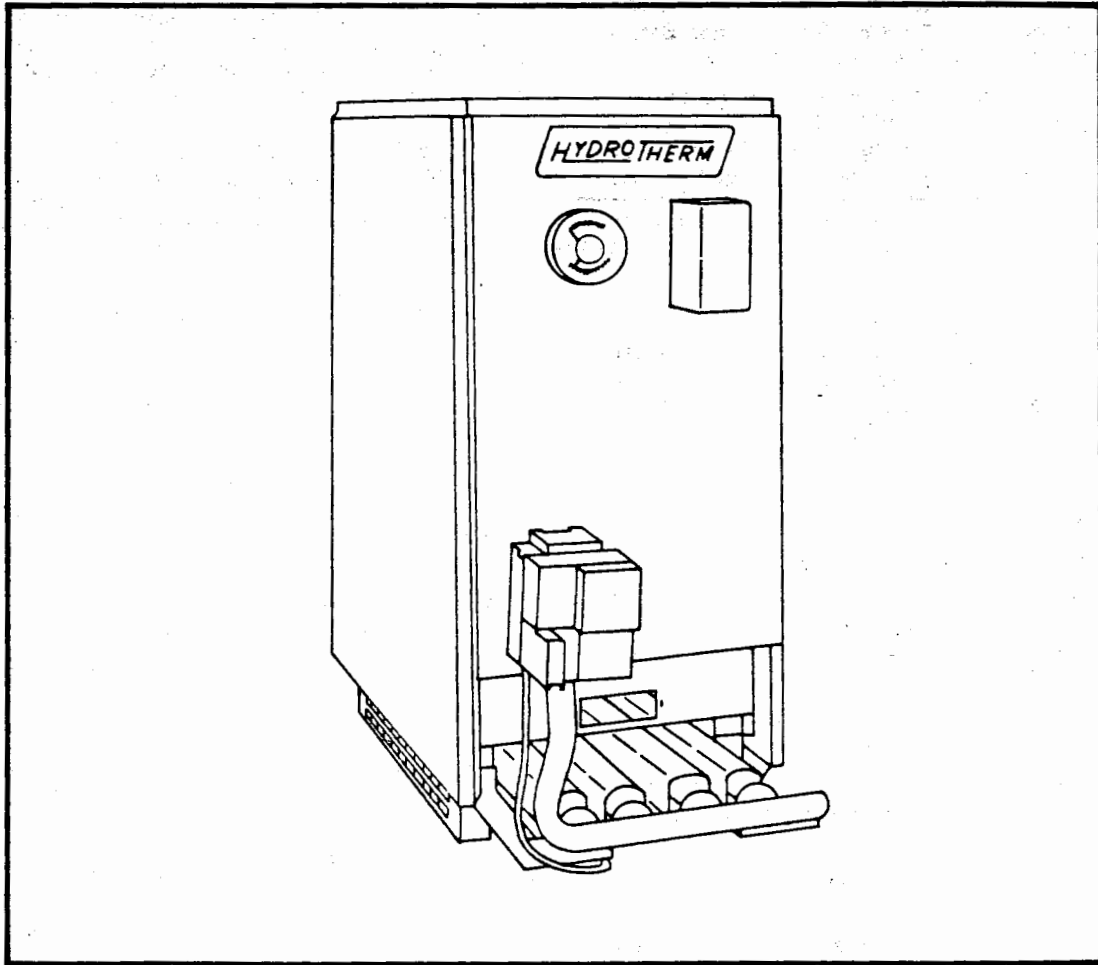


HYDROTHERM^{INC}



MODEL HC-C INSTALLATION GUIDE

**Gas-Fired Hydronic Cast-Iron Boilers
65,000 to 165,000 Btuh Input**

This installation guide applies to the following models:

HC-65C	HC-65C-P	HC-65C-PV
HC-85C	HC-85C-P	HC-85C-PV
HC-100C	HC-100C-P	HC-100C-PV
HC-125C	HC-125C-P	HC-125C-PV
HC-145C	HC-145C-P	HC-145C-PV
HC-165B	HC-165B-P	HC-165B-PV

NOTE:

The installation must conform to the requirements of the authority having jurisdiction or, in the absence of such requirements, to the National Fuel Gas Code, ANSI Z223.1-1980.

Where required by the authority having jurisdiction, the installation must conform to American Society of Mechanical Engineers Safety Code for Controls and Safety Devices for Automatically Fired Boilers, No. CSD-1.

All electrical wiring is to be done in accordance with the National Electrical Code ANSI/NFPA No. 70-1981 and all electrical codes. The unit must be electrically grounded if an external power source is used. U.L. listed low en-

NOTE: Unpack shipment and check for completeness and damage. Our responsibility ceases upon delivery to carrier in good condition. Claims for damage or shortages must be filed immediately against carrier by consignee.

SHIPMENT

Each "HC-C" boiler is shipped as follows:

One crate containing a jacketed boiler completely assembled with wired in gas controls, built in air separator and ASME pressure relief valve mounted on vent fitting and vent damper ("PV" models).

One carton containing one draft diverter.

INSTALLATION:

The boiler may be installed in an alcove.

Locate the boiler so that the connecting flue pipe between the draft diverter and chimney is as short as possible. Observe the following minimum clearances from the boiler to combustible materials:

Sides—6", Rear—6", Front—24" (for servicing). Top—48" From Draft Diverter and the flue pipe in any direction: 6".

This boiler must be installed on non-combustible floor only, unless mounted on a special base available as optional equipment.

Boilers may not be installed on carpeting.

If the boiler is to be installed in a closed room, adequate air for combustion must be provided by two openings: one located about 6" below the ceiling, the other about 6" above the floor. When communicating directly with outside, each opening must have a minimum free area of one square inch per 4000 Btu per hour of input. When ventilation is provided by openings in doors etc., to adjoining spaces having adequate infiltration, each opening must have a minimum free area of one square inch per 1000 Btu per hour of input. Further information may be found in ANS Z 223.1 or CSA Standard B-149 National Fuel Gas Codes.

Where two or more appliances vent into a common flue, the area of the common flue shall be at least equal to the area of the largest flue plus 50 percent of the areas of the additional flue or vent connectors.

The flue or vent connector must be inserted into, but not beyond the inside liner of the chimney. All horizontal runs should pitch upward toward the chimney 1/4" per running foot.

Procedure:

1. Remove the boiler from the crate and set it in position on a concrete basement floor or use HYDROTHERM combustible flooring pan.

ergy safety circuit wire is almost universally approved for safety controls on house heating equipment either internally or externally without protection of conduits or raceway.

In Canada: The installation must be in accordance with Standards CGA B149.1 and B149.2 Installation Codes for Gas Burning Appliances and Equipment and/or Local Codes.

All electrical connections are to be made in accordance with Standard C.S.A. C22.1 Canadian Electrical Code, part 1 and/or Local Codes.

CAUTION: Hydrotherm cast iron boilers are designed for use in closed hot water systems and are not recommended in systems where water is constantly replenished, such as direct fired volume water heating. These systems require a copper tube heat exchanger as shown in the Hydrotherm Volume Water Heating Manual.

MODEL HC-C BOILERS ARE NOT TO BE USED WITHOUT FORCED SYSTEM CIRCULATION.

2. Make sure that all packing material is removed from boiler and that burners, and controls are in proper position. If baffle grid is supplied with boiler, check proper seating inside of dome opening.

CAUTION: The tie rods on the absorption unit of this boiler are intended to accommodate thermal expansion. Do not loosen!

3. Install draft diverter and connect to class B vent, or chimney with flue pipe having the same diameter as the draft diverter.

NOTE: If boiler is equipped with a vent damper, make sure to follow the instructions on page 9.

4. Screw vent fitting assembly into 3/4" tapping on top of boiler opposite the supply tapping. Connect discharge of relief valve outside of building or to laundry sink. Do not plug end of discharge pipe.
5. Connect expansion tank to the 1/2" tapping in the vent fitting assembly as shown in Fig. 2. If diaphragm type expansion tank is used, thread tank directly into this fitting. Remove 1/8" pipe plug from top of fitting and install automatic air vent.
6. Connect gas supply line to the boiler using pipe size which will result in less than .3 inch W.C. pressure drop between the meter and boiler. Refer to chart below. A drip leg must be installed in the drop to the boiler. See Fig. 1. Consult gas company in your area for special requirements which are not provided on a standard boiler. The appliance and its individual shutoff valve must be disconnected from the gas supply piping system during any pressure testing of that system at test pressures in excess of 1/2 psig.

The appliance must be isolated from the gas supply piping system by closing its individual manual shutoff valve during any pressure testing of the gas supply piping system at test pressures equal to or less than 1/2 psig.

PIPE DELIVERY SCHEDULE				
*Capacity of pipes in cubic feet of gas per hour @ .2" P.D.				
Length of Pipe In Ft.	SIZE			
	3/4"	1"	1 1/4"	1 1/2"
10	212	425	725	1170
20	150	300	510	810
30	122	252	425	670
40	105	218	370	580
50	95	195	330	520
75	77	160	270	420

For Natural Gas allow 0.96 cu. ft. for each 1,000 Btu's of input

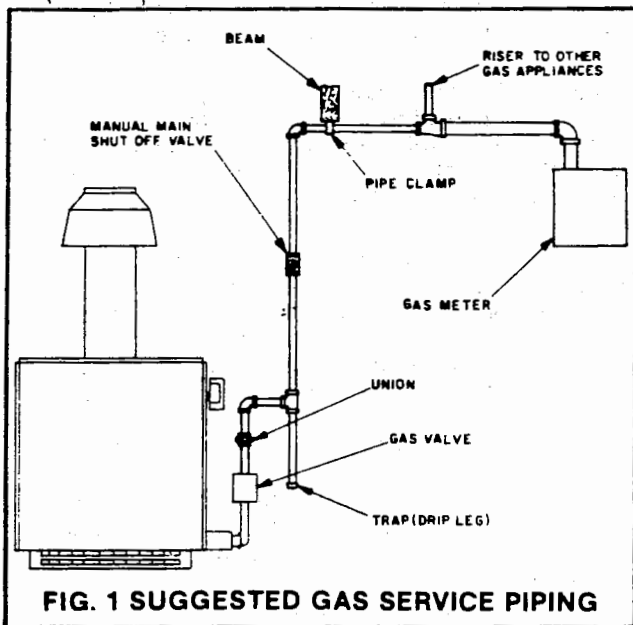


FIG. 1 SUGGESTED GAS SERVICE PIPING

NOTE: Compounds used on threaded joints in gas piping must be resistant to the action of liquefied petroleum gas.

PIPING

Hot water piping should be done in accordance with NFPA Bulletin 89M. Clearance from hot water piping to combustible material of 1" must be observed.

If the boiler is to be installed above the level of the radiation, a low-water cutoff must be installed.

Connect hot water supply from the top of the boiler to the heating system feed line. Connect return to bottom rear flange. Typical piping connections for a forced hot water heating system are shown in Fig. 2.

PURGING INSTRUCTIONS: To remove air from system, proceed as follows: 1. Close cocks "A" and "D". 2. Open cock "B" and attach drain hose to it 3. Open cock "C" to fill system with water (make sure air vents are closed) 4. Fill system until water runs out of the hose in a steady stream. 5. Close cock "B". 6. Open cock "A". 7. Bleed all air vents.

NOTE: The built-in air separator on "HC" series boilers separates air from the water in the top boiler section and vents it into the expansion tank or permits escape to the atmosphere through the automatic air vent on systems using diaphragm expansion tank. This assures trouble-free operation on properly purged systems without installation of other special tank or boiler fittings

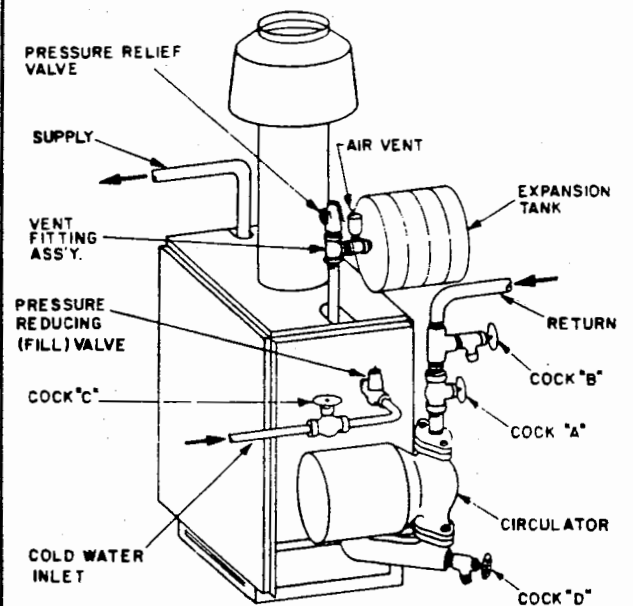


FIG. 2 TYPICAL PIPING FOR HOT WATER SYSTEM

If a hot water boiler is installed in connection with a water chiller the chilled water should be piped in parallel with the boiler, using appropriate valves to prevent the chilled medium from entering the boiler as shown in Fig. 3. When boilers are connected to heating coils located in air-handling units where they may be exposed to refrigerated air circulation, such boiler piping system shall be equipped with flow-control valves or other automatic means to prevent gravity circulation of the boiler water during the cooling cycle.

Fill the system with water in accordance with standard practice and purge each branch of the heating system.

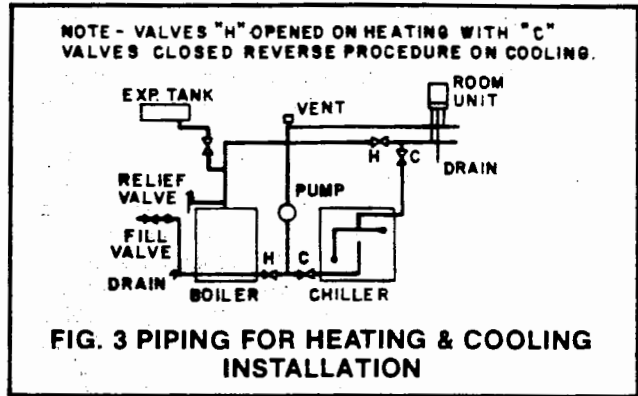
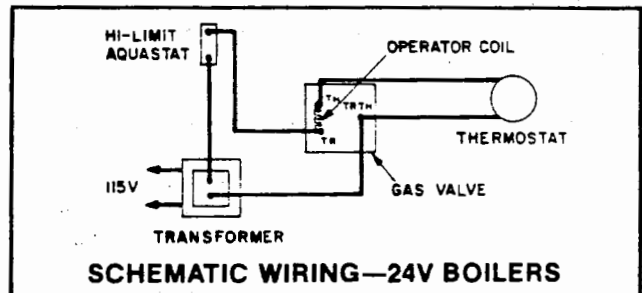


FIG. 3 PIPING FOR HEATING & COOLING INSTALLATION

WIRING

Wire boiler according to the appropriate diagram on Pages 6, 7, 8 or 9.

NOTE: If any of the original wire as supplied with the boiler must be replaced, it must be replaced with similar wire of 105°C. rating.



SCHEMATIC WIRING—24V BOILERS

OPERATION:

1. Remove base door and light pilot according to the instruction plate on the front of the boiler. After pilot has been lighted, replace base door, making sure that the pivot pins are properly placed in the notches on base side plates.
2. Boilers are shipped from the factory with the primary air shutters on the main burner wide open. It is recommended that these air shutters be left in the wide open position unless there is lifting of the flame above the burner ports. If there is lifting the air shutters should be gradually closed until the lifting is eliminated. It may also be necessary to adjust the primary air shutters if the input rate is reduced by a change in the orifices

The boiler and its gas connection must be leak tested before placing the boiler in operation

Check all connections for gas leakage with a soap and water solution.

3. After burner has been in operation for about 10 minutes, check gas input rate to boiler as follows:

- a. Make sure that all other appliances served by the meter are turned off during timing of gas input rate to the boiler.

- b. Measure the time in seconds it takes for the boiler to use one cubic foot of gas. Divide the number of seconds into 3600. This is the number of cubic feet of gas used per hour. Multiply this figure by the heating value of the gas to obtain Btu input per hour.
- c. Example: It takes 36 seconds to use one cubic foot of gas. The heating value of natural gas is approximately 1000 Btu per cubic foot. Therefore

$$\frac{3600 \times 1000}{36} = 100,000 \text{ Btu per hour.}$$

4. If over or under gassed, input may be corrected within certain limitation by adjusting Pressure Regulator. If rated input cannot be obtained with regulator adjustment, gas pressure or orifice size may be at fault—consult your utility representative.
5. Before leaving the job, check all controls to make certain that they are operating properly. Start and stop the burner several times by raising and lowering the thermostat setting. After the boiler has been firing long enough to raise the boiler water temperature to above the minimum setting of high limit, the high limit should be checked by turning its setting from maximum to minimum setting. This should turn the boiler off and on. Safe operation of the boiler burner should then be checked by firing the boiler then turning the pilot valve off and checking to be sure that the main burner gas valve closes off the gas to the main burner. The safety shutoff controls on the valve should also be tested.

a) On units with continuous pilot—

With the boiler firing, disconnect the thermocouple lead from the valve. The valve should close.

b) On units with intermittent ignition—

With the boiler firing, disconnect the wire connected to the "PV" terminal on the S86 control. The valve should close.

Before reconnecting the safeties, turn off the electric current to the boiler.

After completing this check, put high limit on system design temperature. Make sure that the installation complies with all applicable local codes.

Be sure to review instruction sheets enclosed with each control for recommended check out sequence and component check according to manufacturers recommendations.

NOTE: Never leave the job with yellow burning flames. This will quickly carbonize the boiler. If unable to adjust the flame properly consult your utility representative.

Changing Orifices and Burners: Remove burners by lifting up and to the rear until burners are disengaged from the orifice. The orifices can then be removed by using a 5/8" open-end wrench. To reassemble burners to the manifold, line up holes in the burners with orifices and slide assembly back into position.

ORIFICE SIZES FOR HYDROTHERM "HC-C" SERIES BOILERS							
TYPE OF GAS	MANIFOLD PRESS.	HC-65C	HC-85C	HC-100C	HC-125C	HC-145C	HC-165B
NATURAL 1000 BTU/CU. FT. .60 SG.	3.5	37	31	36	31	34	31
PROPANE 2500 BTU/CU. FT. 1.5 SG.	10.0	51	48	51	48	50	48

Gas Pressure Regulator: is an integral part of the gas valve and is factory set at 3 1/2" W.C. for natural gas and 10" for propane. Small variations in gas flow may be made by adjusting the pressure regulator, but in no case should the final manifold pressure setting vary more than .3 inch from above recommended pressures. Any necessary changes

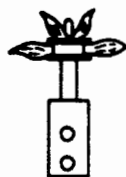
in gas flow should be made by changing size of burner orifice. Check with local gas company for proper orifice size.

Cleaning: A yellow flame caused by improper adjustment is always accompanied by formation of carbon which, if allowed to continue, will partially restrict free passage of products of combustion to flue. If this condition is encountered, sections should be cleaned and burners checked as follows:

1. Remove draft hood, top of jacket and cast iron dome.
2. Remove the burners from combustion chamber.
3. Insert flexible cleaning brush down between section tubes to remove carbon from finned surfaces.
4. Insert brush upward through sections from combustion chamber to remove carbon from lower surfaces not reached from top.
5. Check orifices for proper drill size for gas on which unit is used.
6. Check burners to be sure they contain no foreign matter or restrictions. If they do, brush with a stiff bristle brush (Not a wire brush!) and blow out with air, or use a vacuum cleaner.
7. Check proper position of manifold.
8. Reassemble and properly adjust air shutters.
9. Check input and adjust pressure regulator to give proper input if necessary. Make sure input is not in excess of boiler rating.

MAINTENANCE

1. This boiler has been designed to provide years of trouble free performance, in normal installations. Examination by the home owner at the beginning of each heating season, and in mid heating season should assure continued good performance. In addition, the boiler should be examined by a qualified service professional, or gas suppliers service person, at least once every year.
2. Do not store anything against the boiler, or allow dirt or debris to accumulate in the area immediately surrounding the boiler. Keep boiler area clear and free from combustible materials, gasoline and other flammable vapors and liquids.
3. Before each heating season, the draft hood should be removed from the boiler, and the flueways inspected for the presence of soot or rust scale. Inspect the draft hood and smoke pipe connecting the draft hood to the flue, for rust or corrosion, before replacing the draft hood. The presence of soot, rust scale or corrosion



Q324BF
STANDING
PILOT
MODELS



Q345A
INTERMITTANT
IGNITION PILOT
MODELS

NORMAL PILOT FLAME



NORMAL
(HARD FLAME)



LIFTING
(TOO MUCH AIR)



YELLOW
TIPPING
(MARGINAL)



YELLOW
FLAME
(TOO LITTLE AIR)

MAIN BURNER FLAMES

indicates misadjustment and your service agency should be called, should such accumulation be observed. The pilot burner and main burner must be checked for continued safe operation. All burner ports should be ignited, and burn with a steady blue flame. See drawings below.

4. Circulators used with hot water heating systems should be inspected for water leaks at the pump seal periodically, and the motor lubricated following lube instructions found on the motor.

LIGHTING INSTRUCTIONS

This boiler has met the lighting and performance criteria specified in ANSI Z21.13 with the provided manifold and control assembly.

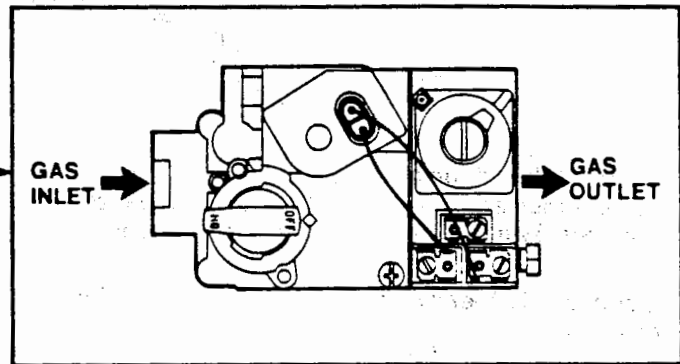
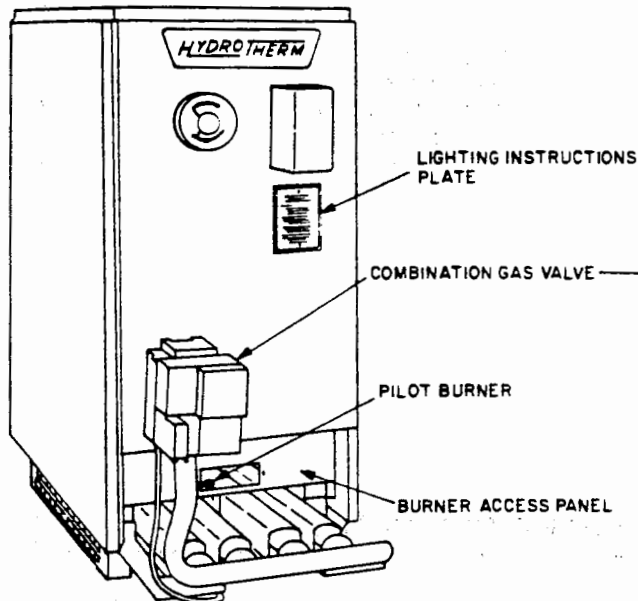


FIG. 5

LIGHTING INSTRUCTIONS
FOR BOILERS EQUIPPED WITH
COMBINATION GAS VALVES

TO LIGHT BURNER

1. DEPRESS KNOB AND TURN TO "OFF". WAIT 5 MINUTES BEFORE ATTEMPTING TO LIGHT OR RELIGHT BURNER.
2. TURN KNOB TO PILOT POSITION AND DEPRESS KNOB FULLY. LIGHT PILOT AND CONTINUE HOLDING KNOB DEPRESSED ABOUT 1 MINUTE SO THAT PILOT WILL STAY LIT WHEN KNOB IS RELEASED.

NOTE: IF PILOT DOES NOT STAY LIT, REPEAT STEPS 1 AND 2

3. TURN KNOB COUNTERCLOCKWISE TO "ON" IF SYSTEM IS CONTROLLED BY A THERMOSTAT. SET AT DESIRED TEMPERATURE.

TO TURN BURNER OFF

1. FOR TEMPORARY SITUATIONS, MAIN BURNER CAN BE SHUT OFF BY TURNING KNOB CLOCKWISE FROM "ON" TO "PILOT". PILOT WILL REMAIN LIT-READY FOR RETURN TO NORMAL SERVICE WITHOUT RELIGHTING.
2. FOR COMPLETE SHUTDOWN, DEPRESS KNOB AND TURN TO "OFF". BOTH PILOT AND MAIN BURNER ARE NOW SHUT OFF.

LIGHTING INSTRUCTIONS
FOR BOILERS EQUIPPED WITH
INTERMITTENT PILOT CONTROL

TO LIGHT

1. TURN OFF ELECTRIC CURRENT. IF BOILER IS EQUIPPED WITH A VENT DAMPER, DAMPER WILL OPEN ON POWER LOSS.
2. TURN OFF MANUAL MAIN CONTROL VALVE AND WAIT 5 MINUTES FOR GAS TO ESCAPE HEATER.
3. TURN ON ELECTRIC CURRENT AND MANUAL MAIN VALVE.
4. SPARK IGNITER LIGHTS PILOT BURNER.
5. ELECTRONIC FLAME SENSOR IN IGNITION CONTROL SENSES PILOT FLAME AND ENERGIZES AUTOMATIC MAIN CONTROL VALVE. IF THE PILOT FAILS TO LIGHT, REPEAT STEPS 1 THROUGH 3.
6. SUBSEQUENT CALLS FOR HEAT FOLLOW SAME PATTERN OUTLINED IN STEPS 4 AND 5.

TO SHUT DOWN

1. TURN OFF ELECTRIC CURRENT.
2. TURN OFF MANUAL MAIN CONTROL VALVE.

CAUTION

Avoid replenishing system water as an excessive amount of minerals will be deposited in the heat exchanger, eventually causing a cracked tube. Repair all leaks.

Any discharge from the relief valve should be directed away from anyone standing nearby to prevent scalding. A short 3/4" pipe may be used to direct the discharge to a

- A. Boilers with manually lighted pilots:
 1. Remove the access panel to the burner compartment, and carefully follow the instructions found on the lighting instruction plate on the boiler.
 2. Figure 5 illustrates the combination valve, pilot burner and lighting plate.
 3. Replace burner access panel before turning valve to "ON" position.
- B. Boilers with intermittent pilot ignition systems:
 1. Refer to Figure 5, and carefully follow the instructions found on the lighting instruction plate on the boiler.
 2. Observe pilot burner flame thru observation window in burner access panel. (Panel need not be removed, since system is fully automatic.)

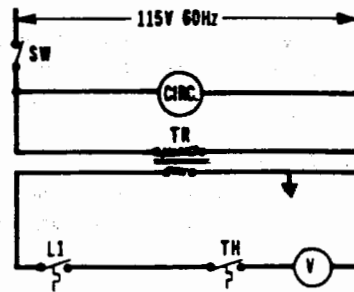
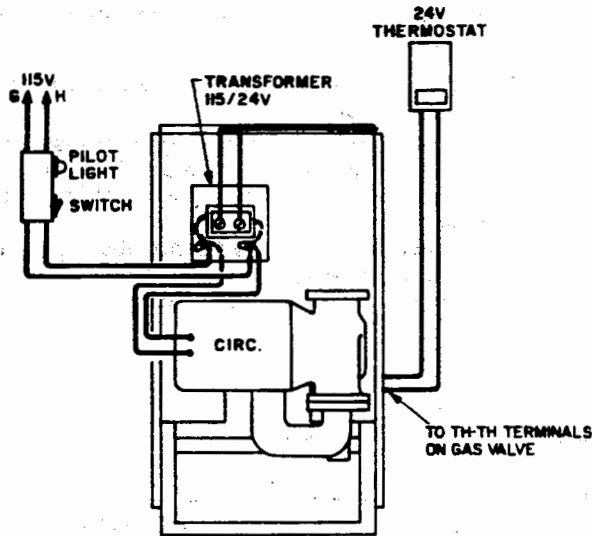
drain or to the floor. Do not restrict discharge from relief valve.

Lint, paper or rags must not be allowed to accumulate near the burners.

Do not place clothing on boiler casing to dry.

Do not draw water from the heating system for cleaning, flushing, etc.

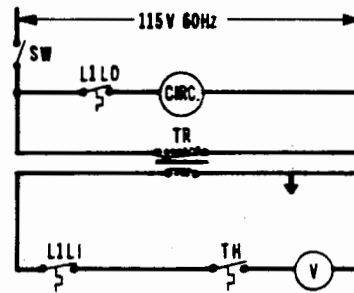
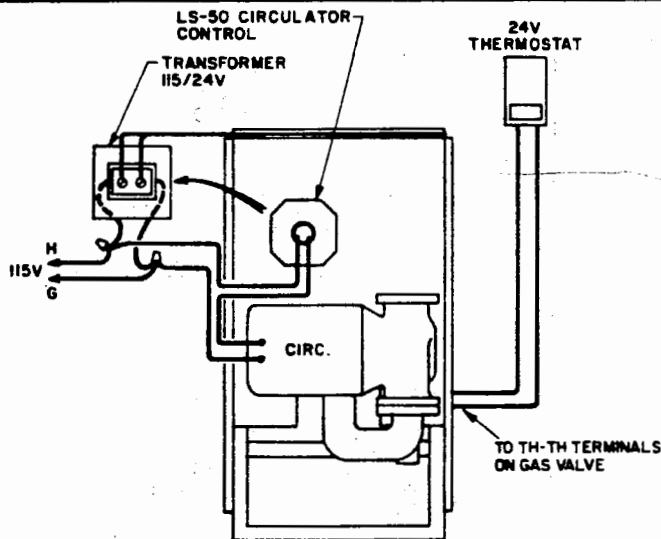
WIRING DIAGRAMS—BOILERS WITH 24V CONTROLS



SW—LINE SWITCH
 TR—TRANSFORMER
 LI—HI-LIMIT AQUASTAT
 TH—THERMOSTAT
 V—GAS VALVE

1. Connect fused power supply (115V 60 Hz.) to transformer and circulator. Provide manual disconnect switch with pilot light at convenient location.
2. Connect 24V thermostat to "TH-TH" terminals on gas valve.

CIRCUIT I—WITH CONSTANT RUNNING CIRCULATOR



SW—LINE SWITCH
 TR—TRANSFORMER
 LLO—CIRCULATOR CONTROL
 LLI—HI-LIMIT
 TH—THERMOSTAT
 V—GAS VALVE

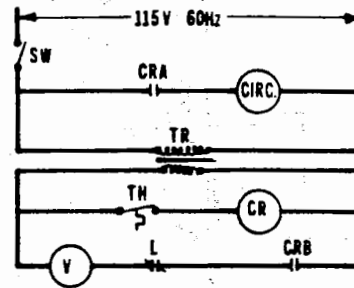
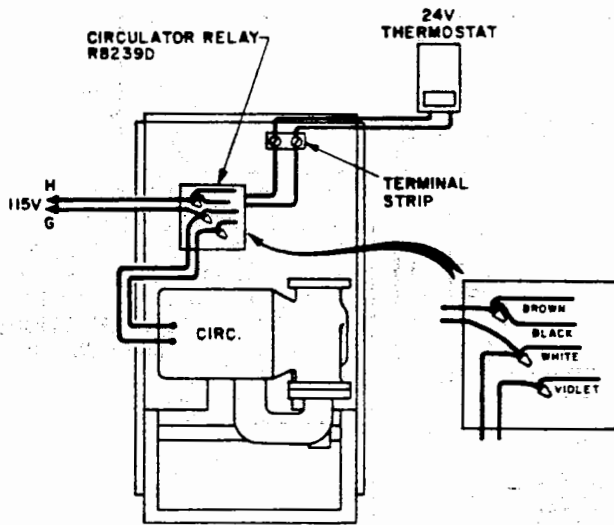
1. Mount LS-50A Circulator Control in tapping on rear of boiler as shown on instructions packed with control (unless already factory mounted).
2. Connect fused power supply (115V 60 Hz.) to transformer and thru LS-50A to circulator.
3. Connect 24V thermostat to "TH-TH" terminals on gas valve.

METHOD OF OPERATION: Thermostat starts boiler. Circulator starts when boiler water temperature

reaches fixed setting on circulator control (approx. 120 F). When thermostat is satisfied, boiler stops but circulator continues to run until boiler water temperature drops below setting of circulator control. Hi-limit aquastat protects against excessive temperatures. In case of power failure boiler will not operate.

NOTE: LS-50A Circulator Control is not for use on HC-165 and is not recommended where radiation is below or on the same level as the boiler.

CIRCUIT II—WITH AQUASTAT CONTROLLED CIRCULATOR



SW - LINE SWITCH
 TR - TRANSFORMER
 TH - THERMOSTAT
 V - GAS VALVE
 CR - RELAY
 CRA - RELAY CONTACT - CIRC.
 CRB - " " - GAS VALVE

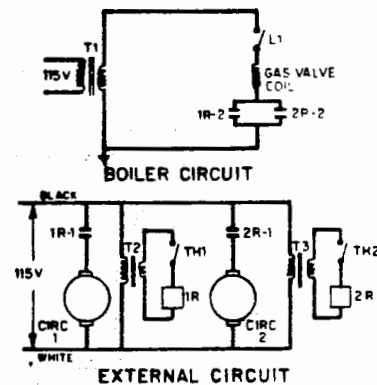
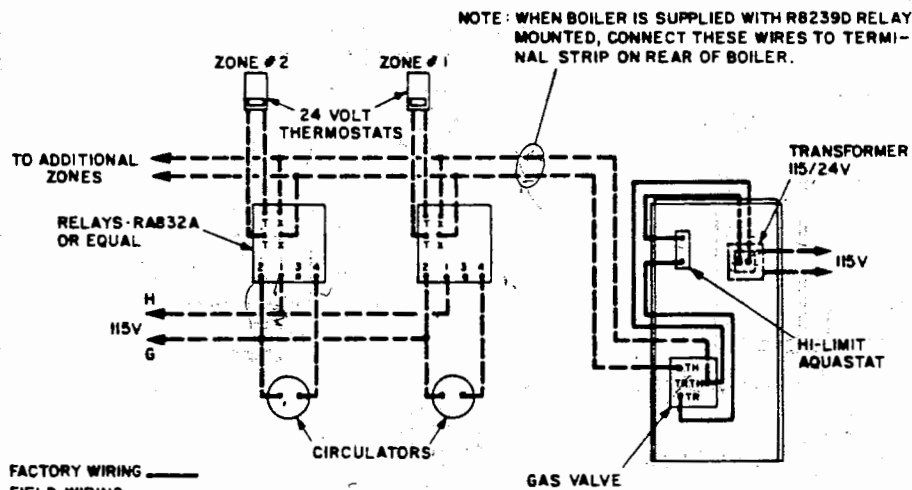
1. Connect fused power supply (115V 60 Hz.) to circulator and boiler circuit thru circulator relay.
2. Connect 24V thermostat to terminal strip on rear of boiler.

used. When heat anticipator is provided it should be set or rated at .65 amp.

METHOD OF OPERATION: Thermostat starts boiler and circulator simultaneously. When thermostat is satisfied, boiler and circulator stop together. Hi-limit aquastat protects against excessive temperatures. In case of power failure boiler will not operate.

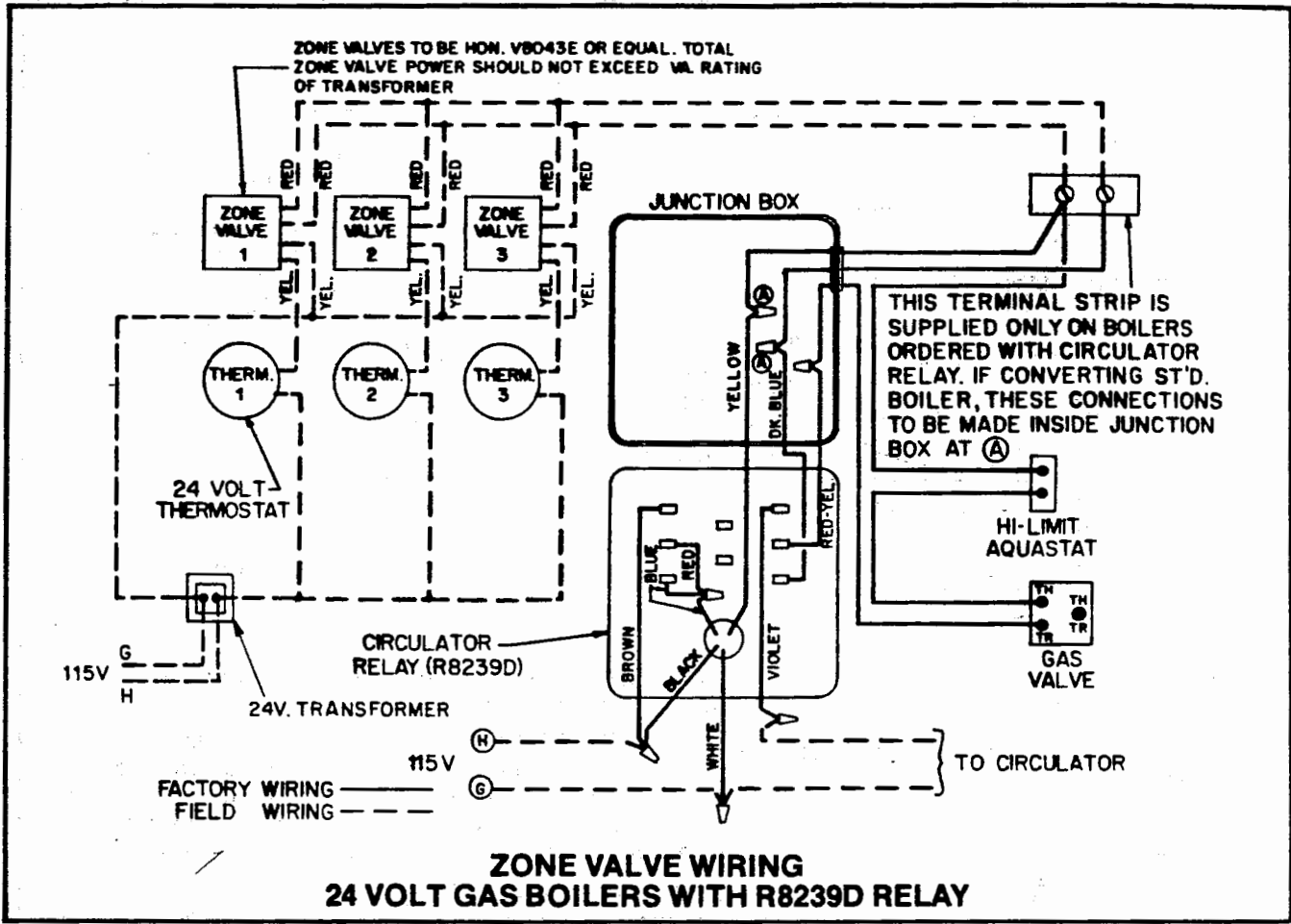
NOTE: Thermostats without heat anticipator may be

CIRCUIT III—WITH RELAY CONTROLLED CIRCULATOR

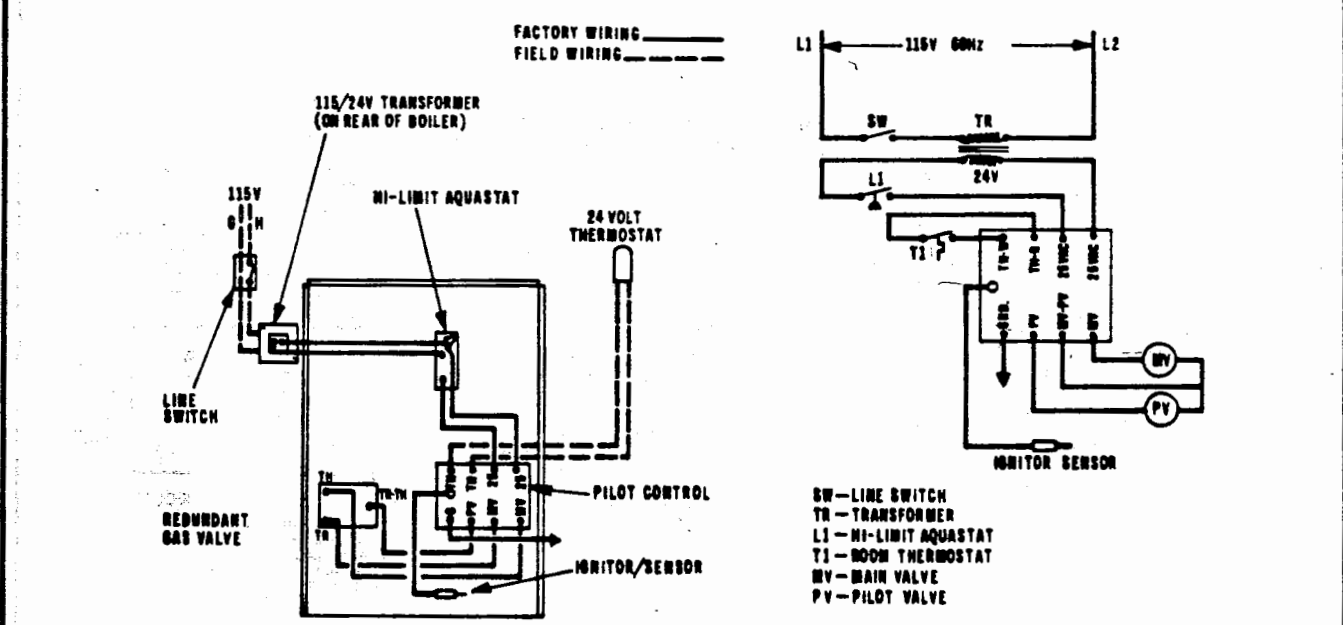


L1 - HI-LIMIT AQUASTAT
 TH1, TH2 - THERMOSTATS
 T1 - TRANSFORMER - 115/24V
 T2, T3 - TRANSFORMERS (IN RELAYS)
 1R - RELAY (1R-1, 1R-2 CONTACTS)
 2R - RELAY (2R-1, 2R-2 CONTACTS)

ZONING WITH CIRCULATORS—24V BOILERS



BOILERS WITH HONEYWELL INTERMITTENT PILOT CONTROL

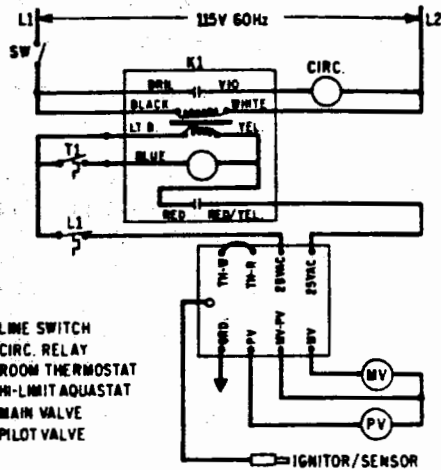
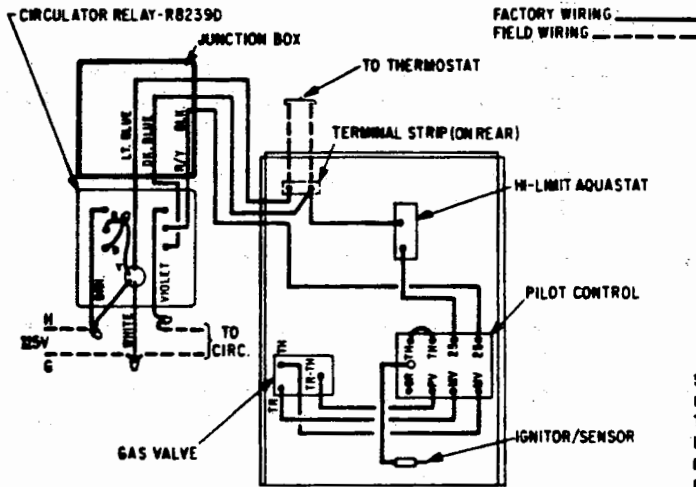


1. Connect fused power supply (115V 60 Hz) to transformer thru a manual disconnect switch.
2. Connect 24 volt thermostat across thermostat TH-R, TH-W terminals on pilot control.

METHOD OF OPERATION

Thermostat senses room temperature, closes on call for heat. Transformer energizes pilot control thru limit switch.

- Pilot valve and igniter are energized. Pilot lights and sensor senses flame.
- Main valve is energized and igniter is deenergized. Unit operates until thermostat is satisfied.
- Limit switch protects against operation at excessive water temperature.



SW - LINE SWITCH
 K1 - CIRC. RELAY
 T1 - ROOM THERMOSTAT
 LI - HI-LIMIT AQUASTAT
 MV - MAIN VALVE
 PV - PILOT VALVE

1. Connect fused power supply (115V 60 Hz) to transformer thru a manual disconnect switch.
2. Connect 24 volt thermostat across thermostat terminal strip.

Circulator is powered thru relay contacts.

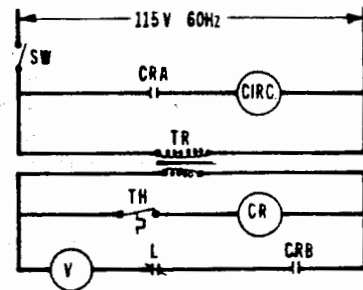
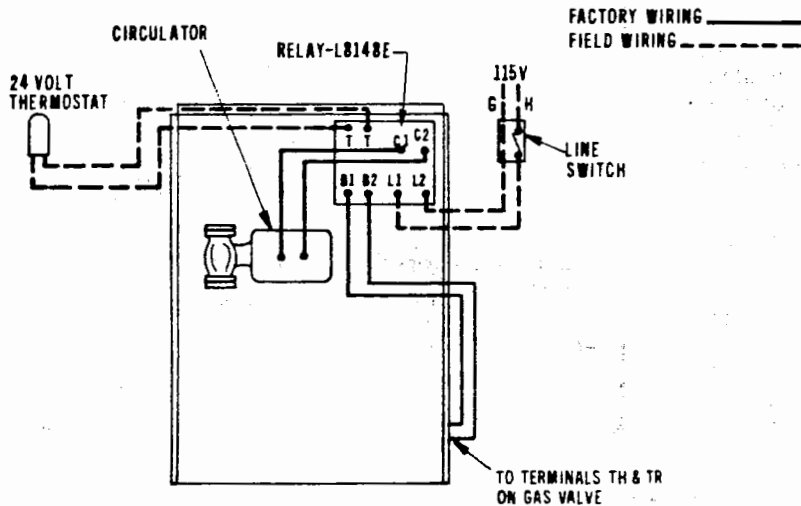
Pilot ignitor module is powered thru limit switch and a second set of relay contacts. Spark-proof pilot flame, and then to open main valve and shut-off spark.

METHOD OF OPERATION

Thermostat senses room temperature, closes on call for heat. Relay is energized thru thermostat contacts.

Limit switch protects against operation at excessive water temperature.

BOILERS WITH INTERMITTENT PILOT AND CIRC. RELAY



SW - LINE SWITCH
 TR - TRANSFORMER
 TH - THERMOSTAT
 V - GAS VALVE
 CR - RELAY
 CRA - RELAY CONTACT - CIRC.
 CRB - " " - GAS VALVE

1. Connect fused power supply (115V 60 Hz.) to circulator and boiler circuit thru circulator relay.
2. Connect 24V thermostat to terminal strip in circulator relay enclosure.

3. Relay contacts CRA close, powering circulator.
4. Relay contacts CRB close, powering gas valve. V. thru limit switch contacts, L, (IN LB148E) and CRB relay contacts.
5. Boiler is heated and provides hot water to radiation.
6. Thermostat satisfied, contacts open, deenergizing relay. Circulator and gas valve shut down.
7. Limit Switch protects against operation at excessive water temperature.

NOTE: Thermostats without heat anticipator may be used. When heat anticipator is provided it should be set or rated at .65 amp.

METHOD OF OPERATION:

1. Line switch, SW, is closed, energizing transformer, TR, and 24 volt control circuit.

BOILERS WITH TRIPLE AQUASTAT RELAY (24 VOLT)

INSTALLATION INSTRUCTIONS FOR BOILERS EQUIPPED WITH VENT DAMPER (MODELS HC-C-PV)

The Hydrotherm Model SP Vent Damper is packaged with the boiler and factory wired to provide for simple, safe and accurate installation.

The model SP vent damper consists of a cast iron damper housing, an 18 gauge aluminized steel damper blade, a gear motor, control relay, and damper position proving switch. A flexible metallic cable is included, which interconnects the vent damper and the boiler electrical circuits via a plug and receptacle arrangement. The vent damper is packed in the carton with the boiler and mounts on top of the vertical cone type draft hood provided with the boiler. Do not modify the draft hood provided with the boiler. Do not modify the draft hood or vent damper in any manner.

Only the boiler may be served by the vent damper. Do not attempt to use it to vent an additional appliance. This could cause a hazard and must be avoided. Provide a separate vent damper for the additional appliance.

After the boiler is set in position for installation, mount the draft hood on the boiler. Next, the vent damper is mounted on top of the vertical cone type draft hood: Locate the motor on the right side and position the cable so that it does not touch the metal surface of the draft hood. (See Figure 1.) The direction of flow arrow must point upward.

Remove the hairpin shipping clip which holds the damper blade in the closed position and observe that the damper springs slowly to the open position. Do not force it closed! Forcing the damper may damage the gear train and void the warranty. The blade should move freely and without obstruction.

A minimum clearance of not less than six inches between the vent damper and combustible construction must be maintained. Also, provide accessibility to the vent damper for service and for checking the damper position indicator which is located on the side of the damper opposite the motor.

Proceed with piping and wiring of the boiler as outlined in the boiler instruction manual. On thermostats with adjustable heat anticipators, the heat anticipator should be set at 0.7 amperes when the vent damper model boilers are used.

When the boiler installation is completed, the function of the vent damper should be verified before the gas valve is turned to the "on" position. This is done as follows:

1. Close electrical supply switch.
2. Set thermostat to call for heat.
3. Observe that damper position indicator rotates to the open position. Damper must be in the open position when appliance main burner is operating.
4. After damper opens, spark should appear at the pilot ignition electrodes.
5. Set the thermostat to no longer call for heat.
6. Spark stops.
7. Observe that damper position indicator rotates to closed position.
8. When damper operation is verified, proceed with the boiler start-up as outlined in the boiler installation instructions.

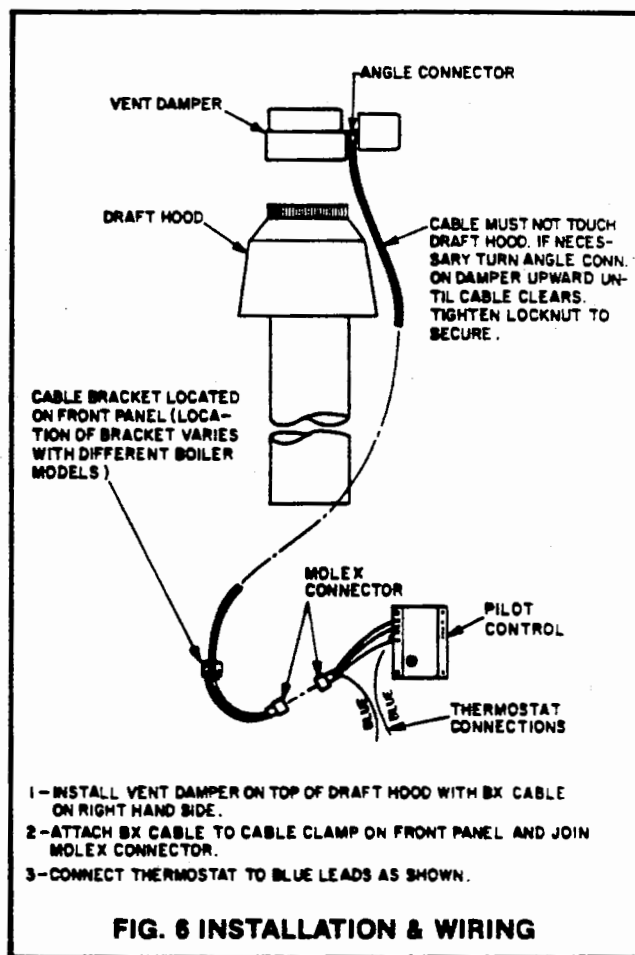


FIG. 6 INSTALLATION & WIRING

VENT DAMPER SEQUENCE OF OPERATION

1. Line switch, SW1, is closed, powering 24 volt transformer.
2. S86 intermittent ignition module and vent damper are energized thru the closed contacts of the limit switches.
3. Damper motor is energized thru the normally closed contacts of the damper-relay; motor runs, closes damper. Boiler is in standby mode.
4. Thermostat closes, energizing damper relay. Relay contacts open, de-energizing motor.
5. Damper opens by spring action. End switch closes when damper is fully open.
6. Closed end switch contacts complete S86 thermostat circuit. S86 responds; pilot valve and igniter are energized.
7. Pilot proves, main valve is energized and igniter de-energized.
8. Unit operates until thermostat is satisfied. Gas valves de-energized.
9. Damper relay de-energized, contacts close.
10. Motor runs, closing damper. Boiler returns to standby mode.