INSTALLATION INSTRUCTIONS

INSTALLATION
INTERMITTENT ELECTRONIC IGNITION
"A" SERIES

OPERATION
HORIZONTAL GAS CONDENSING WARM AIR FURNACE

MAINTENANCE

ISSUE 9132

AFFIX LABEL HERE

CAUTION

These instructions are intended to be used by qualified personnel who have been trained in installing this type of furnace. Installation of this furnace by an unqualified person may lead to equipment damage and/or a hazardous condition which may lead to bodily harm.

GENERAL INSTRUCTIONS

This is a category IV furnace designed for use with either natural or liquefied petroleum gases (propane) when installed with the proper propane conversion kit and has been design certified by the American Gas Association.

It is shipped as a packaged unit, complete with burners and controls, and requires a line voltage (115V) connection to the junction box, a thermostat hook-up as per the wiring diagram and a gas line connection. This furnace is designed to facilitate various installation requirements. To accomplish this, the pilot burner, gas valve, and controls can remain assembled on the same side of the furnace as shipped or all these components may be reversed to the opposite side of the furnace. If necessary, the air inlet may be mounted on the opposite side of the furnace from the gas valve, pilot burner and remaining controls. (Refer to Field Reversing section for details on reversing).

This furnace has been designed to interface with split system cooling equipment (approved by U.L.) so as to provide "year round air conditioning". The blower has been sized for both heating and cooling and the furnace controls include a cooling fan relay.

The furnace installation must conform with local building codes or, in the absence of local codes, with the latest edition of the National Fuel Gas Code, ANSI Z223.1 (NFPA-54).

For complete information on installation standards consult the National Fuel Gas Code obtainable at a nominal cost from the National Fire Protection Association, Inc., Batterymarch Park, Quincy, MA 02269 or the American Gas Association, 1515 Wilson Boulevard, Arlington, VA 22209.

WARNING

The furnace cabinet must have an uninterrupted or unbroken electrical ground to minimize personal injury if an electrical fault should occur. The unit must also be electrically grounded in accordance with local codes, or in the absence of local codes, with the latest edition of the National Electrical Code ANSI/NFPA No. 70, if an external electrical source is utilized. DO NOT use gas piping as an electrical ground.

LOCATION

Site Selection:

This furnace may be located in an attic, basement crawl space, alcove or suspended from the ceiling of a utility room or basement. The following minimum clearances, or greater must be provided between the furnace and adjacent construction:

ATTIC/ALCOVE CLEARANCES				
TOP	SIDES	BACK	FRONT	PVC VENT
2"	0"	*	1" ††	0"

* 0" with controls on front of furnace.
1" from the back of the elbow with air inlet on back of furnace.
1" from the end of the induce motor with the controls located at the back of the unit.
†† from the end of the inducer motor.

WARNING

Failure to comply with all of the above clearances will create a fire hazard.

The furnace should not be connected to an operational chimney. The furnace should also be located as near to the center of the air distribution system as possible, and should be installed level.

Since this furnace is suitable for attic installation, it may be installed on combustible wood flooring; however, it must not be installed directly on carpeting, tile or other combustible material other than wood flooring.

A clearance of at least 30" should be provided at the front of the unit for servicing.

For attic installations, the passageway and servicing area adjacent to the furnace should be floored.

If the furnace is to be installed in a crawl space, consult local codes (Use of concrete pad 1" to 2" thick is recommended).

If the furnace is to be suspended from the ceiling, it will be necessary to use steel pipe straps around each end of the furnace. These straps should be attached to the furnace with sheet metal screws and to the rafters with bolts. The furnace could also be suspended by an angle iron frame bolted to the rafters (See chart below for size and weight of furnace). Care must be taken to allow for blower door access.

A gas fired furnace for installation in a residential garage must be located or protected to avoid physical damage by vehicles.

WARNING

If this furnace is installed in a garage and/or any unconditioned spaced, a thermostatically controlled heat tape must be installed along the entire length of the condensate drain in the unconditioned space.

BTU INPUT	LENGTH	WIDTH	HEIGHT	NET WEIGHT
50,000	55	13 1/2	23 1/8	136
75,000	55	13 1/2	23 1/8	148
100,000	55	17	23 1/8	167
125,000	55	20 1/2	23 1/8	185

WARNING

Do not place combustible material on the furnace jacket. Failure to comply with this warning will create a fire hazard.

WARNING

This furnace is not watertight and is not designed for outdoor installation. This furnace shall be installed in such a manner as to protect the electrical commponents from water. Outdoor installation would lead to a hazardous electrical condition and to premature furnace

Air for Ventilation:

Adequate facilities for providing air for combustion and ventilation must be provided in accordance with the latest edition of section 5.3, Air for Combustion and Ventilation of the National Fuel Gas Code ANSI Z223.1 or applicable provisions of the local building codes.

The furnace shall be installed in a location in which the facilities for ventilation permit satisfactory combustion of gas, proper venting and maintenance of ambient temperature at safe limits under normal conditions of use. The furnace shall be located so as not to interfere with proper circulation of air.

In addition to air needed for combustion, process air must be provided as required for: cooling of equipment or material, controlling dew point, heating, drying, oxidation or dilution, safety exhaust and odor control. Air must be supplied for ventilation, including all air required for comfort and proper working conditions for personnel.

For purposes of this instruction the following definitions apply:

Confined space: A space whose volume is less than 50 cubic feet per 1000 Btu per hour of the aggregate input rating of all appliances installed in that space.

Unconfined space: A space whose volume is not less than 50 cubic feet per 1000 Btu per hour of the aggregate input rating of all appliances installed in that space. Rooms communicating directly with the space in which the appliances are installed, through openings not furnished with doors, are considered a part of the unconfined space.

If ventilation air must be supplied to an unconfined space from outside, an opening with a free area of not less than one square inch per 1000 BTU per hour of total input of all appliances within the unconfined space (but not less than 100 square inches) must be provided. This opening must be located such that it can not be blocked at any time.

If the furnace is located in a confined space, two permanent openings must be provided and each opening must have a free area of not less than one square inch per 1000 BTU per hour of total input of all appliances within the confined space (but not less than 100 square inches each).

These openings should be located such that one is near the top and the other is near the bottom of the confined space. If these openings are to interior areas, these areas must have adequate infiltration from the outside.

CAUTION

Whenever this furnace is installed in an area along with one or more gas appliances, the total BTU input of all appliances must be included when determining the free area requirements for combustion and ventilation air openings.

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When ducts are used to supply air, they must be of the same cross sectional area as the free area of the openings to which they connect. The minimum dimension of rectangular air ducts must not be less than 3 inches.

For additional information refer to the latest edition of the National Fuel Gas Code.

WARNING

Do not block the combustion air openings in the furnace. Any blockage will result in improper combustion and may result in a fire hazard or unsafe condition.

CAUTION

For an attic installation it is important to keep insulation 12" or more away from any furnace openings. Some types of insulating materials may be combustible.

Checking For Vent Oversizing

If this furnace is replacing a furnace that is attached to a venting system serving other appliances, the venting system is likely to be too large to properly vent the remaining attached appliances.

Each appliance remaining connected to the common venting system should be individually checked for proper operation while the other appliances remaining connected to the common venting system are not in operation. The following steps must be followed:

(a) Seal any unused opening in the common venting system.

(b) Visually inspect the venting system for the proper size and horizontal pitch and determine there is no blockage or restriction, leakage, corrosion and other deficiencies which could cause an unsafe condition.

(c) Insofar as is practical, close all building doors and windows and all doors between the space in which the appliances remaining connected to the common venting system are located and other spaces of the building. Turn on clothes dryers and any appliance not connected to the to the common venting system. Turn on any exhaust fans such as range hoods and bathroom exhausts, so they will operate at maximum speed. Do not operate a summer exhaust fan. Close fireplace dampers.

(d) Follow the lighting instructions. Place the appliance being inspected in operation. Adjust thermostat so appliance will operate continuously.

(e) If applicable, test for spillage at the drafthood relief opening after 5 minutes of main burner operation. Use the flame of a match or candle.

(f) After it has been determined that each appliance remaining connected to the common venting system properly vents when tested as outlined above, return doors, windows, exhaust fans, fireplace dampers and any other gas burning appliance to their previous conditions of use.

(g) If improper venting is observed during any of the above tests, the common venting system must be corrected. The vent system or vent connectors may need to be resized.

(h) When resizing any part of the common vent system or vent connectors, the common vent system or connector must be sized to approach the minimum size as determined using the appropriate table found in Appendix G of the National Fuel Gas Code for the United States.

Blocked Vent & Blocked Drain Pressure Switches

This furnace is equipped with two pressure switches that perform several safety functions. The pressure switches are located on the control side of the unit (see figure 1). The switch labeled P1 will turn the unit off in the event of a blocked inlet or blocked outlet condition. The switch labeled P2 will turn off the unit in the event of a blocked drain condition. In addition, the P2 switch insures that the unit has combustion air flowing through the unit prior to initiating the ignition sequence.

WARNING

If a vent or drain blockage has occurred, do not attempt to operate the unit until the blockage has been corrected. Failure to clear the vent and/or drainage system could lead to nuisance furnace shutdown and/or a hazardous condition which may lead to bodily harm.

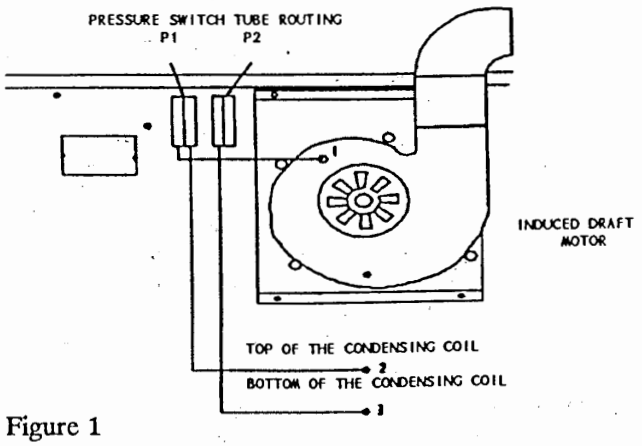


Figure 1

INSTALLATION

In all instances, the vent outlet shall be installed so as to be in the same atmospheric pressure zone as the combustion air intake.

When installed, the furnace must be electrically grounded in accordance with local codes or, in the absence of local codes, with the National Electrical Codes, ANSI/NFPA 70-1990.

To properly install the field wiring of this unit refer to Figure 16. If field reversing of the controls is required refer to the field reversal procedure. In all instances, the wiring to be done, and any replacement of wire shall conform with the temperature limitation for Type T Wire [63° F Rise (35° C)].

Ductwork Recommendation:

The proper sizing of warm air ducts is necessary to insure satisfactory heating operation. Ductwork should be in accordance with the latest editions of NFPA-90A (Air Conditioning Systems) and NFPA-90B (Warm Air Heating and Air Conditioning Systems).

The following recommendations should be followed when installing the ductwork:

1). Install locking-type dampers in all branches of the individual ducts to balance out the system. Dampers should be adjusted to impose the proper static at the outlet of the furnace.

2). Noncombustible flexible duct connectors are recommended to connect both the supply and return ducts to the furnace.

3). In cases where the return air grille is located close to the fan inlet, there should be at least one 90 degree air turn between fan and inlet grille. Further reduction in sound can be accomplished by installing acoustical air turning vanes and/or lining the inside of the duct with acoustical material.

CAUTION

Air openings intake and outlet pipes, return air grilles and warm air registers must not be obstructed.

WARNING

When supply ducts carry air circulated by the furnace to areas outside the spaces containing the furnace, the return air shall also be handled by a duct sealed to the furnace casing and terminating outside the space containing the furnace. Incorrect ductwork termination and sealing will create a hazardous condition which could lead to bodily harm.

When installing the furnace with cooling equipment for year round operation, the following recommendations must be followed for series or parallel air flow:

1). In series flow applications, the coil is mounted after the furnace in an enclosure in the supply air stream. The furnace blower is used for both heating and cooling airflow.

WARNING

The coil MUST be installed on the air discharge side of the furnace. Under no circumstances should the air flow be such that cooled, conditioned air can pass over the furnace heat exchanger. This will cause condensation in the heat exchanger and possible failure of the heat exchanger which could lead to a fire hazard and/or a hazardous condition which may lead to bodily harm. Heat Exchanger failure due to improper installation may not be covered by warranty.

2). In parallel flow installation, dampers must be provided to direct air over the furnace heat exchanger when heat is desired and over the cooling coil when cooling is desired.

IMPORTANT: The dampers should be adequate to prevent cooled air from entering the furnace, and if manually operated, must be equipped with means to prevent operation of either the cooling unit or furnace unless the damper is in the full cool or full heat position.

Gas Piping:

Gas piping shall be of such size and so installed as to provide a supply of gas sufficient to meet maximum demands without undue loss of pressure between the gas meter and the furnace. It is recommended that the gas line to the furnace shall be a separate line direct from the meter, unless the existing gas line is of ample capacity. Refer to Figure 2 for sizing gas piping.

CAPACITY IN CU. FT. OF GAS PER HOUR					
Length of	Nominal iron pipe size, in.				
pipe in ft.	1/2	3/4	1	1 1/4	1 1/2
10	132	278	520	1050	1600
20	92	190	350	730	1100
30	73	152	285	590	890
40	63	130	245	500	760
50	56	115	215	440	670
75	53	93	175	360	545
100	38	79	150	305	460
150	--	64	120	250	380

Based on gas pressures of 0.5 PSIG or less and pressure drop of 0.3"w.c. and 0.60 specific gravity gas.

GAS PIPE CAPACITY TABLE
FIGURE 2

Use a joint compound (pipe dope) that is resistant to the action of liquefied petroleum gases or any other chemical constituents of the gases to be conducted through the piping.

NOTE: In order to make proper input adjustments, minimum and maximum gas supply pressure limits shown on the rating plate must not be exceeded.

Before any system of gas piping is finally put into service, it should be carefully tested to determine if it is gas tight. The piping must stand a pressure of six inches of mercury for a period of ten minutes or as required by local authority.

WARNING

The furnace and its individual shutoff valve must be disconnected from the supply piping system during any pressure testing of that system at test pressures in excess of 1/2 PSIG (3.5 kPa or 14" wc).

The furnace 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 pressures equal to or less than 1/2 PSIG (3.5 kPa or 14" wc). Failure to follow the above procedures could lead to a hazardous condition and bodily harm.

The recommended method for installing the gas piping to the furnace is shown in Figure 3. Figure 4 shows the correct piping for the furnace if the gas valve and controls have been reversed. (See FIELD REVERSING). Support all gas piping independent of the unit.

This furnace is manufactured for use with Natural Gas and must be converted using the proper LP conversion kit to be used with LP gas.

For LP (propane) gas, a tank regulator is required to reduce supply pressure to 12"-13" W.C. For manifold pressure, see Figure 12.

Check all piping for leaks using soapy water and a brush.

WARNING

Never use an open flame when testing for gas leaks! Use of an open flame could lead to a fire or explosion.

The main manual shut off valve must be used in the gas piping for a safe piping system. It must be located as required by local codes, but should always be in an accessible but protected location.

A 1/8 inch NPT plugged tap, accessible for test gauge connection, must be installed immediately upstream of the gas supply connection to the furnace if one is not supplied on the gas valve.

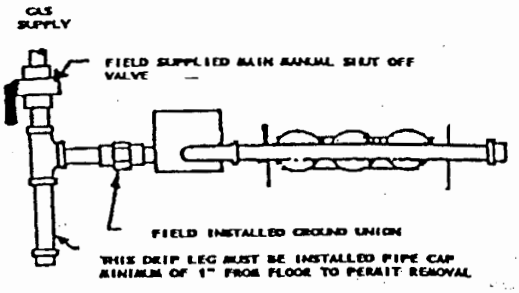


Figure 3

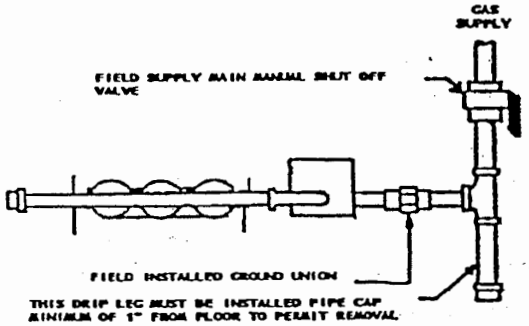


Figure 4

Electrical:

The control system depends on the correct polarity of the power supply. Connect "hot" wire (H) and "ground" wire "G" as shown in Figure 18.

Input	Max. Over Current Protection	Ampacity	Min. Wire Size (AWG)
50	15	10.5	14
75	15	10.5	14
100	20	15	12
125	20	15	12

WARNING

The unit cabinet must have an uninterrupted or unbroken electrical ground to minimize personal injury if an electrical fault should occur.

Use copper wire only for 115V supply service to unit.

When replacing any original wiring, use only 105 degree C, 16 GA. AWG. copper wire.

Instructions for wiring the thermostat are packed in the thermostat (field supplied) box. Make the thermostat connections as shown in Figure 18 at the 24 volt terminal board located in the electrical junction box.

When installing optional accessories to this appliance, follow the manufacturer's installation instructions included with the accessory. Other than wiring for the thermostat, a minimum of type T (63° F rise) must be used.

Venting Instruction:

Venting for this category IV furnace must be with schedule 40 PVC pipe including all elbows and vent terminals. All pipe and fittings must be schedule 40 PVC and conform to the American Society for Testing and Material (ASTM), and American National Standards Institute (ANSI) Standards. PVC primer and solvent cement used to secure all joints must conform to ASTM D2564. THIS FURNACE HAS BEEN APPROVED FOR DIRECT VENT INSTALLATION ONLY. Common venting with other condensing appliances or non-condensing appliances is not allowed.

If this unit is replacing a non-condensing or condensing furnace that is common vented with another appliance; the remaining vent may be oversized. The remaining appliances on a common vent system should be resized according to the latest edition of the National Fuel Gas Code, ANSI Z223.1.

Combustion air must be taken from outside the structure to prevent contamination with compounds containing chlorine and fluoride. Common household items such as bleach, paint remover and some aerosol products contain these contaminants.

WARNING

Contaminated combustion air may cause premature failure of the heat exchanger which may lead to a hazardous condition and/or bodily harm.

CAUTION

Terminate the combustion air intake as far as possible from the air conditioning unit or heat pump, swimming pools, swimming pool pumping units and dryer vents.

All combustion air and exhaust piping must be installed in accordance with local codes and these instructions.

For additional venting information refer to ANSI/NFPA 211 Chimney, Fireplaces, Vents and Solid Fuel Burning Appliances.

Refer to figure 6 for the proper pipe diameters and the minimum and maximum allowable vent lengths.

MODEL	PIPE DIAM.	MIN. VENT	MAX. VENT
50	2"	5 FT.	* 50 FT.
75	2"	5 FT.	* 50 FT.
100	3"	5 FT.	* 50 FT.
125	3"	5 FT.	* 50 FT.

* - Up to (5) 90 degree elbows maybe used.
2-45 degree elbows=1-90 degree elbow

Figure 6

The following requirements are provided for a safe venting system:

1). All pipe should be supported using the proper clamps and/or straps. These supports should be at lea every four feet.

2). ALL HORIZONTAL VENT RUNS MUST BE SLOPING UPWARDS TO OBTAIN 1/4" RISE PER FOOT OF PIPE FROM THE FURNACE TO THE VENT TERMINAL. THIS INSURES PROPER DRAINAGE OF THE CONDENSATE BACK TO THE CONDENSATE DRAIN. FAILURE TO MAINTAIN THIS RISE WILL CAUSE CONDENSATE TO ACCUMULATE IN THE PIPE.

3). All units must have a 90° attached to the air inlet plate with elbow pointing upwardf as shown in Figure 7. Do not seal the top joint of the elbow. This joint must be left unglued to facilitate the removal of the burners during any required maintenance.

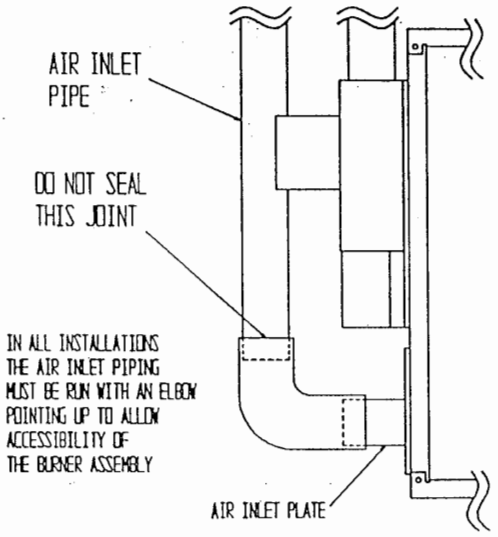


FIGURE 7

4). All units regardless of vent configuration must use the secondary exhaust pipe drain (supplied) as shown in Figures 8 and 9. This insures proper drainage of the condensate that collects in the exhaust pipe.

5). Joints should be sealed with PVC cement and checked for leaks.

6). Check all local codes for any variance.

The vent system can be installed in an existing chimney provided that:

A). NO OTHER GAS FIRED OR WOOD BURNING APPLIANCE IS VENTED INTO THE CHIMNEY.
B). The termination clearances shown in Figure 8 are maintained.
C). Both the air intake and exhaust vent run the length o' the chimney.
D). The top of the chimney is sealed and weather proofed.

Vertical Vent-Termination

The vertical vent termination should be sealed with a plumbing roof boot or equivalent flashing.

The inlet of the intake pipe and the end of the exhaust vent must terminate no less than 12" above the roof or snow accumulation level, and 12" away from a vertical wall or other protrusion (See Figure 8). In all venting configurations use the recommended vent termination kit (supplied).

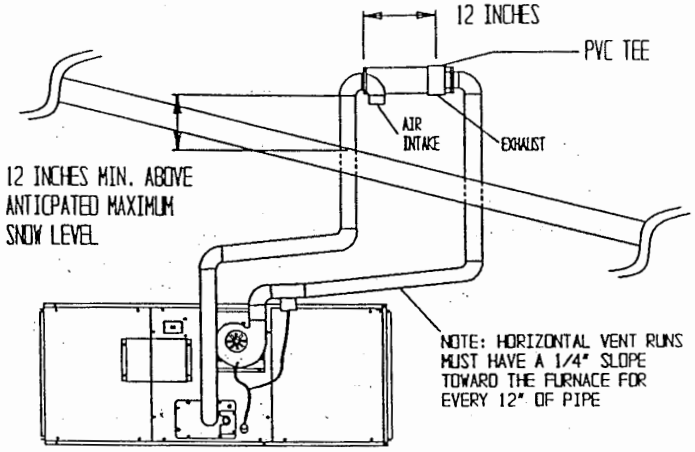


FIGURE 8

NOTE: If 3" vent pipe is required, the 2" to 3" adapter (supplied) must be used. Install the adaptor as close as possible to the outlet of the induced draft motor.

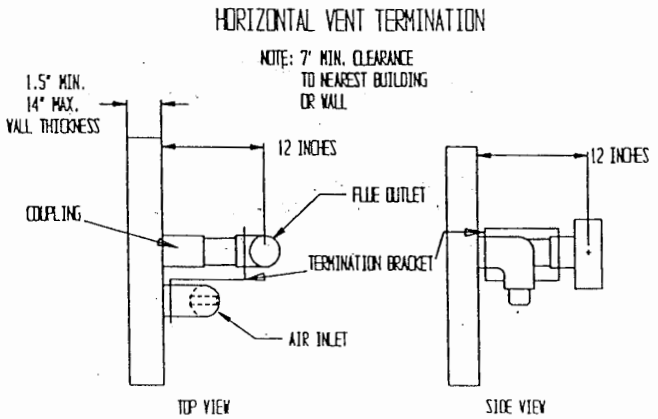
Horizontal (Side Wall) Vent Termination

To prevent blockage of the combustion air and exhaust vent by snow, vent termination must be made 12" above the anticipated annual snow accumulation level.

WARNING

Failure to terminate vent runs above the annual snow accumulation level may result in nuisance furnace shutdown and/or a hazardous condition which may lead to bodily harm.

A minimum of 4 feet clearance must be provided from electric meters, gas meters, regulators and relief equipment.



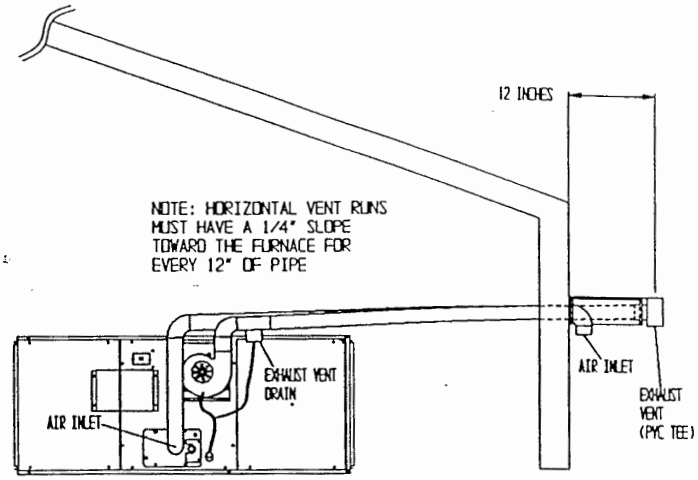


FIGURE 9

Condensate Disposal Drain

This furnace must use the condensate trap supplied with the unit (See Figure 10 for proper drain installation). The drain must terminate at a floor drain, sewer system, or drain vent for proper condensate removal. Drain installation must conform with local building codes.

NOTE: The condensate trap (supplied) must be connected to the PVC tee provided on the unit. Failure to place the trap at this location may cause erratic unit operation and nuisance furnace shutdown.

In addition the trap should be filled with water on the initial start up of the unit. Installation location may require that the trap be filled at the beginning of each heating season.

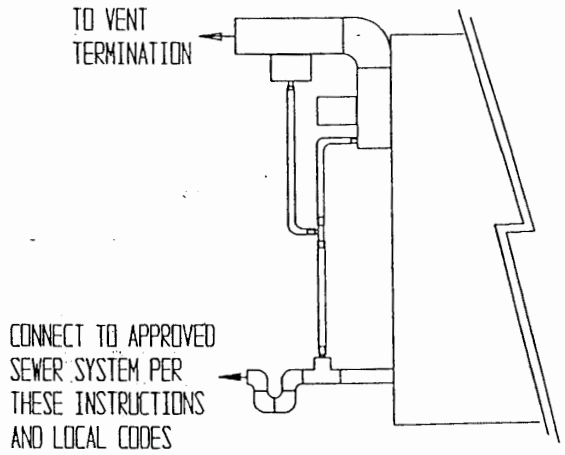


FIGURE 10

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In addition, if this unit is placed in an unconditioned space such as an attic or crawlspace where the temperature is at or close to the outdoor ambient temperature, A THERMOSTATICALLY CONTROLLED HEAT TAPE MUST BE INSTALLED ALONG THE ENTIRE LENGTH OF CONDENSATE DRAIN IN THE UNCONDITIONED SPACE.

WARNING

Failure to install a heat tape on condensate drain lines in unconditioned spaces could lead to nuisance furnace shut down, water damage, and/or a hazardous condition which may lead to bodily harm.

Here's How Your Heating System Works

The furnace operates automatically. It is controlled by a thermostat which you set at the temperature most comfortable to you. When the inside temperature drops below this setting, your thermostat will turn on the heating system.

When the thermostat calls for heat, power from the transformer energizes the fan control board. The fan control energizes the induced draft blower motor. The P1 and P2 pressure switches (N.O.) will close and initiate the ignition sequence. The ignition control will energize the pilot gas valve. The ignition control will light the pilot automatically, If the pilot flame is sensed, the main valve will open and the pilot flame will light the burners. If the pilot flame is not sensed, the control module will lock out after 90 seconds. The ignition control may be reset by turning the thermostat to the OFF position for 1 minute and resetting the thermostat to call for heat.

The electronic fan control will automatically turn on the blower after 30 seconds. Fan on control is not adjustable. The air moved over the heating element by the blower is warmed and passes through the ducts to the room registers.

When the thermostat is satisfied, the circuit is de-energized and the main gas valve stops gas flow to the burners. The blower continues to run until the selectable fan off time period has expired. See Figure 13 for selecting the desired fan off timing.

The heat sensing switch performs as the furnace high temperature limit switch. If the furnace overheats for any reason, the limit switch opens, breaking the circuit to the main gas valve. If the limit is activated, check for a restriction in the duct system (i.e. dirty filers, blocked duct work, closed registers, ect.). The blower motor will be energized and as the unit cools the limit switch will close. This will relight the main burners and unless the overheating condition is corrected, the furnace will cycle on limit. If the furnace is cycling on the high temperature corrective action must betaken. Failure to correct this condition could possibly damage the heat exchangers and may not be covered by the warranty.

WARNING

Should overheating occur, or the gas supply fail to shut off, shut off the manual gas valve to the appliance before shutting off the electrical supply. Failure to follow this warning will lead to a hazardous condition and bodily harm.

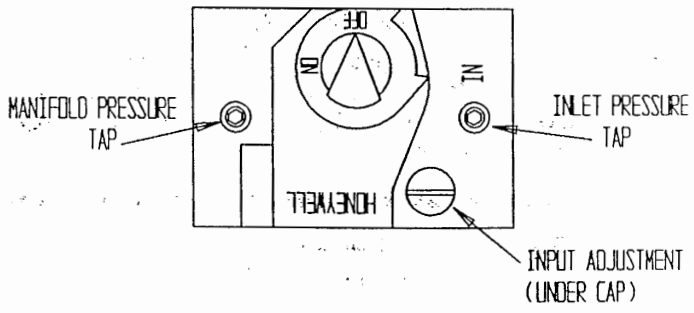
Startup and Operational Checkout

IMPORTANT

THIS FURNACE IS EQUIPPED WITH A METAL BLOWER WHEEL SHIPPING BRACKET WHICH MUST BE REMOVED BEFORE PUTTING THIS FURNACE INTO OPERATION. TO REMOVE THIS BRACKET - 1. REMOVE THE BLOWER ACCESS PANEL. 2. REMOVE THE TWO MOUNTING SCREWS. 3. SLIDE BRACKET OFF BLOWER WHEEL HUB.

WARNING

Do not use this furnace as a construction heater. Use of this furnace as a construction heater exposes the furnace to abnormal conditions, contaminated combustion air and the lack of air filters. Failure to follow this warning can lead to premature furnace failure and/or vent failure which could result in a fire hazard and/or bodily harm.



The automatic gas valve controls the flow of gas to both the pilot and main burners. The manual valve built into the automatic valve body has 2 positions: OFF and ON.

To shut off gas manually: Turn knob from "ON" to "OFF" position. When in "OFF" position, the main burners and the pilot flame are extinguished.

This furnace is equipped with an automatic intermittent electronic ignition control and does not require the lighting of a pilot for furnace operation.

CAUTION

Before proceeding with field reversal, be sure that a correct wiring diagram is available and/or be prepared to mark all wires as they are disconnected.

The gas valve, pilot burner, controls and the induced draft motor may be reversed as follows:

1). Remove the manifold cover plate and the air inlet plate/burner removal covers.

2). Disconnect all wires to the gas valve and the ignition wire.

3). Remove both manifold retention plates and remove the burner assembly.

4). Place manifold on a flat work area and disconnect the pilot tubing from the valve and the pilot. Be careful not to lose the pilot orifice.

5). Remove the ignition and pilot tubing from the grommet.

6). Using two pipe wrenches (one on the gas valve and one on the manifold extension pipe) remove the gas valve.

7). Remove the manifold extension pipe from the manifold (it may be necessary to put a pipe wrench on the manifold pipe while turning the extension).

8). Using two pipe wrenches (one on the manifold pipe between the pipe cap and burner orifices and one on the pipe cap) remove the pipe cap.

9). Clean the threads on the manifold pipes, gas valve and pipe cap of any old joint compound.

10). Reapply a joint compound to the threads of the manifold extension pipe and the manifold.

NOTE: Use a joint compound (pipe dope) that is resistant to the action of liquefied petroleum gases or to any other chemical constituents of the gases to be conducted through the piping.

11). Using two pipe wrenches install the manifold extension on the opposite side of the manifold. The pipe extension should be positioned so that it is pointing away from the burners.

12). Install the gas valve such that the manual knob is in the 12 o'clock position.

13). Using two pipe wrenches (one on the pipe cap and the other on the manifold pipe) tighten the pipe cap onto the other end of the manifold pipe.

14). Remove the screws holding the pilot bracket to the burner support between the first two burners.

15). Mount the pilot bracket between the crossovers of the first two burners on the side of the manifold where the valve is now mounted.

16). Rebend the pilot tubing to connect the tubing to the new location of the pilot and gas valve making sure that there are no kinks in the tubing.

17). Run the pilot tubing through the grommet and reattach the tubing to the pilot and the gas valve.

18). Inspect the pilot assembly to make sure that the pilot orifice is in place.

19). Run the ignition cable through the grommet and reattach the plug connector on the pilot assembly.

20). Check the pilot position per dimensions shown in Figure 11.

21). Remove the tubing attached to the P1 and P2 pressure switches. Be sure to label the tubing locations (Refer to Figure 1).

22). Remove the wires connected to the pressure switches and remove the pressure switches.

23). Remove the control box cover and disconnect the blower leads from the fan control board.

24). Remove the screws on the limit and remove the limit.

25). Disconnect the induced draft motor leads and remove the push in connector from the control box.

26). Remove the control box.

27). Remove the 4 screws on the induced draft motor plate.

28). Remove the four machine head screws that hold the flue return pipe to the front center panel.

29). Remove the center panel from the back side of the unit.

30). Loosen the hose clamp on the condensate drain and disconnect the drain from the condensate collection pan.

31). Remove the indoor motor wire strain relief and tubing from the front center panel.

32). Remove the front center panel.

33). Remove the PVC drain line and install on the rear center panel.

34). Remove the four nuts that hold the flue return pipe to the bottom plate of the condensing coil.

WARNING

THE FOLLOWING STEPS ARE CRITICAL TO INSURE THE PROPER FUNCTIONING OF THE FURNACE. A PRESSURE TEST PROCEDURE IS REQUIRED BEFORE THIS FURNACE MAY BE PLACED IN OPERATION. FAILURE TO FOLLOW THE PRESSURE TEST PROCEDURE OUTLINED IN THE SECTION TITLED "PRESSURE TEST PROCEDURE" MAY RESULT IN BODILY HARM.

35). The gasket/seals that were broken in steps 27, 28 and 34 must be resealed properly to insure safe unit operation.

WARNING

IF ANY GASKET/SEAL INTEGRITY IS QUESTIONABLE DUE TO SEPARATION OF THE GASKET MATERIAL, MALFORMED APPEARANCE, OR ANY NOTICEABLE DEFORMITY; YOU MUST REPLACE THE GASKET MATERIAL. FAILURE TO REPLACE THE GASKET MATERIAL MAY RESULT IN NUISANCE TRIPPING OF SAFETY DEVICES, FAILURE OF THE UNIT TO OPERATE AND/OR A CONDITION WHICH MAY LEAD TO BODILY HARM.

36). Inspect the gasket material on the flue return pipe and/or the gasket material on the bottom of the coil flue return opening (refer to step 35). Install the flue return pipe so that the outlet of the pipe is facing the back of the unit. Replace the four nuts that secure the flue return pipe to the bottom of the coil.

37). Route the motor leads behind the flue return pipe to the same opening on the back center panel.

38). Route the tubing through the similar holes located on the rear center panel. Label the tubing as follows "Top Of The Coil" and "Bottom Of The Coil".

39). Replace the rear center panel and connect the condensate drain.

40). Replace the front center panel and seal the holes with sheetmetal patch plates.

41). Replace the four screws that hold the flue return to the center panel.

42). Remove the blower door with the lighting instructions on it and place it on the side of the furnace that the control box will be mounted.

43). Install the control box, limit, and pressure switches.

44). Inspect the gasket material on the induced dr motor plate. Replace if necessary (refer to step 35).

45). Install the induced draft motor plate.

46). Install the mainfold retention plate on the front side of the unit.

47). Install the burner assembly making sure that manifold bracket slides under the front manifold retention plate.

48). Install the rear manifold retention plate. The burner assembly should be firmly attached to the unit.

49). Replace pressure switch tubing. (Refer to Figure 1.)

50). Rewire the unit using the schematic in this manual or on the control box cover.

WARNING

FIELD REVERSAL IS NOT COMPLETE WITHOUT THE LIGHTING INSTRUCTIONS, CONTROLS AND GAS VALVE BEING ON THE SAME SIDE OF THE UNIT.

51). Upon completing the installation you must pressure test the furnace since critical gasket/seals have been broken.

Pressure Test Procedure:

WARNING

Do not place unit into operation without checking the system pressures of this unit as outlined in this procedure. Failure to follow the pressure test procedure may result in a non-operational unit, nuisance tripping and/or a condition which may lead to bodily harm.

1). Check the wiring to insure that the unit is properly wired.

2). Place a jumper across the pressure switches in such a manner as to by-pass both the safety controls.

3). Turn the gas valve off.

4). Set the thermostat above room temperature and turn the power on to the unit.

5). Check the pressures at: the induced draft motor tap (located at the top and to the left of the motor casing), the tube previously labeled "Top Of The Coil" and the tube previously labeled"Bottom Of The Coil".

WARNING

EXCESSIVE VARIATION OF THE PRESSURES LISTED IN THE FOLLOWING TABLE INDICATE A SYSTEM LEAK AND/OR BLOCKAGE. THIS IS ESPECIALLY TRUE OF THE INDUCED DRAFT MOTOR PRESSURE. AN INDUCED DRAFT MOTOR PRESSURE IN THE RANGE OF 1.5"-1.6" OF WC OF VACUUM PRESSURE INDICATES A LEAK IN THE SYSTEM AND/OR EXCESSIVE VENT LENGTH. CORRECTIVE ACTION MUST BE TAKEN BEFORE THE UNIT IS PLACED INTO OPERATION. FAILURE TO TAKE CORRECTIVE ACTION MAY RESULT IN THE FAILURE OF THE UNIT TO OPERATE, CONDENSATE LEAKAGE, NUISANCE TRIPPING AND/OR PREMATURE UNIT FAILURE, WHICH MAY LEAD TO A CONDITION THAT MAY CAUSE BODILY HARM.

6). Use the following table to verify a properly sealed unit.

NOTE: The pressures listed are for an ambient temperature of approximately 76° F. These pressures may vary slightly due to temperature, vent configuration and vent length. The table is a general guideline of system pressures and may vary slightly from unit to unit.

	Induced Draft Motor Pressure	Top Of The Coil Pressure	Bottom Of The Coil Pressure
50 Min.Vent	2.5	.32	.94
Max.Vent			
75 Min.Vent	2.5	.37	1.45
Max.Vent	2.0	.58	1.5
100 Min.Vent	2.4	.23	1.5
Max.Vent	2.2	.29	1.5
125 Min.Vent	2.5	.28	1.6
Max.Vent	2.3	.38	1.7

7). Reconnect the pressure switch tubing as shown in Figure 1.

8). Turn off the power to the unit.

9). Remove the jumper wire on the pressure switches.

10). Turn on the power to the unit.

11). Reset the thermostat and turn on gas valve. The unit should light.

FURNACE BLOWER SPECIFICATIONS AND AIR FLOW DATA

INPUT	HP	RPM	WHEEL	SPEED	CFM - EXTERNAL STATIC PRESSURE (IN. OF W.C.)									
					.1	.2	.3	.4	.5	.6	.7	.8	.9	1.0
50	1/3	1075	12 X 8	HIGH	1450	1410	1355	1300	1235	1175	1100	1040	960	875
75	1/3	1075	12 X 8	HIGH	1485	1445	1395	1345	1300	1245	1190	1130	1065	990
100	3/4	1075	12 X 9	HIGH	1805	1755	1695	1640	1600	1495	1420	1335	1245	1140
125	3/4	1075	12 X 12	HIGH	2240	2170	2100	2040	1975	1875	1795	1710	1600	1475

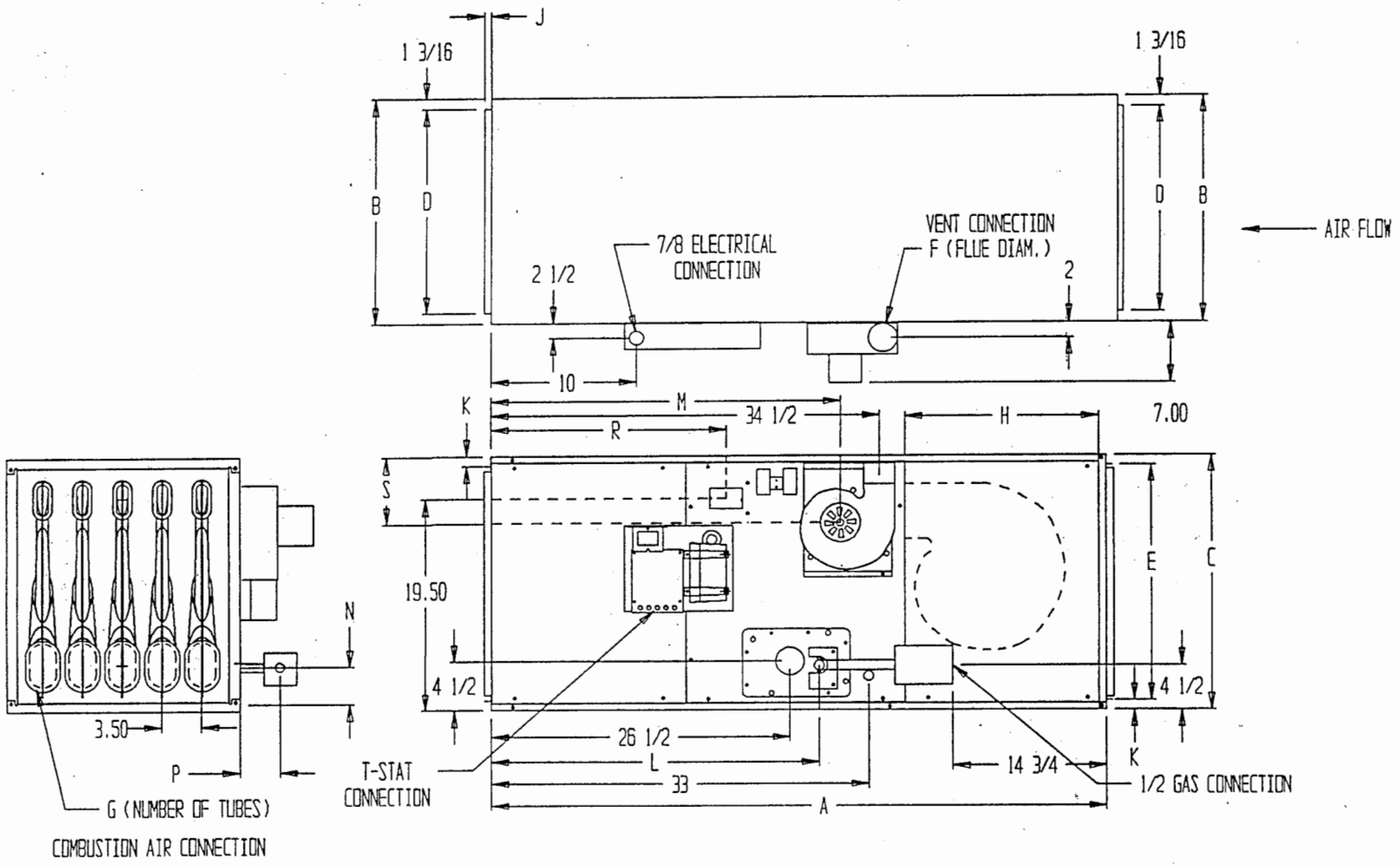
DATA WITHOUT FILTERS IN PLACE

WARNING

When operating the furnace in the heating mode, the static pressure and the temperature rise (supply air temperature minus return air temperature) must be within whose limits specified on the AGA rating label. Failure to follow this warning could lead to severe furnace damage.

WARNING

Turn off all gas and electrical power to furnace before performing any maintenance or service on unit. (Unless specific test requires gas and electrical supplies). Failure to take this precaution may result in personal injury due to electrical shock or uncontrolled gas leakage.



INPUT B.T.U./HR	UNIT DIMENSIONS			DUCT SUPPLY AND RETURN OPENINGS		FLUE DIA.										
	LENGTH	WIDTH	HEIGHT													
	A	B	C	D	E	F	G	H	J	K	L	M	N	P	R	S
50,000	55	13 1/2	23 1/8	11 1/8	21 3/8	2	2	18	5/8	7/8	28 7/8	31	4 1/4	2 3/4	19 1/4	6
75,000	55	13 1/2	23 1/8	11 1/8	21 3/8	2	3	18	5/8	7/8	28 7/8	31	4 1/4	2 3/4	19 1/4	6
100,000	55	17	23 1/8	14 5/8	21 3/8	3	4	18	5/8	7/8	28 7/8	31	4 1/4	2 3/4	19 1/4	6
125,000	55	20 1/2	23 1/8	18 1/8	21 3/8	3	5	18	5/8	7/8	28 7/8	31	4 1/4	2 3/4	19 1/4	6

GENERAL LAYOUT FIG. 15

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TROUBLE SHOOTING GUIDE FOR GAS-FIRED FURNACES WITH ELECTRONIC IGNITION

TROUBLE ANALYSIS CHART		
SYMPTOM	PROBABLE CAUSE	REMEDY
Pilot will not light.	No spark at electrode.	Check spark gap - refer to installation instructions. Check for moisture or dirt accumulation on electrode ceramic - clean ceramic with cloth. Cracked ceramic-replace pilot electrode assembly. Check for loose or broken wiring at and between electronic control module and electrode. Replace wire as necessary. Check fuse or circuit breaker for 115-volt supply to furnace. Check 24-volt input to electronic control box. If you read 24 volts and above steps have been completed, replace electronic control box assembly.
	Spark shorting out to main burner.	Realign electrode tip away from main burner but maintain spark gap to pilot burner as noted above.
	No gas at pilot burner.	Check to see if pilot valve is opening. Look for loose or broken wiring connections. If no deficiency is found, replace valve assembly.
Burners will not ignite.	No 115-volt power to furnace.	Connect to power supply. Check fuse, wiring, or circuit breaker.
	No 24-volt power to control circuit.	Check transformer-replace.
	Miswired or loose connections.	Check all wiring and wiring connections
	No gas at main burners.	Check to see if main valve is opening. Look for loose or broken wiring connections. If no deficiency is found, replace valve assembly.
	Blocked drain pressure switch activatedl	Remove drain restriction and install a thermostatically controlled heat tape around drainline in a unconditioned space if necessary.
	Blocked Vent shutoff switch activated.	Check venting system for blockage. Reset manual button.
	Flame probe or connecting lead is shorted or open.	Correct electrical shorting or open circuit.
	Dirty pilot - yellow flame.	Clean pilot orifice.
Inadequate heating.	Furnace undersized for application.	Replace with proper size furnace.
	Gas input to furnace too low.	Check gas pressure at manifold. Clock gas meter for input. If too low, increase manifold pressure, or replace with correct orifices.
	Limit switch cycles main burners	OFF setting of fan controls set too high-reset. Dirty air filters - clean and reinstall Blower speed too low - use faster speed tap. Registers closed, restricted ductwork - open or remove restriction. Check heat anticipator setting on thermostat - readjust.
Aldehyde odors, (CO), sooting flame, floating flame.	Incomplete combustion - poor flame characteristics.	Check all screws around flue outlets and burner compartment - tighten. LACK OF COMBUSTION AIR-see instructions. Cracked heat exchanger-replace. Overfired furnace - reduce input or change orifices. Check vent for restriction - clean as required.

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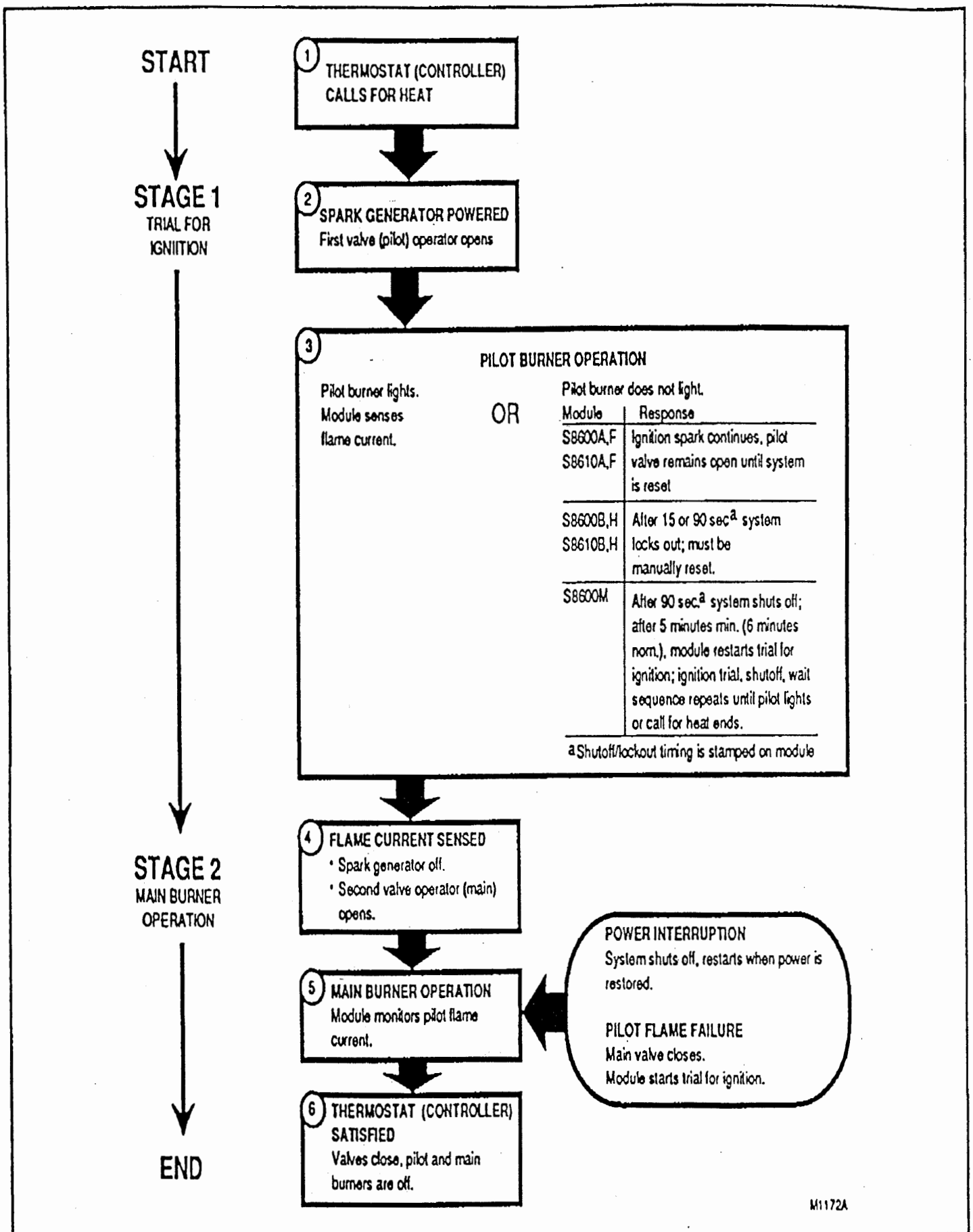

FIGURE 16 NORMAL OPERATING SEQUENCE

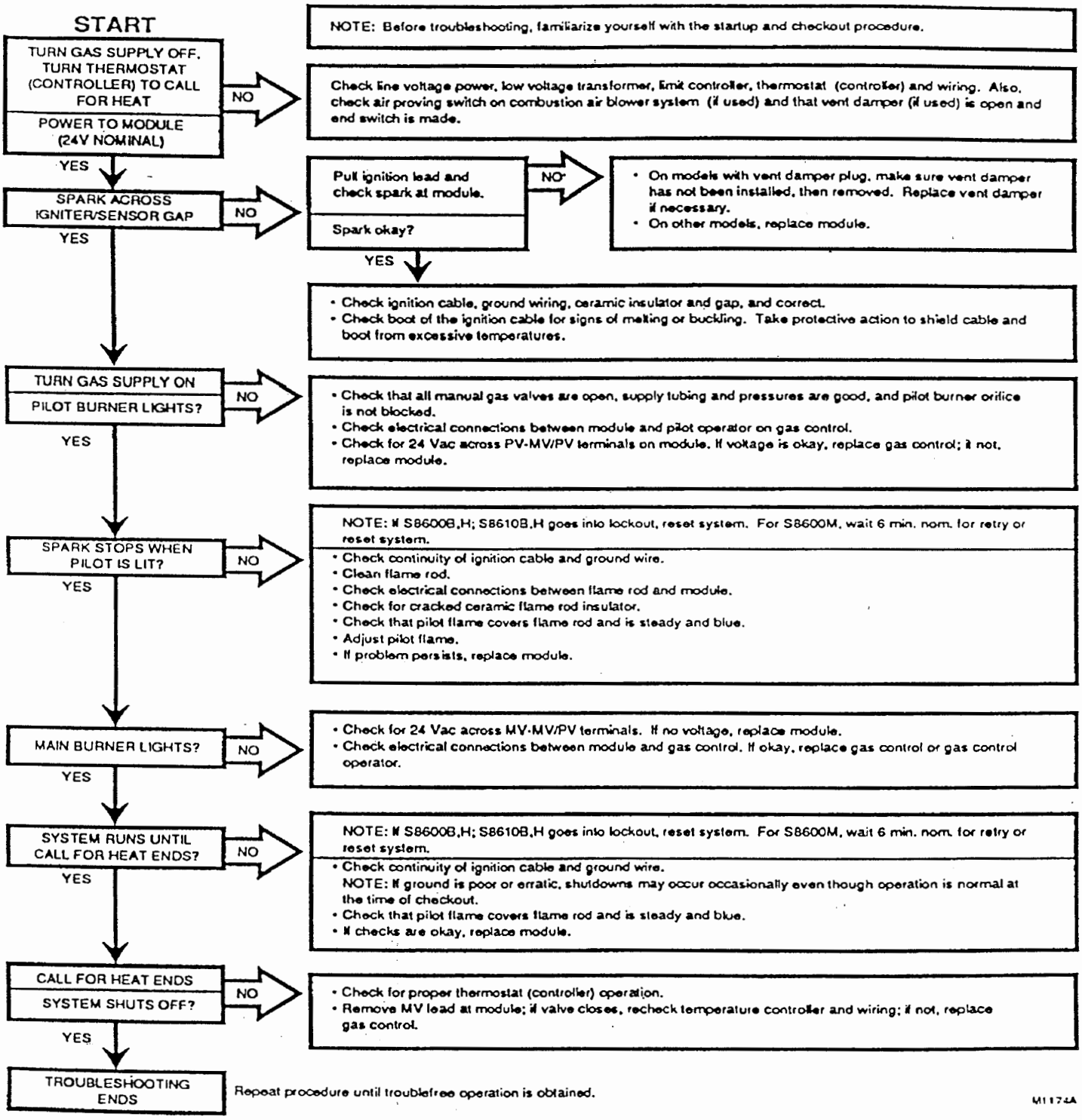

FIGURE 17 TROUBLESHOOTING GUIDE

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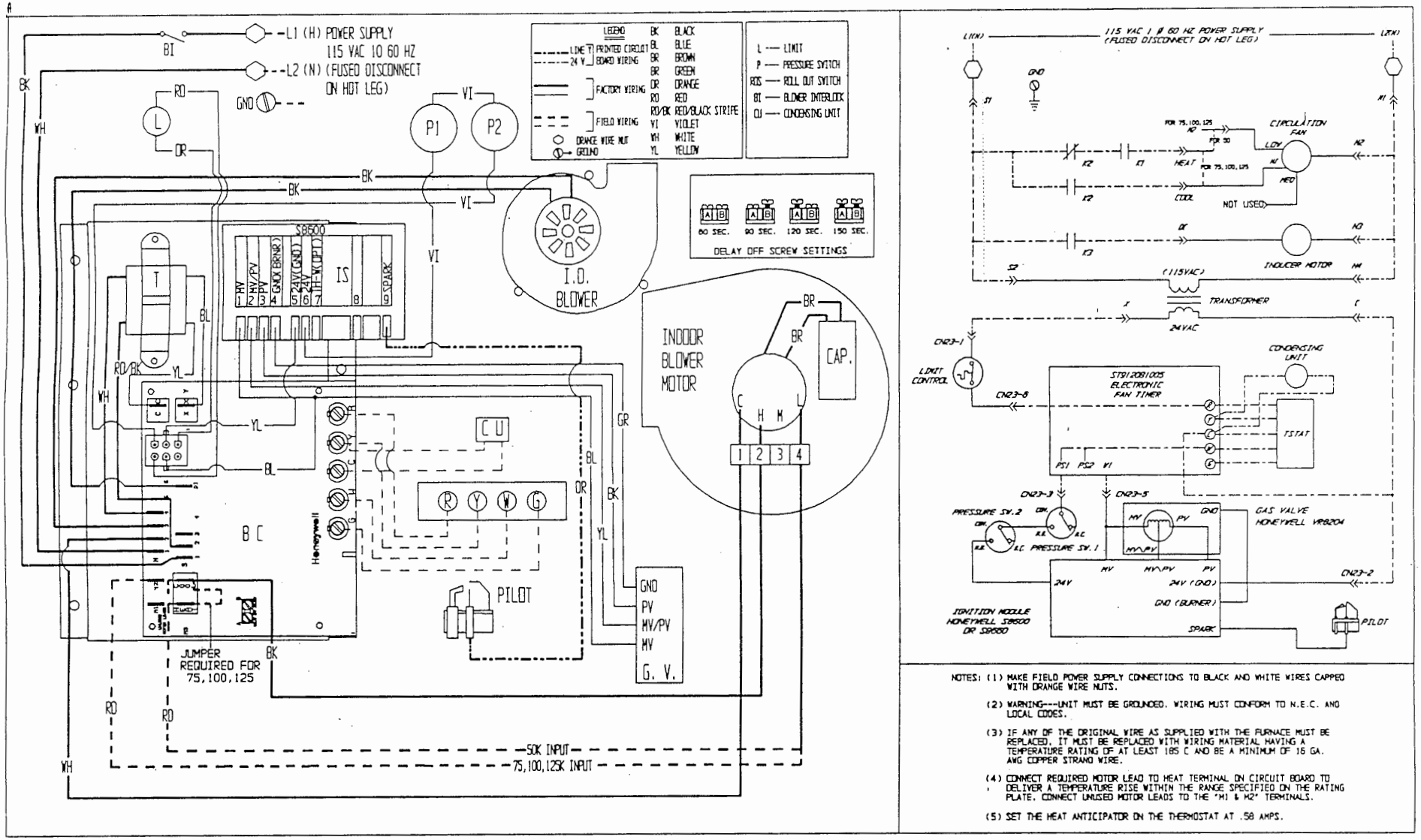

HEAT/COOL WIRING DIAGRAM WITH ST9120B ELECTRONIC FAN TIMER

FIGURE 18