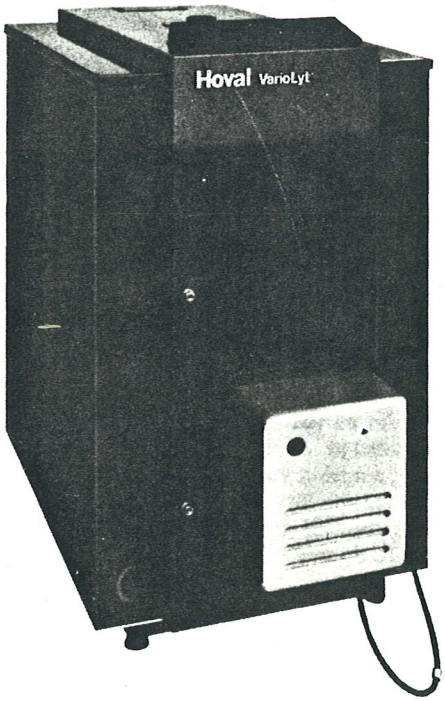
Hoval®

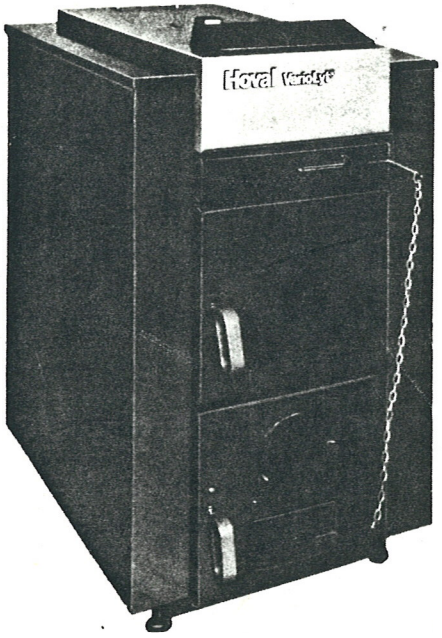


VarioLyt

VarioLyt®

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

TABLE OF CONTENTS

HOVAL — VARIOLYT OPERATING PRINCIPALS

The Hoval VarioLyt Boiler is designed to be used as a straight solid fuel boiler or used in series with an existing oil or gas fired boiler. Certain installation and operating procedures must be followed to insure proper operation and optimum boiler life.

1. For proper burning and to guard against creosote problems, only seasoned hard wood should be used. The maximum moisture content of the wood should be below 20%. Usually in order to get wood this dry it takes 1½ to 2 years of seasoning. When the VarioLyt Boiler is used in series with an existing oil or gas fired boiler, it is recommended that the VarioLyt Boiler only be used when the outside temperature is below 40°F. During spring and autumn the gas or oil burner on the existing boiler should be used.
2. The chimney should be of masonry construction with a tile liner. An all fuel metal chimney can also be used when installed in accordance with existing codes.
3. The use of a mixing valve substantially increases the life of the boiler, and aids in efficiency.
4. The VarioLyt Boiler should be checked and cleaned once a month. To do this, open the cleaning door and scrape off the combustion residues on the heating surfaces using a scraper. At the end of the heating season the boiler must be cleaned to prevent damage to the boiler from potash corrosion. After the boiler has been cleaned, lightly spray the combustion chamber with an oil-graphite mixture.
5. The automatic draft regulator has to be set for the desired operating temperature 60° — 80°C (140° — 175°F) but in no case below 60°C (140°F). Operating a wood fired boiler below 140°F will cause excessive creosote build-up in the boiler.

TECHNICAL DATA

STANDARDS

Boiler for burning solid fuel wood/coal and can be converted to burn fossil fuel oil/Gas. Thermolytic heat exchanger assures complete combustion and constantly high efficiencies.

CONTROLS

The panel is packaged and includes boiler thermometer, operating aquastat, automatic non-electric draft control for solid fuel firing. For units with gas or oil burners the control panel also contains limit aquastats (high and low).

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. The control panel is shipped in a separate, styrofoam box.

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Model		Output oil/gas MBH	Output coal/coke MBH	wood MBH	Primary water gal.	weight lbs.
VarioLyt	22	88	60	52	14	325
	30	120	84	64	20	395
	40	160	112	84	24	485
	52	208	172	132	38	550
	65	260	172	132	38	550

OIL FIRING DATA

Model		Throughput gal./h	Flue gas temp. °F	°C	CO_2 %
VarioLyt	22	0.75	433	198	11-13%
	30	1.10	433	225	11-13%
	40	1.40	446	228	11-13%
	52	1.75	435	224	11-13%
	65	2.25	446	225	11-13%

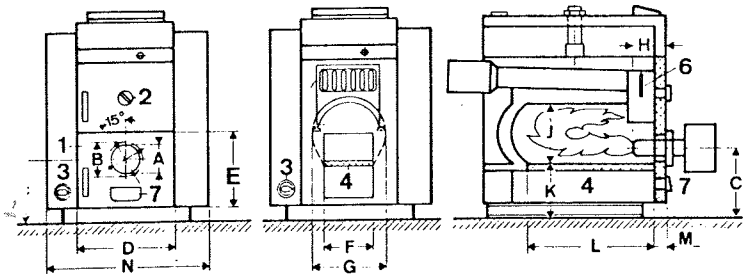
COAL FIRING DATA

Model		Coal size inches	Flue gas temp. °F	°C	Draft "WG
VarioLyt	22	¾ - 1½	515	230	0.08
	30	¾ - 1½	515	240	0.09
	40	¾ - 1½	515	290	0.10
	52	1¼ - 2	515	290	0.12

WOOD FIRING DATA

Model		Wood length Inches	Flue gas temp. °F	°C	Draft "WG
VarioLyt	22	17	510	320	0.08
	30	17	510	330	0.09
	40	19	510	290	0.10
	52	23	510	290	0.12

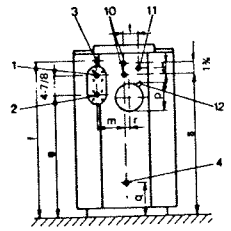
Specifications subject to change without notice.



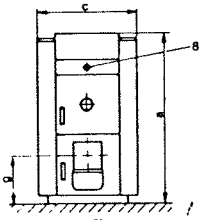
(Sketch no: 1) (Sketch no: 2) (Sketch no: 3)

1. Ashdoor, hinging point right with screws
2. Secondary air inlet
3. Outlet for burner plug
4. Ceramic plate
5. Stainless steel reflector baffle for VarioLyt 22, 30, 40 & 65.
6. Fume guard for solid fuel firing
7. Primary air flap

Boiler dimensions



(Sketch no. 1)



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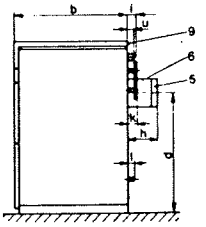

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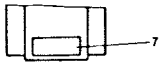


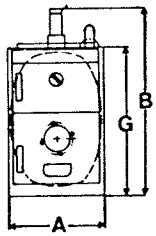
TOP VIEW

(Sketch no. 4)

	VarioLyt 22	30	40	52 & 65
a	40⅛	43⅛	43⅛	48⅛
b	28⅞	28⅞	32⅞	44½
c	25⅝	25⅝	25⅝	30¾
d	26	28⅛	28⅛	36¼
e	27⅝	30⅝	30⅝	35⅜
f	36⅜	39⅜	39⅜	44¼
g	12½	12⅛	12⅛	13
h	8	8⅝	8⅞	7¼
i	1⅝	1¾	1⅞	1⅝
k	1¾	1⅞	2	1⅝
l	1¾	1⅜	1½	2
m	5⅞	7⅛	7⅛	9⅞
n	4¾	4¾	4¾	5⅛
o	5⅞	5⅞	5⅞	5⅞
p	5⅞	7⅛	7⅛	7⅞
q	8⅛	8¼	8¼	8⅞
r	1	1	1	2
s	30½	33½	33½	42⅜
t	3⅞	3⅞	3⅞	6¼
u	1	1	1⅛	1⅛

1. Primary supply
2. Primary return
3. Relief valve
4. Boiler drain
5. Flue connection
6. Cleaning door
7. Boiler control
8. Draft regulator
9. Terminal box
10. Overheat coil
11. Socket for well overheat valve
12. Socket ¼"

Bare Boiler Dimension:



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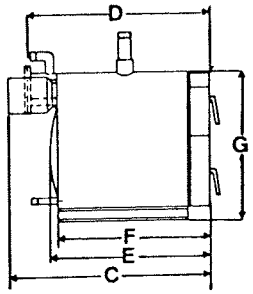

(Sketch no. 6)

Boiler Type	A	B	C	D	E	F	G
22	17-1/2	36-3/8	35-5/8	30-5/8	26-1/4	24-3/8	33-1/2
30	20-1/2	43-3/4	36-3/8	30-3/4	25-7/8	23-7/8	36-3/8
40	20-1/2	43-3/4	40-1/2	35	30-1/8	28-1/8	36-3/8
52	27-1/2	48-5/8	51-7/8	46-1/8	34-5/8	32-5/8	41-3/8

VarioLyt Types	A without hinged burner door	A with hinged burner door	B without hinged burner door	B with hinged burner door	C	D	E	F	G	H	J	K	L	M	N
22	4¾	4¾	5⅞	5⅞	12½	15¾	14⅞	7⅞	13¾	2¾-4¾	14⅝	8⅝	18½	2¾	25⅝
30	4¾	4¾	5⅞	5⅞	12⅛	15¾	16	10¼	16⅞	2¾-4¾	16½	8⅝	18½	2¾	25⅝
40	4¾	4¾	5⅞	5⅞	12⅛	15¾	16	10¼	16⅞	2¾-4¾	16½	8⅝	22	2¾	25⅝
52-65	5⅛	4¾	7½	5⅞	13	22	16¾	11¾	21¼	2¾-4¾	21¼	9⅞	26⅜	2¾	30¾

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MOUNTING OF BURNER

- Burner to be mounted to allow for a swivelling with the door of 90° to the right.
- Burner blast tube shall have a length between 2¾ -(4¾" with swinging bracket.

OPERATION WITH FUEL OIL OR GAS

- Fire grates have to be removed.
- Stainless steel reflector baffles (Expt. type 52) and ceramic plate to be fitted.
- Primary air flap and secondary air opening to be closed, loosen chain of draft regulator.

FUNCTIONING

- Burner will start-up if temperature on operating aquastat setting (standard setting for normal operating conditions 60°C).

VARIOLYT SPECIAL INSTRUCTIONS

SOLID FUEL FIRING WITH EXISTING BOILER

1. Make sure the boiler is full or water. Outside temperature should be below 40°F.
2. Set Samson solid fuel draft regulator to 88°C (190°F).
3. Use paper and small pieces of wood to establish fire. Use only air dried hard wood with a maximum water content of 20%. This means at least 1½ years of seasoning.
4. At 70°C (160°F) the mixing valve will open. (Optional equipment).
5. Set thermostat to start circulator pump.
6. Adjust overfire draft at −0.04 W.G. on VarioLyt boiler.

PRECAUTIONS TO BE OBSERVED

1. Installation should be made by a qualified heating contractor.
2. Burn wood only in tile lined masonry chimney or U.L. approved solid fuel chimney capable of venting (2) boilers.
3. Keep ash pit clean. Build up of ash under grates will cause grates to burn out.
4. Keep the heat exchanger clean. Periodically fill chamber with coal, coke or charcoal. This will burn off any cresote or tar build-up on the heat exchanger. Let boiler cool off and clean with tools provided.
5. Do not use gasoline, oil or lighter fluid to start solid fuel fire.
6. Do not (T) together the 2 boiler's smoke pipes. Break open new hole in chimney for VarioLyt boiler. Keep smoke pipe 18" down from floor joist or combustible material.
7. In case of power failure, manually open mixing valve (optional equipment). Flow checks or zone valves. (Have heating contractor show you how this is done).
8. If boiler overheats because step number 7 does not work, it might require dumping of the fire.
9. At the end of the heating season clean VarioLyt boiler, smoke pipe and chimney. This prevents damage to the boiler from potash and sulphur.

Operating, Maintenance and Installation Instructions for HOVAL VARIOLYT MULTIFUEL BOILERS without Domestic Hot Water Supply Tanks (Heating only)

Boiler Sizes and Output

Boiler ranges	Output btu/h	Oil No. 2 fuel GPH max.	Nozzle Angle
VarioLyt 22	88,000	.75	
VarioLyt 30	120,000	1.10	
VarioLyt 40	160,000	1.40	
VarioLyt 52	208,000	1.75	
VarioLyt 65	260,000	2.25	

45 sec. main flame est. period, 3 sec. response timing on primary safety control when firing rate over 3 GPH.

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

Sides	6 inches
Rear	24 inches
Front	48 inches
Top	6 inches
Smoke pipe	18 inches

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

2. **Approval of Operation**
These VarioLyt Hoval Multifuel Boilers have been tested and are approved for oil firing not heavier than no. 2 fuel oil, wood firing and coal 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 boilers and no. 2 fuel oil storage must be at least 5 ft. away or in accordance with state or local codes. Gasoline or other flammable liquids should be kept in other areas. Wood should be stored in a dry place with as low moisture content as possible for the proper operation of wood firing.

4. **Charging Level**
The maximum wood load level for the VarioLyt boilers is to the crown sheet of the appliance. When firing coal the level shall not be above the bottom edge of the fuel charging door.
The wood lengths are as follows for the VarioLyt boilers:

VarioLyt 22	17 inches
VarioLyt 30	17 inches
VarioLyt 40	19 inches
VarioLyt 52	23 inches
VarioLyt 65	23 inches

5. **Chimney Design**
The chimney for VarioLyt Multifuel Boiler shall be of masonry construction and tile lined. For the best possible operation this chimney should be interior to the home. The chimney size should be no less than 8" x 8" and should not be less than 20 ft.
Warning: The chimney and smoke pipe of these multifuel boilers should be checked periodically and at least thoroughly cleaned every heating season. When cleaning the smoke pipe and chimney they should be carefully inspected for any defect and repaired if necessary.

6. **Chimney Draft**
The draft for this appliance is adjustable by the manufactured damper plate furnished. These boilers are approved without a draft regulator.
The damper on the smoke pipe should be open when burning solid fuel. When burning oil, damper position should be adjusted to a minimum draft of – .015" WC over the fire.
When solid fuel firing on a tall chimney with high draft the damper may be adjusted so that the draft does not exceed –0.08" - 1.12 WC draft at breeching (depending on boiler size).

7. **Overheat Safety Coil**
Hoval VarioLyt Multifuel boilers are furnished with an ixternal safety coil heat exchanger. This will be piped near the back of the boiler in accordance with manufacturer's instructions. This will maintain boiler water temperature below 220°F on power failure or for any reason water circulation stops. The automatic non-electric syr valve (or equal) will open and flow cold water through the coil. The piping from the coil and valve shall not be restricted or have any other valve in the loop. This coil must be piped to a proper drain in accordance with local or state plumbing codes.
Caution: If there is a power failure these boilers can be operated safely on solid fuel. If zone valves are used they shall be opened manually. If zoned with circulators all flow checks shall be manually opened. The wood or coal should be fired in small quantities during any power failure. If not on potable water supply (city water) but on a well supply, the water pressure shall be checked periodically and if there is a loss of water pressure the boiler shall be shut down.

7A. Hoval VarioLyt Multifuel Boilers **not** furnished with an overheat coil heat exchanger, must be equipped with a mixing valve and should be installed in accordance with manufacturers instructions. If boiler temperature reaches 212°F, the mixing valve will open and overheat the radiation. This will only occur with a solid fuel firing and if Sampson regulator is not properly set or fire in combustion chamber has been over fueled.

8. **Safety Controls**
The Hoval VarioLyt boilers are equipped with the following safety controls:
1. ASME boiler pressure relief valve set at 30 PSI.
2. Overheat coil and heat exchanger externally mounted (on some models).
3. Syr non-electric overheat valve or equal (optional).
4. 1 high limit control which cannot be set above 212°F (only on oil or gas models).
5. One Samson combustion air regulating valve non-electric which cannot be set above (100°C, 212°F).
6. Honeywell primary safety control with no greater than 90 sec. flame failure timing (or equal) supplied w/oil burner.

9. **Note:** Direction for setting and operating non-electric combustion air damper control for solid fuel firing: The control furnished by the manufacturer is a Samson regulator non-electric control or equal which cannot be set over 100°C (212°F). The position of this regulator is so that the red numbers are to be used. For adjusting the regulator put on 30°C (86°F) and continue to fire boiler until the primary water temperature (bottom temperature gauge) read 30°C (86°F). Adjust the chain from the Samson valve to the bracket of the combustion air damper so that the damper remains in a closed position with chain tight.
Caution: This adjustment shall not be altered in any way so that the max. temperature will only be 100°C (212°F).

10. **Control Panel – For Heating Only (oil or gas units)**
Control Panel has two switches, one for "on/off" and one for solid fuel burning or oil/gas for automatic switchover; thermometer showing boiler temperature, high limit aquastat set at 212°F and an adjustable aquastat to control boiler temperature from 60°C (140°F) to 90°C (194°F).
Control Panel for Solid fuel firing only.
Control Panel has 1 switch on/off for power to control panel, 1 temperature gauge, 1 aquastat set at 50°C (120°F), 1 aquastat set at 50°C (120°F), 1 aquastat set at 100°C (212°F) to hook up to the three way mixing valve as an overheat device.

11. **Oil Burner**
The oil burner supplied with VarioLyt Boiler is a Carlin "CRD" or other Repco specified burner, UL-Listed product with primary safety control. When installing burner refer to the burner manufacturer instruction sheet. The firing rates of the Hoval VarioLyt Multi-fuel Boilers are from .75 no. 2 fuel to 2.25. The burner should be adjusted according to the manufacturer's specification and the firing rate determined by the Hoval specification sheet.

11A. **Gas Burner**
The Gas Power Burner supplied with VarioLyt Boiler is manufactured by Wayne, or other Repco Specified Burner. The Burner is an AGA listed product with necessary gas safety control. The firing rate of Hoval VarioLyt Multi-fuel boiler is 103,000 - 305,000 BTU input on natural gas. The burner should be equipped with proper orifice and adjusted in accordance to the manufacturer's specifications.

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12. **Combustion Air**
Because of tight home construction, insulation, thermopane windows, etc., your heating contractor must determine if air 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 or 100 square inches per 100,000 B.T.U. combustion input.

The Hoval VarioLyt boilers have two passes for combustion air. The primary air is introduced below the grate for solid fuel firing and on the fuel loading door air can be introduced above the fuel bed. To assist in better coal firing, the secondary air adjustment can be made by regulating the air shutter located on the fuel loading door. The optional high efficiency wood firing kit enables secondary combustion air to travel around the wood and return above the wood bed.

13. **Clean-out Instructions**
The Hoval VarioLyt boilers are supplied with the proper cleaning tools (scraper, brush and poker).

On solid fuel firing, especially wood, the boiler should be cleaned more frequently for efficient operation. These boilers are specially designed with thermolytic heat exchanger tubes to reduce soot problems, but for high efficiency the boiler should be kept as clean as possible. There is a special clean-out door on the smoke pipe connector breeching and on the back of the solid fuel boiler side to make cleaning of these boilers an easier task.

14. To install multifuel boilers they require permits in most states or municipalities. Check with your local building code inspector or your local fire department.
Important: Save these installation, operation and maintenance instructions for your Hoval VarioLyt Multifuel Boiler.

15. The following pages (pictorial) will show procedure to assemble boiler, jacket, piping and wiring diagram (also optional equipment if required) available for the VarioLyt Boiler.

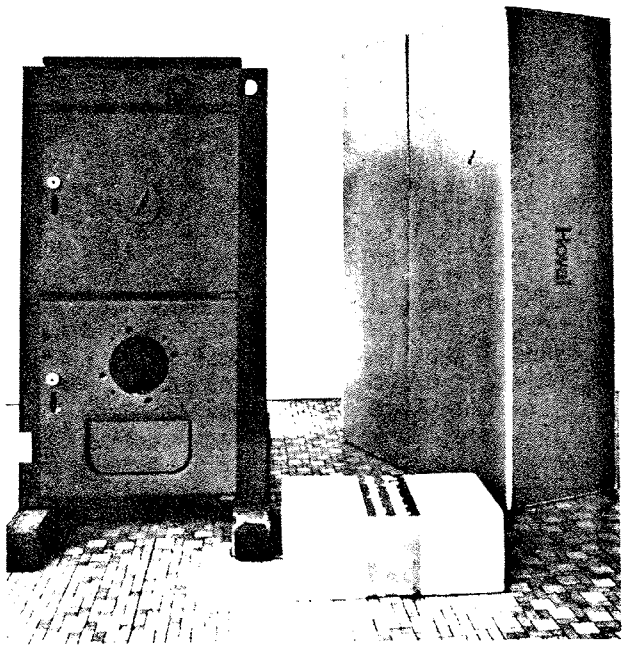

Photo 1
VarioLyt Boiler for gas/oil firing is shipped in three parts, plus a carton with Burner gas/oil
- Boiler (on skids)
- Boiler Jacket (in carton)
- Boiler Control Panel (in styrofoam box) or control panel has been mounted into jacket panel

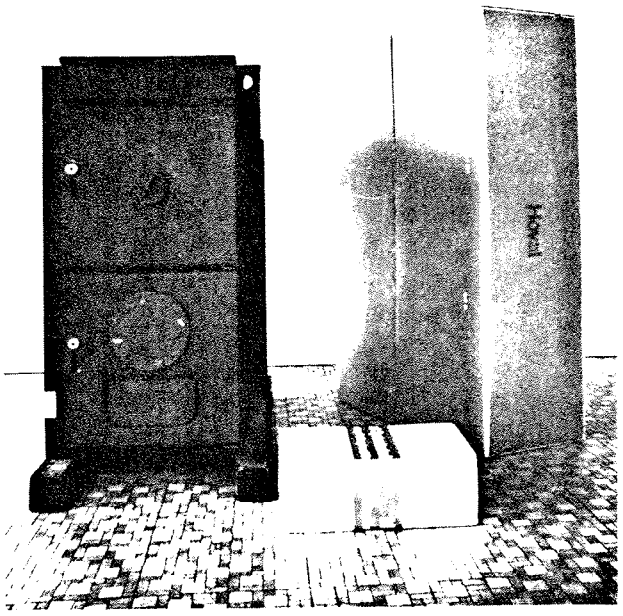

Photo 1A
VarioLyt Boiler for solid fuel firing, shipped in three parts
- Boiler (on skids)
- Boiler Jacket (in carton)
- Boiler Control Panel (in Styrofoam Box) or control has been mounted into jacket panel.

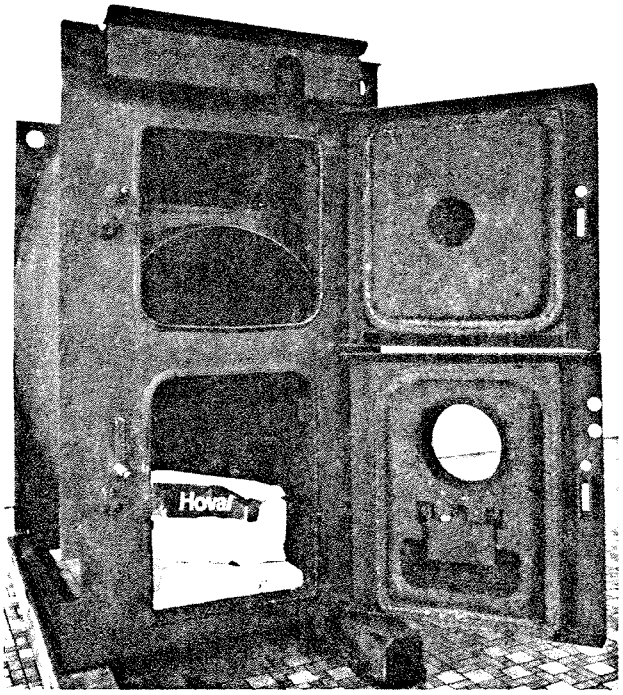

Photo 2
VarioLyt Boiler for oil or gas firing (optional). On lower part of Boiler you will find in the combustion chamber, *stainless steel baffle, ceramic plate, and a plastic bag containing adjusting (leveling) bolts and misc. parts.
*only for VarioLyt Boilers with the following outputs. 88,000 BTU, 120,000 BTU, 160,000 BTU & 260,000 BTU.

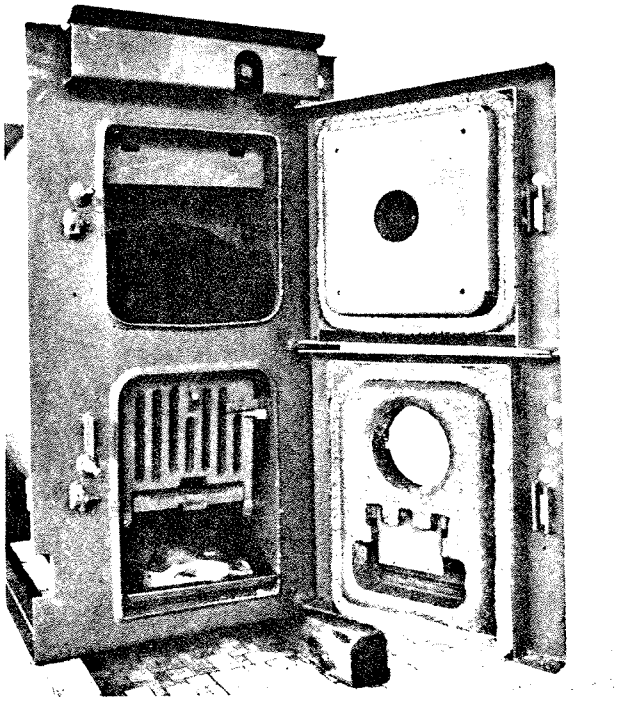

Photo 2A
VarioLyt Boiler for solid fuel firing. In lower part of Boiler you will find the fire grate, front grate, fume guard, ash pan and plastic bag containing the adjustable (leveling) bolts, two door handles, screws and misc. parts.

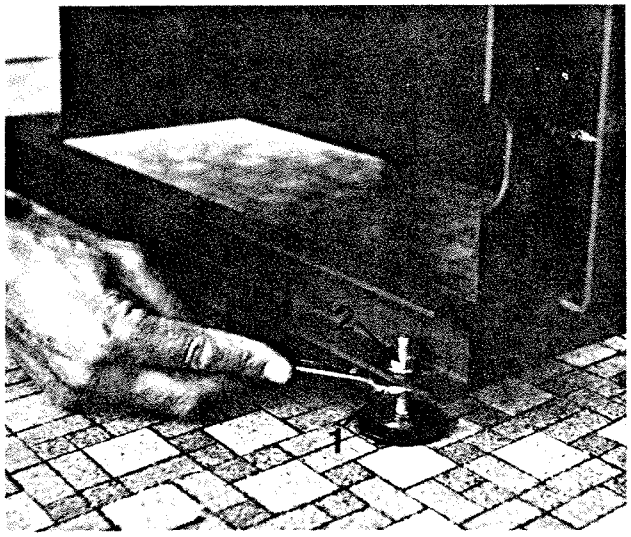

Photo 3 Remove wood skids-
IMPORTANT: Save nuts & washers. Lift boiler on one side and place threaded boiler support into slots of base channel, do the same for the other side of boiler. Level boiler using a water level and adjusting the lower nuts. (1) on all four corners. Place washers and counter nuts (2) and tighten (formerly used for securing the wood skids and boiler).

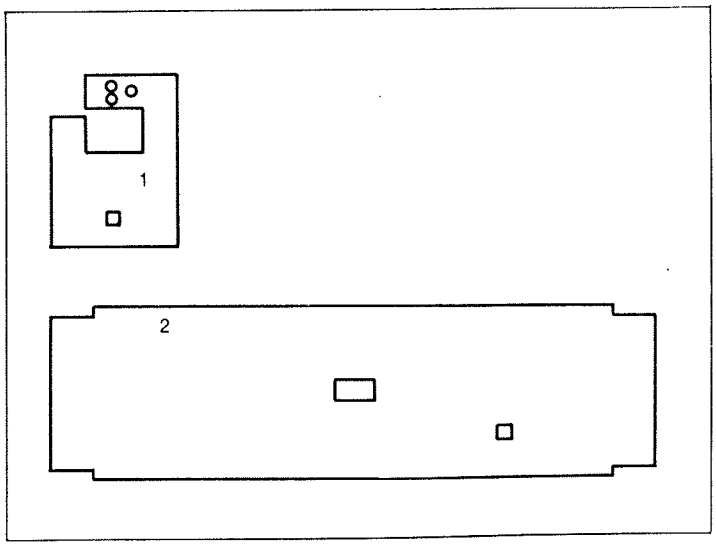

Photo 4
Insulation sheet 1- Rear Side of Boiler
Insulation sheet 2- Boiler Body

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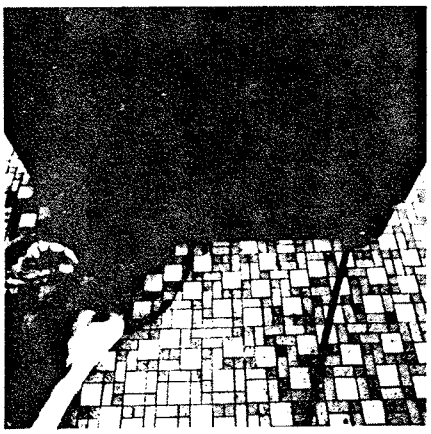


Photo 5
Introduce one of the shorter plastic belts in slots on each side of boiler and pass through the eyelets.

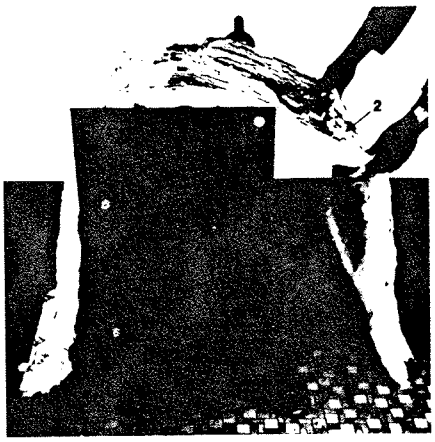


Photo 6
Place insulation sheet (2) on Boiler Body.

Photo 5A
Place plastic belts in shackles at base, pull up on both sides and connect with buckles (2). Strap insulation moderately.

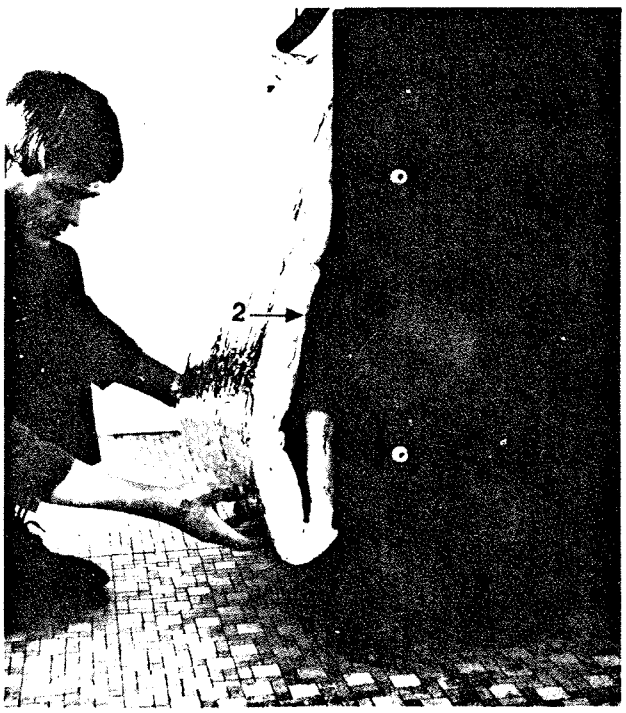


Photo 7
Place right and left insulation sheet (2) on boiler body and fold back lower ends approx. eight (8) inches.

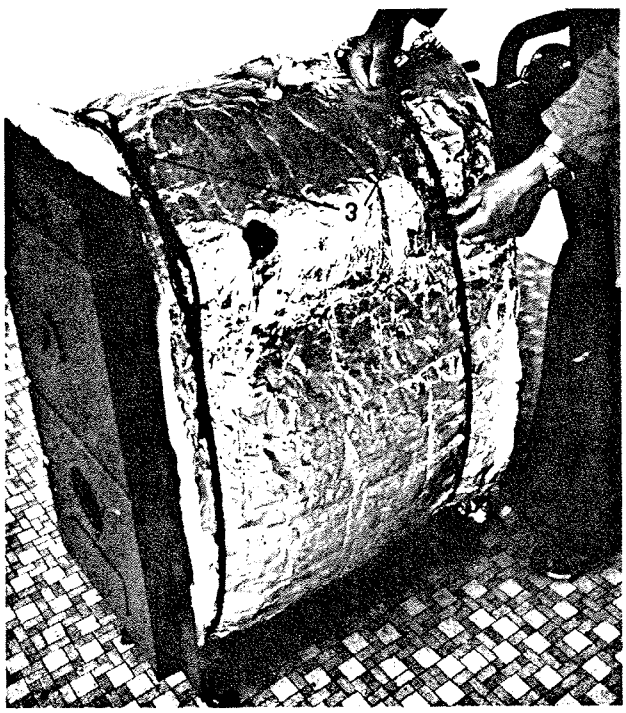


Photo 8
Pull up plastic belts (1) on both sides and connect with buckles (3), strap insulation moderately.

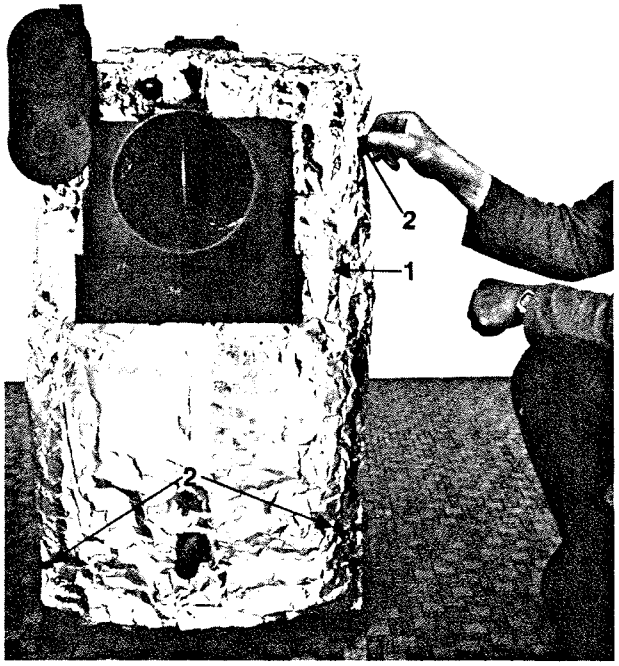


Photo 9
Secure insulation (sheet 1) with four clips (2) to rear side of boiler.

Photo 10
Push controls assembly into opening of cover until plastic catches (1) snap in place. The above applies only if control panel has not been factory installed.

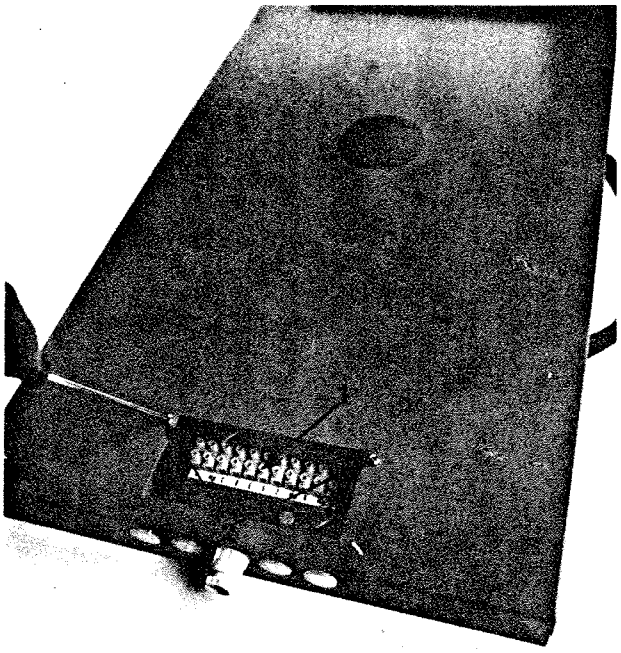


Photo 11
Fasten terminal box (1) against cover with two sheet metal screws. The above applies only if not factory installed.

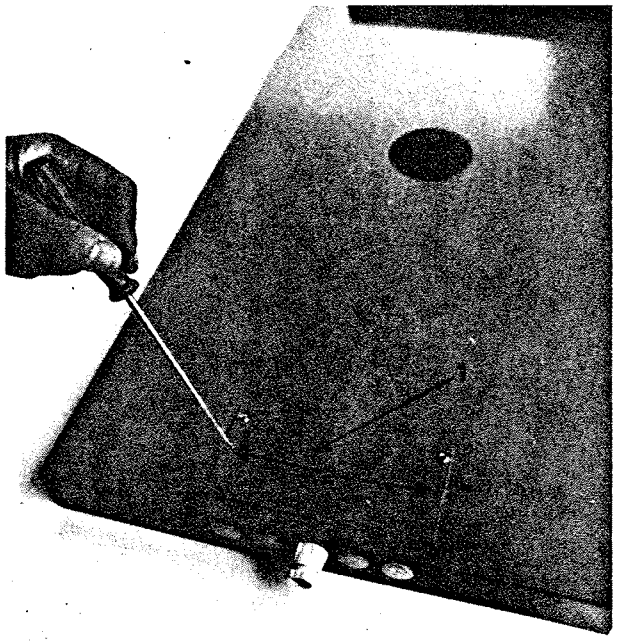


Photo 12
Secure lid of terminal box (1) with two sheet metal screws (2).

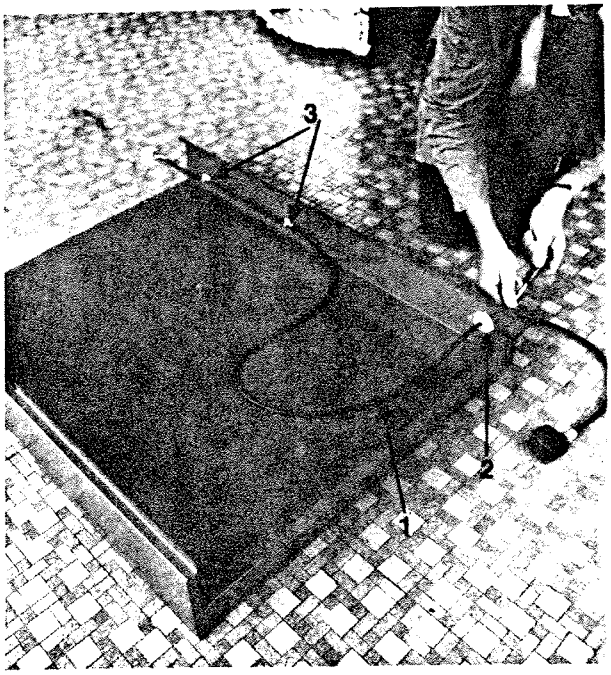


Photo 13
Install burner cable (1) through conduit (2) and fasten with adhesive cable clips (3).
Important: Between the first clip and the conduit a loop must be left for further adjustment. Fasten conduit from outside with two sheet metal screws.

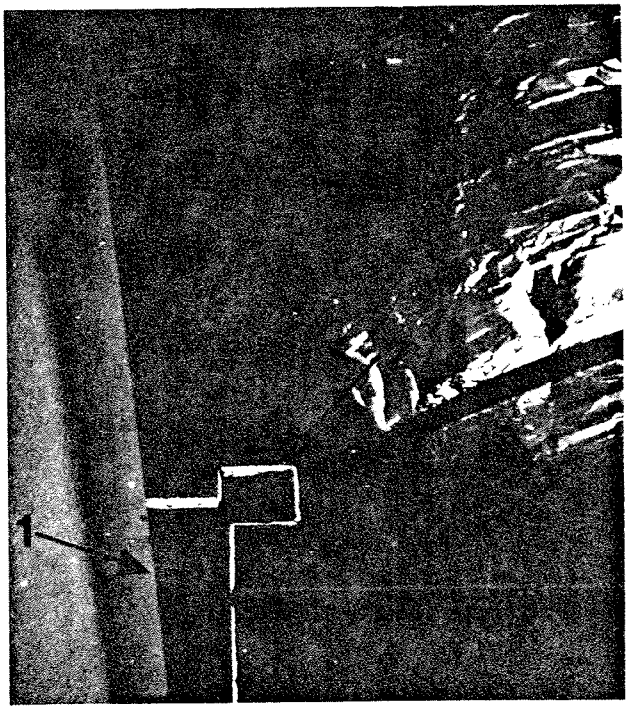


Photo 14
Install left side (1) panel behind base channel and push forward locking the front jacket flange into the square notch (2) of the boiler front.

Photo 15
Screw lifting stud into socket on top of boiler.

Photo 16
Start installation of cover of side panel on one small side as shown above.

Photo 17
Place cover with control box on top boiler insert sensors into boiler control well (2) make sure sensors are fully inserted against bottom of well.
1. Aquastat sensor
2. Thermometer Sensor
3. Spacer Spring (1)

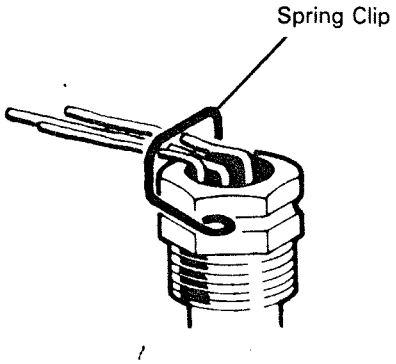


Photo 17A
Secure capillary tubes with clips (see sketch).
Important: Avoid sharp bend in the capillaries.

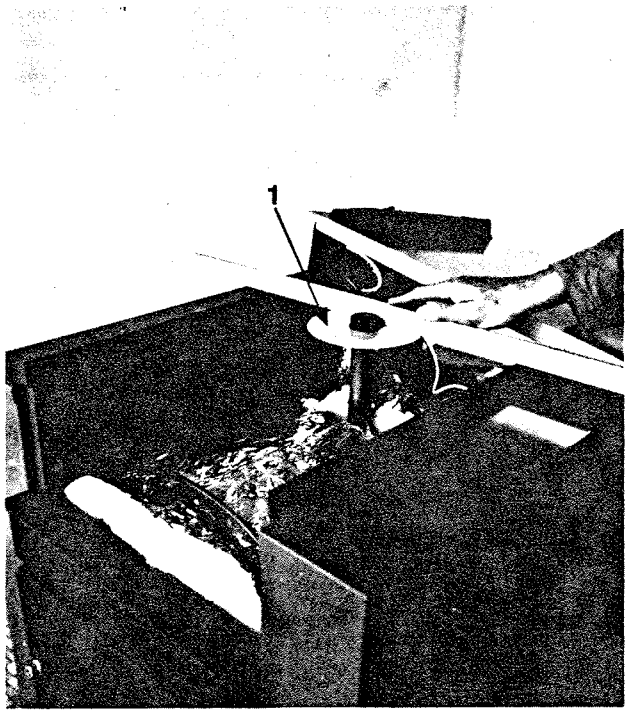


Photo 18
After installation of side panels assemble nut to lifting stud, use straight edge to adjust nut to proper level for installation of top panel.

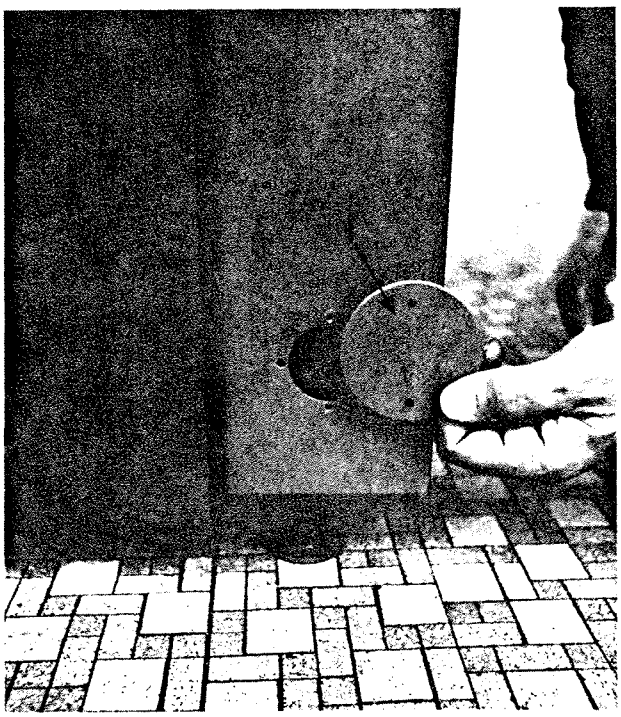


Photo 19
VarioLyt for solid fuel only. Cover hole on the right front side, attach cover (1) with two sheet metal screws. For gas/oil boiler use cover disk with hole for conduit.

Photo 20
Install four tinnerman clips (1) on each side panel for fastening rear panels. (if not factory installed)

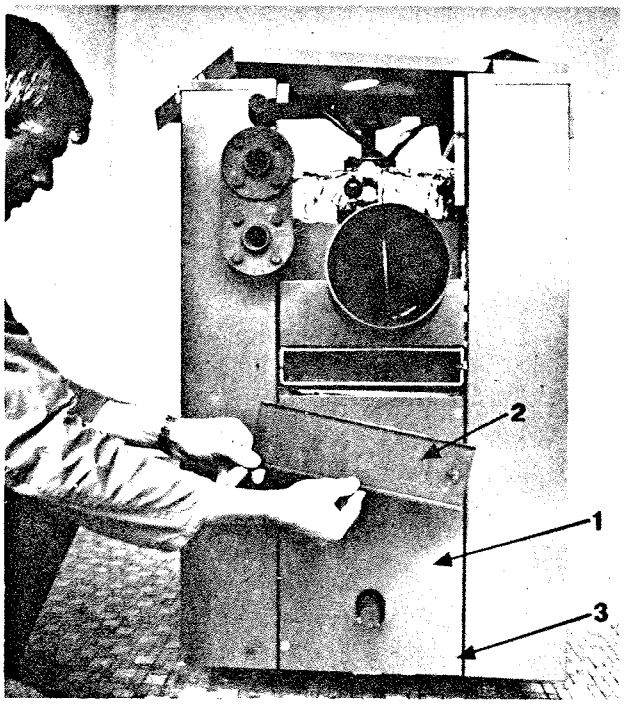


Photo 21
Installation of lower rear panel. Remove cover (2) at clean out opening, fasten lower rear panel (1) with four S/M screws (3). Replace clean out cover with wing nuts.
Note: Some VarioLyt Boilers have clean out located in flue collector, eliminating the clean out cover plate below flue collector.

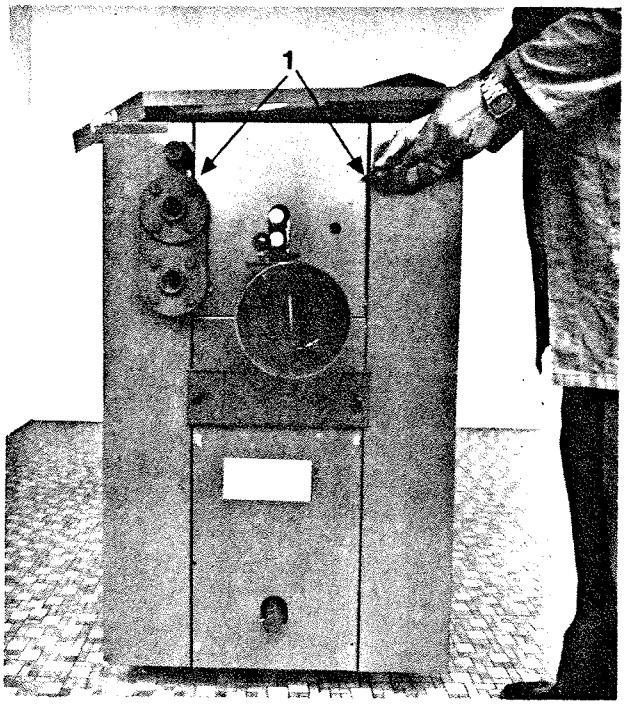


Photo 22
Fasten upper rear panel with two sheet metal screws (1).

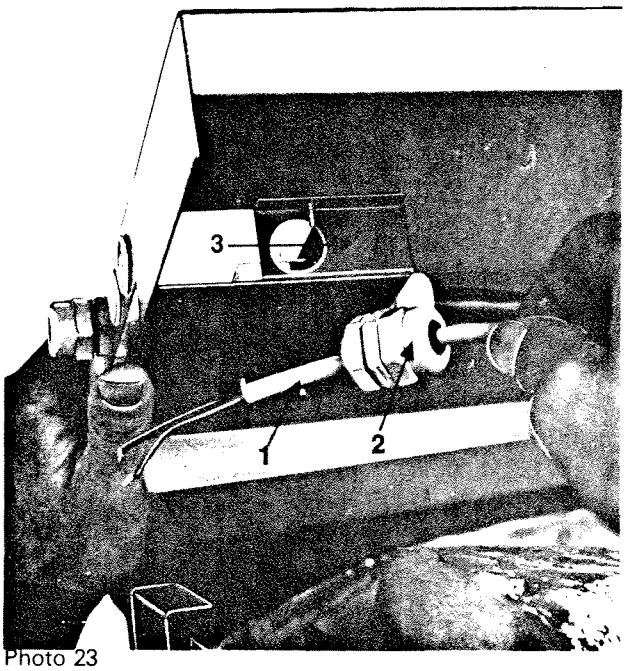


Photo 23
Burner cable attached to junction box. Cable (1) insert into connector (2) place in hole of junction box and tighten nuts to secure cable. For Oil/Gas burner assemble dormer cable to junction box. Cable (1) insert into connector (2) place in hole of junction box and tighten nut to secure cable.

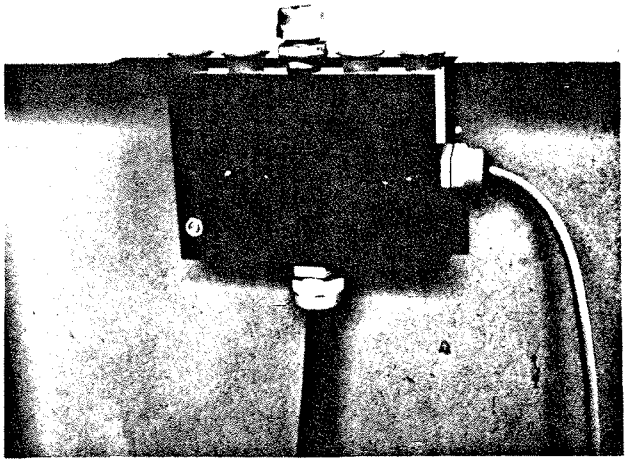


Photo 24
Junction box completely wired and closed for final assembly of jacket.

Photo 25
Connect burner cable with controls. Hold together both side panels with front parts of cover before lowering top jacket cover completely into the front panel.

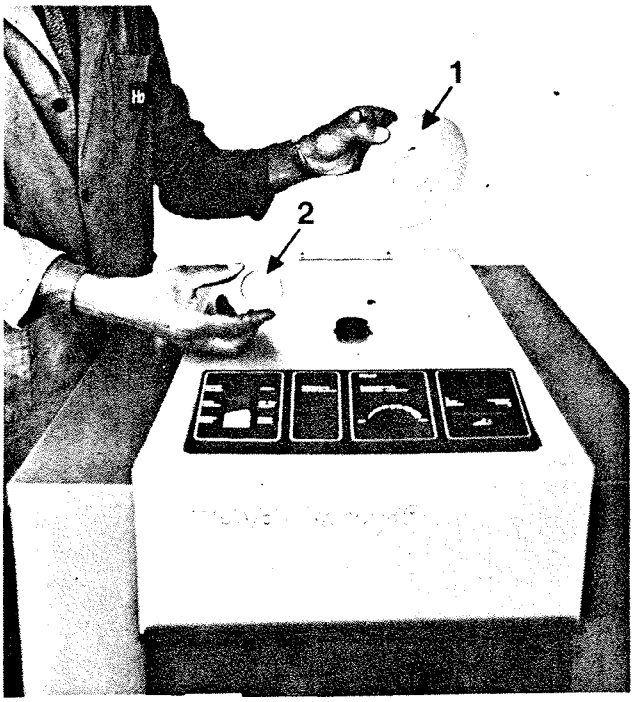


Photo 26
Secure cover with disc (1) and hex nut (2). This completes the installation of boiler jacket.

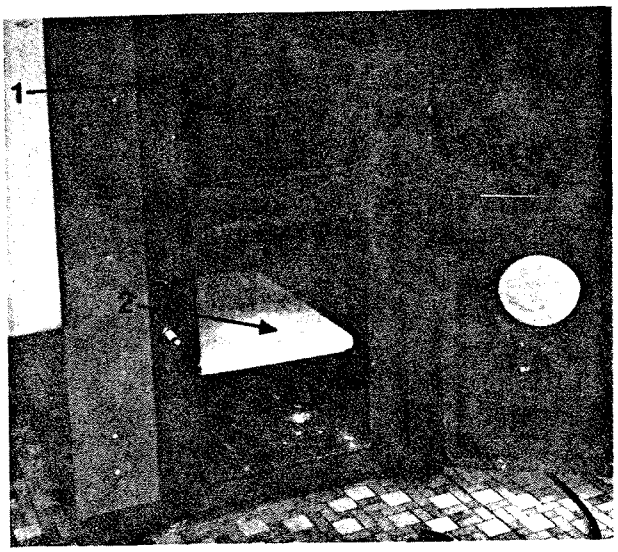
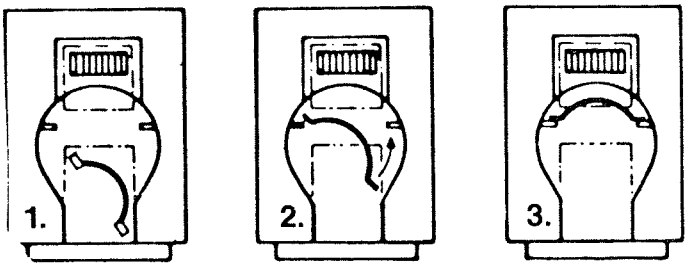
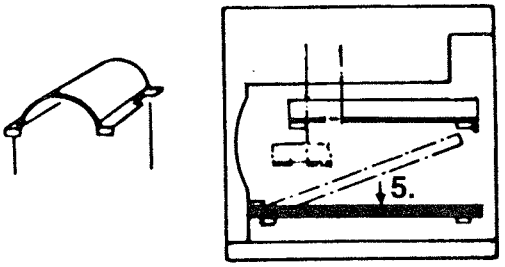
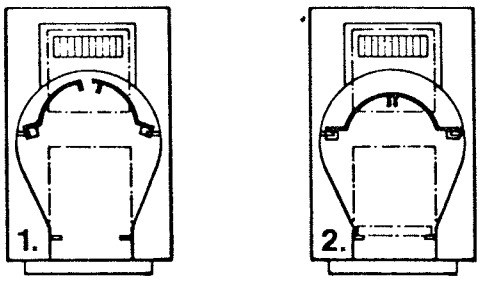


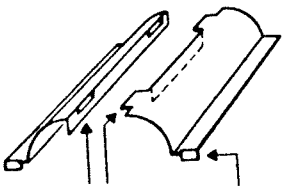
Photo 27
For oil or gas operation check correct position of combustion chamber reflector baffle (1) and the ceramic plate (2). The reflector plate must rest on the grate support. Only VarioLyt Boilers with outputs of 88,000 BTU, 120,000 BTU, 160,000 BTU, and 260,000 BTU have combustion chamber reflector baffles. The reflector baffle can be inserted only through the lower door, see position (1) make sure the notches are on the right hand side of reflector baffle. Two support brackets are located on each side of combustion chamber. Place reflector position (2) first on the left rear bracket. The notches on the right side of reflector allow you to lift and to slide it on the right rear bracket. Position (3) & (4) shows position of reflector.
Important: Pull reflector forward against the door frame. Position (5) shows ceramic plate in lower support bracket (used to support grates).
Note: VarioLyt 22, 30 use one piece reflector baffle. VarioLyt 40 & 65 use 2 piece reflector baffle.

Photo 28
For oil or gas operation lock upper and lower doors with hex nuts.









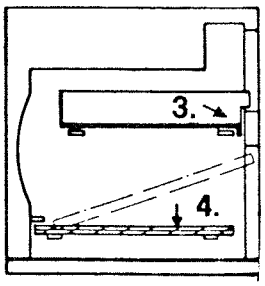


Photo 29
For wood/coal firing — install door handles (9) onto the filling door and ash pit door.

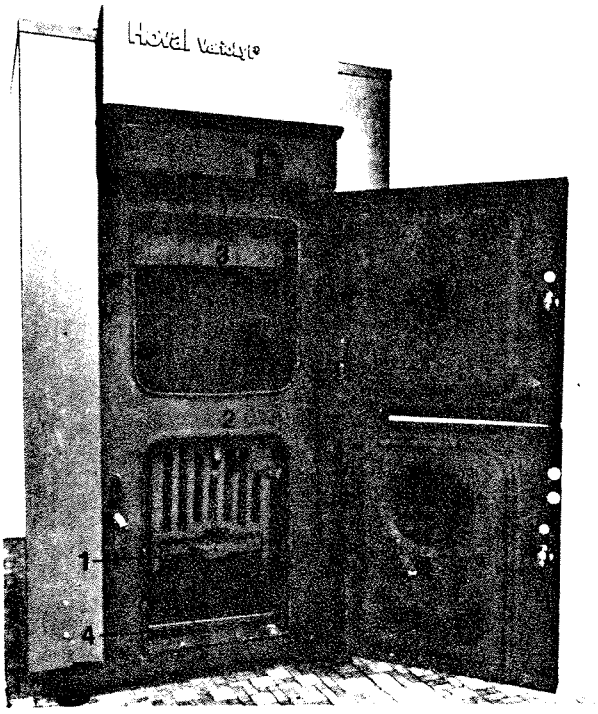


Photo 30
For solid fuel firing check correct position of fire grate (1) front grate (2) fume guard (3) and ash pan (4). For position of high efficiency wood firing parts, see photo 38.

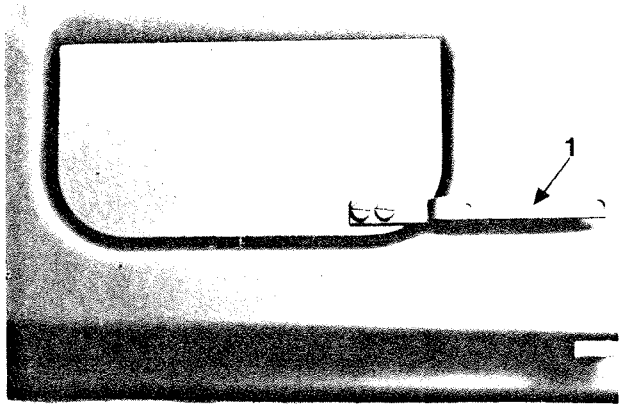


Photo 31
For solid fuel firing mount bracket (1) for automatic draft regulation to the air flap damper.

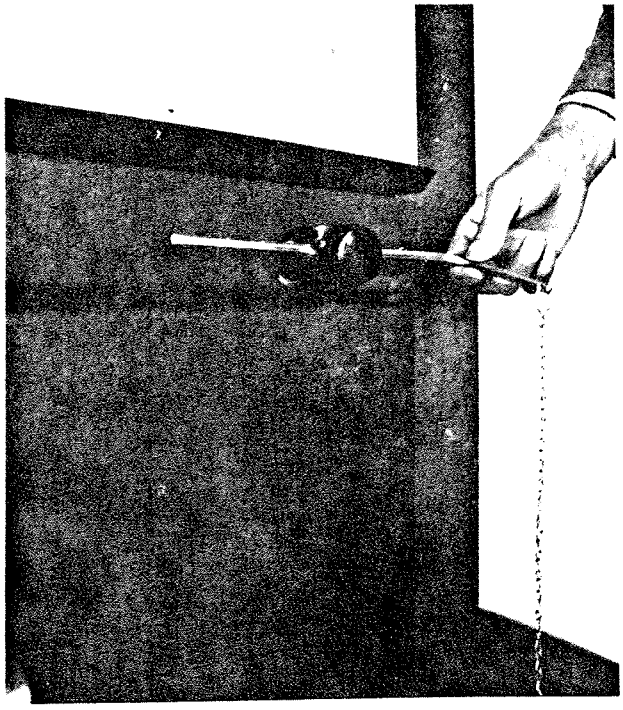


Photo 32
Connect draft regulator lever and air flap with a chain. To adjust the correct chain length the draft regulator should be on setting of 86° Fahrenheit (30°C) with boiler water temperature gauge also reading 30°C. On this position the air flap must be closed.

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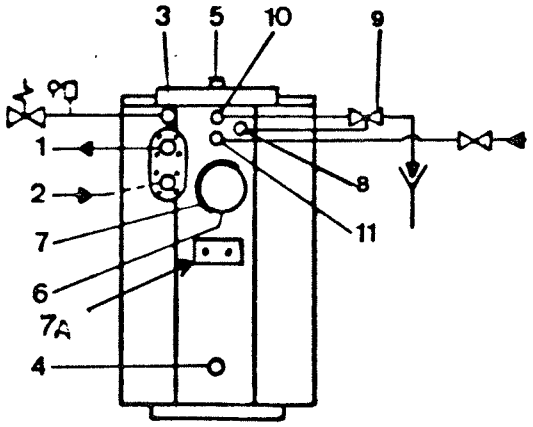


Photo 33
Boiler Connections (rear view of boiler)

1. Heating supply pipe
2. Heating return pipe
3. ASME boiler rel. valve/Exp. tank conn.
4. Boiler drain
5. Socket, lifting eye
6. Smoke outlet breeching
7. Cleaning cover — 7A on some models only
8. Overheat valve sensor well
9. Thermal overheat valve
10. Hot water drain (overheat coil)
11. Cold feed (overheat coil)
    (conn. can be exchanged optionally)

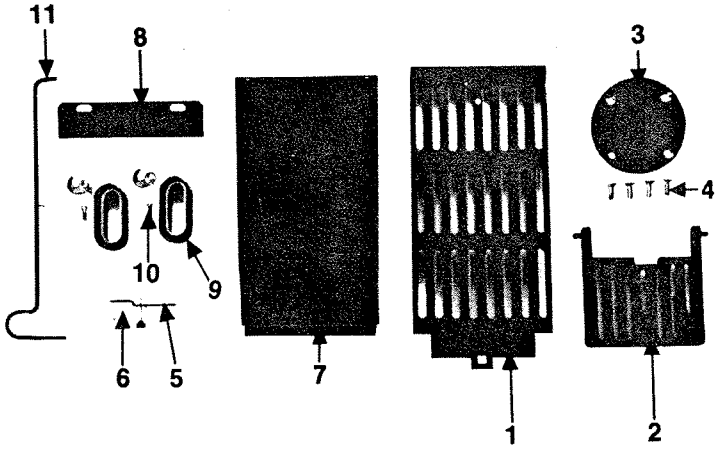


Photo 34
The coal firing kit includes fire grate (1), front grate (2), cover plate (3), four screws for cover plate (4), bracket for draft regulator (5), screw (6), ash pan (7), fume guard (8), two door handles (9), two fastening screws (10), handle bar (11).
Note: VarioLyt 52 & 65 have 2-piece solid fuel grates (one rear & one front section).

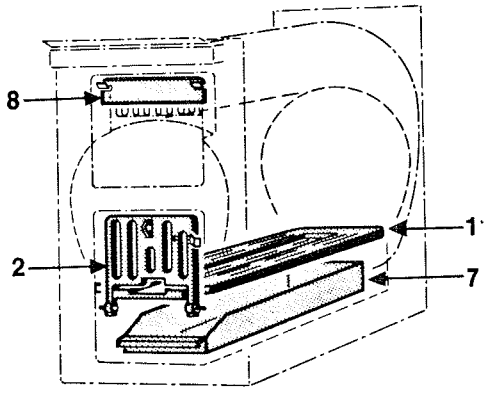


Photo 35
Installation for coal firing. Remove ceramic plate and reflector baffle and install fire grate (1) and front grate (2) slide ash pan (7) under grate, and hang fume guard (8) on hooks.

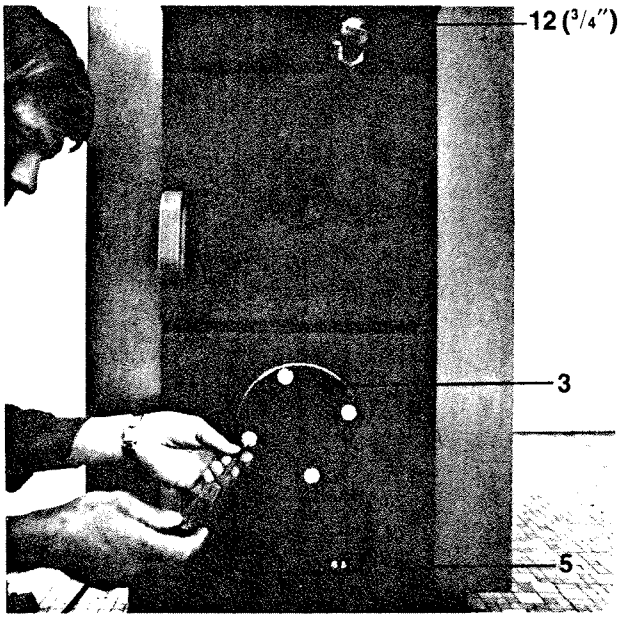


Photo 36
For burning solid fuel. Cover burner hole with cover plate (3). Install Samson draft regulator (12) and adjust per enclosed instruction.

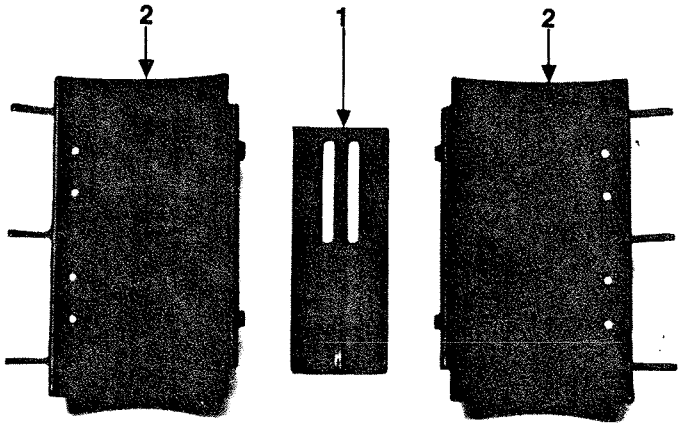
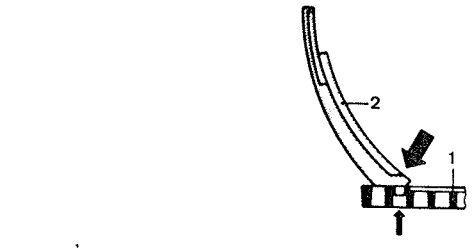


Photo 37
Wood Burning Kit — (optional)
The special equipment for burning wood includes a partial load shutter (1) for output reduction and two secondary air baffles (side grates) (2).



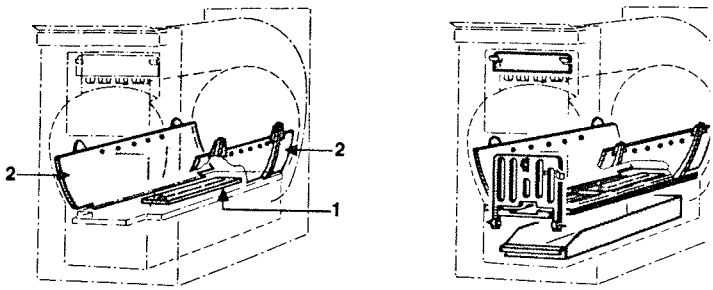


Photo 38
Installation of wood burning kit — side grates (2) are installed on both sides of the combustion chamber (small holes being on the upper side) make sure the knobs of the baffles are located in the second row of slots off the edge of the wood fire side grate.
The partial load shutter (1) is introduced only when it is necessary to reduce the heat output when burning wood and can be adjusted to regulate fire. The load shutter can be adjusted in forward or in reverse position.

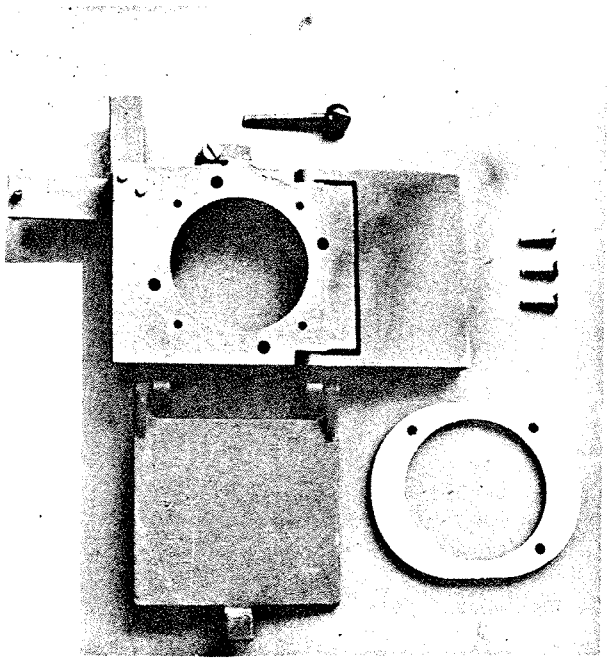


Photo 39
Burner, swing bracket (optional equipment) consist of:
- one swing bracket (1)
- two gasket (2)
- three-flat head bolts (3)
- one-Knob handle

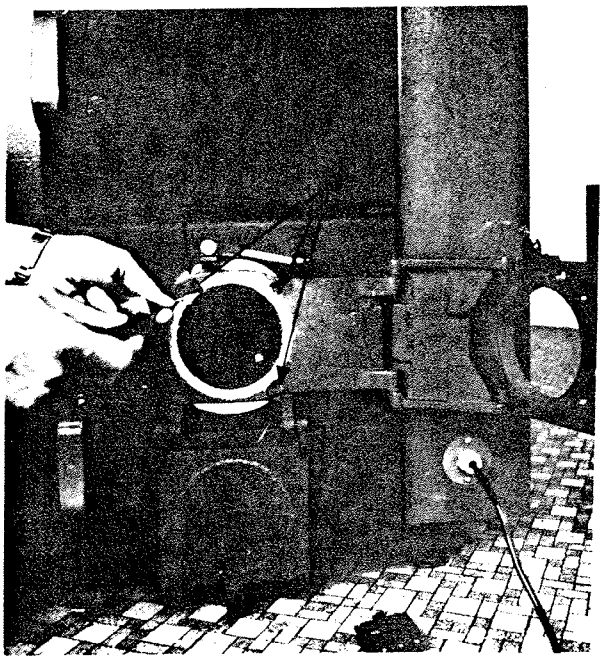


Photo 40
Attach Burner Bracket and Gasket (2) with flat head bolts. Screw knob handle into (swing) latch. Attach Burner to swing bracket with three flat head bolts. Flexible oil line and wiring cable with auxiliary electrical switch. Supplied and attached by installer.

Note: Oil or gas burner switch must be in off position when swinging burner away from operating position.

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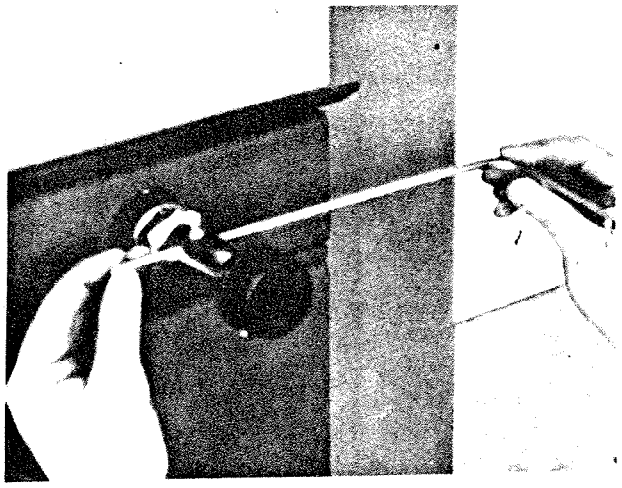
SERVICE SAMSON DRAFT REGULATOR

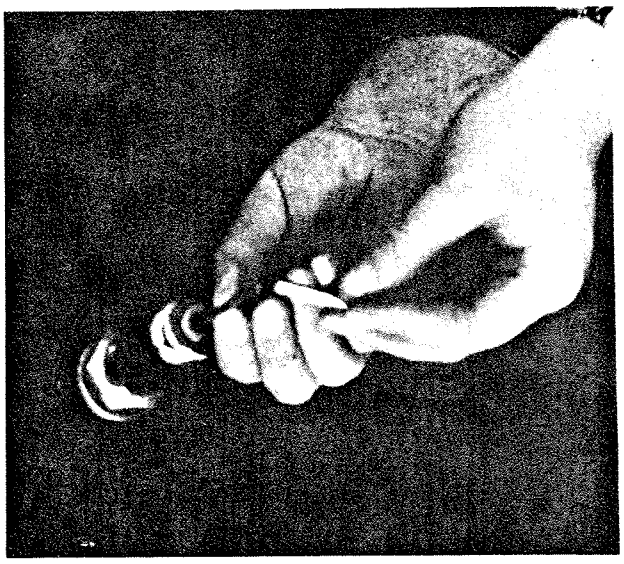
The Samson Draft Regulator is a thermal operated control, and the thermal element may be easily changed if the draft regulator fails to function. Before changing the element a few tests should be made to determine if the regulator is faulty.

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.
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 1 ½".
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.

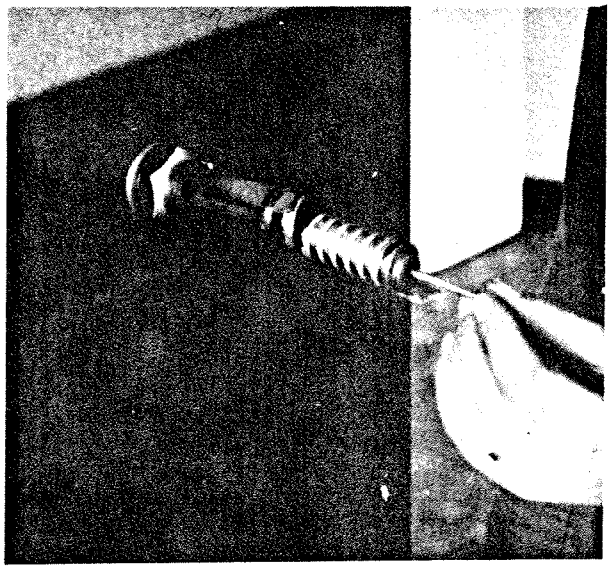
2. Loosen set screw on knob, turn knob counter clockwise off regulator body.



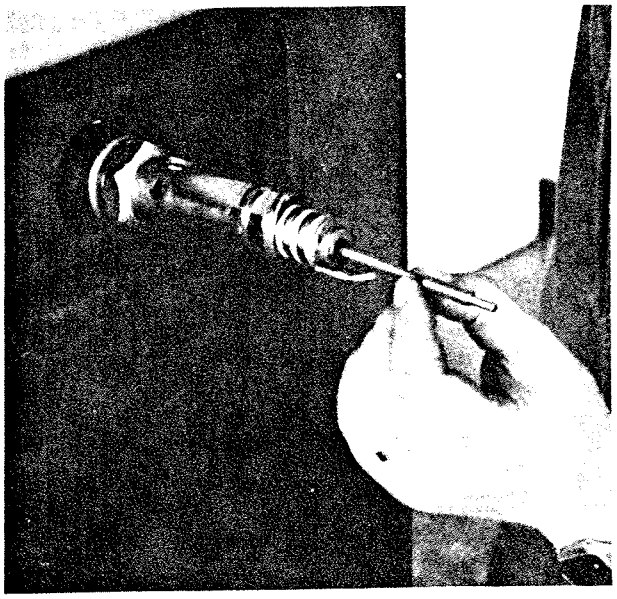
1. Loosen set screw and remove hex arm and pin.



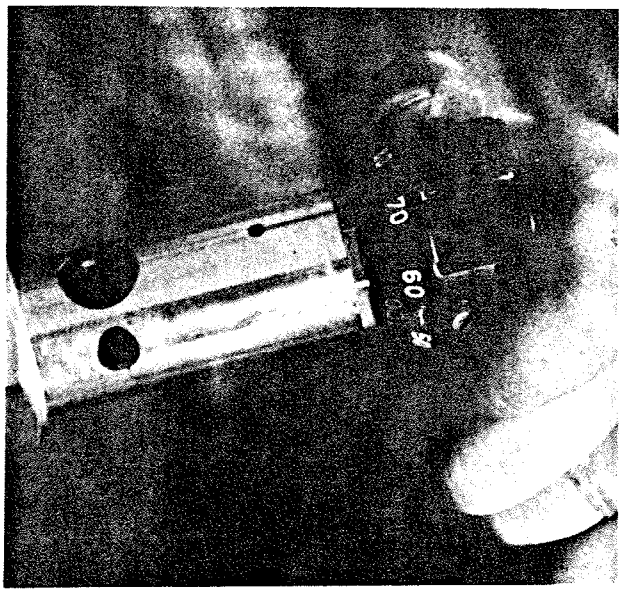
3. Remove push rod and thermal element.



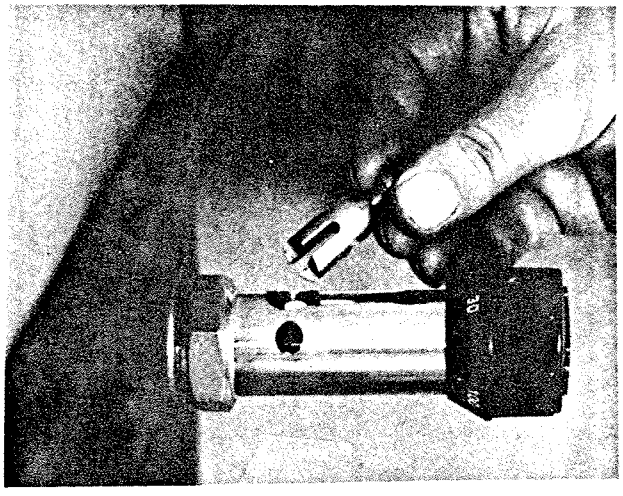
4. Install new thermal element making sure that flat spot on thermal element is at the bottom or 6 o'clock position.



5. Install push rod. (not required on all 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.

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.

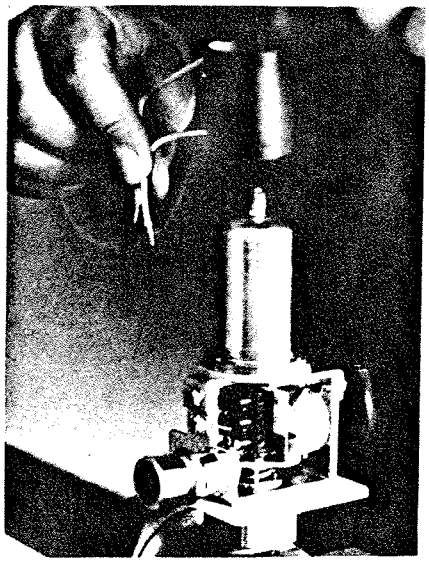
VALVE FUNCTION

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 15 - 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 yellow wire for 110V located in junction box. If the yellow wire 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.

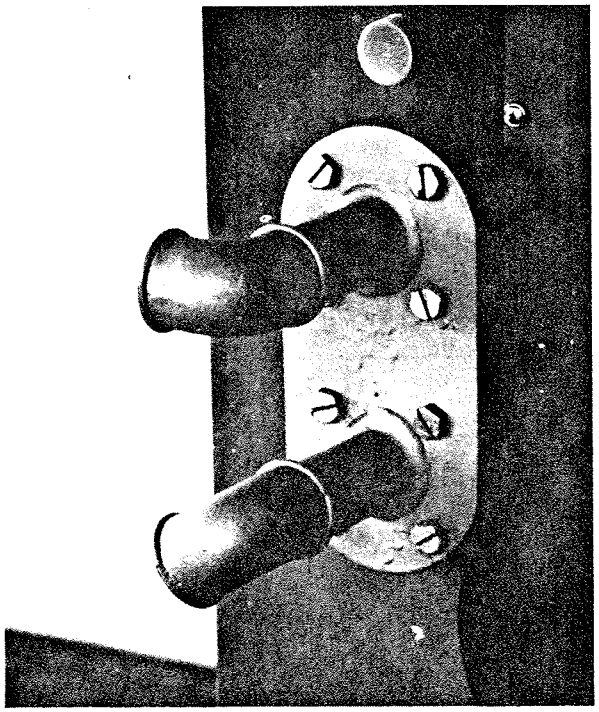
MIXING VALVE CHARACTERISTICS

- 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.

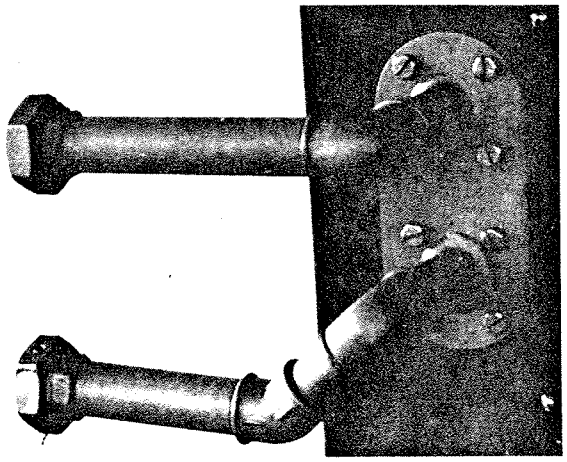
ASSEMBLING

- 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.

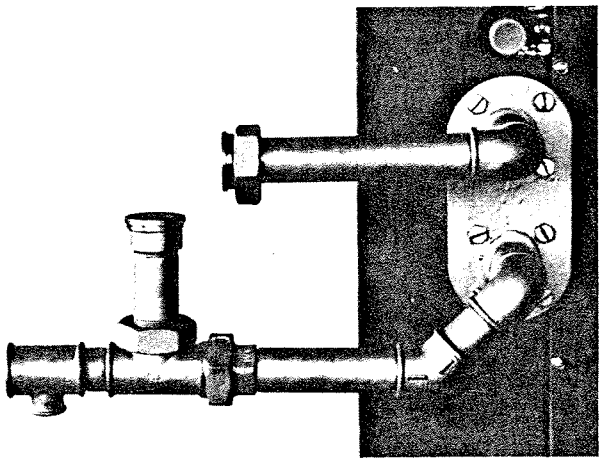
POWER FLOW TO MIXING VALVE FROM MASTER PANEL



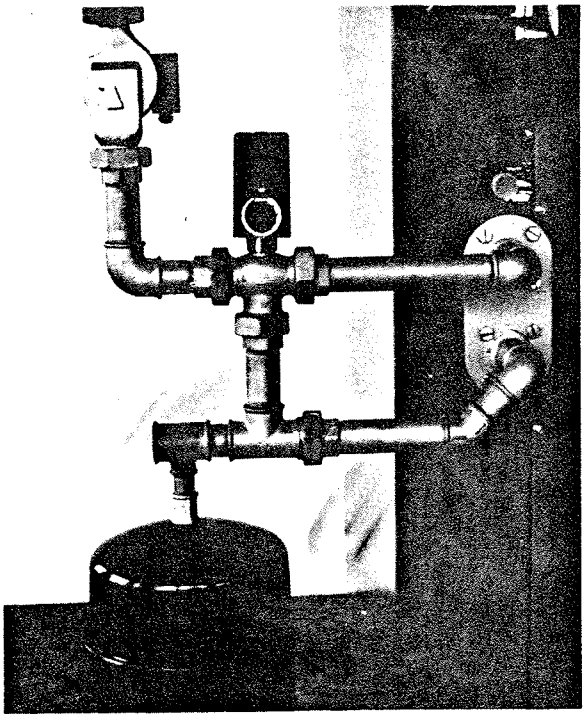
1. Bolt flanges to Boiler and install 2 1¼ 90° els.



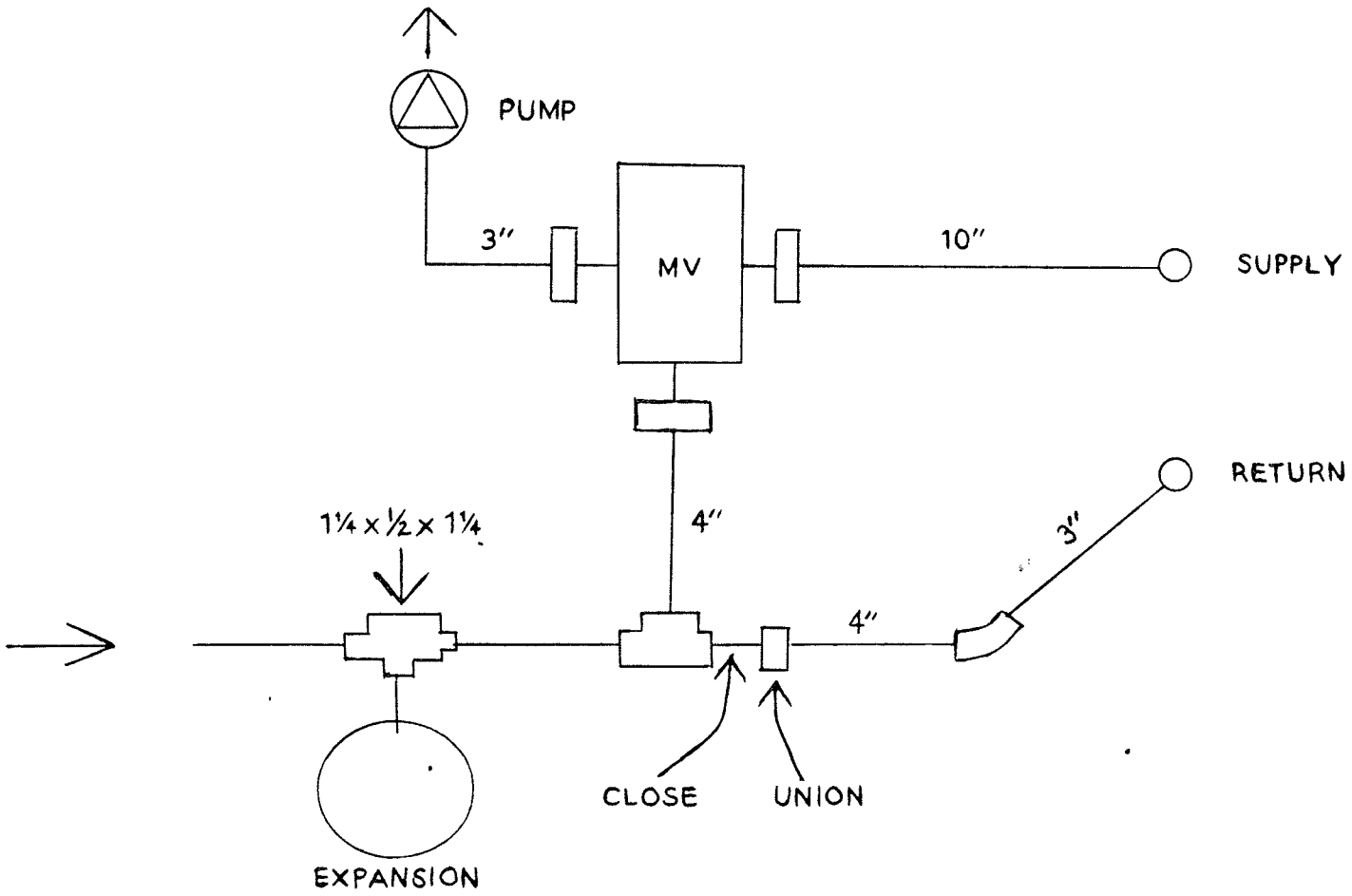
2. Install 1¼ 45° el and 1¼" union.



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



4. Install mixing valve and expansion tank as shown.



MATERIAL REQUIRED

3 — 1¼ 90° Els	4 — 1¼ Nipple 3"
1 — 1¼ 45° Els	1 — 1¼ x ½ x 1¼ T
2 — 1¼ Nipples 4"	1 — 1¼ Union
1 — 1¼ Nipple 10"	

OVERHEAT CONTROL

The Valve is a non-electric, thermal, normally closed valve with a non-adjustable opening temperature of 203°F (94°C).

The function of the valve and the coil is strictly for overheat protection. Constant opening of the valve should not be a function of the Hoval boiler. If the valve is opening often, check the following:

BURNING SOLID FUEL IN MILD WEATHER

If a solid fuel fire is established in mild weather and there are long off cycles when no heat for the house or domestic hot water is required, the residual heat in the solid fuel fire box will overheat the boiler. The longest off cycle should never go beyond 30 minutes, since long off cycles when burning wood will cause problems even when burning dry wood. *(Dry wood still has 15 to 20% moisture content.)*

LOOSE FITTING DOORS

To control a solid fuel fire, the doors must be air tight. Excessive air leakage around doors will cause overheating in mild weather.

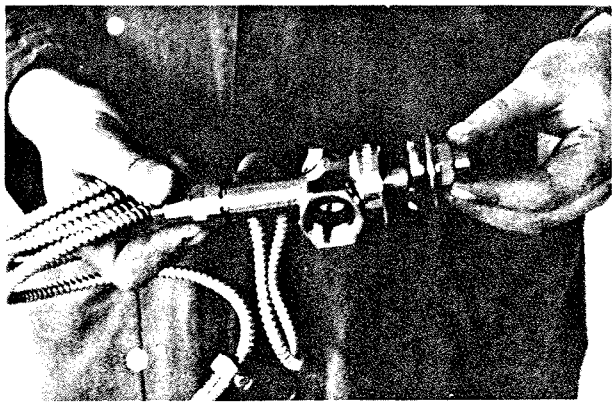
DEFECTIVE VALVE – Check the following:

1. Shut off power to boiler. Remove the access panel. In the boiler well there are two or three (depending on model of boiler) capillary tubes and a probe from the primary water thermometer. Remove rubber plug and 1 capillary from the limit aquastat. *(The Aquastat located in the master panel with the reset button.)*

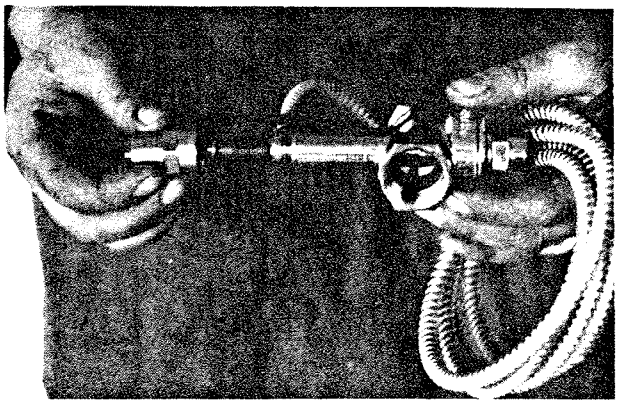
2. Insert a thermometer capable of reading 220°F (104°C) in the boiler well. *(See below).*

3. Place a jumper wire across the terminals on the oil burner operating aquastat. *(The aquastat with the round black knob.)*

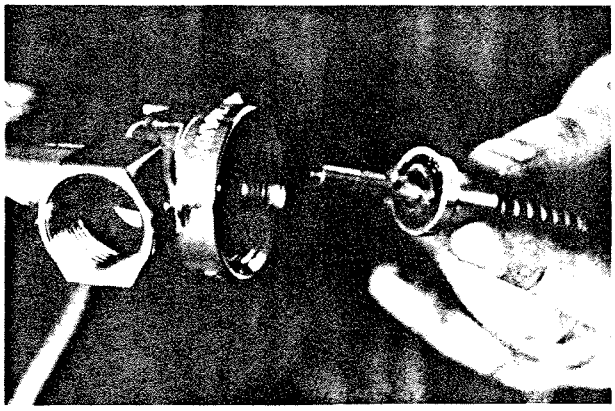
   Activate oil or gas burner. At 203°F (94°C) the TS-130 valve should open. At the same time you can check the accuracy of the primary boiler thermometer.
4. If the valve opens at 203°, the valve is not faulty.



5. If the valve opens before 203°, the thermal element is defective and has to be changed. *This does not require removing the valve body.* Remove nut with red button and replace element.
6. If the valve drips water, flush valve by depressing red button.



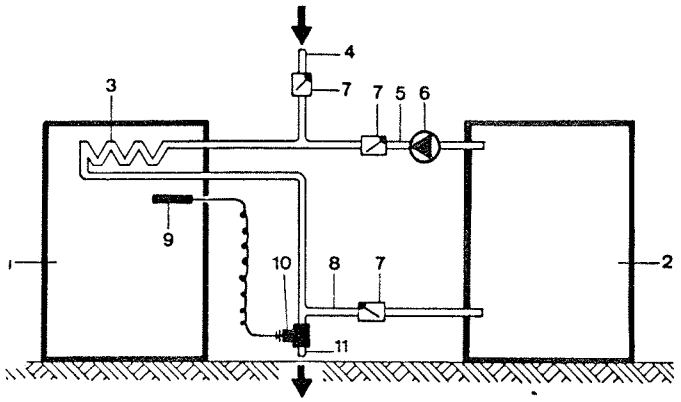
7. If flushing the valve does not stop the water from dripping, shut off the water and remove large nut on valve body.



8. Check the rubber washer and change if defective. This should stop the valve from dripping.

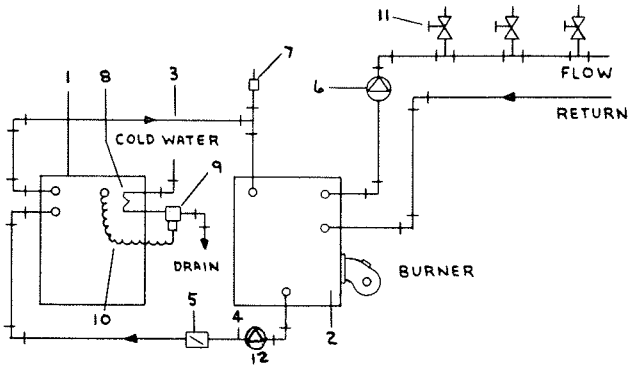
Hoval®

PIPING DIAGRAM HOVAL MULTIFUEL BOILER & SEPARATE DOM. HOT WATER STORAGE TANK



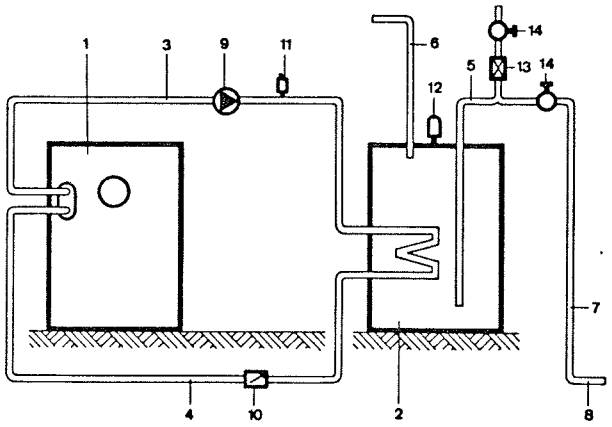
1. Hoval multifuel boiler
2. Dom. hot water tank
3. Overheat coil
4. Cold water
5. Tank return
6. Tank loading pump
7. Check valve
8. Dom. hot water flow
9. Well overheat valve
10. Thermal overheat valve
11. Conn. to open drain

PIPING DIAGRAM – VARIOLYT – ADD ON BOILER WITH CHECK VALVE



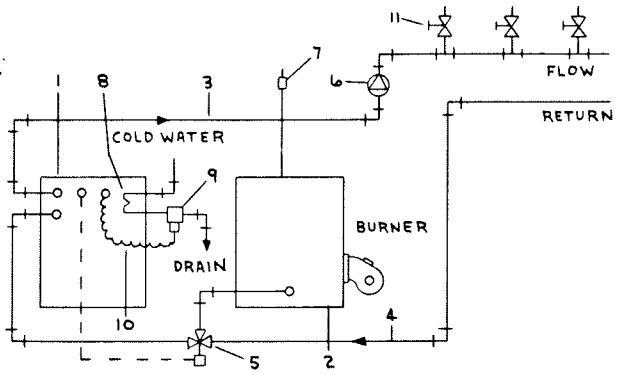
1. Hoval VarioLyt Multifuel Boiler
2. Existing Boiler
3. Primary Flow
4. Primary Return
5. Check Valve
6. Pump
7. Automatic Air Vent
8. Overheat Coil
9. Thermal Overheat Valve
10. Well
11. Gate Valve.
12. Circulator (iron body)

HOVAL VARIOLYT MULTIFUEL BOILER & SEPARATE DOM. HOT WATER TANK



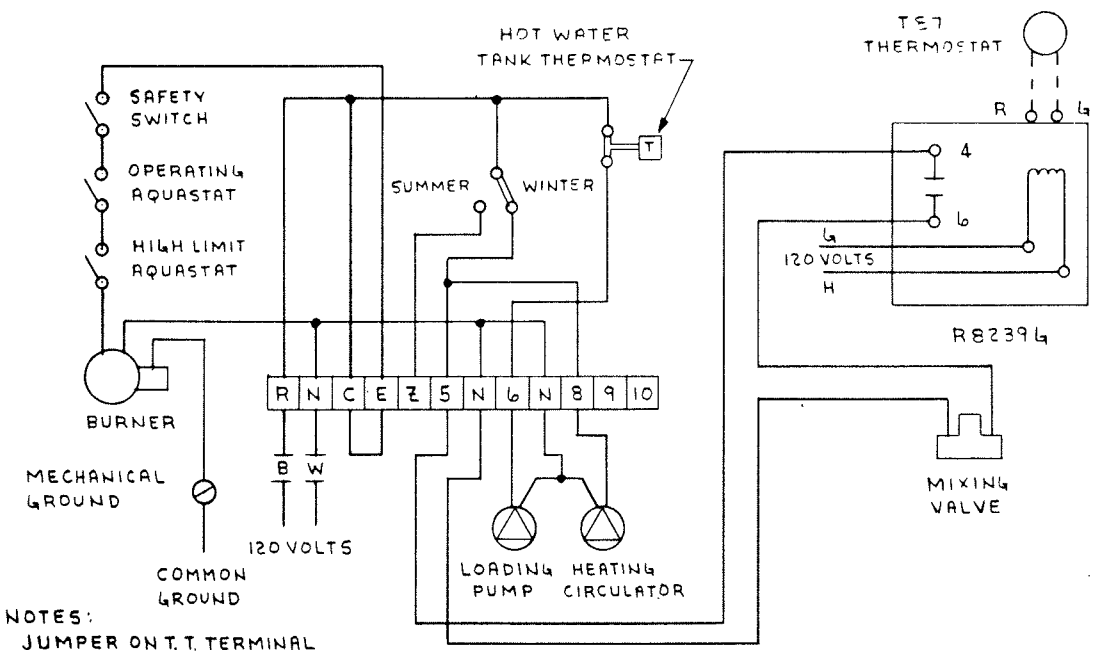
1. Hoval VarioLyt Multifuel Boiler
2. Dom. hot water tank
3. Primary flow
4. Primary return
5. Cold water
6. Dom. hot water supply
7. Siphon loop
8. Tank drain
9. Tank loading pump
10. Checkvalve
11. Automatic air vent
12. Relief valve
13. Pressure reducing valve
14. Gate valve

PIPING DIAGRAM – VARIOLYT – ADD ON BOILER WITH 3 WAY MIXING VALVE



1. Hoval VarioLyt Multifuel Boiler
2. Existing Boiler
3. Primary Flow
4. Primary Return
5. 3 Way Valve
6. Pump
7. Automatic Air Vent
8. Overheat Coil
9. Thermal Overheat Valve
10. Well
11. Gate Valve

1174-220



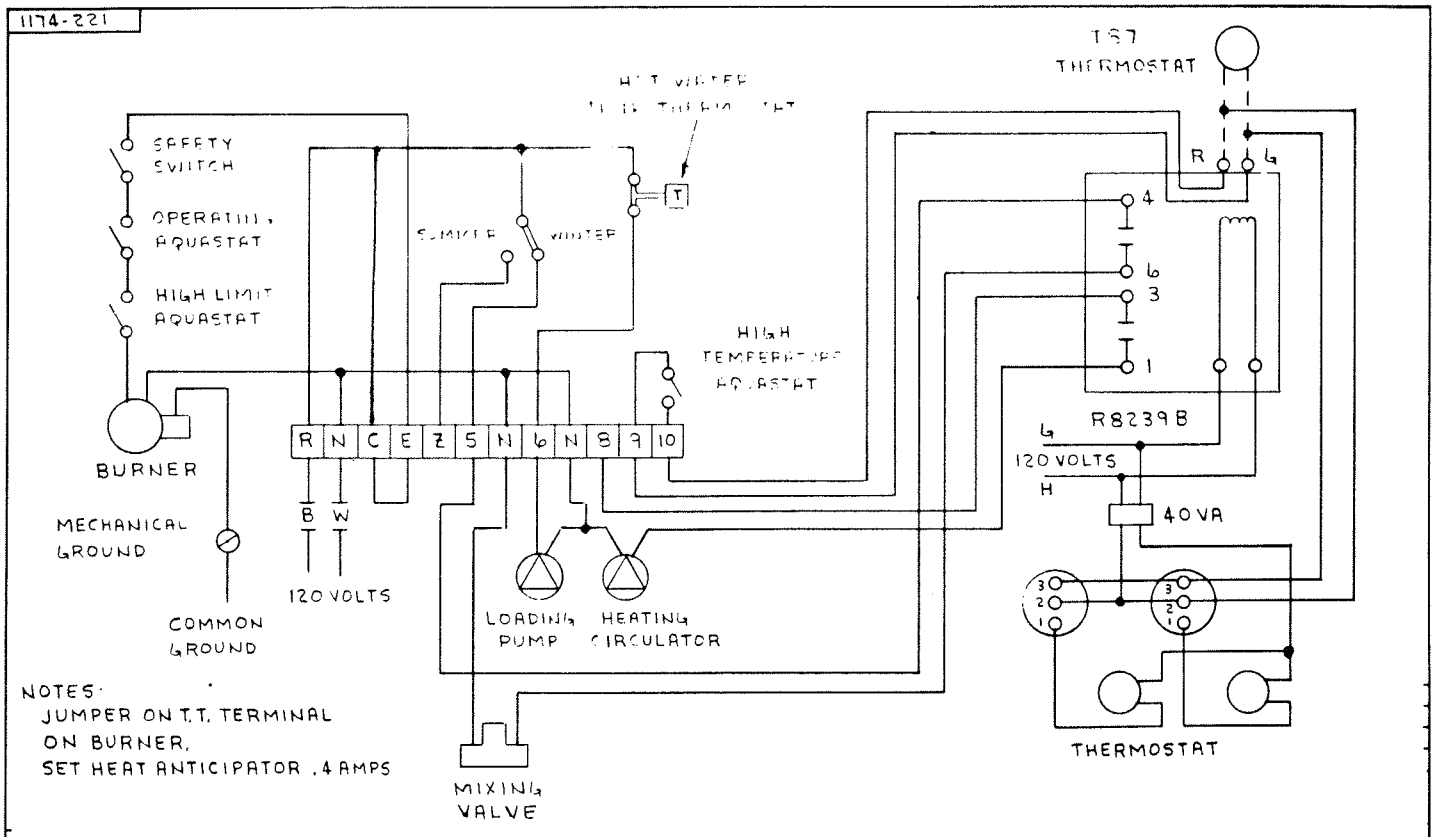
NOTES:
JUMPER ON T. T. TERMINAL
ON BURNER.
SET HEAT ANTICIPATOR .4 AMPS.

CONTROL PANEL NO. 2254-019

TITLE ILLUSTRATION, WID FOR CONSTANT CIRCULATION & INTERMITTENT MIXING VALVE, SINGLE ZONE OPERATION WITH 24 V. THERM., HOT WATER TANK - VARIOLYTOR DUO

NO. 1174-220

1174-221

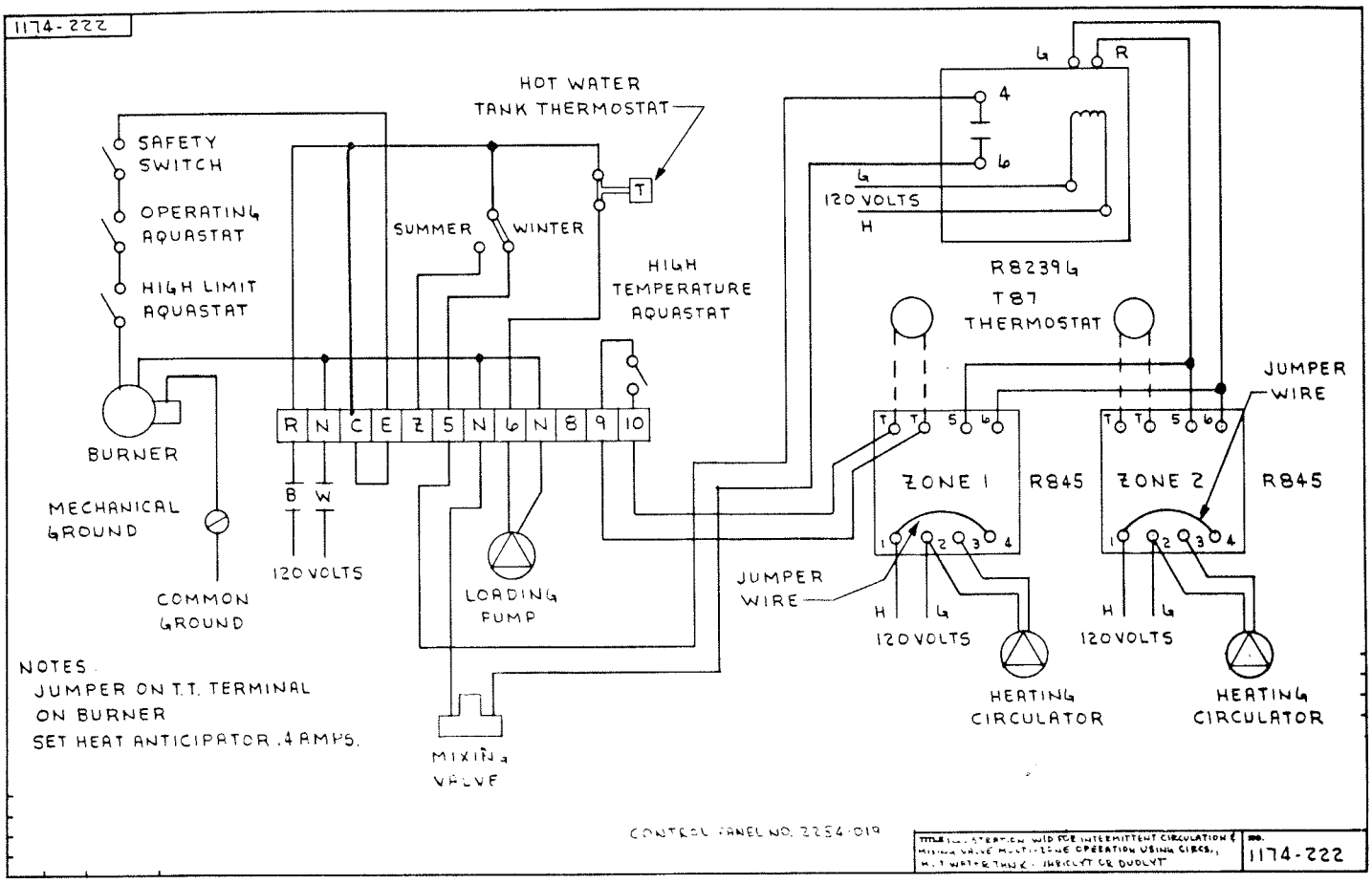


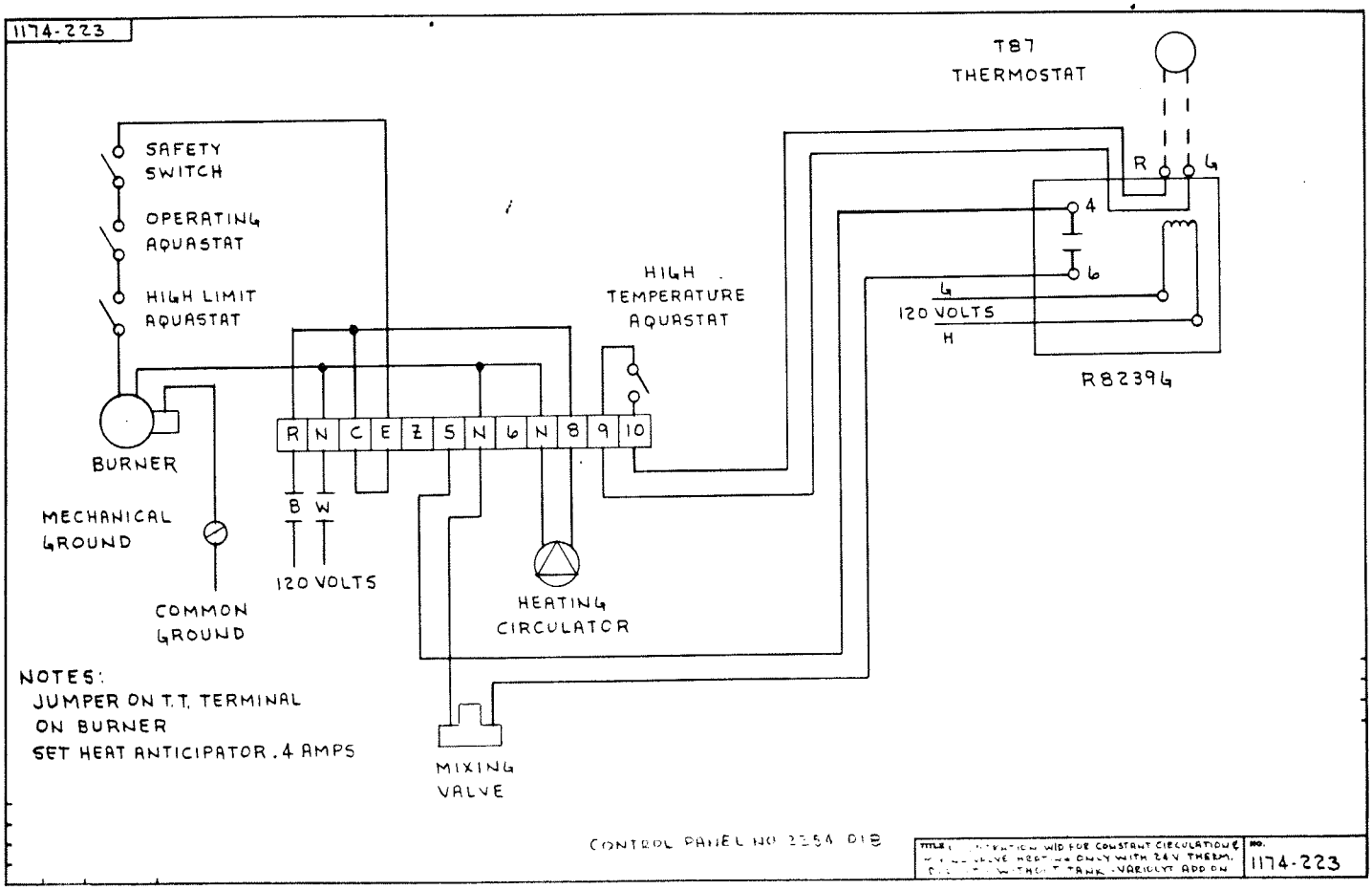
NOTES:
JUMPER ON T. T. TERMINAL
ON BURNER.
SET HEAT ANTICIPATOR .4 AMPS

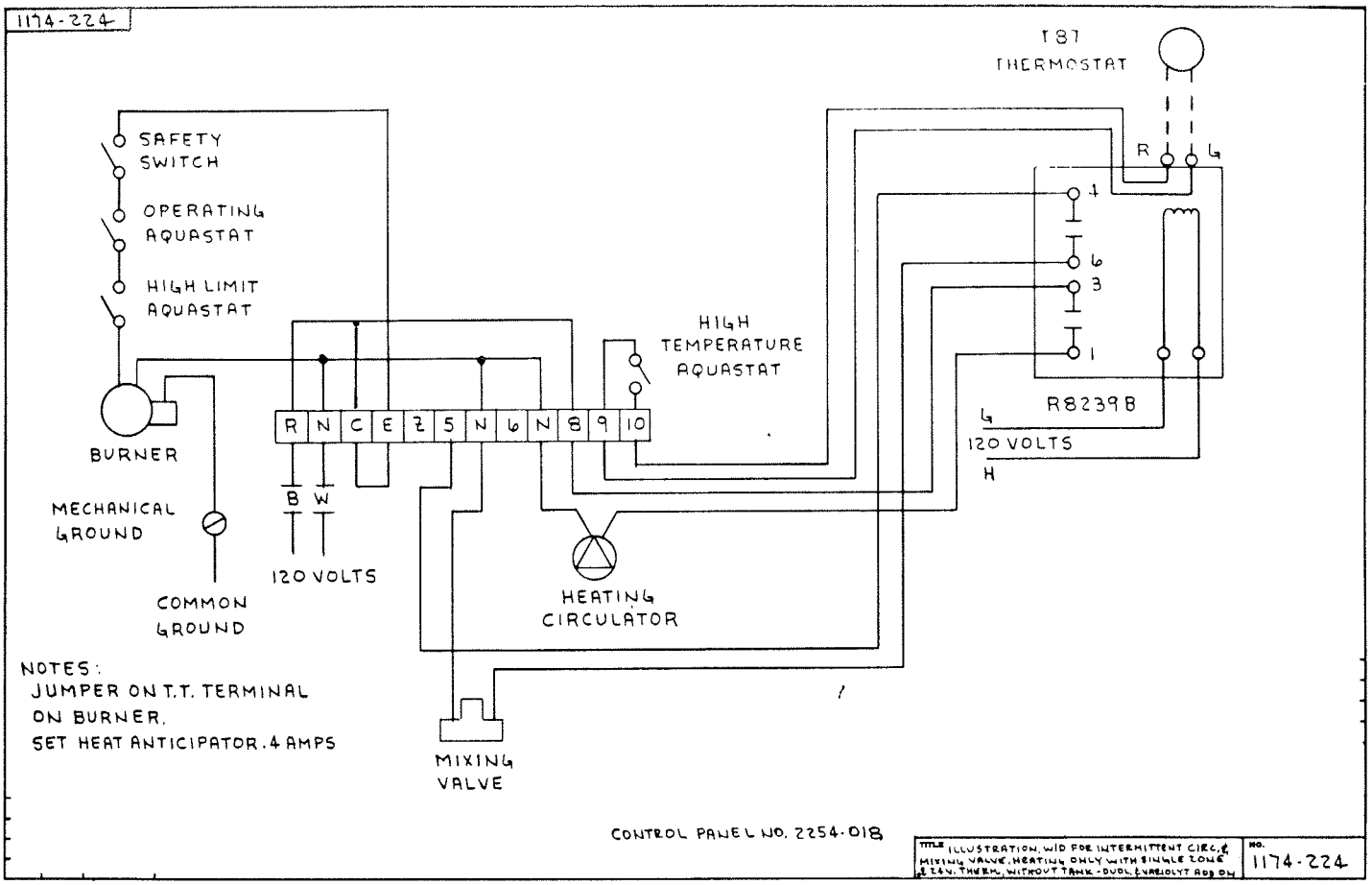
CONTROL PANEL NO. 2254-019

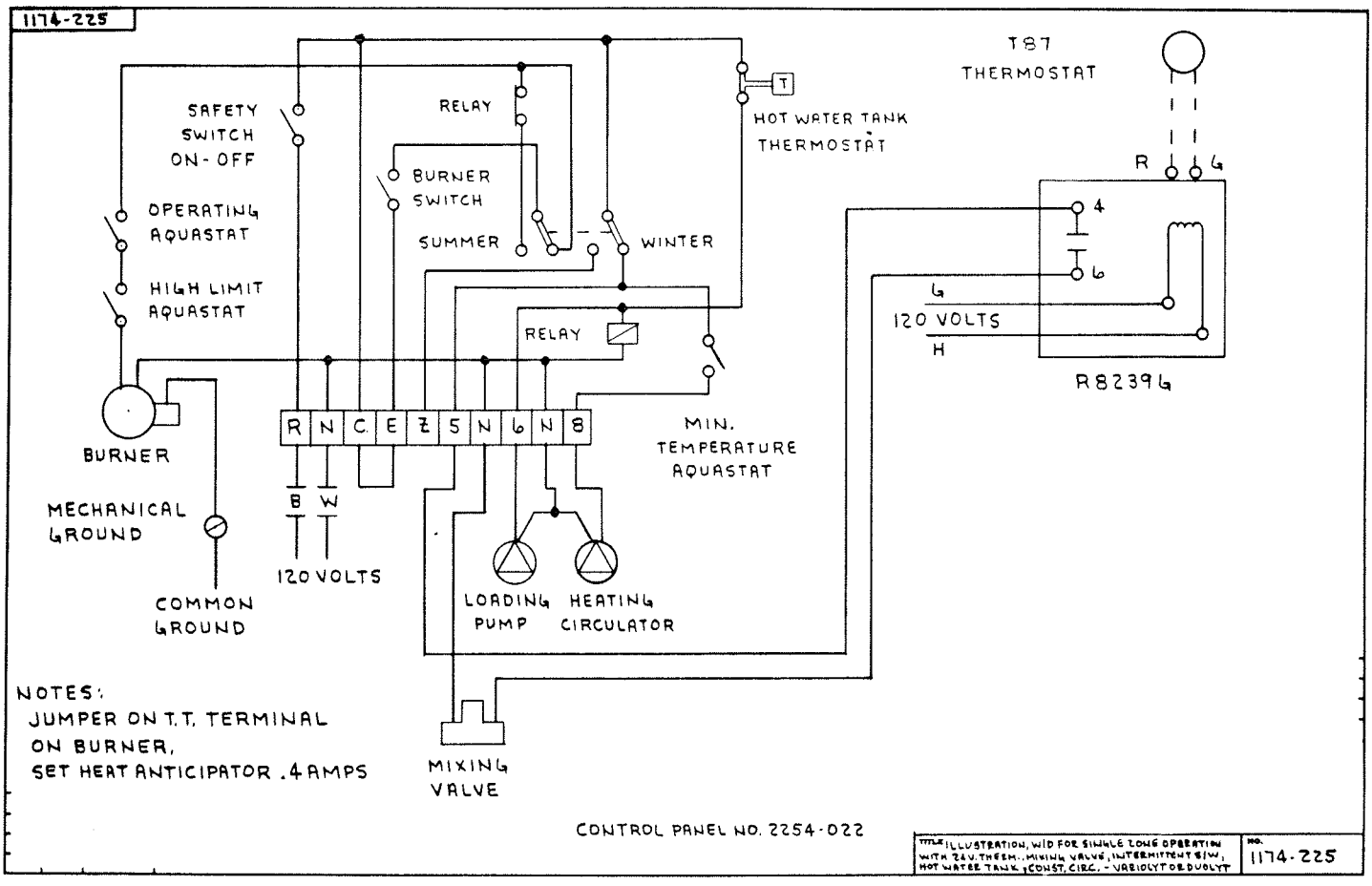
TITLE ILLUSTRATION, WID FOR INTERMITTENT CIRCULATION & MIXING VALVE, SINGLE ZONE OPERATION OR MULTI-ZONE USING 24 V. ZONE VALVES, HOT WATER TANK - VAR. OR DUO.

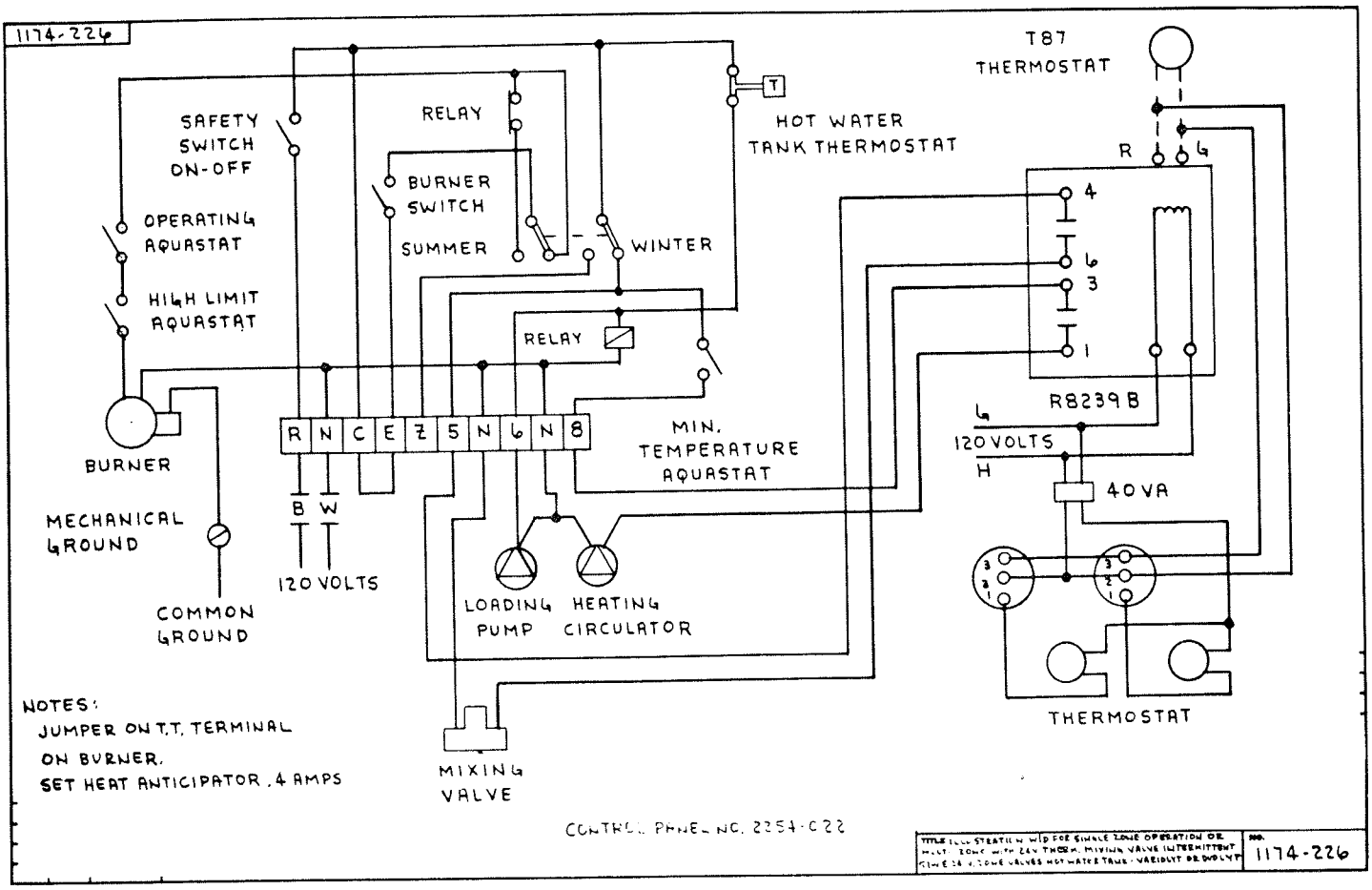
NO. 1174-221

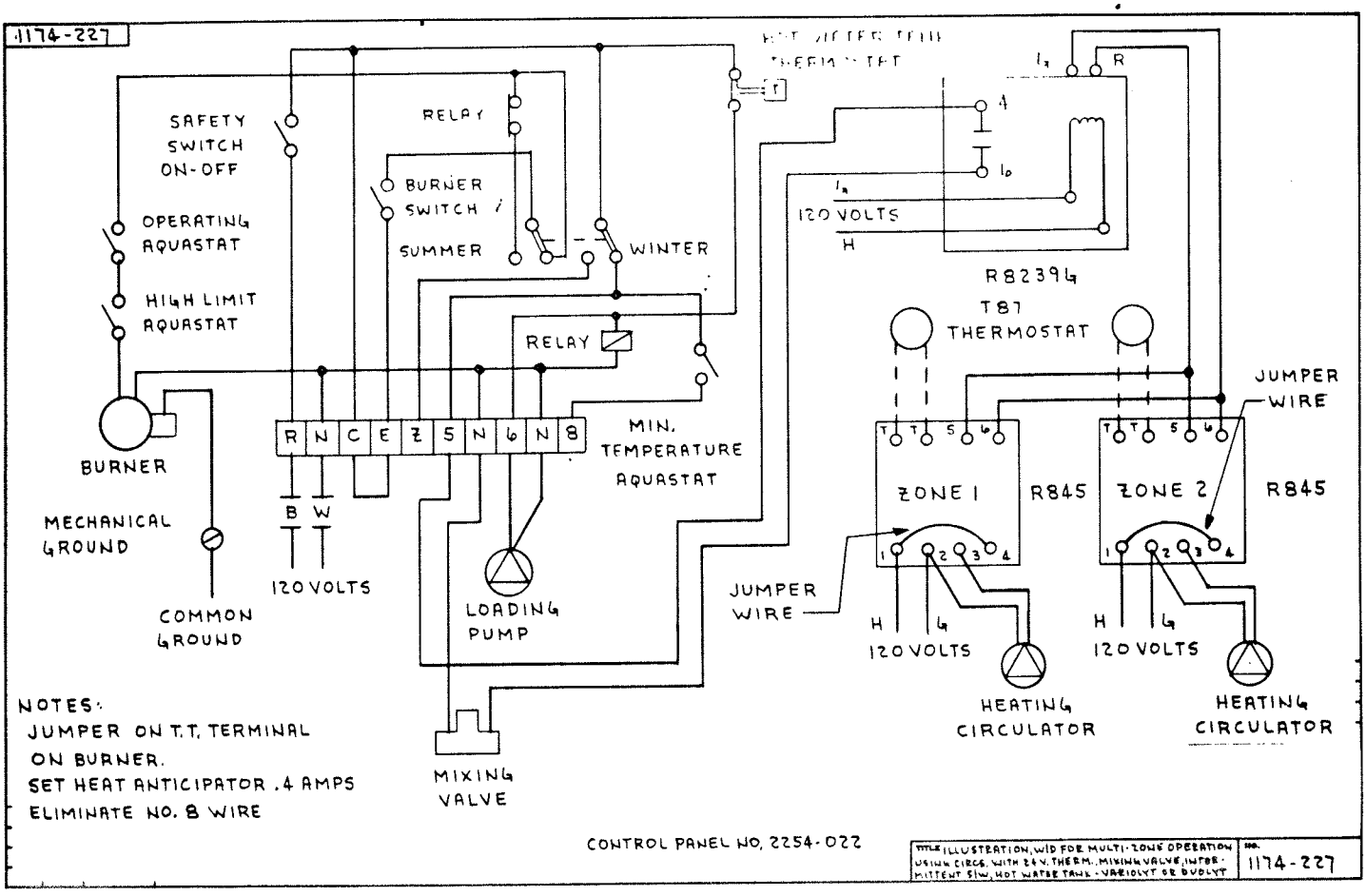

1174-222
HOT WATER
TANK THERMOSTAT
SAFETY
SWITCH
OPERATING
AQUASTAT
HIGH LIMIT
AQUASTAT
SUMMER
WINTER
HIGH
TEMPERATURE
AQUASTAT
T87
THERMOSTAT
JUMPER
WIRE
R82396
120 VOLTS
H
BURNER
MECHANICAL
GROUND
COMMON
GROUND
120 VOLTS
LOADING
PUMP
ZONE 1
R845
ZONE 2
R845
JUMPER
WIRE
120 VOLTS
120 VOLTS
HEATING
CIRCULATOR
HEATING
CIRCULATOR
MIXING
VALVE
NOTES
JUMPER ON T.T. TERMINAL
ON BURNER
SET HEAT ANTICIPATOR .4 AMPS.
CONTROL PANEL NO. 2234-019
1174-222

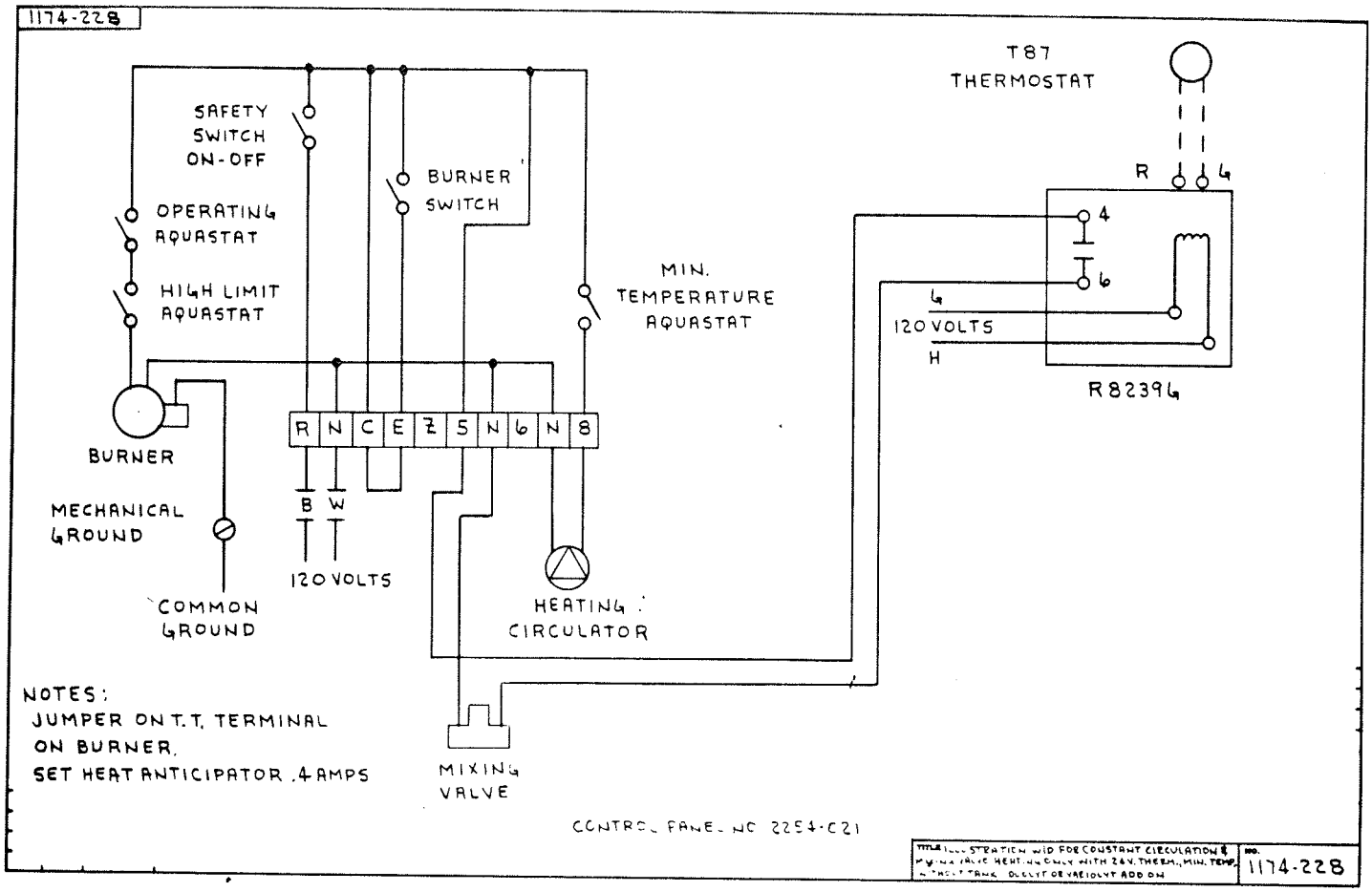

1174-223
T87
THERMOSTAT
SAFETY
SWITCH
OPERATING
AQUASTAT
HIGH LIMIT
AQUASTAT
HIGH
TEMPERATURE
AQUASTAT
R82396
120 VOLTS
H
BURNER
MECHANICAL
GROUND
COMMON
GROUND
120 VOLTS
HEATING
CIRCULATOR
MIXING
VALVE
NOTES:
JUMPER ON T.T. TERMINAL
ON BURNER
SET HEAT ANTICIPATOR .4 AMPS
CONTROL PANEL NO 2234 D18
1174-223

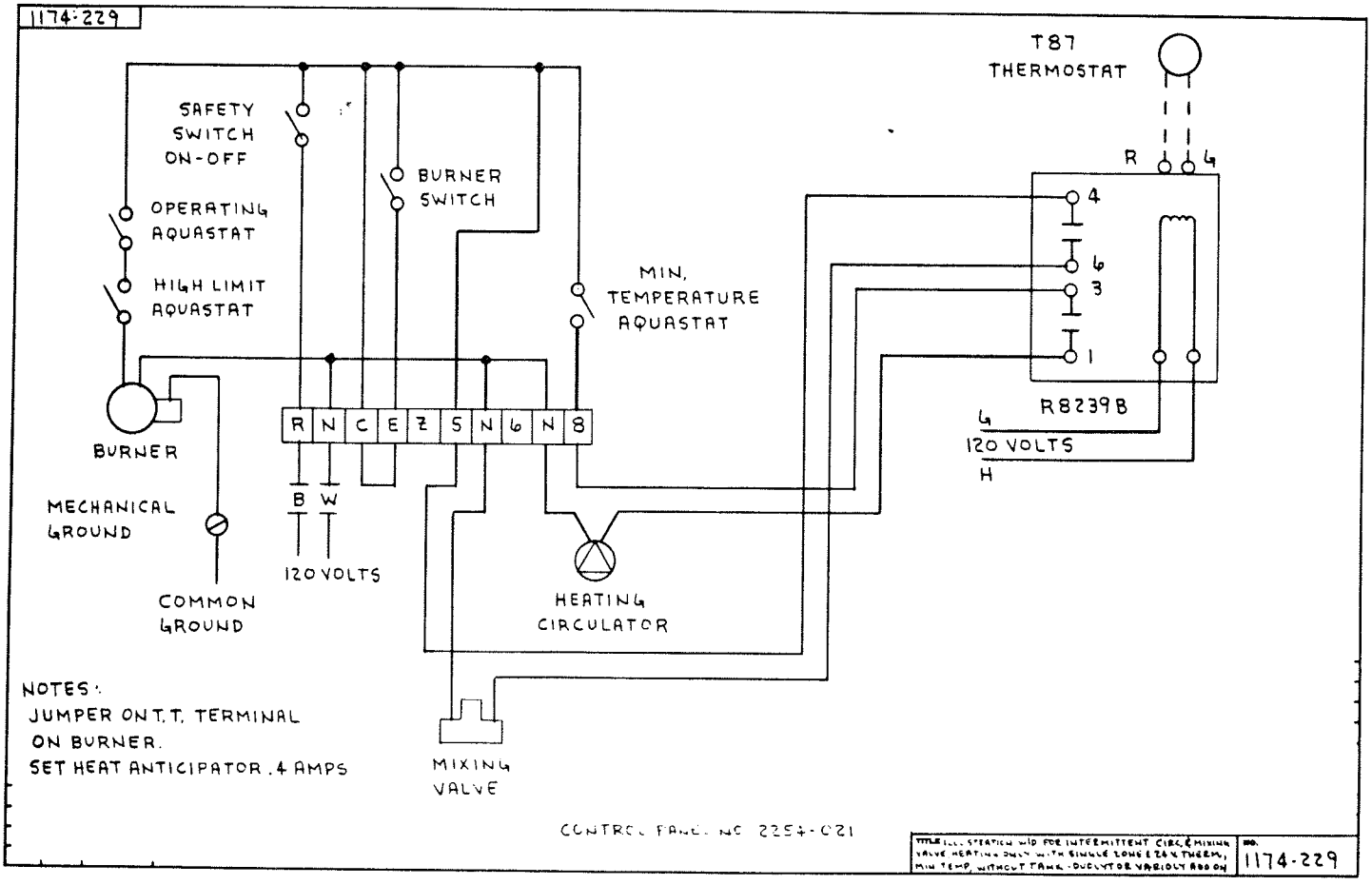

1174-224
T87
THERMOSTAT
SAFETY
SWITCH
OPERATING
AQUASTAT
HIGH LIMIT
AQUASTAT
HIGH
TEMPERATURE
AQUASTAT
R
G
4
6
3
1
R8239B
G
120 VOLTS
H
R N C E Z 5 N 6 N 8 9 10
BURNER
MECHANICAL
GROUND
B W
120 VOLTS
COMMON
GROUND
HEATING
CIRCULATOR
NOTES:
JUMPER ON T.T. TERMINAL
ON BURNER.
SET HEAT ANTICIPATOR .4 AMPS
MIXING
VALVE
CONTROL PANEL NO. 2254-018
TITLE ILLUSTRATION, WID FOR INTERMITTENT CIRC. & MIXING VALVE, HEATING ONLY WITH SINGLE ZONE & 24V. THERM., WITHOUT TANK - DUOL. ENERGLYT ADD ON
NO. 1174-224

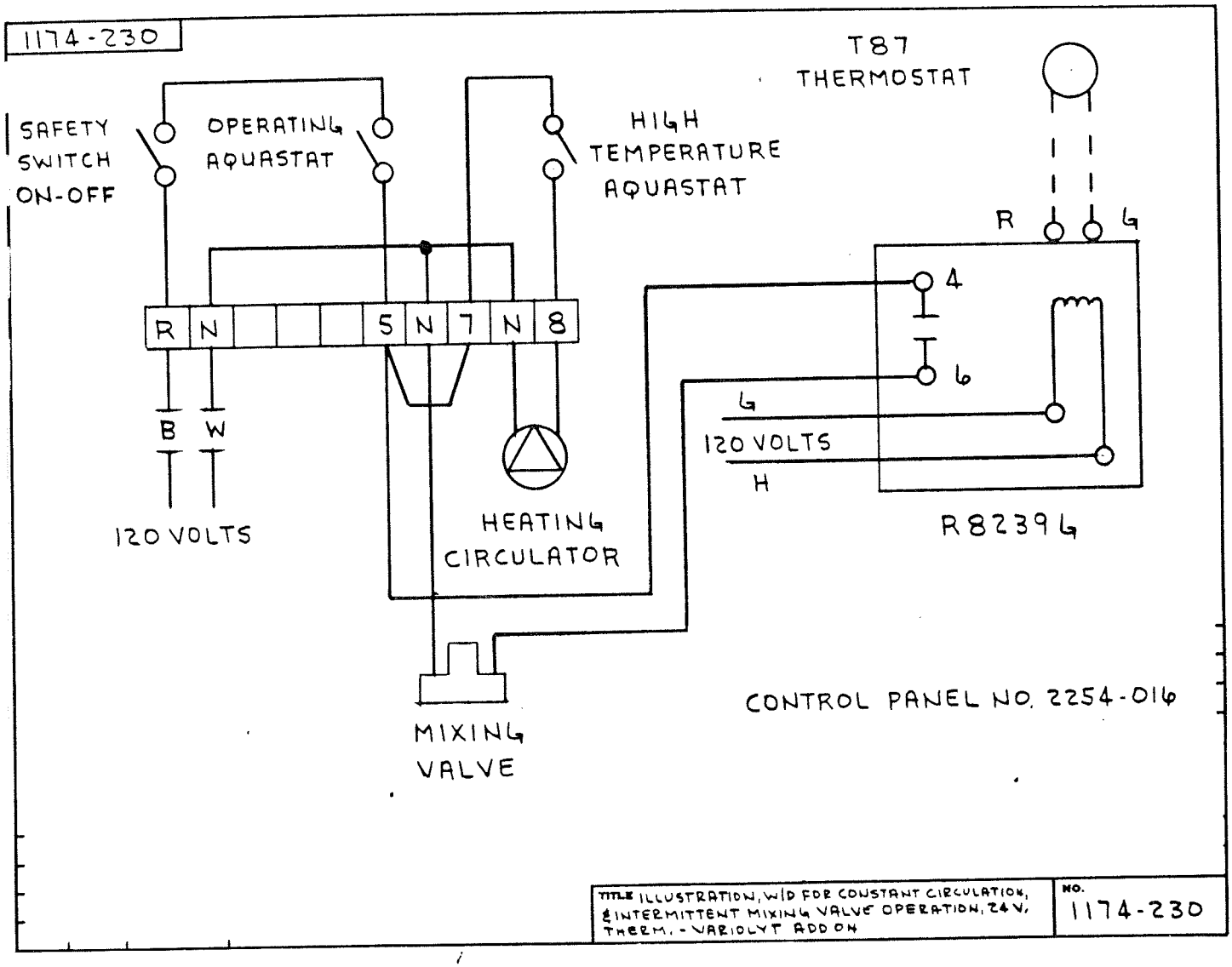

1174-225
T87
THERMOSTAT
T
HOT WATER TANK
THERMOSTAT
SAFETY
SWITCH
ON-OFF
RELAY
BURNER
SWITCH
SUMMER
WINTER
OPERATING
AQUASTAT
HIGH LIMIT
AQUASTAT
RELAY
R
G
4
6
G
120 VOLTS
H
R8239G
R N C E Z 5 N 6 N 8
BURNER
MIN.
TEMPERATURE
AQUASTAT
MECHANICAL
GROUND
B W
120 VOLTS
COMMON
GROUND
LOADING
PUMP
HEATING
CIRCULATOR
NOTES:
JUMPER ON T.T. TERMINAL
ON BURNER,
SET HEAT ANTICIPATOR .4 AMPS
MIXING
VALVE
CONTROL PANEL NO. 2254-022
TITLE ILLUSTRATION, WID FOR SINGLE ZONE OPERATION WITH 24V. THERM., MIXING VALVE, INTERMITTENT SW., HOT WATER TANK, CONST. CIRC. - VARIOLYT OR DUOLYT
NO. 1174-225


1174-226
T87
THERMOSTAT
HOT WATER
TANK THERMOSTAT
SAFETY
SWITCH
ON-OFF
RELAY
BURNER
SWITCH
SUMMER
WINTER
OPERATING
AQUASTAT
HIGH LIMIT
AQUASTAT
RELAY
R N C E Z 5 N 6 N 8
MIN.
TEMPERATURE
AQUASTAT
R
G
4
6
3
1
R8239B
G
120 VOLTS
H
40 VA
BURNER
MECHANICAL
GROUND
B W
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. 2254-022
1174-226


1174-227
SAFETY
SWITCH
ON-OFF
RELAY
BURNER
SWITCH
SUMMER
WINTER
OPERATING
AQUASTAT
HIGH LIMIT
AQUASTAT
RELAY
R N C E Z 5 N 6 N 8
MIN.
TEMPERATURE
AQUASTAT
R
4
6
120 VOLTS
H
R8239G
T87
THERMOSTAT
JUMPER
WIRE
ZONE 1
R845
ZONE 2
R845
JUMPER
WIRE
H
G
120 VOLTS
H
G
120 VOLTS
BURNER
MECHANICAL
GROUND
B W
120 VOLTS
COMMON
GROUND
LOADING
PUMP
HEATING
CIRCULATOR
HEATING
CIRCULATOR
MIXING
VALVE
NOTES:
JUMPER ON T.T. TERMINAL
ON BURNER.
SET HEAT ANTICIPATOR .4 AMPS
ELIMINATE NO. 8 WIRE
CONTROL PANEL NO. 2254-022
1174-227


1174-228
T87
THERMOSTAT
SAFETY
SWITCH
ON-OFF
BURNER
SWITCH
OPERATING
AQUASTAT
HIGH LIMIT
AQUASTAT
MIN.
TEMPERATURE
AQUASTAT
R
4
6
4
120 VOLTS
H
R82396
R N C E Z 5 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
1174-228


1174-229
T87
THERMOSTAT
SAFETY
SWITCH
ON-OFF
BURNER
SWITCH
OPERATING
AQUASTAT
HIGH LIMIT
AQUASTAT
MIN.
TEMPERATURE
AQUASTAT
R
4
6
3
1
4
R8239B
120 VOLTS
H
R N C E Z 5 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
1174-229


1174-230
T87
THERMOSTAT
SAFETY
SWITCH
ON-OFF
OPERATING
AQUASTAT
HIGH
TEMPERATURE
AQUASTAT
R
G
4
6
G
120 VOLTS
H
R N 5 N 7 N 8
B W
120 VOLTS
HEATING
CIRCULATOR
R8239G
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