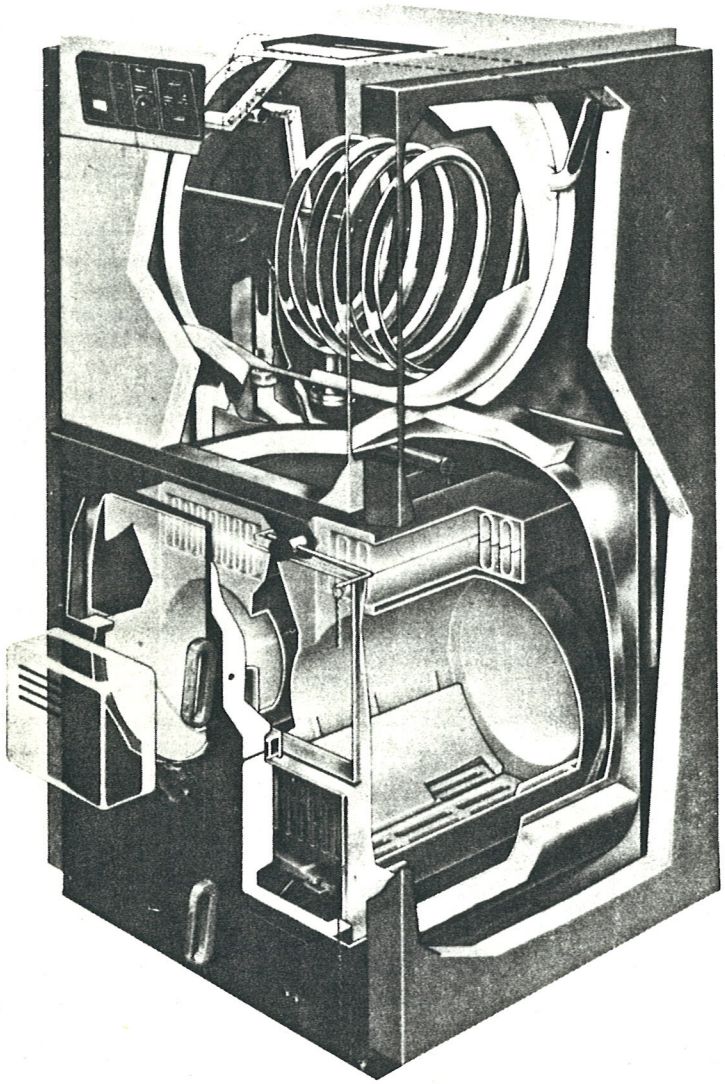
Hoval®



Hoval DuoLyt® Multi Fuel Boiler

with or without Domestic Hot Water Supply Tanks.

The installation of this equipment shall be made in accordance with all local and state ordinances as they may differ from this manual.

INSTALLATION & SERVICE MANUAL

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Hoval

TECHNICAL DATA (WITHOUT TANK MODELS)

STANDARDS

Boiler with two completely separate combustion chambers and flue passes. Automatic switch over from solid fuel to fossil fuel. Dual thermolytic heat exchangers assure complete combustion and consistantly high efficiencies.

Working pressure 30 PSI. Operating temperature 194°F (90°C).

CONTROLS

The panel is packaged and includes selector switches, boiler thermometer, operating aquastat, limit aquastat, minimum aquastat, burner cable, automatic non-electric draft control for solid fuel firing.

INSULATION

Woven layered mineral wool insulation for assured heat retention.

CASING

Channel fitted steel case with baked enamel finish.

SHIPMENT

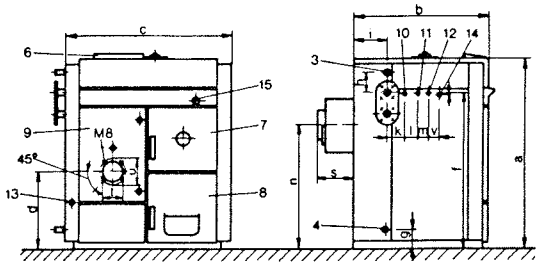
Boiler unit is shipped dismantled and casing is packed in a cardboard box, control panel is packed in a separate styrofoam box.

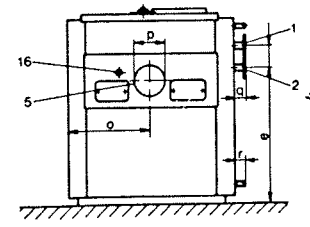
Boiler jacket:

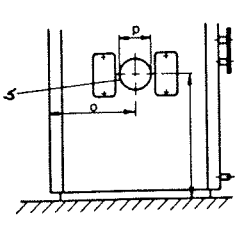
Sheet-metal slip-in components with two color stoved enamel. Base beams with adjustable feet.

Shipment:

Boiler bolted on planks, jacket in cardboard box, controls in styrofoam box or mounted to top cover panel of jacket and with jacket components packed in cardboard box, grates for solid fuel and miscellaneous parts in combustion chamber.







1. Primary supply
2. Primary return
3. Relief valve
4. Boiler drain
5. Flue connection
6. Boiler control
7. Fill door
8. Ash-pit door
9. Burner door
10/11. Overheat coil
12. Socket for well overheat valve
13. Burner cable
14. Socket 1"
15. Draft regulator
16. Socket ¼"

Model		Output oil/gas MBH	Output coal/coke MBH	wood MBH	Primary water gal.	weight lbs.
Duolyt	22	88	60	52	27	620
	30	120	84	64	34	685
	40	160	112	84	51	895
	52	208	112	84	51	895

OIL FIRING DATA

Model		Output gal./h	Flue gas temp. °F	°C	CO_2 %
Duolyt	22	0.75	410	210	
	30	1.10	419	215	11-13.00%
	40	1.30	437	225	
	52	1.75	428	220	

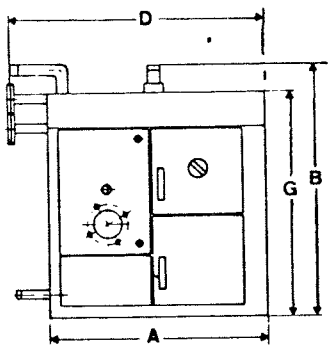
COAL FIRING DATA

Model		Coal size inches	Flue gas temp. °F	°C	Draft "WG
Duolyt	22	¾ - 1½	515	268	0.08
	30	¾ - 1½	515	268	0.09
	40	¾ - 1½	515	268	0.10
	52	1¼ - 2	515	268	0.10

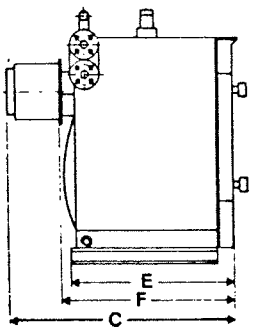
WOOD FIRING DATA

Model		Wood length Inches	Flue gas temp. °F	°C	Draft "WG
Duolyt	22	17	570	295	0.08
	30	17	570	295	0.09
	40	19	570	295	0.10
	52	19	570	295	0.10

Specifications subject to change without notice.



Bare Boiler: (Sketch no: 5)



(Sketch no:6)

Boiler Type	a	b	c	d	e	f	g	Lbs.
22	30¼	41¼	30⅞	34½	24	26⅛	34⅞	540
30	34½	44⅝	30⅞	39⅛	24	25⅞	37	605
40-52	38¾	46	38¼	43	27⅞	30⅛	38⅜	805

Lbs = Boiler without jacket

	DuoLyt 22/-	30/-	40-52/-		DuoLyt 22/-	30/-	40-52/-
a	42-7/8	43-3/4	45-1/8	m	2-1/2	2-1/2	2-1/2
b	29-3/4	29-1/2	30-2/8	n	27	28-3/4	29-3/8
c	34-5/8	38-3/4	43-1/4	o	9-5/8	12	21-1/2
d	18	17-1/8	15-7/8	p	7-1/8	7-1/8	7-7/8
e	30-1/2	31-1/8	32-3/8	q	1-5/8	1-5/8	1-1/2
f	32-5/8	36	37-2/8	r	1-2/8	1-1/8	1-5/8
g	5-1/2	4-1/2	3-1/2	s	1-3/8	1-3/8	7-7/8
h	4-1/8	4-5/8	4-3/4	t	4-3/4	4-3/4	4-3/4
i	7-7/8	8-1/8	4-5/8	u	5-7/8	5-7/8	5-7/8
k	4	4	4	v	3-1/2	3-3/4	5-1/2
l	3	3	3				

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TECHNICAL DATA (WITH TANK MODELS)

STANDARDS

Boiler with two completely separate combustion chambers and flue passes. Automatic switch over from solid fuel to fossil fuel. Dual themolytic heat exchangers assure complete combustion and consistent efficiency.

Working pressure 30 PSI. Operating temperature 194°F (90°C).

DHW — TANK

Tank made from stainless steel. Flange mounted to the top of the boiler. Built-in heating coil, aquastat, and thermometer. Working pressure 100 PSI. Operating temperature 140°F (60°C).

CONTROLS

The panel is packaged and includes selector switches, temperature gauges, operating and limit aquastats, burner cable, automatic non-electric draft control for solid fuel firing.

INSULATION

Woven layered mineral wool insulation for assured heat retention.

CASING

Channel fitted steel case with baked enamel finish.

SHIPMENT

Boiler unit is shipped dismantled and casing is packed in a cardboard box, control panel is packed separately in styrofoam box.

Model	Tank cap. gal.	Output oil/gas MBH	Output coal MBH	Output wood MBH	DHW Output 140°F	Primary water gal.	weight lbs.
Duolyt 22	40	88	60	52	106	27	620
30	40	120	84	64	106	34	685
40	58	160	112	84	165	51	895
52	58	208	112	84	165	51	895

OIL FIRING DATA

Model	Output gal./h	Flue gas temp. °F	Flue gas temp. °C	CO_2 %
Duolyt 22	.75	410	210	
30	1.10	419	215	11-13.00%
40	1.30	437	225	
52	1.75	428	220	

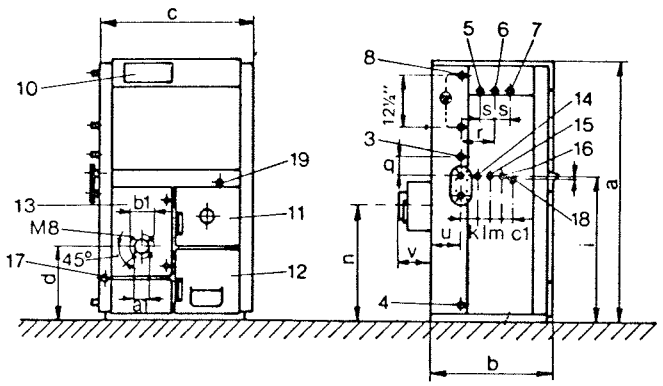
COAL FIRING DATA

Model	Coal size inches	Flue gas temp. °F	Flue gas temp. °C	Draft "WG
Duolyt 22	¾ - 1½	515	268	0.08
30	¾ - 1½	515	268	0.09
40	¾ - 1½	515	268	0.10
52	1¼ - 2	515	268	0.10

WOOD FIRING DATA

Model	Wood length Inches	Flue gas temp. °F	Flue gas temp. °C	Draft "WG
Duolyt 22	17	570	295	0.08
30	17	570	295	0.09
40	19	570	295	0.10
52	19	570	295	0.10

Specifications subject to change without notice.



(Sketch no: 1)

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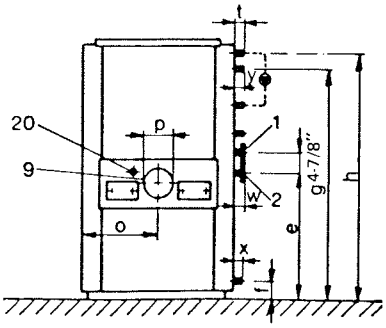

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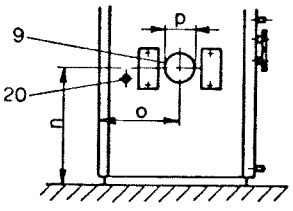

(Sketch no: 4)

Boiler jacket:

Sheet-metal slip-in components with two color stoved enamel. Base beams with adjustable feet.

Shipment:

Boiler bolted on planks, jacket in cardboard box, controls in styrofoam box or mounted to top cover panel of jacket and with jacket components packed in cardboard box, grates for solid fuel and miscellaneous parts in combustion chamber.

1. Primary supply
2. Primary return
3. Relief valve
4. Boiler drain
5. Cold feed
6. Tank relief valve
7. DHW supply
8. Tank return
9. Flue connection
10. Boiler control
11. Fill door
12. Ash-pit door
13. Burner door
14./15. Overheat coil
16. Socket for well overheat valve
17. Burner cable
18. Socket 1"
19. Draft regulator
20. Socket ¼"

	Duolyt		
	22/40	30/40	40/58 52/58
a	60⅝	63¾	68⅞
b	29¾	29½	30⅜
c	34⅝	38¾	43¼
d	18	17⅛	15⅞
e	30½	31⅛	32⅜
f	5½	4½	3½
g	53½	56⅞	60⅛
h	57½	60⅞	63⅞
i	32⅝	36	37⅜
k	4	4	4
l	3	3	3
m	2½	2½	2½
n	27	28¾	29⅜
o	9⅝	12	21½
p	7⅛	7⅛	7⅞
q	4⅛	4⅝	4¾
r	6¾	6¾	10⅛
s	3½	3½	4
t	4¾	3¾	3½
u	7⅞	8⅛	4⅝
v	1⅜	1⅜	7⅞
w	1⅝	1⅝	1½
x	1⅜	1⅛	1⅝
y	2⅜	1⅜	1⅜
a_1	4¾	4¾	4¾
b_1	5⅞	5⅞	5⅞
c_1	3½	3¾	5½

Tank type	Height "	Length "	Length with pipe "
40	21⅝	30⅛	38
58	25⅝	32	38⅞

Tank:

Tank is bolted on boiler top and can be romoved for narrow access areas.

Hoval

HOW THE HOVAL DUOLYT BOILER WITH DOMESTIC HOT WATER OPERATES

The Duolyt Boiler is designed to burn solid and fossil fuel in combination and will automatically switch over from solid to fossil fuel. The combustion system consists of completely separate combustion chambers and secondary flue passes, incorporating a common flue gas collector with a single breeching.

The domestic hot water system consists of a 40 or 58 gallon stainless steel water tank instead of the conventional tankless coil.

SOLID FUEL OPERATION

The Samson solid fuel boiler thermostat should be set for 180°F. The oil or gas burner control should be set for 170°F. When the solid fuel fire is established, if it is not sufficient to maintain boiler water temperature of more than 170°F, the fossil fuel burner will periodically run to maintain minimum heating capacity of 170°. Solid fuel (coal, wood) should not be burned during periods of mild weather because, unlike a gas or oil burner, a solid fuel fire continues to burn even if the house does not require heat, and the boiler water will overheat causing the overheat valve to open. If this occurs it indicates that the solid fuel fire should be allowed to go out.

FOSSIL FUEL OPERATION

The operation of fossil fuel burner is controlled by the operating control located on the master control panel and can be set for the desired operating temperature, but in any case should be set to maintain a minimum water temperature of 170°F during solid fuel operation.

DOMESTIC HOT WATER OPERATION

The domestic hot water tank is a flange mounted tank constructed of corrosion proof material. The control system is of a unique design, which allows the domestic water temperature to be held at 140°F or lower. This system prevents lime and mineral build-up in the tank. The Duolyt boiler is also available without the domestic hot water tank and control system.

INSTALLATION & OPERATING INSTRUCTIONS FOR THE HOVAL DUOLYT BOILER

OIL OR GAS FIRING

1. Make sure the boiler is full of water.
2. Set the Sampson Solid Fuel Draught Regulator in a low setting 30°C (86°F) (Use red numbers).
3. Set Draught Reducing Flap in the oil position.
4. Set burner control aquastat. (Round black knob on electrical panel) counter-clock-wise to its lowest position — app. 60°C.
5. Set burner switch to the on position. Burner should start. Run burner until the primary boiler thermometer reads 30°C (86°F). Stop burner.
6. Set the knob on the Samson Draft Regulator to 30°C (use red numbers). Adjust chain so that the chain is tight and the bottom draft door is closed.
7. Start burner. The boiler should heat to approximately 70°C (158°F) before the burner control aquastat cuts out the burner. Now set the burner control aquastat to the desired temperature all the way clock-wise will give a maximum temperature of approximately 83°C (180°F). Check the oil or gas burner safety controls. Refer to instructions packed with the burner. Using a CO_2 kit, set combustion efficiency to approximately 86-88%.

SOLID FUEL FIRING

The solid fuel firing of the boiler should basically only be operated when the outside temperatures are low, which means that a high percentage of heat is required. It is therefore recommended that during spring, summer and autumn the boiler should be operated with oil or gas.

1. Run oil or gas burner until the boiler heats up. This will increase draft and help the starting of the solid fuel fire.
2. Shut burner switch.
3. Open draught reducing flap on the backside of the boiler. (A.U.F.)
4. Set Sampson Solid Fuel Draught Regulator to 80°C (176°F). Using paper and small pieces of wood to establish fire. **IMPORTANT: DO NOT OVERLOAD FIRE BOX WITH KINDLING WOOD.**

WOOD FIRING

5. Use only air-dried wood with a maximum water content of 20%. This means at least 1½ years of seasoning. Fill fire box with wood. Set burner control aquastat approximately 15°F below Sampson Solid Fuel Control, but in no case below 75°C (165°F). Running the boiler below 165°F when burning solid fuel will cause excessive creosote build-up when burning wood and excessive sulphur build-up on the heat exchanger when burning coal. The minimum chimney draught should be .02" WG with a hot chimney. Periodically fill chamber with coal, coke or charcoal. This will burn off any creosote or tar build-up on the heat exchanger. After the coal burns down, clean the whole solid fuel firing system (combustion chamber and secondary flue passes.)
6. After solid fuel fire is established, turn on oil burner switch.
7. **Keep ash pit clean. Build up of ash under grates will burn out the grates.**
8. Important tip for coal size. DL22/40 size of coal ¾" to 1¼". DL52/65 size of coal 1¼" to 2".

PRECAUTIONS TO BE OBSERVED

1. Burn wood only in tile line masonry chimney or U.L. approved solid fuel chimney.
2. Burn only seasoned hardwood.
3. Before summer, completely clean solid fuel section of boiler to prevent boiler damage from potash, a by-product of creosote which forms when summer moisture mixes with creosote.
4. Be sure to install the siphon loop on the supply water piping to the domestic water tank for tank draining purposes as shown in the piping diagrams.
5. Be sure to install a pressure reducing valve on the supply line to the domestic hot water tank where water systems deliver more than 85 P.S.I.
6. Do not use the overheat coil as a tankless domestic water heater or products insurance coverage will be voided.
7. Use only gas or oil burners approved by Repco Products Corp.
8. Do not use oil, gas or lighter fluid to start solid fuel fire.
9. Do not attach water heater or other appliances to boiler smoke pipe.
10. Keep smoke pipe as short as possible and down at least 18" from floor joist.
11. Do not burn garbage or trash.
12. Keep ash pit clean. The grates require air to pass throught them to prevent them from burning.
13. In case of power failure, manually open mixing valve, flow checks or zone valves. (Have heating contractor show you how this is done).
14. In case step no. 13 does not work, it might require dumping of the fire.

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Operating and Maintenance Instructions
HOVAL DUOLYT MULTI-FUEL BOILERS
with or without
Domestic Hot Water Supply Tank

Boiler Sizes and Output

Boiler ranges	Output BTU	Tank capacity
Duolyt 22	88,000	40 gallon
Duolyt 30	120,000	40 gallon
Duolyt 40	160,000	58 gallon
Duolyt 52	208,000	58 gallon

1. **Clearance and Installation Standards**
The Hoval Duolyt boilers cannot be installed on a combustible floor and the following clearances from combustibles shall be observed for all Duolyt boilers:

Sides	6 inches	
Rear	24 inches	
Front	48 inches	
Top	6 inches	(with Domestic Hot Water Tank)
	18 inches	(without Domestic Hot Water Tank)
Smoke pipe connection	18 inches	

These clearances may be reduced if installation is in accordance with NFPA No. 31 and NFPA No. 211 pamphlet. These standards are available from the National Fire Protection Association, 470 Atlanta Avenue, Boston, Massachusetts.

2. **Approval of Operation**
Hoval Duolyt Multi-fuel Boilers have been tested and are approved for oil firing not heavier than no. 2 oil, wood firing and coal firing and gas firing.
Caution: Do not burn garbage, waste oil, gasoline or any other fuel except that specified by the manufacturer. These boilers cannot be operated with an automatic stoker.

3. **Storage of Combustible Fuel**
Do not store any solid fuel within the specified clearances of the boiler, oil storage must be at least 5 feet from this appliance, or in accordance with NFPA pamphlet no. 31. Wood should be stored in a dry place with as low moisture content as possible for the proper operation of wood firing. (Less than 20% is desirable.)

4. **Charging Level**
The maximum wood load level for the Duolyt boilers is as far up as the crown sheet of the appliance. When coal firing, the coal level shall not be above the bottom edge of the fuel charging door.

5. **Chimney Design**
The chimney for the Hoval Duolyt Multi-fuel boilers shall be of masonry construction and tile lined. For best possible operation, this chimney should be interior to the home. The chimney tile should not be less than 8" x 8" in dimension, and not less than 20' in height.
Warning: Any chimney used for burning wood should be checked periodically and thoroughly cleaned at the end of each heating season. The boiler and smoke pipe should be checked monthly when burning solid fuel and cleaned whenever creosote begins to accumulate.

6. **Chimney Draught**
The draught for this appliance can be adjusted by using the damper control furnished. These boilers can be operated without an automatic draught regulator. The damper furnished with the boiler is marked by the manufacturer and should be opened when burning solid fuel. When burning oil a −0.02 inches WC draught over the fire is required. When firing solid fuel on a tall chimney with high draught the damper may be adjusted so that the draught does not exceed −.08 - .10 inches WC draft (depending on model).

7. **Overheat Safety Coil**
All Hoval Duolyt Multi-fuel boilers are manufactured with an internal overheat coil. This will maintain boiler water temperature below 220°F on power failure or if for any other reason water circulation stops. The automatic non-electric syr valve (or equal) will open and allow cooling water to flow through the coil.

The piping to the coil should not be restricted or have any other valve installed in the loop. This coil must be piped to a proper drain in accordance with local or state plumbing codes.
Caution: During periods of electric power failure, these boilers can be operated safely. If power should be interrupted, open the mixing valve manually. If zone valves are used they should be opened manually. If zoned with circulators, all flow checks must be manually opened. The wood or coal should be fired in small quantities during any period of power failure. If not on potable water supply, but on a well, the water pressure should be checked periodically, and upon loss of water pressure, the system should be shut down.

8. **Safety Controls**
The Hoval Duolyt boilers are equipped with the following safety controls:
1. ASME 30 psi boiler pressure relief valve.
2. Overheating coil.
3. Syr non-electric valve or equal.
4. ASME temperature and pressure relief valve relieving at no greater pressure than 150 psi and water temperature not above 210°F for boilers with domestic hot water tank.
5. Vacuum breaker for boilers with domestic hot water tank.
6. 1 High limit control which cannot be set above 220°F.
7. 1 Samson combustion air regulating valve which cannot be set above 100°C or 212°F.
8. Honeywell primary safety control with no greater than 45 second flame failure timing devices (or equal) supplied with burner.

Directions for setting and operating non-electric combustion air damper control for solid fuel firing.

The control furnished by the manufacturer is a Samson non-electric regulator or equal which cannot be set over 100°C (212°F). In order to properly position this regulator the red numbers should be used. Set the regulator on 30°C (86°F) and run the oil burner

until the primary water temperature (bottom temperature gauge) reads 30°C and then stop the burner using the burner switch on the panel. Adjust the chain from the Samson valve to the bracket of the combustion air damper so that the damper remains in a closed position when the chain is taught.

Caution: This adjustment should be set so that the primary water temperature will not exceed 100°C (212°F).

10. **Control Panel**
The control panel includes: 1 operating aquastat, 1 thermometer, 1 manual limit reset aquastat, 1 max. or min. aquastat, (1 DHW aquastat and thermometer. For use with tank model only).

11. **Oil Burner**
The oil burner furnished is a carlin CRD or oil burner approved by Repco Products Corporation UL-listed product incorporating listed controls. When installing this burner refer to the installation manual furnished by Carlin or others. The firing rates of the Hoval Duolyt Multi-fuel Boilers range from .65 gallons to 2gph and adjustment must be made in accordance with the oil burner instructions. The firing rate must be determined from the Hoval specification sheets.

12. The power gas burner is a Wayne P-250AF with electronic, intermittent ignition, or other burners approved by Repco. Burner adjustment must be made in accordance with the Gas Burner instruction manual supplied by the burner manufacturers.

13. **Combustion Air**
Depending on the type of construction, insulation, thermopane windows, etc. your heating contractor should determine if air for ventilation and combustion is required. The standard for air requirements is available in the National Fire Protection Pamphlet No. 31. This should be referred to.

Secondary air is important when burning wood in order to prevent a smouldering fire which would result in creosote buildup.

Hoval Duolyt boilers provide two passes for combustion air. For solid fuel firing the primary air is introduced below the grate and is also introduced above the fuel bed through an adjustable air control located on the loading door.

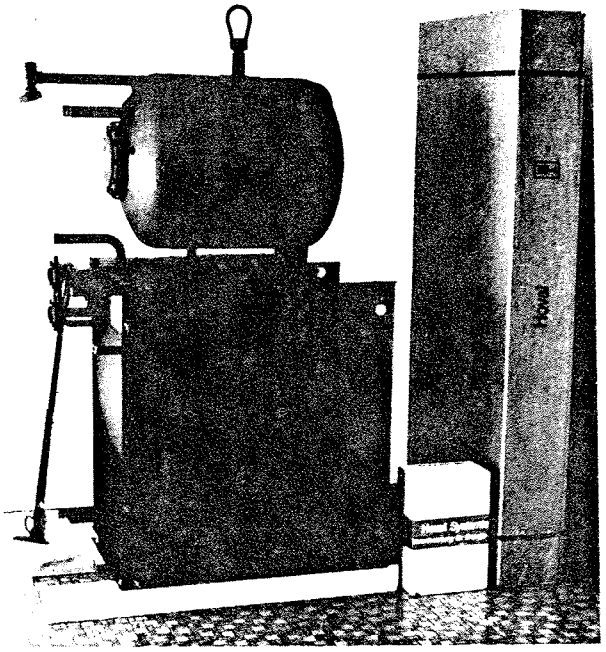


Photo 1
The Duolyt is shipped with separately packed jacket. Boilers shipped with domestic hot water tank assembled to boiler. Cartoned control panel only (if not assembled to jacket at factory.)

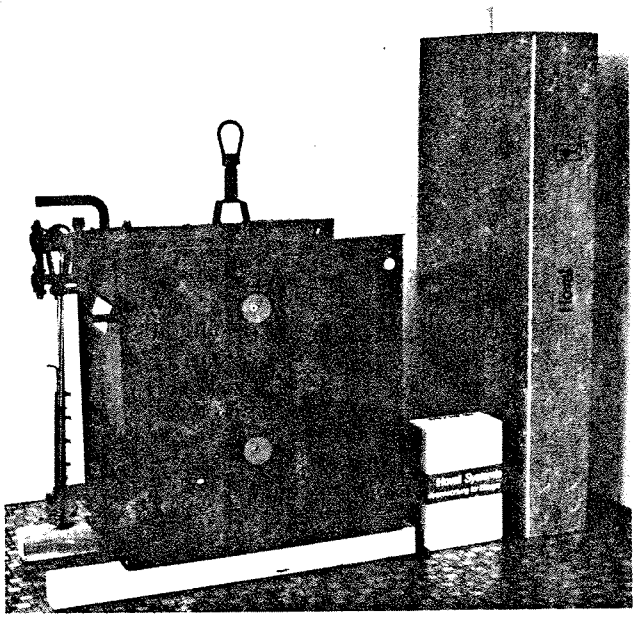
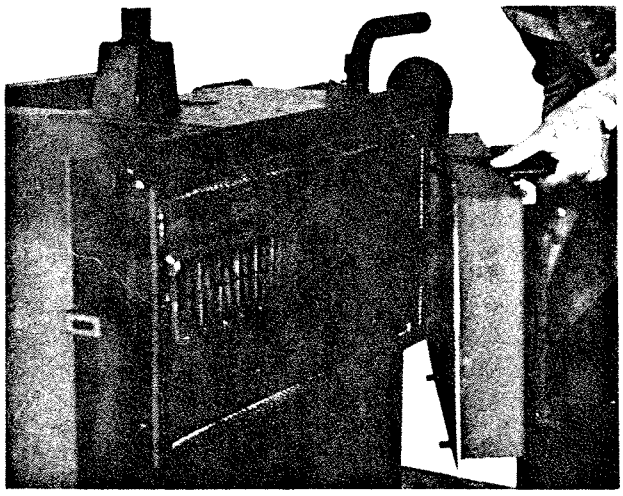


Photo 2
Duolyt less hot water tank is shipped with separately packed jacket, control panel (if not assembled to jacket at factory.



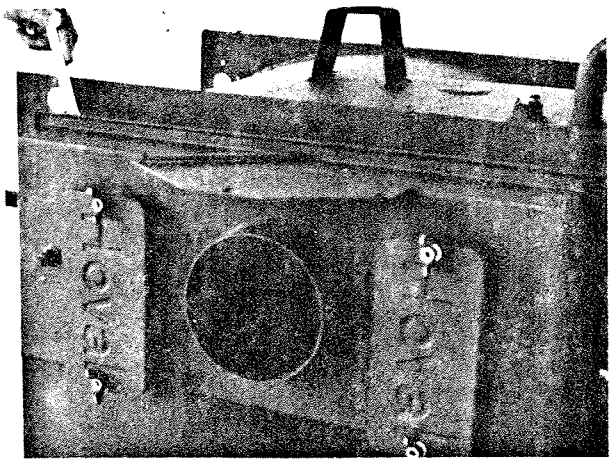


Photo 3 & 4
In case of difficult locating condition (narrow stairs or doorways (flue collector may be removed and re-assembled after location of the Boiler.

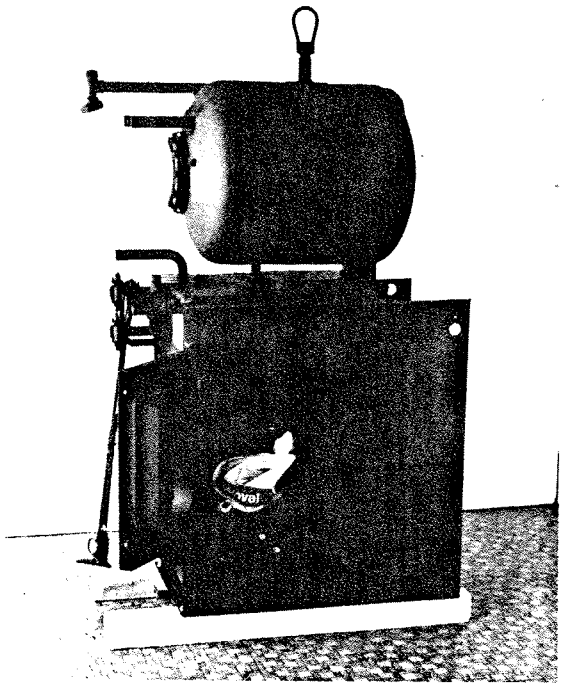


Photo 5
In the chamber area for oil/Gas (left door) you will find a plastic bag containing miscellaneous parts such as screws, handles, etc. Also find combustion chamber reflector Baffle for this chamber. (Duolyt #52 only)

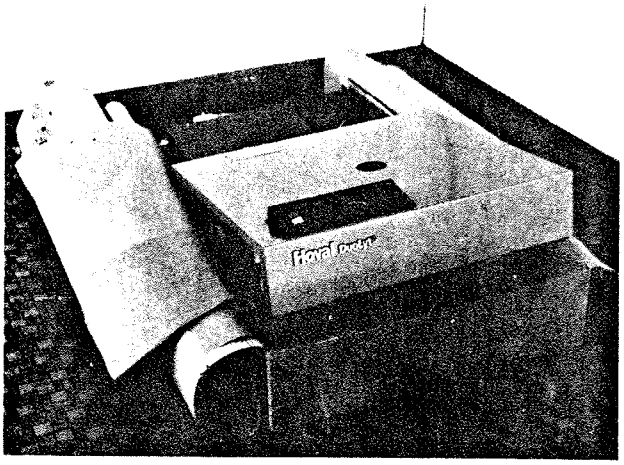


Photo 6
On some models the controls are mounted into top center panel of jacket. This panel is packed on top of the material contained in jacket carton (important for test run). If control panel is shipped separately, place control into jacket opening at top panel, and push central assembly into opening until plastic catches snap in place.

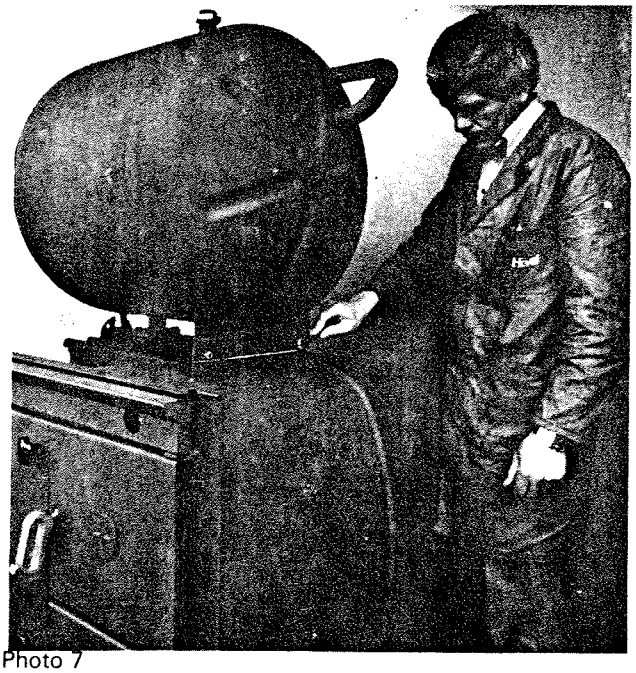


Photo 7
If tank has been removed for ease of delivery through doorways, proceed as follows.

A. Lift hot water tank on top of boiler, place gasket between pipe flanges and assemble with (4) four bolts and nuts, do not tighten.
B. Assemble (2) two bolts and nuts into tank and boiler support brackets and tighten the four bolts.

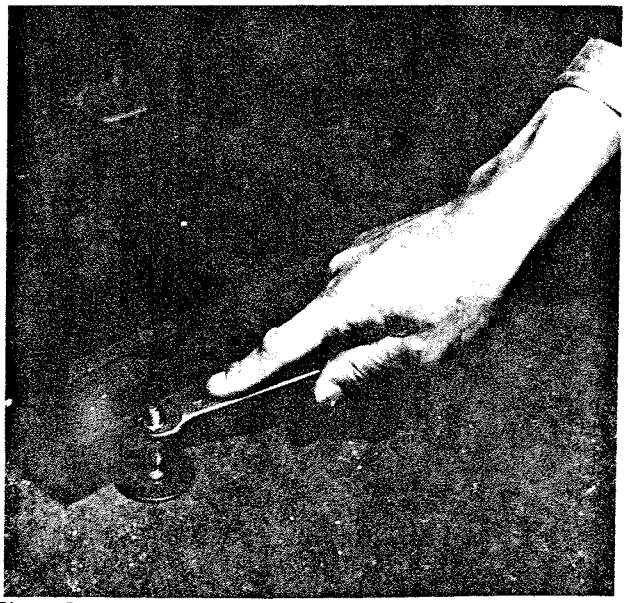


Photo 8
Remove both skids from underneath of Boiler Base channels.

IMPORTANT: Save nuts and washers. They will be used to adjust Boiler level. Lift Boiler on one side and place threaded Boiler support into the slots of Base channel. Level boiler with a water level by adjusting the lower nuts (1) on all four corners, place washers and counter nuts (2) and tighten. (Formally used for securing the wooden skids) and Boiler.

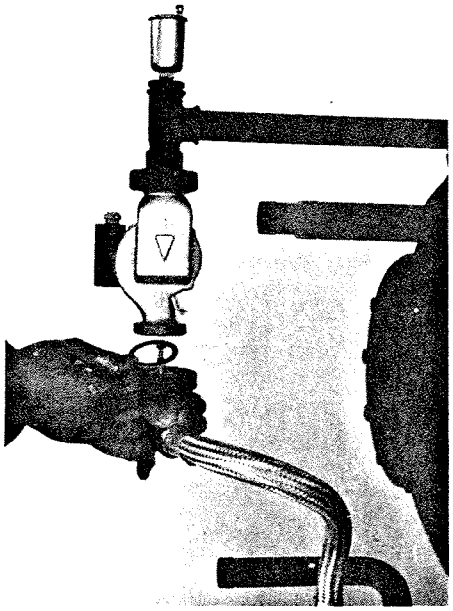


Photo 9
Install pipe Tee on Tank return pipe (use Teflon tape) install reduction coupling and pump coupling on flange. Install loading pump (not included in shipment) flow arrow pointing down. Mount check valve between two gaskets into the lower pump connection.
IMPORTANT: Check valve spring must be on top side.
NOTE: Pumps with mounting flanges use (2) two flat rubber gaskets in mounting the check valve.

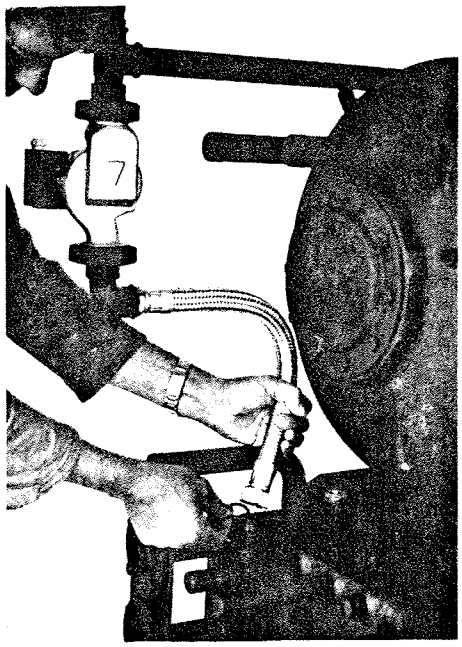


Photo 10
Connect flexible pipe with Tee connection of heating return pipe. Make sure no sharp bends will obstruct the flow.

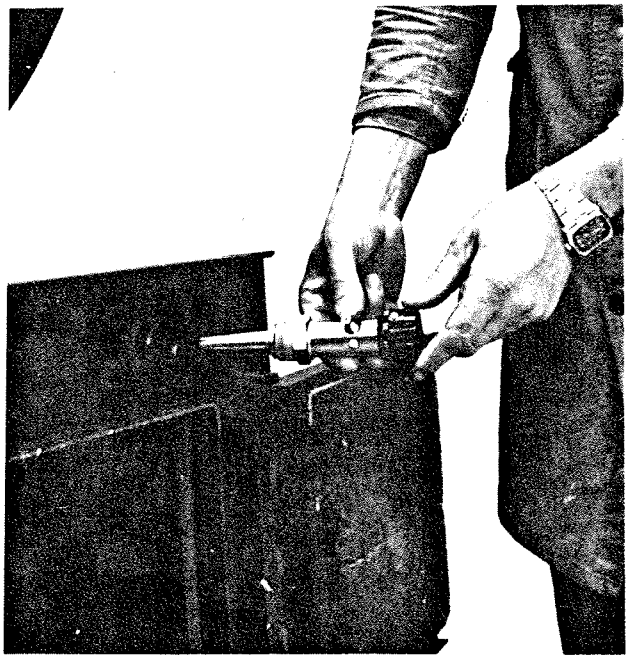


Photo 11
Install Samson draft regulator into the pipe socket on the right upper side of Boiler front.

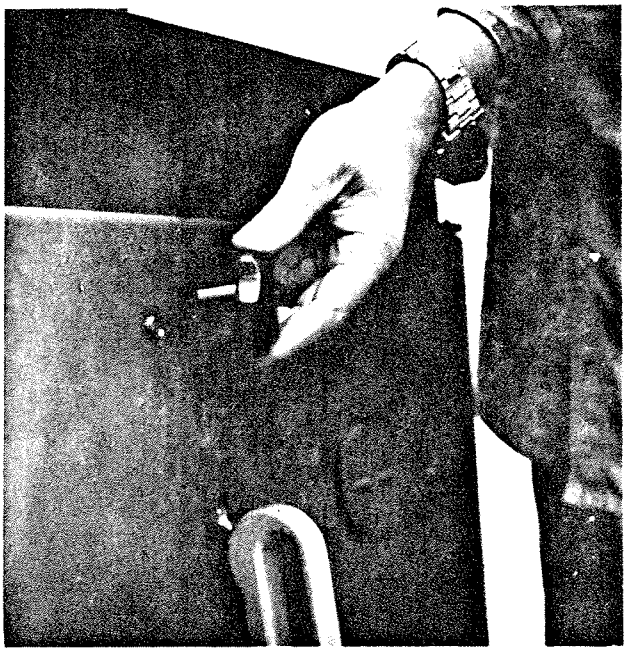


Photo 12
Lock door of oil combustion chamber with star handle.

Photo 13
Install door handles onto the upper and lower right hand doors.

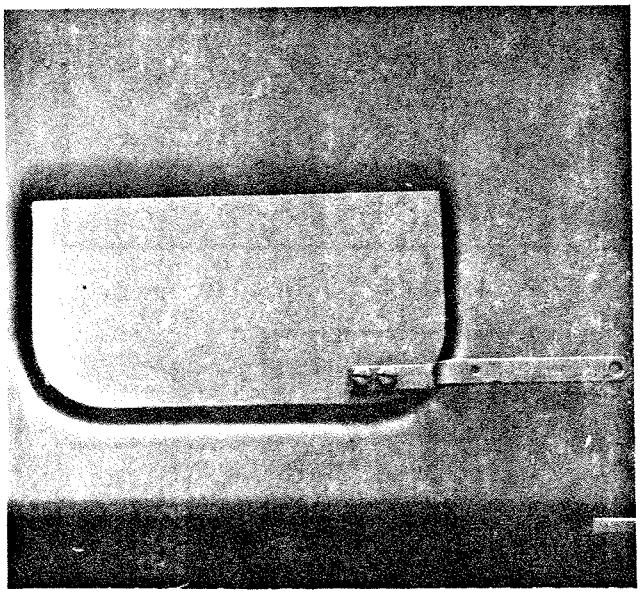


Photo 14
Mount bracket for automatic draft regulation to the air flop (Damper) in the ash pit door. Use screws supplied.

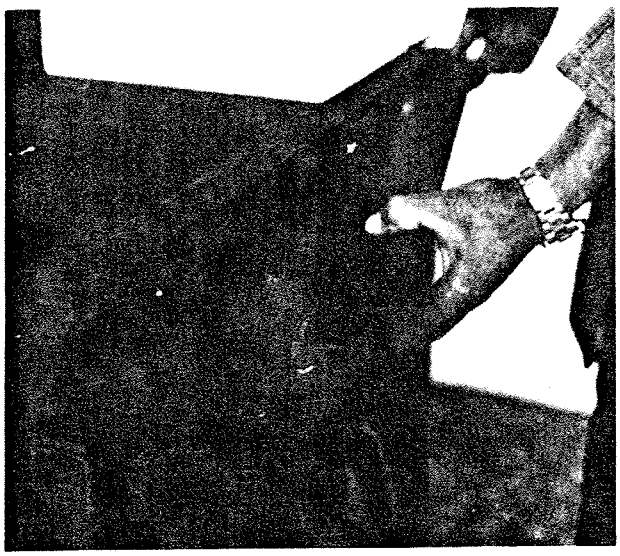


Photo 15
Hang door moulding onto the mounting pins above the doors. (Start on top of boiler)

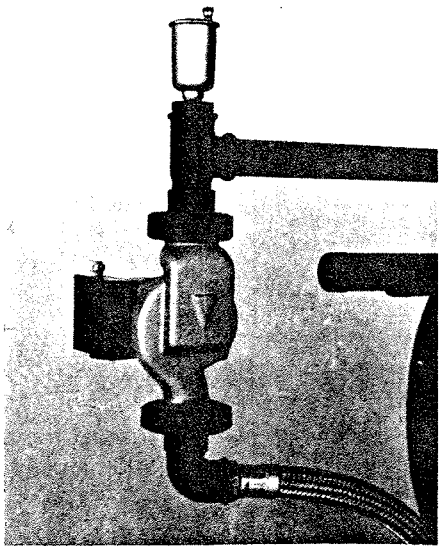
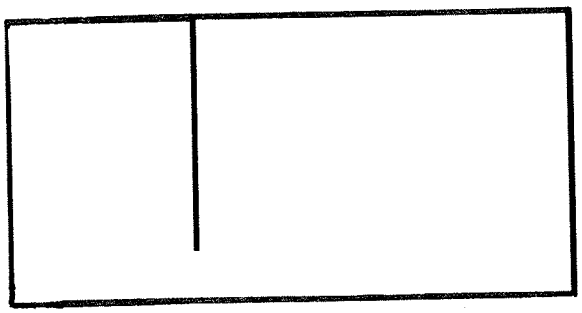
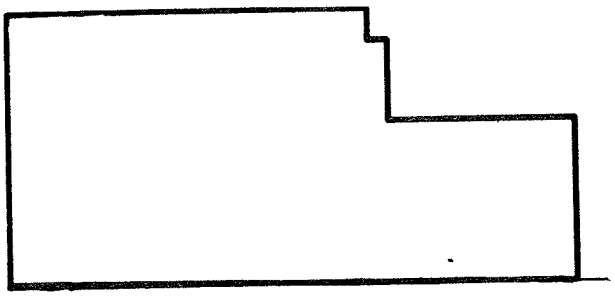


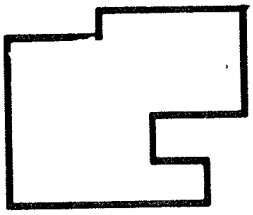
Photo 16
Install auto air vent into pipe (reducing) coupling.
IMPORTANT: Air vent must be used for correct operation of hot water tank.



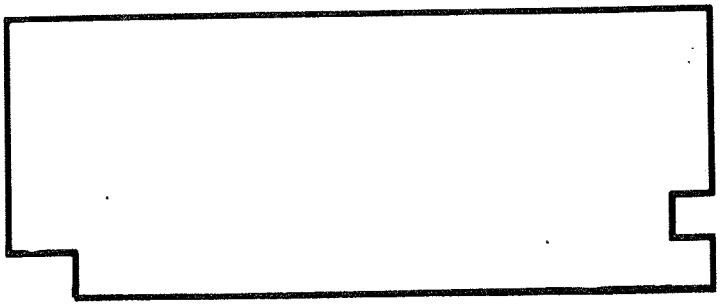
Sheet 1 = right Boiler side



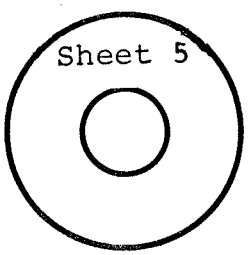
Sheet 2 = left Boiler side



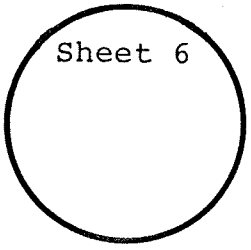
Sheet 3 = Covering pipe connection



Sheet 4 = Tank shell



= Tank crown Left



= Tank crown Right

Photo 17
Place insulation (sheet 1) on right hand side of Boiler.

Photo 18
Place insulation (sheet 2) on the left hand side of Boiler.

This is the boiler/tank insulation.

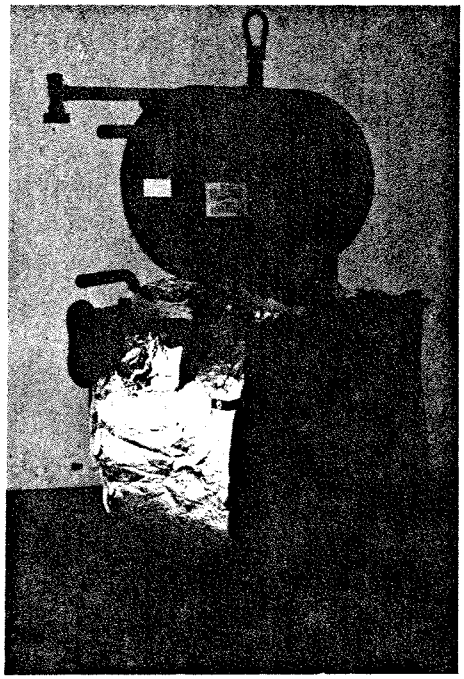


Photo 19
Place insulation (sheet 3) on top of the piping (Boiler).

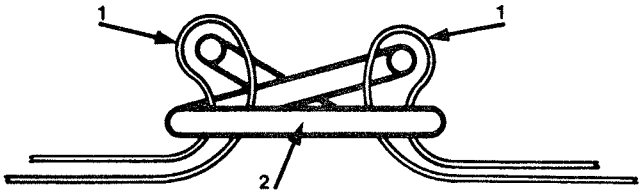


Photo 20
Place plastic belts in shackles at base, pull up on both sides and connect with buckles (2). Strap insulation moderately.

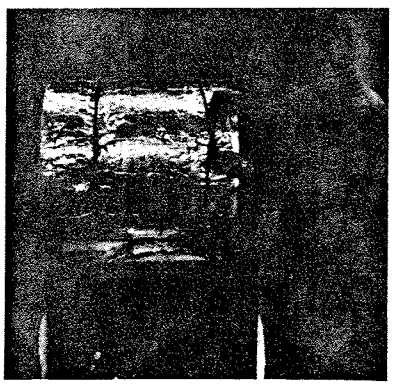


Photo 21 & 22
Cover tank with insulation (Sheet 4) and strap with two plastic belts.

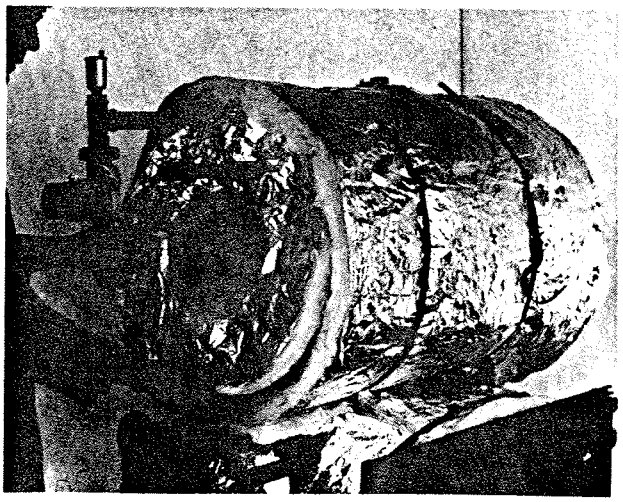


Photo 23
Place insulation (Sheet 5) left and (Sheet 6) right against the end plates of tank.

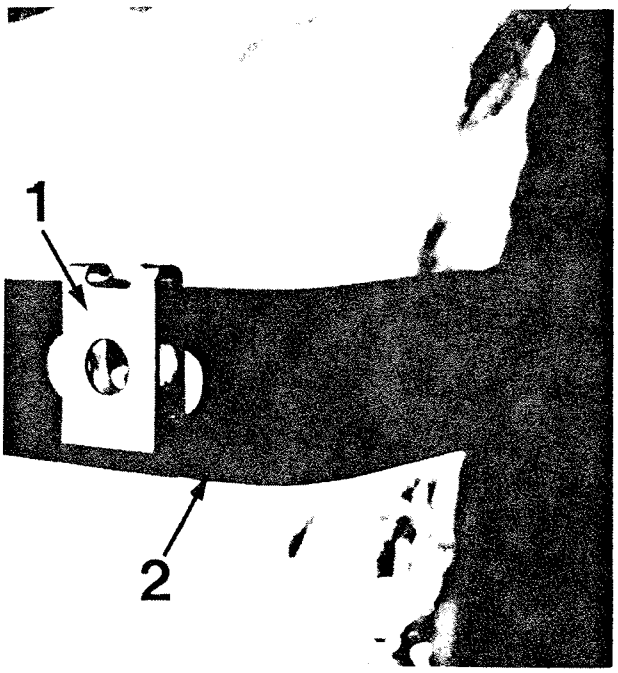


Photo 24
Installation of Boiler Jacket — Slide 5 Tinnerman clips (contained in plastic bag). No. (1) the clips (2) of boiler

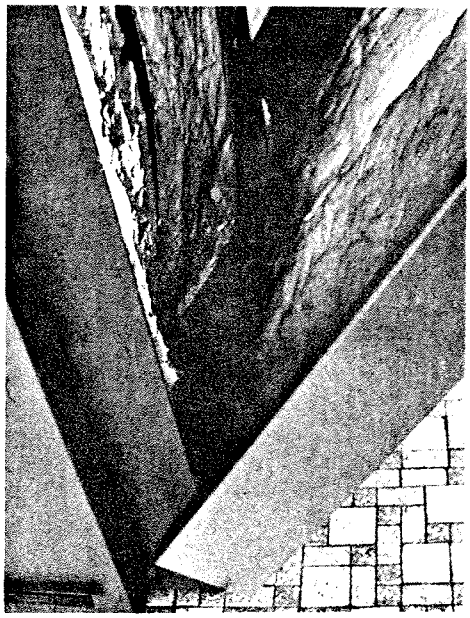


Photo 25
Slide right side panel behind base channel and push upright.

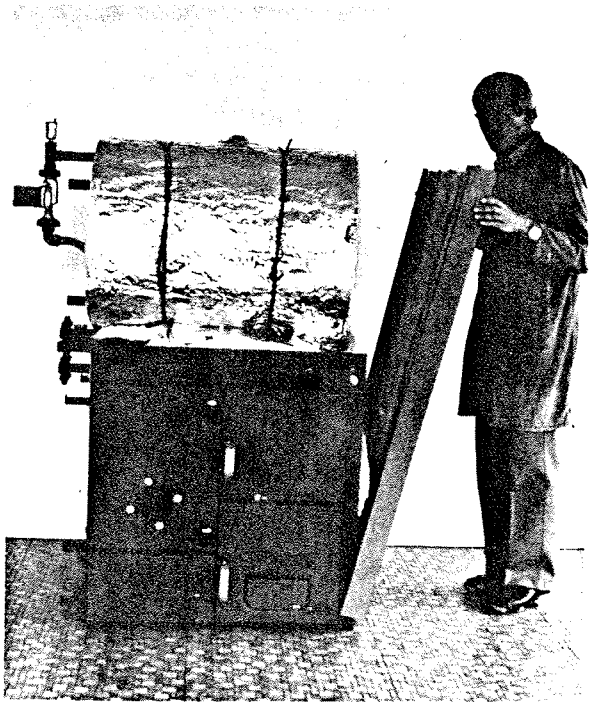


Photo 26

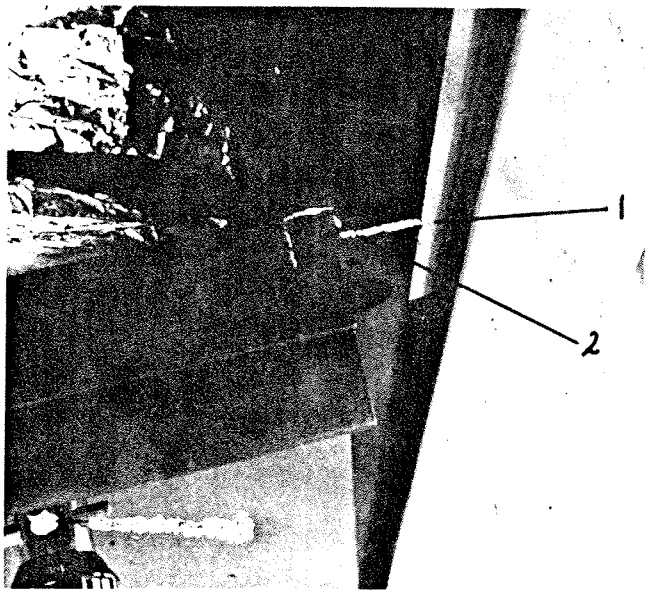


Photo 27
Place offset flange (1) of side panel into cut out (2) of boiler front shield.

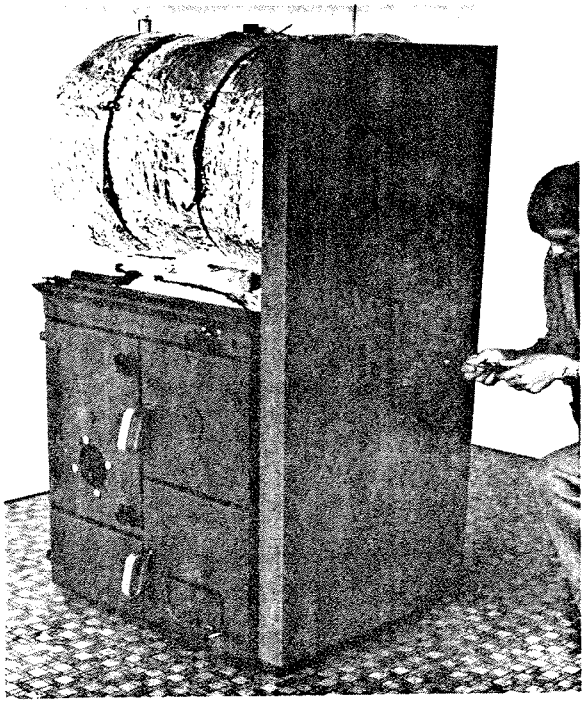


Photo 28
Secure side panel with sheet metal screws.

Photo 29

Photo 30

Fasten front angle (Photo 29) and left rear angle (Photo 30) with two sheet metal screws to the brackets.

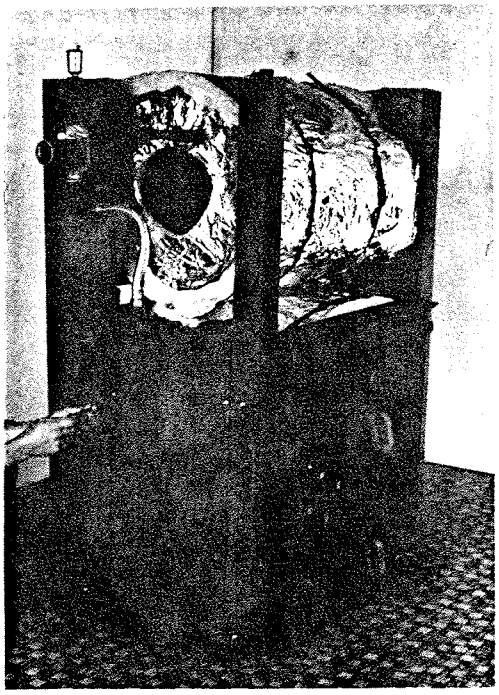


Photo 31

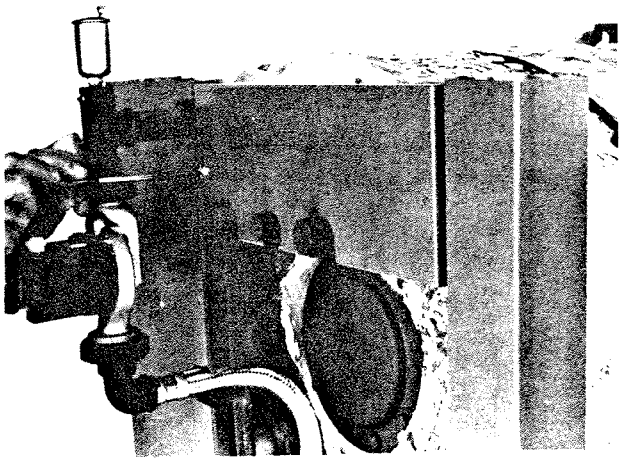


Photo 32

Install lower left side panel (Photo 31) and upper left side panel (Photo 32) with two sheet metal screws each.
IMPORTANT: Do not tighten sheet metal screws.

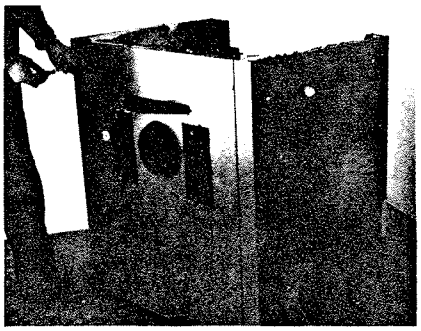
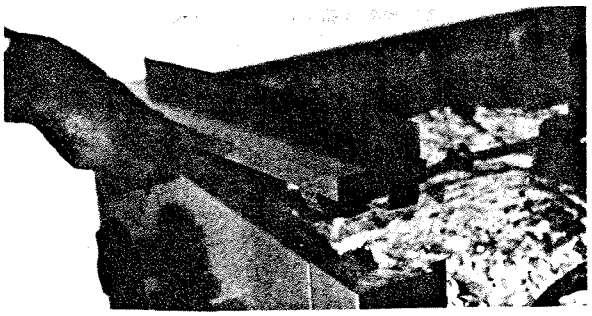


Photo 34

Photo 33

Photo 33 — Duolyt with Hot Water Tank
34 — Duolyt less Hot Water Tank
Fasten rear panel with four sheet metal screws.
IMPORTANT: A flue gas collector protruding from the rear side of the Duolyt 40 and 52 must be covered with insulated hood supplied. The hood is secured against the rear panel with sheet metal screws.



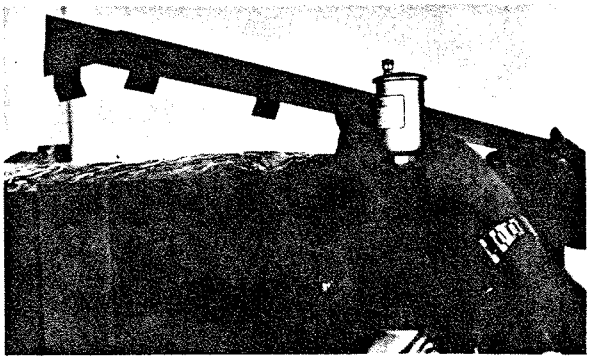


Photo 35 & 36
Installation of right and left hand cover of side panel on one small side as shown above.

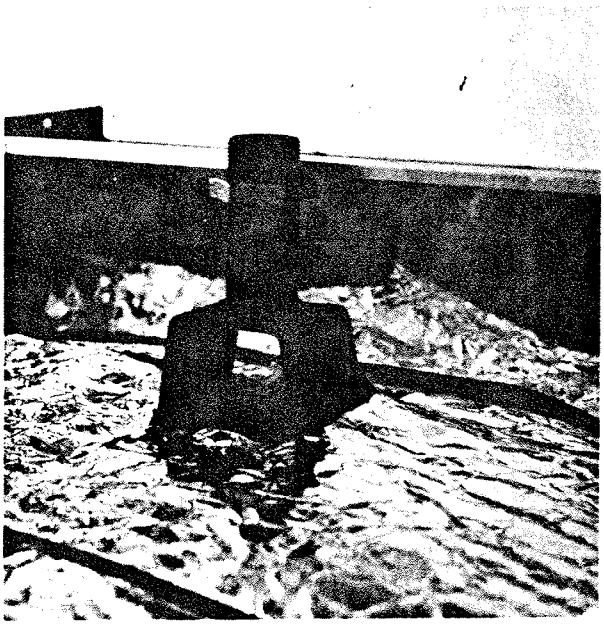


Photo 37
Adjust threaded nut (1) on suspension stud. Level with upper edges of side panels.

Photo 38
Place jacket top panel with control box (as shown in Photo Less HW tank) temporarily on top of jacket.

Photo 39
Installation of aquastat and thermometer

Sensors — Duolyt with hot water tank

The sensors of tank aquastat and tank thermometer are marked in red.
Introduce the 3 not color marked sensors with 4-sector-separator along with boiler thermometer sensor and spaces spring into <u>boiler well.</u> Secure capillary tubes with clip (see sketches).
IMPORTANT: Avoid sharp bend in the capillaries.

1. Four-sector-spaces (copper)
2. Spacer spring
3. Thermometer sensor
4. Holding clip

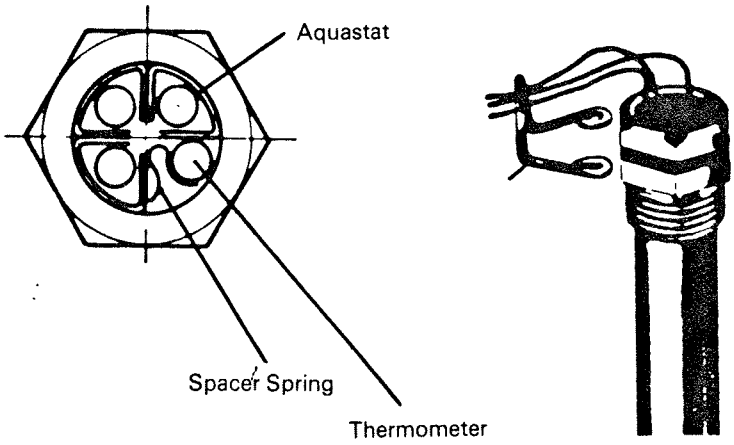


Photo 40
BOILER — WELL

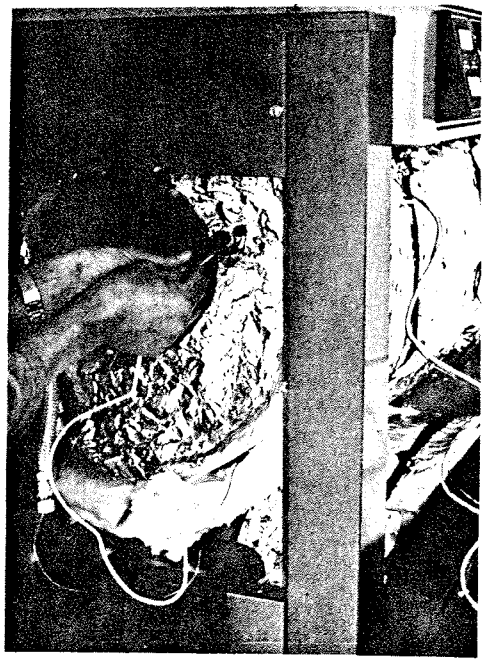


Photo 41
Insert sensors marked red (aquastat and tank temperature sensor) using the sector-separator and spacer spring (1) into the tank well (2) secure capillary tubes with rubber plug (see sketch).
IMPORTANT: Avoid sharp bend in capillaries.

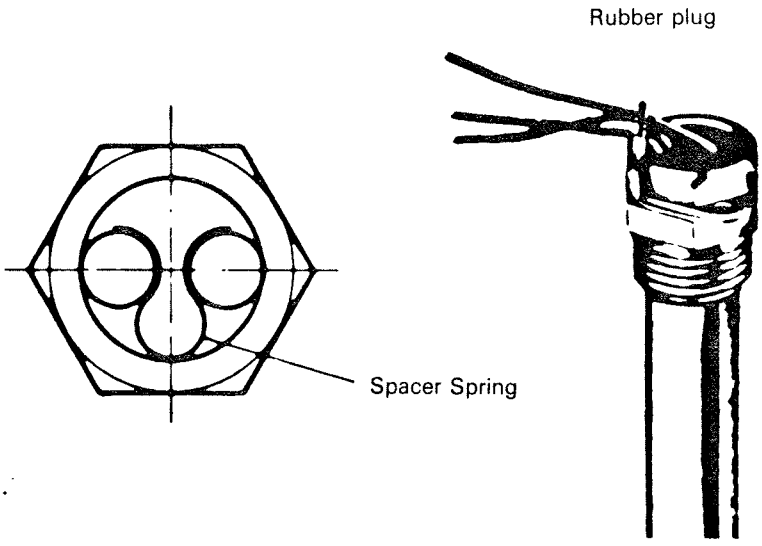


Photo 42
TANK — WELL (#2)
Spacer Spring (#1)

Photo 43
Connect burner cable with controls.

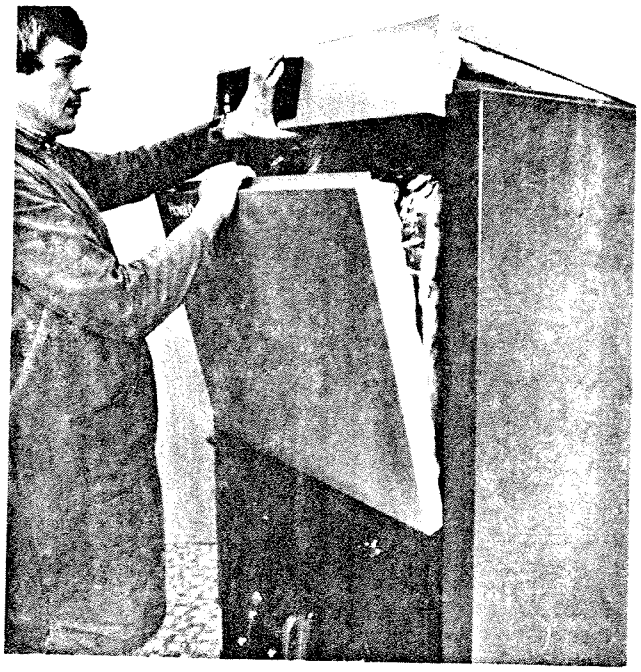


Photo 44
Lift cover, install front panel and clamp by lowering cover.

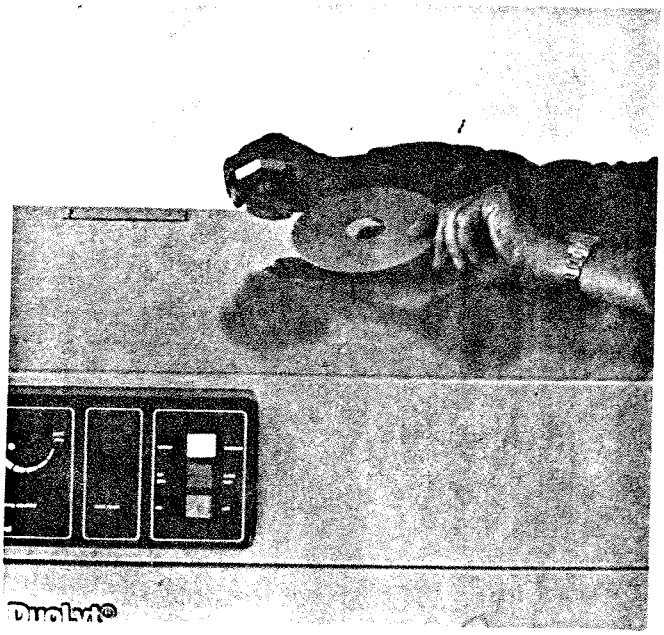


Photo 45
Place top center panel in correct position and secure with disc and threaded nut.

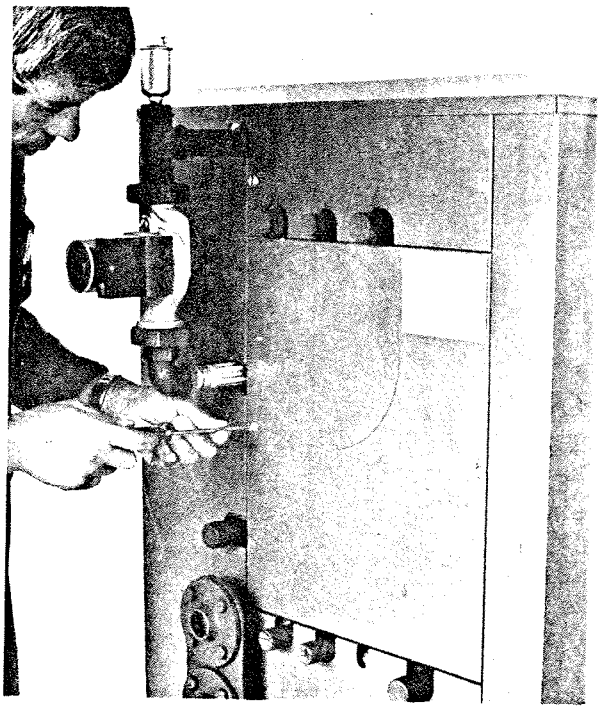


Photo 46
Install the center side panel and secure with two sheet metal screws.
IMPORTANT: Now tighten all sheet metal screws.

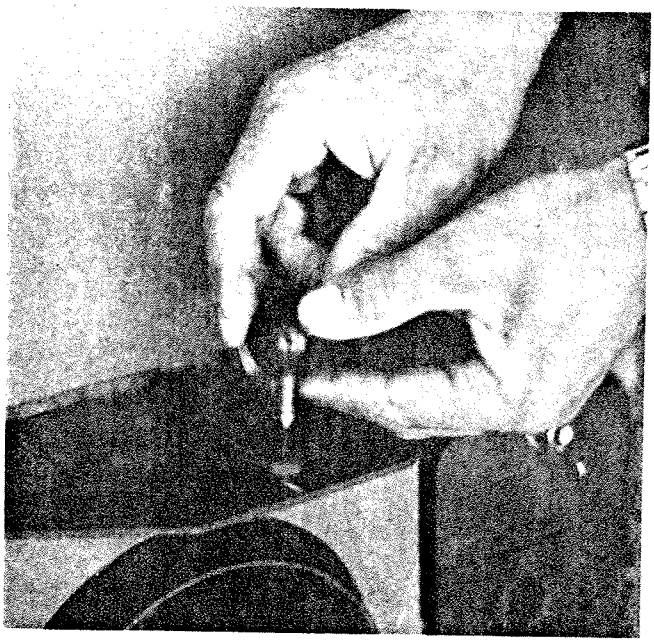


Photo 47
Screw ball head locking screw into the lever of flue damper. For automatic switch over place damper at ½ position. Some models have damper lever located on side of jacket. Mount ballhead locking screws and locate lever for proper operation.

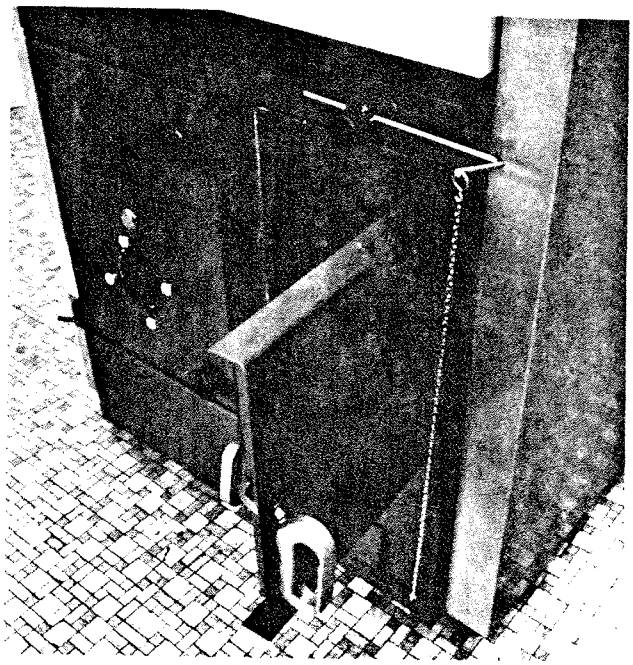


Photo 48
Connect draft regulator chain with air (Flop) damper according to suppliers instructions.

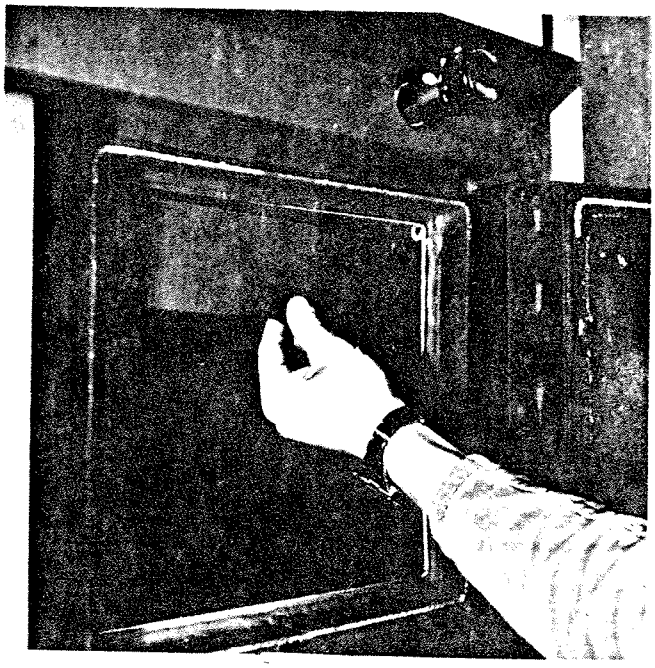


Photo 49
Check correct position of fume guard behind filling door of the solid fuel compartment.

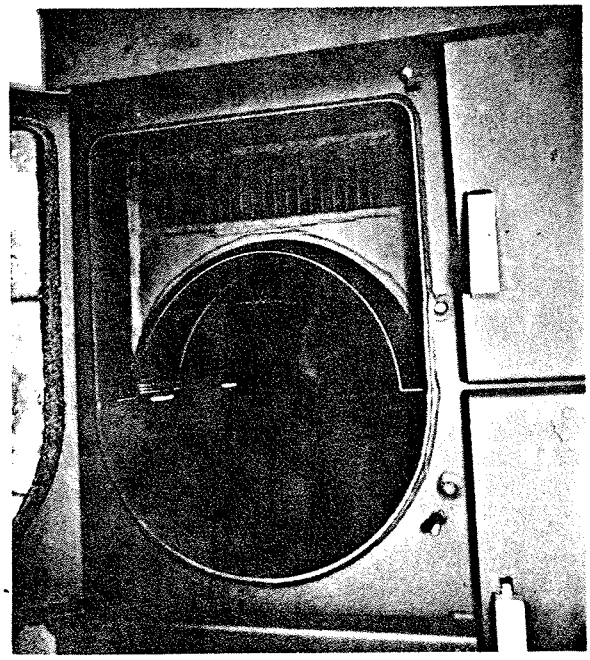
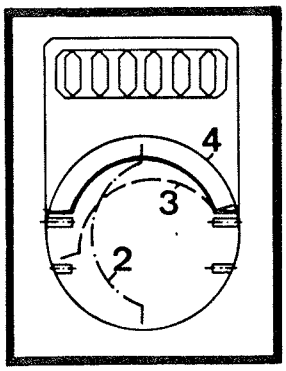


Photo 50

Insert reflector baffle upright into oil/Gas combustion chamber as shown in position (2) with flange tabs (1) toward front of opening. Rotate clockwise and position into the left lower brackets. (3).



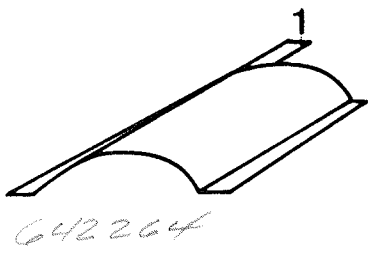


Photo 51

Insert reflector baffle upright into oil/Gas combustion chamber, Position (2) the spacer (1) being directed toward the rear. Rotate reflector clockwise and position into the right upper brackets (3) squeeze reflector slightly and place into the left side brackets. Slide towards the rear until spacer touches rear wall.

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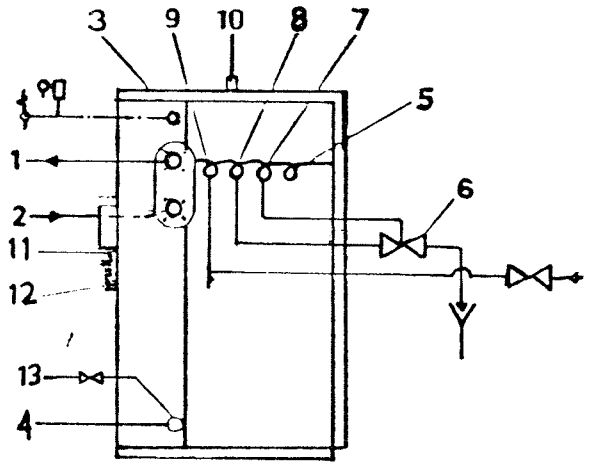
INSTALLATION INSTRUCTION
BOILER INSTALLATION
PIPING CONNECTIONS — DuoLyt

(Sketch no:1)

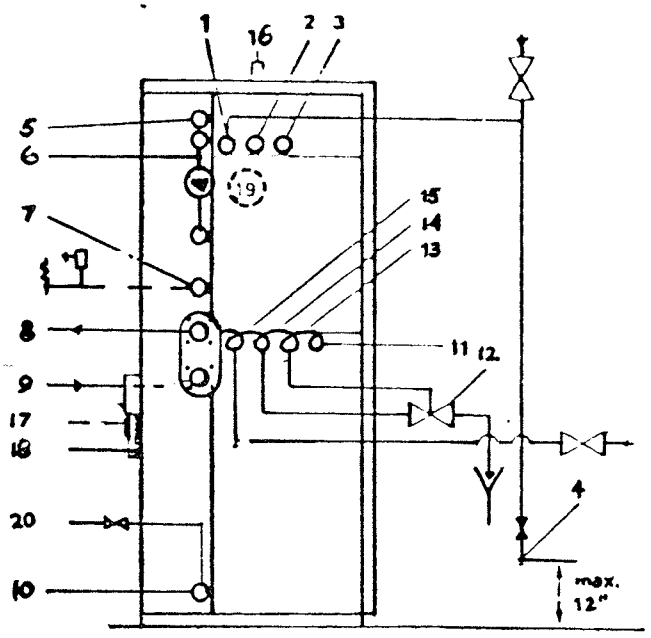
1. Heating supply pipe
2. Heating return pipe
3. ASME boiler relief valve/Exp. tank conn.
4. Boiler drain
5. By-pass mixing-valve for overheating protection
6. Thermal overheating protection
7. Socket for well overheating device
8. Safety overheat coil-conn. hot water drain
9. Safety overheat coil-conn. cold feed
10. Socket lifting eye
11. Smoke outlet breeching
12. Cleaning door
13. Pressure reducing valve (if required)



INSTALLATION INSTRUCTION
BOILER INSTALLATION PIPING CONNECTIONS
DuoLyt — DHW - TANK

(Sketch no: 1)

1. Dom. hot water/cold water feed
2. ASME temp. and pressure relief valve tank
3. Dom hot water supply to appliances
4. Drain for dom. hot water tank
5. Autom. air vent (to be supplied by customer)
6. Circulator return flow from tank (down)
7. ASME boiler relief valve/expansion tank conn.
8. Heating supply pipe
9. Heating return pipe
10. Boiler drain
11. By-pass mixing-valve for overheating protection
12. Thermal overheating device
13. Socket for well overheating device
14. Safety overheat coil-conn. hot water drain
15. Safety overheat coil-conn. cold feed
16. Socket lifting eye
17. Smoke outlet breeching
18. Cleaning door
19. Tank inspection cover (must be easily accessible)
20. Pressure reducing valve (if required)



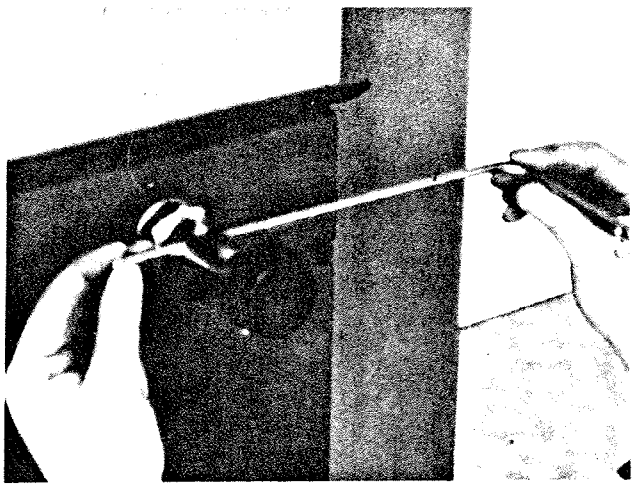
Hoval®

SERVICE SAMSON DRAFT REGULATOR

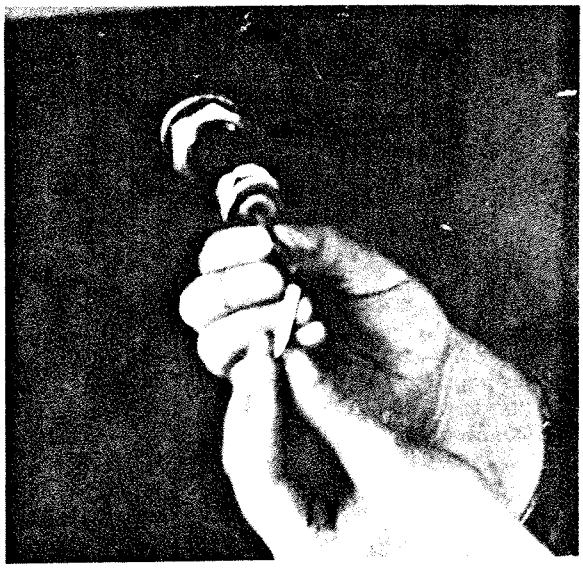
The Samson Draft Regulator is a thermal operated control, and the thermal element may be easily changed if the draft regulator fails to function. Before changing the element a few tests should be made to determine if the regulator is faulty.

1. Check draft door and make sure door operates freely.
2. Check fill and cleanout doors and make sure doors close tightly (no air leakage.)
3. Shut power to oil burner. Run circulator and cool boiler to 30°C (85°F).
4. Turn knob on draft regulator so the red number 30°C matches the red line on the regulator body. Check the chain adjustment. The draft door should be closed and the chain tight.
5. Reset knob to 60°C. The draft door should open about 1½".
6. Start burner and run boiler until it heats to about 60°C. The draft door should be closed at this point.
7. If the regulator fails to function, the thermal element must be changed.

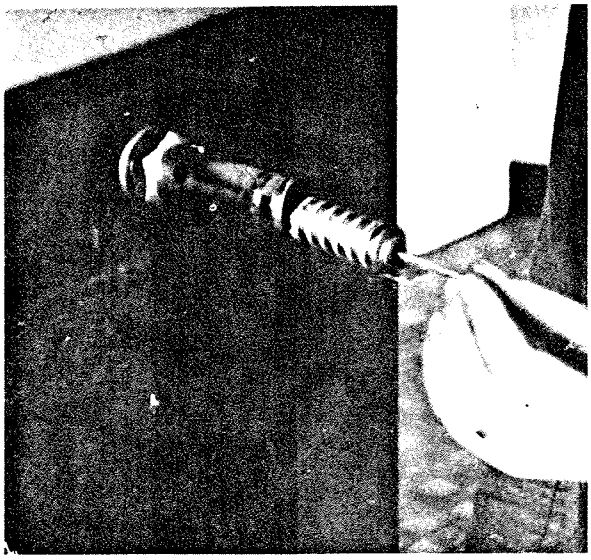
2. Loosen set screw on knob, turn knob counter clockwise off regulator body.



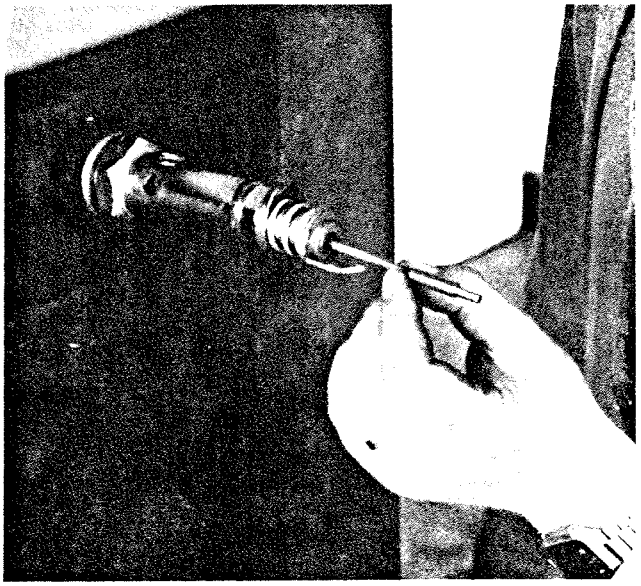
1. Loosen set screw and remove hex arm and pin.



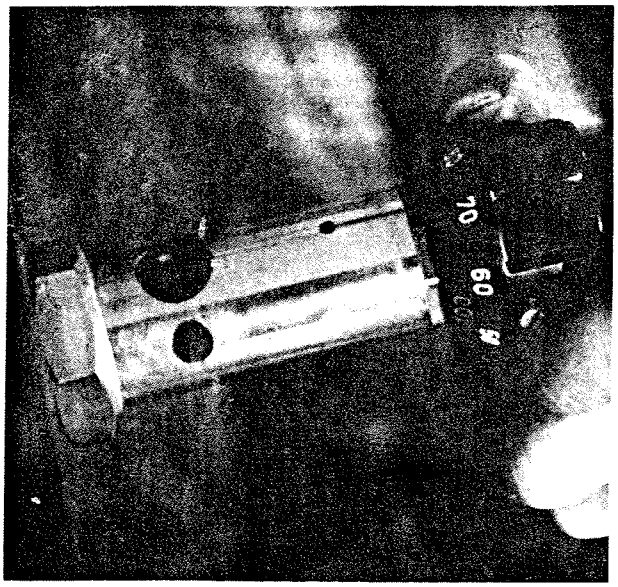
3. Remove push rod and thermal element.



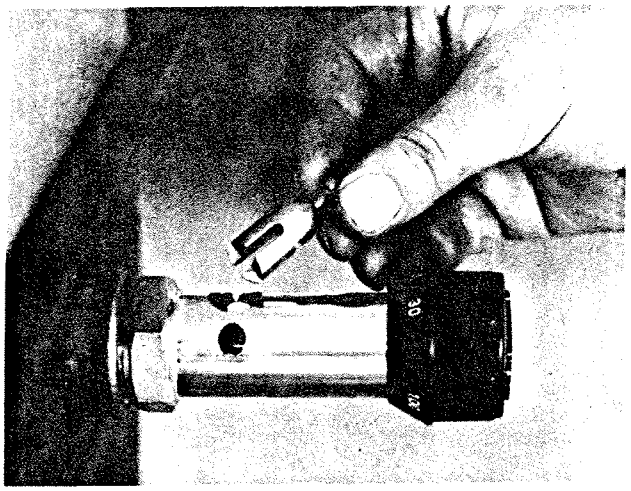
4. Install new thermal element making sure that flat spot on thermal element is at the bottom or 6 o'clock position.



5. Install push rod. (on some models)



6. **THIS IS THE MOST IMPORTANT STEP!**
Match the red number 30 on knob with the red line on the valve body. Press knob in to overcome spring tension and turn clockwise to catch threads on valve body. Tighten set screw on knob.



7. Install drive pin and hex arm and chain.

8. Repeat step #3. Draft regulator is now ready to operate.

9. When burning solid fuel, a setting of 80°C should operate the boiler correctly.

Hoval®

MIXING VALVE

The Mixing Valve is a three-way heat activated valve and is opened by a hydraulic fluid when heated by the 12 watt resistance heater. The heater is energized by the R8239 relay mounted on the wiring harness on call from the thermostat on a single zone system, or the circulator relay on a multi-zone system. From a cold start it will take 15 minutes for the valve to open and 5 minutes to close when the thermostat is satisfied. On normal cycles it takes 8 - 12 minutes to open. For proper operation the cover must be in place.

On a single zone system, the valve acts as a flow check so no flow check is required.

The valve has a knob to manually open the valve in case of power failure or valve failure. THE HOME OWNER SHOULD BE SHOWN HOW TO MANUALLY OPEN THE MIXING VALVE AND FLOW CHECKS.

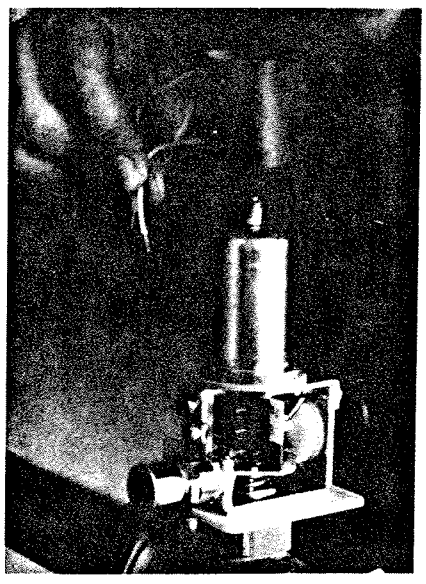
VALVE FUNCTION

The valve is delayed in opening and will pre-temper the return water preventing cold water thermal shock and electrolysis. Also, the mixing valve is a fuel saver.

Because it is controlled by the thermostatic cycles, the mixing valve will not fully open unless a full demand is made on the boiler. This prevents overheating of the houses and excessive heat loss through the piping, thus saving fuel. On copper fin and tube radiation the mixing valve will also eliminate expansion noise.

Before replacing the valve head, make the following checks:

1. Place summer-winter switch located on master panel in the winter position. During this test shut off oil burner switch. Turn thermostat to call for heat, the R8239 relay located on the wiring harness should make contact. Remove cover from mixing valve. Place volt meter across terminals R and MP. A reading of 120 volts should be had, and the heater element should be hot. Install cover. In about 15 minutes the valve should open. Turn knob on valve clockwise. If there is resistance, the valve is not opening. If there is no resistance, the valve is opening.



2. If a reading of 120 volts is obtained across terminal R and MP, and the coil is not hot — replace coil.
3. If the coil is hot and the valve fails to open in 20 minutes — replace the head.
4. If a reading of 120 volts is not obtained at terminals R and MP — place a jumper across terminals R and G on the R8239 relay located on the wiring harness. The relay should make contact.

   If the relay fails to pull in, place volt meter across terminal R and C on the R8239 relay — a reading of 24 volts should be had. If a 24 volt reading is not had, check power supply to relay.

   If the power supply is 110 volts and the reading fails to make contact, replace relay.

   If the relay makes contact and there is still no power to the mixing valve, check the #5 terminal for 110V located in junction box. If the #5 terminal is not hot, open master panel and check summer-winter switch. Replace switch if defective.
5. On the old style mixing valves (the valves with the shift lever), the heater can easily be replaced. Check power supply to terminals R and MP. If you have power at this point, and the head of the valve does not get hot, replace heater.

MIXING VALVE CHARACTERISTICS

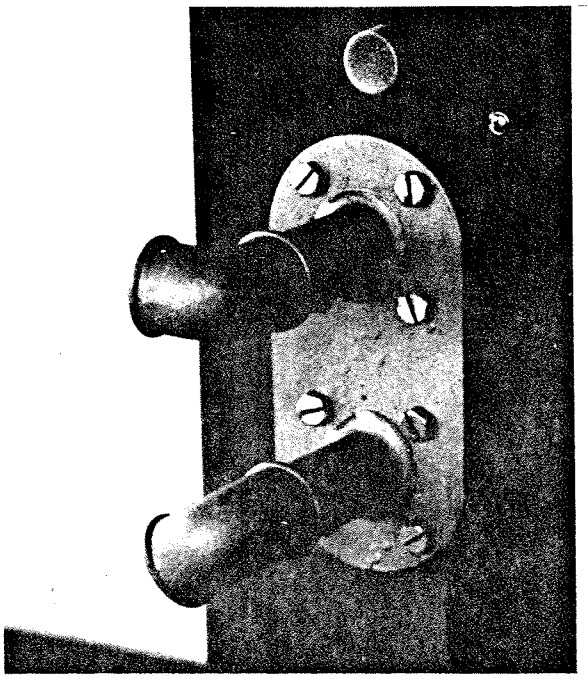
- 120V ± 109.
- Ambient Temperature should not exceed 140°F (60°C).
- R (line) MP (neutral).
- Amp Draw T300 12 Watt Coil .075 Amps.
- Amp Draw Old Style 7702 .35 Amps.
- Ohms T300 — 1100 Ohms.
- Ohms Old Style 7702 — 350 Ohms.
- The wire to the valve must be high temperature asbestos covered wire.

ASSEMBLING

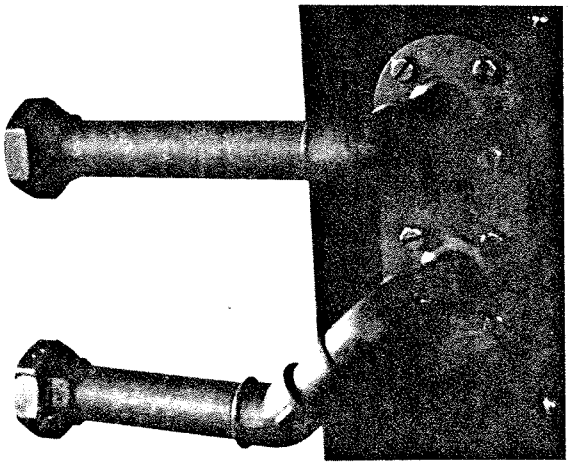
- Remove plastic cap from valve body.
- Position head to valve body and tighten hex nut. Make sure knob is in a position for easy operation.
- Turn knob clockwise a few times to loosen valve.
- Turn knob to the automatic position. Valve is now ready for operation.

POWER FLOW TO MIXING VALVE FROM MASTER PANEL

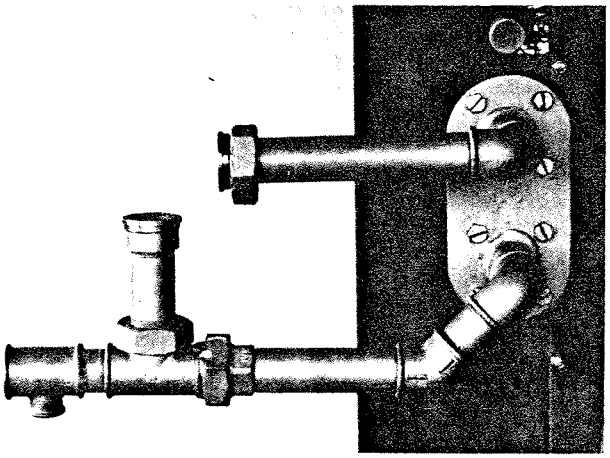
Ersatz No 243525
Helvo Cliff 75.76



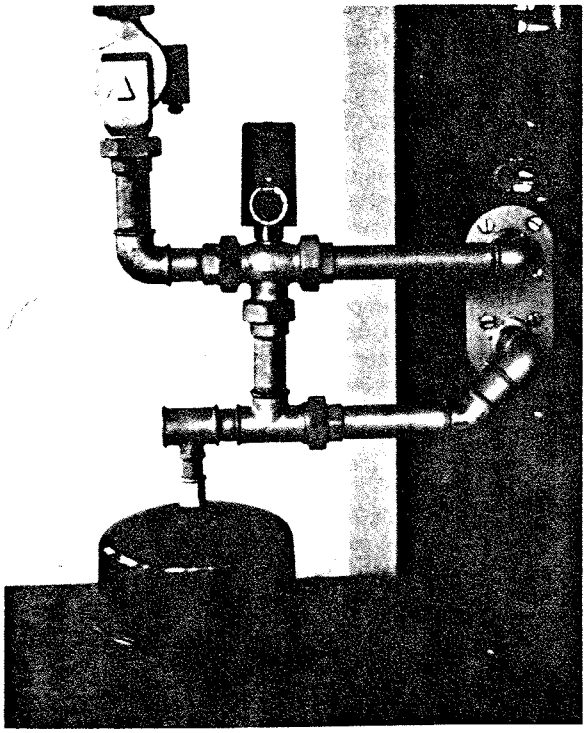
1. Bolt flanges to Boiler and install 2 1¼ 90° els.



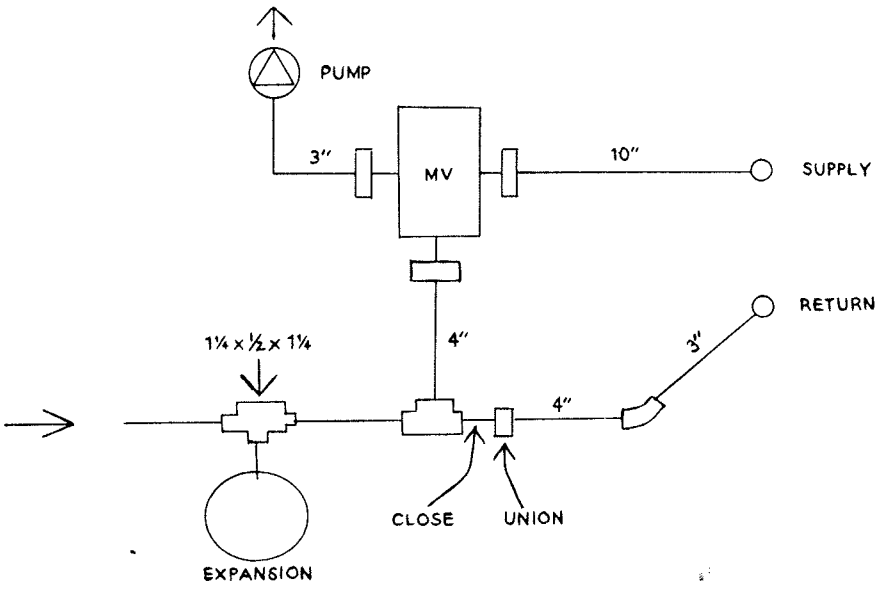
2. Install 1¼ 45° el and 1¼" union.



3. Install 10" nipple and union nut to top flange elbow.



4. Install mixing valve and expansion tank as shown.



5. Final piping.

MATERIAL REQUIRED

3 — 1¼ 90° Els	1 — 1¼ Nipple 10"
1 — 1¼ 45° El	1 — 1¼ Nipple 3"
3 — 1¼ Close Nipples	1 — 1¼ x ¾ x 1¼ T
2 — 1¼ Nipples 4"	

OVERHEAT AQUASTAT INFORMATION

The Duolyt boiler comes equipped with an overheat aquastat that may be used to cool the boiler in an overheat situation before the Syr non-electric overheat valve is activated.

This overheat aquastat is factory set at 90°C (195°F). The Syr overheat valve is preset at 204°F.

If the boiler should overheat, the aquastat will start a pump, open the mixing valve, and dump excess heat into the radiation when the primary water reaches 195°F.

If the water temperature continues to climb, the Syr overheat valve will open when the temperature reaches 204°F and cold water will flow through the overheat coil, cooling down the boiler.

The electrical connections for the oveheat aquastat (9 and 10) are located in the junction box on the top jacket panel at the rear of the panel.

SINGLE ZONE SYSTEM

Using bell wire, connect terminals 9 and 10 to terminals R and G located on the R8239G relay fastened to the wiring harness. If the boiler should overheat, the relay will start the pump and open the mixing valve.

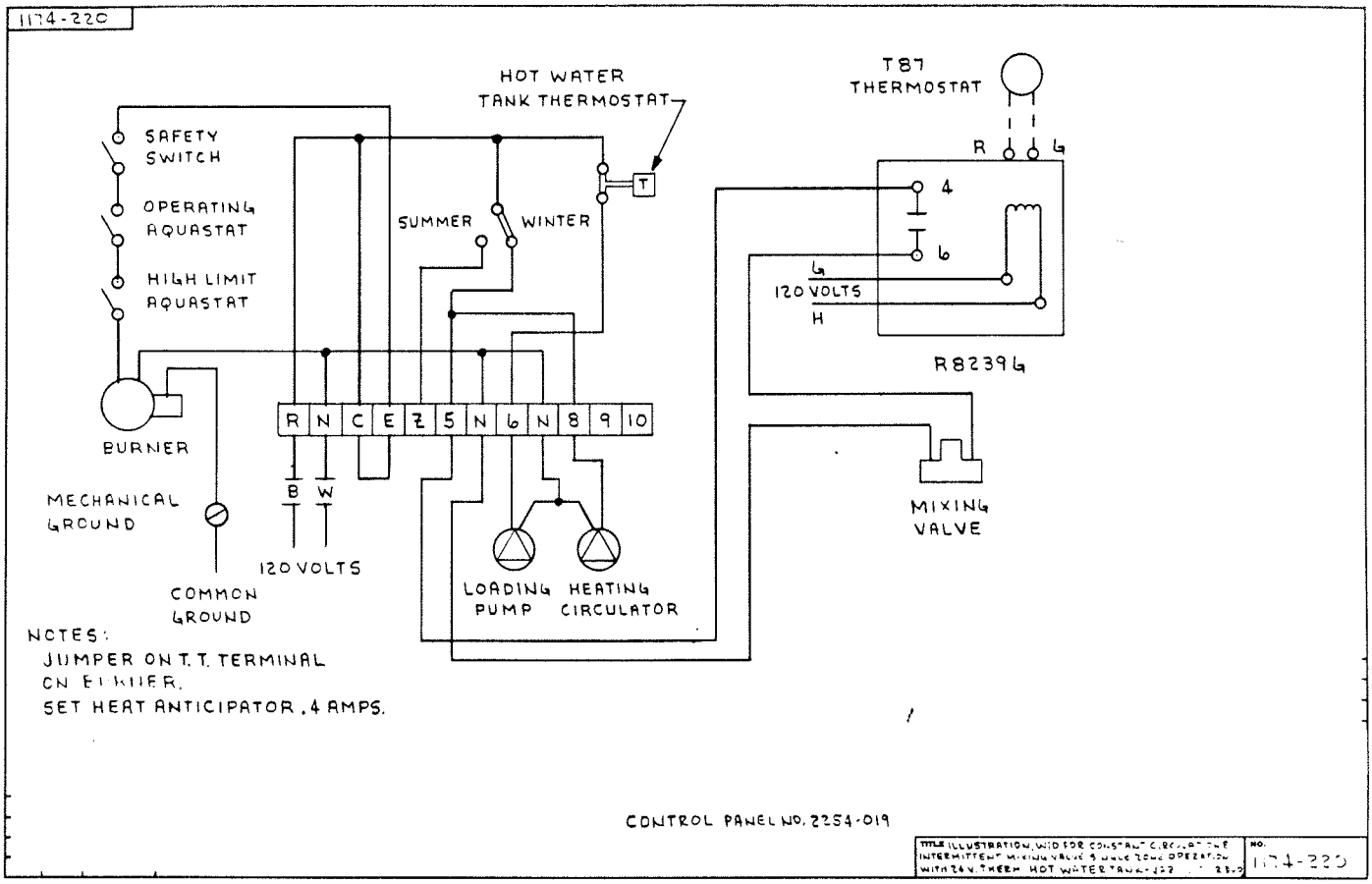
MULTI-ZONE SYSTEM WITH PUMPS USING R845 CIRCULATOR RELAY

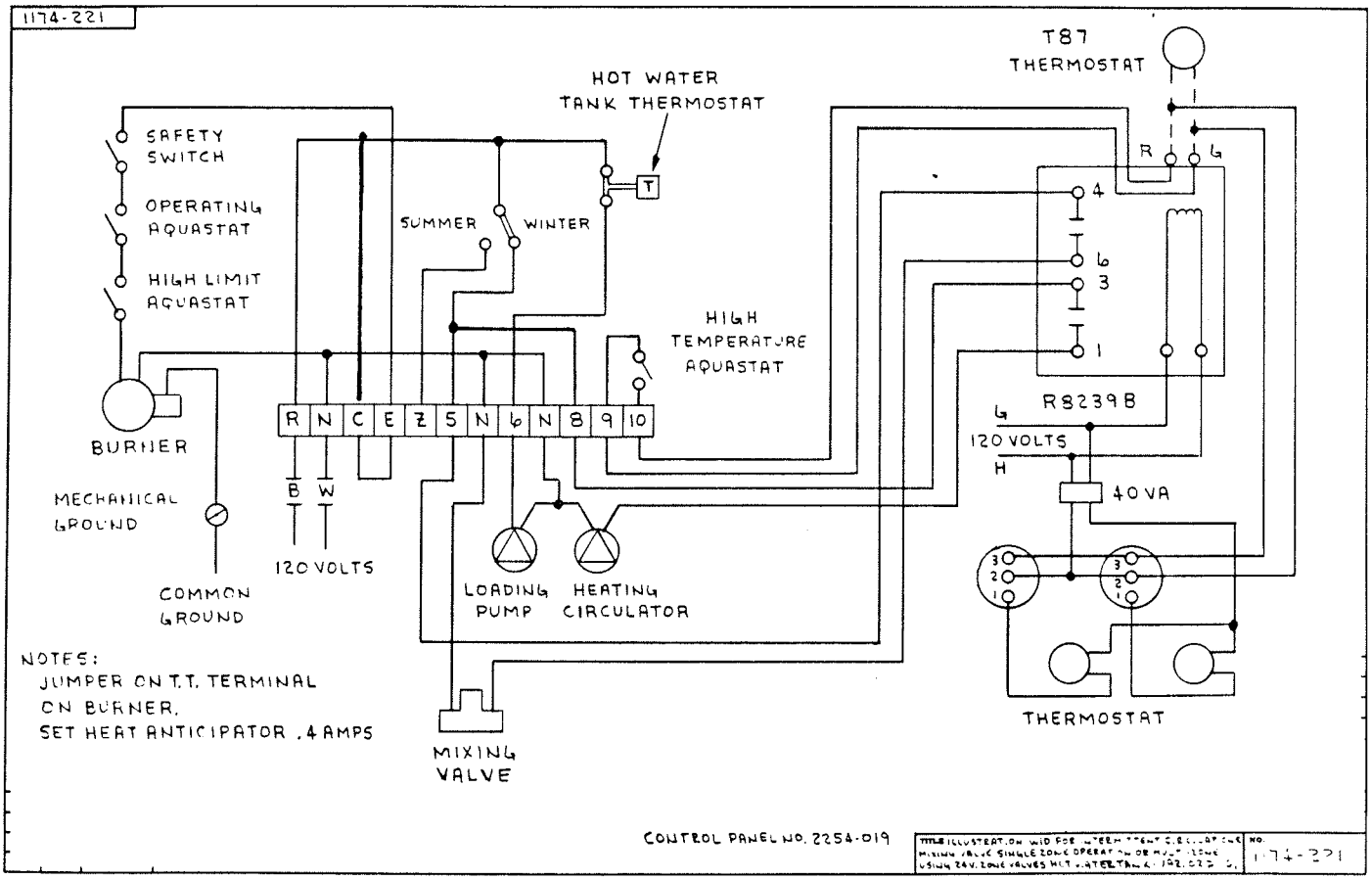
Using bell wire, connect terminals 9 and 10 to the TT terminals on one R845 relay. If the boiler should overheat, the aquastat will energize the zone chosen as the dump zone.

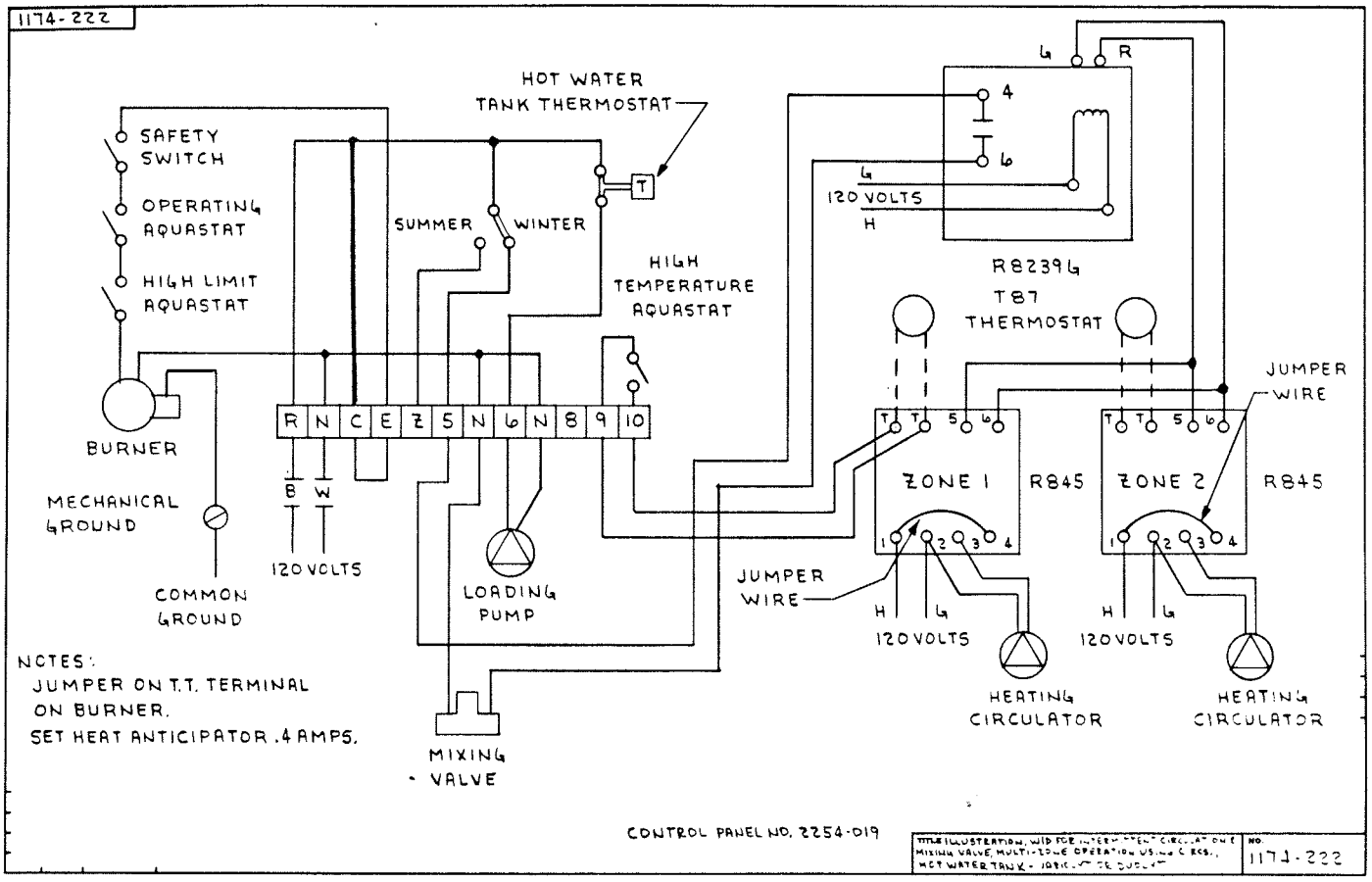
MULTI-ZONE WITH ZONE VALVES

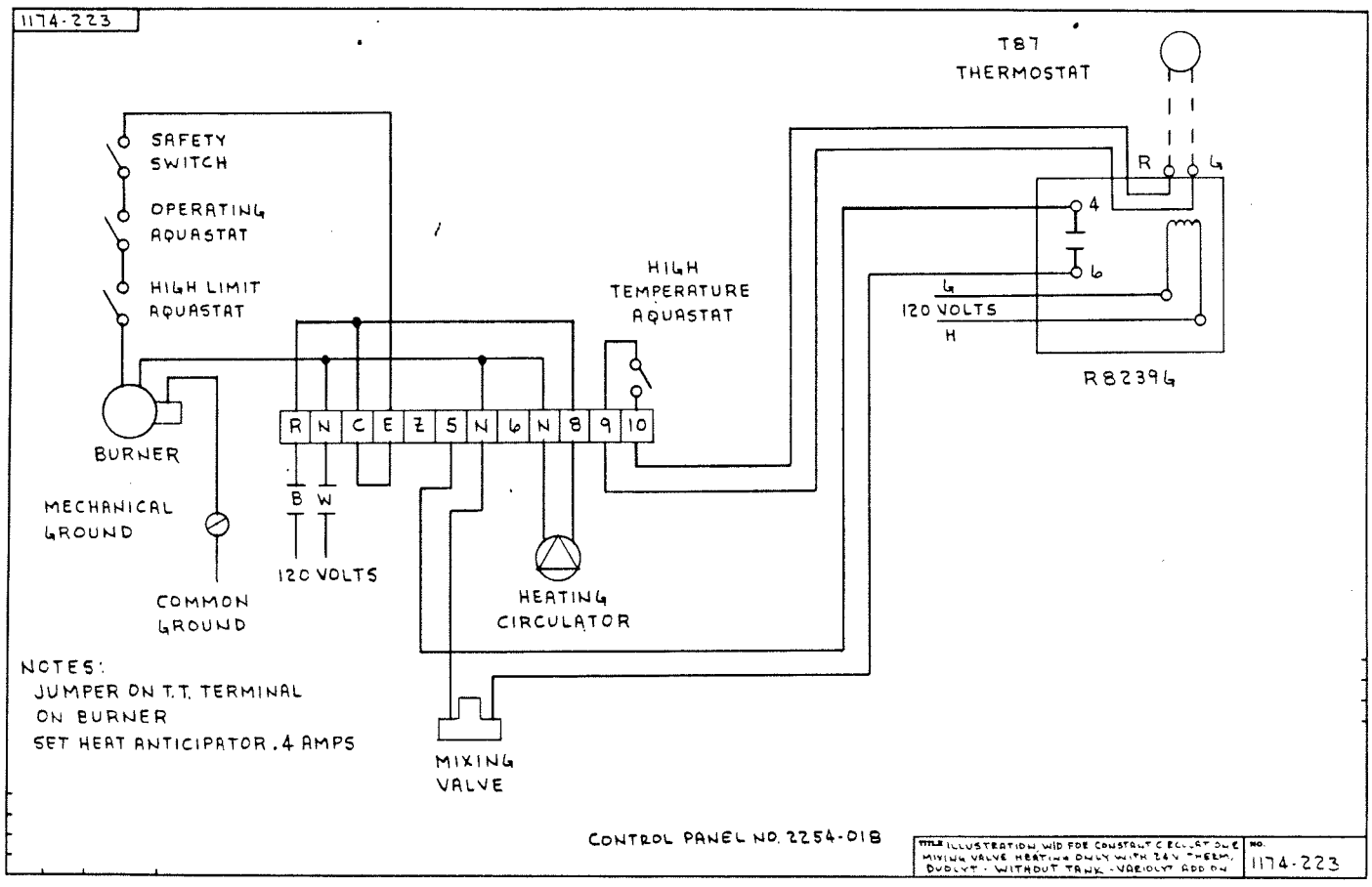
Using bell wire, connect terminals 9 and 10 to zone valve thermostat connections. This means that the overheat aquastat and the thermostat are wired in parallel.

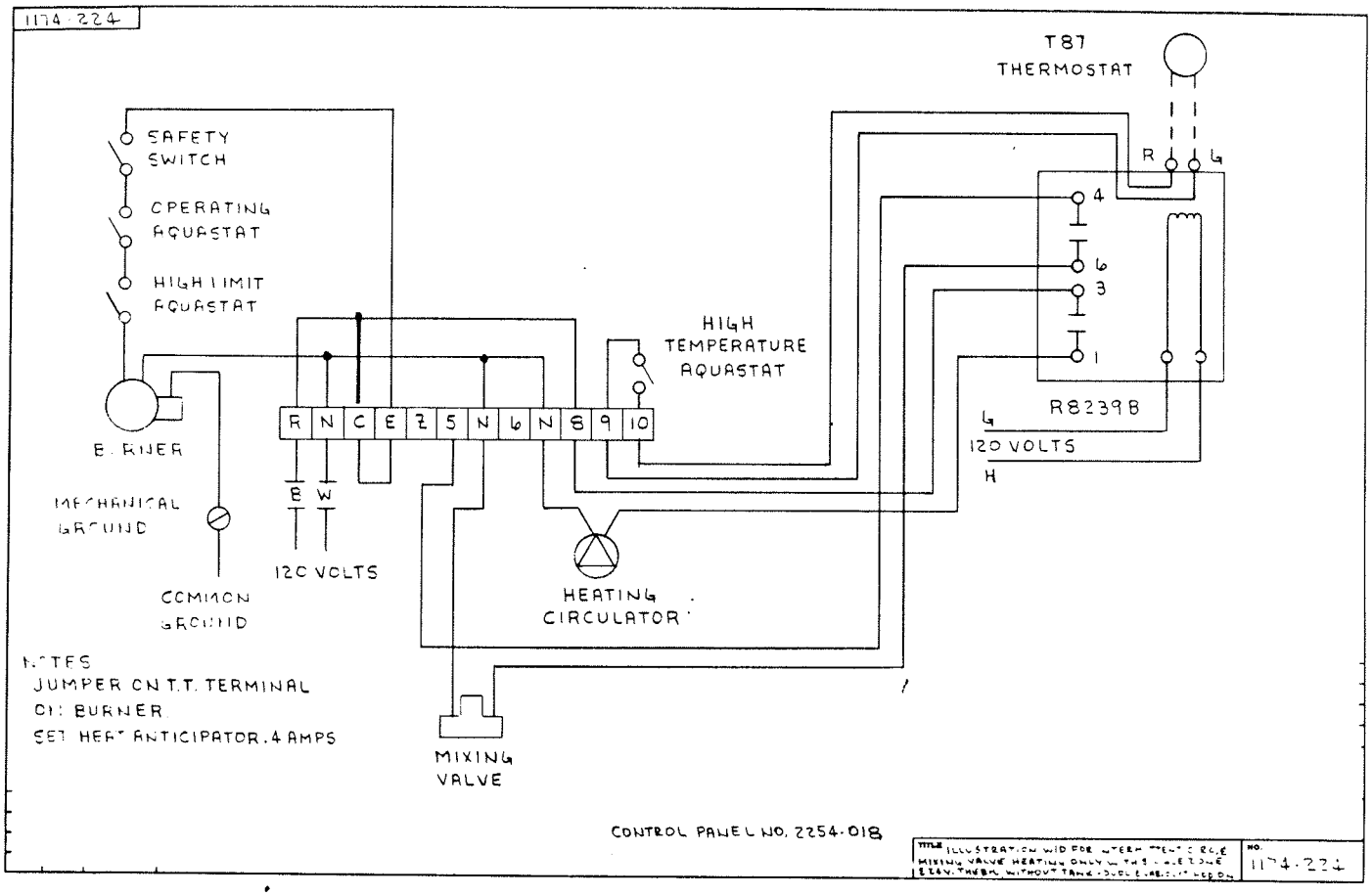
If the boiler should overheat, the aquastat will open the zone valve which will then start the pump and open the mixing valve.

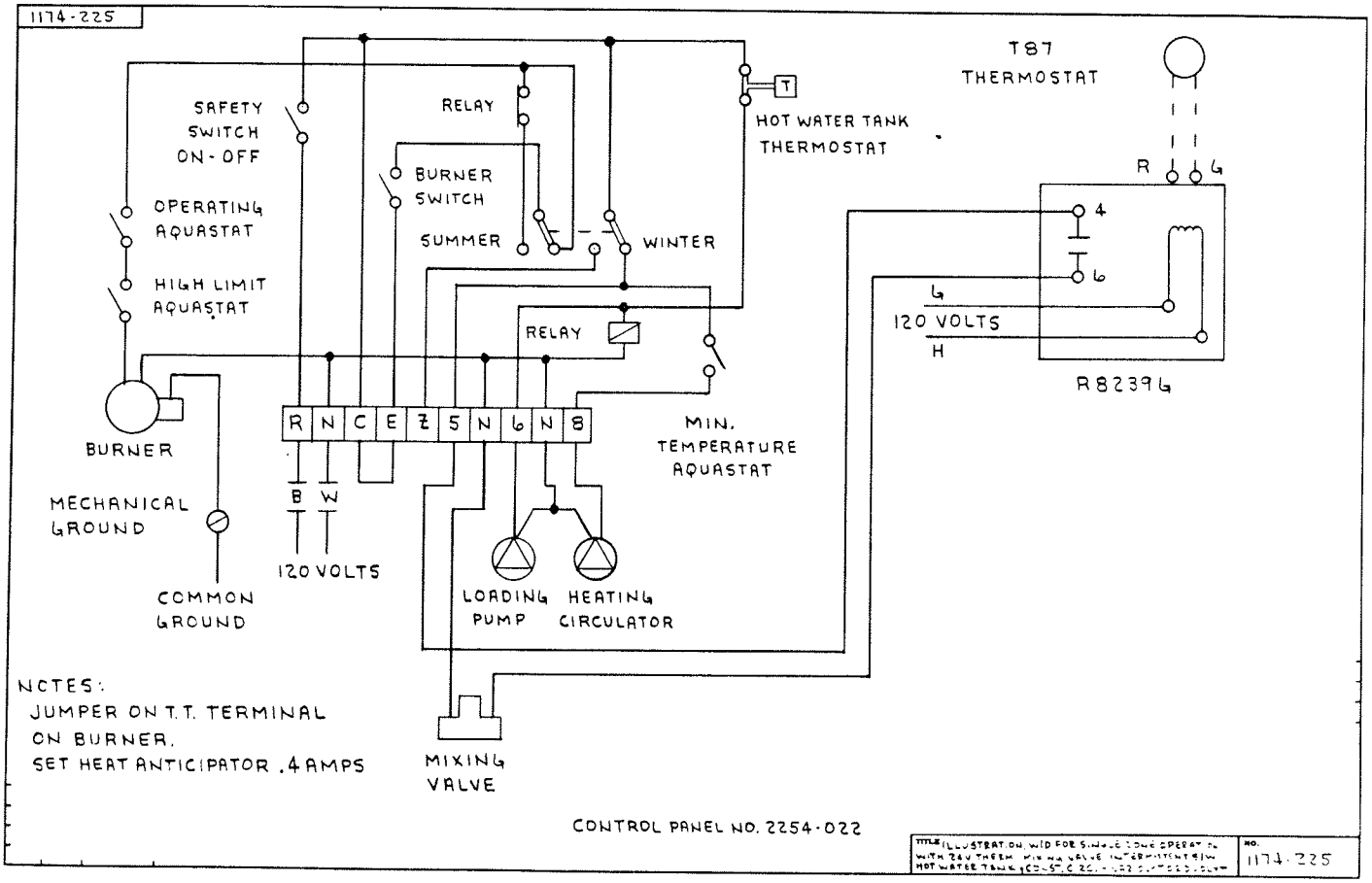

1174-220
HOT WATER
TANK THERMOSTAT
T87
THERMOSTAT
SAFETY
SWITCH
OPERATING
AQUASTAT
HIGH LIMIT
AQUASTAT
SUMMER
WINTER
R
G
4
6
G
120 VOLTS
H
R8239G
R N C E Z 5 N 6 N 8 9 10
BURNER
B W
MECHANICAL
GROUND
120 VOLTS
COMMON
GROUND
LOADING
PUMP
HEATING
CIRCULATOR
MIXING
VALVE
NOTES:
JUMPER ON T.T. TERMINAL
ON BURNER.
SET HEAT ANTICIPATOR .4 AMPS.
CONTROL PANEL NO. 2254-019
ILLUSTRATION, WIRING FOR CONSTANT CIRCULATION
INTERMITTENT MIXING VALVE & SINGLE ZONE OPERATION
WITH 24 V. THREE HOT WATER TANK 122
NO.
1174-220

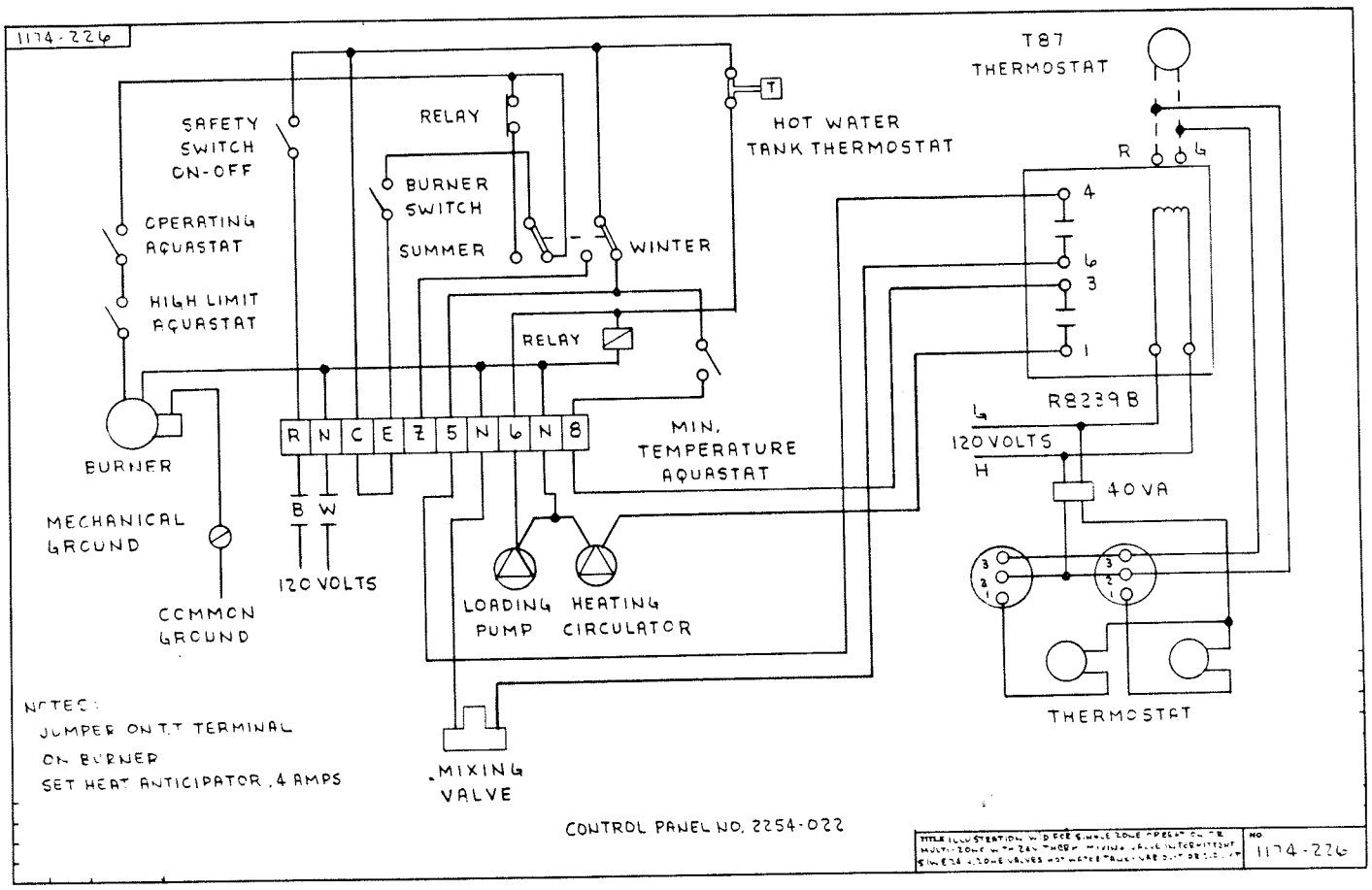

1174-221
T87
THERMOSTAT
HOT WATER
TANK THERMOSTAT
SAFETY
SWITCH
OPERATING
AQUASTAT
HIGH LIMIT
AQUASTAT
SUMMER
WINTER
HIGH
TEMPERATURE
AQUASTAT
R
G
4
6
3
1
R8239B
G
120 VOLTS
H
40 VA
R N C E Z 5 N 6 N 8 9 10
BURNER
B W
MECHANICAL
GROUND
120 VOLTS
COMMON
GROUND
LOADING
PUMP
HEATING
CIRCULATOR
THERMOSTAT
MIXING
VALVE
NOTES:
JUMPER ON T.T. TERMINAL
ON BURNER.
SET HEAT ANTICIPATOR .4 AMPS
CONTROL PANEL NO. 2254-019
ILLUSTRATION, WIRING FOR THREE WAY CIRCULATING
MIXING VALVE & SINGLE ZONE OPERATION WITH
USING 24V. ZONE VALVES HOT WATER TANK 122
NO.
1174-221

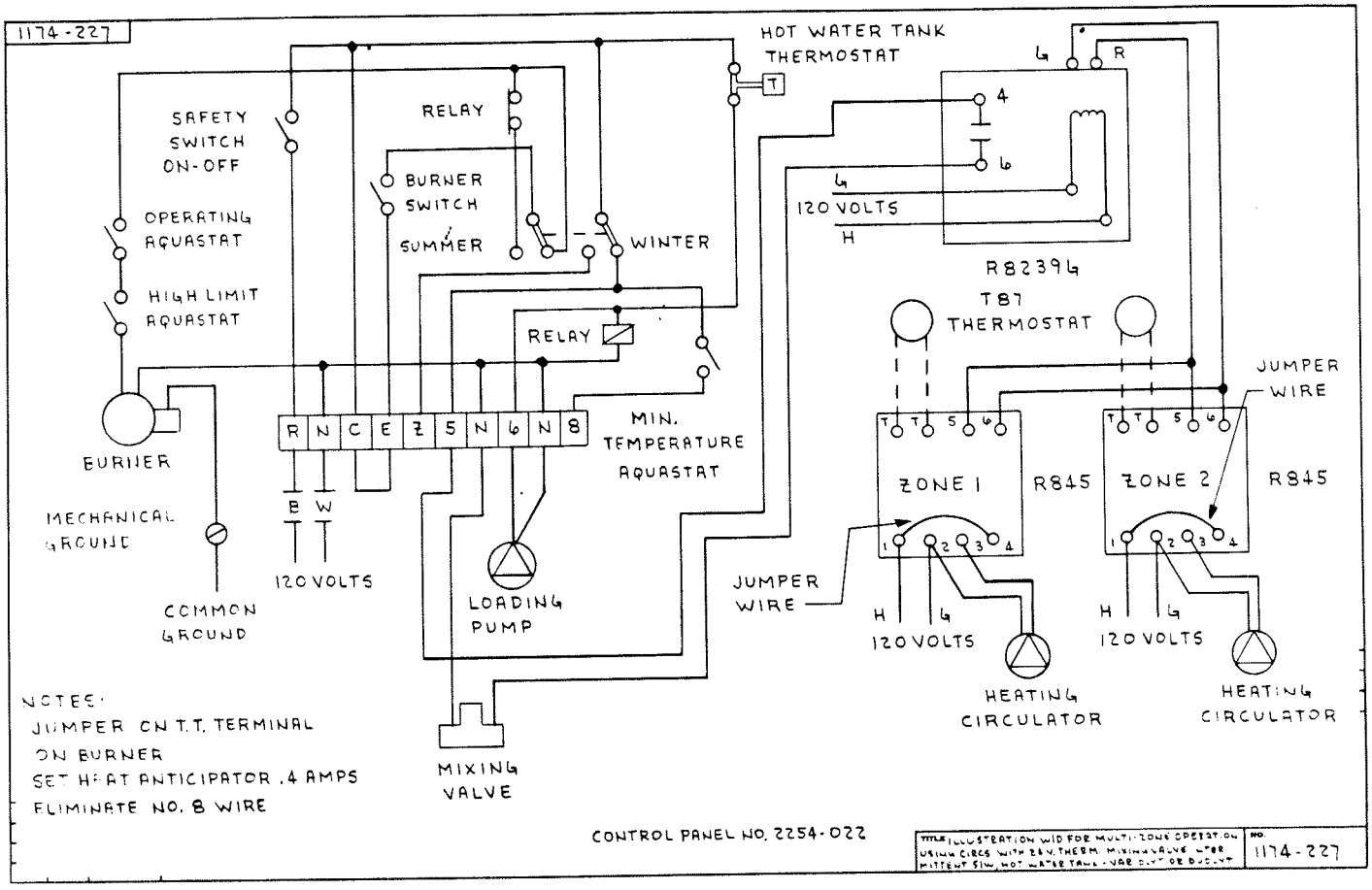

1174-222
HOT WATER
TANK THERMOSTAT
SAFETY
SWITCH
OPERATING
AQUASTAT
HIGH LIMIT
AQUASTAT
SUMMER
WINTER
HIGH
TEMPERATURE
AQUASTAT
G
R
4
6
120 VOLTS
H
R8239G
T87
THERMOSTAT
JUMPER
WIRE
R N C E Z 5 N 6 N 8 9 10
BURNER
MECHANICAL
GROUND
COMMON
GROUND
B W
120 VOLTS
LOADING
PUMP
T T 5 6
ZONE 1
R845
ZONE 2
R845
JUMPER
WIRE
1 2 3 4
H
G
120 VOLTS
120 VOLTS
HEATING
CIRCULATOR
HEATING
CIRCULATOR
MIXING
VALVE
NOTES:
JUMPER ON T.T. TERMINAL
ON BURNER.
SET HEAT ANTICIPATOR .4 AMPS.
CONTROL PANEL NO. 2254-019
1174-222


1174-223
T87
THERMOSTAT
SAFETY
SWITCH
OPERATING
AQUASTAT
HIGH LIMIT
AQUASTAT
HIGH
TEMPERATURE
AQUASTAT
R
G
4
6
120 VOLTS
H
R8239G
R N C E Z 5 N 6 N 8 9 10
BURNER
MECHANICAL
GROUND
COMMON
GROUND
B W
120 VOLTS
HEATING
CIRCULATOR
MIXING
VALVE
NOTES:
JUMPER ON T.T. TERMINAL
ON BURNER
SET HEAT ANTICIPATOR .4 AMPS
CONTROL PANEL NO. 2254-018
1174-223


1174-224
T87
THERMOSTAT
SAFETY
SWITCH
OPERATING
AQUASTAT
HIGH LIMIT
AQUASTAT
HIGH
TEMPERATURE
AQUASTAT
R
G
4
6
3
1
R N C E Z 5 N 6 N 8 9 10
R82398
G
120 VOLTS
H
B W
120 VOLTS
MECHANICAL
GROUND
COMMON
GROUND
HEATING
CIRCULATOR
MIXING
VALVE
NOTES
JUMPER ON T.T. TERMINAL
ON BURNER.
SET HEAT ANTICIPATOR .4 AMPS
CONTROL PANEL NO. 2254-018
1174-224


1174-225
T87
THERMOSTAT
SAFETY
SWITCH
ON-OFF
RELAY
HOT WATER TANK
THERMOSTAT
T
BURNER
SWITCH
SUMMER
WINTER
OPERATING
AQUASTAT
HIGH LIMIT
AQUASTAT
RELAY
R
G
4
6
G
120 VOLTS
H
R82396
R N C E Z 5 N 6 N 8
MIN.
TEMPERATURE
AQUASTAT
BURNER
B W
120 VOLTS
MECHANICAL
GROUND
COMMON
GROUND
LOADING
PUMP
HEATING
CIRCULATOR
MIXING
VALVE
NOTES:
JUMPER ON T.T. TERMINAL
ON BURNER.
SET HEAT ANTICIPATOR .4 AMPS
CONTROL PANEL NO. 2254-022
1174-225


1174-226
T87 THERMOSTAT
SAFETY SWITCH ON-OFF
RELAY
HOT WATER TANK THERMOSTAT
BURNER SWITCH
SUMMER
WINTER
OPERATING AQUASTAT
HIGH LIMIT AQUASTAT
RELAY
R82398
MIN. TEMPERATURE AQUASTAT
120 VOLTS
40 VA
BURNER
MECHANICAL GROUND
COMMON GROUND
120 VOLTS
LOADING PUMP
HEATING CIRCULATOR
THERMOSTAT
MIXING VALVE
NOTES:
JUMPER ON T.T TERMINAL ON BURNER
SET HEAT ANTICIPATOR .4 AMPS
CONTROL PANEL NO. 2254-022
1174-226


1174-227
HOT WATER TANK THERMOSTAT
SAFETY SWITCH ON-OFF
RELAY
BURNER SWITCH
SUMMER
WINTER
OPERATING AQUASTAT
HIGH LIMIT AQUASTAT
RELAY
MIN. TEMPERATURE AQUASTAT
120 VOLTS
R82396
T87 THERMOSTAT
JUMPER WIRE
ZONE 1
R845
ZONE 2
R845
BURNER
MECHANICAL GROUND
COMMON GROUND
120 VOLTS
LOADING PUMP
JUMPER WIRE
120 VOLTS
120 VOLTS
HEATING CIRCULATOR
HEATING CIRCULATOR
MIXING VALVE
NOTES:
JUMPER ON T.T. TERMINAL ON BURNER
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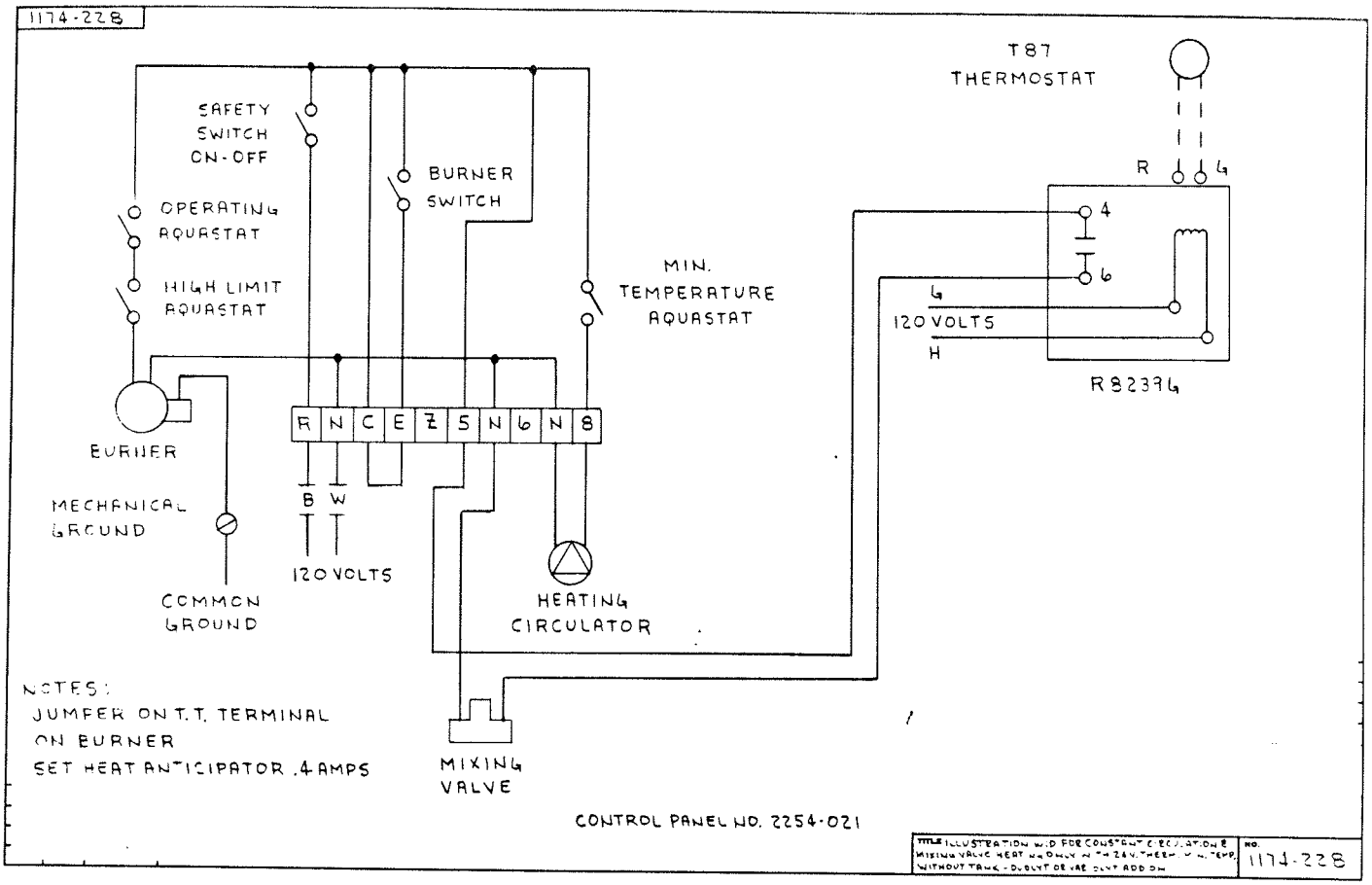
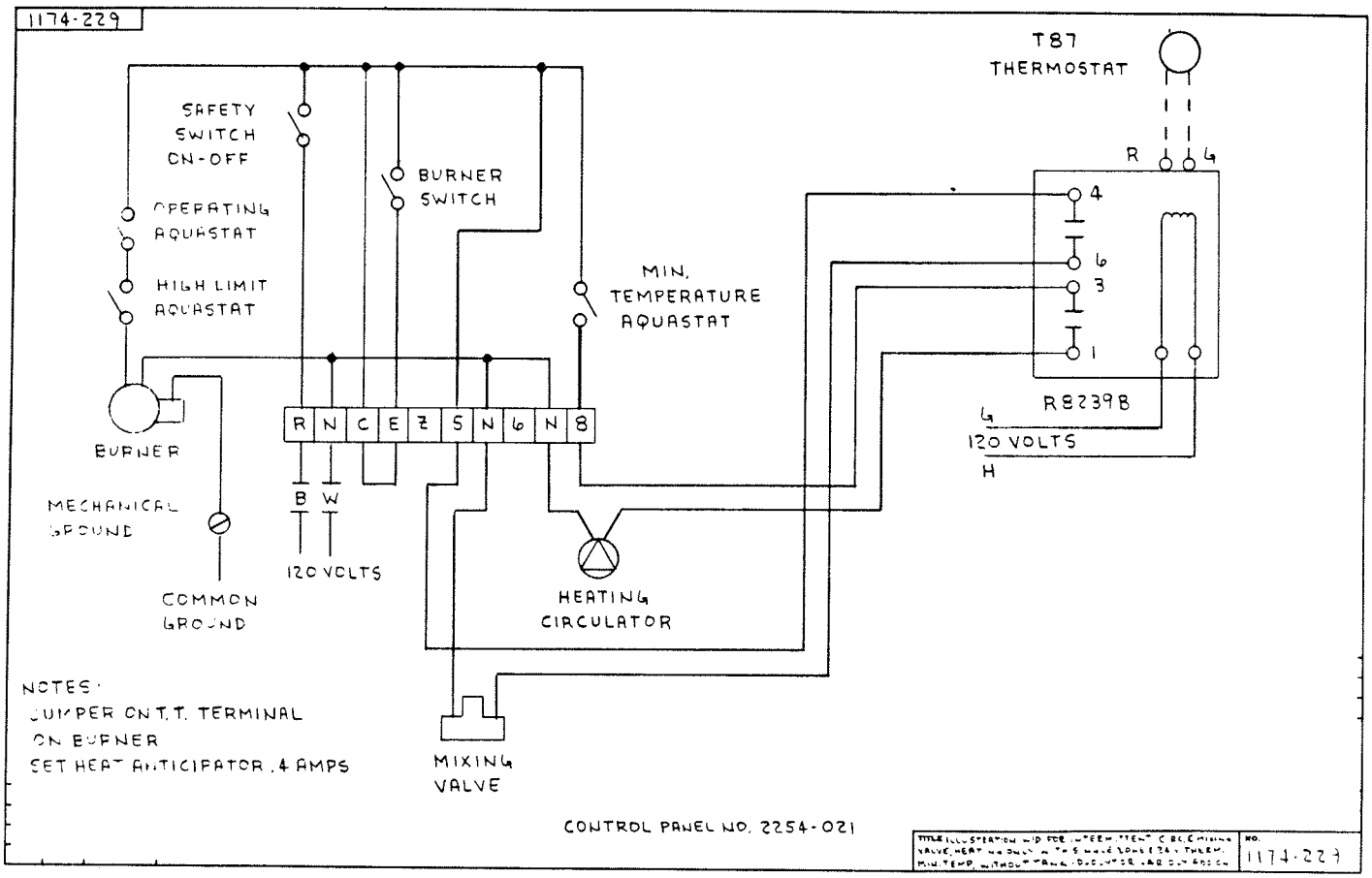
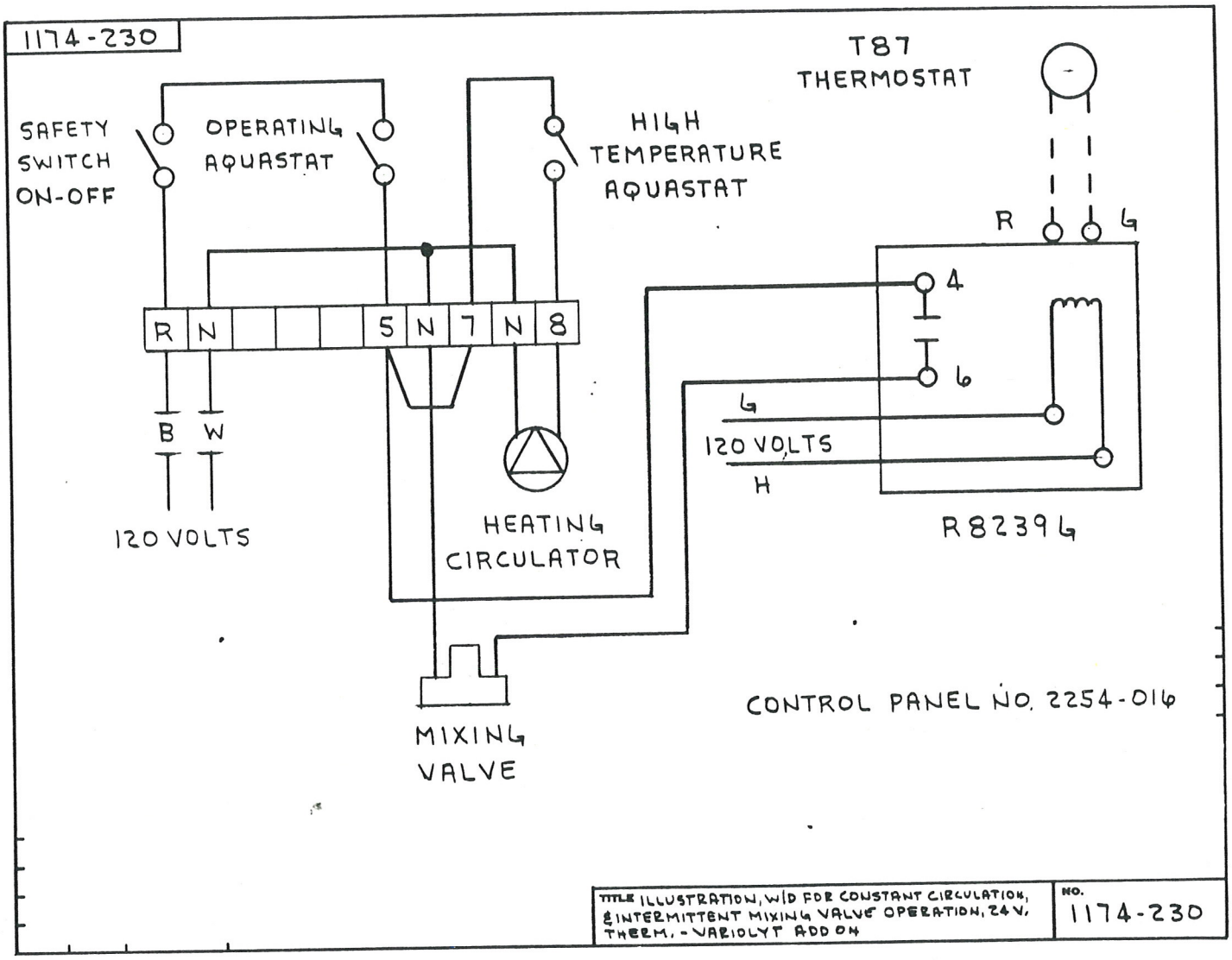
ELIMINATE NO. 8 WIRE
CONTROL PANEL NO. 2254-022
1174-227


1174-228
T87
THERMOSTAT
R
G
SAFETY
SWITCH
ON-OFF
BURNER
SWITCH
OPERATING
AQUASTAT
HIGH LIMIT
AQUASTAT
MIN.
TEMPERATURE
AQUASTAT
4
6
G
120 VOLTS
H
R8239G
R N C E Z S N 6 N 8
BURNER
MECHANICAL
GROUND
B W
120 VOLTS
COMMON
GROUND
HEATING
CIRCULATOR
NOTES:
JUMPER ON T.T. TERMINAL
ON BURNER
SET HEAT ANTICIPATOR .4 AMPS
MIXING
VALVE
CONTROL PANEL NO. 2254-021
NO.
1174-228


1174-229
T87
THERMOSTAT
R
G
SAFETY
SWITCH
ON-OFF
BURNER
SWITCH
OPERATING
AQUASTAT
HIGH LIMIT
AQUASTAT
MIN.
TEMPERATURE
AQUASTAT
4
6
3
1
R8239B
G
120 VOLTS
H
R N C E Z S N 6 N 8
BURNER
MECHANICAL
GROUND
B W
120 VOLTS
COMMON
GROUND
HEATING
CIRCULATOR
NOTES:
JUMPER ON T.T. TERMINAL
ON BURNER
SET HEAT ANTICIPATOR .4 AMPS
MIXING
VALVE
CONTROL PANEL NO. 2254-021
NO.
1174-227


1174-230
T87
THERMOSTAT
SAFETY
SWITCH
ON-OFF
OPERATING
AQUASTAT
HIGH
TEMPERATURE
AQUASTAT
R
G
4
6
G
120 VOLTS
H
R82396
R N 5 N 7 N 8
B W
120 VOLTS
HEATING
CIRCULATOR
MIXING
VALVE
CONTROL PANEL NO. 2254-016
TITLE ILLUSTRATION, W/D FOR CONSTANT CIRCULATION, & INTERMITTENT MIXING VALVE OPERATION, 24 V. THERM. - VARIOLYT ADD ON
NO.
1174-230