

Installation Instructions

80+ 2-Stage & Variable Speed Category I Furnace


*8MPT

*8MPV

* Denotes Brands (C, H, T)

See section 5 for Category I definition.

SAFETY REQUIREMENTS

Recognize safety information. This is the safety-alert symbol . When you see this symbol on the furnace and in instruction manuals be alert to the potential for personal injury.

Understand the signal words *DANGER*, *WARNING*, or *CAUTION*. These words are used with the safety-alert symbol. *DANGER* identifies the most serious hazards, those that will result in severe personal injury or death. *WARNING* signifies a hazard that could result in personal injury or death. *CAUTION* is used to identify unsafe practices that may result in minor personal injury or product and property damage. NOTE is used to highlight suggestions that will result in enhanced installation, reliability, or operation.

Installing and servicing heating equipment can be hazardous due to gas and electrical components. Only trained and qualified personnel should install, repair, or service heating equipment.

Untrained service personnel can perform basic maintenance functions such as cleaning and replacing air filters. All other operations must be performed by trained service personnel. When working on heating equipment, observe precautions in the literature, on tags, and on labels attached to or shipped with the furnace and other safety precautions that may apply.

Follow all safety codes. In the United States, follow all safety codes including the National Fuel Gas Code (NFGC) ANSI Z223.1-2002/NFPA 54-2002. In Canada, refer to the of the National Standard of Canada Natural Gas and Propane Installation Code (NSCNGPIC) CSA B149.1-05. Wear safety glasses and work gloves. Have fire extinguisher available during start-up and adjustment procedures and service calls.

These instructions cover minimum requirements and conform to existing national standards and safety codes. In some instances, these instructions exceed certain local codes and ordinances, especially those that may not have kept up with changing residential construction practices. We require these instructions as a minimum for a safe installation.



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INSTALLER: Affix these instructions on or adjacent to the furnace.

CONSUMER: Retain these instructions for future reference.

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⚠ WARNING

ELECTRIC SHOCK HAZARD
Failure to follow safety warnings exactly could result in serious injury and/or death.
Turn Off All Power Before Servicing.

⚠ WARNING

CARBON MONOXIDE POISONING AND FIRE HAZARD.
Failure to follow safety warnings exactly could result in serious injury, death, and/or property damage.
This furnace is not designed for use in mobile homes, trailers or recreational vehicles.

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START-UP CHECK SHEET

(Keep this page for future reference)

Dealer Name: _____

Address: _____

City, State(Province), Zip or Postal Code: _____

Phone: _____

Owner Name: _____

Address: _____

City, State(Province), Zip or Postal Code: _____

Model Number: _____

Serial Number: _____

Type of Gas: Natural: LP:

Blower Motor H.P.: _____

Supply Voltage: _____

Which blower (DIP switch) setting is used?

Heating _____ Cooling _____ Continuous _____

For variable speed models (*8MPV), What dip switches are selected?

High Fire _____ Low Fire _____ or (Cooling) _____

Temperature of Supply Air: High Fire (°F) _____ or (°C) _____
Low Fire (°F) _____ or (°C) _____

Temperature of Return Air: (°F) _____ or (°C) _____

Temp. Rise Hi Fire (Supply - Return): (°F) _____ or (°C) _____
Lo Fire (Supply - Return): (°F) _____ or (°C) _____

Filter Type and Size: _____

Fan "Time ON" Setting: _____

Dealer Comments: _____

Business Card Here

Fan "Time OFF" Setting: _____

Manual Gas Shut-Off Upstream
of Furnace/Drip-Leg? YES NO

Drip-Leg Upstream of Gas Valve? YES NO

Blower Speed Checked? YES NO

All Electrical Connections Tight? YES NO

Electrical Polarity Checked? YES NO

Furnace Properly Grounded? YES NO

Control Status Light ON? YES NO

Gas Valve Turned ON? YES NO

Measured Line Pressure When Firing Unit: _____

Calculated Firing Rate: (High & Low Fire) (See *Checks and Adjustments* Section). _____

Measured Manifold Pressure: Hi Fire _____ Lo Fire _____

Thermostat OK? YES NO

Thermostat: Single Stage _____ Two Stage _____

Subbase Level? YES NO

Anticipator Set? YES NO Set At?: _____

Breaker On? YES NO

Date of Installation: _____

Date of Start-Up: _____

1. Safe Installation Requirements



WARNING

FIRE, EXPLOSION, AND ASPHIXIATION HAZARD

Improper adjustment, alteration, service, maintenance or installation could result in death, personal injury, and/or property damage.

Installation or repairs made by unqualified persons could result in hazards to you and others. Installation **MUST** conform with local codes or, in the absence of local codes, with codes of all governmental authorities having jurisdiction.

The information contained in this manual is intended for use by a qualified service agency that is experienced in such work, is familiar with all precautions and safety procedures required in such work, and is equipped with the proper tools and test instruments.

NOTE: This furnace is design-certified by the CSA International (formerly AGA and CGA) for installation in the United States and Canada. Refer to the appropriate codes, along with this manual, for proper installation.

- Use only the Type of gas approved for this furnace (see **Rating Plate** on unit). Overfiring will result in failure of heat exchanger and cause dangerous operation. (Furnaces can be converted to LP gas with approved kit.)
 - Install this furnace only in a location and position as specified in "2. *Installation*" of these instructions.
 - Provide adequate combustion and ventilation air to the furnace as specified in "4. *Combustion and Ventilation Air*" of these instructions.
 - Combustion products must be discharged outdoors. Connect this furnace to an approved vent system only, as specified in "5. *Combustion and Ventilation Air*, 6. *Horizontal Venting* and 7. *Masonry Chimney Venting*" of these instructions.
 - Never test for gas leaks with an open flame. Use a commercially available soap solution made specifically for the detection of leaks to check all connections, as specified in "8. *Gas Supply and Piping, Final Check*" of these instructions.
 - Always install furnace to operate within the furnace's intended temperature-rise range with a duct system which has an external static pressure within the allowable range, as specified in "*Technical Support Manual*" of these instructions. See furnace rating plate.
 - When a furnace is installed so that supply ducts carry air circulated by the furnace to areas outside the space containing the furnace, the return air shall also be handled by a duct(s) sealed to the furnace casing and terminating outside the space containing the furnace.
 - A gas-fired furnace for installation in a residential garage must be installed as specified in "2. *Installation Requirements*" of these instructions.
 - This furnace is not to be used for temporary heating of buildings or structures under construction. See "2. *Installation*", item 10.
 - This furnace is **NOT** approved for installation in mobile homes, trailers or recreation vehicles.
- Seal around supply and return air ducts.
 - Install correct filter type and size.
 - Unit **MUST** be installed so electrical components are protected from direct contact with water.

Safety Rules

Your unit is built to provide many years of safe and dependable service providing it is properly installed and maintained. However, abuse and/or improper use can shorten the life of the unit and create hazards for you, the owner.

- A. The U.S. Consumer Product Safety Commission encourages installation of carbon monoxide alarms. There can be various sources of carbon monoxide in a building or dwelling. The sources could be gas-fired clothes dryers, gas cooking stoves, water heaters, furnaces, gas-fired fireplaces, wood fireplaces.

Carbon monoxide can cause serious bodily injury and/or death. Carbon monoxide or "CO" is a colorless and odorless gas produced when fuel is not burned completely or when the flame does not receive sufficient oxygen.

Therefore, to help alert people of potentially dangerous carbon monoxide levels, you should have a commercially available carbon monoxide alarm that is listed by a nationally recognized testing agency in accordance with Underwriters Laboratories Inc. Standard for Single and Multiple Station Carbon Monoxide Alarms, ANSI/UL 2034 or the CSA 6.19-01 Residential Carbon Alarming Devices installed and maintained in the building or dwelling concurrently with the gas-fired furnace installation (see Note below). The alarm should be installed as recommended by the alarm manufacturer's installation instructions.

- B. There can be numerous sources of fire or smoke in a building or dwelling. Fire or smoke can cause serious bodily injury, death, and/or property damage. Therefore, in order to alert people of potentially dangerous fire or smoke, you should have fire extinguisher and smoke alarms listed by Underwriters Laboratories installed and maintained in the building or dwelling (see Note below).

Note: The manufacturer of your furnace does not test any alarms and makes no representations regarding any brand or type of alarms.

- C. To ensure safe and efficient operation of your unit, you should do the following:

1. **Thoroughly read this manual and labels on the unit.** This will help you understand how your unit operates and the hazards involved with gas and electricity.
2. **Do not use this unit if any part has been under water.** Immediately call a qualified service technician to inspect the unit and to replace any part of the control system and any gas control which has been under water.
3. **Never obstruct the vent grilles, or any ducts that provide air to the unit.** Air must be provided for proper combustion and ventilation of flue gases.

Frozen Water Pipe Hazard

WARNING

WATER DAMAGE TO PROPERTY HAZARD

Failure to protect against the risk of freezing could result in property damage.

Do not leave your home unattended for long periods during freezing weather without turning off water supply and draining water pipes or otherwise protecting against the risk of frozen pipes and resultant damage.

Your furnace is designed solely to provide a safe and comfortable living environment. The furnace is NOT designed to ensure that water pipes will not freeze. It is equipped with several safety devices that are designed to turn the furnace off and prevent it from restarting in the event of various potentially unsafe conditions.

2. Installation

WARNING

CARBON MONOXIDE POISONING HAZARD.

Failure to properly vent this furnace or other appliances could result in death or personal injury.

If this furnace is replacing a previously common-vented furnace, it may be necessary to resize the existing vent system to prevent oversizing problems for the other remaining appliances(s). See *Venting and Combustion Air Check* in the 5. *Gas Vent Installation* section of this instruction.

Location and Clearances

If furnace is a replacement, it is usually best to install the furnace where the old one was. Choose the location or evaluate the existing location based upon the minimum clearance and furnace dimensions (Figure 1).

WARNING

CARBON MONOXIDE POISONING HAZARD.

Failure to follow safety warnings exactly could result in death or personal injury.

Do NOT operate furnace in a corrosive atmosphere containing chlorine, fluorine or any other damaging chemicals, which could shorten furnace life.

Refer to 4. *Combustion & Ventilation Air* section, Contaminated Combustion Air for combustion air evaluation and remedy.

Installation Requirements

1. Install furnace level.
2. This furnace is NOT to be used for temporary heat of buildings or structures under construction.
3. Install furnace as centralized as practical with respect to the heat distribution system.
4. Install the vent pipes as short as practical. (See Gas Vent Installation section).
5. Do NOT install furnace directly on carpeting, tile or other combustible material other than wood flooring.

If your furnace remains off for an extended time, the pipes in your home could freeze and burst, resulting in serious water damage.

If the structure will be unattended during cold weather you should take these precautions.

1. Turn off the water supply to the structure and drain the water lines if possible and add an antifreeze for potable water to drain traps and toilet tanks. Open faucets in appropriate areas.

-or-

2. Have someone check the structure frequently during cold weather to make sure it is warm enough to prevent pipes from freezing. Instruct them on a service agency to call to provide service, if required.

-or-

3. Install a reliable remote sensing device that will notify somebody of freezing conditions within the home.

6. Maintain clearance for fire safety and servicing. A front clearance of 24" is minimum for access to the burner, controls and filter. See clearance requirements in Figure 1.

7. Use a raised base if the floor is damp or wet at times.

8. Residential garage installations require:

- Burners and ignition sources installed at least 18" (457 mm) above the floor.
- Furnace must be located or physically protected from possible damage by a vehicle.

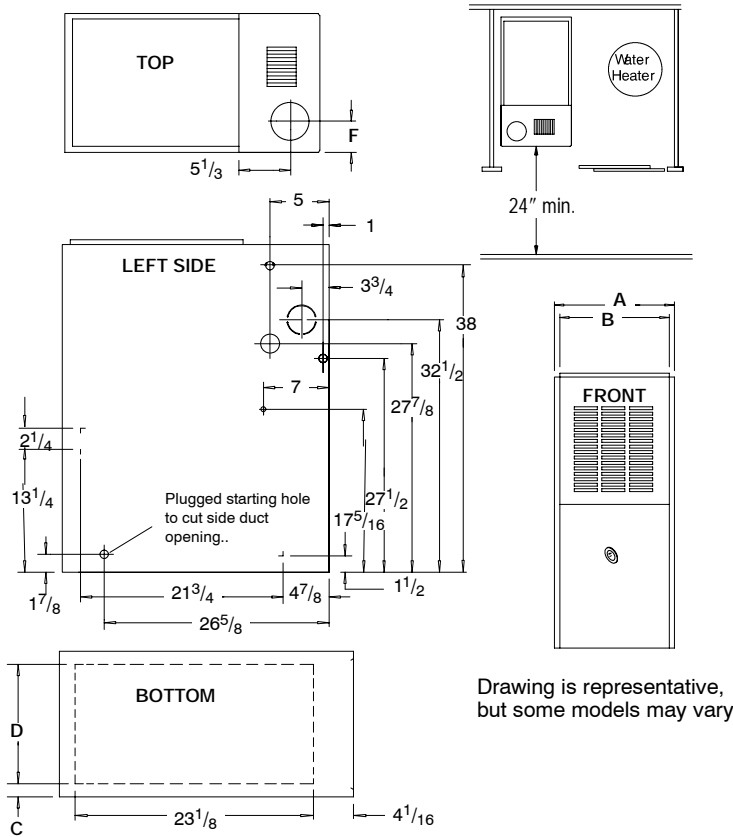
9. If the furnace is to be suspended from the floor joists in a basement or a crawl space or the rafters in an attic, it is necessary to use steel pipe straps or an angle iron frame to attach the furnace. The preferred method is to use an angle iron frame bolted to the rafters or joists.

10. This furnace may be used for construction heat provided that:

- The furnace is permanently installed with all electrical wiring, piping, venting and ducting installed according to these installation instructions. A return air duct is provided, sealed to the furnace casing, and terminated outside the space containing the furnace. This prevents a negative pressure condition as created by the circulating air blower, causing a flame rollout and/or drawing combustion products into the structure.
- The furnace is controlled by a thermostat. It may not be "hot wired" to provide heat continuously to the structure without thermostatic control.
- Clean outside air is provided for combustion. This is to minimize the corrosive effects of adhesives, sealers and other construction materials. It also prevents the entrainment of drywall dust into combustion air, which can cause fouling and plugging of furnace components.
- The temperature of the return air to the furnace is maintained between 55° F (13° C) and 80° F (27° C), with no evening setback or shutdown. The use of the furnace while the structure is under construction is deemed to be intermittent operation per our installation instructions.
- The air temperature rise is within the rated rise range on the furnace rating plate, and the firing rate has been set to the rating plate value.
- The filters used to clean the circulating air during the construction process must be either changed or thoroughly cleaned prior to occupancy.

- The furnace, ductwork and filters are cleaned as necessary to remove drywall dust and construction debris from all HVAC system components after construction is completed.
- After construction is complete, verify proper furnace operating conditions including ignition, gas input rate, air temperature rise, and venting according to these installation instructions.

Figure 1 Dimensions and Clearances (*8MPT/*8MPV)



MINIMUM CLEARANCES TO COMBUSTIBLE MATERIALS FOR ALL UNITS	
REAR	0
FRONT (combustion air openings in furnace and in structure)	3"
Required For Service	*24"
ALL SIDES OF SUPPLY PLENUM	1"
SIDES	0
VENT	
Single Wall Vent	6"
Type B-1 Double Wall Vent	1"
TOP OF FURNACE	1"

*30" clearance recommended for furnace removal.

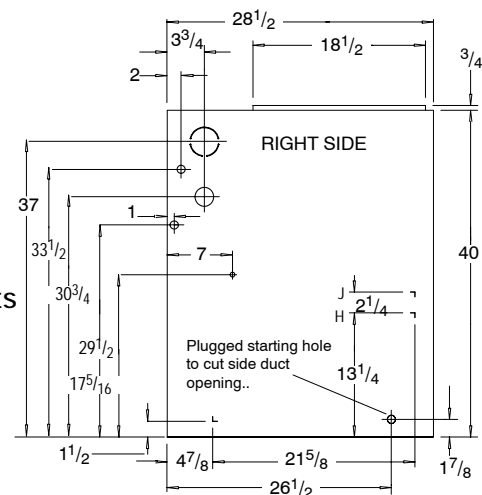
Horizontal position: Line contact is permissible only between lines formed by intersections of top and two sides of furnace jacket, and building joists, studs or framing.

ALL DIMENSIONS IN INCHES

DIMENSIONAL INFORMATION

Furnace Capacity	Cabinet		Top	Bottom		Return Air Opening
	A	B	F	C	D	
*8MPT/V050B12	15 1/2	14	6	13 3/8	12 5/8	H
*8MPT/V075F14 *8MPT100F14	19 1/8	17 1/2	7 3/4	2 1/8	14 3/4	J
*8MPT/V100J20 *8MPT/V125J20	22 3/4	21 1/4	9 1/2	1 15/16	18 3/4	J

* Denotes Brand



NOTE: Evaporator "A" coil drain pan dimensions may vary from furnace duct opening size. Always consult evaporator specifications for duct size requirements.

Furnace is designed for bottom return or side return. Return air through back of furnace is NOT allowed.

Installation Positions

This furnace can be installed in an upflow, horizontal (either left or right) or downflow airflow position. DO NOT install this furnace on its back. For the upflow position, the return air ductwork can be attached to either the left or right side panel and/or the bottom. For horizontal and downflow positions, the return air ductwork must be attached to the bottom. The return air ductwork must never be attached to the back of the furnace.

Furnace Installation

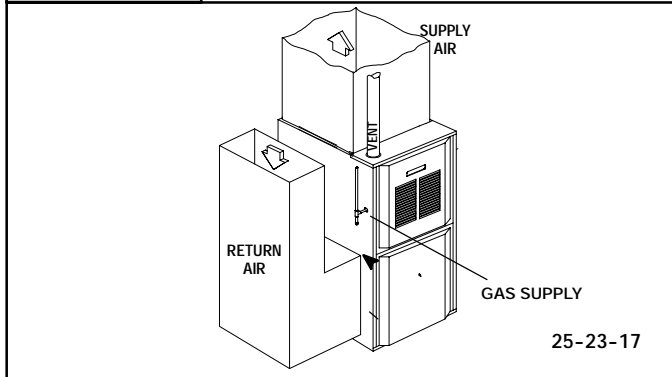
Inspect the rating plate to be certain the model number begins with "**8MPV" or "**8MPT". This identifies the unit as a multi-position furnace and can be installed in a Upflow, Horizontal Right, Horizontal Left or Downflow position

Upflow

No modifications are required for upflow installation. (See Figure 2)

Figure 2

Typical Upflow Installation



Horizontal

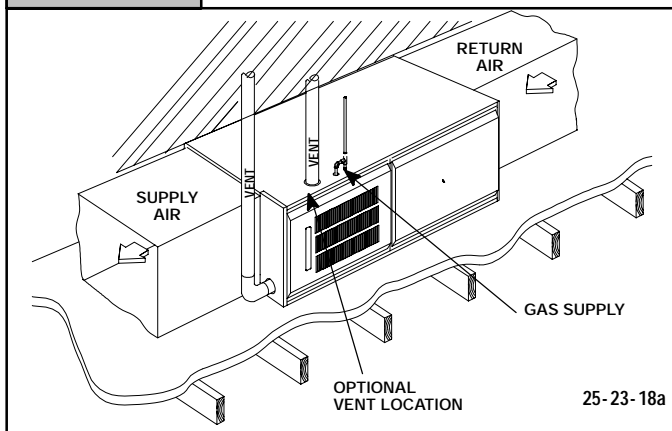
If you purchased a multi-position furnace, it can be installed horizontally in an attic, basement, crawl space, alcove, or suspended from a ceiling in a basement or utility room in either a right or left airflow position. (see Figure 3)

Horizontally installed furnaces may be vented out the top of the unit or out the side facing up. See "Side venting" for instructions to rotate the vent to the side.

The minimum clearances to combustibles **MUST** be maintained between the furnace and adjacent construction, as shown in Figure 1. **ONLY** the corner of the cabinet is allowed to contact the rafters Figure 3. All other clearances **MUST** be observed as shown in Figure 1.

Figure 3

Typical Horizontal Installation



If the furnace is to be suspended from the floor joists in a crawl space or the rafters in an attic, it is necessary to use steel pipe straps or an angle iron frame to attach the furnace. These straps should be attached to the furnace bottom side with sheet metal screws and to the rafters or joists with bolts. The preferred method is to use an angle iron frame bolted to the rafters or joists.

If the furnace is to be installed ground level in a crawl space, consult local codes. A concrete pad 1" to 2" thick is recommended.

Twentyfour inches (24") is recommended between the front of the furnace and adjacent construction or other appliances. This should be maintained for service clearance. (Thirty inches (30") is required to remove furnace).

Keep all insulating materials clear from louvered door. Insulating materials may be combustible.

The horizontal furnaces may be installed directly on combustible wood flooring or supports, however, it is recommended for further fire protection cement board or sheet metal is placed between the furnace and the combustible wood floor and extend 12" beyond the front of the furnace louver door. (This is a recommendation only, not a requirement).

This furnace **MUST NOT** be installed directly on carpeting, tile or other combustible material other than wood flooring or supports.

Downflow



WARNING

FIRE HAZARD.

Failure to install furnace on noncombustible subbase could result in death, personal injury and/or property damage.

Place furnace on noncombustible subbase on downflow applications, unless installing on noncombustible flooring.

The Multi-position furnace (*8MPT or *8MPV) may be installed in a downflow configuration, (see Figure 4). The minimum clearances to combustion **MUST** be maintained between the furnace and adjacent constructions, as shown in Figure 1.

In addition to clearances in Figure 1, clearance for the vent pipe must be considered.

A subbase for combustible floors **MUST** be used when the furnace is installed as a downflow on combustible material. See "11. Ductwork and Filter" (Downflow Section page 24). The outlet flange must be bent flat for downflow installation.

When installing a four-position furnace in the downflow position, the logo is to be repositioned so that it is right side-up as follows:

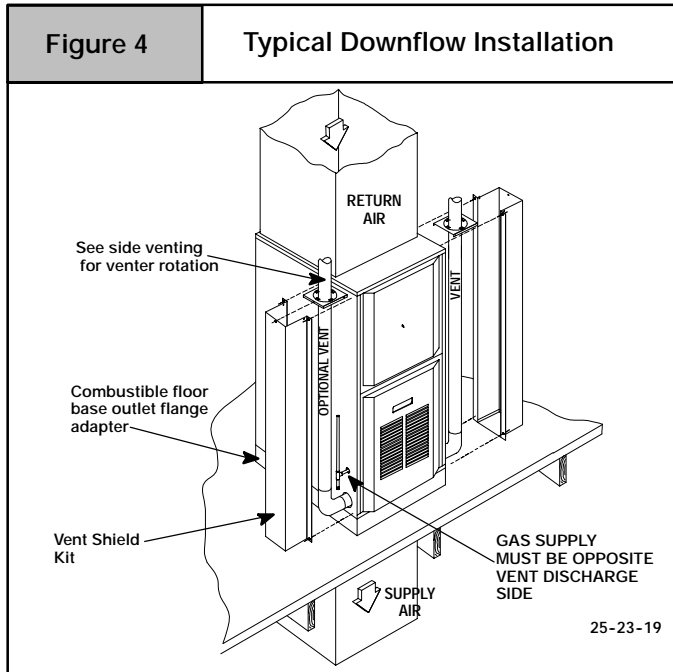
"3" Designation on End of Model Number

1. Find the door hardware kit that is stored in the furnace and save it.
2. Carefully remove logo from the outside of burner compartment door and save it.
3. Carefully remove two small plug buttons from outside of blower compartment door and save them.
4. Remove two thumbscrews from blower compartment door. Save the two thumbscrews.
5. Install two thumbscrews in holes at other end of blower compartment door from where thumbscrews were removed.
6. Install new strip of rubber gasket on inside of blower compartment door on edge that does not already have a gasket.
7. Install logo retainer pins into holes in blower compartment door from which plug buttons were removed.
8. Install plug buttons into holes in burner compartment door from which logo was removed.
9. Install blower compartment door on furnace with bevel edge and logo at top.
10. Install burner compartment door on furnace with bevel edge at bottom.

C8MPT, C8MPV, H8MPT, and H8MPV

1. Carefully remove logo from burner compartment door and save it.
2. Turn the logo rightside-up, and install the logo retainer pins into holes in burner compartment door

3. New labels for rightside-up application on outside of blower compartment door may be purchased in a kit from your distributor to cover upside-down labels.



Downflow Venting: The combustion venter **MUST** be rotated to vent out the side for all downflow installations, (see Figure 4). Bot-

tom venting is not permitted. See “Side venting” for instructions to rotate the vent to the side. In addition to rotating the vent to the side, a Vent Pipe Shield (NAHA002VC) is required to shield the hot vent pipe.

⚠ WARNING

BURN HAZARD.
Vent pipe is **HOT** and could result in personal injury. Hot vent pipe is in reach of small children when installed in downflow position.
Install vent pipe shield NAHA002VC.

Pressure Switch Relocation

If the furnace is installed in the upflow position, the pressure switch will remain in the same position as installed by the factory unless the inducer is rotated. If the furnace is installed in an orientation that places the pressure switch below the pressure tap on the inducer housing, then the switch **MUST** be relocated. In order to relocate the switch, locate 2 mounting holes or drill above the inducer pressure tap. When drilling the 2 holes make sure to keep the switch and tubing far enough away from the burners or hot surfaces as to not melt the hose, switch, or wires. To prevent possible kinking of the pressure switch hose, trim the hose to remove excess length. If additional wire length is needed, cut the wire tie.

Note: When drilling new holes make sure metal shavings do not fall on or in components, as this can shorten the life of the furnace.

3. Side Venting

This furnace is shipped from the factory with the venter assembly in an upflow configuration (top vent). The venter assembly can easily be rotated to a side vent configuration for use in upflow, horizontal-flow, or downflow application.

When using a side vent configuration (side outlet instead of top outlet), it may be necessary to relocate the pressure switch to the alternate position on the opposite side of the top panel. Two screw holes are provided at the alternate position. Route the pressure switch tubing so the tubing is not kinked and not touching the hot collector box, venter housing, or motor. It may be necessary to shorten the length of the tubing to properly route the tubing and eliminate kinks.

Rotating the Venter Assembly

1. If gas and electrical power has already been connected to unit, shut off gas and remove power from unit. Unscrew screws on burner compartment door and remove burner compartment door. See Figure 5.
2. Disconnect power leads to the venter motor and hose to pressure switch. Remove four (4) screws which secure the venter to the collector box, (see Figure 6).
3. Cut webbing with a pair of snips holding the vent plate to the cabinet on either the left or right side of unit depending on right or left venting as desired. Discard vent plate, (see Figure 5).

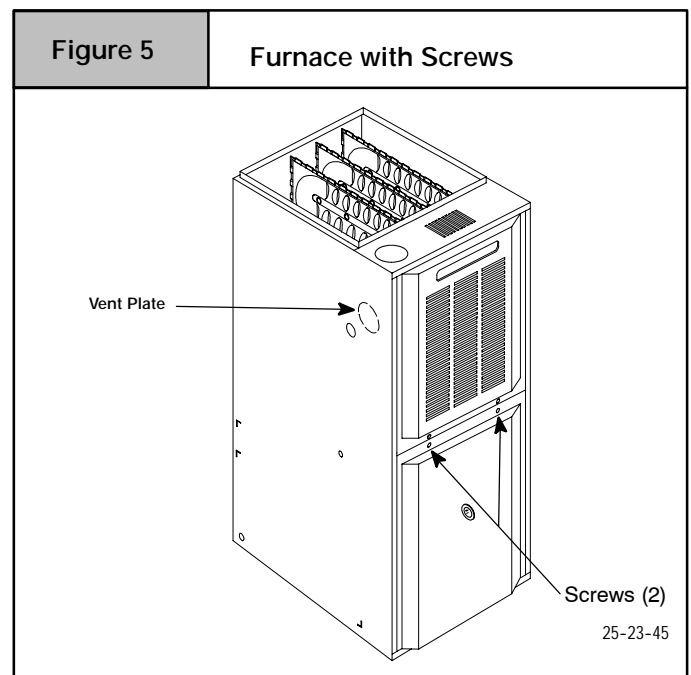
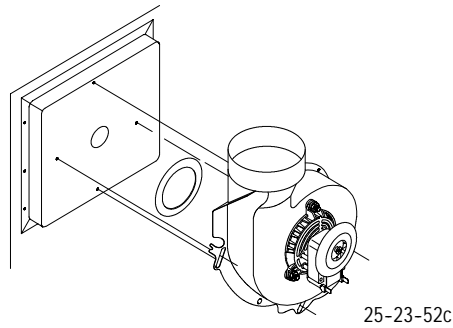


Figure 6

Venter Gasket



4. Replace venter gasket (part # 1013540, if needed) to venter assembly with adhesive in the same location as the old one.
5. Rotate venter assembly 90° right or left from original location depending on venting configurations.
6. Tighten the four(4) screws that secure the venter assembly to the collector box. Do not overtighten. Do tighten screws enough to compress venter gasket.
7. Replace power leads to venter motor and reconnect hose to pressure switch.

NOTE: Unused open vent hole must be covered. A Vent Cover is supplied with Vent Pipe Shield Kit NAHA002VC. A 5⁵/₁₆" diameter Vent Cover can be fabricated with sheet metal for all side vent installations.

4. Combustion & Ventilation Air



WARNING

CARBON MONOXIDE POISONING HAZARD.

Failure to provide adequate combustion and ventilation air could result in death or personal injury.

Use methods described here to provide combustion and ventilation air.

Furnaces require ventilation openings to provide sufficient air for proper combustion and ventilation of flue gases. All duct or openings for supplying combustion and ventilation air must comply with the gas codes, or in the absence of local codes, the applicable national codes.

Combustion and ventilation air must be supplied in accordance with one of the following:

1. Section 8.3, Air for Combustion and Ventilation, of the National Fuel Gas Code, National Fuel Gas Code (NFGC), ANSI Z223.1-2002/NFPA 54-2002 in the U.S.,
2. Sections 7.2, 7.3, 7.5, 7.6, 7.7, and 7.8 of National Standard of Canada, Natural Gas and Propane Installation Code (NSCNGPIC), CSA B149.1-05 in Canada,
3. Applicable provisions of the local building code.

When the installation is complete, check that all appliances have adequate combustion air and are venting properly. See *Venting And Combustion Air Check* in "5. Gas Vent Installation" Section in this manual.

Contaminated Combustion Air

Installations in certain areas or types of structures could cause excessive exposure to contaminated air having chemicals or halogens that will result in safety and performance related problems and may harm the furnace. These instances must use only outdoor air for combustion.

The following areas or types of structures may contain or have exposure to the substances listed below. The installation must be evaluated carefully as it may be necessary to provide outdoor air for combustion.

- Commercial buildings.
- Buildings with indoor pools.
- Furnaces installed in laundry rooms.
- Furnaces installed in hobby or craft rooms.
- Furnaces installed near chemical storage areas.
- Permanent wave solutions for hair.

- Chlorinated waxes and cleaners.
- Chlorine based swimming pool chemicals.
- Water softening chemicals.
- De-icing salts or chemicals.
- Carbon tetrachloride.
- Halogen type refrigerants.
- Cleaning solvents (such as perchloroethylene).
- Printing inks, paint removers, varnishes, etc..
- Hydrochloric acid.
- Sulfuric Acid.
- Solvent cements and glues.
- Antistatic fabric softeners for clothes dryers.
- Masonry acid washing materials.

Outdoor Combustion Air Method

A space having less than 50 cubic feet per 1,000 BTUH input rating for all gas appliances installed in the space requires outdoor air for combustion and ventilation.

Air Openings and Connecting Ducts

1. Total maximum input ratings for all gas appliances in the space **MUST** be considered when determining free area of openings.
2. Connect ducts or openings directly to the outdoors.
3. When screens are used to cover openings, the openings **MUST** be no smaller than 1/4" mesh.
4. The minimum dimension of air ducts **MUST NOT** be less than 3" .
5. When sizing grille, louver or screen, use the free area of opening. If free area is **NOT** stamped or marked on grill or louver, assume a 20% free area for wood and 60% for metal. Screens shall have a mesh size not smaller than 1/4" .

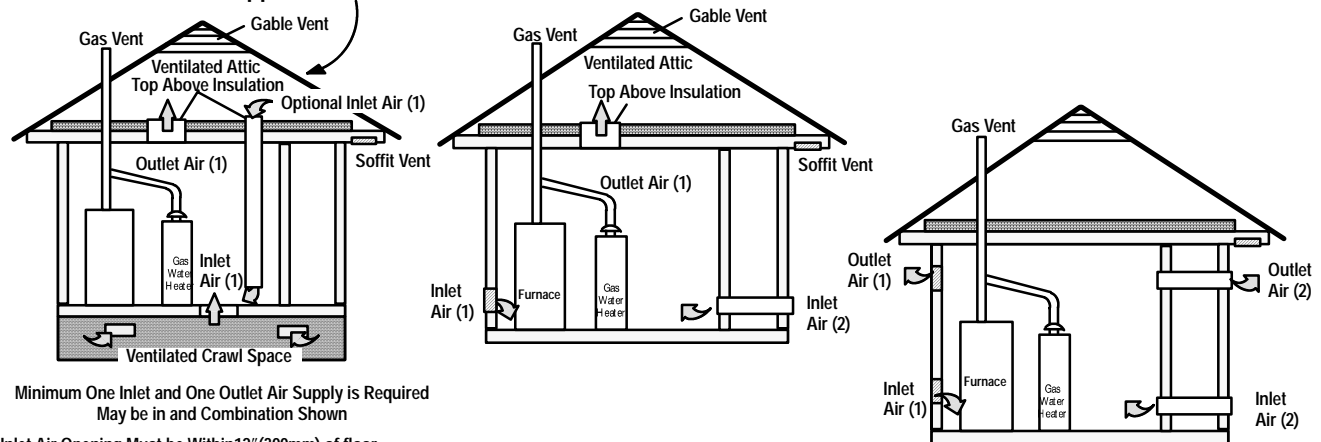
Requirements

1. Provide confined space with sufficient air for proper combustion and ventilation of flue gases using horizontal or vertical ducts or openings.
2. Figure 7 illustrates how to provide combustion and ventilation air when two permanent openings, one inlet and one outlet, are used.
 - a. One opening **MUST** commence within 12" of the floor and the second opening **MUST** commence within 12" of the ceiling.
 - b. Size openings and ducts per Table 1.

Figure 7

Outdoor Air (This is ONLY a guide. Subject to codes of country having jurisdiction.)

This installation NOT approved in Canada



Minimum One Inlet and One Outlet Air Supply is Required
May be in and Combination Shown

Inlet Air Opening Must be Within 12" (300mm) of floor

Outlet Air Opening Must be Within 12" (300mm) of ceiling

(1) 1 Square Inch (6cm²) per 4000 BTUH

(2) 1 Square Inch (6cm²) per 2000 BTUH

- c. Horizontal duct openings require 1 square inch of free area per 2,000 BTUH (1,100 mm²/kW) of combined input for all gas appliances in the space (see Table 1).
 - d. Vertical duct openings or openings directly communicating with the outdoors require 1 square inch of free area per 4,000 BTUH (550 mm²/kW) for combined input of all gas appliances in the space (see Table 1).
3. When one permanent outdoor opening is used, the opening requires:
- a. 1 sq. in. of free area per 3,000 BTUH (700 mm²/kW) for combined input of all gas appliances in the space (see Table 1) and
 - b. not less than the sum of the areas of all vent connectors in the space.
- The opening shall commence within 12" of the top of the enclosure. Appliances shall have clearances of at least 1" from the sides and back and 6" from the front. The opening shall directly communicate with the outdoors or shall communicate through a vertical or horizontal duct to the outdoors or spaces (crawl or attic) that freely communicate with the outdoors.
4. Combination of Indoor and Outdoor Air shall have:
- a. Indoor openings that comply with the Indoor Combustion Air Method below and
 - b. Outdoor openings located as required in the Outdoor Combustion Air Method above and
 - c. Outdoor openings sized as follows.
 - 1) Calculate the Ratio of all Indoor Space volume divided by required volume for Indoor Combustion Air Method.
 - 2) Outdoor opening size reduction Factor is 1 minus the Ratio in 1) above.
 - 3) Minimum size of Outdoor openings shall be the size required in Outdoor Combustion Air Method above multiplied by reduction Factor.

Table 1		Free Area			
BTUH Input Rating	Minimum Free Area Required for Each Opening or Duct to Outdoors				
	Two Horizontal Ducts (sq. in./2,000 BTUH)	Single Opening (sq. in./3,000 BTUH)	Two Vertical Ducts or Openings (sq. in./4,000 BTUH)	Rd Duct (sq. in./4,000 BTUH)	
50,000	25 sq. in.	16.7 sq. in.	12.5 sq. in.	4"	
75,000	37.5 sq. in.	25 sq. in.	18.75 sq. in.	5"	
100,000	50 sq. in.	33.3 sq. in.	25 sq. in.	6"	
125,000	62.50 sq. in.	41.7 sq. in.	31.25 sq. in.	7"	
150,000	75 sq. in.	50 sq. in.	37.5 sq. in.	7"	

EXAMPLE: Determining Free Area

Furnace	Water Heater		Total Input	
100,000	30,000	=	(130,000 ÷ 4,000)	= 32.5 Sq. In. Vertical
Furnace	Water Heater		Total Input	
100,000	30,000	=	(130,000 ÷ 2,000)	= 65 Sq. In. Horizontal

Indoor Combustion Air

Standard and Known-Air-Infiltration Rate Methods

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Indoor air is permitted for combustion and ventilation, if the Standard or Known-Air-Infiltration Rate Method is used.

⚠ WARNING

CARBON MONOXIDE POISONING HAZARD.
 Failure to supply adequate combustion air could result in death or personal injury.
 Most homes will require additional air from outdoors for combustion and ventilation. A space with at least 50 cubic feet per 1,000 BTUH input rating or homes with tight construction may need outdoor air, supplied through ducts, to supplement air infiltration for proper combustion and ventilation of flue gases.

The Standard Method may be used, if the space has no less volume than 50 cubic feet per 1,000 BTUH of the maximum input ratings for all gas appliances installed in the space. The standard method permits indoor air to be used for combustion and ventilation air.

The Known Air Infiltration Rate Method shall be used if the infiltration rate is known to be less than 0.40 air changes per hour (ACH) and equal to or greater than 0.10 ACH. Infiltration rates greater than 0.60 ACH shall not be used. The minimum required volume of the space varies with the number of ACH and shall be determined per Table 2 or Equations 1 and 2. Determine the minimum required volume for each appliance in the space, and add the volumes together to get the total minimum required volume for the space.

Table 2	MINIMUM SPACE VOLUME FOR 100% COMBUSTION AND VENTILATION AIR FROM INDOORS (ft ³)							
	Other Than Fan-Assisted Total (1,000's Btuh)			Fan-assisted Total (1,000's Btuh)				
ACH	30	40	50	50	75	100	125	150
0.60	1,050	1,400	1,750	1,250	1,875	2,500	3,125	3,750
0.50	1,260	1,680	2,100	1,500	2,250	3,000	3,750	4,500
0.40	1,575	2,100	2,625	1,875	2,813	3,750	4,688	5,625
0.30	2,100	2,800	3,500	2,500	3,750	5,000	6,250	7,500
0.20	3,150	4,200	5,250	3,750	5,625	7,500	9,375	11,250
0.10	6,300	8,400	10,500	7,500	11,250	15,000	18,750	22,500
0.00	NP	NP	NP	NP	NP	NP	NP	NP

NP = Not Permitted

Table 2 Minimum Space Volumes were determined by using the following equations from the National Fuel Gas Code ANSI Z223.1/NFPA 54-2002, 8.3.3.2:

- For other than fan-assisted appliances such as a draft hood-equipped water heater,

$$\text{Volume}_{\text{other}} = \frac{21 \text{ ft}^3}{\text{ACH}} \left(\frac{I_{\text{other}}}{1000 \text{ Btu / hr}} \right)$$

- For fan-assisted appliances such as this furnace,

$$\text{Volume}_{\text{fan}} = \frac{15 \text{ ft}^3}{\text{ACH}} \left(\frac{I_{\text{fan}}}{1000 \text{ Btu / hr}} \right)$$

If:

I_{other} = combined input of all other than fan-assisted appliances in Btu/hr

I_{fan} = combined input of all fan-assisted appliances in Btu/hr

ACH = air changes per hour (ACH shall not exceed 0.60.)

The following requirements apply to the Standard Method and to the Known Air Infiltration Rate Method.

- Adjoining rooms can be considered part of a space, if there are no closable doors between rooms.
- An attic or crawl space may be considered a space that freely communicates with the outdoors provided there are adequate ventilation openings directly to outdoors. Openings

MUST remain open and **NOT** have any means of being closed off. Ventilation openings to outdoors **MUST** be at least 1 square inch of free area per 4,000 BTUH of total input rating for all gas appliances in the space.

- In spaces that use the Indoor Combustion Air Method, infiltration should be adequate to provide air for combustion, ventilation and dilution of flue gases. However, in buildings with unusually tight construction, additional air **MUST** be provided using the methods described in section titled *Outdoor Combustion Air Method*.
- Unusually tight construction is defined as Construction with
 - Walls and ceilings exposed to the outdoors have a continuous, sealed vapor barrier. Openings are gasketed or sealed and
 - Doors and openable windows are weather stripped and
 - Other openings are caulked or sealed. These include joints around window and door frames, between sole plates and floors, between wall-ceiling joints, between wall panels, at penetrations for plumbing, electrical and gas lines, etc.

Ventilation Air

Some provincial codes and local municipalities require ventilation or make-up air be brought into the conditioned space as replacement air. Whichever method is used, the mixed return air temperature across the heat exchanger **MUST** not fall below 60° continuously, or 55° on an intermittent basis so that flue gases will not condense excessively in the heat exchanger. Excessive condensation will shorten the life of the heat exchanger and possibly void your warranty.

5. Gas Vent Installation



WARNING

CARBON MONOXIDE POISONING, FIRE AND EXPLOSION HAZARD.

Failure to properly vent this furnace could result in death, personal injury and/or property damage.

Read and follow all instructions in this section.

Install the vent in compliance with codes of the country having jurisdiction, local codes or ordinances and these instructions.

This Category I furnace is fan-assisted.

Category I furnace definition: A central furnace which operates with a non-positive vent static pressure and with a flue loss not less than 17 percent. These furnaces are approved for common-venting and multi-story venting with other fan-assisted or draft hood-equipped appliances in accordance with the NFGC or NSCNPGIC.

Category I Safe Venting Requirements

Category I furnace vent installations shall be in accordance with Parts 10 and 13 of the National Fuel Gas Code (NFGC), ANSI Z223.1-2002/NFPA 54-2002; and/or Section 7 and Appendix C of the CSA B149.1-05, National Standard of Canada, Natural Gas and Propane Installation Code; the local building codes; furnace and vent manufacturer's instructions.

NOTE: The following instructions comply with the ANSI Z223.1/NFPA 54 National Fuel Gas Code and CSA B149.1 Natural Gas and Propane Installation code, based on the High-Heat input rate on the furnace rating plate.

1. If a Category I vent passes through an attic, any concealed space or floor, use **ONLY** Type B or Type L double wall vent pipe. If vent pipe passes through interior wall, use type B vent pipe with ventilated thimble **ONLY**.
2. Do **NOT** vent furnace into any chimney serving an open fireplace or solid fuel burning appliance.
3. Use the same diameter Category I connector or pipe as permitted by:
 - by the National Fuel Gas Code Code (NFGC) ANSI Z223.1-2002 / NFPA 54-2002 sections 10 and 13 venting requirements in the United States
 - or
 - the National Standard of Canada Natural Gas and Propane Installation Code (NSCNPGIC) CSA B149.1-05 section 7 and appendix C venting requirements in Canada.
4. Push the vent connector onto the furnace flue collar of the venter assembly until it touches the bead (at least $\frac{5}{8}$ " overlap) and fasten with at least two field-supplied, corrosion-resistant, sheet metal screws located at least 140° apart.
5. Keep vertical Category I vent pipe or vent connector runs as short and direct as possible.
6. Vertical outdoor runs of Type-B or **ANY** single wall vent pipe below the roof line are **NOT** permitted.
7. Slope all horizontal runs upwards from furnace to the vent terminal a minimum of $\frac{1}{4}$ " per foot (21 mm/m).
8. Rigidly support all horizontal portions of the venting system every 6' or less using proper clamps and metal straps to prevent sagging and ensure there is no movement after installation.
9. Check existing gas vent or chimney to ensure they meet clearances and local codes. See **Figure 1**
10. The furnace **MUST** be connected to a factory built chimney or vent complying with a recognized standard, or a masonry or concrete chimney lined with a lining material acceptable to the authority having jurisdiction. **Venting into an unlined masonry chimney or concrete chimney is prohibited.** See the *Masonry Chimney Venting* section in these instructions.
11. Fan-assisted combustion system Category I furnaces shall not be vented into single-wall metal vents.
12. Category I furnaces must be vented vertically or nearly vertically, unless equipped with a listed mechanical venter.
13. Vent connectors serving Category I furnaces shall not be connected into any portion of mechanical draft systems operating under positive pressure.

Venting and Combustion Air Check

NOTE: When an existing Category I furnace is removed or replaced, the original venting system may no longer be sized to properly vent the attached appliances, and to make sure there is adequate combustion air for all appliances, MAKE THE FOLLOWING CHECK.



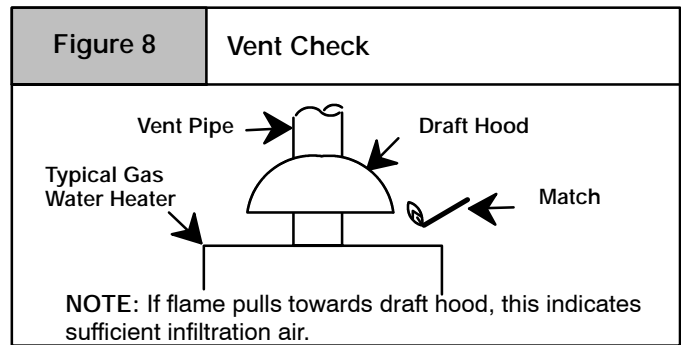
WARNING

CARBON MONOXIDE POISONING HAZARD

Failure to follow the steps outlined below for each appliance connected to the venting system being placed into operation, could result in carbon monoxide poisoning or death:

The following steps shall be followed for each appliance connected to the venting system being placed into operation, while all other appliances connected to the venting system are not in operation:

1. Seal any unused openings in the venting system.
2. Inspect the venting system for proper size and horizontal pitch, as required in the *National Fuel Gas Code, ANSI Z223.1/NFPA 54* or *CSA B149.1, Natural Gas and Propane Installation Code* and these instructions. Determine that there is no blockage or restriction, leakage, corrosion and other deficiencies which could cause an unsafe condition.
3. As far as 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.
4. Close fireplace dampers.
5. 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 are operating at maximum speed. Do not operate a summer exhaust fan.
6. Follow the lighting instructions. Place the appliance being inspected into operation. Adjust the thermostat so appliance is operating continuously.
7. Test for spillage from draft hood equipped appliances at the draft hood relief opening after 5 minutes of main burner operation. Use the flame of a match or candle. (Figure 8)
8. If improper venting is observed, during any of the above tests, the venting system must be corrected in accordance with the *National Fuel Gas Code, ANSI Z223.1/NFPA 54* and/or *CSA B149.1, Natural Gas and Propane Installation Code*.
9. 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-fired burning appliance to their previous conditions of use.



Venting to Existing Masonry Chimney

NOTE: The tables and notes referred to below are found in the most recent printing of the NFGC venting tables.

Use the NFGC or NSCNPIC Tables to size the chimney or vent. **Dedicated venting of one fan assisted furnace into any masonry chimney is restricted.** A chimney must first be lined with either Type-B vent sized in accordance with NFGC tables 13.1 or 13.2 or a listed, metal lining system, sized in accordance with the NFGC section 13.1.7 for a single appliance or 13.2.19 for multiple appliances or NSCNPIC Appendix C, section 10.; or venting into a masonry chimney is permitted as outlined with use of an optional listed masonry chimney kit. (See Section 7. *Masonry Chimney Venting* of these instructions)

Listed, corrugated metallic chimney liner systems in masonry chimneys shall be sized by using NFGC or NSCNPIC tables for dedicated and common venting with the maximum capacity reduced by 20% (0.80 X maximum capacity) and the minimum capacity as shown in the applicable table. Corrugated metal vent systems installed with bends or offsets require additional reduction of 5% of the vent capacity for each bend up to 45° and 10% of the vent capacity for each bend from 45° up to 90°.

NOTE: Two(2) 45° elbows are equivalent to one (1) 90° elbow.

Combined Venting into a Masonry Chimney

Venting into a masonry or concrete chimney is only permitted as outlined in the NFGC or NSCNPIC venting tables. Follow all safe venting requirements.

NOTE: See section 7. *Masonry Chimney Venting*.

6. Horizontal Venting

Category I Furnaces With External Power Venters

In order to maintain a Category I classification of fan-assisted furnaces when vented horizontally with sidewall termination, a power venter is **REQUIRED** to maintain a negative pressure in the venting system.

In the U.S.: Per the NFGC, a listed power venter may be used, when approved by the authority having jurisdiction.

In Canada: Only power venters approved by the appliance manufacturer and where allowed by the authority having jurisdiction may be used

Please consult the Fields Controls Co. or Tjernlund Products, Inc. for power venters certified for use with this furnace.

Vent Termination

Venting Through a Non-Combustible and Combustible Wall

Consult External Power Venter manufacturer instructions.

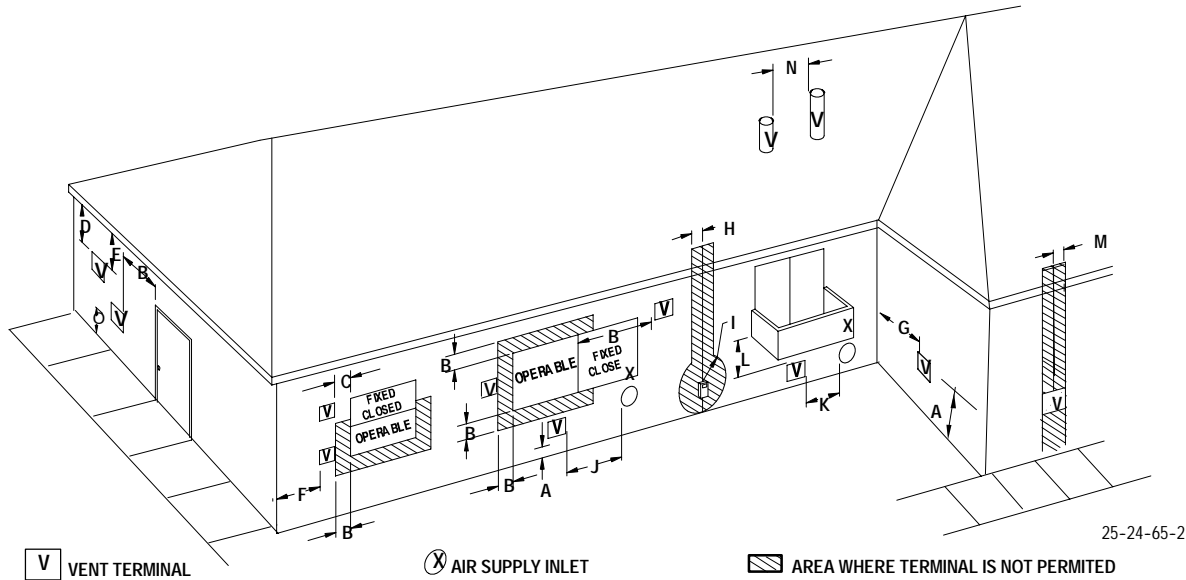
Select the power venter to match the Btuh input of the furnace being vented. Follow all of the manufacturer's installation requirements included with the power venter for:

- venting installation,
- vent terminal location,
- preventing blockage by snow,
- protecting building materials from degradation by flue gases,
- see **Figure 9** for required vent termination.

NOTE: It is the responsibility of the installer to properly terminate the vent and provide adequate shielding. This is essential in order to avoid water/ice damage to building, shrubs and walkways.

Figure 9

Other than Direct Vent Termination Clearance



25-24-65-2

Item	Clearance Descriptions	Canadian Installation (1)	U.S. Installation (2)
A	Clearance above grade, veranda, porch, deck, balcony, or anticipated snow level	12" (30cm) #	12" (30 cm)
B	Clearance to a window or door that may be opened	6" (15 cm) for appliances ≤ 10,000 BTUH (3kW), 12" (30 cm) for appliances > 10,000 Btuh (3 kW) and ≤ 100,000 Btuh (30 kW), 36" (91 cm) for appliances > 100,000 Btuh (30 kW)	4' (1.2 m) below or to the side of the opening, 1' (30 cm) above the opening.
C	Clearance to a permanently closed window	*	*
D	Vertical clearance to a ventilated soffit located above the terminal within a horizontal distance of 2' (61cm) from the centerline of the terminal	*	*
E	Clearance to an unventilated soffit	*	*
F	Clearance to an outside corner	*	*
G	Clearance to an inside corner	*	*
H	Clearance to each side of the centerline extended above electrical meter or gas service regulator assembly	3' (91 cm) within 15' (4.5 m) above the meter/regulator assembly	3' (91 cm) within 15' (4.5 m) above the meter/regulator assembly
I	Clearance to service regulator vent outlet	3' (91 cm)	*
J	Clearance to non-mechanical air supply inlet to building or the combustion air inlet to any other appliance	6" (15 cm) for appliances ≤ 10,000 BTUH (3kW), 12" (30 cm) for appliances > 10,000 Btuh (3 kW) and ≤ 100,000 Btuh (30 kW), 36" (91 cm) for appliances > 100,000 Btuh (30 kW)	4' (1.2 m) below or to the side of opening; 1' (30 cm) above opening.
K	Clearance to a mechanical air supply inlet	6' (1.83 m)	3' (91 cm) above if within 10' (3m) horizontally
L	Clearance under a veranda, porch, deck, or balcony	12" (30 cm) +	*
M	Clearance to each side of the centerline extended above or below vent terminal of the furnace to a dryer or water heater vent, or other appliance's direct vent intake or exhaust.	*	*
N	Clearance from a plumbing vent stack	3' (91 cm)	3' (91 cm)
O	Clearance above a paved sidewalk or paved driveway located on public property.	7' (2.13 m)	7' (2.13 m)

(1.) In accordance with the current CSA B149.1, Natural Gas and Propane Installation Code

(2.) In accordance with the current ANSI Z223.1/NFPA 54, National Fuel Gas Code

18" (46 cm) above roof surface

+ Permitted only if veranda, porch, deck, or balcony is fully open on a minimum of two sides beneath the floor.

* For clearances not specified in ANSI Z223.1/NFPA 54 or CSA B149.1, clearances shall be in accordance with local installation codes and the requirements of the gas supplier and the manufacturer's installation instructions.

** A vent shall not terminate directly above a sidewalk or paved driveway that is located between two single family dwellings and serves both dwellings.

Notes:

1. The vent for this appliance shall not terminate
 - a. Over public walkways; or
 - b. Near soffit vents or crawl space vents or other areas where condensate or vapor could create a nuisance or hazard or property damage; or
 - c. Where condensate vapor could cause damage or could be detrimental to the operation of regulators, relief valves, or other equipment.
2. When locating vent terminations, consideration must be given to prevailing winds, location, and other conditions which may cause recirculation of the combustion products of adjacent vents. Recirculation can cause poor combustion, inlet condensate problems, and accelerated corrosion of the heat exchangers.

7. Masonry Chimney Venting

Chimney Inspection

All masonry chimney construction must conform to Standard ANSI/NFPA211-2000 and to any state or local codes applicable. The chimney must be in good condition and a complete chimney inspection must be conducted prior to furnace installation. If the inspection reveals damage or abnormal conditions, make necessary repairs or seek expert help. See “The Chimney Inspection Chart” Figure 10. Measure inside area of tile-liner and exact height of chimney from the top of the chimney to the highest appliance flue collar or draft hood outlet.

Connector Type

To reduce flue gas heat loss and the chance of condensate problems, the vent connector must be double-wall Type B vent except as specified in the listed kit.

Venting Restrictions for Chimney Types

Interior Chimney - has no sides exposed to the outdoors below the roofline. All installations can be single furnace or common vented with another draft hood equipped Category I appliance.

Exterior Chimney - has one or more sides exposed to the outdoors below the roof line. All installations with a 99% Winter Design Temperature* below 17°F must be common vented only with a draft hood equipped Category I appliance.

* The 99% Winter Design Dry-Bulb (db) temperatures are found in the 1993 ASHRAE Fundamentals Handbook, Chapter 24, Table 1 (United States) and 2 (Canada), or use the 99.6% heating db temperatures found in the 1997 or 2001 ASHRAE Fundamentals Handbook, Climatic Design Information chapter, Table 1A (United States) and 2A (Canada).



WARNING

CARBON MONOXIDE POISONING, FIRE AND EXPLOSION HAZARD.

Failure to properly vent this furnace could result in death, personal injury and/or property damage.

These furnaces are CSA (formerly AGA and CGA) design-certified for venting into exterior clay tile-lined masonry chimneys with a factory accessory Chimney Adapter Kit. Refer to the furnace rating plate for correct kit usage. The Chimney Adapter Kits are for use with ONLY furnaces having a Chimney Adapter Kit number marked on the furnace rating plate.

If a clay tile-lined masonry chimney is being used and it is exposed to the outdoors below the roof line, relining might be required. Chimneys shall conform to the Standard for Chimneys, Fireplaces, Vents, and Solid Fuel Burning Appliances ANSI/NFPA 211-2000 in the United States and to a Provincial or Territorial Building Code in Canada (in its absence, the National Building Code of Canada) and must be in good condition.

U.S.A. - Refer to Sections 13.1.9 and 13.2.20 of the NFGC or the authority having jurisdiction to determine whether relining is required. If relining is required, use a properly sized listed metal liner, Type-B vent, or a listed alternative venting design.

NOTE: See the NFGC, 13.1.9 and 13.2.20 regarding alternative venting design and the exception, which cover installations such as the Chimney Adapter Kits NAHA001DH and NAHA002DH, which are listed for use with these furnaces.

The Chimney Adapter Kit are listed alternative venting design for these furnaces. See the kit instructions for complete details.

Canada (and U.S.A.) - This furnace is permitted to be vented into a clay tile-lined masonry chimney that is exposed to the outdoors below the roof line, provided:

1. Vent connector is Type-B double-wall, and
2. This furnace is common vented with at least 1 draft hood-equipped appliance, and
3. The combined appliance input rating is less than the maximum capacity given in Table A, and
4. The input rating of each space-heating appliance is greater than the minimum input rating given in Table B for Masonry Chimneys for the local 99% Winter Design Temperature. Chimneys having internal areas greater than 38 square inches require furnace input ratings greater than the input ratings of these furnaces. See footnote at bottom of Table B, and
5. The authority having jurisdiction approves.

If all of these conditions cannot be met, an alternative venting design shall be used, such as the listed chimney adapter kit with a furnace listed for use with the kit, a listed chimney-lining system, or a Type-B vent.

Exterior Masonry Chimney, FAN+NAT Installations with Type-B Double-Wall Vent Connectors

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**Table A-
Combined Appliance
Maximum Input Rating in
Thousands of Btu per Hr**

VENT HEIGHT (FT)	INTERNAL AREA OF CHIMNEY (SQ IN.)			
	12	19	28	38
6	74	119	178	257
8	80	130	193	279
10	84	138	207	299
15	NR	152	233	334
20	NR	NR	250	368
30	NR	NR	NR	404

**Table B-
Minimum Allowable Input Rating of
Space-Heating Appliance in
Thousands of Btu per Hr**

VENT HEIGHT (FT)	INTERNAL AREA OF CHIMNEY (SQ IN.)				
	12	19	28	38	
17 to 26°F	Local 99% Winter Design Temperature: 17 to 26°F*				
	6	0	55	99	141
	8	52	74	111	154
	10	NR	90	125	169
	15	NR	NR	167	212
	20	NR	NR	212	258
5 to 16°F	Local 99% Winter Design Temperature: 5 to 16°F*				
	6	NR	78	121	166
	8	NR	94	135	182
	10	NR	111	149	198
	15	NR	NR	193	247
	20	NR	NR	NR	293
-10 to 4°F	Local 99% Winter Design Temperature: -10 to 4°F*				
	6	NR	NR	145	196
	8	NR	NR	159	213
	10	NR	NR	175	231
	15	NR	NR	NR	283
	20	NR	NR	NR	333
-11°F or lower	Local 99% Winter Design Temperature: -11°F or lower*				
	Not recommended for any vent configuration				

* The 99% Winter Design Dry-Bulb (db) temperatures are found in the 1993 ASHRAE Fundamentals Handbook, Chapter 24, Table 1 (United States) and 2 (Canada), or use the 99.6% heating db temperatures found in the 1997 or 2001 ASHRAE Fundamentals Handbook, Climatic Design Information chapter, Table 1A (United States) and 2A (Canada).

Inspections before the sale and at the time of installation will determine the acceptability of the chimney or the need for repair and/or

(re)lining. Refer to "The Chimney Inspection Chart" to perform a chimney inspection.

If the inspection of a previously used tile-lined chimney:

- Shows signs of vent gas condensation, the chimney should be relined in accordance with local codes and the authority having jurisdiction. The chimney should be relined with a listed metal liner, Type-B vent, or a listed chimney adapter kit to reduce condensation. If a condensate drain is required by local code, refer to the NFGC, Section 10.9 for additional information on condensate drains.
- Indicates the chimney exceeds the maximum permissible size in the tables, the chimney should be rebuilt or relined to conform to the requirements of the equipment being installed and the authority having jurisdiction.

A chimney without a clay tile liner, which is otherwise in good condition, shall be rebuilt to conform to ANSI/NFPA 211 or be lined with a UL listed (ULC listed in Canada) metal liner or UL listed Type-B vent. Relining with a listed metal liner or Type-B vent is considered to be a vent-in-a-chase.

If a metal liner or Type-B vent is used to line a chimney, no other appliance shall be vented into the annular space between the chimney and the metal liner.

Appliance Application Requirements

Appliance operation has a significant impact on the performance of the venting system. If the appliances are sized, installed, adjusted, and operated properly, the venting system and/or the appliances should not suffer from condensation and corrosion. The venting system and all appliances shall be installed in accordance with applicable listings, standards, and codes.

The furnace should be sized to provide 100% of the design heating load requirement plus any margin that occurs because of furnace model size capacity increments. Heating load estimates can be made using approved methods available from Air Conditioning Contractors of America (Manual J); American Society of Heating, Refrigerating, and Air-Conditioning Engineers; or other approved engineering methods. Excessive oversizing of the furnace could cause the furnace and/or vent to fail prematurely.

When a metal vent or metal liner is used, the vent or liner must be in good condition and be installed in accordance with the vent or liner manufacturer's instructions.

To prevent condensation in the furnace and vent system, the following precautions must be observed:

- The return-air temperature must be at least 60°F db except for brief periods of time during warm-up from setback at no lower than 55°F db or during initial start-up from a standby condition.
- Adjust the gas input rate per the installation instructions. Low gas input rate causes low vent gas temperatures, causing condensation and corrosion in the furnace and/or venting system. Derating is permitted only for altitudes above 2000'.
- Adjust the air temperature rise to the midpoint of the rise range or slightly above. Low air temperature rise can cause low vent gas temperature and potential for condensation problems.
- Set the thermostat heat anticipator or cycle rate to reduce short cycling.

Air for combustion must not be contaminated by halogen compounds which include chlorides, fluorides, bromides, and iodides. These compounds are found in many common home products such as detergent, paint, glue, aerosol spray, bleach, cleaning solvent, salt, and air freshener, and can cause corrosion of furnaces and vents. Avoid using such products in the combustion-air supply. Furnace use during construction of the building could cause

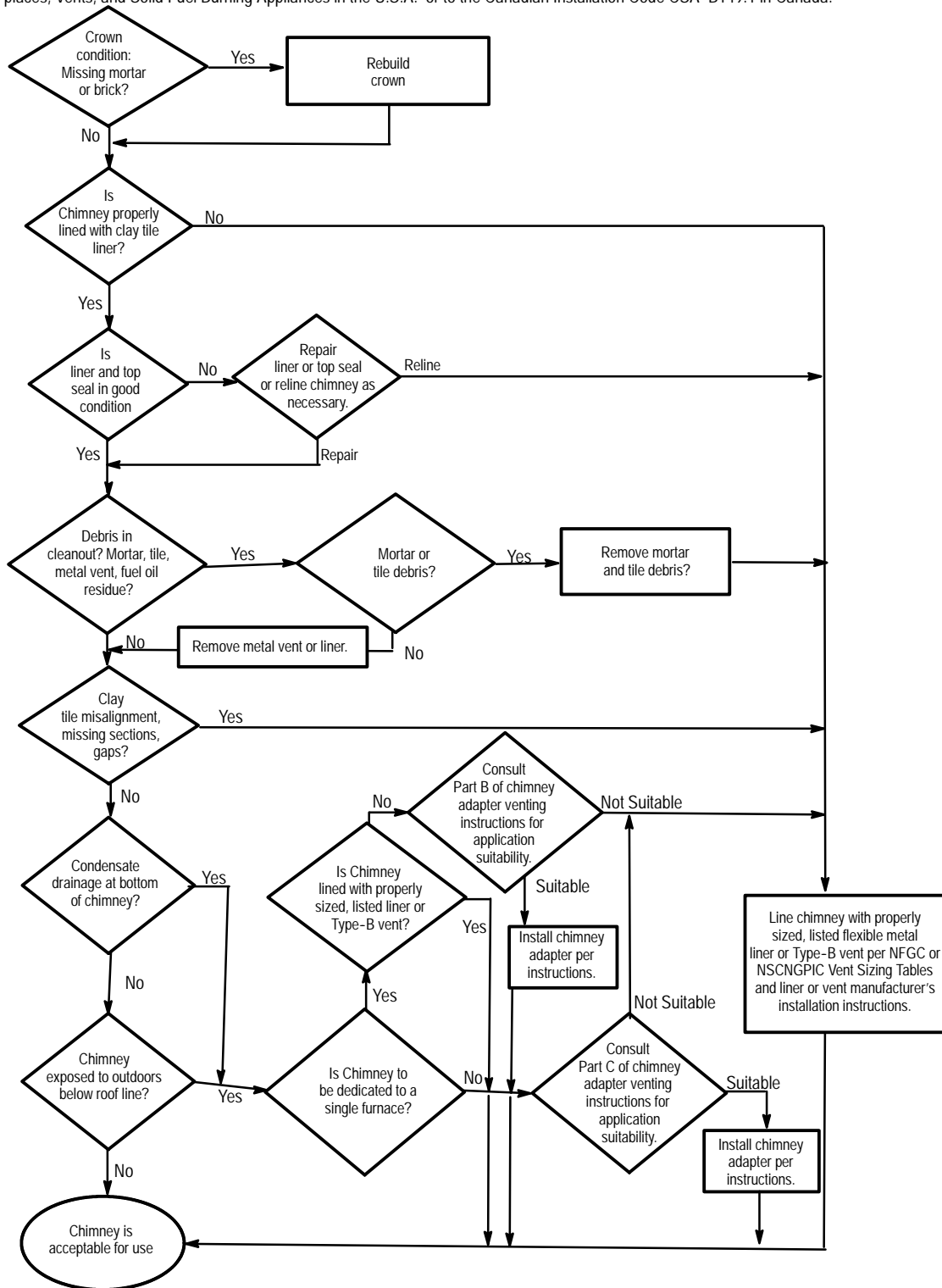
the furnace to be exposed to halogen compounds, causing premature failure of the furnace or venting system due to corrosion. Vent dampers on any appliance connected to the common vent

can cause condensation and corrosion in the venting system. Do not use vent dampers on appliances common vented with this furnace.

Figure 10

CHIMNEY INSPECTION CHART

For additional requirements refer to the National Fuel Gas Code NFPA 54/ANSI Z223.1-2002 and ANSI/NFPA 211-2003 Chimneys, Fireplaces, Vents, and Solid Fuel Burning Appliances in the U.S.A. or to the Canadian Installation Code CSA-B149.1 in Canada.



8. Gas Supply and Piping



WARNING

CARBON MONOXIDE POISONING, FIRE AND EXPLOSION HAZARD.

Failure to follow safety warnings exactly could result in death, personal injury and/or property damage.

Models designated for Natural Gas are to be used with Natural Gas ONLY, unless properly converted to use with LP gas.

Gas Supply Requirements

Gas supply pressure should be within minimum and maximum values listed on rating plate. Pressures are usually set by gas suppliers.

(See LP Gas Conversion Kit instruction manual for furnaces converted to LP gas)

- Use only the Type of gas approved for this furnace. See rating plate for approved gas type.
- A 1/8" NPT plugged tapping, accessible for a test gauge connection, must be installed immediately upstream of the gas supply connection to furnace.
- Gas supply pressure should be within minimum and maximum values listed on rating plate. Pressures are usually set by gas suppliers.
- Gas input must not exceed the rated input shown on the rating plate. Overfiring will result in failure of heat exchanger and cause dangerous operation.
- Do not allow minimum supply pressure to vary downward. Doing so will decrease input to furnace. Refer to Table 3 for Gas supply. Refer to Table 7 or Table 8 for manifold pressures.

Gas Type	Supply Pressure		
	Recommended	Max.	Min.
Natural	7"	14"	4.5"
Propane	11"	14"	11"

Gas Piping Requirements

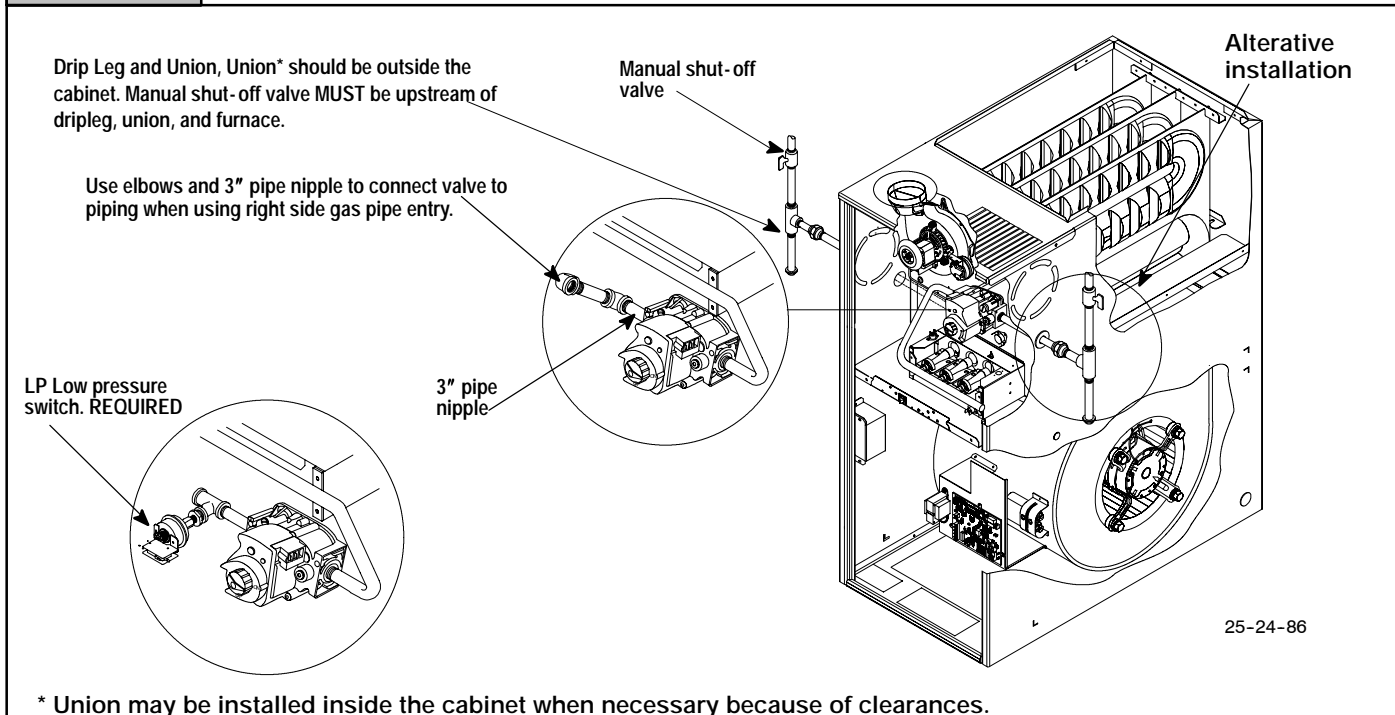
NOTE: The gas supply line must be installed by a qualified service technician in accordance with all building codes.

NOTE: In the state of Massachusetts.

- Gas supply connections MUST be performed by a licensed plumber or gas fitter).
 - When flexible connectors are used, the maximum length shall not exceed 36" (915 mm).
 - When lever handle type manual equipment shutoff valves are used, they shall be T-handle valves.
 - The use of copper tubing for gas piping is NOT approved by the state of Massachusetts.
1. Install gas piping in accordance with local codes, or in the absence of local codes, the applicable national codes.
 2. It is recommended that a manual equipment shutoff valve be installed in the gas supply line outside the furnace. Locate valve as close to the furnace as possible where it is readily accessible. Refer to Figure 11.
 3. Use black iron or steel pipe and fittings or other pipe approved by local code.
 4. Use pipe thread compound which is resistant to natural and LP gases.
 5. Use ground joint unions and install a drip leg no less than 3" long to trap dirt and moisture before it can enter gas control valve inside furnace.

Figure 11

Typical Gas Piping and Adding LP Low Pressure Switch





WARNING

FIRE HAZARD

Failure to follow safety warnings exactly could result in death, personal injury and/or property damage.

Use wrench to hold furnace gas control valve when turning elbows and gas line to prevent damage to the gas control valve and furnace.

- Use two pipe wrenches when making connections to prevent gas valve from turning.

NOTE: If local codes allow the use of a flexible gas appliance connector, always use a new listed connector. Do not use a connector which has previously served another gas appliance.

- Flexible corrugated metal gas connector may NOT be used inside the furnace or be secured or supported by the furnace or ductwork.
- Properly size gas pipe to handle combined appliance load or run gas pipe directly from gas meter or LP gas regulator.
- Install correct pipe size for run length and furnace rating.
- Measure pipe length from gas meter or LP second stage regulator to determine gas pipe size.

Left Side Gas Supply Piping

Gas line can be installed directly to the gas valve through the hole provided in the left side of the cabinet. See Figure 11

Right Side Gas Supply Piping

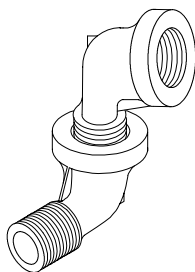
Two(2) 90° street elbows or two(2) 90° standard elbows and two(2) close nipples are required for right side gas supply. See Figure 11.

Piping with Street Elbows

- Assemble the elbows so that the outlet of one(1) elbow is 90° from the inlet of the other. The elbows should be tight enough to be leak proof. An additional 1/4 turn will be required at the end of step 2, see Figure 12.
- Screw elbow assembly into gas valve far enough to be leak proof. Position elbow assembly so that the inlet of the elbow is at the bottom of the gas valve. An additional 1/2 turn will be required in step 3. Turn open end of inlet elbow to face the right side of the furnace (1/4 turn), see Figure 13.
- Turn assembly an additional 1/2 turn to position inlet near the top of the gas valve. In line with gas opening on right side of furnace, see Figure 11 and Figure 14.

Figure 12

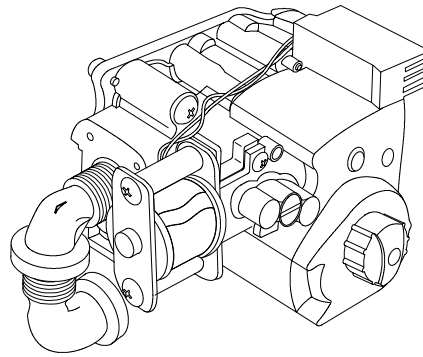
Elbows (*8MP)



25-23-23c

Figure 13

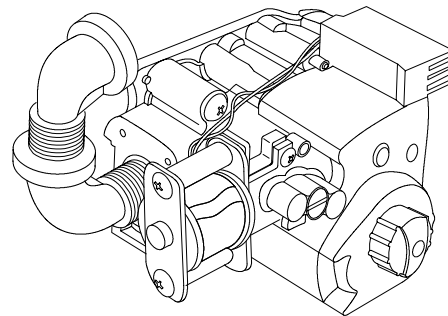
Gas Valve with Elbows (*8MPT/*8MPV)



25-25-03a

Figure 14

Gas Valve with Elbows (*8MPT/*8MPV)



- Gas supply line then can be run directly into opening of elbow.

Piping with Close Nipples and Standard Elbows

- Assemble elbows and nipples similar to street elbows shown in Figure 12.
- Follow steps 2 through 4 *Piping with Street Elbows*.



WARNING

FIRE OR EXPLOSION HAZARD.

Failure to properly install metal gas connector could result in death, personal injury and/or property damage.

A flexible corrugated metal gas connector must be properly installed, shall not extend through the side of the furnace, and shall not be used inside the furnace.

Black iron pipe shall be installed at the furnace gas control valve and extend a minimum of 2" outside furnace.

Additional LP Piping Requirements

- Have a licensed LP gas dealer make all connections at storage tank and check all connections from tank to furnace.
- If copper tubing is used, it MUST comply with limitation set in Local Codes, or in the absence of local codes, the gas codes of the country having jurisdiction.
- Two-stage regulation of LP gas is recommended.



WARNING

FIRE OR EXPLOSION HAZARD.

An open flame or spark could result in death, personal injury and/or property damage.

Liquefied petroleum (LP) gas is heavier than air and will settle and remain in low areas and open depressions.

Thoroughly ventilate area and dissipate gas. Do NOT use a match or open flame to test for leaks, or attempt to start up furnace before thoroughly ventilating area.

Final Check

- Test all pipe for leaks.
- If orifices were changed, make sure they are checked for leaks.
- During pressure testing of gas supply piping system:
 - a. If test pressure does not exceed $1/2$ " psig, isolate the furnace from the gas supply piping system by closing the manual equipment shutoff valve.
 - b. If test pressure exceeds $1/2$ " psig, the furnace and its manual equipment shutoff valve must be disconnected from the gas supply system.
- To check for leaks apply soap suds or a liquid detergent to each joint. Bubbles forming indicate a leak.
- Do not use an open flame to test for gas leaks. Fire or explosion could occur.
- Correct even the smallest leak at once.

9. Electrical Wiring



WARNING

ELECTRICAL SHOCK HAZARD.

Failure to follow safety warnings exactly could result in death or personal injury.

Turn OFF electrical power at fuse box or service panel before making any electrical connections and ensure a proper ground connection is made before connecting line voltage.

4. Move J-box to alternate location and attach using two screws removed from left side location.
5. Position all wires away from hot surfaces, sharp edges, and moving parts. Do not pinch J-box wires or other wires when reinstalling burner compartment door.

Thermostat

The 2-stage furnace control will operate with either a single stage or a two stage heating thermostat and will provide 2-stage heating operation.

For single-stage thermostat installations, the R and W wires from the thermostat connect to the R and W1 connections on the furnace control.

Note: The TT (Thermostat Type) DIP switch (SW1-3) should be in the off position for the furnace to operate properly with a single-stage thermostat. Failure to change DIP switch with single stage thermostat will result in Low Heat operation ONLY. (See Figure 17 and wiring diagram)

During operation, the furnace will operate on low Heat for up to 12 minutes. If the heat request exists for more than 12 minutes, the furnace will automatically shift to the high Heat mode for the remaining duration of the heating cycle.

For 2-stage thermostat installations, the R, W1 and W2 wires from the thermostat connect to the R, W1 and W2 connections on the furnace control. Set TT Dip switch (SW1-3) to ON position. During operation, the furnace will shift from Low Heat to high Heat as requested by the thermostat.

Set thermostat heat anticipator in accordance with the *Technical Support Manual*.

Heat anticipator setting will need to be measured if 24VAC humidifier is installed. Measure current in series from R to W1 at the thermostat. Be sure 24VAC humidifier is wired up to control. Allow furnace to operate for 2 minutes before recording the AC amperage reading. Set anticipator on thermostat to recorded value.

Thermostat location has an important effect on the operation of the furnace. Follow instructions included with thermostat for correct mounting and wiring.

Low voltage connections to furnace must be made on terminal board to furnace control. (See Figure 15)

If cooling is used, the Y and G from the thermostat must be connected to the control board Y and G to energize cooling blower speed.

Power Supply Wiring

The furnace MUST be electrically wired and grounded in accordance with local codes, or in the absence of local codes, with the National Electrical Code (NEC), ANSI/NFPA 70-2002 in the U.S., or the Canadian Electrical Code (CEC), CSA C22.1 in Canada.

The power supply to the furnace connections must be between 104 VAC and 127 VAC during furnace operation for acceptable performance.

Field wiring connections must be made inside the furnace connection box. A suitable strain relief should be used at the point the wires exit the furnace casing.

Copper conductors shall be used. Line voltage wires should conform to temperature limitation of 63° F (35° C) rise. Wire and circuit breaker sizing shall be based on the ampacity of the furnace electrical components plus the amps for all installed accessories (1.0 amps total for EAC and HUM). Ampacity can be determined by using the NEC or CEC.

NOTE: Furnace will not have normal operation if line polarity is reversed. Check ALL field and control connections prior to operation.

Furnace must be installed so the electrical components are protected from water and connected to its own separate circuit.

J-Box Relocation

The J-box is installed in the burner compartment on left side of casing. An alternate J-box location on right side can be used.

1. Remove and save two screws holding J-box to casing.
2. Move large hole plug from right to left J-box location.
3. Clip wire tie holding j-box wires if needed.

Optional Equipment

All wiring from furnace to optional equipment **MUST** conform to local codes or, in the absence of local codes, the applicable national codes. Install wiring in accordance with manufacturer's instructions.

Humidifier/Electronic Air Cleaner

The furnace is wired for 115 VAC humidifier and/or electronic air cleaner connection.

⚠ CAUTION

REDUCED FURNACE LIFE HAZARD

Failure to follow caution instructions may result in reduced furnace life.

Do **NOT** exceed 115V/1.0 amp. maximum current load for both the EAC terminal and the HUM terminal combined.

NOTE:

HUMIDIFIER - The 24VAC HUM is energized when the low pressure switch closes on a call for heat. The 115V HUM (called HUM on Control) is energized when the inducer is energized.

ELECTRONIC AIR CLEANER - EAC is energized when there is a blower speed call. It is **NOT** energized when blower operates in the hard-wired continuous fan mode.

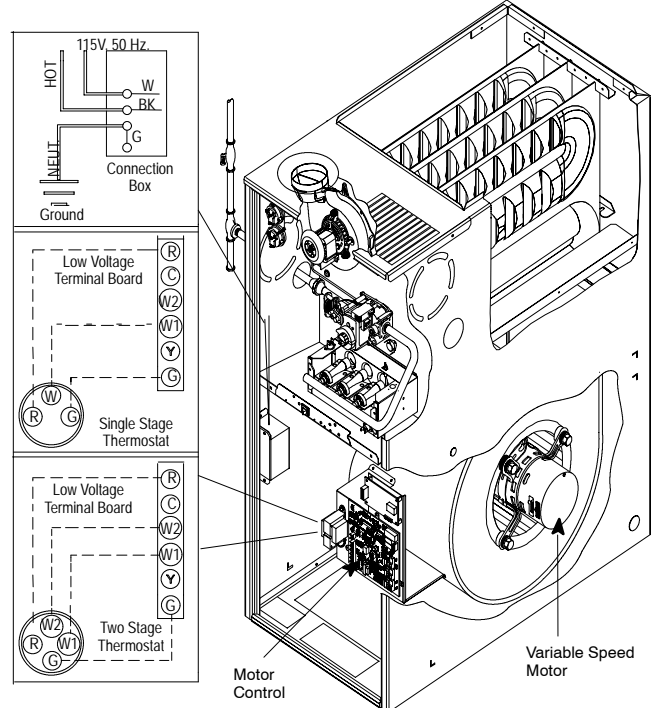
Dehumidification (*8MPV ONLY)

The furnace control is wired for 24 VAC normally-open (N/O) dehumidistat connection. Connect dehumidistat to the Y terminal and the 1/4" male quick connect DEHUM terminal on the furnace control (See Figure 17 and "Furnace Wiring Diagram".) A 20% reduction of cooling airflow will occur when the DEHUM dehumidistat terminal is energized by being connected to Y during a call for cooling from the thermostat.

Figure 15

Electrical Connections *8MPV

NOTE: Junction Box can be mounted to either the left or right side.



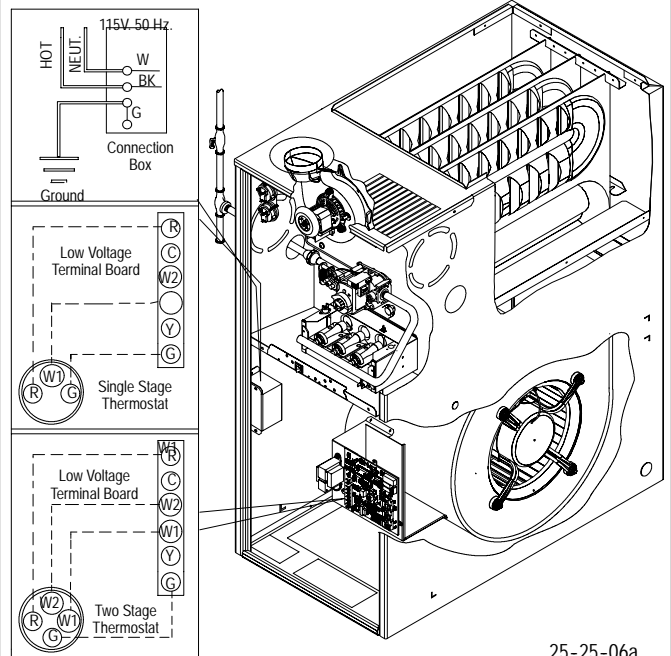
NOTE: 115 VAC/60Hz/single-phase
Operating voltage range*: 127 VAC max, 104 VAC min. 25-25-06

* Permissible limits of voltage at which unit will operate satisfactorily

Figure 16

Electrical Connections *8MPT

NOTE: Junction Box can be mounted to either the left or right side.

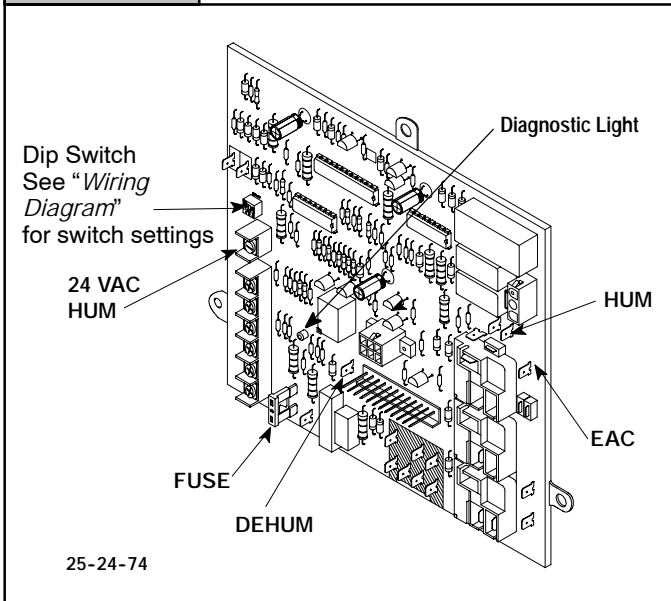


NOTE: 115 VAC/60Hz/single-phase
Operating voltage range*: 127 VAC max, 104 VAC min. 25-25-06a

* Permissible limits of voltage at which unit will operate satisfactorily

Figure 17

Control Connections



Furnace Control

The furnace control ON delay is 30 seconds in the high-heat mode and 45 seconds in low-heat mode. The blower OFF timing is preset at 140 seconds. Four (4) selected OFF delays are available (60, 100, 140, 180). See "Furnace Wiring Diagram".

Furnace Control Fuse

The 24V circuit contains a 5-amp, automotive-type fuse located on furnace control. (See Figure 17) Any electrical shorts to 24V wiring during installation, service, or maintenance may cause fuse to blow. If fuse replacement is required, use only a fuse of identical size (5 amp.).

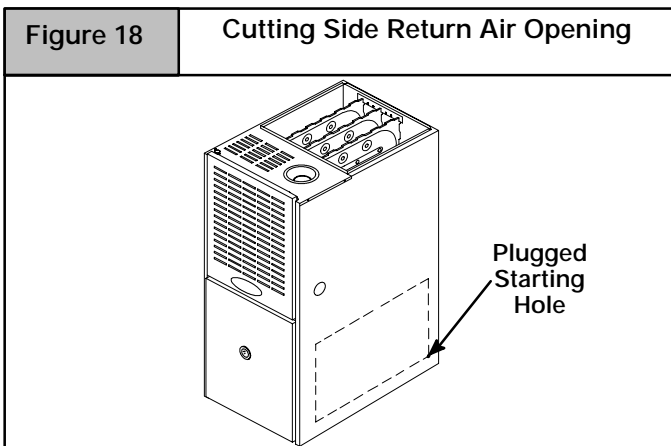
10. Ductwork and Filter (Upflow/Horizontal)

⚠ WARNING
CARBON MONOXIDE POISONING HAZARD.
 Failure to properly seal duct could result in death or personal injury.
 Do NOT draw return air from inside a closet or utility room where furnace is located. Return air duct MUST be sealed to furnace casing.

Duct Connections

This furnace may be installed in only a bottom or side return application. Return air through the back of the furnace is NOT allowed.

Side connections can be made by cutting out the embossed area shown in Figure 18. A plugged hole is provided at each furnace side duct location to help start cutting the opening.



Bottom returns can be made by removing the knockout panel in the furnace base. Do NOT remove knock-out except for a bottom return.

Duct Design

Design and install air distribution system to comply with Air Conditioning Contractors of America manuals or other approved methods that conform to local codes and good trade practices.

When the furnace is located in an area near or adjacent to the living area, the system should be carefully designed with returns to minimize noise transmission through the return air grille. Any blower moving a high volume of air will produce audible noise which could be objectionable when the furnace is located very close to a living area. It is often advisable to route the return air ducts under the floor or through the attic.

- Refer to furnace Technical Support Manual (Blower Data) for air flow information.
- Size ductwork to handle air flow for heating and air conditioning.

Duct Installation Requirements

- When a furnace is installed so that supply ducts carry air circulated by the furnace to areas outside of the space containing the furnace, the return air shall also be handled by duct(s) sealed to the furnace casing and terminating outside the space containing the furnace.

⚠ WARNING
CARBON MONOXIDE POISONING HAZARD.
 Failure to follow safety warning exactly could result in death or personal injury.
 Install cooling coil on furnace discharge. Cool air passing over heat exchanger could cause condensate to form resulting in heat exchanger failure.

- When the furnace is used with a cooling unit, the furnace shall be installed parallel with or on the upstream side of the cooling unit to avoid condensation in the heating element.

- With a parallel flow arrangement, the dampers or other means used to control flow of air shall be adequate to prevent chilled air from entering the furnace. Chilled air going through the furnace could cause condensation and shorten furnace life. Dampers (purchased locally) can be either automatic or manual. Manually or automatically operated dampers **MUST** be equipped with a means to prevent furnace and air conditioning operation, unless damper is in the full heat or cool position.
- Installation of locking-type dampers is recommended in all branches, or in individual ducts to balance system's air flows.
- Non-combustible, flexible duct connectors are recommended for return and supply connections to furnace.
- If air return grille is located close to the fan inlet, install at least one 90° air turn between fan and inlet grille to reduce noise.
- Ductwork installed in attic or exposed to outside temperatures requires a minimum of 2" of insulation with outdoor type vapor barrier.
- Ductwork installed in an indoor unconditioned space requires a minimum of 1" of insulation with indoor type vapor barrier.

Inspection Panel on some models

For a furnace not equipped with a cooling coil, the outlet duct shall be provided with a removable access panel. This opening shall be accessible when the furnace is installed and shall be of such a size that the heat exchanger can be viewed for possible openings using light assistance or a probe can be inserted for sampling the air stream. This access cover shall be attached in such a manner as to prevent air leaks.

Filters

A filter **MUST** be used.

Filters may not be supplied with these furnaces, but can be purchased from your distributor.

See Table 4 for required high-velocity filter sizes.

Table 4	High Velocity Air Filter Sizes (max. 600 FPM)			
	Cabinet Width	Internal Filter	External Filter Rack	
		Bottom	Bottom	Side+
15 ¹ / ₂ "	14 X 25"	14 X 25"	14 X 25" or 16 X 25"	
19 ¹ / ₈ "	16 X 25" *	16 X 25" *	16 X 25" *	
22 ³ / ₄ "	20 X 25" *	20 X 25" *	16 X 25" *	

* Greater than 1600 CFM requires both (left and right) side return filter racks in upflow position.

+ Side return air duct(s) is not permitted with horizontal or downflow furnace installation.

Use either filter type:

- Washable, high-velocity filters are based on a maximum air flow rating of 600 FPM.
- Disposable, low velocity filters are based on a maximum air flow of 300 FPM when used with with external filter grille.

⚠ CAUTION

REDUCED FURNACE LIFE HAZARD

Failure to follow caution instructions may result in reduced furnace life.

Use of excessively dirty and/or restrictive air filters may increase furnace operating temperatures and shorten the life of the furnace.

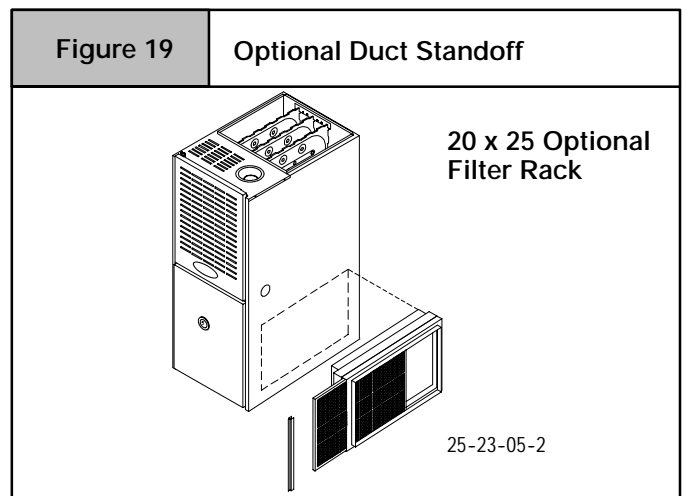
Filters supplied with the furnace are rated at a maximum of 600 fpm air velocity and sized for the furnace's airflow rate. Replacement filters must be of equivalent type, size, and rating except as described below.

Disposable, low-velocity filters may be used to replace washable, high-velocity filters, providing they are sized for 300 FPM or less.

- The furnaces with 1600 or less CFM rating are supplied with a 16" x 25" high-velocity filter and rack. On these models the supplied filter may be installed internally for bottom return or the supplied filter and rack may be mounted externally for bottom return.
- The furnaces with greater than 1600 CFM require that bottom return or both (left and right) side returns are used. Two side return filters and racks are required. Filter racks must be mounted externally. (See Figure 20.) If return air must be on one side only, an optional 20" x 25" filter standoff rack kit can be used. (See Figure 19.) For bottom return, an internal filter can be used or a filter rack kit can be mounted externally.
- See page 41 or 51, *Circulation Air Blower Data* for additional information.

NOTE: The 20" x 25" standoff side filter rack gives more filter area but does not provide more air. (See Figure 19.) To achieve 2000 CFM 2 side returns are still needed. (See Figure 21.)

NOTE: Disposable, low-velocity filters may be replaced with washable, high-velocity filters providing they meet the minimum size areas for 300 FPM or less. Washable, high-velocity filters can be replaced **ONLY** with same type and size filter.

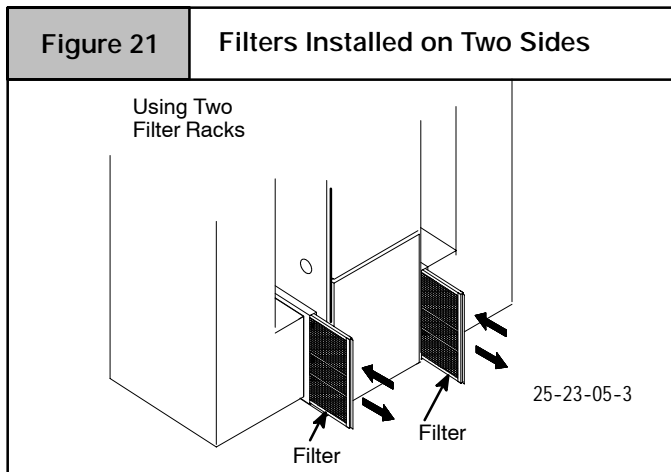
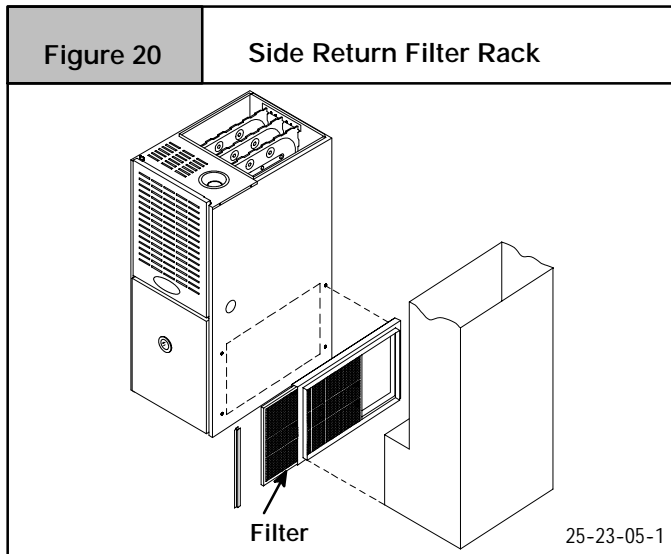


Filters Rack Installation

Side Return

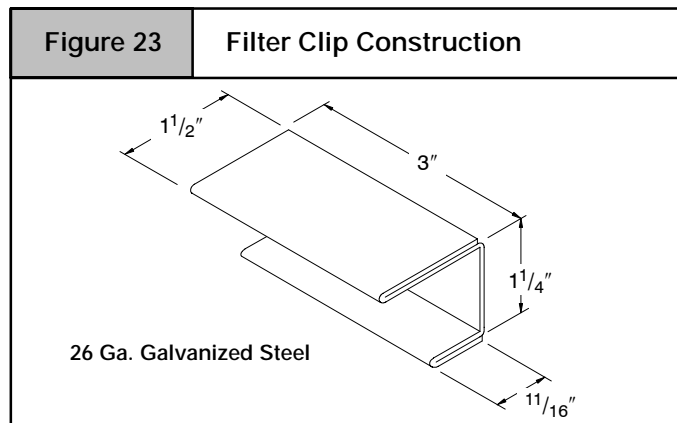
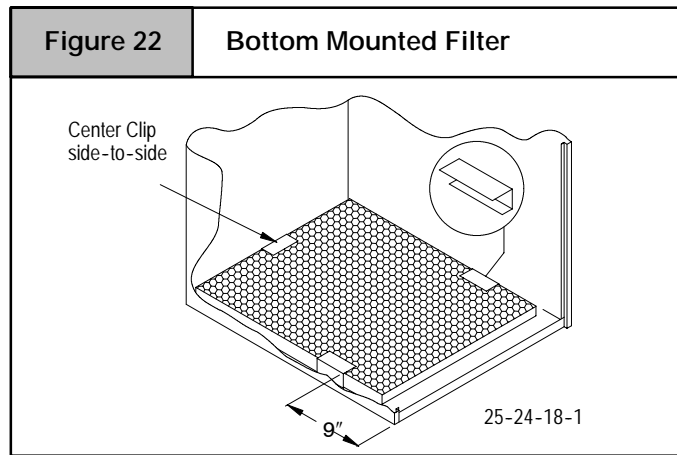
Center the filter rack on the side panel, flush with the bottom edge of the furnace. Mark the fastening holes. Drill the fastening holes in

the side panel and fasten the filter rack in place with sheet metal screws. See Figure 20 & Figure 21.



Internal Filter in Bottom Return Installation

When installing a bottom-mounted filter inside the furnace, install the filter clips on the edge of the bottom duct opening with the wider end of the clips toward the blower, as shown in Figure 22. Clips may be obtained from your distributor or fabricated from sheet metal (Figure 23). Insert filter into side clips first and push filter back until it is fully engaged into back clip.



Note: If filters are only suitable for heating application, advise homeowner that filter size may need to be increased if air conditioning is added.

Addition Of Air Conditioning

When a refrigeration coil is used in conjunction with this furnace, it must be installed on the discharge side of the furnace to avoid condensation on the heat exchanger. The coil installation instructions must be consulted for proper coil location and installation procedures. With a parallel flow arrangement, dampers must be installed to prevent chilled air from entering the furnace. If manually operated dampers are used, they must be equipped with a means to prevent operation of either unit unless the damper is in full heat or full cool position.

Copper or plastic tubing may be used for the condensate drain line.

11. Ductwork and Filter (Downflow)

⚠ WARNING
CARBON MONOXIDE POISONING HAZARD.
 Failure to properly seal duct could result in death or personal injury.
 Do NOT draw return air from inside a closet or utility room where furnace is located. Return air duct MUST be sealed to furnace casing.

⚠ WARNING
FIRE HAZARD.
 Side return air duct(s) could cause excessive furnace and/or air temperatures, which could result in death, personal injury, and/or property damage.
 Return air duct is to be connected to only the top of downflow furnace.



WARNING

BURN HAZARD.

Failure to properly install vent shield could result in death or personal injury.

The vent may be hot.

Vent Shield

A vent shield is required for all downflow installations. The vent **Must** exit out the side of the furnace for all downflow installations. This places the hot vent pipe (over 300° F) within reach of children. The vent shield attaches to side of furnace to cover vent pipe. See Figure 4 in "2. Installation" section.

Outlet Duct Flange

Downflow installations with cased coils require the furnace outlet duct flange to be bent outward and flat to mate the outlet of the furnace to the cased coil.



WARNING

FIRE HAZARD.

Failure to install furnace on noncombustible subbase could result in death, personal injury and/or property damage.

Place furnace on noncombustible subbase on downflow applications, unless installing on non-combustible flooring.

Sub-Bases for Combustible Floors - Furnace Only

Note: When using the subbase for combustible floors, the discharge air duct flanges on the furnace **MUST** be broken down to provide proper fit up to the subbase. Use duct pliers to bend the duct flanges flat onto the furnace casing. **DO NOT** bend the duct flanges inward (toward the heat exchangers) as air flow restrictions may occur.

The Sub-base for Combustible Floors **MUST** be used when a downflow furnace is set on a combustible floor, even when the furnace is installed on a coil box.

1. Cut the opening in the floor according to the dimensions in Table 5 because the base is equipped with locating tabs that center the base over the opening.

The opening in the base is $1\frac{1}{4}$ " shorter and $1\frac{1}{8}$ " narrower than the minimum required size of the opening in the floor. This is done to maintain a 1" clearance between the floor and the plenum.

2. Fabricate the plenum to the dimensions given in Table 5. Note that the dimensions given are outside dimensions.
3. Set the base over the opening in the floor, centering the opening in the base over the opening in the floor. Fasten the base to the floor with screws or nails. See Figure 24 and Figure 25.
4. Drop the plenum through the opening in the base. The flange of the plenum should rest on top of the combustible floor base.

Table 5

Sub-bases for Combustible Floors Dimensions

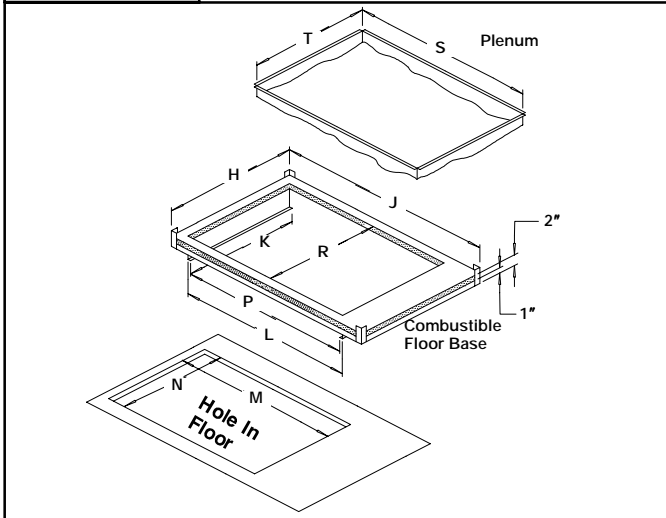
Sub-base for Combustible Floors Part Number	Sub-base for Combustible Floor Dimensions				Opening In Floor		Opening In Base For Plenum		Typical Plenum Dimensions	
	H*	J*	K**	L	M	N	P	R	S	T
Subbase for Furnace Only										
NAHH001SB	$15\frac{11}{16}$	$28\frac{3}{4}$	$14\frac{9}{16}$	16	$16\frac{1}{4}$	$14\frac{5}{8}$	15	$13\frac{1}{2}$	15	$13\frac{1}{2}$
NAHH002SB	$19\frac{5}{16}$	$28\frac{3}{4}$	$18\frac{3}{16}$	16	$16\frac{1}{4}$	$18\frac{1}{4}$	15	$17\frac{1}{8}$	15	$17\frac{1}{8}$
NAHH003SB	$22\frac{15}{16}$	$28\frac{3}{4}$	$21\frac{13}{16}$	16	$16\frac{1}{4}$	$21\frac{7}{8}$	15	$19\frac{3}{4}$	15	$19\frac{3}{4}$
Subbase for Coil Box										
NAHH004SB	$15\frac{11}{16}$	$20\frac{9}{16}$	$14\frac{9}{16}$	16	$16\frac{1}{4}$	$14\frac{5}{8}$	15	$13\frac{1}{8}$	15	$13\frac{1}{2}$
NAHH005SB	$19\frac{5}{16}$	$20\frac{9}{16}$	$18\frac{3}{16}$	16	$16\frac{1}{4}$	$18\frac{1}{4}$	15	$17\frac{1}{8}$	15	$17\frac{1}{8}$
NAHH006SB	$22\frac{15}{16}$	$20\frac{9}{16}$	$21\frac{13}{16}$	16	$16\frac{1}{4}$	$21\frac{7}{8}$	15	$19\frac{3}{4}$	15	$19\frac{3}{4}$

* Outside Dimension

** Base Spacer Side To Side

Figure 24

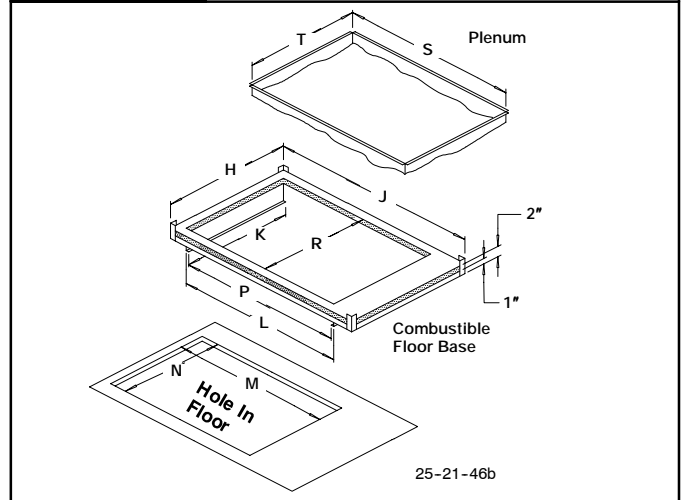
Exploded View of Sub-Base for Furnace ONLY



- Drop the plenum through the opening in the base. The flange of the plenum should rest on top of the combustible floor base

Figure 26

Exploded View of Base for Downflow Cased Coil



25-21-46b

Sub-base for Combustible Floors- Downflow Coil Adapter Box

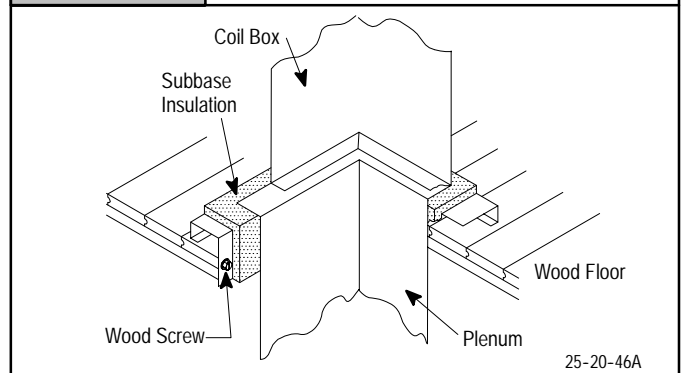
The sub-base for combustible floors is not required when a downflow furnace, *used with a downflow coil box*, is set on combustible flooring.

- Cut the opening in the floor according to the dimensions in Table 5 because the base is equipped with locating tabs that center the base over the opening.

The opening in the base is $1\frac{1}{4}$ " shorter and $1\frac{1}{8}$ " narrower than the minimum required size of the opening in the floor. This is done to maintain a 1" clearance between the floor and the plenum.

Figure 27

Setting the Base

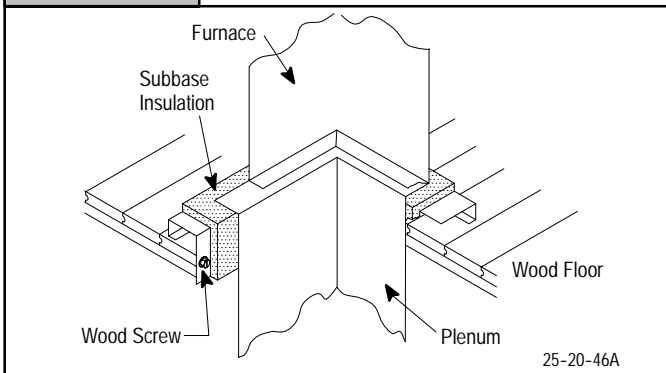


25-20-46A

Consideration must be given to the height of the base to allow for easy installation of the condensate drain. See Figure 28. This subbase for combustible floors has been designed so that the height of the subbase raises the downflow coil off the floor to allow easy installation of the condensate drain

Figure 25

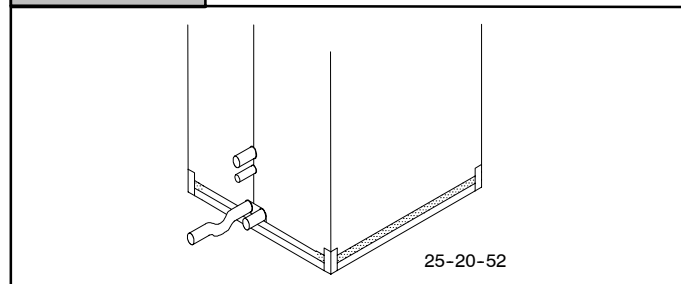
Setting the Base



25-20-46A

Figure 28

Condensate Line Raised by Base



25-20-52

- Fabricate the plenum to the dimensions given in Table 5. Note that the dimensions given are outside dimensions.
- Set the base over the opening in the floor, centering the opening in the base over the opening in the floor. Fasten the base to the floor with screws or nails. See Figure 26 and Figure 27.

Non-Combustible Floor

Set the furnace over the opening in the floor. If necessary, grout around the base to seal air leaks between the base and the floor.

Duct Connections

In the downflow position, the return-air duct must be connected to only the top of the furnace. Top return connections can be made

by removing the knockout panel in the furnace base. Return air connection through the side(s) or back of the furnace is **NOT** allowed.

Duct Design

Design and install the air distribution system to comply with Air Conditioning Contractors of America manuals or other approved methods that conform to local codes and good trade practices.

When the furnace is located in an area near or adjacent to the living area, the system should be carefully designed with returns to minimize noise transmission through the return air grille. Any blower moving a high volume of air will produce audible noise which, could be objectionable when the furnace is located very close to a living area. It is often advisable to route the return air ducts under the floor or through the attic.

- Refer to furnace **Technical Support Manual (Blower Data)** for air flow information.
- Size ductwork to handle air flow for heating and air conditioning, if used.

Duct Installation Requirements

- When a furnace is installed so that supply ducts carry air circulated by the furnace to areas outside of the space containing the furnace, the return air shall also be handled by duct(s) sealed to the furnace casing and terminating outside the space containing the furnace.

⚠ WARNING

CARBON MONOXIDE POISONING HAZARD.

Failure to follow safety warning exactly could result in death or personal injury.

Install cooling coil on furnace discharge. Cool air passing over heat exchanger could cause condensate to form resulting in heat exchanger failure.

- When a furnace is used with a cooling unit, the furnace shall be installed parallel with or on the upstream side of the cooling unit to avoid condensation in the heating element.
- With a parallel flow arrangement, the dampers or other means used to control flow of air shall be adequate to prevent chilled air from entering the furnace. Chilled air going through the furnace could cause condensation and shorten furnace life. Dampers (purchased locally) can be either automatic or manual. Manually or automatically operated dampers **MUST** be equipped with a means to prevent furnace and air conditioning operation, unless damper is in the full heat or cool position.
- Installation of locking-type dampers is recommended in all branches, or in individual ducts to balance system's air flows.
- Non-combustible, flexible duct connectors are recommended for return and supply connections to furnace.
- If air return grille is located close to the fan inlet, install at least one 90° air turn between fan and inlet grille to reduce noise.
- Ductwork installed in attic or exposed to outside temperatures requires a minimum of 2" of insulation with outdoor type vapor barrier.
- Ductwork installed in an indoor unconditioned space requires a minimum of 1" of insulation with indoor type vapor barrier.

Filters

A filter **MUST** be used.

Filters may not be supplied with these furnaces, but can be purchased from your distributor.

See Table 6 for required high-velocity filter sizes.

Table 6	High Velocity Air Filter Sizes (max. 600 FPM)	
Cabinet Width	Internal Filter	External Filter Rack
15 ¹ / ₂ "	14" X 25"	14" X 25"
19 ¹ / ₈ "	16" X 25"	16" X 25"
22 ³ / ₄ "	20" X 25"	20" X 25"

Use either filter type:

- Washable, high-velocity filters are based on a maximum air flow rating of 600 FPM.
- Disposable, low velocity filters are based on a maximum air flow of 300 FPM when used with with external filter grille.

⚠ CAUTION

REDUCED FURNACE LIFE HAZARD

Failure to follow caution instructions may result in reduced furnace life.

Use of excessively dirty and/or restrictive air filters may increase furnace operating temperatures and shorten the life of the furnace.

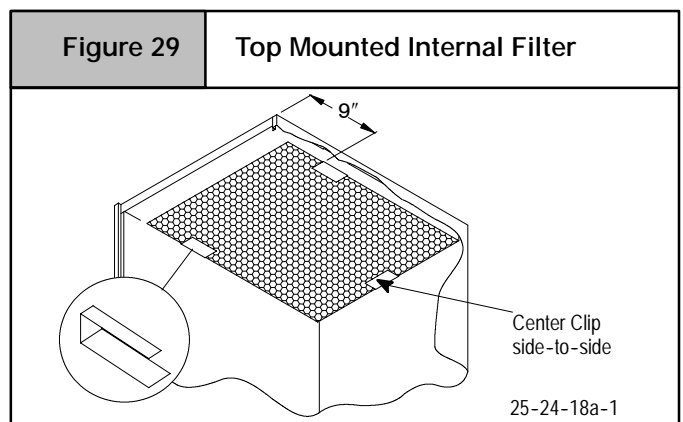
Filters supplied with the furnace are rated at a maximum of 600 fpm air velocity and sized for the furnace's airflow rate. Replacement filters must be of equivalent type, size, and rating except as described below.

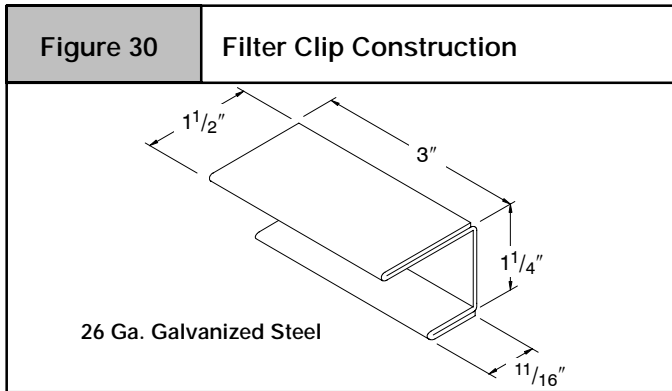
Disposable, low-velocity filters may be used to replace washable, high-velocity filters, providing they are sized for 300 FPM or less.

NOTE: Disposable, low-velocity filters may be replaced with washable, high-velocity filters providing they meet the minimum size areas for 300 FPM or less. Washable, high-velocity filters can be replaced **ONLY** with same type and size filters.

Internal Filter in Top Return Installation

When installing top-mounted filter inside the furnace, install the filter clips on the edge of the top duct opening with the wider end of the clips toward the blower as shown in Figure 29. Clips may be obtained from your distributor or fabricated from sheet metal (Figure 30). Insert filter into side clips first and push filter back until it is fully engaged into back clip.





NOTE: If filters are only suitable for heating application, advise homeowner that filter size may need to be increased if air conditioning is added.

Addition Of Air Conditioning

When a refrigeration coil is used in conjunction with this furnace, it must be installed on the discharge side of the furnace to avoid condensation on the heat exchanger. The coil installation instructions must be consulted for proper coil location and installation procedures. With a parallel flow arrangement, dampers must be installed to prevent chilled air from entering the furnace. If manually operated dampers are used, they must be equipped with a means to prevent operation of either unit unless the damper is in full heat or full cool position.

Copper or plastic tubing may be used for the condensate drain line.

12. Checks and Adjustments

Startup

NOTE: Refer to startup procedures in the *Users Information Manual*.

	WARNING
ELECTRICAL SHOCK, FIRE, OR EXPLOSION HAZARD.	
Failure to follow safety warnings exactly could result in serious injury, death, and/or property damage.	
If any sparks, odors or unusual noises occur, immediately shut OFF gas and power to furnace. Check for wiring errors or obstruction to blower.	

Manifold Gas Pressure Adjustments

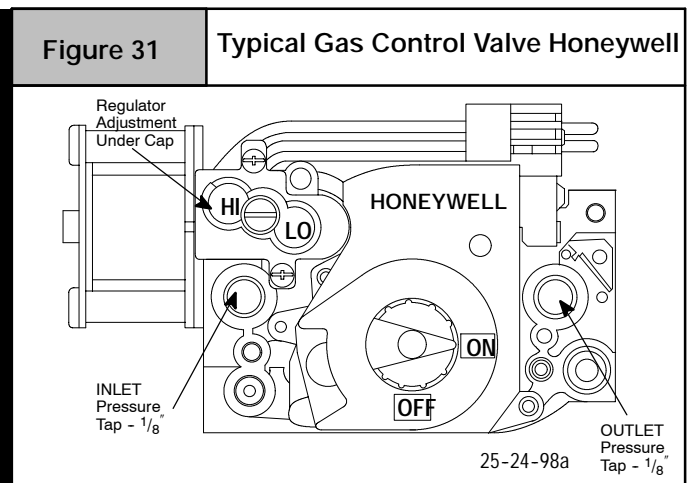
(Hi & Lo Fire)

NOTE: Make adjustment to manifold pressure with burners operating.

	WARNING
FIRE OR EXPLOSION HAZARD.	
Failure to turn OFF gas at shut off before connecting manometer could result in death, personal injury and/or property damage.	
Turn OFF gas at shut off before connecting manometer.	

1. With gas OFF, connect manometer to manifold pressure tap on the outlet of gas control valve. See Figure 31. Use a manometer with a 0" to 12" water column range.
2. Turn gas ON. Operate the furnace on high fire by using a jumper wire on the R to W1 & W2 thermostat connections on the fan board.
3. Remove manifold pressure adjustment screw cover on furnace gas control valve. Turn adjusting screw counterclockwise to decrease the manifold pressure and clockwise to increase pressure. See Figure 31.

NOTE: Adjustment screw cover **MUST** be replaced on gas control valve before reading manifold pressure and operating furnace.



4. Set manifold pressure to value shown in Table 7 or Table 8.
5. Operate the furnace on low fire by using a jumper wire on the R to W1 thermostat connections on the fan board.
Note: The third (3rd) DIP switch should be in the on position to set the low fire manifold pressure. (See wiring diagram.)
6. Repeat steps 3 and 4 for low fire operation.
7. When the manifold pressures are properly set, replace the adjustment screw covers on the gas control valve.
8. Remove the jumper wires from the thermostat connections on the fan board. Remove manometer connection from manifold pressure tap, and replace plug in gas valve.
9. Return third (3rd) DIP switch to previous setting.
10. Check for leaks at plug.

Natural Gas Input Rating Check

The gas meter can be used to measure input to furnace. Check with gas supplier for actual BTU content.

1. Turn OFF gas supply to all appliances other than furnace and start furnace. Use jumper wire on R to W1 and W2 for Hi fire.
2. Time how many seconds it takes the smallest dial on the gas meter to make one complete revolution.

NOTE: If meter uses a 2 cubic foot dial, divide results (seconds) by two.

- Repeat step 2 with jumper wire on R to W1 for low fire.
NOTE: Third (3rd) DIP switch must be in on position. (See furnace wiring diagram). Return third (3rd) DIP switch to previous setting after check.

Refer to Example. The Example is based on a natural gas BTU content of 1,000 BTU's per cubic foot.

Example			
Natural Gas BTU Content per cu. foot	No. of Seconds Per Hour	Time Per Cubic Foot in Seconds	BTU Per Hour
1,000	3,600	48	75,000
$1,000 \times 3,600 \div 48 = 75,000 \text{ BTUH}$			

- Remove jumper wire from R to W1 and W2.
- Relight all appliances and ensure all pilots are operating.

Orifice Sizing

NOTE: Factory sized orifices for natural and LP gas are listed in the furnace Technical Support Manual.

Ensure furnace is equipped with the correct main burner orifices. Refer to Table 7 or Table 8 for correct orifice size and manifold pressure for a given heating value and specific gravity for natural and propane gas.

Operation Above 2000' Altitude

⚠ WARNING

FIRE, EXPLOSION, CARBON MONOXIDE POISONING HAZARD.

Failure to follow safety warnings exactly could result in death, personal injury, and/or property damage.

This high-altitude gas-conversion shall be done by a qualified service agency in accordance with the Manufacturer's instructions and all applicable codes and requirements, or in the absence of local codes, the applicable national codes.

These furnaces may be used at full input rating when installed at altitudes up to 2000'. When installed above 2000', the high fire input must be decreased 2% (natural) or 4% (LP) for each 1000' above sea level in the USA. In Canada, the input rating must be derated 10% (natural) or 5% (LP) for each 1000' above sea level. This may be accomplished by a simple adjustment of manifold pressure or an orifice change, or a combination of a pressure adjustment and an orifice change. The changes required depend on the installation altitude and the heating value of the fuel. Table 7 & Table 8 show the proper furnace manifold pressure and gas orifice size to achieve proper performance based on elevation above sea level for both natural gas and propane gas.

To use the natural gas table, first consult your local gas utility for the heating value of the gas supply. Select the heating value in the vertical column and follow across the table until the appropriate elevation for the installation is reached. The value in the box at the intersection of the altitude and heating value provides not only the manifold pressure but also the orifice size. In the natural gas tables the factory-shipped orifice size is in bold (42). Other sizes must be obtained from service parts.

$$\text{High Altitude Input Rate} = \text{Nameplate Sea Level Input Rate} \times (\text{Multiplier})[\text{USA}]$$

Elevation	High Altitude Multiplier	
	Natural Gas	LP Gas
2001' - 3000'	0.95	0.90
3001' - 4000'	0.93	0.86
4001' - 5000'	0.91	0.82
5001' - 6000'	0.89	0.78
6001' - 7000'	0.87	0.74
7001' - 8000'	0.85	0.70

* Based on mid-range of elevation.

MANIFOLD PRESSURE AND ORIFICE SIZE FOR HIGH ALTITUDE APPLICATIONS

Table 7	NATURAL GAS MANIFOLD PRESSURE (" w.c.)																					
	MEAN ELEVATION FEET ABOVE SEA LEVEL																					
	0 to 2000			2001 to 3000			3001 to 4000			4001 to 5000			5001 to 6000			6001 to 7000			7001 to 8000			
	Orifice No.	Mnfl'd Pressure		Orifice No.	Mnfl'd Pressure		Orifice No.	Mnfl'd Pressure		Orifice No.	Mnfl'd Pressure		Orifice No.	Mnfl'd Pressure		Orifice No.	Mnfl'd Pressure		Orifice No.	Mnfl'd Pressure		
Hi		Lo	Hi		Lo	Hi		Lo	Hi		Lo	Hi		Lo	Hi		Lo	Hi		Lo		
700	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	41	3.7	1.8		
725	--	--	--	--	--	--	--	--	--	--	--	--	--	--	41	3.7	1.8	41	3.4	1.7		
750	--	--	--	--	--	--	--	--	--	--	--	--	--	--	41	3.5	1.7	42	3.6	1.7		
775	--	--	--	--	--	--	--	--	--	--	--	--	--	41	3.6	1.7	42	3.6	1.8	42	3.3	1.6
800	--	--	--	--	--	--	--	--	41	3.6	1.8	42	3.7	1.8	42	3.4	1.7	42	3.1	1.5		
825	--	--	--	--	--	--	41	3.7	1.8	41	3.4	1.7	42	3.5	1.7	42	3.2	1.6	43	3.6	1.8	
850	--	--	--	--	--	--	41	3.5	1.7	42	3.6	1.7	42	3.3	1.6	43	3.7	1.8	43	3.4	1.7	
875	--	--	--	41	3.6	1.7	42	3.6	1.8	42	3.4	1.6	42	3.1	1.5	43	3.5	1.7	43	3.2	1.6	
900	--	--	--	42	3.7	1.8	42	3.4	1.7	42	3.2	1.6	43	3.6	1.7	43	3.3	1.6	44	3.5	1.7	
925	41	3.7	1.8	42	3.5	1.7	42	3.3	1.6	43	3.7	1.8	43	3.4	1.7	43	3.1	1.5	44	3.3	1.6	
950	41	3.5	1.7	42	3.3	1.6	42	3.1	1.5	43	3.5	1.7	43	3.2	1.6	44	3.4	1.7	44	3.1	1.5	
975	42	3.7	1.8	42	3.2	1.6	43	3.6	1.8	43	3.3	1.6	44	3.5	1.7	44	3.2	1.6	45	3.6	1.7	
1000	42	3.5	1.7	43	3.7	1.8	43	3.4	1.7	43	3.1	1.5	44	3.3	1.6	45	3.7	1.8	45	3.4	1.7	
1050	42	3.2	1.6	43	3.3	1.6	43	3.1	1.5	44	3.3	1.6	45	3.6	1.8	--	--	--	--	--	--	
1100	43	3.6	1.7	44	3.5	1.7	44	3.2	1.6	45	3.6	1.8	--	--	--	--	--	--	--	--	--	

NOTE: Natural gas data is based on 0.60 specific gravity. For fuels with different specific gravity consult the National Fuel Gas Code ANSI Z223.1-2002/NFPA 54-2002 or National Standard of Canada, Natural Gas and Propane Installation Code CSA B149.1-05.

Table 8	LPG or PROPANE GAS MANIFOLD PRESSURE (" w.c.)													
	MEAN ELEVATION FEET ABOVE SEA LEVEL													
	0 to 2000		2001 to 3000		3001 to 3999		4001 to 5000		5001 to 6000		6001 to 7000		7001 to 8000	
	Hi	Lo	Hi	Lo	Hi	Lo	Hi	Lo	Hi	Lo	Hi	Lo	Hi	Lo
2500	10.0	4.9	10.0	4.9	9.0	4.4	10.0	4.9	9.4	4.6	8.5	4.2	10	4.9
Orifice Size	#54		#54		#54		#55		#55		#55		#56	

NOTE: Propane data is based on 1.53 specific gravity. For fuels with different specific gravity consult the National Fuel Gas Code ANSI Z223.1-2002/NFPA 54-2002 or National Standard of Canada, Natural Gas and Propane Installation Code CSA B149.1-05.

NOTE: The derating of these furnaces at 2% (Natural Gas) and 4% (Propane Gas) has been tested and design-certified by CSA. In Canada, the input rating must be derated 5% (Natural Gas) and 10% (Propane Gas) for altitudes of 2,000 to 4,500 above sea level. Use the 2001 to 3000 column in Table 7 and Table 8.

The burner orifice part nos. are as follows:

Orifice #41	1096942	Orifice #42	1011351
Orifice #43	1011377	Orifice #44	1011352
Orifice #45	1011353	Orifice #54	1011376
Orifice #55	1011354	Orifice #56	1011355

High Altitude Air Pressure Switch

The factory-installed pressure switches need NOT be changed for any furnace installations from sea level up to and including 8,000' altitude.

⚠ WARNING

CARBON MONOXIDE POISONING HAZARD.

Failure to follow this warning could result in death or personal injury.

NOx inserts for use with Natural Gas units ONLY. If LP Gas is required, NOx inserts must be removed.

LP Conversion

An accessory kit shall be used to convert to propane gas use, see the furnace rating plate for the LP conversion accessory kit part number.

⚠ CAUTION

CARBON MONOXIDE POSINONING HAZARD.

Failure to follow this warning can result in death, property damage and/or personal injury.

Nox inserts for use with Natural Gas units ONLY. If LP Gas is required, NOx inserts must be removed.

⚠ WARNING

FIRE, EXPLOSION, UNIT DAMAGE HAZARD.

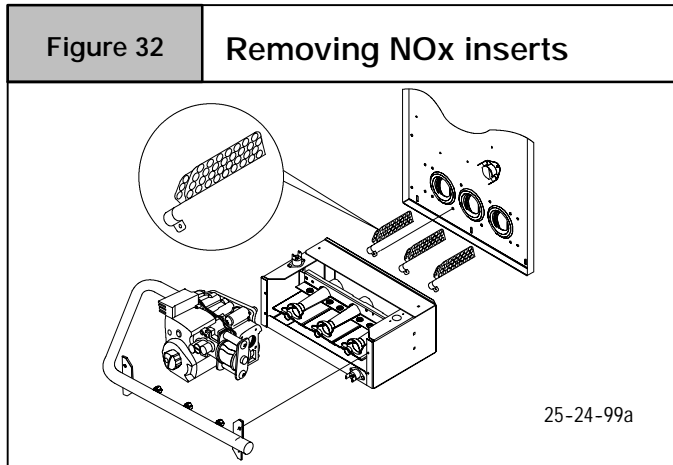
Failure to follow this warning can result in death, property damage and/or personal injury.

An LP conversion accessory kit is required when operating the furnace with LP gas.

For LP conversion remove screws that secure the NOx insert and discard insert.

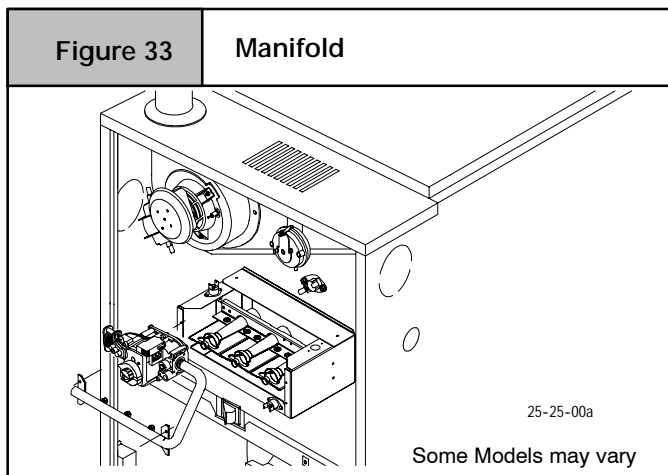
Reinstall screws. See Figure 32

NOTE: It is very important to reinstall the NOx insert mounting screws.

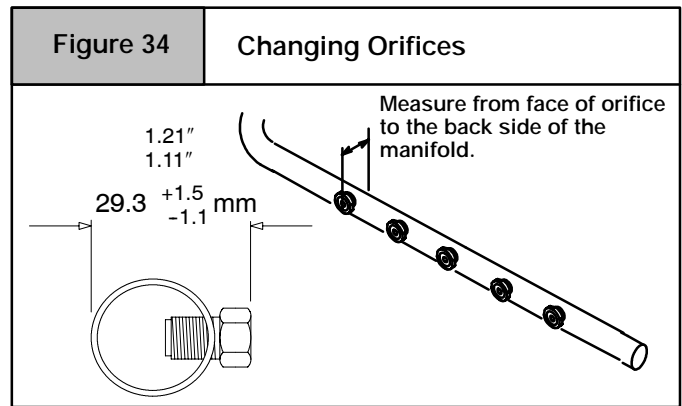


Changing Orifices

1. After disconnecting power and gas supply to the furnace, remove the burner compartment door, exposing the burner compartment.
2. Disconnect gas line from gas valve so manifold can be removed.
3. Disconnect wiring at gas valve. Be sure to note the proper location of all electrical wiring before being disconnected.
4. Remove the four (4) screws holding the manifold and gas valve to the manifold supports. Do not discard any screws. See (Figure 33).



5. Carefully remove the manifold assembly.
6. Remove the orifices from the manifold and replace them with proper sized orifices. See Figure 34.
7. Tighten orifices so they are seated and gas tight. See Figure 34.
8. Reassemble all parts in reverse order as removed. Be sure to engage the main burner orifices in the proper openings in the burners.
9. After reassembling, turn gas on and check all joints for gas leaks using a soapy solution. All leaks must be repaired immediately.



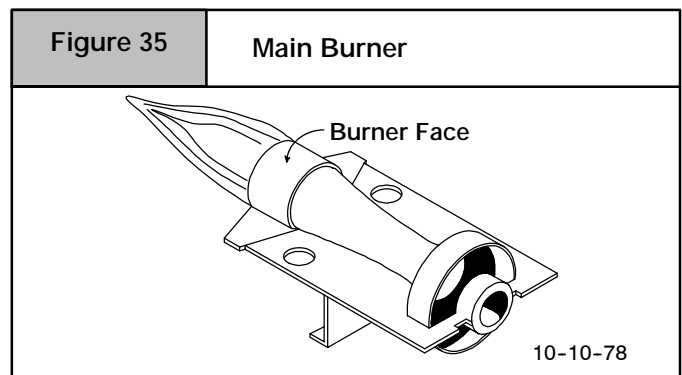
Main Burner Flame Check

Allow the furnace to run approximately 10 minutes. Then inspect the main burner flames. See Figure 35.

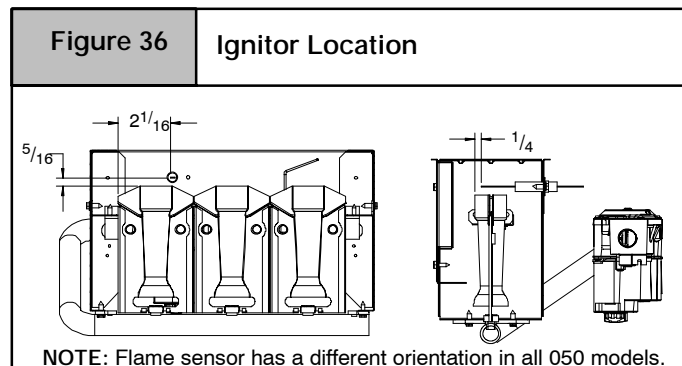
Check for the following (Figure 35):

- Stable and blue flames. Dust may cause orange tips or wisps of yellow, but flames **MUST NOT** have solid, yellow tips.
- Flames extending directly from burner into heat exchanger.
- Flames do **NOT** touch sides of heat exchanger

If any problems with main burner flames are noted, it may be necessary to adjust gas pressures or check for drafts.



For ignitor location see Figure 36.



NOTE: Flame sensor has a different orientation in all 050 models.

Temperature Rise Check

⚠ CAUTION

REDUCED FURNACE LIFE HAZARD

Failure to properly set the air temperature rise may result in reduced furnace life.

Use **ONLY** the blower motor speed taps marked “Y” for YES for setting air temperature rise.

Blower Motor Speed Taps for *8MPNT Model Sizes

Model Sizes	Heat Stage	LO RED	M LO BLUE	M HI ORN	HI BLK
050B12	LO	N	Y	Y	Y
	HI	N	Y	Y	N
075F14	LO	N	Y	Y	Y
	HI	N	Y	Y	Y
100F14	LO	N	Y	Y	Y
	HI	N	N	Y	Y
100J20	LO	Y	Y	N	N
	HI	N	N	Y	Y
125J20	LO	N	N	Y	Y
	HI	N	N	Y	Y

The blower speed **MUST** be set to give the correct air temperature rise through the furnace as marked on the rating plate. Temperature rise is the difference between supply and return air temperatures.

To check temperature rise, use the following procedure:

1. Place thermometers in supply and return air registers as close to furnace as possible, avoiding direct radiant heat from heat exchangers.
2. Operate furnace on high fire for 10 minutes with all the registers and duct dampers open by using a jumper wire on R to W1 and W2 thermostat connections on the furnace control board.

Note: The third (3rd) DIP Switch should be in the on position. (See furnace wiring diagram)
3. Take readings and compare with range specified on rating plate.
4. If the air temperature rise is not in the correct range, the blower speed must be changed. A higher blower speed will lower the temperature rise. A lower blower speed will increase the temperature rise.
5. Repeat steps 2 thru 4 with the furnace operating on low fire for 10 minutes by using a jumper wire on the R to W1 thermostat connections on the fan board.
6. Remove the jumper wire after the adjustments are complete. Return third (3rd) to previous setting.

Changing Blower Speed on *8MPT

⚠ WARNING

ELECTRICAL SHOCK HAZARD.

Failure to disconnect power could result in death or personal injury.

Turn **OFF** power to furnace before changing speed taps.

NOTE: The speed taps that the manufacturer sets at the factory for this furnace are based on a nominal 400 CFM per ton for cooling and the basic mid range on the temperature rise for heating.

Since the manufacturer cannot predict the static pressure that will be applied to the furnace, it is the responsibility of the installer dealer/contractor to select the proper blower motor speed leads for the application when the furnace is installed.

If it is necessary to change speeds, refer to steps below.

1. Refer to *Furnace Wiring Diagram* for location of the heating and cooling speed taps located on the furnace control as well as location of unused blower motor speed leads. Use the chart (Table 9) to determine the blower motor speed settings.

Table 9	Blower Speed Chart (*8MPT)	
	Wire Color	Motor Speed
	Black	High
	Orange*	Med-High
	Blue	Med-Low
	Red	Low
* Med-High speed may not be provided on all models.		

2. Change the heat or cool blower motor speed by removing the motor lead from the “HI Heat or Lo Heat” or “Cool” terminal and replace it with the desired motor speed lead from the “M1” or “M2” location. Connect the wire previously removed from the “Hi Heat or Lo Heat” or “Cool” terminal to the vacated “M1” or “M2” terminal.
3. If the same speed must be used for both heating and cooling, remove the undesired motor speed lead from the “Hi Heat or Lo Heat” or “Cool” terminal and connect that lead to the open terminal at “M1” or “M2” location or tape off. Attach a jumper between the “Hi Heat or Lo Heat” and “Cool” terminals and the remaining motor speed lead.

Note: When using the same speed on motors with (4) speed leads, it will be necessary to tape off the terminal of the motor speed lead removed from the “Hi Heat or Lo Heat” or “Cool” terminal with electrical tape since an open terminal will not be available at the “M1” or “M2” location.

Thoroughly check the system after modification to ensure the proper operation of the circulating air blower in all modes of operation.

Continuous-Fan Operation using “G”

*8MPT Models

Energizing the “G” terminal on the furnace control provides continuous fan operation. This is done by connecting the G terminal of the thermostat to the G terminal on the furnace control. When the FAN switch is turned from auto to ON the fan will operate continuously at “LO HEAT” speed. EAC will be energized in this mode.

NOTE: In heating, the fan will turn off during furnace ignition and warm up then restart at heating speed.

*8MPTV Models

Energizing the “G” terminal on the furnace control provides continuous fan operation. This is done by connecting the G terminal of the thermostat to the G terminal on the furnace control. When the FAN switch is turned from auto to ON the fan will operate continuously at “LO HEAT” speed. EAC will be energized in this mode.

NOTE: No hard-wired continuous fan mode option available for variable speed applications.

NOTE: In heating, the fan will continue to operate at continuous fan speed until the furnace control calls for heat speed after warm-up. Then the fan will run at heat speed.

Hard-Wired Continuous Fan Operation (*8MPT ONLY)

A terminal is provided on the furnace control located in the circulating air blower compartment for operation of the continuous fan option. This connection is intended for the low speed motor tap, and has a lower contact rating (8 amps) than the heat and cool taps. When the low speed blower lead is connected to this terminal, this will provide low speed blower operation whenever the other three speeds (“Hi Heat or Lo Heat” or Cool) are not energized.

Thoroughly check the system after modification to ensure the proper operation of the circulating air blower in all modes of operation.

Separate speed selections for Heat, Cool, and Continuous-Fan

Connect low speed lead from circulating air motor to the “Cont” terminal at the furnace control board. The appropriate motor leads should already be connected to the “Hi Heat and Lo Heat” and “Cool” terminals.

Heating and Continuous-Fan Speed the Same

If it is necessary to operate the low heating speed and continuous-fan speed using the same blower speed, connect a jumper between the “Lo Heat” and “Cont” terminals on the furnace control.

Note: There should be only ONE motor lead going to the “Lo Heat” and “Cont” terminals.

Changing Blower Speed on *8MPV



WARNING

ELECTRICAL SHOCK HAZARD.

Failure to disconnect power could result in death or personal injury.

Turn OFF power to furnace before changing blower speed.

Note: The blower speeds that the manufacturer sets from the factory for this product are based on a nominal 400 CFM per ton cooling and the mid range on the temperature rise for heating.

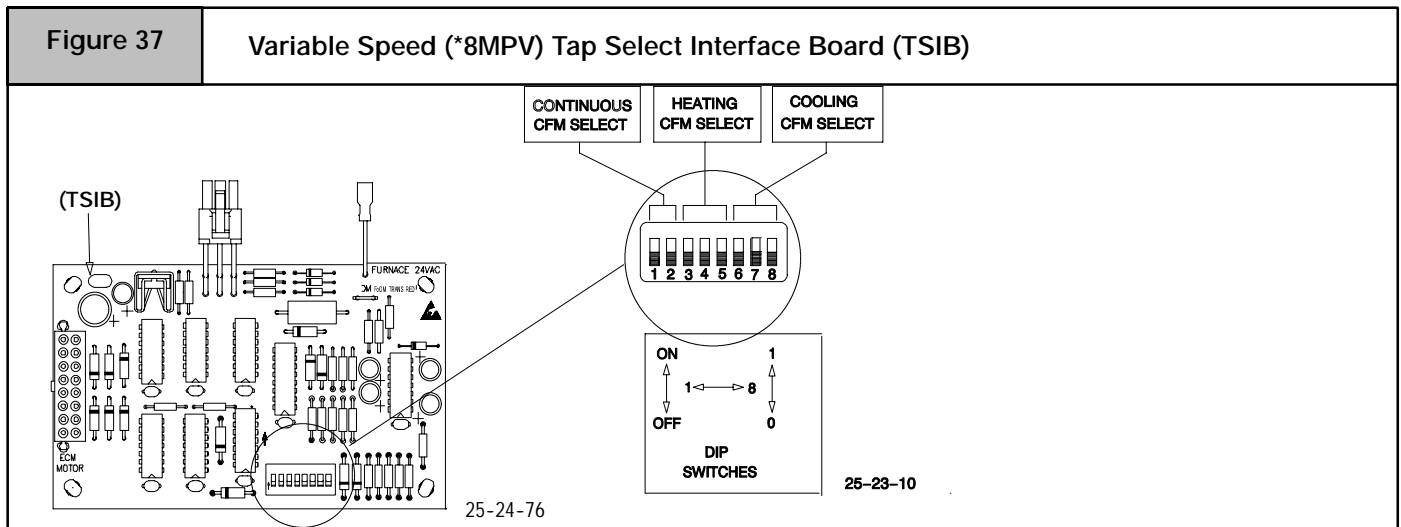
Since the manufacturer cannot predict the static pressure that will be applied to the furnace, it is the responsibility of the installer dealer/contractor to select the proper blower speeds for the application when the furnace is installed.

If it is necessary to change speeds, refer to steps below.

1. The 115 VAC power supply to the furnace must be turned OFF before making adjustments to the motor.

NOTE: Allow at least 1 minute before restoring power to the furnace after making Blower Control changes.

2. The heating, cooling and continuous blower speeds can be adjusted by changing the Dip switch settings that are located on the tap-select interface board (see Figure 37). Switches #1 and #2 adjust the continuous blower speeds. Switches #3, #4 and #5 adjust the heating speeds. Switches #6, #7 and #8 adjust the cooling speed. See the “*Technical Support Manual*” for the switch settings for the desired airflow rates for the installation.



13. Furnace Maintenance



WARNING

FIRE, EXPLOSION, OR CARBON MONOXIDE POISONING HAZARDS

Failure to have the furnace inspected and maintained could result in death, personal injury and/or property damage.

It is recommended that the furnace be inspected and serviced on an annual basis (before the heating season) by a qualified service agency.

See "User's Information Manual".



WARNING

ELECTRICAL SHOCK, FIRE OR EXPLOSION HAZARD

Failure to follow safety warnings exactly could result in dangerous operation death, personal injury and/or property damage.

Improper servicing could result in dangerous operation, serious injury, death or property damage.

- Before servicing, disconnect all electrical power to furnace.
- When servicing controls, label all wires prior to disconnecting. Reconnect wires correctly.
- Verify proper operation after servicing.

14. Sequence of Operation & Diagnostics for *8MPV

The following is the normal operating sequence.

Cooling (Y) Request:

24VAC signals applied to Y & G terminals of FCB (furnace control board). (Must have Y & G for cooling)

- Cool motor speed is energized after 5 second Cool Fan On Delay time.

Y & G signals removed from FCB

- Cool motor speed is de-energized after 90 second Cool Fan Off Delay time.

Cooling (Y) and dehumidification (DEHUM) requests:

- 24 VAC signals applied to Y, DEHUM & G terminals of FCB (furnace control board).
- Same operation as the cooling (Y) request, except the cooling speed is reduced 20% to compensate for high humidity conditions during cooling operation. The cooling speed returns to the normal setting after the DEHUM signal is removed.

Continuous Circulating Fan (G) Request:

24VAC signal applied to G terminal of FCB.

- Continuous fan speed is energized.

G signal removed from FCB.

- Continuous fan speed is de-energized without delay.

NOTE 1) Blower motor runs at the continuous fan speed selected by DIP Switches 1 & 2 in response to a G request.

NOTE 2) Heating or Cooling requests received during a Fan request cause the fan speed to change to the appropriate heat or cool speed after the Fan On Delay time expires. The fan returns to continuous circulating speed after the selected Fan Off Delay time expires following loss of the Heating or Cooling request.

NOTE 3) Hard-wire option not available for variable speed models.

Heating (W1) Request (single stage thermostat operation, 3rd DIP switch (SW1-3) on the FCB must be in off position) (see furnace wiring diagram):

24VAC signal applied to W1 terminal of FCB.

- Inducer motor turns on at high speed and pressure switches close.
- Following a 15 second prepurge delay after the low pressure switch closes, the ignitor begins a 17 second warm up.
- The gas valve is energized, the main burners light at low heat rate and flame is sensed.
- The ignitor is de-energized, and the inducer drops to low speed after the main burners ignite.
- The FCB will delay Low Heat blower operation for the 45-second Low Heat Fan On Delay time timed from the opening of the gas valve.
- If the W1 request is still present after 12 minutes, timed from the opening of the gas valve, the inducer switches to high speed, closing the high pressure switch, then the high fire solenoid energizes, and the fan switches to High Heat speed.

W1 signal removed from FCB.

- The gas valve de-energizes and the main burners go out.
- The inducer runs at its present speed for a 15 second postpurge period.
- The fan runs at its present speed.
- The blower de-energizes after the selected Heat Fan Off Delay time expires timed from the gas valve de-energizing.

NOTE 4) If a new Heating request arrives while the control is waiting for the Heat Fan Off Delay time to expire, the FCB will wait for the selected Heat Fan Off Delay, and then start a new heating cycle.

Heating (W1 & W2) Request (two stage thermostat operation, 3rd DIP (SW1-3) switch must be in on position) (see furnace wiring diagram):

24VAC signals applied to W1 terminal of FCB.

- Same response as single stage thermostat operation described above except the burners, inducer, and blower will not go to high heat rate, and High Heat Fan speed unless a W2 signal is applied.

24VAC signal applied to W1 and W2 terminals of FCB.

- Same light-off routine as described for the signal stage thermostat operation except burners light at high heat rate, the inducer remains on high speed after ignition, and the FCB will delay High Heat blower operation for the 30-second High Stage Heat Fan On Delay.

NOTE 5) The FCB responds without delay to the presence or loss of W2 (with W1 constant). W1 & W2 result in high inducer, high heat rate, and High Heat Fan speed. W1 only results in low inducer, low heat rate, and Low heat Fan speed.

Heating Request with Gas Shut Off:

24 VAC signals applied to W1 terminal of FCB.

The FCB will attempt 4 cycles for ignition then go to soft lockout for 3 hours, and then try for ignition again as long as the heat call remains. Power reset will clear lockout.

- Inducer motor turns on at high speed.
- Following a 15 second prepurge delay after the low pressure switch closes, the ignitor begins warm up.
- The ignitor glows red-hot for 22 seconds, then turns off. The FCB flashes error code 6.
- The ignitor stays off for 17 seconds, then begins to warm up again.
- The ignitor glows red hot for 22 seconds then turns off. The FCB continues flashing error code 6.
- The ignitor stays off for 17 seconds, then begins to warm up again.
- The ignitor glows red hot for 22 seconds then turns off. The FCB continues flashing error code 6.
- The ignitor stays off for 17 seconds, then begins to warm up again.
- The ignitor glows red hot for 22 seconds then turns off. The FCB proceeds to soft lockout. Stops flashing error code 6, and begins flashing error code 6 + 1.
- The inducer motor de-energizes 15 seconds after error code 6 + 1 starts flashing.

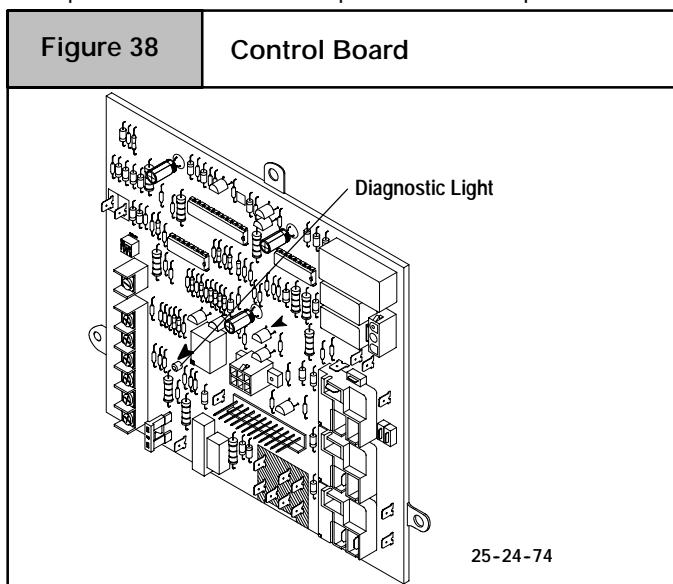
Furnace Control Board Diagnostic Codes (See Figure 38)

OFF	= 24VAC or 115VAC is off, fuse is open
Heartbeat	= Normal operation or no previous Diagnostic Code
ON SOLID	= Soft Lockout - Furnace Control Error (1 hr delay) If code repeats immediately following power reset then replace control
1 Flash	= Not used
2 Flashes	= Pressure switch(es) closed when should be open
3 Flashes	= Low pressure switch open when should be closed
4 Flashes	= Limit or flame roll-out switch open (less than 2 minutes)
5 Flashes	= Flame sensed out of sequence
6 Flashes	= Failure to ignite or flame sense lost while running
6 + 1 Flashes	= Soft Lockout - Max of four trials for ignition reached (3hr delay)
7 Flashes	= Soft Lockout - Limit or flame roll-out switch open longer than 2 minutes (1 hr delay) (roll-out switch requires manual reset)
8 Flashes	= Permanent Lockout - Gas valve relay contact stuck closed or miswired gas valve (power reset only)
9 Flashes	= High pressure switch open when should be closed
10 Flashes	= Improper transformer phasing on twinned applications or improper line voltage polarity.

NOTE1: The 6 + 1 designation indicates a combination of flash codes.

* If status code recall is needed, briefly (2-3 seconds) remove then reconnect one limit switch wire (main or rollout) to display last stored status code. Do not remove power or blower door before initiating status code recall or code will be lost. Code is automatically cleared after 72 hours or upon power reset.

* Proper flame sense microamps: 0.7 microamps D.C. minimum, 2.0 - 4.0 microamps nominal



15. Sequence of Operation & Diagnostics for *8MPT

The following is the normal operating sequence.

Cooling (Y) Request:

24VAC signals applied to Y & G terminals of FCB (furnace control board).

- Cool motor speed is energized after 5 second Cool Fan On Delay time.

Y & G signals removed from FCB

- Cool motor speed is de-energized after 90 second Cool Fan Off Delay time.

NOTE: DEHUM not available on the *8MPT modesl.

Continuous Circulating Fan (G) Request:

24VAC signal applied to G terminal of FCB.

- Low-Heat motor speed is energized without delay.

G signal removed from FCB.

- Low-Heat motor speed is de-energized after 5 second delay.

NOTE 1) Furnace de-energizes the fan during the heat exchanger warm-up period on a call for Heating that occurs during a G request unless a blower motor lead is connected to the Cont terminal on the FCB, in which case see NOTE 2)

NOTE 2) Heating or Cooling requests received during a Fan request cause the fan speed to change to the appropriate heat or cool speed after the Fan On Delay time expires. The fan returns to continuous circulating speed after the selected Fan Off Delay time expires following loss of the Heating or Cooling request.

Continuous Circulating Fan Hard-Wired (Cont) Request:

Field selected low speed motor tap installed on "CONT" terminal.

- Low speed is energized when power applied to furnace. Operates at this speed continuously while there are no other blower demands from furnace control. Fan demands from furnace control for heat, cool or "G" will override hard-wired speed tap.

NOTE 3) EAC is NOT active for hard-wired mode but IS active for fan demands from furnace control for heat, cool and "G".

Heating (W1) Request (single stage thermostat operation, 3rd DIP switch (SW1-3) must be in off position) (see furnace wiring diagram):

24VAC signal applied to W1 terminal of FCB.

- Inducer motor turns on at high speed.
- Following a 15 second prepurge delay after the low pressure switch closes, the ignitor begins a 17 second warm up.
- The gas valve is energized, the main burners light at low heat rate and flame is sensed.
- The ignitor is de-energized, and the inducer drops to low speed after the main burners ignite.
- The FCB will delay Low Heat blower operation for the 45-second Low Heat Fan On Delay time, timed from the opening of the gas valve.
- If the W1 request is still present after 12 minutes, timed from the opening of the gas valve, the inducer switches to high speed, closing the high pressure switch, then the high fire solenoid energizes, and the fan switches to High Heat speed.

W1 signal removed from FCB.

- The gas valve de-energizes and the main burners go out.
- The inducer runs at its present speed for a 15 second postpurge period.
- The fan runs at its present speed.
- The fan de-energizes after the selected Heat Fan Off Delay time expires, timed from the gas valve de-energizing.

NOTE 3) If a new Heating request arrives while the control is waiting in the Heat Fan Off Delay time, the FCB will wait for the selected Heat Fan Off Delay then start a new heating cycle as long as the heat call remains.

Heating Request (W1 & W2) (two stage thermostat operation, 3rd DIP switch (SW1-3) must be in on position) (see furnace wiring diagram):

24VAC signal applied to W1 terminal of FCB.

- Same response as single stage thermostat operation (fan uses Low Stage Heat On Delay) described above except the control will not go to high heat rate, and High Heat Fan speed unless a W2 signal is applied.

24VAC signal applied to W1 and W2 terminals of FCB.

- Same light-off routine as described for the signal stage thermostat operation except main burners light at high heat rate, the inducer remains on high speed after ignition, and the FCB will delay blower operation at the High Heat Fan speed for 30 second On Delay time.

NOTE 4) The FCB responds without delay to the presence or loss of W2 (with W1 constant). W1 & W2 result in high inducer, high heat rate, and High Heat Fan speed. W1 only results in low inducer, low heat rate, and Low heat Fan speed.

Heating Request with Gas Shut Off:

24 VAC signal applied to W1 terminal of FCB.

The FCB will attempt 4 cycles for ignition then go to soft lockout for 3 hours, and then try for ignition again as long as the heat call remains. Power reset will clear lockout.

- Inducer motor turns on at high speed.
- Following a 15 second prepurge delay, the ignitor begins warm up.
- The ignitor glows red-hot for 22 seconds, then turns off. The FCB flashes error code 6.
- The ignitor stays off for 17 seconds, then begins to warm up again.
- The ignitor glows red hot for 22 seconds then turns off. The FCB continues flashing error code 6.
- The ignitor stays off for 17 seconds, then begins to warm up again.
- The ignitor glows red hot for 22 seconds then turns off. The FCB continues flashing error code 6.
- The ignitor stays off for 17 seconds, then begins to warm up again.
- The ignitor glows red hot for 22 seconds then turns off. The FCB proceeds to soft lockout. Stops flashing error code 6, and begins flashing error code 6 + 1.
- The inducer motor de-energizes after a 15 second post purge.

HUMIDIFIER - The 24VAC HUM is energized when the low pressure switch closes on a call for heat. The 115V HUM (called HUM on Control) is energized when the inducer is energized.

ELECTRONIC AIR CLEANER - EAC is energized when there is a blower speed call. It is NOT energized when blower operates in the hard-wired continuous fan mode.

Furnace Control Board Diagnostic Codes (See Figure 38)

OFF	=	24VAC or 115VAC is off, fuse is open
Heartbeat	=	Normal operation or no previous Diagnostic Code
ON SOLID	=	Soft Lockout - Furnace Control Error (1 hr delay) If code repeats immediately following power reset then replace control
1 Flash	=	Not used
2 Flashes	=	Pressure switch(es) closed when should be open
3 Flashes	=	Low pressure switch open when should be closed
4 Flashes	=	Limit or flame roll-out switch open (less than 2 minutes)
5 Flashes	=	Flame sensed out of sequence
6 Flashes	=	Failure to ignite or flame sense lost while running
6 + 1 Flashes	=	Soft Lockout - Max of four trials for ignition reached (3hr delay)
7 Flashes	=	Soft Lockout - Limit or flame roll-out switch open longer than 2 minutes (1 hr delay) (roll-out switch requires manual reset)
8 Flashes	=	Permanent Lockout - Gas valve relay contact stuck closed or miswired gas valve (power reset only)
9 Flashes	=	High pressure switch open when should be closed
10 Flashes	=	Line voltage polarity or improper transformer phasing on twinned applications

NOTE1: The 6 + 1 designation indicates a combination of flash codes.

* If status code recall is needed, briefly (2-3 seconds) remove then reconnect one limit switch wire (main or rollout) to display last stored status code. Do not remove power or blower door before initiating status code recall or code will be lost. Code is automatically cleared after 72 hours or upon power reset.

* Proper flame sense microamps: 0.7 microamps D.C. minimum, 2.0 - 4.0 microamps nominal

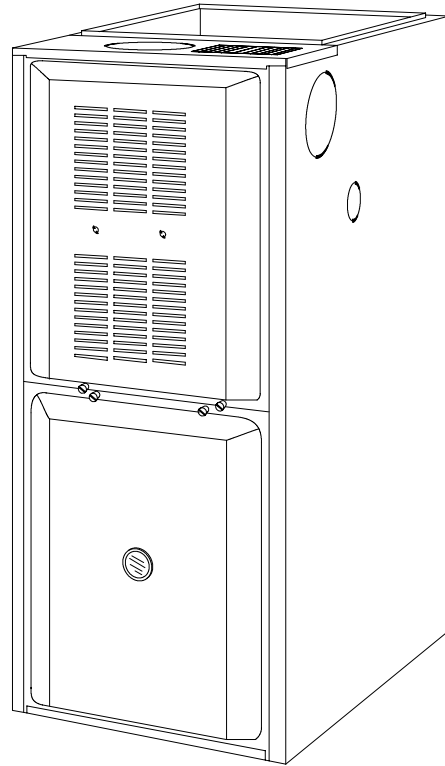
Technical Support Manual

Upflow Models

- *8MPV050B12B1
- *8MPV075F14B1
- *8MPV100J20B1
- *8MPV125J20B1

- *8MPT050B12B1
- *8MPT075F14B1
- *8MPT100F14B1
- *8MPT100J20B1
- *8MPT125J20B1

* Denotes Brand (C, H, T)



FAN ASSISTED COMBUSTION GAS FURNACES



Manufactured by:
International Comfort Products, LLC
Lewisburg, TN 37091
Fast Parts Division
(866) 380-3278



Save This Manual For Future Reference

Model Specifications

Manufacturers Number (Mfr No -See Rating Plate) ALL Models								
Specifications								
	*8MPV050B12B		*8MPV075F14B		*8MPV100J20B		*8MPV125J20B	
General Gas Type	Nat	LP	Nat	LP	Nat	LP	Nat	LP
Transformer Size (VA)	40	40	40	40	40	40	40	40
T'stat Heat Anticipator	.50	.50	.50	.50	.50	.50	.50	.50
Input (Btuh) Std/Alt. Hi Fire	50,000		75,000		100,000		125,000	
Lo Fire	35,000		52,500		70,000		87,500	
Output (Btuh) Std/Alt. Hi Fire	40,000		60,000		81,000		101,000	
Lo Fire	28,000		42,000		61,000		71,000	
Temp. Rise (°F) Hi Fire	30-60		30-60		35-65		30-60	
Lo Fire	25-55		25-55		35-65		25-55	
Electrical (Volts/Hz)	115/60		115/60		115/60		115/60	
Rating Plate Amps.	9.8		11.7		14.9		14.9	
Gas & Ignition Gas Type	Nat	LP	Nat	LP	Nat	LP	Nat	LP
Std. Main Orifices (No/Size)	2/#42	2/#54	3/#42	3/#54	4/#42	4/#54	5/#42	5/#54
Gas Valve Regulation Type	VR 8205Q SNAP	VR 8205Q SNAP	VR 8205Q SNAP	VR 8205Q SNAP	VR 8205Q SNAP	VR 8205Q SNAP	VR 8205Q SNAP	VR 8205Q SNAP
Manifold Press. Hi Fire (" WC)	3.5	10.0	3.5	10.0	3.5	10.0	3.5	10.0
Lo Fire (" WC)	1.7	4.9	1.7	4.9	1.7	4.9	1.7	4.9
Ignition Type	Hot Surface							
Combustion Flue Outlet Size (Inches)	4	4	4	4	4	4	4	4
Limits & Controls Furnace Control (Type)	Integrated							
Furnace Control On delay (Timed-secs)	30 Hi /45 Lo							
Off delay	60,100,140,180							
Thermal Sensor (°F)	300		300		300		300	
Limit Control Setting (°F)	See Limit in Parts List		See Limit in Parts List		See Limit in Parts List		See Limit in Parts List	
Std. Pressure Sw. (Part #)	1013862		1013862		1013862		1013862	
Hi Fire Press (Close)	-0.69		-0.69		-0.69		-0.69	
Hi Fire Press (Open)	-0.59		-0.59		-0.59		-0.59	
Lo Fire Press (Close)	-0.40		-0.40		-0.40		-0.40	
Lo Fire Press (Open)	-0.30		-0.30		-0.30		-0.30	
Blower Data Type & Size	11-8		11-10		11-10		11-10	
Motor Amps FLA	7.7		9.6		12.8		12.8	
Motor Type/H.p.	DC/1/2		DC/3/4		DC/1		DC/1	
Cap. Mfd/Volts	--		--		--		--	
Filter Type	Washable		Washable		Washable		Washable	
Filter Size (")	14x25x1/2		16x25x1/2		16x25x1/2 (2)		16x25x1/2 (2)	
Min. Cool Cap. (Tons)	1.5		1.5		3		3	
Max. Cool Cap. (Tons)	3		3.5		5		5	
Gas Conversion Kits	Nat to LP NAHA002LP (1172959*) LP to Nat NAHA002NG (1172961*)							
*Must be ordered from Service Parts								
Use the Fuel Gas Code to establish proper vent sizing.								

Circulation Air Blower Data - *8MPV

Heating, Cooling & Continuous Airflow Settings

Continuous Blower (CFM) @ 0.10" WC External Static Pressure

Switch Settings		Furnace Model			
#1	#2	50K	75K	100K	125K
0*	0*	563	680	728	752
0	1	695	829	915	881
1	0	804	967	1088	1050
1	1	933	1139	1255	1198

*Factory Setting

Hi Heat Air Temperature Adjustment (° F)**

Switch Settings			Furnace Model			
#3	#4	#5	50K	75K	100K	125K
0*	0*	0*	0	0	0	0
0	0	1	+2	+2	+6	+6
0	1	0	+2	+2	+6	+6
0	1	1	+6	+4	+9	+9
1	0	0	+7	+5	+11	+9
1	0	1	-3	-3	-3	-1
1	1	0	-5	-6	-6	-3
1	1	1	-7	-9	-12	-4

*Factory setting

**Approximate air temperature change from factory setting @ 0.20" WC External Static Pressure on high heat.

MAX CFM's	
Filter Size	CFM
14" X 25"	1400
16" X 25"	1600
20" X 25"	2000
24" X 25"	2500
Max CFM based on 600 FPM	

Lo Heat Air Temperature Adjustment (° F)**

Switch Settings			Furnace Model			
#3	#4	#5	50K	75K	100K	75K
0*	0*	0*	0	0	0	0
0	0	1	+2	+2	+5	+6
0	1	0	+2	+2	+5	+6
0	1	1	+5	+4	+10	+10
1	0	0	+6	+5	+11	+10
1	0	1	-3	-3	-3	-2
1	1	0	-5	-6	-6	-2
1	1	1	-7	-9	-10	-4

*Factory setting

**Approximate air temperature change from factory setting @ 0.20" WC External Static Pressure on high heat.

Cooling (CFM) @ 0.50" WC External Static Pressure (1)
(See Figure 1 - 4 for complete Airflow Range)

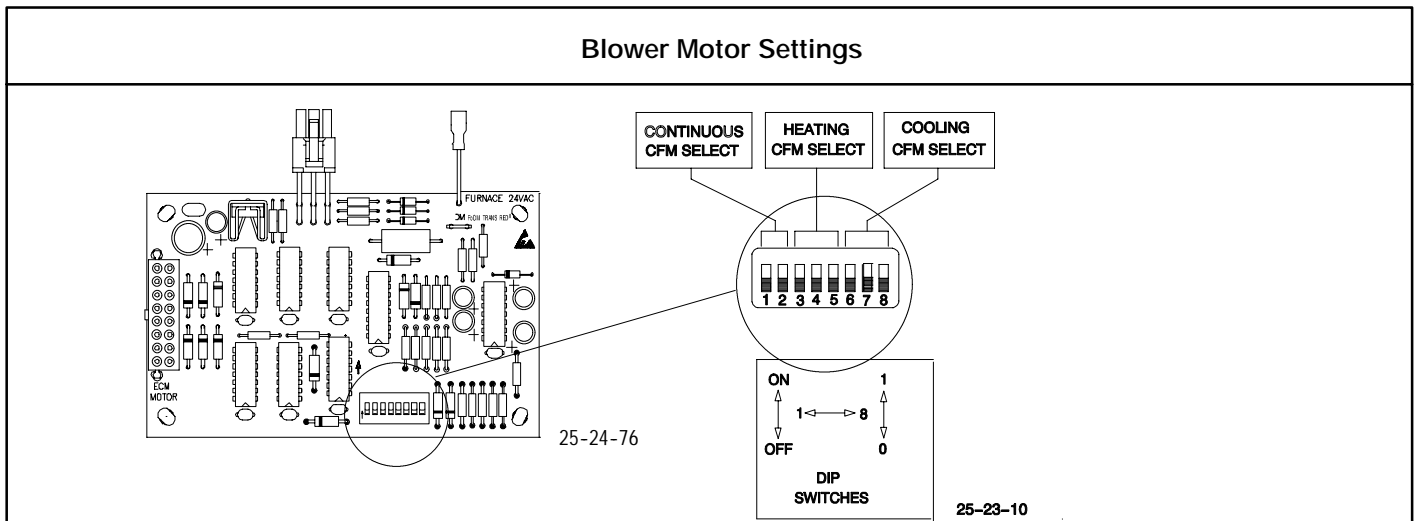
Switch Settings			Furnace Model			
#6	#7	#8	50K	75K	100K	125K
0*	0*	0*	1198	1457	2180	2196
0	0	1	1148	1346	2038	2017
0	1	0	1022	1227	1859	1829
0	1	1	918	1125	1667	1629
1	0	0	827	1038	1483	1444
1	0	1	771	929	1267	1236
1	1	0	726	849	1052	1024
1	1	1	676	820	863	805

*Factory setting

NOTE: (1) Data based on Bottom Only or One Side return.

Filter required for each return-air inlet. Airflow performance includes 1" washable (600 FPM max) filter media.

Blower Motor Settings



Circulation Air Blower Data - *8MPV

Cooling Airflow Settings

Figure 1

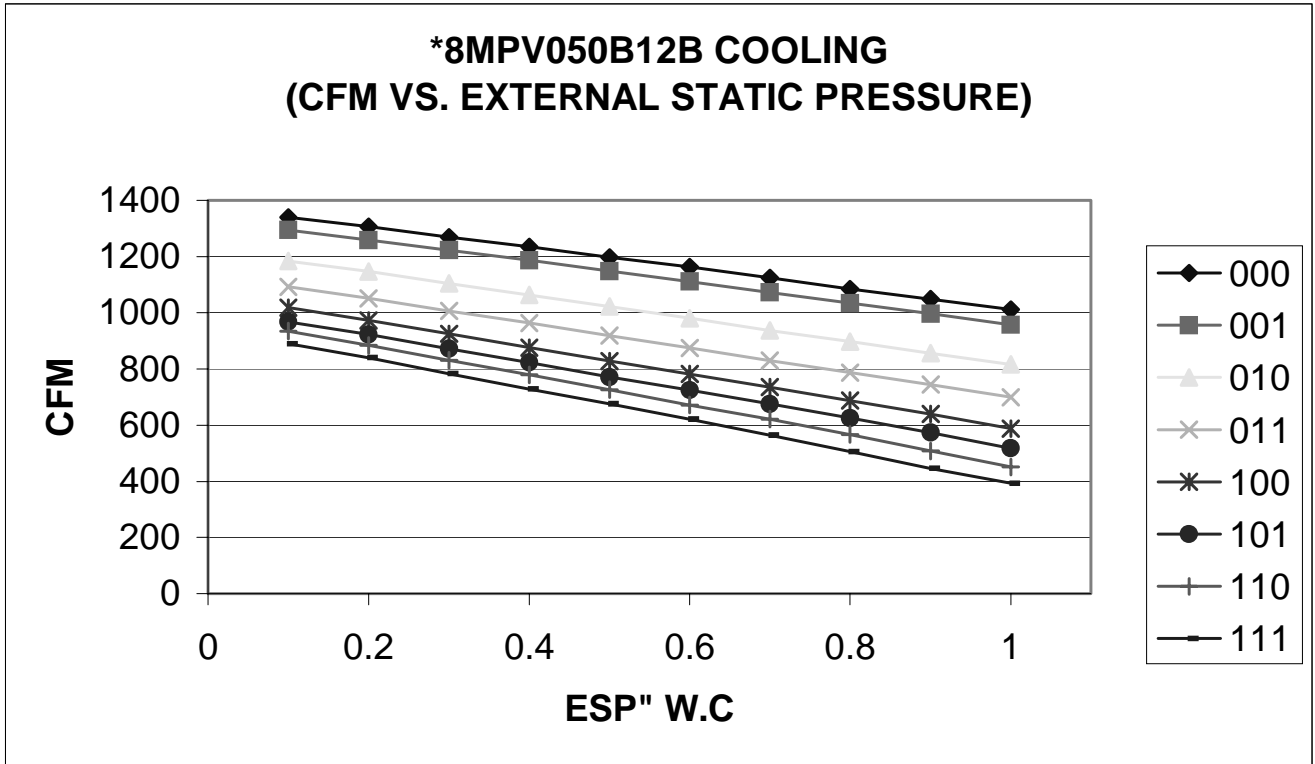
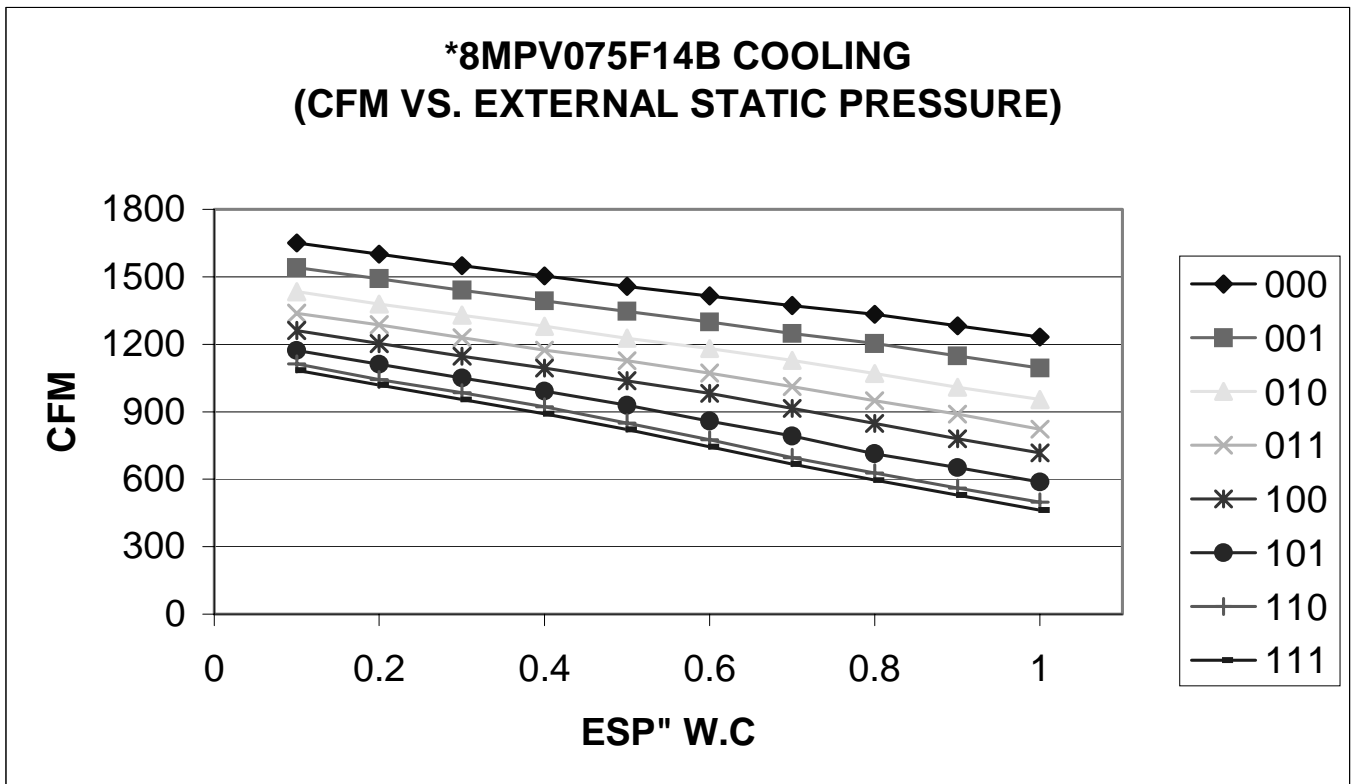


Figure 2



Circulation Air Blower Data - *8MPV

Heating, Cooling & Continuous Airflow Settings

Figure 3

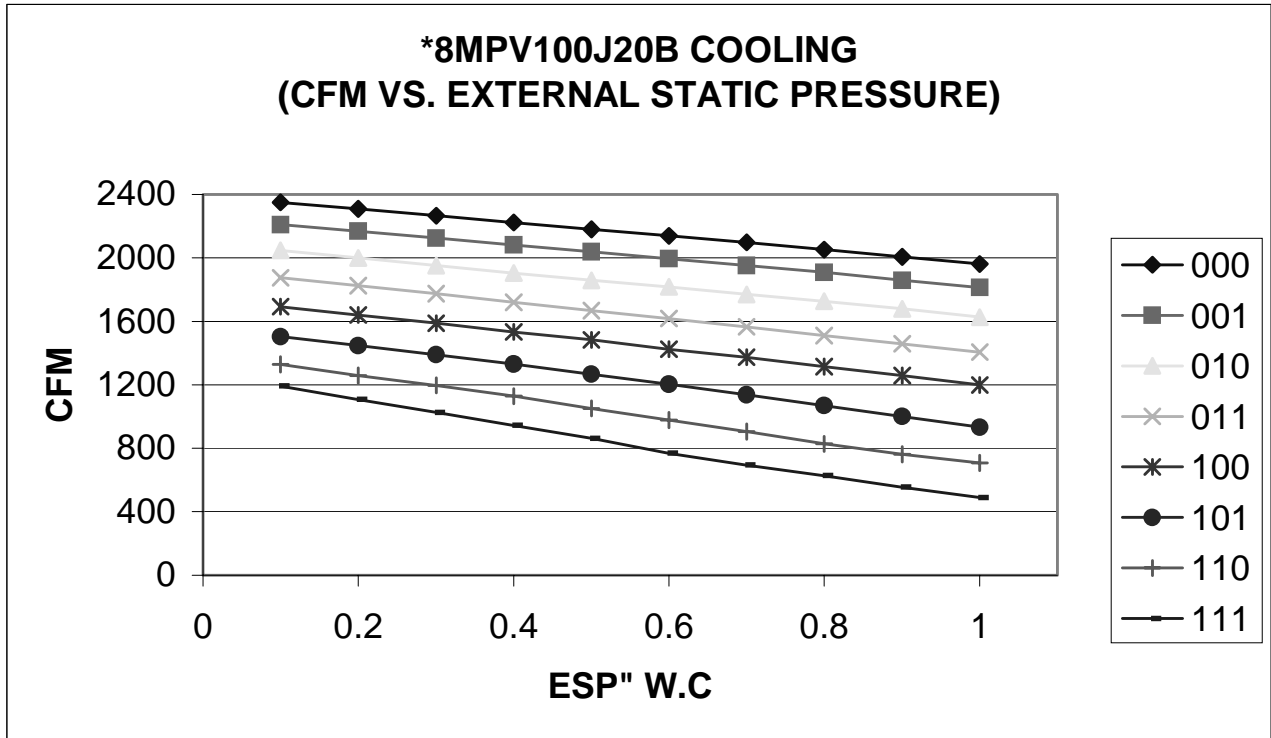
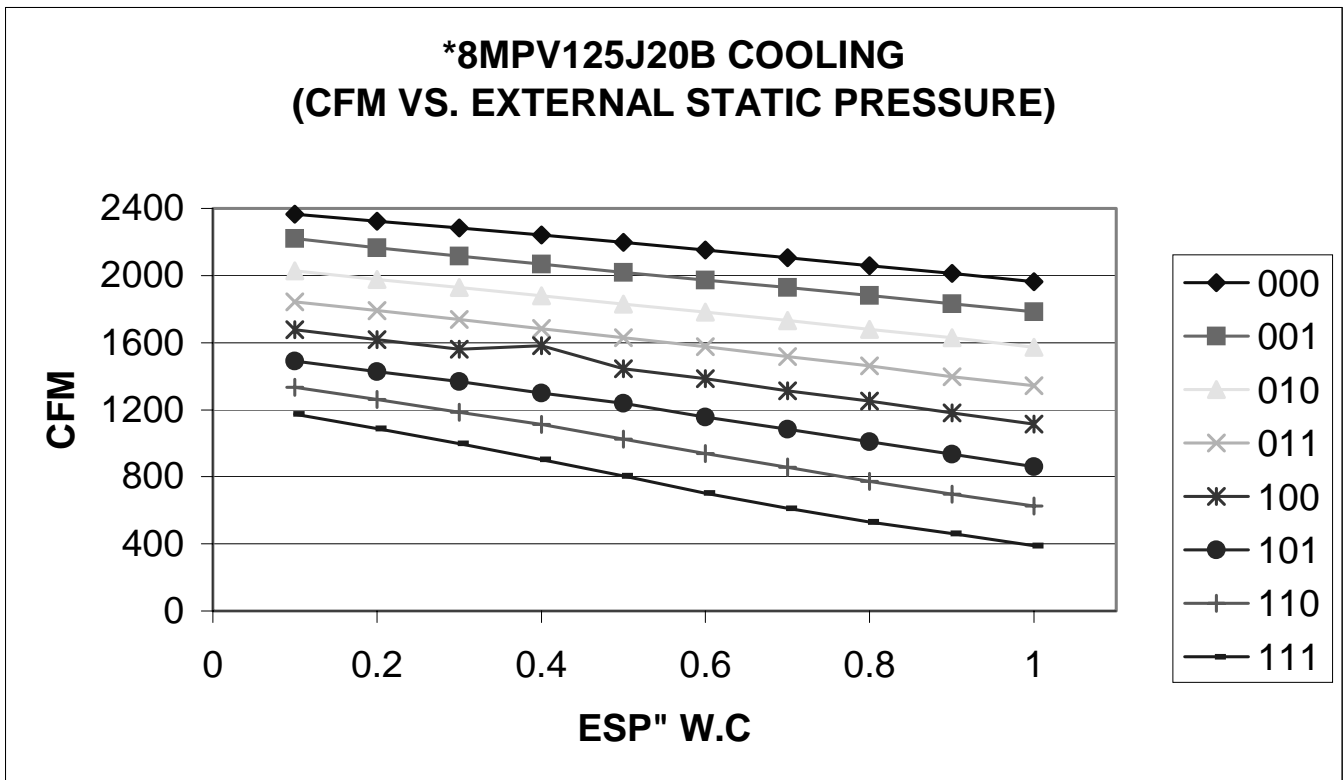
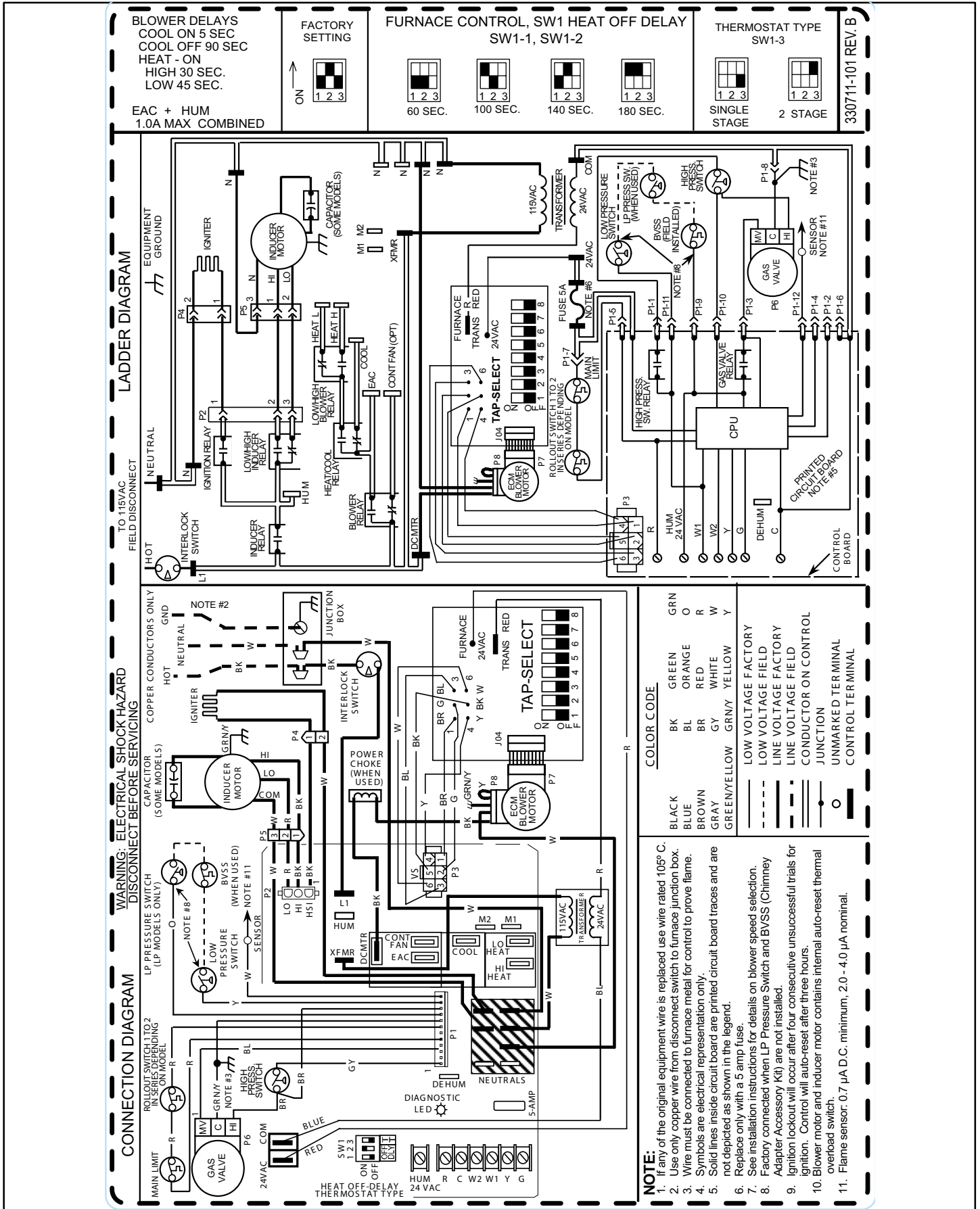
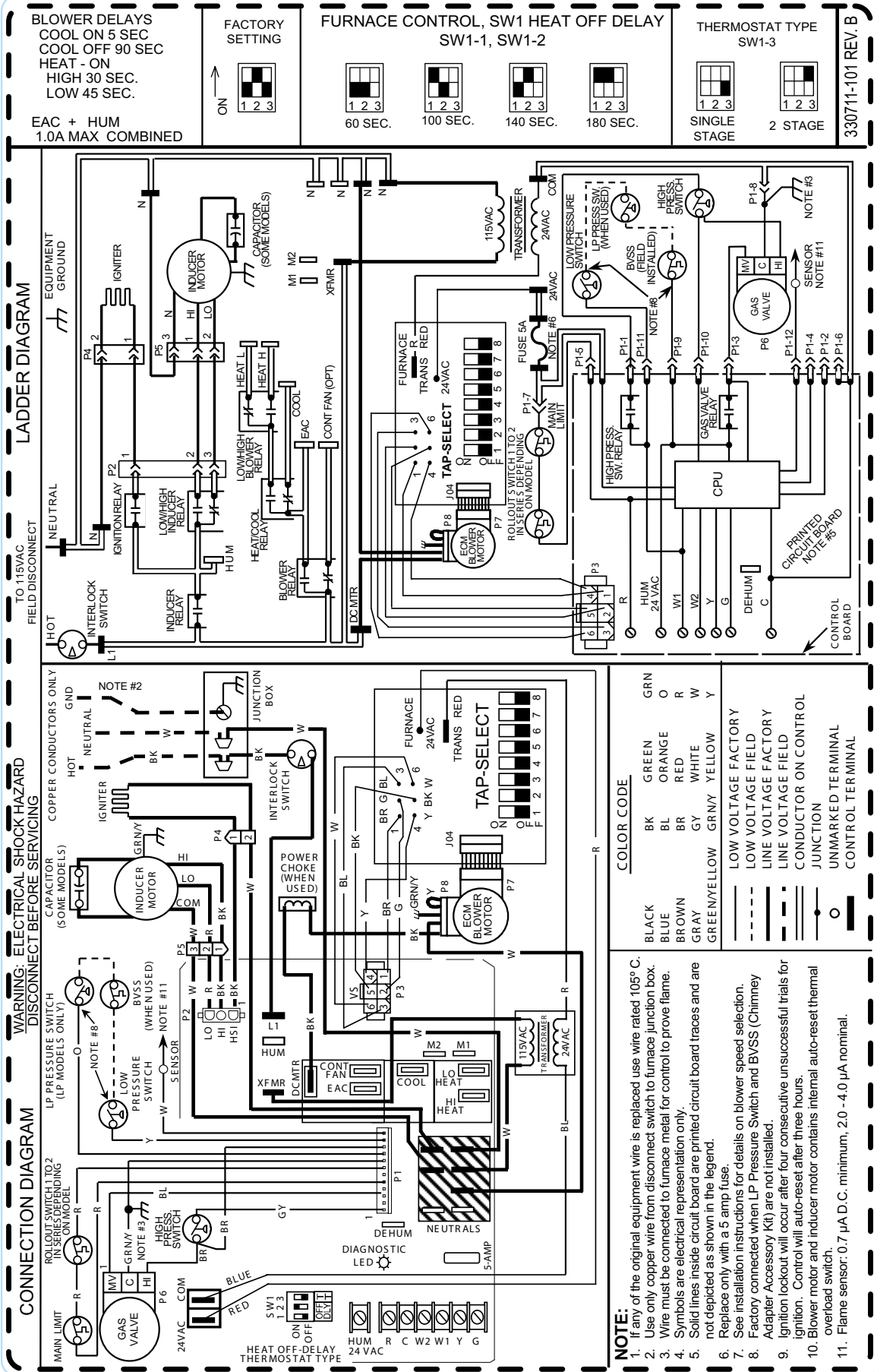


Figure 4

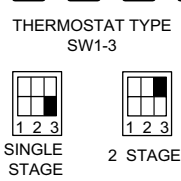
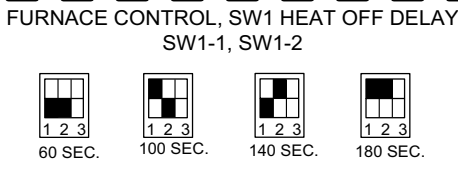
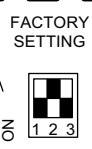


Wiring Diagram *8MPV





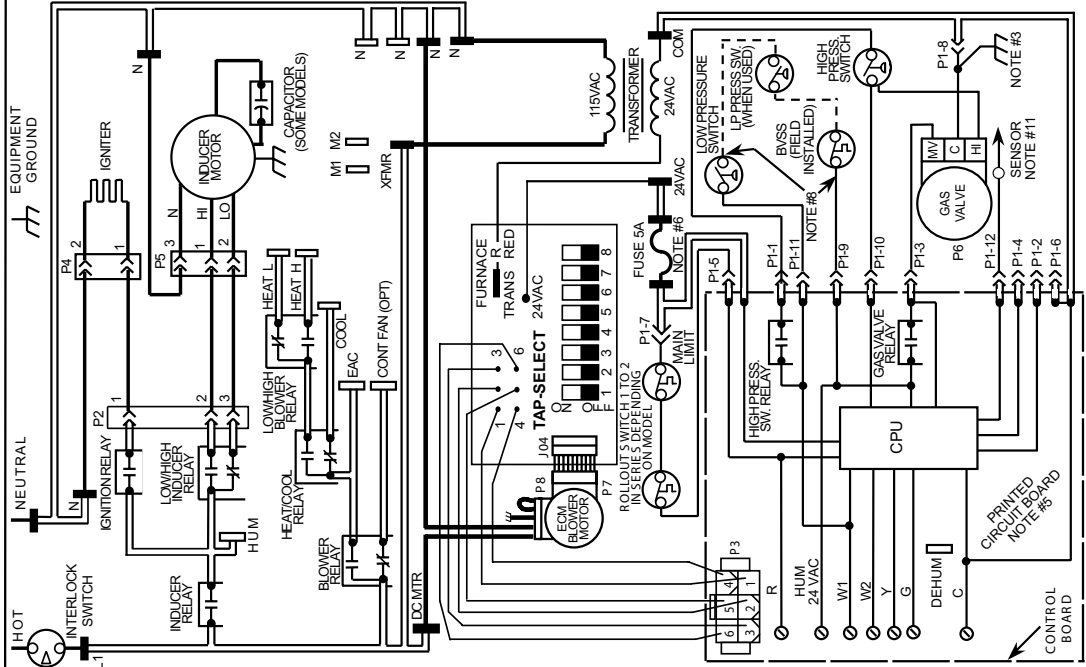
BLOWER DELAYS
 COOL ON 5 SEC
 COOL OFF 90 SEC
 HEAT - ON
 HIGH 30 SEC.
 LOW 45 SEC.



330711-101 REV. B

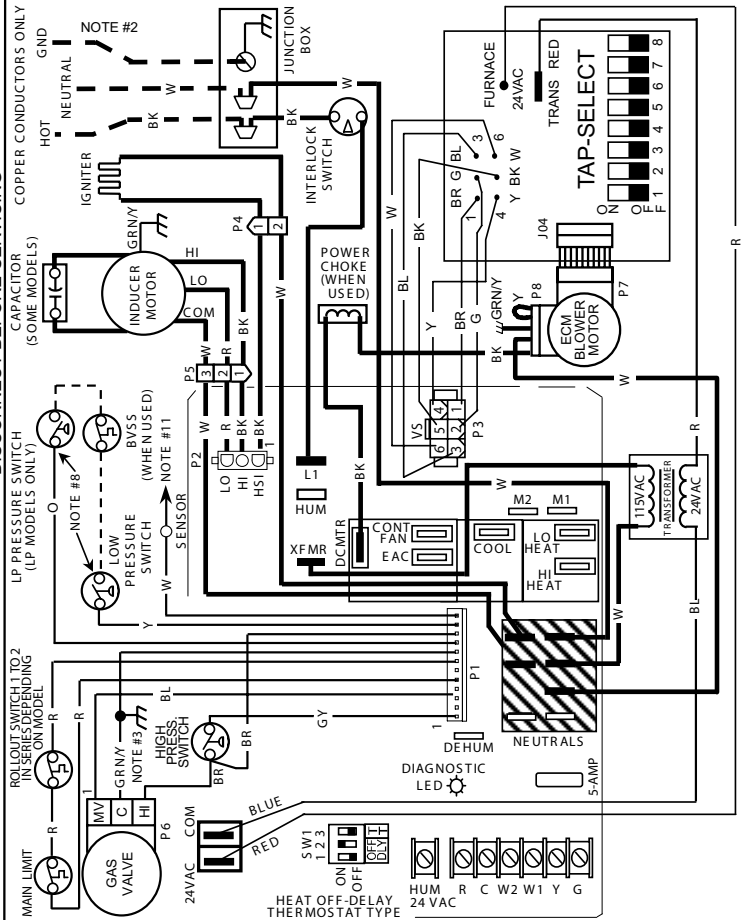
LADDER DIAGRAM

TO 115VAC
 FIELD DISCONNECT



CONNECTION DIAGRAM

WARNING: ELECTRICAL SHOCK HAZARD
 DISCONNECT BEFORE SERVICING

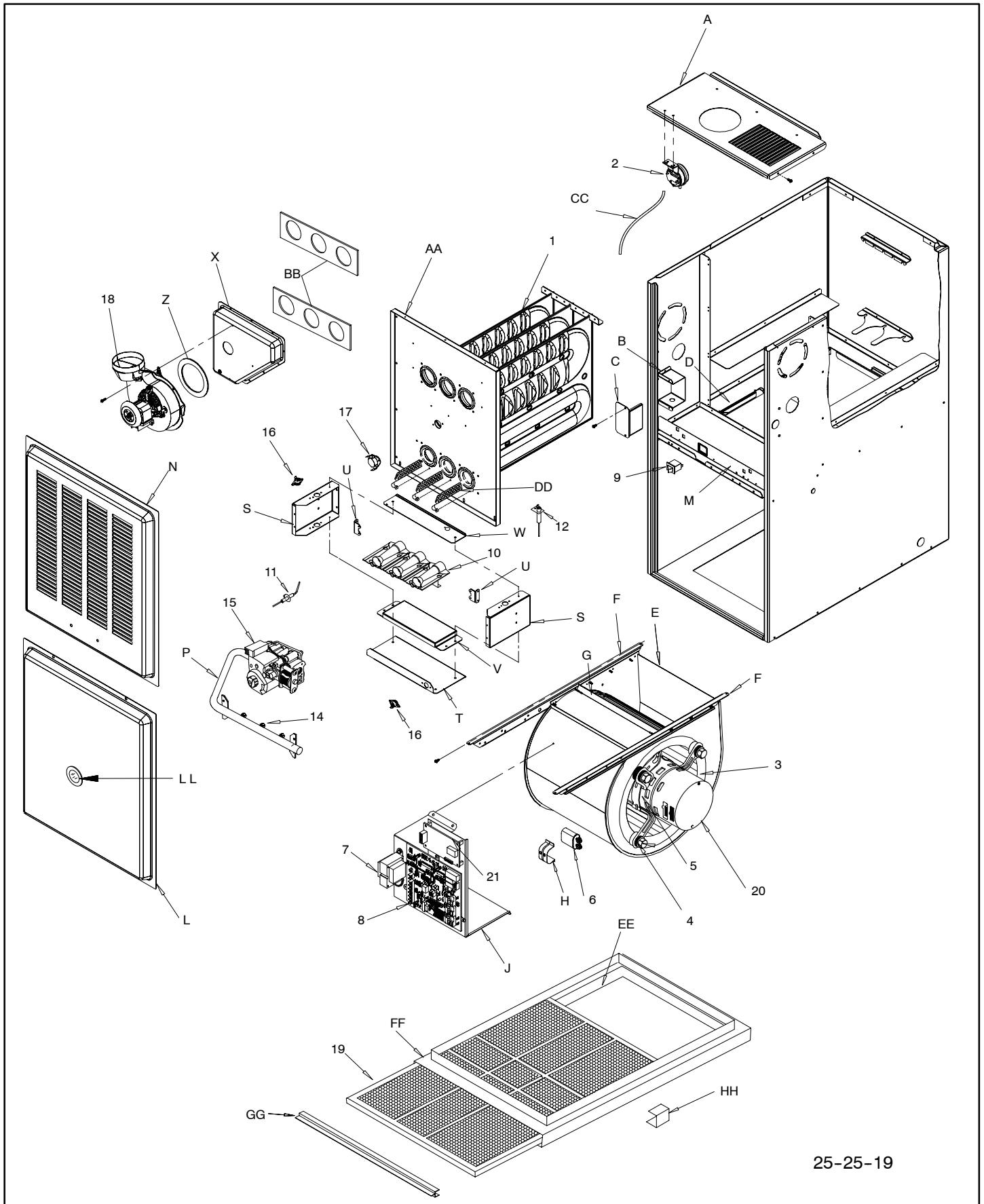


COLOR CODE

BLACK	BK	GREEN	GRN
BLUE	BL	ORANGE	O
BROWN	BR	RED	RED
GRAY	GY	WHITE	W
GREEN/YELLOW	GRNY	YELLOW	Y

LOW VOLTAGE FACTORY
 LOW VOLTAGE FIELD
 LINE VOLTAGE FACTORY
 LINE VOLTAGE FIELD
 CONDUCTOR ON CONTROL
 JUNCTION
 UNMARKED TERMINAL
 CONTROL TERMINAL

- NOTE:**
1. If any of the original equipment wire is replaced use wire rated 105° C.
 2. Use only copper wire from disconnect switch to furnace junction box.
 3. Wire must be connected to furnace metal for control to prove flame.
 4. Symbols are electrical representation only.
 5. Solid lines inside circuit board are printed circuit board traces and are not depicted as shown in the legend.
 6. Replace only with a 5 amp fuse.
 7. See installation instructions for details on blower speed selection.
 8. Factory connected when LP Pressure Switch and BYSS (Chimney Adapter Accessory Kit) are not installed.
 9. Ignition lockout will occur after four consecutive unsuccessful trials for ignition. Control will auto-reset after three hours.
 10. Blower motor and inducer motor contains internal auto-reset thermal overload switch.
 11. Flame sensor: 0.7 µA D.C. minimum, 2.0 - 4.0 µA nominal.



25-25-19

Replacement Parts - *8MPV (Natural Gas)

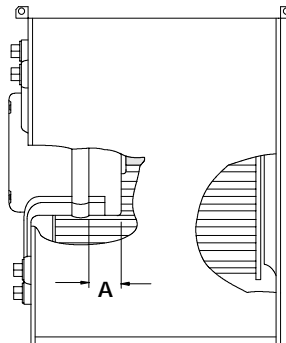
Models - *8MPV050B12B1, *8MPV075F14B1, *8MPV100J20B1 & *8MPV125J20B1

Replacement part supplied will be current active part. For parts not listed, consult place of purchase.

Key No.	Functional Parts Description	Part Number	*8MPV			
			050B12B1	075F14B1	100J20B1	125J20B1
1	Heat Exchanger	1014316	1	-	-	-
		1014318	-	1	-	-
		1014320	-	-	1	-
		1014321	-	-	-	1
2	Switch, Pressure	1014337	1	1	1	1
3	Wheel, Blower	1013011	1	-	-	-
		1172129	-	1	1	1
4	Mount, Motor kit*	1014822	1	1	1	1
5	Motor, Blower	1172828	1	-	-	-
		1172829	-	1	1	1
7	Transformer	1172810	1	1	1	1
8	Control	1172809	1	1	1	1
9	Switch, Interlock	1171981	1	1	1	1
10	Burner Assembly	1172884	1	-	-	-
		1172965	-	1	-	-
		1172966	-	-	1	-
		1172967	-	-	-	1
11	Flame Sensor	1172827	1	1	1	1
12	Ignitor	1172533	1	1	1	1
14	Orifice, Burner # 42	1011351	2	3	4	5
15	Valve, Gas	1172822	1	1	1	1
16	Switch, Limit (Rollout)	1013102	2	2	2	2
17	Switch, Limit (Main)	1008417	1	1	-	-
		1320362	-	-	1	-
		1065294	-	-	-	1
18	Blower, Combustion	1013866	1	1	1	-
		1014383	-	-	-	1
19	Filter	1010364	1	-	-	-
		1010365	-	1	2	2
20	Motor Control	1172830	1	-	-	-
		1172832	-	1	-	-
		1172834	-	-	1	-
		1172836	-	-	-	1
21	Board, Tap Select Interface	1172839	1	1	1	1

*See Table below for bellyband location on motor

Bellyband Location on Motor	
Model *8MPV	A(in.)
050B12B1	1.38
075F14B1	2.83
100J20B1	2.83
125J20B1	2.83



Replacement Parts - *8MPV (Natural Gas)

Models - *8MPV050B12B1, *8MPV075F14B1, *8MPV100J20B1 & *8MPV125J20B1

Replacement part supplied will be current active part. For parts not listed, consult place of purchase.

Key No.	Non-Functional Parts Description	Part Number	*8MPV			
			050B12B1	075F14B1	100J20B1	125J20B1
A	Panel, Top	1013982	1	-	-	-
		1013983	-	1	-	-
		1013984	-	-	1	1
B	Box, Junction	1172860	1	1	1	1
C	Cover, Junction box	1012350	1	1	1	1
D	Partition, Blower	1014009	1	-	-	-
		1014010	-	1	-	-
		1014011	-	-	1	1
E	Housing, Blower	1172885	1	-	-	-
		1172969	-	1	1	1
F	Hanger, Blower	1012328	2	2	2	2
G	Panel, Blower Cutoff	721020013	1	-	-	-
		721020008	-	1	1	1
J	Bracket, Control Mounting	1172845	1	1	1	1
L	Door, Blower (Heil/Arcoaire) (Heil/Arcoaire) (Heil/Arcoaire) (Comfortmaker Only) (Comfortmaker Only) (Comfortmaker Only) (Tempstar Only) (Tempstar Only) (Tempstar Only)	1173053	1	-	-	-
		1173056	-	1	-	-
		1173059	-	-	1	1
		1173052	1	-	-	-
		1173055	-	1	-	-
		1173058	-	-	1	1
		1173054	1	-	-	-
		1173057	-	1	-	-
1173060	-	-	1	1		
M	Bracket, Door	1172231	1	-	-	-
		1172232	-	1	-	-
		1172233	-	-	1	1
N	Door, Louver (Heil/Arcoaire) (Heil/Arcoaire) (Heil/Arcoaire) (Comfortmaker Only) (Comfortmaker Only) (Comfortmaker Only) (Tempstar Only) (Tempstar Only) (Tempstar Only)	1173005	1	-	-	-
		1173006	-	1	-	-
		1173007	-	-	1	1
		1173002	1	-	-	-
		1173003	-	1	-	-
		1173004	-	-	1	1
		1173061	1	-	-	-
		1173062	-	1	-	-
1173063	-	-	1	1		
P	Manifold, Gas	1013478	1	-	-	-
		1013479	-	1	-	-
		1013480	-	-	1	-
		1013481	-	-	-	1
S	Bracket, Manifold Support	1012377	2	2	2	2
T	Top, Burner Box	1013705	1	1	-	-
		1013015	-	-	1	-
		1013016	-	-	-	1
U	Bracket, Burner Box Sides	1012532	2	2	2	2
V	Baffle, Burner Box	1012338	1	1	-	-
		1012339	-	-	1	-
		1012340	-	-	-	1
W	Bottom, Burner Box	1172847	1	-	-	-
		1172848	-	1	-	-
		1172849	-	-	1	-
		1172850	-	-	-	1
X	Collector Box	1014510	1	-	-	-
		1014511	-	1	-	-
		1014509	-	-	1	-
		1014512	-	-	-	1
Z	Gasket, Combustion Blower	1013540	1	1	1	1

Replacement Parts - *8MPV (Natural Gas)

Models - *8MPV050B12B1,*8MPV075F14B1, *8MPV100J20B1 &*8MPV125J20B1

Replacement part supplied will be current active part. For parts not listed, consult place of purchase.

Key No.	Non-Functional Parts Description	Part Number	*8MPV			
			050B12B1	075F14B1	100J20B1	125J20B1
AA	Partition, Front Heat Exchanger	1013543	1	-	-	-
		1013545	-	1	-	-
		1013547	-	-	1	-
		1013548	-	-	-	1
BB	Gaskets, Heat Exchanger	1013991	2	-	-	-
		1013992	-	2	-	-
		1013993	-	-	2	-
		1013994	-	-	-	2
CC	Tubing, Silicone	1172193	1	-	-	-
		1172194	-	1	-	-
		1172195	-	-	1	1
DD	Baffle, Nox	1014019	2	3	4	5
EE	Wrapper, Filter Rack	741010042	1	-	-	-
		741010039	-	1	2	2
FF	Front, Filter Rack	741020004	1	-	-	-
		741020001	-	1	2	2
GG	Cover, Filter Plastic	2791042	1	-	-	-
		2791043	-	1	2	2
HH	Clip, Filter	1008482	3	3	3	3
LL	Sightglass	1172768	1	1	1	1
)	Parts Not Illustrated					
)	Fuse, 5 Amp	1083348	1	1	1	1
)	Harness	1172815	1	1	-	1
		1172816	-	-	1	-
)	Harness, Wire Blower Variable Speed	1173064	1	1	1	1
)	Tap, Pressure	1006230	1	1	1	1
)	Door Screws	1014488	1	1	1	1
)	Door Screw Grommets	1171990	1	1	1	1
)	Manual, Installation	441 01 2020 02	1	1	1	1
)	Manual, Users	441 02 2011 00	1	1	1	1

Manufacturers Number (Mfr No -See Rating Plate)
ALL Models

Specifications

	*8MPT050B12B		*8MPT075F14B		*8MPT100F14B		*8MPT100J20B		*8MPT125J20B	
General										
Gas Type	Nat	LP	Nat	LP	Nat	LP	Nat	LP	Nat	LP
Input (Btuh) Std/Alt. Hi Fire	50,000		75,000		100,000		100,000		125,000	
Lo Fire	35,000		52,500		70,000		70,000		87,500	
Output (Btuh) Std/Alt. Hi Fire	40,000		60,000		81,000		81,000		101,000	
Lo Fire	28,000		42,000		57,000		61,000		71,000	
Temp. Rise (°F) Hi Fire	30-60		30-60		35-65		35-65		30-60	
Lo Fire	25-55		25-55		35-65		35-65		25-55	
Electrical (Volts/Hz)	115/60		115/60		115/60		115/60		115/60	
Rating Plate Amps.	9.8		9.8		9.3		12.1		12.1	
Transformer Size (VA)	40	40	40	40	40	40	40	40	40	40
T'stat Heat Anticipator	.50	.50	.50	.50	.50	.50	.50	.50	.50	.50
Gas & Ignition										
GStd. Main Orifices (No/Size)	2/#42	2/#54	3/#42	3/#54	4/#42	4/#54	4/#42	4/#54	5/#42	5/#54
Gas Valve (Honeywell) VR	8205Q	8205Q	8205Q	8205Q	8205Q	8205Q	8205Q	8205Q	8205Q	8205Q
Regulation Type	SNAP	SNAP	SNAP	SNAP	SNAP	SNAP	SNAP	SNAP	SNAP	SNAP
Manifold Press. Hi Fire (" WC)	3.5	10.0	3.5	10.0	3.5	10.0	3.5	10.0	3.5	10.0
Lo Fire (" WC)	1.7	4.9	1.7	4.9	1.7	4.9	1.7	4.9	1.7	4.9
Ignition Type	Hot Surface									
Combustion										
Flue Outlet Size (Inches)	4	4	4	4	4	4	4	4	4	4
Limits & Controls										
Furnace Control (Type)	Integrated									
Furnace Control On delay	30Hi/45Low									
(Timed-secs) Off delay	60, 100, 140, 180									
Thermal Sensor (°F)	300		300		300		300		300	
Limit Control Setting (°F)	See Limit in Parts List		See Limit in Parts List		See Limit in Parts List		See Limit in Parts List		See Limit in Parts List	
Std. Pressure Sw. (Part No)	1013862		1013862		1013862		1013862		1013862	
Hi Fire Press (Close)	-0.69		-0.69		-0.69		-0.69		-0.69	
Hi Fire Press (Open)	-0.59		-0.59		-0.59		-0.59		-0.59	
Lo Fire Press (Close)	-0.40		-0.40		-0.40		-0.40		-0.40	
Lo Fire Press (Open)	-0.30		-0.30		-0.30		-0.30		-0.30	
Blower Data										
Type & Size	11-8		11-10		11-10		11-10		11-10	
Motor Amps/Rpm	10.3/1100		10.3/1100		8/900		10/1050		10/1050	
Motor Type/H.p.	PSC ¹ / ₂		PSC ¹ / ₂		PSC ¹ / ₂		PSC ¹ / ₂		PSC ¹ / ₂	
Cap. Mfd/Volts	10/370		10/370		7.5/370		10/370		40/370	
Filter Type	Washable		Washable		Washable		Washable		Washable	
Filter Size (")	14x25x1		16x25x1		16x25x1		16x25x1 (2)		16x25x1 (2)	
Min. Cool Cap. (Tons)	1.5		1.5		1.5		3		3	
Max. Cool Cap. (Tons)	3		3.5		3.5		5		5	
Gas Conversion Kits										
Nat to LP	NAHA002LP (1172959*)									
LP to Nat	NAHA002NG (1172961*)									
*Must be ordered from Service Parts										
Use the Fuel Gas Code to establish proper vent sizing.										

CIRCULATION AIR BLOWER DATA

*8MPT050B12 (1) * Denotes Brand

External Static Pressure Inches of W.C.	Air Delivery in Cubic Feet per Minute (C.F.M.) (Furnace Rated @0.5" WC ESP)				
	TAP	LOW	MED L	MED H	HIGH
	.10	472	704	1167	1387
	.30	365	638	1102	1288
	.50	290	572	1035	1194
	.70	209	522	939	1070
	.90	---	443	820	937
1.00	---	370	753	858	

*8MPT100J20 (2) * Denotes Brand

External Static Pressure Inches of W.C.	Air Delivery in Cubic Feet per Minute (C.F.M.) (Furnace Rated @0.5" WC ESP)				
	TAP	LOW	MED L	MED H	HIGH
	.10	773	1045	1453	2147
	.30	755	1037	1469	2128
	.50	712	1020	1459	2078
	.70	647	979	1424	1963
	.90	554	894	1347	1795
	1.00	497	828	1262	1705

*8MPT075F14 (1) * Denotes Brand

External Static Pressure Inches of W.C.	Air Delivery in Cubic Feet per Minute (C.F.M.) (Furnace Rated @0.5" WC ESP)				
	TAP	LOW	MED L	MED H	HIGH
	.10	595	767	1310	1683
	.30	538	673	1267	1611
	.50	400	590	1224	1510
	.70	338	489	1144	1372
	.90	280	382	986	1191
	1.00	242	338	890	1073

*8MPT125J20 (2)(3) * Denotes Brand

External Static Pressure Inches of W.C.	Air Delivery in Cubic Feet per Minute (C.F.M.) (Furnace Rated @0.5" WC ESP)				
	TAP	LOW	MED L	MED H	HIGH
	.10	860	1149	1666	2147
	.30	836	1158	1577	2126
	.50	805	1140	1561	2148
	.70	758	1081	1516	1922
	.90	661	1009	1428	1767
	1.00	614	925	1357	1663

*8MPT100F14 (1) * Denotes Brand

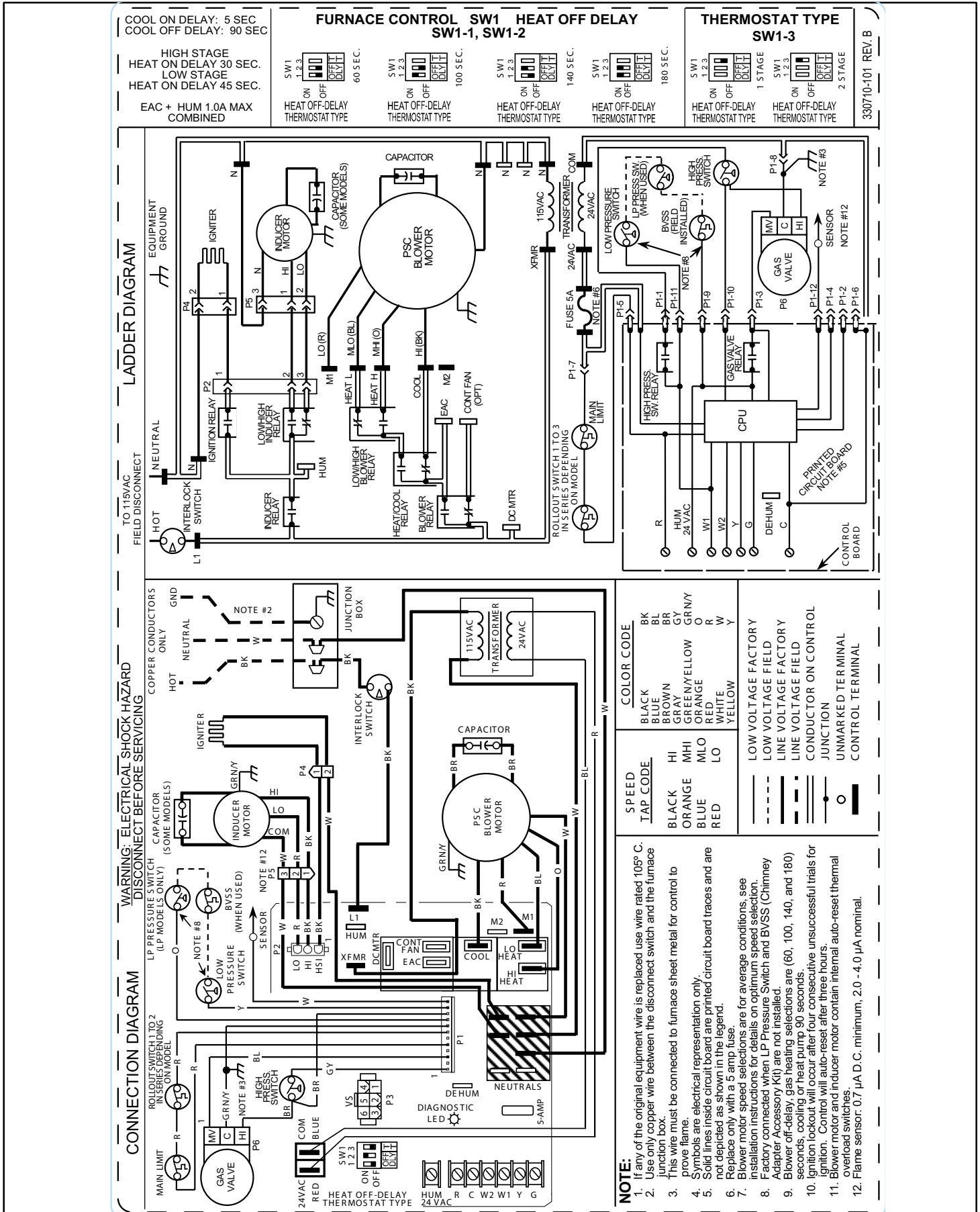
External Static Pressure Inches of W.C.	Air Delivery in Cubic Feet per Minute (C.F.M.) (Furnace Rated @0.5" WC ESP)				
	TAP	LOW	MED L	MED H	HIGH
	.10	770	985	1328	1760
	.30	648	873	1235	1675
	.50	544	772	1115	1551
	.70	457	684	1036	1404
	.90	361	572	895	1215
	1.00	308	508	811	1093

MAX CFM's	
Filter Size	CFM
14" X 25"	1400
16" X 25"	1600
20" X 25"	2000
24" X 25"	2500
Max CFM based on 600 FPM	

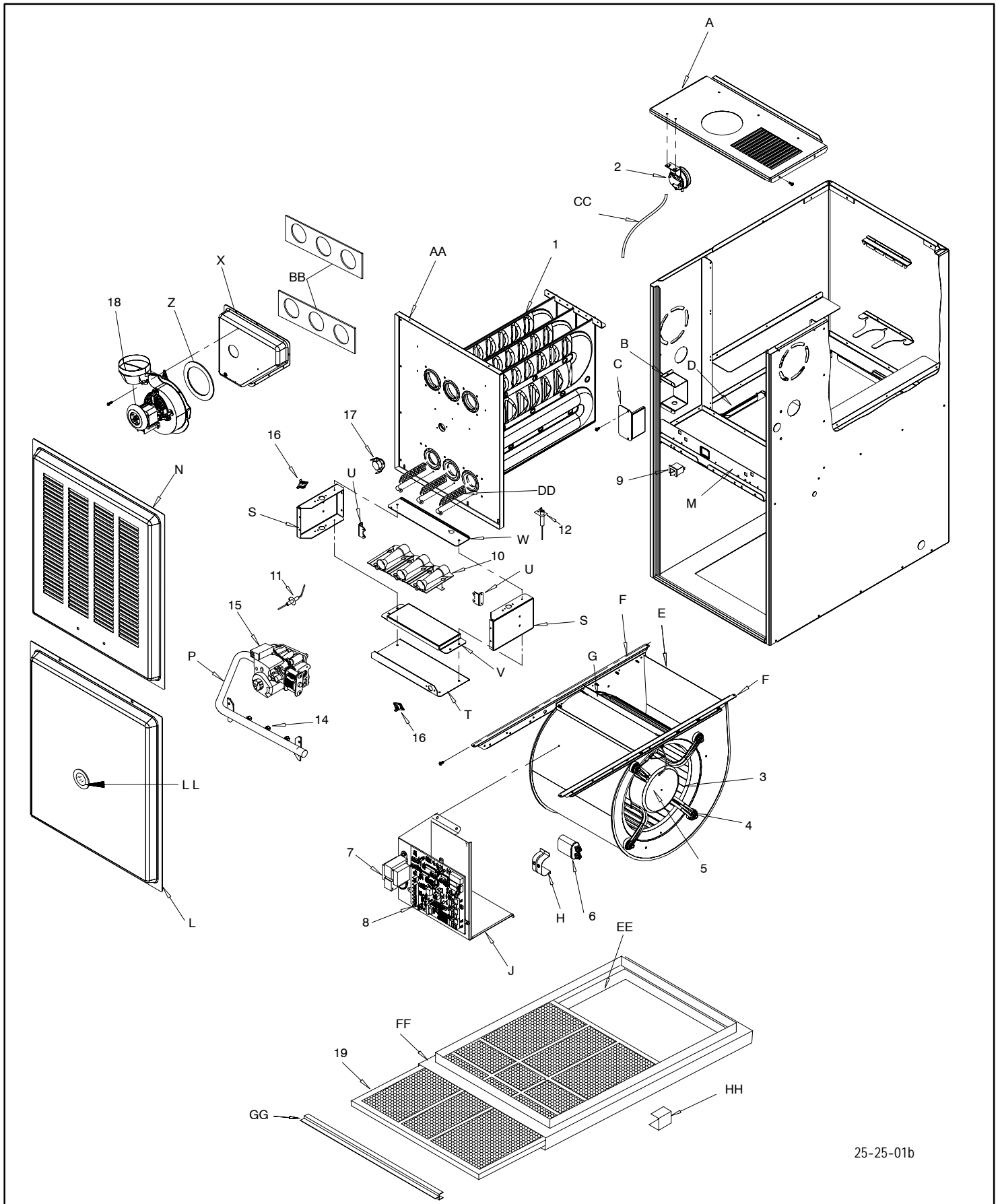
NOTE: (1) Data based on Bottom Only or One Side return.
 (2) Data based on Both Sides or Bottom plus One Side
 (3) 125J20 Reduce airflow by 5% if Bottom Only return.

Filter required for each return-air inlet. Airflow performance includes 1" washable (600 FPM max) filter media.

Wiring Diagram *8MPT



*8MPT (Parts)



25-25-01b

Replacement Parts - *8MPT (Natural Gas)

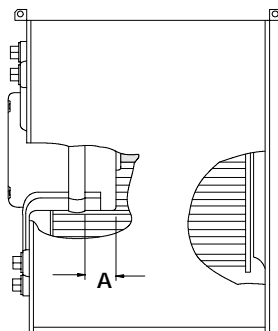
Models - *8MPT050B12B1, *8MPT075F14B1, *8MPT100F14B1, *8MPT100J20B1, *8MPT125J20B1

Replacement part supplied will be current active part. For parts not listed, consult place of purchase.

Key No.	Functional Parts Description	Part Number	*8MPT				
			050B12B1	075F14B1	100F14B1	100J20B1	125J20B1
1	Heat Exchanger	1014316	1	-	-	-	-
		1014318	-	1	-	-	-
		1014319	-	-	1	-	-
		1014320	-	-	-	1	-
		1014321	-	-	-	-	1
2	Switch, Pressure	1014337	1	1	1	1	1
3	Wheel, Blower	1013011	1	-	-	-	-
		1011420	-	1	1	1	1
4	Mount, Motor kit *	1014824	1	-	-	-	-
		1014822	-	1	1	-	-
		1014823	-	-	-	1	1
5	Motor, Blower 1/115 1/2 CCW	1172490	1	1	-	-	-
		1172487	-	-	1	-	-
		1172488	-	-	-	1	1
6	Capacitor	1171729	1	1	-	1	1
		1171728	-	-	1	-	-
7	Transformer	1172810	1	1	1	1	1
8	Control	1172551	1	1	1	1	1
9	Switch, Interlock	1171981	1	1	1	1	1
10	Burner Assembly	1172884	1	-	-	-	-
		1172965	-	1	-	-	-
		1172966	-	-	1	1	-
		1172967	-	-	-	-	1
11	Flame Sensor	1172827	1	1	1	1	1
12	Ignitor	1172533	1	1	1	1	1
14	Orifice, Burner # 42	1011351	2	3	4	4	5
15	Valve, Gas	1172822	1	1	1	1	1
16	Switch, Limit (Rollout)	1013102	2	2	2	2	2
17	Switch, Limit (Main)	1008417	1	1	-	-	-
		34335000	-	-	1	-	-
		1320362	-	-	-	1	-
		1065294	-	-	-	-	1
18	Blower, Combustion	1013866	1	1	1	1	-
		1014383	-	-	-	-	1
19	Filter	1010364	1	-	-	-	-
		1010365	-	1	1	2	2

*See Table below for bellyband location on motor

Bellyband Location on Motor	
Model *8MPT	A(in.)
050B12B1	1.38
075F14B1	1.38
100F14B1	1.38
100J20B1	1.81
125J20B1	1.81



Replacement Parts - *8MPT (Natural Gas)

Models - *8MPT050B12B1, *8MPT075F14B1, *8MPT100F14B1, *8MPT100J20B1, *8MPT125J20B1

Replacement part supplied will be current active part. For parts not listed, consult place of purchase.

Key No.	Non-Functional Parts Description	Part Number	*8MPT					
			050B12B1	075F14B1	100F14B1	100J20B1	125J20B1	
A	Panel, Top	1013982	1	-	-	-	-	
		1013983	-	1	1	-	-	
		1013984	-	-	-	1	1	
B	Box, Junction	1172860	1	1	1	1	1	
C	Cover, Junction box	1012350	1	1	1	1	1	
D	Partition, Blower	1014009	1	-	-	-	-	
		1014010	-	1	1	-	-	
		1014011	-	-	-	1	1	
E	Housing, Blower	1172885	1	-	-	-	-	
		1172969	-	1	1	1	1	
F	Hanger, Blower	1012328	2	2	2	2	2	
G	Panel, Blower Cutoff	721020013	1	-	-	-	-	
		721020008	-	1	1	1	1	
H	Clamp, Capacitor	1170643	1	1	1	1	1	
J	Bracket, Control Mounting	1172845	1	1	1	1	1	
L	Door, Blower (Heil/Arcoaire)	1173037	1	-	-	-	-	
		(Heil/Arcoaire)	1173038	-	1	1	-	
		(Heil/Arcoaire)	1173039	-	-	-	1	1
		(Comfortmaker Only)	1173034	1	-	-	-	-
		(Comfortmaker Only)	1173035	-	1	1	-	-
		(Comfortmaker Only)	1173036	-	-	-	1	1
		(Tempstar Only)	1173040	1	-	-	-	-
(Tempstar Only)	1173041	-	1	1	-	-		
(Tempstar Only)	1173042	-	-	-	1	1		
M	Bracket, Door	1172231	1	-	-	-	-	
		1172232	-	1	1	-	-	
		1172233	-	-	-	1	1	
N	Door, Louver (Heil/Arcoaire)	1173005	1	-	-	-	-	
		(Heil/Arcoaire)	1173006	-	1	1	-	
		(Heil/Arcoaire)	1173007	-	-	-	1	1
		(Comfortmaker Only)	1173002	1	-	-	-	-
		(Comfortmaker Only)	1173003	-	1	1	-	-
		(Comfortmaker Only)	1173004	-	-	-	1	1
		(Tempstar Only)	1013609	1	-	-	-	-
		(Tempstar Only)	1013610	-	1	1	-	-
(Tempstar Only)	1013611	-	-	-	1	1		
P	Manifold, Gas	1013478	1	-	-	-	-	
		1013479	-	1	-	-	-	
		1013480	-	-	1	1	-	
		1013481	-	-	-	-	1	
S	Bracket, Manifold Support	1012377	2	2	2	2	2	
T	Top, Burner Box	1013705	1	1	-	-	-	
		1013015	-	-	1	1	-	
		1013016	-	-	-	-	1	
U	Bracket, Burner Box Sides	1012532	2	2	2	2	2	
V	Baffle, Burner Box	1012338	1	1	-	-	-	
		1012339	-	-	1	1	-	
		1012340	-	-	-	-	1	
W	Bottom, Burner Box	1172847	1	-	-	-	-	
		1172848	-	1	1	-	-	
		1172849	-	-	-	1	-	
		1172850	-	-	-	-	1	
X	Collector Box	1014510	1	-	-	-	-	
		1014511	-	1	-	-	-	
		1014509	-	-	1	1	-	
		1014512	-	-	-	-	1	

Replacement Parts - *8MPT (Natural Gas)

Models - *8MPT050B12B1, *8MPT075F14B1, *8MPT100F14B1, *8MPT100J20B1, *8MPT125J20B1

Replacement part supplied will be current active part. For parts not listed, consult place of purchase.

Key No.	Non-Functional Parts Description	Part Number	*8MPT				
			050B12B1	075F14B1	100F14B1	100J20B1	125J20B1
Z	Gasket, Combustion Blower	1013540	1	1	1	1	1
AA	Partition, Front Heat Exchanger	1013543	1	-	-	-	-
		1013545	-	1	-	-	-
		1013546	-	-	1	-	-
		1013547	-	-	-	1	-
		1013548	-	-	-	-	1
BB	Gaskets, Heat Exchanger	1013991	2	-	-	-	-
		1013992	-	2	-	-	-
		1013993	-	-	2	2	-
		1013994	-	-	-	-	2
CC	Tubing, Silicone	1172193	1	-	-	-	-
		1172194	-	1	1	-	-
		1172195	-	-	-	1	1
DD	Baffle, Nox	1014019	2	3	4	4	5
EE	Wrapper, Filter Rack	741010042	1	-	-	-	-
		741010039	-	1	1	2	2
FF	Front, Filter Rack	741020004	1	-	-	-	-
		741020001	-	1	1	2	2
GG	Cover, Filter Plastic	2791042	1	-	-	-	-
		2791043	-	1	1	2	2
HH	Clip, Filter	1008482	3	3	3	3	3
LL	Sightglass	1172768	1	1	1	1	1
)	Parts Not Illustrated						
)	Fuse, 5 Amp	1083348	1	1	1	1	1
)	Harness, Wire	1172815	1	1	1	1	1
)	Tee, Nylon	1006230	1	1	1	1	1
)	Door Screws	1014488	4	4	4	4	4
)	Door Screw Grommets	1171990	4	4	4	4	4
)	Manual, Installation	441 01 2020 02	1	1	1	1	1
)	Manual, Users	441 02 2011 00	1	1	1	1	1