OIL / GAS (Heat recovery)



Responsibility for energy and environment

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

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Oil/Gas boilers

(heat value / gas condensation)



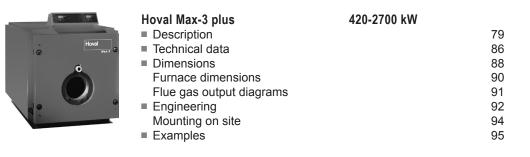
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Standard terms and conditions of delivery

123

Description

Hoval MultiJet® Oil condensing boiler

Boiler

- Oil condensing special boiler according to EN 303 part 1 and 2, EN 15034 and EN 15035
- For firing of standard Diesel oil and lowsulphur heating oil EL, (intermixture of up to 10 % FAME (EN 14213) is possible)
- Maximal flue gas condensation through special jet-insets and 2-stage operation
- No lower delimitation of the boiler water temperature and the boiler return temperature
- No minimal water circulation necessary
- High class stainless steel design resistant against sulphuric acid of the flue gas and condensate carrying parts
- Design with neutralisation box
- · Boiler door:
 - MultiJet[®] (16) opening to the top, swivelmounted to the left or to the front
 - MultiJet[®] (20,25) opening to the top, swivelmounted to the right (standard delivery from the factory) or to the left (changing on site of the customer)
- Insulation at the boiler body with mineral wool mat and special fabric:
 - MultiJet[®] (16) 50 mm
 - MultiJet® (20,25) 80 mm
- Boiler completely cased with steel plate, red powder coated
- Flue outlet:
 - MultiJet® (16) to the top
 - MultiJet[®] (20,25) backwards to the top
- Flue gas sound absorber:
- MultiJet® (16) integrated
- MultiJet® (20,25) see accessories
- · Heating connections right and left side for:
 - Flow
 - Return- High temperature
 - Return- Low temperature
- Sound absorbing / thermal insulation hood
- Flue gas safety temperature limiter integra-
- ted
 MultiJet[®] (16-25): Approval for ambient air independent operation C_{53x} or C_{63x} (according to EN15035).

Control panel TopTronic®T/U3.6

- Integrated control function for
 - 1 mixing circuit
- 1 heating circuit without mixing operation
- domestic hot water loading circuitOption to expand the functions by different
- Key Modules (see accessories)
- Main swith "I/O,
- Safety temperature limiter 110 °C
- Fuse 6.3A
 Trouble indication «Burne
- Trouble indication «Burner»
 Running time meter and counter
- Boiler sensor
- Large LCD-Display
- Rotary pushbutton
- Button for:
- daytime room temperature
- night room temperature
- hot water temperature
- operating mode selection (holiday, absent, heating operation prolongation, automatic, summer, heating operation continuous reduced - frost protection)



Model range

MultiJet [®] Type	Output 40/30 °C kW
(16)	12 - 16
(20)	14 - 20
(25)	16 - 25

Permissions boilers

CE-Product-ID-No. MultiJet[®] (16-25)

CE-0036-0368/05

- adjusting the heating curves
- system information
- emission measurement and manual operation
- Outside sensor AF 200
- Flow sensor with plug
- Calorifier sensor with plug
- Plug connection for 2-stage burner 1 x 230V
- Connection available for room station

Oil burner to MultiJet® (16-25)

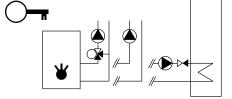
- Fully automatic 2-stage pressure jet burner (blue flame burner)
- With motorized air damper
- With oil pre-heating
- Flame monitoring with flicker detector (IRD)
- Oil burner tested by Hoval for ≤ 1000 m above sea level. 1,2 % output reduction per 100 m higher level

Optional

- · Free standing calorifier,
- see calorifier
- Flue gas systems

Delivery

- MultiJet® (16-25):
 - Boiler with control panel, sound absorbing hood and boiler socket completely cased. Oil burner and ev. neutralisation box are separately packed and delivered.



Oil condensing boiler Hoval MultiJet®

Oil condensing boiler, with control panel Hoval TopTronic®T/U3.6 built-in.

Integrated control function for:

- 1 mixing circuit
- 1 heating circuit without mixing operation
- domestic hot water loading circuit
- Expansion of the function by Key Modules.

Incl. sensor, flue gas safety temperature limiter, 2-stage oil burner and sound absorbing hood. design with neutralisation box.

Suitable flue gas system DN80 see "flue gas systems"

Delivery

 MultiJet® (16-25): Boiler with control panel, sound absorbing hood and boiler socket completely cased. Oil burner and neutralisation box are separately packed and delivered.

Oil condensing boiler with TopTronic®T/U3.6 incl. neutralisation box

Hoval MultiJet® (16): operation with Diesel Oil (Sulfur content max. 1000 ppm) Hoval MultiJet® (20,25): operation with Diesel Oil (Sulfur content max. 2000 ppm)

MultiJet [®] type	Oil burner type	Heat output 40/30 °C kW	
(16)	Blue flame burner	12 - 16	7011 383
(20)	Blue flame burner	14 - 20	7011 389
(25)	Blue flame burner	16 - 25	7011 395

The local regulations must be complied with for installation of a neutralising system.

Hoval

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Part N°

	Accessories	Part N°
Ū	Flue gas sound absorber for MultiJet® (20,25), UltraOil® (16-25) to reduce the flue gas side sound emissions. Connection on both sides E80 sound absorbing approx. 11 dB(A) flue gas resistance 12 Pa (at 25 kW) Total length 810 mm external Ø 160 mm Mounting position: vertical up to 45°	6017 246
	Special cleaning brush stainless steel brush with nylon bristles for a careful cleaning of the stainless steel heating surfaces D 189 x 120/1030	2015 202
	Boiler socket for MultiJet [®] (16) to elevate the condensate drainage made of steel height 150 mm anthracite painted	6025 417
	Boiler socket for MultiJet [®] (20,25), UltraOil [®] (16-35), UltraGas [®] (15-50) to elevate the condensate drainage made of steel height 150 mm anthracite painted	6025 418
	Condensate drainage for Hoval MultiJet [⊚] (16-25)	
	With neutralisation, for condensate drainage into higher situated drain pipe	
	Condensate pump for transporting condensation water into a higher drainage duct. Including connection line, completely wired, cable and plug for connection to the boiler controller max. transport height: 3.5 m Delivery rate up to 120 l/h combinable with neutralisation box can be mounted in boiler socket	6015 159
	Neutralisation granulate for neutralisation box Refill set volume 3 kg Life time of one filling: approx. 2-4 years; depending on amount of condensate	2028 906
A decay water Constrained Maria Lawar Maria Lawar Mar	Active carbon for neutralisation box Refill Carboscreen operating life of one filling approx. 10 years	2029 801

Hoval

		Part N°	
Ø 81	Separating piece C80/125 -> 2xE80PP for ambient air independent operation for separate conduction of flue gas and combustion air. Only in combination with connection set for ambient air independent operation.	2010 174	
	Boiler connection piece for MultiJet® (16) C80/110 -> C80/125PP with measure opening for flue gas and supply air At Hoval LAS flue pipe systems included in the scope of delivery.	2009 694	
(1125) (1105) (1105)	Adapter ring for LAS boiler connection piece for MultiJet® (16) C80/110 -> C80/125 to reduce construction height Attention: T-piece with measure opening necessary Order LAS flue gas system as separate pieces!	5015 274	
	Connection set for ambient air independent operation without sound absorber for UltraOil® (16-35), UltraGas® (15-50), MultiJet® (20,25) Consisting of: corrugated pipe Ø 50 mm for combustion air supply to burner. Concentric boiler connection piece E80 -> C80/125PP for flue gas and supply air. Necessary if no Hoval LAS flue gas system is used.	6027 510	
	Connection set for ambient air independent operation in connection with sound absorber for MultiJet® (20,25), UltraOil® (16-25) suitable for supply air/flue gas system C80/125 PP Consisting of: corrugated pipe Ø 50 mm for combustion air supply to burner Concentric boiler connection piece E80 -> C80/125PP for flue gas and supply air.	6017 143	

6

Accessories for regulator system Hoval TopTronic®T

Key Module for Hoval TopTronic®T

use to get more functions additional to standard functions. *Key Module consisting of:* Function key to plug in TopTronic®T incl. accessories **Only one Key Module possible!**

Standard functions

- already included in TopTronic®T.
- 1 mixing circuit

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- 1 heating circuit without mixing operation
- domestic hot water loading circuit

Functions of the Key Modules

Key Module	2. mixing circuit	solid fuel - storage tank - bi-fuel	solar

(1)	•		
2 3		•	
3-			•
4	•	٠	
5-	•		•
6		•	•
7-	•	٠	٠

1-	Key Module 1 for 2. mixing circuit Function key 1, 1 flow sensor, 2 loose plugs
2	Key Module 2 for solid fuel/ storage tank/bivalent installation Function key 2, 3 immersion sensors, 4 loose plugs
3 -	Key Module 3 <i>for solar plants</i> Function key 3, 1 collector sensor, 1 calorifier sensor, 4 loose plugs
(4)	Key Module 4 for 2. mixing circuit and solid fuel/storage tank/ bivalent installation Function key 4, 1 flow sensor, 3 immersion sensors, 6 loose plugs
5	Key Module 5 for 2. <i>mixing circuit and solar plants</i> Function key 5, 1 flow sensor, 1 collector sensor, 1 calorifier sensor, 6 loose plugs
£ 6 -	Key Module 6 for solid fuel/ storage tank/bivalent installation and solar plants Function key 6, 1 collector sensor, 4 immersi- on sensors, 6 loose plugs
- (7) - 1	Key Module 7 <i>für 2. mixing circuit, solid fuel/ storage tank/</i> <i>bivalent installation and solar plants</i> Function key 7, 1 flow sensor, 1 collector sen- sor, 4 immersion sensors, 8 loose plugs

Sensor type Immersion-/calorifier sensor: Type KVT20/5/6 (L = 5 m) without immersion sleeve flow sensor: Type VF204S with plug collector sensor: Type PT1000 (silicone)

Subject to alterations, 1.8.2013

System approaches and applications

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see Hoval CD

Part N°

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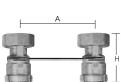
6012 160

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Part N°

	Accessories for TopTronic®T	Part N°
in a norma (a) in in i	Room station RS-T for TopTronic®T effective on one mixing circuit	2034 939
Hoval	Remote control RFF-T for TopTronic®T effective on one mixing circuit	2022 239
000	Outdoor sensor AF 200 (may be included in the heat generator scope of delivery) for one mixing circuit or for the mean value (per regulator 2 outdoor temperature sensors possible)	2022 995
	Cable sensor KVT 20/5/6S 5 m cable and plug	6012 687
	Contact sensor VF204S can be used as flow or return flow sensor with 4 m cable and plug	6012 688
	Flow temperature guard for underfloor heating system (1 guard per heating circuit) 15-95 °C, differential gab 6K, capillary tube max. 700 mm setting (visible form the outside) inside the housing cover	
	Clamp-on thermostat RAK-TW1000.S Thermostat with strap, without cable and plug	242 902
	<i>Kit Clamp-on thermostat RAK-TW1000.S</i> Thermostat with strap, enclosed cable (4 m) and plug	6015 000
	Immersion thermostat RAK-TW1000.S SB 150 Thermostat with pocket 1/2" - depth of immersi- on 150 mm, brass nickel-plated	6010 082
	Kit BMS-Modul 0-10V (Building management system) Consisting of: BMS-Module and trafo Cannot be installed in the boiler control panel!	6015 195
	Casing to accommodate the BMS-Module see "System Components"	
	Communication modules / remote con- nection see "System Components"	

	Boiler-connection-sets	Part N°
	Connection set AS25-S/NT/HT for mounting a heating armature group HA25 for MultiJet® (16), UltraOil® (16,20), UltraGas® (15-27) Suitable for left or right connection Low/high temperature Connection set, fully thermally insulated Rigid flow pipe and flexible return flow pipe For mounting an armature group HA20 adapter set DN20 - DN25 necessary. Delivery: Connection set in assembly units, complete packet.	6017 055
	AS25-S2/NT/HT Low/high temperature for MultiJet® (20,25), UltraOil® (25,35) Connection set, fully thermally insulated Rigid flow pipe and flexible return flow pipe. Suitable for left or right connection of an armature group HA25. For mounting an armature group HA20 an adapter set DN20 - DN25 is necessary. Delivery: Connection set in assembly units, complete packet.	6024 985
e Hoval	Mounting kit AS-HA for MultiJet® (20,25) If an armature group is mounted on both sides of the boiler, this kit has to be ordered in order to allow a complete swinging out of the boiler door.	6027 233
	Holding plate for the installation of a loading group LG25-2/unmixed HA group HA25-2 Suited to Hoval boiler connection set AS25 Dimension between axes A = 125 mm, installation height H = 60 mm	2022 446



Part N°

Part N°



DN20 (¾") Pump with stepless speed control HA20-3BM-R/AX 12-4 AX12-4 6020 519 HA20-3BM-R/AX 13-4 AX13-4 6020 659 DN25 (1") Pump with stepless speed control HA25-3BM-R/AX 12-1 AX12-1 6020 520			
DN20 (¾") Pump with stepless speed control HA20-3BM-R/AX 12-4 AX12-4 6020 519 HA20-3BM-R/AX 13-4 AX13-4 6020 659 DN25 (1") Pump with stepless speed control HA25-3BM-R/AX 12-1 AX12-1 6020 520	with 3-way motor mixer a	nd heat-insulating	
Pump with stepless speed control HA20-3BM-R/AX 12-4 AX12-4 6020 519 HA20-3BM-R/AX 13-4 AX13-4 6020 659 DN25 (1") Pump with stepless speed control 6020 520	HA group - type	Pump - type	
HA20-3BM-R/AX 12-4 AX12-4 6020 519 HA20-3BM-R/AX 13-4 AX13-4 6020 659 DN25 (1") Pump with stepless speed control 6020 520 HA25-3BM-R/AX 12-1 AX12-1 6020 520	DN20 (¾")		
HA20-3BM-R/AX 13-4 AX13-4 6020 659 DN25 (1") Pump with stepless speed control 6020 520 HA25-3BM-R/AX 12-1 AX12-1 6020 520	Pump with stepless spee	d control	
DN25 (1") Pump with stepless speed control HA25-3BM-R/AX 12-1 AX12-1 6020 520	HA20-3BM-R/AX 12-4	AX12-4	6020 519
Pump with stepless speed controlHA25-3BM-R/AX 12-1AX12-16020 520	HA20-3BM-R/AX 13-4	AX13-4	6020 659
HA25-3BM-R/AX 12-1 AX12-1 6020 520	DN25 (1")		
	Pump with stepless spee	d control	
HA25-3BM-R/AX 13-1 AX13-1 6020 521	HA25-3BM-R/AX 12-1	AX12-1	6020 520
	HA25-3BM-R/AX 13-1	AX13-1	6020 521

Heating	armature	group	HA-	3BM-L	

Hoval heating armature groups

with 3-way motor mixer and heat-insulating box. Installation left (flow right).

HA group - type	Pump - type	
DN20 (¾")		
Pump with stepless speed	control	
HA20-3BM-L/AX 12-4	AX12-4	6020 523
HA20-3BM-L/AX 13-4	AX13-4	6025 429
DN25 (1")		
Pump with stepless speed	control	
HA25-3BM-L/AX 12-1	AX12-1	6020 524
HA25-3BM-L/AX 13-1	AX13-1	6020 525













Part N°

Hoval

Loading group LG-2/ Heating armature group For the connection of a heating circuit without r ing box. Installation right	side calorifier or as nixer, with heat-insulat-	
LG/ HA group - type	Pump - type	
DN20 (¾") Pump with stepless spe LG/HA20-2/AX12-4	eed control AX12-4	6020 527
DN25 (1") Pump with stepless spe LG/HA25-2/AX 12-1 LG/HA25-2/AX 13-1	eed control AX12-1 AX13-1	6020 528 6020 529
Compact loading grou With heat-insulating bo	up LG-2	0020 329
Туре	Flow/ Pump Return - type	
DN25 (1") Pump with stepless spe LG25-Compact/AX12-1		6020 492
Bypass valve DN 20 (* for the installation in a H DN 20 Pressure range 0.1 to 0 RPM-regulated pumps a constant speed!	HA group).6 bar	6013 684
Bypass valve DN 20 (1 for the installation in a H DN 25/32 Pressure range 0.1 to 0 RPM-regulated pumps a constant speed!	HA group).6 bar	6006 989
Adapter set DN20-DN2 for the installation of the DN20 to a wall distribut a connection set DN25. Installation height 120 r	e HA group or DN25 or	6013 693
Adapter set DN32-DN for the installation of the DN32 to a connection s	e HA group	6007 191
Wall bracket for the installation of a l on the wall.	Hoval armature group	
Dim. between centre lines C Type mm To	Wall Connection distance p Bottom mm	
DN 25 125 Rp	9 1" R 1" 70,85,100 9 1½" R 1" 87-162 9 2" R1½" 142,167	6019 209 6019 210 6025 295

Detailed data, further HA groups and wall distributors see separate brochure

Hoval

Accessories Part N° Safety set SG15-1" 6411 84 Suitable up to max. 50 kW complete with safety valve (3 bar) Pressure gauge and automatic air vent with cut off valve Connection: 1" internal thread **Expansion chamber** ØD . Reflex NG with threaded connectors permitted operating temperature 70 °C Pre-pressure 1,5 bar Η permitted operating overpressure 6 bar h Туре Colour øD Н h А mm mm mm NG35 354 460 130 R¾" 2427 92 NG50 409 493 175 R¾" 2026 088 NG80 480 565 175 R1" 2026 089 NG100 480 670 175 R1" 2026 090 Vibration elements for boiler socket 6003 737 4 pieces of 100 mm each Height unstressed approx. 50 mm, width 80 mm If vibration elements for boiler socket are used then all connections (incl. flue gas tube) must be connected flexibly with sound absorbing compensators. Oil filter 2004 128 with automatic air vent TOC Duo for operation in one pipe systems with return flow feed Incl. wall mounting set and shut-down valve Connections: tank side internal thread R3/8", burner side external thread R3/8" with internal cone for pipe connection Operating temperature: max. 40 °C Ambient temperature: max. 60 °C Nozzle output: max. 120 l/h Diesel oil Filter inset made of sinter plastic: Fineness 50-75 µm Usage of the filter: <40 kW 2005 275 Filter inset made of sinter plastic Siku Fineness: 50-75 µm Output range: up to 40 kW Clamping ring screw joint KVS/6 5607 24 for TOC Duo made of brass for oil pipe Ø 6 mm

Hoval

	Part N°
Clamping ring screw joint KVS/8 for TOC Duo made of brass for oil pipe Ø 8 mm	5607 25
Clamping ring screw joint KVS/10 for TOC Duo made of brass for oil pipe Ø 10 mm	2010 185
Clamping ring screw joint KVS/12 for TOC Duo made of brass for oil pipe Ø 12 mm	2010 186
Filter inset made from cellulose Fineness 5-20 μm Output range <30 kW mix B10	2030 196
Oil filter with automatic air vent for operation in one pipe systems with return flow feed Incl. wall mounting set and shut-down valve Connections: tank side internal thread R3/8", burner side external thread R3/8" with internal cone for pipe connection Operating temperature: max. 60 °C Ambient temperature: max. 60 °C Nozzle output: max. 100 l/h Filter inset made from cellulose: Fineness 20 µm Usage of the filter: <30 kW	6017 563



Service

Commissioning

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

For commissioning and other services please contact your Hoval sales office

Technical data

Туре			(16)	(20)	(25)
 Nominal output 80/60 °C 		kW	15,6	19,2	24,2
 Nominal output 40/30 °C 		kW	16,0	20,0	25,0
 Range of output 80/60 °C 	1st/2nd stage	kW	11,2 / 15,6	13,6 / 19,2	15,2 / 24,2
 Range of output 40/30 °C 	1st/2nd stage	kW	11,8 / 16,0	14,4 / 20,0	16,0 / 25,0
Heat input	1st/2nd stage	kW	11,3 / 15,9	13,8 / 19,5	15,4 / 24,6
Dimension	0			Space requirements	
 Max. boiler working temperature 		°C	90		90
Min. boiler working temperature				no min. limit	
Min. return flow temperature				no min. limit	
Min. flue gas temperature				no min. limit	
Safety temperature limiter setting (water side)		°C	110	110	110
Working / test pressure		Ũ	3,0 / 4,5	3,0 / 4,5	3,0 / 4,5
 Boiler efficiency with max. burner output at 80 	/60 °C		0,07 4,0	0,07 4,0	0,074,0
(related to net/ gross calorific value)	100 0	%	98,3 / 92,7	98,3 / 92,7	98,3 / 92,7
 Boiler efficiency with max. burner output at 40 	/30 °C	70	50,07 52,7	50,57 52,7	50,57 52,7
(related to net/ gross calorific value)	/30 0	%	103,5 / 97,6	103,5 / 97,6	103,5 / 97,6
 Boiler efficiency at partial load 30 % 		70	100,07 07,0	100,07 07,0	100,07,07,0
at return flow 27°C (according to EN 303)					
(related to net/ gross calorific value)		%	104,5 / 98,6	104,5 / 98,6	104,5 / 98,6
 Nominal efficiency at 75/60 °C 		70	104,57 90,0	104,57 90,0	104,57 90,0
(according to DIN 4702 part 8)					
		%	102,6 / 96,8	102 2 / 06 5	102 5 / 06 7
(related to net/ gross calorific value)		/0	102,07 90,0	102,3 / 96,5	102,5 / 96,7
Nominal efficiency at 40/30 °C (according to DIN 4702 part 8)					
(according to DIN 4702 part 8)		%	104 1 / 09 2	101 2 / 00 2	104 1 / 09 2
(related to net/ gross calorific value)		Watt	104,1 / 98,2 148	104,2 / 98,3 194	104,1 / 98,2 201
Stand-by deficiency qB at 70 °C	m abaya asa	vvall	140	194	201
• Combustion gas resistance, 12,5 % CO ₂ , 500	mabove sea,	mbor	2.0	0.7	0.0
level (Tolerance+/- 20 %) ³		mbar	2,0	0,7	0,9
• Flue gas mass flow at full out 12,5 % CO ₂ Die	Sei Oli	kg/h	24.3	31	38,9
Condensate rate at 40/30 °C		l/h	1,07	1,26	1,75
Flow resistance boiler ¹		z-value	4,5	3,4	3,4
Water resistance at 10 K		mbar	9,0	10,2	16,2
Water resistance at 20 K		mbar	2,2	2,5	4,0
Water flow volume at 10 K		m³/h	1,41	1,73	2,18
Water flow volume at 20 K		m³/h	0,71	0,86	1,09
Boiler water capacity		litre	35	50	58
Boiler gas volume		m³	0,024	0,076	0,088
Insulation boiler body		mm	50	80	80
Weight (incl. casing, sound absorbing hood, b	urner)	kg	117	155	165
Weight of transport		kg	105	137	152
Min./ Max. electrical power consumption		Watt	4 / 124	4 / 145	4 / 174
Acoustic power incl. sound absorber hood					
Ambient air dependent			07	00	05
- Heating noise (EN 15036 part 1)		dB(A)	67	63	65
Ambient air independent				50	50
- Heating noise (EN 15036 part 1)		dB(A)	57	52	56
- Aspiration noise is radiated from the mouth	(DIN 45835)	dB(A)	66	66	66
- Aspiration / exhaust noise - LAS -					- /
is radiated from the mouth (DIN 45835) ²		dB(A)	72	71	74
Ambient air dependent and ambient air indepe				a =	
- Exhaust noise in the pipe (EN 15036 part 2) -	dB(A)	80	85	87
- Exhaust noise is radiated from the mouth					
(DIN 45635 part 47) ²		dB(A)	58	70	73
Combustion chamber dimensions Ø-inside x I	_ength	mm	189x310	295x408	295x420
 Combustion chamber volume 		m³	0,0087	0,027	0,028
 Delivery pressure at flue gas outlet ³ 		Pa	30	50	50
 Flue gas temperature at nominal output 80/ 60 	D°C	°C	85	85	85
 Maximum chimney draft 		Pa	20	20	20

¹ Flow resistance boiler in mbar = Volume flow $(m^3/h)^2 x z$ factor

² MultiJet[®] (16): Sound absorber integrated

MultiJet® (20,25): Data without sound absorber. Reduction by installation of a sound absorber possible.

³ To dimensioning exit gas line see rubric flue gas line systems

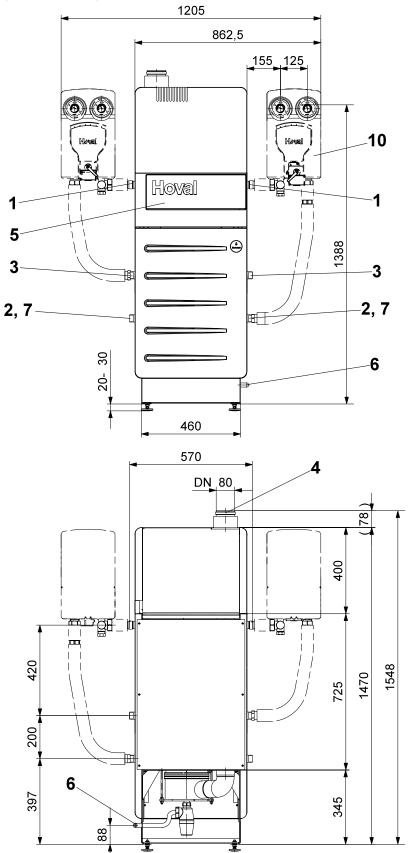
Heating armature group

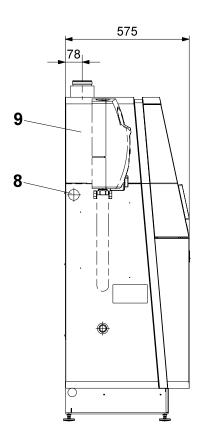
Flow resistance MultiJet[®] (16-25) with heating armature group HA-25-3BM-R/L (with mixing) z = 34,5HA25-2 (without mixing) z = 27,5

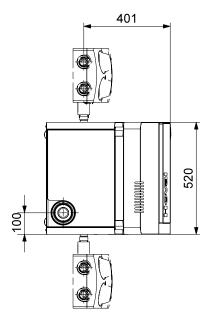
Dimensions

MultiJet[®] (16) with heating armature group HA 25

(Dimensions in mm)



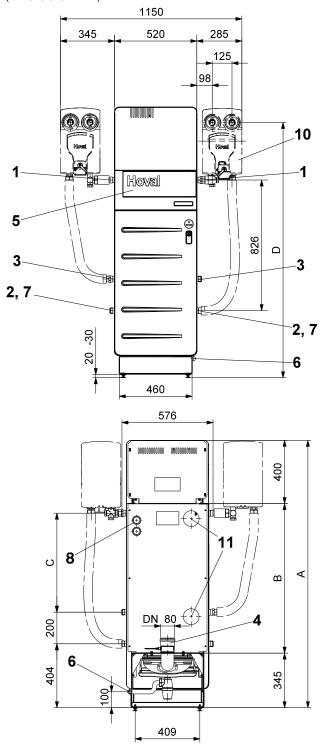




- 1 Flow heating / Safety flow R1"
- 2 Low temperature-return R1"
- 3 High temperature-return R1"
- 4 LAS flue gas/supply air connection C80/110
- 5 Control panel
- 6 Condensate drain (left or right) incl. syphon (DN25) and 2 m PVC passage tube Ø-inside 19 x 4 mm
- 7 Drain
- 8 Electric cable entry point
- 9 Absorber hood
- 10 Heating armature group or loading group (option)

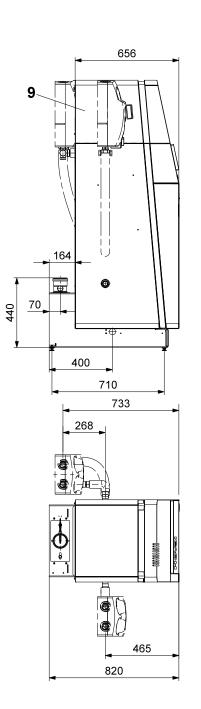
Dimensions

MultiJet® (20,25) with heating armature group HA25 (Dimensions in mm)



- If armature groups are connected on both sides of the boiler the fitting set AS-HA must be ordered, so that a complete swivelling of the boiler door is possible.
- Standard delivery with boiler door opening • to the top, swivel-mounted to the right.
- Change to the left is possible on site of the customer.

Туре	А	В	С	D
MultiJet [®] (20) MultiJet [®] (25)		945 1095		

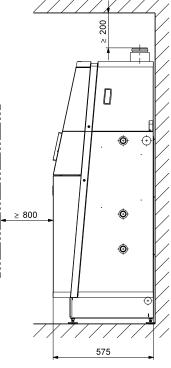


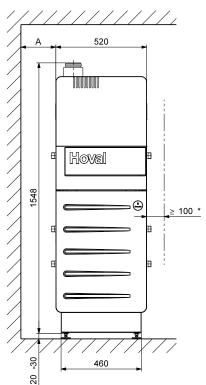
- 1 Flow heating / Safety flow R1"
- 2 Low temperature-return R1"
- High temperature-return R1" 3
- Flue gas outlet DN80 4
- 5 Control panel
- Condensate drain (left or right) incl. syphon (DN25) and 6 2 m PVC passage tube Ø-inside 19 x 4 mm
- 7 Drain
- Electric cable entry point 8
- 9 Absorber hood 10
- Heating armature group or loading group (option)
- Feed-through combustion air hose 11

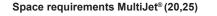
Dimensions

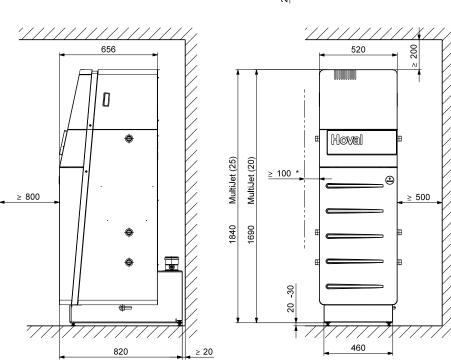
Space requirements

Space requirements MultiJet® (16)









MultiJet® (16)

- A = minimal 100 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 on the right side directly against the wall

* without armature group,

500 mm with armature group

MultiJet® (20,25)

- Door of the boiler inclusive burner must be able to be swung out 90°. Standard design right swivelling. The conversion from right to left is later possible (change on site)
- The minimum wall distance of 500 mm must be kept on the left side, if the boiler door swivel to the left.
- **Note:** The burner standardization edge connection must be installed opposite the swiveling direction
- The cleaning opening must be well accessible.
- Boiler rear side must be accessible.
- * without armature group,
 500 mm with armature group



Engineering

Application

- A satisfying flue gas condensation and thus energy savings are possible only with a lowtemperature heating.
- At deepest outside temperature the heater return temperature is to amount to maximally 45 °C.

Standards and guidelines

The following standard and guidelines must be respected:

- Technical information and installation manual of Hoval
- Hydraulic and technical control regulations
 of Hoval
- Local building law
- Fire protection standard
- DVGW guidelines
- DIN EN 12828 Heating systems in building plans of hot water heating plants
- DIN EN 12831 Heating plants in buildings procedure for computing the normed heating capacity
- VDE 0100

Water quality Heating water

- The European Standard EN 14868 and the Directive VDI 2035 must be observed.
- Hoval boilers and calorifiers are designed for heating plants without significant oxygen intake (plant type I according to EN 14868).
- · Plants with
 - continuous oxygen intake (e.g. underfloor heating systems without diffusion proof plastic piping) or
 - intermittent oxygen intake (e.g. where frequent refilling is necessary)
 - must be equipped with separate circuits.
- Treated heating water must be tested at least 1 x yearly. According to the inhibitor manufacturer's instructions, more frequent testing may be necessary.

- A refilling is not necessary if the quality of the heating water in existing installations (e.g. exchange of boiler) conforms to VDI 2035. The Directive VDI 2035 applies equally to the replacement water.
- New and if applicable existing installations needto be adequately cleaned and flushed before being filled. The boiler may only be filled after the heating system has been flushed!
- Parts of the boiler/ calorifier which have contact with water are made of ferrous materials and stainless steel.
- On account of the danger of stress cracking corrosion in the stainless steel section of the boiler the chloride, nitrate and sulphate contents of the heating water must not exceed 50 mg/l in total.
- The pH value of the heating water should lie between 8.3 and 9.5 after 6 -12 weeks of heating operation.

Filling and replacement water

- For a plant using Hoval boilers untreated drinking water is generally best suited as heating medium, i.e. as filling and replacement water. However, the quality of the untreated drinking water must fulfil the standard set in VDI 2035. Should the mains water available not be suited for use then it must be desalinated and/ or be treated with inhibitors. The stipulations of EN 14868 must be observed.
- In order to maintaina high level of boiler efficiency and to avoid overheating of the heating surfaces the values given in the table should not be exceeded (dependent on boiler performance ratings - for multi-boiler plants rating of smallest boiler applies - and on the water contentof the plant).
- If frost protection agent is being used, please contact the Hoval company to ask for the separate engineering sheet.
- The total amount of filling and replacement water which is used throughout the total service life of the boiler must not exceed three times the water capacity of the plant.

Table 1: Maximal filling quantity based on VDI 2035

		Carbonate hardness of the filling water up to						
[mol/m ³] ¹	<0,1	0,5	1	1,5	2	2,5	3	>3,0
f°H	<1	5	10	15	20	25	30	>30
d°H	<0,56	2,8	5,6	8,4	11,2	14,0	16,8	>16,8
е°Н	<0,71	3,6	7,1	10,7	14,2	17,8	21,3	>21,3
~mg/l	<10	50,0	100,0	150,0	200,0	250,0	300,0	>300
Conductance ²	<20	100,0	200,0	300,0	400,0	500,0	600,0	>600
Size of unit on single boiler	maximum filling quantity without demineralization							
up to 50 kW	NO REQUIREMENT 20 I/kW							

1 Sum of alkaline earths

² If the conductance in µS/cm exceeds the tabular value an analysis of the water is necessary

Frost protection agent

see separate engineering sheet «Use of frost protection agent».

Combustion air supply

The combustion air supply must be guaranteed. The air vent must not be blocked. Where the air supply is fed directly to the boiler (air-exhaust system) the connecting piece for combustion air supply must be used.

The minimum free cross-section for the combustion air can be assumed simplified as follows (nominal output relevant!).

- ambient air dependent operation: A ventilation outlet of at least 1 x 150 sq. cm or 2 x 75 sq. ch cross-sectionandinaddition 2 sq. cm for each kW above 50 kW of boiler capacity is necessary.
- Ambient air independent operation with separate combustion air duct to boiler:
 0.8 sq. cm per 1 kW boiler capacity. The loss of pressure in the combustion air duct must be taken into account when determining the size of the flue gas system.

Oil burner mounting

- The burner connection plug must be mounted opposite of the burner door hinges.
- It should be possible to swivel the boiler door incl. burner by 90°.
- The space between burner and boiler door must be insulated by the additional delivered insulation material.

Electric connection of the burner

- Electric supply 1 x 230 V, 50 Hz, 10 A.
- The burner must be connected to the burner connection plug of the Boiler.
- For safety reasons the electric cable of the burner must be that short that the plug must be removed when swivelling boiler door.

Sound absorption

Sound absorption is possible trough the following steps:

- Walls, ceilings 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.
- 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 flexible with compensators.
- Pumps have to be connected with compensators to the pipes.
- For damping of flame noise it is possible to install a silencer into the flue gas tube (Space should be foreseen for later installation)

Engineering

Sound level

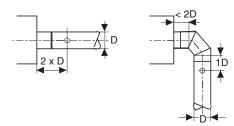
- The acoustic power level value is dependent on local and special circumstances
- The acoustic presure level is dependent on the installation conditions and can e.g. be 10 to 15 db(A) lowerthan the acoutic power level at a distance of 1m.
- Din 4108 must be observed when installing indomestic livin areas.

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

- The exhaust system must be made by an examined and certified exitgas line.
- The exit gas line must be certified gas-tight, humidity-insensitively, corrosion and acidproofas well as for exhaust gas temperatures up to 120 °C.
- The exhaust system must be suitable for the operation withover-pressure.
- The exit gas line is to be laid with upward gradient, so that the resulting condensate of the exhaust system flows back into the boiler so that before deriving into drains it can be neutralized.
- When using exit gas lines made of plastic a safety temperature limiter must be inserted.
- Built in the MultiJet®(16-25) already.
- Computation of the fire-place cross section on basis of DIN 4705.
- In the connection pipe has to be integrated a closable flue gas-wel socket with circular inner diameter of 10-21 mm. The socket has to be led over the thermal insulation.



Fuel oil quality

The Hoval MultiJet[®] can be operated with the following fuel oil qualities:

- Diesel oil (DIN 51603)
- Sulphur content: max. 1000 ppm (0.1% by weight)
- Nitrogen content: undefined
- Low sulphur fuel oil (DIN 51603)
- Sulphur content: max. 50 ppm (0.005% by weight)

Dimensioning flue gas system

See rubric flue gas line systems

Condensate drain

- according to local regulations
- The condensate derivative must be made back by a pipeline that is free of backlog and by a siphon (built in the MultiJet[®] alredy). Suitable materials for the condensate derivative: Pipes from PVC, pipes from ABS or ASP.
- The neutralization of the condensate is necessary also with small plants.
- The boiler can be placed additionally on a special boiler base. Thus a condensate discharge height of 280 mm is reached.

We recommend to install a fine filter with return connection and inset made of sinter plastic $25-75 \ \mu m$ (e.g. type "Oventrop") in fornt of the burner piping.

FIOV



Engineering

Piping mounting

- Hoval MultiJet[®] can only be used for a single pipe system. Max. suction-hight without pump 3,5 m, maximum length of pipe system 40 m.
- The pipes must be fitted in such a way that the boiler door can be opened completely.
- At the end of the fixed piping a shut-off valve must be installed (by "TOC Duo" filter already included).
- We recommend the installation of an automatic heating oil deaerator in front of the burner to safeguard a trouble-free operation.

One pipe heating oil filter

A one pipe heating oil filter with return connection and inset for MultiJet (16-25) mesh size 50 - 75 μ m (e.g. sintered plastic) must be installed in front of the burner piping on the height of the oil pump.

Automatic heating oil deaerator with integrated filter

When connected an automatic heating oil deaerator with filter in front of the burner, the deaerator must be fitted approx. 100 mm above the oil pumpe.

The same specifications apply to the use of this filter as above to one pipe heating oil filter.

- The highest point of the piping should be max. 3.5 m above the tank suction pipe.
- Product pipelines must be installed in such a way that no liquid can emerge independently (rise) from the tank (art. 5 VWF).

- If the highest oil level in the tank is higher then the lowest point of the piping, a solenoid valve must be intalled at the highest point of the system as close at the oil tank as possible.
- In the case of plants with several oil-fired boilers, the oil supply to the boilers must be ensured in all operating states, e.g. provide an independent connection line to the oil tank for each boiler or install a ring line.

Single pipe system

ved

Pipe-Ø inside 4 mm, max. pipe length in m

Suction- height H in m	(16)	MultiJet [®] (20)	(25)
0	30	30	30
1	30	30	30
2	30	28	23
3	20	16	13

This pipe dimensioning table renders orienting values for: Fuel oil EL or intermixture of fuel oil EL with max. 10% FAME (bio fuel oil), oil temperature > 10 $^{\circ}$ C (inner tank) up to 700 m over sea level, 1 filter, 1 valve, 6 arcs/bows 90 $^{\circ}$ (40 mbar).

Pipe systems that are oversized can lead to operational disturbance! For this reason, in case of boiler exchange the pipe dimensioning table must be obserFor the engineering and dimensioning of sucking installations for Diesel oil and pipes made of copper resp. plastic the relevant literature is to be consulted; conversion concerning oil temperature, viscosity, additional resistanc-es, influence of altitude over 700 m over sea level, etc., are to be found there as well.

Note

Also comply with the guideline "Technical Rules for Oil Systems - TRÖI"!

Sanitary installation

- Regulations of the calorifier
- See chapter calorifier

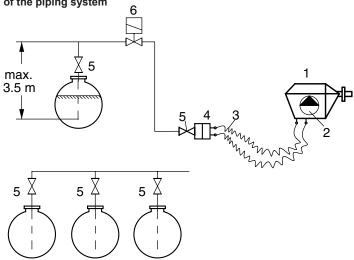
Expansion tank/expansion

 Ideally, the 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.

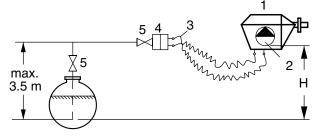
Safety valve

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

Max. oil level higher than the lowest point of the piping system



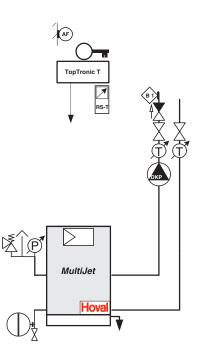
Max. oil level loser as the lowest point of the piping system



- 1 Hoval-burner for 1-line connection with return flow
- 2 Oil pump
- 3 Flexible hoses of the burner
 4 Fuel filter with return connection Sinter plastic inset 25-75 µm
- 5 Shut-off valve6 Solenoid valve
- H = Suction height [m]

Examples

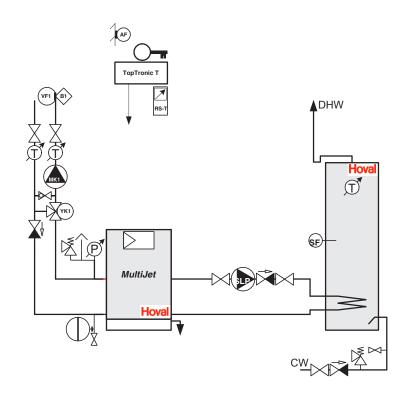
Temperature control by means of weather controlled, flexible boiler temperature. (Without calorifier) Hydraulic schematic BAFT010



Hova

Temperature control by means of weather controlled feed temperature (motorized mixing valve), during calorifier warm-up. Hydraulic schematic BAFT030

Operation of room heating and heating of calorifier is possible at the same time. While heating operation sliding over the boiler.



Notice:

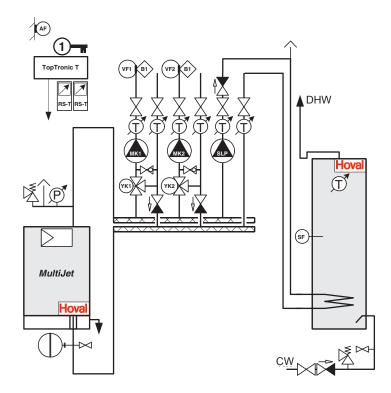
- This hydraulic schematic is a principle schematic. It does not contain all details for installation. The installation must be done according to local conditions, dimensioning and regulations.
- With underfloor heating a flow temperature monitor must be vuilt in.
- Shut-off devices to the safety valve (pressurised expansion tank, safety valve, etc.) are to safe against unintended closing!
- Mount bags to prevent single pipe gravity circulation!

- DKP Pump for heating cycle without mixer
- MK1 Pump mixing cycle 1
- SLP Calorifier loading pump
- YK1 Actuator mixer 1
- B1 Flow temperature guard (if required)
- AF Outside sensor
- SF Calorifier heater sensor
- VF1 Flow sensor 1
- RS-T Room station
- CW Cold Water
- DHW Domestic Hot Water

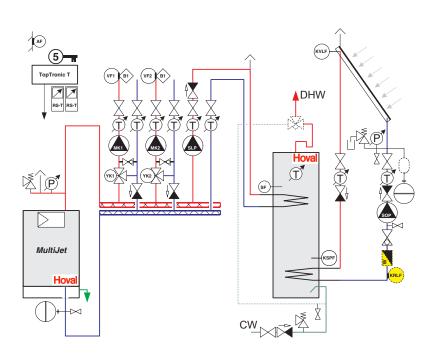
Examples

Temperature control by means of weather controlled, flow temperature control of max. 2 mixing circuits. Operation of room heating and heating of the calorifier is possible at the same time.

Hydraulic schematic BAFT060



Temperature control by means of weather controlled flow temperature control of max. 2 mixing circuits. Operation of room heating and solar heating is possible at the same time. Hydraulic schematic BAFT160



Notice:

- This hydraulic schematic is a principle schematic. It does not contain all details for installation. The installation must be done according to local conditions, dimensioning and regulations.
- With underfloor heating a flow temperature monitor must be vuilt in.
- Shut-off devices to the safety valve (pressurised expansion tank, safety valve, etc.) are to safe against unintended closing!
- Mount bags to prevent single pipe gravity circulation!

- MK1 Pump mixing cycle 1
- MK2 Pump mixing cycle 2
- SLP Calorifier - loading pump
- SOP Solar circulation pump
- YK1 Actuator mixer 1
- Actuator mixer 2 YK2 Β1
- Flow temperature guard (if required) AF
- Outside sensor
- Calorifier heater sensor SF
- VF1 Flow sensor 1
- VF2 Flow sensor 2
- KVLF Solar panel flow sensor PT1000
- KSPF Solar tank sensor (calorifier / buffer)
- KRLF Solar panel return sensor
- **RS-T** Room station
- CW Cold Water
- DHW Domestic Hot Water

Description

Hoval Uno-3

Oil/gas boiler

Boiler

- · 3-pass steel boiler for oil- and gas-firing
- With bi-zonal technology for optimal low
- temperature operation
 Thermolytic, self-cleaning secondary heating surface with flue gas regulators
- Double joint boiler door swivels to the right (modification to left possible on site)
- Insulation 80 mm mineral wool mat and glass fabric
- Casing made of steel plates, red powder coated
- Flue gas outlet and heating flow connection to the rear
- Regulators for flue gas temperature 180 °C (mounting on site)
- Operating temperature max. 90 °C and operating pressure 4 bar

Optional

- Control panel with boiler control and heating regulation in different executions
- Free standing calorifier see calorifer
- At operating pressure max. 3 bar, the boiler complies with the Pressure Equipment Directive (PED) 97/23/EC, operating temperature max. 105 °C. Request for corresponding boiler plate required.

Delivery

• Boiler, insulation with casing and flue gas regulators separately packed delive-red.

On site

· Mounting of boiler control

Control panel TopTronic®T/U3.1

- Operating temperature max. 90 °C and operating pressure 4 bar
- For mounting on top of boiler sideways or on top (change on site).
- Integrated control function for:
- 1 mixing circuit
- 1 heating circuit without mixing operation
- domestic hot water loading circuit
- Option to expand the functions by
- different Key Modules and/or
- mounting of an additional heating regulator TopTronic[®]T/N (see accessories)
- Main switch "I/O"
- Safety temperature limiter 110 °C
- Fuse 6,3 A
- Trouble indication "Burner"
- Burner running time meter and count-up counter
- Boiler sensorLarge LCD-Display
- Rotary pushbutton
- Buttons for
- daytime room temperature
- night room temperature
- hot water temperature
- operating mode selection (holiday, absent, heating operation prolongation, automatic, summer, heating operation continuous reduced - frost protection)

Model range	
Uno-3	Output
Туре	kŴ
(50)	35-50
(62)	46-62
(80)	53-80

53-90

(90)

system information

Outdoor sensor AF 200

Calorifier sensor with plug

Plug connection for burner

Flow sensor with plug

(with cable and plug)

operation

Delivery

On site

sidewavs

adjusting the heating curves

emission measurement and manual

Connection available for room stations

· Mounting of the control panel at the boiler

Installation of the control panel for mounting

· Control panel separately delivered

Permissions boilers

CE-Product-ID-No.

CE-0085AQ0671

• Operating temperature max. 105 °C

Control panel TopTronic®T/U3.2

- Operating temperature max. 105 °C and operating pressure 3 bar. The boiler complies with the Pressure Equipment Directive (PED) 97/23/EC. Request for corresponding boiler plate required.
- Functions like control panel TopTronic[®]T/U3.1, but:
- For operating temperature to 105 °C
- Safety temperature limiter 120 °C

Optional

- Safety temperature limiter 130 °C
- Delivery
- Control panel separately delivered

On site

- · Mounting of the control panel at the boiler
- Installation of the control panel for mounting sideways

Description

Control panel with thermostat T 2.2

- Operating temperature max. 90 °C and operating pressure 4 bar
- For systems without TopTronic®T regulator.
- 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 meter integrated
- · 2 Burner running time meter and count-
- upcounter integratedFlue gas thermometer, 4,5 m capillary tube

Delivery

Control panel separately delivered

On site

- · Mounting of the control panel at the boiler
- Installation of the control panel for mounting sideways

Control panel with thermostat T 0.2

- Operating temperature max. 105 °C and operating pressure 3 bar. The boiler complies with the Pressure Equipment Directive (PED) 97/23/EC. Request for corresponding boiler plate required.
- · For external control
- For systems without TopTronic®T regulator
- · 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
 - temperatur 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 countupcounter integrated
- Flue gas thermometer, 4,5 m capillary tube
- Safety temperature limiter 130 °C

Delivery

· Control panel separately delivered

On site

- · Mounting of the control panel at the boiler
- Installation of the control panel for mounting sideways

Part N°



Low temperature oil/gas boiler Hoval Uno-3

3-pass low temperature boiler without control panel, without burner and burner hood.

Delivery

Boiler and insulation with casing separately packed delivered.

Uno-3 * Type	output kW	operating pressure bar
(50)	35-50	4
(62)	46-62	4
(80)	53-80	4
(90)	60-90	4

* Operating temperature max. 90 °C

At operating pressure max. 3 bar the boiler complies with the Pressure Equipment Directive (PED) 97/23/EC, operating temperature max. 105 °C. Request for corresponding boiler plate required.



Accessories

Sound absorbing/ insulating hood for oil burner Check burner size!			
Depth	Material	Uno-3 Type	
530 mm	sheet steel	(50-90)	6001 077



Vibration elements for boiler socket
4 pieces of 100 mm each
Height unstressed approx. 50 mm,
width 80 mm
If vibration elements for boiler socket
are used then all connections (incl.
flue gas tube) must be connected
flexibly with sound absorbing
compensators.

Part N°

6003 737

Control panel with heating regulator TopTronic®T to Hoval Uno-3	Part N°
Boiler controller TopTronic®T/U3.1 Max. operating temperature 90°C Operating pressure 4 bar - Uno-3 (50-160,360), Max-3 (420-1250) Operating pressure 5 bar - Uno-3 (190-280) For mounting on top of boiler (sideways, change on site). Integrated control function for - 1 mixing circuit - 1 heating circuit without mixer - domestic hot water loading circuit incl. outdoor sensor, flow sensor and calorifier sensor with plug Option to expand the functions by - different key modules and/or - mounting of an additional heating regulator TopTronic®T/N (see accessories)	6020 537
Boiler controller TopTronic®T/U3.2 Max. operating temperature 105°C Operating pressure 3 bar - Uno-3 (50-160) Operating pressure 4 bar - Uno-3 (190-360) Max-3 (420-1250) The boiler complies with the Pressure Equipment Directive (PED) 97/23/EC. Request for corresponding boiler plate required. Functions like boiler controller TopTronic®T/U3.1 Delivery: Boiler controller separately delivered	6020 538
Contact sensor VF204 can be used as flow or return flow sensor with 4 m cable	2023 998

Part N°

Part N°

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with	thermos	tat

Control panel T 2.2

- Operating temperature max. 90 °C and operating pressure 4 bar
- For systems without TopTronic[®] regulator.
- For direct 2-stage burner control, incl. plug connection for burner requirement starting from external calorifier- or heater instruction is possible.
 - without burner running time meter 6015 017 and count-up-counter
 incl. 2 burner running time meter 6015 477 integrated
 incl. 2 burner running time meter 6015 478
 - incl. 2 burner running time meter and count-up-counter integrated

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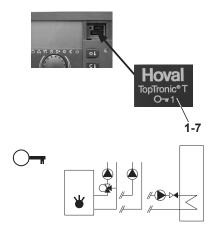
Control panel T 0.2

- Operating temperature max. 105 °C and operating pressure 3 bar. The boiler complies with the Pressure Equipment Directive (PED) 97/23/EC. Request for corresponding boiler plate required. · For external switching command For systems without TopTronic® regulator For special control function without burner plug connection - without burner running time meter 6015 016 and count-up-counter - incl. 2 burner running time meter 6015 475 integrated incl. 2 burner running time meter 6015 476 _
 - and count-up-counter integrated

Accessories to control panel with thermostat (without TopTronic®T regulator)

Flue gas thermometer 4 m, capillary tube

2411 49



Accessories for regulator system Hoval TopTronic[®]T

Key modules for Hoval TopTronic®T

for further functions additionally

to standard functions.

Key module consisting of: Function key for plugging into TopTronic®T

incl. accessories

Only one key module is possible!

Standard functions

already included in TopTronic®T.

- 1 mixing circuit
- 1 heating circuit without mixing operation
- domestic hot water loading circuit

Functions of the Key Modules

Functions	of the Key	Modules	
Key	2. mixing	solid fuel -	solar
Module	circuit	storage tank - bi-fuel	
1)	•		

(1)	•		
2-			
3-			•
4-	•		
5	٠		•
6-			
7-	٠	•	•

Π	Key Module 1 for 2. mixing circuit Function key 1, 1 flow sensor, 2 loose plugs
Π	Key Module 2 for solid fuel/ storage tank/ bivalent installation Function key 2, 3 immersion sensors, 4 loose plugs
Π	Key Module 3 <i>for solar plants</i> Function key 3, 1 collector sensor, 1 calorifier sensor, 4 loose plugs

Key Module 4 for 2. mixing circuit and solid fuel/ storage tank/ bivalent installation Function key 4, 1 flow sensor, 3 immersion sensors, 6 loose plugs

- **Key Module 5** for 2. mixing circuit and solar plants Function key 5, 1 flow sensor, 1 collector sensor, 1 calorifier sensor, 6 loose plugs
- **Key Module 6** for solid fuel/ storage tank/ bivalent installation and solar plants Function key 6, 1 collector sensor, 4 immersion sensors, 6 loose plugs

Key Module 7 for 2. mixing circuit, solid fuel/ storage tank/

bivalent installation and solar plants Function key 7, 1 flow sensor, 1 collector sensor, 4 immersion sensors, 8 loose plugs

Sensor type

Immersion/calorifier sensor:		
	Type KVT20/5/6 (L = 5 m)	
	without immersion sleeve	
flow sensor	: Type VF204S with plug	
collector sensor	: Type PT1000 (silicone)	

Part N°

6012 154

6012 155

6012 156

6012 157

6012 158

6012 159

6012 160

Hova

see Hoval CD

System approaches and applications

3C

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Hoval

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Part N°

	Accessories for regulator system Hoval TopTronic®T	Part N°	
	Additional heating regulator set ZN1 for extending functionality and implementing further heating circuits Consisting of: Heating regulator TopTronic®T/N for - 1 mixer circuit - 1 heating circuit without mixer - hot water loading Only one key module per regulator is possible! Flow sensor VF202K with 2 m cable and plug. Cable set for connecting the auxiliary heating regulator TopTronic®T/ N with the boiler controller Mounting on-site	6020 574	
	Kit BMS-Modul 0-10V (Building management system) Consisting of: BMS-Module and trafo Can be installed in the boiler control panel!	6015 195	
	Communication module/remote connection see "Control"		
	Room station RS-T for TopTronic®T effective on one mixing circuit	2034 939	
	Remote control RFF-T for TopTronic®T effective on one mixing circuit	2022 239	
	Outdoor sensor AF 200 (may be included in the heat generator scope of delivery) for one mixing circuit or for the mean value (per regulator 2 outdoor temperature sensors possible)	2022 995	
_	Flue gas temperature sensor PT 1000/4 L = 2.5 m including fixing screws (installation on site)	6913 57	
	Cable sensor KVT 20/5/6S 5 m cable and plug	6012 687	
)	Contact sensor VF204S can be used as flow or return flow sensor with 4 m cable and plug	6012 688	



Hoval

Accessories	Part N°
Flow temperature guard for underfloor heating system (per heating circuit 1 guard) 15-95 °C, differential gap 6K, capillary tube max. 700 mm, setting (visible from the outside) inside the housing cover.	
<i>clamp-on thermostat</i> RAK-TW1000.S Thermostat with strap, without cable and plug	242 902
 <i>clamp-on thermostat-set</i> RAK-TW1000.S Thermostat with strap, incl. enclosed cable (4 m) and plug	6015 000
Immersion thermostat RAK-TW1000.S SB 150 Thermostat with immersion sleeve ½" - depth of immersion 150 mm brass nickel-plated	6010 082
Safety set SG15-1" Suitable up to max. 50 kW complete with safety valve (3 bar) Pressure gauge and automatic air vent with cut off valve Connection: 1" internal thread	6411 84
Safety set SG20-1" Range of application to 100 kW complete with safety valve (3 bar) Pressure gauge and autom. aspirator with shut-off valve. Connection: DN20 1" internal thread	6014 390

Boiler connection sets

tolerance adjust thermally insula	2) with flexible sleeve tment ted necting an armatur		6014 854	
Connection se for Uno-3 (80) with flange thermally insula suitable for con group HA40. Connection at th	ted necting an armatur	e	6015 122	
for mounting a l	al boiler connectior Hoval loading grou group without mix A [mm]	p LG-2		
DN 32	125	70	2022 447	











Heating armsture are				Part N°	
Heating armature groups Part N°					
Heating armature group with 3-way motor mixer a box. Installation right.					
HA group - type	Pum	o - type			
DN32 (1¼") Pump with stepless spee	d control				
HA32-3BM-R/AX 13-2		13-2		6020 522	
HA32-3BM-R/A15-2	A	15-2		6023 297	
DN40 (1½")					
HA40-3M-R	withou	ut pump		6014 867	
Loading group LG-2 Heating armature group For the connection of a s heating circuit without mi insulating box. Installation	ide calorifie xer, with he	eat-			
LG/ HA group - type	Pu	mp - type			
DN32 (1¼") Pump with stepless spee LG/ HA32-2/AX 13-2 HA32-3BM-L/A15-2	A	X13-2 A15-2		6020 530 6023 298	
DN40 (1½")					
HA40-2	with	out pump		6014 868	
		· · · F · F			
Compact loading group With heat-insulating box installation on the Combi CR (200-1000) in the fee	for the dire Val ER (16	0-500),			
Туре	Flow/ Return	Pump - type			
DN25 (1")					
Pump with stepless spee LG25-Compact/AX12-1	d control 1"	AX12-1		6020 492	
Adapter fitting DN32-DN406014 863for the installation of the HA groupDN32 to a wall distributor DN40 or a connection set AS40-S/NT/ HT.					

Detailed data, further HA groups and wall distributors see separate brochure



Service

Commissioning

Commissioning must be made by works service or Hoval trained authorized serviceman/ company is condition for warranty.

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

Technical data

Uno-3 (50-90)

Туре			(50)	(62)	(80)	(90)
 Nominal output at 80/60 °C Range of output Heat input max. 		kW kW kW	50 35-50 53,7	62 46-62 66,6	80 53-80 86	90 53-90 98
 Max. boiler operating temperature ¹ Safety temperature limiter setting (water side) ¹ Working/test pressure ¹ 		°C °C bar	90 110 4/5,2	90 110 4/5,2	90 110 4/5,2	90 110 4/5,2
 Max. boiler operating temperature ² Safety temperature limiter setting (water side) ² Working/test pressure ² 		°C °C bar	105 120 3/3,9	105 120 3/3,9	105 120 3/3,9	105 120 3/3,9
 Minimum boiler operating temperature Minimum boiler return temperature Minimum flue gas temperature at boiler 		2° 2° 2°	see tab	ble operating ble operating ble operating	conditions	(below)
 Flue gas regulators for 180 °C flue gas temperature for 160 °C flue gas temperature 		Standard Maximum	2R5 3R5+2R2		4R5+1R3	4R5+1R3
 Boiler efficiency at full load at 80/60 °C (related to net/gross calorific value, diesel oil) 		%	93,0/87,7	93,0/87,7	93,0/87,7	93,0/87,7
 Boiler efficiency at partial load 30% at return 37 °C (accord 	ding to EN 303)	%	94/88,7	94,5/89,2	94,7/89,3	94,2/88,9
 (related to net/gross calorific value, diesel oil) Nominal efficiency at 75/60 °C (DIN 4702 part 8) (related to pat/gross calorific value, diesel oil) 		%	95,1/89,7	95,2/89,8	94,7/89,4	94,3/89,0
 (related to net/gross calorific value, diesel oil) Stand-by deficiency qB at 50 °C 		Watt %	192 0,35	192 0,29	198 0,23	198 0,20
 Flue gas resistance at nominal output 180 °C flue gas temperature, 12,5 % CO₂, 500 m over the sea (± 20 %) 		mbar	0,18	0,36	0,62	0,79
Flue gas mass flow	Diesel oil	kg/h	85	105,4	133	153
 Flow resistance boiler ³ Water resistance at 10 K Water resistance at 20 K Water flow resistance at 10 K Water flow resistance at 20 K 		z-value mbar mbar m³/h m³/h	3,22 59,53 15,02 4,30 2,15	3,22 91 23 5,33 2,67	1,50 71,00 17,75 6,88 3,44	1,50 89,0 22,5 7,7 3,9
 Boiler water capacity Boiler gas volume Insulation boiler body Insulation boiler door Weight (incl. casing) Weight (without casing) 		Litre m ³ mm mm kg kg	105 0,125 80 30 247 217	105 0,125 80 30 247 217	115 0,135 80 30 268 233	115 0,135 80 30 268 233
 Fire room dimension Ø-inside x length Fire room volume 		mm m³	ø410x725 0,0872	ø410x725 0,0872	ø410x835 0,1002	ø410x835 0,1002
• Dimensions			see Dimens	ions		
 Maximum depression in flue gas system (boiler connection) 		Ра	30	30	30	30

¹ Control U3.1 and T2.2

² Control U3.2 and T0.2

 $^{_{3}}$ Flow resistance boiler in mbar = volume flow (m³/h)² x z

Possible operationg conditions:

Fuel			Diesel Oil			Methane H		Oil L
		Variant 1	Variant 2	Variant 3	Variant 1	Variant 2	Variant 3	
min. flue gas temperature	°C	130	110	130	130	110	130	130
min. boiler temperature	°C	38	50	52	58	60	62	55
min. return temperature	°C	30	38	no min. limit	45	48	no min. limit	45
Return temperature control		yes	yes	no	yes	yes	no	yes
boiler start protection 1		no	no	yes	no	no	yes	no

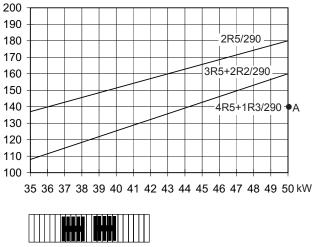
¹ If the boiler temperature is below or goes below the minimum boiler temperature (variant 3) and no return flow control is present the client system parts must be blocked using a suitable control system.

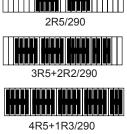
Technical data

Flue gas - ouput diagram

Uno-3 (50)

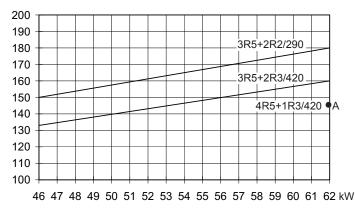
Boiler temperature flow/ return 80/60 °C





Uno-3 (62)

Boiler temperature flow/return 80/60 °C





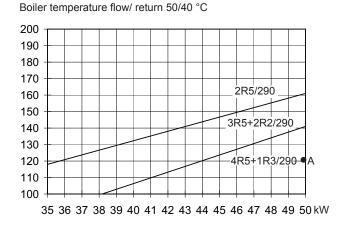




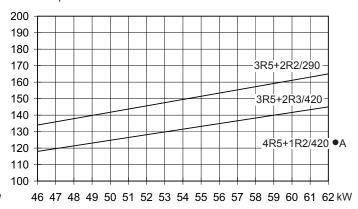


4R5+1R3/420

- kW = Boiler output
- °C = Flue gas temperature on a purified heating surface, boiler flow temperature 80 °C, return temperature 60 °C (in accordance with DIN 4702).
- operation with Diesel oil, $\lambda = 1,22$ with max. burner output (CO₂ Diesel oil = 12,5 %)
- A reduction of the boiler water temperatur to -10K causes a reduction of the flue gas temperature of approx. 6-8K.
- A modification of the CO₂-concentration of +/-1% causes a modification of the flue gas temperature of approx. -/+8K.



Boiler temperature flow/return 50/40 °C





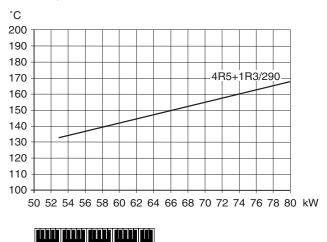
Technical data

Flue gas - output diagram

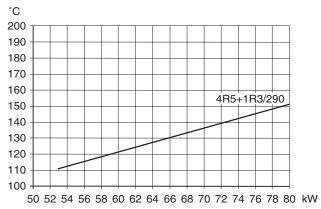
Uno-3 (80)

Boiler temperature flow/ return 80/60 °C

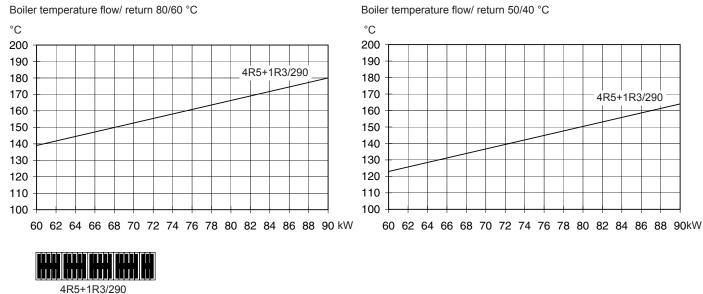
4R5+1R3/290



Boiler temperature flow/ return 50/40 $^\circ\text{C}$



Uno-3 (90)

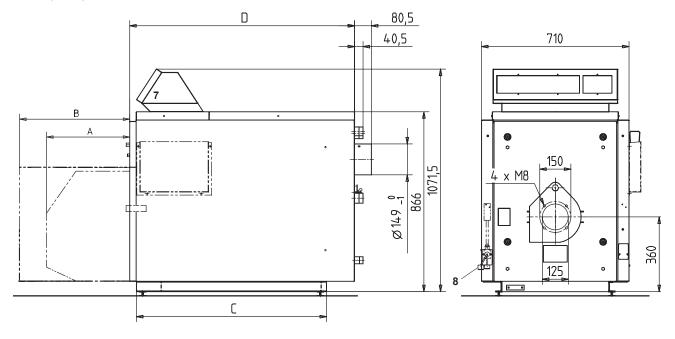


kW = Boiler output

- °C = Flue gas temperature on a purified heating surface, boiler flow temperature 80 °C, return temperature 60 °C (in accordance with DIN 4702).
- Operation with Diesel oil, λ = 1,22 at burner full load (CO₂ Diesel oil = 12,5 %)
- A reduction of the boiler water temperatur to -10K causes a reduction of the flue gas temperature of approx. 6-8K.
- A modification of the CO₂-concentration of +/-1% causes a modification of the flue gas temperature of approx. -/+8K.

Dimensions

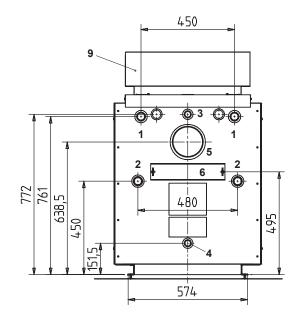
Uno-3 (50-90)



Uno-3	А	В	С	D
(50,62)	400	-	915	1082,5
(80,90)	-	530	1025	1192,5

1	Flow	R 1¼" Uno-3 (50,62), R 1½" Uno-3 (80,90)
2	Return	R 1¼" Uno-3 (50,62), R 1½" Uno-3 (80,90)
3	Safety flow (Expansion)	R 1"
4	Drain	R 1"

- R 1" 4 Drain
- 5 Flue gas outlet Ø 149 mm outer, wall thickness 3 mm
- 6 Cleaning opening
- 7 Control panel
- 8 Connection for burner cable (burner plug)
- 9 Cable routing



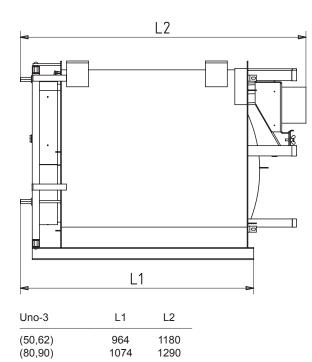


Dimensions

Basis sizes and space requirements

Attention

- Optionally the flue gas collector and boiler outlet will be delivered separately.
- Do not manipulate the equipment on the sockets.

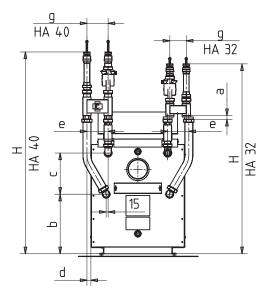


Dimensions

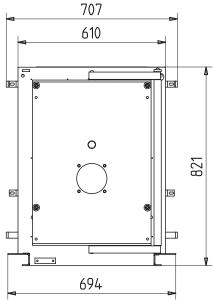
with heating armature groups

Example

Uno-3 with heating armature groups Heating armature groups HA 40 left Heating armature groups HA 32 right (All measures in mm)

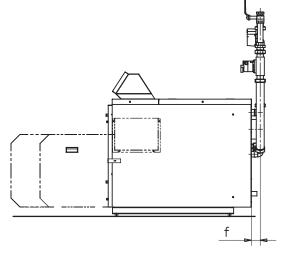


Туре	HA 32 H	HA 40 H	а	d	е	f	HA 32 g	HA 40 g
(50, 62)	1322	-	-	0	125	118	125	-
(80)	1487	1632	30	30	160	195	125	160



Weights

Boiler	Weight
Type	kg
(50)	217
(62)	217
(80)	233
(90)	233



Heating armature groups see "System components"

Subject to alterations, 1.8.2013

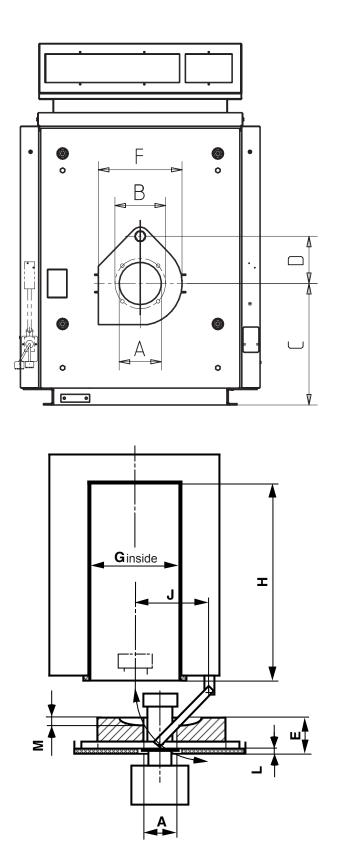
Dimensions

Space requirements

Burner mounting for Uno-3 (50-90)

(All measurements in mm)

The burner must be mounted in such a way that the boiler door can be swiveled at an angle of 90° .



Туре	ØA	ØB	С	D	Е	F	ØG	Н	J	L	М
Uno-3 (50,62)	125	150	360	140	137	248	410	725	272	30	35
Uno-3 (80,90)	125	150	360	140	137	248	410	835	272	30	35



Standards and Guidelines

The following standards and guidelines must be respected:

- Technical information and installation manual of the Hoval company.
- Hydraulic and control technical regulations of the Hoval company.
- · Local building law
- · Fire protection standards
- · DVGW guidelines
- DIN EN 12828 Heating systems in building plans of hot water heating plants.
- DIN EN 12831 heating plants in buildingsprocedure for computing the normed heating capacity
- VDE 0100

Water quality

Heating water:

- The European Standard EN 14868 and the Directive VDI 2035 must be observed.
- Hoval boilers and calorifiers are designed for heating plants without significant oxygen intake (plant type I according to EN 14868).
- Plants with
 - continuous oxygen intake (e.g. underfloor heating systems without diffusion proof plastic piping) or
 - intermittent oxygen intake (e.g. where frequent refilling is necessary) must be equipped with separate circuits.
- Treated heating water must be tested at least 1 x yearly. According to the inhibitor manufacturer's instructions, more frequent testing may be necessary.
- A refilling is not necessary if the quality of the heating water in existing installations (e.g. exchange of boiler) conforms to VDI 2035. The Directive VDI 2035 applies equally to the replacement water.
- New and if applicable existing installations must be adequately cleaned and flushed before being recharged! The boiler may only be filled after the heating system has been flushed.
- Parts of the boiler which have contact with water are made of ferrous materials.
- On account of the danger of stress cracking corrosion the chloride, nitrate and sulfate contents of the heating water must not exceed 200 mg/l in total.
- The pH value of the heating water should lie between 8.3 and 9.5 after 6 - 12 weeks of heating operation.

Filling and replacement water:

- For a plant using Hoval boilers untreated drinking water is generally best suited as filling and replacement water. However, the quality of the untreated drinking water must at least fulfil the standard set in VDI 2035 or be desalinated and/or be treated with inhibitors. The stipulations of EN 14868 must be observed.
- In order to maintain a high level of boiler efficiency and to avoid overheating of the heating surfaces the values given in the table should not be exceeded (dependent on boiler performance ratings - for multi-boiler plants rating of smallest boiler applies - and on the water content of the plant).
- The total amount of filling and replacement water which is used throughout the total service life of the boiler must not exceed three times the water capacity of the plant.

Heating system

Combustion air

- The combustion air supply must be warranted. The air opening must not be lockable.
- Minimal free cross section for air opening 6,5 cm² per 1 kW boiler output.

Oil burner mounting

- The burner connection plug must be mounted opposite the burner door hinges.
- It should be possible to swivel the boiler door incl. burner by 90°.
- The space between burner and boiler door must be insulated by the additional delivered insulation material.

Electric connection of the burner

- Power supply 1 x 230 V, 50 Hz, 10 A.
- The burner must be connected to the burner connection plug of the Boiler.
- For safety reasons the electric cable of the burner must be shortened so the plug must be removed when swivelling boiler door.

Sound absorption

Sound absorption is possible trough 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 it means of antivibration sleeves.
- Install sound absorber hood 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 flexible with compensators.
- Pumps have to be connected with compensators to the pipes.
- For damping of flame noise it is possible to install a silencer into the flue gas tube (Space should be foreseen for later installation).

Heating armature group

If the normal heating armature group DN 32 for heating surface (Water volume ≥ 3 , m³/h) is used, a boiler circuit pump must be fitted.

Maximum filling quantity according to VDI 2035

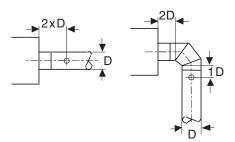
	Carbonate hardness of filling water up to							
[mol/m ³] ¹	<0,1	0,5	1	1,5	2	2,5	3	>3,0
f°H	<1	5	10	15	20	25	30	>30
d°H	<0,56	2,8	5,6	8,4	11,2	14,0	16,8	>16,8
e°H	<0,71	3,6	7,1	10,7	14,2	17,8	21,3	>21,3
~mg/l	<10	50,0	100,0	150,0	200,0	250,0	300,0	>300
Conductance ²	<20	100,0	200,0	300,0	400,0	500,0	600,0	>600
Boiler size of the individual boiler		max	imum filli	ng quanti	ty withou	ıt desalin	ation	1
up to 50 kW			N	O DEMAN	1D			20 l/kW
50 to 200 kW			50 l/kW	20 l/kW	20 l/kW	alwa	ays desali	nate

¹ total of alkaline earths

 $^{\rm 2}$ If the conductance in $\mu S/cm$ exceeds the tabular value an analysis of the water is necessary.

Chimney / Flue gas system Flue gas tube

- The flue gas tube must be led into the chimney with an angle of 30 - 45°.
- If the flue gas tube is longer than 1 m, it must be insulated.



Expansion tank/expansion

Ideally, the 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 tank.

Safety valve

- A safety valve and an automatic air vent must be installed in the safety flow.
- The inlet of the flue gas tube into the chimney has to be carried out in such way, that no condensate can flow from the chimney into the flue gas tube and 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 chimney must be humidity-insensitively, acid resistant and suitable for flue gas temperature > 160 °C
- For existing chimney installation the resoration must be carried out according to the instructions of the chimney constructor.
- Calculation of chimney diameter acc. to DIN 4705.
- The cross sections are to be calculated for boilers without draft requirements.

Required chimney diameter

Basics: Smooth chimneys made of stainless steel, flue gas tube $\leq 2,5$ m, $\Sigma\zeta$ = 2,2, flue gas tube and chimney insulated. Height above sea level \leq 1000 m, outside temperature \leq 30 °C.

m	Chimney and flue gas tube Ø mm				
25	125	150	150	150	
20	125	150	150	150	
15	125	150	150	175	
10	150	150	150	175	
5	150	150	175	175	
Uno-3 Type	(50)	(62)	(80)	(90)	

m = Chimney height (m)

 \emptyset = Min. \emptyset of flue gas tube and chimney



Piping mounting

- Hoval boilers with Hoval oil burners may only connect to a 1-stage oil pipe. Maximum suction height without pump 3.5 m, maximum length of pipe system 30 m.
- The pipes must be fitted in such a way that the boiler door can be opened completely.
- At the end of the fixed piping a shut off valve must be installed (by "Oventrop" filter already included).
- A 1-line fine mesh filter with return supply and strainer insert (100-150 µm) must be installed in front of the burner (for ex. "Oventrop").
- The highest point of the piping should be max. 3.5 m above the tank suction pipe.
- Product pipelines must be installed in such a way that no liquid can emerge independently (rise) from the tank (art. 5VWF).
- If the highest oil level in the tank is higher than the lowest point of the piping system, a solenoid valve must be installed at the highest point of the system (next to the oil tank).
- In the case of plants with several oil-fired boilers, the oil supply to the boilers must be ensured in all operating states, e.g. provide an independent connection line to the oil tank for each boiler or install a ring line.

Single pipe system

pipe- Ø inside 4 mm resp. 6 mm, max. pipe length in m

Suction -	Uno-3	Uno-3	Uno-3	Uno-3	Uno-3
height H	(50)	(62)	(80)	(90)	(90)
in m	4 mm	4 mm	4 mm	4 mm	6 mm
0	19,5	15	11	9	30
1	15	11,5	8	7	30
2	10,5	8	5,5	-	30
3	6	-	-	-	18.5

This pipe dimensioning table reflects explorary data: Relation Diesel oil, oil temperature > 10 °C, up to 700 m above sea level, 1 filter, 1 non-return valve, 6 bends of 90°.

For engineering and dimensioning of suction installations for Diesel oil and pipes from copper resp. plastic use corresponding literature. There you will also find conversions for oil temperature, viscosity, additional resistance, influence of height above 700 m above sea level, etc.

Sanitary installation

- The hot water temperature must conform to the local rules and regulations.
- The setting of the safety valve must not exceed 8 bar.

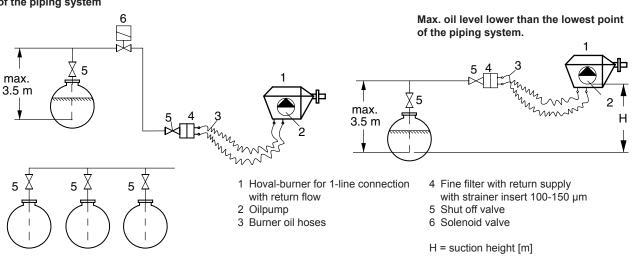
Regulations of the calorifier

See Calorifier

Safety valve

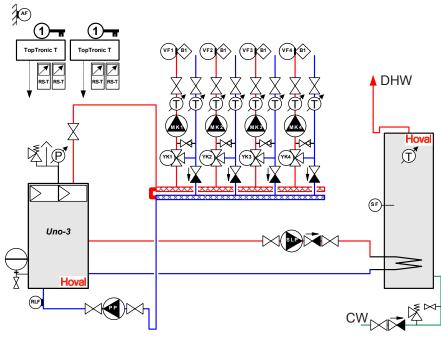
• At the safety flow, a safety valve and an automatic vent must be installed.

Max. oil level higher than the lowest point of the piping system

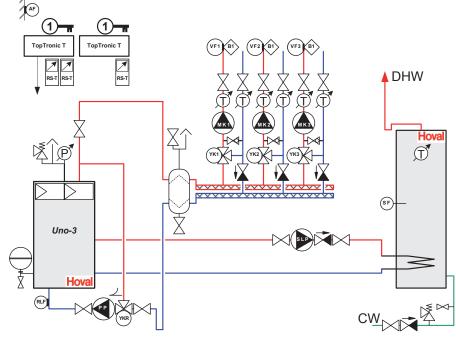


Examples

Hydraulic principle schematic Uno-3 with heating regulator TopTronic®T Hydraulic schematic BBAT030



Hydraulic principle schematic Uno-3 with heating regulator TopTronic®T Hydraulic schematic BBAT040



Notice:

- This hydraulic schematic is a principle schematic. It does not contain all details for installation. The installation must be done according to local conditions, dimensioning and regulations.
- With underfloor heating a flow temperature monitor must be vuilt in.
- Shut-off devices to the safety valve (pressurised expansion tank, safety valve, etc.) are to safe against unintended closing!
- Mount bags to prevent single pipe gravity _ circulation!

RS-T	Room station	SF	Calorifier heater sensor	ZUP	Feed pump
AF	Outdoor sensor 1	B1	Flow temperature guard	YK1	Actuator mixer 1
RLF	Return sensor		(if required)	YK2	Actuator mixer 2
VF1	Flow sensor 1	MK1	Pump mixing ciruit 1	YK3	Actuator mixer 3
VF2	Flow sensor 2	MK2	Pump mixing ciruit 2	YK4	Actuator mixer 4
VF3	Flow sensor 3	MK3	Pump mixing ciruit 3	YKR	Actuator return mixer
VF4	Flow sensor 4	MK4	Pump mixing ciruit 4	CW	Cold Water
KF	Boiler sensor	SLP	Calorifier loading pump	DHW	Domestic Hot Water

Description

Hoval Uno-3

Low temperature 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.
- Secondary heating surface
- Type (110-280) thermolytic self-cleaning with flue gas regulators
- Type (320-360) with dimpled tubes
- Double joint boiler door swivelled to the right (Modification to left possible on site)
- Insulation 80 mm mineral wool mat and glass fabric
- Casing made of steel plates, red powder coated
- · Flue gas outlet to the rear
- Heating connections to the rear incl. counter flanges, screws and seals
- Operating temperature max. 90 °C and operating pressure 4 bar with Uno-3 (95-160, 320,360). Operating pressure 5 bar with Uno-3 (190-280)

Optional

- Control panel with boiler control and regulation in different executions
- Free standing calorifier see Calorifers
- At operating pressure max. 3 bar with Uno-3 (95-160) and 4 bar with Uno-3 (190-280), the boiler complies with the Pressure Equipment Directive (PED) 97/23/EC, operating temperature max. 105°C. Request for corresponding boiler plate required.

Delivery

 Boiler and thermal insulation are separately packed

On site

· Mounting of insulation and casing

Control panel TopTronic®T/U3.1

- Operating temperature max. 90°C and operating pressure 4 bar with Uno-3 (110-160, 320,360). Operating pressure 5 bar with Uno-3 (190-280)
- For mounting on top of boiler sideways or on top (change on site).
- Integrated control function for:
 - 1 mixing circuit
- 1 heating circuit without mixing operation
 domestic hot water loading circuit
- Option to expand the functions by
- different Key Modules and/or
- mounting of an additional heating regulator TopTronic[®]T/N (see accessories)
- Main switch "I/O"
 Safety temperature limiter 110
- Safety temperature limiter 110 °C
- Fuse 6,3 A
- Trouble indication "Burner"
- Burner running time meter and count-up counter
- Boiler sensor
- Large LCD-Display
- Rotary pushbutton

- Buttons for
- daytime room temperature

Model range Uno-3

Туре

(110)

(125)

(160)

(190)

(220)

(250)

(280)

(320)

(360)

Output

kW

50-110

50-125

64-160

76-190

100-220

120-250 130-280

140-320

140-360

- night room temperature
- hot water temperature
- operating mode selection (holiday, absent, heating operation prolongation, automatic, summer, heating operation continuous reduced - frost protection)
- adjusting the heating curves
- system information
- emission measurement and manual operation
- Outside sensor AF 200
- Flow sensor with plug
- Calorifier sensor with plug
- Plug connection for burner
- Connection available for room stations

Delivery

· Control panel separately delivered

At place

- Mounting of control panel
- Installation of the control panel for mounting sideways

Permission boiler CE-Product-ID-No. CE-

CE-0085AQ0671

Control panel TopTronic®T/U3.2

 Operating temperature max. 105°C and operating pressure 3 bar with Uno-3 (110-160).

Operating temperature 4 with Uno-3 (190-360). The boiler complies with the Pressure Equipment Directive (PED) 97/23/EC. Request for corresponding boiler plate required.

- Functions like control panel TopTronic[®]T/U3.1, but:
- For operating temperature to 105 °C
- Safety temperature limiter 120 °C

Optional

Safety temperature limiter 130 °C

Delivery

· Control panel separately delivered

On site

- Mounting of the control panel at the boiler
- Installation of the control panel for mounting sideways



Description

Control panel with thermostat T 2.2

- Operating temperature max. 90°C and operating pressure 4 bar with Uno-3 (110-160, 320,360). Operating pressure 5 bar with Uno-3 (190-280)
- For systems without TopTronic[®] regulator.
- 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 calorfierBoiler and burner breakdown lamp
- Boller and burner breakdown is
 Plug connection for burner (with cable and plug)

Optional

- 2 Running time meter integrated
- 2 Burner running time meter and
- count-upcounter integratedFlue gas thermometer, 4,5 m capillary tube

Delivery

· Control panel separately delivered

On site

- · Mounting of the control panel at the boiler
- Conversion of the boiler control for side mounting

Control panel with thermostat T 0.2

- Operating temperature max. 105°C and operating pressure 3 bar with Uno-3 (110-160).
 Operating pressure 4 bar with Uno-3 (190-360). The boiler complies with the Pressure Equipment Directive (PED) 97/23/EC. Request for corresponding boiler plate required.
- For external control
- For systems without TopTronic® regulator
- 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 meter integrated
- 2 Burner running time meter and
- count-upcounter integrated
- Flue gas thermometer, 4,5 m capillary tube
- Safety temperature limiter 130 °C.

Delivery

Control panel separately delivered

On site

- · Mounting of the control panel at the boiler
- Conversion of the boiler control for side mounting



Low temperature oil/gas - boiler Hoval Uno-3

3-pass-low temperature boiler without oil burner, sound absorber hood and control panel.

Delivery

Boiler, insulation and casing separately packed delivered.

Uno-3* Type	Output kW	Operating pressure bar	
(110)	50-110	4	7003 515
(125)	50-125	4	7003 516
(160)	64-160	4	7003 517
(190)	76-190	5	7003 519
(220)	100-220	5	7003 521
(250)	120-250 ¹	5	7003 523
(280)	130-280	5	7003 525
(320)	140-320	4	7003 527
(360)	140-360	4	7003 528

* Operating temperature max. 90 °C

At operating pressure max. 3 bar with Uno-3 (110-160) and 4 bar with Uno-3 (190-360), the boiler complies with the Pressure Equipment Directive (PED) 97/23/EC, operating temperature max. 105 °C. Request for corresponding boiler plate required.

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•	

Blind flange for third-party burner for Uno-3 (110,125) made of steel incl. setscrews and gasket	6005 203
Blind flange for third-party burner for Uno-3 (160-360) made of steel incl. setscrews and gasket	6005 204
Intermediate flange drilled D200x12	6017 567

Part N°

Hoval

Control panel with heating regulator TopTronic®T to Hoval Uno-3	Part N°	
Boiler controller TopTronic®T/U3.1 Max. operating temperature 90°C Operating pressure 4 bar - Uno-3 (50-160,360), Max-3 (420-1250) Operating pressure 5 bar - Uno-3 (190-280) For mounting on top of boiler (sideways, change on site). Integrated control function for - 1 mixing circuit - 1 heating circuit without mixer - domestic hot water loading circuit incl. outdoor sensor, flow sensor and calorifier sensor with plug Option to expand the functions by - different key modules and/or - mounting of an additional heating regulator TopTronic®T/N (see accessories)	6020 537	
Boiler controller TopTronic®T/U3.2 Max. operating temperature 105°C Operating pressure 3 bar - Uno-3 (50-160) Operating pressure 4 bar - Uno-3 (190-360) Max-3 (420-1250) The boiler complies with the Pressure Equipment Directive (PED) 97/23/EC. Request for corresponding boiler plate required. Functions like boiler controller TopTronic®T/U3.1 Delivery: Boiler controller separately delivered	6020 538	
Contact sensor VF204 can be used as flow or return flow sensor with 4 m cable For indirect return high attitude.	2023 998	

For indirect return high attitude. Return high attitude through close of the heating circle mixer (main pump necessary)

	· · · · · · · · ·	• • •	• • •		LT11
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Control panel with thermostat

Control panel T 2.2

- Operating temperature max 90 °C and operating pressure 4 bar with Uno-3 (110-160, 320,360). Operating pressure 5 bar with Uno-3 (190-280)
- For systems without TopTronic® regulator.
- For direct 2-stage burner control, incl. plug connection for burner requirement starting from external calorifieror heater instruction is possible.
 without burner running time meter
 - without burner running time meter
 and count-up-counter
 incl. 2 burner running time meter
 for the state of the
- incl. 2 burner running time meter 6015 478 and count-up-counter integrated



Control panel T 0.2

- Operating temperature max. 105 °C and operating pressure 3 bar with Uno-3 (95-160). Operating pressure 4 bar with Uno-3 (190-360). The boiler complies with the Pressure Equipment Directive (PED) 97/23/EC. Request for corresponding boiler plate required.
- For external switching command
- For systems without $\ensuremath{\mathsf{TopTronic}}\xspace^{\ensuremath{\mathbb{R}}}$ regulator
- For special control function
 - without burner plug connection
 without burner running time meter 6015 016 and count-up-counter
 incl. 2 burner running time meter 6015 475 integrated
 incl. 2 burner running time meter 6015 476
 - incl. 2 burner running time meter and count-up-counter integrated

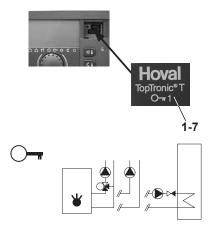
Accessories to control panel with thermostat (without TopTronic®T regulator)

Flue gas thermometer 4 m, capillary tube

2411 49

Part N°

Hova



Accessories for regulator system Hoval TopTronic®T

Key modules for Hoval TopTronic®T

for further functions additionally to standard

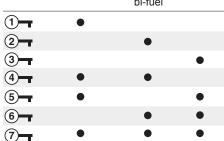
functions. Key module consists of:

- Function key for plugging into TopTronic®T
- incl. accessories
- Only one key module is possible!

Standard functions

already included in TopTronic®T.

- 1 mixing circuit
- 1 heating circuit without mixing operation - domestic hot water loading circuit
- Functions of the Key Modules
- 2. mixing Key solid fuel solar Module circuit storage tank
 - bi-fuel

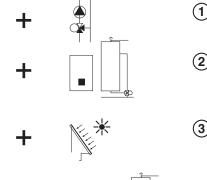


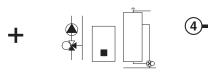
)	Key Module 1 <i>for 2. mixing circuit</i> Function key 1, 1 flow sensor, 2 loose plugs	6012 154
2)	Key Module 2 for solid fuel/ storage tank/ bivalent installation Function key 2, 3 immersion sensors, 4 loose plugs	6012 155
3) 	Key Module 3 <i>for solar plants</i> Function key 3, 1 collector sensor, 1 calorifier sensor, 4 loose plugs	6012 156
l)	Key Module 4 for 2. mixing circuit and solid fuel/ storage tank/ bivalent installation Function key 4, 1 flow sensor, 3 immersion sensors, 6 loose plugs	6012 157
)	Key Module 5 for 2. mixing circuit and solar plants Function key 5, 1 flow sensor, 1 collector sensor, 1 calorifier sensor, 6 loose plugs	6012 158
)	Key Module 6 for solid fuel/ storage tank/ bivalent installation and solar plants Function key 6, 1 collector sensor, 4 immersion sensors, 6 loose plugs	6012 159
7)	Key Module 7 for 2. mixing circuit, solid fuel/ storage tank/ bivalent installation and solar plants Function key 7, 1 flow sensor, 1 collector sensor, 4 immersion sensors, 8 loose plugs	6012 160
	Sensor type	

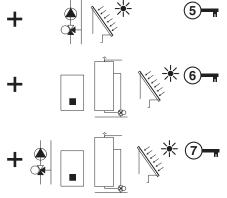
Immersion/calorifier sensor: Type KVT20/5/6 (L = 5 m) without immersion sleeve Type VF204S with plug flow sensor: collector sensor: Type PT1000 (silicone)

Part N°

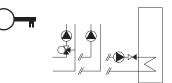
Hoval







System approaches and applications see Hoval CD









Accessories for regulator system Hoval TopTronic®T	Part N°
Additional heating regulator set ZN1 for extending functionality and implementing further heating circuits Consisting of: Heating regulator TopTronic®T/N for - 1 mixer circuit - 1 heating circuit without mixer - hot water loading Only one key module per regulator is possible! Flow sensor VF202K with 2 m cable and plug. Cable set for connecting the auxiliary heating regulator TopTronic®T/ N with the boiler controller Mounting on-site	6020 574
Kit BMS-Modul 0-10V (Building management system) Consisting of: BMS-Module and trafo Can be installed in the boiler control panel!	6015 195

Hoval

Communication module/ remote connection see "Controls"



Accessories

Sound absorbing/ insulating hood Made of steel plates, red powder coated. (Cut-out for the gas pipe by the customer). Hood 2-parts to Uno-3 with oil/gas burner Uno-3 (110-125) without rolers Uno-3 (160-360) with rolers (adjustable up to 170 mm)	
Uno-3 Type Depth Height	
Uno (110-125) (made of sheet steel, without rolers) 530 640	6001 077
Uno (160-360) (made of sheet steel, with rolers) 800 860	637 851

Vibration elements for boiler socket 4 vibration elements mounted under the boiler base. Made of rubber

under the boiler base. Made of rubber. Cross section 80/50 mm.

To Uno-3	Set	Length	
Type	off piece	mm	
(110-220)	4	100	6003 737
(250,280)		150	6003 738
(320,360)	4	200	6003 739

Subject to alterations, 1.8.2013

Hoval

		Part N°
Edanose Co So D L Horal	Room station RS-T for TopTronic®T effective on one mixing circuit	2034 939
Hoval	Remote control RFF-T for TopTronic [®] T effective on one mixing circuit	2022 239
	Outdoor sensor AF 200 (may be included in the heat generator scope of delivery) for one mixing circuit or for the mean value (per regulator 2 outdoor temperature sensors possible)	2022 995
	Flue gas temperature sensor PT 1000/4 L = 2.5 m including fixing screws (installation on site)	6913 57
	Cable sensor KVT 20/5/6S 5 m cable and plug	6012 687
	Contact sensor VF204S can be used as flow or return flow sensor with 4 m cable and plug	6012 688
	Flow temperature guard for underfloor heating system (per heating circuit 1 guard) 15-95 °C, differential gap 6K, capillary tube max. 700 mm, setting (visible from the outside) inside the housing cover.	
	<i>clamp-on thermostat</i> RAK-TW1000.S Thermostat with strap, without cable and plug	242 902
	<i>clamp-on thermostat-set</i> RAK-TW1000.S Thermostat with strap, incl. enclosed cable (4 m) and plug	6015 000
e e	Immersion thermostat RAK-TW1000.S SB 150 Thermostat with pocket 1/2" - depth of immersi- on 150 mm brass nickel-plated	6010 082

Service

Commissioning

Commissioning must be made by works service or Hoval trained authorized serviceman/ company is condition for warranty.

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

Technical data

Uno-3

Туре		(110)	(125)	(160)	(190)
 Nominal output at 80/60°C Range of output (Diesel oil, Methane H: variant 1 and 3) Range of output (Diesel oil, Methane H: variant 2) Burner input maximum 	kW	110	125	160	190
	kW	70-110	70-125	105-160	123-190
	kW	50-110	50-125	64-160	76-190
	kW	118,3	135,8	173,1	206
 Maximum boiler operation temperature ¹ Safety temperature limiter setting (water side) ¹ Working/test pressure at max. operating temperature 90°C ¹ 	°C	90	90	90	90
	°C	110	110	110	110
	bar	4,0/5,2	4,0/5,2	4,0/5,2	5,0/6,5
 Maximum boiler operation temperature ² Safety temperature limiter setting (water side) ² Operating pressure at max. operating temperature 105°C ² 	°C	105	105	105	105
	°C	120	120	120	120
	bar	3,0	3,0	3,0	4,0
 Minimum boiler operating temperature Minimum boiler return temperature Minimum flue gas temperature at boiler 	°C °C °C	see	table operating table operating table operating	conditions (be	low)
 Flue gas regulators for 170°C flue gas temperature Boiler efficiency at full load 80/60°C	%	3R5+2R3	3R5+2R3	6R5	6R5+6R2
(related to net/gross calorific value, diesel oil)		92,7/87,6	92,8/87,6	92,5/87,3	92,2/87,0
 Boiler efficiency at partial load 30% at return 37°C (according to EN 303) (related to net/gross calorific value, diesel oil) 	%	94,8/89,4	94,9/89,5	94,9/89,5	94,8/89,4
 Standard efficiency at 75/60°C (DIN 4702 part 8)	%	95,9/90,5	95,8/90,4	96,1/90,7	96,2/90,8
(related to net/gross calorific value, diesel oil) Stand-by loss gB at 70°C	Watt	400	400	440	570
 Flue gas resistance at nominal output 180 °C flue gas temperature, 12,5% CO₂, 500 m over sea level (tolerance ± 20%) Flue gas mass flow at nominal output 	mbar kg/h	0,89	1,10	1,50	1,40
12,5% CO_2 heat Oil	Kg/II	100		214	524
 Flow resistance boiler ³ Water flow resistance at 10 K Water flow resistance at 20 K Water flow volume at 10 K Water flow volume at 20 K 	z-value	0,2	0,2	0,2	0,1
	mbar	17,90	24,8	37,6	26,5
	mbar	4,47	5,8	9,4	6,6
	m³/h	9,46	11,1	13,7	16,3
	m³/h	4,73	5,4	6,9	8,1
 Boiler water content Boiler gas volume Insulation thickness boiler body Weight (incl. casing) 	Litre	250	250	270	362
	m³	0,1848	0,1848	0,236	0,322
	mm	80	80	80	80
	kg	391	391	495	635
Combustion chamber dimension Ø-inside x lenghtCombustion chamber volume	mm	ø440x974	ø440x974	ø440x974	ø490x974
	m³	0,148	0,148	0,148	0,184
Dimensions			see Dim	ensions	
Maximum depression in flue gas system (boiler connection)	Ра	30	30	30	30

¹ Control U3.1 and T2.2

² Control U3.2 and T0.2

 $^{_{3}}\,$ Flow resistance boiler in mbar = volume flow (m³/h)² x z

Possible operating condition	ns								
Fuel			Diesel oil			Methan H	l	0	ilL
			(110-360)			(110-360))	(110-280)	(320-360)
Uno-3 Type		Variant 1	Variant 2	Variant 3	Variant 1	Variant 2	Variant 3		
min. flue gas temperature	°C	130	110	130	130	110	130	130	130
min. boiler temperature	°C	48	50	52	55	60	62	58	70
min. return flow temperature	°C	35	38	no min. limit	45	48	no min. limit	45	60
Return temperature control		yes	yes	nein	yes	yes	no	yes	yes
Boiler start protection ¹		no	no	yes	no	no	yes	no	no

¹ If the boiler temperature is below or goes below the minimum boiler temperature (variant 3) and no return flow control is present the client system parts must be blocked using a suitable control system.

Technical data

Uno-3

Туре		(220)	(250)	(280)	(320)	(360)
 Nominal output at 80/60°C Range of output (Diesel oil, Methane H: variant 1 and 3) Range of output (Methane H: variant 2) Burner input maximum 	kW	220	250	280	320	360
	kW	143-220	170-250	190-280	220-320	220-360
	kW	100-220	120-250	130-280	140-320	140-360
	kW	236,6	269,1	302	344	390
 Maximum boiler operation temperature ¹ Safety temperature limiter setting (water side) ¹ Working/test pressure at max. operating temperature 90°C ¹ 	°C	90	90	90	90	90
	°C	110	110	110	110	110
	bar	5,0/6,5	5,0/6,5	5,0/6,5	4,0/5,2	4,0/5,2
 Maximum boiler operation temperature ² Safety temperature limiter setting (water side) ² Test pressure at max. operating temperature 105°C ² 	°C	105	105	105	105	105
	°C	120	120	120	120	120
	bar	4,0	4,0	4,0	4,0	4,0
 Minimum boiler operating temperature Minimum boiler return temperature Minimum flue gas temperature at boiler 	2° 2° 2°		see table op	erating condition erating condition erating condition	ons (below)	
 Flue gas regulators for 170°C flue gas temperature Boiler efficiency at full load at 80/60°C	%	9R5/290	6R5+3R3/290	6R5+6R2/290	-	-
(related to net/gross calorific value, diesel oil)		92,6/87,4	92,8/87,6	92,6/87,4	93,5/88,2	92,5/87,3
 Boiler efficiency at partial load 30% at return 37°C (according to EN 303) (related to net/gross calorific value, diesel oil) 	%	95,2/89,8	95,4/90,0	95,3/89,9	95,5/90,1	95,0/89,6
 Standard efficiency at 75/60°C (DIN 4702 part 8)	%	96,0/90,6	96,3/90,9	95,9/90,5	96,6/91,1	95,8/90,4
(related to net/gross calorific value, diesel oil) Stand-by loss qB at 70°C	Watt	570	610	610	670	670
 Flue gas resistance at nominal output 180°C flue gas temperature, 12,5% CO₂, 500 m over sea level (tolerance ± 20%) 	mbar	1,7	1,6	2,8	2,5	3,4
 Flue gas mass flow at nominal output 12,5% CO₂ heat oil 	kg/h	375	426	475	542	610
 Flow resistance boiler ³ Water flow resistance at 10 K Water flow resistance at 20 K Water flow volume at 10 K Water flow volume at 20 K 	z-value	0,1	0,1	0,1	0,022	0,022
	mbar	35,55	46	57,6	16,51	20,94
	mbar	8,9	11,5	14,4	4,10	5,2
	m³/h	18,9	21,4	24	27,43	30,86
	m³/h	9,40	10,7	12	13,71	15,43
 Boiler water content Boiler gas volume Insulation thickness boiler body Weight (incl. casing) 	Litre	362	480	480	625	625
	m³	0,322	0,428	0,428	0,402	0,402
	mm	80	80	80	80	80
	kg	635	880	880	920	920
Combustion chamber dimension Ø-inside x lengthCombustion chamber volume	mm	ø490x974	ø488x1434	ø488x1434	ø488x1634	ø488x1634
	m³	0,184	0,268	0,268	0,3056	0,3056
Dimensions			S	ee Dimensions	6	
 Maximum depression in flue gas system (boiler connection) 	Pa	30	30	30	30	30

¹ Control U3.1 and T2.2

² Control U3.2 and T0.2

³ Flow resistance boiler in mbar = volume flow $(m^3/h)^2 \ge z$

Possible operating condition	ons		Diesel Oil			Methan H	I	Oi	IL
			(110-360)			(110-360))	(110-280)	(320-360)
Uno-3 Type		Variant 1	Variant 2	Variant 3	Variant 1	Variant 2	Variant 3		
min. flue gas temperature	°C	130	110	130	130	110	130	130	130
min. boiler temperature	°C	48	50	52	55	60	62	58	70
min. return flow temperature	°C	35	38	no min. limit	45	48	no min. limit	45	60
Return temperature control		yes	yes	nein	yes	yes	nein	yes	yes
Boiler start protection 1		no	no	yes	no	no	yes	no	no

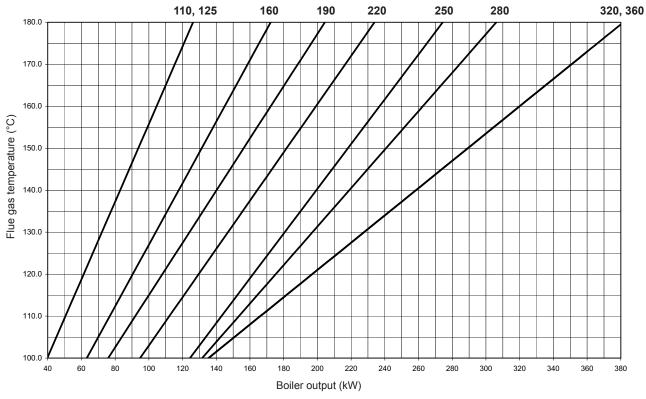
¹ If the boiler temperature is below or goes below the minimum boiler temperature (variant 3) and no return flow control is present the client system parts must be blocked using a suitable control system.

Subject to alterations, 1.8.2013

Technical data

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).
- Operated with Diesel oil $\lambda = 1,22$ with max. burner output (CO₂ Diesel oil = 12,5%)
- A reduction of the boiler water temperature of -10K causes a reduction of the flue gas tem-perature of approx. 6-8K.
- A modification of the CO₂-concentration of +/-1% causes a modification of the flue gas temperature of approx. -/+8K.

Flue gas regulators

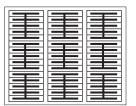
Uno-3 type (110) Regulators 3R5+2R3/290



Regulators3R5+2R3/290

Uno-3 type (125)

Uno-3 type (220) Regulators 9R5/290



Uno-3 type (250) Regulators 6R5+3R3/290

Uno-3 type (160) Regulators 6 R5/290

Uno-3 type (280) Regulators 6R5+6R2/290

Uno-3 type (190) Regulators 6R5+6R2/290

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Uno-3 (320, 360) with dimpled tubes as a re-switch heating surface no regulators necessary

205

Dimensions

Uno-3 (110-280)

3

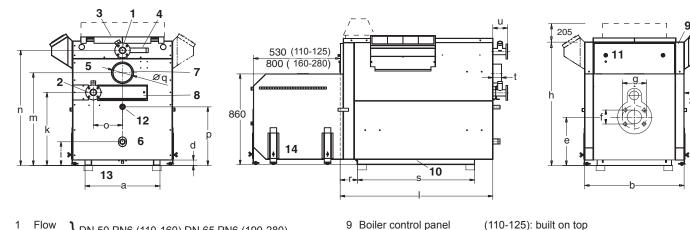
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7

8



Flow Return } DN 50 PN6 (110-160) DN 65 PN6 (190-280) 1 2 Safety flow R 1 1/4" (110-125) R 1 1/2" (160-280)

Flow for calorifier R 1 1/4"

Cleaning opening

Return for calorifier R 1 1/4"

Drain R 1" (110-125) R 1 1/2" (160-280)

Flue gas outlet Ø outside, wall thickness 3 mm

(160-280): optional on top, right or left 10 Socket: width 50 mm

11 Boiler door right swivelled (optional left swivelled)

12 Flue gas collector-cleaning opening R 1" (110-280)

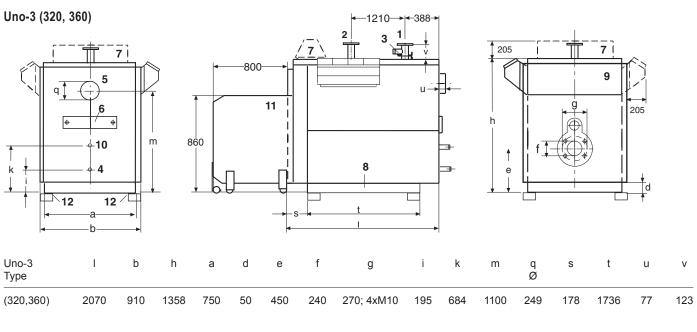
13 optional vibration damper, width 80 mm, height 50 mm

14 Burner sound absorbing hood

without rollers (110-125)

- with rollers adjustable up to 170 mm (160-280) _

Uno-3 Type	Ι	b	h	а	d	е	f	g	i	k	m	n	0	р	q Ø	r	S	t	u
(110,125)			1050					-) -					250				1080		
(160)	1411	910	1198	680	50	450	190	220/270; 4xM10	220	680	863	1072	265	546	179	158	1080	81	137
(190,220)	1431	910	1358	750	50	450	240	270; 4xM10	195	675	950	1218	310	621	199	178	1080	81	134
(250,280)	1916	910	1358	750	50	450	240	270; 4xM10	195	675	950	1218	310	596	249	178	1535	76	134



Flow DN 80, PN 6 1

- Return DN 80, PN 6 2
- 3 Thermostat - immersion sleeve 3/4"
- Drain R 1 1/2" 4

5 Flue gas outlet Ø outer, wall thickness 3 mm

- Cleaning opening 455/95 mm 6
- Boiler control panel right/left or built on top 7

8 Socket, width 50 mm

- Boiler door with stopper on the right side
- (optional left)

9

- 10 Flue gas collector cleaning opening R 1"
- 11 Burner sound absorbing hood
- feet on rolls, height 50 mm, adjustable up to 170 mm
- 12 Optional vibration damper, width 80 mm, height 50 mm



Dimensions

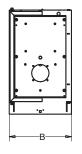
Base size and space requirement

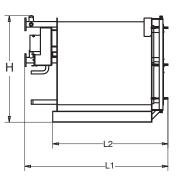
Attention

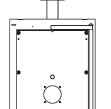
 Optionally flue gas collector and boiler outlet
 O not manipulate the equipment will be delivered separately.

on the sockets

Uno-3 (110-280)

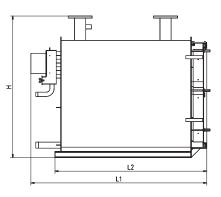






В

Uno-3 (320,360)

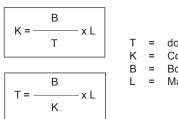


		Len	gth		
		with socket and	without socket and		
Uno-3	Width	flue gas collector	flue gas collector	Height	Weight
Туре	В	L1	L2	Н	kg
(110,125)	680	1513	1080	1084	350
(160)	680	1515	1210	1180	430
(190,220)	750	1535	1230	1335	530
(250,280)	750	2015	1685	1335	760

Uno-3	Width	Length	Length	Height	Weight
Type	B	L1	L2	H	kg
(320,360)	750	2114	1886	1481	800

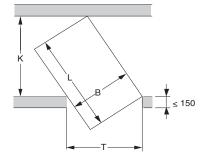
Required min. width of door and corridor to bring in the boiler

The stated measurements are minimal dimensions



door width Corridor width Boiler width Max. boiler length Examples for necessary corridor width Door width T = 800

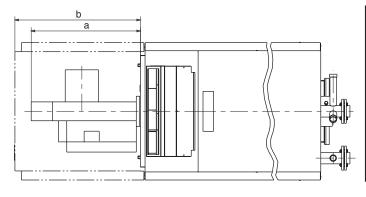
Uno-3 (110,125)	$K = \frac{680}{800} \times 1513 = Corridor \text{ width } \ge 1286$
Uno-3 (160)	$K = \frac{680}{800} \times 1515 = Corridor \text{ width } \ge 1288$
Uno-3 (190,220)	$K = \frac{750}{800} \times 1535 = Corridor \text{ width } \ge 1439$
Uno-3 (250,280)	$K = \frac{750}{800} \times 2015 = Corridor \text{ width } \ge 1890$
Uno-3 (320,360)	$K = \frac{750}{800} \times 2114 = Corridor \text{ width } \ge 1982$

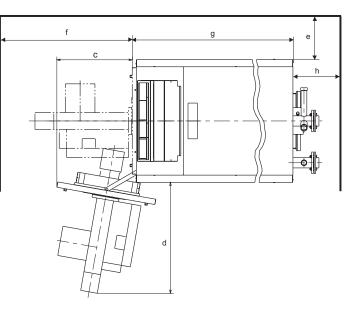


Dimensions

Base size and space requirement

Swinging out of boiler door and hood dimensions





	Sound absorbing hood						
Туре	a b	С	d	e 1	f	g	h
Uno-3 (110)	burner dependent	558	burner dependent	400	burner dependent	1328	600
Uno-3 (125)	burner dependent	584	burner dependent	400	burner dependent	1328	600
Uno-3 (160)	burner dependent	584	burner dependent	400	burner dependent	1411	600
Uno-3 (190)	burner dependent	602	burner dependent	400	burner dependent	1431	600
Uno-3 (220)	burner dependent	606	burner dependent	400	burner dependent	1431	600
Uno-3 (250)	burner dependent	606	burner dependent	400	burner dependent	1916	600
Uno-3 (280)	burner dependent	606	burner dependent	400	burner dependent	2070	600
Uno-3 (320)	burner dependent	606	burner dependent	400	burner dependent	2070	600
Uno-3 (360)	burner dependent	606	burner dependent	400	burner dependent	2070	600

¹ Minimum distance 100 mm

Dimensions

Base size and space requirement

Minimum placing dimensions Boiler vertical

Boiler (without calorifier) standing with swivel flange below, transport on a low lift elevating platform or rollers on site

Boiler height

without socket and

flue gas collector

H2

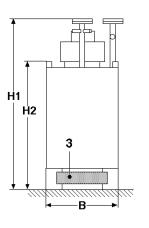
1080

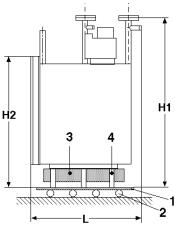
1210

1230

1685

1886





1 Transport plate (at place)

with socket and

flue gas collector

H1

1513

1515

1535

2015

2114

2 pipes as rolls (at place)

Uno-3

(110,125)

(190,220)

(250, 280)

(320,360)

Туре

(160)

3 Boiler door (dismountable)4 Door mounting

Width

В

680

680

750

750

750

Length

L

1084

1180

1335

1335

1481

Uno-3 (160)	K = 6

Door T = 800

Uno-3 (110,125)

Uno-3 (160)	$K = \frac{680}{800} \times 1180 = Corridor \text{ width } \ge 1003$
Uno-3 (190-280)	$K = \frac{750}{800} \times 1335 = Corridor \text{ width} \ge 1252$
Uno-3 (320,360)	K = 750 x 1481 = Corridor width \geq 1389

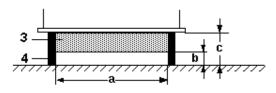
 $K = 680 \times 1084 = Corridor width \ge 922$

Calculation example for the necessary corridor width

800

Measurements boiler door

Space for use of a low lift elevating platform

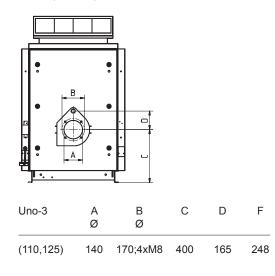


800

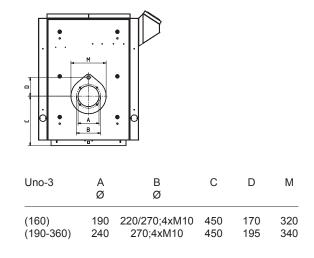
	max. width for		listance
Uno-3	low lift elevating platform	with boiler door	without boiler door
Туре	а	b	С
(110,12	5) 490	50	175
(160-28	60) 540	50	195
(320,36	0) 540	50	195

Dimensions Burner mounting

Uno-3 (110-125)



Uno-3 (160-360)





Standards and Guidelines

The following standards and guidelines must be respected:

- Technical information and installation manual of the Hoval company.
- Hydraulic and control technical regulations of the Hoval company.
- Local building law
- Fire protection standards
- DVGW guidelinesDIN EN 12828
- Heating systems in building plans of hot water heating plants.
- DIN EN 12831 heating plants in buildings

 procedure for computing the normed heating capacity
- VDE 0100

Water quality Heating water:

Requirements of the water quality:

- The European Standard EN 14868 and the Directive VDI 2035 must be observed.
- Hoval boilers and calorifiers are designed for heating plants without significant oxygen intake (plant type I according to EN 14868).
- · Plants with
 - continuous oxygen intake (e.g. underfloor heating systems without diffusion proof plastic piping) or
 - **intermitten**t oxygen intake (e.g. where frequent refilling is necessary)

must be equipped with separate circuits.

- Treated heating water must be tested at least 1 x yearly. According to the inhibitor manufacturer's instructions, more frequent testing may be necessary.
- A refilling is not necessary if the quality of the heating water in existing installations (e.g. exchange of boiler) conforms to VDI 2035. The Directive VDI 2035 applies equally to the replacement water.
- New and if applicable existing installations must be adequately cleaned and flushed before being recharged! The boiler may only be filled after the heating system has been flushed.

Maximum filling quantity according to VDI 2035

		Carl	oonate ha	ardness o	of filling v	vater up t	o	
[mol/m ³] ¹	<0,1	0,5	1	1,5	2	2,5	3	>3,0
f°H	<1	5	10	15	20	25	30	>30
d°H	<0,56	2,8	5,6	8,4	11,2	14,0	16,8	>16,8
е°Н	<0,71	3,6	7,1	10,7	14,2	17,8	21,3	>21,3
~mg/l	<10	50,0	100,0	150,0	200,0	250,0	300,0	>300
Conductance ²	<20	100,0	200,0	300,0	400,0	500,0	600,0	>600
Boiler size of the individual boiler		maxi	mum filli	ng quanti	ity withou	ıt desalin	ation	
50 to 200 kW			50 l/kW	20 l/kW	20 l/kW			
200 to 600 kW		50 l/kW	50 l/kW	20 l/kW		always d	esalinate	

¹ total of alkaline earths

² If the conductance in µS/cm exceeds the tabular value an analysis of the water is necessary.

- Parts of the boiler which have contact with water are made of ferrous materials.
- On account of the danger of stress cracking corrosion the chloride, nitrate and sulfate contents of the heating water must not exceed 200 mg/l in total.
- The pH value of the heating water should lie between 8.3 and 9.5 after 6 - 12 weeks of heating operation.

Filling and replacement water:

- For a plant using Hoval boilers untreated drinking water is generally best suited as filling and replacement water. However, the quality of the untreated drinking water must at least fulfil the standard set in VDI 2035 or be desalinated and/or be treated with inhibitors. The stipulations of EN 14868 must be observed.
- In order to maintain a high level of boiler efficiency and to avoid overheating of the heating surfaces the values given in the table should not be exceeded (dependent on boiler performance ratings - for multi-boiler plants rating of smallest boiler applies - and on the water content of the plant).
- The total amount of filling and replacement water which is used throughout the total service life of the boiler must not exceed three times the water capacity of the plant.

Heating system

Combustion air

 The combustion air supply must be warranted. The air opening must not be lockable.

Space requirements

• The cleaning opening on the flue gas outlet must be easy accessible

Mounting of insulation

 Mounting of insulation and casing requires on the left and right side of the boiler a distance of 40 cm. After assembling of casing it is possible to push the boiler to the wall without distance. 2 boilers can be installed without distance in between, then the insulation and inner side walls must be installed first. Then the boilers can be pushed together. (The boiler door on the left boiler shall be swiveled to left and on the right boiler to right).

Heating armature group

 If more than 1 armature group is required then the installation should be on the wall with a wall distributor and 3-way mixer valves provided on site.

Hydraulic circuit

See Controls

Oil burner mounting

- The burner connection plug must be mounted opposite the burner door hinges.
- It should be possible to swivel the boiler door incl. burner by 90°.
- To change from right to left swivelling is possible on-site.
- Boiler installations with ThermoCondensor require from the burner to overcome the resistance of the heat exchanger.

Electrical connection of the burner

- Control voltage 1 x 230 V
- Burner engine 1 x 230 V
- The burner must be connected to the burner connection plug of the Boiler.
- For safety reasons the electric cable of the burner must be shortened so the plug must be removed when swivelling boiler door.

Sound absorption

Sound absorption is possible trough 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 absorber hood 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 flexible with compensators.
- Pumps have to be connected with compensators to the pipes.
- For damping of flame noise it is possibl to install a silencer into the flue gas tube (Space should be foreseen for later installation).

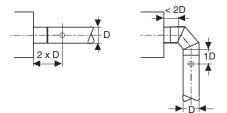




Chimney/ Flue gas system

Flue gas tube

- The flue gas tube must be led into the chimney with an angle of 30-45°.
- If the flue gas tube is longer then 1 m, it must be insulated.
- The inlet of the flue gas tube into the chimney has to be carried out in such a way, that no condensate can flow from the chimney into the fue gas tube and boiler.
- A lockable 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 chimney must be humidity-insensitively, acid resistant and suitable for flue gas temperature > 160 °C
- For existing chimney installation the restoration must be carried out according to the instructions of the chimney constructor.
- Calculation of chimney diameter according to DIN 4705.
- The cross sections are to be calculated for boilers without draft requirements.

Required chimney diameter

Basics: Smooth chimneys made of stainless steel, flue gas tube $\leq 2,5$ m, $\Sigma\zeta$ = 2,2, flue gas tube and chimney insulated, height over sea level \leq 1000 m, outside temperature \leq 30 °C.

Height	Chimney and flue gas tube Ø mm											
25 m	150	175	175	175	175	200	225	225	250	300		
20 m	150	175	175	175	200	200	225	225	250	300		
15 m	150	175	175	175	200	225	225	250	250	300		
10 m	150	175	175	200	200	225	225	250	300	300		
5 m	175	175	175	200	200	225	250	300	300	350		
Uno-3 Type	(95)	(110)	(125)	(160)	(190)	(220)	(250)	(280)	(320)	(360)		

m = effective chimney height

Expansion tank/expansion

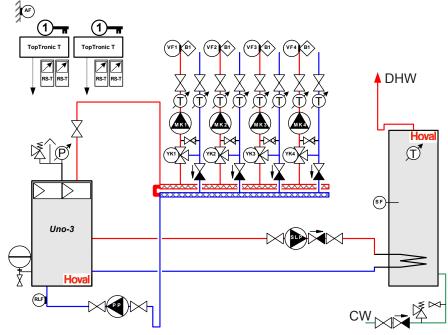
 Ideally, the pressure expansion tank should be connected to the heating system as described in our example applications, with a removable or sealable actuation device. This means that it is not necessary to drain the entire system in order to carry out work on the tank.

Safety valve

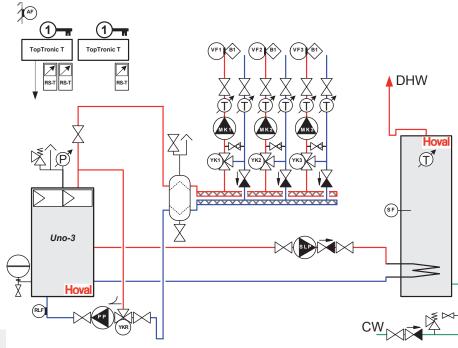
• A safety valve an automatic air vent must be installed in the safety flow

Examples

Hydraulic principle schematic Uno-3 with heating regulator TopTronic®T Hydraulic schematic BBAT030



Hydraulic principle schematic Uno-3 with heating regulator TopTronic®T Hydraulic schematic BBAT040



Notice :

- This hydraulic schematic is a principle schematic, it does not contain all details for installation. The installation must be done according to local conditions, dimensioning and regulations.
- For underfloor heating a flow temperature monitor must be built in.

- Shut-off devices to the safety valve (pressurized expansion tank, safety valve, etc.) are to safe against unintended closing!
- Mount bags to prevent single pipe gravity _ circulation!

Description

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 97/23/EG
- 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

- Control panel with boiler control and regulators in different executions
- · Free standing calorifier see Calorifiers
- Boiler door swivels to the left
- Delivery in single parts and welding on site, time to delivery approx. 8 weeks

Delivery

 Boiler, insulation and casing delivered separately packed

On site

· Mounting of insulation and casing

Control panel TopTronic®T/U3.1

- For operating temperature up to 90 °C
 For mounting on top of boiler Hoval Max-3 (420-1250) mounting on top
- Hoval Max-3 (420-1250) mounting on top Hoval Max-3 (1500-2700) mounting laterally on the left or the right
- Integrated control function for:
 - 1 mixing circuit
 - 1 heating circuit without mixing operation
 domestic hot water loading circuit
- Option to expand the functions by
 - different Key Modules and/or
 - mounting of an additional heating regula-
- tor TopTronic®T/N (see accessories) • Main switch ...I/O"
- Safety temperature limiter 110 °C
- Fuse 6.3 A
- Trouble indication "Burner"
- Burner running time meter and count-up counter
- Boiler sensor
- Large LCD display
- Rotary pushbutton

- Button for
 - daytime room temperature

Model range

Output

kW

200 - 500

220 - 610 240 - 720

280 - 870

350 - 1150

480 - 1350

650 - 1750 750 - 2150

920 - 2500

1030 - 3000

Max-3

Туре

(420)

(530)

(620)

(750)

(1000) (1250)

(1500)

(1800) (2200)

(2700)

- night room temperature
- hot water temperature
- operating mode selection (holiday, absent, heating operation prolongation, automatic, summer, heating operation continuous reduced - frost protection)
- adjusting the heating curves
- system information
- emission measurement and manual operation
- Outdoor sensor AF 200
- Flow sensor with plug
- Calorifier sensor with plug
- Plug connection for burner
- Connection available for room stations
- Delivery
- Control panel separately delivered
- On site
- Mounting of the control panel at the boiler
- Installation of the control panel for mounting sideways

Permission Boiler

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

The boiler complies with the PED Pressure Equipment Directive 97/23EG.

Control panel TopTronic®T/U3.2

- Functions like control panel TopTronic®T/U3.1, but:
- For operating temperature up to 105 °C
- Safety temperature limiter 120 °C

Optional

Safety temperature limiter 130 °C

Delivery Control panel separately delivered

On site

- · Mounting of the control panel at the boiler
- Installation of the control panel for mounting sideways



Description

Control panel

with thermostat T 2.2

- For systems without TopTronic® regulator.
- 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 count-up counters integrated
- · Flue gas thermometer, 4,5 m capillary tube

Delivery

· Control panel separately delivered

On site

- Mounting of the control panel at the boiler
- Conversion of the boiler control for side
- mounting

Control panel with thermostat T 0.2

For external control

- For systems without TopTronic[®] regulator
- 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 heat-
- ing
- temperature regulator for full load heating
- temperature regulator for calorifierwithout burner plug connection
- without burner plug connec

Optional

- · 2 running time meters integrated
- 2 burner running time meters and count-up counters integrated
- Flue gas thermometer, 4,5 m capillary tube
- Safety temperature limiter 130 °C

Delivery

· Control panel separately delivered

On site

- · Mounting of the control panel at the boiler
- Conversion of the boiler control for side mounting

6

Hoval Max-3

Oil/ gas boiler (420-2700)

Boiler

3-pass boiler made of steel for oil/gas LowNOx firing, without control panel For operating temperature of of105°C

Execution: complete delivery

Boiler, insulation and casing separately packed and delivered.

Max-3 Type	Output kW	Working pressure bar	
(420)	200 - 500	6	8002 655
(530)	220 - 610	6	8002 656
(620)	240 - 720	6	8002 657
(750)	280 - 870	6	8002 658
(1000)	350 - 1150	6	8002 659
(1250)	480 - 1350	6	8002 660
(1500)	650 - 1750	6	7011 420
(1800) (2200) (2700)	750 - 2150 920 - 2500 1030 - 3000	6 6 6	7011 421 7011 422 7011 423
(=)		ů.	

Oil/ gas boiler Max-3 (420-2700) PGS without control for mounting on site

Execution: delivery in single parts

for mounting on site

In the Part N° for welding on site

- are contained: _
- Welding
- Mounting (Boiler door, flue gas collector) _
 - Leakage detection under pressure
- Priming

In the Part N° for welding on site

- are not contained:
- Bringing the individual parts into the boiler _ house
- Mounting of insulation and casing _
- Drive and spend the night
- Water and electric current at place

(Mounting on site takes place according to the strict quality standards of the factory assembly)

Time to delivery approx. 8 weeks

Blind flange made

made of steel incl. setscrews and gasket to Max-3 (420, 530) Max-3 (620, 750) Max-3 (1000-2200) Max-3 (2700)

Intermediate flange drilled to match burner

made of steel incl. setscrews and gasket to	
Max-3 (420, 530)	6017 595
Max-3 (620, 750)	6017 593
Max-3 (1000-2700)	6017 594



Part N°

6002 192

6030 026

6002 156

6017 504

Control panel with heating regulator TopTronic®T to Hoval Max-3	Part N°	
Boiler controller TopTronic®T/U3.1 Max. operating temperature 90°C Operating pressure 4 bar - Uno-3 (50-160,360), Max-3 (420-1250) Operating pressure 5 bar - Uno-3 (190-280) For mounting on top of boiler (sideways, change on site). Integrated control function for - 1 mixing circuit - 1 heating circuit without mixer - domestic hot water loading circuit incl. outdoor sensor, flow sensor and calorifier sensor with plug Option to expand the functions by - different key modules and/or - mounting of an additional heating regulator TopTronic®T/N (see accessories)	6020 537	
Boiler controller TopTronic®T/U3.2 Max. operating temperature 105°C Operating pressure 3 bar - Uno-3 (50-160) Operating pressure 4 bar - Uno-3 (190-360) Max-3 (420-1250) The boiler complies with the Pressure Equipment Directive (PED) 97/23/EC. Request for corresponding boiler plate required. Functions like boiler controller TopTronic®T/U3.1 Delivery: Boiler controller separately delivered	6020 538	
Contact sensor VF204 can be used as flow or return flow sensor with 4 m cable	2023 998	
For indirect return high attitude.		

Return high attitude through closing of the heating circle mixer (main pump necessary)

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		• • •	• • •	Loose 1 Loose A	DA
		ar			
10 10-	-			· 0*	·c·h
• 🔳 •	•			Long A	III TALL

Control panel with thermostat	Part N°
 Control panel T 2.2 For systems without TopTronic[®] regulator. For direct 2-stage burner control, incl. plug connection for burner requirement starting from external calorifier- or heater instruction is possible. 	
 without burner running time meter and count-up-counter incl. 2 burner running time meters integrated incl. 2 burner running time meters and count-up-counters integrated 	6015 017 6015 477 6015 478
 Control panel T 0.2 For operating temperature up to 105 °C For external switching command For systems without TopTronic[®] regulator For special control function without burner plug connection 	
 without burner running time meter and count-up-counter incl. 2 burner running time meters integrated 	6015 016 6015 475

incl. 2 burner running time meters and count-up-counters integrated

Accessories to control panel with thermostat

Flue gas thermometer 4 m, capillary tube

2411 49

6015 476

Hoval

	Accessories to heat regulation system TopTronic®T	Part N°		
Hoval TopTronic®T Ort1	Key module 1 for Hoval TopTronic®T for 2. mixing circuit <i>Key module consists of:</i> Function key 1, 1 flow sensor VF204S with plug, 2 loose plugs Only one key module is possible!	6012 154		
	System approaches and applications see Hoval CD			
<image/>	Additional heating regulator set ZN1 for extending functionality and implementing further heating circuits Consisting of: Heating regulator TopTronic®T/N for - 1 mixer circuit - 1 heating circuit without mixer - hot water loading Only one key module per regulator is possible! Flow sensor VF202K with 2 m cable and plug. Cable set for connecting the auxiliary heating regulator TopTronic®T/ N with the boiler controller Mounting on-site	6020 574		
	Kit BMS-Modul 0-10V (Building management system) Consisting of: BMS-Module and trafo Can be installed in the boiler control panel!	6015 195		
	Communication module/ remote connection see Controls			
	Room station RS-T for TopTronic®T effective on one mixing circuit	2034 939		
Hoval	Remote control RFF-T for TopTronic®T effective on one mixing circuit	2022 239		
000	Outdoor sensor AF 200 (may be included in the heat generator scope of delivery) for one mixing circuit or for the mean value (per regulator 2 outdoor temperature sensors possible)	2022 995		

Hoval

		Part N°	
Flue gas temperature s L = 2.5 m including fixing screws (installation on site)	ensor PT 1000/4	6913 57	
Cable sensor KVT 20/5 5 m cable and plug	/6S	6012 687	
Contact sensor VF204S can be used as flow or re flow sensor with 4 m cable and plug		6012 688	
Flow temperature guar for underfloor heating sys (per heating circuit 1 gua 15-95 °C, differential gap max. 700 mm, setting (vi inside the housing cover	stem rd) o 6K, capillary tube sible from the outside)		
<i>clamp-on thermostat</i> Thermostat with strap, w	RAK-TW1000.S ithout cable and plug	242 902	
Immersion thermostat Thermostat with pocket ? on 150 mm brass nickel-	⁄2" - depth of immersi-	6010 082	
Vibration elements for For sound and vibration a rubber. Cross section 80	absorbation. Made of		
Delivery 4 vibration elements per the boiler socket	boiler, mounted under		
to Max-3 Type Set of pie	Length ces mm		
(420,530) 4 (620,750) 4 (1000,1250) 4 (1500,1800) 4 (2200,2700) 6	200 400 500 800 800	6003 739 6003 741 6003 742 6005 623 6005 624	

Service

Commissioning 🗲

Commissioning must be made by works service or Hoval trained authorized serviceman/ company is condition for warranty.

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

Technical data

Max-3

Туре			(420)	(530)	(620)	(750)	(1000)	(1250)	
 Nominal output at 80/60 °C Range of output (Diesel oil, variant 1 and natural gas, variant 	1)	kW kW	500 320-500	610 350-610	720 450-720	870 520-870	1150 680-1150	1350 850-1350	
 Range of output (Natural gas: var Burner input maximum 		kW kW	200-500 539	220-610 662	240-720 781	280-870 944	350-1150 1247	480-1350 1495	
 Maximum boiler operation temper Minimum boiler operation temper Minimum boiler return flow temper Minimum flue gas temperature at Safety temperature limiter setting 	ature rature	ີ ເ ວີ ວີ ວີ	90 110	see ta	90 able operating able operating able operating 110	conditions (b	pelow)	90 110	
(water side) ²									
 Working/test pressure Boiler efficiency at full load at 80/6 (related to net/gross calorific value) 		bar %	6/9,6 92,7/87,5	6/9,6 92,4/87,2	6/9,6 92,4/87,2	6/9,6 92,5/87,3	6/9,6 92,5/87,3	6/9,6 92,5/87,3	
 Boiler efficiency at partial load 30 return 37 °C (according to EN 303 to net/gross calorific value, diesel 	% 3) (related	%	95,2/89,8	95,3/89,9	94,9/89,5	95,2/89,8	95,3/89,9	95,2/89,8	
 Standard efficiency 75/60 °C (DIN 4702 part 8)% (related to ne 	,	%	94,8/89,5	94,7/89,4	94,3/89,0	94,8/89,4	94,9/89,5	94,8/89,4	
calorific value, diesel oil) • Stand-by loss qB at 70 °C		Watt	1000	1035	1120	1180	1250	1380	
 Flue gas resistance at nominal ou 180 °C flue gas temp., 12,5 % CO 500 m over sea level (tolerance ± 	² , 20 %)	mbar	4,9	5,7	5,2	6,5	7,4	8,0	
 Flue gas mass flow at nominal ou 12,5 % CO₂ heating oil 	tput	kg/h	850	1037	1224	1479	1955	2295	
 Flow resistance boiler ³ Water flow resistance at Water flow resistance at Water flow volume at Water flow volume at 	10 K 20 K 10 K 20 K	z-value mbar mbar m³/h m³/h	0,022 40,4 10,1 42,8 21,4	0,022 60,1 15,1 52,2 26,1	0,008 30,5 7,6 61,7 30,8	0,008 44,5 11,1 74,5 37,2	0,003 29,1 7,3 98,5 49,2	0,003 40,2 10,0 115,7 57,8	
 Boiler water content Boiler gas volume Insulation thickness boiler body Weight (incl. casing) Weight (without casing) 		Litre m³ mm kg kg	552 0,583 80 1093 943	520 0,602 80 1150 1000	969 0,846 80 1770 1590	938 0,872 80 1800 1620	1528 1,350 80 2500 2360	1478 1,390 80 2600 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						ee Dimensior			
Maximum depression in flue gas s (boiler connection)	system	Pa	50	50	50	50	50	50	

¹ Limited by the boiler control to 90 °C (U3.1 and T2.2) or to 105 °C (U3.2 and T0.2).
 ² Maximum safety temperature for boiler control U3.1 and T2.2: 110 °C; for U3.2 and T0.2: 120 °C.

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

Possible operating conditions

Fuel		Diese	el oil	Meth	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

Technical data

Max-3

Туре		(1500)	(1800)	(2200)	(2700)	
 Nominal output at 80/60 °C Range of output (Diesel oil, variant 1 and natural gas, variant 1) Range of output (Natural gas: varian) 	kW kW	1750 1050-1750 650-1750	2150 1250-2150 750-2150	2500 1500-2500 920-2500	3000 1780-3000 1030-3000	
Burner input maximum	kW	1894	2324	2702	3243	
 Maximum operation temperature ¹ Minimum operation temperature Minimum boiler return flow temperature Minimum flue gas temperature at boil Safety temperature limiter setting (water side) ² 		see ta	90 ble operating o ble operating o ble operating o 110	conditions (be	low)	
 Working-/test pressure Boiler efficiency at full load at 80/60 ' (related to net/gross calorific value, d) 		6/9,6 92,4/87,2	6/9,6 92,5/87,3	6/9,6 92,5/87,3	6/9,6 92,5/87,3	
 Boiler efficiency at partial load 30 % return 37 °C (according to EN 303) (to net/gross calorific value, diesel oil 	⁶ % related	95,2/89,8	95,3/89,2	95,2/89,2	95,2/89,2	
 Standard efficiency 75/60 °C (DIN 4702 part 8)% (related to net/gi calorific value, diesel oil) 	%	94,8/89,4	94,9/89,5	94,9/89,5	95/89,6	
• Stand-by loss qB at 70 °C	Watt	1850	1950	2100	2300	
 Flue gas resistance at nominal output 180 °C flue gas temp., 12,5 % CO₂, 500 m over sea level (Tolerance ± 20) Flue gas mass flow at nominal output 12,5 % CO₂ heating oil 	%)	7,0 3031	8,8 3723	9,1 4329	8,0 5195	
Water flow resistance at 20 Water flow volume at 10	Pa z-valı) K mbar) K mbar) K m³/h) K m³/h	20 ue 0,022 45 11,3 150,0 75,0	20 0,022 67,9 17,0 184,3 92,1	20 0,002 91,8 23,0 214,3 107,1	20 0,002 132,2 33,1 257,1 128,6	
 Boiler water content Boiler gas volume Insulation thickness boiler body Weight (incl. casing) Weight (without casing) 	Litre m³ mm kg kg	2343 1,956 80 3566 3266	2750 2,510 80 4638 4288	3050 2,761 80 5017 4647	3550 3,037 80 5589 5189	
 Combustion chamber dimension Ø-inside x length Combustion chamber volume 	mm m³	880/2415 1,58	980/2595 2,07	980/2895 2,30	980/3200 2,41	
• Dimensions		s	see Dimension	S		
Maximum depression in flue gas sys (boiler connection)	tem Pa	50	50	50	50	

¹ Limited by the boiler control to 90 °C (U3.1 and T2.2) or to 105 °C (U3.2 and T0.2). For Max-3 (1500-2700) with operating temperature up to 105°C, individual approval in factory according to Pressure Equipment Directive required.

² Maximum safety temperature for boiler control U3.1 and T2.2: 110 °C; for U3.2 and T0.2: 120 °C. Max-3 (1500-2700) requires individual approval in factory according to Pressure Equipment Directive.

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

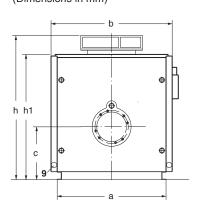
Possible operating conditions

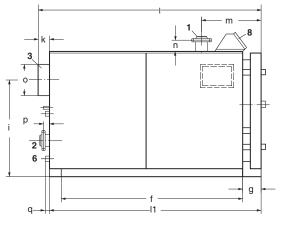
Fuel		Diese	l oil	Meth	Oil L	
_		Variant 1	Variant 2	Variant 1	Variant 2	
min. flue gas temperature min. boiler temperature min. return temperature	0° 0° 0°	130 60 50	110 65 55	130 65 55	100 75 65	130 65 55
Return temperature control		yes	yes	yes	yes	yes

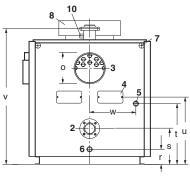
Subject to alterations, 1.8.2013

Dimensions

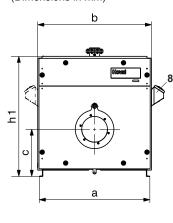
Max-3 (420-1250) (Dimensions in mm)

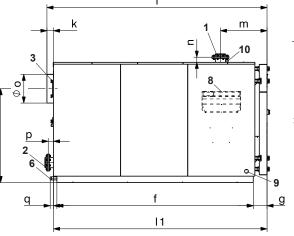






Max-3 (1500-2700) (Dimensions in mm)





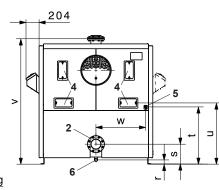
(420,530)

DN 100, PN 6

DN 125, PN 6

DN 150, PN 6

DN 200, PN 6



Flow	(420,530)	DN 100, I
	(620,750)	DN 125, I
	(1000-2200)	DN 150, I
	(2700)	DN 200, I

PN 6 2 Return PN 6 PN 6 PN 6

- (620,750) (1000-2200) (2700) 3 Flue gas outlet
- 4 Cleaning opening

5 Flue gas collector cleaning opening R1"

- 6 Drain R 1½"
- 7 Cable routing
- 8 Control panel
- 9 Electrical connection

10 Bushing Rp ³/₄" with immersion sleeve for boiler temperature sensor

Max-3 Type	а	b	с	f	g	h	h1	i	k	I	11	m	n	Øo	p	q	r
(420,530)	1060	1190	515	1770	181	1435	1230	950	104	2178	2074	641	100	299	54	34	175
(620,750)	1180	1310	550	2045	181	1555	1350	1050	105	2452	2347	666	95	349	55	35	170
(1000,1250)	1370	1500	635	2330	181	1755	1549	1250	107	2739	2632	681	111	349	77	37	175
(1500)	1560	1609	665	2685	212	-	1710	1350	103	3040	2937	722	80	447	83	34	65
(1800)	1720	1769	735	3055	214	-	1868	1460	103	3424	3322	724	80	447	83	52	65
(2200)	1720	1769	735	3355	214	-	1870	1460	101	3724	3623	724	80	447	81	50	65
(2700)	1750	1799	755	3700	212	-	1900	1410	82	4032	3950	722	80	647	82	51	65
. ,																	

Max-3					
Туре	S	t	u	V	W
(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
(1800)	310	890	952	1950	773
(2200)	310	890	952	1950	773
(2700)	370	917	982	1980	790

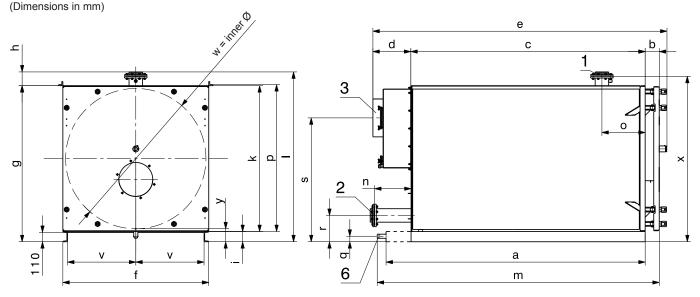
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Dimensions

Base size

Dimensions without insulation and casing

Boiler incl. flange, outlet without flue gas collector.



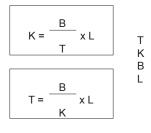
1 Flow 2 Return 3 Flue gas outlet6 Drain

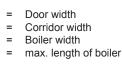
Max-3														
Туре	a *	b	С	d	е	t	g	i	k	I	m	n	0	р
(420,530)	1920	150	1770	277	2222	1060	1180	120	1060	1376	2077	175	460	1072
(620,750)	2195	150	2045	228	2498	1180	1300	120	1180	1496	2353	172	485	1192
(1000,1250)	2480	150	2330	228	2783	1370	1500	120	1380	1660	2638	198	500	1392
(1500)	2685	164	2568	260	3083	1560	1680	120	1560	1842	2923	240	510	-
(1800)	3055	166	2760	450	3467	1720	1840	120	1720	2002	3325	430	510	-
(2200)	3355	166	3060	450	3767	1720	1840	120	1720	2002	3625	430	510	-
(2700)	3700	164	3390	430	4075	1750	1870	120	1750	2039	3953	430	510	-
Max-3														
Туре	q	r	S	V	w	х	У							
(420,530)	175	350	950	475	990	-	-							
(620,750)	170	550	1050	535	1110	-	-							
(1000 1250)	175	115	1250	630	1208	_	_							

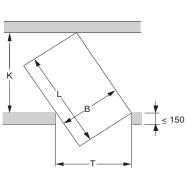
(1000,1250)	175	415	1250	630	1298	-	-
(1500) (1800) (2200)	65 65 65	310 310 310	1350 1460 1460	725 805 805	1494 1654 1654	1790 1950 1950	153 153 153
(2700)	65	330	1410	820	1684	1980	153

* Max-3 (1500-2700): socket protudes

Required min. width of door and corridor to bring in the boiler The stated measurements are minimal dimensions



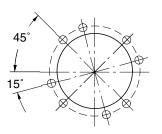




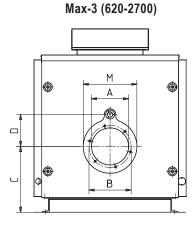
Dimensions

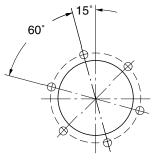
Furnace dimensions

Max-3 (420,530)



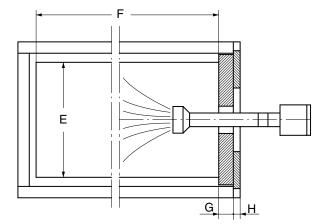
Screw joint flange Max-3 (420, 530) 4 x M12 (45°) 4 x M12 (15°)





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

Screw joint flange Max-3 (1000, 2700) 6 x M16 (15°)

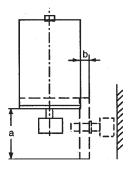


Dimensions

(Dimensions in mm)

Max-3 Type	А	В	С	D	Е	F	G	Н	Μ
(420, 530) (620, 750) (1000, 1250)	290 350 400	330 400 450	515 550 635	250 310 330	606 684 782	1624 1899 2182	163 163 163	30 30 30	420 500 550
(1500) (1800) (2200) (2700)	380 380 380 420	450 450 450 480	655 735 735 735	385 395 395 410	880 976 976 976	2415 2595 2905 3233	191 191 191 191	30 30 30 30	550 550 550 550 600x560

Swinging out of boiler door Boiler door is swiveling to the right or left



Max-3 Type	а	b
(420)	1060	150
(530)	1060	150
(620)	1180	150
(750)	1180	150
(1000)	1370	150
(1250)	1370	150
(1500)	1393	58
(1800)	1553	58
(2200)	1553	58
(2700)	1585	58



Technical data

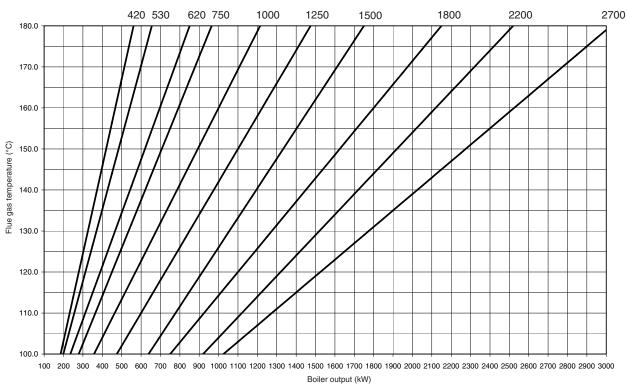
Flue gas output diagrams

Flue gas temperature and output range

In order to reach a good combustion quality (optimum burn-out), the indicated minimum performance must not be undercut.

With new installations acid-proof chimneys are to be planned, or the exhaust gas temperature must be adjusted more highly (min. 160 °C).

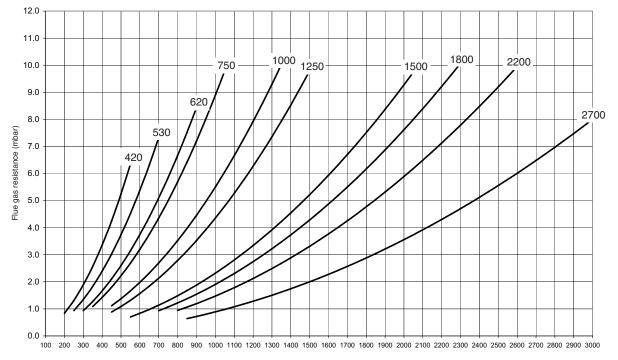
The minimum exhaust gas temperature is to be coordinated absolutely with fire-place conditions, otherwise sulfuric acid formation can cause fire-place sootings.



kW = Boiler output

- = Flue gas temperature on a clean °C surface, boiler flow temperature 80 °C, return temperature 60 °C (in accordance with DIN 4702).
- operation with Diesel oil, $\lambda = 1,22$ with max. burner output
 - (CO₂ Diesel oil = 12,5 %)
- 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 CO₂ concentration of +/-1 % causes a modification of the flue gas temperature of approx. -/+8 K.

Flue gas resistor





Engineering

Standards and guidelines

The following standards and guidelines must be respected:

- Technical information and installation manual of the Hoval company.
- Hydraulic and control technical control regulations of the Hoval company.
- Local building law
- Fire protection standards
- DVGW guidelines
- **DIN EN 12828** Heating systems in building plans of hot water heating plants.
- DIN EN 12831 heating plants in buildings procedure for computing the normed
- heating capacity
- VDE 0100

Water quality Heating water:

- The European Standard EN 14868 and the Directive VDI 2035 must be observed. In particular, attention must be paid to the following stipulations:
- Hoval boilers and calorifiers are designed for heating plants without significant oxygen intake (plant type I according to EN 14868).
- Plants with
 - continuous oxygen intake (e.g. underfloor heating systems without diffusion proof plastic piping) or
 - intermittent oxygen intake (e.g. where frequent refilling is necessary)
- must be equipped with separate circuits. Treated heating water must be tested at
- least 1 x yearly. According to the inhibitor manufacturer's instructions, more frequent testing may be necessary.
- A refilling is not necessary if the quality of the heating water in existing installations (e.g. exchange of boiler) conforms to VDI 2035. The Directive VDI 2035 applies equally to the replacement water.
- New and if applicable existing installations must be adequately cleaned and flushed before being recharged! The boiler may only be filled after the heating system has been flushed
- Parts of the boiler which have contact with water are made of ferrous materials.
- On account of the danger of stress cracking corrosion the chloride, nitrate and sulfate contents of the heating water must not exceed 200 mg/l in total.
- The pH value of the heating water should lie between 8.3 and 9.5 after 6 - 12 weeks of heating operation.

Filling and replacement water:

- For a plant using Hoval boilers untreated drinking water is generally best suited as filling and replacement water. However, the quality of the untreated drinking water must at least fulfil the standard set in VDI 2035 or be desalinated and/or be treated with inhibitors. The stipulations of EN 14868 must be observed.
- In order to maintain a high level of boiler efficiency and to avoid overheating of the heating surfaces the values given in the table should not be exceeded (dependent on boiler performance ratings - for multi-boiler plants rating of smallest boiler applies - and on the water content of the plant).

The total amount of filling and replacement water which is used throughout the total service life of the boiler must not exceed three times the water capacity of the plant.

Heating system

Combustion air

- The combustion air supply must be warranted. The air opening must not be lockable.
- Minimal free cross section for air opening 6.5 cm² per 1 kW boiler output.

Oil burner mounting

- For mounting of the burner an adapter flange may be required depending on the size of the burner flange. The adaptor flange including screws must be delivered by the burner company.
- Length and diameter of the burner pipe should be possible to swivel the boiler door incl. burner by 90°.
- The pipes must be fitted in such a way that the boiler door can be opened completely.
- The connections must be flexible and lead in a sufficient large loop to the burner so that the boiler door can be swung out around 90° to the left or right.
- The space between burner pipe and swivel flange must be isolate. (Delivery by the burner company)
- Boiler installations with ThermoCondensor require from the burner to overcome the resistance of the heat exchanger.

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:

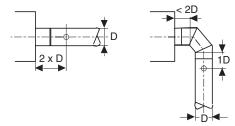
- Heating room walls, ceiling and floor should be very solidly built, a sound absorber should be mounted into the air inlet. Pipe holders and support should be protected by means of anti-vibration sleeves
- Install sound absorber hood for burner.

Maximum filling quantity according to VDI 2035

- 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 flexible with compensators.
- · Pumps have to be connected with compensators to the pipes.
- For damping of flame noise it is possible to install a silencer into the flue gas tube (space should be foreseen for later installation).

Chimney/flue gas system Flue gas pipe

- 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 recommendabel to use a secondary air valve for chimney draft limiting.

Sanitary installation

- · The service water temperature must correspond to the local regulations.
- The safety valve may be adjusted on max. 8 bar.

Regulations of the calorifier

See Calorifiers

01		•						
		Carbonate hardness of filling water up to						
[mol/m ³] ¹	<0,1	0,5	1	1,5	2	2,5	3	>3,0
f°H	<1	5	10	15	20	25	30	>30
d°H	<0,56	2,8	5,6	8,4	11,2	14,0	16,8	>16,8
е°Н	<0,71	3,6	7,1	10,7	14,2	17,8	21,3	>21,3
~mg/l	<10	50,0	100,0	150,0	200,0	250,0	300,0	>300
Conductance ²	<20	100,0	200,0	300,0	400,0	500,0	600,0	>600
Boiler size of the individual boiler		maximum filling quantity without desalination						
200 to 600 kW		50 l/kW	50 l/kW	20 l/kW			esalinate	
over 600 kW						aiways u	esaillate	

¹ Total of alkaline earths

 $^{\rm 2}$ If the conductance in $\mu S/cm$ exceeds the tabular value an analysis of the water is necessary.

Engineering

Required chimney diameter

Basics: Smooth chimneys made of stainless steel, flue gas tube ≤ 5 m, $\Sigma\zeta$ = 2,2,

Flue gas tube and chimney insulated. Height above sea level \leq 1000 m, outdoor temperature \leq 30 °C.

Max-3	3 Type (4	420)	Type (530)		Type (620)		Туре (750)	
m	Flue gas tube Ø mm	Chimney Ø mm						
25	300	300	300	300	300	300	350	350
20	300	300	300	300	300	300	350	350
15	300	300	300	300	350	300	350	350
10	300	300	350	300	350	350	400	350

m = Chimney hight (m)

Mounting on site

Max-3 (420-1500)

If the local situation does not permit bringing in the whole boiler, the possibility of the place assembly exists.

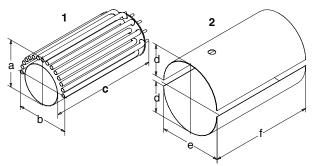
• The element welding on site incl. pressure test are to be coactive to obtain from Hoval.

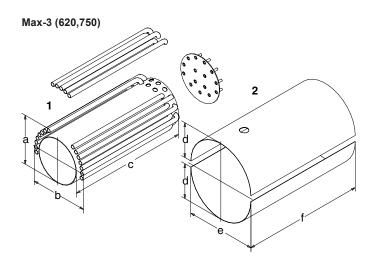
Time to delivery approx. 8 weeks



Dimensions and weights of the single parts

Max-3 (420,530)





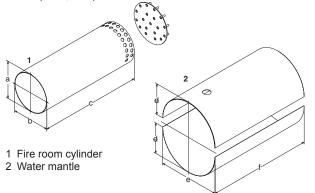
Hova

Engineering

Mounting on site

Dimensions and weights of the single parts

Max-3 (1000,1250)



	Comb			
Max-3 Type	а	b	С	weight kg
(420, 530)	730	835	1725	325
(620, 750)	745	915	2000	410
(1000, 1250)	800	800	2180	375

Water mantle - half shell 2 weight d е f kg (420, 530) 500 1000 1665 105

1120

1310

560

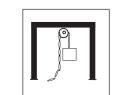
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Planning hints



Important preparations

- · Old boiler must be dismantled and removed.
- · The heating room, if necessary with boiler base, must be available with beginning of work.



Max-3

(620, 750)

(1000, 1250)

Туре

Assembly aids

If no concrete cover is present, at which a chain course with Hilti pegs can be installed, an appropriate scaffolds for loads up to 1000 kg must be present.

1940

2225

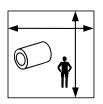
135

215



Boiler material

- The boiler material is delivered by Hoval (in single parts) and must be brought in on site.
- · If bringing in the boiler parts does not take place immediately after unloading, the parts are to be stored weather-pro tected.



Heating room preparation

Required space

In the heating room sufficient space for the assembly of the boiler must be available (see space requirement below)



Power connection

A power connection for the welding machine with a 5-pin plug socket, 3 x 400 V must be present.



Water connection

In the heating room a water connection $(\frac{3}{4})$ with fresh water for filling and squeezing off the welded boiler has to be present.

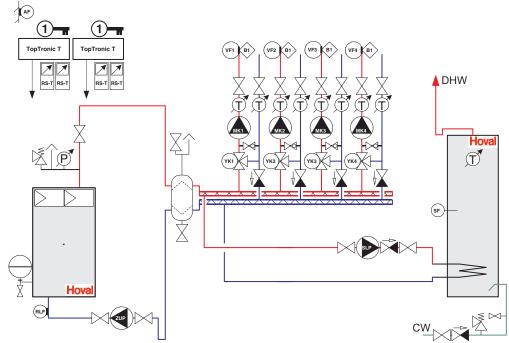
Required space for mounting and welding in the boiler room

Min. room dimensions in mm

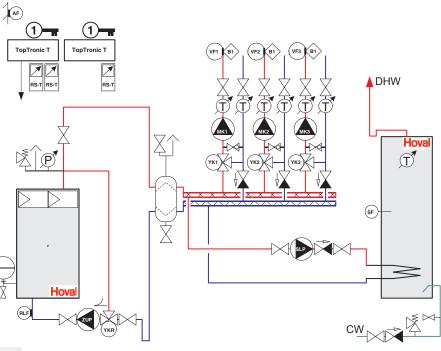
	(420)	(530)	(620)	(750)	(1000)	(1250)
Length	3700	3700	4500	4500	5000	5000
Width	2200	2200	2500	2500	3500	3500
Height	2500	2500	3000	3000	3200	3200

Examples

Hydraulic principle schematic Max-3 with heating regulator TopTronic®T Hydraulic schematic BBDT050



Hydraulic principle schematic Max-3 with heating regulator TopTronic®T Hydraulic schematic BBDT070



Notice :

- This hydraulic schematic is a principle schematic. It does not contain all details for installation. The installation must be done according to local conditions, dimensioning and regulations.
- For underfloor heating, a flow temperature monitor must be built-in.
- Shut-off devices to the safety valve (pres-surized expansion tank, safety valve, etc.) are to safe against unintended closing!
- Mount bags to prevent single pipe gravity _ circulation!

RS-T AF RLF VF1 VF2 VF3 VF4	Room station Outdoor sensor Return sensor Flow sensor 1 Flow sensor 2 Flow sensor 3 Flow sensor 4	B1 MK1 MK2 MK3 MK4 SLP	Flow temperature guard (if required) Pump mixing circuit 1 Pump mixing circuit 2 Pump mixing circuit 3 Pump mixing circuit 4 Calorifier loading pump	ZUP YK1 YK2 YK3 YK4 YKR CW	Feed pump Actuator mixer 1 Actuator mixer 2 Actuator mixer 3 Actuator mixer 4 Actuator return mixer Cold Water
		SLP	Calorifier loading pump		
SF	Calorifier heater sensor			DHW	Domestic Hot Water

Description

Hoval Max-3 plus Oil/gas boiler

Boiler

- · High-efficiency boiler according to EN14394 for firing of heating oil EL and gas.
- Max-3 plus (420-1250) complies with the Pressure Equipment Directive 97/23/EG
- Boiler completely welded
- For LowNOx-burner with intern flue gas re-. circulation
- 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

- · Control panel with boiler control and regulators in different executions
- Free standing calorifier see Calorifiers
- · Boiler door swivels to the left
- · Delivery in single parts and welding on site (Max-3 plus (420-1250)), time to delivery approx. 8 weeks

Delivery

· Boiler, insulation and casing delivered separately packed

On site

· Mounting of insulation and casing

Control panel TopTronic®T/U3.1

- For operating temperature up to 90 °C
- For mounting on top of boiler Hoval Max-3 plus (420-1250) mounting on top Hoval Max-3 plus (1500-2700) mounting laterally on the left or the right
- Integrated control function for:
- 1 mixing circuit
- 1 heating circuit without mixing operation
- domestic hot water loading circuit
- Option to expand the functions by
- different Key Modules and/or mounting of an additional heating regula-
- tor TopTronic®T/N (see accessories) · Main switch "I/O"
- Safety temperature limiter 110 °C
- Fuse 6.3 A
- Trouble indication "Burner"
- · Burner running time meter and count-up counter
- · Boiler sensor
- · Large LCD display
- · Rotary pushbutton

· Button for

- daytime room temperature
- night room temperature
- hot water temperature
- operating mode selection (holiday, absent, heating operation prolongation, automatic, summer, heating operation continuous reduced - frost protection)
- adjusting the heating curves
- system information
- emission measurement and manual operation
- Outdoor sensor AF 200
- Flow sensor with plug
- Calorifier sensor with plug
- Plug connection for burner
- Connection available for room stations

Delivery

· Control panel separately delivered

On site

- Mounting of the control panel at the boiler
- Installation of the control panel for mounting sideways

Max-3 plus

Туре	kŴ		
(420)	147 - 420		
(530)	185 - 530		
(620)	217 - 620		
(750)	263 - 750		
(1000)	350 - 1000		
(1250)	437 - 1250		
(1500)	525 - 1500		
(1800)	630 - 1800		
(2200)	770 - 2200		
(2700)	945 - 2700		

Permission Boiler **Directive on appliances burning** gaseous fuels 90/396/EG Max-3 plus (420-1250): CE-0085BL0015 CE-Product-ID-No. PED Pressure Equipment Directive 97/23 EG

Control panel TopTronic®T/U3.2

- Functions like control panel
- TopTronic[®]T/U3.1, but: For operating temperature up to 105 °C
- Safety temperature limiter 120 °C

Optional

Safety temperature limiter 130 °C

Deliverv

· Control panel separately delivered

On site

- · Mounting of the control panel at the boiler
- Installation of the control panel for mounting sidewavs

HOVa



Description

Control panel

with thermostat T 2.2

- For systems without TopTronic® regulator.
- 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 count-up counters integrated
- · Flue gas thermometer, 4,5 m capillary tube

Delivery

· Control panel separately delivered

On site

- Mounting of the control panel at the boiler
- Conversion of the boiler control for side
- mounting

Control panel

with thermostat T 0.2

- For external control
- For systems without TopTronic[®] regulator
 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 count-up counters integrated
- Flue gas thermometer, 4,5 m capillary tube
- Safety temperature limiter 130 °C

Delivery

· Control panel separately delivered

On site

- · Mounting of the control panel at the boiler
- Conversion of the boiler control for side mounting

Hoval



Max-3 plus

Oil/gas boiler (420-2700)

Boiler

3-pass boiler made of steel for oil/gas LowNOx firing, without control panel For operating temperature of 90°C or 105°C

Execution: complete delivery

Boiler, insulation and casing separately packed and delivered.

Max-3 plus Type	Output kW	Working pressure bar	
(420)	147 - 420	6	7011 939
(530)	185 - 530	6	7011 940
(620)	217 - 620	6	7011 941
(750) (1000)	263 - 750 350 - 1000	6 6	7011 942 7011 943
(1250)	437 - 1250	6	7011 944
(1500)	525 - 1500	6	7011 945
(1800) (2200) (2700)	630 - 1800 770 - 2200 945 - 2700	6 6 6	7011 946 7011 947 7011 948

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!

Oil/gas boiler Max-3 plus (420-1250) PGS without control for mounting on site

Execution: delivery in single parts

for mounting on site In the Part N° for welding on site

- are contained:
- Welding
- Mounting (Boiler door, flue gas collector)
- Leakage detection under pressure
- Priming

In the Part N° for welding on site

- are not contained:
- Bringing the individual parts into the boiler house
- Mounting of insulation and casing
- Drive and spend the night
- Water and electric current at place

(Mounting on site takes place according to the strict quality standards of the factory assembly)

Time to delivery approx. 8 weeks



Part N°

a g

Hoval

		Part N°	
	Blind flange made made of steel incl. setscrews and gasket to		
4.	Max-3 (420, 530)	6002 192	
¥.	Max-3 (620, 750)	6030 026	
	Max-3 (1000-2200)	6002 156	
(Max-3 (2700)	6017 504	
	Intermediate flange drilled to match burner made of steel incl. setscrews and gasket to		
	Max-3 (420, 530)	6017 595	
E. C. C.	Max-3 (620, 750)	6017 593	
-	Max-3 (1000-2700)	6017 594	
C			

Control panel with heating regulator TopTronic®T to Hoval Max-3 plus

Boiler controller TopTronic®T/U3.1 Max. operating temperature 90°C Operating pressure 4 bar - Uno-3 (50-160,360), Max-3 (420-1250) Operating pressure 5 bar - Uno-3 (190-280) For mounting on top of boiler (sideways, change on site). Integrated control function for - 1 mixing circuit - 1 heating circuit without mixer - domestic hot water loading circuit incl. outdoor sensor, flow sensor and calorifier sensor with plug Option to expand the functions by - different key modules and/or - mounting of an additional heating regulator TopTronic®T/N (see accessories)	6020 537
Boiler controller TopTronic®T/U3.2 Max. operating temperature 105°C Operating pressure 3 bar - Uno-3 (50-160) Operating pressure 4 bar - Uno-3 (190-360) Max-3 (420-1250) The boiler complies with the Pressure Equipment Directive (PED) 97/23/EC. Request for corresponding boiler plate required. Functions like boiler controller TopTronic®T/U3.1 Delivery: Boiler controller separately delivered	6020 538
Contact sensor VF204 can be used as flow or return flow sensor with 4 m cable For indirect return high attitude. Return high attitude through closing of the heating circle mixer (main pump necessary)	2023 998

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Control panel with thermostat	Part N°
 Control panel T 2.2 For systems without TopTronic[®] regulator. For direct 2-stage burner control, incl. plug connection for burner requirement starting from external calorifier- or heater instruction is possible. 	
 without burner running time meter and count-up-counter 	6015 017
 incl. 2 burner running time meters integrated 	6015 477
 incl. 2 burner running time meters and count-up-counters integrated 	6015 478
 Control panel T 0.2 For operating temperature up to 105 °C For external switching command For systems without TopTronic[®] regulator For special control function without burner plug connection without burner running time meter 	6015 016
and count-up-counter	0010 010
 incl. 2 burner running time meters integrated 	6015 475

Accessories to control panel with thermostat

incl. 2 burner running time meters and count-up-counters integrated

Flue gas thermometer 4 m, capillary tube

2411 49

6015 476

Hoval

	Accessories to heat regulation system TopTronic®T	Part N°
TopTronic®T O=1 1	Key module 1 for Hoval TopTronic®T for 2. mixing circuit <i>Key module consists of:</i> Function key 1, 1 flow sensor VF204S with plug, 2 loose plugs Only one key module is possible!	6012 154
	System approaches and applications see Hoval CD	
<image/>	Additional heating regulator set ZN1 for extending functionality and implementing further heating circuits Consisting of: Heating regulator TopTronic®T/N for - 1 mixer circuit - 1 heating circuit without mixer - hot water loading Only one key module per regulator is possible! Flow sensor VF202K with 2 m cable and plug. Cable set for connecting the auxiliary heating regulator TopTronic®T/ N with the boiler controller Mounting on-site	6020 574
	Kit BMS-Modul 0-10V (Building management system) Consisting of: BMS-Module and trafo Can be installed in the boiler control panel!	6015 195
	Communication module/ remote connection see Controls	
Image: Contract of the section of	Room station RS-T for TopTronic®T effective on one mixing circuit	2034 939
Hoval	Remote control RFF-T for TopTronic®T effective on one mixing circuit	2022 239
	Outdoor sensor AF 200 (may be included in the heat generator scope of delivery) for one mixing circuit or for the mean value (per regulator 2 outdoor temperature sensors possible)	2022 995

Hoval

Hoval

				Part N°	
	Flue gas ten L = 2.5 m	perature sensor	PT 1000/4	6913 57	
	including fixir	ng screws			
	(installation o	n site)			
	Cable senso	or KVT 20/5/6S		6012 687	
	5 m cable an	d plug			
	Contact sen	sor VF204S		6012 688	
		as flow or return			
	flow sensor				
	with 4 m cabl	e and plug			
	Flow temper				
		heating system			
		circuit 1 guard)	anillar (tuba		
	max 700 mm	erential gap 6K, can, setting (visible fr	om the outside)		
	inside the ho				
•	<i>clamp-on the</i> Thermostat w	rmostat RAK-T vith strap, without	W1000.S	242 902	
	memosial	na suap, wuodu	cusic and plug		
6		ermostat RAK-T		6010 082	
0		vith pocket ½" - de rass nickel-plated	pth of immersi-		
-	Vibration ele	ements for boiler	socket		
	For sound an	d vibration absorb	ation.		
	Made of rubb	er. Cross section	80/50 mm.		
	Delivery				
H		ements per boiler,			
		er the boiler sock	et		
The	to Max-3 plus	3	Length		
	Туре	Set of pieces	mm		
	(420,530)	4	200	6003 739	
	(620,750)	4	400	6003 741	
	(1000,1250)	4	500	6003 742	
	(1500,1800)	4	800	6005 623	
	(2200,2700)	6	800	6005 624	

Service

Commissioning

Commissioning must be made by works service or Hoval trained authorized serviceman/ company is condition for warranty.

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

Technical data

Max-3 plus

Туре		(420)	(530)	(620)	(750)	(1000)	(1250)
 Nominal output at 80/60°C Range of output (at 80/60°C) Burner input maximum 	kW kW kW	420 147-420 441	530 185-530 557	620 217-620 651	750 263-750 788	1000 350-1000 1050	1250 437-1250 1313
 Maximum boiler operating temperature ¹ Minimum boiler operating temperature Minimum boiler return flow temperature Minimum flue gas temperature at boiler Safety temperature limiter setting (water side) ² 	0° 0° 0° 0°	90 110	see tat	see table operating conditions (below) see table operating conditions (below) see table operating conditions (below)			90 110
 Working/test pressure Boiler efficiency at full load at 80/60 °C (related to lower/upper calorific value (heating oil EL)) Boiler efficiency at partial load 30 % 	bar %	6/9,6 95,2/89,8 97,1/91,6	6/9,6 95,2/89,8 97,1/91,6	6/9,6 95,2/89,8 97,1/91,6	6/9,6 95,2/89,8 97,1/91,6	6/9,6 95,2/89,8 97,1/91,6	6/9,6 95,2/89,8 97,1/91,6
 (according to ÉN 303) (related to lower/upper calorificity value (heating oil EL)) Standard efficiency at 75/60 °C (DIN 4702 part 8) (related to lower/upper calorificity value (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 10,8% CO₂, 500 m over sea level (tolerance ± 20%) Flue gas mass flow at nominal output 10,8% CO₂ natural gas 	mbar kg/h	5,6 680	6,3 859	6,0 1004	7,5 1215	8,3 1619	9,8 2025
 Flow resistance boiler ³ Water flow resistance at 10 K Water flow resistance at 20 K Water flow volume at 10 K Water flow volume at 20 K 	z-value mbar mbar m³/h m³/h	0,022 28,5 7,1 36,0 18,0	0,022 45,4 11,4 45,0 22,5	0,008 22,6 5,6 53,0 26,5	0,008 33,1 8,3 64,0 32,0	0,003 22,0 5,5 86,0 43,0	0,003 34,4 8,6 107,0 53,5
 Boiler water content Boiler gas volume Insulation thickness boiler body Weight (incl. casing) Weight (without casing) 	Litre m³ mm kg kg	552 0,583 80 1111 943	520 0,602 80 1171 1000	969 0,846 80 1795 1590	938 0,872 80 1831 1620	1528 1,350 80 2535 2360	1478 1,390 80 2643 2460
 Combustion chamber dimension Ø inside x length Combustion chamber volume 	mm m³	606/1624 0,466	606/1624 0,466	684/1899 0,669	684/1899 0,669	782/2182 1,047	782/2182 1,047
Dimensions			see Din	nensions			
Maximum depression in flue gas system (boiler connection)	Pa	50	50	50	50	50	50

¹ Limited by the boiler control U3.1 and T2.2 to 90 °C or U3.2 and T0.2 to 105 °C. ² Maximum safety temperature for boiler control U3.1 and T2.2: 110 °C or U3.2 and =T0.2: 120 °C. ³ Flow resistance boiler in mbar = volume flow $(m^3/h)^2 \times z$

Possible operating conditions

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

Technical data

Max-3 plus

Туре			(1500)	(1800)	(2200)	(2700)	
 Nominal output at 80/60°C Range of output (at 80/60°C) Burner input maximum 	Range of output (at 80/60°C)		1500 525-1500 1575	1800 630-1800 1890	2200 770-2200 2310	2700 945-2700 2835	
 Minimum boiler operating temperating temperat			see tab	90 ble operating o ble operating o ble operating o 110	conditions (be	low)	
Working/test pressure		bar	6/9,6	6/9,6	6/9,6	6/9,6	
 Boiler efficiency at full load at 80/0 (related to lower/upper calorific value) 		%	95,2/89,8	95,2/89,8	95,2/89,8	95,2/89,8	
Boiler efficiency at partial load 30	% (acc. to EN 303)	%	97,1/91,6	97,1/91,6	97,1/91,6	97,1/91,6	
(related to lower/upper calorific va • Standard efficiency at 75/60°C (DI	N 4702 part 8)	%	97,0/91,5	97,0/91,5	97,0/91,5	97,0/91,5	
(related to lower/upper calorific va • Stand-by loss qB at 70 °C	lue (heating oill EL))	Watt	1850	1950	2100	2300	
 Flue gas resistance at nominal ou 10,8 % CO₂,500 m over sea level Flue gas mass flow at nominal ou 10,8 % CO₂ natural gas 	(tolerance ± 20 %)	mbar kg/h	7,8 2429	9,3 2916	10,7 3564	9,8 4374	
 Flow resistance boiler ³ Water flow resistance at Water flow resistance at Water flow volume at Water flow volume at 	10 K 20 K 10 K 20 K	z-value mbar mbar m³/h m³/h	0,002 33,0 8,3 129,0 84,5	0,002 47,6 11,9 154,0 77,0	0,002 71,1 17,8 189,0 94,5	0,002 107,1 26,8 231,0 115,5	
 Boiler water content Boiler gas volume Insulation thickness boiler body Weight (incl. casing) Weight (without casing) 		Litre m³ mm kg kg	2343 1,956 80 3614 3266	2750 2,510 80 4693 4288	3050 2,761 80 5077 4647	3550 3,037 80 5649 5189	
 Combustion chamber dimension Ø inside x length Combustion chamber volume 		mm m³	880/2415 1,58	980/2595 2,07	980/2895 2,30	980/3200 2,41	
Dimensions			S	ee Dimension	S		
Maximum depression in flue gas a (boiler connection)	system	Ра	50	50	50	50	

Limited by the boiler control U3.1 and T2.2 to 90 °C or U3.2 and T0.2 to 105 °C. For Max-3 plus (1500-2700) with operating temperature up to 105 °C, individual approval in factory according to Pressure Equipment Directive required.
 Maximum safety temperature for boiler control U3.1 and T2.2: 110 °C or U3.2 and T0.2: 120 °C.

For Max-3 plus (1500-2700), individual approval in factory according to Pressure Equipment Directive required.

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

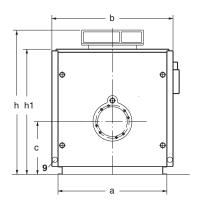
Possible operating conditions

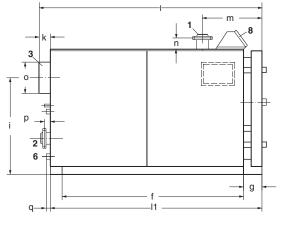
Fuel		Heating oil EL	Natural gas H
min. boiler temperature min. return temperature	°C ℃	65 55	75 65
Return temperature control		yes	yes

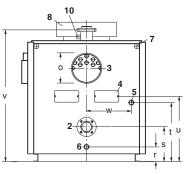
Dimensions

Max-3 plus (420-1250)

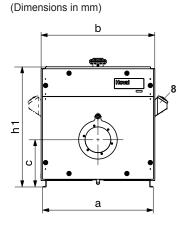
(Dimensions in mm)

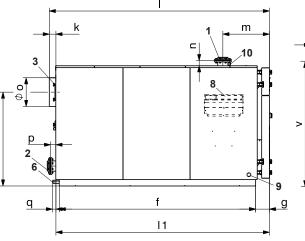


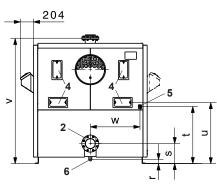




Max-3 plus (1500-2700)







Flow	(420, 530)	[
	(620, 750)	[
	(1000-2200)	[
	(2700)	[

1

))	DN 100, PN 6
))	DN 125, PN 6
00)	DN 150, PN 6
	DN 200, PN 6

2	Return	(420, 530)
		(620, 750)

- (1000-2200)
- (2700) 3 Flue gas outlet
- 4 Cleaning opening
- 5 Flue gas collector cleaning opening R1"

DN 100, PN 6

DN 125, PN 6

DN 150, PN 6

DN 200, PN 6

- 6 Drain R 11/2"
- 7 Cable routing
- 8 Control panel
- 9 Electrical connection
- 10 Bushing Rp ¾" with immersion sleeve for boiler temperature sensor

Max-3 plus Type	а	b	С	f	g	h	h1	i	k	I	11	m	n	Øo	р	q	r
(420, 530)	1060	1190	515	1770	181	1435	1230	950	104	2178	2074	641	100	299	54	34	175
(620, 750)	1180	1310	550	2045	181	1555	1350	1050	105	2452	2347	666	95	349	55	35	170
(1000, 1250) 1370	1500	635	2330	181	1755	1549	1250	107	2739	2632	681	111	349	77	37	175
(1500)	1560	1609	665	2685	212	-	1710	1350	103	3040	2937	722	80	447	83	34	65
(1800)	1720	1769	735	3055	214	-	1868	1460	103	3424	3322	724	80	447	83	52	65
(2200)	1720	1769	735	3355	214	-	1870	1460	101	3724	3623	724	80	447	81	50	65
(2700)	1750	1799	755	3700	212	-	1900	1410	82	4032	3950	722	80	647	82	51	65

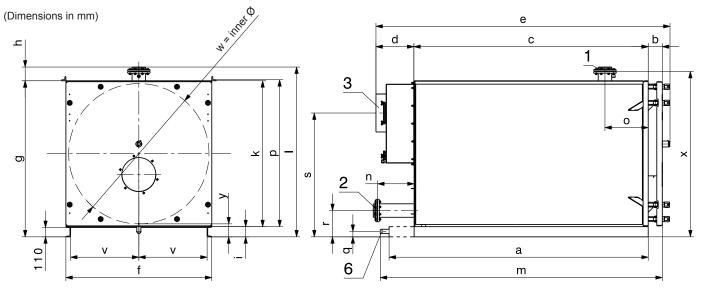
Max-3 plus Type	s	t	u	v	w
(420, 530)	350	595	660	1330	450
(620, 750)	550	722	786	1445	475
(1000, 1250)	415	620	685	1660	590
(1500)	310	777	842	1790	695
(1800)	310	890	952	1950	773
(2200)	310	890	952	1950	773
(2700)	370	917	982	1980	790

Dimensions

Base size

Dimensions without insulation and casing

Boiler incl. flange, outlet without flue gas collector.



1 Flow 2 Return 3 Flue gas outlet6 Drain

Max-3 plus Type	a *	b	С	d	е	f	g	h	i	k	I	m	n	0
(420, 530)	1920	150	1770	277	2222	1060	1180	196	120	1060	1376	2077	175	460
(620, 750)	2195	150	2045	228	2498	1180	1300	196	120	1180	1496	2353	172	485
(1000, 1250)	2480	150	2330	228	2783	1370	1500	160	120	1380	1660	2638	198	500
(, ,														
(1500)	2685	164	2568	260	3083	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
May 2 alua														
Max-3 plus		-							_					
Туре	р	q	r	S	V	W	Х	У	Z	-				
(420, 530)	1072	175	350	950	475	990	-	-	-					
(620, 750)	1192	170	550	1050	535	1110	-	-	-					
(1000, 1250)	1392	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)														

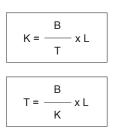
* Max-3 plus (1500-2700) socket protudes

Т

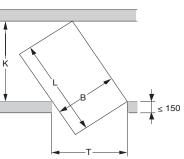
K B

L

Required min. width of door and corridor to bring in the boiler The stated measurements are minimal dimensions



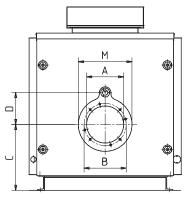
=	Door width
=	Corridor width
=	Boiler width
=	max. length of boiler

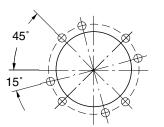


Dimensions

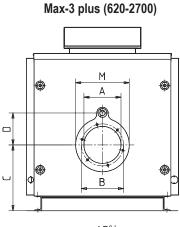
Furnace dimensions

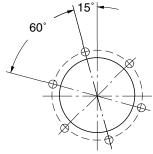
Max-3 plus (420, 530)





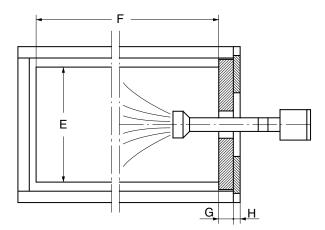
Screw joint flange Max-3 plus (420, 530) 4 x M12 (45°) 4 x M12 (15°)





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

Screw joint flange Max-3 plus (1000-2700) 6 x M16 (15°)

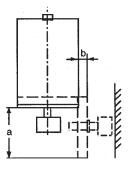


Dimensions

Max-3 plus Type	А	В	С	D	Е	F	G	Н	Μ
(420, 530)	290	330	515	250	606	1624	163	30	420
(620, 750)	350	400	550	310	684	1899	163	30	500
(1000, 1250)	400	450	635	330	782	2182	163	30	550
(1500)	380	450	655	385	880	2415	191	30	550
(1800)	380	450	735	395	976	2595	191	30	550
(2200)	380	450	735	395	976	2905	191	30	550
(2700)	420	480	735	410	976	3233	191	30 6	600x560

(Dimensions in mm)

Swinging out of boiler door Boiler door is swiveling to the right or left (Dimensions in mm)



Max-3 plus		
Туре	а	b
(420)	1060	150
(530)	1060	150
(620)	1180	150
(750)	1180	150
(1000)	1370	150
(1250)	1370	150
(1500)	1393	58
(1800)	1553	58
(2200)	1553	58
(2700)	1585	58



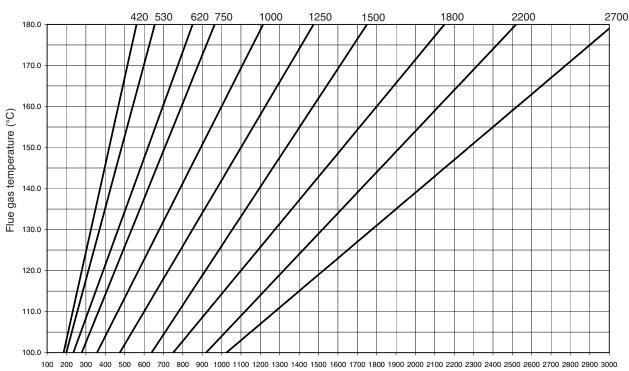
Technical data

Flue gas output diagrams

Flue gas temperature and output range

In order to reach a good combustion quality (optimum burn-out), the indicated minimum performance must not be undercut.

With new installations acid-proof chimneys are to be planned, or the exhaust gas temperature must be adjusted more highly (min. 160 °C). The minimum exhaust gas temperature is to be coordinated absolutely with fire-place conditions, otherwise sulfuric acid formation can cause fire-place sootings.



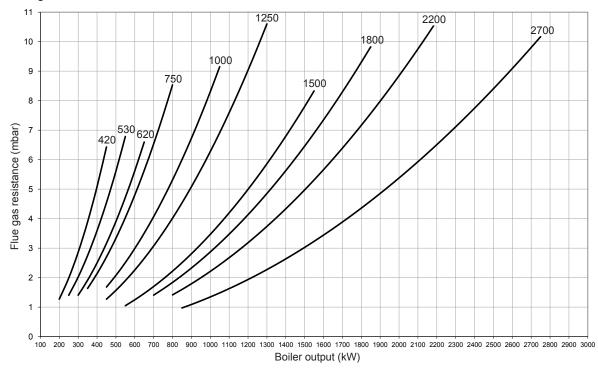
kW = Boiler output

- °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, A reduction of the boiler water temperature $\lambda = 1,11$ with max. burner output to -10 K causes a reduction of the flue gas

Boiler output (kW)

- λ = 1,11 with max. burner output (CO₂ natural gas = 10,8 %) to -10 K causes a reduction of the flue gas temperature of approx. 6-8 K.
 - A modification of the CO₂ concentration of +/-1 % causes a modification of the flue gas temperature of approx. -/+8 K.

Flue gas resistor





Engineering

Standards and guidelines

The following standards and guidelines must be respected:

- Technical information and installation manual of the Hoval company.
- Hydraulic and control technical control regulations of the Hoval company.
- Local building law
- Fire protection standardsDVGW quidelines
- DVGW guidelin
 DIN EN 12828
- Heating systems in building plans of hot water heating plants.
- DIN EN 12831 heating plants in buildings
 procedure for computing the normed
- heating capacity
- VDE 0100

Water quality Heating water:

- The European Standard EN 14868 and the Directive VDI 2035 must be observed.
- Hoval boilers and calorifiers are designed for heating plants without significant oxygen intake (plant type I according to EN 14868).
- Plants with
 - continuous oxygen intake (e.g. underfloor heating systems without diffusion proof plastic piping) or
 - **intermittent** oxygen intake (e.g. where frequent refilling is necessary)
- must be equipped with separate circuits.
 Treated heating water must be tested at least 1 x yearly. According to the inhibitor manufacturer's instructions, more frequent testing may be necessary.
- A refilling is not necessary if the quality of the heating water in existing installations (e.g. exchange of boiler) conforms to VDI 2035. The Directive VDI 2035 applies equally to the replacement water.
- New and if applicable existing installations must be adequately cleaned and flushed before being recharged! The boiler may only be filled after the heating system has been flushed.
- Parts of the boiler which have contact with water are made of ferrous materials.
- On account of the danger of stress cracking corrosion the chloride, nitrate and sulfate contents of the heating water must not exceed 200 mg/l in total.
- he pH value of the heating water should lie between 8.3 and 9.5 after 6 - 12 weeks of heating operation.

Filling and replacement water:

- For a plant using Hoval boilers untreated drinking water is generally best suited as filling and replacement water. However, the quality of the untreated drinking water must at least fulfil the standard set in VDI 2035 or be desalinated and/or be treated with inhibitors. The stipulations of EN 14868 must be observed.
- In order to maintain a high level of boiler efficiency and to avoid overheating of the heating surfaces the values given in the table should not be exceeded (dependent on boiler performance ratings - for multi-boiler plants rating of smallest boiler applies - and on the water content of the plant).

 The total amount of filling and replacement water which is used throughout the total service life of the boiler must not exceed three times the water capacity of the plant.

Heating system Combustion air

- The combustion air supply must be warran-
- ted. The air opening must not be lockable. Minimal free cross section for air opening
- 6.5 cm² per 1 kW boiler output.

Oil burner mounting

- For mounting of the burner an adapter flange may be required depending on the size of the burner flange. The adaptor flange including screws must be delivered by the burner company.
- The pipes must be fitted in such a way that the boiler door can be opened completely.
- The connections must be flexible and lead in a sufficient large loop to the burner so that the boiler door can be swung out around 90° to the left or right.
- The space between burner pipe and swivel flange must be isolate.
 (Delivery by the burner company)

(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

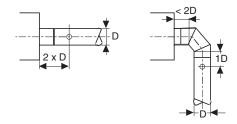
Sound absorption is possible through the following steps:

- 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 absorber hood 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 flexible with compensators.
- Pumps have to be connected with compensators to the pipes.

• For damping of flame noise it is possible to install a silencer into the flue gas tube (space should be foreseen for later installation).

Chimney/ flue gas system Flue gas pipe

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



- The flue gas tube must be designed that no condensate water can get into the boiler. A condensate trap must imperatively be mounted on the flue gas outlet of the boiler.
- A closeable flue gas measuring socket with an inner diameter of 10-21 mm must be foreseen.

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 EN 13384-1 and 2.
- It is recommendabel to use a secondary air valve for chimney draft limiting. The air valve must be mounted after the flue gas sound absorber (if fitted).

Expansion tank/expansion

 Ideally, the 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.

Safety valve

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

Maximum filling quantity according to VDI 2035

		Carbonate hardness of filling water up to						
[mol/m ³] *	<0,1	0,5	1	1,5	2	2,5	3	>3,0
f°H	<1	5	10	15	20	25	30	>30
d°H	<0,56	2,8	5,6	8,4	11,2	14,0	16,8	>16,8
е°Н	<0,71	3,6	7,1	10,7	14,2	17,8	21,3	>21,3
~mg/l	<10	50,0	100,0	150,0	200,0	250,0	300,0	>300
Conductance ²	<20	100,0	200,0	300,0	400,0	500,0	600,0	>600
Boiler size of the individual boiler		maximum filling quantity without desalination						
200 to 600 kW		50 l/kW	50 l/kW	20 l/kW		alwaya d	ocolinato	
over 600 kW						always u	esalinate	

¹ Total of alkaline earths

 $^{\rm 2}$ If the conductance in $\mu S/cm$ exceeds the tabular value an analysis of the water is necessary.

Engineering Mounting on site

Max-3 plus (420-1250)

If the local situation does not permit bringing in the whole boiler, the possibility of the place assembly exists.

• The element welding on site incl. pressure test are to be coactive to obtain from Hoval.

Time to delivery approx. 8 weeks

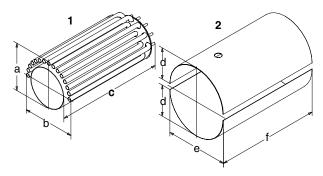


Hoval

Max-3 plus (620, 750)

Dimensions and weights of the single parts

Max-3 plus (420, 530)



Dimensions and weights of the single parts

Max-3 plus (1000-1250)

	Com			
Max-3 plus Type	а	b	С	Weight kg
(420, 530)	730	835	1725	325
(620, 750)	745	915	2000	410
(1000, 1250)	800	800	2180	375

	Water mantle - half shell 2					
Max-3 plus Type	d	е	f	Weight kg		
(420, 530)	500	1000	1665	105		
(620, 750)	560	1120	1940	135		
(1000, 1250)	655	1310	2225	215		

Subject to alterations, 1.8.2013

Engineering Mounting on site

Planning hints



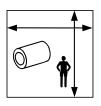
Important preparations

- Old boiler must be dismantled and removed.
- The heating room, if necessary with boiler base, must be available with beginning of work.



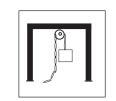
Boiler material

- The boiler material is delivered by Hoval (in single parts) and must be brought in on site.
- If bringing in the boiler parts does not take place immediately after unloading, the parts are to be stored weather-pro tected.



Heating room preparation

Required space In the heating room sufficient space for the assembly of the boiler must be available (see space requirement below)



Assembly aids

If no concrete cover is present, at which a chain course with Hilti pegs can be installed, an appropriate scaffolds for loads up to 1000 kg must be present.

Power connection

A power connection for the welding machine with a 5-pin plug socket, 3 x 400 V must be present.



Water connection

In the heating room a water connection $(\frac{3}{4}^{"})$ with fresh water for filling and squeezing off the welded boiler has to be present.

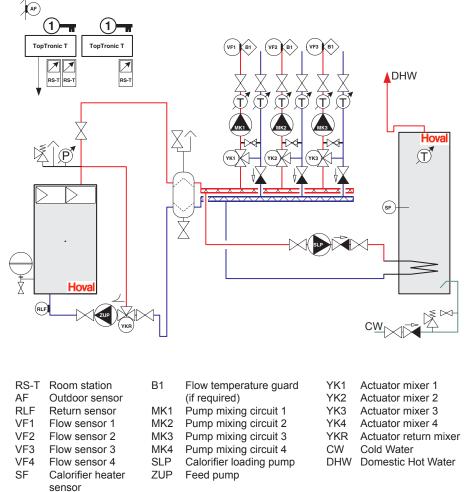
Required space for mounting and welding in the boiler room

Min. room dimensions in mm

	(420)	(530)	(620)	(750)	(1000)	(1250)
Length	3700	3700	4500	4500	5000	5000
Width	2200	2200	2500	2500	3500	3500
Height	2500	2500	3000	3000	3200	3200

Examples

Hydraulic principle schematic Max-3 plus with heating regulator TopTronic®T Hydraulic schematic BBDT070



Notice :

- This hydraulic schematic is a principle schematic. It does not contain all details for installation. The installation must be done according to local conditions, dimensioning and regulations.
- For underfloor heating, a flow temperature monitor must be built-in.
- Shut-off devices to the safety valve (pressurized expansion tank, safety valve, etc.) are to safe against unintended closing!
- Mount bags to prevent single pipe gravity circulation!

Description

Hoval ThermoCondensor VR

Heat recovery unit

- Heat recovery unit for the use of sensitive and latent heat by cooling down the flue gases below the flue gas dew point.
- For connection to the heating system with or without hot water supply.
- Heat exchanger for oil/ gas firing. Adapted to oil/ gas boiler Hoval Uno-3 and Max-3 (420-1250).
- The hydraulic planning of the heat exchanger must be provided for the reutilisation of a partial amount of water of the return flow.
 For maximum exploitation the system temperature in the heat exchanger should be as low as possible.
- Installation between boiler and flue gas line
- Heat exchanger made of plastic tube diffusion-proof
- Casing made of stainless steel (1.4571)
- Included for *ThermoCondensor VR* (50-1200) in the scope of delivery:
 - Flue gas tube between boiler and ThermoCondensor VR
 - The circulation pump with two shut off switch ball valves; ThermoCondensor VR type (800-1200) Pump delivered separately packed
 - Flue gas safety thermostat at the outlet socket
 - Aspirator
 - Safety valve
 - Flow switch
- Included for ThermoCondensor VR (1500,1800) in the scope of delivery:
 - Condensate drainage hose
 - The circulation pump with two shut off switch ball valves;
 ThermoCondensor VR type (1500,1800)
 - Pump delivered separately packed - Flue gas - safety thermostat at the outlet
 - socket
 - Aspirator
 - Safety valve
 - Flow switch
 - 7-pin burner adapter cable (8 m)

Operating over-pressure: max. 6 bar

Operating temperature: max: 90 °C

Max. flue gas temperature: see technical data

Delivery

 Hoval ThermoCondensor VR will be packed and delivered separately



Therr	noCondensor VR	Boiler Uno-3	nominal output total	nominal output total
			RL 30 °C	RL 50 °C
	Туре	Туре	kW	kW
	(50)	(50)	55	53
		(62)	68	65
		(80)	87	84
	(100)	(90)	99	95
	(200)	(110)	121	117
		(125)	137	132
		(160)	176	169
		(190)	208	201
		(220)	241	232
		(250)	273	263
	(400)	(280)	307	296
		(320)	350	338
		(360)	394	379

ThermoCondensor VR	Boiler Max-3	nominal output total	nominal output total
		RL 30 °C	RL 50 °C
Туре	Туре	kW	kW
(600)	(420)	553	533
	(530)	670	644
(800)	(620)	785	760
	(750)	939	914
(1200)	(1000)	1245	1213
	(1250)	1459	1419
(1500)	-	1890	1835
(1800)	-	2325	2260

RL = Plant-return temperature into the ThermoCondensor VR

Hoval



Hoval heat recovery unit ThermoCondensor VR

Heat recovery unit for the use of sensitive and latent heat by cooling down the flue gases below the flue gas dew point. Combinable with oil and gas-heated boiler. Installation between boiler and flue gas line.

Delivery: Hoyal ThermoCondensor V

Hoval ThermoCondensor VR will be packed and delivered separately

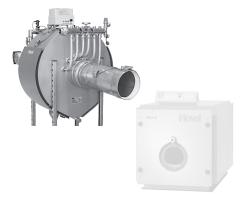
Note:

Boiler Hoval Uno-3 and Hoval Max-3 must be ordered separately.



Thermo- Condensor VR	Suitable for Boiler Uno-3 *	working pressure	
Туре	Туре	bar	_
(50)	(50, 62, 80)	4	7004 919
(100)	(90)	4	7004 920
(200)	(110, 125)	4	7004 922
(200)	(160)	4	7004 923
(200)	(190, 220)	5	7004 924
(200)	(250)	5	7004 925
(400)	(280)	5	7004 926
(400)	(320, 360)	5	7004 927

* Boiler is not included in scope of delivery!



Thermo- Condensor VR	Suitable for Boiler Max-3 *	working pressure	
Туре	Туре	bar	
(600)	(420, 530)	6	7004 930
(800)	(620, 750)	6	7004 931
(1200)	(1000, 1250)	6	7004 932
(1500)	-	6	7004 933
(1800)	-	6	7004 934

* Boiler is not included in scope of delivery!

Boiler control panel Boiler control

Part N°



Accessories

Neutralisation box

Condensate derivative into lower situated drain pipe (without condensate delivery pump). Plastic condensate collector tank for the condensate neutralisation incl. granulate.

Туре suitable for

2	ThermoCondensor VR (50-400)	6014 693
3	ThermoCondensor VR (600-1800)	6014 694

Hova

Part N°

3 ThermoCondensor VR (600-1800)

Service





Commissioning must be made by works service or Hoval trained authorized serviceman/ company is condition for warranty.

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

Technical data

Hoval ThermoCondensor VR with Hoval oil / gas boiler Uno-3 (50-160)

ThermoCondensor VR		Туре		(50)		(100)		(200)	
Oil / gas hot water boiler Uno-3		Туре	(50)	(62)	(80)	(90)	(110)	(125)	(160)
Burner input Boiler		kW	53,7	66,6	86	98	118	136	173
Nominal output boiler		kW	50	62	80	90	110	125	160
Minimum output boiler		kW	35	46	53	53	78	100	122
Nominal output ThermoCondensor VR ⁴	at return 30 °C	kW	4,5	5,5	7,0	9,0	11,0	12,0	15,5
	at return 60 °C	kW	2,5	3,0	3,7	5,0	6,5	7,0	9,0
Nominal output total ⁴	at return 30 °C	kW	55	68	87	99	121	137	176
Boiler + ThermoCondensor VR ⁴	at return 60 °C	kW	53	65	84	95	117	132	169
Standard efficiency according to DIN 4702 T8 ⁴	40/30 °C		102,5	102,3	102,1	103,6	103,8	103,8	103,4
Additional energy gain by the use of the	at return 30 °C	%	9,0	8,9	8,8	10,0	10,0	9,6	9,7
ThermoCondensor VR ⁴	at return 60 °C	%	5,0	4,8	4,6	5,6	5,9	5,6	5,6
Flue gas temperature after heat exchanger ³	at return 30 °C	°C	49	50	52	38	36	37	39
	at return 60 °C	°C	72	74	75	66	62	64	65
Flue gas resistance boiler		mbar	0,18	0,36	0,62	0,8	0,9	1,1	1,5
Flue gas resistance ThermoCondensor VR		mbar	0,2	0,3	0,5	0,2	0,1	0,2	0,2
Flow resistance boiler		z-value	3,2	3,2	1,5	1,5	0,2	0,2	0,2
Flow resistance ThermoCondensor VR ¹		z-value	1500	1500	1500	390	220	220	220
Water capacity boiler		litre	105	105	115	115	250	250	270
Water capacity ThermoCondensor VR		litre	5	5	5	11	22	22	22
Weight incl. casing boiler		kg	247	247	268	268	391	391	495
Weight incl. casing ThermoCondensor VR		kg	45	45	45	57	79	79	79
Heat recovery pump Biral		type	AX13-1	AX13-1	AX13-1	AX13-1	A15-1	A15-1	A15-1
Max. nominal output boiler, at max. 90 °C		bar	4	4	4	4	4	4	4
Max. nominal output ThermoCondensor VR		bar	6	6	6	6	6	6	6
Recommended flow rate ThermoCondensor V	R	m³/h	0,53	0,53	0,53	1,06	1,82	1,82	1,82
Min. flow rate ThermoCondensor VR		m³/h	0,3	0,3	0,3	0,53	0,91	0,91	0,91
Maximum permitted working temperature Thern	noCondensor VR	°C	90	90	90	90	90	90	90
Max. flue gas inlet temperature / Max. working temperature ThermoCondensor	VR	°C	100/90	100/90	100/90	100/90	100/90	100/90	100/90
Max. flue gas inlet temperature / Max. working temperature ThermoCondensor	VR	°C	150/80	150/80	150/80	150/80	150/80	150/80	150/80
Max. flue gas inlet temperature / Max. working temperature ThermoCondensor	VR	°C	200/70	200/70	200/70	200/70	200/70	200/70	200/70
Max. flue gas inlet temperature / Max. working temperature ThermoCondensor	VR	°C	230/60	230/60	230/60	230/60	230/60	230/60	230/60
Value for chimney calculation at maximum nomi	inal load ²								
Flue gas mass flow ³	at 65/60 °C	kg/h	85	105,4	133	153	188	222	274

¹ Flow resistance ThermoCondensor VR in mbar = volume flow $(m^3/h)^2 \times z$

 $^{\scriptscriptstyle 2}\,$ A certified and noncorrosive exit gas line is to be used for the exhaust system.

During the burner selection it must be considered that by the connection of the exhaust system between the boiler

and the waste-gas heat exchangers an additional pressure loss is given by 0,2 mbar.

³ Flow/return temperature of ThermoCondensor related to a flue gas inlet temperature into the heat exchanger of 160 °C.

⁴ Values for the fuel heating oil EL

RL = Plant-return temperature into the ThermoCondensor VR

Technical data

Hoval ThermoCondensor VR with Hoval oil / gas boiler Uno-3 (190-360)

ThermoCondensor VR		type		(200)			(400)	
Oil / gas hot water boiler Uno-3		type	(190)	(220)	(250)	(280)	(320)	(360)
Burner input Boiler		kW	206	236	269	302	344	390
Nominal output boiler		kW	190	220	250	280	320	360
Minimum output boiler		kW	135	156	178	200	222	222
Nominal output ThermoCondensor VR ⁴	at return 30 °C	kW	18,0	20,5	23,0	27,0	30,0	34,0
	at return 60 °C	kW	10,5	11,5	13,0	16,0	17,5	19,0
Nominal output total 4	at return 30 °C	kW	208	241	273	307	350	394
Boiler + ThermoCondensor VR ⁴	at return 60 °C	kW	201	232	263	296	338	379
Standard efficiency according to DIN 4702 T8 $^{\rm 4}$	40/30 °C		103,2	103,0	102,9	103,3	103,1	103,0
Additional energy gain by the use of the	at return 30 °C	%	9,5	9,3	9,2	9,6	9,4	9,4
ThermoCondensor VR ⁴	at return 60 °C	%	5,5	5,2	5,2	5,7	5,5	5,3
Flue gas temperature after heat exchanger ³	at return 30 °C	°C	42	45	47	40	44	45
	at return 60 °C	°C	66	69	70	65	66	68
Flue gas resistance boiler		mbar	1,4	1,7	1,6	2,8	2,5	3,4
Flue gas resistance ThermoCondensor VR		mbar	0,3	0,4	0,4	0,4	0,6	0,7
Flow resistance boiler		z-value	0,1	0,1	0,1	0,1	0,022	0,022
Flow resistance ThermoCondensor VR ¹		z-value	220	220	220	32	32	3,2
Water capacity boiler		litre	362	362	480	480	625	625
Water capacity ThermoCondensor VR		litre	22	22	22	63	63	63
Weight incl. casing boiler		kg	635	635	880	880	920	920
Weight incl. casing ThermoCondensor VR		kg	79	79	79	149	149	149
Heat recovery pump Biral		type	A15-1	A15-1	A15-1	A15-1	A15-1	M15
Max. nominal output boiler, at max. 90 °C		bar	5	5	5	5	4	4
Max. nominal output ThermoCondensor VR		bar	6	6	6	6	6	6
Recommended flow rate ThermoCondensor VI	۲	m³/h	1,82	1,82	1,82	4,25	4,25	4,71
Min. flow rate ThermoCondensor VR		m³/h	0,91	0,91	0,91	2,12	2,12	2,36
Maximum permitted working temperature Therm	noCondensor VR	°C	90	90	90	90	90	90
Max. flue gas inlet temperature / Max. working temperature ThermoCondensor	VR	°C	100/90	100/90	100/90	100/90	100/90	100/90
Max. flue gas inlet temperature / Max. working temperature ThermoCondensor	VR	°C	150/80	150/80	150/80	150/80	150/80	150/80
Max. flue gas inlet temperature / Max. working temperature ThermoCondensor	VR	°C	200/70	200/70	200/70	200/70	200/70	200/70
Max. flue gas inlet temperature / Max. working temperature ThermoCondensor	VR	°C	230/60	230/60	230/60	230/60	230/60	230/60
Value for chimney calculation at maximum nomi	nal load ²							
Flue gas mass flow ³	at 65/60 °C	kg/h	324	375	426	475	542	610

¹ Flow resistance ThermoCondensor VR in mbar = volume flow $(m^3/h)^2 x z$

² A certified and noncorrosive exit gas line is to be used for the exhaust system.

During the burner selection it must be considered that by the connection of the exhaust system between the boiler

and the waste-gas heat exchangers an additional pressure loss is given by 0,2 mbar.

³ Flow/return temperature of ThermoCondensor related to a flue gas inlet temperature into the heat exchanger of 160 °C.

⁴ Values for the fuel heating oil EL

RL = Plant-return temperature into the ThermoCondensor VR

Technical data

Hoval ThermoCondensor VR with Hoval oil / gas boiler Max-3 (420-1250)

ThermoCondensor VR		type	(60	00)	(80	00)	(12	:00)	(1500)	(1800)
Oil / gas hot water boiler Max-3		type	(420)	(530)	(620)	(750)	(1000)	(1250)	-	-
Burner input Boiler		kW	539	662	781	944	1247	1459	1894	2324
Nominal output boiler		kW	500	610	720	870	1150	1350	1750	2150
Minimum output boiler		kW	252	318	372	450	600	750	-	-
Nominal output ThermoCondensor VR ⁴	at return 30 °C	kW	53	60	65	69	95	109	140	175
	at return 60 °C	kW	33,0	34,0	40,0	44,0	63,0	69,0	85,0	110,0
Nominal output total ⁴	at return 30 °C	kW	553	670	785	939	1245	1459	1890	2325
Boiler + ThermoCondensor VR ⁴	at return 60 °C	kW	533	644	760	914	1213	1419	1835	2260
Standard efficiency according to DIN 4702 T8 $^{\scriptscriptstyle 4}$	40/30 °C		103,7	103,5	102,8	102,6	102,9	102,6	102,5	102,6
Additional energy gain by the use of the	at return 30 °C	%	10,6	9,8	9,0	7,9	8,3	8,1	8,0	8,1
ThermoCondensor VR ⁴	at return 60 °C	%	6,6	5,6	5,6	5,1	5,5	5,1	4,9	5,1
Flue gas temperature after heat exchanger ³	at return 30 °C	°C	37	38	46	48	44	49	49	48
	at return 60 °C	°C	63	64	65	67	63	66	65	65
Flue gas resistance boiler		mbar	4,9	5,7	4,0	6,5	7,4	8,0	-	-
Flue gas resistance ThermoCondensor VR		mbar	1,2	1,7	1,0	1,4	1,0	1,2	2,5	2,2
Flow resistance boiler		z-value	0,022	0,022	0,008	0,008	0,003	0,003	-	-
Flow resistance ThermoCondensor VR ¹		z-value	32	14	13	13	6	6	8	6
Water capacity boiler		litre	552	520	969	938	1528	1478	-	-
Water capacity ThermoCondensor VR		litre	63	94	137	137	195	195	258	283
Weight incl. casing boiler		kg	1093	1150	1770	1800	2500	2600	-	-
Weight incl. casing ThermoCondensor VR		kg	149	190	270	270	353	353	435	467
Heat recovery pump Biral		type	A15-1	A16-2	A402	A402	A502	A502	A652	A652
Max. nominal output boiler		bar	6	6	6	6	6	6	-	-
Max. nominal output ThermoCondensor VR		bar	6	6	6	6	6	6	6	6
Recommended flow rate ThermoCondensor VI	२	m³/h	4,25	6,4	8,5	8,5	12,73	12,73	10,40	12,53
Min. flow rate ThermoCondensor VR		m³/h	2,12	3,2	4,24	4,24	6,4	6,4	5,22	6,27
Maximum permitted working temperature Therm	noCondensor VR	°C	90	90	90	90	90	90	90	90
Max. flue gas inlet temperature / Max. working temperature ThermoCondensor	VR	°C	100/ 90	100/ 90	100/ 90	100/ 90	100/ 90	100/ 90	100/ 90	100/ 90
Max. flue gas inlet temperature / Max. working temperature ThermoCondensor	VR	°C	150/ 80	150/ 80	150/ 80	150/ 80	150/ 80	150/ 80	150/ 80	150/ 80
Max. flue gas inlet temperature / Max. working temperature ThermoCondensor	VR	°C	200/ 70	200/70	200/ 70	200/70	200/ 70	200/ 70	200/ 70	200/70
Max. flue gas inlet temperature / Max. working temperature ThermoCondensor *	VR	°C	230/ 60	230/ 60	230/ 60	230/ 60	230/ 60	230/ 60	230/ 60	230/ 60
Value for chimney calculation at maximum nomi	nal load ²									
Flue gas mass flow ³	at 65/60 °C	kg/h	850	1037	1224	1479	1955	2295	3031	3723

¹ Flow resistance ThermoCondensor VR in mbar = volume flow $(m^3/h)^2 \times z$

 $^{\scriptscriptstyle 2}\,$ A certified and noncorrosive exit gas line is to be used for the exhaust system.

During the burner selection it must be considered that by the connection of the exhaust system between the boiler

and the waste-gas heat exchangers an additional pressure loss is given by 0,2 mbar.

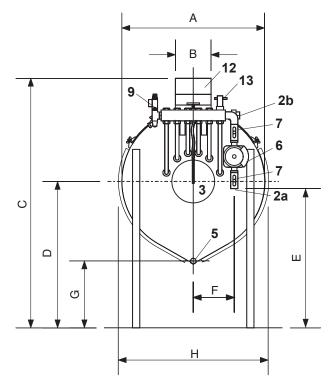
³ Related to a flue gas inlet temperature into the heat exchanger of 160 °C.

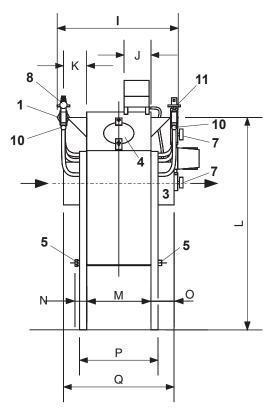
⁴ Values for the fuel heating oil EL

RL = Plant-return temperature into the ThermoCondensor VR

Dimensions

(Dimensions in mm)





- 1 Flow (outlet)
- 2a Return (inlet), Type (50-600)
- 2b Return (inlet), Type (800-1800)
- 3 Flue gas outlet (outlet)
- 4 Cleaning opening
- 5 Condensate drain Ø 21 mm
- 6 Circulation pump

7 Shut off - switch ball valve	7	Shut	off -	switch	ball	valve
--------------------------------	---	------	-------	--------	------	-------

- 8 Safety valve 1/2"
- 9 Aspirator 10 Fill and drain valve 3/4"
- 11 Thermometer
- 12 Control
- 13 Flow switch

Inermo	
Condenso	r

Condensor V	/R																
Туре	А	В	С	D	Е	F	G	Н	I	J	К	L	Μ	Ν	0	Р	Q
(50)	520	175	1)	1)	1)	116	1)	560	453	135	115	1)	163	55	108	233	379
(100) (200)	600 680	175 175	1) 1)	1) 1)	1) 1)	141 191	1) 1)	640 720	508 608	135 135	115 115	1) 1)	218 318	55 55	108 108	288 388	434 534
(400) (600)	960 960	175 175	1) 1)	1) 1)	1) 1)	241 352	1) 1)	1000 1000	823 1033	135 135	135 135	1) 1)	493 703	55 55	108 108	587 797	709 919
(800) (1200) (1500) (1800)	1070 1070 1250 1250	250 250 250 250	1) 1)	1) 1)	1) 1)	2) 2) 2) 2)	1) 1)	1110 1110 1290 1290	1159 1494 1494 1604	185 185 185 185	135 135 135 135	1) 1)	829 1164 1164 1274	55 55 55 55	108 108 108 108	923 1258 1258 1368	1045 1380 1380 1490

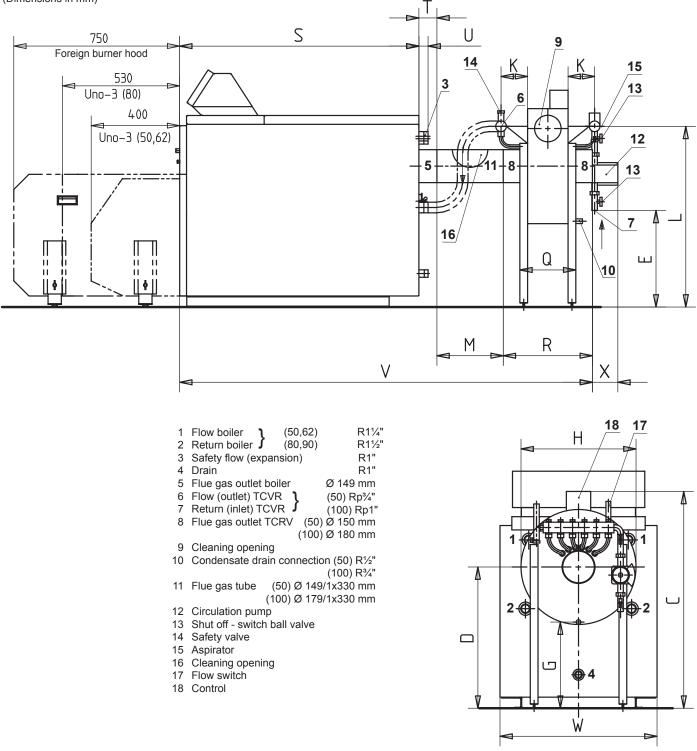
1) see dimensions ThermoCondensor VR with boiler

2) in centre, ThermoCondensor VR with two distributors, pump will be packed and delivered separately.

Thermo Condensor V Type	R Flow/ Return	Flue gas outlet Ø d _a /d _i	Condensate drain	Condensate hose d _i /d _a	Safety valve
(50)	Rp 1"	157/154	G ³ /4"	19/27	Rp ¾"
(100)	Rp 1"	182/179	G ³ /4"	19/27	Rp ¾"
(200)	Rp 1"	207/204	G ³ /4"	19/27	Rp ¾"
(400)	Rp 1"	257/254	G 1"	26/34	Rp ¾"
(600)	Rp 1¼"	257/254	G 1"	26/34	Rp ¾"
(800)	Rp 1½"	307/304	G 1"	26/34	Rp ⅔4"
(1200)	Rp 2"	357/354	G 1"	26/34	Rp 1"
(1500)	Rp 2½"	407/404	G 1"	26/34	Rp 1"
(1800)	Rp 2½"	407/404	G 1"	26/34	Rp 1¼"

Dimensions

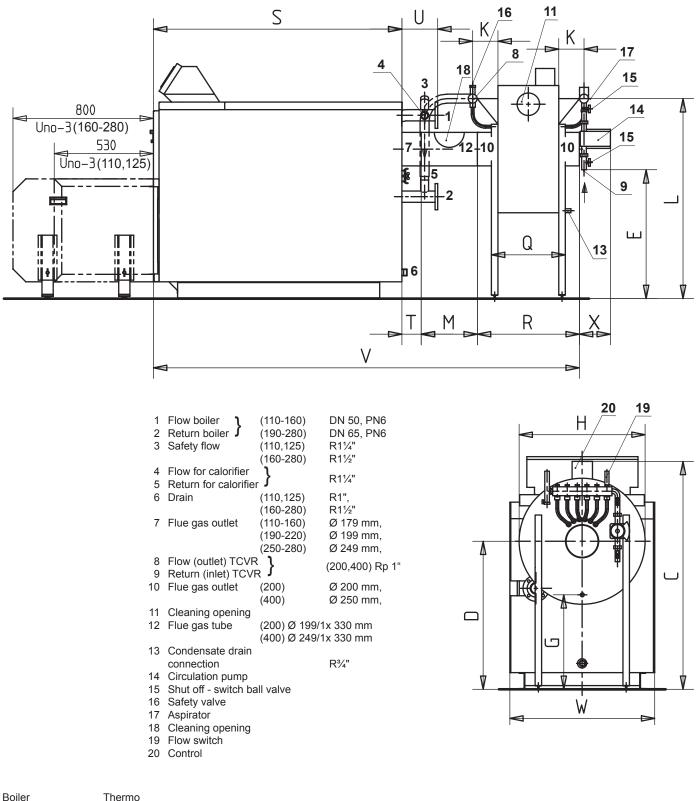
Hoval Uno-3 (50-90) with ThermoCondensor VR (50,100)



Boiler Type	Thermo Condensor VR	С	D	E	G	Н	К	L	М	Q	R	S	т	U	V	W	х
Uno-3 (50,62)	(50)	1036	638	485	350	560	115	872	355	233	379	1082,5	80,5	40,5	1897	710	115
Uno-3 (80)	(50)	1036	638	485	350	560	115	872	355	233	379	1192,5	80,5	40,5	2007	710	115
Uno-3 (90)	(100)	1078	638	521	304	640	115	908	381	288	434	1192,5	80,5	40,5	2088	710	115

Dimensions

Hoval Uno-3 (110-280) with ThermoCondensor VR (200,400)

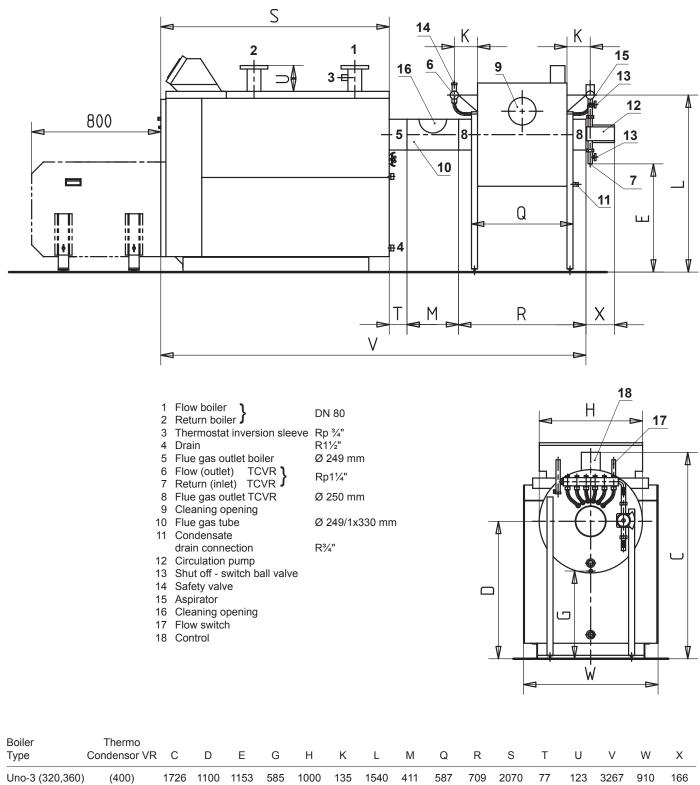


Туре	Condensor VR	С	D	Е	G	Н	Κ	L	Μ	Q	R	S	Т	U	V	W	Х
Uno-3 (110,125)	(200)	1281	799	723	419	720	115	1110	453	388	534	1328	104	192	2419	780	166
Uno-3 (160)	(200)	1345	863	787	483	720	115	1174	453	388	534	1411	81	137	2479	910	166
Uno-3 (190,220)	(200)	1432	950	874	570	720	115	1261	436	388	534	1431	81	134	2482	910	166
Uno-3 (250)	(200)	1432	950	874	570	720	115	1261	453	388	534	1916	76	134	2979	910	166
Uno-3 (280)	(400)	1576	950	1003	435	1000	135	1390	411	587	709	1916	76	134	3112	910	166



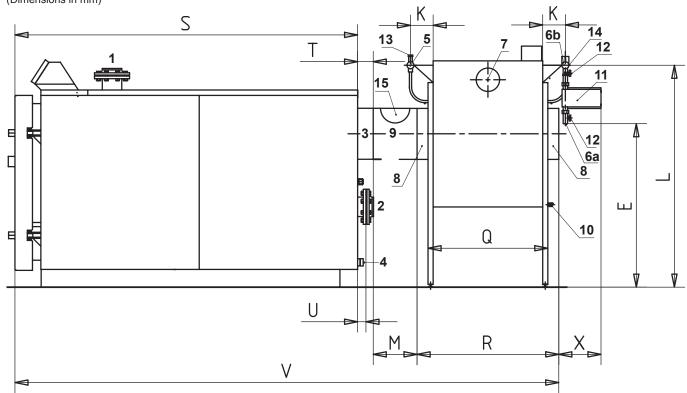
Dimensions

Hoval Uno-3 (320,360) with ThermoCondensor VR (400)

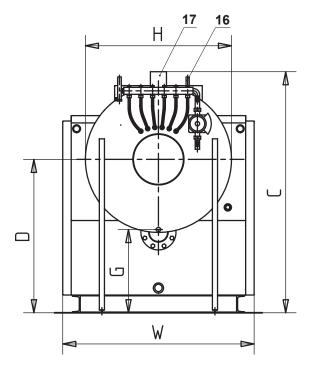


Dimensions

Hoval Max-3 (420-1250) with ThermoCondensor VR (600-1200) (Dimensions in mm)



1 2	Flow boiler Return boiler }	(420,530) (620,750) (1000-1250)	DN 100, DN 125, DN 150
3	Flue gas outlet	(420,530) (620-1250)	Ø 299 mm, Ø 349 mm
4	Drain	(420-1250)	R1½"
5	Flow (outlet) TCVR	(400)	Rp1¼"
		(800,1200)	Rp2"
6a	Return (inlet) TCVR	(600)	Rp1¼"
6b	Return (inlet) TCVR	(800,1200)	Rp2"
7	Cleaning opening		
8	Flue gas outlet TCVR	(600)	Ø 250 mm,
		(800,1200)	Ø 300 mm
9	Flue gas tube	(600)	Ø 249/1x 330 mm,
		(800,1200)	Ø 299/1x 330 mm
10	Condensate	(600-1200)	R1"
	drain connection		
11	Circulation pump		
12	Shut off - switch ball va	lve	
13	,		
14	Aspirator		



Boiler Type	ThermoCon- densor VR	С	D	E	G	Н	к	L	М	Q	R	S	Т	U	V	W	х
Max-3 (420,530) Max-3 (620,750)	(600) (800)	1576 1759	950 1050	986 1050	435 475	1000 1110	135 135	1388 1546	493 493	797 923	919 1045	2074 2347	104 105	54 55	3590 3990	1190 1310	289 289
Max-3 (1000,1250)	(1200) *	1959	1250	1250	675	1110	135	1734	411	1258	1380	2632	107	77	4530	1500	288

* ThermoCondensor VR with two distributors, pump will be packed and delivered separately.

15 Cleaning opening

16 Flow switch17 Control

Hova

Engineering

Standards and Guidelines

Official regulations for installation and operation must be observed. These are in particular the ÖVGW-/DVGW-guidelines, Austrian and German norms and relevant regional by-laws.

Further, take account of the additional official regulations for gas condensing appliances in respect of flue ducts and condensation water drainage.

Installation flush

New and if applicable existing installations need to be adequately cleaned and flushed before being filled. The boiler may only be filled after the heating system has been flushed!

Heating water

Requirements of the water quality: The European Standard EN 14868 and the Directive VDI 2035 resp. SIA 384/1:2009 must be observed. Hoval boilers are suitable for heating plants without significant oxygen intake (plant type I according to EN14868).

Requirements e.g:

- Chloride max. 30 mg/l
- pH-value 8 9,5
- Oxygen content max. 0,1 mg/l

Do not use chemical additives such as antifreeze, inhibitors, etc..

System separation

In case of installations with pipes without a diffusion barrier (e.g. underfloor heating) or with addition of an antifreeze a system separation is necessary.

Closed heating system

The boiler is certified only for the employment in closed heating systems.

Combustion air

For safe and economical operation the combustion air supply must be unimpeded. It is especially important to ensure that the combustion air is clean and free from halogenated compounds. These are to be found, for instance, in sprays, varnishes, glues, solvents and cleaning agents.

Note: Impure combustion air can cause corrosion on stainless steel components.

Installation instructions

Please take note of the advice contained in the installation instructions supplied with every boiler.

Condensate derivative

The authorisation for the drainage into the canalisation of the flue gas condensate has to be given by the local authorities. You will find information concerning the discharge of condensate into public sewage treat-

charge of condensate into public sewage treatment works • in the ÖNORM H 5152 / in the ÖVGW

• In the ONORM H 5152 / In the OVGW guideline G41.

The condensate derivative must be made back by a pipeline that is free of backlog and by a siphon (built in the MultiJet[®] already). The $\ddot{O}NORM$ H 5152 must be observed.

Suitable materials for the condensate derivative:

- Stoneware pipes
- Pipes from PVC
- · Pipes from polyethylene (PE)
- Pipes from ABS or ASP

The neutralization of the condensate is necessary also with small plants.

Flue gas systems

The outlet pipe and the flue system must be watertight and suitable for high pressure operation. They must be resistent to high temperatures and to high acidity. Make contact with the relevant authorities and the local chimney sweep at an early stage of your planning. The exhaust gas pipes must be led with upward gradient to the flue gas system, so that the resulting condensate can flow from the chimney into the flue gas heat exchanger. Cleaning covers in the flue gas line must be attached at the top side.

The flue gas system is to be drained and the condensate is into the condensate box of the flue gas heat exchanger to be derived. Please ask for details of the comprehensive Hoval flue system program.

Application

Heat recovery unit for the use of sensitive and latent heat through the cooling of flue gas to the condensation.

For heating systems with or without hot water supply.

The hydraulic system must be designed that the water circulation is guaranteed during the operation.

Heating water volume flow

The volume flow in the ThermoCondensor VR should be that the temperature increase is as small as possible.

Circulation pump

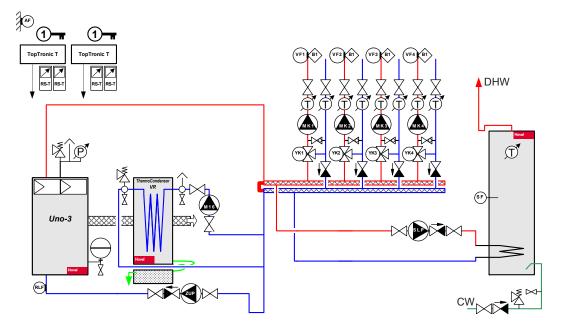
The circulation pump is controlled by a flue thermostat according to the flue gas intake temperature. The switching point of the flue thermostat can be set between 15 and 95 °C.



Examples

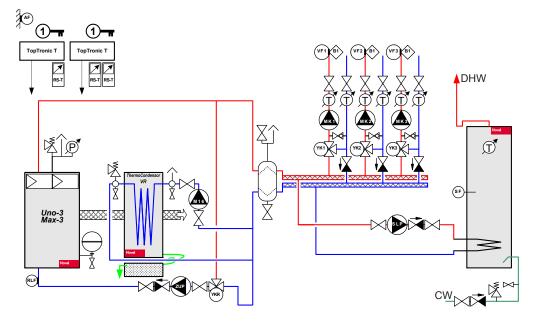
Boiler Uno-3 with ThermoCondensor VR

System with 1 boiler, heat recovery with heating- and hot water operation, with minimum return temperature control, for oil and gas firing. Hydraulic schematic BBLT020



Boiler Uno-3, Max-3 with ThermoCondensor VR

System with 1 boiler, heat recovery with low temperature-heating groups with minimum return temperature control, for oil and gas firing. Hydraulic schematic BBLT060



Notice :

- This hydraulic schematic is a principle schematic. It does not contain all details for installation. The installation must be done according to local conditions, dimensioning and regulations.
- For underfloor heating, a flow temperature monitor must be built-in.
- Shut-off devices to the safety valve (pressurized expansion tank, safety valve, etc.) are to safe against unintended closing!
- Mount bags to prevent single pipe gravity circulation!

1.0-1	
AF	Outdoor sensor
RLF	Return sensor
VF1	Flow sensor 1
VF2	Flow sensor 2
VF3	Flow sensor 3
SF	Calorifier heater sensor
KF	Boiler sensor

RS-T Room station

- B1 Flow temperature guard (if required)
- MK1 Pump mixing circuit 1
- MK2 Pump mixing circuit 2 MK3 Pump mixing circuit 3
- MK3 Pump mixing circuit 4
- SLP Calorifier loading pump
- ZUP Feed pump
- M16 Pump for flue gas heat exchanger
- YK1 Actuator mixer 1
- YK2 Actuator mixer 2
- YK3 Actuator mixer 3
- YK4 Actuator mixer 4
- YKR Actuator return mixer
- CW Cold Water
- DHW Domestic Hot Water

Description

ThermoCondensor AF

- Heat recovery unit for the use of sensitive and latent heat by cooling down the flue gases below the flue gas dew point.
- Heat exchanger combinable with boilers fired with
 - gas
 - low sulphur Diesel oil
 - (sulphur content < 50ppm)
 - bio heating oil (EN 14213)
- For connection to the heating system with or without hot water supply.
- Flue gas- and condensate tangented devices made of high-alloyed stainless steel
- Maximal flue gas condensation through Condensation heating surface of aluFer[®] composite tubing; flue gas side: aluminium water side: stainless steel
- Insulation with mineral wool and glass fabric
- Casing made of steel plate, red powder coated
- Integrated control for the interruption of the burner expensive loop on temperature rise
 - Temperature guard (90 °C) and
 - Savety temperature limiter (110 °C)
 - Flue gas safety temperature limiter (120 °C)
- Plug connector to the condensate lifting station
- Upper flue gas collector incl. flue gas outlet, turnable 90° (executed on site)
- Heat exchanger combinably with gas-heated boiler
- The employment of oil/gas combination burner is possible under adherence to of the following operating conditions and fuel oil quality:
- Fuel oil quality: Diesel oil with sulphur content smaller than 500 ppm (0,05 %)
- Short term operation (less than 4 weeks per heating season) with diesel oil
- Cleaning of the heat exchanger with combination of diesel oil and gas twice yearly.
- Heating connections incl. counter flanges, screws and seals

Operating over-pressure: ThermoCondensor AF (450-3200): max. 6 bar

Operating temperature: Heating water side: max. 90 °C

Flue gas temperature:

at the entrance into the heat exchanger: max. 300 $^\circ\mathrm{C}$

Delivery

 ThermoCondensor AF, insulation and casing are delivered separately packed

Optional

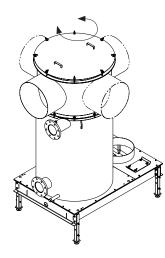
ThermoCondensor AF

- Heat exchanger part on the boiler base in each case around 90° swivelling
- With condensate derivative pump for highlying drain



ThermoCondensor AF	output	output		
	RL 30°C	RL 50°C		
Туре	kW	kW		
(450)	57	24		
(650)	83	33		
(950)	117	50		
(1500)	193	75		
(2000)	256	103		
(2600)	329	126		
(3200)	415	161		

Hoval



ThermoCondensor AF

Flue gas heat exchanger for operation with gas, low sulphur Diesel oil with sulphur content < 50 ppm or bio heating oil (EN 14213). Flue gas- and condensate tangented devices made of high-alloyed stainless steel, condensation heating surfaces made of aluFer[®] composite tubes.

Delivery:

ThermoCondensor AF completely assembled. Insulation and casing are separately delivered.

Thermo- Condensor Type	max. heat output kW Return 30°C	max. heat output kW Return 60°C	working pressure bar	
(450)	57	24	6	7005 499
(650)	83	33		7005 500
(950)	117	50	6	7005 501
(1500)	193	75	6	7005 502
(2000)	256	103	6	7005 503
(2600)	329	126	6	7005 504
(3200)	415	161	6	7005 505

Accessories

Type KB 23 ThermoCondensor AF Condensate drainage into lower situated drain pipe (without condensate delivery pump). With condensate water neutralisation incl. 12 kg granulate. Plastic condensate collector tank. D = 400 mm, L = 600 mm, H = 234 mm	6001 915
Type KB 24 ThermoCondensor AF With condensate delivery pump and condensate water neutralisation incl. 12 kg granulate. Plastic condensate collector tank. D = 400 mm, L = 600 mm, H = 234 mm with silicone hose Ø 9/13, L = 4 m for the condensate drainage into higher situated drain pipe.	6001 916
Additional granulate for higher outputs	
Neutralisation granulate for neutralisation box Refill set volume 3 kg Life time of one filling: approx. 2-4 years; depending on amount of condensate	2028 906
Specifications of granulate quantity see Technical Data	



Service

Commissioning

Commissioning must be made by works service or Hoval trained authorized serviceman/ company is condition for warranty.

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

Part N°

Technical data

ThermoCondensor AF

Туре			(450)	(650)	(950)	(1500)	(2000)	(2600)	(3200)
Nominal output boiler		kW	450	650	950	1500	2000	2600	3200
• Burner input max.		kW	485	700	1024	1616	2155	2802	3448
 Nominal output ThermoCondensor AF ³ 	at 35/30 °C	kW	57	83	117	193	256	329	415
	at 65/60 °C	kW	24	33	50	75	103	126	161
Operating pressure max. / test pressure		bar	6/9,6	6/9,6	6/9,6	6/9,6	6/9,6	6/9,6	6/9,6
 Max. permitted operating temperature 		°C	90	90	90	90	90	90	90
 Max. flue gas inlet temperature 		°C	300	300	300	300	300	300	300
Max. flue gas outlet temperature		°C	120	120	120	120	120	120	120
Boiler water capacity		Litre	99	208	179	239	325	321	436
Weight without casing		kg	279	445	497	939	1140	1217	1520
Weight incl. casing		kg	302	477	527	986	1196	1266	1582
Insulation thickness		mm	80	80	80	80	80	80	80
Flue gas resistance at									
nominal output (± 20 %)		mbar	1,8	1,9	1,8	2,0	4,0	3,0	5,0
 Flow resistance ThermoCondensor AF¹ 		z-value	0,025	0,016	0,016	0,005	0,005	0,002	0,002
 Max. condensate quantity ³ 		l/h	48	70	102	161	215	280	345
pH value of the condensate			5,0	5,0	5,0	5,0	5,0	5,0	5,0
Value for flue calculation at maximum nominal loa	d ²								
 Max. flue gas mass flow ³ 	at 65/60 °C	kg/h	731	1055	1542	2435	3247	4221	5195
Max. flue gas temperature ³	at 65/60 °C	°C	75	66	76	77	75	78	75
• Max. flue gas mass flow ³	at 35/30 °C	kg/h	731	1055	1542	2435	3247	4221	5195
• Max. flue gas temperature ³	at 35/30 °C	°C	56	50	58	58	58	58	57
Neutralisation granulate									
Granulate quantity (sufficient for 6-12 months)		kg	12	18	24	36	54	54	54

¹ Flow resistance ThermoCondensor AF in mbar = volume flow $(m^3/h)^2 x z$

² A certified and noncorrosive exit gas line is to be used for the exhaust system. During the burner selection it must be considered that by the connection of the exhaust system

between the boiler and the waste-gas heat exchangers an additional pressure loss is given by 0,2 mbar.

³ Related to a flue gas inlet temperature into the heat exchanger of 180 °C and fuel H-series natural gas.

Dimensions

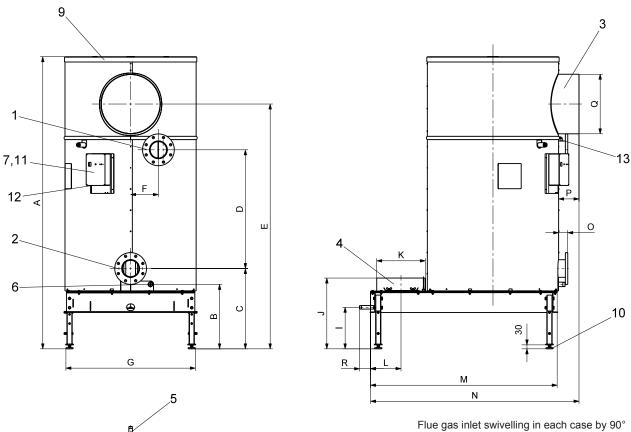
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ThermoCondensor AF (450-3200)



/				DN	
/	1	Heating flow:	(450)	80	PN6
			(650, 950)	100	PN6
			(1500,2000)	125	PN6
			(2600,3200)	150	PN6
	2	Heating return:	(450)	80	PN6
			(650, 950)	100	PN6
			(1500,2000)	125	PN6
			(2600,3200)	150	PN6
R	3	Flue gas inlet (from boil	er)		
	4	Flue gas outlet (to the c	himney)		
Į.	5	Condensate drainage			
			(450-2000)	R¾"	
			(2600,3200)	R1"	
	6	Drain:	(450)	3/4"	
			(650-3200)	R1"	
	7	Thermostat - immersion	sleeve	3/4"	
	8	Condensate collector - of	cleaning cover		
	9	Condensor - cleaning o	pening		
	10	Base (height adjustable	30-800 mm)		
	11	Electric panel			
	12	Electrical connections			

12 Electrical connections 13 Bushing for poss. ventilation

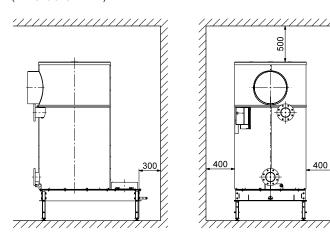
1/2"
/2

R

ThermoCondensor AF																	
Туре	А	В	С	D	Е	F	G	Н	I	J	K	L	Μ	Ν	0	Р	Q
											$Ø_{external}$						$Ø_{external}$
(450)	1682	474	510	703	1433	180	688	638	317	503	205/ 2	150	970	1140	109	169	250/ 2
(650/950)	1831	474	568	635	1506	180	798	853	317	523	307/2	195	1320	1454	76	160	300/ 2
(1500)	1908	487	582	622	1550	210	978	1000	314	535	367/2	230	1410	1575	69	154	450/2
(2000)	2208	487	607	897	1850	210	978	1000	314	535	367/2	230	1410	1575	69	154	450/2
(2600)	1970	503	623	584	1591	210	1158	1180	314	714	448/ 2	188	1596	1761	69	154	498/ 2
(3200)	2270	503	623	884	1891	210	1158	1180	314	714	448/ 2	188	1596	1761	69	154	498/ 2

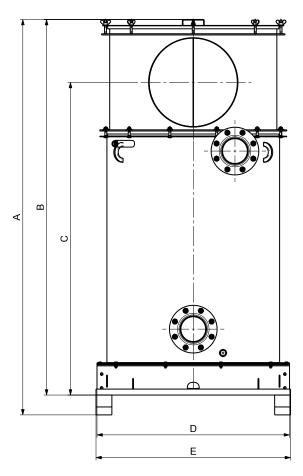
Dimensions

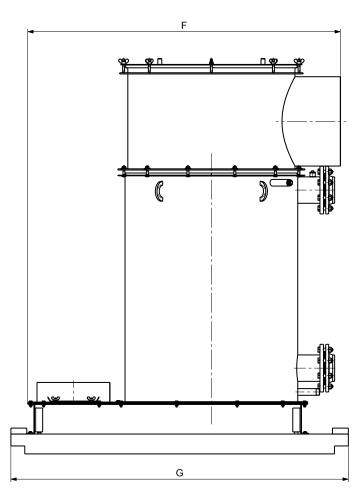
Minimum space required ThermoCondensor AF (Dimensions in mm)



400

Base size ThermoCondensor AF (450 - 3200) (Dimensions in mm)





Dimensions

ThermoCondensor AF

Туре	А	В	С	D	Е	F	G
(450)	1463	1363	1151	680	730	1140	1224
(650,950)	1611	1511	1224	790	790	1454	1600
(1500)	1692	1592	1275	970	980	1575	1700
(2000)	1992	1892	1575	970	980	1575	1700
(2600)	1758	1658	1316	1150	1160	1761	1850
(3200)	2058	1958	1316	1150	1160	1761	1850

Dimensions

Neutralisation unit for ThermoCondensor AF (Dimensions in mm)

Neutralisation box Type KB 23 ThermoCondensor AF

Application:

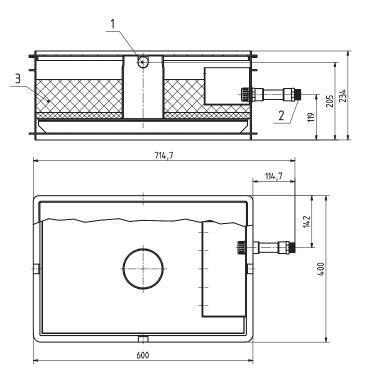
- Condensate drainage into lower situated drain pipe
- With condensate neutralisation
- Placed under or adjacent to ThermoCondensor

Version:

- Plastic condensate collector tank with neutralisation unit
- 12 kg neutralisation granulate

On site:

- If installing adjacent to ThermoCondensor AF, fit connection lines between the boiler (siphon) and the neutralisation box.
- Drain pipe from the neutralisation box



Hova

- 1 Condensate inlet from ThermoCondensor AF
- 2 Outlet R 3/4"

3 Condensate box with 12 kg granulate

Neutralisation box with pump Type KB 24 ThermoCondensor AF

Application:

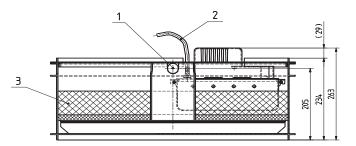
- Condensate drainage into a higher situated drain pipe
- With condensate pump, delivery height 3,5 m
- With condensate neutralisation 12 kg granulate
- Placed under or adjacent to ThermoCondensor AF

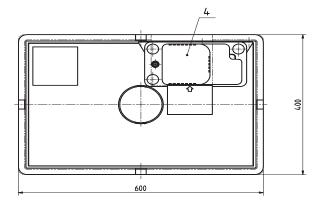
Version:

- Plastic condensate collector tank with delivery pump and neutralisation unit
- 12 kg neutralisation granulate
- Pump delivery height max. 3,5 m (2 dm³/min.)
- Silicone hose Ø 9/13 mm, length 4 m

On site:

- Drain pipe if the silicone hose is to short. If installation adjacent to ThermoCondensor AF:
- Electrical connection between the delivery pump and the electrical control panel if the supply cable is too short.





- 1 Condensate inlet from ThermoCondensor AF
- 2 Outlet from pump, silicone hose Ø 9/13 mm, length 4 m
- 3 Condensate tank with 12 kg granulate
- 4 Condensate pump

Engineering

Standards and Guidelines

The Following standards and guidelines must be respected:

- Technical information and installation manual of the Hoval company.
- Hydraulic and technical control regulations of the Hoval company.
- Local fire police regulations as well as country-specific regulations
- Country-specific fire protection standards
- · Country-specific gas directives
- Directives SWKI 97-1 "Water treatment for heating, steam, cooling and air conditioning installations".
- Ventilation and air supply for the boiler installation room according to directives SWKI 91-1 ventilation of the heating room.
- Country-specific directives SWKI 93-1 "safety-related device for heating systems" for safety-relevant mechanisms for heating systems.
- Directives Procal/FKR "plug-in electrical connections at the boilers and burners".
- Procal data sheet "Corrosion damage in heating installations" and the brochure "Protection against corrosion and boiler scale formation in heating and service water installations".
- Heating water requirement: Total hardness less than 1°f. pH-value 8,3 - 9,5 and for appliances with parts made of aluminium or nonferrous metal 8,3 - max. 9. Oxygen content < 0,1 mg/l
- The air pure retaining regulations must be kept.

Heating water

- VDI2035 and EN14868 must be observed. Hoval boilers are suitable for heating plants without significant oxygen intake (plant type I according to EN14868).
- Old installations must be well flushed before filling.
- The water quality must be tested at least once a year.

Heating system

Combustion air

- The combustion air supply must be warranted. The air opening must not be lockable.
- Minimal free cross section for air opening 6,5 cm² per 1 kW boiler output.

Space requirements

- The cleaning opening in the back at the boiler must be well accessible.
- For Mega-3 it must be behind of the boiler space enough for the blower of the flue gas return.

Mounting of the insulation and casing

- To mount the insulation and casing you need about 40 cm space on the left and right side. After the boiler is cased no space on the side is required.
- 2 boiler can be placed without space between them while the insulation and the internal casing is mounted at first and the boiler will pushed together. (The door of the left boiler must swivelling to the left and to the right door to the right).

Application

Exhaust gas condensation heat recovery unit for the use of sensitive and latent heat through the cooling of flue gas to the condensation. For boilers with gas firing.

For heating systems with or without hot water supply.

The hydraulic system must be designed that the water circulation is guaranteed during the operation.

Function

If the temperature in the ThermoCondensor AF is higher than 90 °C the burner sitches off by the temperature sensor. If the temperature goes down the burner sitches on again. The safety temperature limiter of the ThermoCondensor AF is 110 °C.

The condensate will be collected in the condensate box. The drainage can be done by a siphon and pressure reduction device direct into the drain pipe or with a feeding pump into a higher situated drain pipe.

For the condensate drainage respect the local standards.

Heating water volume flow

The volume flow in the ThermoCondensor AF should be that the temperature increase is as small as possible.

Circulation pump

During the connection to the return collecting tank of a dispenser the flow rate of the return water is dependent on the opening of the valve and thus on the boiler temperature and on the ambient temperature.

The maximum flow rate of the circulation pump is to correspond to the return flow rate at the middle winter temperature.

A pump with 2 different speeds must be planned (burner full load = high pumping speed; Burner basic load = low pumping speed).

System separation

 A system separation by heating installation with plastic pipes without a diffusion barrier is reccomendable or necessary by addition of anti-freeze agents in the heating system.

Indications for heating refurbishment

If an existing oil heating installation is replaced resp. supplemented by a Hoval ThermoCondensor AF, the following instructions regarding the oil tank and its refilling must be observed:

- The Hoval Hoval ThermoCondensor AF must only be operated with Diesel oil lowsulphur with sulphur content < 50 ppm (< 0.005 %).
- It is recommended to clean the oil tank before refilling it.
- A residual amount of Diesel oil in the oil tank may be mixed with Diesel oil low-sulphur, provided that the residual amount does not exceed the following values of the total content.
 Residual amount Diesel oil

(sulphur content: 2000 ppm resp. 0,2 %) max 3 % of tank volume Residual amount Diesel oil (sulphur content: 1000 ppm resp. 0,1 %) max 5 % of tank volume Residual amount eco Diesel oil (sulphur content: 500 ppm resp. 0,05 %) max 10 % of tank volume

 In order to reach the permissible mixture ratio with Diesel oil low-sulphur taking account of the residual amount of Diesel oil in the oil tank, a 100 % tank filling is necessary.

Sound insulation

Sound insulation 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 absorber hood 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 flexible with compensators.
- Pumps have to be connected with compensators to the pipes.
- For damping of flame noise it is possible to install a silencer into the flue gas tube (Space should be foreseen for later installation).

Engineering

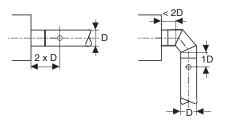
Condensate drainage

- The grant for the derivative of the exhaust condensation into drains must be caught up at the responsible authority.
- Without neutralisation the condensate derivative is permissible only if the sewers and drains are made of plastic or stoneware.
- With drain lines from cement-bound materials a jerkily derivative (without neutralisation) is permissible for boiler performance up to 200 KW.
- At the condensate drainage of the gas-fired boiler a siphon must be inserted.
- The condensate must be led openly (by funnels) into the canalisation.

Chimney/flue gas system

Flue gas pipe

- The flue gas tube between boiler and chimney must be connect 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

- Each boiler must be attached to a separate chimney.
- The exhaust gas pipes must be from corrosion resistant material.
- The exhaust gas pipes must be led with upward gradient to the chimney, so that the condensate can flow back into the Thermo-Condensor AF.
- With horizontal exhaust gas pipes cleaning covers must be attached above at the pipe.
- Chimney bags are to be avoided. Existing chimney bags are to be equipped with the necessary condensate derivatives syphon.
- The flue gas system must be humidity-insensitively and acid proof and admitted up to > 160 °C
- For existing chimney installation the restoration must be carried out according to the instructions of the chimney constructor.
- The cross sections are to be computed for boilers without draught. Observe the SIA introduction no. 384/4 "Chimney for building heating", cross section appointment.
- It is recommendabel to use a secondary air valve for chimney draft limiting.

The Engineering instructions of the corresponding boiler must be observed!

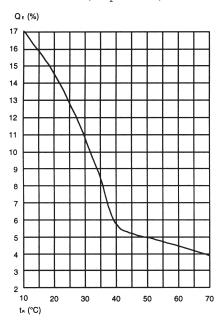
Combination boiler/ThermoCondensor aluFer® (TCAF)

TCAF	Boiler	Minimum output	Boiler	Nominal out	out TCAF	Heating g resis	as sided tance		ow stance	Wa cont		Weigh cas	
Туре	Туре	boiler		at RL 30°C	at RL 60°C	Boiler	TCAF	Boiler	TCAF	Boiler	TCAF	Boiler	TCAF
		kW	kW	kW	kW	mbar	mbar	z-value	z-value	litre	litre	kg	kg
(450)	Uno-3 (320) Uno-3 (360)		320 360	43 49	19 22	2,5 3,4	0,9 1,2	0,022 0,022	0,025 0,025	625 625	99 99	920 620	302 302
(650)	Max-3 (420) Max-3 (530)		500 610	68 72	30 29	4,9 5,7	1,1 1,7	0,022 0,022	0,016 0,016	552 520	208 208	1093 1150	477 477
(950)	Max-3 (620) Max-3 (750)		720 870	84 117	34 52	5,2 6,5	1,0 1,5	0,008 0,008	0,016 0,016	969 938	179 179	1770 1800	527 527
(1500)	Max-3 (1000 Max-3 (1250		1150 1450	155 196	69 80	7,4 9,3	1,2 1,9	0,003 0,003	0,005 0,005	1528 1478	239 239	2500 2600	986 986
(2000)	Max-3 (1500)) 650	1750	236	96	7,0	3,1	0,002	0,005	2343	325	3500	1196
(2600)	Max-3 (1800 Max-3 (2200		2150 2500	290 338	129 138	8,8 9,1	2,1 2,8	0,002 0,002	0,002 0,002	2750 3050	321 321	4000 4300	1266 1266
(3200)	Max-3 (2700)) 1030	3000	405	180	8,0	4,4	0,001	0,002	3550	436	5100	1582

Engineering

Approx. energy profit with gas firing

Energy profit $Q_E(\%)$ referred to the boiler output at burner output basic load. Boiler flue gas temperature 140 °C, λ = 1,14 (CO₂ = 10,4 %)



Energy profit $Q_{E}(\%)$ referred to the boi-

ler output at burner output full load.

Boiler flue gas temperature

180 °C, λ = 1,23 (CO₂ = 9,6 %)

Example:

Mega-3 (600) with ThermoCondensor AF (600), boiler temperature 80 °C. Room temperature Qh = 600 kW, heating system 50/40 °C at outdoor temperature -10 °C. Heating pump = 51,6 m³/h. Middle winter temperature (for Zurich):

$$20 \degree \text{C} - \frac{3717 \text{ heat. days degree}}{229 \text{ heating days}} = 3,7 \degree \text{C}$$

Middle working temperature about 38,3/32,9 °C. The return volume flow of the mixing valve at a boiler temperature of 80 °C is:

Required volume flow of the ThermoCondensor AF circulation pump: 0,114 x 51,6 = 5,9 m³/h Approx. energy profit at flue gas temperature 180°C and t_{RL} 32,9°C = ca. 10%.

t_{R} = Hot water inlet temperature at the ThermoCondensor AF. Temperature difference between hot water inlet and outlet at the ThermoCondensor AF 5 K.

Need of heating energy (liquid gas)

16 hV x 3717 HGT x Qh 600 kW

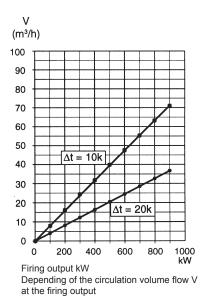
 $\frac{10000 \text{ km}^{-1} \text{ km}^{$

127 387 Nm³ x 11,12 = 1 416 543 kWh/a

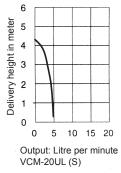
Profit $Q_{_{F}}$ 10 % x η K 0,93 x 1 416 543 = 131 738 kWh/a

"Heating diagram" for heating systems with heating radiator

Outdoor temperat	tv / t _R (°C) sure	tv / t _R (°C)	tv / t _R (°C)	tv / t_{R} (°C)
-10	50/40	60/45	70/50	80/60
-8	48,4/39,0	57,8/43,8	67,3/48,6	76,7/58,1
-6	46,7/38,1	55,6/42,6	64,5/47,2	73,5/56,1
-4	45,1/37,1	53,3/41,3	61,7/45,7	70,1/54,1
-2	43,4/36,0	51,1/40,1	58,8/44,2	66,7/52,1
0	41,6/35,0	48,7/38,7	55,9/42,6	63,3/49,9
2	39,9/33,9	46,4/37,4	53,0/41,0	59,8/47,8
4	38,1/32,7	44,0/36,0	50,0/39,3	56,2/45,5
6	36,2/31,6	41,5/34,5	46,9/37,6	52,5/43,2
8	34,4/30,4	39,0/33,0	43,8/35,8	48,7/40,7
10	32,4/29,1	36,4/31,4	40,5/33,8	44,8/38,1
12	30,4/27,7	33,7/29,7	37,1/31,8	40,8/35,4







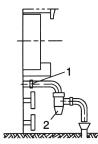
Hoval

Hova

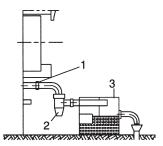
Examples

Examples neutralisation box

Condensate drainage

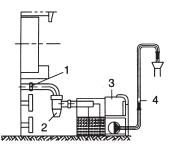


Example A Condensate drainage into lower situated drain pipe (without condensate neutralisation)



Example B

Condensate drainage into lower situated drain pipe, with condensate box Type KB23 ThermoCondensor, with condensate neutralisation

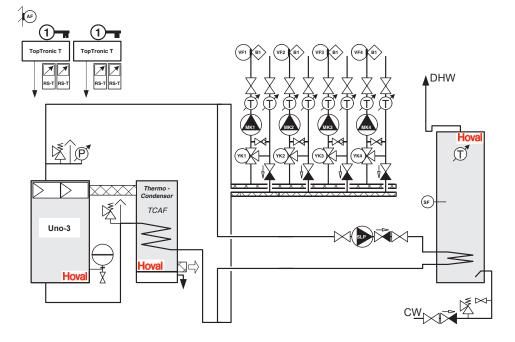


Example C Condensate drainage into higher situated drain pipe, with condensate box type KB24 ThermoCondensor, with condensate neutralisation and condensate delivery pump.

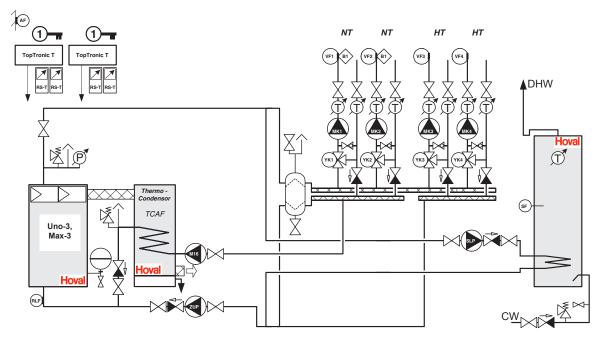
- 1 Condensate drain
- 2 Siphon for condensate drainage for plastic tube Ø 25 and hose union Ø 19 3 Condensate box
- 4 Silicone hose 9 x 13 mm, length = 4 m

Examples

Hydraulic schematic BBGT010



Hydraulic schematic BBGT020



Notice :

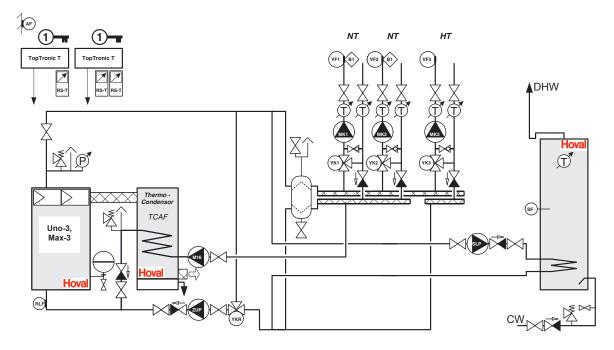
- This hydraulic schematic is a principle schematic. It does not contain all details for installation. The installation must be done according to local conditions, dimensioning and regulations.
- For underfloor heating, a flow temperature monitor must be built-in.
- Shut-off devices to the safety valve (pres-_ surized expansion tank, safety valve, etc.) are to safe against unintended closing!
- Mount bags to prevent single pipe gravity circulation!

RS-T	Room station	MK1
AF	Outdoor sensor	MK2
BRU	Return flow sensor	MK3
VF1	Flow sensor 1	MK4
VF2	Flow sensor 2	SLP
VF3	Flow sensor 3	ZUP
VF4	Flow sensor 4	M16
KF	Boiler sensor	YK1
SF	Calorifier heater sensor	YK2
B1	Flow temperature guard	YK3
	(if required)	YK4
		CW

- MK1 Pump mixing ciruit 1
- MK2 Pump mixing ciruit 2 Pump mixing ciruit 3 MK3
- Pump mixing ciruit 4 MK4
- SLP Calorifier loading pump
- ZUP Feed pump
- M16 Pump for add-on heat exchanger
- YK1 Actuator mixer 1
- YK2 Actuator mixer 2 YK3
 - Actuator mixer 3
 - Actuator mixer 4 Cold Water
- DHW Domestic Hot Water

Examples

Hydraulic schematic BBGT040



Notice :

- This hydraulic schematic is a principle schematic. It does not contain all details for installation. The installation must be done according to local conditions, dimensioning and regulations.
- For underfloor heating, a flow temperature monitor must be built-in.
- Shut-off devices to the safety valve (pressurized expansion tank, safety valve, etc.) are to safe against unintended closing!
- Mount bags to prevent single pipe gravity circulation!

- RS-T Room station
- AF Outdoor sensor
- RLF Return flow sensor
- VF1 Flow sensor 1 VF2 Flow sensor 2
- VF2 Flow serisor 2
- VF3 Flow sensor 3
- KF Boiler sensor
- SF Calorifier heater sensor B1 Flow temperature guard (if required)
- MK1 Pump mixing ciruit 1
- MK2 Pump mixing ciruit 2
- MK3 Pump mixing ciruit 3
- SLP Calorifier loading pump
- ZUP Feed pump
- M16 Pump for flue gas heat exchanger
- YK1 Actuator mixer 1
- YK2 Actuator mixer 2 YK3 Actuator mixer 3
- YK3 Actuator mixer 3
- YKR Actuator return mixer
- CW Cold Water DHW Domestic Hot Water

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. (Re 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 <u>Commissioning certificate</u>
- 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 <u>The place of jurisdiction for the buyer and for us shall be</u> <u>Vaduz.</u> 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.

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