

Counterflow Gas or Oil Heating Appliance

Owners Manual/Installation Instructions

**CMF80-PG Convertible (65, 75, and 90 KBTU/H Inputs),
CMF 100-PG (90 KBTU/H Input)
CMF80-PO Convertible (65, 75, and 90 KBTU/H Inputs),
CMF 100-PO (90 KBTU/H Input)**

Read all instructions carefully before beginning the installation. Read all labels and tags on the furnace carefully and follow all precautions outlined on those labels and tags.

FOR YOUR SAFETY

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

WARNING:

Improper installation, alteration, service or maintenance can cause injury or property damage. Refer to this manual for assistance or consult a qualified installer, service agency, or the gas supplier for additional information.

FOR YOUR SAFETY WHAT TO DO IF YOU SMELL GAS

- Do not try to light any appliance.
- Do not touch any electric switch; do not use any phone in your building.
- Immediately call your gas supplier from a neighbor's phone. Follow the gas supplier's instructions.
- If you cannot reach your gas supplier, call the fire department.

Rated BTUH	CMF-PG 80 CONV.	CMF-PO 80 CONV.	CMF-PG 100	CMF-PO 100
Input	75,000	75,000	90,000	90,000
Output	56,000	60,000	68,000	72,000

GENERAL

CMF furnaces are high quality, direct vent furnaces used for manufactured housing, rec-

reational vehicle, and residential[†] applications. These furnaces are offered in either power gas (designated by PG) or power oil (designated by PO) models. The power gas models are designed for operation with either natural or propane (LP) gas.

The CMF series is convertible from power oil to power gas, and vice versa. Furthermore, the firing rate of the CMF80 Convertible Series can be changed using a certified NORDYNE conversion kit field-installed by a qualified service technician. Refer to the "Firing Rate Conversion" section later in these instructions for more information on the firing rate change.

These furnaces are certified to the UL307 standards (UL 307A for oil models; UL 307B for gas models), and can be installed in a variety of applications, as shown in Table 1. This furnace is not to be used for temporary heating of buildings or structures under construction.

WARNING:

This furnace must be installed by a qualified installing agency and in accordance with applicable local codes and ordinances that govern this type of equipment. Failure to properly install the furnace, base assembly, and venting system as described herein may damage the equipment and/or the home, can create a fire or asphyxiation hazard, violates U.S. listing requirements, and will void the warranty. This furnace is NOT approved for installation with split system air conditioning. Use a NORDYNE packaged air conditioning system.

WARNING:

Do not use this appliance if any part has been submerged under water. Immediately call a qualified service technician to inspect the appliance and to replace any part of the control system and any gas control that has been submerged under water.

INSTALLATION REQUIREMENTS

Equipment Check

All units are securely packaged at the time of shipment and should be carefully inspected upon arrival for damage. Claims for damages (apparent or concealed), shortage in shipment, or nondelivery should be filed immediately against the carrier by the consignee. The carrier is responsible for making prompt inspection of damage and for a thorough investigation of each claim. The manufacturer will not accept claims for transportation damage.

Requirements and Codes:

Installer shall be familiar with and comply with all codes and regulations and applicable to the installation of these heating appliances and related equipment.

All manufactured housing installations must conform with these instructions, all applicable local codes, ANSI Z223.1/NFPA 54 (National Fuel Gas Code), ANSI/NFPA 31 (Installation of Oil Burning Equipment), ANSI/NFPA 70 (National Electrical Code), the Manufactured Home Construction and Safety Standard, Title 24 CFR, part 3280, or when this standard is not applicable, the standard for Manufactured Home

Installations (Manufactured Home Sites, Communities, and Set-ups), ANSI 225.1.

All residential installations (Refer to Table 1) must conform with these instructions, all applicable local building codes, ANSI Z223.1/NFPA 54 (National Fuel Gas Code), ANSI/NFPA 31 (Installation of Oil-Burning Equipment), ANSI/NFPA 70 (National Electrical Code), and NFPA 211 (Chimneys, Fireplaces, Vents, and Solid Fuel-Burning Appliances).

The National Fuel Gas Code is available by writing:

**American National Standards
Institute, Inc.**
1430 Broadway
New York, NY 10018

NFPA publications are available by writing:

National Fire Protection Association
Batterymarch Park
Quincy, ME 02269

Combustion Air and Ventilation Requirements

Provisions for adequate combustion air and ventilation air must be in accordance with the ANSI Z223.1/NFPA 54, (National Fuel Gas Code), ANSI/NFPA 31 (Installation of Oil Burning Equipment), and all applicable local codes.

Depending upon the type of installation (See Table 1), the CMF furnace can draw the combustion air either from outside the home (direct vent) or from the space being conditioned. A direct vent system is one in which the flue products are exhausted to and the combustion air is drawn from outside the house. A direct vent system can also be referred to as a sealed combustion system.

Type of Installation	Ducted Application	Direct Vent System Required	Furnace Base Used	Flue Products Exhausted By
Manufactured Housing or Recreational Vehicle	Yes	Yes	MA-100 or MA-200 Universal Base	NORDYNE SRJ Roofjack Only
Residential [†]	Yes	Yes	MA-100 or MA-200 Universal Base	NORDYNE SRJ Roofjack or an Existing Chimney*
Residential [†]	Yes	Yes	CB-200A Cottage Base	NORDYNE SRJ Roofjack or an Existing Chimney*
Residential [†]	No	No	CB-200A Cottage Base	NORDYNE SRJ Roofjack or an Existing Chimney*

[†]Residential is only defined as a single-story non-manufactured housing installation.

*Refer to the "Venting Requirements" section later in these instructions for more details on properly venting this appliance through an existing chimney.

Table 1

For direct vent applications either the combustion air duct provided with the MA Series base kit or the direct vent kit can be used. The direct vent kit must be ordered separately. Only for a special CB-200A cottage base installation can the CMF draw the combustion air from the conditioned space. The CB-200A cottage base kit must be ordered separately. Refer to the replacement parts listing provided with the furnace to order the direct vent kit or the cottage base kit. Follow the instructions provided with the kits for proper installation.

When unsure about combustion air supply availability, a direct vent system should be used. For small rooms, confined spaces, tight construction or similar situations in which the combustion air requirements of the furnace might not be met, a direct vent system must be used. The air openings in the door of the unit and the warm air registers from the ductwork or base must not be restricted.

Combustion air must not be drawn from a contaminated atmosphere. Excessive exposure to contaminated combustion air will result in safety and performance related problems. Some examples of chemical contaminants are chlorine, fluorine, and sulfur, which can be found in a wide variety of some common commercial and household products.

The installation of the furnace must allow for an adequate supply of combustion air. The combustion air opening of the furnace must be designed and located to prevent blockage by snow.

When drawing the combustion air from underneath the home, ensure that a vent or duct of at least 18 square inches of free area is provided from outside. Check to ensure that the combustion air opening is unobstructed. When using the combustion air duct, ensure that it extends through the floor. When using the direct vent kit, the combustion air opening must be located in the same pressure zone as the flue exit of the roof jack or chimney. Refer to the instructions provided with the direct vent kit for more information.

Venting Requirements — Manufactured Housing Installations

For all manufactured housing applications, the CMF furnace must be vented using the SRJ series roofjack. The instructions for selecting the proper roofjack for your installation are detailed later in these instructions.

Venting Requirements — Residential Installations

WARNING:

This furnace is not to be connected to a chimney flue serving a separate appliance designed to burn solid fuel.

For residential applications (Refer to Table 1), the CMF furnace may be vented through the SRJ series roofjack or through an existing chimney. If the SRJ roofjack is to be used, then the instructions for selecting the proper roofjack for your installation are detailed later in these instructions. If venting through an existing chimney, then the venting system used must be in accordance with these instructions, all applicable local building codes, ANSI Z223.1/NFPA 54 (National Fuel Gas Code), ANSI/NFPA31 (Installation of Oil-Burning Equipment), and NFPA 211 (Chimneys, Fireplaces, Vents, and Solid Fuel-Burning Appliances).

WARNING:

When venting through a chimney, check the chimney for soot, leaks, obstructions, and proper installation.

The materials used to construct the venting system must be capable of withstanding exposure to temperatures of at least 700 degrees F. The existing chimney servicing this furnace must be vertical. Horizontal distances to an existing chimney must be as short as possible, and the connecting pipe must slope upward to the chimney at not less than a 45 degree angle. The total length of the sloping pipe must not exceed 6 feet. The venting system must have no obstructions or sharp bends where soot and other foreign matter can accumulate.

If an inspection determines that the chimney is obstructed, the chimney must be cleaned. Furthermore, the connecting flue pipe must be cleaned or replaced.

For ONLY a CMF power oil furnace installation vented into an existing chimney, a barometric damper can be installed at the vent connection of the furnace to regulate the draft. The barometric damper must be properly installed per the manufacturer's instructions. Refer to all applicable codes to determine whether or not a

barometric damper can be used for your CMF power oil furnace installation. The barometric damper used must be installed such that air from the conditioned space can only enter the flue passageway. Do not use a double acting barometric damper. All flue pipe joints should be fastened with sheet metal screws for rigidity.

The chimney height, required draft, and number of appliances served by the chimney must be in accordance with all applicable codes. To prevent down draft, the chimney should extend at least two feet above the peak of the roof.

It is recommended that the furnace flue serve no other appliances. When the chimney serves only the furnace, the flue area must be sized according to all applicable codes. The minimum internal area of the flue must be equal to at least the area of the furnace flue exit.

When two or more appliances must vent through a common flue, the area of the common flue should be sized in accordance with all applicable codes.

When an existing furnace is removed or replaced in a venting system, then the venting system may not be properly sized to vent the attached appliances. The venting system must be checked to ensure proper venting. Improperly sized venting systems can result in the formation of condensate, leakage, spillage, et cetera. Refer to the ANSI Z223.1/NFPA 54, (National Fuel Gas Code), and ANSI/NFPA 31 (Installation of Oil Burning Equipment) for correcting any improperly operating venting system.

The following steps shall be followed with each appliance connected to the venting system placed in operation, while any other appliances connected to the venting system are not in operation:

- (a) Seal any unused openings in the venting system.
- (b) Inspect the venting system for proper size and horizontal pitch, as required in the ANSI Z223.1/NFPA 54, (National Fuel Gas Code) and ANSI/NFPA 31 (Installation of Oil Burning Equipment), and these instructions. Determine that there is no blockage or restriction, leakage, corrosion or other deficiencies which could cause an unsafe condition.

- (c) In so far as is practical, close all building doors and windows and all doors between the space in which the appliance(s) connected to the venting system are located and other spaces of the building. Turn on clothes dryers and any appliance not connected to the venting system. Turn on any exhaust fans, such as range hoods and bathroom exhausts, so they shall 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 shall operate continuously.
- (e) Test for draft hood equipped appliance spillage at the draft hood 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 connected to the 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.

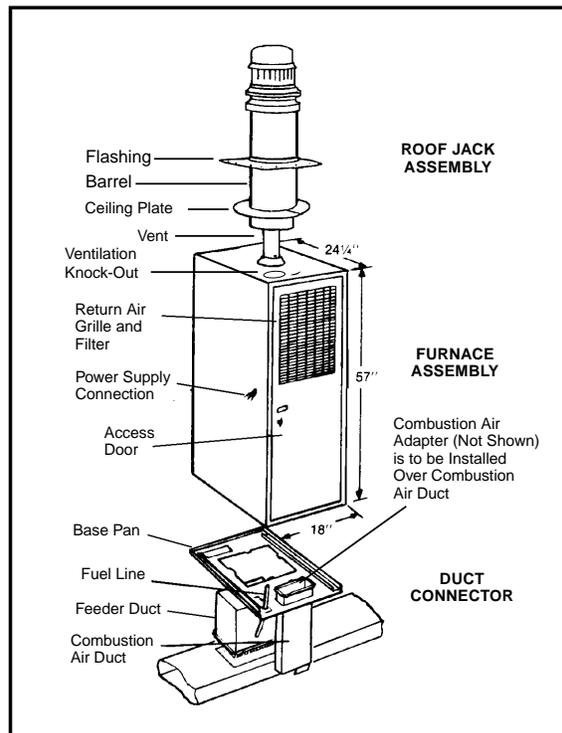


Figure 1. Typical Furnace Installation for Manufactured Housing Applications

- (g) If improper venting is observed during any of the above tests, the venting system must be corrected.

Unit Location and Clearance to Adjacent Material Requirements

The unit must be installed in a level position. The furnace must be installed with the minimum clearances from adjacent materials as stated in Table 2. Additional clearance should be provided to permit servicing of filters, blower, motors, controls, combustion air connections, and vent connections.

ALL MODELS	Closet Installation	Alcove Installation
Sides	0"	0"
Back	0"	0"
Front	6 ^{***}	18"
Top	17"	17"
Vent	6"	6"
Duct within 3' from Furnace	1/4"	1/4"
Plenum	1"	1"
Roof Jack Barrel	0"	0"

** See Item K in the "Closet Installation of Furnace" section later in these instructions for clearance less than 6".

Table 2. Minimum Clearances to Adjacent Materials

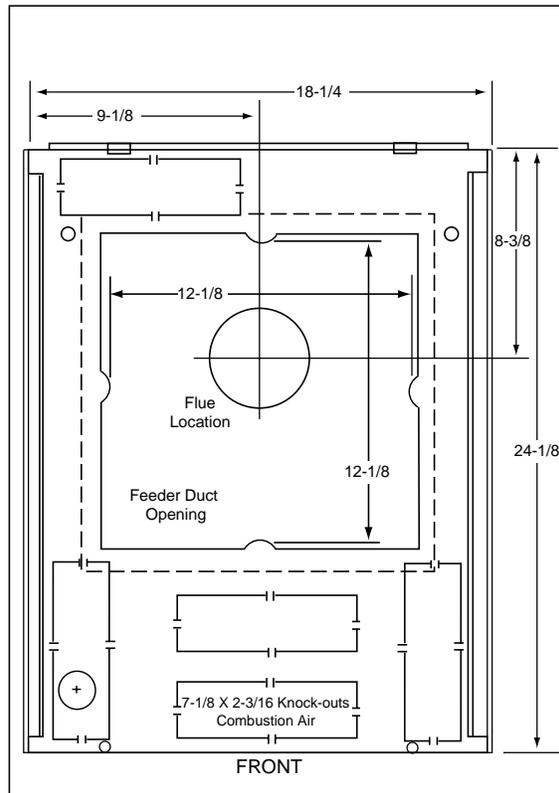


Figure 2. MA-200 Base Pan

UNIT INSTALLATION

These instructions are intended for the use of qualified individuals specially trained and experienced in installation of this type equipment and related system components. Installation and service personnel are required by some governing bodies to be licensed. Persons not qualified should not attempt to install this equipment or interpret these instructions.

MA-200 Base Installation

The MA-200 base is designed for O.E.M. and replacement installation of the CMF series furnace (see Figures 2 and 3). The warm air duct system should be designed so the duct static pressure external to the furnace does not exceed the static pressure listed on the furnace data label.

Use the base pan to mark the 12-1/8" x 12-1/8" center opening for the feeder duct. When the 4" offset feeder duct is used, the floor opening will be offset 4 inches from the opening in the main duct. If using the combustion air duct, select and knock out the combustion air opening to be used. Then mark the 2-1/4" x 7-1/4" opening for the combustion air duct.

Cut the opening for the feeder duct 14-1/8" x 14-1/8" in flooring (cutting opening 1" larger all the way will allow the flanges on the underside of the base pan to fit in the opening).

If using the combustion air duct, cut the opening for the duct about 1/8" larger than the marking on the floor. Be sure to cut through all insulation and the bottom board so that the combustion air duct is unobstructed to outside air.

Drill an approximate 1" diameter hole for the fuel line through the floor and bottom board to the outside. Fuel lines are not supplied with the furnace. They should be installed to comply with all applicable codes.

Drop transition or offset feeder duct upside down through the floor opening and center the top of the feeder duct in 14-1/8" x 14-1/8" floor opening. Using the feeder duct as a guide, mark and cut a 12" x 12" opening in the distribution duct. (See Figure 3)

Insert the feeder tabs into the main duct and bend them over tightly so that the main duct edges are trapped between flanges and tabs. Metal tape may also be used to ensure an air tight connection.

Install the base pan around the feeder duct with the (2) screws through the holes towards the rear of the base pan.

Slit the corners of the feeder duct down to the top of the base pan. While the top of the distribution duct is pulled up with one hand, bend down each side of the feeder duct tightly to the base with the other hand. Trim the metal to allow a one inch flange over the top of the base pan and seal that flange with the metal tape.

If a "V" or "U"-box crossover system is to be used, see the instructions provided with the crossover system.

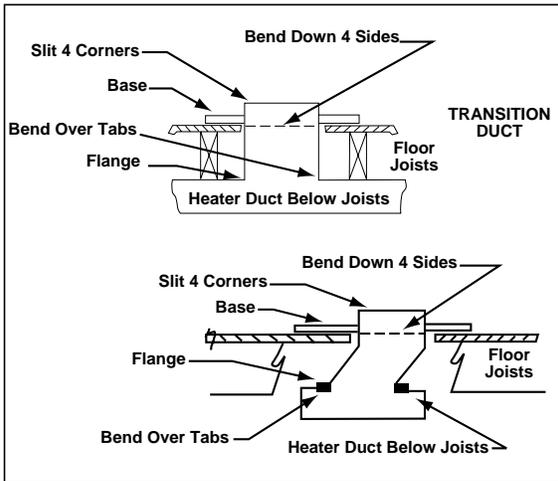


Figure 3. Transition and Offset Ducts

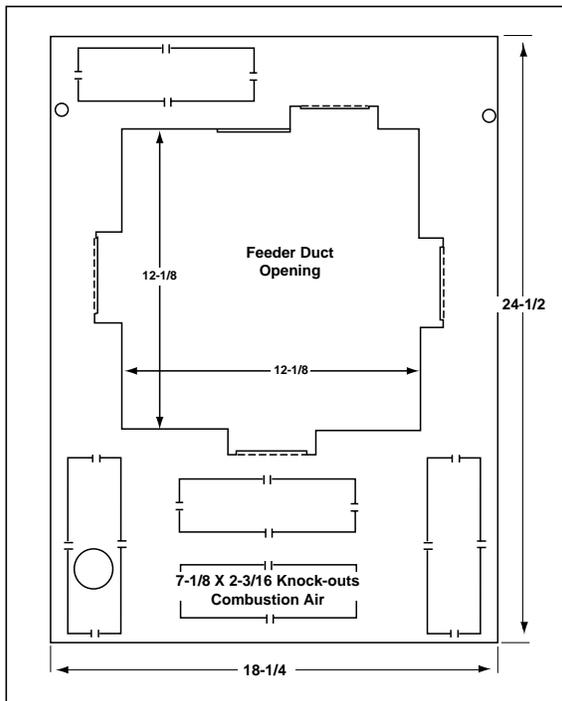


Figure 4. MA-100 Universal Base, Bottom Panel

MA-100 Universal Base Installation

The MA-100 base is designed primarily for replacement installation of the CMF series furnace where the manufactured home duct system may be small and restrictive to proper air flow. The MA-100 base provides approximately four (4) inches of additional plenum space before the discharge air enters the manufactured home duct system. (See Figures 4 and 5)

Use the bottom panel of the base assembly to mark the 12-1/8" x 12-1/8" center opening for the feeder duct. If using the combustion air duct, select and knock out the combustion air opening to be used. Then mark the 2-1/4" x 7-1/4" opening for the combustion air duct.

Cut the opening for the feeder duct 14-1/8" x 14-1/8" in flooring (cutting opening 1" larger all the way around 12-1/8" x 12-1/8" template marking). This will allow the four flanges on the underside of the panel to fit into the opening.

If using the combustion air duct, cut the opening for the duct about 1/8" larger than the marking on the floor. Be sure to cut through all insulation and the bottom board so that the combustion air duct is unobstructed to the outside air.

Drill a 1" hole for the fuel line through the floor and bottom board to the outside. Fuel lines are not supplied with the furnace. They should be installed to comply with local codes.

Put the bottom base panel in place (See Figure 5). Drop the transition feeder duct upside down through the opening and mark a 12" x 12" opening to be cut into the distribution duct. Remove the bottom panel and transition feeder duct; then cut the opening into the distribution duct.

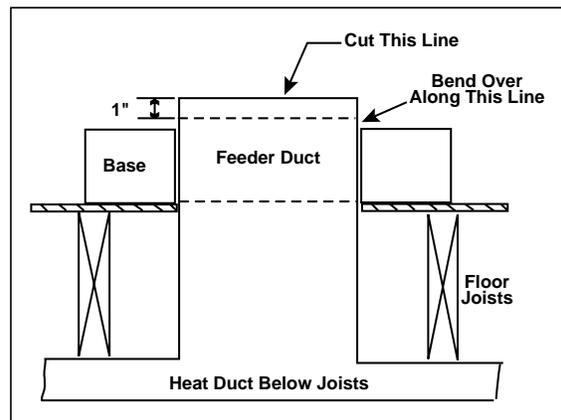


Figure 5. Feeder Duct Installation

Install the feeder duct by bending the tabs inside the heat duct and using the metal tape to insure an airtight connection.

Set the bottom base panel over the feeder duct. Slit the corners of the feeder duct down to the top of the base. While the top of the distribution duct is pulled up with one hand, bend down each side of the feeder duct tightly to the base with the other hand. Trim the metal to allow one inch flange over the top of the base and seal that flange with the metal tape.

Secure the top panel to the floor with two (2) screws through the front flange.

If a "V" or "U"-box crossover system is to be used, see the instructions provided with the crossover system.

Combustion Air Duct/Pipe Installation

The CMF furnace must draw the combustion air from outside, except for special installations (See Table 1). This can be accomplished either by using the 2"X7" rectangular combustion air duct provided in the MA series base kits or using the direct vent kit.

When the rectangular combustion air duct is to be used, install the combustion air duct through the selected knockout in the base. For direct vent applications, the rear knock-out in the furnace base cannot be used. After the combustion air duct has been positioned, install the combustion air adapter. This adapter will transition the 2"X7" opening of the combustion air duct to the 2" diameter of the burner flexible tubing. This adapter is included in the MA series base kits. For retrofit applications in which the MA series base is already installed, the combustion air adapter can be ordered as a kit. Refer to the Replacement Parts List for more details on ordering this kit.

Secure the adapter with either wood or metal fasteners (field provided), depending upon the particular installation. Ensure that the gasket for the adapter is positioned properly before installing the adapter. Attach the flexible hose from the burner to the combustion air adapter using the provided metal hose clamp.

When the direct vent kit is used, follow the instructions provided with the kit. Note: The direct vent kit should be installed before positioning the furnace on the base.

Damper Installation

An automatic shut-off damper is available (see replacement parts list). An automated shut off damper is required when the home is air conditioned by a self-contained unit. This damper is designed to fit in the feeder duct cavity, directly under the furnace. A damper is required to prevent chilled air from flowing over the furnace heat exchanger. For proper installation, refer to the instructions provided with the damper.

Installation of Furnace onto the MA-200 Base

Lift the furnace over the base so that the flange at the back comes to rest on the inside rails of the base.

Raise the front of the furnace to clear the gasket on the bottom of the furnace and slide the back until the rear flange drops into the channel at the rear of the base. Be careful not to damage the combustion air adapter, if present, while positioning the unit.

Be sure that the furnace is all the way back so as to engage the tabs on the rear flange on the base.

Open the access door. Fasten the front of the furnace and the base to the floor with #8 x 1/2" long sheet metal screws.

Using the provided hose clamp, secure the flexible combustion air tubing from the burner to the combustion air adapter.

Installation of Furnace onto the MA-100 Base

Tilt the furnace forward and carefully work the furnace back over the MA-100 Universal base.

Lift the furnace as necessary when positioning the unit over the base assembly to prevent any damage to the feeder duct assembly and combustion air adapter, if present.

Be sure the furnace is positioned all the way to the back of the base assembly.

Open the furnace door and fasten the furnace to the base using #8 x 1/2" long sheet metal screws.

Using the provided hose clamp, secure the flexible combustion air tubing from the burner to the combustion air adapter.

CB-200A Cottage Base Installation

The CMF can be installed on a CB-200A cottage base in certain applications, as described earlier in these instructions (See Table 1). Refer to the Replacement Parts List for information on ordering this base. For installation, refer to the instructions that are provided with the CB-200A base kit.

Closet Installation of the Furnace

Return air systems for a closet installation of the furnace may consist of a grille or grilles in a closet door or side wall that communicates with the living area of the home. (See Figure 6) Return air openings should not be located to draw air directly from a bathroom. Grilles placed in a side wall require a 6" clearance from the wall to the furnace so that the air may enter the front grille of the furnace. In addition, all return air systems, including the floor and ceiling systems, must meet the following conditions:

- A. The return-air opening into the closet, regardless of its location, is to be a minimum of 200 square inches.
- B. If the return-air opening is located in the floor of the closet (versus the vertical front or side wall), the opening is to be provided with means to prevent its inadvertent closure by a flat object placed over the opening.
- C. The cross-sectional area of the return duct system (when located in the floor or ceiling of the manufactured home) leading into the closet is to be not less than 200 square inches.
- D. The total free area of the openings in the floor or the ceiling registers serving the return air duct system is to be not less than 300 square inches. At least one such register is to be located where the likelihood of its being covered by carpeting, boxes, and other objects is minimized.

- E. Materials located in the return duct system shall have a flame spread classification of 200 or less.
- F. Noncombustible pans having one inch upturned flanges are located beneath openings in a floor return duct system.
- G. Hollow spaces used as ducts or plenums for environmental air may contain mineral-insulated metal sheathed cable, aluminum sheathed cable, electrical metallic tubing, rigid metal conduit, flexible metal conduit not to exceed four (4) feet, or metal-clad cables. Wiring materials, fixtures, are to be suitable for the expected ambient temperatures to which they will be subjected.
- H. Gas piping cannot be located in the return duct system.
- I. The negative pressure in the closet must not be less than minus 0.05 inches water column with the closet door closed and the fan operating at high speed. A reading below minus 0.05" indicates a dirty filter or a restricted return air system.

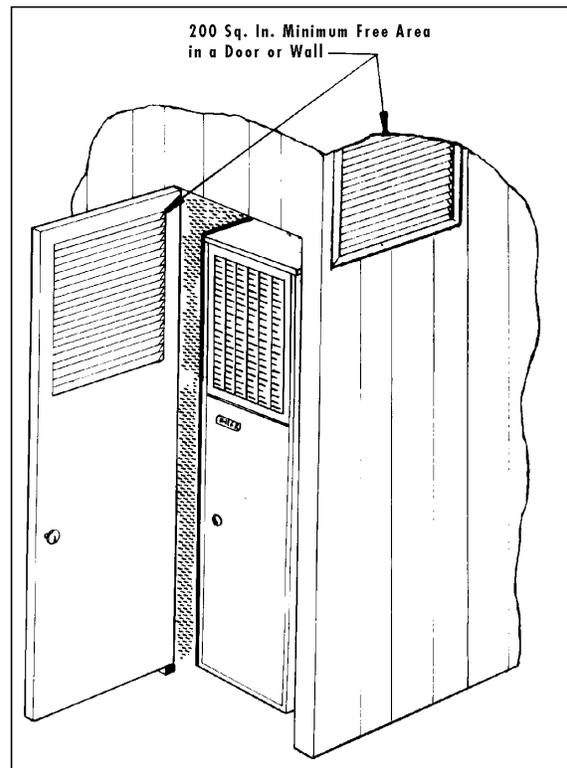


Figure 6. Closet Installation

- J. For floor return systems, the manufacturer or installer shall affix a prominent marking on or near the appliance where it is easily read when the closet door is open. The marking shall read: "CAUTION, HAZARD OF ASPHYXIATION. DO NOT COVER OR RESTRICT FLOOR RETURN AIR OPENING." or equivalent. (This label is supplied with the instruction manual in each furnace.)
- K. For closet installation with less than 6" front clearance, but not less than 1", a louvered door must be used having a minimum 200 square inch free area opening directly in line with openings in the furnace door. A fully louvered door having the minimum free area is also permitted if

the front tolerance is not less than 4". Adjust duct registers to obtain a temperature rise within the range specified on the furnace nameplate.

! WARNING:

Failure to comply with the above procedure and the following instructions may result in fire, asphyxiation or carbon monoxide poisoning.

SRJ Roof Jack Installation

Refer to Figure 7 to determine SRJ roof jack and appropriate accessories required for your installation.

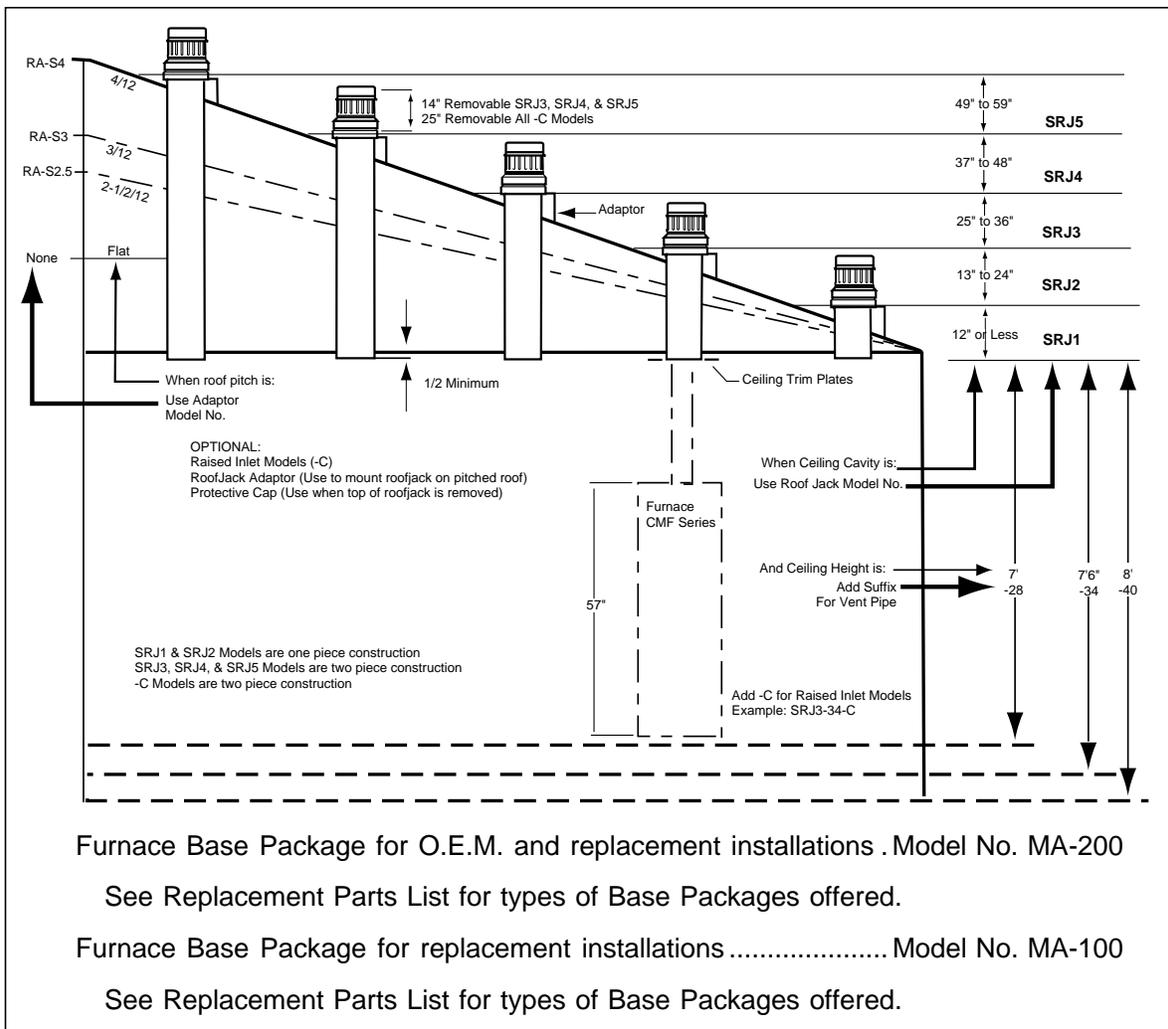


Figure 7. Selection of Roof Jack and Accessories Chart

WARNING:

1. The roof jack and vent pipe as determined from the chart on in Figure 7 must be applied.
2. The indicating line near the bottom of the roof jack must extend below the finished ceiling.
3. The vent pipe must be attached to the furnace flue collar with the sheet metal screw provided.
4. **DO NOT** install any elbows (adjustable or non-adjustable) or a stack damper in the venting system.

NOTICE: Accuracy in locating the base pan and the roof jack openings with respect to the flue outlet is required to avoid hazardous misalignment of the air and vent systems. (See Figure 1)

Use only the SRJ series roof jack as specified on the furnace label.

Cut an approximate 8-1/4" diameter opening through the roof and ceiling directly in line with the flue connection on the top of the furnace.

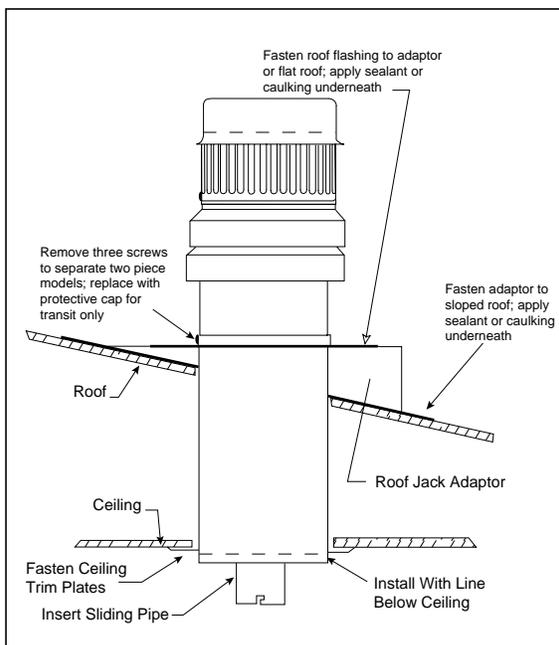


Figure 8. Roof Jack

A roof jack adaptor is required for use on a sloping roof. Center the adaptor opening over the roof opening, use sealant or caulking under the adaptor. Use roofing nails or screws on wood construction or sheet metal screws on metal roofs (caulking, nails or screws not provided).

Insert the vent pipe into the bottom of the roof jack; locking slot, downward, toward the furnace. Slide the pipe into the roof jack to a length that will allow a convenient reach to the connection at the top of the furnace.

Ease the roof jack assembly through the openings. The lower portion of the outer barrel must extend through the finished ceiling as indicated on the barrel. Use sealant or caulking on the roof or adaptor to seal under the flashing of the roof jack assembly.

Extend the vent pipe down to engage the locking slot with the screw in the top of the furnace flue pipe. Turn to lock and tighten the screw. All joints and connections should be inspected before start up of the furnace. (See Figures 8 & 9)

Fasten the ceiling trim/fire stop plates around the upper barrel with four nails or wood screws (not provided).

NOTE: Model SRJ-3, 4, and 5 roof jacks permit the top section to be removed for transit of the dwelling. If the top is removed, remaining openings must be sealed from rain, debris, etc., until the top is replaced. A plastic accessory cap is to be fastened to the lower roof jack section with the same screws used to mount the roof jack cap assembly. (See Figure 8)

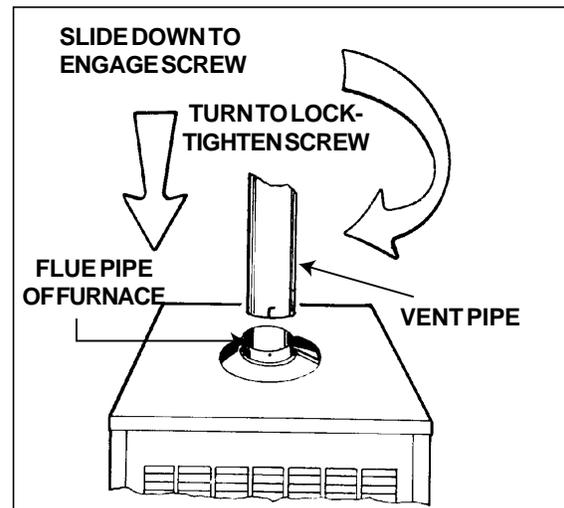


Figure 9. Vent Pipe Installation

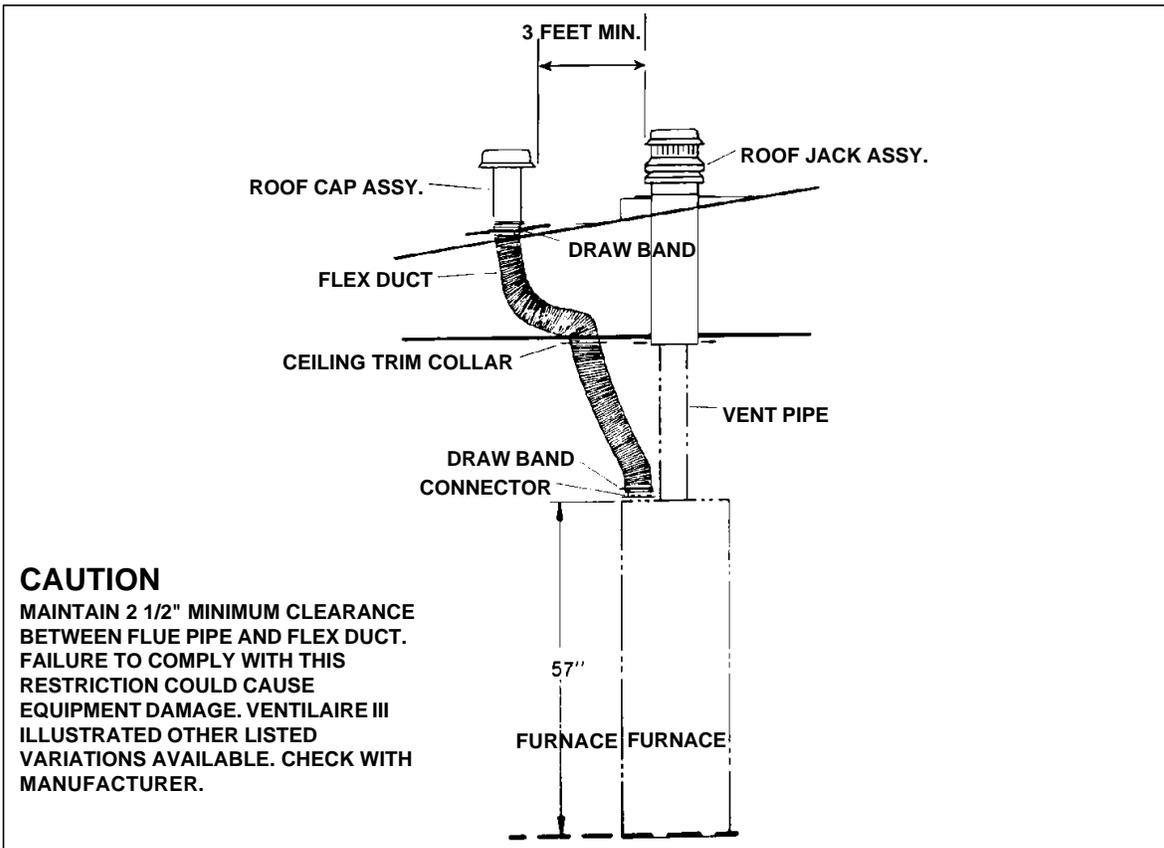


Figure 10. Typical Installation

IMPORTANT: When the top section of the roof jack is removed for transit, a special warning label must be attached adjacent to the fuel line connection of the gas or oil burner. The special warning label is supplied with two piece roof jack assemblies.

Chimney Installation

When venting the CMF through an existing chimney, the materials, sizing, and installation of the chimney must be in accordance with the ANSI Z223.1/NFPA 54, (National Fuel Gas Code), ANSI/NFPA 31(Installation of Oil Burning Equipment), NFPA 211 (Chimneys, Fireplaces, Vents, and Solid Fuel-Burning Appliances) and all applicable local codes. The materials used must be capable of withstanding exposure to temperatures of at least 700°F .

The CMF power gas units are fan-assisted.

Installation of VentilAire III or IV Air Quality Package (Accessory)

The VentilAire air quality packages are available to meet the ventilation requirements as outlined

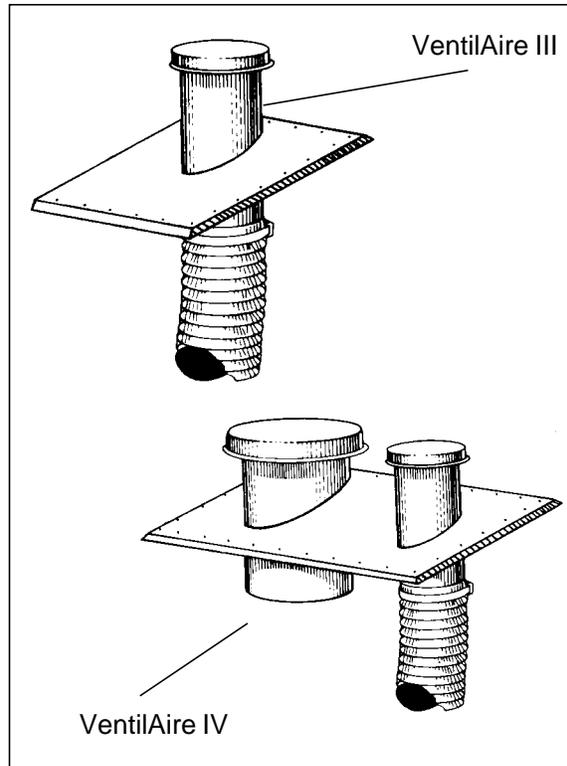


Figure 11. VentilAire III and IV

in H.U.D. Standard Part 3280.103 (b) (2). These packages introduce outdoor air into the living space during furnace blower operation. The VentilAire IV also serves to exhaust moist and/or hot air from the attic space. See Figures 10 and 11 for typical installation. Complete installation instructions are supplied with each air quality package.

FUEL CONNECTIONS

Gas Piping Requirements - PG Series Only

Gas piping should be sized and installed in accordance with local codes ANSI Z223.1/ NFPA 54 (National Fuel Gas Code) and utility regulations. To install the gas supply piping, connect a separate gas line from the gas meter to the burner with a manual shut-off valve installed in the line at the furnace. This valve should be readily accessible to shut-off the gas supply to the furnace in case of an emergency shutdown. When installing the gas supply line, always use new clean piping and route the line in such a manner as to be easily accessible. The piping and threading must be free from cutting burrs and defects. The line must be durable, substantial, and gas tight. Installing a tee fitting with a sediment trap at the bottom of the riser to catch any foreign debris in the gas supply line is recommended. An additional main manual shut-off valve may be installed in the gas supply line to shut-off the main fuel supply, if desired by the homeowner or required by local codes.

The proper gas supply line size can be determined using the gas piping chart, shown in Table 3. Black pipe is the most practical for natural gas, because of the larger sizes required. Copper tubing with an internal coating of tin is recommended for use with propane (LP) gas installations. Compounds used on the threaded joints must be resistant to the actions of propane (LP) gases.

Carefully check for gas leaks with a soap solution or a commercial leak detector fluid. NEVER USE A MATCH OR OPEN FLAME TO DETECT A GAS LEAK!

CAUTION:

The furnace and its appliance main gas valve must be disconnected from the gas supply piping system during any pressure testing of that system at test pressures in excess of ½ psi (3.5 kPa). The furnace must be isolated from the gas supply piping system by closing the equipment shut-off valve during any pressure testing of the gas supply piping system at test pressures equal to or less than ½ psi (3.5 kPa).

Oil Piping Installation — PO Series Only

The following procedures are recommended as good practice. However, requirements of local codes and ordinances, H.U.D. Manufactured Home and Safety Standards or National Fire Protection Association must be satisfied, where they apply, for an approved installation.

Use a tank capacity suitable for the application with a weatherproof, capped fill opening and a shielded vent to let in air as fuel is used. The tank must be clean inside before filling. All water, rust, sediment, and other foreign matter must be flushed out.

If a two pipe system is used or if oil is taken from the bottom of the tank, a filter is recommended. Furthermore, a manual shut-off valve may be used on a single pipe or two pipe system. Please note that local codes will dictate the specific installation requirements.

Type of Pipe	Maximum Possible Pipe Length Required for Different Pipe Diameters			
	1/2"	5/8"	3/4"	1"
Black Iron Pipe for Natural Gas	20'	—	60'	100'
Aluminum or Copper Tubing* for Natural Gas	10'	—	30'	—
Aluminum or Copper Tubing for LP Gas	—	40'	100'	—

*Copper tubing should be internally tin coated.

Table 3. Pipe Length Selection Chart

A fuel or tank gauge is recommended for easy checking of the fuel level. Check the gauge reading with a dip stick.

Locate the storage tank conveniently near the home. For above ground fuel tank installations, the tank may rest three to four inches off the ground. Fuel tanks may also be buried if properly coated to resist corrosion. For below ground fuel tank installations, the vertical dimension from the bottom of the tank to the fuel pump must not exceed ten feet. Keep the tank filled especially in the summer to reduce the accumulation of condensation.

Fuel Line Hook-Up: One Line System

The one line system is highly recommended where vertical lift, from bottom of tank to pump, is not more than eight feet. A single line hookup has the advantage of costing less and giving quieter operation.

Fuel Line Hook-Up: Two Line System

Use a two line system only if the vertical lift exceeds 8 feet.

1. Install the oil feed line as outlined in steps 1-6 below.
2. Install the oil pump bypass plug in the bottom return port.
3. Run the return line up through the furnace base to the return port of the pump. Run the other end of the line to the tank, using 3/8" O.D. copper tubing or 1/4" pipe with the ends capped, and routing the line so it stays clean.

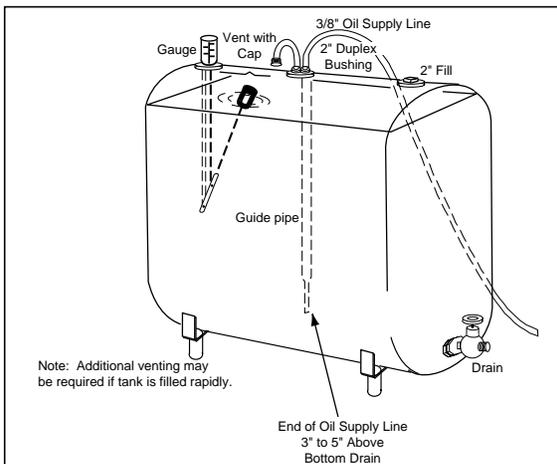


Figure 12. Recommended Tank Hook-Up 200 to 300 Gallon Tank

4. Insert the return line through the second opening in the duplex bushing. If the bottom of the tank is lower than the pump intake, the tube should be inserted three or four inches from the tank bottom. If the bottom of the tank is higher than the pump intake, the return line should extend not more than 8" inside the tank.

Hook-Up Procedure (See Figure 12)

1. Use 3/8" O.D. copper tubing for the fuel line. Cap the end with tape to keep out dirt while the line is being routed.
2. Install duplex bushing for two 3/8" lines in the top fitting of the tank.
3. Insert one end of the tubing through the duplex bushing until it is three to five inches from the bottom drain. Tighten the bushing.
4. Run the line where it will not be subject to damage. Also make bends gradually and avoid kinks which might restrict oil flow.
5. Open the burner access door. Connect the oil line to the intake port on the pump. Tighten other port plugs on the pump.
6. Be sure the oil line is airtight! Air leaks can cause the pump to lose prime and will create other problems such as nozzle failure, odors, rumbling noise, and false safety shut down.
7. Insert the short length of the copper tube level with the bottom of the duplex bushing. Tighten the bushing. Form the tube into an inverted "U" to serve as a vent.

How to Eliminate Air Leaks

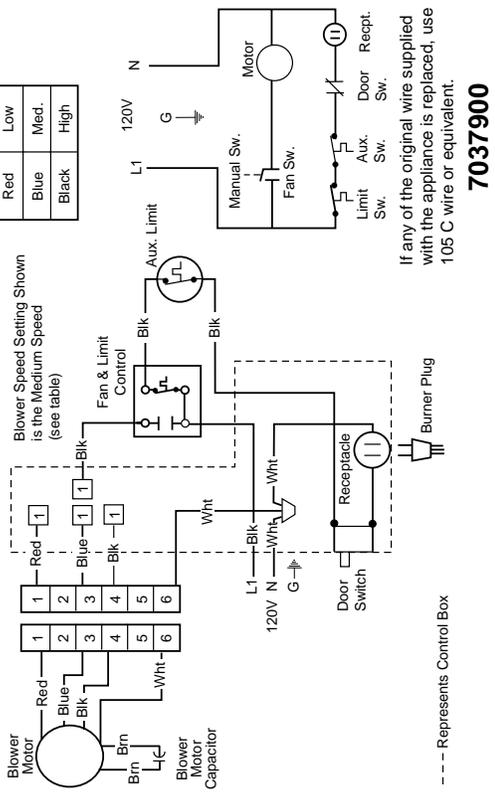
To eliminate problems caused by air in the oil line, all connections in the oil supply line and all plugs, nuts, and fittings on the pump must be airtight. This includes the nut that covers the pressure adjustment. It is important that the hook-up be done carefully and with a good flaring tool.

Fuel Oil Type

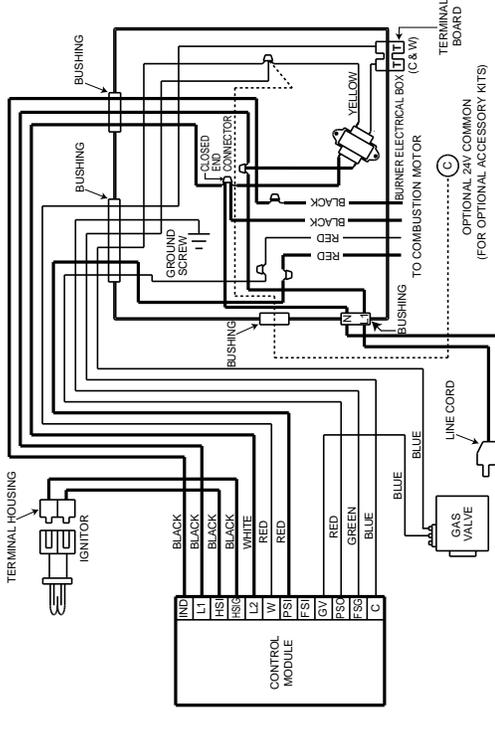
Do not use fuel oil heavier than Grade No. 2. Grade No. 1 may be used where the oil supply is subject to low temperatures.

Model CMF Series Furnace

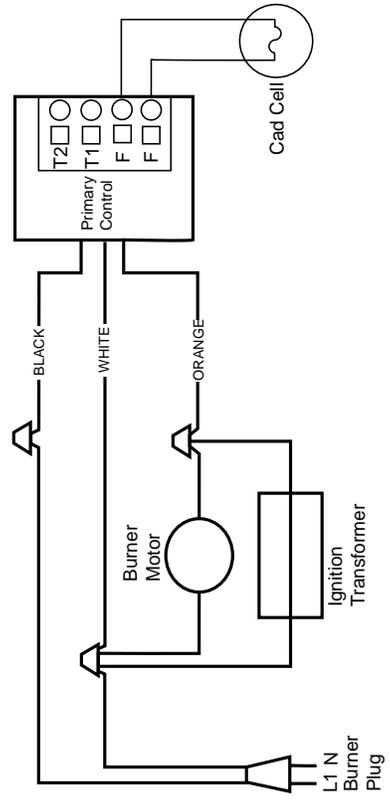
Blower Wire Color	Blower Speed
Red	Low
Blue	Med.
Black	High



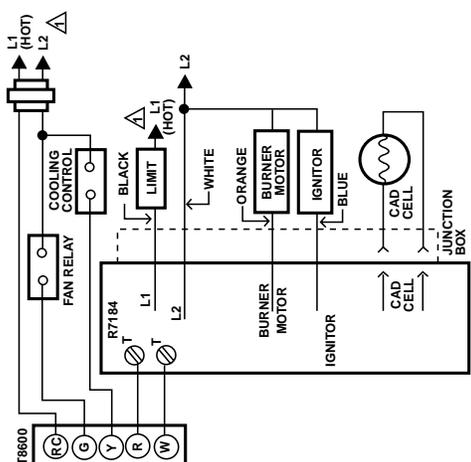
Model PGB-DI Power Gas Burner "Direct Ignition"



Model AF-15 Oil Burner



Typical wiring diagram for 24 Vac thermostat and R7184 for an oil-fired forced air system



LEGEND: SCREW TERMINAL
 → 1/4 IN. QUICK CONNECT TERMINAL
 POWER SUPPLY PROVIDE DISCONNECT MEANS AND OVERLOAD PROTECTION AS REQUIRED.

Figure 13. Wiring Diagram

DO NOT USE GASOLINE, CRANKCASE OIL, OR ANY OIL CONTAINING GASOLINE.

! WARNING:

Failure to keep supply oil clean by various procedures described above may cause failure of certain components such as the fuel pump gears, check valve, shaft seal, or burner nozzle which may result in a burner fire.

ELECTRICAL WIRING

General

All electrical wiring must be made in accordance with these instructions, all local codes, and ANSI/NFPA 70 (National Electric Code). This furnace shall be installed so the electrical components are protected from water.

If any of the original wiring supplied with the appliance must be replaced, it must be replaced with wiring of the same material, gauge, and temperature rating.

Line Voltage Requirements

Before proceeding with the electrical connections, make certain that the voltage, frequency, and phase of the supply source are the same as those specified on the unit rating plate. This

unit must be electrically grounded in accordance with local codes, or in the absence of local codes, with ANSI/NFPA 70 (National Electrical Code).

Use 14-2 Type NM cable with ground or conduit with single wires. Secure the cable at the appliance using a code approved connector.

Line Voltage Connections

Before connecting the power supply wiring, become familiar with the wiring of this appliance by reviewing the wiring diagram, shown in Figure 13, or the wiring label located on the inside of the appliance.

1. Open the appliance door to gain access to the control box.
2. Remove the control box cover.
3. Connect the black wire of the power supply cable to the black wire of the appliance.
4. Connect the white wire of the power supply cable to the white wire of the appliance.
5. Connect the ground wire of the power supply cable to the green screw located in the control box of the appliance.
6. Check all electrical connections, which should be secure and tight.

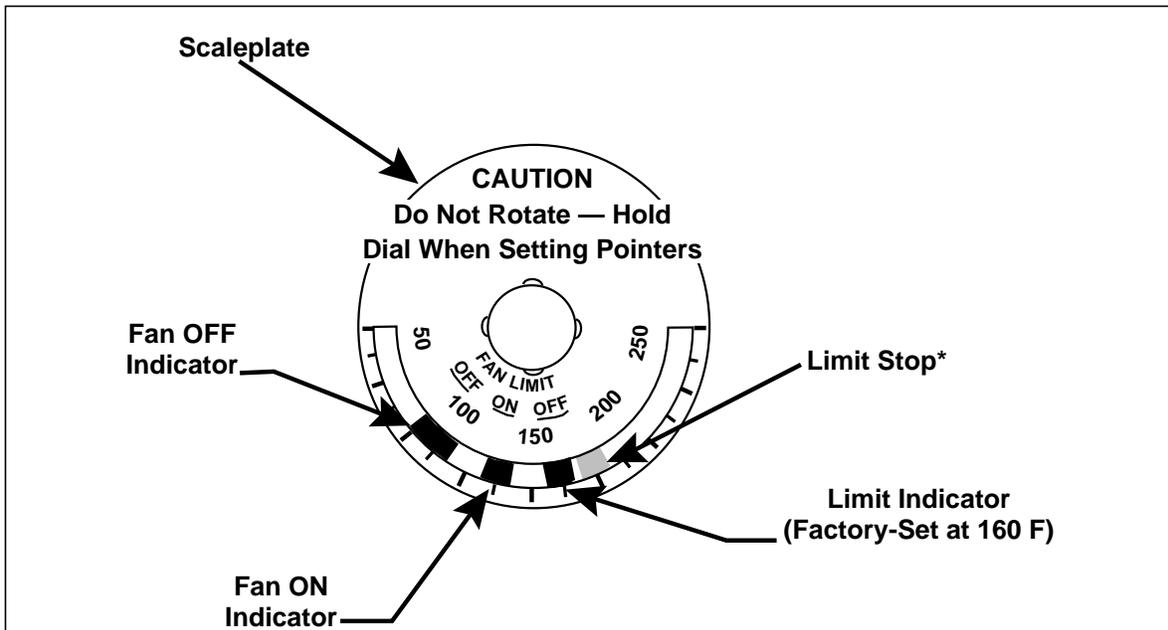


Figure 14. Fan and Limit Settings

7. Replace the control box cover.
8. Install a disconnect switch (fused or unfused) between the appliance and the electrical supply at a convenient location near the appliance. This switch should be easily accessible.

Room Thermostat Requirements

When selecting thermostat location, consideration must be given to the following:

1. Locate the thermostat approximately five feet above the floor in a location accessible for wiring and setting, preferably in a living or adjoining room.
2. Locate on an inside wall.
3. Do not locate where influenced by abnormal heat, such as from sunlight, radio, T.V., or lamps.
4. Do not locate where influenced by abnormal cold, such as on an outside wall, on a wall separating an unheated room, near drafts from stairwells or doors, or close to windows.
5. Do not locate where air circulation is poor, such as behind open doors, in corners or alcoves, or close to furniture.

The heat anticipator of the thermostat should be adjusted to .4 amps for power oil models, and .9 for power gas direct ignition models.

Room Thermostat Connections

1. Run R and W from the thermostat to the burner compartment.
2. Connect R to one of the low voltage terminals on the burner.
3. Connect W to the other low voltage terminal on the burner.

FAN AND LIMIT CONTROLS

Constant Blower Operation

The button protruding through the cover of the fan and limit control provides either automatic operation of the blower through the thermostat

or constant blower operation. Pull the button out for automatic operation. Push the button in for constant blower operation.

Fan and Limit Settings

CAUTION:

When adjusting the fan setting levers, hold the scaleplate dial to keep it from turning and straining the sensing element.

The fan and limit switch has three levers: FAN ON, FAN OFF, and LIMIT OFF. These levers control the blower operation of the appliance.

The FAN ON lever controls the temperature at which the blower energizes. This lever can be adjusted through a range of 15°F above the FAN OFF setting to 30 °F below the LIMIT OFF setting. The recommended factory setting is 110 °F.

The FAN OFF lever controls the temperature at which the blower is to stop to prevent the circulation of cool air. The recommended factory setting is 90 °F.

The LIMIT OFF lever is a safety stop. This lever should not be adjusted or tampered with for any reason. The factory setting is 160 °F.

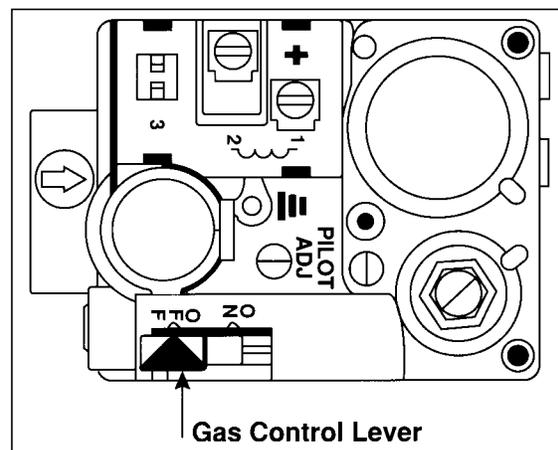


Figure 15. Direct Ignition Gas Valve

Auxiliary Limit

This furnace is equipped with an auxiliary manual reset limit. This limit is designed to function ("trip") in the event of a blower motor failure. If the limit trips, reset the limit by firmly pressing the red button in the center of the limit. The limit is located on the left hand side of the blower assembly. If the limit will not reset, continues to trip, or the blower does not function, notify your NORDYNE Distributor or Service PRO immediately.

MAINTENANCE

Air Filters

Air filters should be inspected and cleaned monthly.

Combustion Air and Venting System

Inspect the combustion air and venting system at the beginning and end of the heating system for deterioration, blockage, or damage. Clean the system, if necessary.

LIGHTING AND OPERATING INSTRUCTIONS FOR CMF PG DIRECT IGNITION GAS BURNERS

For Your Safety Read Before Lighting or Operating.

**WARNING:**

If you do not follow these instructions exactly, a fire or explosion may result causing property damage, personal injury or loss of life.

- A. This appliance does not have a pilot. It is equipped with an ignition device which automatically lights the burner. **Do not try to light the burner by hand.**
- B. BEFORE LIGHTING OR OPERATING smell all around the appliance area for gas. Be sure to smell next to the floor because some gas is heavier than air and will settle on the floor.

WHAT TO DO IF YOU SMELL GAS:

- Do not try to light any appliance.
- Do not touch any electric switch, do not use the phone.
- Leave the building immediately, then call your gas supplier.
- If you cannot reach the gas supplier, call the fire department.

- C. Use only your hand to push in and move the gas control lever. Never use tools. If the lever will not push in by hand, don't try to repair it, call a qualified service technician. Force or attempted repair may result in a fire or explosion.
- D. Do not use this appliance if any part has been under water. Immediately call a qualified service technician to inspect the appliance and to replace any part of the control system and any gas control which has been under water.
- E. Should overheating occur, or the gas supply fail to shut off, turn off the manual gas valve to the appliance.

Operating Instructions for PG Direct Ignition Burner

1. STOP! Read the safety information above.
2. Set the thermostat to OFF or to its lowest setting.
3. Turn off all electric power to the appliance.
4. This appliance is equipped with an ignition device which automatically lights the burner. DO NOT try to light the burner by hand.
5. Turn the latch and open the furnace door.
6. Push in the gas control lever and move to OFF. DO NOT FORCE.
7. Wait ten (10) minutes to clear out any gas. If you then smell gas, STOP! Follow Section B in the safety information above. If you don't smell gas, go to the next step.

Burner Designation	Firing Rate Input (BTUH)	Natural Gas Orifice Number	Natural Gas Time Per Rev.* (sec)	LP Gas Orifice Number	LP Gas Time Per Rev.** (sec)
Gas Gun-65-DI-S	65,000	24	55	43	138
Gas Gun-75-DI-S	75,000	20	48	40	120
Gas Gun-90-DI-S	90,000	16	40	36	100

* There times are based on natural gas at an average of 1,000 BTU per cubic foot, a burner manifold pressure of 3.5 in WC, and a meter dial size of 1 cubic foot.

** There times are based on LP gas at an average of 2,500 BTU per cubic foot, a burner manifold pressure of 3.5 in WC, and a meter dial size of 1 cubic foot.

Table 4. Natural and LP Gas Orifices

- | | |
|---|--|
| <ol style="list-style-type: none"> 8. Move the gas control lever to ON. 9. Close the furnace door and turn the latch. 10. Turn on all electric power to the appliance. 11. Turn the thermostat to ON and set to the desired setting. 12. If the appliance will not operate after one re-try, follow the instructions in the "To Turn Off Gas To Appliance" Section below and call your service technician or gas supplier. | <ol style="list-style-type: none"> 1. Shut off all other gas fired appliances, except for any pilots. 2. Start the furnace in heating mode and allow it to run for at least three minutes. 3. Measure the amount of time (in seconds) required for the gas meter to complete one revolution. Note that one revolution will be equal to one cubic foot of gas. 4. Compare the time measured with the appropriate time listed in Table 4. If the time varies by more than 5% from the times shown in the table, then measure the inlet and gas valve manifold pressures, using the procedure outlined in the "Measuring the Inlet Supply and Manifold Pressures" section. 5. If both the inlet gas pressure and the manifold pressure are properly set, then check the burner orifice to ensure that it is properly sized. Further gas problems should be referred to the local gas supplier. |
|---|--|

To Turn Off Gas to the Appliance

- | | |
|--|--|
| <ol style="list-style-type: none"> 1. Set the thermostat to OFF or to its lowest setting. 2. Turn off all electric power to the appliance if service is to be performed. 3. Turn the latch and open the furnace door. 4. Push in the gas control lever and move to OFF. DO NOT FORCE. 5. Close the furnace door and turn the latch. | |
|--|--|

Checking the Input of the Furnace

Refer to the rating plate on the furnace to determine the firing rate for your application. Using Table 4, determine the appropriate orifice size for the firing rate and gas being used in your application. Check the burner orifice to ensure that it is the correct size.

The input of this furnace can be checked using the following procedure, which is based on using a one cubic foot gas meter:

Measuring the Inlet Gas and Manifold Pressures

For natural gas installations, the inlet gas line pressure at the gas valve inlet must be between 5 in WC and 7 in WC. For LP gas installations, the incoming gas line pressure at the gas valve inlet must be between 11 in WC and 13 in WC. This pressure can be checked at the port located on the gas inlet end of the gas valve using a pressure gauge or U-tube manometer, which must be installed according to the manufacturer's supplied instructions.

For natural gas installations, the manifold pressure must be set at 3.5 in WC. For LP gas installations, the manifold pressure must be set

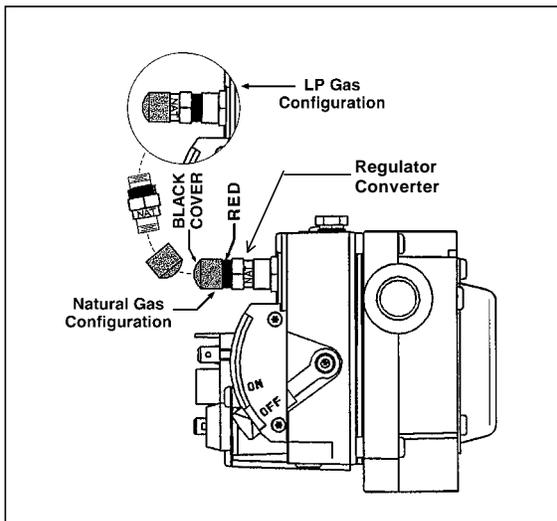


Figure 16. Natural Gas Configuration

at 10.0 in WC. This pressure can be checked at the port located on the gas outlet end of the gas valve using a pressure gauge or U-tube manometer, which must be installed according to the manufacturer's supplied instructions. If the manifold pressure is not equal to the valves above, then it must be adjusted. To adjust the manifold pressure, remove the regulator converter from the gas valve, as shown in Figure 16. Then turn the adjusting screw clockwise to increase the pressure or counterclockwise to reduce the pressure. Once the manifold pressure is correctly set, replace the regulator converter in the same manner as it was removed earlier.

To install a pressure gauge or U-tube manometer in the gas valve:

1. Determine which pressure, the inlet gas or manifold pressure, you want to measure.
2. With a 3/16" Allen wrench, remove the appropriate tap plug located on the gas valve. When measuring the inlet gas pressure, remove the tap plug on the inlet side of the gas valve. When measuring the manifold pressure, remove the tap plug on the outlet side of the gas valve.
3. Install a fitting, which has a 1/8" NPT pipe thread that is compatible with the pressure gauge or U-tube manometer.
4. Install the pressure gauge or U-tube manometer according to the manufacturer's supplied instructions.

5. After measuring the pressure, be sure to remove the pressure gauge or U-tube manometer from the gas valve and replace the tap plug. Ensure that the tap plug is tight and not cross-threaded.

Gas Burner Controls

The gas valve lever can be set to ON or OFF, as shown in Figure 16. When in the ON position, gas flow through the gas valve is allowed when the valve is energized electrically. When in the OFF position, gas flow is completely shut off.

Combustion Blower Centrifugal Switch

Input (BTU/H)	Natural Gas Setting	LP Gas Setting	Oil Setting
65,000	3.0	3.0	3.0
75,000	3.5	3.5	4.0
90,000	4.0	4.0	3.5

Table 5. Air Shutter Setting for Different Fuels

The electric motor for the blower which supplies combustion air to the burner is equipped with a centrifugal switch wired in series with the burner controls. This switch is normally open until the speed of the blower motor closes it thereby powering the burner controls. The burner controls will not function until the blower motor is operating at full speed.

Natural Gas to LP Conversion

This gas fired heating appliance was shipped from the factory for use with natural gas. However, the appliance can be converted to be used with LP gas. Use the following procedure for gas conversion of the burner.

1. Follow instructions "To Turn Off Gas To Appliance" earlier in these instructions.
2. Shut off gas supply at meter.
3. Disconnect gas burner electric cord, gas piping to burner, and thermostat leads.
4. Remove three (3) hexagon nuts holding burner in place.
5. Disconnect inlet pipe union at burner.

6. Disconnect the two wires leading to gas control valve.
7. Remove three (3) bolts from U-shaped manifold plate and orifice assembly.
8. Remove the main orifice and replace it with the appropriate LP fuel orifice. Refer to the rating plate on the furnace to determine the firing rate for your application. If the firing rate of your furnace has been converted, ensure that the appropriate LP orifice for the new firing rate is installed. Then, use Table 4 to determine the proper LP orifice for your firing rate.
9. Remove the regulator converter and its black cover located on top of the gas valve and invert. (See Figure 16 — For LP, the red ring will be located at the bottom and the “LP” stamping on the converter will appear right side up.)
10. Screw converter back into the regulator, hand tight plus 1/8 turn, and replace the black cover onto the converter top to protect the threads.
11. Reinstall the burner assembly into the furnace.
12. Reconnect the gas piping and electrical wires to the gas valve.

13. Open the manual shut-off valve and follow the “Operating Instructions” as outlined previously in this manual to put the furnace into operation.

Adjusting the Burner

The air shutter is factory pre-set for installation in a given furnace, as shown in Table 5. You should not need to adjust the air shutter setting of the gas gun burner except when converting the firing rate of the furnace. For your installation, check to ensure that the air shutter setting is correct. It is very important that the combustion air supply be ample without decreasing the efficiency of the burner. An inadequate amount of air can cause carbon monoxide (CO) production. The carbon dioxide (CO₂) content of the flue products should be in the range of 8.0% to 9.0% for natural gas and 9.0% to 10.0% for LP gas. The burner should run quietly. For high altitude operation (altitudes greater than 2,000 feet), the input should be de-rated by 4% for each 1,000 feet above sea level by reducing the orifice size or decreasing the manifold pressure. When decreasing the manifold pressure, the pressure must not be set below 3.2 in WC. If the pressure needs to be set below 3.2 in WC to achieve the proper de-rate, then change the orifice size and raise the manifold pressure back to 3.5 in WC.

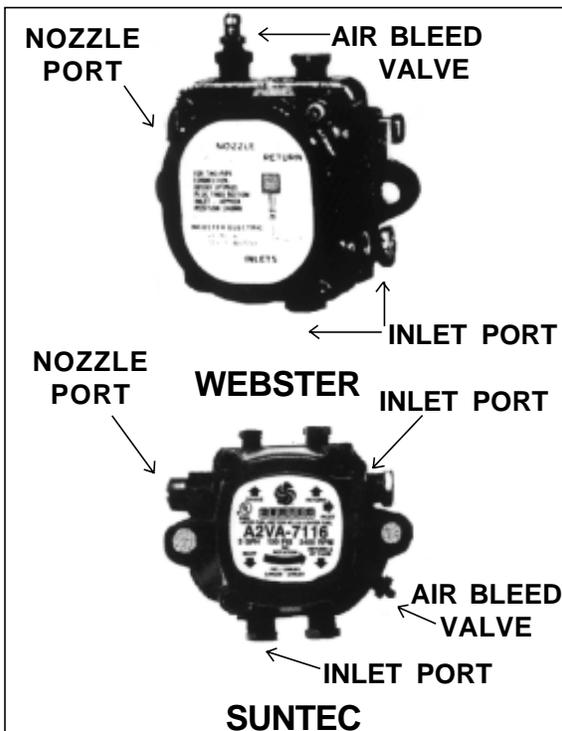


Figure 17. Oil Pumps

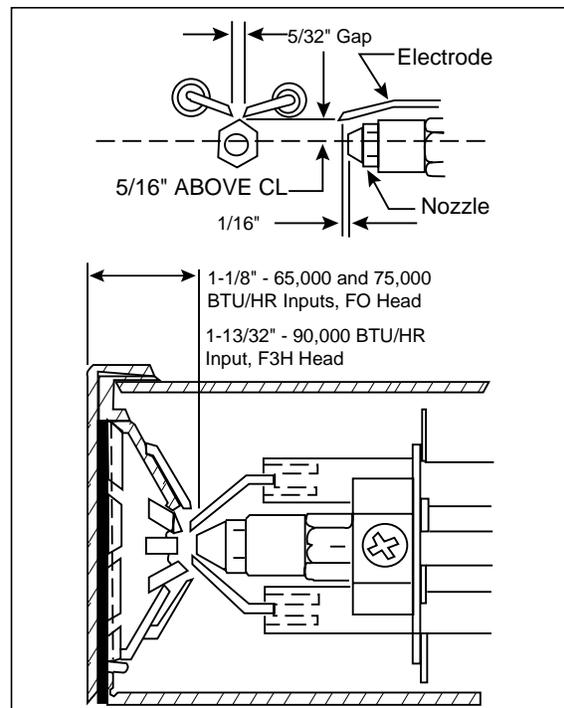


Figure 18. PO Oil Burner Electrode Settings

LIGHTING AND OPERATING INSTRUCTIONS FOR CMF PO OIL BURNERS

Oil burners in this series are factory equipped with a primary control capable of either intermittent or interrupted ignition.

Start-Up Procedure

1. Open all manual shut-off valves in the oil supply line from the tank to the burner.
2. Turn ON the electrical supply to the furnace.
3. Set the room thermostat to the desired temperature.

Air-Bleed Procedure - Single Pipe Installation

1. Open the door to the furnace.
2. Attach 1/4" I.D. plastic tube over the end of the airbleed valve on the oil pump as shown in Figure 17. Place the other end of the tube in a large container.
3. Pull the door interlock switch out to start the burner.
4. Turn the airbleed valve open not more than 1/2 turn to get a fast flow of oil into the container.
5. To assure continuous operation, use a wire to jump terminals T-T (or F-F) on the primary control while burner is running. If furnace is equipped with the Honeywell R7184 primary control, priming oil pump procedure is as follows:
 - a. While the ignition is on, press the reset button for 1/2 second or less and release the reset button. The lockout time will be extended to 4 minutes.
 - b. If prime is not established within the 4 minutes, the control will lock out. Press the reset button to reset the control and to step "a".
 - c. Repeat steps "a" and "b", if needed, until the pump is fully primed.
6. When oil flow is clear and free of air bubbles, close air-bleed valve and tighten.

(Time to bleed air out will vary depending on length of oil line, number of bends, etc.)

7. Remove the jumper wire on the primary control.

Oil Burner Shutdown Procedure

Set the room thermostat to "OFF" or its lowest setting.

Flame Adjustment

1. Turn the thermostat to a setting below room temperature to start the furnace.
2. Allow the furnace to operate for about ten (10) minutes.
3. Adjust the air shutter setting until 11% CO₂ with a number zero smoke or less is achieved. Furthermore, the draft over the fire must be at least negative 0.02 in WC. The factory set air shutter settings are shown in Table 5.

Electrode Setting

The electrode setting is carefully set at the factory. However, during transit, the setting of the electrodes may become improper. Before attempting to start the oil burner, check the positioning of the electrodes to ensure that they are properly positioned, as shown in Figure 18. Improperly adjusted electrodes can result in poor ignition. Do not permit the electrodes to be closer than 1/4" to any grounded surface.

SWITCHING FROM INTERRUPTED TO INTERMITTENT IGNITION CONTROL

Honeywell oil primary control can be switched between interrupted and intermittent ignition control. To switch from interrupted duty (Factory set) to intermittent duty, remove the ignitor wire from the blue control wire. Attach the burner motor and igniter wire to the orange control wire. Cap and reseal the orange wire. Cap and isolate the blue control wire. Refer to Figure 13.

FIRING RATE CONVERSION

The rated firing rates of the CMF80 convertible furnaces (PO & PG) can be adjusted from the factory setting of 75,000 BTU/hr. The firing rate can be changed to either 65,000 BTU/hr or to 90,000 BTU/hr using the appropriate certified NORDYNE conversion kit installed by a NORDYNE distributor or Service PRO. See the Replacement Parts Listing for the appropriate kit number to order.

FURNACE OPERATING SEQUENCE

A. Gas Furnace

1. On a call for heat, the thermostat contacts close, which applies 24 volts to the "W" terminal.
2. The combustion blower motor energizes. After the motor begins to rotate, the centrifugal switch, which is located in the motor end cap, closes.
3. A thirty (30) second pre-purge period begins, during which the ignition control will initiate an internal safety start check.
4. Upon passing the safety check, the control begins a fifteen (15) second ignitor warm-up period. During this period, the ignitor will warm to the ignition temperature.
5. The control then applies 24 volts to the gas valve.
6. The ignitor ignites the gas, and the presence of flame will be detected using flame rectification principles.
7. The flame must be detected within a timed trial ignition period. If the flame is detected, then the ignitor is de-energized. The gas valve will remain open until the call for heat from the thermostat is completed. Conversely, if the flame is not detected, then the control will close the gas valve at the end of the timed trial ignition period. The control will then attempt ignition two (2) more times before locking out.
8. The circulating air blower will energize thereafter, when the temperature fan switch closes.
9. When the thermostat is satisfied, the "W" terminal is de-energized.
10. The gas valve circuit will be de-energized, and the gas valve will close.
11. The circulating air blower will de-energize, when the temperature fan switch opens.

The control will close the gas valve, if the presence of flame is not or no longer detected. The control will attempt to re-ignite the gas twice before locking out. Once in lock-out, the control

can be reset by interrupting the 24 volt power. This can be easily accomplished by setting the thermostat below room temperature for at least forty five (45) seconds, and then returning it to the desired setting.

If adjusting the thermostat does not reset the ignition control, turn off the power to the appliance for forty five (45) seconds, and then turn it back on.

NOTE: If the gas control has been replaced or serviced, lighting may not be satisfactory until air has been purged from the gas line or the gas input and combustion air have been adjusted.

B. Oil Furnace - Honeywell R7184 Control

1. When a call for heat is initiated, there is a 2-6 second delay while the control performs a safe start check.
2. The ignition and motor are turned on and a flame should be established within the 15-second lockout time.
3. If flame is not sensed within the 15-second lockout time, the control shuts down on safety lockout and must be manually reset. If control locks out three times in a row, the control enters restricted lockout. To reset, hold down the reset button for 30 seconds until the LED flashes twice.
4. Once flame is established, the ignition remains on 10 seconds to ensure flame stability. It then turns off. (interrupted ignition)
5. The circulating air blower will energize thereafter, when the temperature fan switch closes.
6. The furnace runs until the call for heat is satisfied. Burner is shut down.
7. The circulating air blower will de-energize, when the temperature fan switch opens.

ADJUSTING HEAT DISTRIBUTION

1. Set the room thermostat for the desired room temperature.
2. Balance the heat distribution by adjusting the register openings.

**SERVICE GUIDE FOR FURNACES WITH
PGB POWER BURNER WITH DIRECT
IGNITION**

 **CAUTION:**

Verify proper operation after servicing.

 **IMPORTANT:**

1. Always disconnect power before servicing.
 2. Only persons trained and experienced in direct ignition systems should service this equipment.
 3. If a condition exists that causes the ignition control to go into safety lockout, meter readings must be taken quickly after restart - within trial for ignition period.
 4. Always de-energize the system for at least 45 seconds before recycling for further tests.
 5. The ignition control cannot be repaired. If the troubleshooting procedure indicates a malfunction in the control, it must be replaced.
-

 **CAUTION:**

Label all wires prior to disconnection when servicing controls. Wiring Errors can cause improper and dangerous operation.

- A. Burner motor does not run - thermostat calls for heat.
1. Defective thermostat circuit - bridge TT connections on burner junction box, if burner motor runs, check:
 - a. Thermostat connections
 - b. Thermostat
 2. No voltage to burner - plug test lamp into burner plug receptacle, if it does not light, check for:
 - a. Blown fuse, electric supply off
 - b. Door switch not making contact
 - c. Limit switch in open mode
 - d. Check for clean air filter and proper airflow
 - e. Loose wire connections
 - f. Check for tripped manual reset auxiliary limit.
3. 120 volts is available to burner - Test lamp does not light. Remove junction box cover on burner, check for:
- a. Loose wires
 - b. Defective transformer
 - c. Defective motor
- B. Burner motor does not run, no main flame.
1. Defective centrifugal switch
 - a. Check the operation of centrifugal switch by removing end bell of the burner motor.
 2. Check for gas supply - gas line valve on, control lever on.
 3. Check for burner safety lockout. (Restart burner)
 4. Check for 24 volts to ignition control
 - a. No voltage at purge timer - check the centrifugal switch in the combustion motor.
 - b. No voltage to ignition control - check purge timer (allow one minute for purge timer to activate).
 - c. Check for 120 volts to ignition control. (-Voltmeter at L1 and L2).
- C. Ignition control is powered (120v and 24v). Ignitor does not heat up.
1. Remove AMP plug from burner tube receptacle and check for 120 volts at the plug during ignition sequence
 2. Replace ignition control if 120 volts is not supplied to AMP plug within 3 minutes of ignition cycle start.
- D. 120 volts is available at AMP plug. Ignitor does not heat up.
1. Disconnect burner plug from furnace receptacle.
 2. Disconnect AMP plug from burner tube receptacle and check ignitor circuit through receptacle with an ohmmeter.

- a. Normal ohm reading should be between 40 to 75 ohms.
- b. An infinite or zero ohm reading indicates a defective ignitor and it must be replaced.
- 3. Check for continuity from ignitor receptacle to burner ground.
- 4. Check for hairline cracks in ignitor's insulating ceramic.
- 5. Check thermostat anticipator. (0.9 amps)
- H. Burner does not shut off. (Note: Burner will stop when the door switch is open. With the door open, secure the door switch in the closed position by depressing the switch. The means for securing the door switch must be removed once this testing has been completed.

 **WARNING:**

When replacing the ignition control, replacement control MUST have the safety lockout time. FAILURE TO FOLLOW THIS WARNING MAY RESULT IN AN EXPLOSION.

- E. Main flame ignites but burner locks out.
 - 1. Ignition control is not properly grounded.
 - 2. Defective ignition control.
 - 3. Improper gas pressure or burner air adjustment is not allowing flame to contact ignitor tip for flame proving rectification.
- F. 24 volts supplied to gas valve during ignition but no main gas flow.
 - 1. Gas valve may be defective. Replace if necessary.
 - 2. Gas piping may be plugged. Check for adequate gas supply to gas valve at union.
- G. Burner operates, insufficient heat
 - 1. Check the thermostat for proper setting and location. The thermostat should not be located where it will be affected by another heat source. (Lamps, ovens, sunlight, etc.)
 - 2. Check for clean air filters and proper air flow.
 - 3. Check burner for proper gas firing rate.
 - 4. Be sure unit is not undersized for its thermal load.
- I. Burner flame without motor running — gas valve is stuck in open position — Replace the control, burner and heat exchanger may need cleaning.
- J. Noisy fire — Readjust combustion air to reduce volume of air being drawn into the burner. (Caution — See “Adjusting the Burner” or “Flame Adjustment” sections)
- K. High Gas Bills
 - 1. Check the combustion air adjustment.
 - 2. Be sure the proper size orifice is being used.
 - 3. Be sure the return air filter is clean.
 - 4. Be sure the home is insulated, windows and doors fit tightly, and there are no air leaks in the heating ducts.
 - 5. Check room thermostat to be sure the setting is not higher than necessary. Low humidity requires higher temperatures for comfort. Perhaps humidity should be increased.
- L. Circulation blower will not operate even though the burner operates.
 - 1. Turn on the manual blower switch, if the blower operates, check the fan switch.
 - 2. Check the wiring to the motor.
 - 3. Check for a burned out motor.

Control Module Status Indicator

A. Gas Furnace

1. One flash - the control is in lock-out because the inducer centrifugal switch is or was stuck closed.
2. Two flashes - the control is in lockout because the signal was not received by the control that the inducer centrifugal switch had closed within the time.
3. Three flashes - the control is in lockout because a failed ignition attempt, a gas valve error, or a false flame sensed during the warm up period. A false flame condition exists when the flame sensor senses a flame without a flame present. If a false flame has been sensed, the control will only return to normal operation after the false flame condition is no longer present.
4. Four flashes - the control is in lockout due to a failure within the control board.

B. Oil Furnace

The indicator light on the oil primary control provides lockout, recycle, and cad cell indications as follows:

1. Flashing ½ second on, ½ second off - system is locked out or in restricted mode.
2. Flashing 2 seconds on, 2 seconds off - control is in recycle mode.
3. Indicator light is on - cad cell is sensing flame.
4. Indicator light is off - cad cell is not sensing flame.

TROUBLESHOOTING- Honeywell R7184 Primary Control

The following service procedures will help you become familiar with the R7184 oil primary control. For further service information, please refer to Honeywell R7184 Installation Instructions, 69-1233 and Beckett Technician's Quick Reference Guide, RWB 61351.

A. Burner does not start with a call for heat.

1. Check the electrical supply to the furnace.
2. Be sure the furnace door switch is in the on position.
3. Check for line voltage at the oil primary control. The voltage should be 115 VAC.
4. Check indicator light with burner off, no call for heat (no flame).
 - a. If indicator light is on, the cad cell is seeing stray light or the cad cell or controller is defective.
 - b. If Indicator light is off, go to step 5.
 - c. If flashing, reset as B 1.
5. Jumper T to T terminals on primary control.
 - a. If burner starts, check thermostat or limit wiring connections.
 - b. If burner does not start, turn off power. Check all wiring connections.
 - c. If burner does not start, replace R7184 control.

B. Burner starts, then locks out on safety with indicator light flashing at ½ second on, ½ second off.

1. Reset primary control.

To reset the control from lockout, the button needs only to be pressed and released. If it is in restricted mode, the button should be held in for 30 seconds (until the light flashes twice, or until the light stops flashing on earlier models).

Note: **Restricted Mode:** If the control locks out three times in a row without a complete heat cycle between attempts, the lockout becomes restricted mode.

- a. If indicator light stops flashing and ignition remains off, primary control could be defective. If line voltage is present at the ignitor terminals, but there is no ignition, the ignitor is probably defective and needs to be replaced.
 - b. If indicator light stops flashing, burner turns on, but control locks out again, check cad cell. If cad cell is Okay, replace primary control.
 - c. If Indicator light continues to flash at ½ second on. ½ second off, verify that control is not in restricted mode, if restricted mode, reset it. If not in restricted mode, replace R7184.
 - d. If indicator light stays off while the flame is on, check cad cell sighting for view of flame.
 - e. If burner locks out, check cad cell resistance.
 - f. If burner keeps running, system is Okay.
 - g. If indicator light is off, check cad cell assembly after disconnecting line voltage power.
- C. Burner will not start, and indicator light is flashing at 2 second on, 2 second off.**
- Hold the reset button down for 1-2 seconds. If indicator light continues to flash, wait for 60-70 seconds. If it still continues to flash, replace the primary control.
- D. To Check Cad Cell Resistance.**
- Press and release the button during the run mode. The light will flash to indicate the cad cell resistance. For proper burner operation, it is important that the cad cell resistance reading is not over 1600 Ohms. For cad cell resistance, see Table 6.

Led Flashes	Cad Cell Resistance in Ohms
1	0 - 400
2	400 - 800
3	800 - 1,600
4	>1600

Table 6. Cad Cell Resistance when sensing flame

INSTALLER: Please leave these installation instructions with the homeowner.



708062

708062B (Replaces 708062A)

Specifications and illustrations subject to change without notice and without incurring obligations.
Printed in U.S.A. (8/03)

O'Fallon, MO

NORDYNE