Thermal insulation IB 160-45** for pipe bend BU 160-45 made of steam-tight EPDM Insulation thickness: 25 mm	2023 561
	**Thermal insulation IB 160-90** for pipe bend BU 160-90 made of steam-tight EPDM Insulation thickness: 25 mm	2023 560
	Notice Comply with the regional regulations with regard to thermal insulation.	
	**Adhesive IK** for thermal insulation ready-to-use adhesive with brush 0.25 litre can	2023 562
	**Adhesive tape IKB** for thermal insulation made of EPDM Thickness: 3 mm Width: 50 mm Roll: 15 m	2023 563

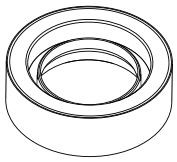
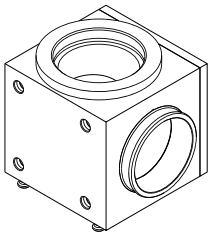
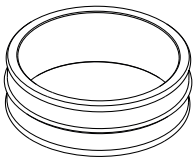
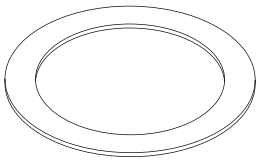
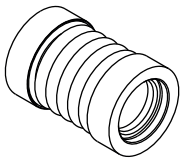
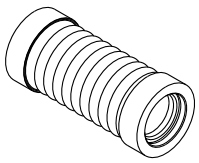
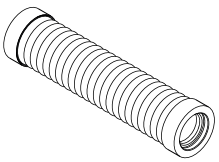
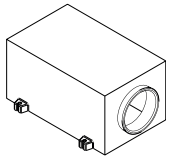
Pipe system DN 160 IsiPipe made of EPP

		Part No.
	**IsiPipe piping EPP-160-1000** Thermally insulated pipe Material: EPP, wall thickness 15 mm Inner Ø 160 mm, length: 1000 mm	2075 571
	**IsiPipe pipe bend EPP-160-90°** Thermally insulated pipe bend 90° Material: EPP, wall thickness 15 mm Inner Ø 160 mm	2075 572
	**IsiPipe pipe bend EPP-160-45°** Thermally insulated pipe bend 45° Material: EPP, wall thickness 15 mm Inner Ø 160 mm	2075 573
	**IsiPipe sleeve EPP-160** Thermally insulated sleeve Material: EPP, wall thickness 15 mm length: 80 mm Inner Ø 160 mm	2075 594
	**IsiPipe pipe clamp ROS-X** of galvanised steel semicircular pipe clamp, cable tie and hanger bolt M8 x 60 including anchor	2045 744

Pipe system DN 160 IsiPipe made of EPP

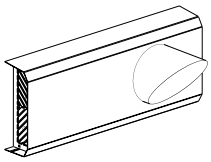
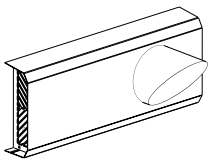
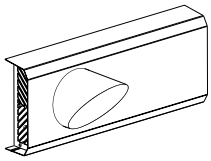
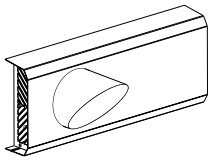
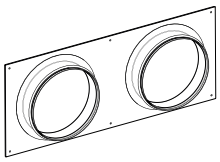
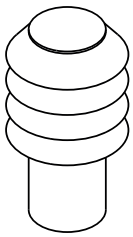
		Part No.
	**IsiPipe Plus pipeline EPP-160-1000** Thermally insulated pipe with sleeve Material: EPP Wall thickness: 43 mm Internal Ø: 160 mm Outer Ø: 246 mm Length: 1000 mm Sleeve: 30 mm	6059 864
	**IsiPipe Plus pipe bend EPP-160-45°** Thermally insulated pipe bend 45° with sleeve Material: EPP Wall thickness: 43 mm Internal Ø: 160 mm Outer Ø: 246 mm	6059 865
	**IsiPipe plus pipe clamp ROS 160-200** Semi-circular pipe clip from galvanized steel including cable tie. Hanger bolt M8 x 60 including anchor	2069 624

Notice
Exact use of the IsiPipe articles,
see Engineering.

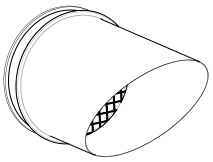
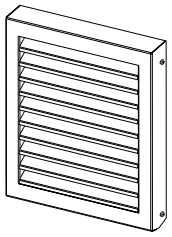
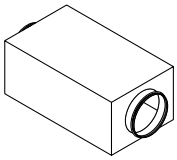
		Part No.
	**IsiPipe plus device adapter 160** Thermally insulated sleeve Material: EPP Scope of delivery 2 pcs.	6052 925
	**IsiCube** Thermally insulated air guide DN 160 + base Material EPP, for outdoor applications Air guide either 90° or straight Including IsiFit and 4 feet Including 4 pins and compensating plate suitable for IsiPipe device adapter 160 Can be combined with themselves 2 pieces are required as base	6054 685
	**IsiFit** Nipple/nipple made of EPP Inner Ø 160 mm, outer Ø 180 mm Suitable for ER and ERT, IsiCube, IsiPipe device adapter 160, IsiFlex	6054 723
	**IsiSeal** for a secure and tight connection when using IsiPipe Plus Device adapter 160 (scope of delivery 2 pcs.)	6057 485
	**IsiFlex 0.3 m** suitable for IsiSystem 160 Acoustically and thermally insulated, flexible connector Material: EPP and rockwool Length: 0.2-0.3 m	6055 896
	**IsiFlex 0.5 m** suitable for IsiSystem 160 Acoustically and thermally insulated, flexible connector, material EPP and rockwool Length: 0.25-0.5 m	6055 894
	**IsiFlex 1.0 m** suitable for IsiSystem 160 Acoustically and thermally insulated, flexible connector, material EPP and rockwool Length: 0.4-1.0 m	6055 877
	**IsiSound** Suitable for IsiSystem 160 Thermally insulated silencer insensitive to moisture, material EPP	6056 360

Notice
Exact use of the IsiPipe articles,
see Engineering.

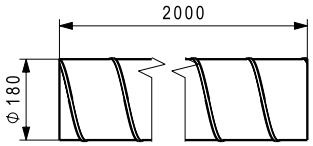
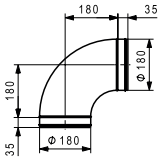
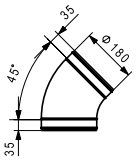
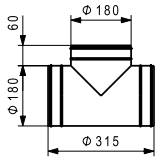
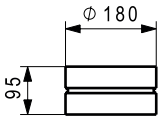
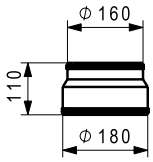
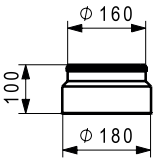
Accessories DN 160

		Part No.
	**Wall outlet Ø 160 exhaust air on right** made of galvanised sheet metal	6052 505
	**Wall outlet white Ø 160 exhaust air on right** made of galvanised sheet metal white coated (RAL 9016)	6052 504
	**Wall outlet Ø 160 exhaust air on left** made of galvanised sheet metal	6052 507
	**Wall outlet white Ø 160 exhaust air on left** made of galvanised sheet metal white coated (RAL 9016)	6052 506
	**Plywood for wall outlet Ø 160** suitable for wall outlet, Ø 160	6052 517
	**Stainless steel cowl AAS-150** for spiral-seam tube DN 150, galvanic isolation of the connection for outside and exhaust air of stainless steel, lamella cowl, 1 pipe DN 150, length = 0.5 m, 2 pipes DN 150, length = 1 m and 2 wall mountings	6010 185
	**Stainless steel segment pipe bend CRB-150-90** for spiral-seam tube DN 150, galvanic isolation of the connection 90° bend of stainless steel DN 150	2040 722
	**Cold-shrink tape** for sealing air ducts, heat and cold resistant width: 50 mm, roll: 15 m	2021 796
	**Ventilation silicone** for sealing air ducts, heat and cold resistant odourless	3000 009

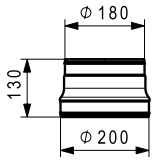
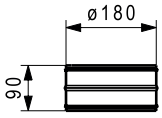
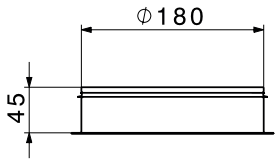
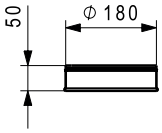
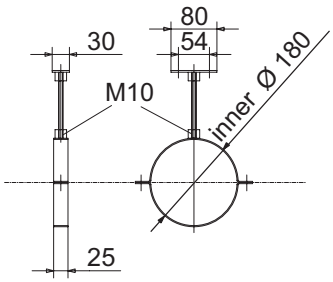
Accessories DN 160

		Part No.
	**Exhaust air nozzle FST-160** for spiral-seam tube DN 160 of galvanised sheet steel with bird protection grille and double lip seal for horizontal installation	2070 412
	**Weatherproof grille WG-160** for outdoor and exhaust air Anthracite grey painted (RAL 7016) with double lip seal, pipe nozzle DN 160	6062 253
	**Sound absorber SD-160-500** for spiral-seam tube DN 160 rectangular casing of galvanised sheet steel, with double lip seal DN 160, dimensions: 290 x 215 mm, Length: 0.5 m	2074 514
	**Shut-off damper DTU-160** for spiral-seam tube DN 160 sealed shut-off damper for manual operation of galvanised steel sheet DN 160	2074 513

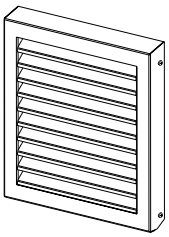
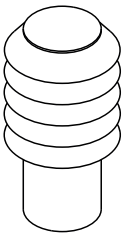
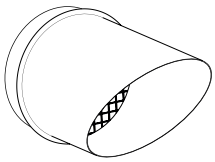
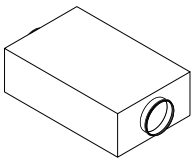
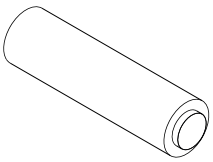
Pipe system DN 180

		Part No.
	**Spiral-seam tube WFR-180** of galvanised sheet steel DN 180, length: 2 m	2057 030
	**Pipe bend BU-180-90** 90° bend of galvanised sheet steel with double lip seal DN 180	2057 047
	**Pipe bend BU-180-45** 45° bend of galvanised sheet steel with double lip seal DN 180	2057 048
	**T-piece TCPU-180-180-180** of galvanised sheet steel with double lip seal DN 180/DN 180/DN 180	2057 049
	**Sleeve MF-180** of galvanised sheet steel DN 180	2057 051
	**Reduction/extension RCU-180-160** made of galvanised sheet steel with double lip seal DN 180 nipple/DN 160 nipple	2070 976
	**Reduction/extension RCFU-180-160** made of galvanised sheet steel with double lip seal DN 180 sleeve/DN 160 nipple	2070 975

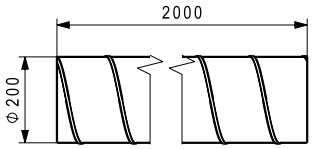
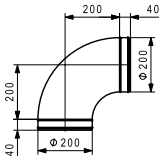
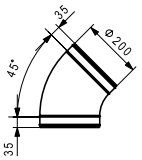
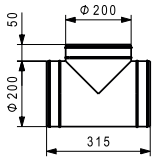
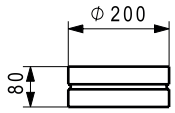
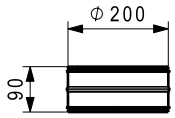
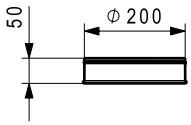
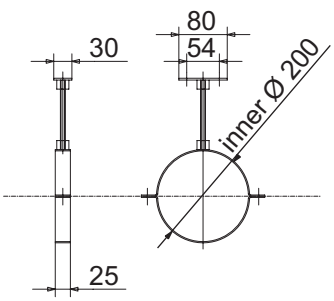
Pipe system DN 180

		Part No.
	**Reduction/extension RCU-200-180** of galvanised sheet steel with double lip seal DN 200 nipple/DN 180 nipple	2057 053
	**Nipple NPU-180** of galvanised sheet steel with double lip seal DN 180	2057 064
	**Spigot ILX Ø 180 x 40 mm** with double lip seal	2070 895
	**End cover ED-180** of galvanised sheet steel with double lip seal DN 180	2057 065
	**Pipe clamp ROS-180** of galvanised sheet steel 2-section pipe clamp with insulation insert, threaded rod 0.2 m and ground plate. DN 180	6034 767

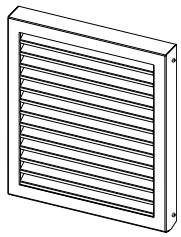
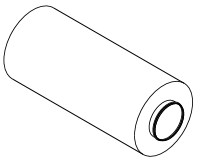
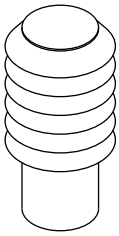
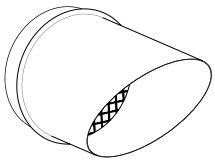
Accessories DN 180

		Part No.
	**Weatherproof grille WG-180** for outdoor and exhaust air Anthracite grey painted (RAL 7016) with double lip seal, pipe nozzle DN 180	6062 254
	**Fresh air suction set AAS-180** for spiral-seam tube DN 180 galvanic isolation of the connection for outside and exhaust air of stainless steel, lamella cowl, 1 tube DN 180, length: 0.5 m, 2 tubes DN 180, length: 1 m and 2 wall fastenings	6034 766
	**Stainless steel pipe bend CRB-180-90** for spiral-seam tube DN 180, galvanic isolation of the connection 90° bend of stainless steel	2057 066
	**Exhaust air nozzle FST-180** for spiral-seam tube DN 180 of galvanised sheet steel with bird protection grille for horizontal installation	2057 069
	**Silencer FSR-180-750** **for spiral-seam tube DN 180** rectangular casing made of galvanised sheet steel, with double lip seal, DN 180, Dimensions: 480 x 250 mm, length: 0.75 m	2057 874
	**Silencer FLSDA-180-1000** **for spiral-seam tube DN 180** Silencer outside manufactured from flexible aluminium envelope tube, inside from perforated aluminium tube, with double lip seal, DN 180, packing thickness 50 mm, length: 1 m	2057 875

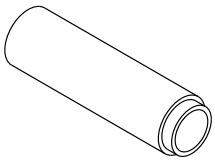
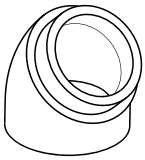
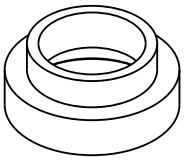
Pipe system DN 200

		Part No.
	**Spiral-seam tube WFR-200** of galvanised sheet steel DN 200, length: 2 m	2045 707
	**Pipe bend BU-200-90** 90° bend of galvanised sheet steel with double lip seal DN 200	2040 734
	**Pipe bend BU-200-45** 45° bend of galvanised sheet steel with double lip seal DN 200	2040 735
	**T-piece TCPU-200-200** of galvanised sheet steel with double lip seal DN 200/DN 200/DN 200	2040 736
	**Sleeve MF-200** of galvanised sheet steel DN 200	2040 737
	**Nipple NPU-200** of galvanised sheet steel with double lip seal DN 200	2040 739
	**End cover ED-200** of galvanised sheet steel with double lip seal DN 200	2040 740
	**Pipe clamp ROS-200** of galvanised steel 2-section pipe clamp with insulation insert, threaded rod 0.2 m and ground plate. DN 200	6025 970

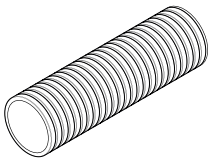
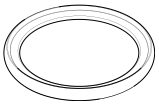
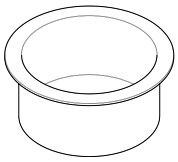
Accessories DN 200

		Part No.
	**Weatherproof grille WG-200** for outdoor and exhaust air Anthracite grey painted (RAL 7016) with double lip seal, pipe nozzle DN 200	6062 255
	**Silencer SD-200-1000** for spiral-seam tube DN 200 round casing of galvanised sheet steel, with double lip seal, DN 200, outer diameter: 400 mm, length: 0.9 m	2040 743
	**Stainless steel cowl AAS-200** for spiral-seam tube DN 200, galvanic isolation of the connection for outside and exhaust air of stainless steel, lamella cowl, 1 pipe DN 200, length: 0.5 m, 2 pipes DN 200, length: 1 m and 2 wall mountings	6031 914
	**Stainless steel segment pipe bend CRB-200-90** for spiral-seam tube DN 200, galvanic isolation of the connection 90° bend of stainless steel	2054 221
	**Exhaust air nozzle FST-200** for spiral-seam tube DN 200 of galvanised sheet steel with bird protection grille for horizontal installation	2054 220

IsiPipe Plus Pipe system EPP DN 200

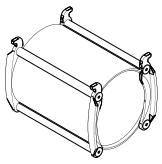
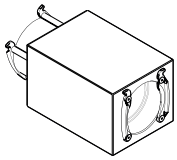
		Part No.
	**IsiPipe Plus pipeline EPP-200-1000** Thermally insulated pipe Material: EPP, wall thickness 43 mm Inner Ø 200 mm, outer Ø 286 mm Length: 1000 mm incl. sleeve (60 mm)	2065 111
	**IsiPipe Plus pipe bend EPP-200-45°** Thermally insulated pipe bend 45° Material: EPP, wall thickness 43 mm Inner Ø 200 mm, outer Ø 286 mm	2065 113
	**IsiPipe Plus sleeve EPP-200** Thermally insulated sleeve Material: EPP, wall thickness 43 mm length: 80 mm Inner Ø 200 mm, outer Ø 326 mm	2065 125
	**IsiPipe Plus ecc. adapter EPP-180-200** Thermally insulated ecc. adapter Material: EPP, eccentrical 48 mm, length: 250 mm Inner Ø 180 mm on IsiPipe Plus 200	2065 128
	**IsiPipe plus pipe clamp ROS 160-200** Semi-circular pipe clip from galvanized steel including cable tie. Hanger bolt M8 x 60 including anchor	2069 624

Flex pipe system DN 75

		Part No.
	**Flexible pipe 75** of polyethylene PE-HD DN 75, inner Ø 62 mm, roller: 50 m smooth inner/ribbed outer surface, antistatic coating	2072 166
	Flexible pipe package 75 of polyethylene PE-HD DN 75, inner Ø 62 mm, 6 rolls of 50 m, smooth inner/ribbed outer surface, antistatic coating Flexible pipe packages are excluded from return.	6050 103
	**Sealing ring DI-75 black** for flexible pipe DN 75	2016 227
	**Stopper 75** For flexible pipe flex 75 Sealing plug	2072 168

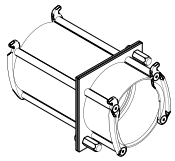
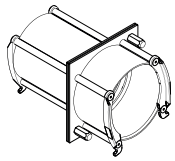
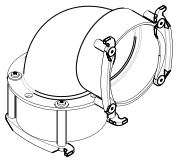
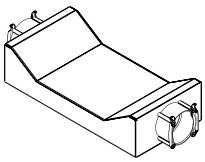
Accessories DN 75

Order the sealing rings for the accessories separately. For quick and simple installation, all accessories are equipped with snap-on clip for attachment of the flexible pipe.

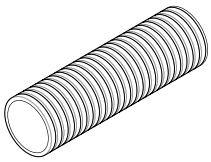
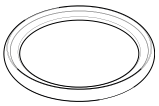
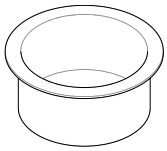
	**Double sleeve DM-75** for flexible pipe DN 75 for connecting flexible pipes	6022 896
	**Helmholtz silencer HSD-75** for flexible pipe DN 75 for highly acoustically sensitive rooms dampens low frequencies (500 Hz)	6020 756

Accessories DN 75

Order the sealing rings for the accessories separately. For quick and simple installation, all accessories are equipped with snap-on clip for attachment of the flexible pipe.

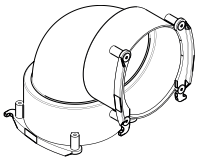
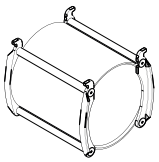
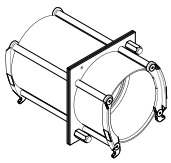
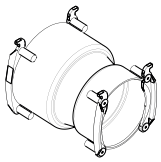
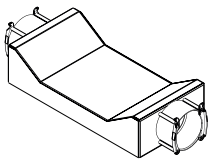
		Part No.
	**Formwork coupling SK-75** for flexible pipe DN 75 for extending a flexible pipe through the ceiling or the floor without damaging the boarding	6013 047
	**Formwork coupling SK-75/90** for flexible pipe DN 75 and 90 for extending a flexible pipe through the ceiling or the floor and extension from DN 75 to DN 90 without damaging the boarding.	6030 820
	**Pipe bend RB-75** for flexible pipe DN 75 for connecting flexible pipes at an angle of 90°	6022 967
	**Flexible pipe crossing FRK-75** for flexible pipe DN 75 for crossing two flexible pipes DN 75 with reduced construction height (100 mm). For one crossing 2 pieces are necessary.	6031 011
	**Cable tie** For fastening flexible pipes Colour: natural	
	4.8 x 302 mm — 100 Units/package	2057 027
	7.6 x 370 mm — 100 Units/package	2057 028
	9.0 x 610 mm — 50 Units/package	2057 029

Flex pipe system DN 90

		Part No.
	**Flexible pipe 90** of polyethylene PE-HD DN 90, inner Ø: 75 mm, roller: 50 m smooth inner/ribbed outer surface, antistatic coating	2072 167
	Flexible pipe package 90 of polyethylene PE-HD DN 90, inner Ø: 75 mm, 4 rolls of 50 m, smooth inner/ribbed outer surface, antistatic coating Flexible pipe packages are excluded from return.	6050 104
	**Sealing ring DI-90 black** for flexible pipe DN 90	5031 311
	**Stopper 90** For flexible pipe flex 90 Sealing plug	2072 169

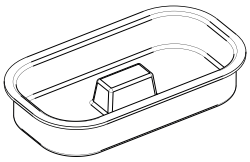
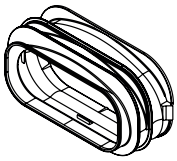
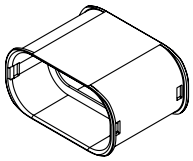
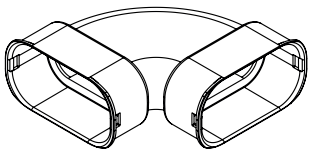
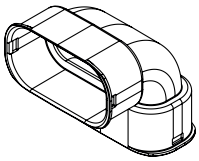
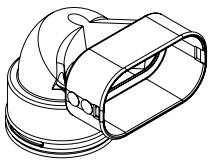
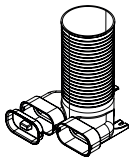
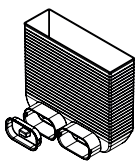
Accessories DN 90

Order the sealing rings for the accessories separately. For quick and simple installation, all accessories are equipped with snap-on clip for attachment of the flexible pipe.

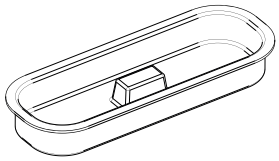
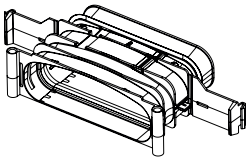
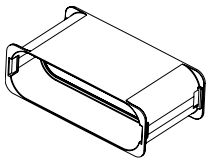
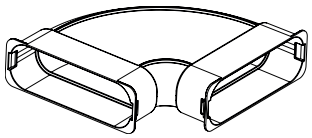
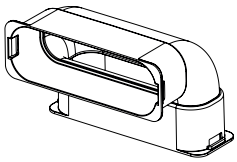
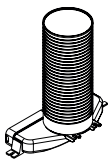
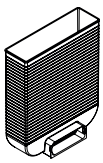
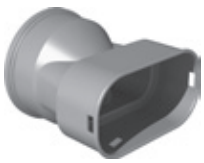
	**Pipe elbow RB-90** for flexible pipe DN 90 for connecting flexible pipes at an angle of 90°	6043 275
	**Double sleeve DM-90** for flexible pipe DN 90 for connecting flexible pipes	6022 494
	**Formwork coupling SK-90** for flexible pipe DN 90 for extending a flexible pipe through the ceiling or the floor without damaging the boarding	6022 495
	**Reduction/extension RCFU-90-75** for connecting flexible pipe DN 90 with flexible pipe DN 75 of plastic	6022 514
	**Flexible pipe crossing FRK-90** for flexible pipe DN 90 for crossing two flexible pipes DN 90 with reduced construction height (100 mm). For one crossing 2 pieces are necessary.	6031 012

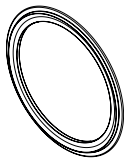
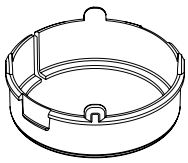
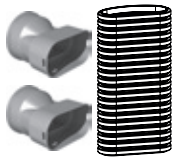
Cable ties can be found under “Flexible pipe DN 75”.

Flat channel system DN 100

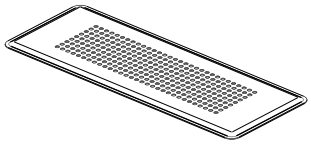
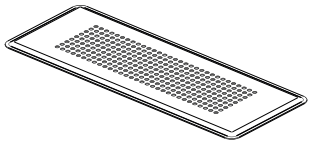
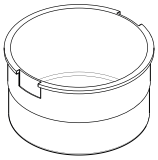
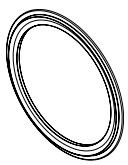
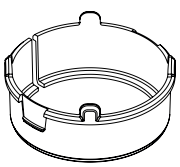
		Part No.
	**Flat channel 100** Flexible ventilation pipe 102 x 49 mm Roll length 50 m	2071 003
	**Stopper flat channel 100** for flat channel 100 Sealing plug for building protection	2072 404
	**Stopper flat 100** for flat channel system 100	2071 004
	**Seal flat 100** for flat channel 100	2071 005
	**Sleeve 100** for flat channel 100	2071 006
	**Arch horizontal flat 100** for flat channel 100	2071 007
	**Arch vertical flat 100** for flat channel 100	2071 008
	**Arch vertical flat to round 100-75** Transition 90° round to flat	2071 009
	**Outlet round, lateral 90° 125-2 x 100** for flat channel 100 incl. mounting bracket, 1 stopper 100 for poppet valve DN 125 supply air 40 m³/h extract air 50 m³/h	2071 010
	**Outlet round, front 125-2 x 100** for flat channel 100 incl. mounting bracket, 1 stopper 100 for poppet valve DN 125 supply air 40 m³/h extract air 50 m³/h	2071 011
	**Floor exhaust flat 2 x 100** for floor grille inox and white 309 x 86.5 mm interior incl. 1 stopper 100 2 flat channel 100 connections	2071 012

Flat channel system DN 140

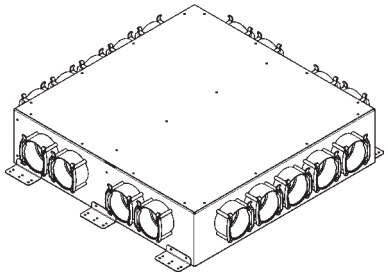
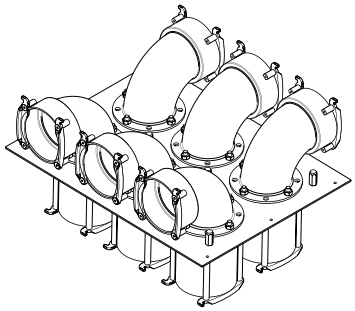
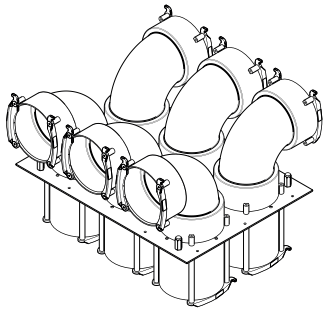
		Part No.
	**Flat channel 140** Flexible ventilation pipe 142 x 49 mm Roll length 20 m	2071 013
	**Stopper flat channel 140** for flat channel 140 Sealing plug for building protection	2072 406
	**Stopper flat 140** for flat channel system 140	2071 014
	**Seal flat 140** for flat channel 140	2071 015
	**Sleeve 140** for flat channel 140	2071 016
	**Arch horizontal flat 140** for flat channel 140	2071 017
	**Arch vertical flat 140** for flat channel 140	2071 018
	**Outlet round, lateral 90° 125-2 x 140** for flat channel 140 incl. mounting bracket, 1 stopper 140 for poppet valve DN 125 supply air 40 m^3/h extract air 50 m^3/h	2071 019
	**Floor exhaust flat 1 x 140** for floor grille inox and white 309 x 85 mm inside 1 connection flat channel 140	2071 020
	**Adapter flat to round 140-90,** made of plastic	2071 001

		Part No.
	**Sealing ring for flexible pipe DN 90** in connection with click ring 90, for connection of flexible pipe FR-90 to adapter flat to round 140-90	2070 998
	**Click ring DN 90** for adapter flat to round 140-90 and flexible pipe FR-90	2071 000
	**Flat channel intersection 140-90** Consisting of: 1 metre flat channel 140 2 adapters flat to round 140-90 2 seals 140 2 click rings DN 90 2 seals 90	2071 002

System accessories

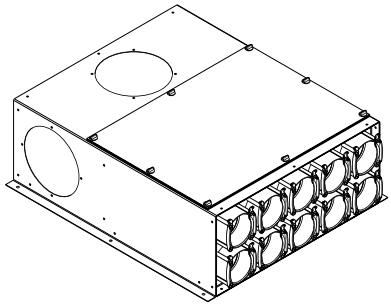
	**Floor grille Inox** for floor exhaust flat 2 x 100 and 1 x 140 Dimensions: 350 x 130 mm	2070 930
	**Floor grill, white** for floor exhaust flat 2 x 100 and 1 x 140 Dimensions: 350 x 130 mm	2070 931
	**Outlet round 90° lateral 125-2 x 75** made of plastic 2 x 75/125 mm Usable length 325 mm incl. 1 stopper 75	2070 997
	**Stopper 75** Sealing plug for sealing unnecessary connections to round outlet 90° side 125-2 x 75	2070 932
	**Sealing ring for flexible pipe DN 75** in connection with click ring 75, for connection of flexible pipe FR-75 to outlet round 90° side 125-2 x 75 and bend vertical flat to round 100-75	2070 994
	**Click ring DN 75** for outlet round 90° side 125-2 x 75 and vertical bend flat to round 100-75 Flexible pipe FR-75	2070 996

Distribution cases DN 160

		Part No.
	Application **Preferably concrete installation (mass concrete)**	
	**Distribution box VTB-160 9 x 75** Air distribution box from aluzinc sheet with access panel (can be painted on site). Interior lined with sound insulating material. Connection nozzle: 2 x DN 160 (downward) ZUL 9 x 75 resp. ABL 9 x 75 Consisting of: Box, 6 connection brackets, 2 end caps, orifices for setting the air quantity per flex pipe DN 75.	6054 083
	**Section distributor SV-6 x 75** for flexible pipe DN 75 for space-saving routing of 6 flexible pipes in the ceiling. Optionally 6 x 90° bends, of which max. 3 can be replaced by straight nozzles. Each 90° bend can be rotated in increments of 45°. 6 x DN 75 For supply and extract air one section distributor each is necessary.	6042 706
	**Section distributor SV-6 x 90** for flexible pipes DN 90 for space-saving routing of 6 flexible pipes in the ceiling. Optionally 6 x 90° bends, of which max. 3 can be replaced by straight nozzles. Each 90° bend can be rotated in increments of 45°. 6 x DN 90. For supply and extract air one section distributor each is necessary	6044 775

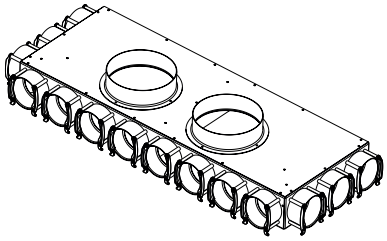
Distribution cases DN 160

Application
On-wall installation

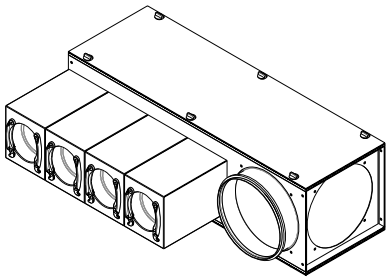


Distribution case VK
Casing of aluzinc sheet with 1 connection nozzle Ø 160 mm (included separately), can be mounted on the front, at the top or laterally on the left or on the right (on site) and x connection nozzles for flexible pipe Ø 75 mm. An internal sound insulation element with washable outer skin and an access panel.
Incl. throttle orifices

Type	Connections	Part No.
VK-160 75 x 6	6	6054 084
VK-160 75 x 8	8	6054 085
VK-160 75 x 10	10	6054 086

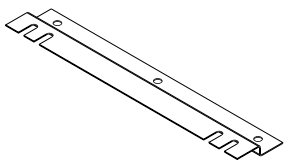


Distribution box VTB-160 14 x 75 6052 044
for concrete installation height 91 mm
Distribution box of aluzinc sheet
without access panel.
Connecting sleeve:
2 x DN 160 supply and extract air
SUP 7 x DN 75
(4 x front and 3 x side)
EXT 7 x DN 75
(4 x front and 3 x side)



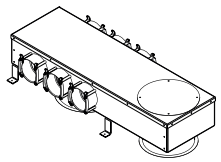
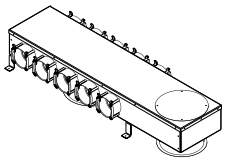
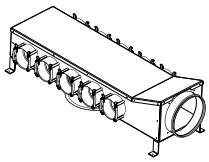
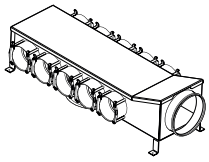
Storey distributor GVT-X
for connecting x flexible tubes Ø 75 mm.
Casing of galvanised sheet steel with sound absorbing mat, connection possibilities Ø 160 mm, incl. 2 nozzles Ø 160 mm with double lip seal. Flexible installation possible due to access panel on both sides.
Incl. throttle orifices

Type	Connection	Part No.
GVT-3	3	6054 087
GVT-4	4	6054 088
GVT-5	5	6054 089
GVT-6	6	6054 090



Mounting holder MH 5032 853
for storey distributor GVT-X
from galvanised steel sheet
Length: 0.3 m
Two angle rails recommended
per storey distributor.

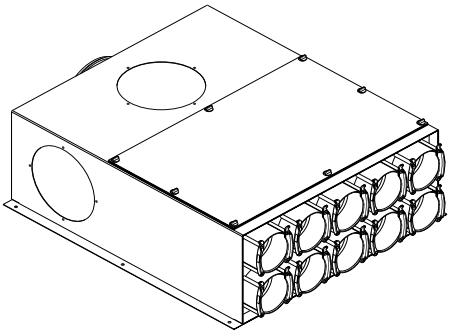
Distribution cases DN 160

		Part No.
	Application **Preferably concrete installation** **(mass concrete)**	
	**In-wall distribution case UPVK-160 75 x 6** Distribution case made of aluzinc sheet metal for cementing in. With a sliding connection piece DN 160 and 2 x 3 connections DN 75 (side), incl. 2 end covers, inner lining of sound insulating material, inspection sliding connection piece DN 180 Incl. throttle orifices	6051 581
	**In-wall distribution case UPVK-160 75 x 10** Distribution case made of aluzinc sheet metal for cementing in. With a sliding connection piece DN 160 and 2 x 5 connections DN 75 (side), incl. 4 end covers, inner lining of sound insulating material, inspection sliding connection piece DN 180 Incl. throttle orifices	6051 589
	**In-wall distribution case UPVKS-160 75 x 10** Distribution case made of aluzinc sheet metal for cementing in. With a connection nozzle DN 160 (end face) and 2 x 5 connections DN 75 (side) incl. 5 end covers, inner lining of sound insulating material, inspection sliding connection piece DN 180 Incl. throttle orifices	6051 671
	**In-wall distribution case UPVKS-160 90 x 10** Distribution case made of aluzinc sheet metal for cementing in. With a connection nozzle DN 160 (end face) and 2 x 5 connections DN 90 (side) incl. 4 end covers, inner lining of sound insulating material, inspection sliding connection piece DN 180 Incl. throttle orifices	6051 626

Distribution cases DN 180

Part No.

Application
On-wall installation

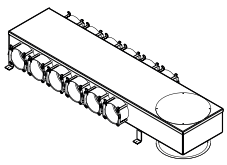


Distribution case VK
Casing of aluzinc sheet with 1 connection nozzle Ø 180 mm (supplied loose), on end, top or left-side mounting (on site) and x connection nozzles for flex pipes Ø 75 resp. 90 mm. An internal sound insulation element with washable outer skin and an access panel.
Incl. throttle orifices

Type	Connections	Part No.
VK-180 75 x 8	8	6031 881
VK-180 75 x 10	10	6035 673
VK-180 75 x 12	12	6035 674
VK-180 90 x 8	8	6031 880
VK-180 90 x 10	10	6035 675
VK-180 90 x 12	12	6035 711

Distribution cases DN 200

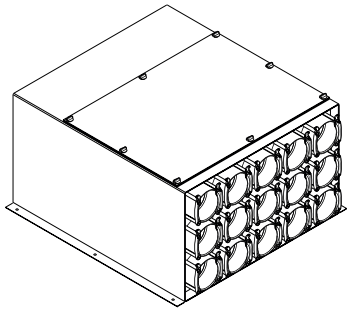
Application
Preferably concrete installation (mass concrete)



Access panel on bottom

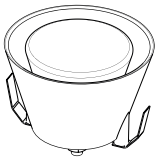
In-wall distribution case UPVK-200 90 x 12 — 6051 623
Distribution case made of aluzinc sheet metal for cementing in. With a sliding connection piece DN 200 and
2 x 6 connections DN 90 (side),
incl. 6 end covers, inner lining of sound insulating material, inspection sliding connection piece DN 180
Incl. throttle orifices

Application
On-wall installation

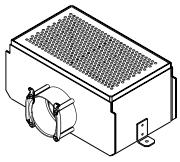
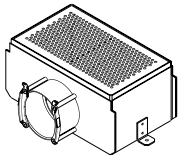


Distribution case VK-200 75 x 15 — 6030 966
Air distribution case of aluzinc sheet with access panel.
Inside with sound insulation element.
Connection nozzles:
1 x DN 200 (on the back)
15 x (3 x 5) DN 75 (on the front)
Incl. throttle orifices

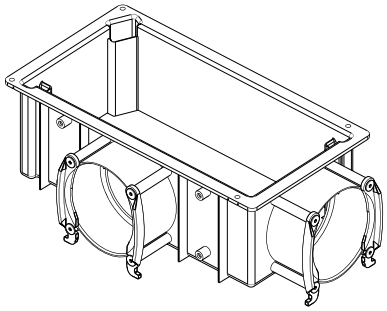
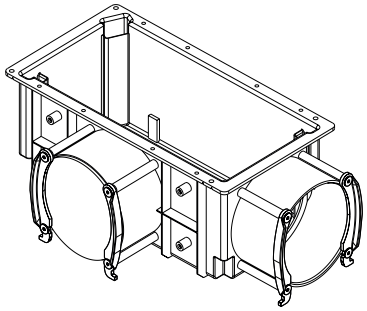
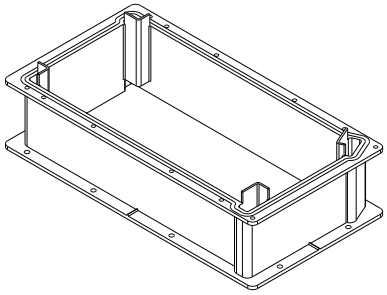
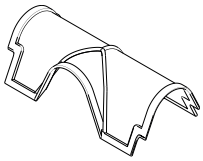
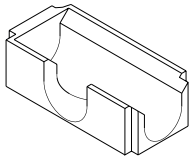
Distribution case accessories

		Part No.
	**Control damper RK-80** for flexible pipe DN 75 sealing control damper for adjustment of the air flow. Of galvanised sheet steel DN 80	6013 654
	**Air flow rate control valve DN 90** for connection housing AG-90, quick 90, floor passage BD-30-90	2070 534
	**End cover quick 75** Cover for unused connections DN 75	5043 525
	**End cover quick 90** Cover for unused connections DN 90	5043 522

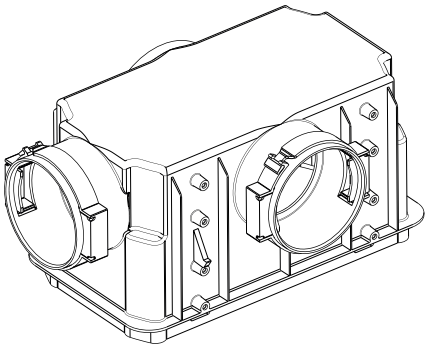
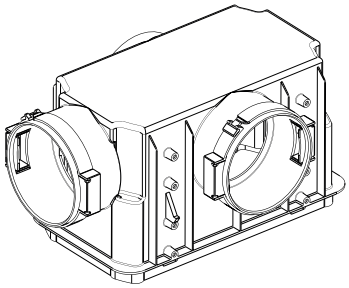
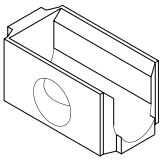
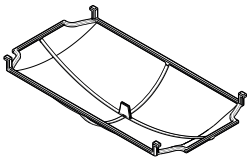
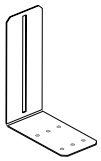
Air grilles - floor

	Application **In the floor structure** **(finished floor, only supply air)**	
	**Floor grille BD-30-75** perforated grille made from stainless steel in an adjustable casing Inner component of stainless steel Outer component of aluzinc sheet with 2 fastening catches and one connection nozzle for flexible pipe DN 75 Supply air up to 30 m³/h Height: 130 to 180 mm	6015 304
	**Floor grille BD-30-90** perforated grille made from stainless steel in an adjustable casing. Inner component of stainless steel, outer component of Al/Zn sheet with 2 fastening catches and one connection nozzle for flexible pipe DN 90. Supply air up to 40 m³/h Height: 130 to 180 mm	6022 513

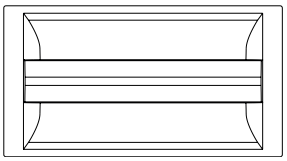
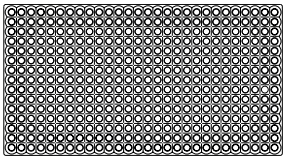
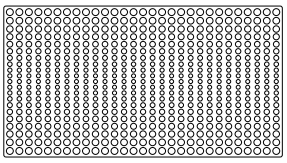
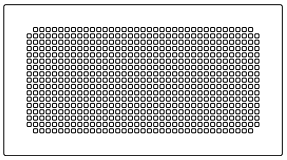
Air grilles - wall/ceiling

		Part No.
	Application **Mass concrete, masonry walls and lightweight walls**	
	**Connection housing AG-60** for supply and extract air in combination with design grilles. Casing allows precise grille alignment (swivelling) after mounting. Plastic casing with 2 connection nozzles DN 75, fastening bracket, end cover, sound insulating mat and insert block as building protection cover and plastering aid. Supply air: 1 x DN 75 up to 30 m³/h 2 x DN 75 up 40 m³/h Exhaust air: 1 x DN 75 up to 30 m³/h 2 x DN 75 up to 60 m³/h For installation in solid concrete, masonry and plasterboard walls.	6034 355
	**Connection housing AG-90** for supply and extract air in combination with design grilles. Casing allows precise grille alignment (swivelling) after mounting. Plastic casing with 2 connection nozzles DN 90, fastening bracket, end cover, sound insulating mat and insert block as building protection cover and plastering aid. Supply air: 1 x DN 90 up to 40 m³/h Exhaust air: 1 x DN 90 up to 60 m³/h For installation in solid concrete, masonry and plasterboard walls.	6034 357
	**Extension VAG-60/90** for connection housing AG-60 and AG-90 for raising above the lower reinforcement for solid concrete ceilings. Raising height: 60 mm Extension permits precise grille alignment after installation.	6034 360
	**Extract air filter AGF-60/90** for connection housing AG-60 and AG-90 of cleanable, fine-mesh polyamide net with plastic frame. Cannot be combined with sound insulation insert.	5033 121
	**Sound insulation insert 60/90** for connection housing AG-60 and AG-90 retrofittable sound insulation insert for acoustically sensitive rooms. Cannot be combined with extract air filter AGF-60/90.	6034 398

Air grilles - wall/ceiling

		Part No.
	Application **Mass concrete, filigree blankets**	
	**Connection housing quick 75** for supply and extract air in combination with design grilles. Housing allows precise alignment of grilles after mounting. Plastic housing with 2 connection nozzles DN 75. Very easy to mount, no nails in concrete after stripping. Supply air: 1 x DN 75 up to 30 m³/h 2 x DN 75 up to 40 m³/h Extract air: 1 x DN 75 up to 30 m³/h 2 x DN 75 up to 60 m³/h Suitable for installation in solid concrete	6046 302
	**Connection housing quick 90** for supply and extract air in combination with design grilles. Housing allows precise alignment of grilles after mounting. Plastic housing with 2 connection nozzles DN 90. Very easy to mount, no nails in concrete after stripping. Supply air: 1 x DN 90 up to 40 m³/h Extract air: 1 x DN 90 up to 60 m³/h Suitable for installation in solid concrete	6046 296
	**Sound insulation insert quick** for connection housing quick retrofittable sound insulation insert for acoustically sensitive rooms. Not combinable with extract airfilter quick	6047 831
	**Extract air filter quick** for connection housing quick of cleanable, fine-mesh polyamide net with plastic frame. Cannot combine w/sound insulation insert	5045 011
	**Mounting set quick** Mounting help for connection housing quick with 4 mounting brackets and 8 screws	6048 808

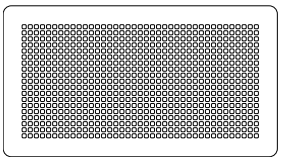
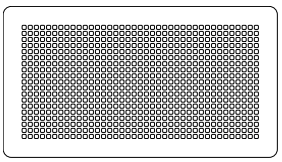
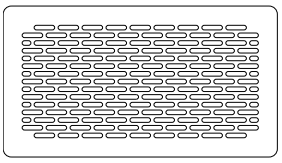
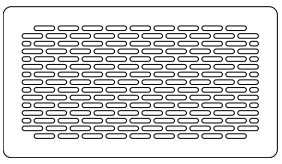
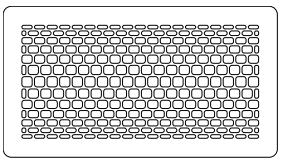
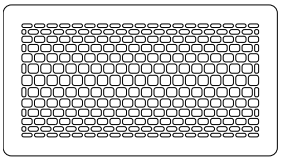
Air grilles - wall/ceiling

		Part No.
	Plastic supply air/extract air grille	
	The alignment of the grilles can be slightly corrected after installation.	
	**Design grille Pazifik** for connection housing AG-60, AG-90 and quick 75/90 made of plastic, with plug connection, white (RAL 9016) stove-enamelled, Suited for: supply air up to 40 m³/h extract air up to 60 m³/h	6046 743
	**Design grille Adria** for connection housing AG-60, AG-90 and quick 75/90 made of plastic, with plug connection, white (RAL 9016) stove-enamelled, Suited for: supply air up to 40 m³/h extract air up to 60 m³/h	6046 744
	**Design grille Atlantik** for connection housing AG-60, AG-90 and quick 75/90 made of plastic, with plug connection, white (RAL 9016) stove-enamelled, Suited for: supply air up to 40 m³/h extract air up to 60 m³/h	6046 745
	**Design grille Karibik** for connection housing AG-60, AG-90 and quick 75/90 made of plastic, with plug connection, white (RAL 9016), painting on site, Suitable for: supply air up to 40 m³/h extract air up to 60 m³/h	6047 228

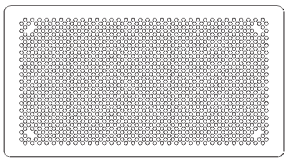
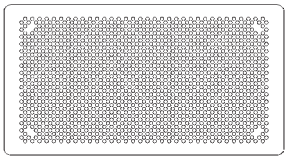
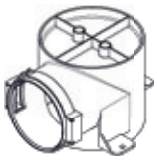
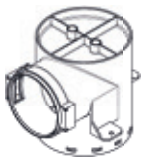
Air grilles - wall/ceiling

Metal supply air/extract air grille

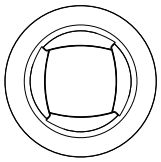
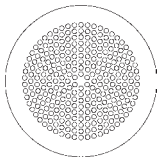
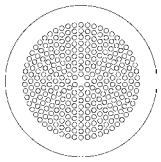
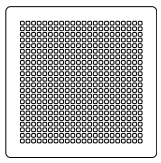
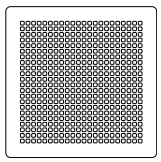
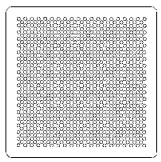
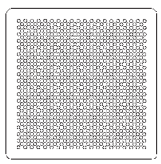
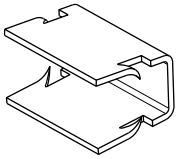
The alignment of the grilles can be slightly corrected after installation.

		Part No.
	**Design grille Pizol** for connection housing AG-60/90 and quick 75/90 of brushed stainless steel, with plug connection, Suited for: supply air up to 40 m³/h extract air up to 60 m³/h	6046 696
	**Design grille Pizol** for connection housing AG-60/90 and quick 75/90 of sheet steel, with plug connection, white (RAL 9016) stove-enamelled, Suited for: supply air up to 40 m³/h extract air up 60 m³/h	6046 698
	**Design grille Alvier** for connection housing AG-60/90 and quick 75/90 of brushed stainless steel, with plug connection, Suited for: supply air up to 40 m³/h extract air up to 60 m³/h	6046 700
	**Design grille Alvier** for connection housing AG-60/90 and quick 75/90 of sheet steel, with plug connection, white (RAL 9016) stove-enamelled, Suited for: supply air up to 40 m³/h extract air up to 60 m³/h	6046 702
	**Design grille Säntis** for connection housing AG-60/90 and quick 75/90 of brushed stainless steel, with plug connection, Suited for: supply air up to 40 m³/h extract air up to 60 m³/h	6046 724
	**Design grille Säntis** for connection housing AG-60/90 and quick 75/90 of sheet steel, with plug connection, white (RAL 9016) stove-enamelled, Suited for: supply air up to 40 m³/h extract air up to 60 m³/h	6046 726

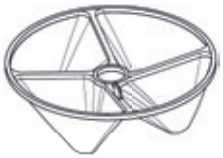
Air grilles - wall/ceiling

		Part No.
	**Design grille Pilatus white** for connection housing AG-60/90 and quick 75/90 Aluminium sheet with flanged edges, with plug connection, painted white (RAL 9016) Suitable for: - Supply air up to 40 m³/h - Extract air up to 60 m³/h	6054 365
	**Design grille Pilatus Alu** for connection housing AG-60/90 and quick 75/90 Aluminium sheet with flanged edges, with plug connection, brushed aluminium anodized Suitable for: - Supply air up to 40 m³/h - Extract air up to 60 m³/h	6054 366
	**Connection cylinder quick 75 short** for masonry, lightweight and wood construction Plastic casing, two connections DN 75 incl. 1 stopper DN 75 Supply air: 1 x DN 75 up to 30 m³/h 2 x DN 75 up to 40 m³/h With design grille Tangential 125 only 1 x DN 75 Extract air: 1 x DN 75 up to 30 m³/h 2 x DN 75 up to 60 m³/h	6050 374
	**Connection cylinder quick 75 medium** for element ceiling up to 60 mm, solid concrete Plastic casing, two connections DN 75 incl. 1 stopper DN 75 Supply air: 1 x DN 75 up to 30 m³/h 2 x DN 75 up to 40 m³/h With design grille Tangential 125 only 1 x DN 75 Extract air: 1 x DN 75 up to 30 m³/h 2 x DN 75 up to 60 m³/h	6050 375
	**Connection cylinder quick 90 short** for masonry, lightweight and wood construction Plastic casing, with connection DN 90 Supply air: 1 x DN 90 up to 40 m³/h Extract air: 1 x DN 90 up to 60 m³/h	6050 377
	**Connection cylinder quick 90 medium** for element ceiling up to 60 mm, solid concrete Plastic casing, with connection DN 90 Supply air: 1 x DN 90 up to 40 m³/h Extract air: 1 x DN 90 up to 60 m³/h	6050 378

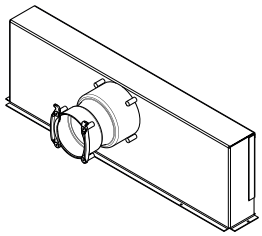
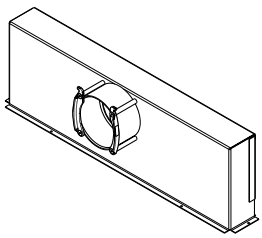
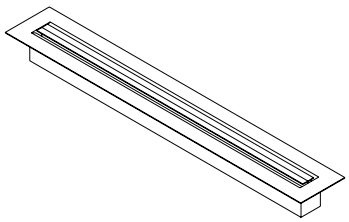
Air grilles - wall/ceiling

		Part No.
	**Design grille Tangential 125** suitable for connection cylinders quick 75 and 90 made of plastic, with plug-in connection Colour: white RAL 9016, can be painted on site Supply air up to 40 m³/h Extract air up to 50 m³/h	6052 158
	**Design grille Falknis painted white** suitable for connection cylinders quick 75 and 90 Steel, painted white (RAL 9016) With plug-in connection Supply air up to 40 m³/h Extract air up to 50 m³/h	6052 162
	**Stainless steel design grille Falknis** suitable for connection cylinders quick 75 and 90 Brushed stainless steel With plug-in connection Supply air up to 40 m³/h Extract air up to 50 m³/h	6051 847
	**Design grille Calanda painted white** suitable for connection cylinders quick 75 and 90 Steel, painted white (RAL 9016) With plug-in connection Supply air up to 40 m³/h Extract air up to 50 m³/h	6052 161
	**Stainless steel design grille Calanda** suitable for connection cylinders quick 75 and 90 Brushed stainless steel With plug-in connection Supply air up to 40 m³/h Extract air up to 50 m³/h	6051 849
	**Design grille Rigi white** suitable for connection cylinder quick 75 and 90 Aluminium sheet with flanged edges Painted white (RAL 9016) With plug connection - Supply air up to 40 m³/h - Extract air up to 60 m³/h	6054 363
	**Design grille Rigi aluminium** suitable for connection cylinder quick 75 and 90 Aluminium sheet with flanged edges Surface: anodized brushed aluminium With plug connection - Supply air up to 40 m³/h - Extract air up to 60 m³/h	6054 364
	**Steel brackets set of 10** for outlet round 90° lateral 125 in connection with designer grilles	6056 054

Air grilles - wall/ceiling

		Part No.
	**Extract air filter 125** for connection cylinder quick 75 and 90 of cleanable, fine-mesh polyamide net with plastic frame.	5049 629
	**Disc valve supply air TVZ-125** for connection cylinder quick 75 and 90 of sheet steel (white RAL 9016) with installation frame DN 125, height: 45 mm supply air up to 40 m³/h	2056 417
	**Disc valve extract air TVA-125** for connection cylinder quick 75 and 90 of sheet steel (white RAL 9016) with installation frame DN 125, height: 45 mm extract air up to 60 m³/h	2056 416

Grilles - supply air/extract air

	Application **Concrete installation (in-situ concrete)**	
	**Connection box SD-75** for encasing in concrete, made of galvanised sheet steel with 1 nozzle 75 mm Air quantity up to 30 m³/h	6022 617
	**Connection box SD-90** for encasing in concrete, made of galvanised sheet steel with 1 nozzle 90 mm Air quantity up to 40 m³/h	6022 543
	**Design slit grille 500 mm** matching connection box SD-75 and SD-90 Colour: anodized aluminium Supply air: up to 40 m³/h	2037 000

Pipe system DN 160
The pipe system consists of galvanised steel with double lip seal.
Pipe as per DIN 24145; 0.6 mm thick.

Flow rate [m³/h]	[Pa/m] Pipe	Pressure drop [Pa] 90° elbow	[Pa] 45° elbow
150	0.5	1.3	0.8
200	0.8	2.0	1.2
250	1.2	2.5	1.5
350	1.8	5.0	1.8

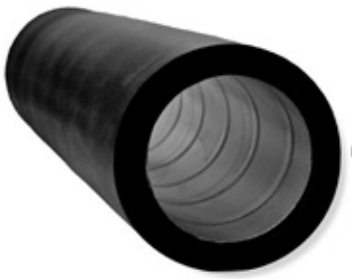
Pipe system DN 180
The pipe system consists of galvanised steel with double lip seal.
Pipe as per DIN 24145; 0.6 mm thick.

Flow rate [m³/h]	[Pa/m] Pipe	Pressure drop [Pa] 90° elbow	[Pa] 45° elbow
150	0.4	0.8	0.5
250	0.6	2.0	1.0
350	1.0	4.0	2.0

Pipe system DN 200
The pipe system consists of galvanised steel with double lip seal.
Pipe as per DIN 24145; 0.6 mm thick.

Flow rate [m³/h]	[Pa/m] Pipe	Pressure drop [Pa] 90° elbow	[Pa] 45° elbow
150	0.3	0.7	0.5
350	0.7	1.6	1.0
500	1.5	4.0	2.0

Thermal insulation for main duct DN 160
The insulation consists of synthetic rubber (closed-cell EPDM with resistant outside skin), insulation thickness 25 mm, black.
Thermal conductance λ at 0 °C is 0.032 W/mK
Steam diffusion resistance ≥ 7000
Fire class 5.3 or B1



Thermal insulation tube: for spiral-seam tube DN 160 mm, case contains 3 tubes, each with a length of 2 m

Thermal insulation for pipe elbow: Thermal insulation mat cut to length for pipe elbow (2-part) suitable for DN 160

Pipe clamp with thermal insulation sleeve: For installation of pipes without thermal bridges

Adhesive: ready-to-use adhesive with brush 0.25 l

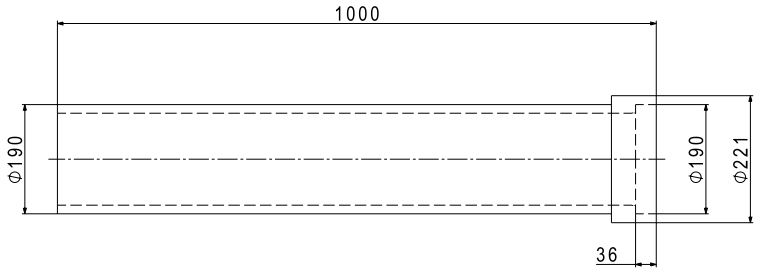
Adhesive tape: of synthetic rubber, 50 mm wide, 15-meter roll

Notice
Comply with regional regulations on thermal insulation.

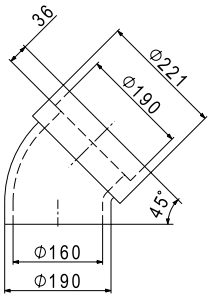
IsiPipe pipe system EPP
Pipeline consists of diffusion-tight EPP
Wall thickness: 15 mm, grey
Thermal conductance: λ = 0.035 W/mK

IsiPipe pipe system EPP-160
(Dimensions in mm)

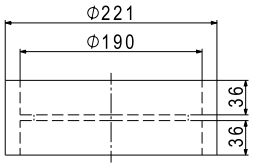
IsiPipe pipeline EPP-160/1000



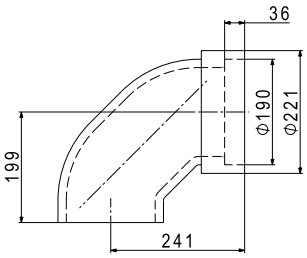
IsiPipe pipe bend EPP-160/45



IsiPipe sleeve EPP-160

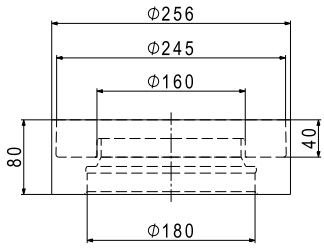


IsiPipe pipe bend EPP-160/90

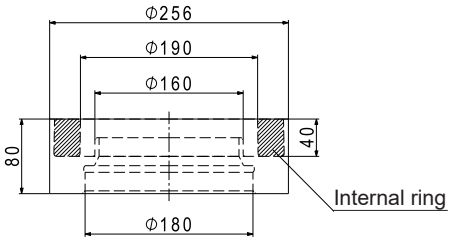


IsiPipe device adapter EPP-160
(Dimensions in mm)

IsiPipe device adapter
without inner ring for IsiPipe Plus (43 mm)



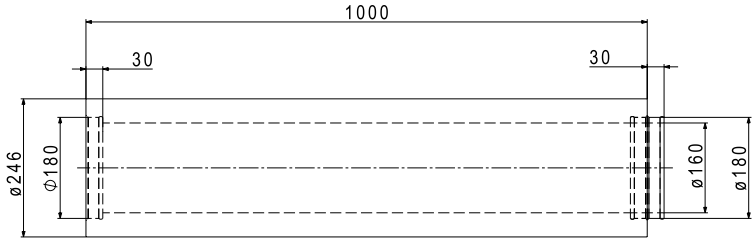
IsiPipe device adapter
with inner ring for IsiPipe (15 mm)



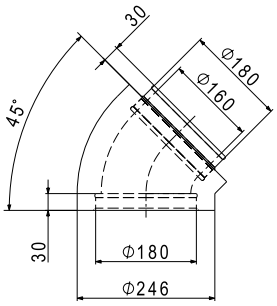
IsiPipe Plus pipe system EPP
Pipeline consists of diffusion-tight EPP
Wall thickness: 43 mm, black
Thermal conductance: λ = 0.035 W/mK

IsiPipe Plus pipe system EPP-160
(Dimensions in mm)

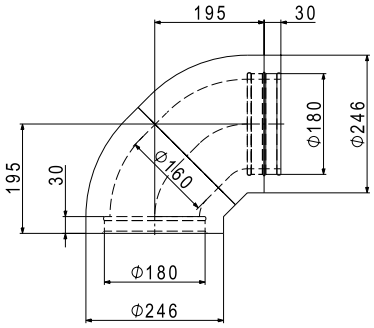
IsiPipe Plus pipeline EPP-160/1000



IsiPipe Plus pipe bend EPP-160

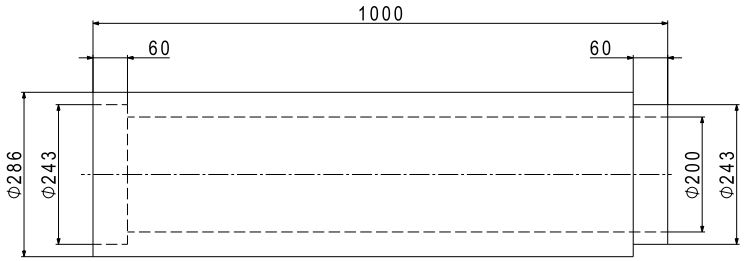


2 IsiPipe Plus pipe bends EPP-160/45

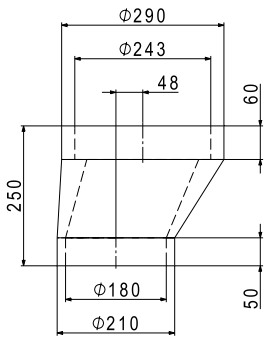


IsiPipe Plus pipe system EPP-200
(Dimensions in mm)

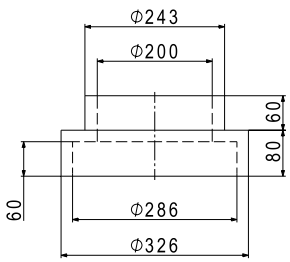
IsiPipe Plus pipeline EPP-200/1000



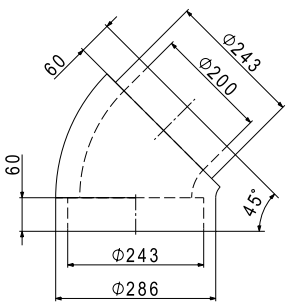
IsiPipe Plus eccentric adapter EPP-180-200



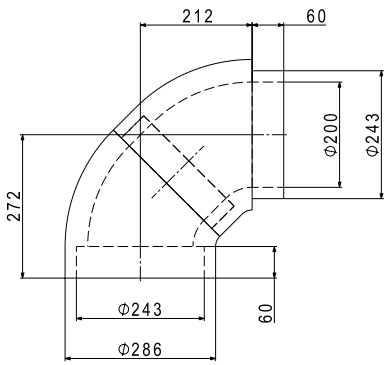
IsiPipe Plus device adapter EPP-200



IsiPipe Plus pipe bend EPP-200/45



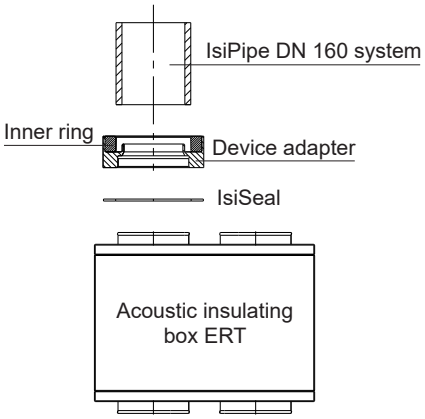
2 IsiPipe Plus pipe bends EPP-200/45



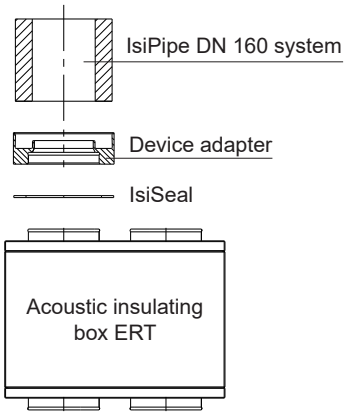
IsiPipe application

Device adapter

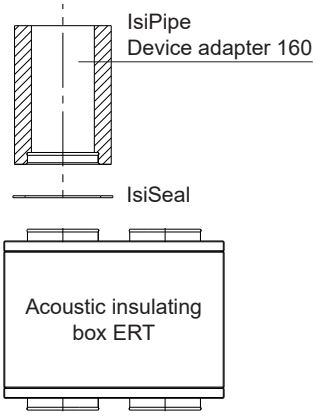
Device adapter with inner ring for connection of IsiPipe DN 160 with wall thickness 15 mm.



Device adapter without inner ring for connecting cut-to-length IsiPipe Plus pipes DN 160 with a wall thickness of 43 mm.

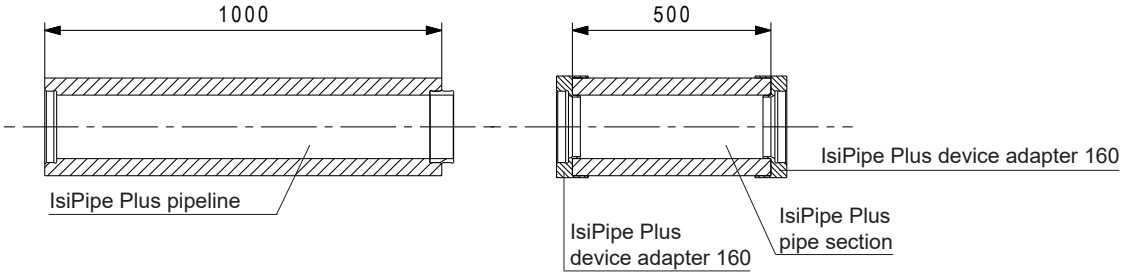


The IsiSeal is glued between the device adapter or IsiPipe to secure and better seal the connection.

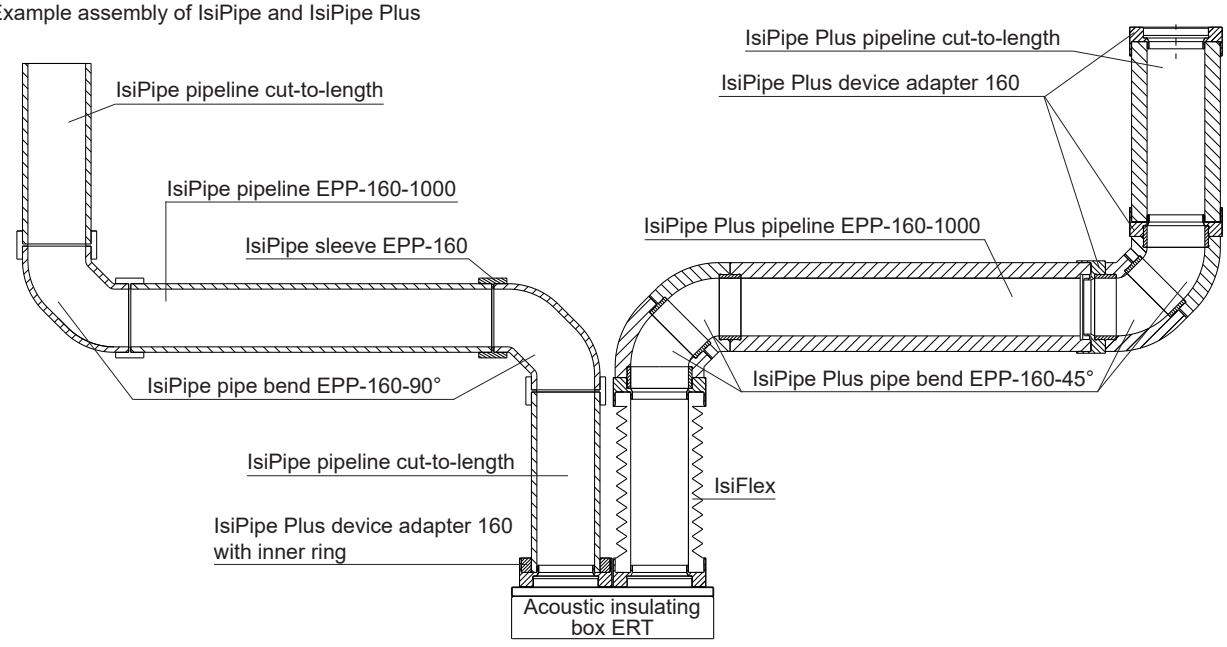


IsiPipe Plus pipeline

Cut-to-length pipes can be connected to the device adapter.

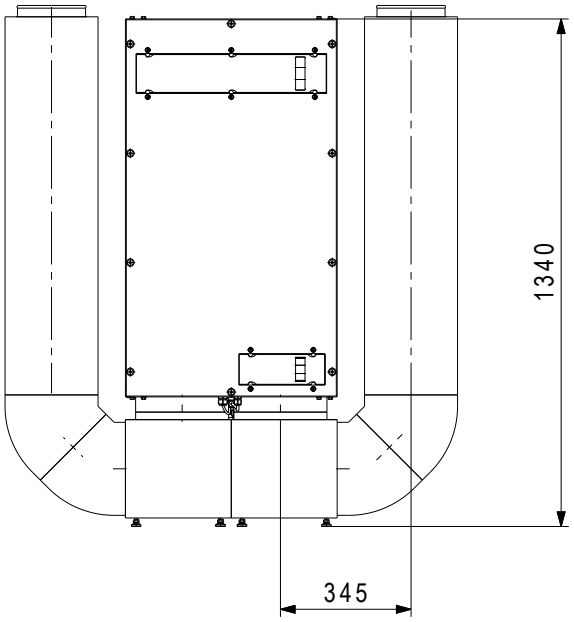


Example assembly of IsiPipe and IsiPipe Plus

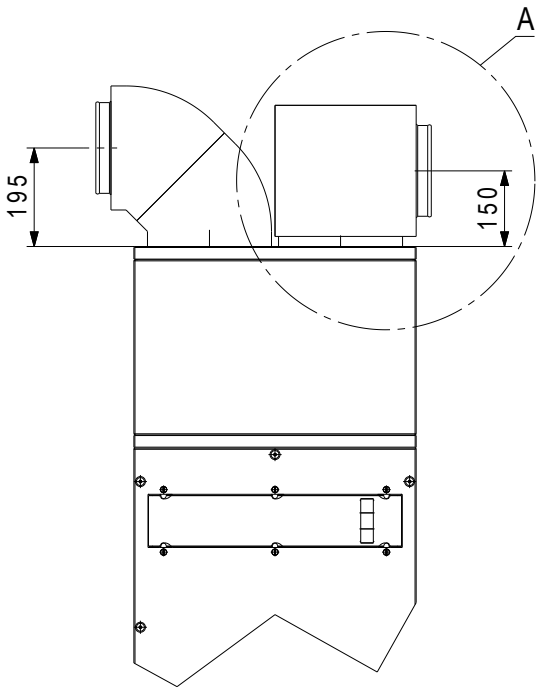


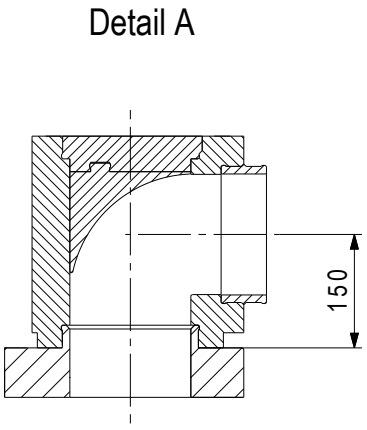
IsiCube application

The IsiCube is used as a base for the HomeVent® ER. This allows a more compact design and the Isipipe system can be connected directly to the Cube.

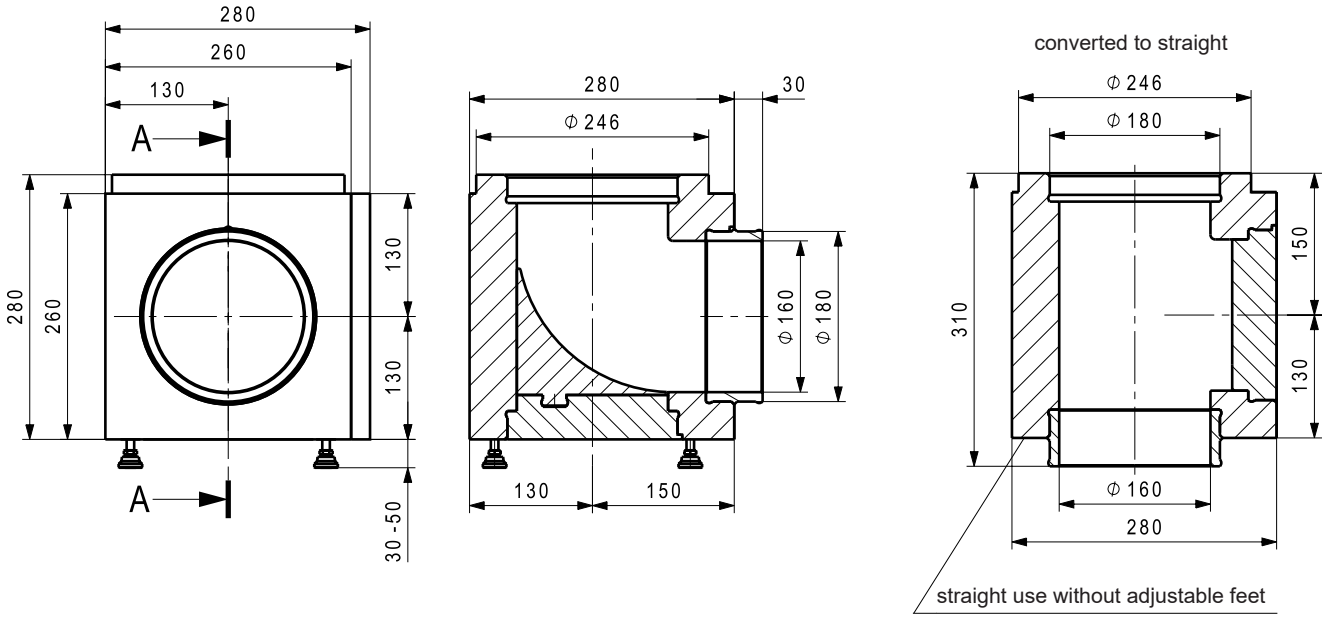


The IsiCube can also be used as a pipe bend to save overall height.

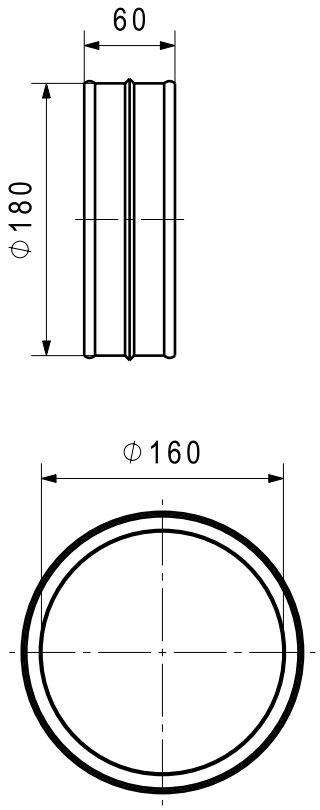




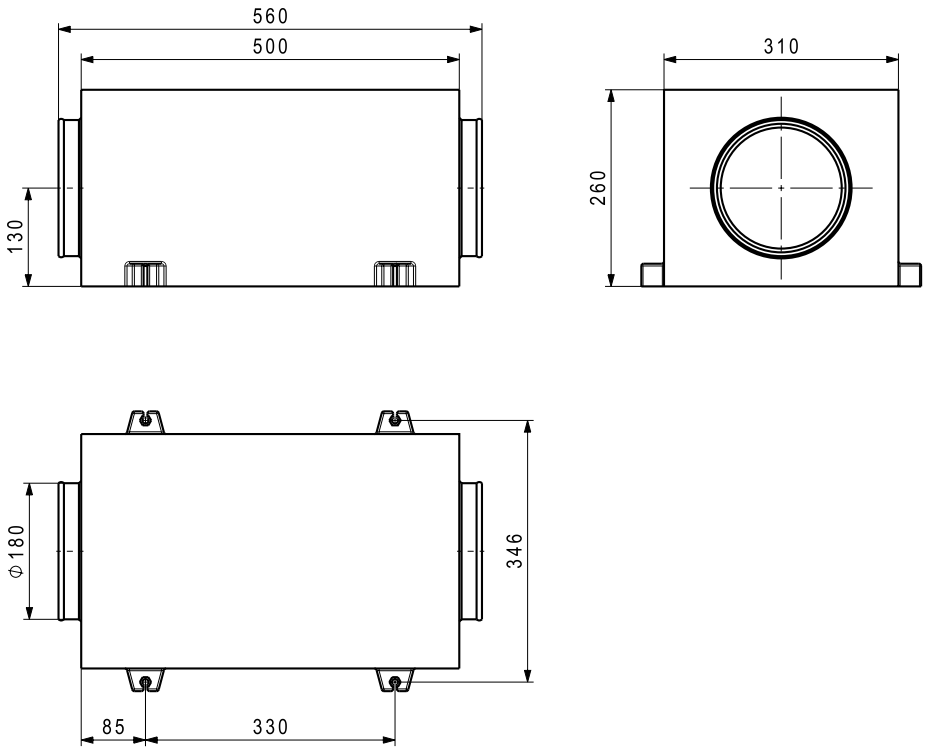
IsiCube
(Dimensions in mm)

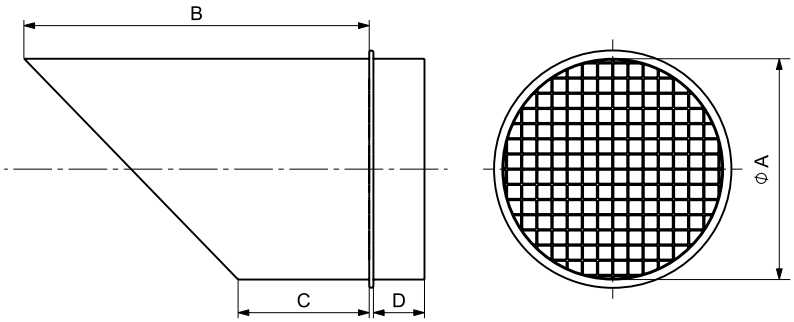


IsiFit



IsiSound

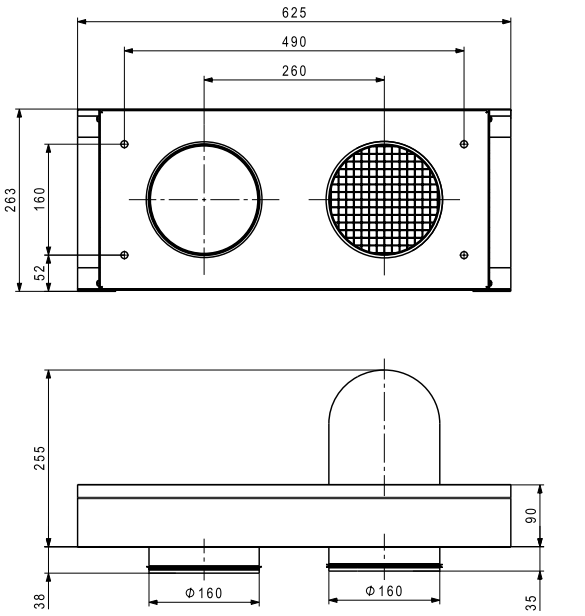




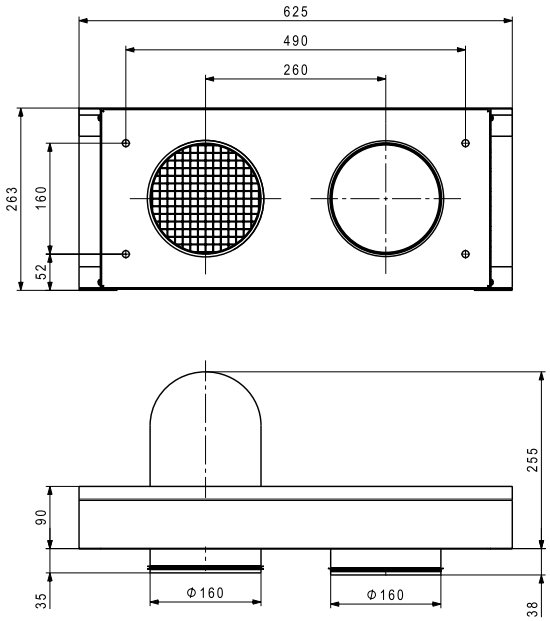
Exhaust air nozzle FST
for spiral-seam tube DN
of galvanised sheet steel
with bird protection grille
for horizontal installation

	A	B	C	D
FST-160	160	250	95	37
FST-180	180	270	90	45
FST-200	200	245	45	45

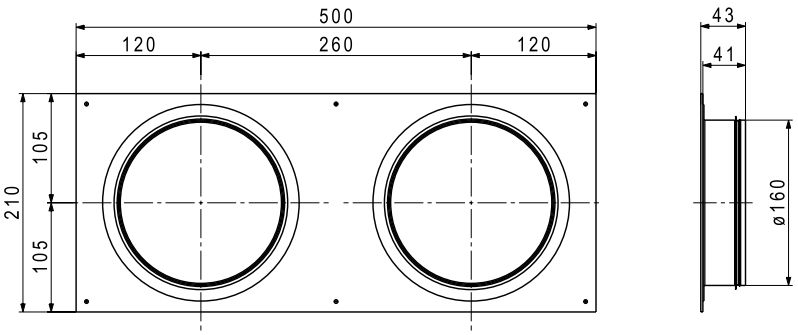
Wall outlet Ø 160 left

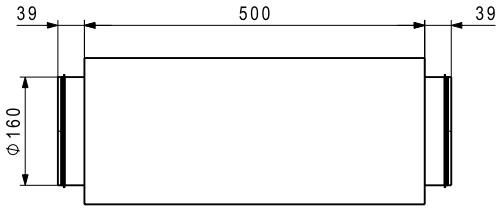


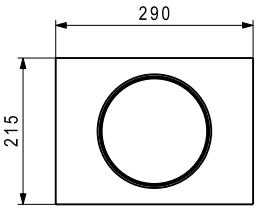
Wall outlet Ø 160 right



Plywood
for wall outlet, Ø 160

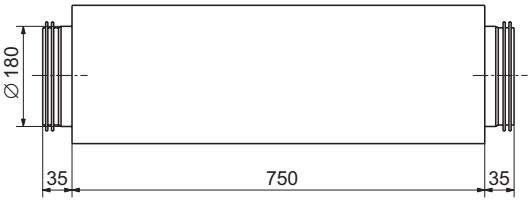


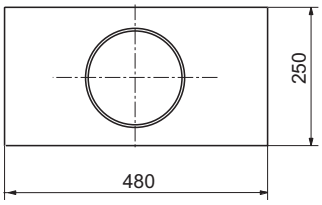




Silencer SD-160-500
The silencer consists of a rectangular casing of galvanised steel with connection nozzles on both sides. The housing is lined on the inside with highly effective sound absorbing material. The unit can be cleaned through the pipe nozzle. When used in fresh air and exhaust air, the silencers must be thermally insulated on site.

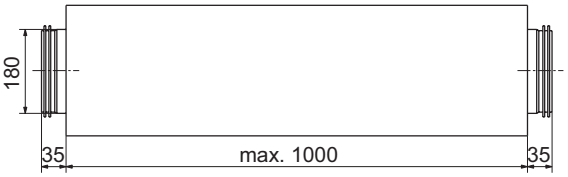
Frequency [Hz]	125	250	500	1000	2000	4000	8000
Simple damping [dB]	6	10	19	23	32	25	16

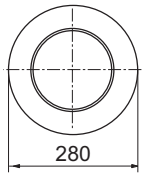




Silencer FSR-180-750
The silencer consists of a rectangular casing of galvanised steel with connection nozzles on both sides. The housing is lined on the inside with highly effective sound absorbing material. The unit can be cleaned through the pipe nozzle. When used in fresh air and exhaust air, the silencers must be thermally insulated on site.

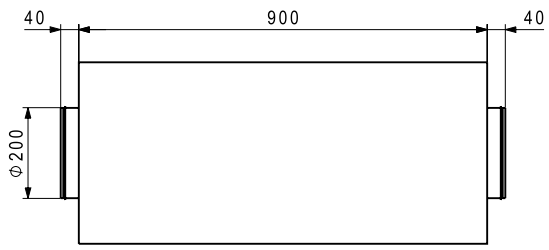
Frequency [Hz]	125	250	500	1000	2000	4000	8000
Simple damping [dB]	6	16	19	19	19	18	5

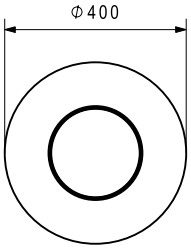




Silencer FLSDA-180-1000
The silencer consists of a flexible aluminium envelope tube, inside from perforated aluminium tube with connection nozzles on both sides with double lip seal.

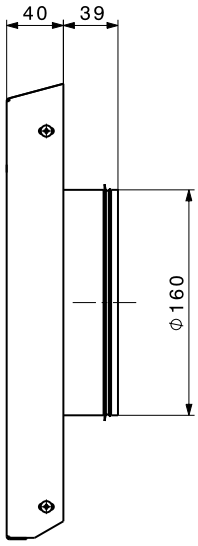
Frequency [Hz]	125	250	500	1000	2000	4000	8000
Simple damping [dB]	5	13	30	42	34	24	13

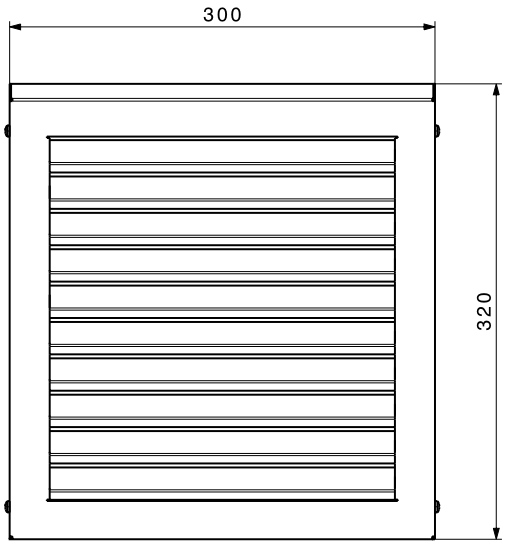




Silencer SD-200-1000
The silencer consists of a round casing of galvanised steel with connection nozzles on both sides. The housing is lined on the inside with highly effective sound absorbing material. The unit can be cleaned through the pipe nozzle.

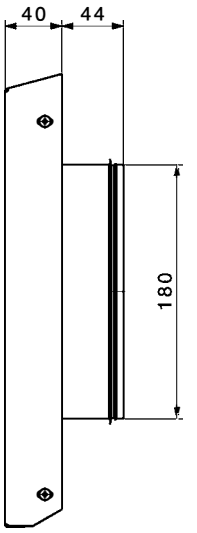
Frequency [Hz]	125	250	500	1000	2000	4000	8000
Simple damping [dB]	5	15	27	27	20	10	5

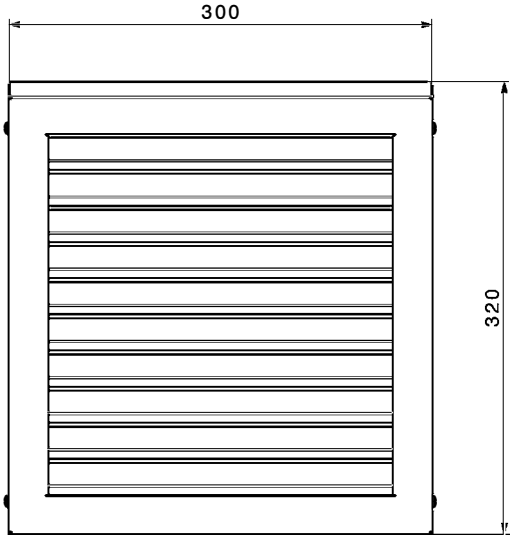




Weatherproof grille WG-160
for spiral-seam tube DN 160
for outside and exhaust air
of aluminium with rain lug,
can be painted with double lip seal,
pipe nozzle DN 160

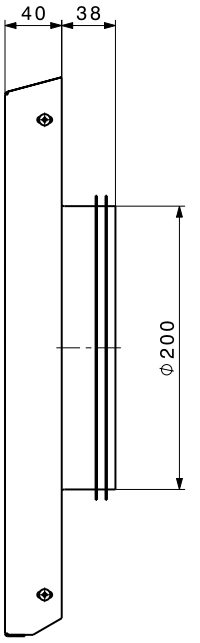
Flow rate [m³/h]	Pressure drop Outside air [Pa]	Pressure drop Exhaust air [Pa]
250	6	7
450	10	18

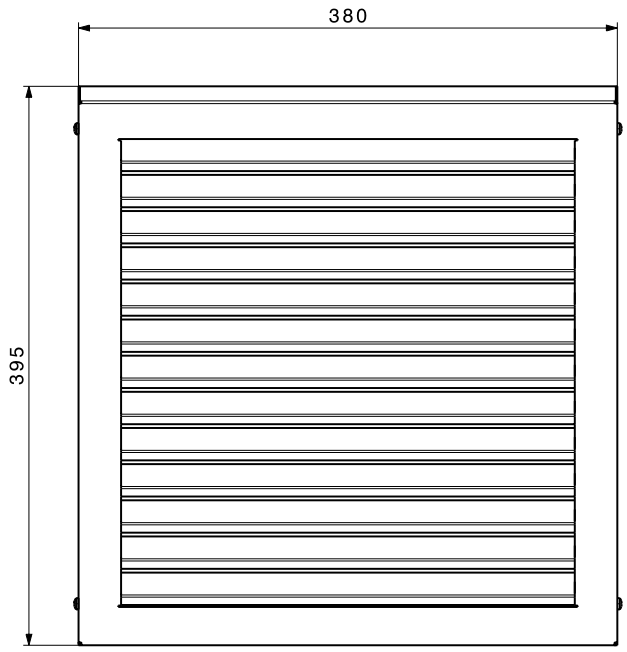




Weatherproof grille WG-180
for spiral-seam tube DN 180
for outside and exhaust air
of aluminium with rain lug,
can be painted with double lip seal,
pipe nozzle DN 180

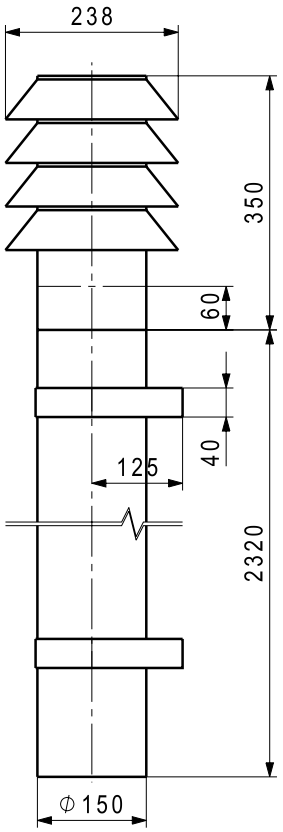
Flow rate [m³/h]	Pressure drop Outside air [Pa]	Pressure drop Exhaust air [Pa]
250	5	6
450	9	17





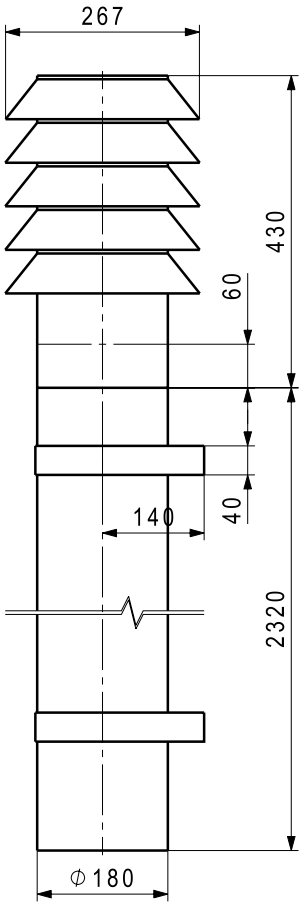
Weatherproof grille WG-200
for spiral-seam tube DN 200
for outside and exhaust air
of aluminium with rain lug,
can be painted with double lip seal,
pipe nozzle DN 200

Flow rate [m³/h]	Pressure drop Outside air [Pa]	Pressure drop Exhaust air [Pa]
250	4	5
450	8	16

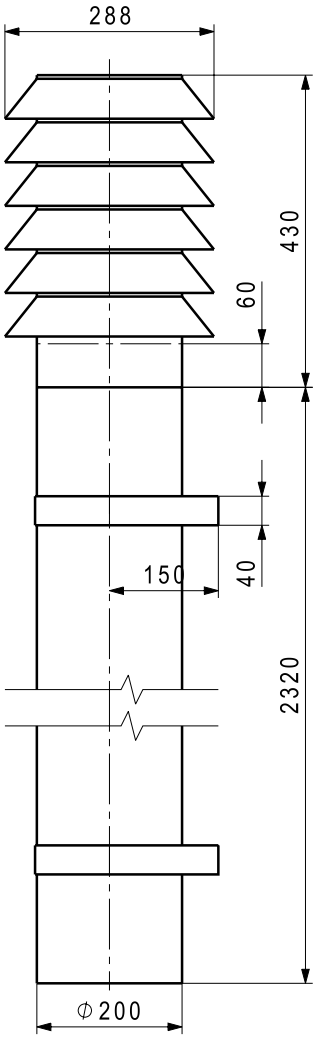


Outside air intake set AAS-150
for spiral-seam tube DN 150
galvanic isolation of the connection
for outside and exhaust air
of stainless steel, lamella cowl,
consisting of:
1 cowl DN 150,
1 pipe DN 150, length: 0.5 m,
2 pipes DN 150, length: 1 m and
2 wall mountings

Flow rate [m³/h]	Pressure drop of cowl [Pa]
100	3
150	5
200	8
250	12



Stainless steel cowl AAS-180
for spiral-seam tube DN 180
galvanic isolation of the connection
for outside and exhaust air
of stainless steel, lamella cowl,
consisting of:
1 cowl DN 180,
1 pipe DN 180, length: 0.5 m,
2 pipes DN 180, length: 1 m and
2 wall mountings



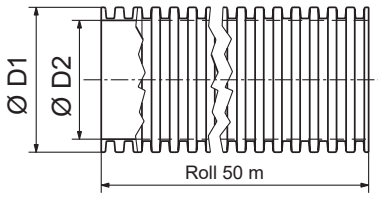
Stainless steel cowl AAS-200
for spiral-seam tube DN 200
galvanic isolation of the connection
for outside and exhaust air
of stainless steel, lamella cowl,
consisting of:
1 cowl DN 200,
1 pipe DN 200, length: 0.5 m,
2 pipes DN 200, length: 1 m and
2 wall mountings

Pipe system distribution duct DN 75 and DN 90
The distribution duct is a flexible pipe of polyethylene PE-HD with a smooth inside wall, ribbed on the outside.

Antistatic coating
Weight 0.33 kg/m
Application limit:
Air and ambient temperature -25…60 °C

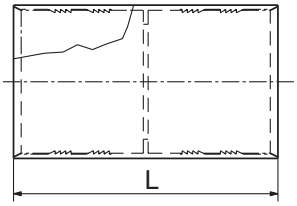
Pipe system	Flow rate [m³/h]	Pressure drop straight pipe [Pa/m]	Press loss pipe elbow 90° (r = 2D) [Pa]
DN 75	10	0.3	0.1
DN 75	20	1.1	0.4
DN 75	30	2.5	1.0
DN 90	20	0.6	0.2
DN 90	30	1.2	0.4
DN 90	40	2.2	0.8

Flexible pipe FR

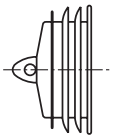


Sealing ring DI

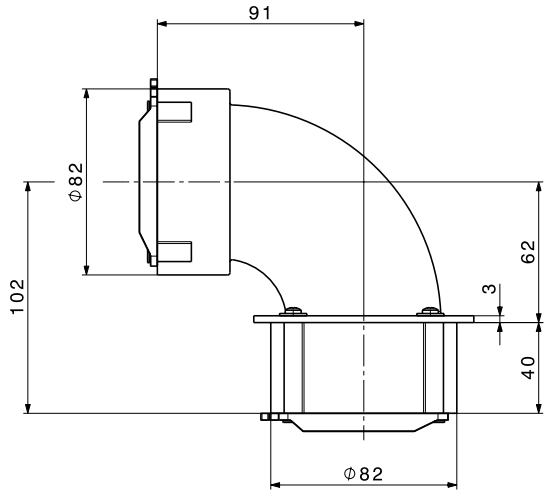
Double sleeve DM

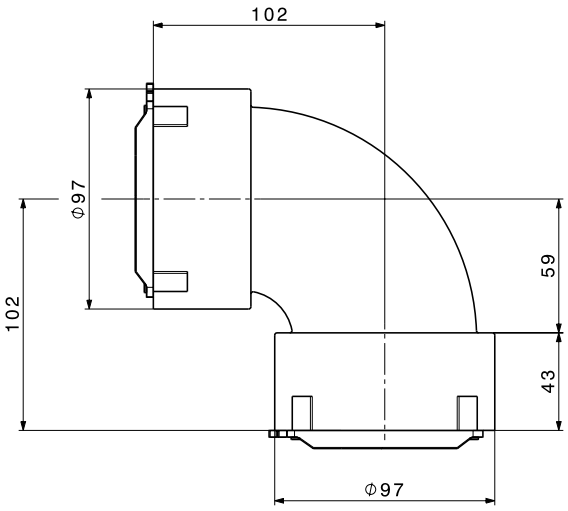


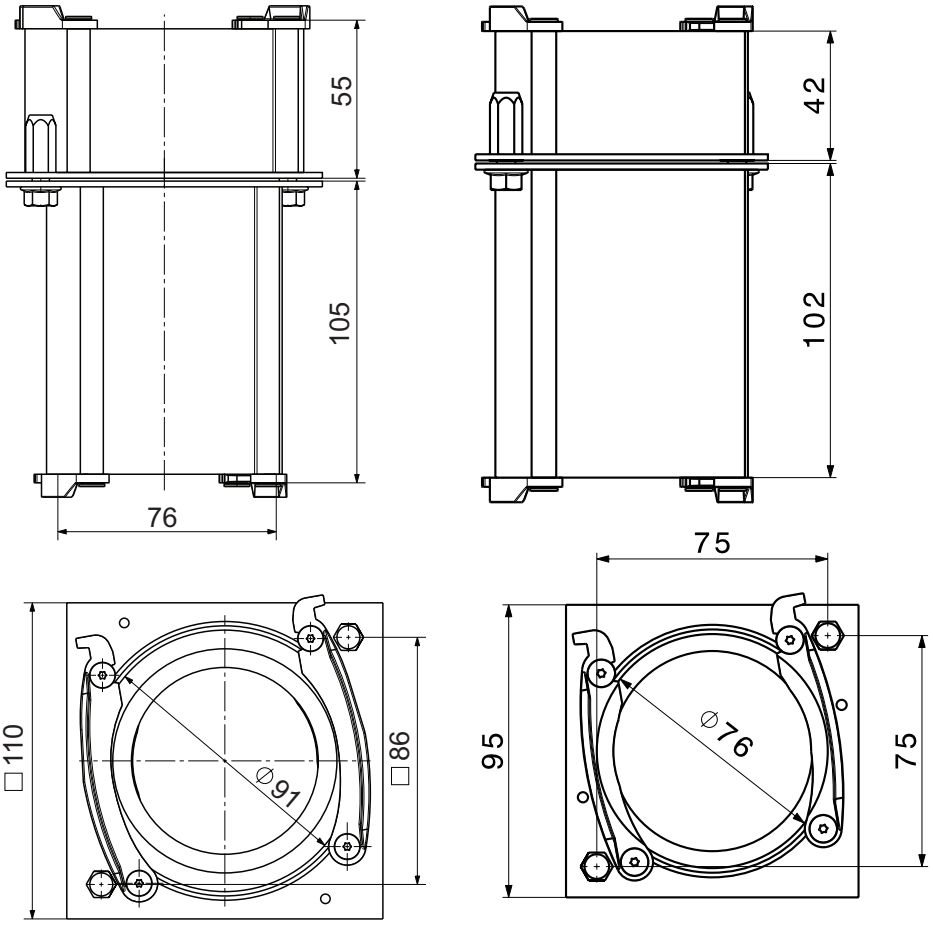
Stopper ST



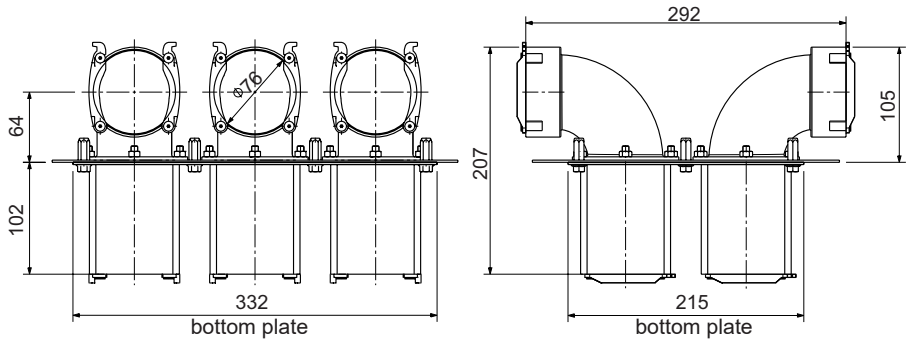
Pipe system	D1 [mm]	D2 [mm]	L [mm]	R
DN 75	75	62	100	150
DN 90	90	76	100	150



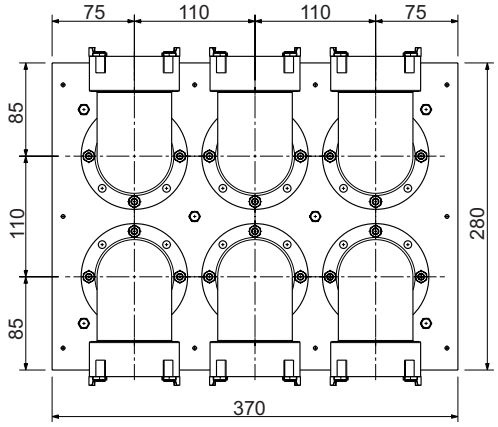


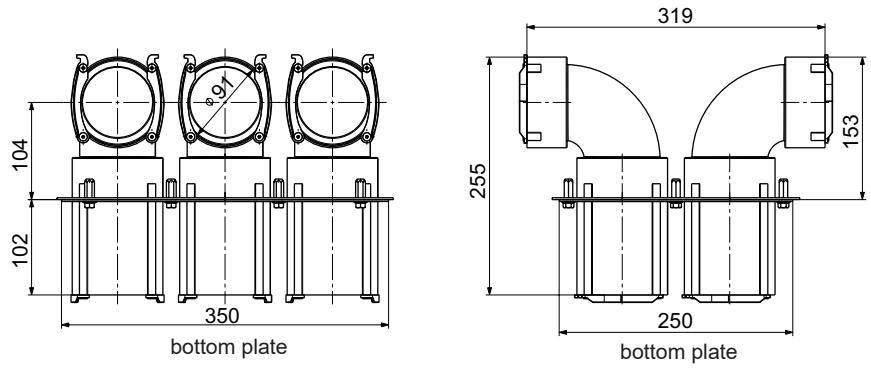


Formwork coupling SK-75/90
for flexible pipe DN 75 and 90 for extending a flexible pipe through the ceiling or the floor and extension from DN 75 to DN 90 without damaging the boarding.

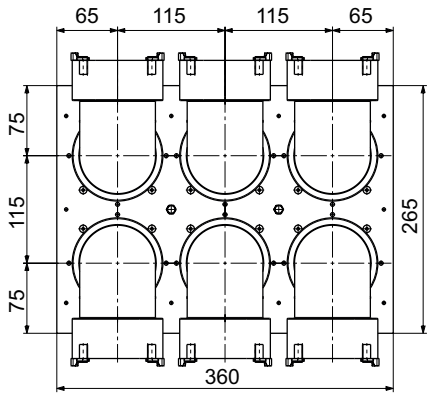


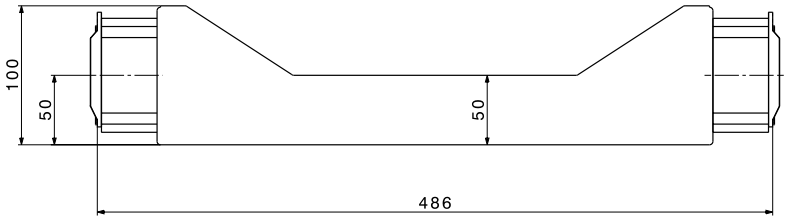
Section distributor SV-6 x 75
For quick, space-saving installation of flexible pipes FR-75 in ceilings/floors and walls. Each 90° connection can be rotated in increments of 45°.
After completion of the building shell, the lower distributor plate is fitted and the flexible pipes FR-75 are simply connected up. The inside of the 90° nozzles is rounded to allow easy cleaning of the ducts.

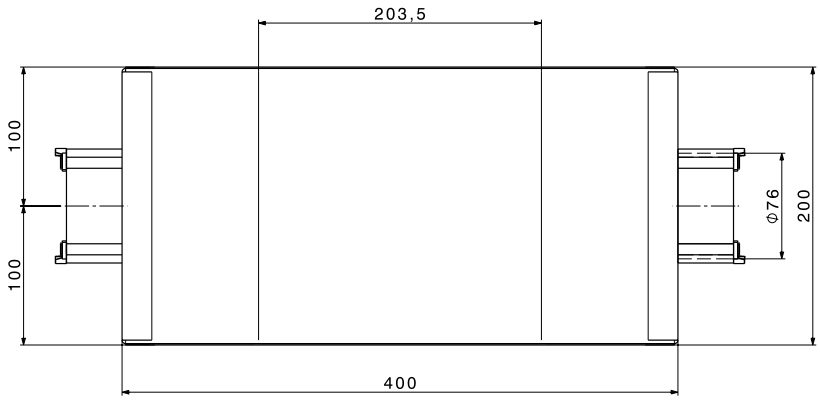




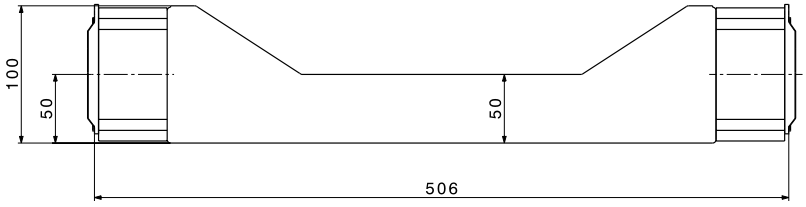
Section distributor SV-6 x 90
For quick, space-saving installation of flexible pipes FR-75 in ceilings/floors and walls. Each 90° connection can be rotated in increments of 45°.
After completion of the building shell, the lower distributor plate is fitted and the flexible pipes FR-75 are simply connected up. The inside of the 90° nozzles is rounded to allow easy cleaning of the ducts.

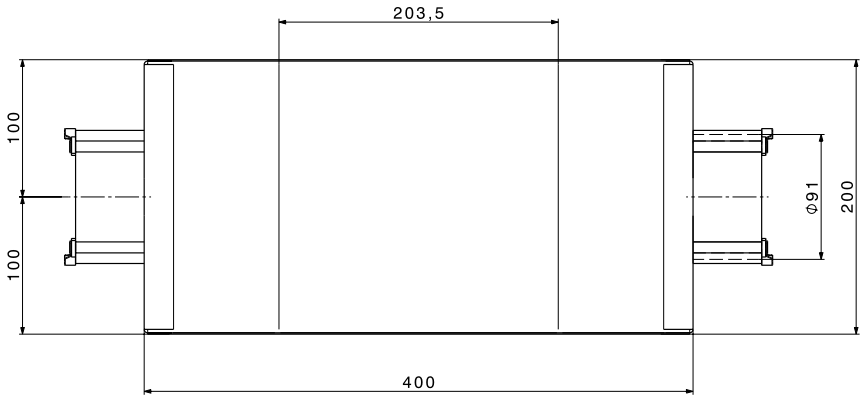






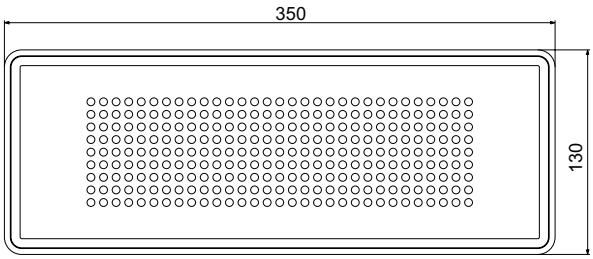
Flexible pipe crossing FRK-75
for flexible pipe DN 75
for crossing two flexible pipes DN 75
with reduced construction height (100 mm).
For one crossing 2 pieces are necessary.



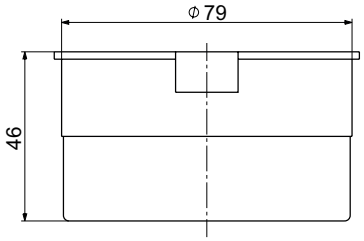


Flexible pipe crossing FRK-90
for flexible pipe DN 90
for crossing two flexible pipes DN 90
with reduced construction height (100 mm).
For one crossing 2 pieces are necessary.

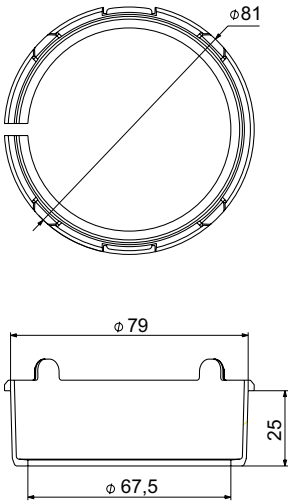
Floor grille 100, 140
inox or white colour
for flat channel system 100 and 140
Dimensions: 350 x 130 mm



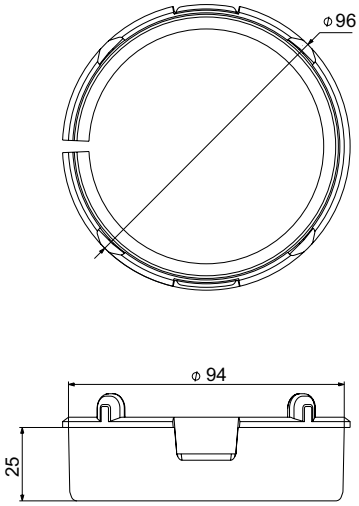
Stopper flat 75
sealing plug for outlet 90°
lateral 125-2 x 75



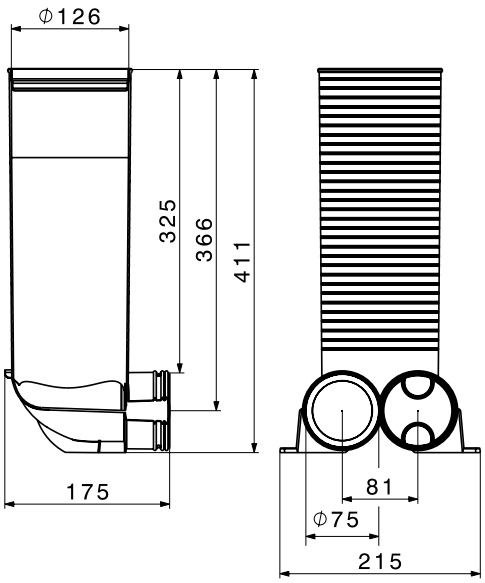
Click ring 75
for outlet 90° lateral 125-2 x 75



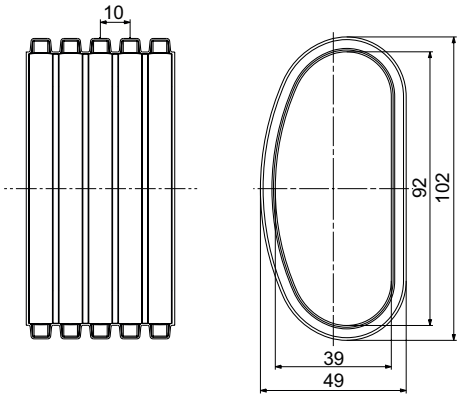
Click ring 90
for outlet 90° lateral 125-2 x 90



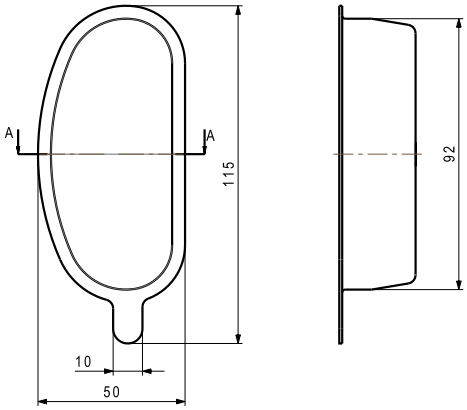
Outlet flat 90 125-75
Outlet round 90° lateral 125-2 x 75
made of plastic 2 x 75/125 mm
Usable length 325 mm

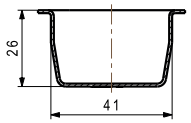


Flat channel 100
Flexible ventilation pipe 102 x 49 mm
Roll length 50 m
minimum bending radius 200 mm

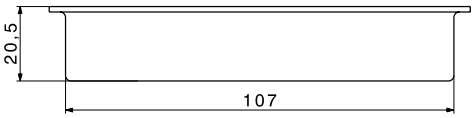


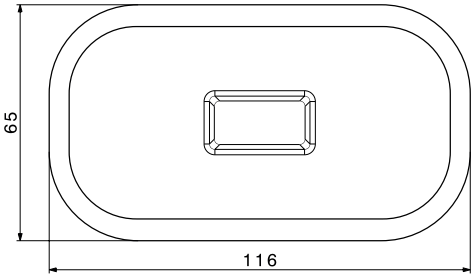
Plug flat channel 100



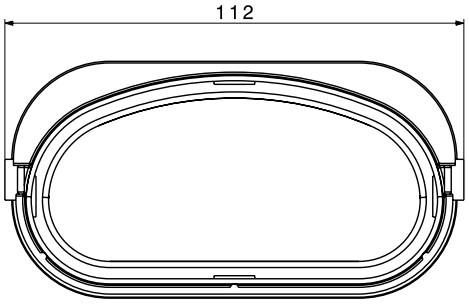


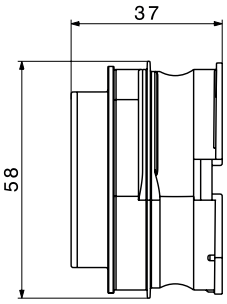
Stopper flat 100
for flat channel system 100 connections



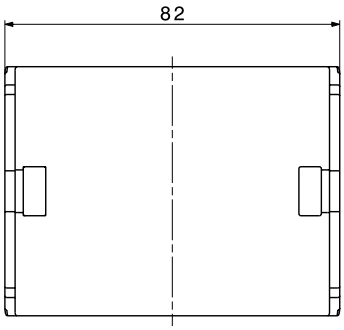


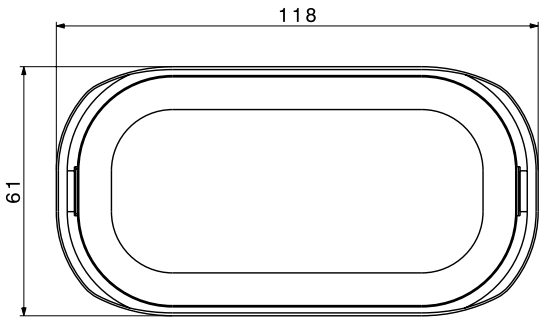
Seal flat 100
for flat channel 100



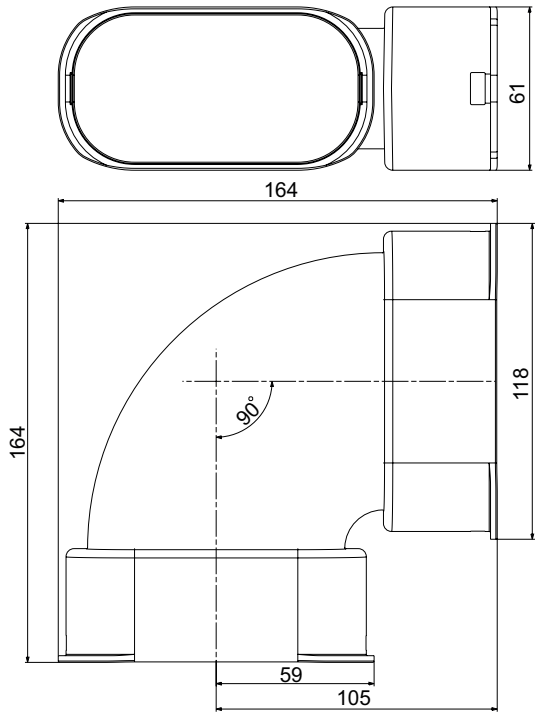


Sleeve 100
for flat channel 100

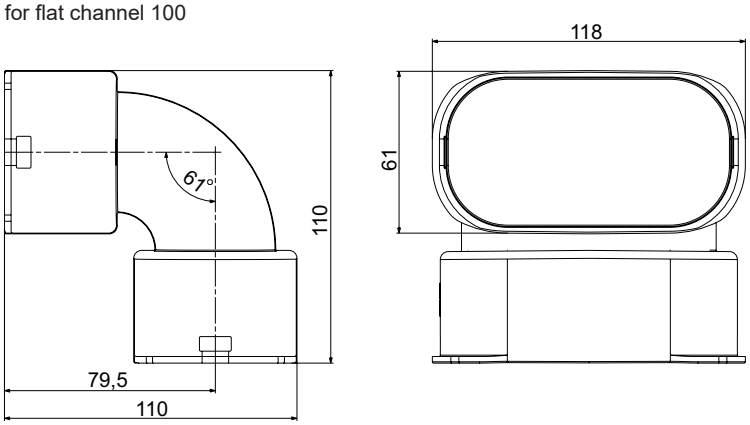




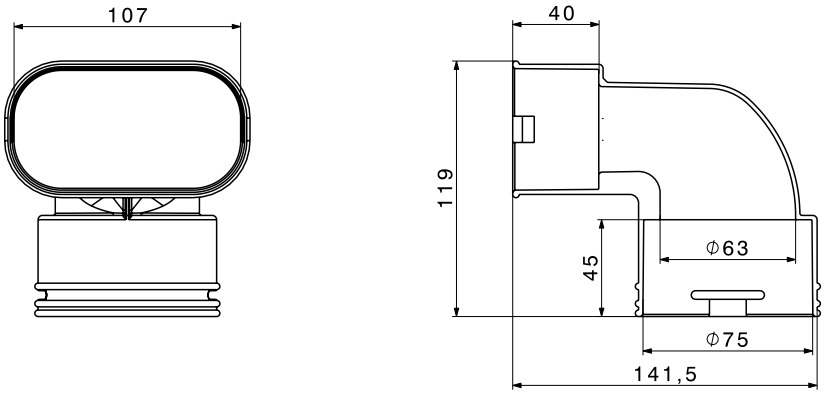
Arch horizontal flat 100
for flat channel 100



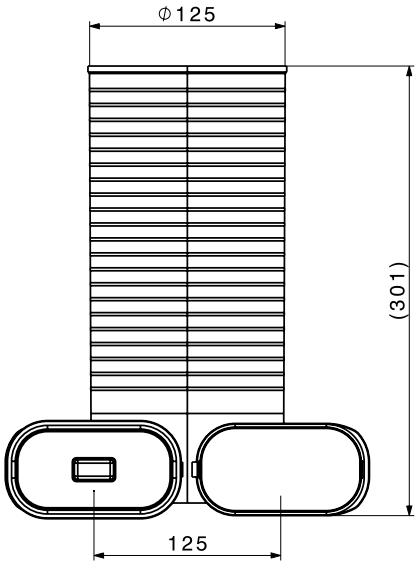
Arch vertical flat 100
for flat channel 100

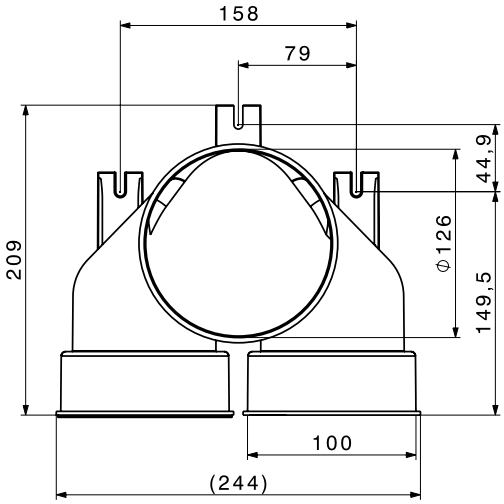


Arch vertical flat to round 100-75
Transition 90° round to flat

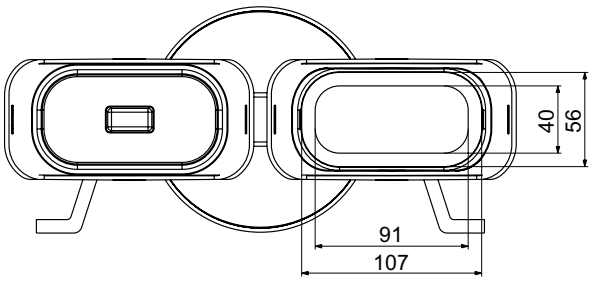


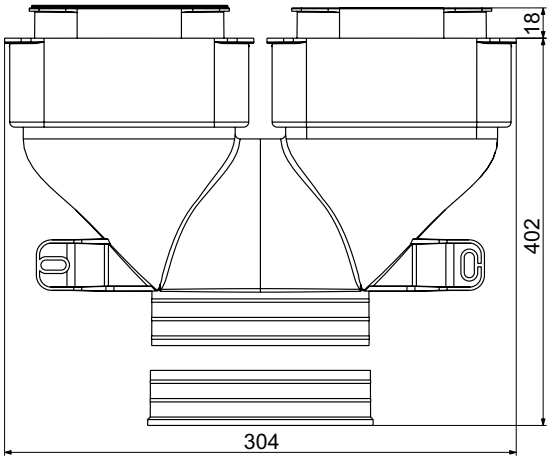
Outlet round, lateral 90° 125-2 x 100
for flat channel 100
incl. mounting bracket



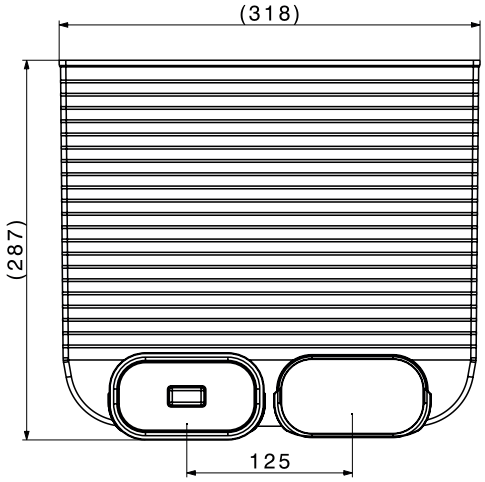


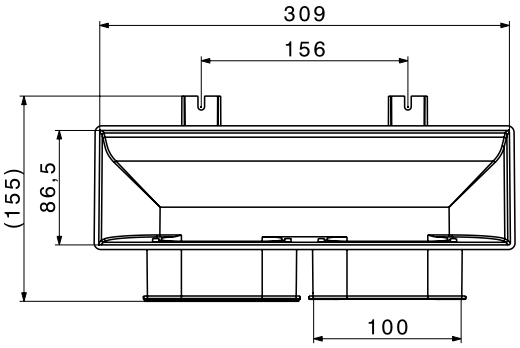
Outlet round, front 125-2 x 100
for flat channel 100
incl. mounting bracket



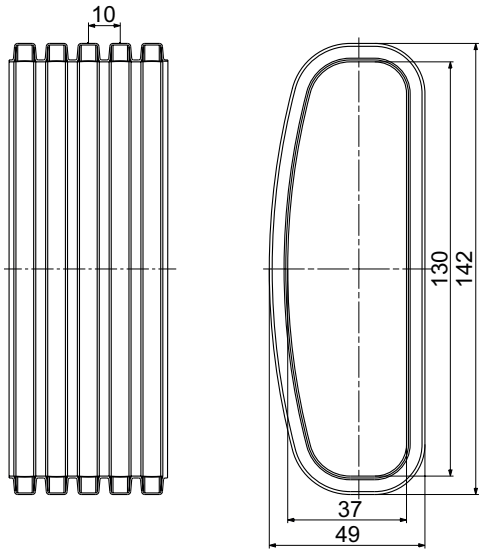


Floor exhaust flat 2 x 100
309 x 86.5 mm interior
2 flat channel 100 connections

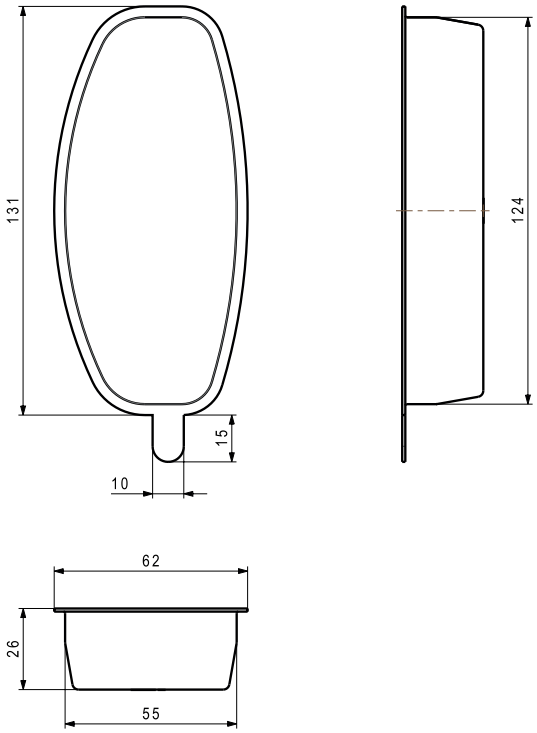




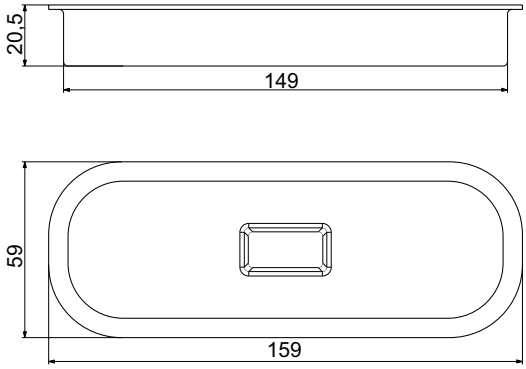
Flat channel 140
Flexible ventilation pipe 142 x 49 mm
Roll length 20 m
minimum bending radius 200 mm



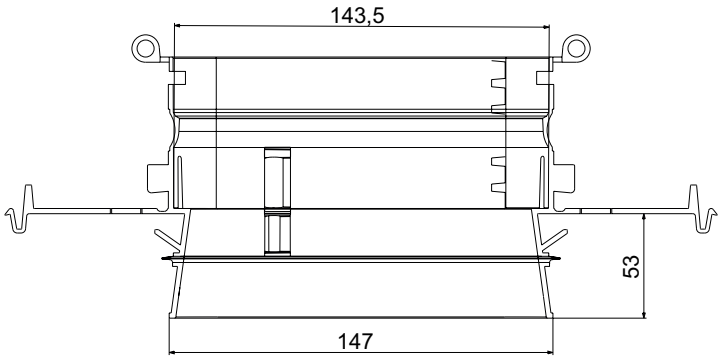
Plug flat channel 140

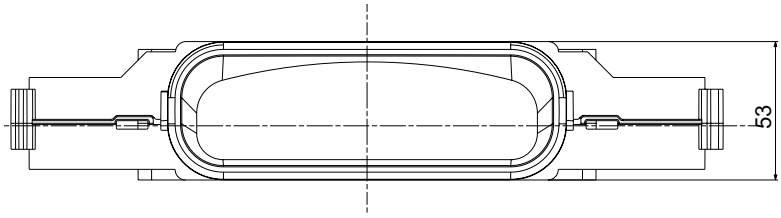


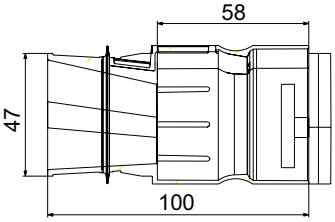
Stopper flat 140
for flat channel system 140 connections



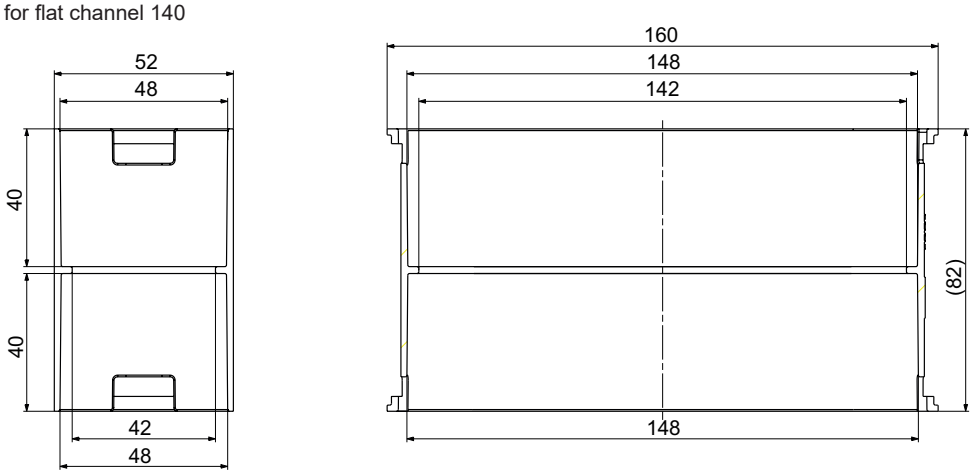
Seal flat 140
for flat channel 140



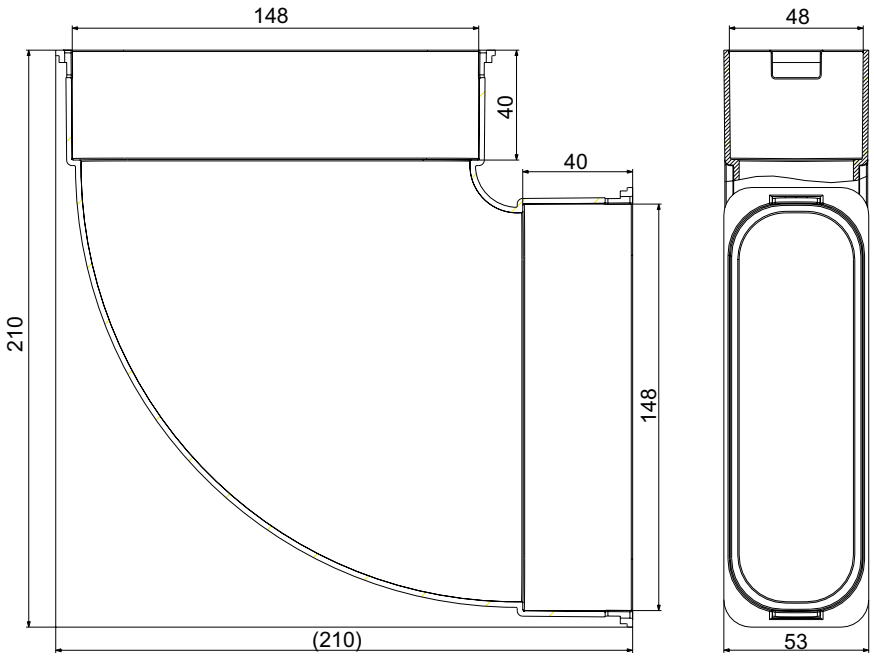




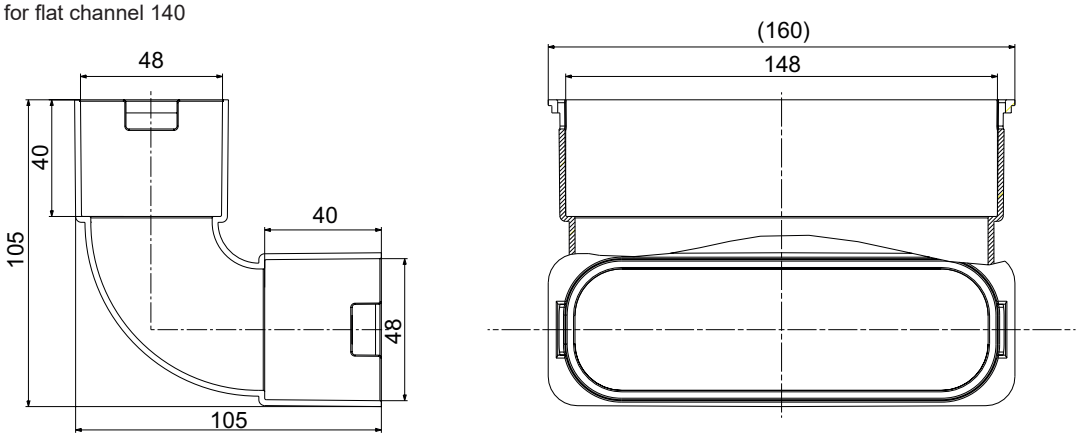
Sleeve 140
for flat channel 140



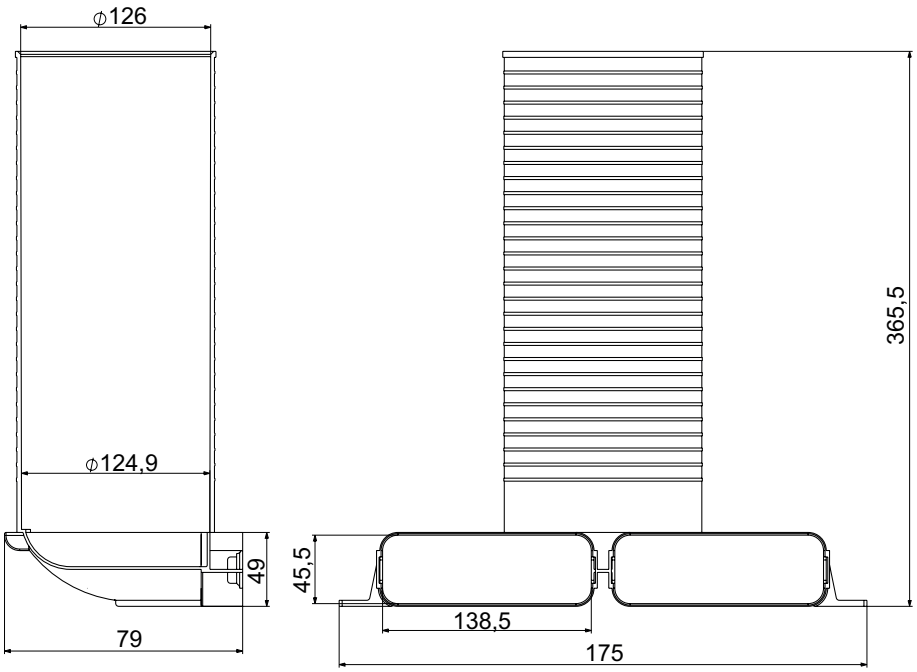
Arch horizontal flat 140
for flat channel 140



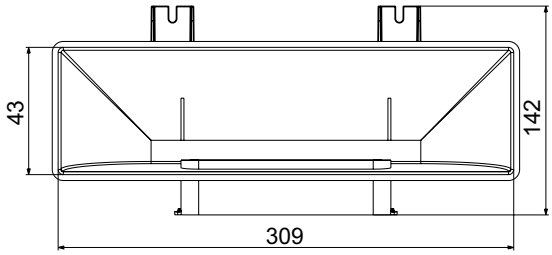
Arch vertical flat 140
for flat channel 140

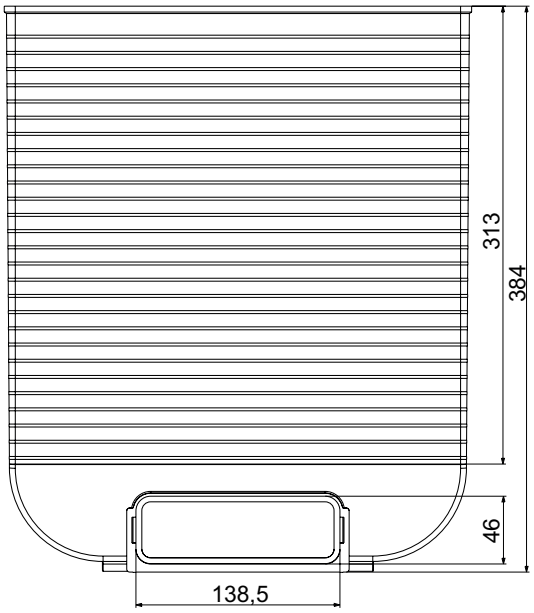


Outlet round, lateral 90° 125-2 x 140
for flat channel 140
incl. mounting bracket

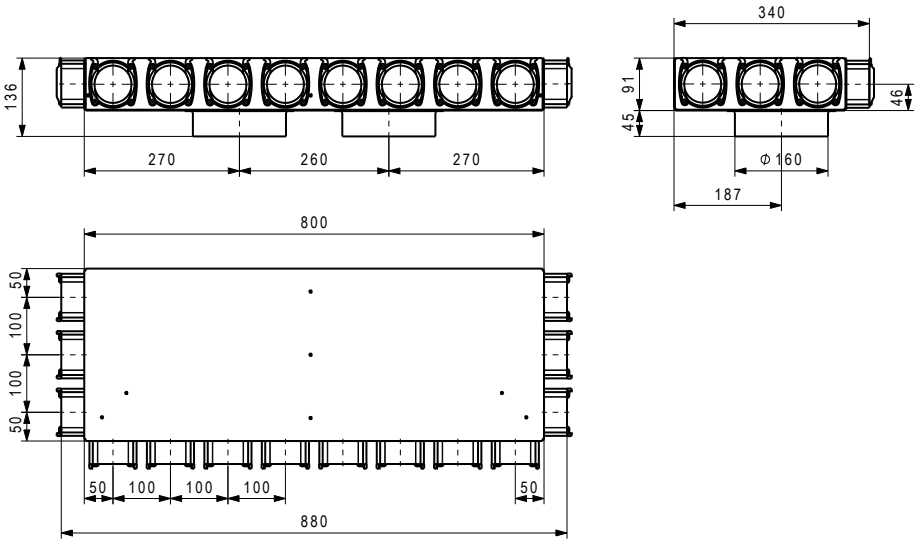


Floor exhaust flat 1 x 140
309 x 85 mm interior
1 flat channel 140 connection



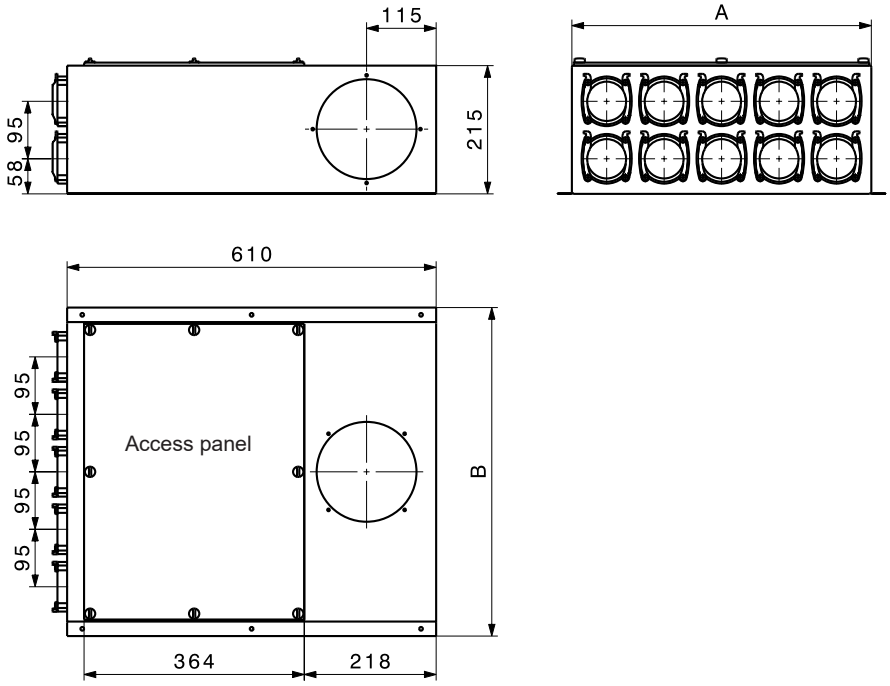


Distribution cases DN 160



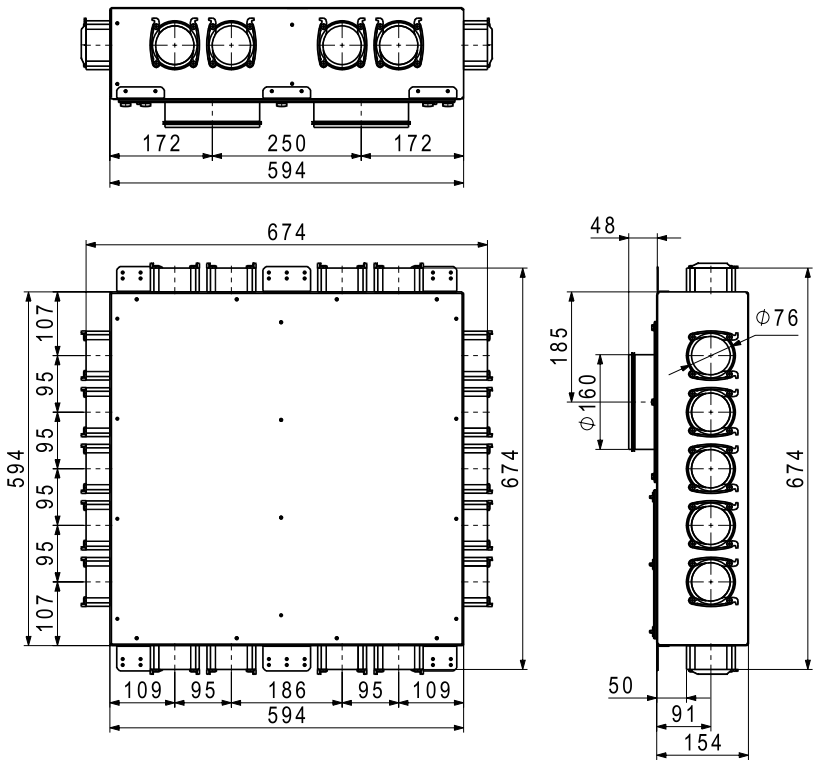
Distribution box VTB-160 14 x 75
Air distribution box of aluzinc sheet
without access panel.
Connection nozzles:
2 x DN 160 supply and extract air
supply air 7 x DN 75 (4 x front and 3 x side)
extract air 7 x DN 75 (4 x front and 3 x side)

Distribution cases DN 160



Distribution case for 6, 8 or 10 connections VK-160-75
This distribution case with an integrated silencer is used if the pipes can be arranged and laid centrally. Orifices for setting the air quantity per flexible pipe DN 75 (included in the scope of delivery).
In type VK, the DN 75 connections are on the end; the connection nozzle DN 160 is supplied and can be installed on the end, top or on the left or right side. The distribution case is suitable for on-wall installation.

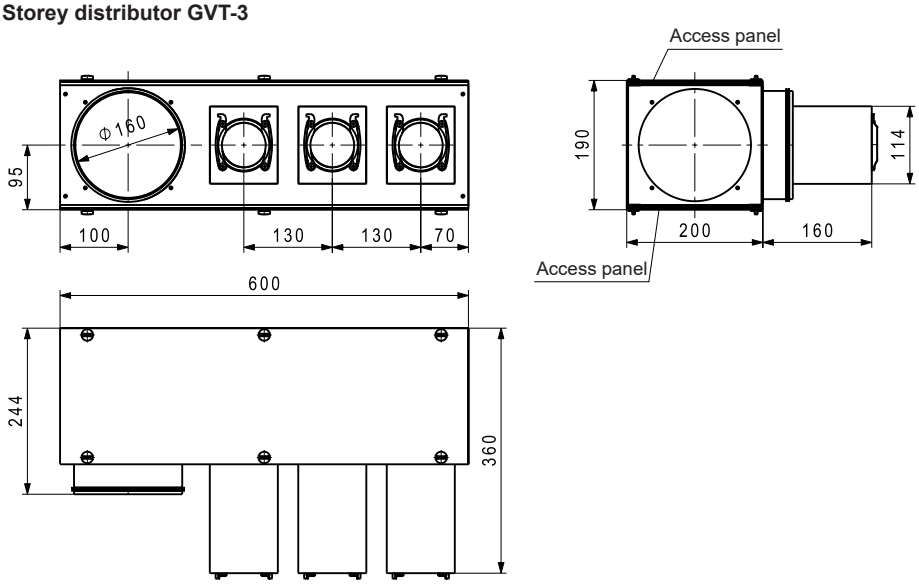
Type	A	B	n
VK-160-75 x 6	305	355	6
VK-160-75 x 8	400	450	8
VK-160-75 x 10	495	545	10



Distribution box VTB-160 9 x 75
for concrete installation
Distribution box of aluzinc sheet with access panel (can be painted on site). Lined on the inside with sound absorbing material.
Connection nozzle:
2 x DN 160 (downward)
Supply air 9 x DN 75
(5 x side/2 x front and rear each)
Extract air 9 x DN 75
(5 x side/2 x front and rear each)
Consisting of: box, 6 connection brackets, 4 end caps, incl. throttle orifices.

Distribution cases DN 160

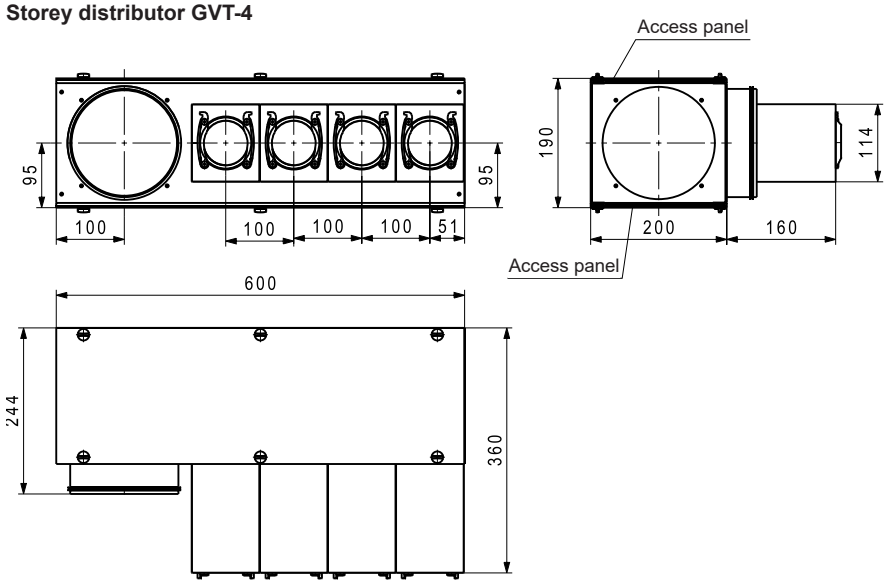
Storey distributor GVT-3



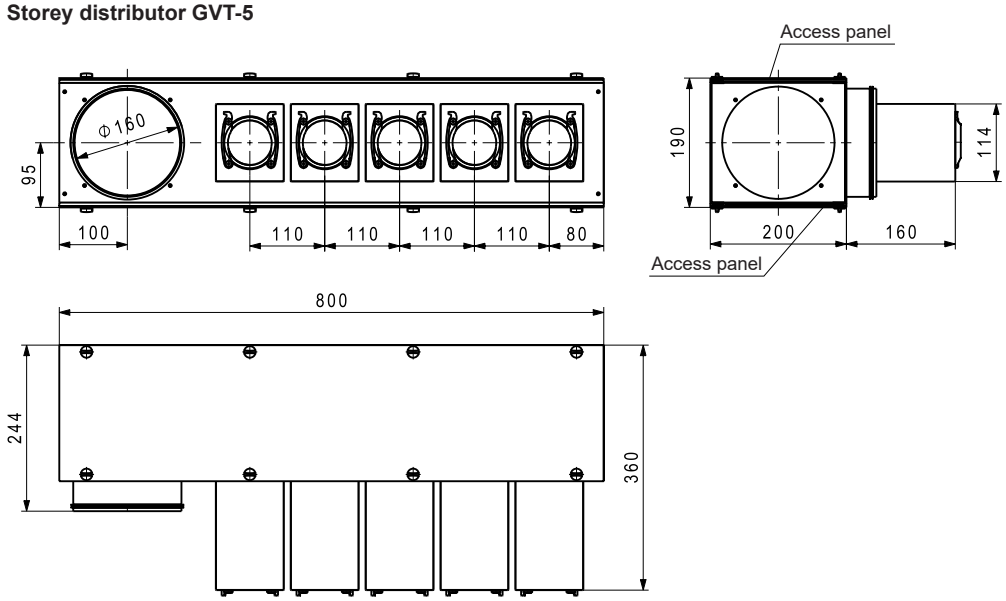
Storey distributor GVT-3 ... GVT-6
Storey distributor with 4 connection options for the main duct,
incl. 2 connection nozzles DN 160,
incl. 3 sealing caps DN 160.
Flexible installation and easy cleaning of the pipes via the access panels on both sides. Orifices for setting the air quantity per flexible pipe DN 75 or DN 90 (included in the scope of delivery). Resonators for sound insulation.
Material: Galvanised steel
Inside lining: Sound absorbing mat

The mounting holder MH
for floor distributor GVT-3 ... GVT-6
must be ordered separately.

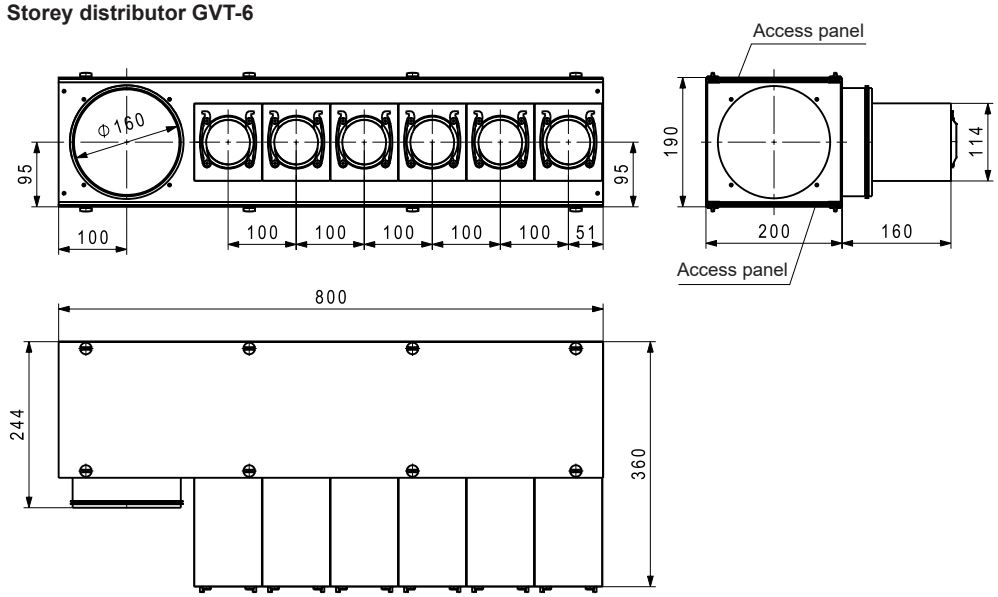
Storey distributor GVT-4



Storey distributor GVT-5

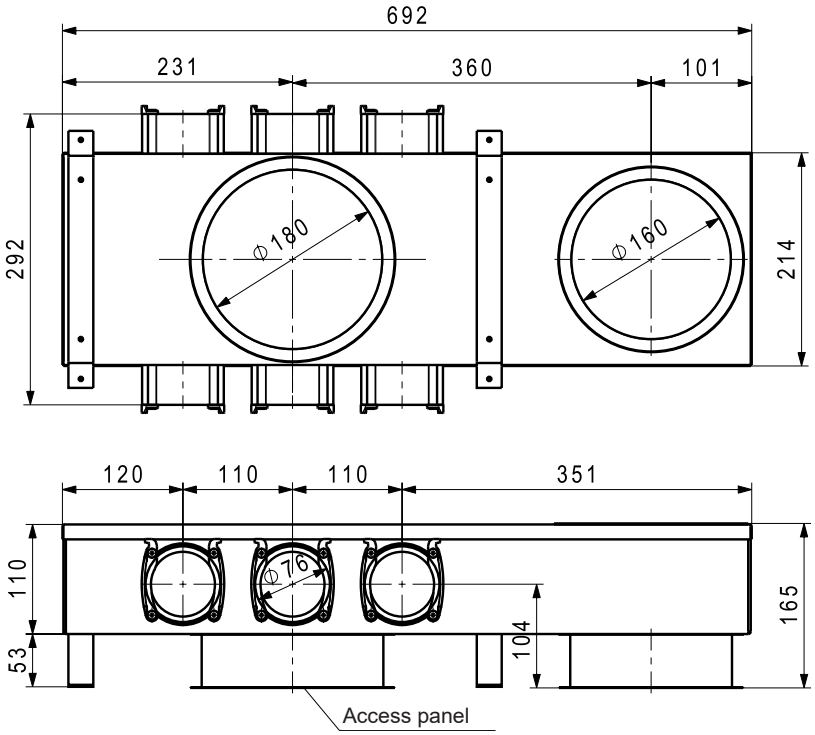


Storey distributor GVT-6



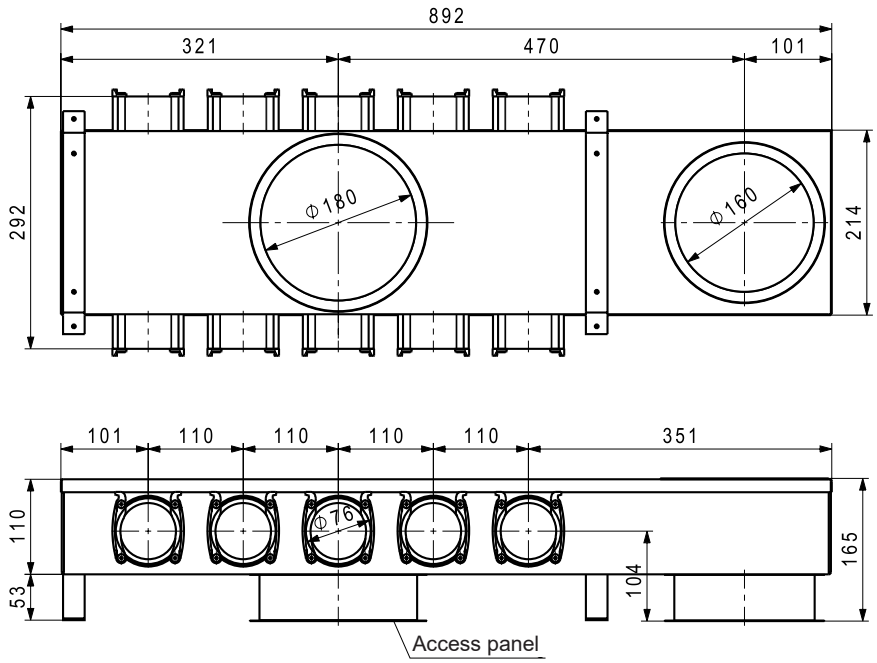
Distribution cases DN 160

UPVK 75 x 6



In-wall distribution case 75 x 6
for concrete installation
Distribution case of aluzinc sheet. With one connection nozzle DN 160 (upwards and downwards) and 2 x 3 nozzles DN 75 (lateral), incl. 2 end covers, 1 spigot DN 160, inside lining of sound insulating material, orifices for setting the air quantity per flexible pipe.

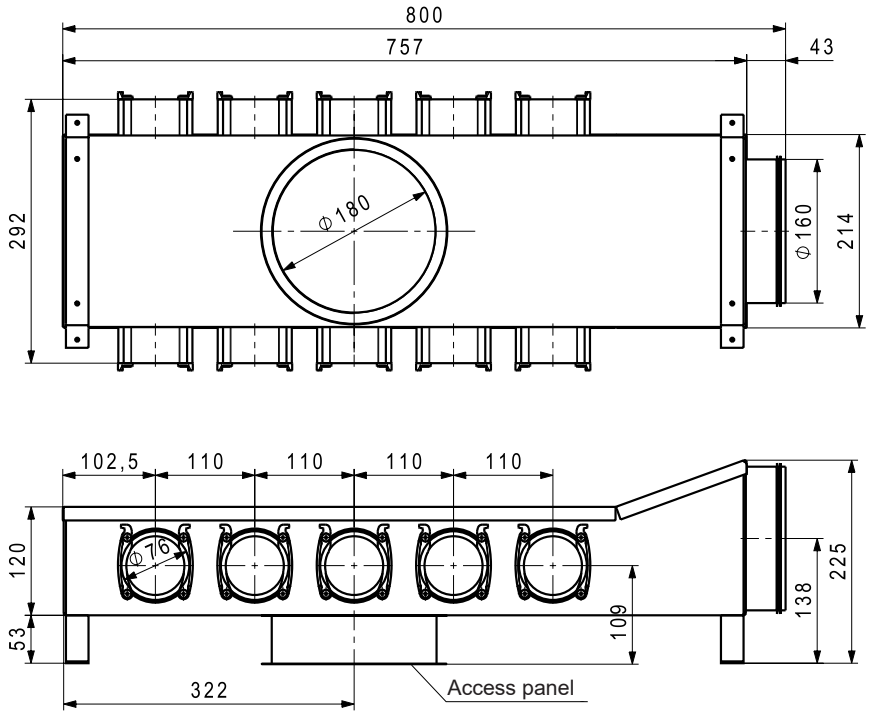
UPVK 75 x 10



In-wall distribution case 75 x 10
for concrete installation
Distribution case of aluzinc sheet for encasing in concrete. With one connection nozzle DN 160 (upwards and downwards) and 2 x 5 nozzles DN 75 (lateral), incl. 4 end covers, 1 spigot DN 160, inside lining of sound insulating material. Orifices for setting the air quantity per flexible pipe.

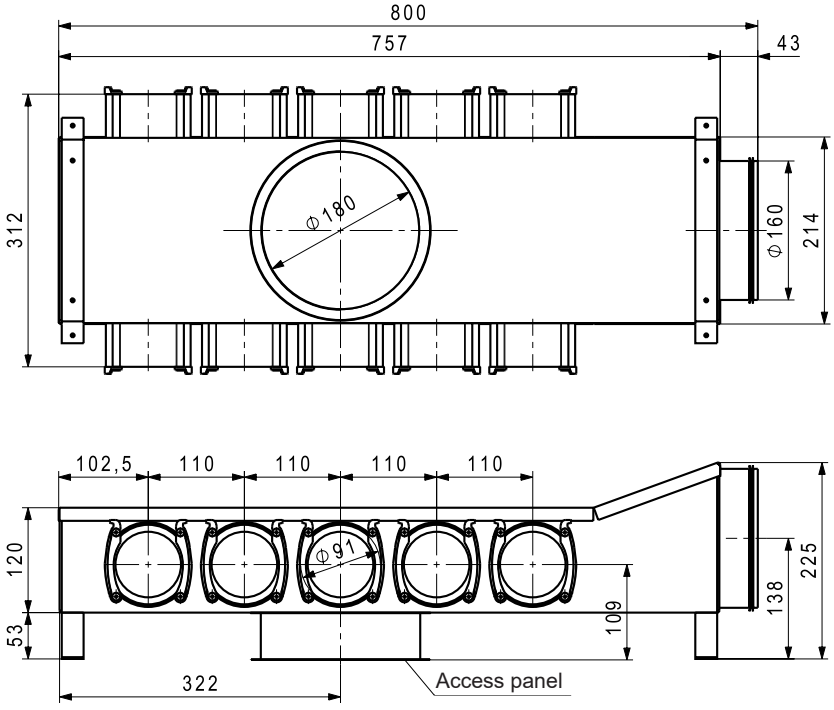
Distribution cases DN 160

In-wall distribution case UPVKS 75 x 10



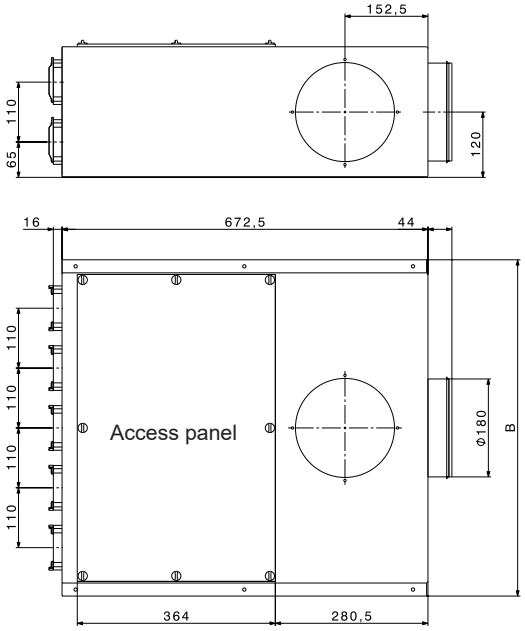
In-wall distribution case UPVKS 75 x 10 / 90 x 10
for concrete installation
Distribution case made from aluzinc sheet. With one connection nozzle DN 160 (on face) and 2 x 5 nozzles DN 75 and DN 90 (lateral), incl. 4 end covers, inside lining of sound insulating material, incl. throttle orifices.

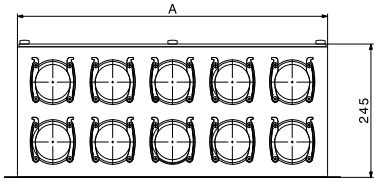
In-wall distribution case UPVKS 90 x 10



Distribution cases DN 180

Distribution case VK-180-75



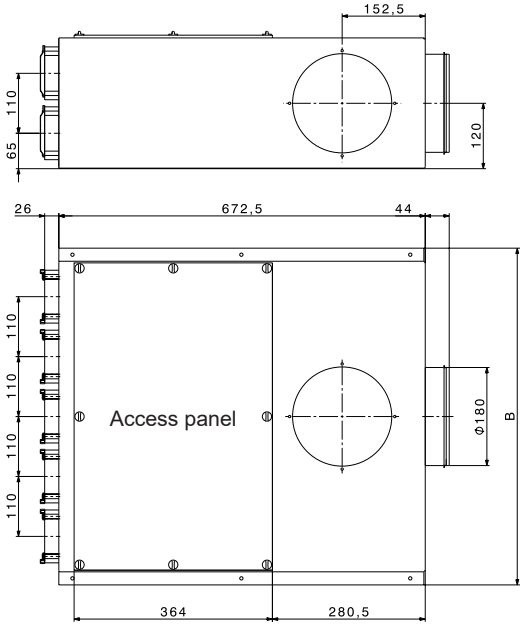


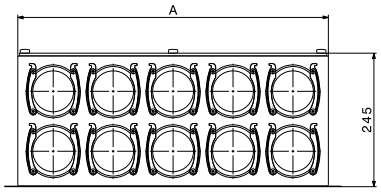
Distribution case for 8, 10 or 12 connections VK-180-75 resp. VK-180-90
This distribution case with an integrated silencer is used if the pipes can be arranged and laid centrally.
Incl. throttle orifices.
In type VK, the DN 75 resp. DN 90 connections are on the end; the connection nozzle DN 180 is supplied and can be installed on the end, top or on the left or right side. The distribution case is suitable for on-wall installation.

Dimensions distribution case VK-180-75x..

type	A	B	n
VK-180-75 x 8	460	508	8
VK-180-75 x 10	570	618	10
VK-180-75 x 12	680	728	12

Distribution case VK-180-90

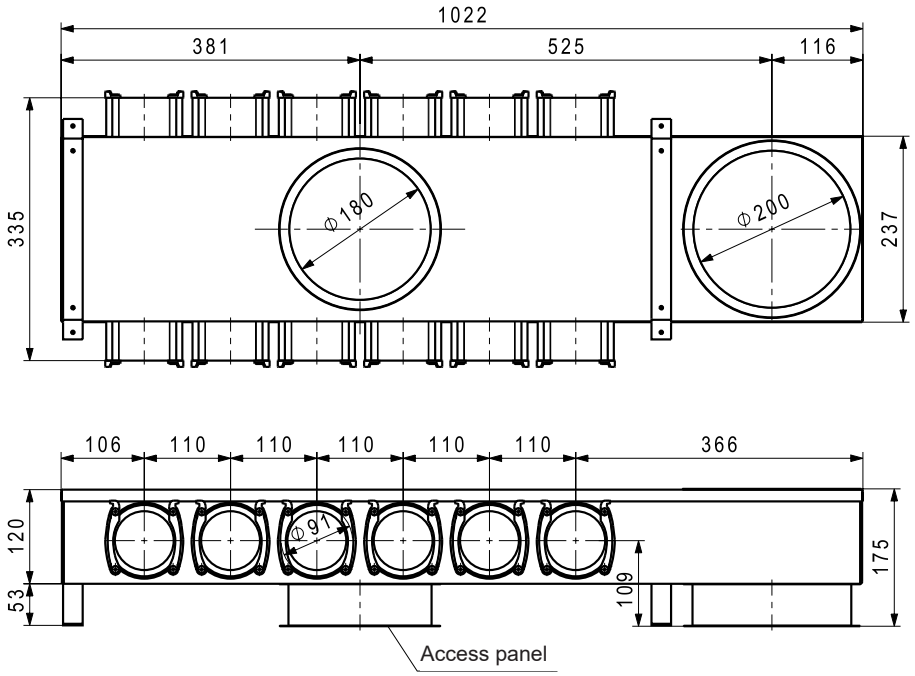




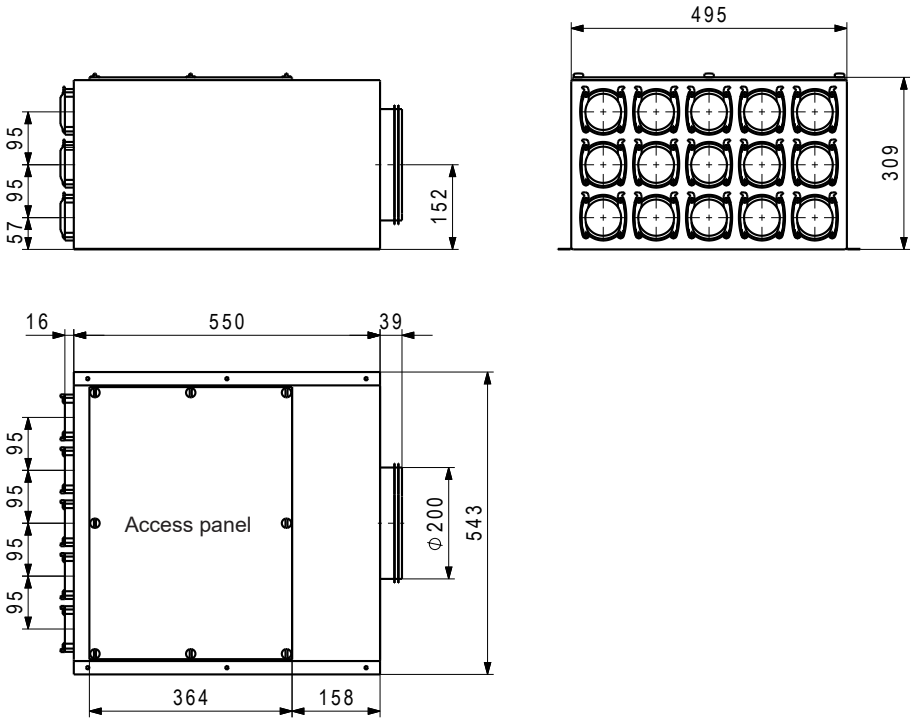
Dimensions distribution case VK-180-90x..

type	A	B	n
VK-180-90 x 8	460	508	8
VK-180-90 x 10	570	618	10
VK-180-90 x 12	680	728	12

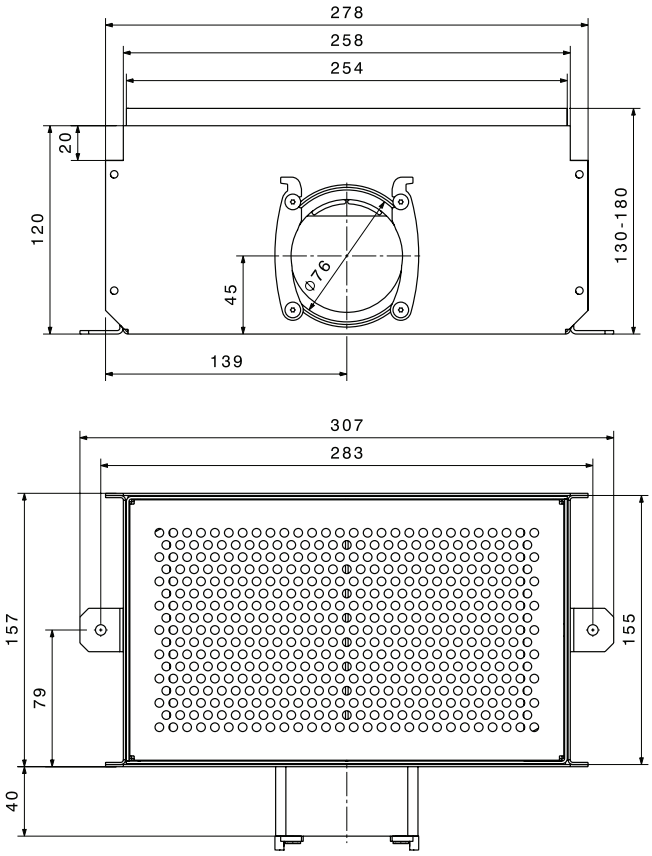
Distribution cases DN 200



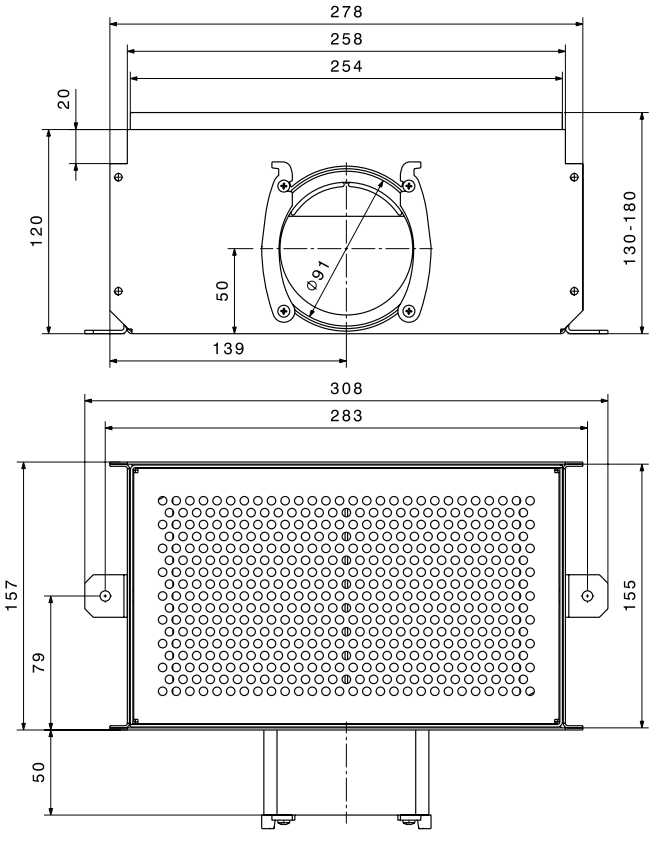
In-wall distribution cases UPVK-200 90 x 12
for concrete installation
Distribution case made from aluzinc sheet.
Lined on the inside with sound absorbing material.
Connection nozzles:
2 x DN 200, 2 x 6 DN 90 (sideways).
Incl. end covers, 1 connection nozzle DN 200, incl. throttle orifices



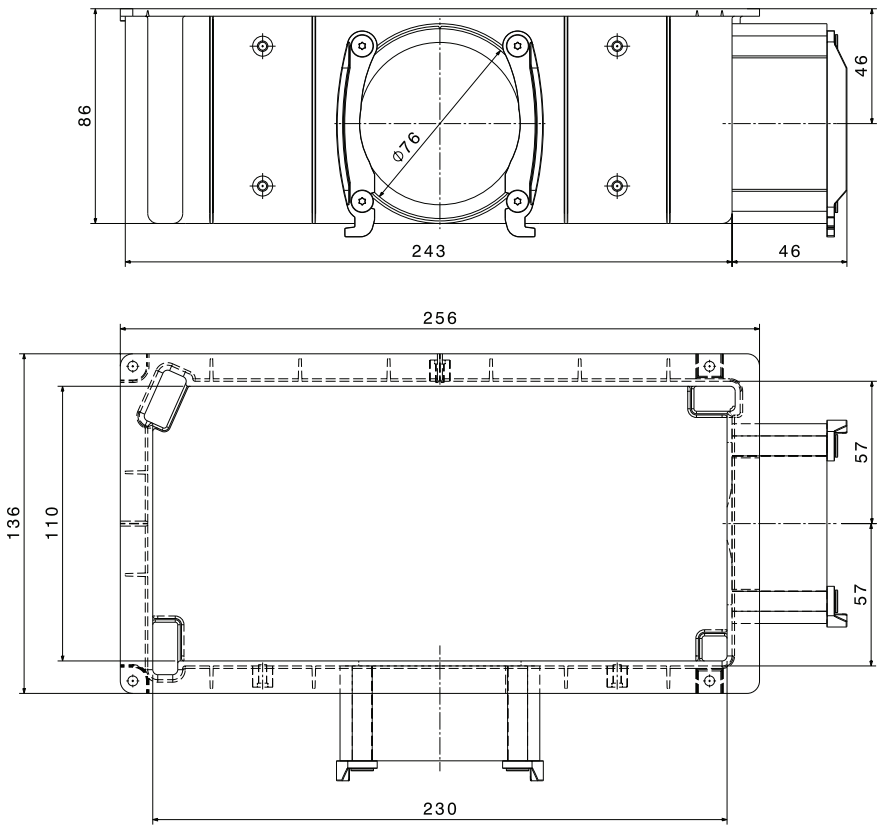
Distribution case VK-200 75 x 15
Distribution case of aluzinc sheet with access panel.
Inside with sound absorption block.
Connection nozzles:
1 x DN 200 (on the back)
15 x DN 75 (on the front)
Incl. throttle orifices



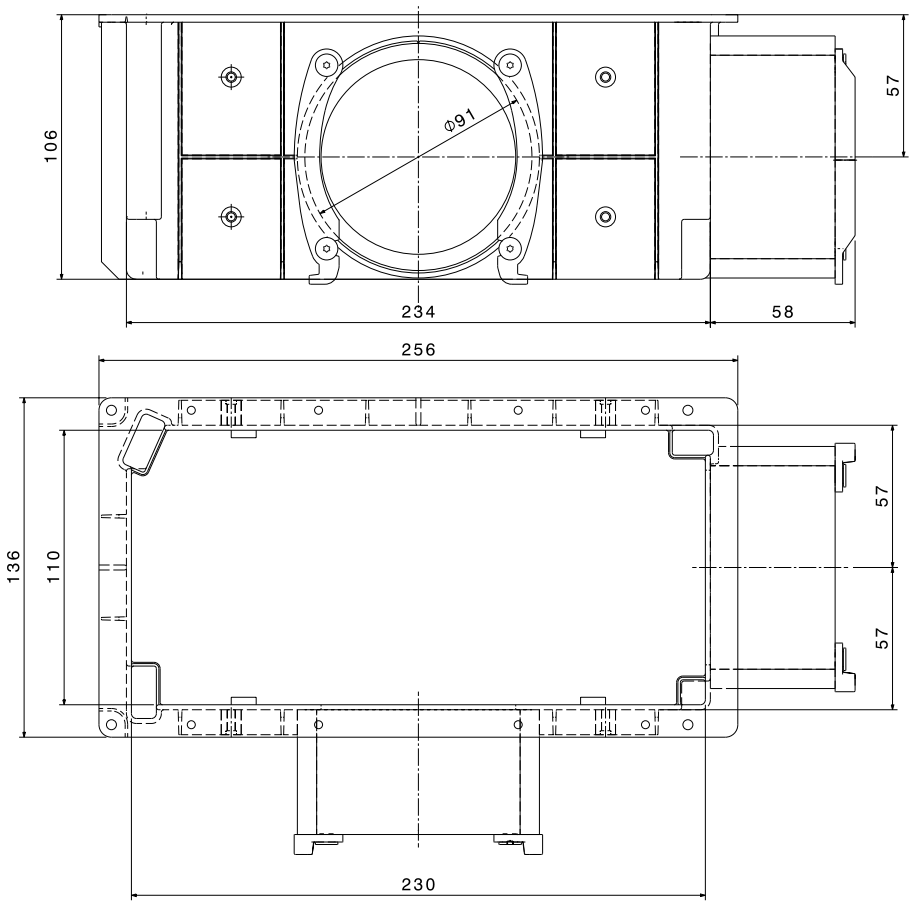
Floor grille BD-30-75
For installation in the floor structure, supply air flow rate 30 m³/h. Perforated stainless steel grille in an adjustable casing, height 130-180 mm, inner component of stainless steel with 3 contact points, outer component of aluzinc sheet with 2 fastening catches and one connection nozzle for flexible pipe FR-75.
Only suitable for supply air.



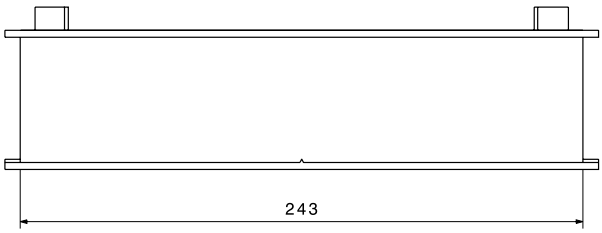
Floor grille BD-30-90
For installation in the floor structure, supply air flow rate 40 m³/h. Perforated stainless steel grille in an adjustable casing, height 130-180 mm, inner component of stainless steel with 3 contact points, outer component of aluzinc sheet with 2 fastening catches and one connection nozzle for flexible pipe FR-90.
Only suitable for supply air.



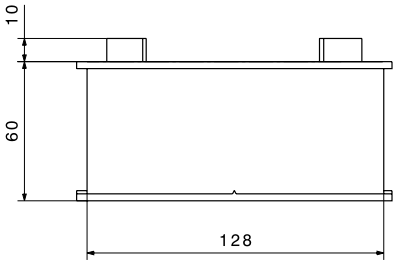
Connection housing AG-60
In combination with the design grilles. The extension allows fine adjustment of the grille (rotating) after installation. Suitable for installation in mass concrete, masonry walls or lightweight construction. Of plastic with 2 connection nozzles DN 75. Incl. fixing angles, sound absorbing mat and insert block as building protection cover and plastering aid.

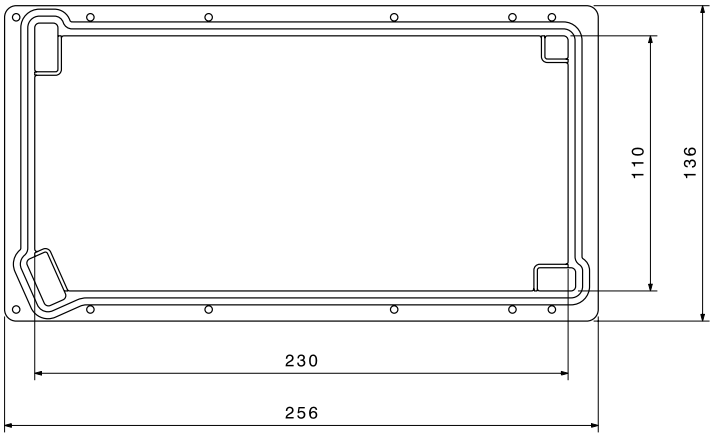


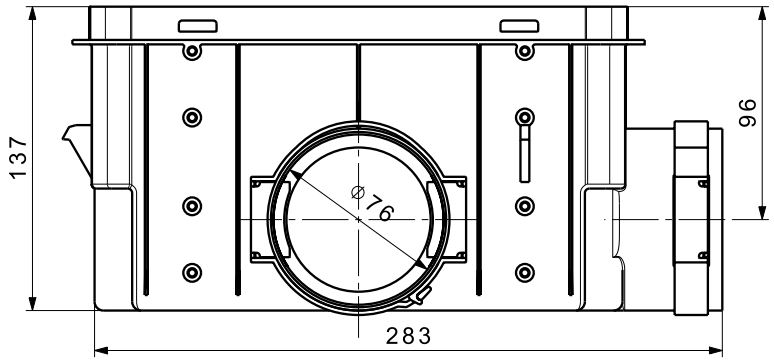
Connection housing AG-90
In combination with the design grilles. The housing allows fine adjustment of the grille (rotating) after installation. Suitable for installation in mass concrete, masonry walls or lightweight construction. Of plastic with 2 connection nozzles DN 90. Incl. fixing angles, sound insulation mat and insert block as building protection cover and plastering aid.



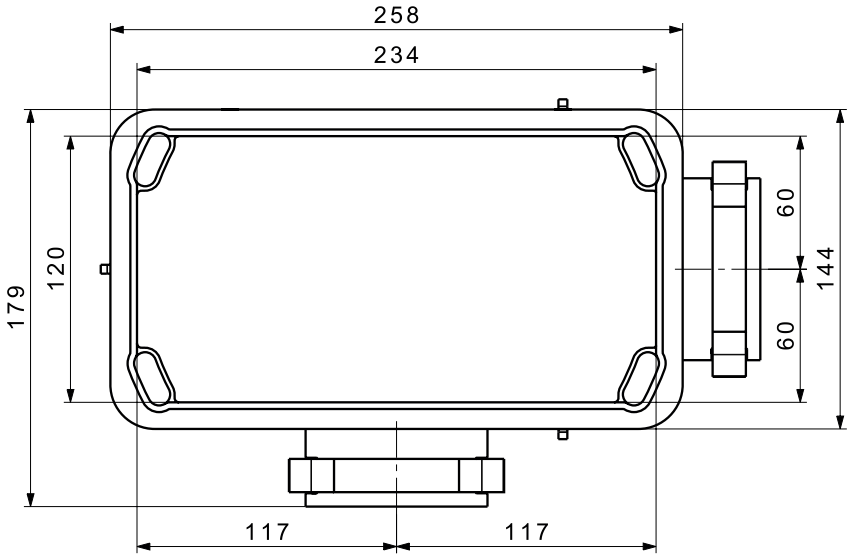
Extension VAG-60/VAG-90
For installation of AG-60 and AG-90 on the formwork panel. Extension permits precise grille alignment after installation.

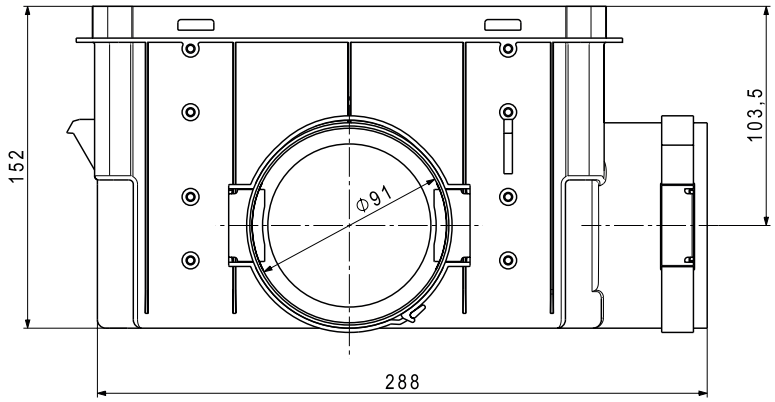


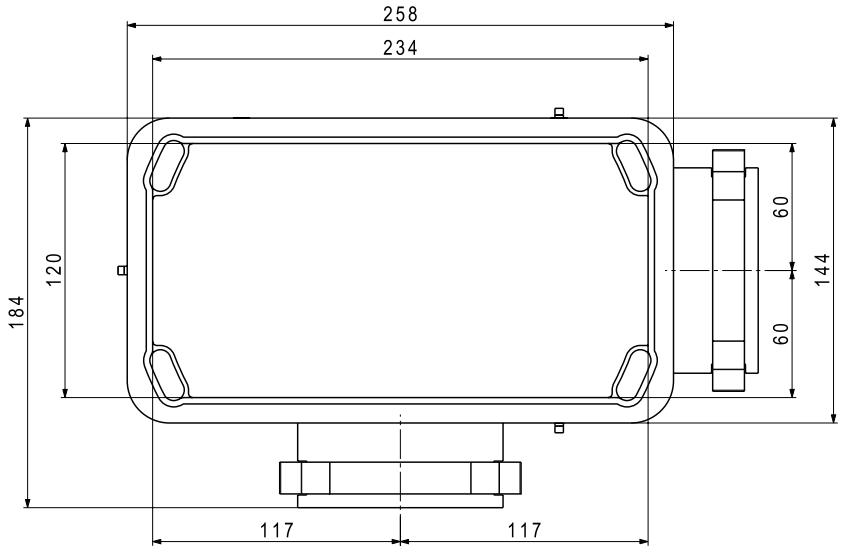




Connection housing quick 75
for supply and extract air incombination with the design grilles. The housing allows fine adjustment of the grilles after installation. Plastic housing with 2 connection nozzles DN 75. Very easy to mount, no nails in concrete after stripping.
Supply air:
1 x DN 75 up to 30 m³/h
2 x DN 75 up to 40 m³/h
Extract air:
1 x DN 75 up to 30 m³/h
2 x DN 75 up to 60 m³/h

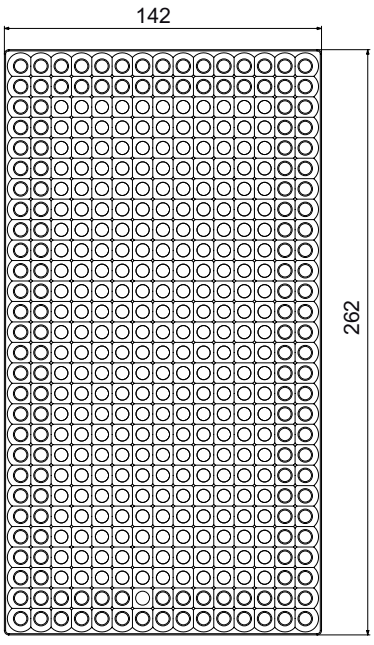




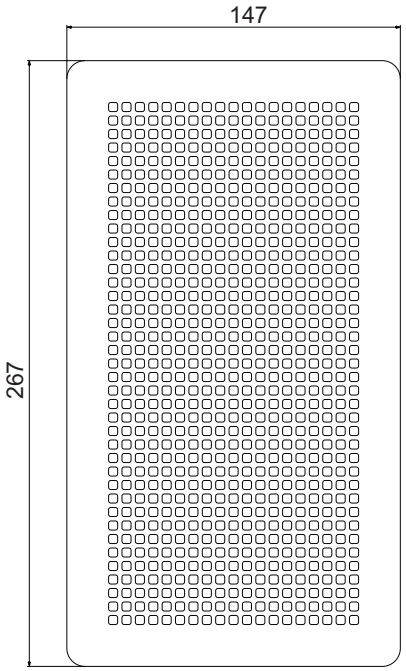


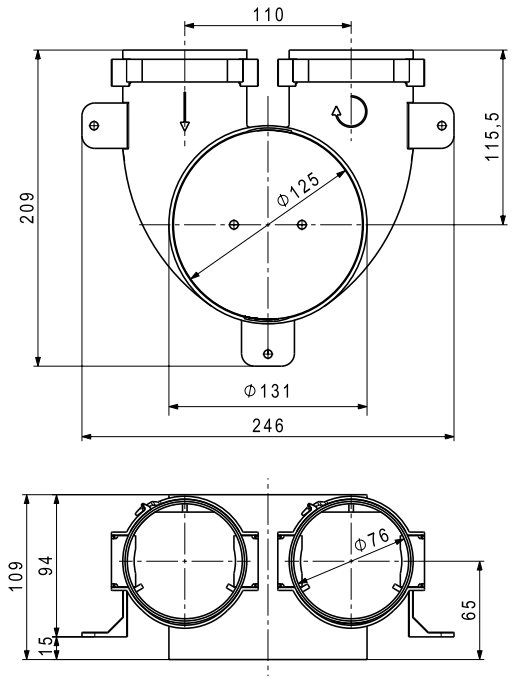
Connection housing quick 90
for supply and extract air in combination with the design grilles. The housing allows fine adjustment of the grilles after installation. Plastic housing with 2 connection nozzles DN 90. Very easy to mount, no nails in concrete after stripping.
Supply air:
1 x DN 90 up to 40 m³/h
Extract air:
1 x DN 90 up to 60 m³/h
Suitable for installation in mass concrete

Design grille made of plastic
The grille is mounted on the connection housing AG-60 or the connection housing quick 75/90. There are four grille designs (Pazifik, Adria, Atlantik, Karibik). The outside dimensions are identical for all grilles. The wall/ceiling plaster must not exceed 30 mm.



Design grille made of metal
The grille is mounted on the connection housing AG-60 or the connection housing quick 75/90. There are four grille designs (Alvier, Säntis, Pizol, Pilatus) in different variants (brushed stainless steel or brushed and anodised aluminium or painted white RAL 9016). The outside dimensions are identical for all grilles. The wall/ceiling plaster must not exceed 30 mm.

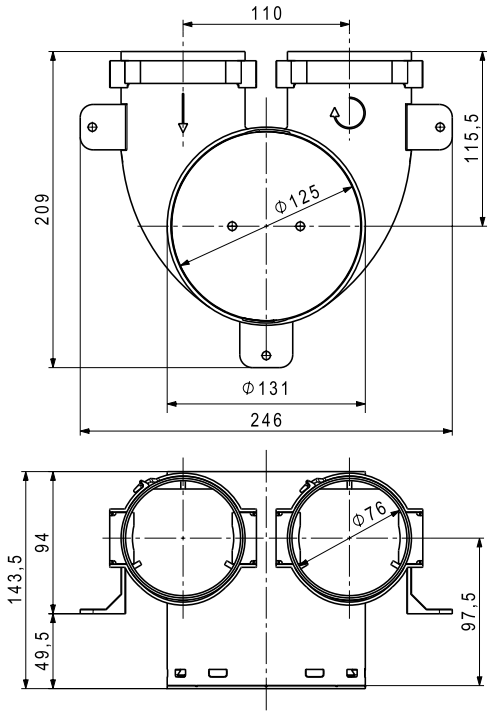




Connection cylinder quick 75 short
For masonry, lightweight and wood construction. Plastic casing, two connections DN 75 incl. 1 stopper DN 75

Supply air:
1 x DN 75 up to 30 m³/h
2 x DN 75 up to 40 m³/h
With tangential outlet only 1 x DN 75

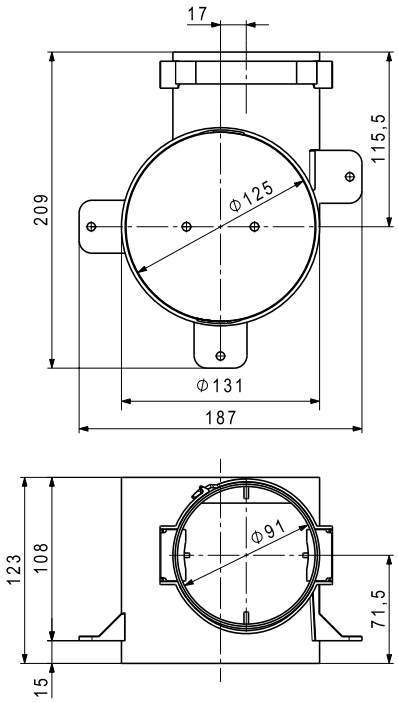
Extract air:
1 x DN 75 up to 30 m³/h
2 x DN 75 up to 60 m³/h



Connection cylinder quick 75 medium
For element ceiling 60 mm, solid concrete. Plastic casing, two connections DN 75 incl. 1 stopper DN 75 and building protection cover

Supply air:
1 x DN 75 up to 30 m³/h
2 x DN 75 up to 40 m³/h
With tangential outlet only 1 x DN 75

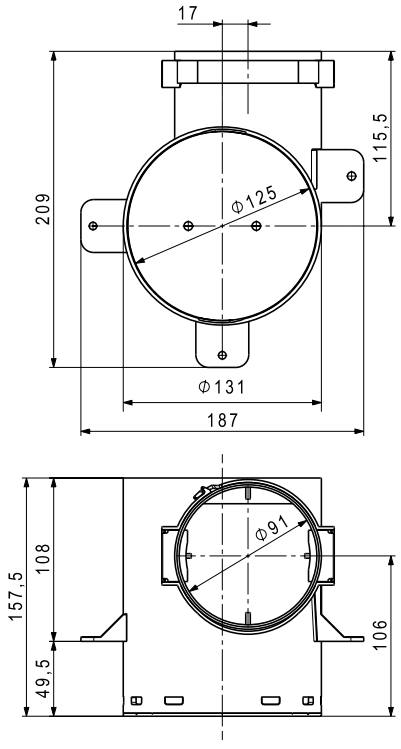
Extract air:
1 x DN 75 up to 30 m³/h
2 x DN 75 up to 60 m³/h



Connection cylinder quick 90 short
for masonry, lightweight and wood construction. Plastic casing, with connection DN 90

Supply air:
1 x DN 90 up to 40 m³/h

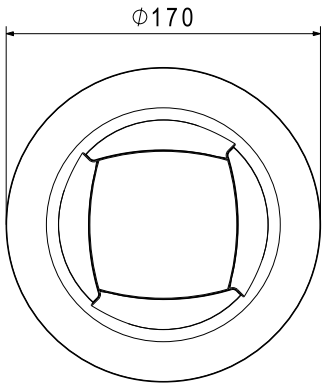
Extract air:
1 x DN 90 up to 60 m³/h



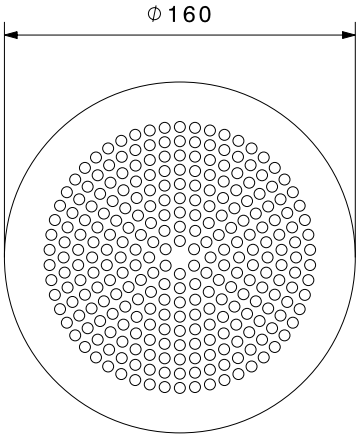
Connection cylinder quick 90 medium
for element ceiling up to 60 mm, solid concrete.
Plastic casing, with connection DN 90
incl. building protection cover

Supply air:
1 x DN 90 up to 40 m³/h

Extract air:
1 x DN 90 up to 60 m³/h

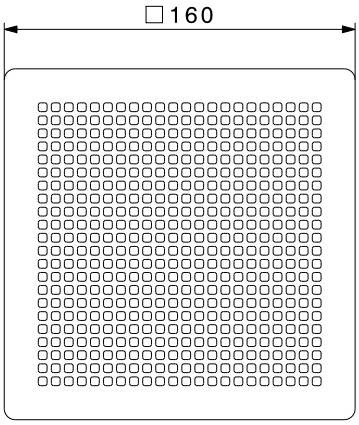


Design grille Tangential 125
suitable for:
Connection cylinder quick 75 and 90 made of plastic, with plug-in connection.
Colour: white RAL 9016, can be painted on site
Supply air up to 40 m³/h
Extract air up to 50 m³/h



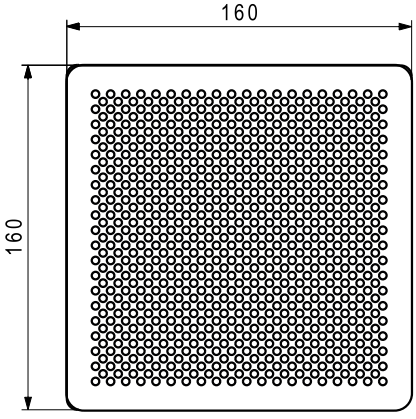
Stainless steel design grille Falknis
suitable for:
Connection cylinder quick 75 and 90
Brushed stainless steel
With plug-in connection
Supply air up to 40 m³/h
Extract air up to 50 m³/h

Design grille Falknis painted white
suitable for:
Connection cylinder quick 75 and 90
Steel, painted white (RAL 9016)
With plug-in connection
Supply air up to 40 m³/h
Extract air up to 50 m³/h



Stainless steel design grille Calanda
suitable for:
Connection cylinder quick 75 and 90
Brushed stainless steel
With support for connection cylinder quick 75 and 90.
Supply air up to 40 m³/h
Extract air up to 50 m³/h

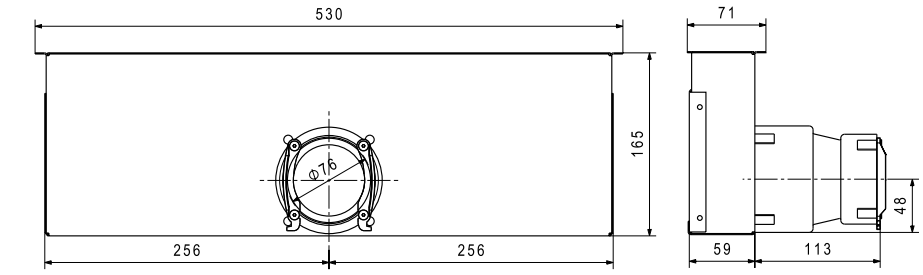
Design grille Calanda painted white
suitable for:
Connection cylinder quick 75 and 90
Steel, painted white (RAL 9016)
With plug-in connection
Supply air up to 40 m³/h
Extract air up to 50 m³/h

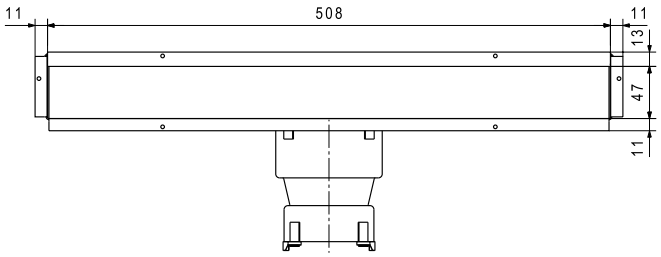


Design grille Rigi aluminium
Suitable for connection cylinder quick 75 and 90
Aluminium sheet with flanged edges
Surface: anodized brushed aluminium
With holding fixture for connection cylinder quick 75 and 90.
Supply air up to 40 m³/h
Extract air up to 60 m³/h

Design grille Rigi white
Suitable for connection cylinder quick 75 and 90.
Aluminium sheet with flanged edges
Painted white (RAL 9016)
With holding fixture for
connection cylinder quick 75 and 90
Supply air up to 40 m³/h
Extract air up to 60 m³/h

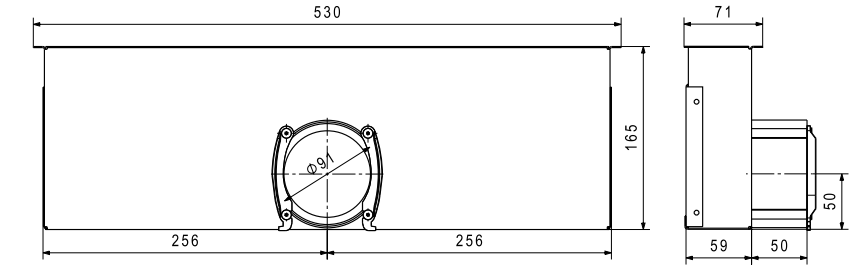
Connection box SD-75

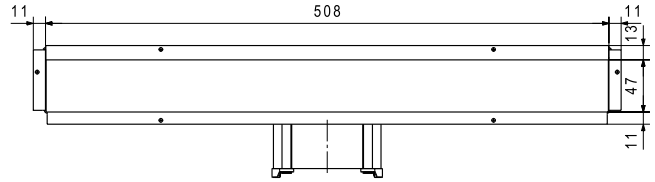




Connection box SD-75 and SD-90
The slit grille is used for linear supply air distribution. It can be set to one or two outlet sides when taken into service, as required (preset to two sides).
The flow rate is set in the distribution case.

Connection box SD-90





Relevant standards and regulations (incomplete)

- DIN 1946-T6: Controlled mechanical supply and extract air handling for apartments with heat recovery
- DIN 4109: Sound insulation in structural engineering
- DIN EN 779: 2012 Particulate air filters for general ventilation – determination of the filtration performance
- DIN 18017-T3: Ventilation of bathrooms and WCs without outside windows
- Building Energy Act GEG
- Ventilation System Guideline LüAR

General

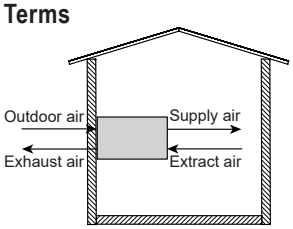
The following information is required for planning the comfort ventilation:

- Type, number, surface area and utilisation of the rooms included in the ventilation
- Floor plans and clear room heights
- Possible locations for routing distribution lines and outlets (ceiling, floor structure, outside wall, etc.)

One comfort ventilation device is only allowed to be used for one utilisation unit. The application limits must be complied with.

Fire protection requirements must be clarified with the responsible specialist. Normally (model building code), there are no special fire protection requirements within usage units with max. 2 dwelling units comprising in total less than 400 m² surface area and less than 7 m height. Living area ventilation units do not replace the drying out of the building. This should be completed by the time the living area ventilation is taken into operation. In the first few winters, additional window ventilation may be necessary depending on the room humidity, e.g. after showering or cooking.

Terms



Depending on the use to which they are put, rooms are divided into supply air, overflow and extract air areas (table 1). Rooms are only equipped with both supply and extract air ports in exceptional cases. Rooms equipped with comfort ventilation must be located within the thermal (insulated) building shell.

Flow rates

Necessary flow rates must be defined for a specific project on the basis of the current status of the relevant standards. Special requirements, e.g. concerning noise, moisture loads and temperatures must be taken into account. The following design recommendations are based on DIN 1946 part 6, although compliance with this standard must be examined on a case-by-case basis.
The largest of the volume flows described in the following 4 points is used as the basis for the nominal ventilation of the ventilation unit (e.g. total of all extract air volume flows however max. 1.2 times the value from Table 2). The maximum air flow rate of the ventilation unit should be sufficient for intensive ventilation (1.3 x nominal ventilation at 170 Pa, for example).

1. A flow rate of 30 m³/h must be provided per person for the residential unit.
2. The area-related minimum flow rates in Table 2 must be complied with.
3. The flow rates in Table 3 must be guaranteed for extract air rooms.
4. The flow rates in Table 4 are recommended for supply air rooms.

Table 1

Zone	**Room use (examples)**
Supply air zone	Bedroom, living room, nursery, dining room
Overflow zone	Corridor, hallway, stairway
Extract air zone	Bathroom, toilet, storage room, kitchen, hall

Table 2

Relevant surface A_{NE} [m²]	**20**	**30**	**50**	**70**	**90**	**110**	**130**	**150**	**170**	**190**	**210**
Nominal ventilation $V_{R,NL}$ [m³/h]	35	45	65	80	100	115	125	140	150	155	165

Table 3: extract air

Room type	**Extract air** [m³/h]	**n ***
Kitchen, kitchenette	40	2
Bathroom, toilet with shower	40	2
Toilet	20	1
Utility room, hobby room	20	1

* n = usual number of flexible pipes

Table 4: supply air

Room type	**Extract air** [m³/h]	**n ***
Living room	40-50	2
Master bedroom (2 persons)	40	2
Nursery (1 person)	24	1
Office (private), dining room, guestroom	20	1

* n = usual number of flexible pipes

Supply/extract air

Only directly or indirectly heated rooms are included in the ventilation. All supply and extract lines should be routed within the insulated building envelope.
The position of the supply air, overflow air and extract air openings must be selected such that cross-ventilation occurs. Supply air openings must be positioned outside the occupied area, and in particular not above the head ends of beds, writing desks or couches.
Hoval normally uses round flexible pipes DN 75 or flat channels 100 as distribution lines. For noise and efficiency reasons, they should be 6 and 15 m long. The external pressure drops (outside + supply air or extract + exhaust air incl. distributor and silencer) should not be more than approx. 100 Pa for nominal ventilation. Hoval recommends complying with a maximum pressure drop of 40 Pa for the lines after the distributor (room-side). Flow rates in excess of 27 m³/h rated ventilation must therefore be distributed between 2 lines. In long line runs, it is necessary to carry out a corresponding calculation.
Distributors must be accessible for inserting the throttle orifices and for cleaning.
Lines between the ventilation unit and the supply air distributor or extract air manifold are normally routed with the diameter of the unit coupling. In cool rooms, they must be insulated.

Fresh/exhaust air

The fresh air inlet should be planned in such a way as to avoid the intake of pollutants and smells. It should be at least 2 m above ground and not close to garages or roads with heavy traffic.
The exhaust air outlet should be positioned in such a way that it cannot be drawn in by the outside air inlet. The horizontal distance should be at least 2 m (note the predominant wind direction).
The fresh and exhaust air lines must be insulated over their complete surface and be impervious to vapour diffusion so as to avoid condensation forming on surfaces (e.g. 25 mm EPDM). When laying in shafts, the conditions (temperature and humidity) must be calculated and taken into account. The insulation must be continued through the outer wall at least until shortly below the outside surface.

Silencers

Silencers suitable for the noise emissions of the ventilation units must always be positioned in the supply and extract air lines.
To avoid disturbance of neighbours or on your own patio, for example, it is recommended that silencers should be installed in the exhaust air and possibly also outside air lines.

Unit installation

The ER comfort ventilation units can be mounted in various different installation positions. (mounting on a wall/ceiling/floor, outside air top/bottom). The access panel is present on both sides for installation in opposite direction. The ERT ventilation units are always installed with the nozzles directed upwards.
Vibration dampers (accessories) must be used for mounting in order to avoid noise transmission and to prevent distortion of the unit. The entire comfort ventilation unit as well as its integrated and add-on parts must be accessible for maintenance and servicing work.

The installation conditions in the technical data (temperature, humidity) must be complied with.

Operator terminal/wiring

The comfort air ventilation unit is configured ready-to-connect. For connection with the mains supply a 3 m long cable with plug is supplied. A 230 V mains socket should be provided close to the comfort ventilation unit in the electrical planning. The operator terminal should be installed so that it is visible (fault display, operation).

The comfort ventilation unit and operator terminal are connected by an 8-pin CAT 5 patch ribbon cable. For distances over 3 m, we recommend installing shielded cables 4 x 2 x 0.8 mm² to a network socket (RJ45) close to the comfort ventilation unit and connected to the position of the operator terminal (RJ45 plug). The HomeVent® comfort ventilation unit is supplied with a 3 m long cable with an RJ45 plug for connecting the unit to the socket.

Combination with heating sources

When using ventilation systems together with heating sources, the chimney sweep must be consulted in advance.

Systems extracting air (e.g. cooker hood, ventilation system, central vacuum cleaner, extract air dryer) can give rise to negative pressures and cause hazardous flue gases to be drawn out of the heat source; as a result, a pressure monitor with design certification is generally required as a safety device. This interrupts the electrical power supply to the air extraction system if dangerous pressure conditions arise. The use of approved fire sources independent from the room air can prevent the flue gas being sucked out.

Services

Hoval will be happy to assist you in planning and taking the systems into operation.

IsiPipe and IsiPipe Plus air ducts made of EPP

- The IsiPipe EPP air ducts are joined via a connecting sleeve.
- To ensure tight sealing, the individual sections must be inserted into the sleeve as far as the stop. Tight sealing must be ensured even when individual sections expand or contract as a result of temperature fluctuations.
- The individual sections can be shortened (e.g. using a knife or a saw). When shortening sections, always cut at right angles and remove any residue from the pipe. Use an assembly device, e.g. pipe clamp.
- IsiPipe air ducts made of EPP must be accessible (must not be routed in the cable duct).
- IsiPipe air ducts made of EPP must be supported at regular intervals (approx. every 1.5 m) with pipe clamps.
- When installing accessory parts with a high dead weight, the weight must be supported so that there is no load on the IsiPipe air duct.
- Thermal bridges must be prevented at the junctions between IsiPipe air ducts and pipes or components made of another material, e.g. metal.

1. General

1.1 The following Terms and Conditions shall apply to all our present and future contracts for deliveries and other services (even if the said Terms and Conditions are not specifically mentioned in verbal, telephonic or fax communications).

1.2 All deviations from the present Terms and Conditions, ancillary verbal agreements and subsequent contractual amendments shall only be valid if they have been confirmed by us in writing.

1.3 Buying terms and conditions of the client shall not be valid even if they are not specifically rejected by us. Our Standard Terms and Conditions of Delivery shall be regarded as accepted at the latest upon receipt of our goods and services by the client.

1.4 If a provision of the present Terms and Conditions of Delivery proves to be wholly or partially invalid, the contracting parties shall replace the aforesaid provision by a new provision which comes as close as possible to the legal and economic intention of the invalid provision.

2. Offers

2.1 Our offers shall be subject to change without notice.

2.2 Orders shall only be regarded as accepted when they have been confirmed by us in writing.

2.3 Illustrations, drawings and all technical details in catalogues and printed material shall be approximate values as customary within the industry. They shall only be binding if specific reference is made to them in the contract. We shall also reserve the right to make technical and design changes after the conclusion of the contract.

2.4 Cost estimates, drawings and other documents shall remain our property and shall be subject to copyright protection; they may not be made available to third parties.

3. Regulations in the country of destination

3.1 At the latest at the time of the order, the buyer shall draw our attention to the regulations and standards in force in the country of destination relating to the design of the delivered goods and the operation thereof and also to the execution of services.

3.2 Our deliveries and services shall comply with the regulations and standards in the country of destination provided the buyer has drawn our attention thereto in accordance with Section 3.1.

3.3 The buyer shall duly inform us of any special application features of goods ordered from us if these differ from our general recommendations.

4. Prices

4.1 Our prices shall be ex works, net, excluding packaging.

4.2 All ancillary costs, e.g. freight, insurance, export, transit, import and other approvals, licenses and authentications, shall be for the account of the buyer. The buyer shall also bear all taxes, charges, customs duty, etc., which are levied in connection with the contract.

4.3 We shall reserve the right to make price adjustments if wage rates or material prices change between the date of the order confirmation and the contractual performance of the contract. Price increases shall normally be notified three months in advance. We shall be bound to the price stated in the order confirmation for a period of three months after the effective date of the price increase.

5. Payment terms

5.1 Unless otherwise agreed in writing, our invoices shall be payable within thirty days with no cash discount. Payment shall be deemed to have been made when the amount in question is at our unrestricted disposal on our account in Swiss Franks.

5.2 Payment dates shall be observed even if any delays whatsoever occur after shipment of the goods from our works. The buyer shall not be permitted to reduce or withhold payments on account of complaints or counterclaims not recognised by us.

5.3 Payments shall also be made if insignificant components are missing but usage of the delivered goods is not rendered impossible as a result or if rectification work has to be carried out on the delivery. We shall be entitled to reject rectification of the defect as long as the buyer has not discharged his/its obligations to us.

5.4 If the buyer fails to comply with the agreed payment dates, default interest shall be paid from the agreed due date without a reminder being issued; the aforesaid interest shall be based on the interest rates prevailing at the domicile of the buyer, but shall be not less than four percent above the current discount rate of the Swiss Central Bank.

5.5 We shall be entitled to make deliveries of pending orders dependent upon settlement of outstanding claims.

6. Reservation of title

6.1 Delivered goods shall remain our property (reserved goods) pending full and complete payment of all present and future claims to which we are entitled regardless of their legal cause. This shall also apply if payments are made in settlement of specifically designated claims.

6.2 The buyer shall be entitled to process and sell reserved goods in the ordinary course of business.

6.3 If our reserved goods are combined or intermingled with other goods, the buyer shall hereby transfer his/its ownership rights in the new goods or chattels to us upon the conclusion of the contract in the amount of the invoice value of the reserved goods.

6.4 If the goods are resold by the buyer, he/it shall hereby transfer to us upon the conclusion of the contract with us his/its claims arising from the aforesaid resale in the amount of the invoice value of the reserved goods.

6.5 If the reserved goods are used by the buyer to perform a works or works delivery contract, his/its claim from the aforesaid works or works delivery contract shall hereby be assigned to us in the same amount and on the same date as for the purchase price claim (Section 6.4).

6.6 As long as he/it is honouring his/its payment obligations, the buyer shall, however, be authorised to collect his/its resale claim which has been assigned to us. He/it may not dispose of such claims by way of assignment to third parties, however. The empowerment of the buyer to collect the claim may be revoked by us at any time. We shall be entitled to notify third party debtors of the assignment. The buyer shall be entitled to provide us with the necessary information and documents in order to enable us to enforce our rights.

6.7 If the value of our securities exceeds our total claims by more than 10 %, we shall be obliged to release securities of our choice at the request of the buyer.

6.8 The buyer shall inform us immediately of any pledge or other impediment to our property enforced by third parties.

6.9 The buyer shall be obliged to collaborate in measures required to protect our title. He/it shall, in particular, empower us upon the conclusion of the contract to make entries or prior notice of the reservation of title at his/its cost in public registers, books and documents, etc., in accordance with the relevant national laws and shall perform all formalities in this respect.

6.10 The buyer shall maintain the reserved goods at his/its cost for the duration of the reservation of title and shall insure the said goods against theft, breakage, fire, water and other risks in our favour. He/it shall also take all steps to ensure that our property claims are neither adversely affected nor rescinded.

7. Delivery periods

7.1 Delivery periods and deadlines stated by us shall be approximate unless we have given an express written confirmation of a deadline as binding.

7.2 Delivery periods shall be deemed to have been met if notification of readiness to deliver has been sent to the buyer before the end of the delivery period.

7.3 The delivery period shall be prolonged if details required for the performance of the contract are not received on time or if they are subsequently changed by the buyer.

7.4 The delivery period shall also be reasonably prolonged if impediments arise which we cannot avert despite exercise of the necessary care (e.g. major operational disruptions, industrial disputes, delayed or defective deliveries, force majeure, etc.).

7.5 If an agreed delivery date is met by more than 14 days, the buyer shall be obliged to set us a reasonable period of grace. The buyer may only withdraw from the contract if our goods have not been delivered by the end of the said period of grace. Compensation claims for non-performance, delayed performance or any consequential losses shall be excluded unless there was gross negligence on our part.

8. Transfer of risk

8.1 Unless expressly agreed otherwise in writing, our “ex works” deliveries shall be made in accordance with the international rules on the interpretation of commercial clauses of the International Chamber of Commerce (Incoterms) in the version in force on the date of the order confirmation.

8.2 The transfer of risk shall be determined by the aforesaid Incoterms.

8.3 Insurance against damages of any kind shall be the responsibility of the buyer.

8.4 Complaints in connection with the transport shall be immediately notified by the buyer to the last carrier upon receipt of the delivery.
8.5 If despatch is delayed at the request of the buyer or for any other reasons not attributable to us, the risk shall pass to the buyer on the original date envisaged for the “ex works” delivery. We shall be entitled to demand payment from this date onwards.

9. Delivery inspection

9.1 The buyer shall be required to inspect deliveries immediately. If the goods do not comply with the order or the delivery note or if visible defects are identified, he/it shall be obliged to notify the aforesaid to us in writing within eight days of receipt. Later complaints shall not be recognised. (Regarding transport damages, cf. Section 8.4)

10. Assembly and operations

10.1 The assembly, putting into operation, operation and maintenance of the delivered goods shall be carried out in accordance with our guidelines. They may be executed by our staff or by appropriately trained third parties as agreed with the buyer.
10.2 If we require a commissioning certificate for certain product groups, warranty claims for the proper functioning of the equipment can only be enforced if a proper hand-over has been documented by a confirmed commissioning certificate received by us within one month of the hand-over.

11. Warranty

11.1 Warranty period
11.1.1 The general warranty period shall be 12 months from the first commissioning but no longer than 18 months from the date on which the relevant goods left our works.
If despatch is delayed for reasons not attributable to us, the warranty shall lapse no later than 18 months after notification of the readiness to deliver.
The general warranty period shall exclude electrical components for which the warranty period shall be 6 months from the first commissioning but no later than 12 months from the date of shipment from our works.
11.1.2 We refer to Section 11.6.1 with regard to the warranty period for third party products.
11.1.3 The warranty period for components which we have repaired during the warranty period or have delivered as replacement shall be 12 months from the completion of our repair or from the date of the replacement delivery but no longer than the end of a period equivalent to twice the original warranty period as per Section 11.1.1.
11.2 Liability for material, design and workmanship defects
11.2.1 The contractual condition of the goods shall be based on the condition upon the transfer of risk.
11.2.2 Defects shall be notified to us immediately in writing.
11.2.3 We shall be liable for all components which can be shown to have become defective or unusable before the end of the warranty period as a result of defective materials, defective design or defective workmanship, with such components being repaired or replaced ex works immediately at our choice.
11.3 Liability for warranted qualities
11.3.1 Warranted qualities shall only be those which are specifically designated as such in the order confirmation or in the relevant specifications.
11.3.2 The aforesaid assurance shall apply at the latest until the end of the warranty period. If a taking-over test has been agreed with the buyer, the assurance shall be deemed as performed if proof of the relevant qualities is furnished during the aforesaid test.
11.3.3 If the warranted qualities are not performed or only partially performed, the buyer shall be entitled to an immediate rectification. The buyer shall grant us the necessary time and opportunity for this purpose.
11.3.4 If the rectification is abortive or only partially successful, the buyer shall be entitled to a reasonable reduction of the purchase price. If the defect is so serious that it cannot be rectified within a reasonable period of time, and if deliveries or services for the notified purpose are not usable or are only usable to a much lesser extent, the buyer shall be entitled to refuse acceptance of the defective component or to withdraw from the contract if part-acceptance is economically unreasonable. We shall only be obliged to refund amounts which have been paid to us for the components affected by the aforesaid withdrawal.
11.4 Exclusion of liability for defects
11.4.1 Our liability shall exclude damages which cannot be proved to have been sustained as a result of defective material, defective design or defective workmanship.
11.4.2 Damages shall therefore be excluded for example which were caused by
- improper work of other persons with regard to planning, site preparation, assembly, operation and maintenance;
- plant concepts and designs which do not comply with the latest state of the art;
- non-observance of our guidelines for planning, assembly, commissioning, operations and maintenance;
- force majeure (e.g. thunderstorms).

11.4.3 The following shall be excluded in particular
- corrosion damages (e.g. as a result of aggressive water, unsuitable water treatment, oxygen intakes, emptying the plant over a longer period of time, falling below the dew point, chemical or electrochemical effects, etc.);
- damages caused by air pollution (e.g. the accumulation of intense dust, aggressive vapours, etc.);
- damages caused by unsuitable equipment and fuels;
- damages caused by overcharging, excessive water pressure, scaling, improper electrical connections and inadequate fuse protection.

11.4.4 Components shall also be excluded from the warranty which are subject to natural wear and tear (e.g. burner nozzles, combustion chamber inserts, ignition and monitoring components in contact with fire, fireclay and wall facings, fuses, seals and flexible tubes).
11.5 Commissioning certificate
11.5.1 We hereby draw attention to the due and proper hand-over and - if envisaged - the commissioning certificate in accordance with Section 10.2 as prerequisites for our warranty.
11.6 Deliveries and services of sub-contractors
11.6.1 Our liability for third party products which form a major part of the delivered goods (e.g. warehouse and conveying equipment, burners, measuring and control equipment, electrical components, flue gas and waste water cleaning equipment) shall - if permissible - be limited to an assignment of our claims against the suppliers of the said third party products.

12. Exclusion of further liability

12.1 The buyer shall have no rights and claims for materials, design and workmanship defects or the lack of warranted qualities unless specifically mentioned in Sections 11.1 to 11.6.
12.2 All claims for compensation, reduction in the contract price, rescission of the contract or withdrawal from the contract shall be excluded in particular unless these are specifically mentioned. Under no circumstances shall the buyer have any compensation claim for damages which were not sustained by the delivered goods themselves (e.g. replacement costs, cost for establishing the cause of the damage, expertises, production stoppages, production losses, lost orders, lost profit and other direct or indirect damages). The aforesaid liability exclusion shall not apply in the event of gross negligence on our part.
12.3 The exclusion as per Section 12.2 shall apply for all breaches of contract and all claims of the buyer regardless of why they were lodged from a legal point of view. It shall therefore also apply for a breach of any ancillary obligations (e.g. inadequate advice, etc.).

13. Jurisdiction

13.1 **The place of jurisdiction for the buyer and for us shall be Vaduz.** We shall be entitled to bring action against the buyer at his/its domicile, however.
13.2 The legal relationship between the parties shall be governed by the substantive laws of Switzerland. The application of the UN convention on contracts for the international sale of goods (CISG) shall be excluded.

Hoval quality.
You can count on us.

Hoval

Hoval is one of the leading international companies for heating and indoor climate solutions. Drawing on more than 75 years of experience and benefiting from a close-knit team culture, the Hoval Group delivers exciting solutions and develops technically superior products. This leadership role requires a sense of responsibility for energy and the environment, which is expressed in an intelligent combination of different heating technologies and customised indoor climate solutions.

Hoval also provides personal consultations and comprehensive customer service. With around 2200 employees in 16 companies around the world, Hoval sees itself not as a conglomerate, but as a large family that thinks and acts globally.
Hoval heating and indoor climate solutions are currently exported to more than 50 countries.

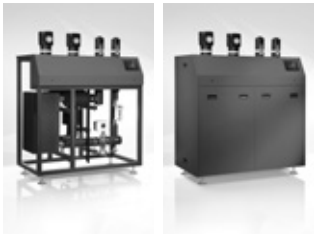
Responsibility for energy and environment

Hoval Aktiengesellschaft
Austrasse 70
FL-9490 Vaduz
Principality of Liechtenstein
(Swiss customs territory)
Phone +423 3992 400
Fax +423 3992 618
E-Mail info@hoval.com
www.hoval.com

2024 - 04 | Subject to modifications

Your Hoval partner

District heating station



Services

Hoval TransTherm® giro

District heating transfer station
- Indirect compact station for heat transfer and regulation of heating and hot water production systems.
- Standard design for heating water in accordance with DIN and AGFW directives.
  District heating primary:
  - maximum pressure stage 16/25 bar
  - maximum operating temperature 110-150 °C
  - maximum flow rate 4.5 m³/h
  - connections - standard design left, conversion to the right on site.

  Secondary heating:
  - maximum operating pressure 3 bar
  - maximum operating temperature 95 °C
  - maximum flow rate 6.5 m³/h
  - connection optional, top and/or bottom.

Option
- Special design for other requirements and district-heating-specific requirements on request.

- Installed:
  District heating primary:
  - 1 flow rate controller with motorised valve, actuator without emergency control function (110 °C) with emergency control function (140, 150 °C)
  - 1 heat meter adapter
  - 1 return temperature sensor
  - 1 flow temperature sensor
  - 1 strainer
  - 1 drain

  Secondary heating:
  - stainless steel plate heat exchanger, copper-soldered design
  - 1 return temperature sensor
  - 1 flow temperature sensor
  - 1 safety temperature monitor (140, 150 °C)
  - 1 safety valve 3 bar
  - 1 pressure gauge
  - 1 strainer
  - 1 drain
  - 1 connection for diaphragm pressure expansion tank

- District heating station in fully welded and thermally insulated design (100 % thermally insulated), in powder-coated sheet aluminium casing, colour pure white (RAL 9010).
- TopTronic® E controller installed

Series TransTherm® giro type	Hydraulics	Number of plates (heat exchanger)	Max. flow temperature °C	nominal pressure bar	Heat output [1] kW
(H0/N10/T110/P16)	0	10	110	16	26
(H0/N10/T140/P16)	0	10	140	16	26
(H0/N10/T150/P25)	0	10	150	25	26
(H0/N20/T110/P16)	0	20	110	16	64
(H0/N20/T140/P16)	0	20	140	16	64
(H0/N20/T150/P25)	0	20	150	25	64
(H0/N40/T110/P16)	0	40	110	16	128
(H0/N40/T140/P16)	0	40	140	16	128
(H0/N40/T150/P25)	0	40	150	25	128

TransTherm® giro type	Hydraulics	Number of plates (heat exchanger)	Max. flow temperature °C	nominal pressure bar	Heat output [1] kW
(H0/N60/T110/P16)	0	60	110	16	151
(H0/N60/T140/P16)	0	60	140	16	151
(H0/N60/T150/P25)	0	60	150	25	151
(H0/N80/T110/P16)	0	80	110	16	189
(H0/N80/T140/P16)	0	80	140	16	189
(H0/N80/T150/P25)	0	80	150	25	189

[1] Reference temperature primary 90-53 °C/ secondary 75-50 °C

TopTronic® E controller

TopTronic® E control panel
- Colour touchscreen 4.3 inch
- Simple, intuitive operating concept
- Display of the most important operating statuses
- Configurable start screen
- Operating mode selection
- Configurable day and week programmes
- Operation of all connected Hoval CAN bus modules
- Commissioning wizard
- Service and maintenance function
- Fault message management
- Analysis function
- Weather display (with HovalConnect option)
- Adaptation of the heating strategy based on the weather forecast (with HovalConnect option)

TopTronic® E basic module district heating com (TTE-FW com)
- Control functions integrated for
  - primary valve control
  - cascade management
  - 1 heating circuit with mixer
  - 1 heating circuit without mixer
  - 1 hot water charging circuit
  - various additional functions
- Outdoor sensor
- Immersion sensor (calorifier sensor)
- Contact sensor (flow temperature sensor)
- Complete plug set for DH module

Options for TopTronic® E controller
- Can be expanded by max. 5 module expansions:
  - module expansion heating circuit DH
  - module expansion hot water DH
  - module expansion universal DH
- Can be optionally expanded with various accessories:
  - Ethernet connection TTE-FW com
  - repeater TTE-FW com LON-Bus
  - router TTE-FW com Ethernet on LON-Bus
  - data socket 13-pin TTE-FW com LON-Bus and lighting protection
  - various software licences for HovalSupervisor
  - various services for HovalSupervisor
- Can be networked with a total of up to 16 controller modules:
  - heating circuit/hot water module
  - solar module
  - buffer module
  - measuring module
  - e.g. max 45 mixer circuits

Number of modules that can be additionally installed in the control panel:
- 2 module expansions district heating and 1 Ethernet connection TTE-FW com
- Free space top-hat rail 310 mm

Further information about the TopTronic® E
see “Controls”

Design on request
- Flow rate controller with motorised valve, actuator with emergency control function
- Supply of system components such as heat meter, heating armature group, calorifier, charging group etc.
- Special design for requirements deviating from the standard or specific requirements for district heating networks.
- Hoval control system
- District heating station for direct heat transmission

Delivery
- District heating transfer station, fully cased and ready for electrical connection

On site
- Installation of heat meter

Accessories

	Part No.
 **Stand system** for TransTherm® giro in the base casing Mounting variant “free-standing in the room” white powder-coated Dimensions: Width x depth: 659 x 500 mm Height min./max. 930/1570 mm	8006 027
Immersion sleeve for heat meter DN 10 (¼″ ext.), 35 mm, ID: 5.2 mm	8004 958
 **Sensor pockets heat. network** ½″, 100 mm for imm. sleeve Price comprises 2 pieces	7012 335
 **Heat meter Sharky 775 (MID-cert.)** Qp 1.5 DN 15 (¾″ ET) PN 25 110 mm 230 V M-Bus sensor FL/RT: 5.2 mm/2 m direct	8004 668
 **Heat meter Sharky 775 (MID-cert.)** Qp 2.5 DN 20 (1″ ext.) PN 25 130 mm 230 V M-Bus sensor FL/RT: 5.2 mm/2 m direct	8004 711
 **Ball valve** Shut-off fitting between the heating network and the district heating station (without thermal insulation) Material: nickel-plated brass Internal thread/screw connection Price includes 2 pcs.	

Size inches	Operating pressure max. bar	Operating temperature max. °C	
¾″	25	120	7011 481
1″	25	120	7011 482
1¼″	25	120	7013 945

 **Angle ball valve heating network DN 20 (¾″ internal thread)** Ball valves as shut-off valve between heating network and district heating station (without thermal insulation) Internal thread/screw connection Max. operating pressure: 25 bar Max. operating temperature: 120 °C Price comprises 2 pieces	7013 946
 **Angle ball valve heating network DN 25 (1″ internal thread)** Ball valves as shut-off valve between heating network and district heating station (without thermal insulation) Internal thread/screw connection Max. operating pressure: 25 bar Max. operating temperature: 120 °C Price comprises 2 pieces	7013 947

Ball valve
Shut-off fitting between the heating network and the district heating station (without thermal insulation)
Material: steel
Weld end/internal thread G 1″
Price includes 2 pcs.

Size	Operating pressure max. bar	Operating temperature max. °C	Part No.
DN 20	25	140	7011 483
DN 25	25	140	7011 484
DN 32	25	140	7013 944

Ball valve building system DN 25 (1″ internal thread)
Ball valves as shut-off valve between district heating station and secondary side (without thermal insulation)
Nickel-plated brass
Internal/external thread
Max. operating pressure: 16 bar
Max. operating temperature: 100 °C
Price comprises 2 pieces

7011 485

Ball valve building system DN 32 (1¼″ internal thread)
Ball valves as shut-off valve between district heating station and secondary side (without thermal insulation)
Nickel-plated brass
Internal/external thread
Max. operating pressure: 16 bar
Max. operating temperature: 100 °C
Price comprises 2 pieces

7011 486

Pressure gauge
0-16 bar, Ø 63 mm
price comprises 2 pieces

7011 901

Pressure gauge
0-25 bar, Ø 63 mm
price comprises 2 pieces

7011 902

Twinlock measuring connection
for pressure and temperature measurement in the flow and return of the heat network on the district heating station (necessary measuring devices are not included)

2048 840

Welded screw connections
DN 20, PN 25
(2 pcs.)

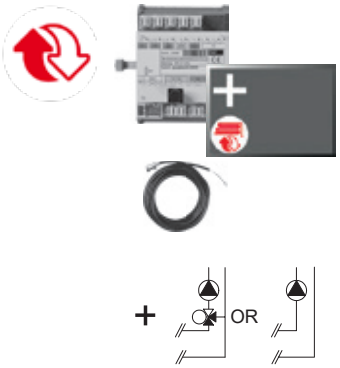
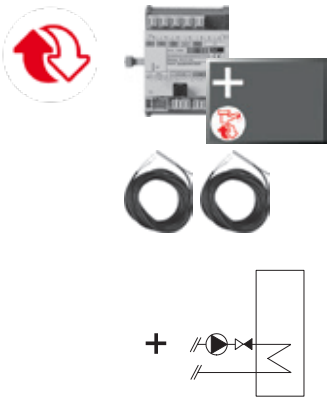
7011 480

2 flanges heating network DN 20 PN 25

7010 910

TopTronic® E module expansions

for TopTronic® E basic module district heating com

	Part No.
 **TopTronic® E module expansion district heating circuit TTE-FE HK FW** Expansion to the inputs and outputs of a controller module (basic module district heating/fresh water, basic module district heating com) for carrying out various functions. Refer to the Hoval System Technology to find which functions and hydraulic arrangements can be implemented. Consisting of: - Fitting accessories - Ribbon cable for connecting the device bus to the controller module, - Connection set for connecting the controller module to the mains voltage, - 1 x contact sensor ALF/1.1P/2.5/T L = 2.5 m, - Plug set - district heating expansion	6038 119
 **TopTronic® E module expansion hot water district heating TTE-FE WW FW** Expansion to the inputs and outputs of the basic module district heating/fresh water or basic module district heating com for implementing a hot water circuit. Consisting of: - fitting accessories - 2 immersion sensors TF/1.1P/2.5/6T, L = 2.5 m	6038 120
 **TopTronic® E module expansion Universal district heating TTE-FE UNI FW** Expansion to the inputs and outputs of the basic module district heating/fresh water or basic module district heating com for implementing various functions. Consisting of: - Fitting accessories	6038 117

Notice
Refer to the Hoval System Technology to find which functions and hydraulic arrangements can be implemented.

Further information
see “Controls” - “Hoval TopTronic® E module expansions district heating” chapter

	Part No.
 **Ethernet connection** TopTronic® E district heating com R2 - Communications module expansion for TopTronic® E basic module district heating com - TCP/IP interface for communication with the HovalSupervisor management system - Top hat rail mounting directly adjacent to the basic module - Connection to the basic module via Ribbon cable - Dimensions (L x W x H): 96 x 48 x 42.3	6057 388
 **TopTronic® E district heating com LON-Bus repeater** - Repeater as electrical signal booster of the LON-Bus network - Used for boosting the range of the signal when there are long distances between the control centre and the individual TopTronic® E basic module district heating com controller modules - Positioning of the repeaters depending on the data network (routing type, cable type, length, etc.) at different positions in the network - Electrical power supply 230 V AC - Dimensions (L x W x H): 71 x 92 x 60 **Notice** After 5 repeaters, a router must be used for boosting the signal. Article on request.	6061 947
 **Router TopTronic® E district heating com TTE-FWR - CAN bus** - Interface between the Hoval LON-Bus network and HovalSupervisor - Interface between the Hoval TCP/IP network and HovalSupervisor - Serves as a physical interface between the data stream of the district heating network and e.g a master computer with TCP/IP interface - Possibility of connecting differential pressure sensors variable inputs 0-10 V or 0/4-20 mA - Router can be installed in control panel with DIN-rail mounting - Temperature and pressure control for up to five strands or 5 heating circuits - Dimensions (L x W x H): 355 x 120 x 75 TopTronic® E control module black for operating the router (optional) and mating connector set must be ordered separately.	6047 303

	Part No.
 **Data socket TopTronic® E district heating com** **LON-Bus and lightning protection** - Data socket for connecting the telecommunication cable at the building connection - Connection must be made according to the appropriate applicable regulations - Data sockets must also be installed with dummy connections - 1 input block 13-pin - 2 output blocks each 13-pin - 2 outputs 3-pin for controller and repeater - Wet room socket IP55 Dimensions (L x W x H): 180 x 140 x 75 incl. 10 stepped nipples	2061 738

Accessories for TopTronic® E

		Part No.
	**TopTronic® E controller modules**	
TTE-HK/WW	TopTronic® E heating circuit/ hot water module	6034 571
TTE-SOL	TopTronic® E solar module	6037 058
TTE-PS	TopTronic® E buffer module	6037 057
TTE-MWA	TopTronic® E measuring module	6034 574
	**TopTronic® E room control modules**	
TTE-RBM	TopTronic® E room control modules	
	easy white	6037 071
	comfort white	6037 069
	comfort black	6037 070
	**Enhanced language package TopTronic® E** one SD card required per control module Consisting of the following languages: HU, CS, SL, RO, PL, TR, ES, HR, SR, JA, DA	6039 253
	**HovalConnect**	
	HovalConnect LAN	6049 496
	HovalConnect WLAN	6049 498
	HovalConnect Modbus	6049 501
	HovalConnect KNX	6049 593
	TopTronic® E interface modules	
	GLT module 0-10 V	6034 578
	**TopTronic® E sensors**	
AF/2P/K	Outdoor sensor H x W x D = 80 x 50 x 28 mm	2056 774
TF/2P/5/6T	Immersion sensor, L = 5.0 m	2056 777
ALF/2P/4/T	Contact sensor, L = 4.0 m	2056 778
TF/1.1P/2.5S/6T	Collector sensor, L = 2.5 m	2056 776
	**TopTronic® E wall casing**	
WG-190	Wall casing small	6052 983
WG-360	Wall casing medium	6052 984
WG-360 BM	Wall casing medium with control module cut-out	6052 985
WG-510	Wall casing large	6052 986
WG-510 BM	Wall casing large with control module cut-out	6052 987

Further information
see “Controls”

	Part No.
Flow temperature monitor for panel heating (1 controller per heating circuit) 15-95 °C, setting (visible externally) under the casing cover	
Clamp-on flow temperature monitor RAK-TW1000S with retaining strap, without cable and plug	242 902
Clamp-on flow temperature monitor set RAK-TW1000S with retaining strap, supplied with cable (4 m) and plug	6033 745
Immersion thermostat RAK-TW1000S Thermostat with immersion sleeve ½″ Depth of immersion 150 mm, nickel-plated brass	6010 082

Services

Commissioning
Commissioning by works service or Hoval trained authorised serviceman/company is condition for warranty.

For commissioning and other services please contact your Hoval sales office.

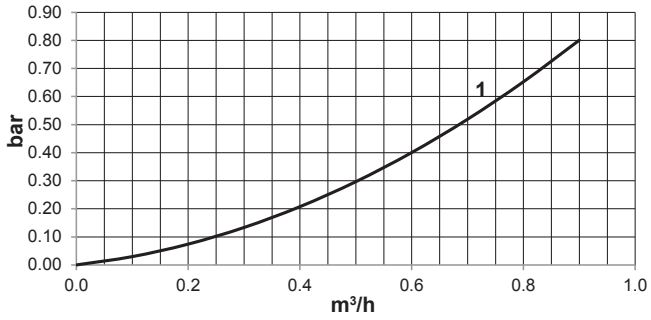
	District heating primary						Secondary heating			
TransTherm® giro type	**Max. nominal pressure** bar	**T-max.** °C	**Valve** kvs	**Closing pressure** [1] bar	**Connection size** inches	**V̇max.** m³/h	**Operating pressure** bar	**T-max.** °C	**Connection size** inches	**V̇max.** m³/h
(H0/N10/T110/P16)	16	110	1.6	4	G 1″	0.9	3	95	Rp 1″	1.3
(H0/N10/T140/P16)	16	140	1.6	14	G 1″	0.9	3	95	Rp 1″	1.3
(H0/N10/T150/P25)	25	150	1.6	20	G 1″	0.9	3	95	Rp 1″	1.3
(H0/N20/T110/P16)	16	110	2.5	4	G 1″	1.2	3	95	Rp 1″	2.4
(H0/N20/T140/P16)	16	140	2.5	14	G 1″	1.6	3	95	Rp 1″	2.4
(H0/N20/T150/P25)	25	150	2.5	20	G 1″	1.6	3	95	Rp 1″	2.4
(H0/N40/T110/P16)	16	110	4.0	14	G 1″	2.4	3	95	Rp 1″	4.5
(H0/N40/T140/P16)	16	140	4.0	14	G 1″	2.4	3	95	Rp 1″	4.5
(H0/N40/T150/P25)	25	150	4.0	20	G 1″	2.4	3	95	Rp 1″	4.5
(H0/N60/T110/P16)	16	110	6.3	14	G 1″	3.5	3	95	Rp 1″	6.5
(H0/N60/T140/P16)	16	140	6.3	14	G 1″	3.5	3	95	Rp 1″	6.5
(H0/N60/T150/P25)	25	150	6.3	20	G 1″	3.5	3	95	Rp 1″	6.5
(H0/N80/T110/P16)	16	110	8.0	14	G 1″	4.5	3	95	Rp 1″	6.5
(H0/N80/T140/P16)	16	140	8.0	14	G 1″	4.5	3	95	Rp 1″	6.5
(H0/N80/T150/P25)	25	150	8.0	20	G 1″	4.5	3	95	Rp 1″	6.5

[1] Actuator valve

Pressure drop diagrams

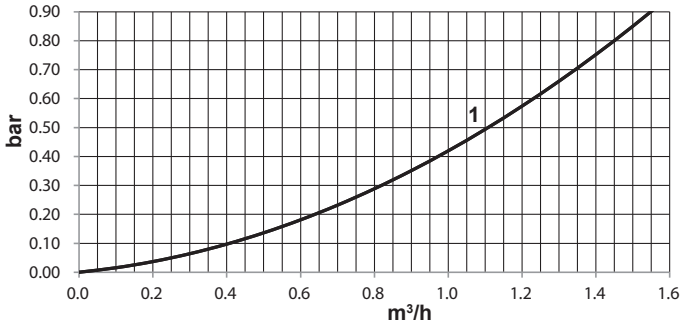
District heating primary
dp control valve with heat exchanger,
without heat meter.

TransTherm® giro (H0/N10)



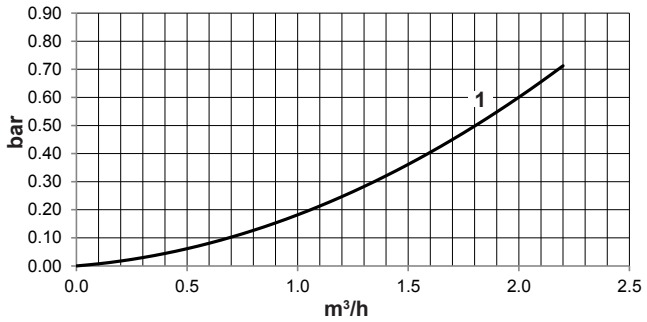
1 kvs 1.6 AVQM DN 15 PN 16(25) 150 °C ¾″

TransTherm® giro (H0/N20)



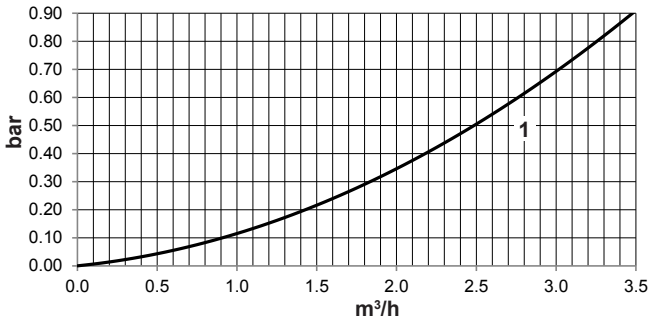
1 kvs 2.5 AVQM DN 15 PN 16(25) 150 °C ¾″

TransTherm® giro (H0/N40)



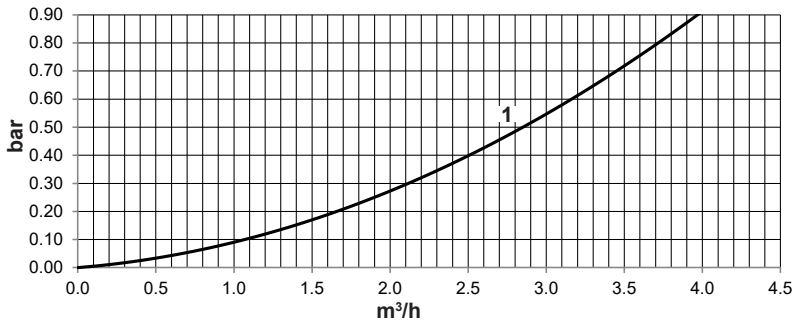
1 kvs 4.0 AVQM DN 15 PN 16(25) 150 °C ¾″

TransTherm® giro (H0/N60)



1 kvs 6.3 AVQM DN 20 PN 16(25) 150 °C 1″

TransTherm® giro (H0/N80)

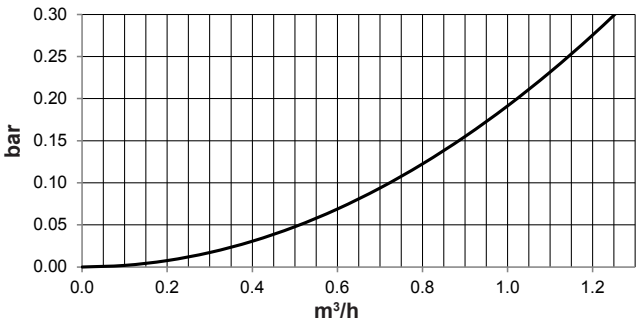


1 kvs 8.0 AVQM DN 20 PN 16(25) 150 °C 1″

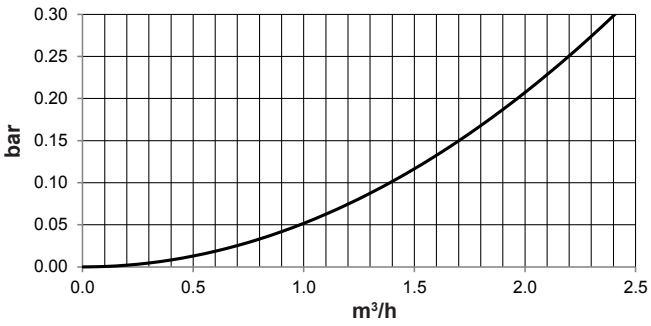
Pressure drop diagrams

Secondary building system
dp heat exchanger

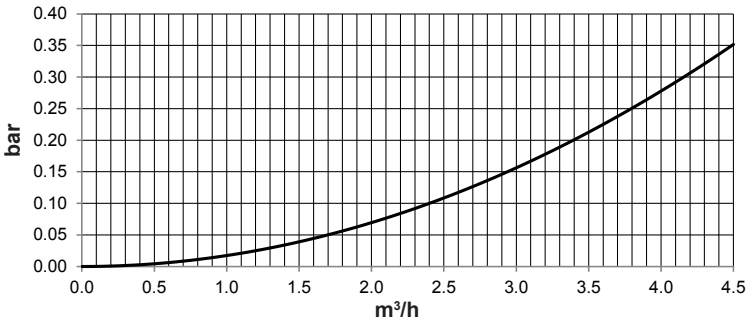
TransTherm® giro (H0/N10)



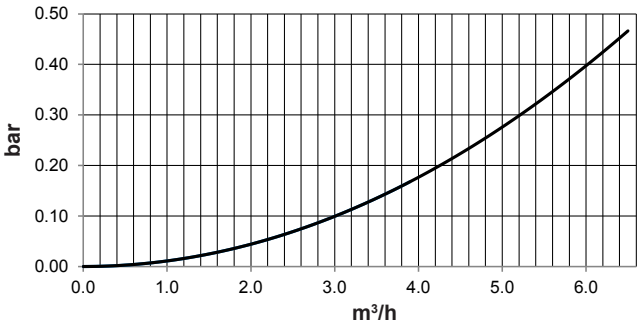
TransTherm® giro (H0/N20)



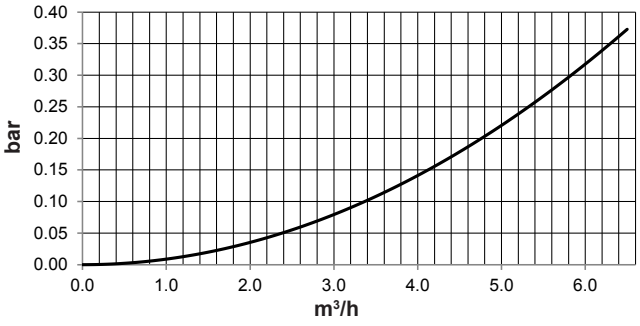
TransTherm® giro (H0/N40)



TransTherm® giro (H0/N60)



TransTherm® giro (H0/N80)



Performance data

TransTherm® giro (H0/N10-H0/N80)

- 2 outputs for house system
- Integrated control
  primary: max. return temperature control
  secondary: for 1 mixer circuit, 1 heating circuit without mixer, 1 hot water charging circuit

			District heating									
			70 °C					75 °C				
Secondary heating	TransTherm® giro		H0/N10	H0/N20	H0/N40	H0/N60	H0/N80	H0/N10	H0/N20	H0/N40	H0/N60	H0/N80
75/50 °C	T return primary	°C	-	-	-	-	-	-	-	-	-	-
	V̇ primary	**m³/h**	-	-	-	-	-	-	-	-	-	-
	Q max.	kW	-	-	-	-	-	-	-	-	-	-
	V̇ secondary	**m³/h**	-	-	-	-	-	-	-	-	-	-
70/50 °C	T return primary	°C	-	-	-	-	-	55	55	55	55	55
	V̇ primary	**m³/h**	-	-	-	-	-	**0.77**	**1.60**	**2.40**	**3.50**	4.50
	Q max.	kW	-	-	-	-	-	18	37	56	81	105
	V̇ secondary	**m³/h**	-	-	-	-	-	**0.77**	**1.60**	**2.40**	**3.50**	4.50
70/55 °C	T return primary	°C	-	-	-	-	-	60	60	60	60	60
	V̇ primary	**m³/h**	-	-	-	-	-	**0.92**	**1.60**	**2.40**	**3.50**	**4.50**
	Q max.	kW	-	-	-	-	-	16	28	42	61	79
	V̇ secondary	**m³/h**	-	-	-	-	-	**0.92**	**1.60**	**2.40**	**3.50**	**4.50**
65/40 °C	T return primary	°C	45	45	45	45	45	43	43	43	43	43
	V̇ primary	**m³/h**	**0.34**	**0.89**	**2.13**	**3.30**	**4.47**	**0.32**	**0.86**	**1.94**	**3.01**	**4.09**
	Q max.	kW	10	26	62	96	130	12	32	72	112	152
	V̇ secondary	**m³/h**	**0.34**	**0.89**	**2.13**	**3.30**	**4.47**	**0.41**	**1.10**	**2.48**	**3.85**	**5.23**
60/40 °C	T return primary	°C	43	43	43	43	43	43	43	43	43	43
	V̇ primary	**m³/h**	**0.57**	**1.40**	**2.40**	**3.50**	**4.50**	**0.70**	**1.45**	**2.40**	**3.50**	**4.06**
	Q max.	kW	18	44	75	110	141	26	54	89	130	151
	V̇ secondary	**m³/h**	**0.77**	**1.89**	**3.24**	**4.73**	**6.08**	**1.12**	**2.32**	**3.84**	**5.60**	**6.50**
60/45 °C	T return primary	°C	47	47	47	47	47	47	47	47	47	47
	V̇ primary	**m³/h**	**0.67**	**1.50**	**2.40**	**3.50**	**4.50**	**0.61**	**1.23**	**2.33**	**3.19**	**3.48**
	Q max.	kW	18	40	64	94	113	20	40	76	104	113
	V̇ secondary	**m³/h**	**1.03**	**2.29**	**3.68**	**5.37**	**6.50**	**1.15**	**2.29**	**4.36**	**5.96**	**6.50**
55/30 °C	T return primary	°C	33	33	33	33	33	33	33	33	33	33
	V̇ primary	**m³/h**	**0.42**	**1.07**	**2.42**	**3.50**	**4.50**	**0.57**	**1.35**	**2.40**	**3.52**	**3.87**
	Q max.	kW	18	46	104	151	189	28	66	117	172	189
	V̇ secondary	**m³/h**	**0.62**	**1.58**	**3.58**	**5.18**	**6.50**	**0.96**	**2.27**	**4.03**	**5.92**	**6.50**
50/30 °C	T return primary	°C	32	32	32	32	32	32	32	32	32	32
	V̇ primary	**m³/h**	**0.54**	**1.18**	**2.26**	**3.03**	**3.42**	**0.52**	**1.04**	**2.00**	**2.72**	**3.02**
	Q max.	kW	24	52	100	134	151	26	52	100	136	151
	V̇ secondary	**m³/h**	**1.03**	**2.24**	**4.30**	**5.76**	**6.50**	**1.12**	**2.24**	**4.30**	**5.85**	**6.50**
50/35 °C	T return primary	°C	36	36	36	36	36	36	36	36	36	36
	V̇ primary	**m³/h**	**0.51**	**1.01**	**1.87**	**2.58**	**2.87**	**0.44**	**0.88**	**1.63**	**2.25**	**2.50**
	Q max.	kW	20	40	74	102	113	20	40	74	102	113
	V̇ secondary	**m³/h**	**1.15**	**2.29**	**4.24**	**5.85**	**6.50**	**1.15**	**2.29**	**4.24**	**5.85**	**6.50**
45/30 °C	T return primary	°C	31	31	31	31	31	31	31	31	31	31
	V̇ primary	**m³/h**	**0.44**	**0.88**	**1.63**	**2.25**	**2.50**	**0.39**	**0.78**	**1.45**	**1.99**	**2.22**
	Q max.	kW	20	40	74	102	113	20	40	74	102	113
	V̇ secondary	**m³/h**	**1.15**	**2.29**	**4.24**	**5.85**	**6.50**	**1.15**	**2.29**	**4.24**	**5.85**	**6.50**
45/35 °C	T return primary	°C	36	36	36	36	36	36	36	36	36	36
	V̇ primary	**m³/h**	**0.30**	**0.66**	**1.26**	**1.72**	**1.91**	**0.26**	**0.57**	**1.10**	**1.50**	**1.67**
	Q max.	kW	12	26	50	68	76	12	26	50	68	76
	V̇ secondary	**m³/h**	**1.03**	**2.24**	**4.30**	**5.85**	**6.50**	**1.03**	**2.24**	**4.30**	**5.85**	**6.50**

TransTherm® giro (H0/N10-H0/N80)

- 2 outputs for house system
- Integrated control
  primary: max. return temperature control
  secondary: for 1 mixer circuit, 1 heating circuit without mixer, 1 hot water charging circuit

			District heating									
			80 °C					90 °C				
Secondary heating	**TransTherm® giro**		**H0/N10**	**H0/N20**	**H0/N40**	**H0/N60**	**H0/N80**	**H0/N10**	**H0/N20**	**H0/N40**	**H0/N60**	**H0/N80**
75/50 °C	T return primary	°C	55	55	55	55	55	53	53	53	53	53
	V̇ primary	**m³/h**	**0.41**	**1.10**	**2.41**	**3.50**	**4.50**	**0.60**	**1.49**	**2.98**	**3.50**	**4.50**
	Q max.	kW	12	32	70	102	131	26	64	128	151	189
	V̇ secondary	**m³/h**	**0.41**	**1.10**	**2.41**	**3.50**	**4.50**	**0.89**	**2.20**	**4.40**	**5.18**	**6.50**
70/50 °C	T return primary	°C	53	53	53	53	53	52	52	52	52	52
	V̇ primary	**m³/h**	**0.64**	**1.66**	**2.40**	**3.50**	**4.50**	**0.63**	**1.22**	**2.31**	**3.50**	**3.50**
	Q max.	kW	20	52	75	110	141	28	54	102	151	151
	V̇ secondary	**m³/h**	**0.86**	**2.24**	**3.24**	**4.73**	**6.08**	**1.20**	**2.32**	**4.39**	**6.50**	**6.50**
70/55 °C	T return primary	°C	58	58	58	58	58	57	57	57	57	57
	V̇ primary	**m³/h**	**0.78**	**1.56**	**2.97**	**3.50**	**4.50**	**0.52**	**1.04**	**1.98**	**2.71**	**2.96**
	Q max.	kW	20	40	76	90	113	20	40	76	104	113
	V̇ secondary	**m³/h**	**1.15**	**2.29**	**4.36**	**5.13**	**6.50**	**1.15**	**2.29**	**4.36**	**5.96**	**6.50**
65/40 °C	T return primary	°C	42	42	42	42	42	42	42	42	42	42
	V̇ primary	**m³/h**	**0.32**	**0.81**	**1.77**	**2.76**	**4.28**	**0.61**	**1.22**	**2.26**	**3.12**	**3.39**
	Q max.	kW	14	36	78	122	189	34	68	126	174	189
	V̇ secondary	**m³/h**	**0.48**	**1.24**	**2.68**	**4.20**	**6.50**	**1.17**	**2.34**	**4.33**	**5.99**	**6.50**
60/40 °C	T return primary	°C	42	42	42	42	42	42	42	42	42	42
	V̇ primary	**m³/h**	**0.59**	**1.22**	**2.26**	**3.12**	**3.42**	**0.47**	**0.97**	**1.79**	**2.47**	**2.71**
	Q max.	kW	26	54	100	138	151	26	54	100	138	151
	V̇ secondary	**m³/h**	**1.12**	**2.32**	**4.30**	**5.93**	**6.50**	**1.12**	**2.32**	**4.30**	**5.93**	**6.50**
60/45 °C	T return primary	°C	47	47	47	47	47	47	47	47	47	47
	V̇ primary	**m³/h**	**0.52**	**1.04**	**1.98**	**2.71**	**2.96**	**0.40**	**0.80**	**1.52**	**2.08**	**2.27**
	Q max.	kW	20	40	76	104	113	20	40	76	104	113
	V̇ secondary	**m³/h**	**1.15**	**2.29**	**4.36**	**5.96**	**6.50**	**1.15**	**2.29**	**4.36**	**5.96**	**6.50**
55/30 °C	T return primary	°C	33	33	33	33	33	32	32	32	32	32
	V̇ primary	**m³/h**	**0.62**	**1.21**	**2.27**	**3.15**	**3.46**	**0.50**	**0.98**	**1.84**	**2.55**	**2.80**
	Q max.	kW	34	66	124	172	189	34	66	124	172	189
	V̇ secondary	**m³/h**	**1.17**	**2.27**	**4.27**	**5.92**	**6.50**	**1.17**	**2.27**	**4.27**	**5.92**	**6.50**
50/30 °C	T return primary	°C	32	32	32	32	32	32	32	32	32	32
	V̇ primary	**m³/h**	**0.47**	**0.93**	**1.79**	**2.44**	**2.71**	**0.39**	**0.77**	**1.48**	**2.02**	**2.24**
	Q max.	kW	26	52	100	136	151	26	52	100	136	151
	V̇ secondary	**m³/h**	**1.12**	**2.24**	**4.30**	**5.85**	**6.50**	**1.12**	**2.24**	**4.30**	**5.85**	**6.50**
50/35 °C	T return primary	°C	36	36	36	36	36	36	36	36	36	36
	V̇ primary	**m³/h**	**0.39**	**0.78**	**1.45**	**1.99**	**2.22**	**0.32**	**0.64**	**1.18**	**1.62**	**1.81**
	Q max.	kW	20	40	74	102	113	20	40	74	102	113
	V̇ secondary	**m³/h**	**1.15**	**2.29**	**4.24**	**5.85**	**6.50**	**1.15**	**2.29**	**4.24**	**5.85**	**6.50**
45/30 °C	T return primary	°C	31	31	31	31	31	31	31	31	31	31
	V̇ primary	**m³/h**	**0.35**	**0.70**	**1.30**	**1.79**	**1.99**	**0.29**	**0.58**	**1.08**	**1.49**	**1.65**
	Q max.	kW	20	40	74	102	113	20	40	74	102	113
	V̇ secondary	**m³/h**	**1.15**	**2.29**	**4.24**	**5.85**	**6.50**	**1.15**	**2.29**	**4.24**	**5.85**	**6.50**
45/35 °C	T return primary	°C	36	36	36	36	36	36	36	36	36	36
	V̇ primary	**m³/h**	**0.23**	**0.51**	**0.98**	**1.33**	**1.48**	**0.19**	**0.41**	**0.80**	**1.08**	**1.20**
	Q max.	kW	12	26	50	68	76	12	26	50	68	76
	V̇ secondary	**m³/h**	**1.03**	**2.24**	**4.30**	**5.85**	**6.50**	**1.03**	**2.24**	**4.30**	**5.85**	**6.50**

TransTherm® giro (H0/N10-H0/N80)

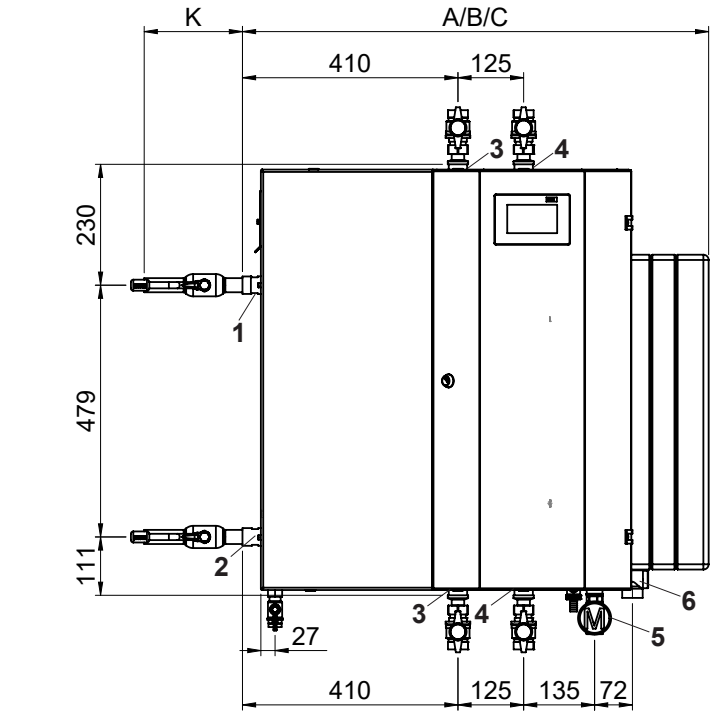
- 2 outputs for house system
- Integrated control
  primary: max. return temperature control
  secondary: for 1 mixer circuit, 1 heating circuit without mixer, 1 hot water charging circuit

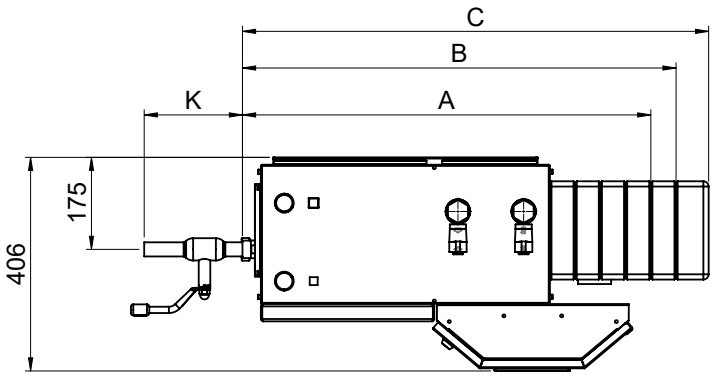
			District heating									
			110 °C					130 °C				
Secondary heating	TransTherm® giro		H0/N10	H0/N20	H0/N40	H0/N60	H0/N80	H0/N10	H0/N20	H0/N40	H0/N60	H0/N80
75/50 °C	T return primary	°C	52	52	52	52	52	52	52	52	52	52
	V̇ primary	**m³/h**	**0.50**	**1.01**	**1.90**	**2.58**	**2.80**	**0.37**	**0.75**	**1.41**	**1.92**	**2.08**
	Q max.	kW	34	68	128	174	189	34	68	128	174	189
	V̇ secondary	**m³/h**	**1.17**	**2.34**	**4.40**	**5.99**	**6.50**	**1.17**	**2.34**	**4.40**	**5.99**	**6.50**
70/50 °C	T return primary	°C	52	52	52	52	52	52	52	52	52	52
	V̇ primary	**m³/h**	**0.42**	**0.80**	**1.51**	**2.24**	**2.24**	**0.31**	**0.60**	**1.12**	**1.67**	**1.67**
	Q max.	kW	28	54	102	151	151	28	54	102	151	151
	V̇ secondary	**m³/h**	**1.20**	**2.32**	**4.39**	**6.50**	**6.50**	**1.20**	**2.32**	**4.39**	**6.50**	**6.50**
70/55 °C	T return primary	°C	57	57	57	57	57	57	57	57	57	57
	V̇ primary	**m³/h**	**0.32**	**0.65**	**1.23**	**1.69**	**1.84**	**0.24**	**0.47**	**0.90**	**1.23**	**1.34**
	Q max.	kW	20	40	76	104	113	20	40	76	104	113
	V̇ secondary	**m³/h**	**1.15**	**2.29**	**4.36**	**5.96**	**6.50**	**1.15**	**2.29**	**4.36**	**5.96**	**6.50**
65/40 °C	T return primary	°C	42	42	42	42	42	42	42	42	42	42
	V̇ primary	**m³/h**	**0.43**	**0.86**	**1.59**	**2.20**	**2.39**	**0.33**	**0.66**	**1.23**	**1.70**	**1.85**
	Q max.	kW	34	68	126	174	189	34	68	126	174	189
	V̇ secondary	**m³/h**	**1.17**	**2.34**	**4.33**	**5.99**	**6.50**	**1.17**	**2.34**	**4.33**	**5.99**	**6.50**
60/40 °C	T return primary	°C	42	42	42	42	42	42	42	42	42	42
	V̇ primary	**m³/h**	**0.33**	**0.68**	**1.26**	**1.75**	**1.91**	**0.25**	**0.53**	**0.98**	**1.35**	**1.48**
	Q max.	kW	26	54	100	138	151	26	54	100	138	151
	V̇ secondary	**m³/h**	**1.12**	**2.32**	**4.30**	**5.93**	**6.50**	**1.12**	**2.32**	**4.30**	**5.93**	**6.50**
60/45 °C	T return primary	°C	47	47	47	47	47	47	47	47	47	47
	V̇ primary	**m³/h**	**0.27**	**0.55**	**1.04**	**1.42**	**1.55**	**0.21**	**0.41**	**0.79**	**1.08**	**1.17**
	Q max.	kW	20	40	76	104	113	20	40	76	104	113
	V̇ secondary	**m³/h**	**1.15**	**2.29**	**4.36**	**5.96**	**6.50**	**1.15**	**2.29**	**4.36**	**5.96**	**6.50**
55/30 °C	T return primary	°C	32	32	32	32	32	32	32	32	32	32
	V̇ primary	**m³/h**	**0.37**	**0.73**	**1.37**	**1.90**	**2.08**	**0.30**	**0.58**	**1.09**	**1.51**	**1.66**
	Q max.	kW	34	66	124	172	189	34	66	124	172	189
	V̇ secondary	**m³/h**	**1.17**	**2.27**	**4.27**	**5.92**	**6.50**	**1.17**	**2.27**	**4.27**	**5.92**	**6.50**
50/30 °C	T return primary	°C	32	32	32	32	32	32	32	32	32	32
	V̇ primary	**m³/h**	**0.29**	**0.57**	**1.10**	**1.50**	**1.67**	**0.23**	**0.46**	**0.88**	**1.19**	**1.33**
	Q max.	kW	26	52	100	136	151	26	52	100	136	151
	V̇ secondary	**m³/h**	**1.12**	**2.24**	**4.30**	**5.85**	**6.50**	**1.12**	**2.24**	**4.30**	**5.85**	**6.50**
50/35 °C	T return primary	°C	36	36	36	36	36	36	36	36	36	36
	V̇ primary	**m³/h**	**0.23**	**0.46**	**0.86**	**1.19**	**1.32**	**0.18**	**0.37**	**0.68**	**0.93**	**1.04**
	Q max.	kW	20	40	74	102	113	20	40	74	102	113
	V̇ secondary	**m³/h**	**1.15**	**2.29**	**4.24**	**5.85**	**6.50**	**1.15**	**2.29**	**4.24**	**5.85**	**6.50**
45/30 °C	T return primary	°C	31	31	31	31	31	31	31	31	31	31
	V̇ primary	**m³/h**	**0.22**	**0.44**	**0.81**	**1.11**	**1.23**	**0.17**	**0.35**	**0.64**	**0.89**	**0.99**
	Q max.	kW	20	40	74	102	113	20	40	74	102	113
	V̇ secondary	**m³/h**	**1.15**	**2.29**	**4.24**	**5.85**	**6.50**	**1.15**	**2.29**	**4.24**	**5.85**	**6.50**
45/35 °C	T return primary	°C	36	36	36	36	37	36	36	36	36	36
	V̇ primary	**m³/h**	**0.14**	**0.30**	**0.58**	**0.79**	**0.89**	**0.11**	**0.24**	**0.46**	**0.62**	**0.69**
	Q max.	kW	12	26	50	68	76	12	26	50	68	76
	V̇ secondary	**m³/h**	**1.03**	**2.24**	**4.30**	**5.85**	**6.50**	**1.03**	**2.24**	**4.30**	**5.85**	**6.50**

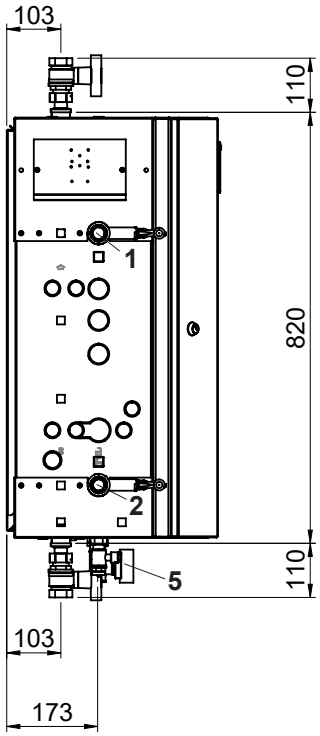
TransTherm® giro (H0/N10-H0/N80)

(Dimensions in mm)

District heating connection on the left - view of exterior

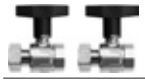






1	Flow primary	R 1″
2	Return primary	R 1″
3	Flow secondary	Rp 1″
4	Return secondary	Rp 1″
5	Diaphragm pressure expansion tank connection (ball valves/pressure gauge options)	Rp ½″
6	Safety valve	½″

TransTherm® giro type	**Designation**	**without option (ball valve)** mm
(H0/N10,H0/N20)	A	791
(H0/N40)	B	839
(H0/N60,H0/N80)	C	887

Ball valve option	**Size**	**Connection size** inches	**K** mm
	DN 20	¾″	85
	DN 25	1″	110
	DN 32	1¼″	115
	DN 20	¾″	180
	DN 25	1″	195
	DN 32	1¼″	235

Adapters for heat meter:

PN 16

(H0/N10,H0/N20)	R ¾″, 110 mm
(H0/N40,H0/N60)	R 1″, 130 mm
(H0/N80)	R 1¼″, 260 mm

PN 25

(H0/N10-H0/N60)	R 1″, 190 mm
(H0/N80)	R 1¼″, 260 mm

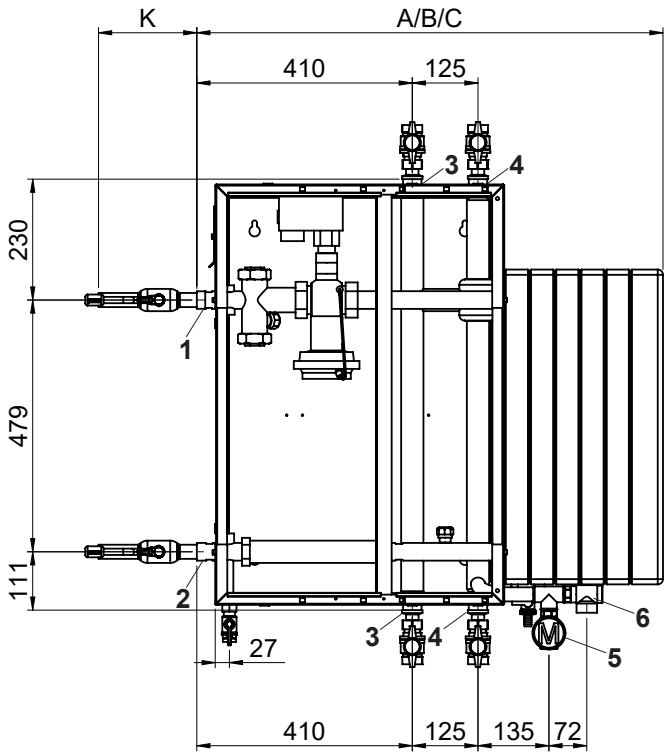
Sensor dimensions

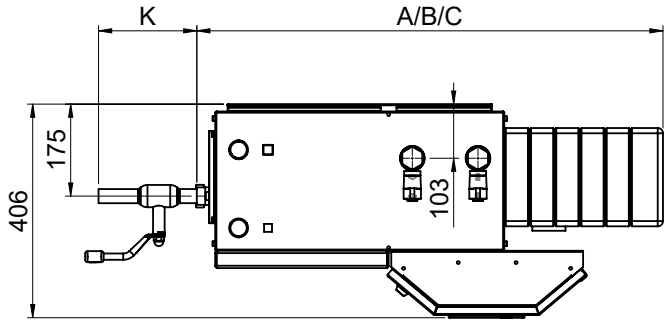
1 x M10 x 1 (27.5-38 mm)
1 x ¼″ for immersion sleeve
(length without add-on 35 mm)

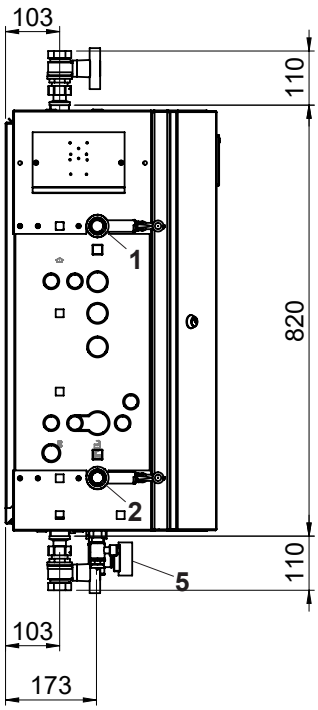
TransTherm® giro (H0/N10-H0/N80)

(Dimensions in mm)

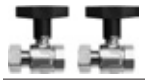
District heating connection on the left - view of interior







TransTherm® giro type	Designation	without option (ball valve) mm
(H0/N10,H0/N20)	A	791
(H0/N40)	B	839
(H0/N60,H0/N80)	C	887

Ball valve option	Size	Connection size inches	K mm
	DN 20	¾″	85
	DN 25	1″	110
	DN 32	1¼″	115
	DN 20	¾″	180
	DN 25	1″	195
	DN 32	1¼″	235

1	Flow primary	R 1″
2	Return primary	R 1″
3	Flow secondary	Rp 1″
4	Return secondary	Rp 1″
5	Diaphragm pressure expansion tank connection (ball valves/pressure gauge options)	Rp ½″
6	Safety valve	½″

Adapters for heat meter:

PN 16

(H0/N10,H0/N20)	R ¾″, 110 mm
(H0/N40,H0/N60)	R 1″, 130 mm
(H0/N80)	R 1¼″, 260 mm

PN 25

(H0/N10-H0/N60)	R 1″, 190 mm
(H0/N80)	R 1¼″, 260 mm

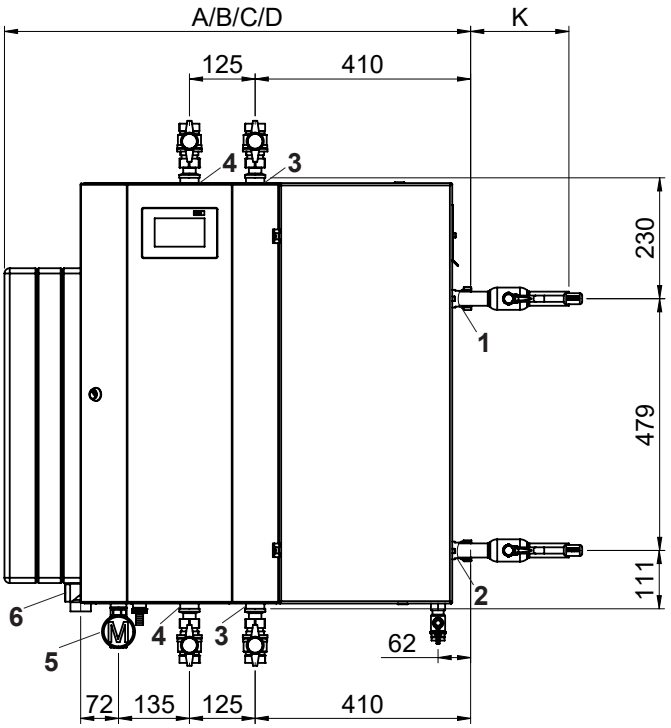
Sensor dimensions

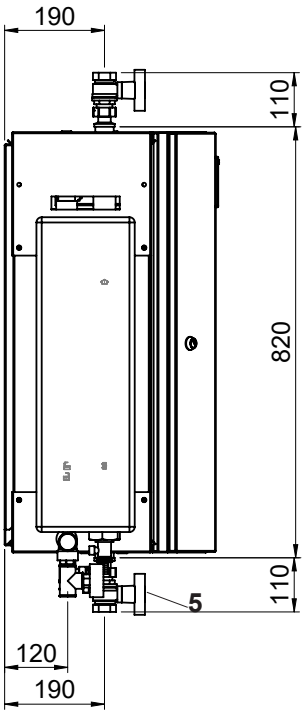
1 x M10 x 1 (27.5-38 mm)
1 x ¼″ for immersion sleeve
(length without add-on 35 mm)

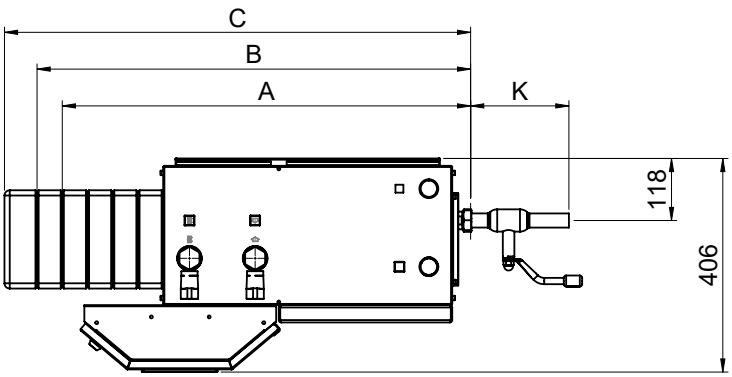
TransTherm® giro (H0/N10-H0/N80)

(Dimensions in mm)

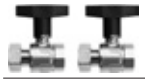
District heating connection on the right - view of exterior
For this connection type, the casing must be turned through 180° on site.







TransTherm® giro type	Designation	without option (ball valve) mm
(H0/N10,H0/N20)	A	791
(H0/N40)	B	839
(H0/N60,H0/N80)	C	887

Ball valve option	Size	Connection size inches	K mm
	DN 20	¾″	85
	DN 25	1″	110
	DN 32	1¼″	115
	DN 20	¾″	180
	DN 25	1″	195
	DN 32	1¼″	235

1	Flow primary	R 1″
2	Return primary	R 1″
3	Flow secondary	Rp 1″
4	Return secondary	Rp 1″
5	Diaphragm pressure expansion tank connection (ball valves/pressure gauge options)	Rp ½″
6	Safety valve	½″

Adapters for heat meter:

PN 16

(H0/N10,H0/N20)	R ¾″, 110 mm
(H0/N40,H0/N60)	R 1″, 130 mm
(H0/N80)	R 1¼″, 260 mm

PN 25

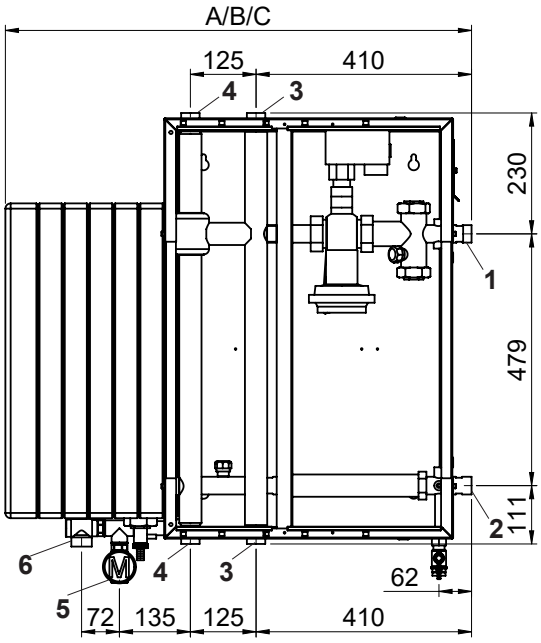
(H0/N10-H0/N60)	R 1″, 190 mm
(H0/N80)	R 1¼″, 260 mm

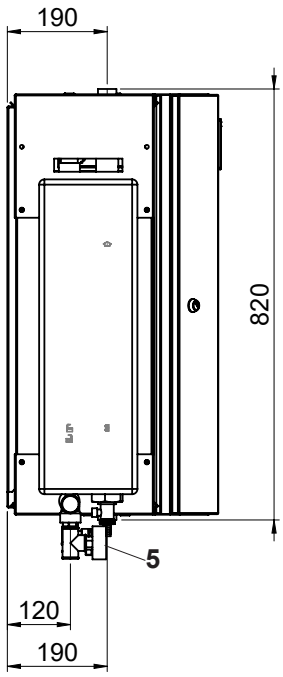
Sensor dimensions
1 x M10 x 1 (27.5-38 mm)
1 x ¼″ for immersion sleeve
(length without add-on 35 mm)

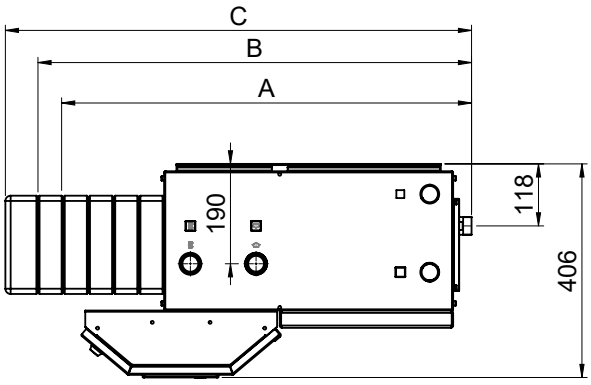
TransTherm® giro (H0/N10-H0/N80)

(Dimensions in mm)

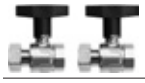
District heating connection on the right - view of interior
For this connection type, the casing must be turned through 180° on site.







TransTherm® giro type	Designation	without option (ball valve) mm
(H0/N10,H0/N20)	A	791
(H0/N40)	B	839
(H0/N60,H0/N80)	C	887

Ball valve option	Size	Connection size inches	K mm
	DN 20	¾″	85
	DN 25	1″	110
	DN 32	1¼″	115
	DN 20	¾″	180
	DN 25	1″	195
	DN 32	1¼″	235

1	Flow primary	R 1″
2	Return primary	R 1″
3	Flow secondary	Rp 1″
4	Return secondary	Rp 1″
5	Diaphragm pressure expansion tank connection (ball valves/pressure gauge options)	Rp ½″
6	Safety valve	½″

Adapters for heat meter:

PN 16

(H0/N10,H0/N20)	R ¾″, 110 mm
(H0/N40,H0/N60)	R 1″, 130 mm
(H0/N80)	R 1¼″, 260 mm

PN 25

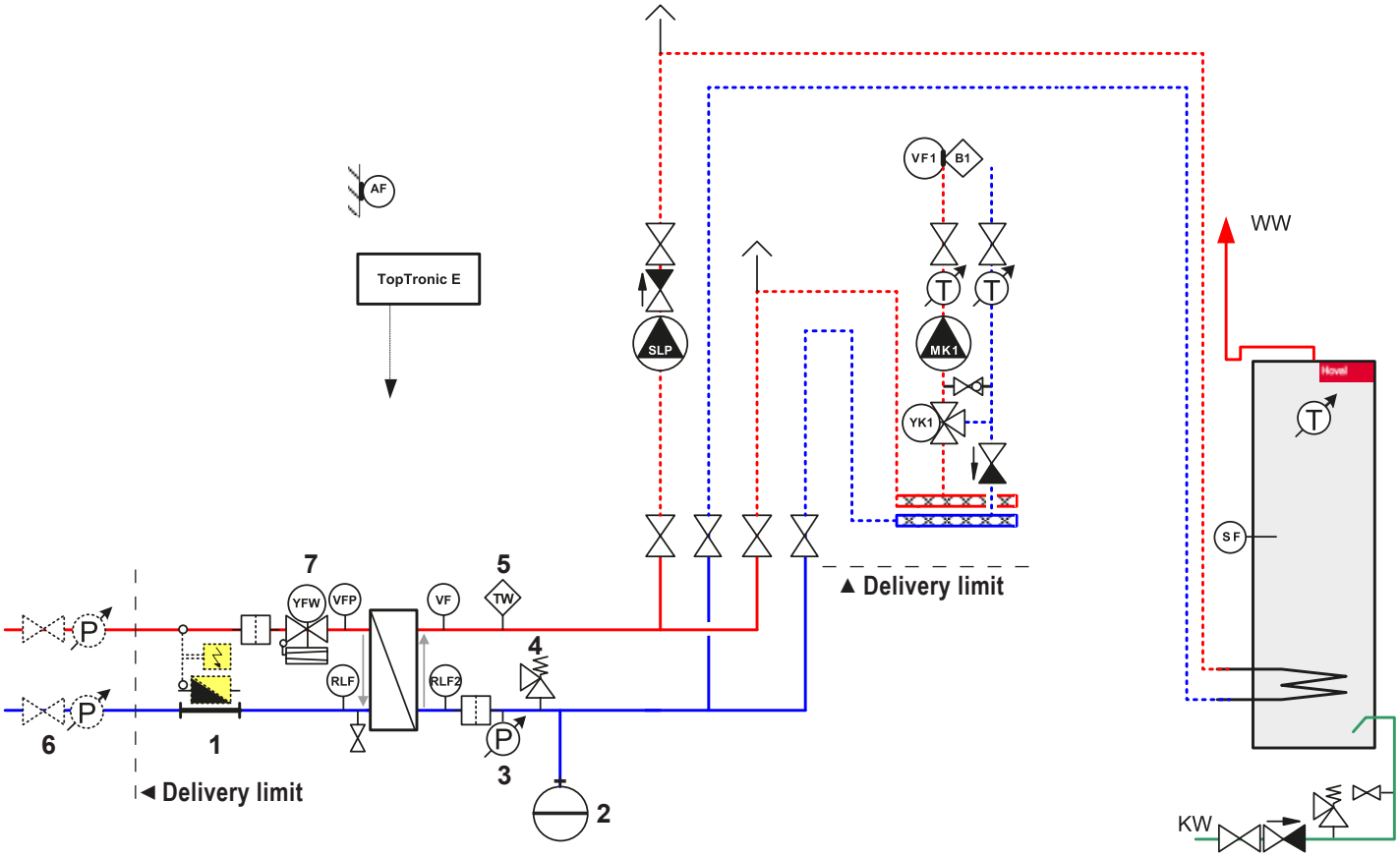
(H0/N10-H0/N60)	R 1″, 190 mm
(H0/N80)	R 1¼″, 260 mm

Sensor dimensions
1 x M10 x 1 (27.5-38 mm)
1 x ¼″ for immersion sleeve
(length without add-on 35 mm)

TransTherm® giro (H0/N10-H0/N80)

District heating station with
- 1 heating circuit with mixer
- hot water production

Hydraulic schematic BGAE010



Notice
- The example schematics merely show the basic principle and do not contain all information required for installation. The installation must be done according to local conditions, dimensioning and regulations.
- With underfloor heating a flow temperature monitor must be built in.
- Shut-off devices to the safety valve (diaphragm pressure expansion tank, safety valve, etc.) are to safe against unintended closing!
- Mount bags to prevent single pipe gravity circulation!

1 Heat meter adapter (heat meter optional)
2 Diaphragm pressure expansion tank (option)
3 Pressure gauge
4 Safety valve
5 Temperature monitor
Standard on design
140/150 °C, 16/25 bar
Optional on design
110 °C/16 bar
6 Shut-off valve (option)
7 Flow rate controller with motorised control valve

RLF Return sensor
RLF2 Return sensor (secondary)
VFP Flow sensor (primary)
VF Flow sensor (secondary)
AF Outdoor sensor
SF Calorifier sensor
TW Temperature monitor

Hoval TransTherm® giro plus

District heating transfer station
- Indirect compact station for heat transfer and regulation of heating and hot water production systems
- Standard design for heating water in accordance with DIN and AGFW directives
  District heating primary:
  - maximum pressure stage 16/25 bar
  - maximum operating temperature 110-150 °C
  - maximum flow rate 2.4 m³/h
  - Connections - standard design right, conversion to left on site
  Secondary heating:
  - maximum operating pressure 3 bar
  - maximum operating temperature 95 °C
  - maximum flow rate 3.2 m³/h
  - connection optional, top and/or bottom

Option
- Special design for other requirements and district-heating-specific requirements on request
- District heating station in fully welded and thermally insulated design (100 % thermally insulated), in powder-coated sheet aluminium casing, colour pure white (RAL 9010)
- TopTronic® E controller installed

Series

TransTherm® giro plus type	Hydraulics	Number of plates (heat exchanger)	Max. flow temperature °C	Nominal pressure bar	Heat output [2] kW
(H../N10/T110/P16)	1/3/5/8/9	10	110	16 [1]	38
(H../N10/T120/P16)	5/9	10	120	16	38
(H../N10/T140/P16)	1/3/8	10	140	16	38
(H../N10/T150/P25)	1/3/8	10	150	25	38
(H../N20/T110/P16)	1/3/8/9	20	110	16 [1]	47
(H../N20/T120/P16)	9	20	120	16	47
(H../N20/T140/P16)	1/3/8	20	140	16	47
(H../N20/T150/P25)	1/3/8	20	150	25	47

TransTherm® giro plus type	Hydraulics	Number of plates (heat exchanger)	Max. flow temperature °C	Nominal pressure bar	Heat output [2] kW
(H../N40/T110/P16)	1/3/8/9	40	110	16 [1]	91
(H../N40/T120/P16)	9	40	120	16	91
(H../N40/T140/P16)	1/3/8	40	140	16	91
(H../N40/T150/P25)	1/3/8	40	150	25	91

[1] Without emergency control function (safety function)
[2] Reference temperature primary 90-53 °C/ secondary 75-50 °C

TopTronic® E controller

TopTronic® E control panel
- Colour touchscreen 4.3 inch
- Simple, intuitive operating concept
- Display of the most important operating statuses
- Configurable start screen
- Operating mode selection
- Configurable day and week programmes
- Operation of all connected Hoval CAN bus modules
- Commissioning wizard
- Service and maintenance function
- Fault message management
- Analysis function
- Weather display (with HovalConnect option)
- Adaptation of the heating strategy based on the weather forecast (with HovalConnect option)

TopTronic® E basic module district heating com (TTE-FW com)
Control functions integrated for
- primary valve control
- cascade management
- 1 heating circuit with mixer
- 1 heating circuit without mixer
- 1 hot water charging circuit
- various additional functions
- Outdoor sensor
- Immersion sensor (calorifier sensor)
- Contact sensor (flow temperature sensor)
- Complete plug set for DH module

Options for TopTronic® E controller
- Can be expanded by max. 5 module expansions:
  - module expansion heating circuit DH
  - module expansion hot water DH
  - module expansion universal DH
- Can be optionally expanded with various accessories:
  - Ethernet connection TTE-FW com
  - repeater TTE-FW com LON-Bus
  - router TTE-FW com Ethernet on LON-Bus
  - data socket 13-pin TTE-FW com LON-Bus and lighting protection
  - various software licences for HovalSupervisor
  - various services for HovalSupervisor
- Can be networked with a total of up to 16 controller modules:
  - heating circuit/hot water module
  - solar module
  - buffer module
  - measuring module
  - e.g. max 45 mixer circuits

Number of accessories that can be additionally installed in the control panel:
- 1 Ethernet connection TTE-FW com

Further information about the TopTronic® E
see “Controls”

Design on request
- Flow rate controller with motorised valve, actuator with emergency control function
- Supply of system components such as heat meter, heating armature group, calorifier, charging group etc.
- Special design for requirements deviating from the standard or specific requirements for district heating networks.
- Hoval control system
- District heating station for direct heat transmission

Delivery
- District heating transfer station, fully cased and ready for electrical connection
- Adapter for heat meter installation

On site
- Installation of heat meter

TransTherm® giro plus (H1/N10-H1/N40)

- Installed:

  District heating primary
  - 1 flow rate controller (with motorised valve, actuator without emergency control function (110 °C) with emergency control function (140, 150 °C)
  - 1 heat meter adapter
  - 1 return temperature sensor
  - 1 strainer
  - 1 drain

  Secondary heating
  - Stainless steel plate heat exchanger in soldered design, 10 plates (H1/N10), 20 plates (H1/N20), 40 plates (H1/N40)
  - 1 flow temperature sensor
  - 1 safety temperature monitor (140, 150 °C)
  - 1 safety valve 3 bar
  - 1 pressure gauge
  - 1 strainer
  - 1 drain

1 heating armature group DN 25 for 1 direct heating circuit, comprising

- Complete pipework with 2 ball valves
- High-efficiency heating circulating pump
- 1 non-return valve

Spare connection DN 25 for external heating groups

- With air-bleeding/drain, closed

TransTherm® giro plus (H3/N10-H3/N40)

- Installed:

  District heating primary
  - 1 flow rate controller (with motorised valve, actuator without emergency control function (110 °C) with emergency control function (140, 150 °C)
  - 1 heat meter adapter
  - 1 return temperature sensor
  - 1 strainer
  - 1 drain

  Secondary heating
  - Stainless steel plate heat exchanger, soldered design, 10 plates (H3/N10), 20 plates (H3/N20), 40 plates (H3/N40)
  - 1 flow temperature sensor
  - 1 safety temperature monitor (140, 150 °C)
  - 1 safety valve 3 bar
  - 1 pressure gauge
  - 1 strainer
  - 1 drain

1 heating armature group DN 25 for 1 direct heating circuit, comprising

- Complete pipework with 2 ball valves
- High-efficiency heating circulating pump
- 1 non-return valve

1 calorifier charging group DN 25 comprising

- Complete pipework with 2 ball valves
- High-efficiency heating circulating pump
- 1 non-return valve

TransTherm® giro plus (H5/N10)

- Installed:

  District heating primary
  - 1 flow rate controller (with motorised valve, actuator without emergency control function (110 °C) with emergency control function (120 °C)
  - 1 heat meter adapter
  - 1 return temperature sensor
  - 1 strainer
  - 1 drain

  Secondary heating
  - Stainless steel heat exchanger in soldered design, 10 plates (H5/N10)
  - 1 flow temperature sensor
  - 1 safety temperature monitor (120 °C)
  - 1 safety valve 3 bar
  - 1 pressure gauge
  - 1 strainer
  - 1 drain

1 heating armature group DN 25 for 1 mixer heating circuit, comprising

- Complete pipework with 2 ball valves
- High-efficiency heating circulating pump
- 3-way motor mixer
- 1 non-return valve

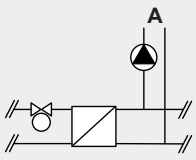
1 heating armature group DN 25 for 1 direct heating circuit, comprising

- Complete pipework with 2 ball valves
- High-efficiency heating circulating pump
- 1 non-return valve

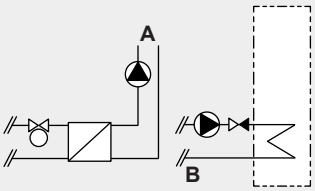
1 calorifier flow group DN 20 Fresh water module comprising

- Flow rate controller and temperature regulator (thermal)
- Stainless steel heat exchanger in soldered design, 36 plates
- 1 pressure expansion valve

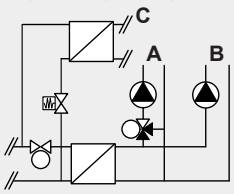
TransTherm® giro plus (H1/N10-H1/N40)



TransTherm® giro plus (H3/N10-H3/N40)



TransTherm® giro plus (H5/N10)



Position connection secondary heating:
A downwards
B upwards
C side

TransTherm® giro plus (H8/N10-H8/N40)

- Installed:
  District heating primary
  - 1 flow rate controller (with motorised valve, actuator without emergency control function (110 °C) with emergency control function (120 °C)
  - 1 heat meter adapter
  - 1 return temperature sensor
  - 1 strainer
  - 1 drain

  Secondary heating
  - Stainless steel heat exchanger in soldered design, 10 plates (H8/N10), 20 plates (H8/N20), 40 plates (H8/N40)
  - 1 flow temperature sensor
  - 1 safety temperature monitor (120 °C)
  - 1 safety valve 3 bar
  - 1 pressure gauge
  - 1 strainer
  - 1 drain

1 heating armature group DN 25 for 1 mixer heating circuit, comprising

- Complete pipework with 2 ball valves
- High-efficiency heating circulating pump
- 3-way motor mixer
- 1 non-return valve

1 calorifier charging group DN 25 comprising

- Complete pipework with 2 ball valves
- High-efficiency heating circulating pump
- 1 non-return valve

TransTherm® giro plus (H9/N10-H9/N40)

- Installed:
  District heating primary
  - Flow rate controller (with motorised valve, actuator without emergency control function (110 °C) with emergency control function (120 °C)
  - 1 heat meter adapter
  - 1 return temperature sensor
  - 1 strainer
  - 1 drain

  Secondary heating
  - Stainless steel plate heat exchanger in soldered design, 10 plates (H9/N10), 20 plates (H9/N20), 40 plates (H9/N40)
  - 1 flow temperature sensor
  - 1 safety temperature monitor (120 °C)
  - 1 safety valve 3 bar
  - 1 pressure gauge
  - 1 strainer
  - 1 drain

1 heating armature group DN 25 for 1 direct heating circuit, comprising

- Complete pipework with 2 ball valves
- High-efficiency heating circulating pump
- 1 non-return valve

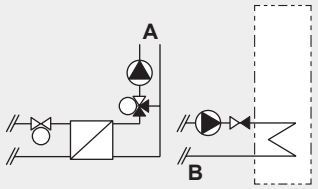
1 calorifier flow group DN 20 Fresh water module, comprising

- Flow rate controller and temperature regulator (thermal)
- Stainless steel heat exchanger in soldered design, 36 plates
- 1 pressure expansion valve

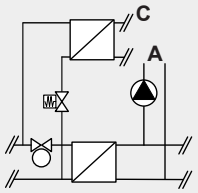
Spare connection DN 25 for external heating groups

- With air-bleeding/drain, closed

TransTherm® giro plus (H8/N10-H8/N40)



TransTherm® giro plus (H9/N10-H9/N40)



Position connection secondary heating:
A downwards
B upwards
C side

Accessories

		Part No.
	Immersion sleeve for heat meter DN 10 (¼″ ext.), 35 mm, ID: 5.2 mm	8004 958
	**Sensor pockets heat. network** ½″, 100 mm for imm. sleeve Price comprises 2 pieces	7012 335
	**Heat meter Sharky 775 (MID-cert.)** Qp 1.5 DN 15 (¾″ ET) PN 25 110 mm 230 V M-Bus sensor FL/RT: 5.2 mm/2 m direct	8004 668
	**Heat meter Sharky 775 (MID-cert.)** Qp 2.5 DN 20 (1″ ext.) PN 25 130 mm 230 V M-Bus sensor FL/RT: 5.2 mm/2 m direct	8004 711
	**Ball valve** Shut-off fitting between the heating network and the district heating station (without thermal insulation) Material: nickel-plated brass Internal thread/screw connection Price includes 2 pcs.	

Size inches	Operating pressure max. bar	Operating temperature max. °C	
¾″	25	120	7011 481
1″	25	120	7011 482
1¼″	25	120	7013 945

	**Angle ball valve heating network DN 20 (¾″ internal thread)** Ball valves as shut-off valve between heating network and district heating station (without thermal insulation) Internal thread/screw connection Max. operating pressure: 25 bar Max. operating temperature: 120 °C Price comprises 2 pieces	7013 946
	**Angle ball valve heating network DN 25 (1″ internal thread)** Ball valves as shut-off valve between heating network and district heating station (without thermal insulation) Internal thread/screw connection Max. operating pressure: 25 bar Max. operating temperature: 120 °C Price comprises 2 pieces	7013 947

Ball valve
Shut-off fitting between the heating network and the district heating station (without thermal insulation)
Material: steel
Weld end/internal thread G 1″
Price includes 2 pcs.

Size	Operating pressure max. bar	Operating temperature max. °C	Part No.
DN 20	25	140	7011 483
DN 25	25	140	7011 484
DN 32	25	140	7013 944

Pressure gauge 7011 901
0-16 bar, Ø 63 mm
price comprises 2 pieces

Pressure gauge 7011 902
0-25 bar, Ø 63 mm
price comprises 2 pieces

Twinlock measuring connection 2048 840
for pressure and temperature measurement in the flow and return of the heat network on the district heating station (necessary measuring devices are not included)

Welded screw connections 7011 480
DN 20, PN 25
(2 pcs.)

2 flanges heating network DN 20 PN 25 7010 910

Circulation set 7016 730
for TransTherm® giro plus (H5/N10), (H9/N10-H9/N40)
for on site installation at cold water inlet of TransTherm® giro plus

Set consists of:
- Recirculation pump w/ internal ball valve and non-return flap
- Safety valve 10 bar
- Required connection elements

Accessories for TopTronic® E

	Part No.
 **Ethernet connection** TopTronic® E district heating com R2 - Communications module expansion for TopTronic® E basic module district heating com - TCP/IP interface for communication with the HovalSupervisor management system - Top hat rail mounting directly adjacent to the basic module - Connection to the basic module via Ribbon cable - Dimensions (L x W x H): 96 x 48 x 42.3	6057 388
 **TopTronic® E district heating com LON-Bus repeater** - Repeater as electrical signal booster of the LON-Bus network - Used for boosting the range of the signal when there are long distances between the control centre and the individual TopTronic® E basic module district heating com controller modules - Positioning of the repeaters depending on the data network (routing type, cable type, length, etc.) at different positions in the network - Electrical power supply 230 V AC - Dimensions (L x W x H): 71 x 92 x 60 **Notice** After 5 repeaters, a router must be used for boosting the signal. Article on request.	6061 947
 **Router TopTronic® E district heating com TTE-FWR - CAN bus** - Interface between the Hoval LON-Bus network and HovalSupervisor - Interface between the Hoval TCP/IP network and HovalSupervisor - Serves as a physical interface between the data stream of the district heating network and e.g a master computer with TCP/IP interface - Possibility of connecting differential pressure sensors variable inputs 0-10 V or 0/4-20 mA - Router can be installed in control panel with DIN-rail mounting - Temperature and pressure control for up to five strands or 5 heating circuits - Dimensions (L x W x H): 355 x 120 x 75 TopTronic® E control module black for operating the router (optional) and mating connector set must be ordered separately.	6047 303

Accessories for TopTronic® E

	Part No.
 **Data socket TopTronic® E district heating com LON-Bus and lightning protection** - Data socket for connecting the telecommunication cable at the building connection - Connection must be made according to the appropriate applicable regulations - Data sockets must also be installed with dummy connections - 1 input block 13-pin - 2 output blocks each 13-pin - 2 outputs 3-pin for controller and repeater - Wet room socket IP55 Dimensions (L x W x H): 180 x 140 x 75 incl. 10 stepped nipples	2061 738
 **Flow temperature monitor** for panel heating (1 controller per heating circuit) 15-95 °C, setting (visible externally) under the casing cover	
Clamp-on flow temperature monitor RAK-TW1000S with retaining strap, without cable and plug	242 902
Clamp-on flow temperature monitor set RAK-TW1000S with retaining strap, supplied with cable (4 m) and plug	6033 745
Immersion thermostat RAK-TW1000S Thermostat with immersion sleeve ½″ Depth of immersion 150 mm, nickel-plated brass	6010 082

Services

Commissioning
Commissioning by works service or Hoval trained authorised serviceman/company is condition for warranty.

For commissioning and other services please contact your Hoval sales office.

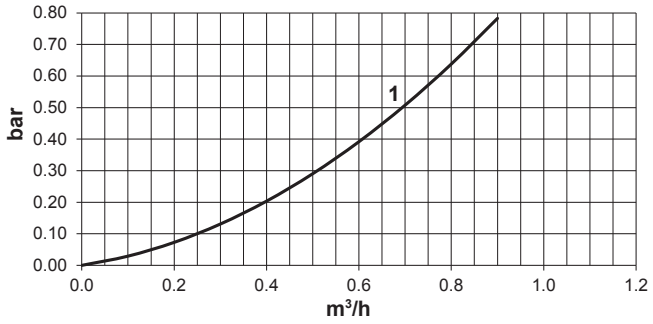
District heating primary

TransTherm® giro plus type	Nominal pressure bar	T-max. °C	Valve kvs	Closing pressure [1] bar	V̇ max. m³/h
(H1/N10/T110/P16)	16	110	1.6	4.0	0.9
(H1/N10/T140/P16)	16	140	1.6	14.0	0.9
(H1/N10/T150/P25)	25	150	1.6	20.0	0.9
(H1/N20/T110/P16)	16	110	2.5	4.0	1.6
(H1/N20/T140/P16)	16	140	2.5	14.0	1.6
(H1/N20/T150/P25)	25	150	2.5	20.0	1.6
(H1/N40/T110/P16)	16	110	4.0	14.0	2.4
(H1/N40/T140/P16)	16	140	4.0	14.0	2.4
(H1/N40/T150/P25)	25	150	4.0	20.0	2.4
(H3/N10/T110/P16)	16	110	1.6	4.0	0.9
(H3/N10/T140/P16)	16	140	1.6	14.0	0.9
(H3/N10/T150/P25)	25	150	1.6	20.0	0.9
(H3/N20/T110/P16)	16	110	2.5	4.0	1.6
(H3/N20/T140/P16)	16	140	2.5	14.0	1.6
(H3/N20/T150/P25)	25	150	2.5	20.0	1.6
(H3/N40/T110/P16)	16	110	4.0	14.0	2.4
(H3/N40/T140/P16)	16	140	4.0	14.0	2.4
(H3/N40/T150/P25)	25	150	4.0	20.0	2.4
(H5/N10/T110/P16)	16	110	1.6	4.0	0.9
(H5/N10/T120/P16)	16	120	1.6	6.0	0.9
(H8/N10/T110/P16)	16	110	1.6	4.0	1.0
(H8/N10/T140/P16)	16	140	2.5	14.0	1.6
(H8/N10/T150/P25)	25	150	2.5	20.0	1.6
(H8/N20/T110/P16)	16	110	2.5	4.0	1.2
(H8/N20/T140/P16)	16	140	2.5	14.0	1.6
(H8/N20/T150/P25)	25	150	2.5	20.0	1.6
(H8/N40/T110/P16)	16	110	4.0	14.0	2.2
(H8/N40/T140/P16)	16	140	4.0	14.0	2.4
(H8/N40/T150/P25)	25	150	4.0	20.0	2.4
(H9/N10/T110/P16)	16	110	1.6	6.0	0.9
(H9/N10/T120/P16)	16	120	1.6	6.0	0.9
(H9/N20/T110/P16)	16	110	2.5	6.0	1.6
(H9/N20/T120/P16)	16	120	2.5	6.0	1.6
(H9/N40/T110/P16)	16	110	4.0	6.0	2.4
(H9/N40/T120/P16)	16	120	4.0	6.0	2.4

[1] Actuator valve

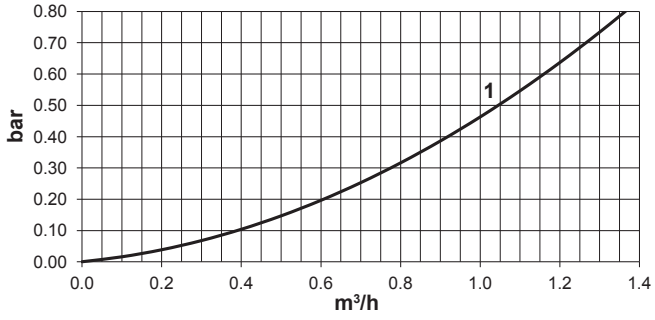
Pressure drop diagrams
District heating primary
dp control valve with heat exchanger,
without heat meter

TransTherm® giro plus (H../N10)



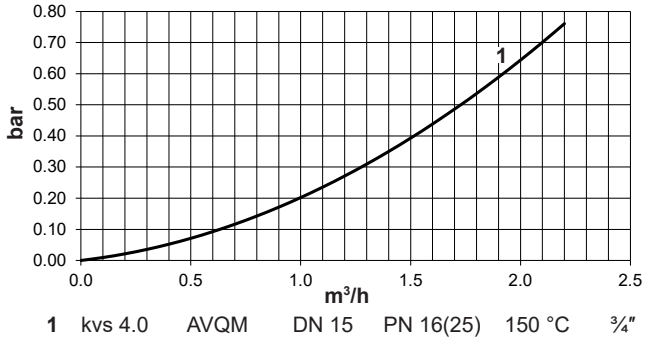
1 kvs 1.6 AVQM DN 15 PN 16(25) 150 °C ¾″

TransTherm® giro plus (H../N20)



1 kvs 2.5 AVQM DN 15 PN 16(25) 150 °C ¾″

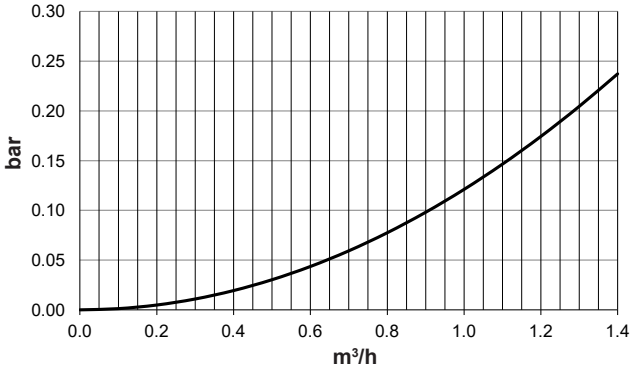
TransTherm® giro plus (H../N40)



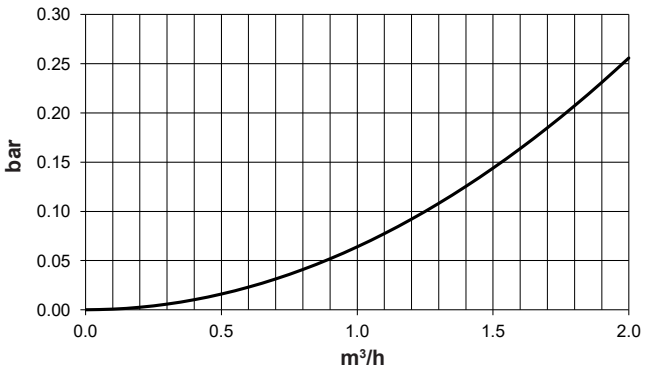
1 kvs 4.0 AVQM DN 15 PN 16(25) 150 °C ¾″

Pressure drop diagrams
Building system secondary
dp heat exchanger

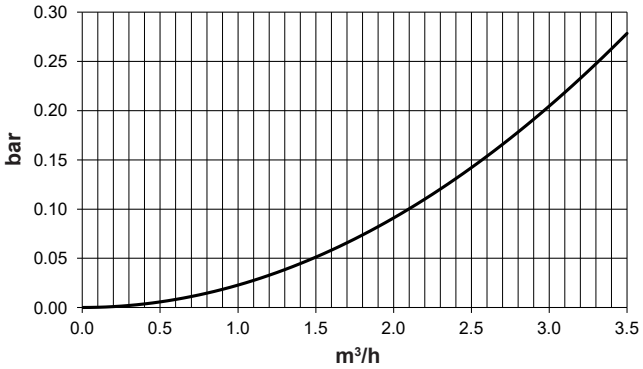
TransTherm® giro plus (H../N10)



TransTherm® giro plus (H../N20)



TransTherm® giro plus (H../N40)



Secondary heating TransTherm® giro plus	Connection size	Operating pressure 3 bar, T-max. 95 °C Flow rate		
		Mixer circuit	Direct circuit	Hot water charging circuit
type	DN	m³/h	m³/h	m³/h
(H1/N10/T110/P16)	25	-	1.15	-
(H1/N10/T140/P16)	25	-	1.15	-
(H1/N10/T150/P25)	25	-	1.15	-
(H1/N20/T110/P16)	25	-	2.05	-
(H1/N20/T140/P16)	25	-	2.05	-
(H1/N20/T150/P25)	25	-	2.05	-
(H1/N40/T110/P16)	25	-	4.05	-
(H1/N40/T140/P16)	25	-	4.05	-
(H1/N40/T150/P25)	25	-	4.05	-
(H3/N10/T110/P16)	25	-	1.15	1.15
(H3/N10/T140/P16)	25	-	1.15	1.15
(H3/N10/T150/P25)	25	-	1.15	1.15
(H3/N20/T110/P16)	25	-	2.05	1.6
(H3/N20/T140/P16)	25	-	2.05	1.6
(H3/N20/T150/P25)	25	-	2.05	1.6
(H3/N40/T110/P16)	25	-	4.05	1.85
(H3/N40/T140/P16)	25	-	4.05	1.85
(H3/N40/T150/P25)	25	-	4.05	1.85
(H5/N10/T110/P16)	25	1.0	1.15	-
(H5/N10/T120/P16)	25	1.0	1.15	-
(H8/N10/T110/P16)	25	1.0	-	1.15
(H8/N10/T140/P16)	25	1.0	-	1.15
(H8/N10/T150/P25)	25	1.0	-	1.15
(H8/N20/T110/P16)	25	1.65	-	1.6
(H8/N20/T140/P16)	25	1.65	-	1.6
(H8/N20/T150/P25)	25	1.65	-	1.6
(H8/N40/T110/P16)	25	3.6	-	1.85
(H8/N40/T140/P16)	25	3.6	-	1.85
(H8/N40/T150/P25)	25	3.6	-	1.85
(H9/N10/T110/P16)	25	-	1.15	-
(H9/N10/T120/P16)	25	-	1.15	-
(H9/N20/T110/P16)	25	-	2.05	-
(H9/N20/T120/P16)	25	-	2.05	-
(H9/N40/T110/P16)	25	-	4.05	-
(H9/N40/T120/P16)	25	-	4.05	-

Fresh water module type F (7-36)

Maximum pressures/temperatures:

Primary side	PN 16/120 °C
DHW	PN 10
Setting range	45-65 °C

Setpoint in temperature maintenance mode
approx. 8-10 °C under the setpoint

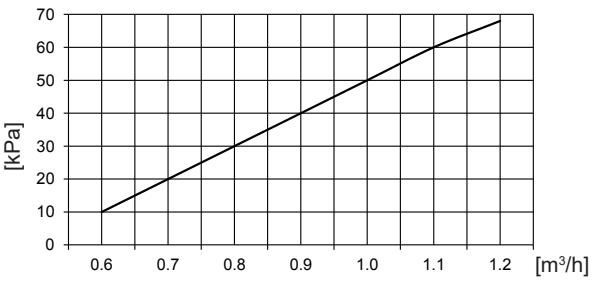
Effective pressure of the integrated differential pressure regulator 16 kPa

Flow rate temperature regulator (thermal) kvs = 3.0

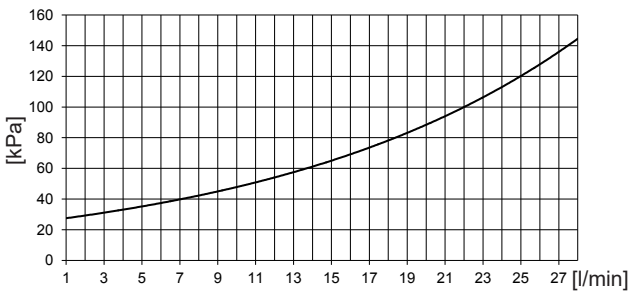
Technical data - DHW side:

Output	35…55 kW
Nominal pressure	10 bar
Maximum pressure	6/8/10 bar
Test pressure	8/12/15 bar
Min. differential pressure	0.8 bar
Max. differential pressure	6 bar
Operating temperature	65…45-10 °C
Maximum temperature	80 °C
Connection dimension	DN 20 3/4″ ext. thread

Pressure drop, district heating side



Pressure drop DHW side



Performance data

TransTherm® giro plus
Integrated control: primary: max. return temperature control
secondary for heating circuits in acc. with table

TransTherm® giro plus type	Mixer circuit	Direct heating circuit	DHW charging circuit	Fresh water module	Spare connection for external heating circuit
(H1/N10-H1/N40)		●			●
(H3/N10-H3/N40)		●	●		
(H5/N10)	●	●		●	
(H8/N10-H8/N40)	●		●		
(H9/N10-H9/N40)		●		●	●

Secondary heating	**TransTherm® giro plus**		**District heating**								
			70 °C			**75 °C**			**80 °C**		
			(H1/N10) (H3/N10) (H5/N10) (H8/N10) (H9/N10)	(H1/N20) (H3/N20) (H8/N20) (H9/N20)	(H1/N40) (H3/N40) (H8/N40) (H9/N40)	(H1/N10) (H3/N10) (H5/N10) (H8/N10) (H9/N10)	(H1/N20) (H3/N20) (H8/N20) (H9/N20)	(H1/N40) (H3/N40) (H8/N40) (H9/N40)	(H1/N10) (H3/N10) (H5/N10) (H8/N10) (H9/N10)	(H1/N20) (H3/N20) (H8/N20) (H9/N20)	(H1/N40) (H3/N40) (H8/N40) (H9/N40)
75/50 °C	T return primary	°C	-	-	-	-	-	-	55	55	55
	V̇ primary	**m³/h**	-	-	-	-	-	-	**0.56**	**0.77**	**1.87**
	Q max.	kW	-	-	-	-	-	-	16	22	53
	V̇ secondary	**m³/h**	-	-	-	-	-	-	**0.56**	**0.77**	**1.87**
70/50 °C	T return primary	°C	-	-	-	55	55	55	54	53	53
	V̇ primary	**m³/h**	-	-	-	**1.01**	**1.41**	**2.2**	**0.99**	**1.2**	**2.34**
	Q max.	kW	-	-	-	23	32	52	30	38	73
	V̇ secondary	**m³/h**	-	-	-	**1.01**	**1.39**	**2.3**	**1.31**	**1.66**	**3.18**
70/55 °C	T return primary	°C	-	-	-	59	59	58	57	57	57
	V̇ primary	**m³/h**	-	-	-	**1.23**	**1.49**	**2.2**	**0.87**	**1.05**	**2.04**
	Q max.	kW	-	-	-	23	28	43	23	28	55
	V̇ secondary	**m³/h**	-	-	-	**1.34**	**1.64**	**2.56**	**1.34**	**1.64**	**3.21**
65/40 °C	T return primary	°C	45	45	45	45	45	44	44	44	43
	V̇ primary	**m³/h**	**0.53**	**0.7**	**1.58**	**1**	**1.39**	**2.2**	**0.92**	**1.12**	**2.14**
	Q max.	kW	15	20	45	34	47	77	38	47	91
	V̇ secondary	**m³/h**	**0.53**	**0.7**	**1.58**	**1.18**	**1.64**	**2.71**	**1.33**	**1.64**	**3.18**
60/40 °C	T return primary	°C	44	44	43	43	43	42	42	42	42
	V̇ primary	**m³/h**	**1.01**	**1.27**	**2.2**	**0.81**	**1.01**	**1.94**	**0.69**	**0.84**	**1.65**
	Q max.	kW	30	38	68	30	38	73	30	38	73
	V̇ secondary	**m³/h**	**1.31**	**1.66**	**2.98**	**1.31**	**1.66**	**3.18**	**1.31**	**1.66**	**3.18**
60/45 °C	T return primary	°C	47	47	47	47	47	47	47	47	47
	V̇ primary	**m³/h**	**0.89**	**1.01**	**2.06**	**0.71**	**0.86**	**1.66**	**0.59**	**0.72**	**1.39**
	Q max.	kW	23	28	55	23	28	55	23	28	55
	V̇ secondary	**m³/h**	**1.34**	**1.63**	**3.19**	**1.34**	**1.63**	**3.19**	**1.34**	**1.63**	**3.19**
55/30 °C	T return primary	°C	34	34	34	33	33	33	33	32	32
	V̇ primary	**m³/h**	**0.94**	**1.15**	**2.19**	**0.8**	**0.99**	**1.88**	**0.69**	**0.85**	**1.64**
	Q max.	kW	38	47	91	38	47	91	38	47	91
	V̇ secondary	**m³/h**	**1.32**	**1.64**	**3.17**	**1.32**	**1.64**	**3.17**	**1.32**	**1.64**	**3.17**
50/30 °C	T return primary	°C	32	32	32	32	32	32	32	32	32
	V̇ primary	**m³/h**	**0.7**	**0.88**	**1.67**	**0.61**	**0.77**	**1.47**	**0.54**	**0.66**	**1.29**
	Q max.	kW	30	38	73	30	38	73	30	38	73
	V̇ secondary	**m³/h**	**1.31**	**1.66**	**3.17**	**1.31**	**1.66**	**3.17**	**1.31**	**1.66**	**3.17**
50/35 °C	T return primary	°C	37	37	37	37	37	37	37	37	37
	V̇ primary	**m³/h**	**0.6**	**0.73**	**1.41**	**0.52**	**0.63**	**1.23**	**0.45**	**0.55**	**1.1**
	Q max.	kW	23	28	55	23	28	55	23	28	55
	V̇ secondary	**m³/h**	**1.33**	**1.63**	**3.19**	**1.33**	**1.63**	**3.19**	**1.33**	**1.63**	**3.19**
45/30 °C	T return primary	°C	32	32	32	32	32	32	32	32	32
	V̇ primary	**m³/h**	**0.52**	**0.63**	**1.23**	**0.46**	**0.56**	**1.09**	**0.41**	**0.49**	**0.97**
	Q max.	kW	23	28	55	23	28	55	23	28	55
	V̇ secondary	**m³/h**	**1.33**	**1.62**	**3.18**	**1.33**	**1.62**	**3.18**	**1.33**	**1.62**	**3.18**
45/35 °C	T return primary	°C	37	37	37	37	37	37	37	37	37
	V̇ primary	**m³/h**	**0.39**	**0.48**	**0.91**	**0.34**	**0.42**	**0.8**	**0.29**	**0.37**	**0.7**
	Q max.	kW	15	19	36	15	19	36	15	19	36
	V̇ secondary	**m³/h**	**1.31**	**1.65**	**3.12**	**1.31**	**1.65**	**3.12**	**1.31**	**1.65**	**3.12**

TransTherm® giro plus
Integrated control: primary: max. return temperature control
secondary for heating circuits in acc. with table

TransTherm® giro plus type	Mixer circuit	Direct heating circuit	DHW charging circuit	Fresh water module	Spare connection for external heating circuit
(H1/N10-H1/N40)		●			●
(H3/N10-H3/N40)		●	●		
(H5/N10)	●	●		●	
(H8/N10-H8/N40)	●		●		
(H9/N10-H9/N40)		●		●	●

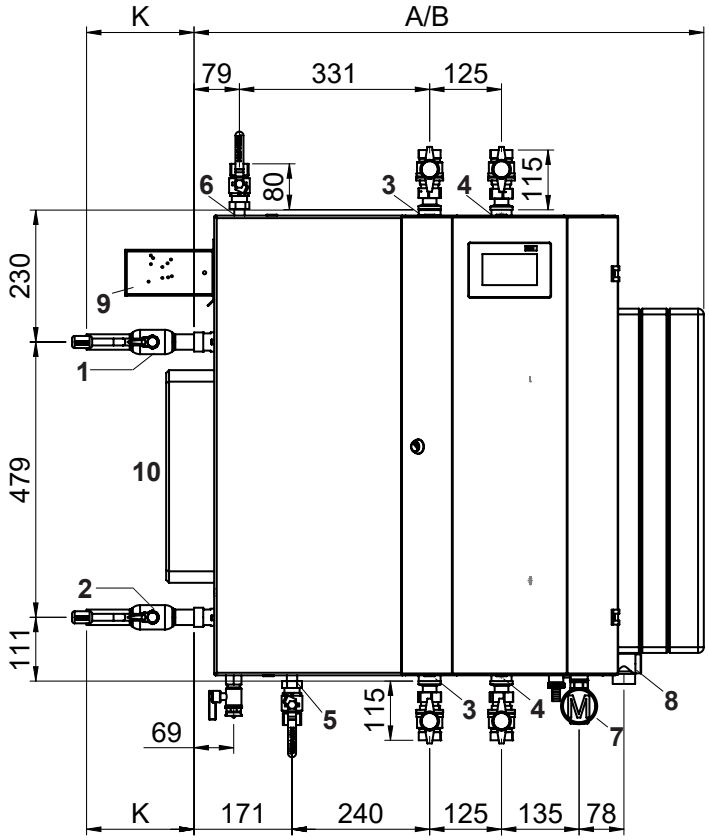
Secondary heating	**TransTherm® giro plus**		**District heating**								
			90 °C			**110 °C**			**130 °C**		
			(H1/N10) (H3/N10) (H5/N10) (H8/N10) (H9/N10)	(H1/N20) (H3/N20) (H8/N20) (H9/N20)	(H1/N40) (H3/N40) (H8/N40) (H9/N40)	(H1/N10) (H3/N10) (H5/N10) (H8/N10) (H9/N10)	(H1/N20) (H3/N20) (H8/N20) (H9/N20)	(H1/N40) (H3/N40) (H8/N40) (H9/N40)	(H1/N10) (H3/N10) (H8/N10)	(H1/N20) (H3/N20) (H8/N20)	(H1/N40) (H3/N40) (H8/N40)
75/50 °C	T return primary	°C	54	53	53	52	52	52	52	52	52
	V̇ primary	**m³/h**	**0.91**	**1.12**	**2.13**	**0.57**	**0.7**	**1.35**	**0.43**	**0.53**	**1.02**
	Q max.	kW	38	47	91	38	47	91	38	47	91
	V̇ secondary	**m³/h**	**1.33**	**1.65**	**3.19**	**1.33**	**1.65**	**3.19**	**1.33**	**1.65**	**3.19**
70/50 °C	T return primary	°C	52	52	52	52	52	52	52	52	52
	V̇ primary	**m³/h**	**0.68**	**0.86**	**1.64**	**0.45**	**0.56**	**1.08**	**0.34**	**0.43**	**0.81**
	Q max.	kW	30	38	73	30	38	73	30	38	73
	V̇ secondary	**m³/h**	**1.31**	**1.66**	**3.19**	**1.31**	**1.66**	**3.19**	**1.31**	**1.66**	**3.19**
70/55 °C	T return primary	°C	57	57	57	57	57	57	57	57	57
	V̇ primary	**m³/h**	**0.59**	**0.71**	**1.4**	**0.37**	**0.45**	**0.89**	**0.28**	**0.34**	**0.66**
	Q max.	kW	23	28	55	23	28	55	23	28	55
	V̇ secondary	**m³/h**	**1.34**	**1.64**	**3.21**	**1.34**	**1.64**	**3.21**	**1.34**	**1.64**	**3.21**
65/40 °C	T return primary	°C	42	42	42	42	42	42	42	42	42
	V̇ primary	**m³/h**	**0.69**	**0.85**	**1.64**	**0.48**	**0.6**	**1.15**	**0.38**	**0.47**	**0.9**
	Q max.	kW	38	47	91	38	47	91	38	47	91
	V̇ secondary	**m³/h**	**1.33**	**1.64**	**3.18**	**1.33**	**1.64**	**3.18**	**1.33**	**1.64**	**3.18**
60/40 °C	T return primary	°C	42	42	42	42	42	42	42	42	42
	V̇ primary	**m³/h**	**0.53**	**0.66**	**1.29**	**0.24**	**0.48**	**0.92**	**0.3**	**0.38**	**0.72**
	Q max.	kW	30	38	73	30	38	73	30	38	73
	V̇ secondary	**m³/h**	**1.31**	**1.66**	**3.18**	**1.31**	**1.66**	**3.18**	**1.31**	**1.66**	**3.18**
60/45 °C	T return primary	°C	47	47	47	47	47	47	47	47	47
	V̇ primary	**m³/h**	**0.45**	**0.55**	**1.08**	**0.31**	**0.38**	**0.75**	**0.24**	**0.3**	**0.58**
	Q max.	kW	23	28	55	23	28	55	23	28	55
	V̇ secondary	**m³/h**	**1.34**	**1.63**	**3.19**	**1.34**	**1.63**	**3.19**	**1.34**	**1.63**	**3.19**
55/30 °C	T return primary	°C	32	32	32	32	32	32	32	32	32
	V̇ primary	**m³/h**	**0.57**	**0.69**	**1.35**	**0.42**	**0.52**	**1.01**	**0.34**	**0.42**	**0.81**
	Q max.	kW	38	47	91	38	47	91	38	47	91
	V̇ secondary	**m³/h**	**1.32**	**1.64**	**3.17**	**1.32**	**1.64**	**3.17**	**1.32**	**1.64**	**3.17**
50/30 °C	T return primary	°C	32	32	32	32	32	32	32	32	32
	V̇ primary	**m³/h**	**0.45**	**0.55**	**1.07**	**0.33**	**0.42**	**0.81**	**0.27**	**0.34**	**0.65**
	Q max.	kW	30	38	73	30	38	73	30	38	73
	V̇ secondary	**m³/h**	**1.31**	**1.66**	**3.17**	**1.31**	**1.66**	**3.17**	**1.31**	**1.66**	**3.17**
50/35 °C	T return primary	°C	37	37	37	37	37	37	37	37	37
	V̇ primary	**m³/h**	**0.37**	**0.45**	**0.88**	**0.27**	**0.33**	**0.65**	**0.22**	**0.26**	**0.52**
	Q max.	kW	23	28	55	23	28	55	23	28	55
	V̇ secondary	**m³/h**	**1.33**	**1.63**	**3.19**	**1.33**	**1.63**	**3.19**	**1.33**	**1.63**	**3.19**
45/30 °C	T return primary	°C	32	32	32	32	32	32	32	32	32
	V̇ primary	**m³/h**	**0.34**	**0.41**	**0.81**	**0.26**	**0.31**	**0.61**	**0.21**	**0.25**	**0.49**
	Q max.	kW	23	28	55	23	28	55	23	28	55
	V̇ secondary	**m³/h**	**1.33**	**1.62**	**3.18**	**1.33**	**1.62**	**3.18**	**1.33**	**1.62**	**3.18**
45/35 °C	T return primary	°C	37	37	37	37	37	37	37	37	37
	V̇ primary	**m³/h**	**0.24**	**0.31**	**0.58**	**0.18**	**0.23**	**0.43**	**0.14**	**0.18**	**0.34**
	Q max.	kW	15	19	36	15	19	36	15	19	36
	V̇ secondary	**m³/h**	**1.31**	**1.65**	**3.12**	**1.31**	**1.65**	**3.12**	**1.31**	**1.65**	**3.12**

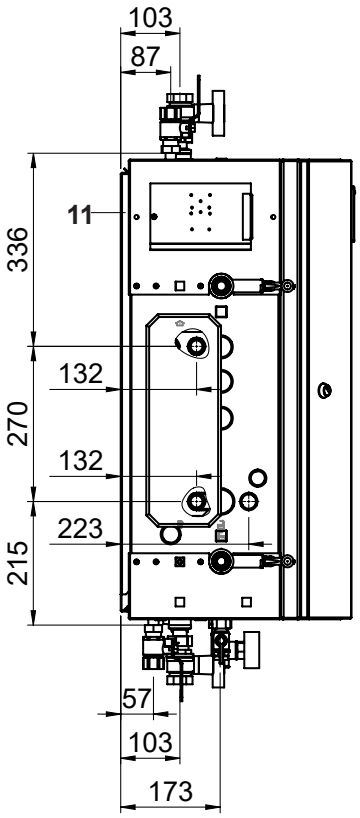
Hot water output, fresh water module

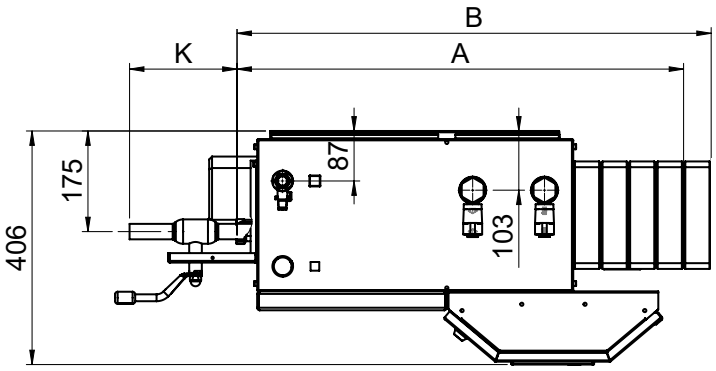
Domestic hot water			Minimum district heating flow operating temperature				
			65 °C (H5/N10) (H9/N10-H9/N40)	**70 °C** (H5/N10) (H9/N10-H9/N40)	**75 °C** (H5/N10) (H9/N10-H9/N40)	**80 °C** (H5/N10) (H9/N10-H9/N40)	**85 °C** (H5/N10) (H9/N10-H9/N40)
45/10 °C	T return primary	°C	19.2	18.3	17	16	15
	V̇ primary	m³/h	**1.2**	**1.2**	**1.07**	**0.97**	**0.89**
	Q max.	kW	63	71	71	71	71
	V̇ secondary	m³/h	**1.56**	**1.76**	**1.76**	**1.76**	**1.76**
50/10 °C	T return primary	°C	22.1	20.6	19.5	18.4	17.3
	V̇ primary	m³/h	**1.2**	**1.2**	**1.2**	**1.15**	**1.05**
	Q max.	kW	59	68	76.5	81.4	81.4
	V̇ secondary	m³/h	**1.28**	**1.47**	**1.65**	**1.76**	**1.76**
55/10 °C	T return primary	°C	26.4	23.7	22	20.7	19.8
	V̇ primary	m³/h	**1.2**	**1.2**	**1.2**	**1.2**	**1.2**
	Q max.	kW	53	64	73	81.5	89.5
	V̇ secondary	m³/h	**1.0**	**1.23**	**1.4**	**1.57**	**1.72**
60/10 °C	T return primary	°C	34.2	28.2	25.3	23.4	22
	V̇ primary	m³/h	**1.2**	**1.2**	**1.2**	**1.2**	**1.2**
	Q max.	kW	42.5	57.5	68.5	78	86.5
	V̇ secondary	m³/h	**0.74**	**0.99**	**1.19**	**1.35**	**1.5**
45/15 °C	T return primary	°C	22.1	21	20	19.2	18.6
	V̇ primary	m³/h	**1.2**	**1.09**	**0.97**	**0.88**	**0.8**
	Q max.	kW	59	61	61	61	61
	V̇ secondary	m³/h	**1.7**	**1.76**	**1.76**	**1.76**	**1.76**
50/15 °C	T return primary	°C	24.7	23.5	22.5	21.3	20.4
	V̇ primary	m³/h	**1.2**	**1.2**	**1.18**	**1.06**	**0.96**
	Q max.	kW	55.4	64	71	71	71
	V̇ secondary	m³/h	**1.37**	**1.58**	**1.76**	**1.76**	**1.76**
55/15 °C	T return primary	°C	28.5	26.3	24.9	23.8	22.7
	V̇ primary	m³/h	**1.2**	**1.2**	**1.2**	**1.2**	**1.14**
	Q max.	kW	50	60	69	77	81
	V̇ secondary	m³/h	**1.1**	**1.3**	**1.5**	**1.67**	**1.76**
60/15 °C	T return primary	°C	35.4	30.4	27.9	26.8	25
	V̇ primary	m³/h	**1.2**	**1.2**	**1.2**	**1.2**	**1.2**
	Q max.	kW	41	54.5	65	73	82
	V̇ secondary	m³/h	**0.79**	**1.05**	**1.25**	**1.42**	**1.58**
50/20 °C	T return primary	°C	27.6	26.6	25.4	24.5	23.7
	V̇ primary	m³/h	**1.2**	**1.2**	**1.07**	**0.96**	**0.87**
	Q max.	kW	51	60	61	61	61
	V̇ secondary	m³/h	**1.49**	**1.73**	**1.76**	**1.76**	**1.76**
55/20 °C	T return primary	°C	31	29.2	27.9	26.9	25.8
	V̇ primary	m³/h	**1.2**	**1.2**	**1.2**	**1.17**	**1.05**
	Q max.	kW	46.8	56.5	85	71	71
	V̇ secondary	m³/h	**1.16**	**1.4**	**1.61**	**1.76**	**1.76**
60/20 °C	T return primary	°C	36.8	32.8	30.7	29.3	28.3
	V̇ primary	m³/h	**1.2**	**1.2**	**1.2**	**1.2**	**1.2**
	Q max.	kW	38.7	51	61	69.5	78
	V̇ secondary	m³/h	**0.84**	**1.11**	**1.32**	**1.5**	**1.69**

TransTherm® giro plus
(Dimensions in mm)

District heating connection on the left - view of exterior







1	Flow primary R 1″
2	Return primary R 1″
3	Flow secondary Rp 1″
4	Return secondary Rp 1″
5	Cold water inlet R ¾″
6	Hot water outlet R ¾″
7	Diaphragm pressure expansion tank connection including ball valves/pressure gauge Rp ¾″
8	Safety valve
9	Heat meter calculation unit (option)
10	Fresh water module
11	Mounting plate

Cut-off ball valves
on the primary and secondary side
not included in the scope of delivery (option)

TransTherm® giro plus type	**Designation**	**without option (ball valve)** mm
(H../N10), (H../N20)	A	791
(H../N40)	B	839

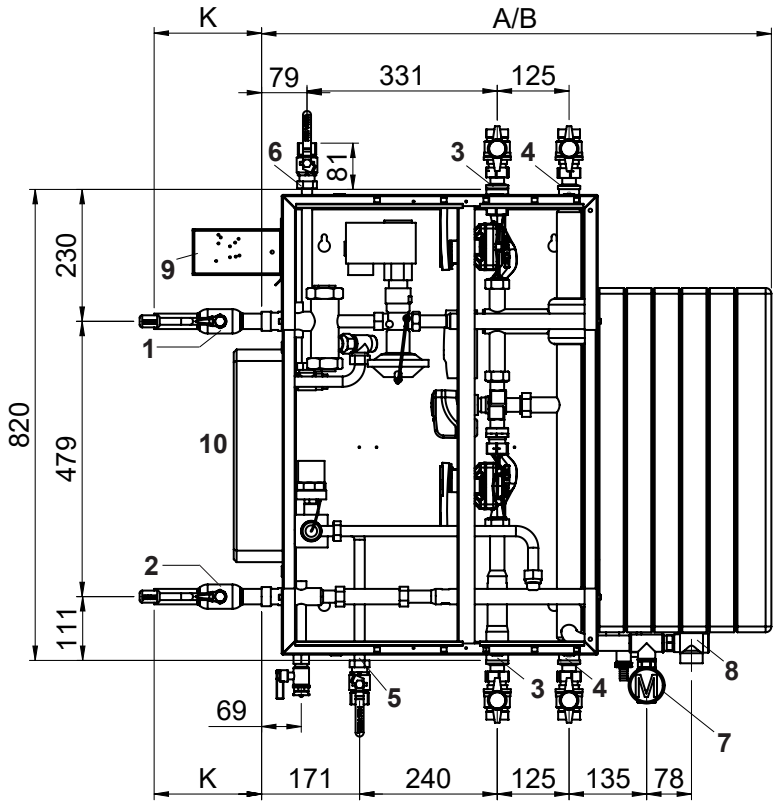
Ball valve option	**Size**	**Connection size** inches	**K** mm
	DN 20	¾″	85
	DN 25	1″	110
	DN 32	1¼″	115
	DN 20	¾″	180
	DN 25	1″	195
	DN 32	1¼″	235

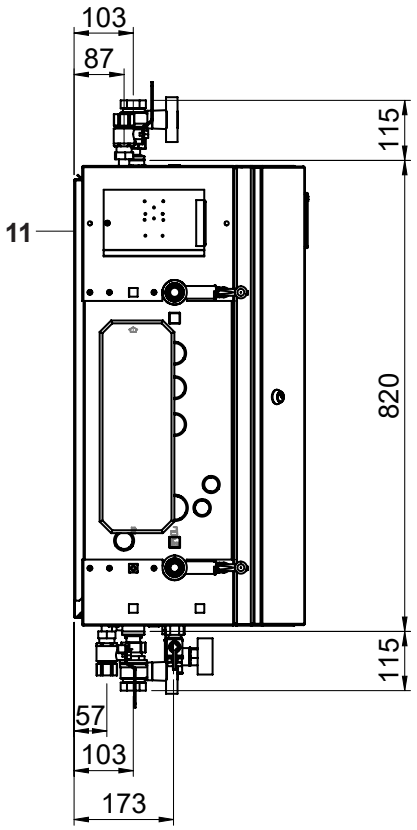
Adapters for heat meter:
PN 16
(H../N10,H../N20) R ¾″, 110 mm
(H../N40,H../N60) R 1″, 130 mm
(H../N80) R 1¼″, 260 mm
PN 25
(H../N10-H../N60) R 1″, 190 mm
(H../N80) R 1¼″, 260 mm

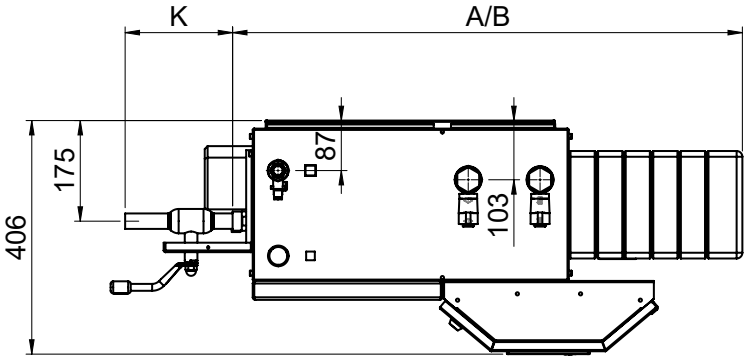
Sensor dimensions
1 x M10 x 1 (27,5-38 mm)
1 x ¼″ for immersion sleeve
(length without add-on 35 mm)

TransTherm® giro plus
(Dimensions in mm)

District heating connection on the left - view of interior







1	Flow primary	R 1″
2	Return primary	R 1″
3	Flow secondary	Rp 1″
4	Return secondary	Rp 1″
5	Cold water inlet	R ¾″
6	Hot water outlet	R ¾″
7	Diaphragm pressure expansion tank connection including ball valves/pressure gauge	Rp ¾″
8	Safety valve	
9	Heat meter calculation unit (option)	
10	Fresh water module	
11	Mounting plate	

Cut-off ball valves
on the primary and secondary side
not included in the scope of delivery (option)

TransTherm® giro plus type	**Designation**	**without option (ball valve)** mm
(H../N10), (H../N20)	A	791
(H../N40)	B	839

Ball valve option	**Size**	**Connection size** inches	**K** mm
	DN 20	¾″	85
	DN 25	1″	110
	DN 32	1¼″	115
	DN 20	¾″	180
	DN 25	1″	195
	DN 32	1¼″	235

Adapters for heat meter:

PN 16

(H../N10,H../N20)	R ¾″, 110 mm
(H../N40,H../N60)	R 1″, 130 mm
(H../N80)	R 1¼″, 260 mm

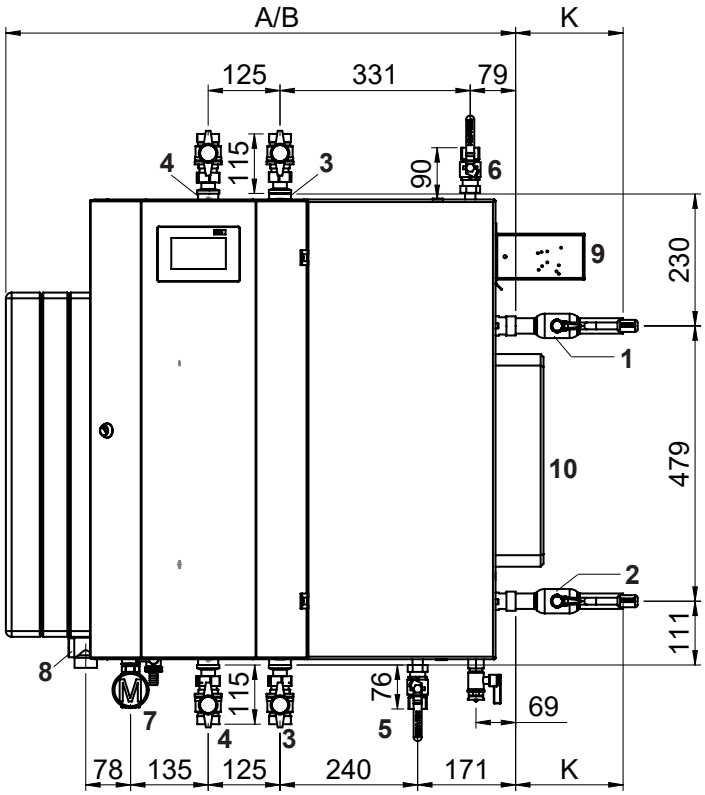
PN 25

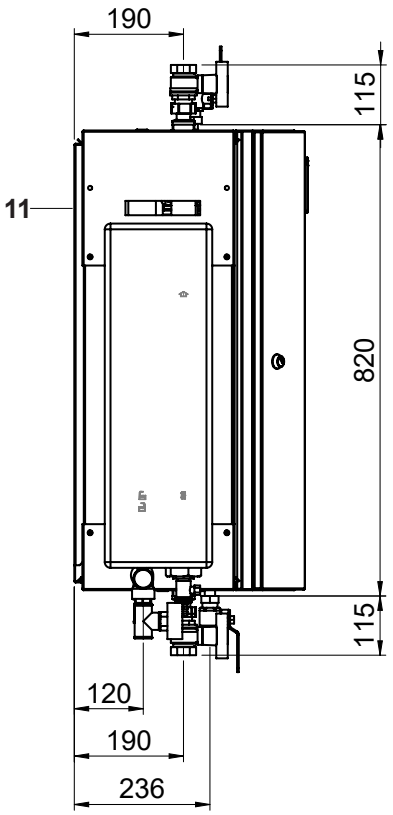
(H../N10-H../N60)	R 1″, 190 mm
(H../N80)	R 1¼″, 260 mm

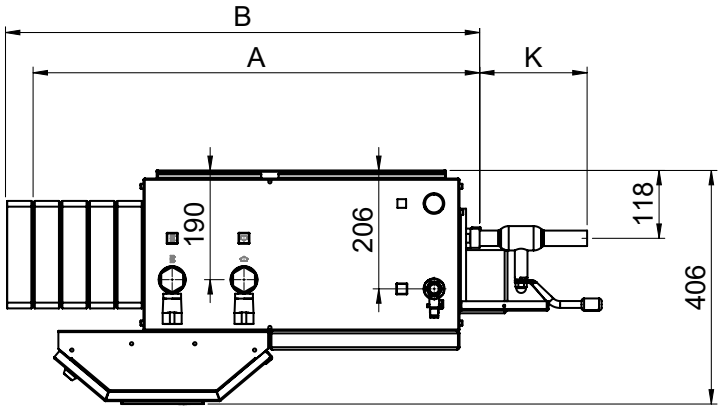
Sensor dimensions
1 x M10 x 1 (27.5-38 mm)
1 x ¼″ for immersion sleeve
(length without add-on 35 mm)

TransTherm® giro plus
(Dimensions in mm)

District heating connection on the right - view of exterior
For this connection type, the casing
must be turned through 180° on site.







1	Flow primary R 1″
2	Return primary R 1″
3	Flow secondary Rp 1″
4	Return secondary Rp 1″
5	Cold water inlet R ¾″
6	Hot water outlet R ¾″
7	Diaphragm pressure expansion tank connection including ball valves/pressure gauge Rp ¾″
8	Safety valve
9	Heat meter calculation unit (option)
10	Fresh water module
11	Mounting plate

Cut-off ball valves
on the primary and secondary side
not included in the scope of delivery (option)

TransTherm® giro plus type	Designation	without option (ball valve) mm
(H../N10), (H../N20)	A	791
(H../N40)	B	839

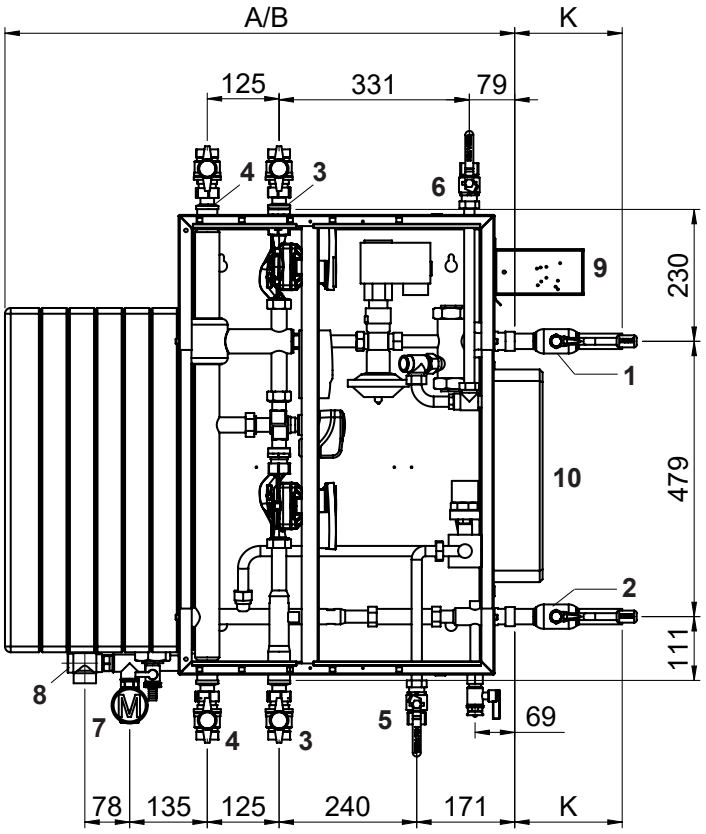
Ball valve option	Size	Connection size inches	K mm
	DN 20	¾″	85
	DN 25	1″	110
	DN 32	1¼″	115
	DN 20	¾″	180
	DN 25	1″	195
	DN 32	1¼″	235

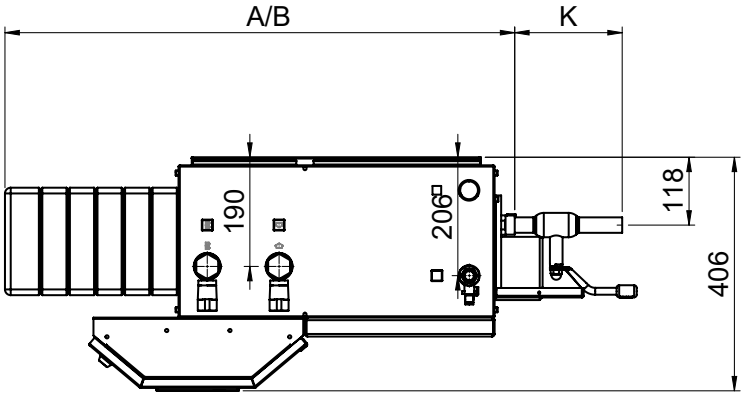
Adapters for heat meter:
PN 16
(H../N10,H../N20) R ¾″, 110 mm
(H../N40,H../N60) R 1″, 130 mm
(H../N80) R 1¼″, 260 mm
PN 25
(H../N10-H../N60) R 1″, 190 mm
(H../N80) R 1¼″, 260 mm

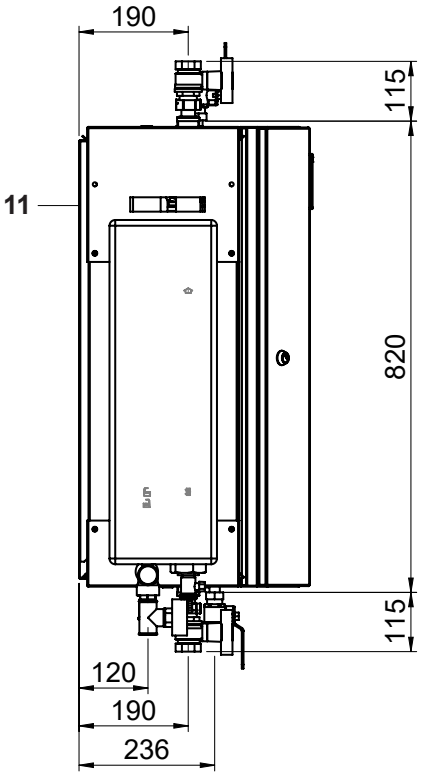
Sensor dimensions
1 x M10 x 1 (27.5-38 mm)
1 x ¼″ for immersion sleeve
(length without add-on 35 mm)

TransTherm® giro plus
(Dimensions in mm)

District heating connection on the right - view of interior
For this connection type, the casing must be turned through 180° on site.







1	Flow primary	R 1″
2	Return primary	R 1″
3	Flow secondary	Rp 1″
4	Return secondary	Rp 1″
5	Cold water inlet	R ¾″
6	Hot water outlet	R ¾″
7	Diaphragm pressure expansion tank connection including ball valves/pressure gauge	Rp ¾″
8	Safety valve	
9	Heat meter calculation unit (option)	
10	Fresh water module	
11	Mounting plate	

Cut-off ball valves
on the primary and secondary side
not included in the scope of delivery (option)

TransTherm® giro plus type	**Designation**	**without option (ball valve)** mm
(H../N10), (H../N20)	A	791
(H../N40)	B	839

Ball valve option	**Size**	**Connection size** inches	**K** mm
	DN 20	¾″	85
	DN 25	1″	110
	DN 32	1¼″	115
	DN 20	¾″	180
	DN 25	1″	195
	DN 32	1¼″	235

Adapters for heat meter:
PN 16

(H../N10,H../N20)	R ¾″, 110 mm
(H../N40,H../N60)	R 1″, 130 mm
(H../N80)	R 1¼″, 260 mm

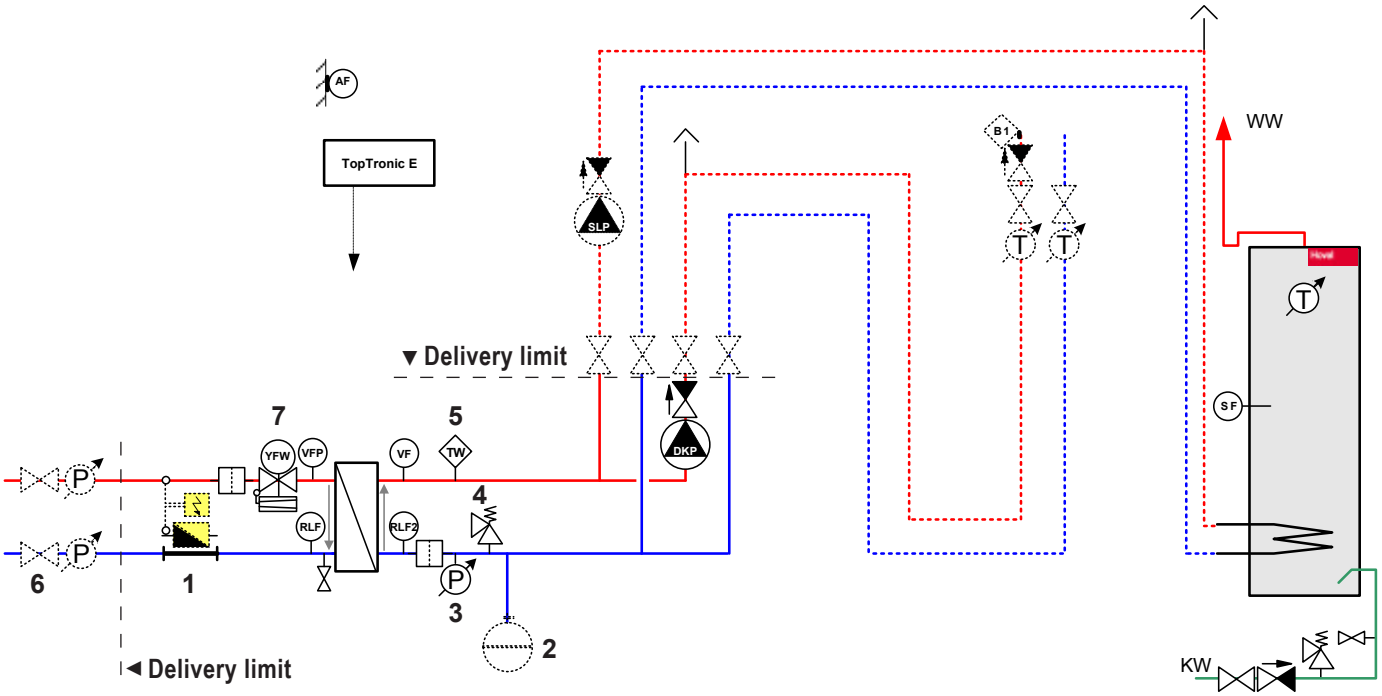
PN 25

(H../N10-H../N60)	R 1″, 190 mm
(H../N80)	R 1¼″, 260 mm

Sensor dimensions
1 x M10 x 1 (27.5-38 mm)
1 x ¼″ for immersion sleeve
(length without add-on 35 mm)

TransTherm® giro plus (H1/N10-H1/N40)

District heating station with
- 1 heater circuit without mixer
- spare connection for external heating circuit e.g. hot water production



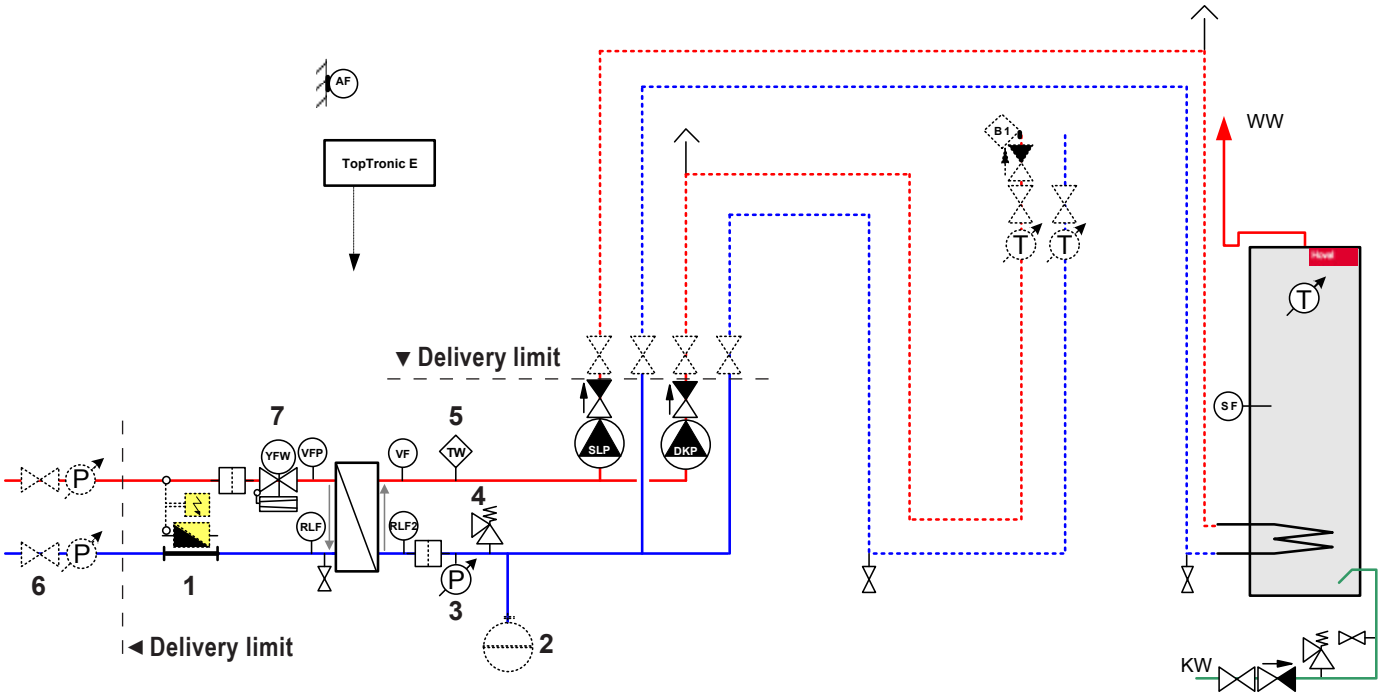
Notice:
- The example schematics merely show the basic principle and do not contain all information required for installation. The installation must be done according to local conditions, dimensioning and regulations.
- With underfloor heating a flow temperature monitor must be built in.
- Shut-off devices to the safety valve (diaphragm pressure expansion tank, safety valve, etc.) are to safe against unintended closing!
- Mount bags to prevent single pipe gravity circulation!

1 Heat meter adapter (heat meter optional)
2 Diaphragm pressure expansion tank (option)
3 Pressure gauge
4 Safety valve
5 Temperature monitor
Standard on design 120/140/150 °C, 16/25 bar
Optional on design 110 °C/16 bar
6 Shut-off valve (option)
7 Flow rate controller with motorised control valve

RLF Return sensor
RLF2 Return sensor (secondary)
VFP Flow sensor (primary)
VF Flow sensor (secondary)
AF Outside sensor
SF Buffer sensor
TW Temperature monitor

TransTherm® giro plus (H3/N10-H3/N40)

District heating station with
- 1 heater circuit without mixer
- hot water production



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- With underfloor heating a flow temperature monitor must be built in.
- Shut-off devices to the safety valve (diaphragm pressure expansion tank, safety valve, etc.) are to safe against unintended closing!
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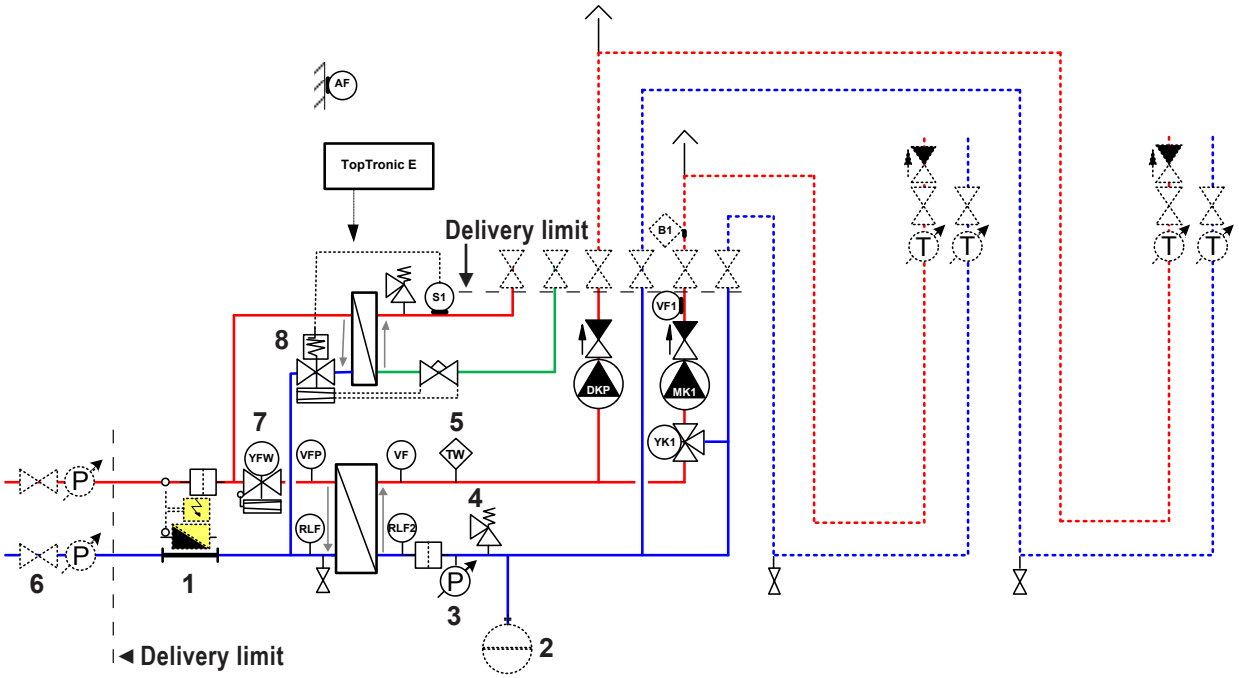
1 Heat meter adapter (heat meter optional)
2 Diaphragm pressure expansion tank (option)
3 Pressure gauge
4 Safety valve
5 Temperature monitor
Standard on design 120/140/150 °C, 16/25 bar
Optional on design 110 °C/16 bar
6 Shut-off valve (option)
7 Flow rate controller with motorised control valve

RLF Return sensor
RLF2 Return sensor (secondary)
VFP Flow sensor (primary)
VF Flow sensor (secondary)
AF Outside sensor
SF Buffer sensor
TW Temperature monitor

TransTherm® giro plus (H5/N10)

District heating station with
- 1 heating circuit with mixer
- 1 heating circuit without mixer
- hot water production, fresh water module



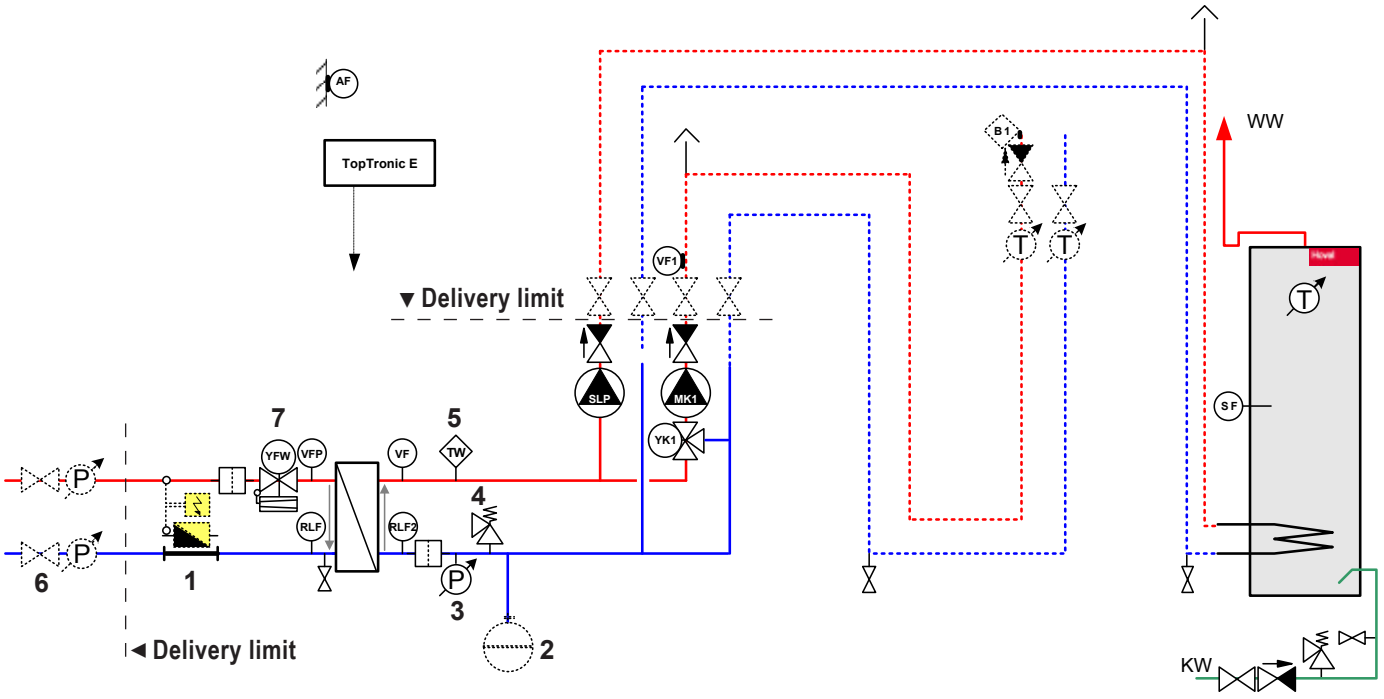
Notice:
- The example schematics merely show the basic principle and do not contain all information required for installation. The installation must be done according to local conditions, dimensioning and regulations.
- With underfloor heating a flow temperature monitor must be built in.
- Shut-off devices to the safety valve (diaphragm pressure expansion tank, safety valve, etc.) are to safe against unintended closing!
- Mount bags to prevent single pipe gravity circulation!

1 Heat meter adapter (heat meter optional)
2 Diaphragm pressure expansion tank (option)
3 Pressure gauge
4 Safety valve
5 Temperature monitor
Standard on design
120/140/150 °C, 16/25 bar
Optional on design
110 °C/16 bar
6 Shut-off valve (option)
7 Flow rate controller with motorised control valve
8 Thermal flow rate controller and temperature regulator

RLF Return sensor
RLF2 Return sensor (secondary)
VFP Flow sensor (primary)
VF Flow sensor (secondary)
AF Outside sensor
SF Buffer sensor
TW Temperature monitor

TransTherm® giro plus (H8/N10-H8/N40)

District heating station with
- 1 heating circuit with mixer
- hot water production



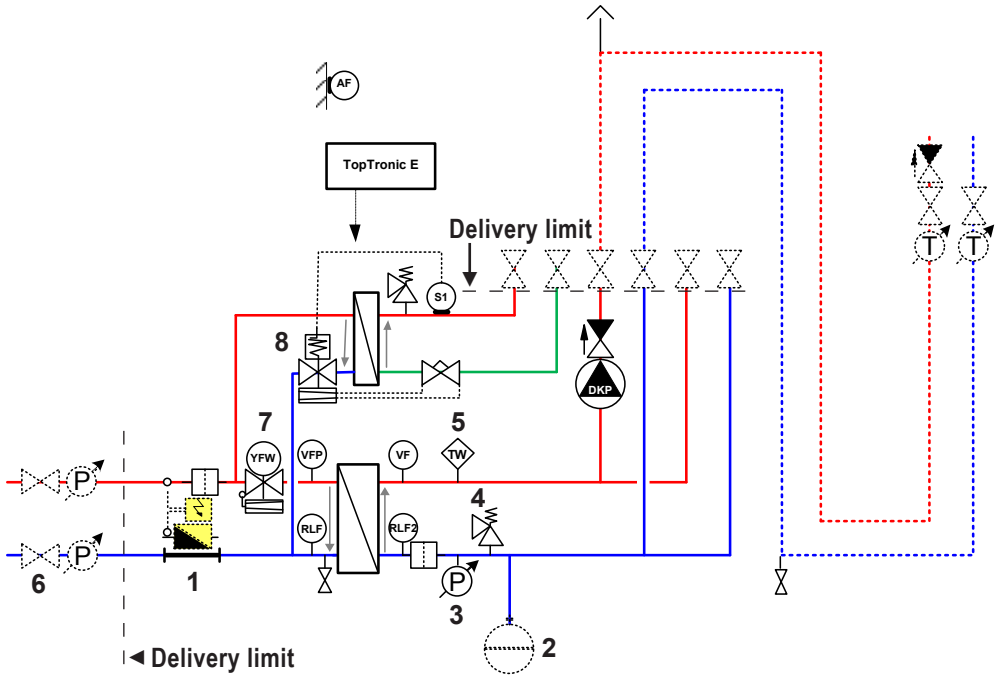
Notice:
- The example schematics merely show the basic principle and do not contain all information required for installation. The installation must be done according to local conditions, dimensioning and regulations.
- With underfloor heating a flow temperature monitor must be built in.
- Shut-off devices to the safety valve (diaphragm pressure expansion tank, safety valve, etc.) are to safe against unintended closing!
- Mount bags to prevent single pipe gravity circulation!

1 Heat meter adapter (heat meter optional)
2 Diaphragm pressure expansion tank (option)
3 Pressure gauge
4 Safety valve
5 Temperature monitor
Standard on design 120/140/150 °C, 16/25 bar
Optional on design 110 °C/16 bar
6 Shut-off valve (option)
7 Flow rate controller with motorised control valve

RLF Return sensor
RLF2 Return sensor (secondary)
VFP Flow sensor (primary)
VF Flow sensor (secondary)
AF Outside sensor
SF Buffer sensor
TW Temperature monitor

TransTherm® giro plus (H9/N10-H9/N40)

District heating station with
- 1 heating circuit without mixer
- hot water production, fresh water module
- spare connection for external heating circuit



Notice:
- The example schematics merely show the basic principle and do not contain all information required for installation. The installation must be done according to local conditions, dimensioning and regulations.
- With underfloor heating a flow temperature monitor must be built in.
- Shut-off devices to the safety valve (diaphragm pressure expansion tank, safety valve, etc.) are to safe against unintended closing!
- Mount bags to prevent single pipe gravity circulation!

1 Heat meter adapter (heat meter optional)
2 Diaphragm pressure expansion tank (option)
3 Pressure gauge
4 Safety valve
5 Temperature monitor
Standard on design 120/140/150 °C, 16/25 bar
Optional on design 110 °C/16 bar
6 Shut-off valve (option)
7 Flow rate controller with motorised control valve
8 Thermal flow rate controller and temperature regulator

RLF Return sensor
RLF2 Return sensor (secondary)
VFP Flow sensor (primary)
VF Flow sensor (secondary)
AF Outside sensor
SF Buffer sensor
TW Temperature monitor

Hoval TransTherm® pro S

District heating transfer station

- Indirect compact station for heat transfer and regulation of heating and hot water production systems.
- Standard design for heating water in accordance with DIN and AGFW directives.
  District heating primary:
  - Maximum pressure stage 16/25 bar
  - Maximum operating temperature 110-150 °C
  - Maximum flow rate 62 m³/h
  - Connection at the top

  Secondary heating:
  - maximum operating pressure 3 bar
  - Maximum operating temperature 110 °C
  - Maximum flow rate 88 m³/h
  - Connection at the top

Installed

District heating primary:
- 1 flow rate controller with motorised valve, actuator
  - without emergency control function (110 °C) (types F and G, sequential circuit with 2 valves)
  - with emergency control function (140, 150 °C) (types F and G, sequential circuit with 2 valves)
- 1 heat meter adapter
- 1 return temperature sensor
- 1 flow temperature sensor
- 2 thermometers
- 1 strainer
- 1 drain

Secondary heating:
- Stainless steel plate heat exchanger in soldered design
- Ball stop valves or shut-off dampers
- 1 Return temperature sensor
- 1 flow temperature sensor
- 1 safety temperature monitor (140, 150 °C)
- 2 thermometers
- 1 safety valve 3 bar (membrane-sv)
- 1 pressure gauge
- 1 strainer
- 1 drain
- 1 connection for diaphragm pressure expansion tank

- District heating station in fully welded and thermally insulated design (50 % thermally insulated, EPP), mounted vibration-free on a steel frame structure and provided with special corrosion protection
- Partial enclosure with powder-coated sheet steel, colour red (RAL 3011)
- Control panel integrated in partial enclosure with
  - TopTronic® E controller
  - Terminals for electrical power supply
  - Circuit breaker
  - Neutral conductor terminal block

TransTherm® pro S

TransTherm® pro RS

Series TransTherm® pro S type	Size	Hydraulics	Number of plates (heat exchanger)	Max. flow temperature °C	Nominal pressure bar	Heat output [1] kW
(A/H0/N36/T110/P16)	A	0	36	110	16	149
(A/H0/N36/T140/P16)	A	0	36	140	16	149
(A/H0/N36/T150/P25)	A	0	36	150	25	149
(B/H0/N50/T110/P16)	B	0	50	110	16	195
(B/H0/N50/T140/P16)	B	0	50	140	16	195
(B/H0/N50/T150/P25)	B	0	50	150	25	195
(C/H0/N60/T110/P16)	C	0	60	110	16	241
(C/H0/N60/T140/P16)	C	0	60	140	16	241
(C/H0/N60/T150/P25)	C	0	60	150	25	241
(D/H0/N100/T110/P16)	D	0	100	110	16	402
(D/H0/N100/T140/P16)	D	0	100	140	16	402
(D/H0/N100/T150/P25)	D	0	100	150	25	402

Series TransTherm® pro S type	Size	Hydraulics	Number of plates (heat exchanger)	Max. flow temperature °C	Nominal pressure bar	Heat output [1] kW
(E/H0/N140/T110/P16)	E	0	140	110	16	460
(E/H0/N140/T140/P16)	E	0	140	140	16	460
(E/H0/N140/T150/P25)	E	0	140	150	25	460
(F/H0/N200/T110/P16)	F	0	200	110	16	575
(F/H0/N200/T140/P16)	F	0	200	140	16	575
(F/H0/N200/T150/P25)	F	0	200	150	25	575
(G/H0/N180/T110/P16)	G	0	180	110	16	915
(G/H0/N180/T140/P16)	G	0	180	140	16	915
(G/H0/N180/T150/P25)	G	0	180	150	25	915
(H/H0/N200/T110/P16)	H	0	200	110	16	1417
(H/H0/N200/T140/P16)	H	0	200	140	16	1417
(H/H0/N200/T150/P25)	H	0	200	150	25	1417

Types F and G, sequential circuit with 2 valves

[1] Reference temperature primary 90-52 °C/ secondary 70-50 °C

Hoval TransTherm® pro RS

- Design same as Hoval TransTherm® pro S but with completely removable sheet steel enclosure (housing type RS)
- For this version, it is necessary to order the standard Hoval TransTherm® pro S design and, in addition, the housing type RS.

TopTronic® E controller

TopTronic® E control panel
- Colour touchscreen 4.3 inch
- Simple, intuitive operating concept
- Display of the most important operating statuses
- Configurable start screen
- Operating mode selection
- Configurable day and week programmes
- Operation of all connected Hoval CAN bus modules
- Commissioning wizard
- Service and maintenance function
- Fault message management
- Analysis function
- Weather display (with HovalConnect option)
- Adaptation of the heating strategy based on the weather forecast (with HovalConnect option)

TopTronic® E basic module district heating com (TTE-FW com)
Control functions integrated for
  - primary valve control
  - cascade management
  - 1 heating circuit with mixer
  - 1 heating circuit without mixer
  - 1 hot water charging circuit
  - various additional functions
- Outdoor sensor
- Immersion sensor (calorifier sensor)
- Contact sensor (flow temperature sensor)
- Complete plug set for DH module

Options for TopTronic® E controller
- Can be expanded by max. 5 module expansions:
  - module expansion heating circuit DH
  - module expansion hot water DH
  - module expansion universal DH

- Can be optionally expanded with various accessories:
  - Ethernet connection TTE-FW com
  - repeater TTE-FW com LON-Bus
  - router TTE-FW com Ethernet on LON-Bus
  - data socket 13-pin TTE-FW com LON-Bus and lighting protection
  - various software licences for HovalSupervisor
  - various services for HovalSupervisor
- Can be networked with a total of up to 16 controller modules:
  - heating circuit/hot water module
  - solar module
  - buffer module
  - measuring module
  - e.g. max 45 mixer circuits

Number of modules that can be additionally installed in the control panel:
- 5 module expansions

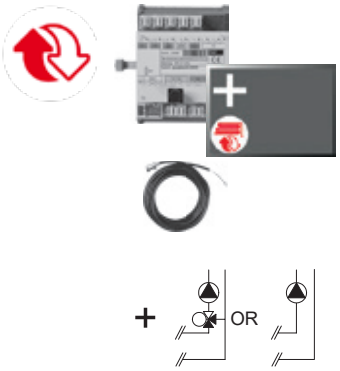
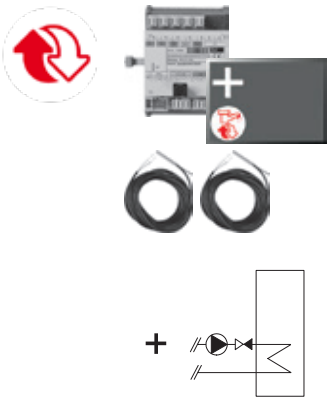
Further information about the TopTronic® E
see “Controls”

Design on request
- Flow rate controller with motorised valve, actuator with emergency control function
- Supply of system components such as heat meter, heating armature group, calorifier, charging group etc.
- Hoval control system
- District heating station for direct connection

Delivery
- District heating transfer station already mounted on steel frame structure and ready for electrical connection.
  - TransTherm® pro S with partial enclosure
  - TransTherm® pro RS with complete enclosure

On site
- Installation of heat meter

TopTronic® E module expansions
for TopTronic® E basic module district heating com

	Part No.
 **TopTronic® E module expansion district heating circuit TTE-FE HK FW** Expansion to the inputs and outputs of a controller module (basic module district heating/fresh water, basic module district heating com) for carrying out various functions. Refer to the Hoval System Technology to find which functions and hydraulic arrangements can be implemented. Consisting of: - Fitting accessories - Ribbon cable for connecting the device bus to the controller module, - Connection set for connecting the controller module to the mains voltage, - 1 x contact sensor ALF/1.1P/2.5/T L = 2.5 m, - Plug set - district heating expansion	6038 119
 **TopTronic® E module expansion hot water district heating TTE-FE WW FW** Expansion to the inputs and outputs of the basic module district heating/fresh water or basic module district heating com for implementing a hot water circuit. Consisting of: - fitting accessories - 2 immersion sensors TF/1.1P/2.5/6T, L = 2.5 m	6038 120
 **TopTronic® E module expansion Universal district heating TTE-FE UNI FW** Expansion to the inputs and outputs of the basic module district heating/fresh water or basic module district heating com for implementing various functions. Consisting of: - Fitting accessories	6038 117

Notice
Refer to the Hoval System Technology to find which functions and hydraulic arrangements can be implemented.

Further information
see “Controls” - “Hoval TopTronic® E module expansions district heating” chapter

		Part No.
	**Ethernet connection** TopTronic® E district heating com R2 - Communications module expansion for TopTronic® E basic module district heating com - TCP/IP interface for communication with the HovalSupervisor management system - Top hat rail mounting directly adjacent to the basic module - Connection to the basic module via Ribbon cable - Dimensions (L x W x H): 96 x 48 x 42.3	6057 388
	**TopTronic® E district heating com LON-Bus repeater** - Repeater as electrical signal booster of the LON-Bus network - Used for boosting the range of the signal when there are long distances between the control centre and the individual TopTronic® E basic module district heating com controller modules - Positioning of the repeaters depending on the data network (routing type, cable type, length, etc.) at different positions in the network - Electrical power supply 230 V AC - Dimensions (L x W x H): 71 x 92 x 60 **Notice** After 5 repeaters, a router must be used for boosting the signal. Article on request.	6061 947
	**Router TopTronic® E district heating com TTE-FWR - CAN bus** - Interface between the Hoval LON-Bus network and HovalSupervisor - Interface between the Hoval TCP/IP network and HovalSupervisor - Serves as a physical interface between the data stream of the district heating network and e.g a master computer with TCP/IP interface - Possibility of connecting differential pressure sensors variable inputs 0-10 V or 0/4-20 mA - Router can be installed in control panel with DIN-rail mounting - Temperature and pressure control for up to five strands or 5 heating circuits - Dimensions (L x W x H): 355 x 120 x 75 TopTronic® E control module black for operating the router (optional) and mating connector set must be ordered separately.	6047 303

	Part No.
 **Data socket TopTronic® E district heating com** **LON-Bus and lightning protection** - Data socket for connecting the telecommunication cable at the building connection - Connection must be made according to the appropriate applicable regulations - Data sockets must also be installed with dummy connections - 1 input block 13-pin - 2 output blocks each 13-pin - 2 outputs 3-pin for controller and repeater - Wet room socket IP55 Dimensions (L x W x H): 180 x 140 x 75 incl. 10 stepped nipples	2061 738

Accessories for TopTronic® E

		Part No.
TopTronic® E controller modules		
TTE-HK/WW	TopTronic® E heating circuit/ hot water module	6034 571
TTE-SOL	TopTronic® E solar module	6037 058
TTE-PS	TopTronic® E buffer module	6037 057
TTE-MWA	TopTronic® E measuring module	6034 574

TopTronic® E room control modules		
TTE-RBM	TopTronic® E room control modules	
	easy white	6037 071
	comfort white	6037 069
	comfort black	6037 070

Enhanced language package TopTronic® E		6039 253
one SD card required per control module Consisting of the following languages: HU, CS, SL, RO, PL, TR, ES, HR, SR, JA, DA		

HovalConnect		
HovalConnect LAN		6049 496
HovalConnect WLAN		6049 498
HovalConnect Modbus		6049 501
HovalConnect KNX		6049 593

TopTronic® E interface modules		
GLT module 0-10 V		6034 578

TopTronic® E sensors		
AF/2P/K	Outdoor sensor H x W x D = 80 x 50 x 28 mm	2056 774
TF/2P/5/6T	Immersion sensor, L = 5.0 m	2056 777
ALF/2P/4/T	Contact sensor, L = 4.0 m	2056 778
TF/1.1P/2.5S/6T	Collector sensor, L = 2.5 m	2056 776

TopTronic® E wall casing		
WG-190	Wall casing small	6052 983
WG-360	Wall casing medium	6052 984
WG-360 BM	Wall casing medium with control module cut-out	6052 985
WG-510	Wall casing large	6052 986
WG-510 BM	Wall casing large with control module cut-out	6052 987

Further information
see “Controls”

	Part No.
Flow temperature monitor for panel heating (1 controller per heating circuit) 15-95 °C, setting (visible externally) under the casing cover	
Clamp-on flow temperature monitor RAK-TW1000S with retaining strap, without cable and plug	242 902
Clamp-on flow temperature monitor set RAK-TW1000S with retaining strap, supplied with cable (4 m) and plug	6033 745
Immersion thermostat RAK-TW1000S Thermostat with immersion sleeve ½″ Depth of immersion 150 mm, nickel-plated brass	6010 082

Services

Commissioning
Commissioning by works service or Hoval trained authorised serviceman/company is condition for warranty.

For commissioning and other services please contact your Hoval sales office.

	District heating primary									
TransTherm® pro S/RS	**Connection size**	**V̇ max.**	**Nominal pressure max.**	**T-max.**	**Valve type**	**Valve nominal width**	**Valve**	**Closing pressure [1]**	**Valve V̇ max.**	**Valve actuator**
type	DN	m³/h	bar	°C	Danfoss	DN	kvs	bar		type
(A/H0/N36/T110/P16)	32	3.5	16	110	AVQM	25	8	12	3.5	AMV10
(A/H0/N36/T140/P16)	32	3.5	16	140	AVQM	25	8	12	3.5	AMV13
(A/H0/N36/T150/P25)	32	3.5	25	150	AVQM	25	8	20	3.5	AMV13
(B/H0/N50/T110/P16)	40	6.5	16	110	AVQM	32	12.5	20	8	AMV20
(B/H0/N50/T140/P16)	40	6.5	16	140	AVQM	32	12.5	20	8	AMV23
(B/H0/N50/T150/P25)	40	6.5	25	150	AVQM	32	12.5	20	8	AMV23
(C/H0/N60/T110/P16)	40	6.5	16	110	AVQM	32	12.5	20	8	AMV20
(C/H0/N60/T140/P16)	40	6.5	16	140	AVQM	32	12.5	20	8	AMV23
(C/H0/N60/T150/P25)	40	6.5	25	150	AVQM	32	12.5	20	8	AMV23
(D/H0/N100/T110/P16)	50	10	16	110	AVQM	40	16	20	10	AMV20
(D/H0/N100/T140/P16)	50	10	16	140	AVQM	40	16	20	10	AMV23
(D/H0/N100/T150/P25)	50	10	25	150	AVQM	40	16	20	10	AMV23
(E/H0/N140/T110/P16)	65	12	16	110	AVQM	50	20	20	12.5	AMV20
(E/H0/N140/T140/P16)	65	12	16	140	AVQM	50	20	20	12.5	AMV23
(E/H0/N140/T150/P25)	65	12	25	150	AVQM	50	20	20	12.5	AMV23
(F/H0/N200/T110/P16)	65	16	16	110	2 x AVQM	40	16	20	20	2 x AMV20
(F/H0/N200/T140/P16)	65	16	16	140	2 x AVQM	40	16	20	20	2 x AMV23
(F/H0/N200/T150/P25)	65	16	25	150	2 x AVQM	40	16	20	20	2 x AMV23
(G/H0/N180/T110/P16)	80	25	16	110	2 x AVQM	50	20	20	25	2 x AMV20
(G/H0/N180/T140/P16)	80	25	16	140	2 x AVQM	50	20	20	25	2 x AMV23
(G/H0/N180/T150/P25)	80	25	25	150	2 x AVQM	50	20	20	25	2 x AMV23
(H/H0/N200/T110/P16)	100	40	16	110	AFQM	80	80	16	40	AMV55
(H/H0/N200/T140/P16)	100	40	16	140	AFQM	80	80	20	40	AME659
(H/H0/N200/T150/P25)	100	40	25	150	AFQM	80	80	20	40	AME659

[1] Actuator valve

	Secondary heating				
TransTherm® pro S/RS	**Connection size**	**Maximum flow rate**	**Operating pressure max.**	**T-max.**	**Safety function**
type	DN	m³/h	bar	°C	
(A/H0/N36/T110/P16)	40	6.5	3 [1]	110	without
(A/H0/N36/T140/P16)	40	6.5	3 [1]	110	STW
(A/H0/N36/T150/P25)	40	6.5	3 [1]	110	STW
(B/H0/N50/T110/P16)	50	8.5	3 [1]	110	without
(B/H0/N50/T140/P16)	50	8.5	3 [1]	110	STW
(B/H0/N50/T150/P25)	50	8.5	3 [1]	110	STW
(C/H0/N60/T110/P16)	50	10.5	3 [1]	110	without
(C/H0/N60/T140/P16)	50	10.5	3 [1]	110	STW
(C/H0/N60/T150/P25)	50	10.5	3 [1]	110	STW
(D/H0/N100/T110/P16)	65	17.5	3 [1]	110	without
(D/H0/N100/T140/P16)	65	17.5	3 [1]	110	STW
(D/H0/N100/T150/P25)	65	17.5	3 [1]	110	STW
(E/H0/N140/T110/P16)	80	25	3 [1]	110	without
(E/H0/N140/T140/P16)	80	25	3 [1]	110	STW
(E/H0/N140/T150/P25)	80	25	3 [1]	110	STW
(F/H0/N200/T110/P16)	80	25	3 [1]	110	without
(F/H0/N200/T140/P16)	80	25	3 [1]	110	STW
(F/H0/N200/T150/P25)	80	25	3 [1]	110	STW
(G/H0/N180/T110/P16)	100	40	3 [1]	110	without
(G/H0/N180/T140/P16)	100	40	3 [1]	110	STW
(G/H0/N180/T150/P25)	100	40	3 [1]	110	STW
(H/H0/N200/T110/P16)	125	60	3 [1]	110	without
(H/H0/N200/T140/P16)	125	60	3 [1]	110	STW
(H/H0/N200/T150/P25)	125	60	3 [1]	110	STW

[1] STW = safety temperature monitor

Performance data

Trans Therm pro S/RS			District heating															
			70 °C								75 °C							
Heating secondary			(A/H0/N36..)	(B/H0/N50..)	(C/H0/N60..)	(D/H0/N100..)	(E/H0/N140..)	(F/H0/N200..)	(G/H0/N180..)	(H/H0/N200..)	(A/H0/N36..)	(B/H0/N50..)	(C/H0/N60..)	(D/H0/N100..)	(E/H0/N140..)	(F/H0/N200..)	(G/H0/N180..)	(H/H0/N200..)
85/60 °C	T return primary	°C	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	V̇ primary	**m³/h**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Q max.	kW	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	V̇ secondary	**m³/h**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
80/60 °C	T return primary	°C	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	V̇ primary	**m³/h**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Q max.	kW	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	V̇ secondary	**m³/h**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
80/65 °C	T return primary	°C	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	V̇ primary	**m³/h**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Q max.	kW	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	V̇ secondary	**m³/h**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
75/50 °C	T return primary	°C	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	V̇ primary	**m³/h**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Q max.	kW	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	V̇ secondary	**m³/h**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
70/50 °C	T return primary	°C	-	-	-	-	-	-	-	-	53	53	53	53	53	53	58	54
	V̇ primary	**m³/h**	-	-	-	-	-	-	-	-	**3.5**	**6.5**	**6.5**	**10.0**	**12.1**	**16.0**	**25.0**	**40.0**
	Q max.	kW	-	-	-	-	-	-	-	-	87	161	161	248	298	397	469	941
	V̇ secondary	**m³/h**	-	-	-	-	-	-	-	-	**3.7**	**7.0**	**7.0**	**10.8**	**12.9**	**17.2**	**20.5**	**41.2**
70/55 °C	T return primary	°C	-	-	-	-	-	-	-	-	57	57	57	57	57	57	60	57
	V̇ primary	**m³/h**	-	-	-	-	-	-	-	-	**3.5**	**6.5**	**6.5**	**10.0**	**12.4**	**16.0**	**25.0**	**40.0**
	Q max.	kW	-	-	-	-	-	-	-	-	71	131	131	206	248	323	404	788
	V̇ secondary	**m³/h**	-	-	-	-	-	-	-	-	**4.1**	**7.6**	**7.6**	**12.0**	**14.4**	**18.7**	**23.5**	**46.0**
65/40 °C	T return primary	°C	45	45	45	45	45	45	51	46	43	43	43	43	43	43	49	44
	V̇ primary	**m³/h**	**3.5**	**6.5**	**6.5**	**10.0**	**12.0**	**16.0**	**25.0**	**40.0**	**3.5**	**6.6**	**6.6**	**10.0**	**12.2**	**16.0**	**25.0**	**40.0**
	Q max.	kW	99	184	184	288	346	454	523	1077	128	237	237	364	437	583	724	1396
	V̇ secondary	**m³/h**	**3.4**	**6.3**	**6.3**	**10.0**	**12.0**	**15.7**	**18.2**	**37.5**	**4.4**	**8.2**	**8.2**	**12.6**	**15.1**	**20.2**	**25.2**	**48.7**
60/40 °C	T return primary	°C	42	42	43	43	43	43	47	42	42	42	42	42	42	42	46	42
	V̇ primary	**m³/h**	**3.5**	**6.2**	**6.5**	**10.0**	**12.0**	**16.0**	**25.0**	**40.0**	**3.5**	**5.2**	**6.4**	**10.0**	**12.2**	**15.4**	**25.0**	**36.8**
	Q max.	kW	111	196	202	311	374	498	648	1228	133	196	242	381	457	576	816	1377
	V̇ secondary	**m³/h**	**4.8**	**8.5**	**8.7**	**13.5**	**16.2**	**21.6**	**28.2**	**53.4**	**5.7**	**8.5**	**10.5**	**16.5**	**19.8**	**25.0**	**35.5**	**60.0**
60/45 °C	T return primary	°C	47	47	47	47	47	47	49	46	47	47	47	47	47	47	49	45
	V̇ primary	**m³/h**	**3.5**	**5.6**	**6.5**	**10.0**	**12.0**	**16.0**	**25.0**	**39.0**	**3.5**	**4.6**	**5.7**	**9.5**	**10.8**	**13.6**	**25.0**	**31.3**
	Q max.	kW	93	147	172	265	318	424	573	1032	113	147	181	302	345	432	733	1032
	V̇ secondary	**m³/h**	**5.3**	**8.5**	**9.9**	**15.3**	**18.4**	**24.5**	**33.3**	**60.0**	**6.5**	**8.5**	**10.5**	**17.5**	**20.0**	**25.0**	**40.0**	**60.0**
55/30 °C	T return primary	°C	33	33	33	33	33	33	38	33	32	32	32	32	32	32	37	32
	V̇ primary	**m³/h**	**3.5**	**5.8**	**6.6**	**10.0**	**12.0**	**16.0**	**25.0**	**41.8**	**3.5**	**5.0**	**6.2**	**10.0**	**11.9**	**15.0**	**25.0**	**35.9**
	Q max.	kW	150	246	278	428	513	684	885	1726	172	246	303	492	578	722	1049	1726
	V̇ secondary	**m³/h**	**5.1**	**8.5**	**9.6**	**14.8**	**17.7**	**23.6**	**30.7**	**60.0**	**5.9**	**8.5**	**10.5**	**17.0**	**20.0**	**25.0**	**36.4**	**60.0**
50/30 °C	T return primary	°C	32	32	32	32	32	32	36	31	32	32	32	32	32	32	34	31
	V̇ primary	**m³/h**	**3.4**	**4.5**	**5.6**	**9.3**	**10.7**	**13.3**	**25.0**	**31.0**	**3.0**	**4.0**	**4.9**	**8.3**	**9.4**	**11.9**	**20.2**	**27.7**
	Q max.	kW	150	196	243	404	462	578	921	1382	150	196	243	404	462	578	321	1382
	V̇ secondary	**m³/h**	**6.5**	**8.5**	**10.5**	**17.5**	**20.0**	**25.0**	**40.0**	**60.0**	**6.5**	**8.5**	**10.5**	**17.5**	**20.0**	**25.0**	**40.0**	**60.0**
50/35 °C	T return primary	°C	37	37	37	37	37	37	35	35	37	37	37	37	37	37	37	35
	V̇ primary	**m³/h**	**3.0**	**3.9**	**4.8**	**8.0**	**9.2**	**11.5**	**23.7**	**26.0**	**2.6**	**3.4**	**4.2**	**7.0**	**8.0**	**10.1**	**16.2**	**23.1**
	Q max.	kW	112	147	182	303	346	433	921	1036	112	147	182	303	346	433	690	1036
	V̇ secondary	**m³/h**	**6.5**	**8.5**	**10.5**	**17.5**	**20.0**	**25.0**	**40.0**	**60.0**	**6.5**	**8.5**	**10.5**	**17.5**	**20.0**	**25.0**	**40.0**	**60.0**
45/30 °C	T return primary	°C	32	32	32	32	32	32	32	30	32	32	32	32	32	32	32	30
	V̇ primary	**m³/h**	**2.6**	**3.4**	**4.2**	**7.0**	**8.0**	**10.0**	**16.3**	**23.1**	**2.3**	**3.0**	**3.7**	**6.2**	**7.1**	**8.9**	**14.2**	**20.5**
	Q max.	kW	113	147	182	303	347	433	691	1037	113	147	182	303	347	433	691	1037
	V̇ secondary	**m³/h**	**6.5**	**8.5**	**10.5**	**17.5**	**20.0**	**25.0**	**40.0**	**60.0**	**6.5**	**8.5**	**10.5**	**17.5**	**20.0**	**25.0**	**40.0**	**60.0**
45/35 °C	T return primary	°C	37	37	37	37	37	37	35	35	37	37	37	37	37	37	35	35
	V̇ primary	**m³/h**	**2.0**	**2.6**	**3.2**	**5.3**	**6.1**	**7.6**	**11.9**	**17.4**	**1.7**	**2.2**	**2.8**	**4.6**	**5.3**	**6.7**	**10.3**	**15.2**
	Q max.	kW	75	98	121	202	231	288	460	691	75	98	121	202	231	288	460	691
	V̇ secondary	**m³/h**	**6.5**	**8.5**	**10.5**	**17.5**	**20.0**	**25.0**	**40.0**	**60.0**	**6.5**	**8.5**	**10.5**	**17.5**	**20.0**	**25.0**	**40.0**	**60.0**

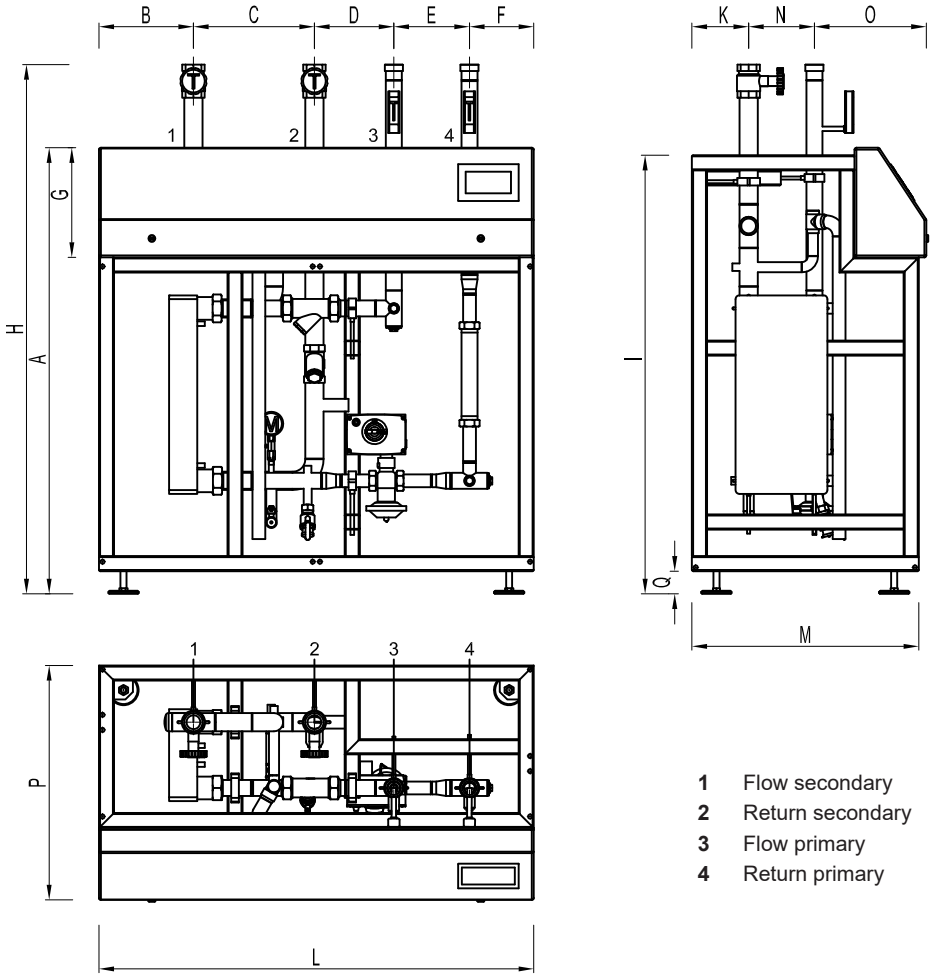
Trans Therm pro S/RS Heating secondary			District heating															
			80 °C								85 °C							
			(A/H0/N36..)	(B/H0/N50..)	(C/H0/N60..)	(D/H0/N100..)	(E/H0/N140..)	(F/H0/N200..)	(G/H0/N180..)	(H/H0/N200..)	(A/H0/N36..)	(B/H0/N50..)	(C/H0/N60..)	(D/H0/N100..)	(E/H0/N140..)	(F/H0/N200..)	(G/H0/N180..)	(H/H0/N200..)
85/60 °C	T return primary	°C	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	V̇ primary	**m³/h**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Q max.	kW	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	V̇ secondary	**m³/h**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
80/60 °C	T return primary	°C	-	-	-	-	-	-	-	-	64	64	64	64	64	64	68	67
	V̇ primary	**m³/h**	-	-	-	-	-	-	-	-	**3.5**	**6.5**	**6.5**	**10.0**	**12.0**	**16.0**	**25.0**	**40.0**
	Q max.	kW	-	-	-	-	-	-	-	-	84	156	156	240	289	385	478	828
	V̇ secondary	**m³/h**	-	-	-	-	-	-	-	-	**3.6**	**6.8**	**6.8**	**10.5**	**12.6**	**16.8**	**21.0**	**36.4**
80/65 °C	T return primary	°C	-	-	-	-	-	-	-	-	67	67	67	67	67	67	71	70
	V̇ primary	**m³/h**	-	-	-	-	-	-	-	-	**3.5**	**6.5**	**6.5**	**10.0**	**12.0**	**16.0**	**25.0**	**40.0**
	Q max.	kW	-	-	-	-	-	-	-	-	72	134	134	206	247	329	410	705
	V̇ secondary	**m³/h**	-	-	-	-	-	-	-	-	**4.2**	**7.8**	**7.8**	**12.0**	**14.4**	**19.2**	**24.1**	**41.4**
75/50 °C	T return primary	°C	55	55	55	55	55	55	61	60	53	53	53	53	53	53	59	58
	V̇ primary	**m³/h**	**3.5**	**6.6**	**6.6**	**10.0**	**12.0**	**16.0**	**25.0**	**40.0**	**3.5**	**6.6**	**6.6**	**10.0**	**12.0**	**16.0**	**25.0**	**40.0**
	Q max.	kW	101	187	187	287	345	460	536	931	129	239	239	368	441	589	737	1258
	V̇ secondary	**m³/h**	**3.5**	**6.5**	**6.5**	**10.0**	**12.0**	**16.0**	**18.8**	**32.6**	**4.4**	**8.3**	**8.3**	**12.8**	**15.3**	**20.4**	**25.8**	**44.1**
70/50 °C	T return primary	°C	52	52	53	53	53	53	57	56	52	52	52	52	52	52	56	55
	V̇ primary	**m³/h**	**3.5**	**6.1**	**6.6**	**10.0**	**12.0**	**16.0**	**25.0**	**40.0**	**3.5**	**5.2**	**6.4**	**10.0**	**12.0**	**15.4**	**25.0**	**40.0**
	Q max.	kW	113	195	205	316	379	506	659	1118	133	195	241	379	455	575	825	1385
	V̇ secondary	**m³/h**	**4.9**	**8.5**	**8.9**	**13.7**	**16.5**	**22.0**	**28.8**	**48.9**	**5.7**	**8.5**	**10.5**	**16.5**	**19.8**	**25.0**	**36.1**	**60.6**
70/55 °C	T return primary	°C	57	57	57	57	57	57	60	59	57	57	57	57	57	57	59	58
	V̇ primary	**m³/h**	**3.5**	**5.6**	**6.5**	**10.0**	**12.0**	**16.0**	**25.0**	**40.0**	**3.5**	**4.6**	**5.7**	**9.5**	**10.8**	**13.6**	**23.0**	**34.1**
	Q max.	kW	92	146	171	264	317	422	580	978	112	146	181	301	344	430	685	1062
	V̇ secondary	**m³/h**	**5.3**	**8.5**	**9.9**	**15.3**	**18.4**	**24.5**	**33.9**	**57.1**	**6.5**	**8.5**	**10.5**	**17.5**	**20.0**	**25.0**	**40.0**	**62.0**
65/40 °C	T return primary	°C	43	43	43	43	43	43	49	47	42	42	42	42	42	42	48	46
	V̇ primary	**m³/h**	**3.5**	**5.8**	**6.6**	**10.0**	**12.0**	**16.0**	**25.0**	**40.0**	**3.5**	**5.0**	**6.2**	**10.0**	**11.9**	**14.9**	**25.0**	**39.9**
	Q max.	kW	149	245	277	427	512	683	900	1519	174	245	303	496	577	721	1062	1777
	V̇ secondary	**m³/h**	**5.1**	**8.5**	**9.6**	**14.8**	**17.7**	**23.6**	**31.4**	**53.0**	**6.0**	**8.5**	**10.5**	**17.2**	**20.0**	**25.0**	**37.1**	**62.0**
60/40 °C	T return primary	°C	42	42	42	42	42	42	46	43.7	42	42	42	42	42	42	45	43
	V̇ primary	**m³/h**	**3.4**	**4.5**	**5.6**	**9.3**	**10.7**	**13.4**	**23.4**	**34.7**	**3.0**	**4.0**	**5.0**	**8.3**	**9.5**	**11.9**	**20.0**	**30.0**
	Q max.	kW	150	196	242	404	461	576	918	1423	150	196	242	404	461	576	918	1423
	V̇ secondary	**m³/h**	**6.5**	**8.5**	**10.5**	**17.5**	**20.0**	**25.0**	**40.0**	**62.0**	**6.5**	**8.5**	**10.5**	**17.5**	**20.0**	**25.0**	**40.0**	**62.0**
60/45 °C	T return primary	°C	47	47	47	47	47	47	48	47	47	47	47	47	47	47	48	47
	V̇ primary	**m³/h**	**3.0**	**3.9**	**4.8**	**8.1**	**9.2**	**11.6**	**18.9**	**28.5**	**2.6**	**3.4**	**4.2**	**7.0**	**8.0**	**10.1**	**16.1**	**24.5**
	Q max.	kW	112	147	181	302	345	432	688	1066	112	147	181	302	345	432	688	1066
	V̇ secondary	**m³/h**	**6.5**	**8.5**	**10.5**	**17.5**	**20.0**	**25.0**	**40.0**	**62.0**	**6.5**	**8.5**	**10.5**	**17.5**	**20.0**	**25.0**	**40.0**	**62.0**
55/30 °C	T return primary	°C	32	32	32	32	32	32	37	31	32	32	32	32	32	32	35	31
	V̇ primary	**m³/h**	**3.4**	**4.5**	**5.5**	**9.3**	**10.6**	**13.3**	**23.7**	**32.8**	**3.1**	**4.1**	**5.0**	**8.4**	**9.6**	**12.1**	**20.8**	**29.5**
	Q max.	kW	188	246	303	506	578	722	1151	1784	188	246	303	506	578	722	1151	1784
	V̇ secondary	**m³/h**	**6.5**	**8.5**	**10.5**	**17.5**	**20.0**	**25.0**	**40.0**	**62.0**	**6.5**	**8.5**	**10.5**	**17.5**	**20.0**	**25.0**	**40.0**	**62.0**
50/30 °C	T return primary	°C	32	32	32	32	32	32	33	30	32	32	32	32	32	32	35	30
	V̇ primary	**m³/h**	**2.7**	**3.6**	**4.4**	**7.4**	**8.5**	**10.7**	**17.6**	**25.6**	**2.5**	**3.2**	**4.0**	**6.7**	**7.7**	**9.7**	**20.7**	**23.0**
	Q max.	kW	150	196	243	404	462	578	921	1428	150	196	243	404	462	578	1151	1428
	V̇ secondary	**m³/h**	**6.5**	**8.5**	**10.5**	**17.5**	**20.0**	**25.0**	**40.0**	**62.0**	**6.5**	**8.5**	**10.5**	**17.5**	**20.0**	**25.0**	**40.0**	**62.0**
50/35 °C	T return primary	°C	37	37	37	37	37	37	37	35	37	37	37	37	37	37	36	35
	V̇ primary	**m³/h**	**2.3**	**3.0**	**3.7**	**6.2**	**7.1**	**8.9**	**14.2**	**21.1**	**2.0**	**2.7**	**3.3**	**5.6**	**6.4**	**8.0**	**12.6**	**19.0**
	Q max.	kW	112	147	182	303	346	433	690	1070	112	147	182	303	346	433	690	1070
	V̇ secondary	**m³/h**	**6.5**	**8.5**	**10.5**	**17.5**	**20.0**	**25.0**	**40.0**	**62.0**	**6.5**	**8.5**	**10.5**	**17.5**	**20.0**	**25.0**	**40.0**	**62.0**
45/30 °C	T return primary	°C	32	32	32	32	32	32	31	30	32	32	32	32	32	32	31	30
	V̇ primary	**m³/h**	**2.0**	**2.7**	**3.3**	**5.5**	**6.3**	**8.0**	**12.6**	**19.1**	**1.8**	**2.4**	**3.0**	**5.0**	**5.8**	**7.3**	**11.4**	**17.4**
	Q max.	kW	113	147	182	303	347	433	691	1072	113	147	182	302	347	433	691	1072
	V̇ secondary	**m³/h**	**6.5**	**8.5**	**10.5**	**17.5**	**20.0**	**25.0**	**40.0**	**62.0**	**6.5**	**8.5**	**10.5**	**17.5**	**20.0**	**25.0**	**40.0**	**62.0**
45/35 °C	T return primary	°C	37	37	37	37	37	37	35	35	37	37	37	37	37	37	35	35
	V̇ primary	**m³/h**	**1.5**	**2.0**	**2.4**	**4.1**	**4.7**	**5.9**	**9.1**	**14.0**	**1.3**	**1.8**	**2.2**	**3.7**	**4.2**	**5.3**	**8.2**	**12.6**
	Q max.	kW	75	98	121	202	231	288	460	714	75	98	121	202	231	288	460	714
	V̇ secondary	**m³/h**	**6.5**	**8.5**	**10.5**	**17.5**	**20.0**	**25.0**	**40.0**	**62.0**	**6.5**	**8.5**	**10.5**	**17.5**	**20.0**	**25.0**	**40.0**	**62.0**

Trans Therm pro S/RS Heating secondary			District heating															
			90 °C								95 °C							
			(A/H0/N36..)	(B/H0/N50..)	(C/H0/N60..)	(D/H0/N100..)	(E/H0/N140..)	(F/H0/N200..)	(G/H0/N180..)	(H/H0/N200..)	(A/H0/N36..)	(B/H0/N50..)	(C/H0/N60..)	(D/H0/N100..)	(E/H0/N140..)	(F/H0/N200..)	(G/H0/N180..)	(H/H0/N200..)
85/60 °C	T return primary	°C	65	65	65	65	65	65	71	67	63	63	63	63	63	63	69	67
	V̇ primary	**m³/h**	**3.5**	**6.6**	**6.6**	**10.0**	**12.0**	**16.0**	**25.0**	**40.0**	**3.5**	**6.6**	**6.6**	**10.0**	**12.0**	**16.3**	**25.0**	**40.0**
	Q max.	kW	100	186	186	286	344	458	546	950	128	238	238	367	440	587	746	1274
	V̇ secondary	**m³/h**	**3.5**	**6.5**	**6.5**	**10.0**	**12.0**	**16.0**	**19.2**	**33.4**	**4.4**	**8.3**	**8.3**	**12.8**	**15.3**	**20.4**	**26.2**	**44.8**
80/60 °C	T return primary	°C	62	62	62	62	62	62	67	65	62	62	62	62	62	62	66	61
	V̇ primary	**m³/h**	**3.5**	**6.1**	**6.6**	**10.0**	**12.0**	**16.0**	**25.0**	**40.0**	**3.5**	**5.2**	**6.5**	**10.0**	**12.0**	**15.5**	**25.0**	**36.3**
	Q max.	kW	112	195	208	321	385	513	667	1132	132	195	240	378	453	572	832	1366
	V̇ secondary	**m³/h**	**4.9**	**8.5**	**9.1**	**14.0**	**16.8**	**22.4**	**29.3**	**49.7**	**5.7**	**8.5**	**10.5**	**16.5**	**19.8**	**25.0**	**36.6**	**60.0**
80/65 °C	T return primary	°C	67	67	67	67	67	67	71	68	67	67	67	67	67	67	69	65
	V̇ primary	**m³/h**	**3.5**	**5.6**	**6.6**	**10.0**	**12.0**	**16.0**	**25.0**	**40.0**	**3.5**	**4.6**	**5.7**	**9.0**	**10.9**	**13.7**	**22.7**	**31.1**
	Q max.	kW	92	146	171	263	315	420	546	987	112	146	180	300	343	428	682	1023
	V̇ secondary	**m³/h**	**5.3**	**8.5**	**9.9**	**15.3**	**18.4**	**24.5**	**19.2**	**57.8**	**6.5**	**8.5**	**10.5**	**17.5**	**20.0**	**25.0**	**40.0**	**60.0**
75/50 °C	T return primary	°C	52	52	52	52	52	52	58	56	52	52	52	52	52	52	57	51
	V̇ primary	**m³/h**	**3.5**	**5.7**	**6.6**	**10.0**	**12.0**	**16.0**	**25.0**	**40.0**	**3.5**	**5.0**	**6.2**	**10.0**	**11.9**	**14.9**	**25.0**	**35.4**
	Q max.	kW	153	244	284	437	524	699	910	1537	173	244	302	494	575	718	1072	1713
	V̇ secondary	**m³/h**	**5.3**	**8.5**	**9.8**	**15.2**	**18.2**	**24.3**	**31.9**	**53.8**	**6.0**	**8.5**	**10.5**	**17.2**	**20.0**	**25.0**	**37.6**	**60.0**
70/50 °C	T return primary	°C	52	52	52	52	52	52	55	54	52	52	52	52	52	52	54	50
	V̇ primary	**m³/h**	**3.5**	**4.5**	**5.6**	**9.4**	**10.7**	**13.5**	**23.1**	**34.3**	**3.1**	**4.0**	**5.0**	**8.3**	**9.5**	**11.9**	**19.8**	**27.6**
	Q max.	kW	149	195	241	402	460	575	915	1417	149	195	241	402	460	575	915	1372
	V̇ secondary	**m³/h**	**6.5**	**8.5**	**10.5**	**17.5**	**20.0**	**25.0**	**40.0**	**62.0**	**6.5**	**8.5**	**10.5**	**17.5**	**20.0**	**25.0**	**40.0**	**60.0**
70/55 °C	T return primary	°C	57	57	57	57	57	57	58	57	57	57	57	57	57	57	57	55
	V̇ primary	**m³/h**	**3.0**	**3.9**	**4.8**	**8.1**	**9.2**	**11.6**	**18.8**	**28.3**	**2.6**	**3.4**	**4.2**	**7.0**	**8.0**	**10.1**	**16.0**	**23.0**
	Q max.	kW	112	146	181	301	344	430	685	1062	112	146	181	301	344	430	685	1028
	V̇ secondary	**m³/h**	**6.5**	**8.5**	**10.5**	**17.5**	**20.0**	**25.0**	**40.0**	**62.0**	**6.5**	**8.5**	**10.5**	**17.5**	**20.0**	**25.0**	**40.0**	**60.0**
65/40 °C	T return primary	°C	42	42	42	42	42	42	47	45	42	42	42	42	42	42	46	41
	V̇ primary	**m³/h**	**3.4**	**4.5**	**5.6**	**9.3**	**10.6**	**13.4**	**23.3**	**34.7**	**3.1**	**4.1**	**5.1**	**8.5**	**9.7**	**12.1**	**20.5**	**28.4**
	Q max.	kW	187	245	303	504	577	721	1146	1777	187	245	303	504	577	721	1146	1720
	V̇ secondary	**m³/h**	**6.5**	**8.5**	**10.5**	**17.5**	**20.0**	**25.0**	**40.0**	**62.0**	**6.5**	**8.5**	**10.5**	**17.5**	**20.0**	**25.0**	**40.0**	**60.0**
60/40 °C	T return primary	°C	42	42	42	42	42	42	44	43	42	42	42	42	42	42	43	40
	V̇ primary	**m³/h**	**2.7**	**3.6**	**4.4**	**7.4**	**8.5**	**10.7**	**17.5**	**26.5**	**2.5**	**3.3**	**4.0**	**6.8**	**7.7**	**9.7**	**15.7**	**22.5**
	Q max.	kW	150	196	242	404	461	576	918	1423	150	196	242	404	461	576	918	1377
	V̇ secondary	**m³/h**	**6.5**	**8.5**	**10.5**	**17.5**	**20.0**	**25.0**	**40.0**	**62.0**	**6.5**	**8.5**	**10.5**	**17.5**	**20.0**	**25.0**	**40.0**	**60.0**
60/45 °C	T return primary	°C	47	47	47	47	47	47	47	46	47	47	47	47	47	47	47	45
	V̇ primary	**m³/h**	**2.3**	**3.0**	**3.7**	**6.2**	**7.1**	**8.9**	**14.1**	**21.6**	**2.0**	**2.7**	**3.3**	**5.6**	**6.4**	**8.0**	**12.6**	**18.4**
	Q max.	kW	112	147	181	302	345	432	688	1066	112	147	181	302	345	432	688	1032
	V̇ secondary	**m³/h**	**6.5**	**8.5**	**10.5**	**17.5**	**20.0**	**25.0**	**40.0**	**62.0**	**6.5**	**8.5**	**10.5**	**17.5**	**20.0**	**25.0**	**40.0**	**60.0**
55/30 °C	T return primary	°C	32	32	32	32	32	32	34	31	32	32	32	32	32	32	34	30
	V̇ primary	**m³/h**	**2.8**	**3.7**	**4.6**	**7.7**	**8.8**	**11.1**	**18.6**	**26.9**	**2.6**	**3.4**	**4.3**	**7.1**	**8.2**	**10.2**	**16.8**	**24.0**
	Q max.	kW	188	246	303	506	578	722	1151	1784	188	246	303	506	578	722	1151	1726
	V̇ secondary	**m³/h**	**6.5**	**8.5**	**10.5**	**17.5**	**20.0**	**25.0**	**40.0**	**62.0**	**6.5**	**8.5**	**10.5**	**17.5**	**20.0**	**25.0**	**40.0**	**60.0**
50/30 °C	T return primary	°C	32	32	32	32	32	32	32	30	32	32	32	32	32	32	32	30
	V̇ primary	**m³/h**	**2.3**	**3.0**	**3.7**	**6.2**	**7.1**	**8.9**	**14.3**	**21.3**	**2.1**	**2.7**	**3.4**	**5.7**	**6.5**	**8.2**	**13.1**	**19.0**
	Q max.	kW	150	196	243	404	462	578	921	1428	150	196	243	404	462	578	921	1382
	V̇ secondary	**m³/h**	**6.5**	**8.5**	**10.5**	**17.5**	**20.0**	**25.0**	**40.0**	**62.0**	**6.5**	**8.5**	**10.5**	**17.5**	**20.0**	**25.0**	**40.0**	**60.0**
50/35 °C	T return primary	°C	37	37	37	37	37	37	36	35	37	37	37	37	37	37	35	30
	V̇ primary	**m³/h**	**1.8**	**2.4**	**3.0**	**5.0**	**5.8**	**7.3**	**11.4**	**17.3**	**1.7**	**2.2**	**2.8**	**4.6**	**5.3**	**6.7**	**10.4**	**19.0**
	Q max.	kW	112	147	182	303	346	433	690	1070	112	147	182	303	346	433	690	1036
	V̇ secondary	**m³/h**	**6.5**	**8.5**	**10.5**	**17.5**	**20.0**	**25.0**	**40.0**	**62.0**	**6.5**	**8.5**	**10.5**	**17.5**	**20.0**	**25.0**	**40.0**	**60.0**
45/30 °C	T return primary	°C	32	32	32	32	32	32	30	30	32	32	32	32	32	32	30	30
	V̇ primary	**m³/h**	**1.7**	**2.2**	**2.7**	**4.6**	**5.3**	**6.7**	**10.4**	**16.0**	**1.6**	**2.0**	**2.5**	**4.3**	**4.9**	**6.2**	**9.6**	**14.2**
	Q max.	kW	113	147	182	303	347	433	691	1072	113	147	182	303	347	433	691	1037
	V̇ secondary	**m³/h**	**6.5**	**8.5**	**10.5**	**17.5**	**20.0**	**25.0**	**40.0**	**62.0**	**6.5**	**8.5**	**10.5**	**17.5**	**20.0**	**25.0**	**40.0**	**60.0**
45/35 °C	T return primary	°C	37	37	37	37	37	37	35	35	37	37	37	37	37	37	35	35
	V̇ primary	**m³/h**	**1.2**	**1.6**	**2.0**	**3.3**	**3.8**	**4.9**	**7.5**	**11.6**	**1.1**	**1.5**	**1.8**	**3.1**	**3.5**	**4.4**	**6.8**	**10.2**
	Q max.	kW	75	98	121	202	231	288	460	714	75	98	121	202	231	288	460	691
	V̇ secondary	**m³/h**	**6.5**	**8.5**	**10.5**	**17.5**	**20.0**	**25.0**	**40.0**	**62.0**	**6.5**	**8.5**	**10.5**	**17.5**	**20.0**	**25.0**	**40.0**	**60.0**

Trans Therm pro S/RS Heating secondary			District heating															
			110 °C								130 °C							
			(A/H0/N36..)	(B/H0/N50..)	(C/H0/N60..)	(D/H0/N100..)	(E/H0/N140..)	(F/H0/N200..)	(G/H0/N180..)	(H/H0/N200..)	(A/H0/N36..)	(B/H0/N50..)	(C/H0/N60..)	(D/H0/N100..)	(E/H0/N140..)	(F/H0/N200..)	(G/H0/N180..)	(H/H0/N200..)
85/60 °C	T return primary	°C	63	63	63	63	63	63	65	61	63	63	63	63	63	63	62	60
	V̇ primary	**m³/h**	**3.5**	**4.6**	**5.7**	**9.6**	**10.9**	**13.7**	**22.0**	**31.4**	**2.5**	**3.3**	**4.1**	**6.8**	**7.8**	**9.8**	**15.3**	**22.3**
	Q max.	kW	186	243	301	501	573	716	1137	1706	186	243	301	501	573	716	1137	1706
	V̇ secondary	**m³/h**	**6.5**	**8.5**	**10.5**	**17.5**	**20.0**	**25.0**	**40.0**	**60.0**	**6.5**	**8.5**	**10.5**	**17.5**	**20.0**	**25.0**	**40.0**	**60.0**
80/60 °C	T return primary	°C	62	62	62	62	62	62	62	60	62	62	62	62	62	62	61	60
	V̇ primary	**m³/h**	**2.7**	**3.6**	**4.5**	**7.5**	**8.5**	**10.7**	**17.3**	**24.7**	**2.0**	**2.6**	**3.2**	**5.3**	**6.1**	**7.7**	**12.0**	**17.8**
	Q max.	kW	149	195	240	401	458	572	910	1366	149	195	240	401	458	572	910	1366
	V̇ secondary	**m³/h**	**6.5**	**8.5**	**10.5**	**17.5**	**20.0**	**25.0**	**40.0**	**60.0**	**6.5**	**8.5**	**10.5**	**17.5**	**20.0**	**25.0**	**40.0**	**60.0**
80/65 °C	T return primary	°C	67	67	67	67	67	67	66	65	67	67	67	67	67	67	65	65
	V̇ primary	**m³/h**	**2.3**	**3.0**	**3.7**	**6.2**	**7.1**	**9.0**	**14.0**	**20.3**	**1.6**	**2.1**	**2.6**	**4.3**	**4.9**	**6.2**	**9.6**	**14.3**
	Q max.	kW	111	146	180	300	343	428	682	1023	111	146	180	300	343	428	682	1023
	V̇ secondary	**m³/h**	**6.5**	**8.5**	**10.5**	**17.5**	**20.0**	**25.0**	**40.0**	**60.0**	**6.5**	**8.5**	**10.5**	**17.5**	**20.0**	**25.0**	**40.0**	**60.0**
75/50 °C	T return primary	°C	52	52	52	52	52	52	53	50	52	52	52	52	52	52	51	50
	V̇ primary	**m³/h**	**2.9**	**3.8**	**4.6**	**7.8**	**8.9**	**11.2**	**18.3**	**26.0**	**2.1**	**2.8**	**3.5**	**5.9**	**6.7**	**8.4**	**13.3**	**19.6**
	Q max.	kW	187	244	302	503	575	718	1142	1713	187	244	302	503	575	718	1142	1713
	V̇ secondary	**m³/h**	**6.5**	**8.5**	**10.5**	**17.5**	**20.0**	**25.0**	**40.0**	**60.0**	**6.5**	**8.5**	**10.5**	**17.5**	**20.0**	**25.0**	**40.0**	**60.0**
70/50 °C	T return primary	°C	52	52	52	52	52	52	51	50	52	52	52	52	52	52	50	50
	V̇ primary	**m³/h**	**2.3**	**3.0**	**3.7**	**6.2**	**7.1**	**8.9**	**14.8**	**20.6**	**1.7**	**2.2**	**2.8**	**4.7**	**5.3**	**6.7**	**10.5**	**15.9**
	Q max.	kW	149	195	241	402	460	575	914	1372	149	195	241	402	460	575	914	1372
	V̇ secondary	**m³/h**	**6.5**	**8.5**	**10.5**	**17.5**	**20.0**	**25.0**	**40.0**	**60.0**	**6.5**	**8.5**	**10.5**	**17.5**	**20.0**	**25.0**	**40.0**	**60.0**
70/55 °C	T return primary	°C	57	57	57	57	57	57	55	55	57	57	57	57	57	57	55	55
	V̇ primary	**m³/h**	**1.9**	**2.4**	**3.0**	**5.1**	**5.8**	**7.3**	**11.4**	**16.8**	**1.4**	**1.8**	**2.2**	**3.7**	**4.3**	**5.4**	**8.3**	**12.5**
	Q max.	kW	112	146	181	301	344	430	685	1028	112	146	181	301	344	430	685	1028
	V̇ secondary	**m³/h**	**6.5**	**8.5**	**10.5**	**17.5**	**20.0**	**25.0**	**40.0**	**60.0**	**6.5**	**8.5**	**10.5**	**17.5**	**20.0**	**25.0**	**40.0**	**60.0**
65/40 °C	T return primary	°C	42	42	42	42	42	42	43	40	42	42	42	42	42	42	41	40
	V̇ primary	**m³/h**	**2.4**	**3.2**	**4.0**	**6.6**	**7.6**	**9.6**	**15.4**	**22.2**	**1.9**	**2.5**	**3.1**	**5.2**	**6.0**	**7.5**	**11.8**	**17.5**
	Q max.	kW	187	245	303	504	577	721	1146	1720	187	245	303	504	577	721	1146	1720
	V̇ secondary	**m³/h**	**6.5**	**8.5**	**10.5**	**17.5**	**20.0**	**25.0**	**40.0**	**60.0**	**6.5**	**8.5**	**10.5**	**17.5**	**20.0**	**25.0**	**40.0**	**60.0**
60/40 °C	T return primary	°C	42	42	42	42	42	42	41	40	42	42	42	42	42	42	40	40
	V̇ primary	**m³/h**	**1.9**	**2.6**	**3.2**	**5.3**	**6.1**	**7.7**	**12.0**	**17.7**	**1.5**	**2.0**	**2.5**	**4.2**	**4.8**	**6.0**	**9.4**	**14.0**
	Q max.	kW	150	196	242	404	461	576	918	1377	150	196	242	404	461	576	918	1377
	V̇ secondary	**m³/h**	**6.5**	**8.5**	**10.5**	**17.5**	**20.0**	**25.0**	**40.0**	**60.0**	**6.5**	**8.5**	**10.5**	**17.5**	**20.0**	**25.0**	**40.0**	**60.0**
60/45 °C	T return primary	°C	47	47	47	47	47	47	45	45	47	47	47	47	47	47	45	45
	V̇ primary	**m³/h**	**1.6**	**2.1**	**2.5**	**4.3**	**4.9**	**6.2**	**9.6**	**14.3**	**1.2**	**1.6**	**2.0**	**3.3**	**3.8**	**4.8**	**7.4**	**11.1**
	Q max.	kW	112	147	181	302	345	432	687	1032	112	147	181	302	345	432	687	1032
	V̇ secondary	**m³/h**	**6.5**	**8.5**	**10.5**	**17.5**	**20.0**	**25.0**	**40.0**	**60.0**	**6.5**	**8.5**	**10.5**	**17.5**	**20.0**	**25.0**	**40.0**	**60.0**
55/30 °C	T return primary	°C	32	32	32	32	32	32	32	30	32	32	32	32	32	32	31	30
	V̇ primary	**m³/h**	**2.1**	**2.8**	**3.5**	**5.8**	**6.6**	**8.4**	**13.4**	**19.5**	**1.7**	**2.3**	**2.8**	**4.7**	**5.4**	**6.8**	**10.6**	**15.8**
	Q max.	kW	188	246	303	506	578	722	1151	1726	188	246	303	506	578	722	1151	1726
	V̇ secondary	**m³/h**	**6.5**	**8.5**	**10.5**	**17.5**	**20.0**	**25.0**	**40.0**	**60.0**	**6.5**	**8.5**	**10.5**	**17.5**	**20.0**	**25.0**	**40.0**	**60.0**
50/30 °C	T return primary	°C	32	32	32	32	32	32	31	30	32	32	32	32	32	32	30	30
	V̇ primary	**m³/h**	**1.7**	**2.2**	**2.8**	**4.6**	**5.3**	**6.7**	**10.5**	**15.6**	**1.4**	**1.8**	**2.2**	**3.7**	**4.3**	**5.4**	**8.4**	**12.6**
	Q max.	kW	150	196	243	404	462	578	921	1382	150	196	243	404	462	578	921	1382
	V̇ secondary	**m³/h**	**6.5**	**8.5**	**10.5**	**17.5**	**20.0**	**25.0**	**40.0**	**60.0**	**6.5**	**8.5**	**10.5**	**17.5**	**20.0**	**25.0**	**40.0**	**60.0**
50/35 °C	T return primary	°C	37	37	37	37	37	37	35	35	37	37	37	37	37	37	35	35
	V̇ primary	**m³/h**	**1.3**	**1.8**	**2.2**	**3.7**	**4.2**	**5.4**	**8.3**	**12.4**	**1.1**	**1.4**	**1.7**	**2.9**	**3.4**	**4.3**	**6.6**	**9.9**
	Q max.	kW	112	147	182	303	346	433	690	1036	112	147	182	303	346	433	690	1036
	V̇ secondary	**m³/h**	**6.5**	**8.5**	**10.5**	**17.5**	**20.0**	**25.0**	**40.0**	**60.0**	**6.5**	**8.5**	**10.5**	**17.5**	**20.0**	**25.0**	**40.0**	**60.0**
45/30 °C	T return primary	°C	32	32	32	32	32	32	30	30	32	32	32	32	32	32	30	30
	V̇ primary	**m³/h**	**1.3**	**1.7**	**2.1**	**3.5**	**4.0**	**5.0**	**7.8**	**11.7**	**1.0**	**1.3**	**1.7**	**2.8**	**3.2**	**4.1**	**6.3**	**9.5**
	Q max.	kW	113	147	182	303	347	433	691	1037	113	147	182	303	347	433	691	1037
	V̇ secondary	**m³/h**	**6.5**	**8.5**	**10.5**	**17.5**	**20.0**	**25.0**	**40.0**	**60.0**	**6.5**	**8.5**	**10.5**	**17.5**	**20.0**	**25.0**	**40.0**	**60.0**
45/35 °C	T return primary	°C	37	37	37	37	37	37	35	35	37	37	37	37	37	37	35	35
	V̇ primary	**m³/h**	**0.9**	**1.2**	**1.5**	**2.5**	**2.8**	**3.6**	**5.5**	**8.3**	**0.6**	**0.9**	**1.1**	**1.4**	**2.1**	**2.7**	**4.4**	**6.6**
	Q max.	kW	75	98	121	202	231	288	460	691	75	98	121	202	231	288	460	691
	V̇ secondary	**m³/h**	**6.5**	**8.5**	**10.5**	**17.5**	**20.0**	**25.0**	**40.0**	**60.0**	**6.5**	**8.5**	**10.5**	**17.5**	**20.0**	**25.0**	**40.0**	**60.0**

TransTherm® pro S type (A-C)

(Dimensions in mm)



1 Flow secondary
2 Return secondary
3 Flow primary
4 Return primary

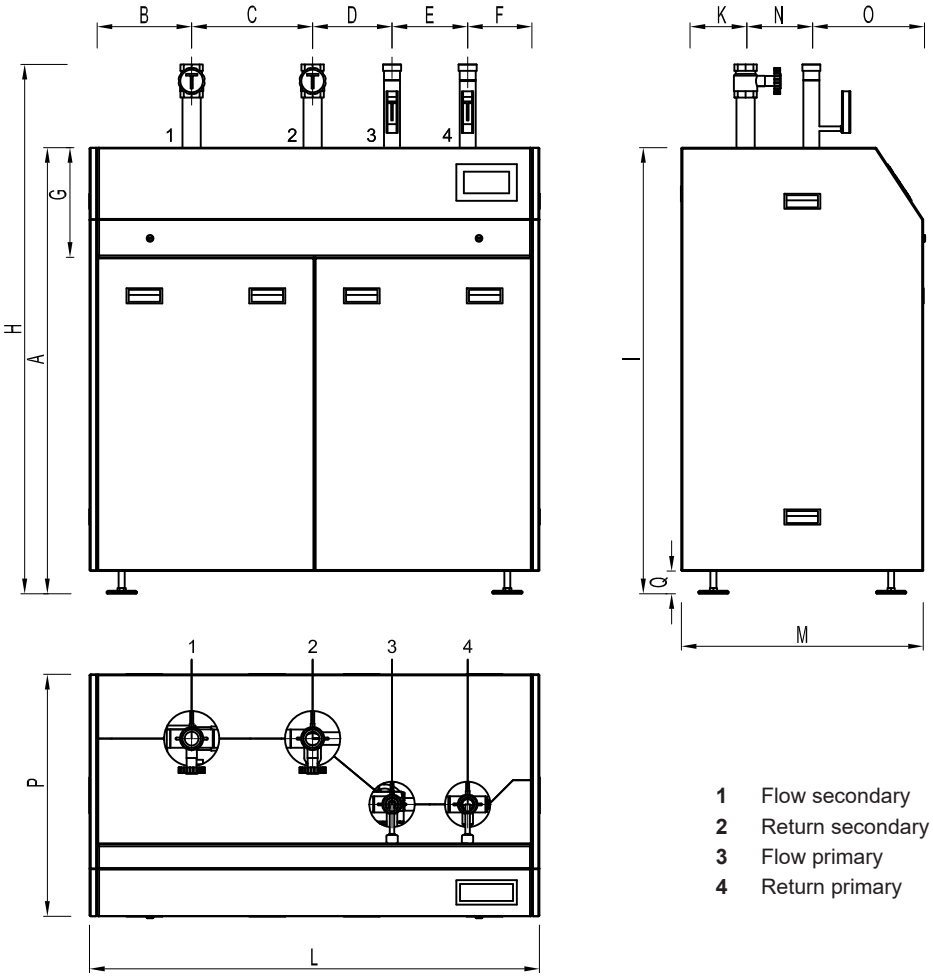
TransTherm® pro S	A	B	C	D	E	F	G	H	I	K	L	M	N	O	P	Q
(A-C)	1180	250	320	210	200	170	290	1400	1160	150	1150	620	174	296	620	60

Allocation of heat meters

TransTherm® pro S/RS	Heat meter qp	Installation length mm	Connection size inches
(A, B, C)	3.5	260	R 1¼"
(A, B, C)	6.0	260	R 1¼"

TransTherm® pro RS type (A-C)

(Dimensions in mm)

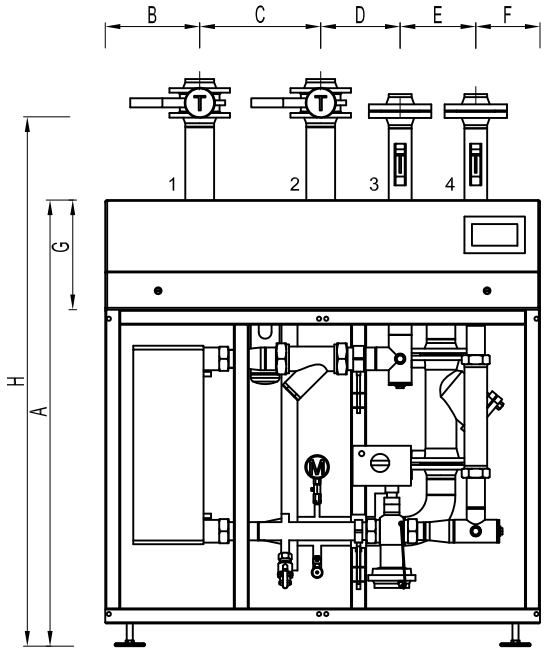


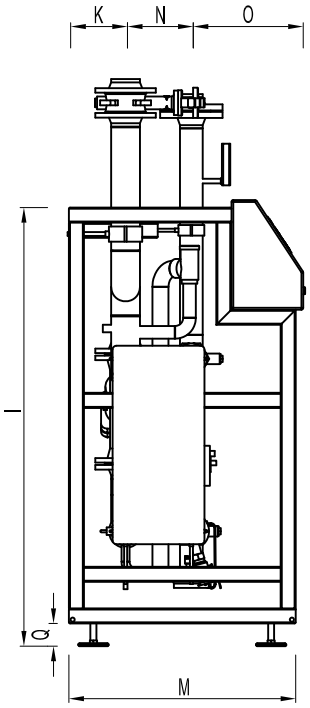
1 Flow secondary
2 Return secondary
3 Flow primary
4 Return primary

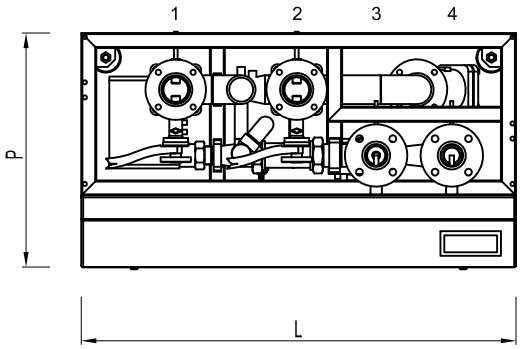
TransTherm® pro RS	A	B	C	D	E	F	G	H	I	K	L	M	N	O	P	Q
(A-C)	1180	270	320	210	200	190	290	1400	1180	170	1190	640	174	296	640	60

TransTherm® pro S type (D)

(Dimensions in mm)







1 Flow secondary
2 Return secondary
3 Flow primary
4 Return primary

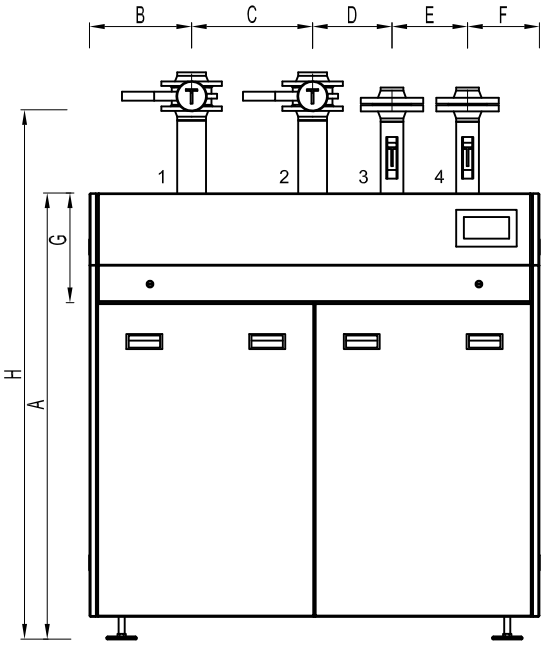
TransTherm® pro S	A	B	C	D	E	F	G	H	I	K	L	M	N	O	P	Q
(D)	1180	250	320	210	200	170	290	1500	1160	150	1150	620	174	296	620	60

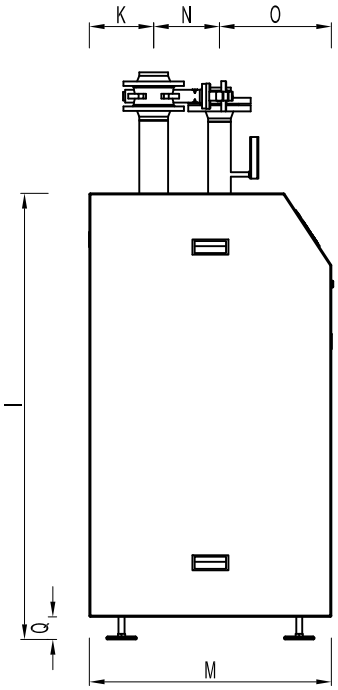
Allocation of heat meters

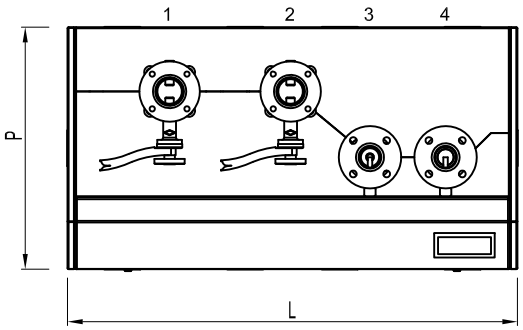
TransTherm® pro S/RS	Heat meter qp	Installation length mm	Connection size inches
(D)	10	300	R 2″

TransTherm® pro RS type (D)

(Dimensions in mm)





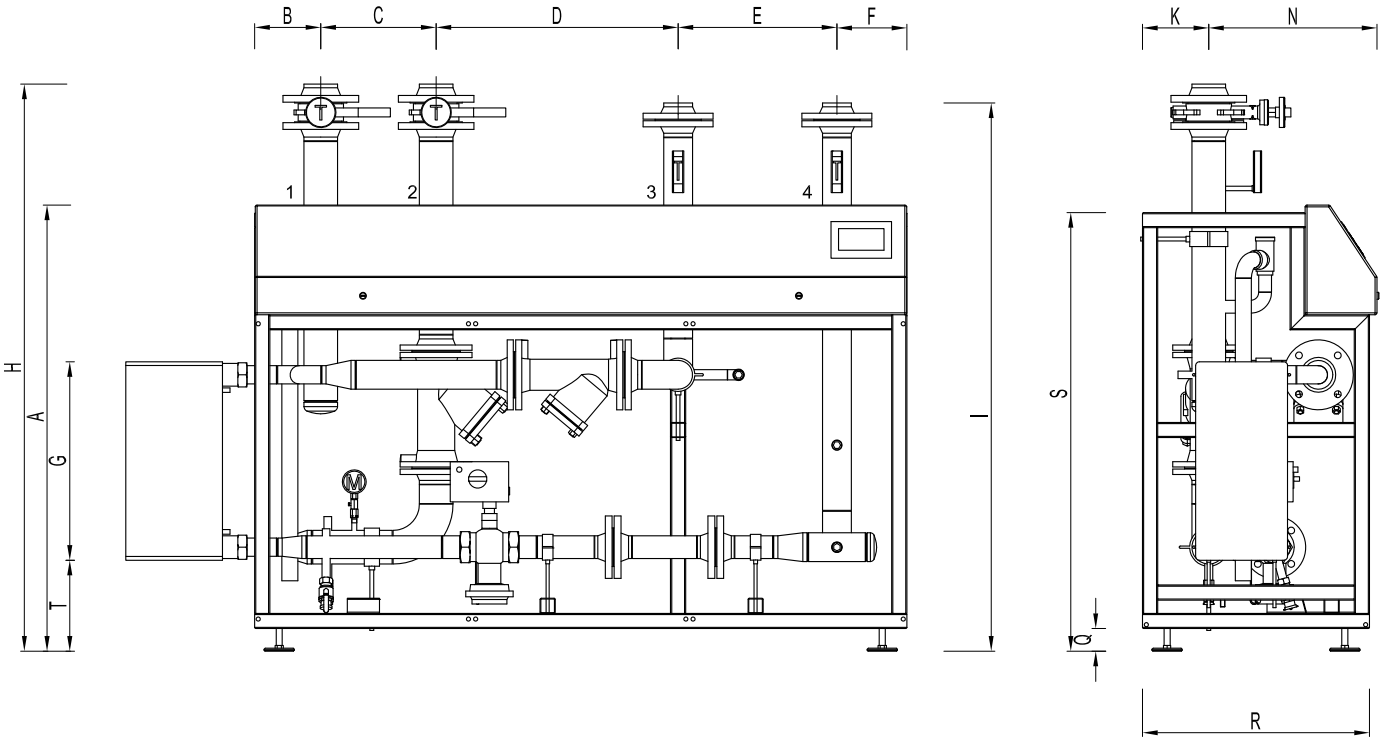


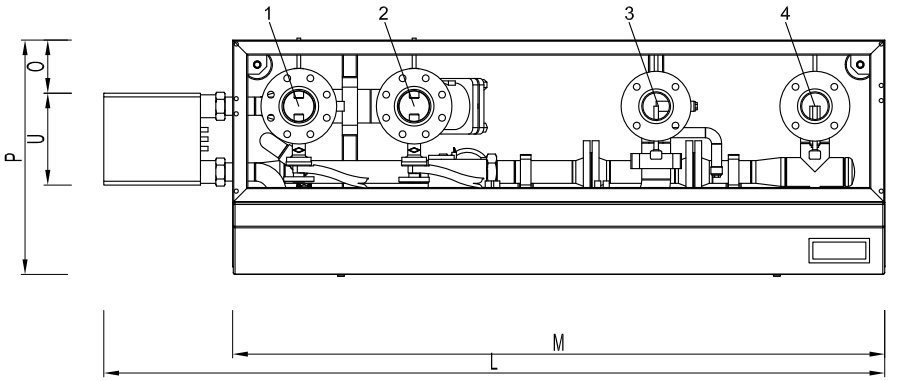
1 Flow secondary
2 Return secondary
3 Flow primary
4 Return primary

TransTherm® pro RS	A	B	C	D	E	F	G	H	I	K	L	M	N	O	P	Q
(D)	1180	270	320	210	200	190	290	1500	1180	170	1190	640	174	296	640	60

TransTherm® pro S type (E-G)

(Dimensions in mm)





1 Flow secondary
2 Return secondary
3 Flow primary
4 Return primary

TransTherm® pro S	A	B	C	D	E	F	G	H	I	K	L	M	N	O	P	Q	R	S	T	U
(E)	1180	175	305	640	420	185	525	1500	1450	175	2066	1725	445	141	620	60	600	1160	241	243
(F)	1180	175	305	640	420	185	525	1500	1450	175	2275	1725	445	141	620	60	600	1160	241	243
(G)	1180	175	305	640	420	185	525	1500	1450	175	2320	1725	445	128	620	60	600	1160	241	243

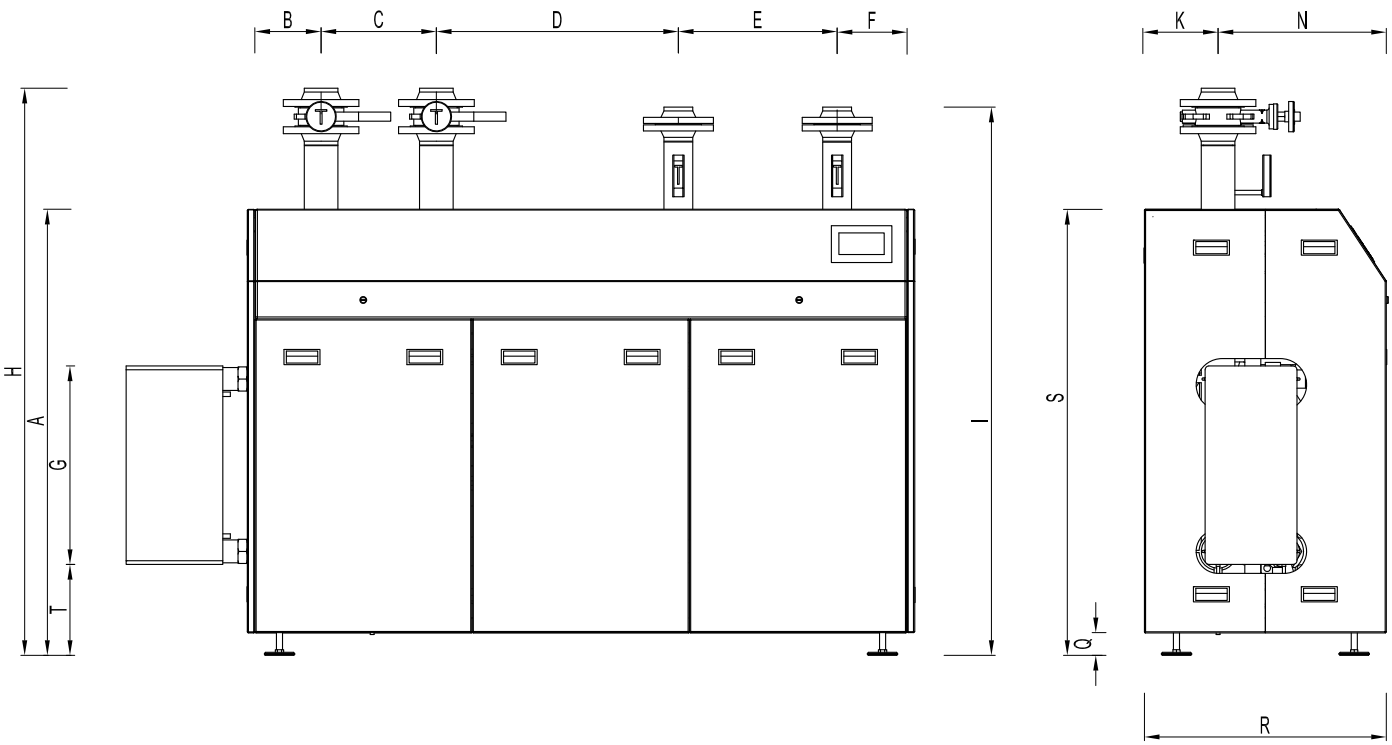
Allocation of heat meters

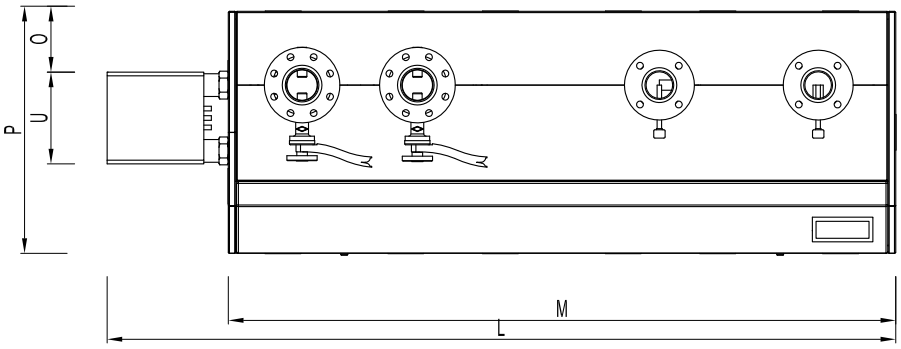
TransTherm® pro S/RS	Heat meter qp	Installation length mm	Connection size inches
(E, F)	15	270	DN 50 FL
(G)	25	300	DN 65 FL
(H)	40	300	DN 80 FL

TransTherm® pro S type (H)
on request

TransTherm® pro RS type (E-G)

(Dimensions in mm)

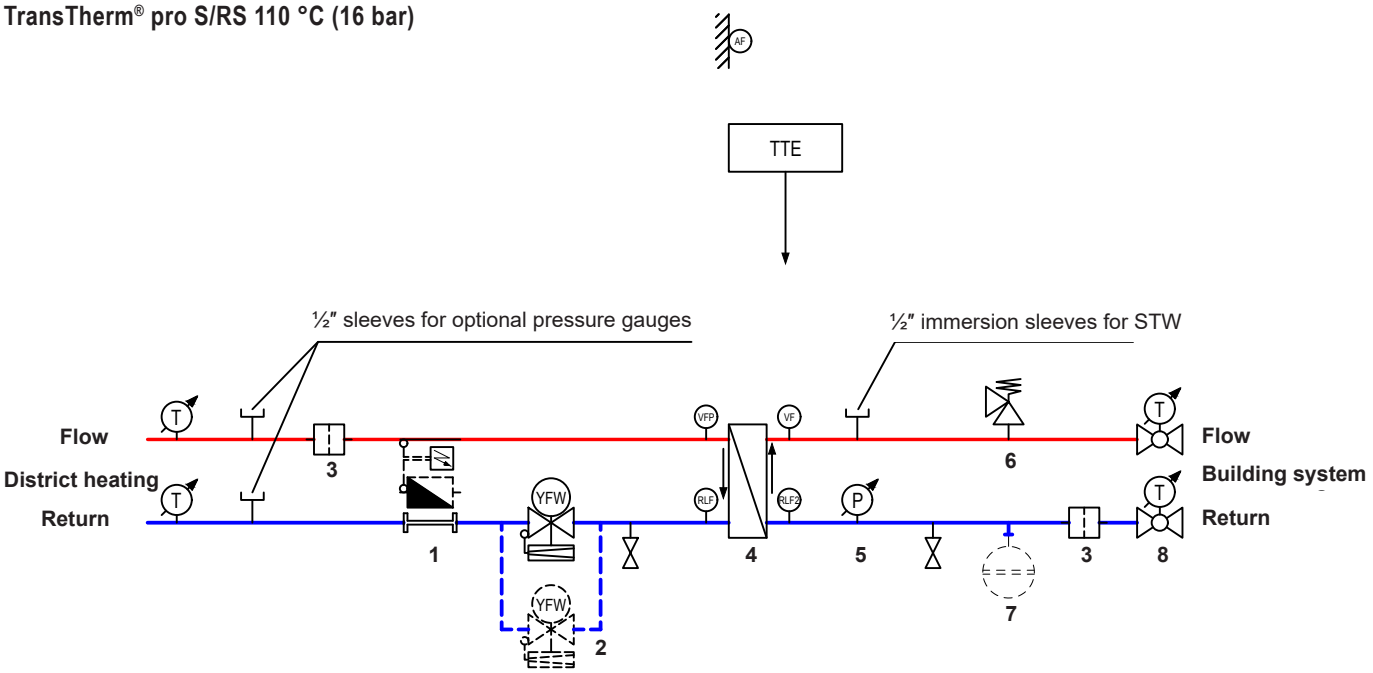




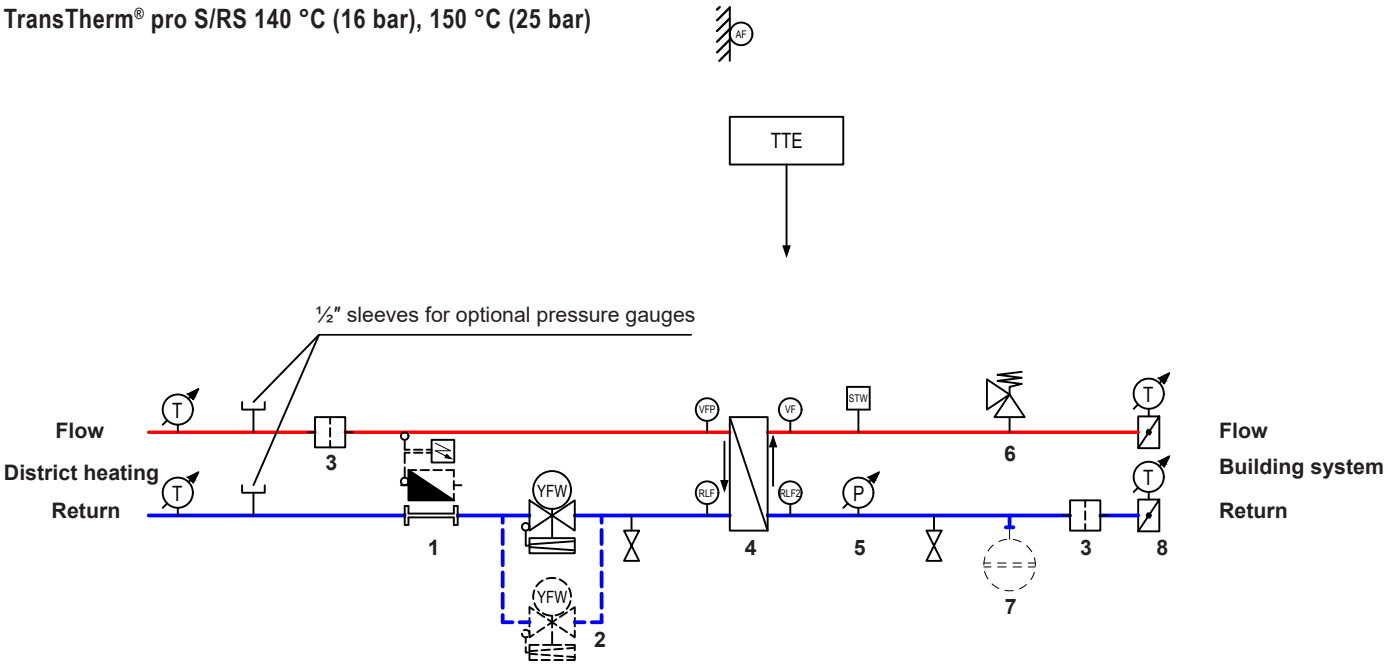
1 Flow secondary
2 Return secondary
3 Flow primary
4 Return primary

TransTherm® pro RS	A	B	C	D	E	F	G	H	I	K	L	M	N	O	P	Q	R	S	T	U
(E)	1180	195	305	640	420	205	525	1500	1450	195	2086	1765	445	161	640	60	640	1180	241	243
(F)	1180	195	305	640	420	205	525	1500	1450	195	2295	1765	445	161	640	60	640	1180	241	243
(G)	1180	195	305	640	420	205	525	1500	1450	195	2340	1765	445	148	640	60	640	1180	241	243

TransTherm® pro S/RS 110 °C (16 bar)



TransTherm® pro S/RS 140 °C (16 bar), 150 °C (25 bar)



1 Heat meter adapter (heat meter optional)
2 Flow rate controller with motorised control valve (for types F and G, sequential circuit with 2 valves)
3 Strainer
4 Heat exchanger
5 Pressure gauge
6 Safety valve
7 Diaphragm pressure expansion tank connection (diaphragm pressure expansion tank optionally)
8 Shut-off valve with thermometer

RLF Return sensor
VF Flow sensor
AF Outdoor sensor

Notice:
- The example schematics merely show the basic principle and do not contain all information required for installation. The installation must be done according to local conditions, dimensioning and regulations.
- With underfloor heating a flow temperature monitor must be built in.
- Shut-off devices to the safety valve (diaphragm pressure expansion tank, safety valve, etc.) are to safe against unintended closing!
- Mount bags to prevent single pipe gravity circulation!

Hoval TransTherm® pro

- Indirect compact station for heat transfer and regulation of heating and hot water production systems.
- For connection to district heating networks.
- Ready-to-connect and pre-wired heating groups are integrated as required.
- Various products and systems are available for hot water production.
- The TransTherm® pro district heating station is designed and manufactured on a project-specific basis. The design is adapted to local conditions (installation/set-up). The technical requirements and conditions imposed by the heat supply company are implemented individually during planning and production.
- Operating pressure up to PN 40, operating temperatures of up to 200 °C can be realised.
- In the case of connection to steam networks, maximum operating temperatures of up to 350 °C are possible.
- All configurations and connection options are implemented.
- Multi-section construction in modular design for difficult on-site installation conditions is possible.
- The TransTherm® pro district heating station is of fully welded design, mounted vibration-free on a free-standing or wall installation frame and equipped with special corrosion protection.
- All electrical components are pre-wired and ready-to-connect.
- In the case of multi-frame design, the electrical wiring is optimised for minimum connection effort.

Design on request
- Project-based 3D design drawings as a planning aid and for visualisation in case of order
- Tube bundle heat exchangers
- Hoval control system
- District heating station for direct connection

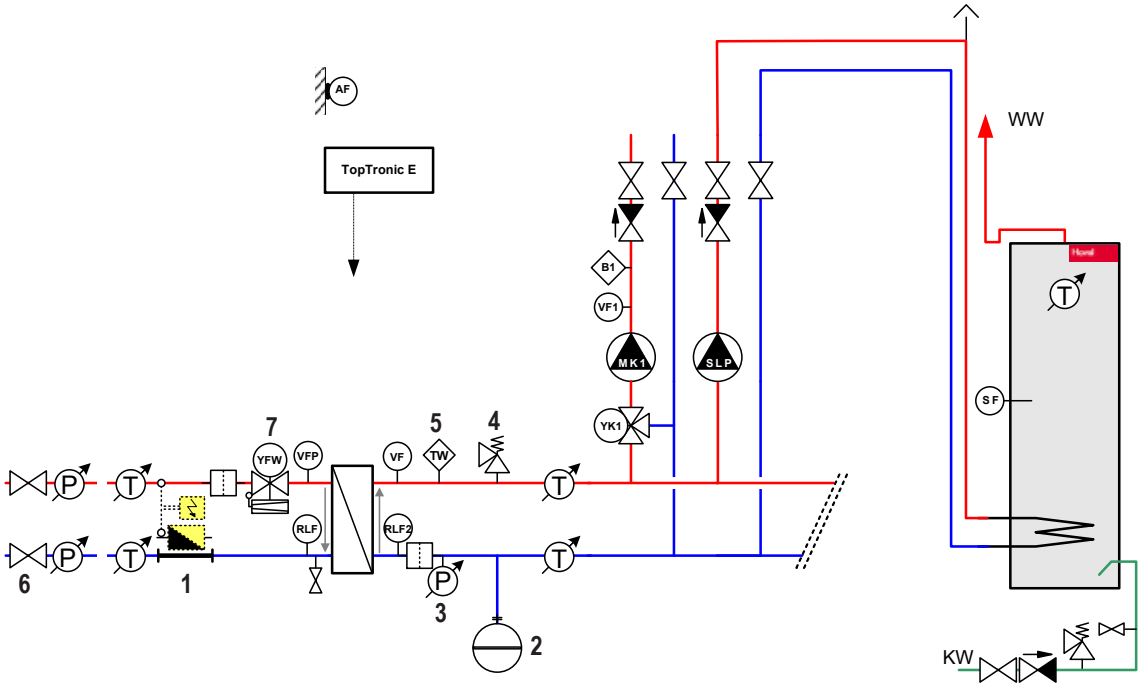
Hoval TransTherm® pro

Heat output 10-15000 kW

TransTherm® pro

District heating station

- Heating groups, number and size project-based



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- With underfloor heating a flow temperature monitor must be built in.
- Shut-off devices to the safety valve (diaphragm pressure expansion tank, safety valve, etc.) are to safe against unintended closing!
- Mount bags to prevent single pipe gravity circulation!

1 Heat meter adapter
2 Diaphragm pressure expansion tank (option)
3 Pressure gauge
4 Safety valve
5 Temperature monitor
6 Shut-off valve
7 Flow rate controller with motorised control valve

RLF Return sensor
RLF2 Return sensor (secondary)
VFP Flow sensor (primary)
VF Flow sensor (secondary)
AF Outdoor sensor
SF Calorifier sensor
TW Temperature monitor

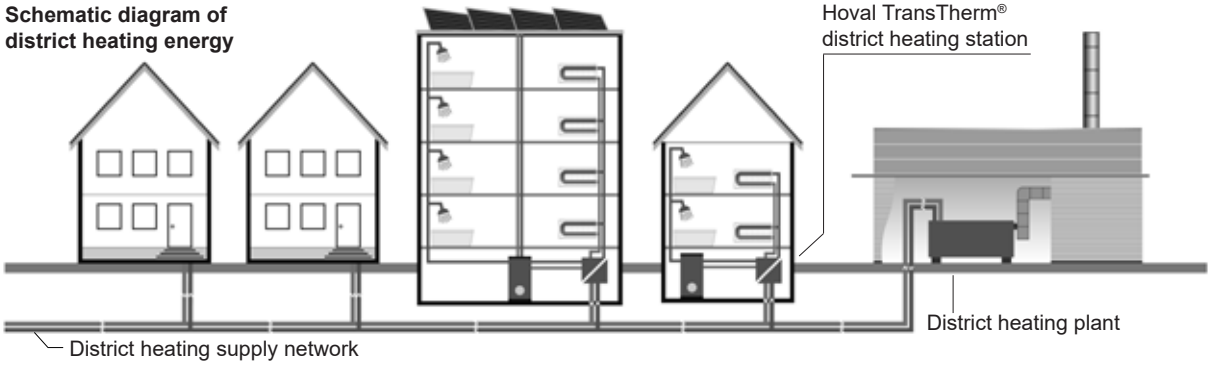
General
District heating is thermal energy which is provided centrally and distributed over large areas with the help of a heat transfer medium and a pipe system.
Hot water or water vapour are usually used as the heat transfer medium.
Typically, district heating systems supply entire boroughs, towns or regions from one or just a few powerful heat sources. A further characteristic of this system is that as a rule, the owner of the heat sources and the distribution networks is not the owner of the buildings which are supplied with heat.

District heating is mainly generated in cogeneration heating plants. The exploitation of heat gains from nuclear power plants or industrial processes, for example waste incineration, is also a significant factor.
A special type of heat gain exploitation is the so-called “cold” district heating e.g. from waste water purification plants.

The lukewarm purified waste water is fed via a distance pipe to a central local heating supply plant. There it serves as a heat source with which a heat pump can be operated at a relatively high coefficient of performance.

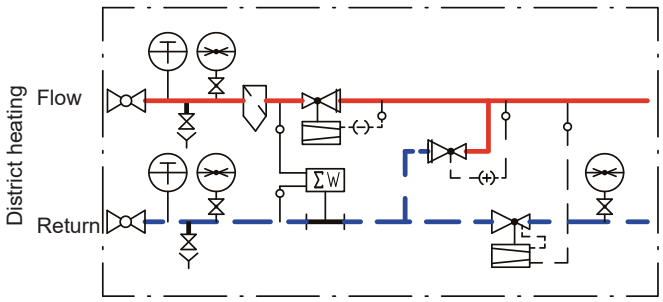
Heat transport from the heat source to the consumers is effected via the district heating distribution network.

Schematic diagram of district heating energy



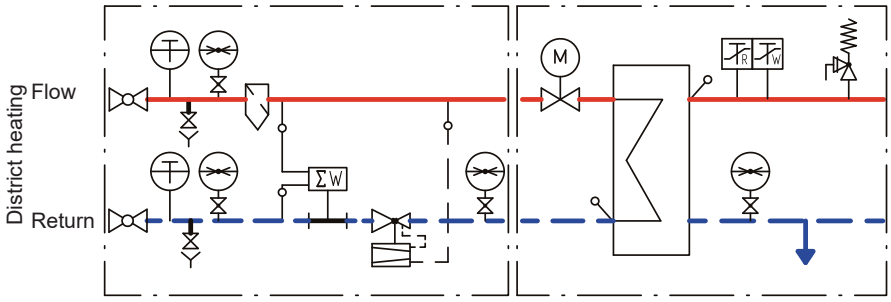
District heating transfer station
The district heating transfer station is the link between the district heating network and the building system. There are two basic connection types, direct and indirect connection.

Direct connection
In the case of direct connection, district heating water flows straight through the building system.
This connection type is desirable where hydraulic separation of the primary and secondary circuits is not required and the pressure fluctuations in the distribution network are manageable. It is mainly used in local heating supply systems with radial networks.



District heating connection with a transfer station for direct connections

Indirect connection
In the case of an indirect connection, there is full hydraulic separation of the district heating network and the building system by means of a heat exchanger. This means that the district heating network and the building system are also independent with respect to pressure, which can be advantageous for the configuration and operation of the distribution networks. The configuration standard of the district heating station depends on the requirements of the network operators and customers.



District heating connection with a transfer station for indirect connections

Space for district heating station
- It must be possible for the district heating provider to access the district heating station at any time.
- The district heating station should be installed in a lockable room.
- The size of the room must be sufficient for all parts of the system to be operated without problems.
- The space requirement for the district heating station must be provided in accordance with the specifications of the district heating provider.
- If no heat is taken from the district heating network, the space housing the district heating station and the parts of the district heat supply system must be kept frost-free.
- Sufficient ventilation must be provided.
- A 230 V socket must be available for measuring equipment.

District heating connection
- The district heating distribution network is a closed system.
- The heat is supplied through the circulation of heating water as a heat transfer medium from the flow line, whereby the water is routed back into the return line of the district heating provider after flowing through the customer's heat exchanger, indirect connection, or with direct connection, fully and cooled.
- The quality of the district heating water must not be changed in the heating system.

Heat quantity measurement
- A heat meter must be installed in the district heating connection.
- Hoval district heating stations are delivered with an adapter installed; this is replaced with the heat meter during commissioning.
- The measuring equipment is used to ensure that heat is delivered to the heating system correctly, and to measure the associated heat usage.
- The district heating provider must be consulted with regard to the method for measuring the heat quantity and the associated electrical installations used.

Flow rate controller with motorised control valve
- The maximum volume of water required on the basis of the ordered district heating power is set at the primary valve (combination valve).
- If this equipment is used in combination with the actuator, the temperature can also be controlled.

Differential pressure regulator
The differential pressure regulator is set by the district heating provider so that the required differential pressure for the domestic installation is available at the property boundary.

District heating flow/return temperatures
- The following operating modes are used to regulate the flow temperature: continuously controlled; constant; or constant/continuously controlled.
- The primary maximum return temperature is specified by the district heating provider. It is limited in the return flow by means of a sensor.
- For economical operation of the district heating network, the temperature difference in the system must be as great as possible.

Temperature difference ratio
- The return temperature difference of the heat exchanger is the difference in temperature between the primary and secondary return temperatures and is specified by the district heating network operator.
- If the temperature difference is reduced, the district heating return temperature drops.

Pressure levels
The following pressure levels are stipulated by the responsible district heating providers:
- Nominal pressure (dimensioning)
- Test pressure
- Maximum pressure drop of district heating station
- Closing pressure of primary control valve (in the event of a fault or power failure)

Heat output of the district heating station
- The heat output is based on:
  - The overall heat balance for the various heat consumers, taking simultaneous use into account.
  - The primary-side temperature difference between the heat exchanger, with a minimum outside temperature taken as a basis, and the maximum flow water volume required.
- The flow water volume must be calculated for summer and winter and DHW heating. The worst-case scenario determines the effective heat output of the district heating station (different operating temperatures!).

DHW heating
- Possible differences in summer and winter operating temperatures for the district heating station must be taken into consideration in the case of DHW heating.
- The entire district heating water volume is available to the priority circuit for DHW heating. This results in short heating-up times for the storage volume.
- Calorifier and heat exchanger combinations must be dimensioned so that the temperature difference of the service water heat exchanger is as low as possible and the return temperature of the secondary circuit is lower than 30 °C when heating-up begins.
- The heat output and storage volume must be coordinated in such a way that, particularly at the end of heating-up operation, the maximum primary return temperature and the difference in temperature of the district heating station are not exceeded.
- An anti-legionella circuit for thermal disinfection of a DHW heating system by exceeding the return temperature limit for restricted periods of time must be agreed on with the district heating provider.
- DHW circulation must not influence the stratification in the storage tank.
- For selection of the calorifier, see Calorifiers

Control
- The primary valve controls the secondary flow temperature in accordance with the outside air temperature. (An exception is made where there is a constant requirement.)
- The control valve must be designed so that it executes optimum control. This is ensured if the valve authority is perfectly matched to the district heat exchanger.
- The most stable control ratios are produced when

$$pv = \frac{\Delta pValve}{\Delta pValve + \Delta p\ Heat\ Exchanger} \geq 0.5$$

- When dimensioning the control valve, it is also vital to ensure that no impermissible noises occur
- To avoid pressure surges, the control valve must automatically seal shut in the event of a power failure. To this end, the valve must be configured with a minimum closing pressure specified by the district heating provider.
- Controlling the primary water flow by means of multiple hydraulic actuators connected in parallel can increase control accuracy in light-load operation.
- Adjustment should behave in a stable manner and must not be susceptible to vibrations.
- The heating system must be protected against excess temperatures

Impermissible hydraulic circuits
- Consumers must not be directly connected to the primary circuit.
- Connections on the primary side between flow and return (bypass) are forbidden.
- Water must never be fed from the heating flow directly into the heating return on the secondary side (heating system) (e.g. no bypass/injection systems/short circuit at heating distributors and ventilation groups).
- The hydraulic system must be approved by the district heating provider.

Installation of the district heating station
- Hoval district heating transfer stations are delivered fully cased and wired ready for electrical connection.
- Electrical connection of district heating station, mains connection 1 x 230 V, 50 Hz or according to wiring diagram
- The lines must be positioned so that the front door can still be fully opened.
- A heat meter must be installed upstream of the district heating station.
- The district heating connection must be dimensioned in accordance with standard engineering practice and taking into account the technical and general conditions imposed by the district heating provider, in particular with regard to temperature, pressure and different operating states in summer/winter.
- When connecting Hoval district heating stations, we recommend installing an expandable bracket immediately after the connection in order to prevent force being exerted on the heat exchanger unnecessarily as a result of thermal expansion.
- Work on components of the district heating network system may only be performed by installation technicians with the requisite training. (e.g. x-ray-proof welding)

Pipes and fittings
Attention must be paid to the selection of the correct materials for the system components with respect to pressure and temperature.

Commissioning
- The installer must inform the district heating provider when the system is complete.
- Commissioning is carried out as agreed between the district heating provider, the installation company and Hoval.
- Work done by district heating provider:
  - Commissioning of the district heating circuit if the adjustment system is electrically wired and the system is operational.
  - Installation of the heat metering equipment (hot water meter, temperature sensor and calculation unit)
  - Filling of the system with district heating water

Adjustment
- The installation company is under obligation to adjust the heating system immediately following commissioning so that low return temperatures are maintained for each heating group or main return.
- The heating system is deemed to be adjusted for the district heating supply if, at the time of acceptance, the measured return temperatures and the temperature difference correspond to those on the installation display.

Secondary heating system
- The entry of gas or air into the heating system must be avoided.
- Low operating temperatures must be a priority.

Safety equipment
- Safety components must be provided and installed in compliance with the valid regulations and directives.

Diaphragm pressure expansion tank
- The diaphragm pressure expansion tank must be connected to the separate connections of the Hoval district heating station using a detachable or sealable actuation device. This means that it is not necessary to drain the entire system in order to carry out work on the diaphragm pressure expansion tank.

Water quality of the heating water:
- The requirements of European standard EN 14868 and VDI 2035 or SIA 384/1:2009 must be met. In particular, the following specifications must be complied with:
- Hoval district heating stations are suitable for heating systems without significant oxygen intake (system type I in accordance with EN 14868).
- Treated heating water must be tested at least 1 x per year, or more frequently if prescribed by the manufacturer of the inhibitor.
- On existing systems (for example if the heat generator is replaced), where the quality of the existing heating water meets the requirements of VDI 2035, re-filling of the system is not recommended. The requirements of VDI 2035 also apply to replacement water.
- Before filling new systems and, where necessary, existing systems, the heating system must be professionally cleaned and flushed. The district heating station must not be filled until the heating system has been flushed.
- The pH-value of the heating water should be between 8.3 and 9.5 after 6 to 12 weeks of heating operation.

Filling and replacement water:
- As a rule, untreated mains water is best suited as filling and replacement water for a system with Hoval district heating stations. However, the quality of the untreated mains water must still meet the requirements of VDI 2035 or be demineralised and/or treated with inhibitors. The requirements of EN 14868 must be met in this context.

Requirements and directives
The following requirements and directives must be complied with:
- Technical information and installation instructions from Hoval.
- Technical and general conditions specified by the respective district heating provider.
- Hydraulic regulations and those pertaining to instrumentation and control, local fire prevention authority regulations and country-specific regulations
- SWKI 91-1 guidelines on boiler room ventilation
- SWKI 301-1 guidelines “Safety engineering installations for heating systems”
- Corrosion by halogenated hydrocarbons
- Corrosion damage by oxygen in heating systems
- Corrosion damage in the heating water
- Directive on water quality and water treatment in heating systems

Observe the following under Calorifiers Engineering hot water
Water quality
Hoval engineering guideline - water quality of the plant water on the heating side and the tap water on the domestic water side with the use of copper-soldered plate heat exchangers.

1. General

1.1 The following Terms and Conditions shall apply to all our present and future contracts for deliveries and other services (even if the said Terms and Conditions are not specifically mentioned in verbal, telephonic or fax communications).

1.2 All deviations from the present Terms and Conditions, ancillary verbal agreements and subsequent contractual amendments shall only be valid if they have been confirmed by us in writing.

1.3 Buying terms and conditions of the client shall not be valid even if they are not specifically rejected by us. Our Standard Terms and Conditions of Delivery shall be regarded as accepted at the latest upon receipt of our goods and services by the client.

1.4 If a provision of the present Terms and Conditions of Delivery proves to be wholly or partially invalid, the contracting parties shall replace the aforesaid provision by a new provision which comes as close as possible to the legal and economic intention of the invalid provision.

2. Offers

2.1 Our offers shall be subject to change without notice.

2.2 Orders shall only be regarded as accepted when they have been confirmed by us in writing.

2.3 Illustrations, drawings and all technical details in catalogues and printed material shall be approximate values as customary within the industry. They shall only be binding if specific reference is made to them in the contract. We shall also reserve the right to make technical and design changes after the conclusion of the contract.

2.4 Cost estimates, drawings and other documents shall remain our property and shall be subject to copyright protection; they may not be made available to third parties.

3. Regulations in the country of destination

3.1 At the latest at the time of the order, the buyer shall draw our attention to the regulations and standards in force in the country of destination relating to the design of the delivered goods and the operation thereof and also to the execution of services.

3.2 Our deliveries and services shall comply with the regulations and standards in the country of destination provided the buyer has drawn our attention thereto in accordance with Section 3.1.

3.3 The buyer shall duly inform us of any special application features of goods ordered from us if these differ from our general recommendations.

4. Prices

4.1 Our prices shall be ex works, net, excluding packaging.

4.2 All ancillary costs, e.g. freight, insurance, export, transit, import and other approvals, licenses and authentications, shall be for the account of the buyer. The buyer shall also bear all taxes, charges, customs duty, etc., which are levied in connection with the contract.

4.3 We shall reserve the right to make price adjustments if wage rates or material prices change between the date of the order confirmation and the contractual performance of the contract. Price increases shall normally be notified three months in advance. We shall be bound to the price stated in the order confirmation for a period of three months after the effective date of the price increase.

5. Payment terms

5.1 Unless otherwise agreed in writing, our invoices shall be payable within thirty days with no cash discount. Payment shall be deemed to have been made when the amount in question is at our unrestricted disposal on our account in Swiss Franks.

5.2 Payment dates shall be observed even if any delays whatsoever occur after shipment of the goods from our works. The buyer shall not be permitted to reduce or withhold payments on account of complaints or counterclaims not recognised by us.

5.3 Payments shall also be made if insignificant components are missing but usage of the delivered goods is not rendered impossible as a result or if rectification work has to be carried out on the delivery. We shall be entitled to reject rectification of the defect as long as the buyer has not discharged his/its obligations to us.

5.4 If the buyer fails to comply with the agreed payment dates, default interest shall be paid from the agreed due date without a reminder being issued; the aforesaid interest shall be based on the interest rates prevailing at the domicile of the buyer, but shall be not less than four percent above the current discount rate of the Swiss Central Bank.

5.5 We shall be entitled to make deliveries of pending orders dependent upon settlement of outstanding claims.

6. Reservation of title

6.1 Delivered goods shall remain our property (reserved goods) pending full and complete payment of all present and future claims to which we are entitled regardless of their legal cause. This shall also apply if payments are made in settlement of specifically designated claims.

6.2 The buyer shall be entitled to process and sell reserved goods in the ordinary course of business.

6.3 If our reserved goods are combined or intermingled with other goods, the buyer shall hereby transfer his/its ownership rights in the new goods or chattels to us upon the conclusion of the contract in the amount of the invoice value of the reserved goods.

6.4 If the goods are resold by the buyer, he/it shall hereby transfer to us upon the conclusion of the contract with us his/its claims arising from the aforesaid resale in the amount of the invoice value of the reserved goods.

6.5 If the reserved goods are used by the buyer to perform a works or works delivery contract, his/its claim from the aforesaid works or works delivery contract shall hereby be assigned to us in the same amount and on the same date as for the purchase price claim (Section 6.4).

6.6 As long as he/it is honouring his/its payment obligations, the buyer shall, however, be authorised to collect his/its resale claim which has been assigned to us. He/it may not dispose of such claims by way of assignment to third parties, however. The empowerment of the buyer to collect the claim may be revoked by us at any time. We shall be entitled to notify third party debtors of the assignment. The buyer shall be entitled to provide us with the necessary information and documents in order to enable us to enforce our rights.

6.7 If the value of our securities exceeds our total claims by more than 10 %, we shall be obliged to release securities of our choice at the request of the buyer.

6.8 The buyer shall inform us immediately of any pledge or other impediment to our property enforced by third parties.

6.9 The buyer shall be obliged to collaborate in measures required to protect our title. He/it shall, in particular, empower us upon the conclusion of the contract to make entries or prior notice of the reservation of title at his/its cost in public registers, books and documents, etc., in accordance with the relevant national laws and shall perform all formalities in this respect.

6.10 The buyer shall maintain the reserved goods at his/its cost for the duration of the reservation of title and shall insure the said goods against theft, breakage, fire, water and other risks in our favour. He/it shall also take all steps to ensure that our property claims are neither adversely affected nor rescinded.

7. Delivery periods

7.1 Delivery periods and deadlines stated by us shall be approximate unless we have given an express written confirmation of a deadline as binding.

7.2 Delivery periods shall be deemed to have been met if notification of readiness to deliver has been sent to the buyer before the end of the delivery period.

7.3 The delivery period shall be prolonged if details required for the performance of the contract are not received on time or if they are subsequently changed by the buyer.

7.4 The delivery period shall also be reasonably prolonged if impediments arise which we cannot avert despite exercise of the necessary care (e.g. major operational disruptions, industrial disputes, delayed or defective deliveries, force majeure, etc.).

7.5 If an agreed delivery date is met by more than 14 days, the buyer shall be obliged to set us a reasonable period of grace. The buyer may only withdraw from the contract if our goods have not been delivered by the end of the said period of grace. Compensation claims for non-performance, delayed performance or any consequential losses shall be excluded unless there was gross negligence on our part.

8. Transfer of risk

8.1 Unless expressly agreed otherwise in writing, our “ex works” deliveries shall be made in accordance with the international rules on the interpretation of commercial clauses of the International Chamber of Commerce (Incoterms) in the version in force on the date of the order confirmation.

8.2 The transfer of risk shall be determined by the aforesaid Incoterms.

8.3 Insurance against damages of any kind shall be the responsibility of the buyer.

8.4 Complaints in connection with the transport shall be immediately notified by the buyer to the last carrier upon receipt of the delivery.
8.5 If despatch is delayed at the request of the buyer or for any other reasons not attributable to us, the risk shall pass to the buyer on the original date envisaged for the “ex works” delivery. We shall be entitled to demand payment from this date onwards.

9. Delivery inspection

9.1 The buyer shall be required to inspect deliveries immediately. If the goods do not comply with the order or the delivery note or if visible defects are identified, he/it shall be obliged to notify the aforesaid to us in writing within eight days of receipt. Later complaints shall not be recognised. (Regarding transport damages, cf. Section 8.4).

10. Assembly and operations

10.1 The assembly, putting into operation, operation and maintenance of the delivered goods shall be carried out in accordance with our guidelines. They may be executed by our staff or by appropriately trained third parties as agreed with the buyer.
10.2 If we require a commissioning certificate for certain product groups, warranty claims for the proper functioning of the equipment can only be enforced if a proper hand-over has been documented by a confirmed commissioning certificate received by us within one month of the hand-over.

11. Warranty

11.1 Warranty period

11.1.1 The general warranty period shall be 12 months from the first commissioning but no longer than 18 months from the date on which the relevant goods left our works.
If despatch is delayed for reasons not attributable to us, the warranty shall lapse no later than 18 months after notification of the readiness to deliver.
The general warranty period shall exclude electrical components for which the warranty period shall be 6 months from the first commissioning but no later than 12 months from the date of shipment from our works.

11.1.2 We refer to Section 11.6.1 with regard to the warranty period for third party products.

11.1.3 The warranty period for components which we have repaired during the warranty period or have delivered as replacement shall be 12 months from the completion of our repair or from the date of the replacement delivery but no longer than the end of a period equivalent to twice the original warranty period as per Section 11.1.1.

11.2 Liability for material, design and workmanship defects

11.2.1 The contractual condition of the goods shall be based on the condition upon the transfer of risk.

11.2.2 Defects shall be notified to us immediately in writing.

11.2.3 We shall be liable for all components which can be shown to have become defective or unusable before the end of the warranty period as a result of defective materials, defective design or defective workmanship, with such components being repaired or replaced ex works immediately at our choice.

11.3 Liability for warranted qualities

11.3.1 Warranted qualities shall only be those which are specifically designated as such in the order confirmation or in the relevant specifications.

11.3.2 The aforesaid assurance shall apply at the latest until the end of the warranty period. If a taking-over test has been agreed with the buyer, the assurance shall be deemed as performed if proof of the relevant qualities is furnished during the aforesaid test.

11.3.3 If the warranted qualities are not performed or only partially performed, the buyer shall be entitled to an immediate rectification. The buyer shall grant us the necessary time and opportunity for this purpose.

11.3.4 If the rectification is abortive or only partially successful, the buyer shall be entitled to a reasonable reduction of the purchase price. If the defect is so serious that it cannot be rectified within a reasonable period of time, and if deliveries or services for the notified purpose are not usable or are only usable to a much lesser extent, the buyer shall be entitled to refuse acceptance of the defective component or to withdraw from the contract if part-acceptance is economically unreasonable. We shall only be obliged to refund amounts which have been paid to us for the components affected by the aforesaid withdrawal.

11.4 Exclusion of liability for defects

11.4.1 Our liability shall exclude damages which cannot be proved to have been sustained as a result of defective material, defective design or defective workmanship.

11.4.2 Damages shall therefore be excluded for example which were caused by
- improper work of other persons with regard to planning, site preparation, assembly, operation and maintenance;
- plant concepts and designs which do not comply with the latest state of the art;
- non-observance of our guidelines for planning, assembly, commissioning, operations and maintenance;
- force majeure (e.g. thunderstorms).

11.4.3 The following shall be excluded in particular
- corrosion damages (e.g. as a result of aggressive water, unsuitable water treatment, oxygen intakes, emptying the plant over a longer period of time, falling below the dew point, chemical or electrochemical effects, etc.);
- damages caused by air pollution (e.g. the accumulation of intense dust, aggressive vapours, etc.);
- damages caused by unsuitable equipment and fuels;
- damages caused by overcharging, excessive water pressure, scaling, improper electrical connections and inadequate fuse protection.

11.4.4 Components shall also be excluded from the warranty which are subject to natural wear and tear (e.g. burner nozzles, combustion chamber inserts, ignition and monitoring components in contact with fire, fireclay and wall facings, fuses, seals and flexible tubes).

11.5 Commissioning certificate

11.5.1 We hereby draw attention to the due and proper hand-over and - if envisaged - the commissioning certificate in accordance with Section 10.2 as prerequisites for our warranty.

11.6 Deliveries and services of sub-contractors

11.6.1 Our liability for third party products which form a major part of the delivered goods (e.g. warehouse and conveying equipment, burners, measuring and control equipment, electrical components, flue gas and waste water cleaning equipment) shall - if permissible - be limited to an assignment of our claims against the suppliers of the said third party products.

12. Exclusion of further liability

12.1 The buyer shall have no rights and claims for materials, design and workmanship defects or the lack of warranted qualities unless specifically mentioned in Sections 11.1 to 11.6.

12.2 All claims for compensation, reduction in the contract price, rescission of the contract or withdrawal from the contract shall be excluded in particular unless these are specifically mentioned. Under no circumstances shall the buyer have any compensation claim for damages which were not sustained by the delivered goods themselves (e.g. replacement costs, cost for establishing the cause of the damage, expertises, production stoppages, production losses, lost orders, lost profit and other direct or indirect damages). The aforesaid liability exclusion shall not apply in the event of gross negligence on our part.

12.3 The exclusion as per Section 12.2 shall apply for all breaches of contract and all claims of the buyer regardless of why they were lodged from a legal point of view. It shall therefore also apply for a breach of any ancillary obligations (e.g. inadequate advice, etc.).

13. Jurisdiction

13.1 **The place of jurisdiction for the buyer and for us shall be Vaduz.** We shall be entitled to bring action against the buyer at his/its domicile, however.

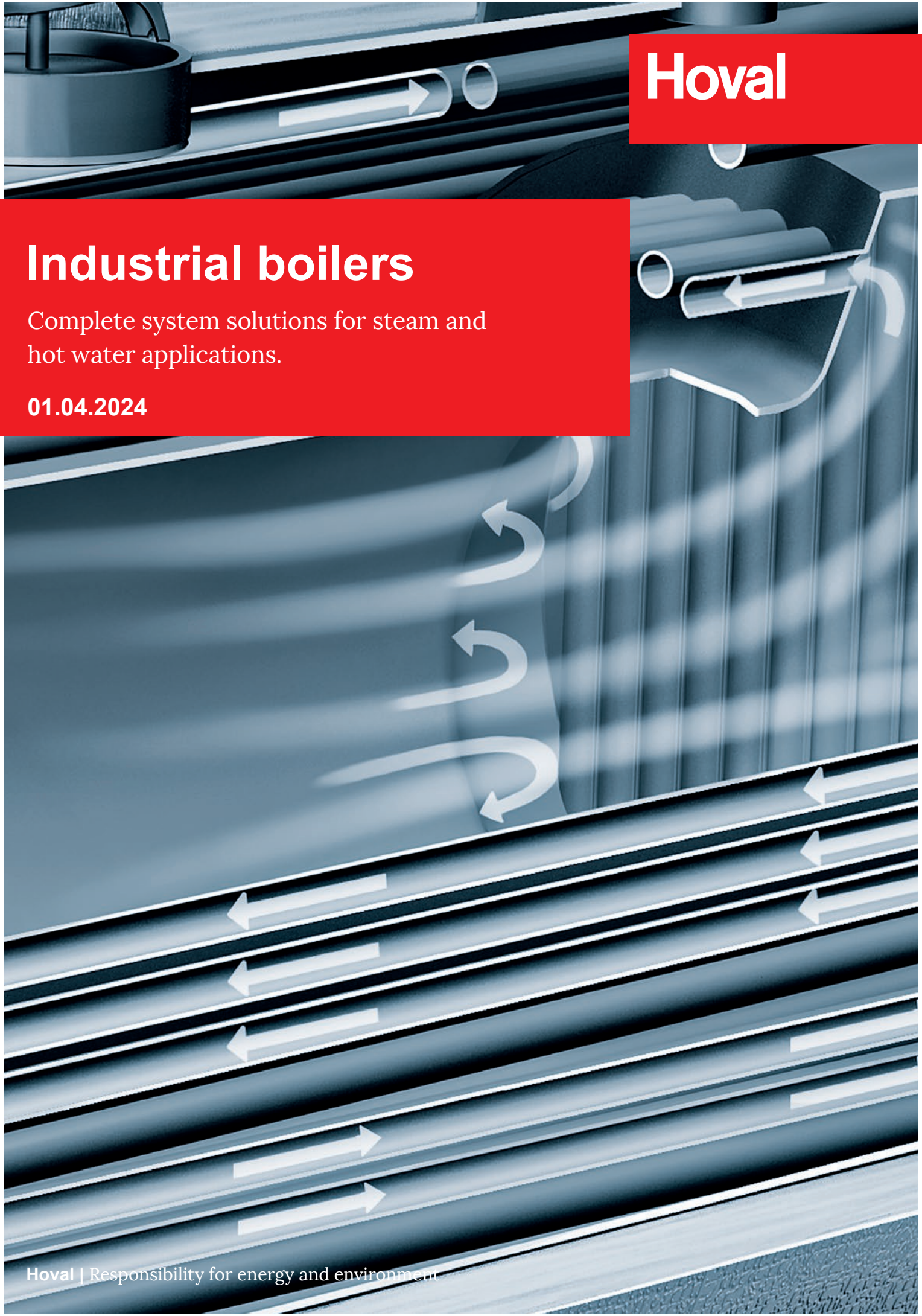
13.2 The legal relationship between the parties shall be governed by the substantive laws of Switzerland. The application of the UN convention on contracts for the international sale of goods (CISG) shall be excluded.

Hoval

Industrial boilers

Complete system solutions for steam and hot water applications.

01.04.2024



Hot water boilers

THW-I NTE

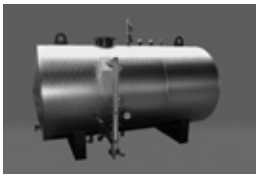
aqua3 E

Steam boilers

THD-U

THSD-I E

Accessories



THW-I NTE

Hoval hot water boiler

The Hoval high output hot water boilers are made of quality steel and are distinguished by their solid, robust and elastic construction. They particularly convince by their easy way of operation, their easy maintenance and optimal efficiency. The client receives an economical, environment friendly compact unit, ready for installation. The boilers are constructed for oil or gas firing.

Boiler type THW-I NTE
The type THW-I NTE classical 3 pass flame tube flue gas tube boiler with an inner fully water cooled flue gas turning chamber guarantees high efficiency. The boiler consists of a cylindric shell, the two head plates, the centric flame tube including the back flue gas turning chamber with water cooled finned tube wall and the two flue gas passes. The boiler door is thermally insulated and flue gas proof for burner mounting. The boiler is completely electrically welded and provided with all required inspection openings.
The spacious designed flame tube with low thermal charges results in an excellent combustion and reduces emissions. The large water content secures an even boiler running time and thus reduces the number of boiler starts.

Admissible max. safety valve pressure/temperature
Standard pressures: 6 and 10 bar.
Higher pressure on request.
Max. operating temperature: 110/120 °C (depending on local regulations).

Thermal insulation
The boiler is fully insulated including flue gas collector with rock wool insulation. The casing is made of structured aluminium plate. Sockets and cuttings are nicely framed.

Connection fittings and sockets
The connection fittings and sockets on the boiler and on the fitting pipe are meant for the attachment of:
flow intermediate piece, thermometer for return, return shut-off, safety valve, drain, vent.

Large equipment

2 boiler supports
1 flue gas collector with integrated flue gas exit backward.
1 back cleaning cover with bleeder valves
1 boiler door for burner mounting, thermally insulated and designed flue gas proof, placed on left and right swivelable hinges for the flue gas sided cleaning of boiler
1 boiler plate

High efficiency
Due to the above technical facts an efficiency of up to 95 % (standard efficiency 75/ 60 °C flow/ return) can be achieved. Thus continuous working costs are kept low. The sources of energy are used more efficiently and Hoval spares the environment.

Construction guiding, quality approval
The boiler is designed with all necessary inspection doors.
The construction and manufacturing of the boilers is done according to the European Pressure Equipment Directive (PED) 2014/68/EU, with CE-Certification; boilers up to 10 MW and 10 bar according to EN 14394. The ISO 9001:2000 certification and the quality approval at our factory with our Hoval quality performance department guarantees the highest product quality. For installation and operation of the boiler the local laws and norms are to be respected.

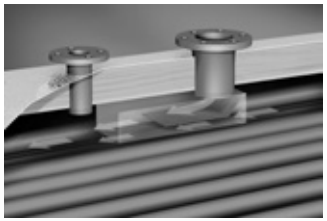
Control panel
The control panel for the Hoval boiler can be equipped with the required control units and indicators for control and supervision of boiler and burner. The operation and alarm reports may be shown as fault indication. The control panel will be made upon customer requirements and depending on the burner to be used.

Boiler water quality
For operation the Hoval and the country specific boiler water regulations have to be respected and local waste water regulations have to be paid attention to. Detailed information for the boiler water quality can be found in the appendix.

Delivery
The pressure body is provided with a primer. Due to transport reasons the insulation can be fixed at the factory. Burner armatures and control panel are either pre-mounted (as far as transport technically possible) or packed loosely in a separate box. The mounting and wiring can be done at the factory or at site. Connection openings are covered.

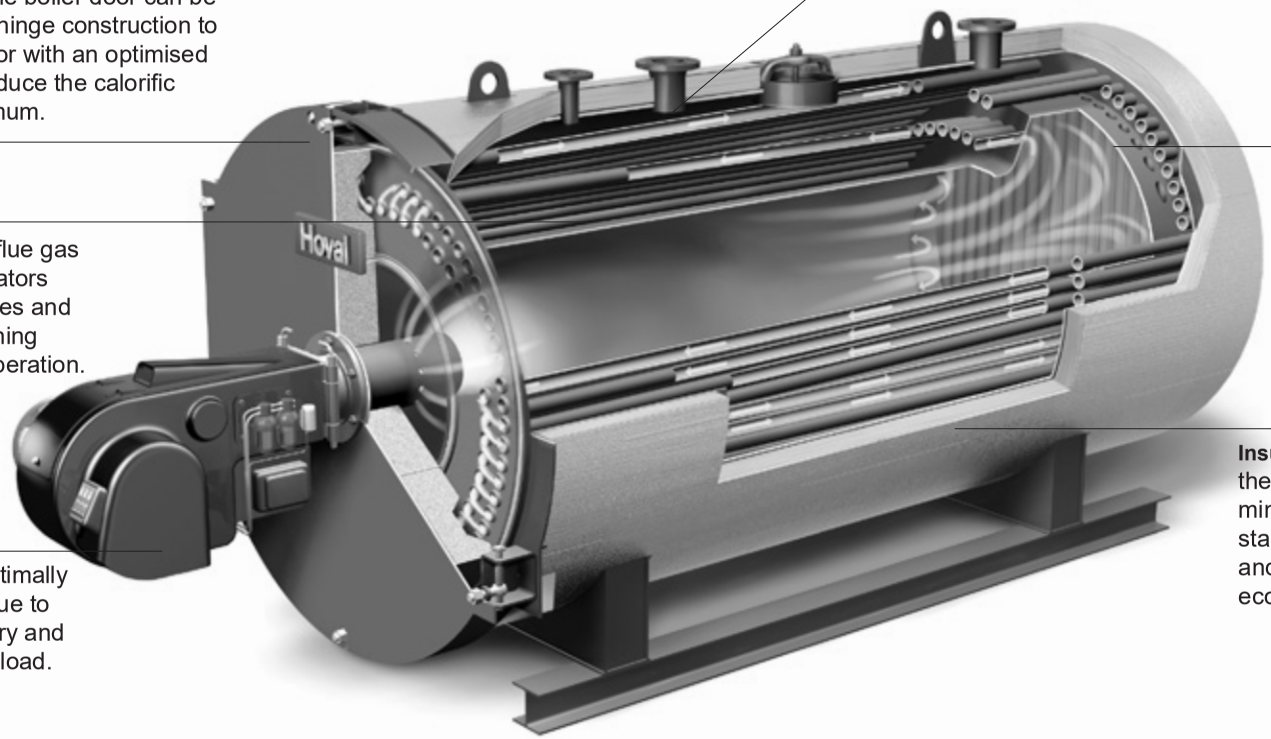
On request
Volt-free contacts for BMS connection (Building Management System)

Sectional view



Return injection: The return water from the heating system is led into the warm area of the boiler. Because of the special return injection the entering water into the boiler will be turned by 90° and accelerated by a baffle plate. By injector effect hot water will be sucked in and will be mixed intensively with the cold water. Thereby the temperature of the return water increases.

Boiler door: Large boiler door provides easy access for cleaning of the combustion chamber to the second and third pass. The boiler door can be easily opened by the special hinge construction to the left or right. The boiler door with an optimised thermal insulation helps to reduce the calorific losses of the boiler to a minimum.



Heating surface: The smooth flue gas flame tube without any turbulators reduces the exhaust gas losses and makes an easy and fast cleaning possible for an economical operation.

Finned tube wall (reverse chamber): Due to the finned tube wall a completely water cooled turning chamber of the first to the second pass secure a maximum utilisation of the heat.

Insulation: A highly effective thermal insulation with aluminium boarding reduces the standby losses to a minimum and contributes to highest economy.

Burner: The boiler can be optimally fitted with LowNOx burners due to combustion chamber geometry and the low combustion chamber load.

THW-I NTE (23/15 - 50/40)

Technical data

Type		(23/15)	(28/20)	(35/25)	(40/30)	(45/35)	(50/40)
• Nominal output (oil and gas)	kW	2300/1500	2800/2000	3300/2500	4000/3000	4500/3500	5000/4000
• Operating temperature max. (SBT) [1]	°C	120	120	120	120	120	120
• Temperature level flow/return	°C	80/60	80/60	80/60	80/60	80/60	80/60
• Safety valve pressure	bar	6	6	6	6	6	6
	bar	10	10	10	10	10	10
• Boiler efficiency at 80/60 °C (natural gas)	%	90.1/92.2	90.4/92.1	90.7/92.3	90.9/92.3	91.1/92.3	91.7/92.7
• Flue gas resistance	mbar	9.0/6.0	9.0/6.0	10.0/7.0	11.0/7.5	11.0/8.0	11.0/8.0
• Water content	l	2800	3500	4500	5000	5500	6500
• Water flow resistance *	mbar	150	200	150	200	250	150
	z-value **	0.0145	0.01305	0.00626	0.00639	0.00631	0.00307
• Flue gas temperature after boiler (natural gas)	°C	226/180	222/184	217/180	213/182	209/182	197/174
• Flue gas temperature after boiler (diesel oil)	°C	216/172	213/177	208/173	204/174	200/175	189/167

[1] Country and equipment specific
* for boiler max. load and $\Delta T = 20$ K
** for other flow rates use “z-value” for water side pressure drop calculation: Δp (mbar) = asked flow rate $(m^3/h)^2 * z$

Dimensions and weights

Type			(23/15)	(28/20)	(35/25)	(40/30)	(45/35)	(50/40)
• Flame tube diameter	6 bar	mm	750	800	850	900	950	1000
	10 bar	mm	750	800	850	900	950	1000
• Flame tube length without turning chamber		mm	2420	2920	3270	3570	3720	4120
• Boiler **length**								
• with insulation, without burner		mm	3430	3930	4280	4580	4730	5330
• Boiler **width** with insulation, without armatures		mm	1770	1870	1970	2020	2070	2170
• Boiler **height** with insulation, with armatures		mm	2600	2800	2900	2950	3000	3250
• Diameter flue gas outlet		mm	450	500	500	550	600	600
• Transport weight **without** burner incl. equipment	6 bar	kg	4000	5300	6000	6600	7300	8400
	10 bar	kg	4500	6000	6900	7600	8200	10000

Fitting pipe

Type		(23/15)	(28/20)	(35/25)	(40/30)	(45/35)	(50/40)
• 1 fitting pipe without insulation (flow intermediate piece) (dimension for ΔT = 20 K)	DN	150	150	150	200	200	200

Boiler basic equipment

Type		(23/15)	(28/20)	(35/25)	(40/30)	(45/35)	(50/40)
• 1 drain ball valve	DN	40	40	40	40	40	40
• 1 ventilation valve (fitting pipe)	DN	½″	½″	½″	½″	½″	½″
• 1 thermometer flow	DN	½″	½″	½″	½″	½″	½″
• 1 thermometer return flow	DN	½″	½″	½″	½″	½″	½″
• 1 safety thermostat	DN	½″	½″	½″	½″	½″	½″
• 1 cleaning set				Brush with rod			

Boiler ancillary equipment

Type		(23/15)	(28/20)	(35/25)	(40/30)	(45/35)	(50/40)
• 1 safety valve 6 bar	DN	50/80	65/100	65/100	65/100	65/100	80/125
• 1 safety valve 10 bar	DN	40/65	50/80	50/80	50/80	65/100	65/100
• 1 temperature switch		R ½″	R ½″	R ½″	R ½″	R ½″	R ½″
• 1 temperature limiter STB		R ½″	R ½″	R ½″	R ½″	R ½″	R ½″
• 1 pressure gauge		R ½″	R ½″	R ½″	R ½″	R ½″	R ½″
• 1 pressure limiter SDB		R ½″	R ½″	R ½″	R ½″	R ½″	R ½″
• 1 low water level indicator (Syr)		R ½″	R ½″	R ½″	R ½″	R ½″	R ½″

Boiler return flow heat up

Type		(23/15)	(28/20)	(35/25)	(40/30)	(45/35)	(50/40)
• 1 pump 120 °C	m^3/h	35	40	45	60	65	75
• 1 thermostat	DN	R ½″	R ½″	R ½″	R ½″	R ½″	R ½″
• 1 non return valve	DN	65	80	80	80	80	100
• 2 non return flaps	DN	65	80	80	80	80	100

1 connection pipe

Type		(23/15)	(28/20)	(35/25)	(40/30)	(45/35)	(50/40)
• 1 connection pipe	DN	65	80	80	80	80	100

Subject to project-related alterations

THW-I NTE (55/45-100/90)

Technical data

Type			(55/45)	(60/50)	(70/60)	(80/70)	(90/80)	(100/90)
• Nominal output (oil and gas)		kW	5500/4500	6000/5000	7000/6000	8000/7000	9000/8000	10000/9000
• Operating temperature max. (SBT) [1]		°C	120	120	120	120	120	120
• Temperature level flow/return		°C	80/60	80/60	80/60	80/60	80/60	80/60
• Safety valve pressure		bar	6	6	6	6	6	6
		bar	10	10	10	10	10	10
• Boiler efficiency at 80/60 °C (natural gas)		%	91.4/92.4	91.4/92.3	91.5/92.3	91.5/92.1	91.5/92.1	91.6/92.1
• Flue gas resistance		mbar	12.0/9.0	13.0/9.5	13.0/10.0	14.0/10.5	14.0/11.0	15.0/12.0
• Water content		l	7000	8000	9000	10000	11500	13000
• Water flow resistance *		mbar	150	150	200	150	200	200
		z-value **	0.00254	0.00213	0.00209	0.00120	0.00126	0.00102
• Flue gas temperature after boiler (natural gas)		°C	202/181	203/184	201/184	202/188	201/188	200/189
• Flue gas temperature after boiler (diesel oil)		°C	194/174	195/177	193/177	195/181	193/181	193/182

[1] Country and equipment specific
* for boiler max. load and $\Delta T = 20$ K
** for other flow rates use “z-value” for water side pressure drop calculation: Δp (mbar) = asked flow rate $(m^3/h)^2$ * z

Dimensions and weights

Type			(55/45)	(60/50)	(70/60)	(80/70)	(90/80)	(100/90)
• Flame tube diameter	6 bar	mm	1025	1050	1100	1150	1200	1250
	10 bar	mm	1025	1050	1100	1150	1200	1250
• Flame tube length without turning chamber		mm	4370	4420	4620	4820	5120	5420
• Boiler **length** with insulation, without burner		mm	5380	5430	5630	5830	6230	6530
• Boiler **width** with insulation, without armatures		mm	2220	2270	2370	2470	2570	2670
• Boiler **height** with insulation, with armatures		mm	3300	3400	3600	3700	3800	3900
• Diameter flue gas outlet		mm	650	650	700	750	750	800
• Transport weight **without** burner incl. equipment	6 bar	kg	9200	10000	11200	12500	14000	16000
	10 bar	kg	10800	12200	13500	15000	17000	18500

Fitting pipe

Type		(55/45)	(60/50)	(70/60)	(80/70)	(90/80)	(100/90)
• 1 fitting pipe without insulation (flow intermediate piece) (dimension for ΔT = 20 K)	DN	200	250	250	250	250	300

Boiler basic equipment

Type		(55/45)	(60/50)	(70/60)	(80/70)	(90/80)	(100/90)
• 1 drain ball valve	DN	40	40	40	40	40	40
• 1 ventilation valve (fitting pipe)	DN	½"	½"	½"	½"	½"	½"
• 1 thermometer flow	DN	½"	½"	½"	½"	½"	½"
• 1 thermometer return flow	DN	½"	½"	½"	½"	½"	½"
• 1 safety thermostat	DN	½"	½"	½"	½"	½"	½"
• 1 cleaning set				Brush with rod			

Boiler basic equipment

Type		(55/45)	(60/50)	(70/60)	(80/70)	(90/80)	(100/90)
• 1 safety valve 6 bar	DN	80/125	80/125	100/150	100/150	100/150	100/150
• 1 safety valve 10 bar	DN	65/100	65/100	80/125	80/125	80/125	80/125
• 1 temperature switch		R ½"	R ½"	R ½"	R ½"	R ½"	R ½"
• 1 temperature limiter STB		R ½"	R ½"	R ½"	R ½"	R ½"	R ½"
• 1 pressure gauge		R ½"	R ½"	R ½"	R ½"	R ½"	R ½"
• 1 pressure limiter SDB		R ½"	R ½"	R ½"	R ½"	R ½"	R ½"
• 1 low water level indicator (Syr)		R ½"	R ½"	R ½"	R ½"	R ½"	R ½"

Boiler return flow heat up

Type		(55/45)	(60/50)	(70/60)	(80/70)	(90/80)	(100/90)
• 1 pump 120 °C	m^3/h	80	85	100	115	130	145
• 1 thermostat	DN	R ½"	R ½"	R ½"	R ½"	R ½"	R ½"
• 1 non return valve	DN	100	100	125	125	125	125
• 2 non return flaps	DN	100	100	125	125	125	125

1 connection pipe

Type		(55/45)	(60/50)	(70/60)	(80/70)	(90/80)	(100/90)
• 1 connection pipe	DN	100	100	125	125	125	125

Subject to project-related alterations

THW-I NTE (120/100)

Technical data

Type			(120/100) [2]
• Nominal output (oil and gas)		kW	12000/10000
• Operating temperature max. (SBT) [1]		°C	120
• Temperature level flow/ return		°C	80/60
• Safety valve pressure		bar	6
		bar	10
• Boiler efficiency at 80/60 °C (natural gas)		%	91.6/92.24
• Flue gas resistance		mbar	15/12
• Water content		l	14000
• Water flow resistance *		mbar	250
		z-value **	0.00089
• Flue gas temperature after boiler (natural gas)		°C	200/187
• Flue gas temperature after boiler (diesel oil)		°C	193/180

[1] Country and equipment specific
[2] According to EN 14394 max. allowed load = 10 MW
* for boiler max. load and ΔT = 20 K
** for other flow rates use “z-value” for water side pressure drop calculation: Δp (mbar) = asked flow rate $(m^3/h)^2$ * z

Dimensions and weights

Type			(120/100)
• Flame tube diameter	6 bar	mm	1300
	10 bar	mm	1300
• Flame tube length without turning chamber		mm	5520
• Boiler **length** with insulation, without burner		mm	6630
• Boiler **width** with insulation, without armatures		mm	2770
• Boiler **height** with insulation, with armatures		mm	4200
• Diameter flue gas outlet		mm	850
• Transport weight **without** burner incl. equipment			
	6 bar	kg	18000
	10 bar	kg	21000

Fitting pipe

Type		(120/100)
• 1 fitting pipe without insulation (flow intermediate piece) dimension for ΔT = 20 K, * dimension for ΔT = 30 K	DN	300

Boiler basic equipment

Type		(120/100)
• 1 drain ball valve	DN	40
• 1 ventilation valve (fitting pipe)	DN	½″
• 1 thermometer flow	DN	½″
• 1 thermometer return flow	DN	½″
• 1 safety thermostat	DN	½″
• 1 cleaning set		Brush with rod

Boiler ancillary equipment

Type		(120/100)
• 1 safety valve 6 bar	DN	125/200
• 1 safety valve 10 bar	DN	100/150
• 1 temperature switch		R ½″
• 1 temperature limiter STB		R ½″
• 1 pressure gauge		R ½″
• 1 pressure limiter SDB		R ½″
• 1 low water level indicator (Syr)		R ½″

Boiler return flow heat up

Type		(120/100)
• 1 pump 120 °C	m^3/h	175
• 1 thermostat	DN	R ½″
• 1 non return valve	DN	150
• 2 non return flaps	DN	150

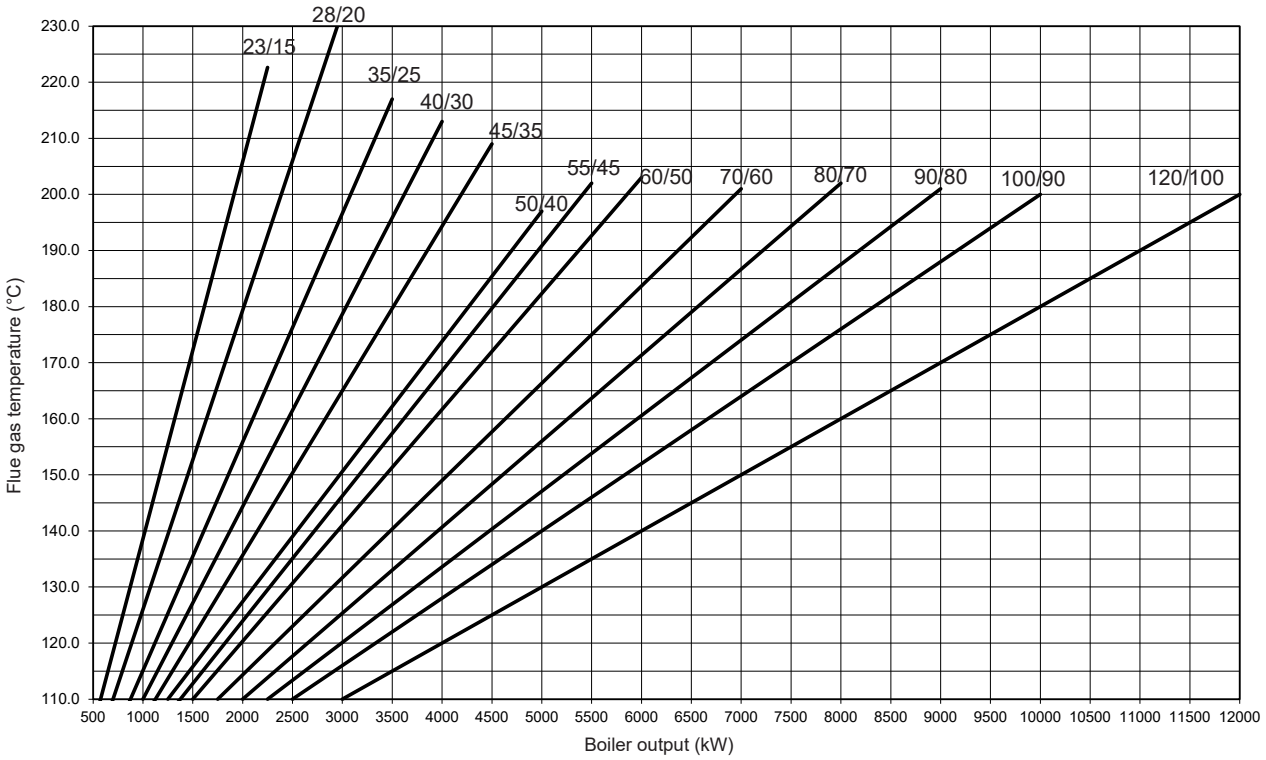
1 connection pipe

Type		(120/100)
• 1 connection pipe	DN	150

Subject to project-related alterations

Flue gas diagram

THW-I NTE

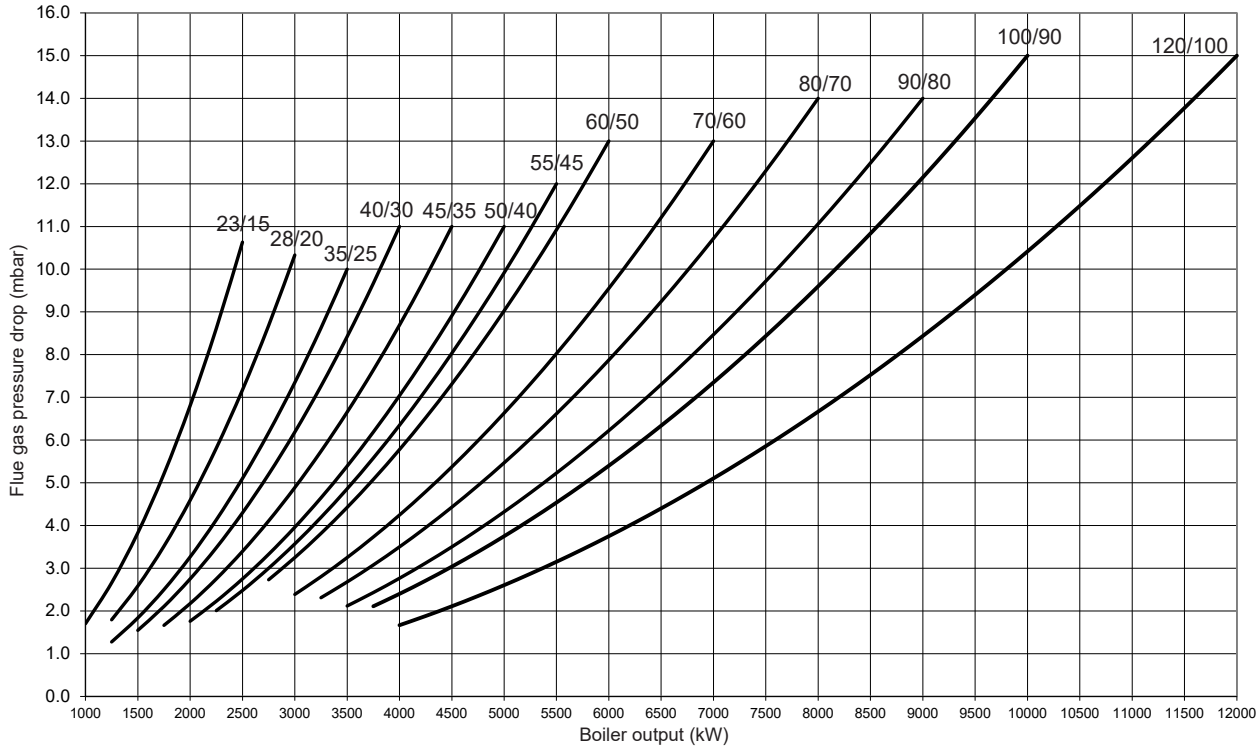


These data represent an average value from measurements with different burner manufacturers.

kW = Boiler output
°C = Flue gas temperature with cleaned heating surface, boiler flow temperature 80 °C, boiler return flow temperature 60 °C

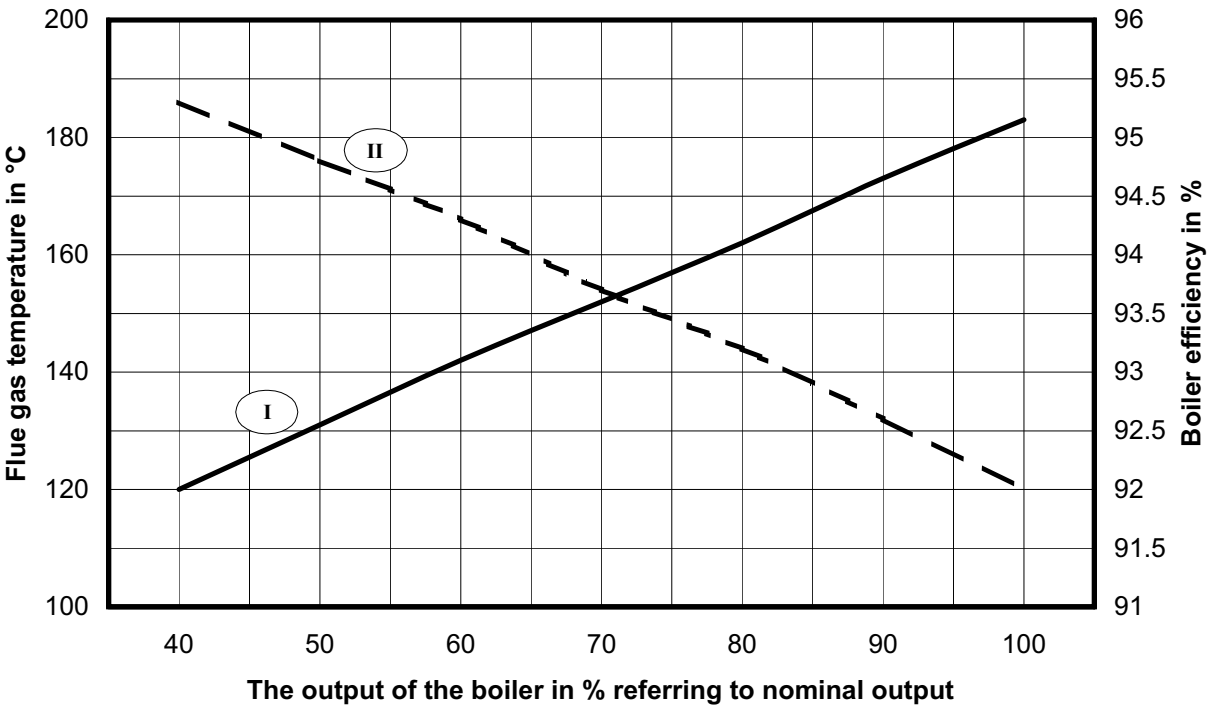
- Operated with natural gas, λ = 1.15 with max. burner output
- A reduction of the boiler water temperature of 10 K causes a reduction of the flue gas temperature by approx. 6-8 K.

Flue gas pressure drop



Flue gas temperature and boiler efficiency

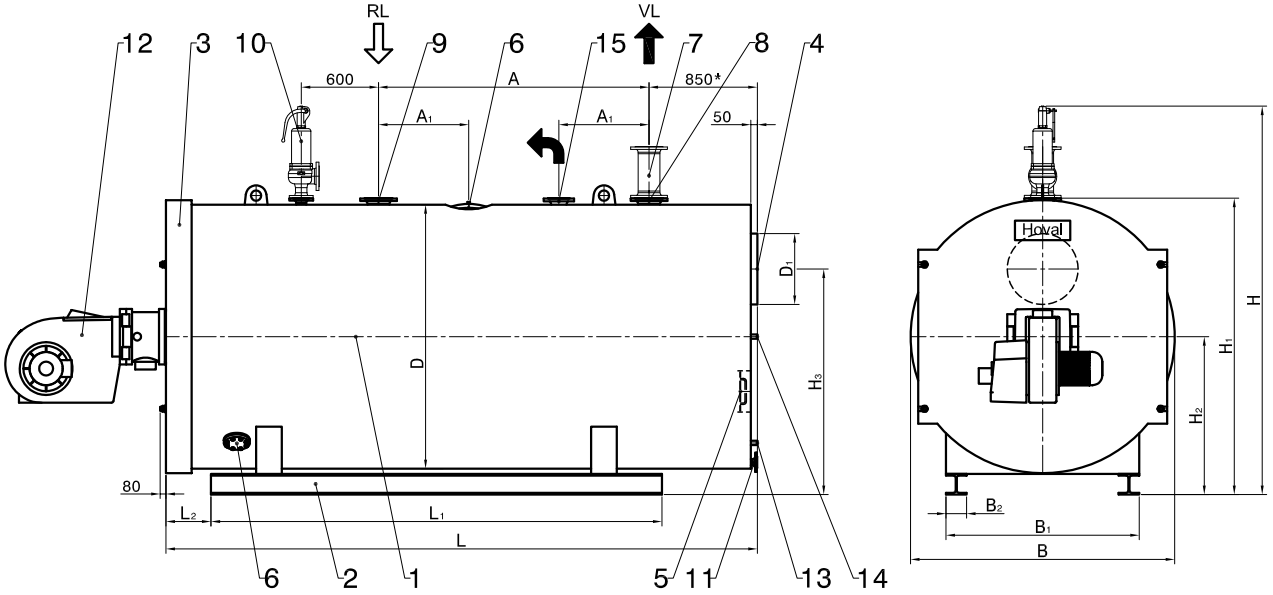
In dependence on the boiler efficiency with a boiler water temperature of 80/60 °C.



I Flue gas temperature in °C

II Boiler efficiency in %

THW-I NTE without economiser - subject to construction-caused alterations



1 Boiler (with flue gas collector)
2 Boiler base
(to THW-I NTE (45/35) with U-girder,
from THW-I NTE (50/40) with I-girder)
3 Hinged door, incl. reversal chamber
2nd/3rd smoke gas pass
4 Flue gas outlet with 1 x ½″ fitting
5 Explosion flap and cleaning opening
6 Inspection opening
7 Fitting pipe PN 16
8 Boiler outlet nozzle
9 Return flow nozzle
10 Safety valve nozzle PN 16
11 Drain nozzle DN 40/PN 16
12 Burner
13 Condensate drain nozzle 1″
14 Flame peephole
15 Admixing nozzle (BS)

Pressure stage 6 or 10 bar (overpressure).
Dimensions for boiler design pressure 10 bar
Safety valve dimensions for boiler design pressure 6 bar
For transport lugs 100 mm to H_1, are to add.

* From boiler size 90/80 upward = 950 mm

Further pressure stages on request!
Dimensions incl. 100 mm insulation.

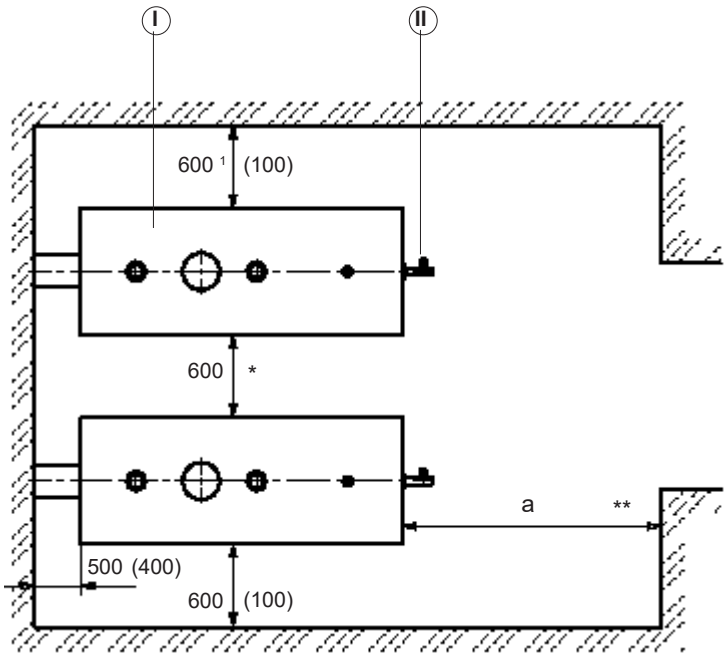
	Main dimensions					Boiler foundation					Transport dim			OL/IL nozzle		Flue gas con.		SV	BS
Boiler type	B Width	L Length	H	H_1	H_2	D	L_1	L_2	B_1	B_2	B_{min}	$H^{3)}_{min}$	A	A_1	DN [1), 2)]	H_3	D_1	DN [1)]	DN [1)]
(23/15)	1770	3430	2600	1960	1000	1700	2650	230	1250	60	2000	2160	1600	600	150	1400	450	50	65
(28/20)	1870	3930	2800	2060	1050	1800	3000	230	1350	60	2100	2260	1800	600	150	1500	500	65	80
(35/25)	1970	4280	2900	2160	1100	1900	3500	230	1400	60	2200	2360	2100	700	150	1550	500	65	80
(40/30)	2020	4580	2950	2210	1125	1950	3500	230	1450	60	2250	2410	2100	700	200	1600	550	65	80
(45/35)	2070	4730	3000	2260	1150	2000	3500	230	1500	60	2300	2460	2100	700	200	1650	600	65	80
(50/40)	2170	5330	3250	2410	1250	2100	4000	350	1550	160	2400	2610	2500	800	200	1750	600	80	100
(55/45)	2220	5380	3300	2460	1325	2150	4000	350	1600	160	2450	2660	2500	800	200	1800	650	80	100
(60/50)	2270	5430	3400	2560	1350	2200	4500	350	1650	160	2500	2760	2500	800	250	1850	650	80	100
(70/60)	2370	5630	3600	2660	1400	2300	4500	350	1700	160	2600	2860	2500	800	250	1900	700	100	125
(80/70)	2470	5930	3700	2760	1450	2400	5000	350	1800	160	2700	2960	3000	900	250	2050	750	100	125
(90/80)	2570	6230	3800	2860	1500	2500	5000	350	1850	160	2800	3060	3000	900	250	2100	750	100	150
(100/90)	2670	6530	3900	2960	1550	2600	5500	350	1950	160	2900	3160	3000	900	300	2200	800	100	150
(120/100)	2770	6630	4200	3060	1600	2700	5500	350	2000	160	3000	3260	3000	900	300	2300	850	125	150

[1)] DN/...PN 16
[2)] Diameter for standard ΔT = 20 K (from THW-I 140/120 NTE upwards ΔT = 30 K), other dimensions on request
[3)] Without fitting pipe

Space requirements

Installation

(Dimensions in mm)



I Boiler
II Burner

* Consider control panel
** Flame tube length (cleaning)
1 600-900, depending on local standards

To facilitate installation and maintenance the given measures should be kept; in case of limited space the minimal spaces (measures in brackets) are sufficient.

Positioning

- No air pollution through halogenated hydrocarbon (contained e.g. in sprays, paints, solvents and cleaners)
- No large amounts of dust
- No high atmospheric humidity
- Frost-resistant and well ventilated

Otherwise errors and damages to the installation may occur.

The boiler may only be installed in rooms where air pollution through halogenated hydrocarbon can occur if sufficient measures are taken ensuring the supply of unpolluted combustion air.

Type	(23/15)	(28/20)	(35/25)	(40/30)	(45/35)	(50/40)	(55/45)	(60/50)
THW-I NTE a (mm)	2900	3400	3750	4050	4200	4600	4850	4900

Type	(70/60)	(80/70)	(90/80)	(100/90)	(120/100)
THW-I NTE a (mm)	5100	5300	5600	5900	6100

Rules and regulations

The following rules and regulations have to be respected:

- Hoval technical information and installation guide.
- hydraulic and control technical regulations, to guarantee the min. admissible boiler temperature and the conditions for a safe operation according to national regulations.
- fire protection regulations
- national regulations concerning permission, installation and operation of boiler appliances. Boiler appliances have to be installed according to national laws and regulations and accessories requirements.
- Besides the national and local regulations the project specific circumstances of the boiler supplier have to be considered for every application.

Water treatment/water quality

- The quality of the boiler water has to be guaranteed according to Hoval technical information and national regulations.
- Hoval boilers must only be operated with treated water. For the treatment of water apply for the values to be kept refer to the Hoval guide lines.
- Requested water quality: see supplement.
- Do not use chemical additives such as anti-freeze, inhibitors, etc. without written confirmation from Hoval.
- Old and new installations must be well flushed before filling.
- The water quality should be monitored and recorded.

Planning, operation and maintenance

- National and local rules and regulations have to be considered for the fuel supply.
- Safety and exhaust valve connections must be able to discharge the system pressure without any risk.
- Filters and strainers have to be cleaned periodically, especially if installed in front of control devices.
- The components containing heat and the pipes are to be insulated in order to reduce radiation losses.

Combustion air

- The supply of combustion air must be guaranteed for a safe and economic operation. There must be no possibility to close the air supply opening.
- Aeration and ventilation of the boiler house has to be secured.
- In the installation room no negative pressure larger than 3 N/m^2 is allowed. To adhere to this demand, plan a cross free section for the air supply opening of at least 200 cm^2, resp. 2 cm^2 per kW output. The aspect ratio for rectangular openings should not be more than 1.5 : 1.
  If the opening is trellised an adequate surcharge is needed. National laws have to be respected.
- Boilers are not to be installed in rooms where halogen compounds occur which can enter the combustion air. (e.g. laundries, drying, etc.).

Noise level reduction

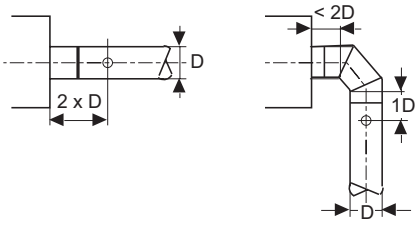
The following measures for noise level reduction are possible:

- Solid construction of heating room walls, ceiling and floor, installation of silencer in fresh air supply, noise insulation for support and bracket of pipes.
- Installation of sound attenuation cowl for burner.
- A substantial part of the sound caused in the combustion chamber and in the top heating surfaces is radiated from the flu gas system as sound transmitted by air. In addition to this, resonance features, depending on chimney dimensioning and inlet, may occur which are triggered by the oscillation of the combustion noises (snooping). These sounds can be reduced by burner-lateral measures, e.g. changes of flame geometry, atomisation characteristics or fuel throughput.
- Flue gas sound absorbers cause a substantial sound level reduction as well. These sound absorbers should usually be tuned at low frequencies of 60-250 Hz. Flue gas sound absorbers function according to the principle of sound absorption. The kinetic energy of the exhaust gases is consumed by friction requiring an increase in chimney draft in the flue gas system. This has to be considered for burner dimensioning. The connection piece form the boiler to the flue gas sound absorber has to be gas-tight because the draft- and pressure-zero point is behind the flue gas sound absorber.
- The necessary space requirement of approx. 2 m for the later installation of a flue gas sound absorber should already be included when planning.

Chimney/flue gas system

Flue gas line

- The flue gas connection pipe between the boiler and the vertical part of the flue gas line should be routed into the vertical part with a 30-45° incline.
- Thermal insulation is required with a length of more than 1 m
- The insertion of the connection tube into the chimney must be carried out in such a way that no condensate can flow into the boiler
- A closable flue gas test port with a circular internal diameter of between 10-21 mm must be installed in the connection tube. The port must protrude beyond the thermal insulation



Flue gas system

- The flue gas system must be humidity-insensitive and acid-proof and admitted for flue gas temperatures up to > 200 °C.
- For existing flue gas systems the restoration must be carried out according to the instructions of the chimney constructor.
- Calculation of the chimney section based on EN 13384 and EN 1443.
- Planning a bypass air flap as a chimney limitation is recommended.

Start-up condensate from the boiler

- When commissioning a cold boiler, condensate always occurs within the boiler. This collects in the lower area of the boiler (flue gas collector) and is then evaporated through the boiler's continued heating up.
- The boiler should therefore – due also to this reason – only be started up without "network acceptance", so that the condensation temperature threshold (approx. 55 °C) is exceeded as quickly as possible
- If necessary, the condensate which occurs can be drained via the flue gas collector's cleaning fitting (remove cap on the drain connection before starting the burner, connect ball valve and temperature-resistant drain hose).

Remarks

- When draining the condensate, it must be ensured that no uncontrolled escape of flue gas occurs in the installation room (do not keep the ball valve open "constantly", but only drain off the condensate "intermittently").
- The locally valid waste water regulations must be observed when disposing of the condensate!

- As soon as the boiler has reached its minimum temperature and this can be kept stable via the return boost, the burner should be shut off briefly and the closure cap mounted on the cleaning drain connection again.
- The drain connection on the boiler's flue gas collector is not intended for the permanent connection of a drainage line – frequent condensation in the area of the boiler is impermissible!

Boiler water specifications

Guiding lines for boiler water and system water specifications for pump circulation boilers (large water room boiler)

Operating pressure	bar	> 0.5 ≤ 25
General requirements		colourless, clear, free from suspended matter and foam
pH value at 25 °C		9.0-11.5
Sum of earth alkalies (Ca + Mg) [1]	mmol/l °dH	< 0.02 < 0.112
Conductivity at 25 °C [4]	µS/cm	< 1500
Acid capacity KS 8.2 [2] (p-value)	mmol/l	1-5
Silicic acid (SiO_2)	mg/l	< 100
Phosphate (P_2O_4) [3]	mg/l	10-30
Sodium sulphite (Na_2SO_3) [3]	mg/l	5-10
Iron (Fe)	mg/l	< 0.2
Copper (Cu)	mg/l	< 0.1
Oil/fat	mg/l	< 1.0
Oxygen (O_2)	mg/l	< 0.02

[1] Noted in the past as °dH, changing factor: 1 mmol/l = 5.6 °dH (German hardness)
[2] Noted in the past as p-value, changing factor: KS 8.2 = 1 according p-value = 1
[3] Measuring only necessary if dosing chemicals are used which contains these values.
[4] For level electrodes minimum conductivity > 5 µS/cm

It is not necessary to make continuous control of following parameters: silicic acid (SiO_2)

Important notice
Hoval recommends that a water treatment specialist is employed to carry out routine monitoring of the supply water in order to ensure it remains within specification.

aqua3 E

Hoval hot water boiler

The Hoval high output hot water boilers are made of quality steel and are distinguished by their solid, robust and elastic construction. They particularly convince by their easy way of operation, their easy maintenance and optimal efficiency. The client receives an economical, environment friendly compact unit, ready for installation. The boilers are constructed for oil or gas firing.

Boiler type aqua3 E

The type aqua3 E as classical 3 pass flame tube flue gas tube boiler with an inner fully water cooled flue gas turning chamber guarantees high efficiency. The boiler consists of a cylindric shell, the two head plates, the centric flame tube including the back flue gas turning chamber with water cooled finned tube wall and the two flue gas passes. The boiler door is thermally insulated and flue gas proof for burner mounting. The boiler is completely electrically welded and provided with all required inspection openings.
The spacious designed flame tube with low thermal charges results in an excellent combustion and reduces emissions. The large water content secures an even boiler running time and thus reduces the number of boiler starts.

Admissible max. safety valve pressure/temperature

Standard pressures: 10, 13 and 16 bar.
Higher pressure on request.
Max. temperature up to 210 °C.

Thermal insulation

The boiler is fully insulated including flue gas collector with rock wool insulation. The casing is made of structured aluminium plate. Sockets and cuttings are nicely framed.

Connection fittings and sockets

The connection fittings and sockets on the boiler and on the fitting pipe are meant for the attachment of:
Flow intermediate piece, Thermometer for return, return shut-off, safety valve, drain.

Large equipment

2 boiler supports
1 flue gas collector with integrated flue gas exit backward
1 back cleaning cover with bleeder valves
1 boiler door for burner mounting, thermally insulated and designed flue gas proof, placed on left and right swivelable hinges for the flue gas sided cleaning of boiler
1 boiler plate

High efficiency

Due to the above technical facts an efficiency of up to > 91 % (120 °C middle temperature, flow/return) can be achieved. Thus continuous working costs are kept low. The sources of energy are used more efficiently and Hoval protects the environment.

Construction guiding, quality approval

The boiler is designed with all necessary inspection doors.
The construction and manufacturing of the boilers is done according to the European Pressure Equipment Directive (PED) 2014/68/EU - EN 12953 with CE-certificate. The ISO 9001:2000 certification and the quality approval at our factory with our Hoval quality performance department guarantees the highest product quality. For installation and operation of the boiler the local laws and norms are to be respected.

Control panel

The control panel for the Hoval boiler can be equipped with the required control units and indicators for control and supervision of boiler and burner. The operation and alarm reports may be shown as fault indication. The control panel will be made upon customer requirements and depending on the burner to be used.

Boiler water quality

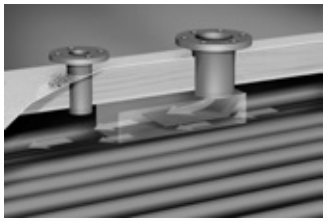
For operation the Hoval and the country specific boiler water regulations have to be respected and local waste water regulations have to be paid attention to. Detailed information for the boiler water quality can be found in the appendix.

Delivery

The pressure body is provided with a primer. Due to transport reasons the insulation can be fixed at the factory. Burner armatures and control panel are either pre-mounted (as far as transport technically possible) or packed loosely in a separate box. The mounting and wiring can be done at the factory or at site. Connection openings are covered.

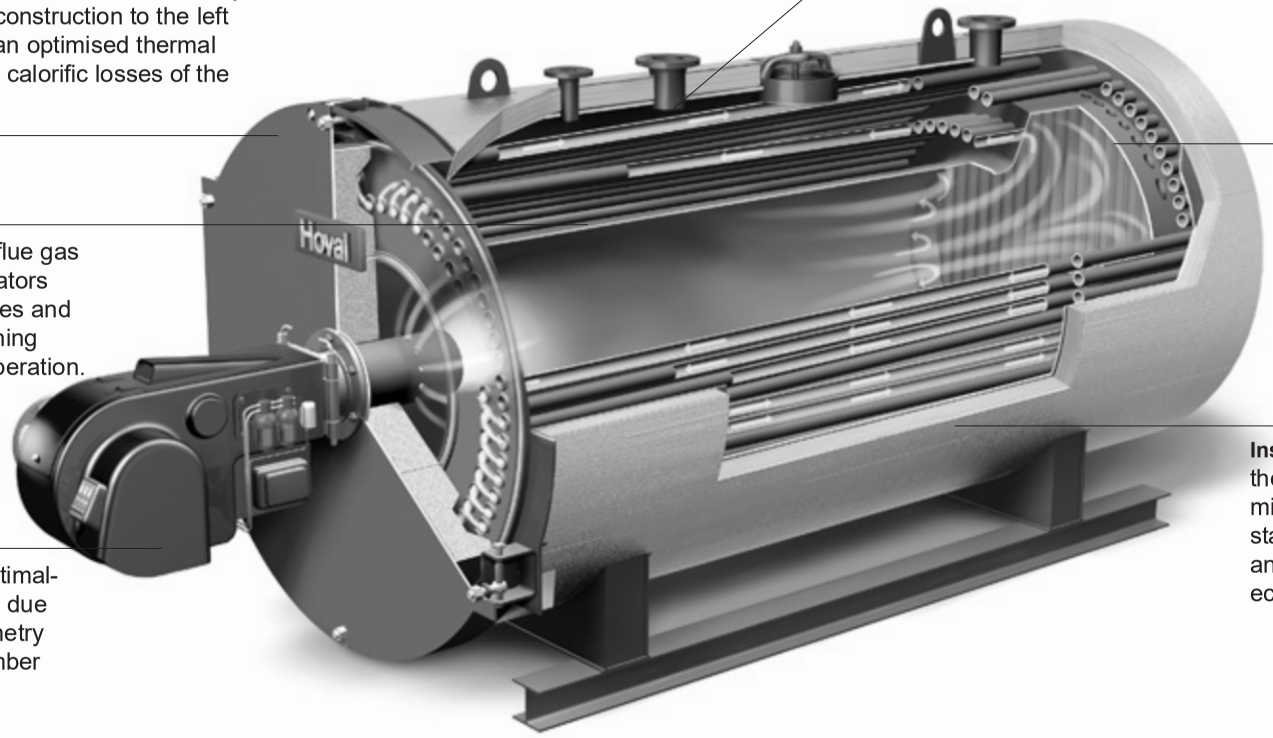
On request

Volt-free contacts for BMS connection (Building Management System).



Return injection: The return water from the heating system is led into the warm area of the boiler. Because of the special return injection the entering water into the boiler will be turned by 90° and accelerated by a baffle plate. By injector effect hot water will be sucked in and will be mixed intensively with the cold water. Thereby the temperature of the return water increases.

Boiler door: Large boiler door provides easy access for cleaning of the combustion chamber to the second and third pass. The boiler door can be easily opened by the special hinge construction to the left or right. The boiler door with an optimised thermal insulation helps to reduce the calorific losses of the boiler to a minimum.



Heating surface: The smooth flue gas flame tube without any turbulators reduces the exhaust gas losses and makes an easy and fast cleaning possible for an economical operation.

Finned tube wall (reverse chamber): Due to the finned tube wall a completely water cooled turning chamber of the first to the second pass secure a maximum utilisation of the heat.

Insulation: A highly effective thermal insulation with aluminium boarding reduces the standby losses to a minimum and contributes to highest economy.

Burner: The boiler can be optimally fitted with LowNOx burners due to combustion chamber geometry and the low combustion chamber load.

aqua3 E (1000-6000)

Technical data

Type		(1000)	(2000)	(3000)	(4000)	(5000)	(6000)
• Nominal output (oil firing)	kW	1000	2000	3000	4000	5000	6000
• Nominal output (gas firing)	kW	1000	2000	3000	4000	5000	6000
• Operating temperature max. (SBT) [1)]				depending on net pressure			
• Temperature level flow/return				depending on net pressure			
• Safety valve pressure	bar	10	10	10	10	10	10
	bar	13	13	13	13	13	13
	bar	16	16	16	16	16	16
• Boiler efficiency at 120 °C (natural gas) *	%	89.2	89.6	89.7	89.6	89.4	89.5
• Boiler efficiency at 120 °C (diesel oil) *	%	89.9	90.3	90.3	90.2	90.1	90.2
• Flue gas resistance	mbar	8.0	9.0	10.0	11.0	11.0	11.0
at max. boiler load of	kW	1000	2000	3000	4000	5000	6000
• Water content	l	2150	4000	5810	6890	8310	10020
• Water flow resistance **	mbar	95	65	72	52	80	110
	z-value ***	0.05264	0.00901	0.00406	0.00181	0.00178	0.00170
• Flue gas temperature after boiler (natural gas)	°C	246	240	241	244	248	247
• Flue gas temperature after boiler (diesel oil)	°C	235	230	231	234	238	237

[1)] Country and equipment specific
* Efficiency for boiler middle temperature
** For boiler max. load and $\Delta T = 20$ K
*** For other flow rates use “z-value” for water side pressure drop calculation: Δp (mbar) = asked flow rate $(m^3/h)^2 * z$

Dimensions and weights

Type			(1000)	(2000)	(3000)	(4000)	(5000)	(6000)
• Flame tube diameter	10 bar	mm	600	740	860	920	980	1050
	13 bar	mm	600	740	860	920	980	1050
	16 bar	mm	600	740	860	920	980/1080	1050/1200
• Flame tube length without turning chamber		mm	1764	2606	3206	3610	4056	4306
• Boiler **length** with insulation, without burner		mm	2830	3680	4280	4680	5130	5480
• Boiler **width** with insulation, without armatures		mm	1660	1910	2110	2210	2310	2460
• Boiler **height** with insulation, without assembly tube		mm	1800	2050	2250	2450	2550	2700
• Diameter flue gas outlet		mm	300	450	500	600	650	750
• Transport weight **without** burner incl. equipment								
	10 bar	kg	3500	5000	7500	9200	11100	13300
	13 bar	kg	3800	5500	8300	10000	11400	14300
	16 bar	kg	4100	6000	8800	10800	12500	15200

Assembly tube

Type		(1000)	(2000)	(3000)	(4000)	(5000)	(6000)
• 1 assembly tube without insulation (flow intermediate piece) (dimensions for ΔT = 20 K)	DN	80	125	150	200	200	200

Boiler basic equipment

Type		(1000)	(2000)	(3000)	(4000)	(5000)	(6000)
• 1 drain ball valve	DN	40	40	40	40	40	40
• 1 ventilation valve (assembly tube)	DN	½"	½"	½"	½"	½"	½"
• 1 thermometer flow	DN	½"	½"	½"	½"	½"	½"
• 1 thermometer return flow	DN	½"	½"	½"	½"	½"	½"
• 1 safety thermostat	DN	½"	½"	½"	½"	½"	½"
• 1 cleaning set				Brush with rod			

Boiler basic equipment

Type		(1000)	(2000)	(3000)	(4000)	(5000)	(6000)
• 1 safety valve 10 bar	DN	25/40	40/65	50/80	50/80	65/100	65/100
• 1 safety valve 13 bar	DN	25/40	32/50	40/65	50/80	65/100	65/100
• 1 safety valve 16 bar	DN	25/40	32/50	40/65	50/80	50/80	65/100

Flow/return flow shut off armature

Type		(1000)	(2000)	(3000)	(4000)	(5000)	(6000)
• Shut-off flap	DN	80	125	150	200	200	200

Boiler equipment according to TRD 604 - EN 12953-6

Type		(1000)	(2000)	(3000)	(4000)	(5000)	(6000)
• 2 safety temperature controls	DN	R ½"	R ½"	R ½"	R ½"	R ½"	R ½"
• 1 return flow temperature control	DN	R ½"	R ½"	R ½"	R ½"	R ½"	R ½"
• 1 pressure gauge	DN	R ½"	R ½"	R ½"	R ½"	R ½"	R ½"
• 2 safety pressure controls	DN	R ½"	R ½"	R ½"	R ½"	R ½"	R ½"
• 1 pressure min. control	DN	R ½"	R ½"	R ½"	R ½"	R ½"	R ½"
• 1 water level limiter	DN	R ½"	R ½"	R ½"	R ½"	R ½"	R ½"
• 1 min. flow control switch	DN	50	50	50	50	50	50

Boiler return flow heat up

Type		(1000)	(2000)	(3000)	(4000)	(5000)	(6000)
• 1 pump 140 °C	m^3/h	14	35	50	65	80	90
• 1 thermostat	DN	R ½"	R ½"	R ½"	R ½"	R ½"	R ½"
• 1 non return valve	DN	40	80	80	80	80	100
• 2 shut-off flaps	DN	40	80	80	80	80	100
• 1 pump 180 °C	m^3/h	14	35	50	65	80	90
• 1 thermostat	DN	R ½"	R ½"	R ½"	R ½"	R ½"	R ½"
• 1 non return valve	DN	65	80	80	80	80	100
• 2 shut-off flaps	DN	65	80	80	80	80	100

Subject to project-related alterations

aqua3 E (8000-16500)

Technical data

Type			(8000)	10000)	(12000)	(15000)	(16500)
• Nominal output (oil firing)		kW	7930	9400	12000	12730	12810
• Nominal output (gas firing)		kW	8000	10000	12000	15000	16380
• Operating temperature max. (SBT) [1)]					depending on net pressure		
• Temperature level flow/return					depending on net pressure		
• Safety valve pressure		bar	10	10	10	10	10
		bar	13	13	13	13	13
		bar	16	16	16	16	16
• Boiler efficiency at 120 °C (natural gas) *		%	89.4	89.5	89.1	89.6	89.9
• Boiler efficiency at 120 °C (diesel oil) *		%	90.1	90.4	89.8	90.8	91.4
• Flue gas resistance		mbar	12.0	11.0	14.0	15.0	14.0
at max. boiler load of		kW	8000	10000	12000	15000	16380
• Water content		l	12970	15870	20780	26920	32350
• Water flow resistance **		mbar	80	120	85	135	120
		z-value ***	0.00070	0.00067	0.00033	0.00033	0.00022
• Flue gas temperature after boiler (natural gas)		°C	250	249	259	248	240
• Flue gas temperature after boiler (diesel oil)		°C	240	234	248	223	210

[1)] Country and equipment specific
* Efficiency for boiler middle temperature
** At boiler max. load and Δ T = 20 K
*** For other flow rates use “z-value” for water side pressure drop calculation: Δp (mbar) = asked flow rate ($m^3/h)^2$ * z

Dimensions and weights

Type			(8000)	(10000)	(12000)	(15000)	(16500)
• Flame tube diameter	10 bar	mm	1170	1280	1400/1550	1550/1700	1620/1770
	13 bar	mm	1170/1320	1280/1430	1400/1550	1550/1700	1620/1770
	16 bar	mm	1170/1320	1280/1430	1400/1550	1550/1700	1620/1770
• Flame tube length without turning chamber		mm	4680	5130	5830	6130	6430
• Boiler **length** with insulation, without burner		mm	5830	6330	7030	7365	7665
• Boiler **width** with insulation, without armatures		mm	2660	2860	3060	3360	3560
• Boiler **height** with insulation, without assembly tube		mm	2900	3150	3350	3650	3900
• Diameter flue gas outlet		mm	850	950	1050	1150	1200
• Transport weight **without** burner incl. equipment							
	10 bar	kg	17800	20500	23000	26500	31000
	13 bar	kg	19000	22000	24500	28000	33000
	16 bar	kg	20500	23500	26700	32000	35000

Assembly tube

Type		(8000)	(10000)	(12000)	(15000)	(16500)
• 1 assembly tube without insulation (flow intermediate piece) (dimensions for ΔT = 20 K)	DN	250	250	300	300	350

Boiler basic equipment

Type		(8000)	(10000)	(12000)	(15000)	(16500)
• 1 drain ball valve	DN	40	40	40	40	40
• 1 ventilation valve (assembly tube)	DN	½"	½"	½"	½"	½"
• 1 thermometer flow	DN	½"	½"	½"	½"	½"
• 1 thermometer return flow	DN	½"	½"	½"	½"	½"
• 1 safety thermostat	DN	½"	½"	½"	½"	½"
• 1 cleaning set				Brush with rod		

Safety valve

Type		(8000)	(10000)	(12000)	(15000)	(16500)
• 1 safety valve 10 bar	DN	80/125	80/125	100/150	100/150	125/200
• 1 safety valve 13 bar	DN	65/100	80/125	80/125	100/150	100/150
• 1 safety valve 16 bar	DN	65/100	65/100	80/125	80/125	100/150

Flow/return flow shut-off armature

Type		(8000)	(10000)	(12000)	(15000)	(16500)
• Shut-off flap	DN	250	250	300	300	350

Boiler equipment according to TRD 604 - EN 12953-6

Type		(8000)	(10000)	(12000)	(15000)	(16500)
• 2 safety temperature controls STB	DN	R ½"	R ½"	R ½"	R ½"	R ½"
• 1 return flow temperature control	DN	R ½"	R ½"	R ½"	R ½"	R ½"
• 1 pressure gauge	DN	R ½"	R ½"	R ½"	R ½"	R ½"
• 2 safety pressure controls	DN	R ½"	R ½"	R ½"	R ½"	R ½"
• 1 pressure min. control	DN	R ½"	R ½"	R ½"	R ½"	R ½"
• 1 water level limiter	DN	R ½"	R ½"	R ½"	R ½"	R ½"
• 1 min. flow control switch	DN	50	50	50	50	50

Boiler return flow heat up

Type		(8000)	(10000)	(12000)	(15000)	(16500)
• 1 pump 140 °C	m^3/h	120	150	175	230	260
• 1 thermostat	DN	R ½"	R ½"	R ½"	R ½"	R ½"
• 1 non return valve	DN	125	150	150	200	200
• 2 shut-off flaps	DN	125	150	150	200	200
• 1 pump 180 °C	m^3/h	120	150	175	230	260
• 1 thermostat	DN	R ½"	R ½"	R ½"	R ½"	R ½"
• 1 non return valve	DN	125	150	150	200	200
• 2 shut-off flaps	DN	125	150	150	200	200

Subject to project-related alterations

aqua3 E (18000-20000)

Technical data

Type			(18000)	(20000)
• Nominal output (oil firing)		kW	17980	19580
• Nominal output (gas firing)		kW	18000	20000
• Operating temperature max. (SBT) [1]			depending on net pressure	
• Temperature level flow/return			depending on net pressure	
• Safety valve pressure		bar	10	10
		bar	13	13
		bar	16	16
• Boiler efficiency at 120 °C (natural gas) *		%	90.2	90.9
• Boiler efficiency at 120 °C (diesel oil) *		%	91.0	91.5
• Flue gas resistance		mbar	15.0	15.0
at max. boiler load of		kW	18000	19580
• Water content		l	35140	38250
• Water flow resistance **		mbar	80	100
		z-value ***	0.00014	0.00014
• Flue gas temperature after boiler (natural gas)		°C	235	220
• Flue gas temperature after boiler (diesel oil)		°C	226	211

[1] Country and equipment specific
* Efficiency for boiler middle temperature
** At boiler max. load and $\Delta T = 20$ K
*** For other flow rates use “z-value” for water side pressure drop calculation: Δp (mbar) = asked flow rate $(m^3/h)^2 * z$

Dimensions and weights

Type			(18000)	(20000)
• Flame tube diameter	10 bar	mm	1700/1850	1770/1920
	13 bar	mm	1700/1850	1770/1920
	16 bar	mm	1700/1850	1770/1920
• Flame tube length without turning chamber		mm	6680	7080
• Boiler **length** with insulation, without burner		mm	7915	8315
• Boiler **width** with insulation, without armatures		mm	3660	3760
• Boiler **height** with insulation, without assembly tube		mm	4050	4200
• Diameter flue gas outlet		mm	1250	1300
• Transport weight **without** burner incl. equipment				
	10 bar	kg	35000	40000
	13 bar	kg	38500	43000
	16 bar	kg	42000	46000

Assembly tube

Type		(18000)	(20000)
• 1 assembly tube without insulation (flow intermediate piece) (dimensions for ΔT = 20 K)	DN	400	400

Boiler basic equipment

Type		(18000)	(20000)
• 1 drain ball valve	DN	40	40
• 1 ventilation valve (assembly tube)	DN	½″	½″
• 1 thermometer flow	DN	½″	½″
• 1 thermometer return	DN	½″	½″
• 1 safety thermostat	DN	½″	½″
• 1 cleaning set		Brush with rod	

Safety valve

Type		(18000)	(20000)
• 1 safety valve 10 bar	DN	125/200	125/200
• 1 safety valve 13 bar	DN	100/150	125/200
• 1 safety valve 16 bar	DN	100/150	100/150

Flow/return flow shut-off armature

Type		(18000)	(20000)
• Shut-off flap	DN	400	400

Boiler equipment according to TRD 604 - EN 12953-6

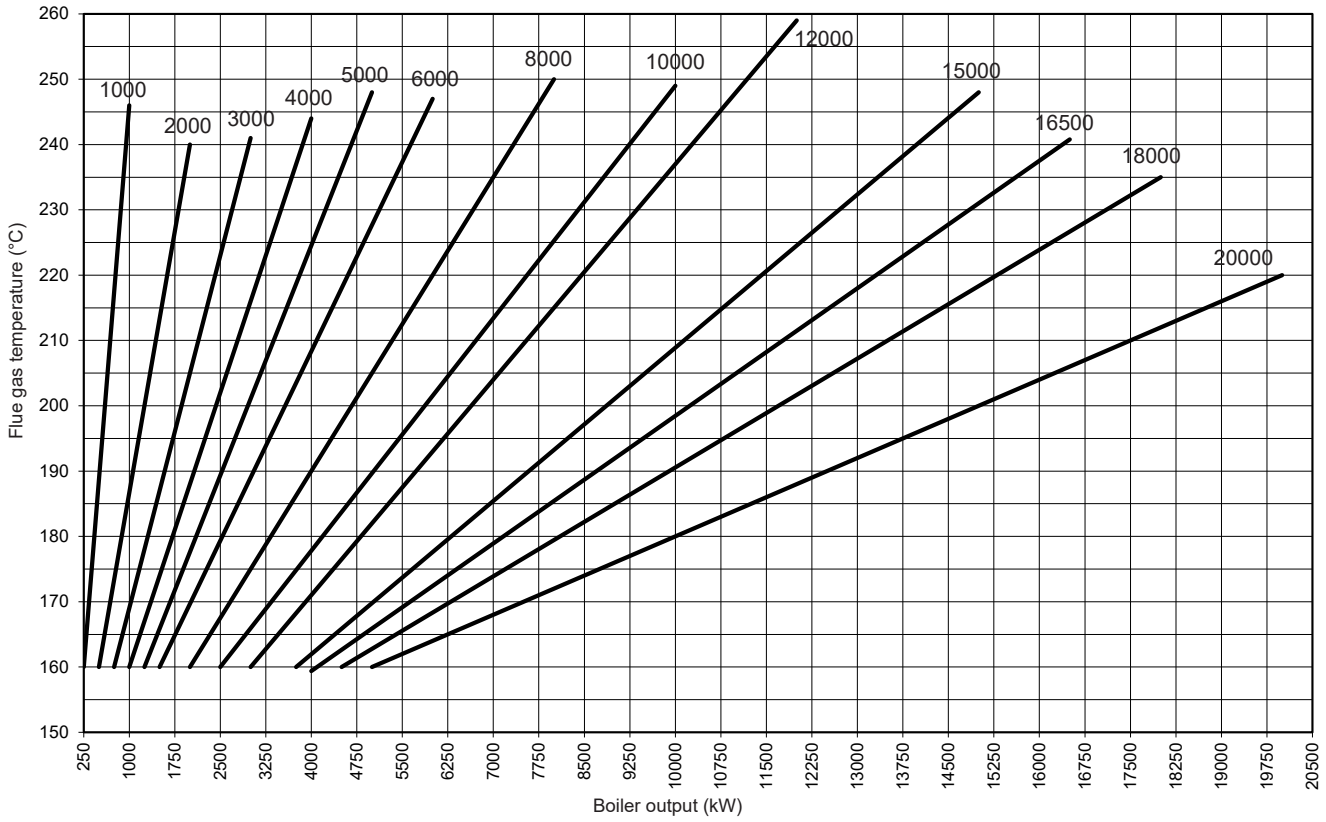
Type		(18000)	(20000)
• 2 safety temperature controls	DN	R ½″	R ½″
• 1 return flow temperature control	DN	R ½″	R ½″
• 1 pressure gauge	DN	R ½″	R ½″
• 2 safety pressure controls	DN	R ½″	R ½″
• 1 pressure min. control	DN	R ½″	R ½″
• 1 water level limiter	DN	R ½″	R ½″
• 1 min. flow control switch	DN	50	50

Boiler return flow heat up

Type		(18000)	(20000)
• 1 pump 140 °C	m^3/h	290	320
• 1 thermostat	DN	R ½″	R ½″
• 1 non return valve	DN	200	200
• 2 shut-off flaps	DN	200	200
• 1 pump 180 °C	m^3/h	290	320
• 1 thermostat	DN	R ½″	R ½″
• 1 non return valve	DN	200	200
• 2 shut-off flaps	DN	200	200

Subject to project-related alterations

Flue gas diagram

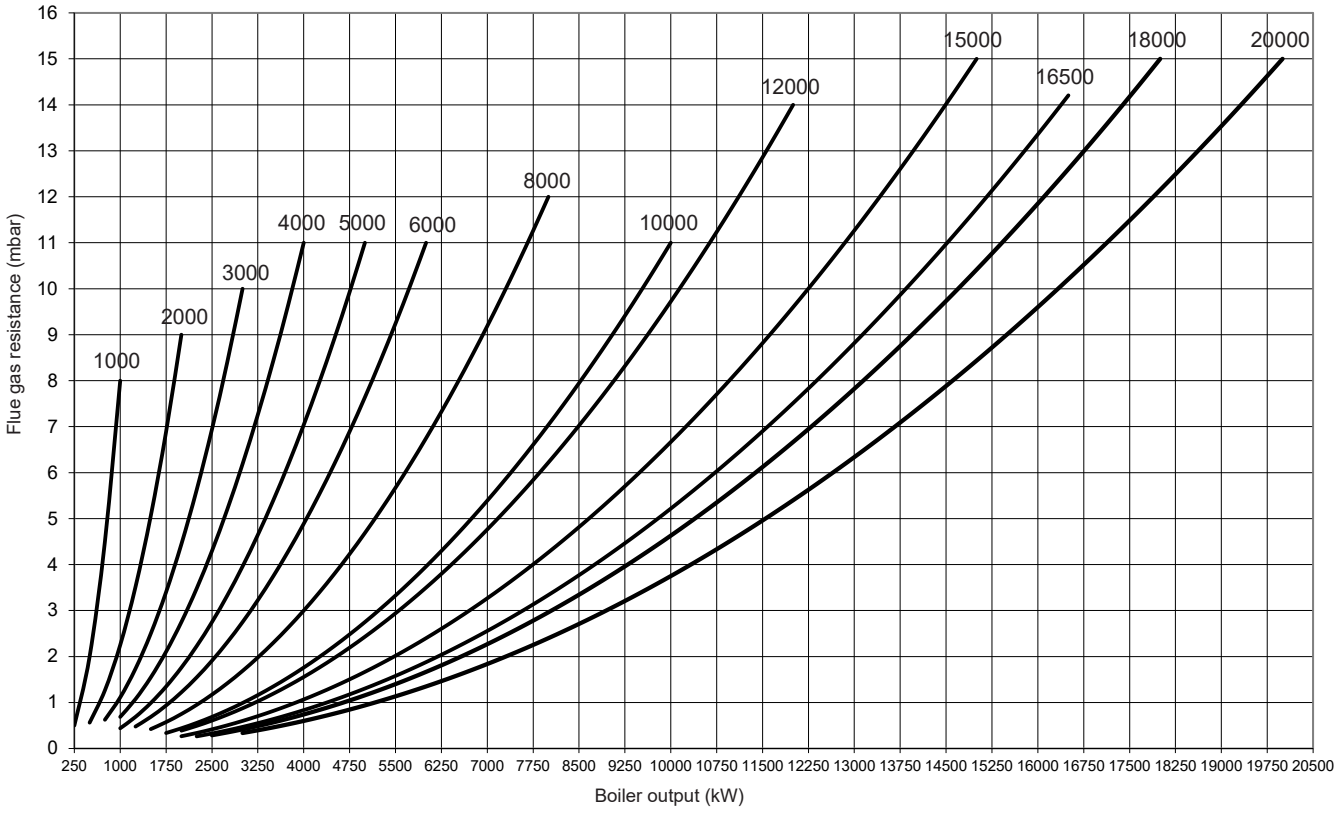


These data represent an average value from measurements with different burner manufacturers.

kW = Boiler output
°C = Flue gas temperature with cleaned heating surface, boiler middle temperature 120 °C

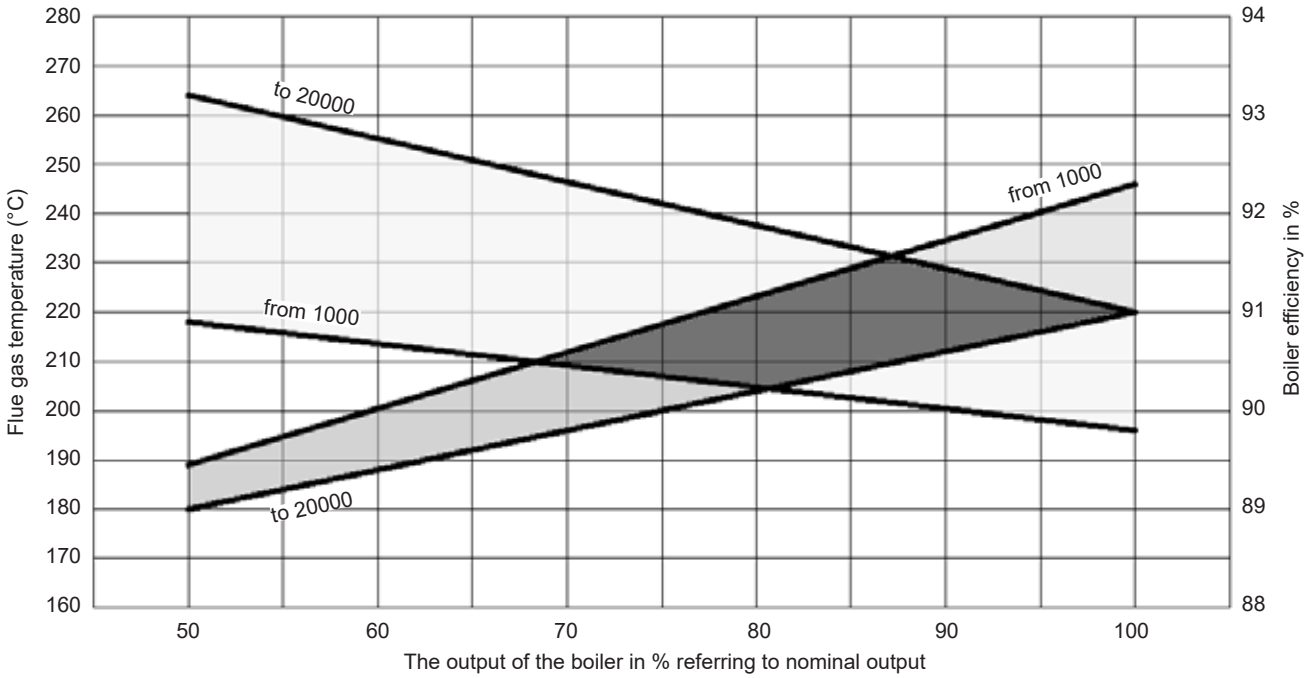
- Operating with natural gas, λ = 1.15 with max. burner output
- A reduction of the boiler water temperature of 10 K causes a reduction of the flue gas temperature by approx. 6-8 K.

Flue gas resistance



Flue gas temperature and boiler efficiency

In dependence on the boiler efficiency with a middle boiler water temperature of 120 °C.



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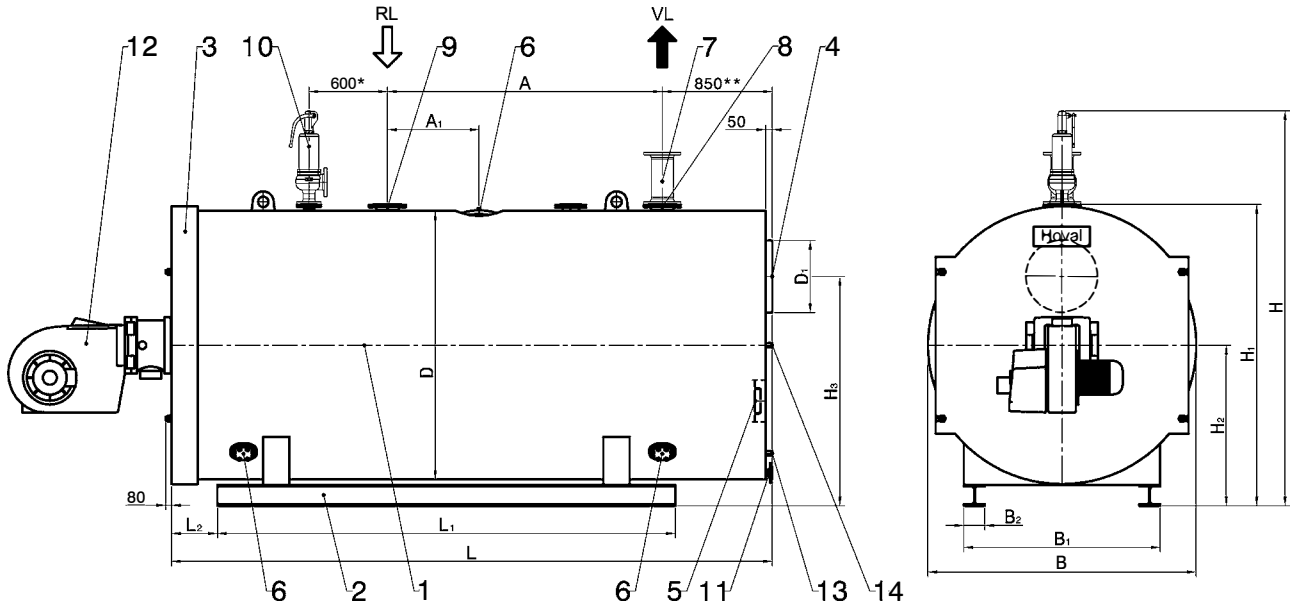


1 Boiler (with flue gas collector)
2 Boiler base
(up to type 3000 with U-girder, from type 4000 with I-girder)
3 Hinged door, incl. reversal chamber 2nd/3rd smoke gas pass
4 Flue gas outlet with 1 x ½″ pipe fitting
5 Explosion flap and cleaning opening
6 Inspection opening
7 Boiler outlet armature tube PN 16/PN 25
8 Boiler flow nozzle (BF)
9 Return flow nozzle
10 Safety valve nozzle (SV)
11 Purge/drain valve DN 40/PN 40
12 Burner
13 Condensate drain nozzle R1″
14 Flame peephole

* Type 1000 = 400, type 2000 = 500, type 16500 - 20000 = 700 mm
** From type 6000 upwards = 950 mm

Design pressure 10, 13 and 16 bar (gauge).
Dimensions for boiler design pressure 10 bar
Safety valve dimensions for boiler design pressure 10 bar
Notice: Add 100 mm to H_1 for crane hooks.

Other pressure levels on request!
Dimensions incl. 100 mm insulation

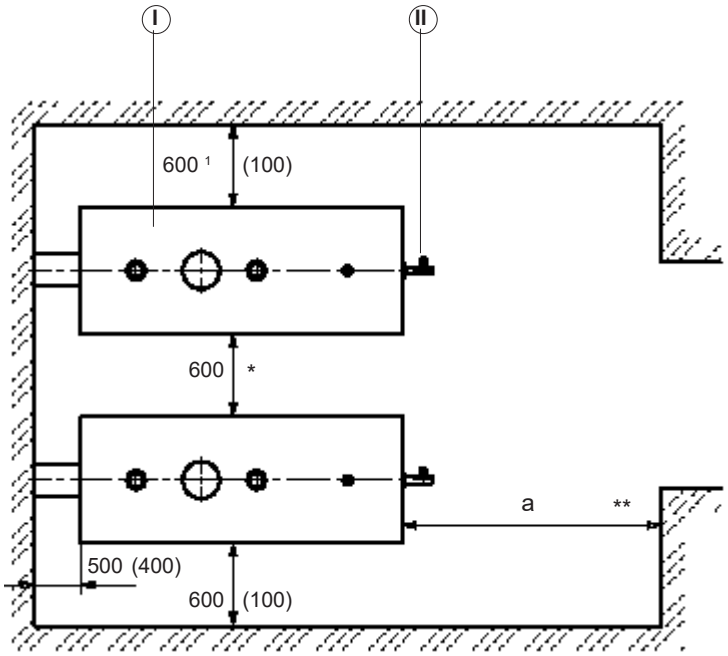
	Main dimensions					Boiler foundation					Transport dim.		F/R nozzle			Flue gas con.		SV
Boiler type	B Width	L Length	H	H_1	H_2	D	L_1	L_2	B_1	B_2	B_{min}	$H^{3)}_{min}$	A	A_1	DN [1), 2)]	H_3	D_1	DN [1)]
(1000)	1660	2830	2185	1800	950	1600	2000	0	1150	60	1760	2285	800	300	80	1300	300	25
(2000)	1910	3680	2580	2050	1075	1850	2850	0	1375	60	2010	2680	1500	500	125	1500	450	40
(3000)	2110	4280	2835	2250	1175	2050	3450	0	1550	60	2210	2935	2000	700	150	1700	500	50
(4000)	2210	4680	3035	2450	1325	2150	3700	150	1600	160	2310	3135	2400	800	200	1800	600	50
(5000)	2310	5130	3265	2550	1375	2250	4150	150	1700	160	2410	3365	2850	950	200	1900	650	65
(6000)	2460	5480	3415	2700	1450	2400	4400	150	1800	160	2560	3515	3100	1000	200	2000	750	65
(8000)	2660	5830	3705	2900	1550	2600	4750	150	1950	160	2760	3805	3450	1150	250	2150	850	80
(10000)	2860	6330	3955	3150	1700	2800	5200	150	2050	200	2960	4055	3900	1300	250	2350	950	80
(12000)	3060	7030	4260	3350	1800	3000	5900	150	2200	200	3160	4360	4600	1530	300	2500	1050	100
(15000)	3360	7365	4560	3650	1950	3300	6200	150	2400	200	3460	4660	4900	1630	300	2725	1150	100
(16500)	3560	7665	4995	3900	2100	3500	6500	150	2600	200	3660	5095	5100	1700	350	2925	1200	125
(18000)	3660	7915	5145	4050	2200	3600	6750	150	2700	200	3760	5245	5350	1780	400	3050	1250	125
(20000)	3760	8315	5295	4200	2300	3700	7150	150	2900	200	3860	5395	5750	1910	400	3175	1300	125

[1)] DN/...PN 16/PN 40
[2)] Diameter for standard ΔT = 20 K, other dimensions on request
[3)] Without armature tube

Space requirements

Installation

(Dimensions in mm)



I Boiler
II Burner

* Consider control panel
** Flame tube length (cleaning)
1 600-900, depending on local standards

To facilitate installation and maintenance the given measures should be kept; in case of limited space the minimal spaces (measures in brackets) are sufficient.

Positioning

- No air pollution through halogenated hydrocarbon (contained e.g. in sprays, paints, solvents and cleaners)
- No large amounts of dust
- No high atmospheric humidity
- Frost-resistant and well ventilated

Otherwise errors and damages to the installation may occur.

The boiler may only be installed in rooms where air pollution through halogenated hydrocarbon can occur if sufficient measures are taken ensuring the supply of unpolluted combustion air.

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Type	(1000) mm	(2000) mm	(3000) mm	(4000) mm	(5000) mm	(6000) mm	(8000) mm	(10000) mm	(12000) mm	(15000) mm	(16500) mm
a	2200	3000	3600	4000	4400	4700	5100	5500	6200	6500	6800

aqua3 E

Type	(18000) mm	(20000) mm
a	7100	7500

Rules and regulations

The following rules and regulations have to be respected:

- Hoval technical information and installation guide.
- hydraulic and control technical regulations, to guarantee the min. admissible boiler temperature and the conditions for a safe operation according to national regulations.
- fire protection regulations
- national regulations concerning permission, installation and operation of boiler appliances. Boiler appliances have to be installed according to national laws and regulations and accessories requirements.
- Besides the national and local regulations the project specific circumstances of the boiler supplier have to be considered for every application.

Water treatment/water quality

- The quality of the boiler water has to be guaranteed according to Hoval technical information and national regulations.
- Hoval boilers must only be operated with treated water. For the treatment of water apply for the values to be kept refer to the Hoval guide lines.
- Requested water quality: see supplement.
- Do not use chemical additives such as anti-freeze, inhibitors, etc. without written confirmation from Hoval.
- Old and new installations must be well flushed before filling.
- The water quality should be monitored and recorded.

Planning, operation and maintenance

- National and local rules and regulations have to be considered for the fuel supply.
- Safety and exhaust valve connections must be able to discharge the system pressure without any risk.
- Filters and strainers have to be cleaned periodically, especially if installed in front of control devices.
- The components containing heat and the pipes are to be insulated in order to reduce radiation losses.

Combustion air

- The supply of combustion air must be guaranteed for a safe and economic operation. There must be no possibility to close the air supply opening.
- Aeration and ventilation of the boiler house has to be secured.
- In the installation room no negative pressure larger than 3 N/m² is allowed. To adhere to this demand, plan a cross free section for the air supply opening of at least 200 cm², resp. 2 cm² per kW output. The aspect ratio for rectangular openings should not be more than 1.5 : 1.
  If the opening is trellised an adequate surcharge is needed. National laws have to be respected.
- Boiler houses have to be fitted with the relevant outer pressure relief surface.
- Boilers are not to be installed in rooms where halogen compounds occur which can enter the combustion air. (e.g. laundries, drying, etc.).

Noise level reduction

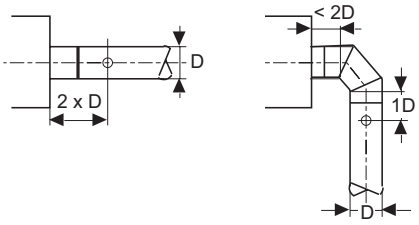
The following measures for noise level reduction are possible:

- Solid construction of heating room walls, ceiling and floor, installation of silencer in fresh air supply, noise insulation for support and bracket of pipes.
- Installation of sound attenuation cowl for burner.
- A substantial part of the sound caused in the combustion chamber and in the top heating surfaces is radiated from the flue gas system as sound transmitted by air. In addition to this, resonance features, depending on chimney dimensioning and inlet, may occur which are triggered by the oscillation of the combustion noises (snooping). These sounds can be reduced by burner-lateral measures, e.g. changes of flame geometry, atomisation characteristics or fuel throughput.
- Flue gas sound absorbers cause a substantial sound level reduction as well. These sound absorbers should usually be tuned at low frequencies of 60-250 Hz. Flue gas sound absorbers function according to the principle of sound absorption. The kinetic energy of the exhaust gases is consumed by friction requiring an increase in chimney draft in the flue gas system. This has to be considered for burner dimensioning. The connection piece form the boiler to the flue gas sound absorber has to be gas-tight because the draft- and pressure-zero point is behind the flue gas sound absorber.
- The necessary space requirement of approx. 2 m for the later installation of a flue gas sound absorber should already be included when planning.

Chimney/flue gas system

Flue gas line

- The flue gas connection pipe between the boiler and the vertical part of the flue gas line should be routed into the vertical part with a 30-45° incline.
- Thermal insulation is required with a length of more than 1 m.
- The insertion of the connection tube into the chimney must be carried out in such a way that no condensate can flow into the boiler
- A closable flue gas test port with a circular internal diameter of between 10-21 mm must be installed in the connection tube. The port must protrude beyond the thermal insulation.



Flue gas system

- The flue gas system must be humidity-insensitive and acid-proof and admitted for flue gas temperatures up to > 200 °C.
- For existing flue gas systems the restoration must be carried out according to the instructions of the chimney constructor.
- Calculation of the chimney section based on EN 13384 and EN 1443.
- Planning a bypass air flap as a chimney limitation is recommended.

Start-up condensate from the boiler

- When commissioning a cold boiler, condensate always occurs within the boiler. This collects in the lower area of the boiler (flue gas collector) and is then evaporated through the boiler's continued heating up.
- The boiler should therefore – due also to this reason – only be started up without "network acceptance", so that the condensation temperature threshold (approx. 55 °C) is exceeded as quickly as possible.
- If necessary, the condensate which occurs can be drained via the flue gas collector's cleaning fitting (remove cap on the drain connection before starting the burner, connect ball valve and temperature-resistant drain hose).

Remarks

- When draining the condensate, it must be ensured that no uncontrolled escape of flue gas occurs in the installation room (do not keep the ball valve open "constantly", but only drain off the condensate "intermittently").
- The locally valid waste water regulations must be observed when disposing of the condensate!

- As soon as the boiler has reached its minimum temperature and this can be kept stable via the return boost, the burner should be shut off briefly and the closure cap mounted on the cleaning drain connection again.
- The drain connection on the boiler's flue gas collector is not intended for the permanent connection of a drainage line – frequent condensation in the area of the boiler is impermissible!

Boiler water specifications

Boiler water - general

Boiler water must be free of hardness components. pH-value should be above neutral level. Please refer to following tables for water composition.

During a BOSB-operation feed- and boiler water have to be checked every 72 h, without BOSB- operation daily checks are necessary! The values must be recorded in the operating log book!

Make up water for hot water boilers (table 1)

Parameter	Unit	Make-up water for hot water boilers
Operating pressure	bar (0.1 MPa)	total range
Appearance	-	clear, free from suspended solids and foam
Direct conductivity at 25 °C	µS/cm	not specified, only guide values for boiler water relevant
pH value at 25 °C [1)]	-	> 7.0
Total hardness [3)] (Ca + Mg)	mmol/l	< 0.02
Iron (Fe) concentration	mg/l	< 0.2
Copper (Cu) concentration	mg/l	< 0.1
Silica (SiO_2) concentration	mg/l	not specified, only guide values for boiler water relevant, see table 2
Oxygen (O_2) concentration	mg/l	-
Oil/grease concentration (see EN 12953-6)	mg/l	< 1
Organic substances (as TOC) concentration	-	see footnote [2)]

[1)] With copper alloys in the system the pH value shall be maintained in the range 8.7 to 9.2.

[2)] Organic substances are generally a mixture of several different compounds. The composition of such mixtures and the behaviour of their individual components under the conditions of boiler operation are difficult to predict. Organic substances may be decomposed to form carbonic acid or other acidic decomposition products which increase the acid conductivity and cause corrosion or deposits. They also may lead to foaming and/or priming which shall be kept as low as possible.

[3)] Noted in the past as °dH, conversion factor: 1 mmol/l = 5.6° dH (German hardness)

Source: EN12953-10:2003 (E) + Hoval handbook

Boiler water specifications

Boiler water for hot water boilers (table 2)

Parameter	Unit	Boiler water for hot water boilers
Operating pressure	bar (0.1 MPa)	total range
Appearance	-	clear, free from suspended solids and foam
Direct conductivity at 25 °C	µS/cm	< 1 500 [6]
pH value at 25 °C	-	9.0 to 11.5 [1]
Total hardness (Ca + Mg) [6]	mmol/l	< 0.02
Composite alkalinity [4]	mmol/l	< 5
Silica (SiO_2) concentration	mg/l	pressure dependent, according to figure 1 [7]
Phosphate (PO_4) [2], [5]	mg/l	10 to 30
Sodium Sulphite (Na_2SO_3) [5]	mg/l	5 to 10
Iron (Fe) concentration	mg/l	< 0.2
Copper (Cu) concentration	mg/l	< 0.1
Oxygen (O_2) concentration) [8]	mg/l	< 0.02
Oil/grease concentration (see EN 12953-6)	mg/l	< 1
Organic substances	-	see footnote [3]

[1] If non-ferrous materials are present in the system, e. g. aluminium, they may require lower pH value and direct conductivity, however, the protection of the boiler has priority.

[2] If coordinated phosphate treatment is used; considering all other values higher PO_4 concentrations are acceptable (see clause 4 of EN 12953-10 for details).

[3] See [2] at table 1

[4] Noted in the past as p-value, conversion factor: KS 8.2 = 1 according p-value = 1

[5] Measuring only necessary if dosing chemicals are used which contains these composition

[6] For level electrodes minimum conductivity = > 5 µS/cm

[7] It's not necessary to make continuous control of following parameters: Silica (SiO_2) concentration

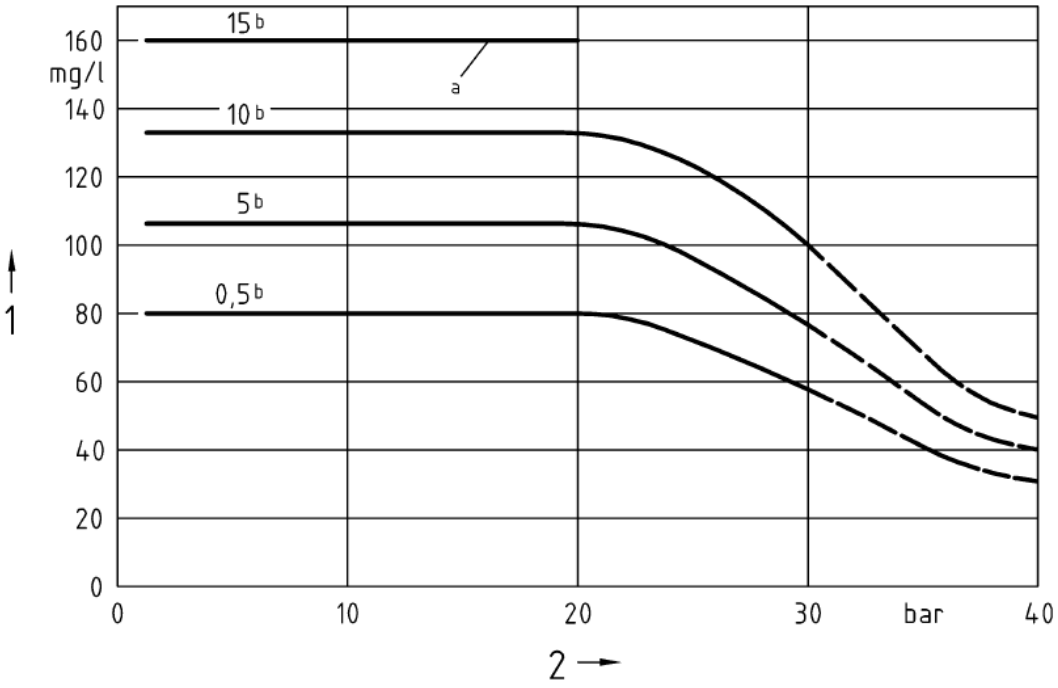
[8] Value for continuous operation and/or if a deaerator is used; if the operation is discontinuous or without deaerator film forming agents and/or excess of oxygen scavenger shall be used.

Source: EN12953-10:2003 (E) + Hoval handbook

Boiler water specifications

Fig. 1 Maximum acceptable silica content (SiO_2) of the boiler water dependent on the pressure

Source: EN12953-10:2003 (E)



1 Maximum silica content (SiO_2)
2 Operating pressure

a This level of alkalinity is not permissible > 20 bar
b Alkalinity in mmol/l

Important notice
Hoval recommends that a water treatment specialist is employed to carry out routine monitoring of the supply water in order to ensure it remains within specification.

THD-U

Hoval steam boiler
The Hoval high output steam boilers are made of high quality steel and are distinguished by their solid, robust and flexible design, particularly by their ease of operation, their easy maintenance and an optimal efficiency. The client receives an economical, environmentally friendly compact unit, ready for installation. The boilers are constructed for oil or gas firing.

Boiler type THD-U
The type THD-U classical 3 pass flame tube flue gas tube boiler with reverse flame tube and an inner completely water cooled flue gas reversal chamber guarantees high efficiency. The boiler consists of a cylindric shell, the two end plates, the reverse flame tube including the back flue gas reversal chamber with water cooled finned tube wall, the dimple flue gas tubes which increase the heat transfer (Hoval patent) and the fitting pipe, placed either on the right (standard) or on the left. The boiler door is insulated and flue gas proof for burner mounting. The boiler is completely electrically welded and provided with all required inspection openings.
The spacious flame tube with low thermal heat release results in an excellent combustion and reduced emissions. The large water content gives steady state boiler operation and thus reduces the number of boiler starts.

Admissible max. safety valve pressure
Standard pressures: 8.5, 11.5 and 13.6 bar
Safety valve pressures: 10, 13 and 16 bar
Higher operating pressure on request.

Thermal insulation
The boiler is fully insulated including the flue gas collector with mineral wool insulation. The casing is made of stucco aluminium plate. Sockets and cuttings are nicely framed.

Connection fittings and sockets
The connection fittings and sockets on the boiler and on the fitting pipe are meant for the attachment of:
water level regulation and water level control, water level indicator (reflection indicator), pressure switch for pressure regulation and pressure supervision, pressure gauge set, main steam valve, safety valve(s), boiler feed, sludge/drainage, desalting.

Large equipment
2 boiler base supports in heavy construction
1 flue gas collector with integrated horizontal flue gas connection with cleaning door and integrated bleeder valve
1 boiler door for burner mounting, thermally insulated and designed flue gas proof, placed on left and right swivelable hinges for the flue gas side cleaning of boiler
1 feed water distribution pipe
1 boiler plate
1 low water mark NW
1 water separator
1 flue gas tube cleaning kit

High efficiency
Due to the above technical facts an efficiency of up to 90 % resp. and up to 94 % with economiser, can be achieved. Thus continuos fuel costs are kept to a minimum. The sources of energy are used more efficiently and Hoval benefits the environment.

Construction guiding, quality approval
The boiler is designed with all necessary inspection doors.
Construction and production is made acc. to the European Pressure Directive Equipment (PED) 2014/68/EU - EN 12953, with CE-approval. The local official approval and inspection is carried out by TÜV or an independent test authority. The ISO 9001:2000 certification and the quality approval at our factory with our Hoval quality performance department guarantees the highest product quality. For installation and operation of the boiler the local laws and norms are to be respected.

Control panel
The control panel for the Hoval boiler is equipped with the required control units and indicators for control and supervision of boiler and burner. The operation and alarm reports are shown as fault indication. The control panel will be made upon customer requirements and depending on burner to be used.

Feed water quality
For operation the Hoval and the country specific feed and boiler water regulations have to be respected and local waste water regulations have to be paid attention to.
Detailed information for the feed water quality can be found in the appendix.

Delivery
The pressure body is provided with a primer paint finish. Due to transport reasons the insulation can be fixed at the factory. Burner and control panel are either pre-mounted (if transport is possible) or packed in a separate box. The mounting and wiring can be done at the factory or at site. Connection openings are capped.

On request
- Second safety valve
- Second water level meter
- Visible boiler lockout display
- Second feed water pump
- Modulating feed water control
- Quick action blow down valve
- Automatic boiler blow down
- Economiser
- PLC (programmable logic controller) S7-200/300
- Volt-free contacts for BMS (Building Management System)

THD-U (500-1600)

Technical data without economiser

Type			(500)	(650)	(800)	(1000)	(1200)	(1600)
• Saturated steam output (oil- and gas-fired)		kg/h	500	650	800	1000	1200	1600
• Heat conduction		kW	326	424	522	652	783	1044
• Feed water temperature		°C	103	103	103	103	103	103
• Safety valve pressure		bar	10	10	10	10	10	10
		bar	13	13	13	13	13	13
		bar	16	16	16	16	16	16
• Boiler efficiency **without** economiser (10 bar)		%	89.1	89.4	89.3	89.4	89.7	89.6
• Flue gas resistance		mbar	3.1	3.3	3.6	4.2	4.7	5.5
• Water content	up to low water	l	871	997	1211	1328	1647	1859
	full	l	1054	1247	1601	1775	2165	2678
• Flue gas temperature after boiler **without** economiser	at 10 bar	°C	243	236	240	239	231	237

Data economiser (only with gas - or diesel oil possible)

Type			(500)	(650)	(800)	(1000)	(1200)	(1600)
• Additional output economiser		kW	17	21	27	33	36	52
• Boiler efficiency **with** economiser		%	94	94	94	94	94	94
• Flue gas resistance economiser	mbar		3.0	3.0	3.0	3.0	3.0	3.0
• Feed water temperature	inlet	°C	103	103	103	103	103	103
	outlet	°C	132	130	131	131	129	130
• Flue gas temperature after economiser		°C	140	140	140	140	140	140

Dimensions and weights (without economiser)

Type		(500)	(650)	(800)	(1000)	(1200)	(1600)
• Diameter boiler body, without insulation	mm	1100	1150	1250	1250	1300	1400
• Boiler length (pressure body)	mm	1600	1750	1900	2150	2500	2600
• Diameter (inner) flame tube	mm	575	575	650	650	700	725
• Flame tube length	mm	1495	1645	1795	2045	2395	2495
• Boiler **length** with insulation, without burner	mm	2285	2435	2585	2835	3185	3285
• Boiler **width** with insulation, with pump	mm	1935	1985	2085	2085	2135	2235
• Boiler **height** with insulation, with armatures	mm	1950	2000	2100	2100	2150	2250
• Diameter flue gas outlet	mm	200	200	250	250	300	350
• Transport weight at 10 bar, without equipment	kg	1590	1960	2330	2720	3260	3680

THD-U (500-1600)

Armatures

Type		(500)	(650)	(800)	(1000)	(1200)	(1600)
• 1 flue gas tube cleaning equipment		yes	yes	yes	yes	yes	yes
• 1 main steam valve	10 bar	DN 40	DN 40	DN 50	DN 50	DN 65	DN 65
	13 bar	DN 32	DN 40	DN 50	DN 50	DN 50	DN 65
	16 bar	DN 32	DN 32	DN 40	DN 50	DN 50	DN 50
• 2 safety valves	10 bar	DN 25/40	DN 25/40	DN 25/40	DN 25/40	DN 25/40	DN 25/40
	13 bar	DN 25/40	DN 25/40	DN 25/40	DN 25/40	DN 25/40	DN 25/40
	16 bar	DN 25/40	DN 25/40	DN 25/40	DN 25/40	DN 25/40	DN 25/40
• 2 water level gauge valves		DN 20	DN 20	DN 20	DN 20	DN 20	DN 20
• 2 reflection indicators		M = 320	M = 320	M = 320	M = 320	M = 320	M = 320
• 1 sample taking valve		DN 15	DN 15	DN 15	DN 15	DN 15	DN 15
• 1 purge shut-off valve		DN 25	DN 25	DN 32	DN 32	DN 32	DN 32
• 1 purge ball valve		DN 25	DN 25	DN 32	DN 32	DN 32	DN 32
• 1 pressure gauge with three-way valve		R ½″	R ½″	R ½″	R ½″	R ½″	R ½″
• 3 feed water/pump valves		DN 25	DN 25	DN 25	DN 25	DN 25	DN 25
• 3 feed water backstroke/non return valves		DN 25	DN 25	DN 25	DN 25	DN 25	DN 25
• 2 strainers (pump suction side)		DN 25	DN 25	DN 25	DN 40	DN 40	DN 40
• 2 ball valves (pump suction side)		DN 25	DN 25	DN 25	DN 40	DN 40	DN 40
• 1 pressure gauge pump with shut-off valve		R ¼″	R ¼″	R ¼″	R ¼″	R ¼″	R ¼″
• 2 feed water pumps, Grundfos		CR	CR	CR	CR	CR	CR
Motor rating	10 bar	1.1 kW	1.1 kW	1.1 kW	1.1 kW	1.1 kW	1.5 kW
• 2 feed water pumps, Grundfos		CR	CR	CR	CR	CR	CR
Motor rating	13 bar	1.5 kW	1.5 kW	1.5 kW	1.5 kW	1.5 kW	2.2 kW
• 2 feed water pumps, Grundfos		CR	CR	CR	CR	CR	CR
Motor rating	16 bar	1.5 kW	1.5 kW	2.2 kW	2.2 kW	2.2 kW	3.0 kW

THD-U (2000-5000)

Technical data without economiser

Type			(2000)	(2500)	(3000)	(3500)	(4000)	(4500)	(5000)
• Saturated steam output (oil- and gas-fired)		kg/h	2000	2500	3000	3500	4000	4500	5000
• Heat conduction		kW	1304	1631	1957	2283	2609	2935	3261
• Feed water temperature		°C	103	103	103	103	103	103	103
• Safety valve pressure		bar	10	10	10	10	10	10	10
		bar	13	13	13	13	13	13	13
		bar	16	16	16	16	16	16	16
• Boiler efficiency **without** economiser (10 bar)		%	89.6	89.5	89.4	89.5	89.7	89.7	89.8
• Flue gas resistance		mbar	5.7	6.5	6.7	5.0	7.3	6.9	6.9
• Water content	up to low water	l	2254	2636	3074	3952	4261	4783	5163
	full	l	2914	3353	4162	5426	6436	6530	7253
• Flue gas temperature after boiler **without** economiser									
	at 10 bar	°C	238	238	241	240	234	233	234

Data economiser

Type			(2000)	(2500)	(3000)	(3500)	(4000)	(4500)	(5000)
• Additional output economiser		kW	65	81	101	116	125	139	156
• Boiler efficiency **with** economiser		%	94	94	94	94	94	94	94
• Flue gas resistance economiser		mbar	3.0	3.0	3.0	3.0	3.0	3.0	3.0
• Feed water temperature	inlet	°C	103	103	103	103	103	103	103
	outlet	°C	130	130	131	131	129	129	129
• Flue gas temperature after economiser		°C	140	140	140	140	140	140	140

Dimensions and weights (without economiser)

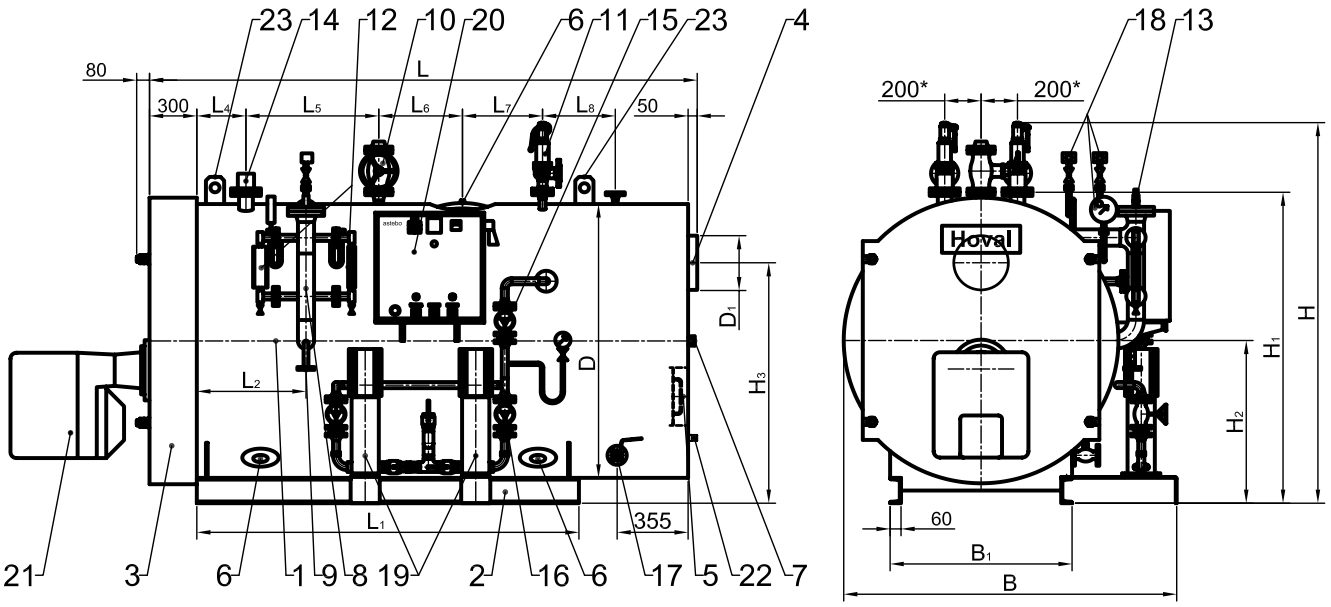
Type		(2000)	(2500)	(3000)	(3500)	(4000)	(4500)	(5000)
• Diameter boiler body, without insulation	mm	1500	1600	1750	1950	1950	2000	2100
• Boiler length (pressure body)	mm	2650	2750	3000	300	3500	3500	3500
• Diameter (inner) flame tube	mm	850	925	975	1100	1100	1150	1200
• Flame tube length	mm	2540	2640	2890	2890	3390	3390	3390
• Boiler **length** with insulation, without burner	mm	3335	3435	3685	3685	4185	4185	4185
• Boiler **width** with insulation, with pump	mm	2335	2435	2585	2785	2785	2835	2935
• Boiler **height** with insulation, with armatures	mm	2410	2510	2660	2950	2950	3000	3150
• Diameter flue gas outlet	mm	350	400	450	500	500	550	600
• Transport weight at 10 bar, without equipment	kg	4700	5560	6150	8415	9230	9860	10520

THD-U (2000-5000)

Armatures

Type		(2000)	(2500)	(3000)	(3500)	(4000)	(4500)	(5000)
• 1 flue gas tube cleaning equipment		yes	yes	yes	yes	yes	yes	yes
• 1 main steam valve	10 bar	DN 80	DN 100	DN 100	DN 100	DN 100	DN 125	DN 125
	13 bar	DN 65	DN 80	DN 80	DN 100	DN 100	DN 100	DN 100
	16 bar	DN 65	DN 65	DN 80	DN 80	DN 100	DN 100	DN 100
• 2 safety valve	10 bar	DN 25/40	DN 25/40	DN 25/40	DN 25/40	DN 32/50	DN 32/50	DN 32/50
	13 bar	DN 25/40	DN 25/40	DN 25/40	DN 25/40	DN 25/40	DN 32/50	DN 32/50
	16 bar	DN 25/40	DN 25/40	DN 25/40	DN 25/40	DN 25/40	DN 25/40	DN 24/40
• 2 water level gauge valves		DN 20	DN 20	DN 20	DN 20	DN 20	DN 20	DN 20
• 2 reflection indicators		M = 320	M = 320	M = 450	M = 450	M = 450	M = 450	M = 450
• 1 sample taking valve		DN 15	DN 15	DN 15	DN 15	DN 15	DN 15	DN 15
• 1 purge-shut-off valve		DN 40	DN 40	DN 40	DN 40	DN 40	DN 40	DN 40
• 1 purge-ball valve		DN 40	DN 40	DN 40	DN 40	DN 40	DN 40	DN 40
• 1 pressure gauge with three-way valve		R ½"	R ½"	R ½"	R ½"	R ½"	R ½"	R ½"
• 3 feed water/pump valves		DN 25	DN 32	DN 32	DN 32	DN 32	DN 32	DN 32
• 3 feed water backstroke/ non return valves		DN 25	DN 32	DN 32	DN 32	DN 32	DN 32	DN 32
• 2 strainers (pump suction side)		DN 40	DN 50	DN 50	DN 50	DN 50	DN 50	DN 50
• 2 ball valves (pump suction side)		DN 40	DN 50	DN 50	DN 50	DN 50	DN 50	DN 50
• 1 pressure gauge pump with shut-off valve		R ¼"	R ¼"	R ¼"	R ¼"	R ¼"	R ¼"	R ¼"
• 2 feed water pumps, Grundfos Motor rating	10 bar	CR 2.2 kW	CR 3.0 kW	CR 3.0 kW	CR 3.0 kW	CR 3.0 kW	CR 4.0 kW	CR 4.0 kW
• 2 feed water pumps, Grundfos Motor rating	13 bar	CR 2.2 kW	CR 4.0 kW	CR 4.0 kW	CR 4.0 kW	CR 4.0 kW	CR 4.0 kW	CR 4.0 kW
• 2 feed water pumps, Grundfos Motor rating	16 bar	CR 3.0 kW	CR 4.0 kW	CR 4.0 kW	CR 5.5 kW	CR 5.5 kW	CR 5.5 kW	CR 5.5 kW

THD-U without economiser - subject to construction-caused alterations



1 Boiler
2 Boiler base
3 Hinged front door
4 Flue gas outlet
5 Explosion flap and cleaning opening
6 Inspection opening
7 Inspection glass (flame tube)
8 Fitting pipe
9 Continuous blowdown valve
10 Steam valve
11 Safety valve(s)
12 Water level gauge
13 Water level control
14 Water insufficiency control 1 + 2
15 Boiler feed socket - valve group
16 Boiler feed pump(s) - valve group
17 Blow down/purge valve
18 Pressure gauge and manostat
19 Feed water pump(s)
20 Electric control panel
21 Burner
22 Condensate drain nozzle
23 Crane hooks

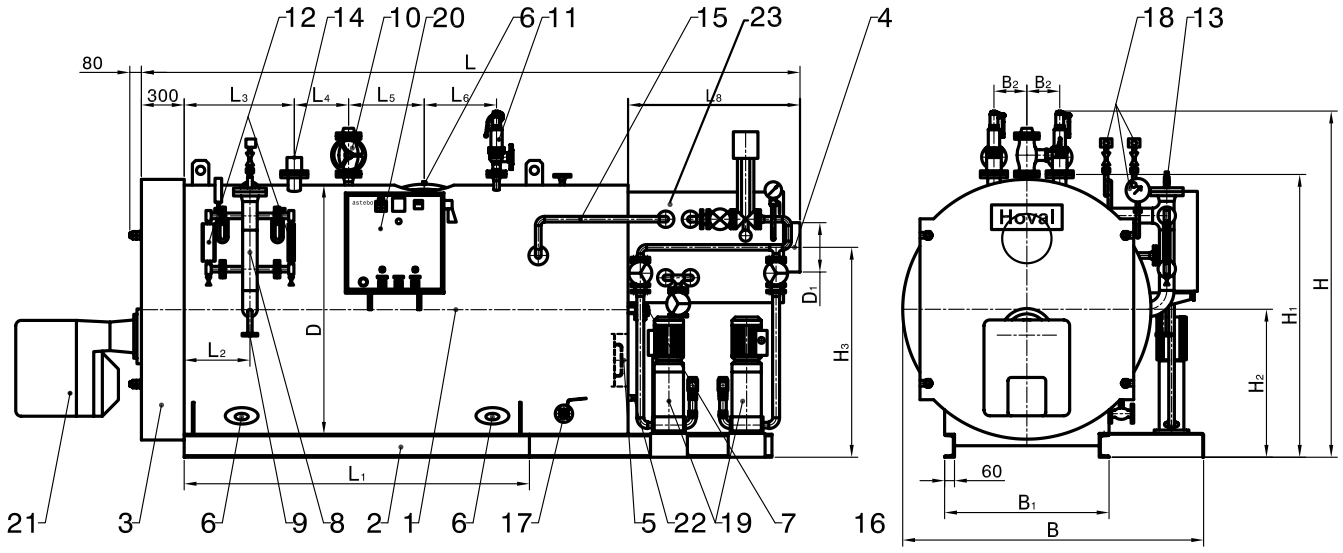
Capacity	Main dimensions				Connecting dimensions							Base frame		Flue gas connection		Required space B x H (for transport)			
kg/h	L	B **	H	D	L_2	L_4	L_5	L_6	L_7	H_1	H_2	L_1	B_1	H_3	D_1	with armatures		without armatures	
500	2205	1935	1950	1300	350	200	300	350	350	1560	800	1250	850	1150	200	2050	2100	1750	1750
650	2355	1985	2000	1350	350	200	300	350	350	1610	825	1400	900	1200	200	2200	2150	1800	1800
800	2505	2085	2100	1450	400	200	400	400	400	1710	875	1550	1000	1300	250	2300	2250	1900	1900
1000	2755	2085	2100	1450	500	250	500	450	450	1710	875	1800	1000	1300	250	2300	2250	1900	1900
1200	3105	2135	2150	1500	500	250	500	600	600	1760	900	2150	1050	1350	300	2350	2300	1950	1950
1600	3205	2235	2250	1600	500	250	500	600	600	1860	950	2250	1150	1400	350	2450	2400	2050	2050
2000	3255	2335	2410	1700	650	300	500	600	600	1960	1000	2300	1250	1500	350	2550	2550	2150	2150
2500	3355	2435	2510	1800	650	300	500	600	600	2060	1050	2400	1350	1550	400	2650	2650	2250	2250
3000	3355	2585	2660	1950	750	350	600	650	650	2210	1125	2650	1450	1675	450	2800	2800	2400	2400
3500	3605	2785	2950	2150	750	350	600	650	650	2410	1225	2650	1650	1825	500	3000	3100	2600	2600
4000	4105	2785	2950	2150	950	350	600	850	850	2410	1225	3150	1650	1825	500	3000	3100	2600	2600
4500	4105	2835	3000	2200	950	350	600	850	850	2460	1250	3150	1700	1825	550	3050	3150	2650	2650
5000	4105	2935	3150	2300	950	350	600	850	850	2560	1300	3150	1700	1925	600	3150	3300	2750	2750

* From THD-U 2000 (and higher) distance = 250 mm
** Dimension may vary to used pumps

Design pressure 10, 13 and 16 bar (gauge)
Other pressure levels on request!
Transport dimensions for design pressure 10 bar

Add 40 mm to H_1 for crane hooks
Dimensions incl. 100 mm insulation.

THD-U with economiser - subject to construction-caused alterations



1 Boiler
2 Boiler base
3 Hinge
4 Flue gas outlet
5 Explosion flap and cleaning opening
6 Inspection opening
7 Inspection glass (flame tube)
8 Fitting pipe
9 Continuous blowdown valve
10 Steam valve
11 Safety valve(s)
12 Water level gauge
13 Water level control
14 Water insufficiency control 1 + 2
15 Boiler feed socket - valve group
16 Boiler feed pump(s) - valve group
17 Blow down/purge valve
18 Pressure gauge and manostat
19 Feed water pump(s)
20 Electric control panel
21 Burner
22 Condensate drain nozzle
23 Economiser

Capacity	Main dimensions				Connecting dimensions								Base frame		Flue gas connection		Required space B x H (for transport)			
kg/h	L	B **	H	D	L_2	L_3	L_4	L_5	L_6	L_8	H_1	H_2	L_1	B_1	H_3	D_1	with armatures		without armatures	
500	3162	1935	1950	1300	350	200	300	350	350	1007	1560	800	1250	850	1130	150	2050	2100	1750	1750
650	3312	1985	2000	1350	350	200	300	350	350	1007	1610	825	1400	900	1160	150	2200	2150	1800	1800
800	3500	2085	2100	1450	400	200	400	400	400	1045	1710	875	1550	1000	1250	200	2300	2250	1900	1900
1000	3750	2085	2100	1450	500	250	500	450	450	1045	1710	875	1800	1000	1250	200	2300	2250	1900	1900
1200	4137	2136	2150	1500	500	250	500	600	600	1082	1760	900	2150	1050	1270	250	2350	2300	1950	1950
1600	4275	2235	2250	1600	500	250	500	600	600	1120	1860	950	2250	1150	1370	300	2450	2400	2050	2050
2000	4325	2335	2410	1700	650	300	500	600	600	1120	1960	1000	2300	1250	1400	300	2550	2550	2150	2150
2500	4462	2435	2510	1800	650	300	500	600	600	1157	2060	1050	2400	1350	1500	350	2650	2650	2250	2250
3000	4750	2585	2660	1950	750	350	600	650	650	1195	2210	1125	2650	1450	1600	400	2800	2800	2400	2400
3500	4750	2785	2950	2150	750	350	600	650	650	1195	2410	1225	2650	1650	1700	400	3000	3100	2600	2600
4000	5287	2785	2950	2150	950	350	600	850	850	1232	2410	1225	3150	1650	1760	450	3000	3100	2600	2600
4500	5325	2835	3000	2200	950	350	600	850	850	1270	2460	1250	3150	1700	1760	500	3050	3150	2650	2650
5000	5325	2935	3150	2300	950	350	600	850	850	1270	2560	1300	3150	1700	1830	550	3150	3300	2750	2750

* From THD-U 2000 (and higher) distance = 250 mm
** Dimension may vary to used pumps

Design pressure 10, 13 and 16 bar (gauge)
Other pressure levels on request!
Transport dimensions for design pressure 10 bar

Add 40 mm to H_1 for crane hooks
Dimensions incl. 100 mm insulation.

Rules and regulations

The following rules and regulations have to be respected:

- Hoval technical information and installation guide
- hydraulic and control technical regulations, to guarantee the min. admissible boiler temperature and the conditions for a safe operation according to national regulations
- fire protection regulations
- national regulations concerning permission, installation and operation of boiler appliances Boiler appliances have to be installed according to national laws and regulations and accessories requirements.
- Besides the national and local regulations the project specific circumstances of the boiler supplier have to be considered for every application.

Water treatment/water quality

- The quality of the boiler water has to be guaranteed according to Hoval technical information and national regulations.
- Hoval boilers may only be operated with treated water. The national regulations for the treatment of water apply for the values to be kept.
- Required water quality see attachment.
- Don't use chemical additives like anti-freeze etc. Except chemicals which are necessary for normal boiler operation (see water quality specification).
- Old and new installations must be well flushed before filling.
- The water quality has to be checked daily.

Planning, operation and maintenance

- The heating of the feed water and the degassing takes place in the feed water tank.
- To increase the efficiency, especially for natural gas operation, an economiser can be added to preheat the feed water.
- Pumps (especially horizontal rotary pumps
- and hot water/condensate pumps, NPSH pumps) need to be installed with the necessary flow, return pipework and positive suction pressure according to requirements. The installation has to be completely free of tension (anti-vibration proof).
- National and local rules and regulations have to be considered for the fuel supply.
- The operation and water analysis data are to be recorded daily in the operation booklet.
- Safety valves and blow-off pipes must discharge the system overpressure riskless.
- Filters and strainers have to be cleaned periodically, especially if installed in front of control devices.
- The drain of the desalting, blow down, drainage, overflow, etc. has to be safely discharged into a dislodging tank.
- All heating components and pipework are to be insulated in order to reduce radiation losses.

Combustion air

- The supply of combustion air must be guaranteed for a safe and economic operation. There must be no possibility of the air supply being shut off.
- Ventilation of the boiler house has to also be provided.
- In the installation room no negative pressure larger than 3 N/m^2 is allowed. To adhere to this demand, plan a free area for the air supply opening of at least 200 cm^2, plus 2 cm^2 per kW output . The aspect ratio for rectangular openings should not be more than 1.5 : 1. If the opening is louvred ensure the free area is sufficient. National laws have to be respected.
- Boiler houses have to be fitted with the relevant outer pressure relief surface.
- Steam boilers are not to be installed in rooms where halogen compounds occur which can enter the combustion air. (e.g. laundries, drying and hobby rooms, etc.).

Noise level reduction

The following measures for noise level reduction are possible:

- Solid construction of heating room walls, ceiling and floor, installation of silencer in fresh air supply, noise insulation for support and bracket of pipes.
- Installation of sound attenuation cowl for the burner.
- A substantial part of the sound caused in the combustion chamber and in the top heating surfaces is radiated from the flue outlet as sound transmitted by air. In addition to this, resonance features, depending on chimney dimensioning and inlet, may occur which are triggered by the oscillation of the combustion process. These sounds can be reduced by burner-lateral measures, e.g. changes of flame geometry, atomisation characteristics or fuel throughput.
- Flue gas attenuators cause a substantial sound level reduction as well. These sound absorbers should usually be tuned at low frequencies of 60-250 Hz. Flue gas attenuators function according to the principle of sound absorption. The kinetic energy of the exhaust gases is reduced by friction requiring an increase in chimney draft in the flue system. This has to be considered for burner sizing. The connection piece from the boiler to the flue gas sound absorber has to be gas-tight.
- The necessary space requirement of approx. 2 m for the later installation of a flue gas sound absorber should be included when planning.

Chimney/flue gas system

- A properly designed chimney/flue arrangement must be provided to match each particular application.
- To achieve a smooth discharge of the exhaust gases from the boiler into the chimney, the flue connection must enter the chimney at approx. 30-45 °.
- From a length of greater than 1 m thermal insulation is necessary.
- Adequate provision should be made to drain of condensate form the base of the chimney ensuring condensate does not run back into the boiler smokebox.

Boiler and feed water specifications for steam boiler plants

Boiler water - general

Boiler water must be free of hardness components. pH value should be above neutral level. Please refer to following tables for water composition.

During a BOSB-operation feed and boiler water have to be checked every 72 h, without BOSB- operation daily checks are necessary! The values must be recorded in the operating log book!

Feed water specifications for natural circulating boilers – shell boilers (table 1)

Parameter	Unit	Feed water for steam boilers	
Operating pressure	bar (0.1 MPa)	> 0.5 to 20	> 20
Appearance	-	clear, free from suspended solids and foam	
Direct conductivity at 25 °C	µS/cm	not specified, only guide values relevant for boiler water - see table 2	
pH value at 25 °C [1)]	-	> 9.2 [2)]	> 9.2 [2)]
Total hardness [3)], [6)] (Ca + Mg)	mmol/l	< 0.01 [3)]	< 0.01
Iron (Fe) concentration	mg/l	< 0.3	< 0.1
Copper (Cu) concentration	mg/l	< 0.05	< 0.03
Silica (SiO_2) concentration	mg/l	not specified, only guide values for boiler water relevant, see table 2	
Oxygen (O_2) concentration	mg/l	< 0.05 [4)]	< 0.02
Oil/grease concentration (see EN 12953-6)	mg/l	< 1	< 1
Organic substances (as TOC) concentration	-	see footnote [5)]	

[1)] With copper alloys in the system the pH value shall be maintained in the range 8.7 to 9.2.

[2)] With softened water pH value > 7.0 the pH value of boiler water according to table 2 should be considered.

[3)] At operating pressure < 1 bar total hardness max. 0.05 mmol/l shall be acceptable.

[4)] Value for continuous operation and/ or if a deaerator is used; if the operation is discontinuous or without deaerator film forming agents and/or excess of oxygen scavenger shall be used.

[5)] Organic substances are generally a mixture of several different compounds. The composition of such mixtures and the behaviour of their individual components under the conditions of boiler operation are difficult to predict. Organic substances may be decomposed to form carbonic acid or other acidic decomposition products which increase the acid conductivity and cause corrosion or deposits. They also may lead to foaming and/or priming which shall be kept as low as possible.

[6)] Noted in the past as °dH, conversion factor: 1 mmol/l = 5.6°dH (German hardness)

Source: EN12953-10:2003 (E) + Hoval handbook

Boiler and feed water specifications for steam boiler plants

Boiler water specifications for natural circulating boilers – shell boilers - (table 2)

Parameter	Unit	Boiler water for steam boilers using		
		Feedwater direct conductivity > 30 µS/cm		Feedwater direct conductivity ≤ 30 µS/cm
Operating pressure	bar (0.1 MPa)	> 0.5 to 20	> 20	> 0.5
Appearance	-	clear, free from suspended solids and foam		
Direct conductivity at 25 °C [8]	µS/cm	< 6 000 [1]	see figure 1 [1]	< 1 500
pH value at 25 °C	-	10.5 to 12.0	10.5 to 11.8	10.0 to 11.0 [2], [3]
Total hardness [10], [11] (Ca + Mg)	mmol/l	< 0.01		
Composite alkalinity [7]	mmol/l	1 to 15 [1]	1 to 10 [1]	0.1 to 1.0 [3]
Silica (SiO_2) concentration [9]	mg/l	pressure dependent, according to figure 2		
Phosphate (PO_4) [4], [6]	mg/l	10 to 30	10 to 30	6 to 15
Sodium Sulphite (Na_2SO_3) [6]	mg/l	5 to 10	5 to 10	5 to 10
Organic substances (as TOC) concentration	-	see footnote [5]		

[1] With super heater consider 50 % of the indicated upper value as maximum value.

[2] Basic pH adjustment by injecting Na_3PO_4, additional NaOH injection only if the pH value is < 10.

[3] If the acid conductivity of the boiler feedwater is < 0.2 µS/cm, and its Na + K concentration is < 0.010 mg/l, phosphate injection is not necessary. Under the conditions AVT (all volatile treatment, feedwater pH ≥ 9.2 and boiler water pH ≥ 8.0) can be applied, in this case the acid conductivity of the boiler water is < 5 µS/cm.

[4] If coordinated phosphate treatment is used; considering all other values higher PO4-concentrations are acceptable (see clause 4 of EN 12953-10 for details).

[5] See [5] in table 1.

[6] Measuring only necessary if dosing chemicals are used which contains these composition

[7] Noted in the past as p-value, conversion factor: KS 8.2 = 1 according p-value = 1

[8] For level electrodes minimum conductivity = > 5 µS/cm

[9] It's not necessary to make continuous control of following parameters: Silica (SiO_2) concentration

[10] At operating pressure < 1 bar total hardness max. 0.05 mmol/l shall be acceptable.

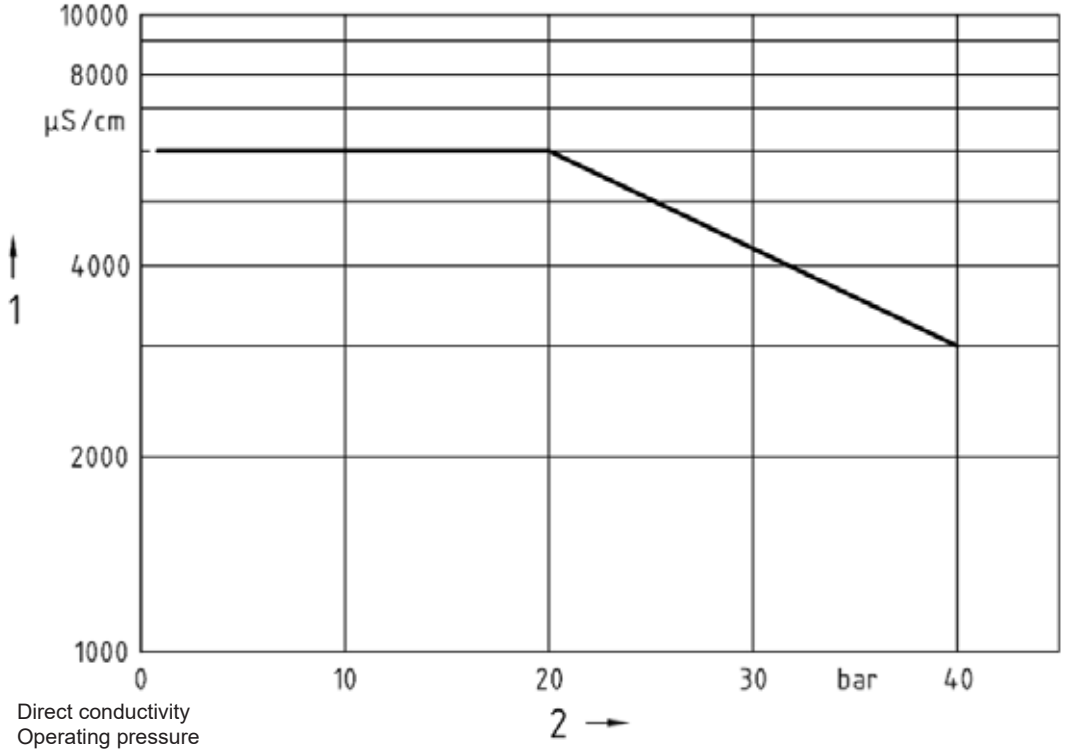
[11] Noted in the past as °dH, conversion factor: 1 mmol/l = 5.6°dH (German hardness)

Source: EN12953-10:2003 (E) + Hoval handbook

Boiler and feed water specifications for steam boiler plants

Fig. 1 Maximum acceptable direct conductivity of the boiler water dependent on the pressure; feedwater direct conductivity > 30 µS/cm

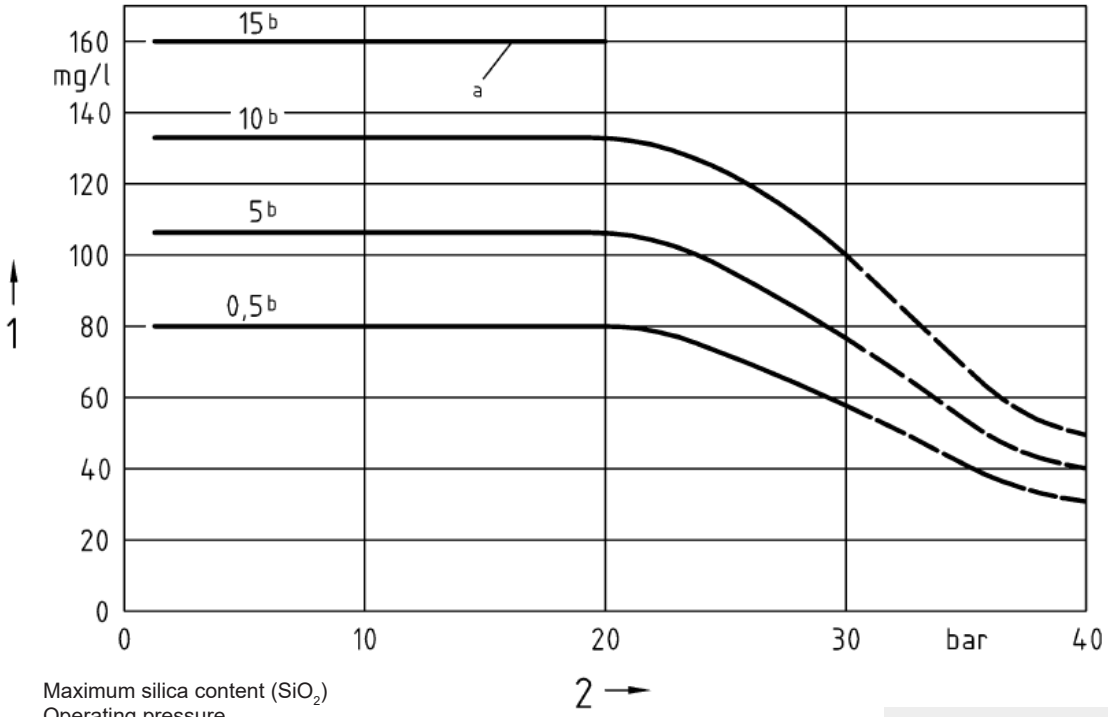
Source: EN12953-10:2003 (E)



1 Direct conductivity
2 Operating pressure

Fig. 2 Maximum acceptable silica content (SiO_2) of the boiler water dependent on the pressure

Source: EN12953-10:2003 (E)



1 Maximum silica content (SiO_2)
2 Operating pressure

a This level of alkalinity is not permissible > 20 bar
b Alkalinity in mmol/l

Important notice
Hoval recommends that a water treatment specialist is employed to carry out routine monitoring of the supply water in order to ensure it remains within specification.

THSD-I E

Hoval steam boiler

The Hoval high output steam boilers are made of high quality steel and are distinguished by their solid, robust and flexible construction, particularly by their operational ease, their easy maintenance and an optimal efficiency. The client receives an economical, environment friendly compact unit, ready for installation. The boilers are constructed for oil or gas firing.

Boiler type THSD-I E without economiser
The type THSD-I E classical 3 pass flame tube flue gas tube boiler with inner fully water cooled flue gas turning chamber with finned tube wall guarantees high efficiency. The boiler consists of a cylindric shell, the two head plates, the flame tube including the back flue gas turning chamber with water cooled finned tube wall, the two flue gas passes and the fitting pipe, placed either on the right (standard) or on the left. The boiler door is insulated and flue gas proof for burner mounting. The boiler is completely electrically welded and provided with all required inspection openings.
The spacious flame tube with low thermal charges results in an excellent combustion and reduced emissions. The large water content secures an even burner running time and thus reduces the number of boiler starts.

Boiler body type THSD-I E with economiser
Design according to THSD-I E **with** economiser for further reduction of flue gas temperature. Therefore a higher efficiency of up to 95 % with minimum space requirements can be achieved.

Admissible max. safety valve pressure
Standard pressures: 10,13 and 16 bar.
Higher pressure on request.

Thermal insulation
The boiler is fully insulated with mineral wool insulation. The casing is made of structured aluminium plate. Fittings and out-cuts are properly rimmed. The flue gas collector is thermally insulated.

Connection fittings and sockets
The connection fittings and sockets on the boiler and on the fitting pipe are meant for the attachment of:
water level regulation and water level control, water level indicator (reflection indicator), manostat for pressure regulation and pressure supervision, pressure gauge set, main steam valve, safety valve(s), boiler feeding, sludging/drainage, desalting.

Large equipment
2 boiler supports in heavy construction
1 flue gas collector with integrated flue gas exit backwards with cleaning door and integrated bleeder valve.
1 boiler door for burner mounting, thermally insulated and designed flue gas proof, placed on left and right swivelable hinges for the flue gas sided cleaning of boiler
1 feed water distribution pipe
1 boiler plate
1 low water mark NW
1 water separator
1 flue gas tube cleaning kit

High efficiency
Due to the above technical facts an efficiency of up to 90 % resp. up to 95 % with economiser, can be achieved. Thus continuous working costs are kept low. The sources of energy are used more efficiently and Hoval spares the environment.

Construction guiding, quality approval
The boiler is designed with all necessary inspection doors.
Construction and production is done acc. to the European Pressure Equipment Directive (PED) 2014/68/EU - EN 12953 with CE-conformity.
The quality approval at our factory is done by TÜV or a national authorised quality institution. The ISO 9001:2000 certification and the quality approval at our factory with our Hoval quality performance department guarantees the highest product quality.
For installation and operation of the boiler the local laws and norms are to be respected. If gas fired the value Nitrogen oxides (NO_x) < 100 mg/Nm³ is guaranteed at nominal output.

Control panel
The control panel for the Hoval boiler can be equipped with the required control units and indicators for control and supervision of boiler and burner. The operation and alarm reports may be shown as fault indication. The control panel will be made upon customer requirements and depending on the burner to be used.

Feed water quality
For operation the Hoval and the country specific feed and boiler water regulations have to be respected and local waste water regulations have to be paid attention to.
Detailed information for the feed water quality can be found in the appendix.

Delivery
The pressure body is provided with a primer. Due to transport reasons the insulation can be fixed at the factory. Burner armatures and control panel are either pre-mounted (as far as transport technically possible) or packed loosely in a separate box. The mounting and wiring can be done at the factory or at site. Connection openings are covered.

On request
- Second safety valve
- Second water level indicator
- Second feed water pump
- Modulating feed water control
- Automatic boiler blow down
- Economiser
- PLC (programmable logic controller) S7-1200/300
- Volt-free contacts for BMS (Building Management System)

THSD-I E (25/20-90/80)

Technical data without economiser

Type			(25/20)	(30/25)	(35/30)	(45/40)	(55/50)	(70/60)	(90/80)
• Steam output (oil- and gas-fired)		kg/h	2500/2000	3000/2500	3500/3000	4500/4000	5500/5000	7000/6000	9000/8000
• Output	at 10 bar	kW	1630/1304	1956/1630	2283/1956	2934/2608	3586/3260	4564/3912	5868/5216
	at 13 bar	kW	1635/1308	1963/1635	2290/1963	2944/2617	3596/3271	4579/3925	5888/5234
	at 16 bar	kW	1639/1311	1967/1639	2295/1967	2951/2623	3606/3278	4590/3934	5901/5246
• Feed water temperature		°C	103	103	103	103	103	103	103
• Safety valve pressure		bar	10	10	10	10	10	10	10
		bar	13	13	13	13	13	13	13
		bar	16	16	16	16	16	16	16
• Boiler efficiency **without** economiser									
Natural gas	at 10 bar	%	89.4/89.9	89.3/89.7	89.2/89.6	89.2/89.5	89.7/89.9	89.8/90.2	89.3/89.6
	at 13 bar	%	88.9/89.4	88.9/98.3	88.7/89.2	88.7/89.1	89.2/89.5	89.4/89.8	88.8/89.2
	at 16 bar	%	88.5/89.0	88.4/88.9	88.3/88.8	88.4/88.7	88.8/89.1	89.0/89.4	88.5/88.8
Diesel oil	at 10 bar	%	90.0/90.5	90.0/90.4	89.9/90.3	89.9/90.2	90.4/90.6	90.5/90.8	90.0/90.3
	at 13 bar	%	89.6/90.1	89.6/90.0	89.5/89.9	89.5/89.8	89.9/90.1	90.0/90.4	89.5/89.9
	at 16 bar	%	89.2/89.7	89.2/89.6	89.1/89.5	89.1/89.4	89.5/89.8	89.7/90.0	89.2/89.5
• Flue gas resistance		mbar	11.0/8.5	12.0/9.0	12.0/9.5	12.0/10.0	12.5/10.0	13.0/10.5	13.0/11.0
• Water content *	up to LW	l	3610	4310	4790	5840	7100	7940	9970
	full	l	4500	5400	5860	7180	8790	10010	13100
• Flue gas temperature after boiler **without** economiser									
Natural gas	at 10 bar	°C	241/229	243/233	246/236	246/239	237/231	234/226	247/239
	at 13 bar	°C	250/238	252/242	256/245	256/248	246/241	244/235	257/249
	at 16 bar	°C	259/247	260/251	264/254	264/256	255/249	252/244	264/256
Diesel oil	at 10 bar	°C	236/225	237/228	241/231	241/234	232/227	230/222	242/235
	at 13 bar	°C	245/234	247/238	250/241	251/243	242/237	240/232	252/242
	at 16 bar	°C	254/243	255/246	259/249	259/252	250/245	248/240	259/251

* For boiler design pressure 10 bar

Technical data economiser (gas firing only)

Type			(25/20)	(30/25)	(35/30)	(45/40)	(55/50)	(70/60)	(90/80)
• Additional output economiser									
	at 10 bar	kW	92/62	114/86	136/107	170/141	192/165	237/186	355/294
	at 13 bar	kW	100/72	124/94	147/117	185/155	210/182	258/205	385/322
	at 16 bar	kW	107/77	132/101	158/126	197/166	226/196	280/224	402/337
• Boiler efficiency **with** economiser		%	94.4	94.4	94.4	94.4	94.4	94.4	94.4
• Flue gas resistance economiser		mbar	1.5	1.5	2.0	2.0	2.0	2.2	2.2
• Feed water temperature	inlet	°C	103	103	103	103	103	103	103
• Feed water temperature	outlet								
	at 10 bar	°C	134/130	135/132	136/133	135/133	133/131	132/129	136/134
	at 13 bar	°C	137/133	138/135	139/136	138/136	135/134	134/132	139/137
	at 16 bar	°C	139/136	140/137	141/138	140/138	138/136	137/135	141/139
• Flue gas temperature after economiser		°C	140 *	140 *	140 *	140 *	140 *	140 *	140 *

* On request: 130 °C

THSD-I E (25/20-90/80)

Dimensions and weights

Type			(25/20)	(30/25)	(35/30)	(45/40)	(55/50)	(70/60)	(90/80)
• Boiler body diameter, without insulation		mm	1750	1850	1900	2000	2100	2200	2400
• Boiler length (pressure body)		mm	2800	3000	3200	3550	4000	4200	4700
• Inner flame tube diameter	at 10 bar	mm	650	700	750	800	850	900	1000
	at 13 bar	mm	650	700	750	800	850	900	1000
	at 16 bar	mm	650	700	750	800	850	900	1000/1150
• Flame tube length, with turning chamber		mm	2680	2880	3080	3430	3880	4080	4580
• Boiler **length** with insulation, without burner		mm	3330	3530	3730	4080	4530	4830	5330
• Boiler **width** with insulation, without pump		mm	2255	2355	2405	2505	2605	2705	2905
• Boiler **height** with insulation, without armatures		mm	2290	2390	2440	2590	2690	2790	2990
• Flue gas outlet diameter		mm	400	450	450	550	600	650	750
• Transport weight **without** burner and **without** economiser incl. accessories	at 10 bar	kg	5000	6000	7000	8000	9500	11000	14500
	at 13 bar	kg	5500	6500	7500	8500	10500	12500	15500
	at 16 bar	kg	6000	7000	8000	9500	11000	13500	16500

Armatures

Type		(25/20)	(30/25)	(35/30)	(45/40)	(55/50)	(70/60)	(90/80)
• 1 flue gas tube cleaning equipment		yes	yes	yes	yes	yes	yes	yes
• 1 main steam valve	10 bar	DN 80	DN 100	DN 100	DN 125	DN 125	DN 150	DN 150
	13 bar	DN 80	DN 80	DN 80	DN 100	DN 125	DN 125	DN 150
	16 bar	DN 65	DN 65	DN 80	DN 100	DN 100	DN 125	DN 125
• 1 vent valve		DN 25	DN 25	DN 25	DN 25	DN 25	DN 25	DN 25
• 2 safety valves	10 bar	DN 25/40	DN 25/40	DN 25/40	DN 32/50	DN 32/50	DN 40/65	DN 40/65
	13 bar	DN 25/40	DN 25/40	DN 25/40	DN 32/50	DN 32/50	DN 32/50	DN 40/65
	16 bar	DN 25/40	DN 25/40	DN 25/40	DN 25/40	DN 25/40	DN 32/50	DN 32/50
• 2 water level gauge valves		DN 20	DN 20	DN 20	DN 20	DN 20	DN 20	DN 20
• 2 reflection indicators		M = 420	M = 420	M = 420	M = 420	M = 420	M = 420	M = 420
• 1 sample taking and desalting shut-off valve		DN 15	DN 15	DN 15	DN 15	DN 15	DN 15	DN 15
• 1 purge shut-off valve		DN 40	DN 40	DN 40	DN 40	DN 40	DN 40	DN 40
• 1 purge ball valve		DN 40	DN 40	DN 40	DN 40	DN 40	DN 40	DN 40
• 1 pressure gauge with three-way valve		R ½"	R ½"	R ½"	R ½"	R ½"	R ½"	R ½"
• 3 feed water/pump valves		DN 25	DN 25	DN 25	DN 32	DN 32	DN 40	DN 40
• 3 feed water backstroke/no return valves		DN 25	DN 25	DN 25	DN 32	DN 32	DN 40	DN 40
• 2 strainers (pump suction side)		DN 40	DN 40	DN 40	DN 50	DN 50	DN 65	DN 65
• 2 ball valve pumps (suction side)		DN 40	DN 40	DN 40	DN 50	DN 50	DN 65	DN 65
• 1 pressure gauge pump with shut-off valve		R ¼"	R ¼"	R ¼"	R ¼"	R ¼"	R ¼"	R ¼"
• 2 feed water pumps	10 bar	CR	CR	CR	CR	CR	CR	CR
Motor rating	10 bar	2.2	3.0	3.0	4.0	4.0	5.5	7.5
• 2 feed water pumps	13 bar	CR	CR	CR	CR	CR	CR	CR
Motor rating	13 bar	3.0	4.0	4.0	4.0	5.5	7.5	11.0
• 2 feed water pumps	16 bar	CR	CR	CR	CR	CR	CR	CR
Motor rating	16 bar	4.0	4.0	5.5	5.5	7.5	7.5	11.0

THSD-I E (110/100-220/200)

Technical data without economiser

Type			(110/100)	(130/120)	(150/140)	(170/160)	(190/180)	(220/200)
• Steam output (gas-fired) - 10 bar		kg/h	11000/10000	13000/12000	15000/14000	17000/16000	19000/18000	21450/20000
• Steam output (oil-fired) - 10 bar		kg/h	10960/10000	12044/12044	12966/12966	13920/13920	14860/14860	16750/16750
• Output	at 10 bar	kW	7120/6520	8476/7824	9780/9128	11084/10432	12364/11736	13962/13040
	at 13 bar	kW	7196/6542	8505/7850	9813/9159	11121/10467	12409/11776	13896/13084
	at 16 bar	kW	7213/6557	8524/7868	9835/9180	11147/10491	12442/11802	13838/13114
• Feed water temperature		°C	103	103	103	103	103	103
• Safety valve pressure		bar	10	10	10	10	10	10
		bar	13	13	13	13	13	13
		bar	16	16	16	16	16	16
• Boiler efficiency **without** economiser								
Natural gas	at 10 bar	%	89.1/89.4	89.5/89.7	89.2/89.5	89.3/89.5	89.2/89.4	89.5/89.7
	at 13 bar	%	88.7/89.0	89.1/89.3	88.9/89.1	88.9/89.1	88.8/89.0	89.0/89.2
	at 16 bar	%	88.4/89.0	88.7/88.9	88.4/88.7	88.5/88.7	88.4/88.6	88.7/88.8
Diesel oil	at 10 bar	%	90.1/90.4	90.4/90.4	90.3/90.3	90.5/90.5	90.6/90.6	90.8/90.8
	at 13 bar	%	89.4/89.7	89.8/90.0	89.8/89.8	90.0/90.0	90.1/90.1	90.4/90.4
	at 16 bar	%	89.1/89.4	89.5/89.6	89.4/89.4	89.6/89.6	89.7/89.7	90.0/90.0
• Flue gas resistance		mbar	15.0/13.0	15.0/13.0	15.0/13.0	15.0/13.0	15.0/13.0	15.0/13.0
• Water content *	up to LW	l	13400	13520	17610	19310	21860	22980
	full	l	17700	19220	24030	26300	29750	31930
• Flue gas temperature after boiler **without** economiser								
Natural gas	at 10 bar	°C	250/244	243/238	249/244	248/244	250/246	245/240
	at 13 bar	°C	260/253	251/246	257/252	256/252	258/254	254/250
	at 16 bar	°C	267/260	260/255	265/261	265/261	266/262	262/258
Diesel oil	at 10 bar	°C	246/239	234/234	235/235	231/231	230/230	226/226
	at 13 bar	°C	255/249	246/242	247/247	243/243	241/241	235/235
	at 16 bar	°C	262/256	254/251	255/255	251/251	249/249	243/243

* For boiler design pressure 10 bar

Technical data economiser (gas firing only)

Type			(110/100)	(130/120)	(150/140)	(170/160)	(190/180)	(220/200)
• Additional output economiser								
	at 10 bar	kW	435/374	505/444	580/519	670/608	771/707	840/741
	at 13 bar	kW	473/408	529/468	617/556	712/648	817/752	991/809
	at 16 bar	kW	494/429	566/503	660/595	768/694	871/803	972/866
• Boiler efficiency **with** economiser		%	94.4	94.4	94.4	94.4	94.4	94.4
• Flue gas resistance economiser		mbar	2.5	2.5	2.5	3.0	3.0	3.0
• Feed water temperature	inlet	°C	103	103	103	103	103	103
• Feed water temperature	outlet							
	at 10 bar	°C	136/135	136/134	136/134	136/135	137/136	136/134
	at 13 bar	°C	139/138	137/136	138/137	138/137	139/138	139/137
	at 16 bar	°C	141/139	140/138	140/139	141/140	142/141	141/140
• Flue gas temperature after economiser		°C	140 *	140 *	140 *	140 *	140 *	140 *

* On request: 130 °C

THSD-I E (110/100 - 220/200)

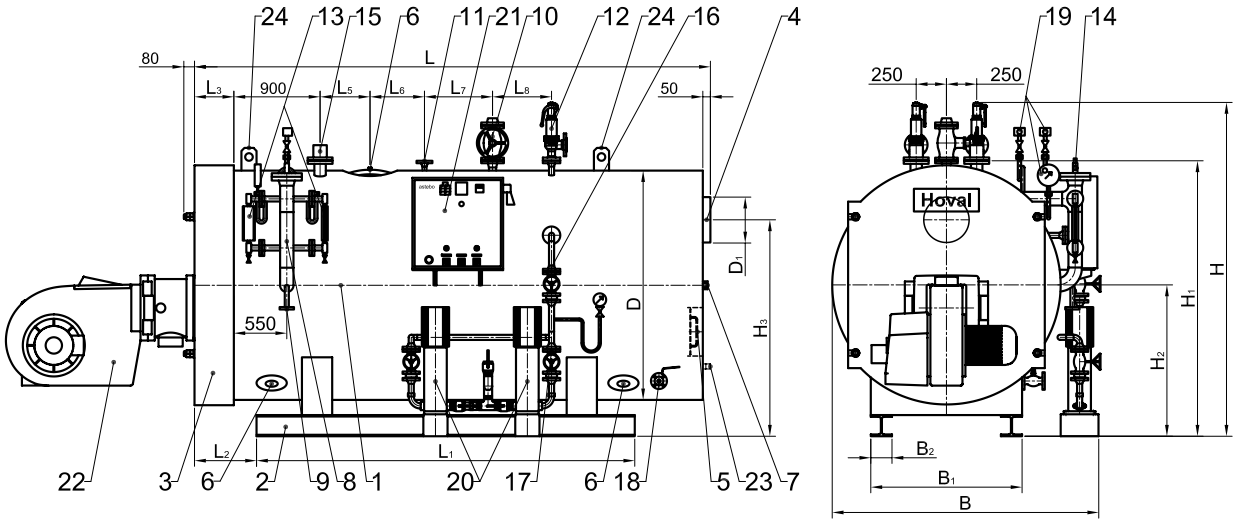
Dimensions and weights

Type			(110/100)	(130/120)	(150/140)	(170/160)	(190/180)	(220/200)
• Boiler body diameter, without insulation		mm	2600	2800	2900	3000	3100	3200
• Boiler length (pressure body)		mm	5100	5500	5800	6100	6300	6800
• Inner flame tube diameter	at 10 bar	mm	1050	1100	1150	1200	1250	1300/1450
	at 13 bar	mm	1050	1100/1250	1150/1300	1200/1350	1250/1400	1300/1450
	at 16 bar	mm	1050/1200	1100/1250	1150/1300	1200/1350	1250/1400	1300/1450
• Flame tube length, with turning chamber		mm	4930	5330	5630	5930	6130	6630
• Boiler **length** with insulation, without burner		mm	5850	6180	6480	6650	7015	7515
• Boiler **width** with insulation, with pump		mm	3105	3305	3405	3505	3605	3705
• Boiler **height** with insulation, without armatures		mm	3200	3410	3510	3610	3710	3810
• Flue gas outlet diameter		mm	850	950	1000	1050	1100	1200
• Transport weight **without** burner and **without** economiser incl. accessories	at 10 bar	kg	17500	22000	26000	28500	30500	34000
	at 13 bar	kg	19000	23000	26500	29000	31000	36500
	at 16 bar	kg	19500	24500	28500	31500	35500	40000

Armatures

Type		(110/100)	(130/120)	(150/140)	(170/160)	(190/180)	(220/200)
• 1 flue gas tube cleaning equipment		yes	yes	yes	yes	yes	yes
• 1 main steam valve	10 bar	DN 200	DN 200	DN 200	DN 200	DN 250	DN 250
	13 bar	DN 150	DN 150	DN 200	DN 200	DN 200	DN 250
	16 bar	DN 150	DN 150	DN 150	DN 200	DN 200	DN 200
• 1 vent valve		DN 25	DN 25	DN 25	DN 25	DN 25	DN 25
• 2 safety valves	10 bar	DN 50/80	DN 50/80	DN 65/100	DN 65/100	DN 65/100	DN 65/100
	13 bar	DN 40/65	DN 50/80	DN 50/80	DN 50/80	DN 65/100	DN 65/100
	16 bar	DN 40/65	DN 40/65	DN 50/80	DN 50/80	DN 50/80	DN 50/80
• 2 water level gauge valves		DN 20	DN 20	DN 20	DN 20	DN 20	DN 20
• 2 reflection indicators		M = 420	M = 420	M = 420	M = 420	M = 420	M = 420
• 1 sample taking and desalting shut-off valve		DN 15	DN 15	DN 15	DN 15	DN 15	DN 15
• 1 purge shut-off valve		DN 40	DN 40	DN 40	DN 40	DN 40	DN 40
• 1 purge ball valve		DN 40	DN 40	DN 40	DN 40	DN 40	DN 40
• 1 pressure gauge with three-way valve		R ½"	R ½"	R ½"	R ½"	R ½"	R ½"
• 2 feed water/pump valves		DN 50	DN 50	DN 50	DN 50	DN 65	DN 65
• 2 feed water backstroke/no return valves		DN 50	DN 50	DN 50	DN 50	DN 65	DN 65
• 1 strainers (pump suction side)		DN 80	DN 80	DN 80	DN 100	DN 100	DN 100
• 1 ball valve pump (suction side)		DN 80	DN 80	DN 80	DN 100	DN 100	DN 100
• 1 pressure gauge pump with shut-off valve		R ¼"	R ¼"	R ¼"	R ¼"	R ¼"	R ¼"
• 2 feed water pumps	10 bar	CR	CR	CR	CR	CR	CR
Motor rating	10 bar	7.5	11.0	11.0	11.0	15.0	15.0
• 2 feed water pumps	13 bar	CR	CR	CR	CR	CR	CR
Motor rating	13 bar	11.0	11.0	15.0	15.0	18.5	18.5
• 2 feed water pumps	16 bar	CR	CR	CR	CR	CR	CR
Motor rating	16 bar	15.0	15.0	18.5	18.5	22.0	22.0

Steam boiler THSD-I E without economiser



1 Boiler
2 Boiler base
3 Hinged front door
4 Flue gas outlet
5 Explosion flap and cleaning opening
6 Inspection opening
7 Inspection glass (flame tube)
8 Fitting pipe
9 Continuous blowdown valve
10 Steam valve
11 Vent valve
12 Safety valve(s)
13 Water level gauge
14 Water level control
15 Water insufficiency control 1 + 2
16 Feed water piping
17 Feed water valve(s)
18 Blow down/purge valve
19 Pressure gauge and manostat
20 Feed water pump(s)
21 Electrical control panel
22 Burner
23 Condensate drain nozzle
24 Crane hooks

Type	Main dimensions				Connecting dimensions							Base frame				Flue gas connection		Required space B x H (for transport)			
	L	B **	H	D	L_3	L_5	L_6	L_7	L_8	H_1	H_2	L_1	L_2	B_1	B_2	H_3	D_1	with armatures		without armatures	
25/20	3330	2585	2710	1950	230	350	350	300	600	2260	1175	2200	380	1500	160	1750	400	2600	2750	2300	2300
30/25	3530	2685	2810	2050	230	350	350	300	800	2360	1225	2400	380	1500	160	1825	450	2700	2850	2400	2400
35/30	3730	2735	2950	2100	230	400	350	350	350	2410	1250	2600	380	1550	160	1850	450	2750	3000	2450	2500
45/40	4080	2835	3100	2200	230	500	400	400	400	2560	1350	2950	380	1650	160	1950	550	2850	3100	2550	2600
55/50	4530	2935	3250	2300	230	600	500	500	500	2660	1400	3400	380	1700	160	2050	600	2950	3300	2650	2700
70/60	4830	3035	3350	2400	230	600	500	600	600	2760	1450	3600	380	1800	160	2100	650	3050	3400	2750	2800
90/80	5330	3235	3680	2600	230	600	600	600	600	2960	1550	4100	380	1950	160	2250	750	3250	3700	2950	3000
110/100	5850	3435	3930	2800	280	600	600	600	800	3210	1700	4500	430	2050	200	2450	850	3450	3950	3150	3250
130/120	6180	3635	4220	3000	280	600	600	700	1000	3410	1800	4900	430	2200	200	2650	950	3650	4250	3350	3450
150/140	6480	3735	4320	3100	280	600	600	800	1100	3510	1850	5200	430	2250	200	2675	1000	3750	4350	3450	3550
170/160	6680	3835	4420	3200	280	600	600	900	1200	3610	1900	5400	430	2300	200	2750	1050	3850	4450	3550	3650
190/180	7015	3935	4630	3300	315	600	600	1000	1300	3710	1950	5700	430	2400	200	2800	1100	3950	4650	3650	3750
220/200	7515	4035	4730	3400	315	600	600	1100	1400	3810	2000	6000	430	2500	200	2850	1200	4050	4750	3750	3850

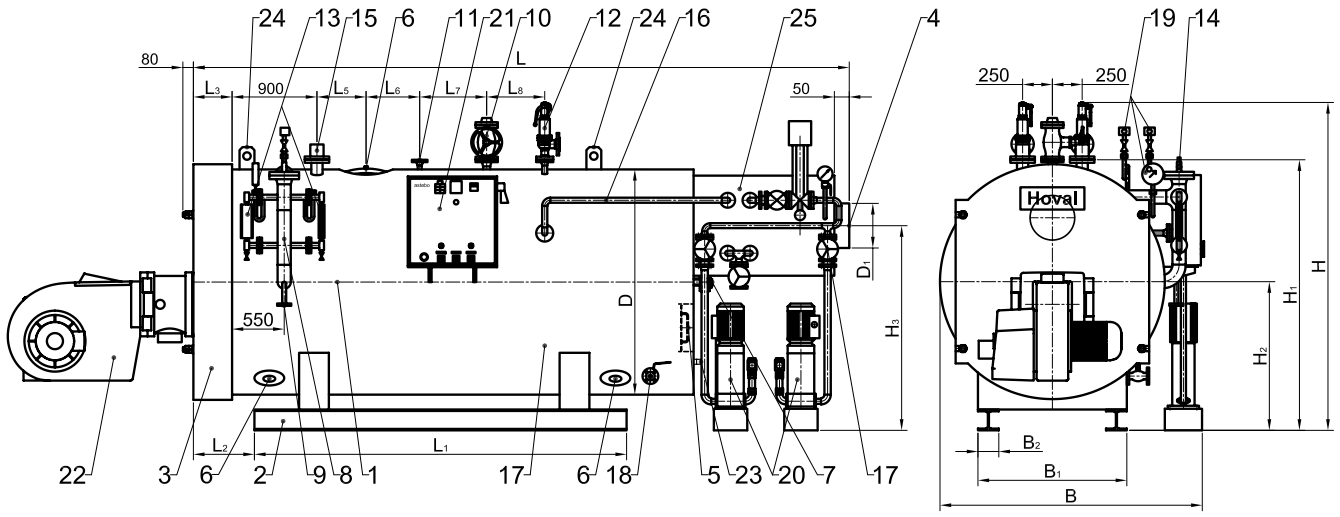
Design pressure 10, 13 and 16 bar (gauge).
Other pressure levels on request!

Add 100 mm to H_1 for crane hooks.
Dimensions incl. 100 mm isolation.

Transport dimensions for design pressure 10 bar

** Dimension may vary to used pumps

Steam boiler THSD-I E with economiser



1 Boiler
2 Boiler base
3 Hinged front door
4 Flue gas outlet
5 Explosion flap and cleaning opening
6 Inspection opening
7 Inspection glass (flame tube)
8 Fitting pipe
9 Continuous blowdown valve
10 Steam valve
11 Vent valve
12 Safety valve(s)
13 Water level gauge
14 Water level control
15 Water insufficiency control 1 + 2
16 Feed water piping
17 Feed water valve(s)
18 Blow down/purge valve
19 Pressure gauge and manostat
20 Feed water pump(s)
21 Electrical control panel
22 Burner
23 Condensate drain nozzle
24 Crane hooks
25 Economiser

Type	Main dimensions				Connecting dimensions							Base frame				Flue gas connection		Required space B x H (for transport)			
																		with armatures		without armatures	
	L	B **	H	D	L_3	L_5	L_6	L_7	L_8	H_1	H_2	L_1	L_2	B_1	B_2	H_3	D_1				
25/20	4437	2585	2710	1950	230	350	350	300	600	2260	1175	2200	380	1500	160	1540	350	2600	2750	2300	2300
30/25	4637	2685	2810	2050	230	350	350	300	800	2360	1225	2400	380	1500	160	1645	350	2700	2850	2400	2400
35/30	4875	2735	2950	2100	230	400	350	350	350	2410	1250	2600	380	1550	160	1655	400	2750	3000	2450	2500
45/40	5262	2835	3100	2200	230	500	400	400	400	2560	1350	2950	380	1650	160	1720	450	2850	3100	2550	2600
55/50	5750	2935	3250	2300	230	600	500	500	500	2660	1400	3400	380	1700	160	1795	500	2950	3300	2650	2700
70/60	6087	3035	3350	2400	230	600	500	600	600	2760	1450	3600	380	1800	160	1845	550	3050	3400	2750	2800
90/80	6662	3235	3680	2600	230	600	600	600	600	2960	1550	4100	380	1950	160	1965	650	3250	3700	2950	3000
110/100	7220	3435	3930	2800	280	600	600	600	800	3210	1700	4500	430	2050	200	2140	700	3450	3950	3150	3250
130/120	7587	3635	4220	3000	280	600	600	700	1000	3410	1800	4900	430	2200	200	2295	750	3650	4250	3350	3450
150/140	7925	3735	4320	3100	280	600	600	800	1100	3510	1850	5200	430	2250	200	2330	800	3750	4350	3450	3550
170/160	8162	3835	4420	3200	280	600	600	900	1200	3610	1900	5400	430	2300	200	2365	850	3850	4450	3550	3650
190/180	8535	3935	4630	3300	315	600	600	1000	1300	3710	1950	5700	430	2400	200	2425	900	3950	4650	3650	3750
220/200	9110	4035	4730	3400	315	600	600	1100	1400	3810	2000	6000	430	2500	200	2435	1000	4050	4750	3750	3850

Design pressure 10, 13 and 16 bar (gauge).
Other pressure levels on request!

Transport dimensions for design pressure 10 bar

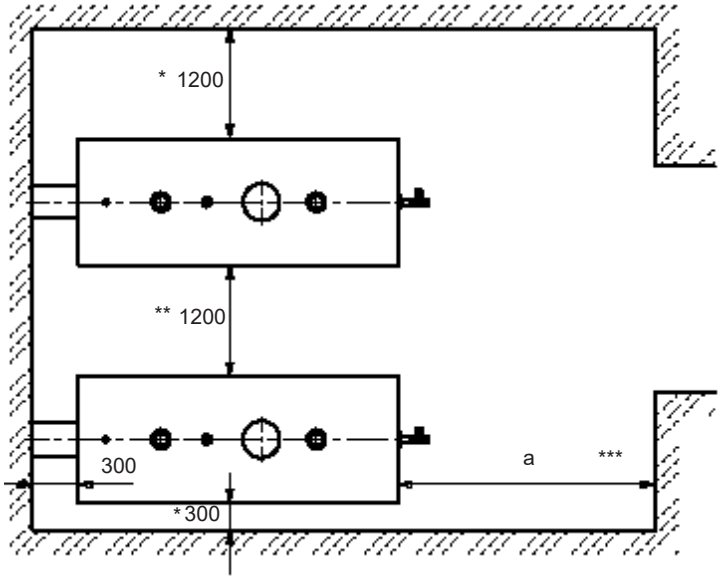
** Dimension may vary to used pumps

Add 100 mm to H_1 for crane hooks.
Dimensions incl. 100 mm isolation.

Space requirements

Installation

(Dimensions in mm)



To facilitate installation and maintenance the given measures should be kept.

Minimal space refers to boiler.
Depending on equipment (accessories) the minimal space have to be examined according to TRD 403.

Positioning

- No air pollution through halogenated hydrocarbon (contained e.g. in sprays, paints, solvents and cleaners)
- No large amounts of dust
- No high atmospheric humidity
- Frost-resistant and well ventilated

Otherwise errors and damages to the installation may occur.

The boiler may only be installed in rooms where air pollution through halogenated hydrocarbon can occur if sufficient measures are taken ensuring the supply of unpolluted combustion air.

* 300 mm/1200 mm + burner overall length (consider pivoting range/pivoting side of boiler front door too)

** Consider control panel, pump build-up

*** Flame tube length (cleaning)

Steam output (t/h)	2.5/2.0	3.0/2.5	3.5/3.0	4.5/4.0	5.5/5.0	7.0/6.0	9.0/8.0	11.5/10.0
THSD-I E a (mm)	2800	3000	3200	3550	4000	4200	4700	5100

Steam output (t/h)	13.0/12.0	15.0/14.0	17.0/16.0	19.0/18.0	22.0/20.0
THSD-I E a (mm)	5500	5800	6100	6300	6800

Rules and regulations

The following rules and regulations have to be respected:

- Hoval technical information and installation guide
- hydraulic and control technical regulations, to guarantee the min. admissible boiler temperature and the conditions for a safe operation according to national regulations
- fire protection regulations
- national regulations concerning permission, installation and operation of boiler appliances Boiler appliances have to be installed according to national laws and regulations and accessories requirements.
- Besides the national and local regulations the project specific circumstances of the boiler supplier have to be considered for every application.

Water treatment/water quality

- The quality of the boiler water has to be guaranteed according to Hoval technical information and national regulations.
- Hoval boilers may only be operated with treated water. The national regulations for the treatment of water apply for the values to be kept.
- Required water quality see attachment.
- Don't use chemical additives like anti-freeze etc. Except chemicals which are necessary for normal boiler operation (see water quality specification).
- Old and new installations must be well flushed before filling.
- The water quality has to be checked daily.

Planning, operation and maintenance

- The heating of the feed water and the degassing takes place in the feed water tank.
- To increase the efficiency, especially for natural gas operation, an economiser can be added to preheat the feed water.
- Pumps (especially horizontal rotary pumps
- and hot water/condensate pumps, NPSH pumps) need to be installed with the necessary flow, return pipework and positive suction pressure according to requirements. The installation has to be completely free of tension (anti-vibration proof).
- National and local rules and regulations have to be considered for the fuel supply.
- The operation and water analysis data are to be recorded daily in the operation booklet.
- Safety valves and blow-off pipes must discharge the system overpressure riskless.
- Filters and strainers have to be cleaned periodically, especially if installed in front of control devices.
- The drain of the desalting, blow down, drainage, overflow, etc. has to be safely discharged into a dislodging tank.
- All heating components and pipework are to be insulated in order to reduce radiation losses.

Combustion air

- The supply of combustion air must be guaranteed for a safe and economic operation. There must be no possibility of the air supply being shut off.
- Ventilation of the boiler house has to also be provided.
- In the installation room no negative pressure larger than 3 N/m^2 is allowed. To adhere to this demand, plan a free area for the air supply opening of at least 200 cm^2, plus 2 cm^2 per kW output . The aspect ratio for rectangular openings should not be more than 1.5 : 1. If the opening is louvred ensure the free area is sufficient. National laws have to be respected.
- Boiler houses have to be fitted with the relevant outer pressure relief surface.
- Steam boilers are not to be installed in rooms where halogen compounds occur which can enter the combustion air. (e.g. laundries, drying and hobby rooms, etc.).

Noise level reduction

The following measures for noise level reduction are possible:

- Solid construction of heating room walls, ceiling and floor, installation of silencer in fresh air supply, noise insulation for support and bracket of pipes.
- Installation of sound attenuation cowl for the burner.
- A substantial part of the sound caused in the combustion chamber and in the top heating surfaces is radiated from the flue outlet as sound transmitted by air. In addition to this, resonance features, depending on chimney dimensioning and inlet, may occur which are triggered by the oscillation of the combustion process. These sounds can be reduced by burner-lateral measures, e.g. changes of flame geometry, atomisation characteristics or fuel throughput.
- Flue gas attenuators cause a substantial sound level reduction as well. These sound absorbers should usually be tuned at low frequencies of 60-250 Hz. Flue gas attenuators function according to the principle of sound absorption. The kinetic energy of the exhaust gases is reduced by friction requiring an increase in chimney draft in the flue system. This has to be considered for burner sizing. The connection piece from the boiler to the flue gas sound absorber has to be gas-tight.
- The necessary space requirement of approx. 2 m for the later installation of a flue gas sound absorber should be included when planning.

Chimney/flue gas system

- A properly designed chimney/flue arrangement must be provided to match each particular application.
- To achieve a smooth discharge of the exhaust gases from the boiler into the chimney, the flue connection must enter the chimney at approx. 30-45 °.
- From a length of greater than 1 m thermal insulation is necessary.
- Adequate provision should be made to drain of condensate form the base of the chimney ensuring condensate does not run back into the boiler smokebox.

Boiler and feed water specifications for steam boiler plants

Boiler water - general

Boiler water must be free of hardness components. pH-value should be above neutral level. Please refer to following tables for water composition.

During a BOSB-operation feed and boiler water have to be checked every 72 h, without BOSB operation daily checks are necessary! The values must be recorded in the operating log book!

Feed water specifications for natural circulating boilers – shell boilers (table 1)

Parameter	Unit	Feed water for steam boilers	
Operating pressure	bar (0.1 MPa)	> 0.5 to 20	> 20
Appearance	-	clear, free from suspended solids and foam	
Direct conductivity at 25 °C	µS/cm	not specified, only guide values relevant for boiler water - see table 2	
pH value at 25 °C [1)]	-	> 9.2 [2)]	> 9.2 [2)]
Total hardness [3), 6)] (Ca + Mg)	mmol/l	< 0.01 [3)]	< 0.01
Iron (Fe) concentration	mg/l	< 0.3	< 0.1
Copper (Cu) concentration	mg/l	< 0.05	< 0.03
Silica (SiO_2) concentration	mg/l	not specified, only guide values for boiler water relevant, see table 2	
Oxygen (O_2) concentration	mg/l	< 0.05 [4)]	< 0.02
Oil/grease concentration (see EN 12953-6)	mg/l	< 1	< 1
Organic substances (as TOC) concentration	-	see footnote [5)]	

[1)] With copper alloys in the system the pH value shall be maintained in the range 8.7 to 9.2.

[2)] With softened water pH value > 7.0 the pH value of boiler water according to table 2 should be considered.

[3)] At operating pressure < 1 bar total hardness max. 0.05 mmol/l shall be acceptable.

[4)] Value for continuous operation and/ or if a deaerator is used; if the operation is discontinuous or without deaerator film forming agents and/or excess of oxygen scavenger shall be used.

[5)] Organic substances are generally a mixture of several different compounds. The composition of such mixtures and the behaviour of their individual components under the conditions of boiler operation are difficult to predict. Organic substances may be decomposed to form carbonic acid or other acidic decomposition products which increase the acid conductivity and cause corrosion or deposits. They also may lead to foaming and/or priming which shall be kept as low as possible.

[6)] Noted in the past as °dH, conversion factor: 1 mmol/l = 5.6° dH (German hardness)

Source: EN12953-10:2003 (E) + Hoval handbook

Boiler water specifications for natural circulating boilers – shell boilers - (table 2)

Parameter	Unit	Boiler water for steam boilers using		
		Feedwater direct conductivity > 30 µS/cm		Feedwater direct conductivity ≤ 30 µS/cm
Operating pressure	bar (0.1 MPa)	> 0.5 to 20	> 20	> 0.5
Appearance	-	clear, free from suspended solids and foam		
Direct conductivity at 25 °C [8]	µS/cm	< 6 000 [1]	see figure 1 [1]	< 1 500
pH value at 25 °C	-	10.5 to 12.0	10.5 to 11.8	10.0 to 11.0 [2], [3]
Total hardness [10], [11] (Ca + Mg)	mmol/l	< 0.01		
Composite alkalinity [7]	mmol/l	1 to 15 [1]	1 to 10 [1]	0.1 to 1.0 [3]
Silica (SiO_2) concentration [9]	mg/l	pressure dependent, according to figure 2		
Phosphate (PO_4) [4], [6]	mg/l	10 to 30	10 to 30	6 to 15
Sodium Sulphite (Na_2SO_3) [6]	mg/l	5 to 10	5 to 10	5 to 10
Organic substances (as TOC) concentration	-	see footnote [5]		

[1] With super heater consider 50 % of the indicated upper value as maximum value.

[2] Basic pH adjustment by injecting Na_3PO_4, additional NaOH injection only if the pH value is < 10.

[3] If the acid conductivity of the boiler feedwater is < 0.2 µS/cm, and its Na + K concentration is < 0.010 mg/l, phosphate injection is not necessary. Under the conditions AVT (all volatile treatment, feedwater pH ≥ 9.2 and boiler water pH ≥ 8.0) can be applied, in this case the acid conductivity of the boiler water is < 5 µS/cm.

[4] If coordinated phosphate treatment is used; considering all other values higher PO_4 concentrations are acceptable (see clause 4 of EN 12953-10 for details).

[5] See [5] in table 1.

[6] Measuring only necessary if dosing chemicals are used which contains these composition

[7] Noted in the past as p-value, conversion factor: KS 8.2 = 1 according p-value = 1

[8] For level electrodes minimum conductivity = > 5 µS/cm

[9] It's not necessary to make continuous control of following parameters: Silica (SiO_2) concentration

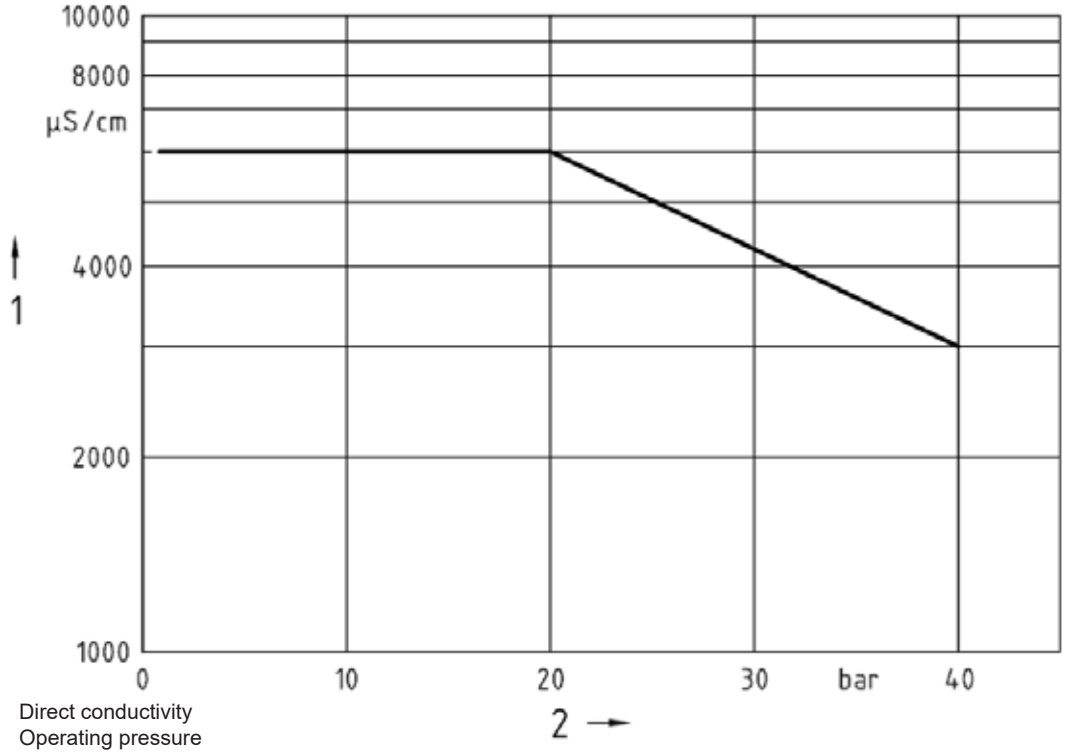
[10] At operating pressure < 1 bar total hardness max. 0.05 mmol/l shall be acceptable.

[11] Noted in the past as °dH, conversion factor: 1 mmol/l = 5.6° dH (German hardness)

Source: EN12953-10:2003 (E) + Hoval handbook

Fig. 1 **Maximum acceptable direct conductivity of the boiler water dependent on the pressure; feedwater direct conductivity > 30 µS/cm**

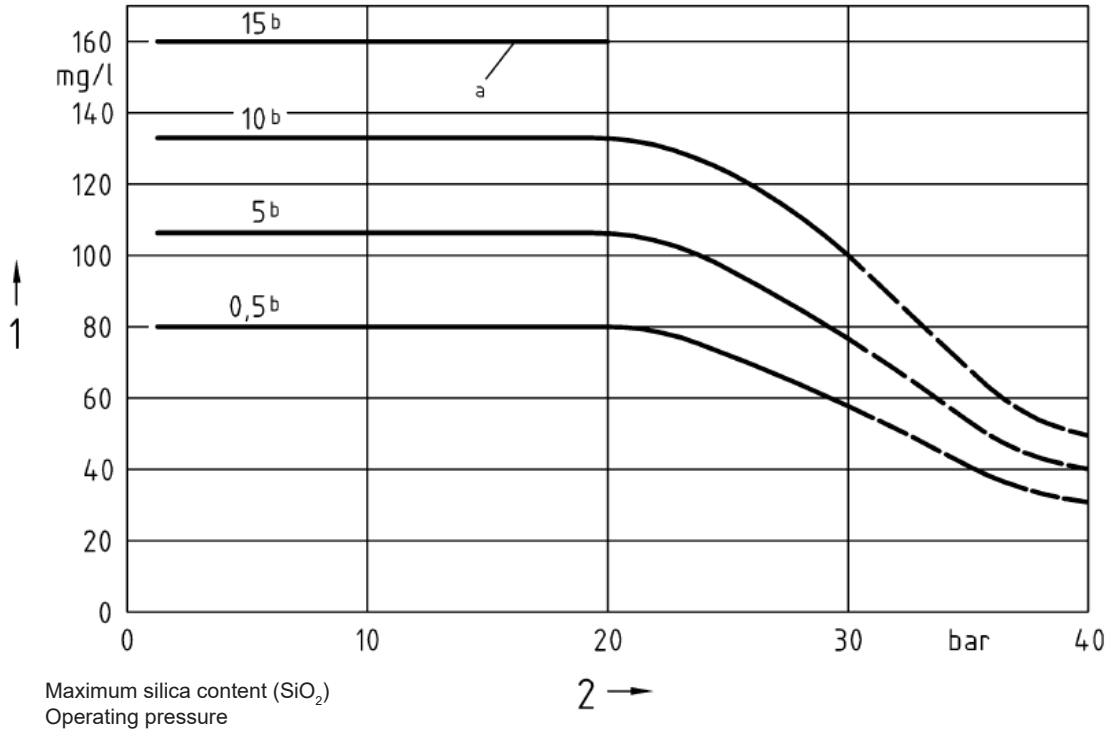
Source: EN12953-10:2003 (E)



1 Direct conductivity
2 Operating pressure

Fig. 2 **Maximum acceptable silica content (SiO_2) of the boiler water dependent on the pressure**

Source: EN12953-10:2003 (E)



1 Maximum silica content (SiO_2)
2 Operating pressure

a This level of alkalinity is not permissible > 20 bar
b Alkalinity in mmol/l

Important notice
Hoval recommends that a water treatment specialist is employed to carry out routine monitoring of the supply water in order to ensure it remains within specification.

SPW-D

Feed water tank SPW-D
The Hoval feed water tank type SPW-D is made of steel sheet St 37.2. The pressureless tank with ventilation into the atmosphere is completely electrically welded and provided with all necessary links. The tank must be positioned approx. 2-3 metres above boiler level. Installed in the container is a heat up feature, consisting of a special heating tube for a direct steam heat up of the tank.

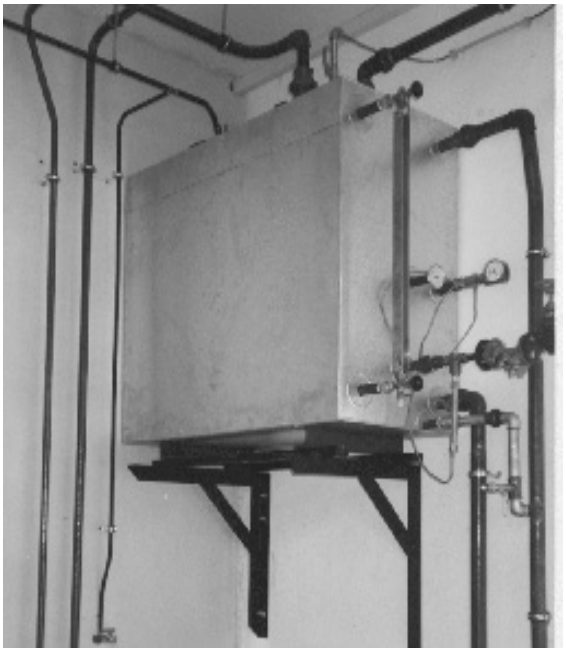
Admissible operating temperature
Operating temperature: 95 °C

Thermal insulation
The tank is completely insulated with mineral wool. The casing is made of structured aluminium plate. Fittings and out-cuts are properly rimmed.

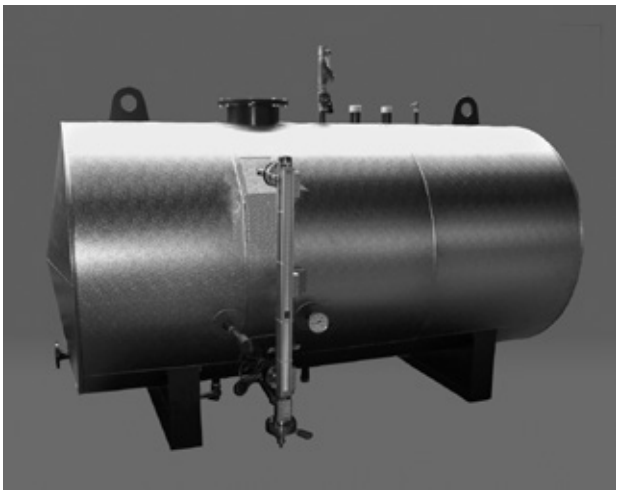
Armatures
The feed water tank will be supplied with the following armatures:
1 water level indicator with glass protection
1 drain valve
1 thermometer diameter 100 mm
1 shut-off valve (water)
1 additional water backfeed with float valve
(on request solenoid valve)

Armatures for heat up equipment:
1 temperature regulator with capillar pipe and impulse connection line
1 steam regulator valve (shut-off valve)
1 strainer (steam)
1 shut-off valve (steam)
1 metering valve

Delivery
The feed water tank is provided with a primer. The insulation and the armatures are either mounted or packed loosely in a separate box according to size.



SPW-D 500-1500 l



SPW-D 2000-3000 l

SPW-D 500-1500 l, angular
SPW-D 2000-3000 l, round

Type		(500)	(1000)	(1500)	(2000)	(3000)
• Water content	l	500	1000	1500	2000	3000
• Construction		angular	angular	angular	angular	angular
• Material		St 37.2	St 37.2	St 37.2	St 37.2	St 37.2
• Wall thickness	mm	5	5	5	4	4
• Regenerated water amount max.	m^3/h	0.5	1.0	1.5	2.0	3.0
• Heating steam output						
from 15 °C to 95 °C	kW	47	93	140	185	279
Saturated steam	kg/h	84	168	252	336	504
• **Length** without insulation	mm	1100	1650	2100	2100	2900
• **Height** without insulation	mm	1000	100	1000	1725	1725
• **Width** without insulation	mm	500	700	700	-	-
• Diameter without insulation	mm	-	-	-	1350	1350
• **Length** with insulation, without armatures	mm	1280	1830	2280	2180	2980
• **Height** with insulation, without armatures	mm	1340	1340	1340	1725	1725
• **Width** with insulation, without armatures	mm	600	800	800	1450	1450

Sockets

Type	(500)	(1000)	(1500)	(2000)	(3000)
• Socket for thermostat	R 2″	R 2″	R 2″	R 2″	R 2″
• Socket for condensate return	R 2″	R 2″	R 2″	R 2″	R 2″
• Socket for venting	R 2″	R 2″	R 2″	R 2″	R 2″
• Socket for over flow	R 1¼″	R 1¼″	R 1¼″	R 1¼″	R 1¼″
• Socket for boiler feeding	R 1½″	R 1½″	R 1½″	R 1½″	R 1½″

Fine armatures with float valve

Type	(500)	(1000)	(1500)	(2000)	(3000)
• 1 fluid level indicator	R ½″	R ½″	R ½″	R ½″	R ½″
• 1 thermometer	R ½″	R ½″	R ½″	R ½″	R ½″
• 1 draining	R 1″	R 1″	R 1″	R 1″	R 1″
• 1 dosing ball valve	R ½″	R ½″	R ½″	R ½″	R ½″
• 1 float valve	R ½″	R ½″	R ¾″	R ¾″	R 1″
• 1 shut-off valve	R ½″	R ½″	R ¾″	R ¾″	R 1″

Fine armatures with magnetic valve

Type		(500)	(1000)	(1500)	(2000)	(3000)
• 1 fluid level indicator		R ½″	R ½″	R ½″	R ½″	R ½″
• 1 thermometer		R ½″	R ½″	R ½″	R ½″	R ½″
• 1 draining		R 1″	R 1″	R 1″	R 1″	R 1″
• 1 dosing ball valve		R ½″	R ½″	R ½″	R ½″	R ½″
• 1 solenoid valve		R ½″	R ½″	R 3/4″	R 3/4″	R 1″
• 1 shut-off valve		R ½″	R ½″	R 3/4″	R 3/4″	R 1″
• 1 two step control	DN	20	20	20	20	20

SPW-D 500-1500 l, angular
SPW-D 2000-3000 l, round

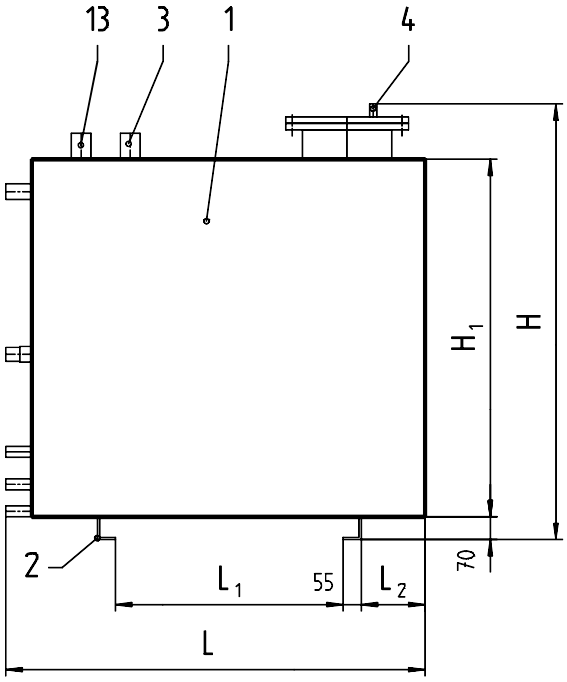
Direct heat up equipment

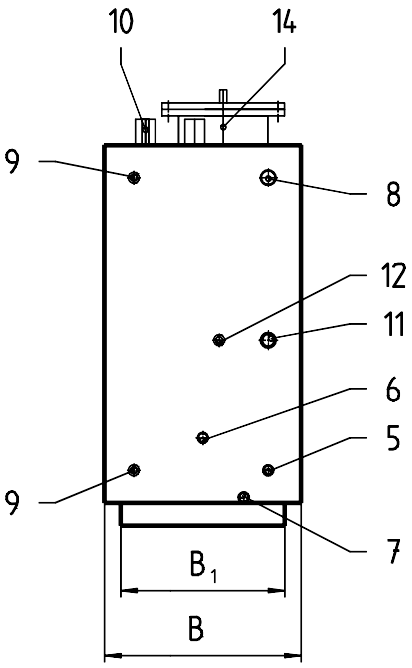
Type		(500)	(1000)	(1500)	(2000)	(3000)
• 1 nozzle pipe		yes	yes	yes	yes	yes

Fine armatures, heating steam

Type		(500)	(1000)	(1500)	(2000)	(3000)
• 1 shut-off valve incl. temperature regulator						
	0.5 bar	R 1″	DN 40	DN 50	DN 65	DN 65
	6 bar	R ½″	R ½″	R ¾″	DN 25	DN 25
	10 bar	R ½″	R ½″	R ½″	DN 20	DN 25
	13 bar	R ½″	R ½″	DN 15	DN 15	DN 32
	16 bar	R ½″	R ½″	DN 15	DN 15	DN 32
• 1 shut-off valve	0.5 bar	R 1¼″	R 2″	DN 65	DN 80	DN 80
	6 bar	DN 20	DN 25	DN 32	DN 40	DN 50
	10 bar	DN 15	DN 20	DN 25	DN 32	DN 40
	13 bar	DN 15	DN 20	DN 25	DN 25	DN 32
	16 bar	DN 15	DN 20	DN 20	DN 25	DN 32
• 1 strainer	0.5 bar	R 1¼″	R 2″	DN 65	DN 80	DN 80
	6 bar	DN 20	DN 25	DN 32	DN 40	DN 50
	10 bar	DN 15	DN 20	DN 25	DN 32	DN 40
	13 bar	DN 15	DN 20	DN 25	DN 25	DN 32
	16 bar	DN 15	DN 20	DN 20	DN 25	DN 32

SPW-D 500-1500 l, angular



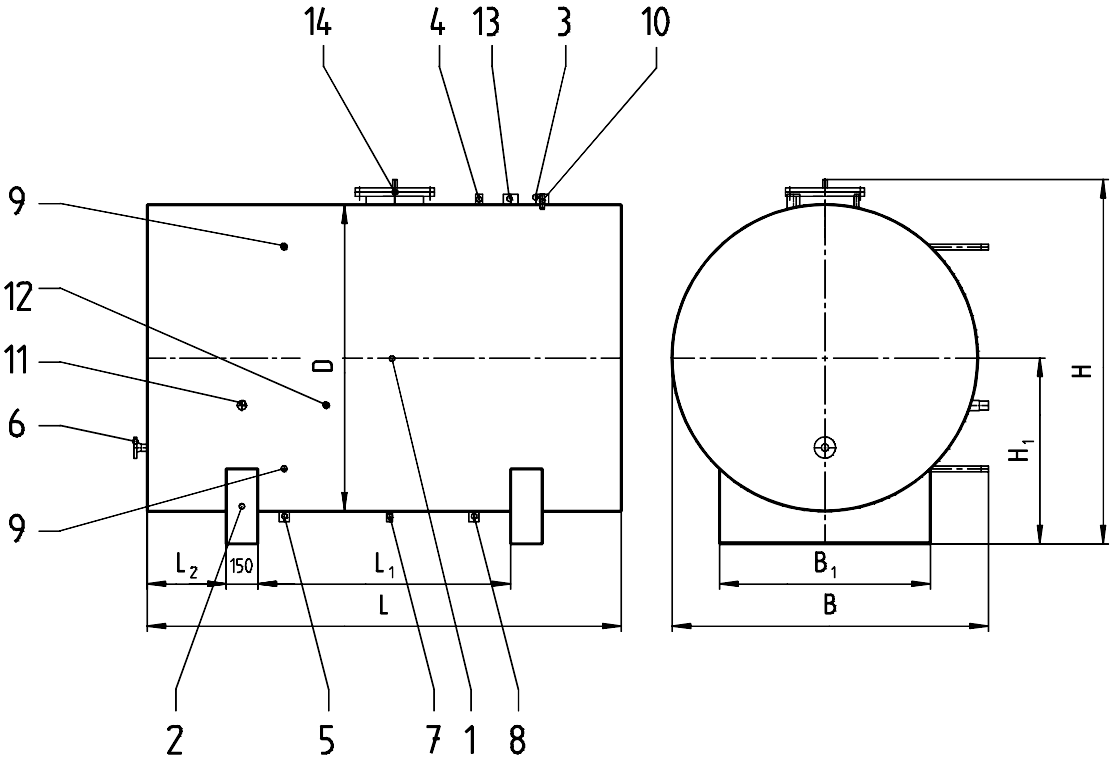


1	Feed water tank	6	Steam injection/heating
2	Tank base frame	7	Drain
3	Condensate inlet	8	Over flow outlet
4	Regenerated water inlet	9	Water level indicator
5	Boiler feed water connection	10	Dosing connection
11	Thermostat		
12	Thermometer		
13	Vent		
14	Inspection opening with level control		

Content	Main dimensions				Base frame		
[litres]	L	B	H	H_1	L_1	L_2	B_1
(500)	1280	600	1340	1000	695	195	500
(1000)	1830	800	1340	1000	945	345	700
(1500)	2280	800	1340	1000	1195	445	700

Dimensions incl. 50 mm insulation.

SPW-D 2000-3000 l, round



1 Feed water tank
2 Tank base frame
3 Condensate inlet
4 Regenerated water inlet (not if float valve)
5 Boiler feed water connection
6 Steam injection (direct) (optional) indirect heat up
7 Drain
8 Over flow outlet
9 Water level indicator
10 Dosing connection
11 Thermostat
12 Thermometer
13 Vent
14 Inspection opening with level control by electrode (optional) level control by float valve

Content	Main dimensions					Base frame		
[litres]	L	B	H	H_1	D	L_1	L_2	B_1
(2000)	2650	1150	1400	750	1100	1200	500	700
(3000)	2980	1450	1725	870	1350	1750	400	900

Dimensions incl. 50 mm insulation.

SPW-E 3000-30000 l
Feed water tank with deaerator
(calculated for 50 % condensate, 50 % fresh water)

SPW-E

Feed water tank SPW-E
The Hoval feed water tank type SPW-E is made of steel St 37.2. The tank is completely electrically welded and provided with all necessary links. The tank must be positioned approx. 2-4 meters above boiler level (sub-construction to be made on site). Installed in the tank is a bottom heating equipment consisting of a special heating tube for a direct steam heat up of the tank. The trickle plate deaerator is made of special Inox high quality steel 1.4301. It consists of all the required fixtures, as well as the linking fittings with attachment flange.

Admissible operating pressure/temperature
Max. operating temperature: 110 °C
Max. operating pressure: 0.5 bar

Thermal insulation
The tank is completely insulated with mineral wool. The casing is made of structured aluminium plate. Fittings and out-cuts are properly rimmed.

Armatures
The feed water tank will be supplied with the following armatures:
1 magnetic level indicator
1 drainage ball valve
1 boiler feed water valve
1 safety valve
1 thermometer diameter 100 mm
1 pressure gauge set
1 overflow with condensate discharger
1 vapour valve made of quality steel

Delivery
The feed water tank is provided with a primer. The accessories are supplied loosely in a separate box.

Level regulation
2 magnetic switches for magnetic valve on/off
1 electronic control panel for wall mounting

Additional water group
1 magnetic valve
1 shut-off/surrounding set (ball valves)

Condensate group
1 condensate shut-off valve
1 condensate non-return valve

Heating steam group
1 medium control mechanical pressure regulator
1 strainer heat steam
1 shut-off valve heat steam
1 manual shut-off valve - bottom heat up
1 non-return valve - bottom heat up

SPW-E

Feed water tank 0.5 bar

Type		(3000)	(4000)	(5000)	(6000)	(8000)	(10000)	(12000)
• Water content	l	3000	4000	5000	6000	8000	10000	12000
• Construction		round	round	round	round	round	round	round
• Material		St 37.2	St 37.2	St 37.2	St 37.2	St 37.2	St 37.2	St 37.2
• Wall thickness	mm	4	4	5	5	5	6	6
• Weight	kg	510	560	800	1020	1330	1600	1660
• **Length** without insulation	mm	2875	3275	3700	4400	5000	5200	5400
• Diameter without insulation	mm	1250	1250	1400	1400	1600	1600	1600
• **Length** with insulation, without armatures	mm	2925	3325	3750	4450	5050	5250	5450
• **Height** with insulation, without armatures	mm	1725	1725	1870	1870	2100	2100	2100
• **Width** with insulation, without armatures	mm	1450	1450	1600	1600	1800	1800	1800

Fine armatures tank

Type		(3000)	(4000)	(5000)	(6000)	(8000)	(10000)	(12000)
• 1 fluid level indicator		R ½″	R ½″	R ½″	R ½″	R ½″	R ½″	R ½″
• 1 anti vacuum valve	DN	15	15	15	15	15	15	15
• 1 dosing ball valve		R ½″	R ½″	R ½″	R ½″	R ½″	R ½″	R ½″
• 1 draining		R 2″	R 2″	R 2″	R 2″	R 2″	R 2″	R 2″
• 1 thermometer		R ½″	R ½″	R ½″	R ½″	R ½″	R ½″	R ½″
• 1 pressure gauge with three-way valve		R ½″	R ½″	R ½″	R ½″	R ½″	R ½″	R ½″
• 1 boiler feed water ball valve		R 2″	R 2″	R 2 ½″	R 2 ½″	R 3″	R 3″	R 3″
• 1 condensate trap		R 2″	R 2″	R 2″	R 2″	R 2″	R 2″	R 2″
• 1 condensate trap ball valve		R 2″	R 2″	R 2″	R 2″	R 2″	R 2″	R 2″
• 1 magnetic level gauge		yes	yes	yes	yes	yes	yes	yes

SPW-E

Feed water tank 0.5 bar

Type		(14000)	(16000)	(20000)	(25000)	(30000)
• Water content	l	14000	16000	20000	25000	30000
• Construction		round	round	round	round	round
• Material		St 37.2	St 37.2	St 37.2	St 37.2	St 37.2
• Wall thickness	mm	6	6	8	10	10
• Weight	kg	1710	2300	3500	4700	5000
• **Length** without insulation	mm	5430	5650	6100	5520	6200
• Diameter without insulation	mm	1600	2000	2200	2500	2500
• **Length** with insulation, without armatures	mm	5700	5700	6150	5570	6250
• **Height** with insulation, without armatures	mm	2100	2470	2470	2870	2870
• **Width** with insulation, without armatures	mm	1800	2200	2200	2650	2650

Fine armatures tank

Type		(14000)	(16000)	(20000)	(25000)	(30000)
• 1 fluid level indicator		R ½″	R ½″	R ½″	R ½″	R ½″
• 1 anti vacuum valve	DN	15	15	15	15	15
• 1 dosing ball valve		R ½″	R ½″	R ½″	R ½″	R ½″
• 1 draining		R 2″	R 2″	R 2″	R 2″	R 2″
• 1 thermometer		R ½″	R ½″	R ½″	R ½″	R ½″
• 1 pressure gauge with three-way valve		R ½″	R ½″	R ½″	R ½″	R ½″
• 1 boiler feed water ball valve	DN	100	100	125	150	150
• 1 condensate trap		R 2″	R 2″	R 2″	R 2″	R 2″
• 1 condensate trap ball valve		R 2″	R 2″	R 2″	R 2″	R 2″
• 1 magnetic level gauge		yes	yes	yes	yes	yes

SPW-E (3000-12000)

Deaerator 0.5 bar - condensate 50 %

Type		(3000)	(4000)	(6000)	(8000)	(10000)	(12000)
• Deaerator output	kg/h	3000	4000	6000	8000	10000	12000
• Construction		round	round	round	round	round	round
• Material		1.4301	1.4301	1.4301	1.4301	1.4301	1.4301
• Wall thickness	mm	3	3	3	3	3	3
• Weight	kg	165	186	186	258	264	276
• Cylindric height	mm	1350	1430	1490	1600	1600	1650
• Diameter	mm	700	700	700	900	900	900
• **Width** without armatures	mm	1020	1020	1020	1220	1220	1220
• **Length** without armatures	mm	1020	1020	1020	1250	1250	1250
• **Height** without armatures of flange	mm	1490	1570	1630	1740	1740	1790

Fine armatures exhaust vapour

• 1 exhaust vapour valve	DN	15	25	25	25	25	32

Additional water group

Type		(3000)	(4000)	(6000)	(8000)	(10000)	(12000)
• Regenerated water amount	m^3/h	1	2	3	4	5	6
• Heating up output from 10 to 107 °C	kW	113	226	338	451	564	677
• Heating steam output	kg/h	204	407	611	815	1019	1222
Fine armatures							
• 1 magnetic valve		R 1″	R 1″	R 1″	R 1¼″	R 1¼″	R 1½″
• 3 bypass ball valve		R 1″	R 1″	R 1″	R 1¼″	R 1¼″	R 1½″
• 1 non-return valve		R 1″	R 1″	R 1″	R 1¼″	R 1¼″	R 1½″

Condensate group

Type		(3000)	(4000)	(6000)	(8000)	(10000)	(12000)
• Condensate water amount	m^3/h	1	2	3	4	5	6
• Heating up output from 80 to 107 °C	kW	31	63	94	126	157	188
• Heating steam output	kg/h	57	113	170	227	284	340
Fine armatures							
• 1 condensate shut-off valve	DN	25	25	25	32	32	40
• 1 condensate non-return valve	DN	25	25	25	32	32	40

SPW-E (3000-12000)

Deaerator 0.5 bar - condensate 50 %

Type		(16000)	(20000)	(25000)	(30000)
• Deaerator output	kg/h	16000	20000	25000	30000
• Construction		round	round	round	round
• Material		1.4301	1.4301	1.4301	1.4301
• Wall thickness	mm	3	3	3	3
• Weight	kg	300	321	400	420
• Cylindric height	mm	1650	1650	2000	1890
• Diameter	mm	900	1100	1250	1250
• **Width** complete without armatures	mm	1220	1420	1570	1570
• **Length** complete without armatures	mm	1250	1500	1650	1650
• **Height** complete without armatures of flange	mm	1790	1790	2030	2030

Fine armatures exhaust vapour

• 1 exhaust vapour valve	DN	32	40	40	40

Additional water group

Type		(16000)	(20000)	(25000)	(30000)
• Regenerated water amount	m^3/h	8	10	12.5	15
• Heating up output from 10 to 107 °C	kW	902	1128	1410	1692
• Heating steam output	kg/h	1630	2037	2546	3056
Fine armatures					
• 1 magnetic valve		R 1½″	R 2″	R 2″	R 2″
• 3 bypass ball valve		R 1½″	R 2″	R 2″	R 2″
• 1 non-return valve		R 1½″	R 2″	R 2″	R 2″

Condensate group

Type		(16000)	(20000)	(25000)	(30000)
• Condensate water amount	m^3/h	8	10	12.5	15
• Heating up output from 80 to 107 °C	kW	251	314	393	471
• Heating steam output	kg/h	454	567	708	851
Fine armatures					
• 1 condensate shut-off valve	DN	40	50	50	50
• 1 condensate non-return valve	DN	40	50	50	50

SPW-E (3000-12000)

Deaerator 0.5 bar - condensate 50 %

Heating steam group

Type			(3000)	(4000)	(6000)	(8000)	(10000)	(12000)
• Heating steam amount								
	at 10 bar	kg/h	260	521	781	1042	1302	1562
	at 13 bar	kg/h	260	521	781	1042	1302	1562
	at 16 bar	kg/h	260	521	781	1042	1302	1562
• 1 steam pressure reducing valve (partially with range limiter)								
	at 10 bar	DN	25	32	32	40	50	50
	at 13 bar	DN	25	25	32	32	40	50
	at 16 bar	DN	25	25	25	32	32	40
• $Q_{adjusted}$	at 10 bar	kg/h	350	700	900	1200	1400	1800
	at 13 bar	kg/h	350	700	900	1200	1400	1800
	at 16 bar	kg/h	350	700	900	1200	1400	1800
• 2 shut-off valves	at 10 bar	DN	25	32	32	40	50	50
	at 13 bar	DN	25	25	32	32	40	50
	at 16 bar	DN	25	25	32	32	40	50
• 1 strainer	at 10 bar	DN	25	32	32	40	50	50
	at 13 bar	DN	25	25	32	32	40	50
	at 16 bar	DN	25	25	32	32	40	50
• 1 valve - floor heat-up	at 10 bar	DN	15	15	15	25	25	25
	at 13 bar	DN	15	15	15	15	25	25
	at 16 bar	DN	15	15	15	15	15	25
• Q_{max}	at 10 bar	kg/h	403	403	403	857	857	857
	at 13 bar	kg/h	538	538	538	538	1142	1142
	at 16 bar	kg/h	672	672	672	672	672	1428
• 1 non-return valve	at 10 bar	DN	15	15	15	25	25	25
	at 13 bar	DN	15	15	15	15	25	25
	at 16 bar	DN	15	15	15	15	15	25
• 1 safety valve 0.5 bar	at 10 bar	DN	50/80	65/100	65/100	80/125	80/125	100/150
	at 13 bar	DN	50/80	65/100	65/100	80/125	80/125	100/150
	at 16 bar	DN	80/125	80/125	80/125	80/125	80/125	100/150
• Output necessary	at 10 bar	kg/h	753	1103	1303	2057	2257	2657
	at 13 bar	kg/h	888	1238	1438	1738	2542	2942
	at 16 bar	kg/h	1730	1730	1730	2352	2352	3228

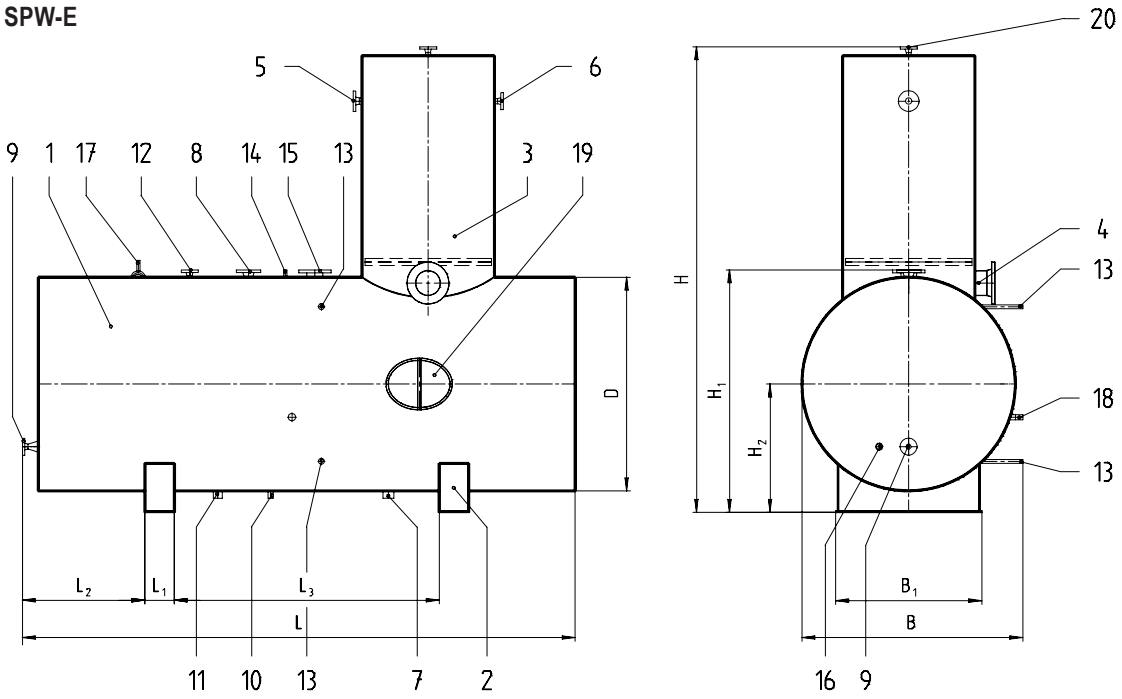
SPW-E (16000-30000)

Deaerator 0.5 bar - condensate 50 %

Heating steam group

Type			(16000)	(20000)	(25000)	(30000)
• Heating steam amount						
	at 10 bar	kg/h	2038	2604	3255	3906
	at 13 bar	kg/h	2038	2604	3255	3906
	at 16 bar	kg/h	2038	2604	3255	3906
• 1 steam pressure reducing valve (partially with range limiter)						
	at 10 bar	DN	65	65	80	80
	at 13 bar	DN	50	65	65	65
	at 16 bar	DN	50	50	65	65
• $Q_{adjusted}$	at 10 bar	kg/h	2200	2800	3500	4100
	at 13 bar	kg/h	2200	2800	3500	4100
	at 16 bar	kg/h	2200	2800	3500	4100
• 2 shut-off valves	at 10 bar	DN	65	65	80	80
	at 13 bar	DN	50	65	65	65
	at 16 bar	DN	50	65	65	65
• 1 strainer	at 10 bar	DN	65	65	80	80
	at 13 bar	DN	50	65	65	65
	at 16 bar	DN	50	65	65	65
• 1 valve - floor heat-up	at 10 bar	DN	32	32	32	32
	at 13 bar	DN	25	32	32	32
	at 16 bar	DN	25	25	32	32
• Q_{max}	at 10 bar	kg/h	1613	1613	1613	1613
	at 13 bar	kg/h	1142	2150	2150	2150
	at 16 bar	kg/h	1428	1428	2688	2688
• 1 non-return valve	at 10 bar	DN	32	32	32	32
	at 13 bar	DN	25	32	32	32
	at 16 bar	DN	25	25	32	32
• 1 safety valve 0.5 bar	at 10 bar	DN	100/150	2 x 100/150	2 x 100/150	2 x 100/150
	at 13 bar	DN	100/150	2 x 100/150	2 x 100/150	2 x 100/150
	at 16 bar	DN	100/150	2 x 100/150	2 x 100/150	2 x 100/150
• Output necessary	at 10 bar	kg/h	3813	4413	5113	5713
	at 13 bar	kg/h	3342	4950	5600	6250
	at 16 bar	kg/h	3628	4228	6188	6788

SPW-E



1 Feed water tank
2 Tank base frame
3 Deaerator
4 Deaerator heat up steam socket
5 Condensate inlet
6 Regenerated water inlet
7 Boiler feed water connection
8 Safety valve socket
9 Steam floor heat up/Steam injection
10 Drain
11 Over flow outlet
12 Anti vacuum valve socket
13 Water level indicator
14 Dosing connection
15 Level control socket
16 Thermostat
17 Pressure gauge
18 Thermometer
19 Inspection opening
20 Exhaust steam valve socket

Tank content [litres]	Deaerator output [m³/h]	Main dimensions						Base frame			
		L	B	H	H_1	H_2	D	L_1	L_2	L_3	B_1
(3000)	3	2925	1450	3225	1725	870	1350	150	735	1800	900
(4000)	4	3325	1450	3225	1725	870	1350	150	735	2200	900
(5000)	5	3750	1600	3450	1870	870	1500	200	735	2600	1000
(6000)	6	4450	1600	3500	1870	870	1500	200	735	3000	1000
(8000)	8	5050	1800	3850	2100	1050	1700	200	1050	2450	1200
(10000)	10	5250	1800	3850	2100	1050	1700	200	1050	2650	1200
(12000)	12	5450	1800	3900	2100	1050	1700	300	1050	2850	1200
(16000)	16	5700	2200	4275	2470	1200	2100	300	735	3200	1400
(20000)	20	6150	2200	4275	2470	1200	2300	300	735	3750	1600
(25000)	25	5570	2650	4900	2870	1450	2600	500	735	3300	1900
(30000)	30	6250	2650	4900	2870	1450	2600	500	735	3980	1900

The total height in this data sheet refer to 50 % condensate and 50 % fresh water.
For other deaerator outputs (relation condensate/fresh water) please see deaerator data sheet!

Operating pressure max. 0.5 bar (overpressure)

Dimensions incl. 50 mm insulation.

KDS

Condensate station KDS
The Hoval condensate station type KDS is made of stainless steel 1.4301. The pressureless tank with ventilation into the atmosphere is completely electrically welded and provided with all necessary sockets and tank supports.

Thermal insulation
The tank is completely insulated with mineral wool. The casing is made of structured aluminium plate. Fittings and out-cuts are properly rimmed.

Control panel
The control panel for the condensate station is equipped with all required control units and indicators for the control and supervision of the tank.

Armatures
The condensate station will be supplied with the following armatures:
1 water level indicator
1 thermometer
1 drainage valve

Regulation:
1 level electrode with switch amplifier or magnetic level indicator for condensate pump on/off
1 contact with low water cut-off
1 contact for over flow alarm

Delivery
The tank is completely insulated. Armatures and pumps are mounted up to a content of 3000 litres. Above 3000 litres the tank is insulated. Armatures and pumps are packed loosely in a separate box.

Condensate pump station:
2 condensate pumps
2 ball valve pumps (suction side)
2 strainers
2 ball valve pumps (pressure side)
2 non-return valves
1 pressure gauge set

KDS (500-3000)

Condensate tank

Type		(500)	(1000)	(1500)	(2000)	(2500)	(3000)
• Content	l	500	1000	1500	2000	2500	3000
• Construction		angular	angular	angular	round	round	round
• Material		1.4301	1.4301	1.4301	1.4301	1.4301	1.4301
• Wall thickness	mm	3	3	3	3	3	3
• Weight	kg	120	200	270	300	320	380
• **Length** without insulation without pump set	mm	920	1570	2020	1950	2350	2750
• **Height** without insulation	mm	1200	1200	1200	-	-	-
• **Width** without insulation	mm	500	700	700	-	-	-
• Diameter without insulation	mm	-	-	-	1250	1250	1250
• **Length** with insulation, without armatures, with pump approx.	mm	1920	2520	2970	2750	3150	3650
• **Length** with insulation, without armatures, without pump approx.	mm	-	-	-	-	-	-
• **Height** with insulation, without armatures	mm	1300	1300	1300	1725	1725	1725
• **Width** with insulation, without armatures	mm	600	800	800	1450	1450	1450

Fine armatures

Type		(500)	(1000)	(1500)	(2000)	(2500)	(3000)
• 1 fluid level indicator	DN	R ½″	R ½″	R ½″	R ½″	R ½″	20
• 1 thermometer		R ½″	R ½″	R ½″	R ½″	R ½″	R ½″
• 1 draining		R 1″	R 1″	R 1″	R 1″	R 1″	R 1″
• 1 two-step control		yes	yes	yes	yes	yes	yes
• 1 magnet cap indicator							yes

Condensate group

Type		(500)	(1000)	(1500)	(2000)	(2500)	(3000)
• Condensate pump output	m^3/h	1	2	3	4	5	6
• 2 condensate pumps							
Grundfos 2 bar		CR	CR	CR	CR	CR	CR
Motor rating 2 bar		0.37	0.37	0.55	0.55	0.55	0.75
• 2 pump valves (pressure side)	DN	15	20	25	25	32	32
• 2 non-return valves (pressure side)	DN	15	20	25	25	32	32
• Pressure gauge with shut off valve		R ¼″	R ¼″	R ¼″	R ¼″	R ¼″	R ¼″
• 2 ball valves (suction side)		R 1″	R 1½″	R 2″	R 2″	R 2 ½″	R 3″
• 2 strainers (suction side)		R 1″	R 1½″	R 2″	R 2″	R 2 ½″	R 3″

KDS (4000-10000)

Condensate tank

Type		(4000)	(5000)	(6000)	(8000)	(10000)
• Content	l	4000	5000	6000	8000	10000
• Construction		round	round	round	round	round
• Material		1.4301	1.4301	1.4301	1.4301	1.4301
• Wall thickness	mm	4	4	4	4	4
• Weight	kg	430	500	540	900	1000
• **Length** without insulation without pump set	mm	3150	3550	4250	4850	5050
• **Height** without insulation	mm	-	-	-	-	-
• **Width** without insulation	mm	-	-	-	-	-
• Diameter without insulation	mm	1250	1400	1400	1600	1600
• **Length** with insulation, without armatures, with pump approx.	mm	-	-	-	-	
• **Length** with insulation, without armatures, without pump approx.	mm	3550	3650	4350	4950	5150
• **Height** with insulation, without armatures	mm	1725	1870	1870	2100	2100
• **Width** with insulation, without armatures	mm	1450	1600	1600	1800	1800

Fine armatures

Type		(4000)	(5000)	(6000)	(8000)	(10000)
• 1 fluid level indicator	DN	20	20	20	20	20
• 1 thermometer		R ½″	R ½″	R ½″	R ½″	R ½″
• 1 draining		R 2″	R 2″	R 2″	R 2″	R 2″
• 1 two-step control		yes	yes	yes	yes	yes
• 1 magnet cap indicator		yes	yes	yes	yes	yes

Condensate group

Type		(4000)	(5000)	(6000)	(8000)	(10000)
• Condensate pump output	m^3/h	8	10	12	16	20
• 2 condensate pumps						
Grundfos 2 bar		CR	CR	CR	CR	CR
Motor rating 2 bar		1.10	1.10	2.20	2.20	3.00
• 2 pump valves (pressure side)	DN	40	40	50	50	65
• 2 non-return valves (pressure side)	DN	40	40	50	50	65
• Pressure gauge with shut off valve		R ¼″	R ¼″	R ¼″	R ¼″	R ¼″
• 2 ball valves (suction side)	DN	R 3″	R 3″	R 3″	100	125
• 2 strainers (suction side)	DN	R 3″	R 3″	R 3″	100	125

KDS (12000-30000)

Condensate tank

Type		(12000)	(16000)	(20000)	(25000)	(30000)
• Content	l	12000	16000	20000	25000	30000
• Construction		round	round	round	round	round
• Material		1.4301	1.4301	1.4301	1.4301	1.4301
• Wall thickness	mm	4	5	5	5	5
• Weight	kg	1100	2000	2500	3000	3500
• **Length** without insulation without pump set	mm	5250	5500	5950	5400	6050
• **Height** without insulation	mm	-	-	-	-	-
• **Width** without insulation	mm	-	-	-	-	-
• Diameter without insulation	mm	1600	2000	2200	2500	2500
• **Length** with insulation, without armatures, with pump approx.	mm	-	-	-	-	-
• **Length** with insulation, without armatures, without pump approx.	mm	5350	5600	6050	5500	6150
• **Height** with insulation, without armatures	mm	2100	2470	2470	2870	2870
• **Width** with insulation, without armatures	mm	1800	2200	2200	2650	2650

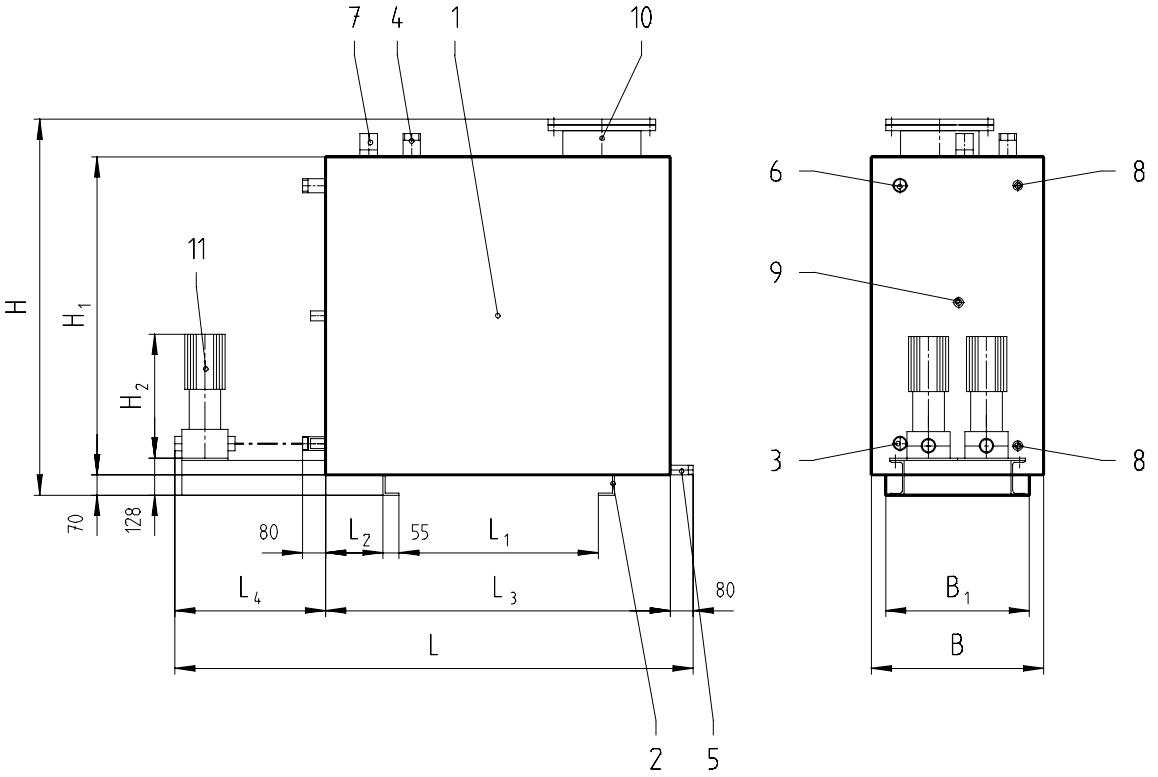
Fine armatures

Type		(12000)	(16000)	(20000)	(25000)	(30000)
• 1 fluid level indicator	DN	20	20	20	20	20
• 1 thermometer		R ½″	R ½″	R ½″	R ½″	R ½″
• 1 draining		R 2″	R 2″	R 2″	R 2″	R 2″
• 1 two-step control		yes	yes	yes	yes	yes
• 1 magnet cap indicator		yes	yes	yes	yes	yes

Condensate group

Type		(12000)	(16000)	(20000)	(25000)	(30000)
• Condensate pump output	m^3/h	24	32	40	40	40
• 2 condensate pumps						
Grundfos 2 bar		CR	CR	CR	CR	CR
Motor rating 2 bar		3.00	5.50	5.50	5.50	5.50
• 2 pump valves (pressure side)	DN	65	80	100	100	100
• 2 non-return valves (pressure side)	DN	65	80	100	100	100
• Pressure gauge with shut off valve		R ¼″	R ¼″	R ¼″	R ¼″	R ¼″
• 2 ball valves (suction side)	DN	125	150	150	150	150
• 2 strainers (suction side)	DN	125	150	150	150	150

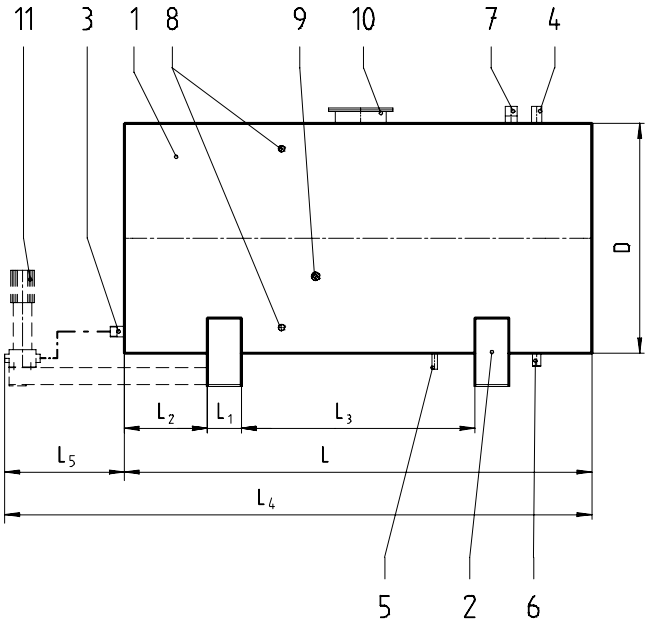
KDS 500-1500 l, angular

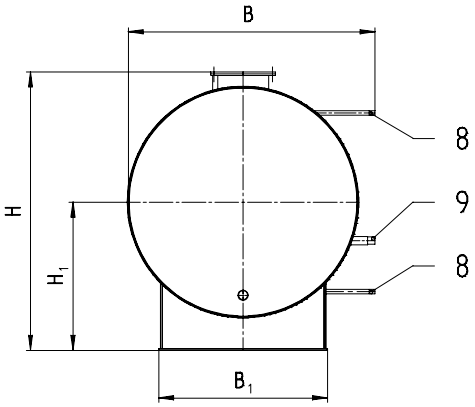


1	Condensate tank	7	Vent	Dimensions incl. 50 mm insulation	
2	Tank base frame	8	Water level indicator		
3	Outlet to condensate pump	9	Thermometer		
4	Condensate inlet	10	Inspection opening with level control		
5	Condensate drain outlet	11	Condensate pump station		
6	Overflow outlet				

Tank	Main dimensions						Base frame			
content [litres]	L	B	H	L_3	L_4	H_1	H_2	L_1	L_2	B_1
(500)	1920	600	1300	1020	720	1100	427	700	195	500
(1000)	2520	800	1300	1670	770	1100	427	950	345	700
(1500)	2970	800	1300	2120	770	1100	427	1200	445	700

KDS 2000-30000 l, round





1 Condensate tank
2 Tank base frame
3 Outlet to condensate pump
4 Condensate inlet
5 Condensate drain outlet
6 Overflow outlet
7 Vent
8 Water level indicator
9 Thermometer
10 Inspection opening with level control
11 Condensate pump station

Dimensions incl. 50 mm insulation

Tank content [litres]	Main dimensions							Base frame			
	L	B	H	L_4	L_5	H_1	D	L_1	L_2	L_3	B_1
(2000)	2050	1450	1725	2750	700	870	1350	150	400	950	900
(2500)	2450	1450	1725	3150	700	870	1350	150	400	1350	900
(3000)	2850	1450	1725	3650	800	870	1350	150	400	1750	900
(4000)	3550	1450	1725	-	-	870	1350	200	475	2200	1000
(5000)	3650	1600	1870	-	-	870	1500	200	650	2600	1000
(6000)	4350	1600	1870	-	-	870	1500	200	650	3000	1000
(8000)	4950	1800	2100	-	-	1050	1700	200	950	2450	1200
(10000)	5150	1800	2100	-	-	1050	1700	200	950	2650	1200
(12000)	5350	1800	2100	-	-	1050	1700	300	950	2850	1200
(16000)	5600	2200	2470	-	-	1200	2100	300	650	3200	1400
(20000)	6050	2200	2470	-	-	1200	2300	300	650	3750	1600
(25000)	5500	2650	2870	-	-	1450	2600	500	650	3300	1900
(30000)	6150	2650	2870	-	-	1450	2600	500	650	3980	1900

1. General

1.1 The following Terms and Conditions shall apply to all our present and future contracts for deliveries and other services (even if the said Terms and Conditions are not specifically mentioned in verbal, telephonic or fax communications).

1.2 All deviations from the present Terms and Conditions, ancillary verbal agreements and subsequent contractual amendments shall only be valid if they have been confirmed by us in writing.

1.3 Buying terms and conditions of the client shall not be valid even if they are not specifically rejected by us. Our Standard Terms and Conditions of Delivery shall be regarded as accepted at the latest upon receipt of our goods and services by the client.

1.4 If a provision of the present Terms and Conditions of Delivery proves to be wholly or partially invalid, the contracting parties shall replace the aforesaid provision by a new provision which comes as close as possible to the legal and economic intention of the invalid provision.

2. Offers

2.1 Our offers shall be subject to change without notice.

2.2 Orders shall only be regarded as accepted when they have been confirmed by us in writing.

2.3 Illustrations, drawings and all technical details in catalogues and printed material shall be approximate values as customary within the industry. They shall only be binding if specific reference is made to them in the contract. We shall also reserve the right to make technical and design changes after the conclusion of the contract.

2.4 Cost estimates, drawings and other documents shall remain our property and shall be subject to copyright protection; they may not be made available to third parties.

3. Regulations in the country of destination

3.1 At the latest at the time of the order, the buyer shall draw our attention to the regulations and standards in force in the country of destination relating to the design of the delivered goods and the operation thereof and also to the execution of services.

3.2 Our deliveries and services shall comply with the regulations and standards in the country of destination provided the buyer has drawn our attention thereto in accordance with Section 3.1.

3.3 The buyer shall duly inform us of any special application features of goods ordered from us if these differ from our general recommendations.

4. Prices

4.1 Our prices shall be ex works, net, excluding packaging.

4.2 All ancillary costs, e.g. freight, insurance, export, transit, import and other approvals, licenses and authentications, shall be for the account of the buyer. The buyer shall also bear all taxes, charges, customs duty, etc., which are levied in connection with the contract.

4.3 We shall reserve the right to make price adjustments if wage rates or material prices change between the date of the order confirmation and the contractual performance of the contract. Price increases shall normally be notified three months in advance. We shall be bound to the price stated in the order confirmation for a period of three months after the effective date of the price increase.

5. Payment terms

5.1 Unless otherwise agreed in writing, our invoices shall be payable within thirty days with no cash discount. Payment shall be deemed to have been made when the amount in question is at our unrestricted disposal on our account in Swiss Franks.

5.2 Payment dates shall be observed even if any delays whatsoever occur after shipment of the goods from our works. The buyer shall not be permitted to reduce or withhold payments on account of complaints or counterclaims not recognised by us.

5.3 Payments shall also be made if insignificant components are missing but usage of the delivered goods is not rendered impossible as a result or if rectification work has to be carried out on the delivery. We shall be entitled to reject rectification of the defect as long as the buyer has not discharged his/its obligations to us.

5.4 If the buyer fails to comply with the agreed payment dates, default interest shall be paid from the agreed due date without a reminder being issued; the aforesaid interest shall be based on the interest rates prevailing at the domicile of the buyer, but shall be not less than four percent above the current discount rate of the Swiss Central Bank.

5.5 We shall be entitled to make deliveries of pending orders dependent upon settlement of outstanding claims.

6. Reservation of title

6.1 Delivered goods shall remain our property (reserved goods) pending full and complete payment of all present and future claims to which we are entitled regardless of their legal cause. This shall also apply if payments are made in settlement of specifically designated claims.

6.2 The buyer shall be entitled to process and sell reserved goods in the ordinary course of business.

6.3 If our reserved goods are combined or intermingled with other goods, the buyer shall hereby transfer his/its ownership rights in the new goods or chattels to us upon the conclusion of the contract in the amount of the invoice value of the reserved goods.

6.4 If the goods are resold by the buyer, he/it shall hereby transfer to us upon the conclusion of the contract with us his/its claims arising from the aforesaid resale in the amount of the invoice value of the reserved goods.

6.5 If the reserved goods are used by the buyer to perform a works or works delivery contract, his/its claim from the aforesaid works or works delivery contract shall hereby be assigned to us in the same amount and on the same date as for the purchase price claim (Section 6.4).

6.6 As long as he/it is honouring his/its payment obligations, the buyer shall, however, be authorised to collect his/its resale claim which has been assigned to us. He/it may not dispose of such claims by way of assignment to third parties, however. The empowerment of the buyer to collect the claim may be revoked by us at any time. We shall be entitled to notify third party debtors of the assignment. The buyer shall be entitled to provide us with the necessary information and documents in order to enable us to enforce our rights.

6.7 If the value of our securities exceeds our total claims by more than 10 %, we shall be obliged to release securities of our choice at the request of the buyer.

6.8 The buyer shall inform us immediately of any pledge or other impediment to our property enforced by third parties.

6.9 The buyer shall be obliged to collaborate in measures required to protect our title. He/it shall, in particular, empower us upon the conclusion of the contract to make entries or prior notice of the reservation of title at his/its cost in public registers, books and documents, etc., in accordance with the relevant national laws and shall perform all formalities in this respect.

6.10 The buyer shall maintain the reserved goods at his/its cost for the duration of the reservation of title and shall insure the said goods against theft, breakage, fire, water and other risks in our favour. He/it shall also take all steps to ensure that our property claims are neither adversely affected nor rescinded.

7. Delivery periods

7.1 Delivery periods and deadlines stated by us shall be approximate unless we have given an express written confirmation of a deadline as binding.

7.2 Delivery periods shall be deemed to have been met if notification of readiness to deliver has been sent to the buyer before the end of the delivery period.

7.3 The delivery period shall be prolonged if details required for the performance of the contract are not received on time or if they are subsequently changed by the buyer.

7.4 The delivery period shall also be reasonably prolonged if impediments arise which we cannot avert despite exercise of the necessary care (e.g. major operational disruptions, industrial disputes, delayed or defective deliveries, force majeure, etc.).

7.5 If an agreed delivery date is met by more than 14 days, the buyer shall be obliged to set us a reasonable period of grace. The buyer may only withdraw from the contract if our goods have not been delivered by the end of the said period of grace. Compensation claims for non-performance, delayed performance or any consequential losses shall be excluded unless there was gross negligence on our part.

8. Transfer of risk

8.1 Unless expressly agreed otherwise in writing, our “ex works” deliveries shall be made in accordance with the international rules on the interpretation of commercial clauses of the International Chamber of Commerce (Incoterms) in the version in force on the date of the order confirmation.

8.2 The transfer of risk shall be determined by the aforesaid Incoterms.

8.3 Insurance against damages of any kind shall be the responsibility of the buyer.

8.4 Complaints in connection with the transport shall be immediately notified by the buyer to the last carrier upon receipt of the delivery.
8.5 If despatch is delayed at the request of the buyer or for any other reasons not attributable to us, the risk shall pass to the buyer on the original date envisaged for the “ex works” delivery. We shall be entitled to demand payment from this date onwards.

9. Delivery inspection

9.1 The buyer shall be required to inspect deliveries immediately. If the goods do not comply with the order or the delivery note or if visible defects are identified, he/it shall be obliged to notify the aforesaid to us in writing within eight days of receipt. Later complaints shall not be recognised. (Regarding transport damages, cf. Section 8.4)

10. Assembly and operations

10.1 The assembly, putting into operation, operation and maintenance of the delivered goods shall be carried out in accordance with our guidelines. They may be executed by our staff or by appropriately trained third parties as agreed with the buyer.
10.2 If we require a commissioning certificate for certain product groups, warranty claims for the proper functioning of the equipment can only be enforced if a proper hand-over has been documented by a confirmed commissioning certificate received by us within one month of the hand-over.

11. Warranty

11.1 Warranty period

11.1.1 The general warranty period shall be 12 months from the first commissioning but no longer than 18 months from the date on which the relevant goods left our works.
If despatch is delayed for reasons not attributable to us, the warranty shall lapse no later than 18 months after notification of the readiness to deliver.
The general warranty period shall exclude electrical components for which the warranty period shall be 6 months from the first commissioning but no later than 12 months from the date of shipment from our works.
11.1.2 We refer to Section 11.6.1 with regard to the warranty period for third party products.
11.1.3 The warranty period for components which we have repaired during the warranty period or have delivered as replacement shall be 12 months from the completion of our repair or from the date of the replacement delivery but no longer than the end of a period equivalent to twice the original warranty period as per Section 11.1.1.

11.2 Liability for material, design and workmanship defects

11.2.1 The contractual condition of the goods shall be based on the condition upon the transfer of risk.
11.2.2 Defects shall be notified to us immediately in writing.
11.2.3 We shall be liable for all components which can be shown to have become defective or unusable before the end of the warranty period as a result of defective materials, defective design or defective workmanship, with such components being repaired or replaced ex works immediately at our choice.

11.3 Liability for warranted qualities

11.3.1 Warranted qualities shall only be those which are specifically designated as such in the order confirmation or in the relevant specifications.
11.3.2 The aforesaid assurance shall apply at the latest until the end of the warranty period. If a taking-over test has been agreed with the buyer, the assurance shall be deemed as performed if proof of the relevant qualities is furnished during the aforesaid test.
11.3.3 If the warranted qualities are not performed or only partially performed, the buyer shall be entitled to an immediate rectification. The buyer shall grant us the necessary time and opportunity for this purpose.
11.3.4 If the rectification is abortive or only partially successful, the buyer shall be entitled to a reasonable reduction of the purchase price. If the defect is so serious that it cannot be rectified within a reasonable period of time, and if deliveries or services for the notified purpose are not usable or are only usable to a much lesser extent, the buyer shall be entitled to refuse acceptance of the defective component or to withdraw from the contract if part-acceptance is economically unreasonable. We shall only be obliged to refund amounts which have been paid to us for the components affected by the aforesaid withdrawal.

11.4 Exclusion of liability for defects

11.4.1 Our liability shall exclude damages which cannot be proved to have been sustained as a result of defective material, defective design or defective workmanship.
11.4.2 Damages shall therefore be excluded for example which were caused by
- improper work of other persons with regard to planning, site preparation, assembly, operation and maintenance;
- plant concepts and designs which do not comply with the latest state of the art;
- non-observance of our guidelines for planning, assembly, commissioning, operations and maintenance;
- force majeure (e.g. thunderstorms).

11.4.3 The following shall be excluded in particular
- corrosion damages (e.g. as a result of aggressive water, unsuitable water treatment, oxygen intakes, emptying the plant over a longer period of time, falling below the dew point, chemical or electrochemical effects, etc.);
- damages caused by air pollution (e.g. the accumulation of intense dust, aggressive vapours, etc.);
- damages caused by unsuitable equipment and fuels;
- damages caused by overcharging, excessive water pressure, scaling, improper electrical connections and inadequate fuse protection.

11.4.4 Components shall also be excluded from the warranty which are subject to natural wear and tear (e.g. burner nozzles, combustion chamber inserts, ignition and monitoring components in contact with fire, fireclay and wall facings, fuses, seals and flexible tubes).

11.5 Commissioning certificate

11.5.1 We hereby draw attention to the due and proper hand-over and - if envisaged - the commissioning certificate in accordance with Section 10.2 as prerequisites for our warranty.

11.6 Deliveries and services of sub-contractors

11.6.1 Our liability for third party products which form a major part of the delivered goods (e.g. warehouse and conveying equipment, burners, measuring and control equipment, electrical components, flue gas and waste water cleaning equipment) shall - if permissible - be limited to an assignment of our claims against the suppliers of the said third party products.

12. Exclusion of further liability

12.1 The buyer shall have no rights and claims for materials, design and workmanship defects or the lack of warranted qualities unless specifically mentioned in Sections 11.1 to 11.6.
12.2 All claims for compensation, reduction in the contract price, rescission of the contract or withdrawal from the contract shall be excluded in particular unless these are specifically mentioned. Under no circumstances shall the buyer have any compensation claim for damages which were not sustained by the delivered goods themselves (e.g. replacement costs, cost for establishing the cause of the damage, expertises, production stoppages, production losses, lost orders, lost profit and other direct or indirect damages). The aforesaid liability exclusion shall not apply in the event of gross negligence on our part.
12.3 The exclusion as per Section 12.2 shall apply for all breaches of contract and all claims of the buyer regardless of why they were lodged from a legal point of view. It shall therefore also apply for a breach of any ancillary obligations (e.g. inadequate advice, etc.).

13. Jurisdiction

13.1 **The place of jurisdiction for the buyer and for us shall be Vaduz.** We shall be entitled to bring action against the buyer at his/its domicile, however.
13.2 The legal relationship between the parties shall be governed by the substantive laws of Switzerland. The application of the UN convention on contracts for the international sale of goods (CISG) shall be excluded.

Hoval quality.
You can count on us.

Hoval

Hoval is one of the leading international companies for heating and indoor climate solutions. Drawing on more than 75 years of experience and benefiting from a close-knit team culture, the Hoval Group delivers exciting solutions and develops technically superior products. This leadership role requires a sense of responsibility for energy and the environment, which is expressed in an intelligent combination of different heating technologies and customised indoor climate solutions.

Hoval also provides personal consultations and comprehensive customer service. With around 2200 employees in 16 companies around the world, Hoval sees itself not as a conglomerate, but as a large family that thinks and acts globally.
Hoval heating and indoor climate solutions are currently exported to more than 50 countries.

Responsibility for energy and environment

Hoval Aktiengesellschaft
Austrasse 70
FL-9490 Vaduz
Principality of Liechtenstein
(Swiss customs territory)
Phone +423 3992 400
Fax +423 3992 618
E-Mail info@hoval.com
www.hoval.com

2024 - 04 | Subject to modifications

Your Hoval partner

Efficient. Flexible. Reliable.

Hoval indoor climate systems are decentralised systems for heating, cooling and ventilating halls for industrial, commercial and leisure applications. The systems have a modular structure. One system comprises several ventilation units which are spread around the room. These units are equipped with reversible heat pumps and gas-fired appliances for decentralised heat and cold generation, or they heat and cool with a connection to a central energy supply.

Tailored control systems complete the system and ensure the effective combination and optimal use of all resources.

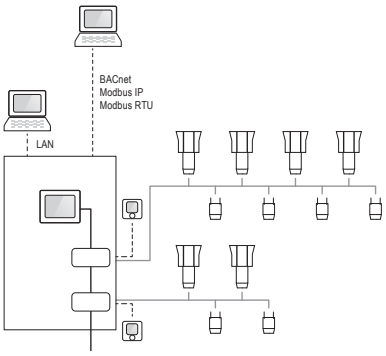
Diverse range of units ensures flexibility
Different types of ventilation units can be combined to create the perfect system for the project in question:
- RoofVent® supply and extract air handling units
- TopVent® supply air units
- TopVent® recirculation units

The number of supply and extract air handling units depends on how much fresh air is required in order to create a comfortable atmosphere for people in the building. Recirculation units cover additional heat or cool demand as required. A broad range of unit types and sizes with heating and cooling coils in various output levels means that the overall output of the system can be scaled to whatever level is required.
Specially designed unit versions are also available for halls with particularly humid or oily extract air. Furthermore, there is a range of units available which have been expressly developed for very specific purposes. ProcessVent units, for example, are coupled with extract air purification systems in industrial halls and recover heat from process air.

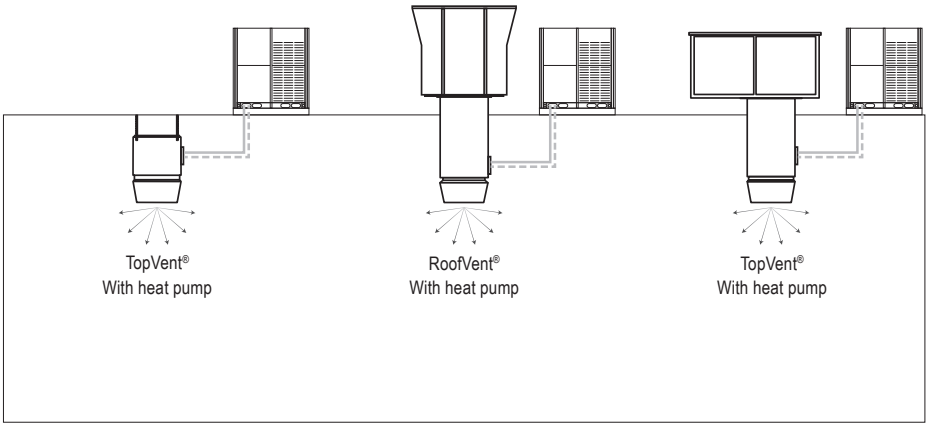
Draught-free air distribution
A key feature of Hoval indoor climate units is the patented vortex air distributor, known as the Air-Injector. It is controlled automatically and changes the blowing angle of the air continuously between vertical and horizontal. The highly efficient air supply system has many advantages:
- It provides a high level of comfort during heating and cooling. No draughts develop in the hall.
- The efficient and even air distribution ensures that the indoor climate units cover a large area.
- The Air-Injector keeps the temperature stratification in the room low, thus minimising heat loss through the roof.

Control with specialist expertise
The TopTronic® C control system, which was specifically developed for Hoval indoor climate systems, regulates the separate units individually and controls them based on zones. This enables optimal adjustment to the local requirements of the different usage areas in the building. The patented control algorithm optimises energy use and ensures maximum comfort and hygiene levels. Clear interfaces make it easy to connect the system to the building management system.
Simpler control systems are also available for units that are only used for supply air or air recirculation.

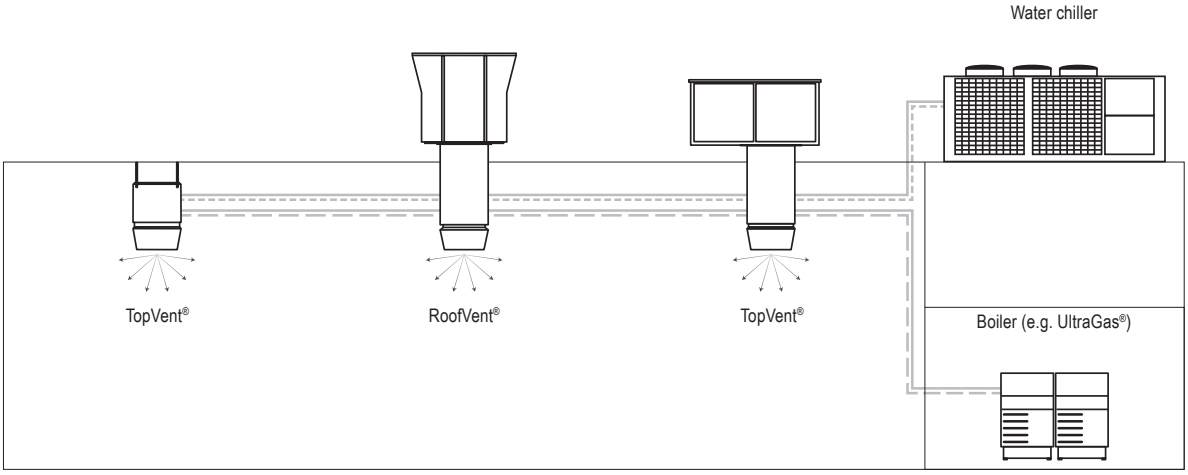
Competent and reliable
Hoval will support you and provide expert knowledge throughout all project phases. You can rely on comprehensive technical advice when it comes to planning Hoval indoor climate systems and on the skills of the Hoval technicians during the installation, commissioning and maintenance of the system.



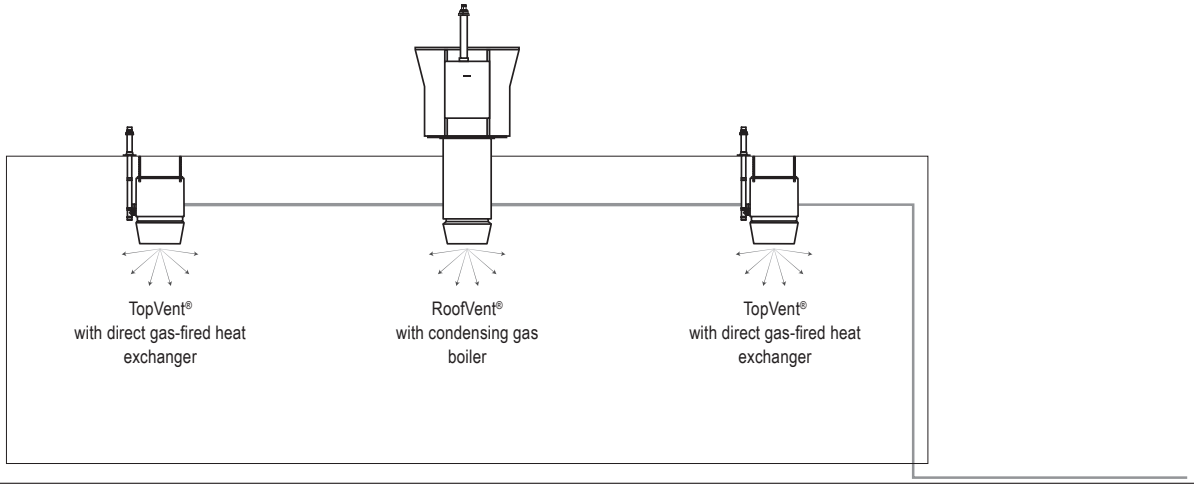
System with decentralised heat and cold generation with heat pump



System with central heat and cold generation



System with decentralised gas-fired heat generation



Supply and extract air handling units with efficient air distribution

RoofVent® RP

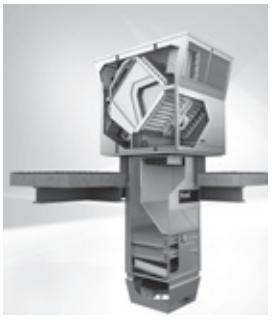
Heating and cooling with decentralised heat pump

Ventilation
- Fresh air supply
- Extract air removal
- Filters fresh air, recirculated air and extract air
- Air distribution with Air-Injector
- Recirculation operation

Heating
- With heat pump

Cooling
- Free cooling
- With heat pump

Energy recovery



RoofVent® RH

Heating with central heat generation

Ventilation
- Fresh air supply
- Extract air removal
- Filters fresh air, recirculated air and extract air
- Air distribution with Air-Injector
- Recirculation operation

Heating
- With connection to boiler system

Cooling
- Free cooling

Energy recovery

RoofVent® RC

Heating and cooling with central heat and cold generation in the 2-pipe system

Ventilation
- Fresh air supply
- Extract air removal
- Filters fresh air, recirculated air and extract air
- Air distribution with Air-Injector
- Recirculation operation

Heating
- With connection to boiler system

Cooling
- Free cooling
- With connection to water chiller

Energy recovery

RoofVent® RHC

Heating and cooling with central heat and cold generation in the 4-pipe system

Ventilation
- Fresh air supply
- Extract air removal
- Filters fresh air, recirculated air and extract air
- Air distribution with Air-Injector
- Recirculation operation

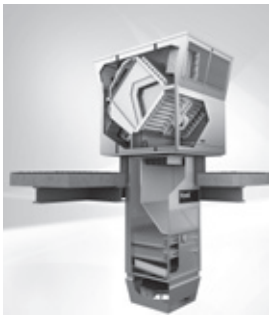
Heating
- With connection to boiler system

Cooling
- Free cooling
- With connection to water chiller

Energy recovery

Technical data		RP-6	RP-9	RH-6	RH-9	RC-6	RC-9	RHC-6	RHC-9
Air flow rate	m³/h	5500	8000	5500	8000	5500	8000	5500	8000
Heat output (max.)	kW	33.5 / 40	67	78	139	78	139	78	139
Cooling capacity (max.)	kW	33.5 / 40	67	–	–	52	98	52	98
Operating distance	m × m	22 × 22	28 × 28	22 × 22	28 × 28	22 × 22	28 × 28	22 × 22	28 × 28
Weight	kg	911	1200	849	1123	882	1171	919	1244

Supply and extract air handling units with efficient air distribution

		
RoofVent® KH (Non-EU countries)	**RoofVent® KC** (Non-EU countries)	**RoofVent® KHC** (Non-EU countries)
Heating with central heat generation	**Heating and cooling with central heat and cold generation in the 2-pipe system**	**Heating and cooling with central heat and cold generation in the 4-pipe system**
Ventilation • Fresh air supply • Extract air removal • Filters fresh air, recirculated air and extract air • Air distribution with Air-Injector • Recirculation operation	**Ventilation** • Fresh air supply • Extract air removal • Filters fresh air, recirculated air and extract air • Air distribution with Air-Injector • Recirculation operation	**Ventilation** • Fresh air supply • Extract air removal • Filters fresh air, recirculated air and extract air • Air distribution with Air-Injector • Recirculation operation
Heating • With connection to boiler system	**Heating** • With connection to boiler system	**Heating** • With connection to boiler system
Cooling • Free cooling	**Cooling** • Free cooling • With connection to water chiller	**Cooling** • Free cooling • With connection to water chiller
Energy recovery	**Energy recovery**	**Energy recovery**

Technical data		KH-6	KH-9	KC-6	KC-9	KHC-6	KHC-9
Air flow rate	m³/h	7500	11000	7000	10500	7000	10500
Heat output (max.)	kW	110	171	106	167	106	167
Cooling capacity (max.)	kW	–	–	81	112	81	112
Operating distance	m × m	27 × 27	36 × 36	25 × 25	35 × 35	25 × 25	35 × 35
Weight	kg	716	905	749	972	786	1026

Supply and extract air handling units with efficient air distribution	
	
RoofVent® RG	**RoofVent® KG** (Non-EU countries)
Heating with gas-fired heat generation	**Heating with gas-fired heat generation**
Ventilation • Fresh air supply • Extract air removal • Filters fresh air, recirculated air and extract air • Air distribution with Air-Injector • Recirculation operation	**Ventilation** • Fresh air supply • Extract air removal • Filters fresh air, recirculated air and extract air • Air distribution with Air-Injector • Recirculation operation
Heating • with condensing gas boiler	**Heating** • with condensing gas boiler
Cooling • Free cooling	**Cooling** • Free cooling
Energy recovery	**Energy recovery**

Technical data		RG-9	KG-9
Air flow rate	m³/h	8000	11000
Heat output (max.)	kW	70	70
Cooling capacity (max.)	kW	–	–
Operating distance	m × m	28 × 28	36 × 36
Weight	kg	1251	1147

Recirculation units with efficient air distribution

TopVent® TP

Heating and cooling with decentralised heat pump

Ventilation
- Recirculation operation
- Air distribution with Air-Injector
- Air filtration (option)

Heating
- With heat pump

Cooling
- With heat pump

TopVent® TH

Heating with central heat generation

Ventilation
- Recirculation operation
- Air distribution with Air-Injector
- Air distribution via outlet nozzle (option)
- Air filtration (option)

Heating
- With connection to boiler system

TopVent® TC

Heating and cooling with central heat and cold generation in the 2-pipe system

Ventilation
- Recirculation operation
- Air distribution with Air-Injector
- Air filtration (option)

Heating
- With connection to boiler system

Cooling
- With connection to water chiller

TopVent® THC

Heating and cooling with central heat and cold generation in the 4-pipe system

Ventilation
- Recirculation operation
- Air distribution with Air-Injector
- Air filtration (option)

Heating
- With connection to boiler system

Cooling
- With connection to water chiller

Technical data		TP-6	TP-9	TH-6	TH-9	TC-6	TC-9	THC-6	THC-9
Air flow rate	m³/h	6000	9000	6000	9000	6000	9000	6000	9000
Heat output (max.)	kW	33.5 / 40	67	76	118	76	141	76	118
Cooling capacity (max.)	kW	33.5 / 40	67	–	–	44	87	44	87
Operating distance	m × m	23 × 23	31 × 31	23 × 23	31 × 31	23 × 23	31 × 31	23 × 23	31 × 31
Weight	kg	245	316	111	166	216	276	255	340

Recirculation units with efficient air distribution, configured as roof units

TopVent® CP

Heating and cooling with decentralised heat pump

Ventilation
- Recirculation operation
- Air distribution with Air-Injector
- Air distribution box for duct connection (option)
- Air filtration

Heating
- With heat pump

Cooling
- With heat pump

TopVent® CH

Heating with central heat generation

Ventilation
- Recirculation operation
- Air distribution with Air-Injector
- Air distribution box for duct connection (option)
- Air distribution via outlet nozzle (option)
- Air filtration

Heating
- With connection to boiler system

TopVent® CC

Heating and cooling with central heat and cold generation in the 2-pipe system

Ventilation
- Recirculation operation
- Air distribution with Air-Injector
- Air distribution box for duct connection (option)
- Air filtration

Heating
- With connection to boiler system

Cooling
- With connection to water chiller

TopVent® CHC

Heating and cooling with central heat and cold generation in the 4-pipe system

Ventilation
- Recirculation operation
- Air distribution with Air-Injector
- Air distribution box for duct connection (option)
- Air filtration

Heating
- With connection to boiler system

Cooling
- With connection to water chiller

Technical data		CP-6	CP-9	CH-6	CH-9	CC-6	CC-9	CHC-6	CHC-9
Air flow rate	m³/h	6000	9000	6000	9000	6000	9000	6000	9000
Heat output (max.)	kW	33.5 / 40	67	76	118	76	141	76	118
Cooling capacity (max.)	kW	33.5 / 40	67	–	–	44	87	44	87
Operating distance	m × m	23 × 23	31 × 31	23 × 23	31 × 31	23 × 23	31 × 31	23 × 23	31 × 31
Weight	kg	672	869	616	791	647	843	684	898

Supply air units with efficient air distribution

TopVent® MP

Heating and cooling with decentralised heat pump

Ventilation
- Fresh air supply (duct connection)
- Mixed air operation
- Recirculation operation
- Air distribution with Air-Injector
- Air filtration

Heating
- With heat pump

Cooling
- Free cooling
- With heat pump

TopVent® MH

Heating with central heat generation

Ventilation
- Fresh air supply (duct connection)
- Mixed air operation
- Recirculation operation
- Air distribution with Air-Injector
- Air filtration

Heating
- With connection to boiler system

Cooling
- Free cooling

TopVent® MC

Heating and cooling with central heat and cold generation in the 2-pipe system

Ventilation
- Fresh air supply (duct connection)
- Mixed air operation
- Recirculation operation
- Air distribution with Air-Injector
- Air filtration

Heating
- With connection to boiler system

Cooling
- Free cooling
- With connection to water chiller

TopVent® MHC

Heating and cooling with central heat and cold generation in the 4-pipe system

Ventilation
- Fresh air supply (duct connection)
- Mixed air operation
- Recirculation operation
- Air distribution with Air-Injector
- Air filtration

Heating
- With connection to boiler system

Cooling
- Free cooling
- With connection to water chiller

Technical data		MP-6	MP-9	MH-6	MH-9	MC-6	MC-9	MHC-6	MHC-9
Air flow rate	m³/h	6000	9000	6000	9000	6000	9000	6000	9000
Heat output (max.)	kW	33.5 / 40	67	78	121	78	145	78	121
Cooling capacity (max.)	kW	33.5 / 40	67	–	–	34	68	34	68
Operating distance	m × m	23 × 23	31 × 31	23 × 23	31 × 31	23 × 23	31 × 31	23 × 23	31 × 31
Weight	kg	304	380	172	237	275	343	314	408

Supply air units with efficient air distribution, configured as roof units

TopVent® SP

Heating and cooling with decentralised heat pump

Ventilation
- Fresh air supply
- Mixed air operation
- Recirculation operation
- Air distribution with Air-Injector
- Air distribution box for duct connection (option)
- Air filtration

Heating
- With heat pump

Cooling
- Free cooling
- With heat pump

TopVent® SH

Heating with central heat generation

Ventilation
- Fresh air supply
- Mixed air operation
- Recirculation operation
- Air distribution with Air-Injector
- Air distribution box for duct connection (option)
- Air filtration

Heating
- With connection to boiler system

Cooling
- Free cooling
- Adiabatic cooling (option)

TopVent® SC

Heating and cooling with central heat and cold generation in the 2-pipe system

Ventilation
- Fresh air supply
- Mixed air operation
- Recirculation operation
- Air distribution with Air-Injector
- Air distribution box for duct connection (option)
- Air filtration

Heating
- With connection to boiler system

Cooling
- Free cooling
- With connection to water chiller

TopVent® SHC

Heating and cooling with central heat and cold generation in the 4-pipe system

Ventilation
- Fresh air supply
- Mixed air operation
- Recirculation operation
- Air distribution with Air-Injector
- Air distribution box for duct connection (option)
- Air filtration

Heating
- With connection to boiler system

Cooling
- Free cooling
- With connection to water chiller

Technical data		SP-6	SP-9	SH-6	SH-9	SC-6	SC-9	SHC-6	SHC-9
Air flow rate	m³/h	6000	9000	6000	9000	6000	9000	6000	9000
Heat output (max.)	kW	33.5 / 40	67	78	121	78	145	78	121
Cooling capacity (max.)	kW	33.5 / 40	67	–	–	34	68	34	68
Operating distance	m × m	23 × 23	31 × 31	23 × 23	31 × 31	23 × 23	31 × 31	23 × 23	31 × 31
Weight	kg	717	924	661	846	692	898	729	953

Recirculation units with efficient air distribution

TopVent® TV	TopVent® TW Pro
Heating with central heat generation	**Air curtain with central heat generation**
Ventilation • Recirculation operation • Air distribution via air outlet louvre	**Ventilation** • Recirculation operation • Air distribution via outlet grid
Heating • With connection to boiler system	**Heating** • With connection to boiler system - TW Pro 150-1 - TW Pro 150-2 - TW Pro 200-1 - TW Pro 200-2

Technical data		TV-2	TV-4	TV-5	150-0	200-0	150-1	200-1	150-2	200-2
Air flow rate	m³/h	2100	4850	5700	8500	12800	7900	11900	7300	10700
Heat output (max.)	kW	13	30	45	–	–	32	48	58	88
Cooling capacity (max.)	kW	–	–	–	–	–	–	–	–	–
Operating distance	m × m	7 × 7	10 × 10	12 × 12	8.0	8.0	7.5	7.5	7.0	7.0
Weight	kg	16	23	24	43	58	51	66	54	70

Gas-fired recirculation and supply air units

TopVent® TG

Gas-fired recirculation unit with efficient air distribution

Ventilation
- Recirculation operation
- Air distribution with Air-Injector
- Air distribution via outlet nozzle (option)
- Air filtration

Heating
- with gas-fired heat exchanger

TopVent® MG

Gas-fired supply air unit with efficient air distribution

Ventilation
- Fresh air supply (duct connection)
- Mixed air operation
- Recirculation operation
- Air distribution with Air-Injector
- Air filtration

Heating
- with gas-fired heat exchanger

TopVent® GV

Gas-fired recirculation unit

Ventilation
- Recirculation operation
- Air distribution via air outlet louvre

Heating
- with gas-fired heat exchanger

Technical data		TG-6	TG-9	MG-6	MG-9	GV-3	GV-5
Air flow rate	m³/h	7000	11000	7000	11000	4200	8500
Heat output (max.)	kW	29	61	29	61	29	50
Cooling capacity (max.)	kW	–	–	–	–	–	–
Operating distance	m × m	26 × 26	36 × 36	26 × 26	36 × 36	12 × 12	16 × 16
Weight	kg	125	170	175	230	40	80

Compact units with energy recovery from process air

ProcessVent PV	ProcessVent PVH	ProcessVent PVC
Compact unit for ventilating with energy recovery from process air	**Compact unit for ventilating and heating with energy recovery from process air**	**Compact unit for ventilating, heating and cooling with energy recovery from process air**
Ventilation • Fresh air supply • Extract air removal (with air conveyance via the extract air purification plant) • Recirculation operation • Air filtration	**Ventilation** ■ Fresh air supply ■ Extract air removal (with air conveyance via the extract air purification plant) ■ Recirculation operation ■ Air filtration	**Ventilation** ■ Fresh air supply ■ Extract air removal (with air conveyance via the extract air purification plant) ■ Recirculation operation ■ Air filtration
	Heating • With connection to boiler system	**Heating** • With connection to boiler system
		Cooling • With connection to water chiller
Energy recovery from process air	**Energy recovery from process air**	**Energy recovery from process air**

Technical data		PV-10	PVH-10	PVC-10
Air flow rate	m³/h	10000	10000	10000
Heat output (max.)	kW	–	234	256
Cooling capacity (max.)	kW	–	–	118
Operating distance	m × m	–	–	–
Weight	kg	1657	1699	1754