

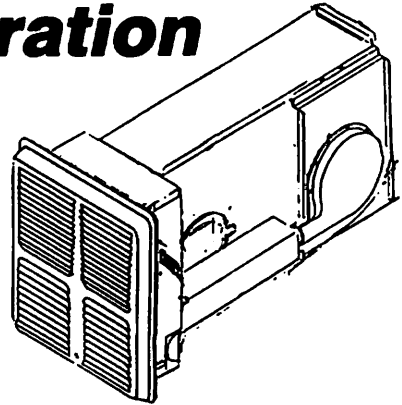


hydro flame corporation

1874 SOUTH PIONEER ROAD • SALT LAKE CITY, UTAH 84104

Everest Star 79/80 SERIES OWNERS MANUAL

**IMPORTANT INSTRUCTIONS
MUST STAY WITH UNIT
OWNER — READ CAREFULLY
KEEP FOR FUTURE
REFERENCE**



DIRECT VENT CENTRAL AND FAN-TYPE DIRECT VENT WALL FURNACE, FOR INSTALLATION IN RECREATIONAL VEHICLES OR MANUFACTURED (MOBILE) HOME.



TESTED TO U.L. 307(B)

**APPROVAL
CERTIFIED BY C.G.A.**

FOR YOUR SAFETY

If you smell gas

1. Open all windows
2. Don't touch any electrical switches
3. Extinguish any open flame
4. Vacate premises until ventilation is complete and gas source is found and corrected.
5. Immediately call your supplier.

FOR YOUR SAFETY

Clothing or other flammable material should not be placed on or near the appliance.

Do not store or use gasoline or other flammable vapors, liquids in the vicinity of this or any other appliance.

Children and adults should be alerted to the hazards of high surface temperatures and should stay away to avoid burns or clothing ignition.

Young children should be carefully supervised when they are in the same room as the appliance.

WARNING:

THIS UNIT MUST BE SERVICED ONLY BY AN AUTHORIZED SERVICEMAN. MODIFICATION OF THE APPLIANCE CAN BE EXTREMELY HAZARDOUS AND COULD LEAD TO SERIOUS INJURY OR DEATH.

FUEL BURNING APPLIANCES GENERATE TOXIC FLUE PRODUCTS. MODIFICATION OR IMPROPER MAINTENANCE CAN CAUSE CARBON MONOXIDE IN DEADLY AMOUNTS. TO PREVENT THIS, MAINTAIN APPLIANCE IN SAFE OPERATING CONDITION.

DO NOT BLOCK OR MODIFY ANY COMBUSTION AIR OR FLUE GAS PASSAGEWAYS.

DO NOT ADD ANY DEVICES OR ACCESSORIES TO THIS APPLIANCE EXCEPT THOSE SPECIFICALLY AUTHORIZED BY HYDRO FLAME.

ALWAYS CONSULT YOUR AUTHORIZED SERVICEMAN FOR ANY PROBLEMS OR QUESTIONS YOU MAY HAVE PERTAINING TO THIS APPLIANCE.

ALWAYS INSPECT THE APPLIANCE BEFORE STARTING A NEW HEATING SEASON, PAYING SPECIAL ATTENTION TO COMBUSTION AIR, FLUE GAS PASSAGEWAYS AND FUEL LINES.

WARNING: IMPROPER INSTALLATION, ADJUSTMENT, ALTERATION, SERVICE OR MAINTENANCE CAN CAUSE INJURY OR PROPERTY DAMAGE. REFER TO THIS MANUAL FOR ASSISTANCE OR ADDITIONAL INFORMATION, CONSULT A QUALIFIED INSTALLER, SERVICE AGENCY OR THE GAS SUPPLIER.

THE AREA IN WHICH THIS FURNACE IS INSTALLED MUST BE KEPT CLEAN. **DO NOT** STORE ANYTHING AROUND THE FURNACE THAT WILL RESTRICT THE AIR FLOW TO THE FURNACE. **NEVER** PLACE HAZARDOUS MATERIALS SUCH AS AEROSOL CANS, PLASTIC CONTAINERS, GASOLINE, OR ANY OTHER FLAMMABLE MATERIALS NEAR THE FURNACE.

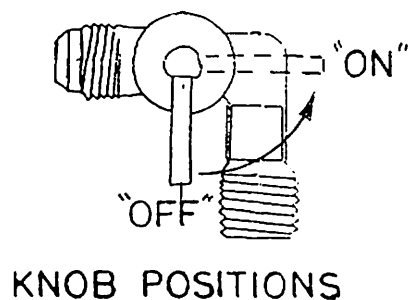
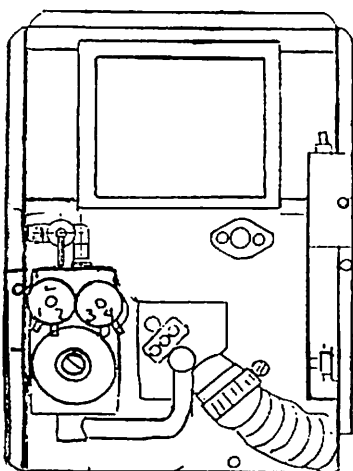
Before proceeding, check all gas connections with a soap solution to detect any leaks. **NEVER** check for leaks with a lighted match.

OPERATING INSTRUCTIONS AUTOMATIC "DIRECT SPARK" IGNITION MODELS

Important: Failure to follow these lighting instructions exactly may result in damage to the furnace.

1. Set thermostat on "off" position.
2. Turn thermostat on "off" position. (If furnace is so equipped). Wait 5 minutes. See figure 1 (Gas valve is located behind louver panel door. To remove, pull forward and lift off).
3. Set thermostat to "on" position and adjust to desired setting.
4. Allow 15 to 30 seconds for burner to ignite.
5. If burner does not light, set thermostat on "off" position wait 60 seconds then re-set thermostat to "on" position.
6. If ignition is not obtained after 3 tries, go to complete shut down and determine cause.
7. Turn gas valve knob to "off" position. (If furnace is so equipped). See figure 1.
8. Set thermostat to "off" position.

FIGURE 1



KNOB POSITIONS

SEQUENCE OF NORMAL OPERATION

1. When the thermostat calls for heat, a delay of 15 to 30 seconds will elapse before the time delay relay energizes the fan motor.
2. When the fan motor reaches approximately 75% of the normal R.P.M. (within 1 to 2 seconds) the sail switch, in response to the air flow, will engage allowing current flow to the gas valve, through the direct spark ignition module.
3. The gas valve will open and allow gas to flow to the main burner, where it is ignited by the direct spark ignition system.
4. If the thermostat is satisfied or turned down, the gas valve will close and the flame on the main burner will go out. The blower will continue to run for a short period of time, and will then shut off. The purpose of this is to remove most of the remaining gases and heat from the heat exchanger.

OPERATING INSTRUCTIONS "PILOT" IGNITION MODELS

Important: Failure to follow these lighting instructions exactly may result in damage to the furnace.

To place furnace into operation:

1. Press gas valve knob in and turn to "off".
2. Set thermostat to highest setting (if thermostat has an "on/off" switch, turn to "on") and wait 5 minutes.
3. Turn gas valve knob to "pilot" position. NOTE: Fan should be running.
4. Press gas valve knob in and light pilot by pushing in on ignitor repeatedly until pilot lights. Hold gas valve knob in for one minute or until pilot remains lit.
5. Set thermostat to desired setting (FAN SHOULD BE RUNNING), then turn gas valve knob to "on" position.
6. For complete shut down: Turn gas valve knob to "off" position and thermostat to lowest setting or switch to "off" position.

SEQUENCE OF NORMAL OPERATION

1. When the wall thermostat contacts close a time delay, fan relay is energized.
2. After a 15 second delay the motor starts, turning the circulating and combustion air wheels.
3. When the blower reaches the R.P.M.'s necessary to close the air operated sail switch, power is supplied through a temperature limit switch to open the main gas valve.
4. The burner is then ignited by the pilot flame.
5. When the wall thermostat contacts open, the fan relay is de-energized, the gas valve closes and the blower motor stops after a 45 to 120 seconds for a cool down period.

TIME DELAY FAN RELAY

This relay controls the sequence of the blower operation. When the bimetal disc of the relay is heated internally to its operating temperature, the switch closes. This completes the circuit to the motor. The blower will continue to run as long as the relay is hot even though the thermostat is satisfied and the main burner is off. When the relay sensor cools after the thermostat is satisfied, the switch opens and the blower shuts off.

LIMIT SWITCH

The purpose of the limit control is to open the circuit to the main burner if for any reason the furnace becomes abnormally hot. If the circulating air system is blocked, even partially, the limit control will function and cause the main burner to cycle. If cycling of the limit control occurs, the circulating air passage should be thoroughly cleaned, the ducts and register checked for restriction, check for 12 volts to the furnace. If the limit control is damaged, it cannot be repaired. It must be replaced with a new one.

CAUTION: NEVER SHORT ACROSS OR BYPASS THE LIMIT CONTROL EVEN FOR ONLY TEMPORARY OPERATION.

AIR SWITCH

The circulating air switch has two purposes:

1. It is an "air prover." It operates in response to the flow of air generated by the blower wheel. Hence, if for any reason the air from the blower wheel is not sufficient, the switch will not operate. One cause of insufficient air is a slow motor caused by low voltage.
2. The switch allows time for the blower to pull in a sufficient amount of air for combustion before it engages. Once it closes, power is supplied to the direct spark ignition module and the ignition cycles starts.

BLOWER ASSEMBLY BURNER

One motor is used to drive both the combustion air and the circulating air blower wheels. Although one motor drives both wheels, the blowers are separate. The combustion air blower is sealed so as to allow no passage of air between it and the circulating room air blower. The combustion air blower draws air from the outside atmosphere and into the burner box, then the gas controls allow gas to flow into the burner where it is mixed, then expelled through the burner screen where it is ignited in the combustion chamber.

MAINTENANCE AND CLEANING

NOTE: For continued satisfactory performance of this unit, it is necessary that the control compartment be kept clean. It is also important that the appliance area be clean and free of combustible materials, vapors and liquids.

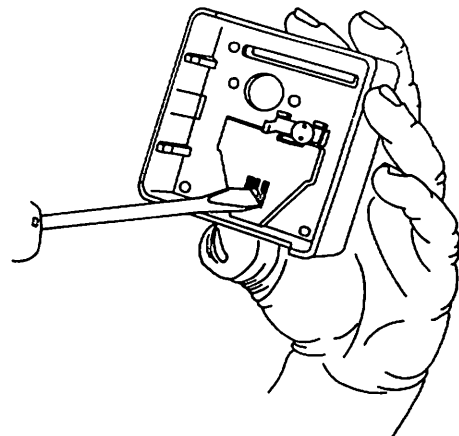
Routine inspections, maintenance and cleaning of venting system and gas connections is recommended at least on a yearly basis, or as required. The motor is permanently lubricated and sealed and requires no oiling.

THERMOSTAT

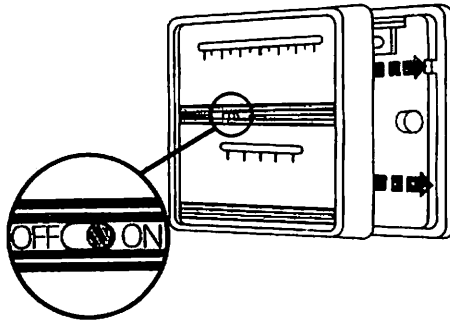
1. Thermometer adjustment for correct temperature setting. Move control lever so that your heater comes on (about 3 degrees below room temperature). When the heater shuts off, your thermometer should match your level setting. If it doesn't, remove cover and turn the small inside slotted shaft on the inside of the cover until thermometer reading and thermostat lever setting match.

ATTENTION

When first fired, the furnace may circulate fumes caused by the burning of material used in the manufacturing process. These fumes may cause physical irritation in some persons. We therefore recommend that you open all windows and doors on initial firing until the fumes have fully dissipated to the outside.



2. When snapping the cover onto thermostat base make sure that "on-off" switch on the front cover is in the "on" switch position. This will allow the switch to function properly. Turn the switch to "off" when the furnace is not in use. Failure to do so may cause battery drain.



SERVICE HINTS, DIAGNOSIS AND CORRECTIVE MEASURES

INSTALLATION AND SERVICE SHOULD BE DONE ONLY BY A QUALIFIED SERVICE PERSON. THE APPLIANCE SHOULD BE INSPECTED BEFORE USE AND AT LEAST ANNUALLY BY A PROFESSIONAL SERVICE PERSON. MORE FREQUENT CLEANING MAY BE REQUIRED DUE TO EXCESSIVE LINT FROM CARPETING, BEDDING MATERIAL, ETC. IT IS IMPERATIVE THAT CONTROL COMPARTMENTS, BURNERS AND CIRCULATING AIR PASSAGEWAYS OF THE APPLIANCE BE KEPT CLEAN.

SHORT CIRCUIT CHECKOUT

If fuses are blown or circuit breaker is tripped, short is indicated and should be checked.

1. Turn off all appliances including furnace.
2. Install an ammeter on the positive (+) side of the battery. Amperage reading should be (0). If the amperage reading ceases, the furnace electrical system is shorted or miswired and should be checked.

AMPERAGE DRAW THROUGH FURNACE WITH THERMOSTAT "OFF"

1. Incorrect wiring. If the 12 volt and thermostat wires are not connected properly at the furnace a continuous circuit can be created through the heater of the fan relay. If this condition exists, the blower will start as soon as the thermostat closes and will shut off when the thermostat opens, instead of having a delayed action. In some cases this will also burn out the thermostat. Refer to the wiring diagram for correct connections.
2. Internal short to ground in gas control or motor. Disconnect all wiring to control or motor and use an ohmmeter to check for shorts to ground. At no point should there be a reading between the electrical circuit of the motor, control and ground.

GAS SUPPLY

Be sure manual gas valve is in the full open position. NEVER operate furnace with valve partially open.

THERMOSTAT

Check to be sure thermostat is properly wired and is calling for heat.

MALFUNCTION CIRCULATING AIR SWITCH

Be sure the circulation air switch is moving enough to close its contacts. If the switch is not closing, clean any dust or dirt from the actuator pin. Other reasons for the switch not operating are:

1. Insufficient fan speed (slow motor due to low charged battery, faulty motor or line and dust accumulation restricting return air to furnace). Check wiring in accordance with units wiring diagram to ensure that proper polarity of the 12 volt D.C. power supply is observed. This polarity must be observed so the motor will run in the proper direction of rotation to insure correct air delivery.
2. Faulty circulating air switch if there is no continuity through the contacts when the sail is closed. Switch should also be replaced if battery is fully charged and with fan motor running at normal speed the switch fails to close within 3 to 4 seconds.

GAS CONTROL VALVE

Check valve terminals. If voltage is present, but valve does not open (when circulating air switch is closed), replace control valve.

FAN NOT OPERATING

Check for burned-out motor, loose wiring terminals, blown fuse, tripped circuit breaker, or no power to the furnace.

DEFECTIVE FAN RELAY

Relay may be at fault if motor fails to start within 60 seconds after thermostat calls for heat.

EXCESSIVE BLOWER NOISE

1. Motor or blower wheel out of balance. Replace motor or blower wheel. Also blower wheel may need to be repositioned on the motor shaft if blower wheel is rubbing housing.
2. Motor hum. Replace motor.

ERRATIC FAN OPERATION

A loose terminal, defective relay or reversed wiring polarity, may cause the motor to cycle off while the thermostat is calling for heat. Repair terminal or replace relay.

DIRECT SPARK IGNITION SYSTEM

DESCRIPTION: The direct spark ignition system consists of a solid state printed circuit control module, an electrode assembly, a 12 volt gas control, and connecting high and low voltage wires. To ignite the burner, it is necessary only to set the thermostat. The thermostat, in series with the air prover switch, powers the ignitor to simultaneously open the main burner valve and provide the ignition spark. Should the flame not be established within a period of 7 seconds, the system provides safety shut down.

Electronic flame sensing circuitry in the ignitor detects the presence or absence of the main burner flame. If the flame is not established during the flame establishing period, the system closes the gas valve and locks out. If the flame is extinguished during the ignition cycle, the ignitor will provide one retry for ignition, before going into lock-out. To reactivate or retry for ignition, if lock-out has occurred, set the thermostat to the "off" position for 60 seconds, then reset to the "on" position.

1. **INPUT POLARITY:** If a spark is present and the gas valve opens but the system shuts down after the trial period, check input voltage for proper polarity.

2. **GROUNDING:** It is essential to proper operation that the system be properly grounded. If a spark is present and the gas valve opens but the system shuts down after the trial for ignition period, check for proper ground.
3. **WIRING:** Check all wiring for proper and secure connections. Be sure the connector is fully engaged on the control board. Check the high voltage wire for proper connection at both ends. Clean any corrosion that may interfere with good electrical contact.
4. **HIGH VOLTAGE MALFUNCTION:** (See Caution below). If during the trial for ignition, the spark is intermittent (the valve may or may not open) the following should be checked:
 1. Electrode spark gap — should be 1/8: ± 1/32".
 2. Ceramic insulators — check for cracks.
 3. Electrode lead wires — check for cracks or breaks.
5. **VALVE MALFUNCTION:** If there is power to the gas valve and a spark during the trial for ignition, but the valve will not open, check the valve for an open coil or other malfunction.
6. **ERRATIC OPERATION:** If the system operates properly for a period of time but randomly shuts down during the duty cycle, or will not operate during cold starts, (check the flame proving circuit sensor wire) with a D.C. Microamp Meter. The current should be 5-15 microamps. A low or marginal flame current may cause nuisance tripping. If this condition is experienced, the electrode location should be checked to make sure the sensor electrode is in the flame.

Low microamps can also be caused by too much combustion air.

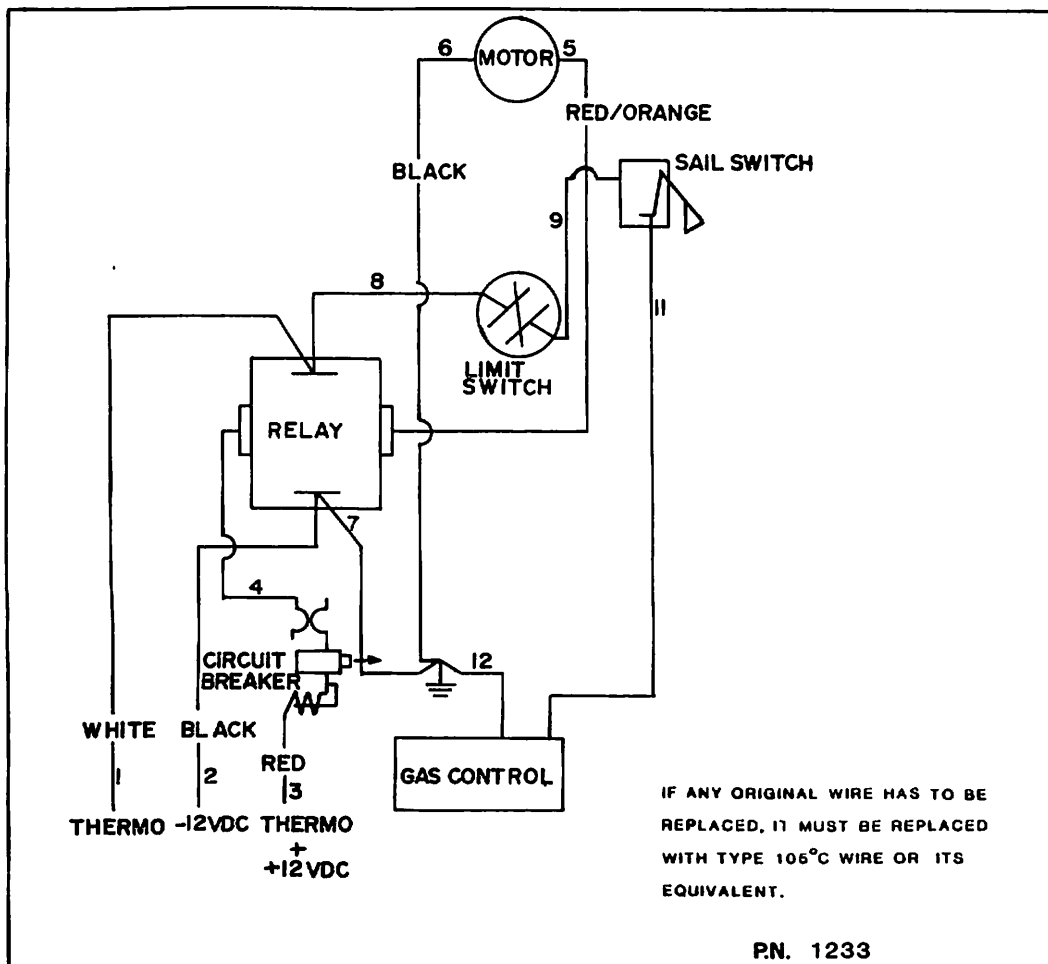
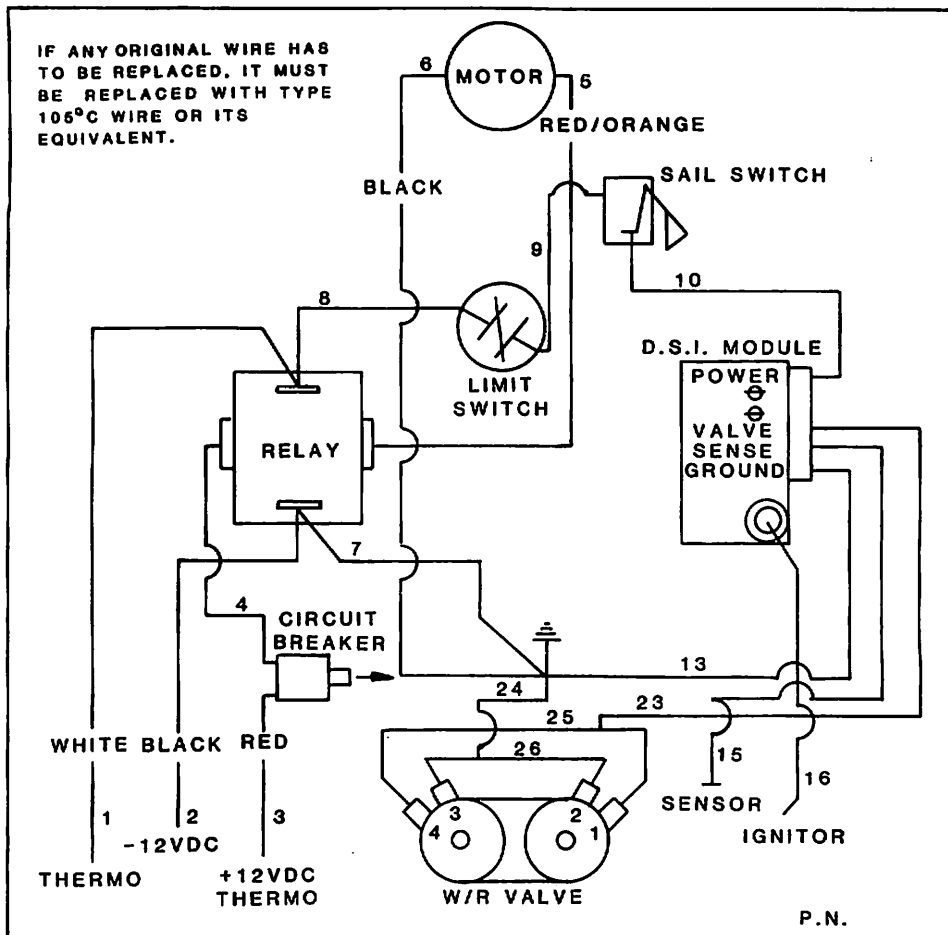
The solid state control module is not field repairable. Any modifications or repairs could alter the function of sensitive electronic circuits, and cause unsafe operation.

CAUTION

SERVICING THIS DEVICE SHOULD ONLY BE PERFORMED BY A QUALIFIED SERVICE-MAN WITH DUE REGARD FOR SAFETY AS IMPROPER ACTIONS COULD RESULT IN A HAZARDOUS CONDITION, RESULTING IN SERIOUS INJURY OR DEATH.

WARNING

DO NOT APPLY POWER TO CONTROL MODULE UNLESS WIRING CONNECTIONS ARE COMPLETE AND ELECTRODE IS PROPERLY GROUNDED. USE EXTRA CAUTION IN AREAS WHERE HIGH VOLTAGE IS PRESENT.





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DIRECT SPARK IGNITION

“TROUBLE SHOOTING GUIDE”

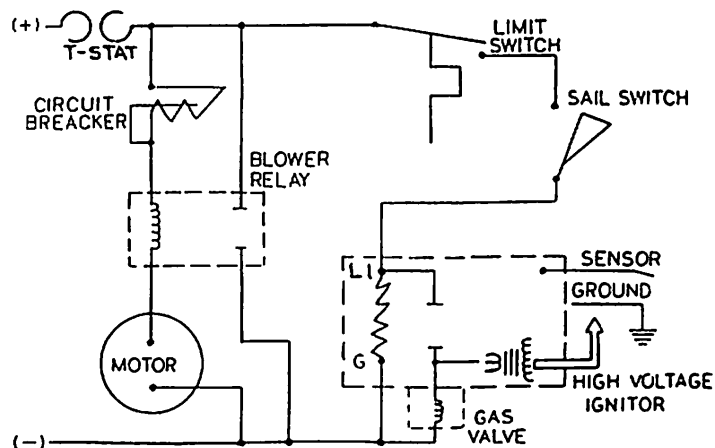
CAUTION

SERVICING THIS FURNACE SHOULD ONLY BE PERFORMED BY A QUALIFIED SERVICEMAN WITH DUE REGARD FOR SAFETY AS IMPROPER ACTIONS COULD RESULT IN A HAZARDOUS CONDITION, RESULTING IN SERIOUS INJURY OR DEATH.

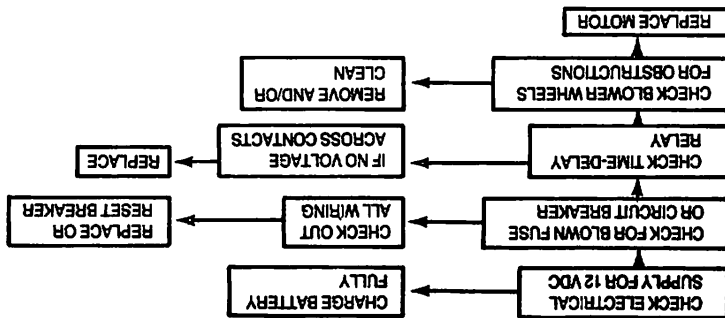
OPERATING SEQUENCE

- A. When the thermostat contacts close, a circuit is completed to the blower time delay relay coil, ground to the gas valve, and to terminal ground of the control module (see wiring schematic). The module does not operate at this time, the sail switch is open — no power to L1.
- B. After a 15-30 second delay, the blower relay contacts close completing the circuit to the blower motor.
- C. When the blower motor reaches approximately 75% of its rated speed, the sail switch closes completing the power circuit through the limit switch, to terminal L1 of the control module.
- D. When the control module receives power it simultaneously energizes three separate circuits:
 1. 12 vdc (+) is supplied to the gas control, allowing gas to flow to the main burner.
 2. Intermittent high voltage is applied to the ignition electrode causing a spark to ground, igniting the gas from the burner.
 3. An AC voltage is applied to the flame sensor. If a proper flame is present, a small rectified DC current signals the control module that flame is present, and the heater will remain on until the end of the heating cycle (when the thermostat opens). The blower will continue to run for approximately 45 seconds to 2 minutes.

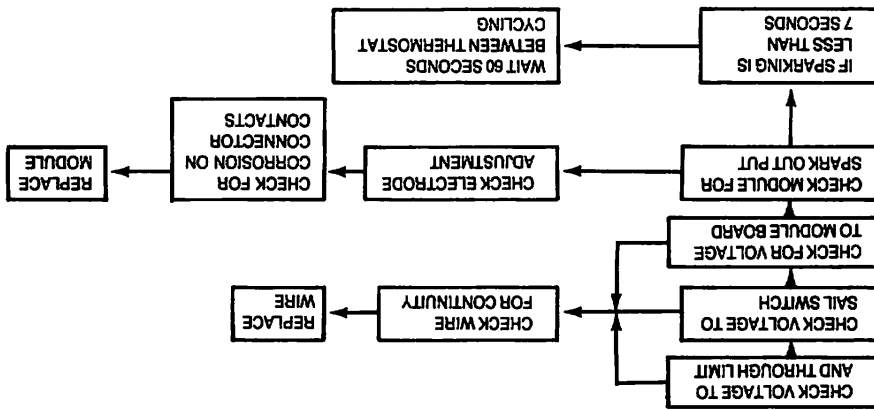
DIRECT SPARK IGNITION SCHEMATIC



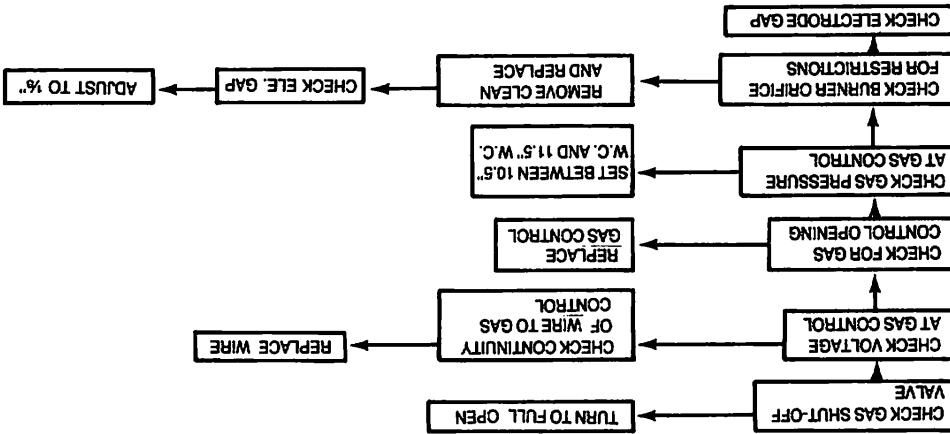
A. Problem: No Heat.



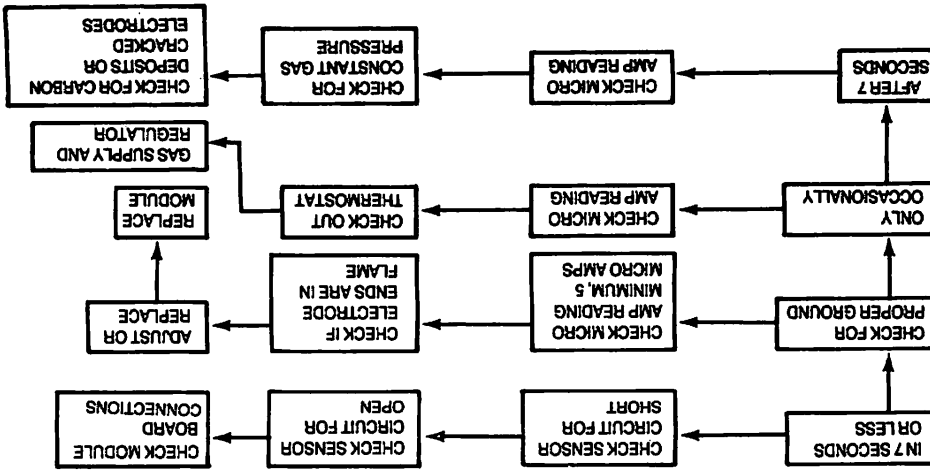
B. Problem: Blower Runs, No Spark.



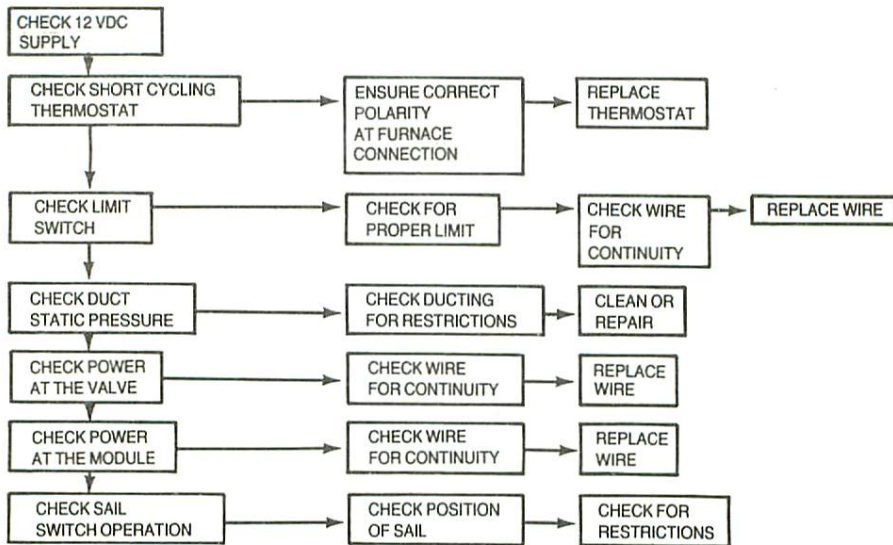
C. Problem: Blower Runs, Spark OK, No Flame.



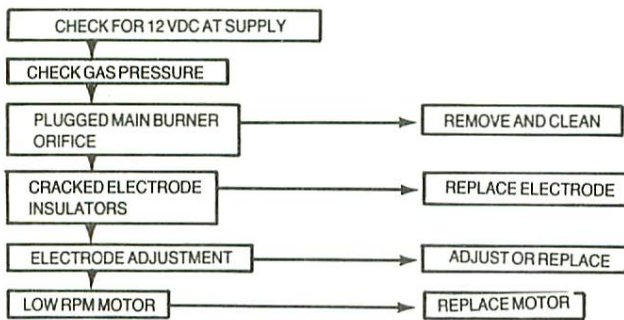
D. Problem: Burner Lock Out Occurs.



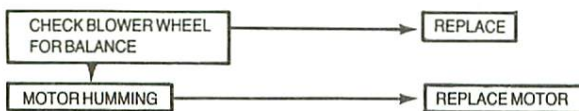
E. Problem: Burner Cycling On and Off.



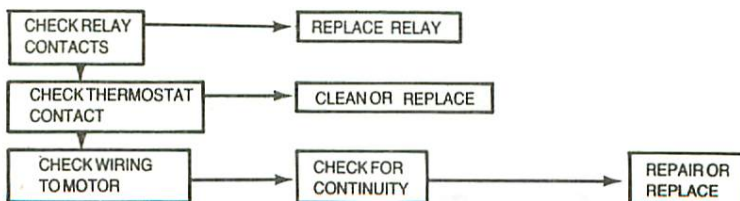
F. Problem: Ignition Pop.



G. Problem: Blower or Motor Noise.



H. Problem: Erratic Fan Operation.





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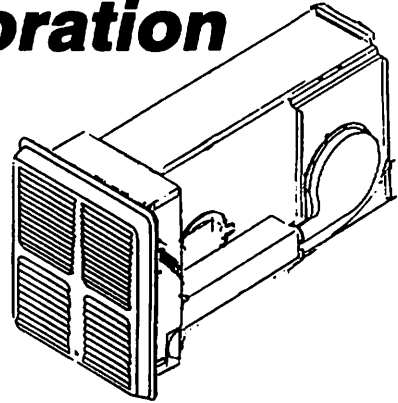


hydro flame corporation

1874 SOUTH PIONEER ROAD • SALT LAKE CITY, UTAH 84104

Everest Star

Installation Instructions
For Models
FA-7920, FA-7916, FA-7912
and HF-8012



Direct Vent Central and Fan-Type Direct Vent Wall Furnaces, for Installation in Recreational Vehicle or Manufactured (Mobile) Home.



TESTED TO U.L. 307(b)



CERTIFIED BY C.G.A.

These furnaces are for use with propane gas only and must be installed only by QUALIFIED personnel in accordance with these instructions. The installation must also conform with the following codes where they apply.

ALL LOCAL CODES

1. National Fuel Gas Code ANSI Z 223.1 1984.
2. American National Standard for Recreational Vehicles, ANSI A 119.2 1982 and A 119.5.
3. CSA Z 240.4, 1 and 2 and Z 240.6.2.
4. Can 1-B 149 Installation Code.
5. The Manufactured Home Construction and Safety Standard (Title 24, CFR part 3280).
6. This furnace conforms to Part 280.707(a)(2) of Hud Mobile Home Construction and Safety Standard.

THIS FURNACE WAS TESTED AND INSPECTED BEFORE IT LEFT THE FACTORY. IF ANY PARTS ARE FOUND TO BE DAMAGED, DO NOT INSTALL THE FURNACE. IMMEDIATELY CONTACT THE TRANSPORTATION COMPANY AND FILE A CLAIM.

WARNING: IMPROPER INSTALLATION, ADJUSTMENT ALTERATION, SERVICE OR MAINTENANCE CAN CAUSE INJURY, PROPERTY DAMAGE OR DEATH. THIS FURNACE IS NOT DESIGNED FOR USE WITH AIR FILTERS NOR ARE THEY TO BE USED IN CONJUNCTION WITH COOLING UNITS. READ ALL INSTRUCTIONS BEFORE STARTING.

These furnaces are design certified for propane gas only, (**DO NOT CONVERT TO NATURAL GAS**) at the following gas inlet pressure 11.0" W.C. maximum. (W.C. = Water Column)

WARNING: THESE FURNACES MUST BE INSTALLED AND VENTED SO THAT THE NEGATIVE PRESSURE CREATED BY THE CIRCULATING AIR BLOWER CANNOT EFFECT THE COMBUSTION AIR INTAKE OR VENTING OF ANY OTHER APPLIANCE.

Model No.	Input BTU/HR	Output BTU/HR	Type Gas	Electrical Rating	Amps	Watts
FA-7920 (D or P)	19,500	15,700	Propane	12 VDC	2.9	34.8
FA-7916 (D or P)	16,000	12,900	Propane	12 VDC	2.9	34.8
FA-7912 (D or P)	12,000	10,000	Propane	12 VDC	2.9	34.8
HF-8012 (D or P)	12,000	10,000	Propane	12 VDC	1.6	19.2

LETTERS AFTER THE MODEL NUMBER STAND FOR:

D = Direct Spark Ignition

P = Piezo Spark Ignition

FURNACE DIMENSIONS

	Casing	Door	Vent Cap
Width	8"	9 ⁷ / ₈ "	5 ⁷ / ₈ "
Height	11"	11 ¹ / ₂ "	3 ³ / ₈ "
Length	20 5/16"	—	—
Depth	—	1 ¹ / ₄ "	5/8"

Due to High Temperatures, the appliance should be located out of traffic and away from furniture and draperies. Adults and Children should be alerted to the hazards of high surface temperatures and should stay away to avoid burns or clothing ignition. Young children should be carefully supervised when they are in the same room as the appliance. Clothing or other flammable materials should not be placed on or near the appliance. Any safety screen or guard removed for servicing an appliance must be replaced prior to operating the appliance. Installation and repair should be done by a qualified service person. The appliance should be inspected before each use and at least annually by a professional service person. Note frequent cleaning may be required due to excessive lint from carpeting, bedding material, etc. It is imperative that control compartments, burners, and circulating air passageways of the appliance be kept clean.

MINIMUM CLEARANCE TO COMBUSTIBLES.

TOP AND SIDES = 1/4" (0" TO SPACERS)

AIR TUBE = 0"

REAR = 0"

FRONT AS REQUIRED FOR SERVICE.

DUCTS WITHIN 3'-0" OF FURNACE 1/4" EXCEPT THAT U.L.

LISTED WIRE BOUND VINYL AIR DUCTS MAY HAVE 0" CLEARANCE.

BOTTOM EQUALS 1/4" (0" TO SPACERS) DO NOT INSTALL ON CARPETING.

RETURN AIR

1. Return air is supplied through front grill panel. All that is needed is to maintain the required clearances as called for.
2. Route wiring to right side of furnace using a minimum of 22 to 18 guage wire, to thermostat.

INSTALLATION

This furnace must be installed in accordance with these instructions and all National or Local Codes and C.S.A. Standards.

1. Select a location for installing the furnace through an outside wall. It is recommended that it be located as far as possible from any outside projection such as a tilt out room.
2. Remove from furnace the combustion air box extension (B) and the exhaust tube extension (C) which will be installed from the outside of the coach.

3. Provide an 11¼" high x 8⅝" wide opening in the cabinet and 2 7/16" high x 4 15/16" wide opening in the outside wall. See figure 1.
4. On side discharge models remove the left knockout plate. See figure 3.
 - A. On front discharge type models remove the front discharge cover plate. See figure 5.
 - B. On optional front/side models remove or install the duct cover plate or front discharge cover plate.
 - C. To install duct adapters for side discharge models, insert back flange over casing and insert tab into square notch then twist adapter 180 degrees.
5. Install furnace into cabinet opening and secure with two screws through holes that are provided in control box flanges. See figure 4.
 - A. Slide 4" ducting material over duct adapters and secure and seal for ducted models.
6. To determine the vent lengths required, determine the length from the back of the furnace casing to the outside of vehicle side wall, this will give you "A" dimension. See figure 2 for correct vent kit.
 - A. To install combustion air box apply mastic or sealant to back of flanges on box. Slide through outside wall cut out and into furnace air channel. (DO NOT FORCE OR BEND PARTS OUT OF SHAPE.)
 - B. Apply mastic or sealant to the top and sides of the outer edge of the vent cap, (DO NOT PLUG HOLES). Slide assembly over furnace exhaust tube, push into wall and secure with two screws. Note bottom flange is not sealed to allow water drainage.
7. Install self trim door by sliding door flange over control box top flange and pushing in on bottom of door. NOTE: To assure sufficient return air to the circulating blower maintain specified clearances.

ELECTRICAL

1. Remove junction box cover from furnace by removing screw located on the right side. See figure 5.
2. Route wiring to right side of furnace using a minimum of 18 GA. wire, except for thermostat wires.
3. Connect furnace wiring to field wiring as shown.

FIELD LEADS	FURNACE LEADS
12 VDC (+) and thermostat	-to- Red (+) 12 VDC and thermostat
12 VDC (-)	-to- Black (-) 12 VDC
Thermostat	-to- White thermostat

4. Replace junction box cover.

NOTE:

1. OBSERVE POLARITY OF LEADS WHEN CONNECTING.
2. Ground the furnace in accordance with national electrical ANSI/NPFA No. 70 1984 and all local codes, Canadian Electrical Code C-22.1.

GAS PIPING

For gas piping and pipe sizing, refer to the Federal Mobile Home Construction and Safety Standard, part 280, N.F.P.A. 54 or ANS/N.F.P.A. NO. 501C-1977 and all state and local codes.

Gas Line hook-up is made through the left side of the furnace casing. Actual hook-up is accomplished inside the furnace casing immediately ahead of the Gas Control Valve.

A 3/8" flared fitting connection is provided at the control valve inlet for gas supply connection to the furnace. The gas supply line of the furnace must be of adequate size to provide 11" water column gas pressure. This pressure must be maintained under maximum flow conditions with all gas appliances in operation. Tubing may be type "K" for propane gas (Bottled Gas), however be sure to check with ANS, CGA and CSA Standards for any other requirements concerning gas piping.

This furnace and its individual shut-off valve must be disconnected from the gas supply piping system during any pressure testing of that system at test pressure in excess of 1/2 psig. (3.45 KPA).

This furnace must be isolated from the gas supply piping system by closing the manual shut-off valve during any pressure testing of the gas supply piping system at test pressures equal to or less than 1/2 psig. (3.45 KPA).

A 1/8" N.P.T. plugged tapping accessible for test gage connection is recommended, installed immediately up stream of the gas supply connection to the furnace.

IMPORTANT:

All pipe joints must be sealed with a sealing compound resistant to the effects of LP or Natural Gas. These joints must then be leak checked.

NEVER USE A FLAME TO CHECK FOR LEAKS.

CAUTION: DO NOT TWIST VALVE DURING PIPING.

NOTE:

Standards may require installation of an external manual shut-off valve if required, the manual valve must be located outside the confines of the furnace casing except if shut-off is supplied as part of the furnace.

SEQUENCE OF DIRECT SPARK IGNITION OPERATION

1. When the thermostat calls for heat a delay of 15 to 30 seconds will elapse before the time delay relay energizes the fan motor.
2. As the fan motor reaches approximately 75% of the normal R.P.M. (within 1 to 2 seconds) the sail switch, in response to the air flow, will close allowing current flow to the direct spark ignition board.
3. The direct spark ignition board will send current to the gas valve and allow gas to flow to the main burner where it is ignited by a direct spark igniter.
4. If the thermostat is satisfied or turned down, the gas valve will close and the flame on the main burner will go out. The blower will continue to run for a short period of time and then shut-off. The purpose of this is to remove most of the remaining gases and heat from the exchanger.

OPERATIONAL CHECKOUT

IMPORTANT: Failure to follow these lighting instructions exactly may result in damage to the furnace.

1. Set thermostat to "off" position.
2. Turn gas valve to "off" position (if furnace is so equipped). Wait 5 minutes. (Gas valve is located behind front door panel. To remove pull forward at the bottom of door) and lift off.
3. Turn gas valve to full "on" position. Correct operation of the furnace depends on this valve being in the full "on" position. Never attempt to operate the furnace with valve partially closed. (If furnace is equipped with a shut-off).
4. Set thermostat to the desired temperature. Furnace will now operate automatically. When the thermostat calls for heat a delay of 15 to 30 seconds will occur before the fan motor is energized.
5. Allow 15 seconds for burner to ignite.
6. If burner does not ignite set thermostat to the "off" position. Wait 60 seconds and reset to "on" position.
7. If ignition is not obtained after three tries, go to complete shut-down and determine cause.

FOR COMPLETE SHUT-DOWN, TURN GAS VALVE KNOB TO "OFF", (IF FURNACE IS SO EQUIPPED). SET THERMOSTAT TO "OFF" SETTING.

SEQUENCE OF PILOT OPERATION

When the wall thermostat contacts close, a time delayed relay is energized. After a 15 second delay the motor starts turning the circulating and combustion wheels. When the blower reaches the R.P.M.'s necessary to close the air operated sail switch, power is supplied through a temperature limit switch to open the main gas valve. The burner is then ignited by the pilot flame. When the wall thermostat contact opens, the fan relay is de-energized, the gas valve closes and the blower motor stops running after 45 seconds to 2 minutes. This is a cool down period and is normal.

OPERATIONAL CHECKOUT:

IMPORTANT: Failure to follow these lighting instructions exactly may result in damage to the furnace.

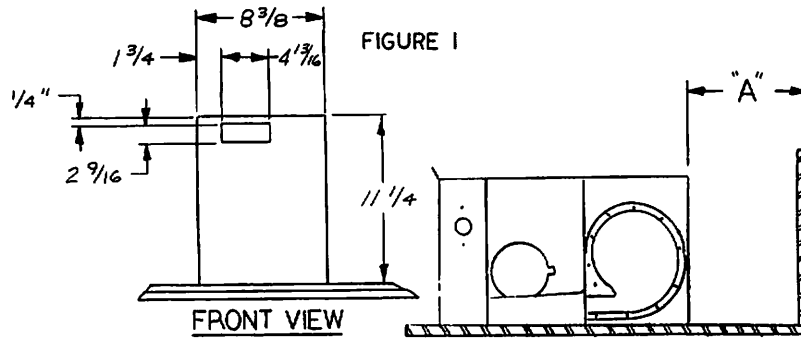
To place furnace into operation.

1. Press gas valve knob in and turn to "off."
2. Set thermostat to highest setting (if thermostat has an "on/off" switch, turn to "on") and wait 5 minutes.
3. Turn gas valve knob to pilot position. NOTE: Blower should be running.
4. Press gas valve knob in and light pilot by pushing in on ignitor repeatedly until pilot lights. Hold gas valve knob in for one minute or until pilot remains lit.
5. Set thermostat to desired setting (fan should be running), then turn gas valve knob to "on" position.
6. For complete shut-down: Turn gas valve knob to "pilot" position, depress and turn to "off" position and thermostat to lowest setting or switch to "off" position.

SHORT CIRCUIT CHECKOUT

If a fuse is blown or circuit breaker is tripped, a short is indicated and should be checked.

1. Turn off all appliances including the furnace.
2. Install an ammeter on the positive (+) lead of the battery. The meter reading should be 0. If an amperage reading ceases, the furnace electrical system is shorted or mis-wired, amp should be checked. See wiring diagram.
3. Refer to the operation and service instructions for a complete checkout.



79/80 VENT KIT

MODEL S	"A" DIM.		CABINET DEPTH		VENT KIT NO.	EXTENSIONS	
	MIN.	MAX.	MIN.	MAX.		EXH. TUBE	AIR BOX
FA 79	0"	3-1/2"	20-5/8"	23-3/4"	2150	1680	1677
HF 80	3-1/2"	7-1/2"	23-3/4"	28-5/8"	2151	1679	1676
	7-1/2"	11-1/2"	28-5/8"	32"	2145	1678	1675

FIGURE 2

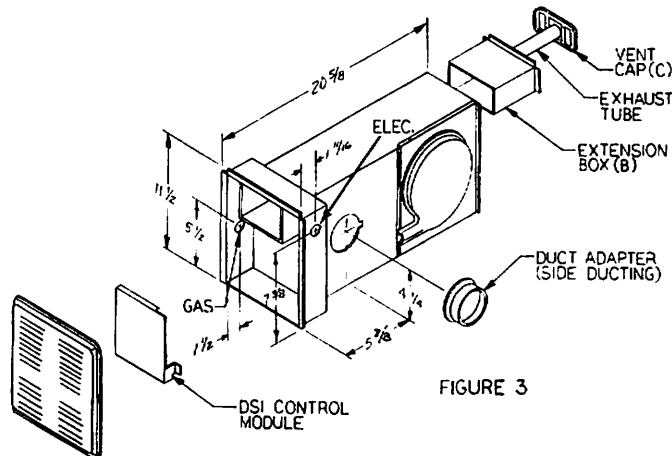


FIGURE 3

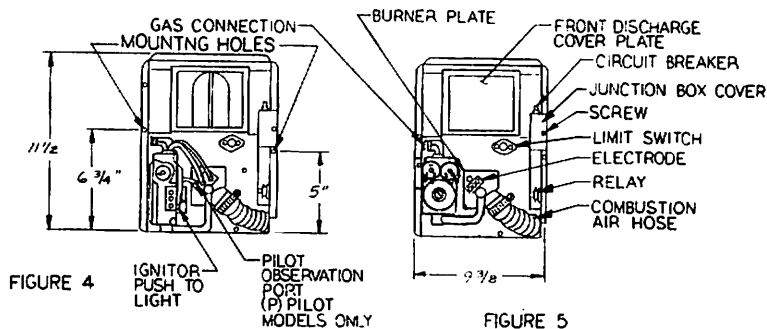


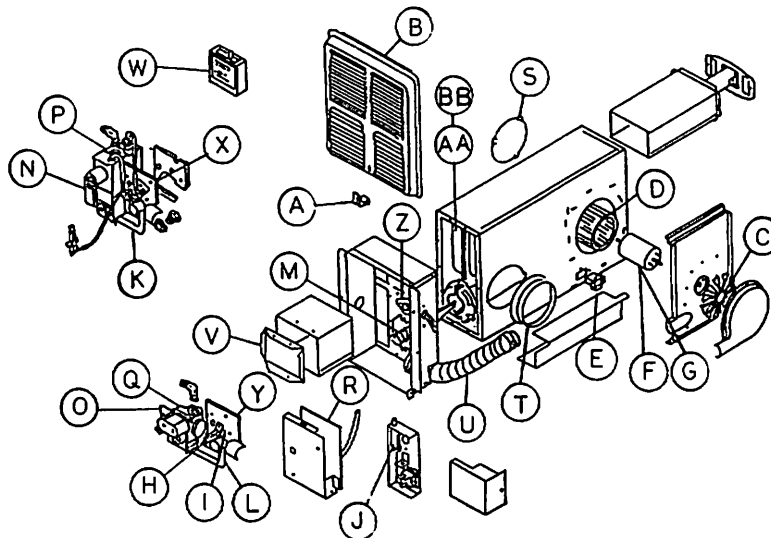
FIGURE 4

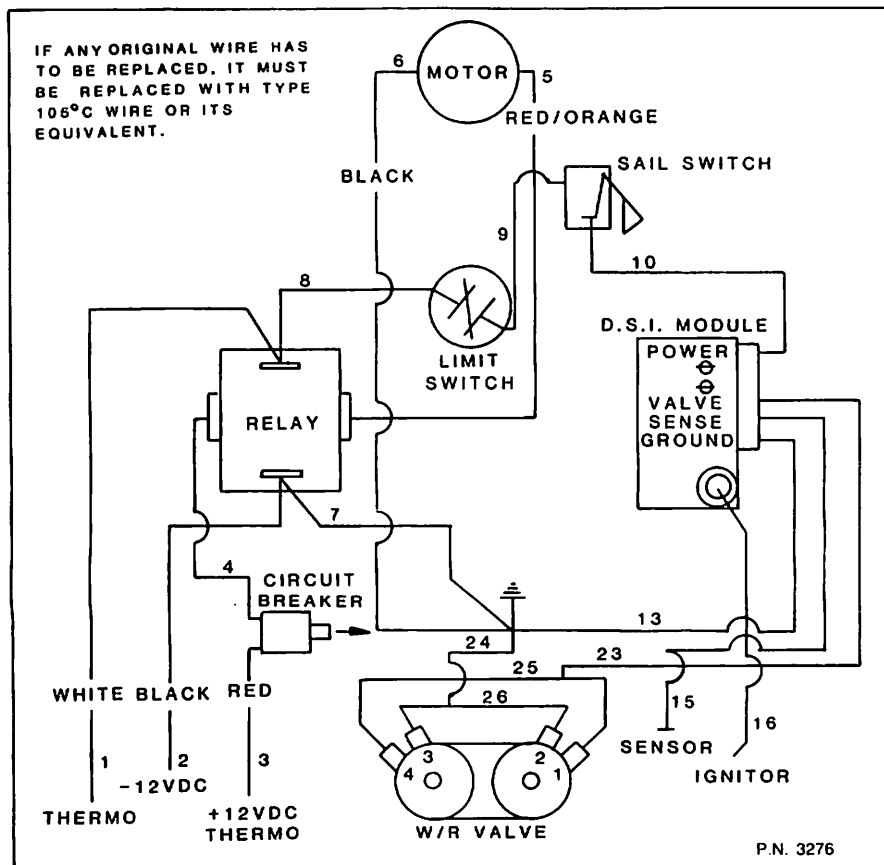
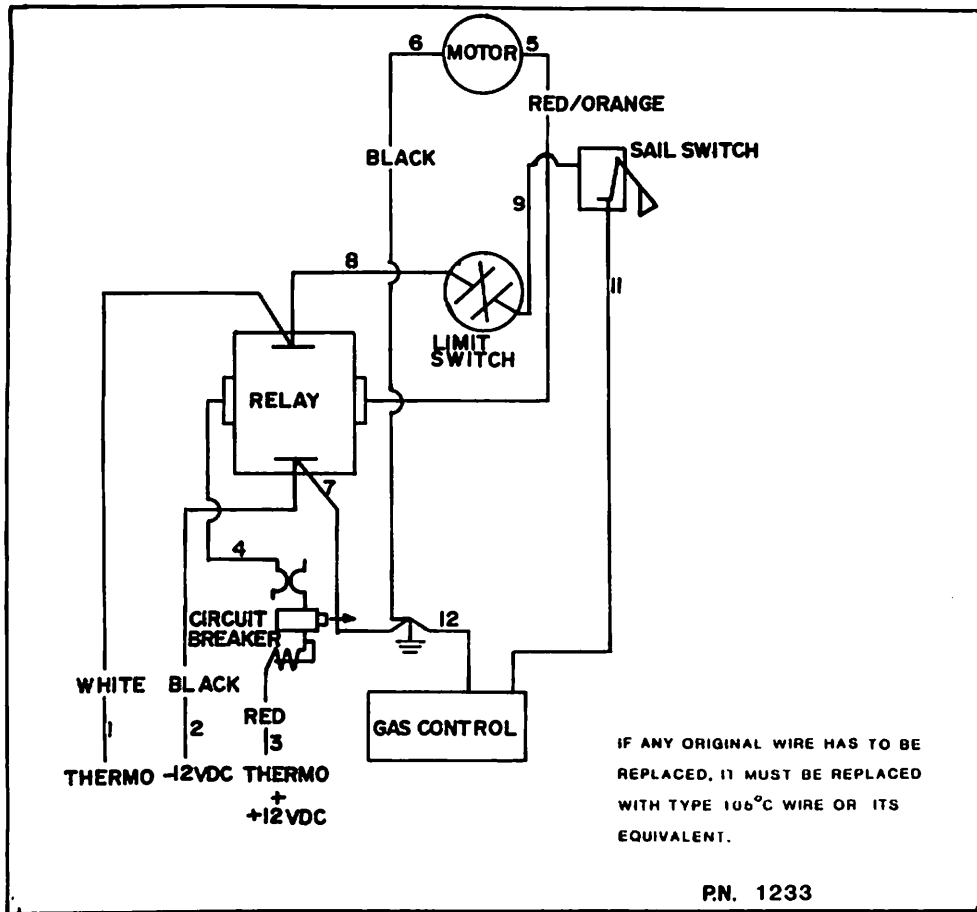
FIGURE 5

PREVENTIVE MAINTENANCE

1. Clean complete furnace and air tube passageways periodically as needed to remove dust, lint, etc.
2. Check gas system for leaks at least once a year.
3. Check blower wheels annually and clean.
4. Check warm air ducts and registers for dirt and lint once a year.

Isometric Number	Description	Part No.	Isometric Number	Description	Part No.
A	Door Catch	1145	AA	Heating Element Assy. (Pilot)	1689
B	Front Grill	1036	BB	Heating Element Assy. (DSI)	1828
C	Combustion Wheel	1137			
D	Circulating Wheel	1140			
E	Sail Switch Assy.	1685			
F	Motor (79 Only)	1036			
G	Motor (80 Only)	1035			
H	Electrode	1287			
I	Electrode Gasket	2172			
J	Circuit Breaker	1028			
K	Manifold (Robertshaw)	2696			
L	Manifold (W/R)	3180			
M	Burner Head Assy.	2008			
N	Valve Bkt. (Robertshaw)	3007			
O	Valve Bkt. (W/R)	3210			
P	Pilot Control Valve	2697			
Q	DSI Control Valve	2886			
R	DSI Board	1288			
S	Duct Cover Plate	1361			
T	Duct Adapter	1474			
U	Comb. Air Hose	1880			
V	Front Discharge Cover	1348			
W	Thermostat	1030			
X	Burner Plate Pilot	1452			
Y	Burner Plate DSI	1454			
Z	Limit Switch	1023			





INSTALLATION INSTRUCTIONS

**ROOM THERMOSTAT
 CM60 12/24 VOLT & CM66 MILLIVOLT
 HEATING THERMOSTATS**

DESCRIPTION

The CM60, CM66 Room Thermostats control a heating system, either gas, oil or electric. They sense the room temperature and automatically open or close an electrical circuit to a valve or a relay in a heating appliance.

There are two main assemblies, a cover and a base. The cover has a decorative face plate, and comes with or without thermometer. The temperature scales are Fahrenheit and Celsius. There are three internal ribs which fit into guides in the base for centering and to provide gripping to hold the cover to the base.

The base mounts to the wall with two #6 screws. Leveling is not required. The system wiring is connected to two screw terminals on the back. On the front is the bimetal coil, a magnet, contacts, adjustable anticipator (CM 60 model only), a temperature setting lever and an optional "OFF" switch. The anticipator adjusts the thermostat to the heating system, and can be used to change the system cycles per hour for more even heating. The lever sets the temperature at which the thermostat turns the system ON.

SPECIFICATIONS

ELECTRICAL RATING:

- CM60-24 volt nominal, (30 VAC, 1.0 amperes max.),
 12 volt D.C. nominal
- CM66-Millivolt, 250 to 750 millivolt

APPLICATION: Two wire heating

ANTICIPATOR: .18-1.0 amperes, adjustable. (CM60 only)

TEMPERATURE RANGE: 50°F to 90°F, 10°C to 30°C.

TEMPERATURE DIFFERENTIAL: 2°F, 1°C.

SIZE: 3 x 3-1/4 x 1-1/2 inches.

OPTIONAL FEATURES: OFF switch, thermometer, customized cover face plate, HI-LO temperature setting stops.

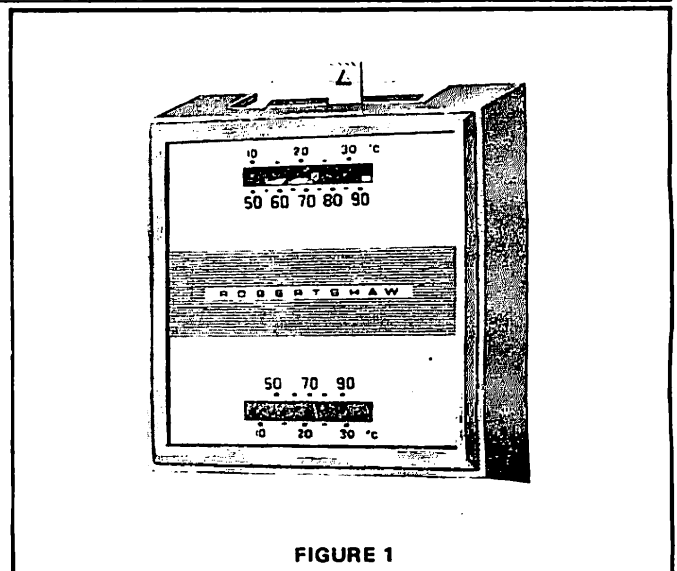


FIGURE 1

LOCATION

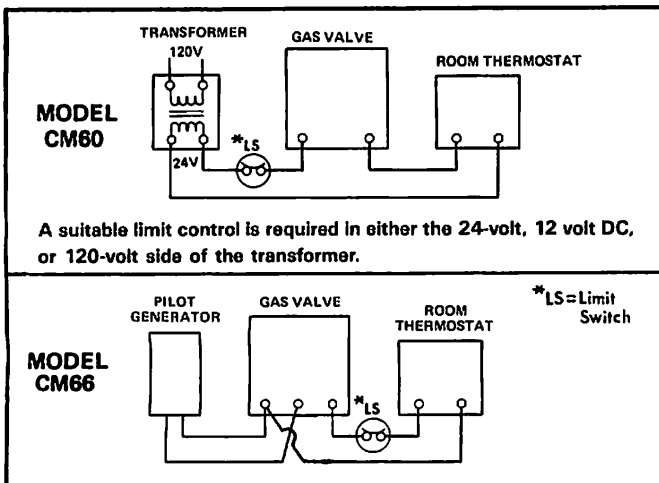
- Locate on an inside wall about five feet off the floor accessible to wiring, service and adjustment, in a frequently used room, such as a living room, etc. . .
- Do not locate in unusual heating conditions such as in sunlight, close to lamps, TV sets, radiators, registers or other heat producing appliances.
- Do not locate in unusual cooling conditions such as on an outside wall, or one separating an unheated room, or in drafts from stairwells, doors, windows, etc. . .
- Do not locate where air circulation is poor such as in a corner, alcove, over furniture, or behind an open door.

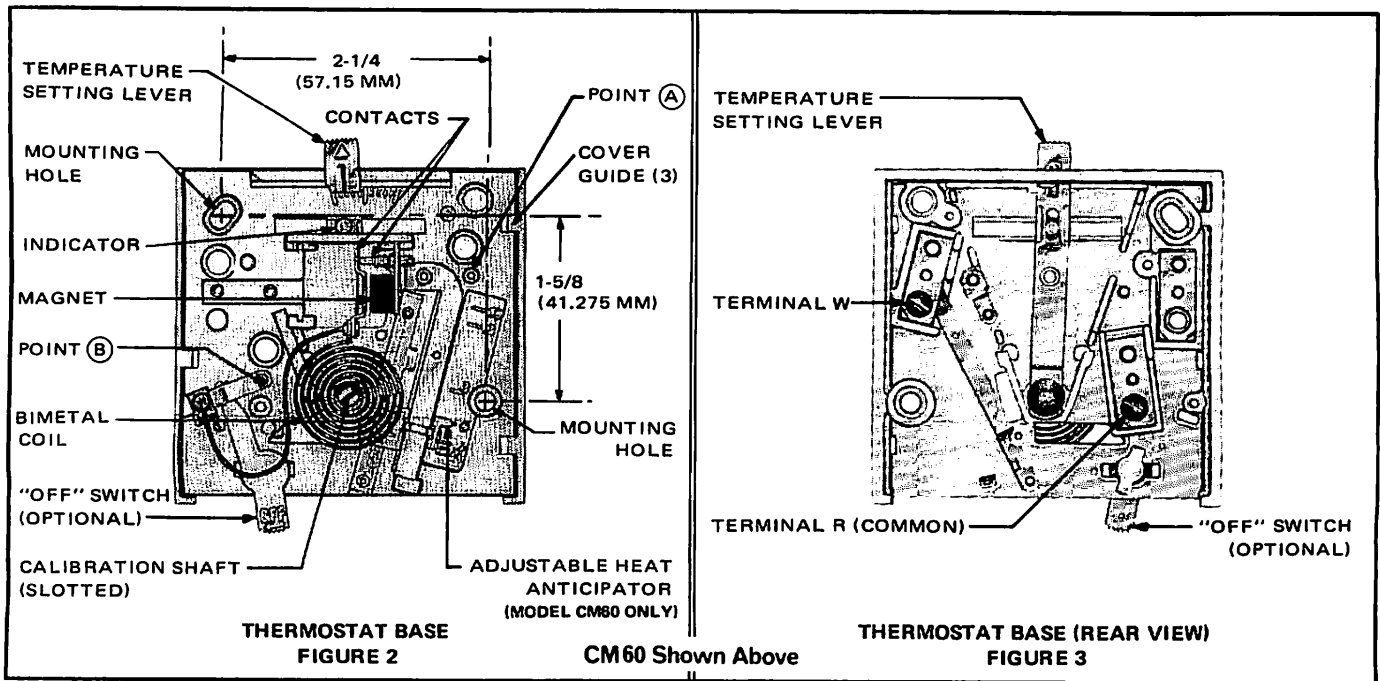
WARNING

READ CAREFULLY BEFORE PROCEEDING.

This is a precision instrument, handle carefully. Only the procedures outlined in this bulletin are approved by the Manufacturer. Replace thermostat if other service is required.

1. Disconnect electricity to the appliance before installation or service. Reconnect when through.
2. **DO NOT** short control terminals at appliance to test system. Room thermostat will be damaged.
3. **DO NOT** locate thermostat in a humid area. The life expectancy will be reduced.
4. Wiring must conform to local codes and ordinances.
5. When appliances have time delay control, the system operation will lag behind thermostat.





INSTALLATION

1. Disconnect electricity (warning note 1).
2. Grip cover at top and bottom and pull off.
3. Drill mounting holes in wall (fig. 2)
4. Pull about 3 inches of wire through wall opening and strip the ends 3/8 inch. Connect wires to screw terminals (fig. 3) and tighten securely. Bend wires to prevent interference with the temperature setting lever.
5. Push wires back through wall opening leaving some slack. Close opening with insulating material.
6. Mount base to wall with the furnished screws.

ADJUSTMENTS

ANTICIPATOR (CM60 Model Only)

The anticipator must be set by the installer. Set to one of the following conditions:

1. The same reading as the replaced thermostat.
2. The current draw (amperage) of the valve or relay (see label on the control).
3. The circuit amperage determined as follows:
 - A. Set the temperature setting lever to the lowest position (LH side) so that contacts are open.
 - B. Use an AC ammeter for 24 volt applications, or DC ammeter for 12 VDC applications, 0-1 ampere range, and place probes on point A and point B (fig. 2). Heating control or relay must then turn ON and a reading appear on the meter. Do not use a voltmeter. NOTE: If equipped with an "OFF" switch, put it in an ON position (point B).
 - C. Set anticipator (slider) to meter reading. This is the nominal setting.
4. After system has operated for several hours, heating cycles should be from 4-6 per hour (typical). For more even heating, cycles can be increased or decreased by adjusting anticipator. Set to higher number for fewer cycles. Make adjustments in small increments.

CALIBRATION

A thermostat responds to the temperature in its immediate area. It is factory calibrated to turn ON when the room temperature is at or below the selected temperature. If re-calibration becomes necessary, proceed as follows:

1. Set temperature setting lever to the lowest position and allow the thermostat to stabilize for 10 minutes.
2. Set the lever to the reading of a thermometer that is accurate and is close to the thermostat, or to the thermostat thermometer, if so equipped. Remove cover. Do not let heat from hands, breath, etc., affect calibration. Work quickly.
3. Hold the lever stationary and, with a blade screwdriver, turn the calibration shaft (fig. 2) counter clockwise until the contacts are apart, and, slowly, turn the shaft clockwise until the contacts just snap closed.
4. Replace cover and set temperature setting lever to the desired setting.

THERMOMETER CALIBRATION

1. Place an accurate thermometer close to the thermostat.
2. Remove cover, and with a blade screwdriver, turn (do not push in) the small slotted shaft on the inside of the cover until the pointer has correct reading on the scale. Breath and body heat will affect the sensitive bimetal, make adjustment quickly.

SERVICE

CONTACT CLEANING

1. Grip cover at top and bottom and pull off carefully.
2. Move temperature lever to open contacts. Place a piece of unprinted, unglazed paper between the contacts and move the lever to close them. Press lightly on the moveable contact and polish by moving the paper back and forth. (Removes tarnish.)
3. Replace cover and test system operation by setting lever.