INSTALLATION INSTRUCTIONS



MG3P Upflow Furnace



MG3S Downflow Furnace

⚠ WARNING

FIRE OR EXPLOSION HAZARD

- Failure to follow safety warnings exactly could result in serious injury, death or property damage.
- Installation and service must be performed by a qualified installer, service agency or the gas supplier.
- Do not store or use gasoline or other flammable vapors and liquids in the vicinity of this or any other appliance.

WHAT TO DO IF YOU SMELL GAS

- Do not try to light any appliance.
- Do not touch any electrical switch; do not use any phone in your building.
- Leave the building immediately.
- Immediately call your gas supplier from a neighbors phone. Follow the gas suppliers instructions.
- If you cannot reach your gas supplier, call the fire department.

⚠ AVERTISSEMENT

RISQUE D'INCENDIE OU D'EXPLOSION

- Le non-respect des avertissements de sécurité pourrait entraîner des blessures graves, la mort ou des dommages matériels.
- L'installation et l'entretien doivent être effectués par un installateur qualifié, un organisme de service ou le fournisseur de gaz.
- Ne pas entreposer ni utiliser de l'essence ni d'autres vapeurs ou liquides inflammables dans le voisinage de cet appareil, ni de tout autre appareil.

QUE FAIRE S'IL Y A UNE ODEUR DE GAZ

- Ne tenter d'allumer aucun appareil.
- Ne toucher à aucun interrupteur électrique; n'utiliser aucun téléphone dans le bâtiment.
- Évacuer l'immeuble immédiatement.
- Appeler immédiatement le fournisseur de gaz en employant le téléphone d'un voisin. Respecter les instructions du fournisseur de gaz.
- Si personne ne répond, appeler le service des incendies.

DO NOT DESTROY. PLEASE READ CAREFULLY & KEEP IN A SAFE PLACE FOR FUTURE REFERENCE.
NE PAS DÉTRUIRE. VEUILLEZ LIRE ATTENTIVEMENT ET CONSERVER EN UN LIEU SÛR POUR RÉFÉRENCE ULTÉRIEURE.

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IMPORTANT SAFETY INFORMATION

INSTALLER: Please read all instructions before servicing this equipment. Pay attention to all safety warnings and any other special notes highlighted in the manual. Safety markings are used frequently throughout this manual to designate a degree or level of seriousness and should not be ignored. **WARNING** indicates a potentially hazardous situation that if not avoided, could result in personal injury or death. **CAUTION** indicates a potentially hazardous situation that if not avoided, may result in minor or moderate injury or property damage.

⚠ WARNING:

The safety information listed in this manual must be followed during the installation, service, and operation of this unit. Unqualified individuals should not attempt to interpret these instructions or install this equipment. Failure to follow safety recommendations could result in possible damage to the equipment, serious personal injury or death.

⚠ WARNING:

Improper installation, service, adjustment, or maintenance may cause explosion, fire, electrical shock or other hazardous conditions which may result in personal injury or property damage. Unless otherwise noted in these instructions, only factory authorized kits or accessories may be used with this product.

⚠ WARNING:

Do not install this furnace if any part has been submerged under water. A flood damaged furnace is extremely dangerous. Attempts to use the furnace may result in fire or explosion. A qualified service agency should be contacted to inspect the furnace and to replace any electrical or control system parts that have been wet or under water.

- To minimize equipment failure or personal injury, it is essential that only qualified individuals install, service, or maintain this equipment. If you do not posses mechanical skills or tools, call your local dealer for assistance.
- Follow all precautions in the literature, on tags, and on labels provided with the equipment. Read and thoroughly understand the instructions provided with the equipment prior to performing the installation and operational checkout of the equipment.
- Use caution when handling this appliance or removing components. Personal injury can occur from sharp metal edges present in all sheet metal constructed equipment.
- Do not store any of the following on, or in contact with, the unit: Rags, brooms, vacuum cleaners, or other cleaning tools, spray or aerosol cans, soap powders, bleaches, waxes, cleaning compounds, plastics or plastic containers, paper bags or other paper products, gasoline, kerosene, cigarette lighter fluid, dry cleaning fluids, paint thinners, or other volatile fluids.
- The installer should become familiar with the units wiring and ladder diagrams before making any electrical connections to the unit. See Figure 45 (page 42), Figure 46 (page 43), Figure 47 (page 44), Figure 48 (page 45), or the unit wiring label.
- Always reinstall the doors on the furnace after servicing. Do not operate the furnace without all doors and covers in place.

REQUIREMENTS & CODES

⚠ WARNING:

The information listed below must be followed during the installation, service, and operation of this furnace. Failure to follow safety recommendations could result in possible damage to the equipment, serious personal injury or death.

- This furnace must be installed in accordance with these instructions, all applicable local building codes and the current revision of the National Fuel Gas Code (NFPA54/ANSI Z223.1) or the Natural Gas and Propane Installation Code, CAN/CGA B149.1.
  CE générateur d'air chaud doit être installé conformément aux instructions du fabricant et aux codes locaux. En l'absence de code local, respecter la norme ANSI Z223.,1, institulé National Fuel Gas Code ou les codes d'installation CAN/GCA-B149.
- Use only with type of gas approved for this furnace. Refer to the furnace rating plate.
- Install this furnace in accordance to the minimum clearances to combustible materials shown in Figure 1 (page 5).
- Provide adequate combustion and ventilation air to the furnace space as specified on pages 6 - 9.
- Provide adequate clearances around the vent air intake terminal as specified in Figure 7 (page 10), Figure 8, Figure 9 (page 10), & Figure 10.
- Combustion products must be discharged outdoors. Connect this furnace to an approved vent system only, as specified on pages 9 - 12.
- Never test for gas leaks with an open flame. Use a commercially available soap solution to check all connections. See page 23.
- This furnace is designed to operate with a maximum external pressure rise of 0.5 inches of water column. Consult Table 9 (page 33), Table 10 (page 37), Table 11 (page 38), Table 12 (page 39), & Table 13 (page 40) and the rating plate for the proper circulating air flow and temperature rise. **NOTE**: It is important that the duct system be designed to handle the desired flow rate and external pressure rise. An improperly designed duct system can result in nuisance shutdowns, and comfort or noise issues.
- When supply ducts carry air circulated by the furnace to areas outside 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. See page 13.
- This furnace may not be used for temporary heating of buildings or structures under construction.
- The Commonwealth of Massachusetts requires compliance with regulation 248 CMR 4.00 and 5.00 for installation of through – the – wall vented gas appliances as follows:

1. For direct-vent appliances, mechanical-vent heating appliances or domestic hot water equipment, where the bottom of the vent terminal and the air intake is installed below four feet above grade the following requirements must be satisfied:
   a.) A carbon monoxide (CO) detector and alarm shall be placed on each floor level where there are bedrooms. The

detector shall comply with NFPA 720 (2005 Edition) and be mounted in the living area outside the bedroom(s).

b.) A (CO) detector shall be located in the room that houses the appliance or equipment and shall:
- Be powered by the same electrical circuit as the appliance or equipment. Only one service switch shall power the appliance and the (CO) detector;
- Have battery back-up power;
- Meet ANSI/UL 2034 Standards and comply with NFPA 720 (2005 Edition); and Approved and listed by a Nationally Recognized Testing Laboratory as recognized under 527 CMR.

c.) A Product-approved vent terminal must be used, and if applicable, a product-approved air intake must be used. Installation shall be in strict compliance with the manufacturer's instructions. A copy of the installation instructions shall remain with the appliance or equipment at the completion of the installation.

d.) A metal or plastic identification plate shall be mounted at the exterior of the building, four feet directly above the location of vent terminal. The plate shall be of sufficient size, easily read from a distance of eight feet away, and read "Gas Vent Directly Below".

2. For direct-vent appliances, mechanical-vent heating appliances or domestic hot water equipment where the bottom of the vent terminal and the air intake is installed above four feet above grade the following requirements must be satisfied:

a.) A (CO) detector and alarm shall be placed on each floor level where there are bedrooms. The detector shall comply with NFPA 720 (2005 Edition) and be mounted in the living area outside the bedroom(s).

b.) The (CO) detector shall:
- Be located in the room that houses the appliance or equipment;
- Be hard-wired or battery powered or both.
- Shall comply with NFPA 720 (2005 Edition).

c.) A product-approved vent terminal must be used, and if applicable, a product-approved air intake must be used. Installation shall be in strict compliance with the manufacturer's instructions. A copy of the installation instructions shall remain with the appliance or equipment at the completion of the installation.

The information listed below is for reference purposes only and does not necessarily have jurisdiction over local or state codes. Always consult with local authorities before installing any gas appliance.

Combustion & Ventilation Air
- US: National Fuel Gas Code (NFGC), Air for Combustion and Ventilation
- CANADA: Natural Gas and Propane Installation Codes (NSCNGPIC), Venting Systems and Air Supply for Appliances

Duct Systems
- US and CANADA: Air Conditioning Contractors Association (ACCA) Manual D, Sheet Metal and Air Conditioning Contractors National Association (SMACNA), or American Society of Heating, Refrigeration, and Air Conditioning Engineers (ASHRAE) Fundamentals Handbook

Electrical Connections
- US: National Electrical Code (NEC) ANSI/NFPA 70
- CANADA: Canadian Electrical Code CSA C22.1

Gas Piping & Gas Pipe Pressure Testing
- US: NFGC and National Plumbing Codes
- CANADA: NSCNGPIC

General Installation
- US: Current edition of the NFGC and the NFPA 90B. For copies, contact the National Fire Protection Association Inc., Batterymarch Park, Quincy, MA 02269; or American Gas Association, 400 N. Capitol, N.W., Washington DC 20001 or www.NFPA.org
- CANADA: NSCNGPIC. For a copy, contact Standard Sales, CSA International, 178 Rexdale Boulevard, Etobicoke (Toronto), Ontario, M9W 1R3 Canada

Safety
- US: (NFGC) NFPA 54–1999/ANSI Z223.1 and the Installation Standards, Warm Air Heating and Air Conditioning Systems ANSI/NFPA 90B.
- CANADA: CAN/CSA-B149.1 and .2–M00 National Standard of Canada. (NSCNGPIC)

Combustion Air Quality

⚠ CAUTION:

Combustion air must not be drawn from a corrosive atmosphere.

To maximize heat exchanger life, the combustion air must be free of chemicals that can form corrosive acidic compounds in the combustion gases. The recommended source of combustion air is to use outdoor air. However, the use of indoor air in most applications is acceptable except as listed:

If outside air is used as return air to the furnace for ventilation or to improve indoor air quality, the system must be designed so that the return air is not less than 60° F (15° C) during operation. If a combination of indoor and outdoor air is used, the ducts and damper system must be designed so that the return air supply to the furnace is equal to the return air supply under normal, indoor return air applications.

- If the furnace is a single pipe installation and installed in a confined space, it is required that the necessary combustion air come from the outdoors by way of attic, crawl space, air duct, or direct opening. See pages 7 - 9 for combustion air requirements.
- Installations in these locations may require outdoor air for combustion, due to chemical exposures:
  - Commercial buildings
  - Buildings with indoor pools
  - Furnaces installed in laundry rooms
  - Furnaces installed in hobby or craft rooms
  - Furnaces installed near chemical storage areas
- Exposure to the following substances in the combustion air supply may require outdoor air for combustion:
  - Permanent wave solutions
  - Chlorinated waxes and cleaners
  - Chlorine based swimming pool chemicals
  - Water softening chemicals
  - De-icing salts or chemicals
  - Carbon Tetrachloride
  - Halogen type refrigerants
  - Cleaning solvents (perchloroethylene)
  - Printing inks, paint removers, varnishes, etc.
  - Hydrochloric Acid
  - Cements and glues
  - Antistatic fabric softeners
  - Masonry acid washing materials

Heating Load

This furnace should be sized to provide the design heating load requirement. 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. In addition, the ductwork should be appropriately sized to the capacity of the furnace to ensure its proper airflow rating. For installations above 2,000 ft., the furnace should have a sea level input rating large enough that it will meet the heating load after deration for altitude.

Installation in a Garage

⚠ WARNING:

Do not place combustible material on or against the furnace cabinet or within 6 inches of the vent pipe. Do not place combustible materials, including gasoline or any other flammable vapors and liquids, in the vicinity of the furnace.

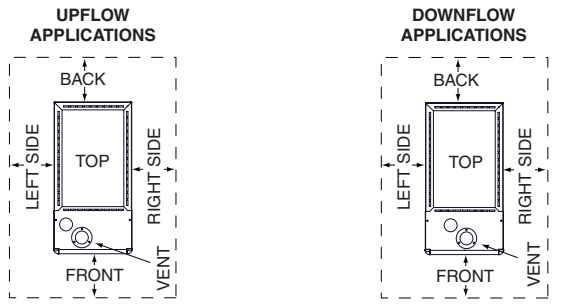
This Gas-fired furnace may be installed in a residential garage with the provision that the burners and igniter are located no less than 18 inches (457mm) above the floor. The furnace must be located or protected to prevent physical damage by vehicles.

Clearances to Combustible Materials

This furnace is Design Certified in the U.S. and Canada by CSA International or Underwriter's Laboratories for the minimum clearances to combustible material listed in Figure 1. **NOTE**: The furnace is listed for installation on combustible or non-combustible flooring. However, wood is the only combustible flooring allowed for installation. Downflow models must use the appropriate subase kit when installing over a wood floor. To obtain model number and specific clearance information, refer to the furnace rating plate, located inside of the furnace cabinet.

Access for positioning and servicing the unit must be considered when locating unit. The need to provide clearance for access to panels or doors may require clearance distances over and above the requirements. **Allow 24 inches minimum clearance from the front of the unit for servicing and positioning. However, 36 inches is strongly recommended.**

CLEARANCES TO COMBUSTIBLE MATERIALS



Left Side	0 Inches	Top	1 Inch
Right Side	0 Inches	Front	†4 Inches
Vent	1 Inch	Back	0 Inches

†Allow 24 in. minimum clearance for servicing. Recommended clearance is 36 in.

Figure 1. Minimum Clearances to Combustible Materials

Operation of Furnace During Construction

⚠ CAUTION:

Failure to follow these instructions will void the factory warranty and may significantly reduce the life or the performance of the furnace, and/ or result in other unsafe conditions. It is the responsibility of the installing contractor to insure these provisions are met.

Operating gas furnaces in construction environments can cause a variety of problems with the furnace. Proper use of commercial portable space heating equipment during construction is recommended. This gas furnace may be used during construction if it is not in violation of any applicable codes and the following criteria are met:

- The installation must meet all applicable codes. The furnace must be permanently installed according to the instructions supplied with the furnace. This includes the electrical supply, gas piping, duct work, and venting. The furnace must be controlled by a room thermostat properly installed according to the instructions supplied with the furnace and thermostat. The installation must include a properly installed air filter in the return air duct, sealed to the furnace with no by-pass air. The filter must be inspected frequently and replaced when necessary.
- The furnace input rate and air temperature rise must be checked and verified to be within the acceptable ranges as marked on the furnace nameplate.
- Before occupying the structure: The air filter must be replaced or cleaned, the duct work must be inspected and cleaned of any construction debris, and the furnace must be cleaned and/ or repaired if found to be dirty, damaged, or malfunctioning in any way by a qualified HVAC technician. The furnace shall be inspected and approved by applicable local authority even if this requires redundant inspections.
- Serial numbers for furnaces used during construction must be submitted in writing (fax and email also acceptable). This information will be used to track the long-term affects of the use during construction on furnaces. Proof of this submittal shall be available for the final inspection of the furnace prior to occupancy.
- This furnace is designed to operate with return air temperatures in ranges normally found in occupied residences, including setbacks. Minimum continuous return temperature must not be below 60° F (15° C). Occasionally a temporary return temperature of 55° F (12° C) is acceptable. However, operation with a return temperature below 55° F (12° C) is not allowed.
- The installing contractor and / or builder must:
  — Comply with the requirements of this section.
  — Complete the attached Use of Furnace During Construction checklist.
  — Email copy of completed Use of Furnace During Construction checklist to consumercare@rheem.com
  — Leave original completed Use of Furnace During Construction checklist with furnace.
  — Disclose use of the furnace during construction to the homeowner in advance of the sale.

COMBUSTION AIR & VENTING REQUIREMENTS

⚠ 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 with each individual appliance connected to the venting system being placed in 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 the CSA B149.1, Natural Gas and Propane Installation Codes 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.**
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 Codes.**
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.**

⚠ AVERTISSEMENT :

RISQUE D'EMPOISONNEMENT AU MONOXYDE DE CARBONE

Le non-respect des consignes suivantes portant sur chacun des appareils raccordés au système d'évacuation mis en service pourrait entraîner l'empoisonnement au monoxyde de carbone ou la mort.

Les consignes suivantes doivent être observées pour chaque appareil raccordé au système d'évacuation mis en service si les autres appareils raccordés au système ne sont pas en service :

1. **Sceller toute ouverture non utilisée du système d'évacuation.**
2. **S'assurer que le système d'évacuation présente des dimensions et une pente horizontale conformes à la norme ANSI Z223.1/NFPA 54, intitulée National Fuel Gas Code ou aux codes d'installation CSA-B149.1, ainsi qu'aux présentes instructions. S'assurer que le système d'évacuation n'est pas bloqué, restreint, corrodé, qu'il ne fuit pas et qu'il ne présente aucun autre défaut potentiellement dangereux.**
3. **Dans la mesure du possible, fermer toutes les portes et fenêtres du bâtiment, et toutes les portes entre la pièce où se trouve l'appareil raccordé au système d'évacuation et les autres pièces du bâtiment.**
4. **Fermer les registres de foyer.**
5. **Mettre en service les sécheuses et tout autre appareil qui n'est pas raccordé au système d'évacuation. Faire fonctionner à régime maximal tout ventilateur d'évacuation, tel que les hottes de cuisinière et les ventilateurs de salles de bains. Ne pas mettre en service les ventilateurs d'été.**
6. **Respecter les instructions d'allumage. Mettre en service l'appareil à l'essai. Régler le thermostat de manière à ce que l'appareil fonctionne sans interruption.**
7. **Vérifier s'il y a des émanations à l'orifice d'évacuation du coupe-tirage des appareils dotés d'un coupe-tirage 5 minutes après l'allumage du brûleur principal. Utiliser la flamme d'une allumette ou d'une chandelle.**
8. **Si l'on constate, au cours de l'un des essais qui précèdent, que l'évacuation est déficiente, corriger le système d'évacuation conformément à la norme ANSI Z223.1/NFPA 54, National Fuel Gas Code, et (ou) aux codes d'installation CSA B149.1.**
9. **Après avoir déterminé que tous les appareils raccordés au système d'évacuation évacuent correctement tel que prescrit ci-dessus, rouvrir les portes et les fenêtres et remettre les ventilateurs d'évacuation, les registres de foyers et tout autre appareil fonctionnant au gaz à leur état de fonctionnement initial.**

IMPORTANT INFORMATION

- **This furnace must be vented in compliance with the current revision of the National Fuel Gas Code (ANSI-Z223.1/NFPA54). Instructions for determining the adequacy of an installation can be found in the current revision of the NFGC (ANSI Z223.1 / NFPA54). Consult local codes for special requirements. These requirements are for US installations as found in the NFGC.**
- **Furnace installation using methods other than those described in the following sections must comply with the National Fuel Gas Code (NFGC) and all applicable local codes.**
- **Requirements in Canada (B149.1) are structured differently. In Canada, venting shall conform to the requirements of the current (CAN/CGA B149.1 or .2) installation codes. Consult local codes for special requirements.**
- **Provisions must be made during the installation of this furnace that provide an adequate supply of air for combustion. The combustion air from the outside needs to be clear of chemicals that can cause corrosion. The inlet pipe should not be placed near corrosive chemicals such as those listed on page 4.**

⚠ WARNING:

Upon completion of the furnace installation, carefully inspect the entire flue system both inside and outside the furnace to assure it is properly sealed. Leaks in the flue system can result in serious personal injury or death due to exposure of flue products, including carbon monoxide.

⚠ WARNING:

This furnace must not be vented with other appliances, even if that appliance is of the condensing type. Common venting can result in severe corrosion of other appliances or their venting and can allow combustion gases to escape through such appliances or vents. Do not vent the furnace to a fireplace chimney or building chase.

This condensing furnace is certified for installation either as a Direct Vent (2-pipe) or Conventional (1-pipe) appliance. Direct Vent appliances draw combustion air from the outdoors and vent combustion products back outside. Installation with air taken from around the furnace is often referred to as Conventional installation - i.e. only the vent (exhaust) pipe is provided.

Another important consideration when selecting one or two pipe installation is the quality of the Indoor air which can sometimes be contaminated with various household chemicals . These chemicals can cause severe corrosion in the furnace combustion system. A 2-pipe installation has the additional advantage that it isolates the system from the effects of negative pressure in the house.

- The MG3 series gas furnace has been certified for use in manufactured homes in the United States to the UL 307B standard and to ANSI Z21.47 CAN/CGA-2.3 in Canada and the United States. These furnaces may be installed in:

  Manufactured Homes
  Recreational Vehicles, Park Models
  Manufactured Buildings
  Modular Homes / Buildings

Air openings on top of the furnace and openings in closet doors or walls must never be restricted. If the furnace is operated without adequate air for combustion, the flame roll-out switch will open, turning off the gas supply to the burners.

IMPORTANT NOTE

This safety device is a manually reset switch. DO NOT install jumper wires across these switches to defeat their function or reset a switch without identifying and correcting the fault condition. If a switch must be replaced, use only the correct sized part specified in the Replacement Parts List provided online.

⚠ CAUTION:

Exhaust fans, clothes dryers, fireplaces and other appliances that force air from the house to the outdoors can create a negative pressure inside the house, resulting in improper furnace operation or unsafe conditions such as flame roll out. It is imperative that sufficient air exchange with the outdoors is provided to prevent depressurization. Additional information about how to test for negative pressure problems can be found in the NFGC.

Direct Vent Installation

The MG3 furnace is listed as a Direct Vent (2-pipe) forced air furnace (type FSP) for use with both natural and propane (LP) gases. **NOTE:** Direct vent appliances draw combustion air from the outdoors and vent combustion products back outside, isolating the entire system from the indoor space. It is important to make sure that the whole system is sealed and clearances to combustibles are maintained regardless of the installation being in a confined or unconfined space.

Installation in Confined Spaces

A confined space is an area with volume less than 50 cubic feet per 1,000 Btuh of the combined input rates of all appliances drawing combustion air from that space. Furnace closets, small equipment rooms and garages are confined spaces. Furnaces installed in a confined space which supply heated air to areas outside the space must draw return air from outside the space and must have the return air ducts tightly sealed to the furnace.

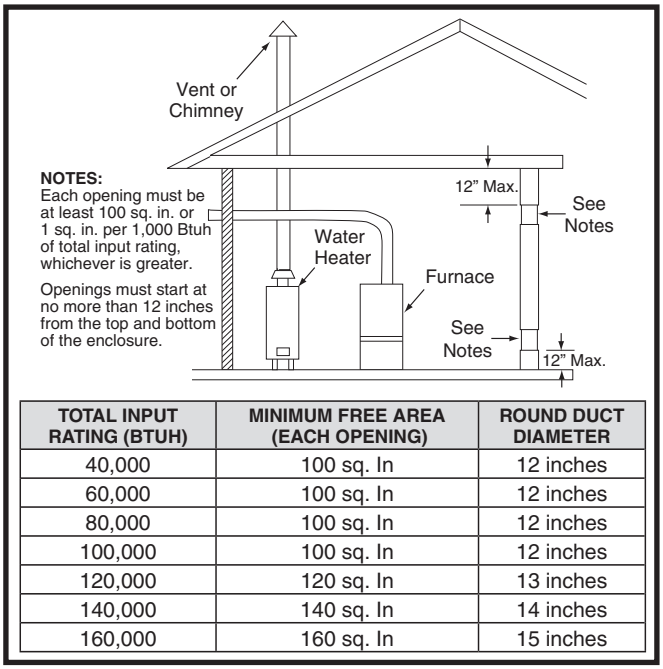
Ducts must have a cross-sectional area at least as large as the free area of their respective openings to the furnace space. Attics or crawl spaces must connect freely with the outdoors if they are the source of air for combustion and ventilation.

The required sizing of these openings is determined by whether inside or outside air is used to support combustion, the method by which the air is brought to the space, and by the total input rate of all appliances in the space. In all cases, the minimum dimension of any combustion air opening is 3 inches.

Air From Inside

If combustion air is taken from the heated space, the two openings must each have a free area of at least one square inch per 1,000 Btuh of total input of all appliances in the confined space, but **not less than** 100 square inches of free area. See Example and Figure 2.

Example:
If the combined input rate of all appliances is less than or equal to 100,000 Btuh, each opening must have a free area of at least 100 square inches. If the combined input rate of all appliances is 120,000 Btuh, each opening must have a free area of at least 120 square inches.



TOTAL INPUT RATING (BTUH)	MINIMUM FREE AREA (EACH OPENING)	ROUND DUCT DIAMETER
40,000	100 sq. In	12 inches
60,000	100 sq. In	12 inches
80,000	100 sq. In	12 inches
100,000	100 sq. In	12 inches
120,000	120 sq. In	13 inches
140,000	140 sq. In	14 inches
160,000	160 sq. In	15 inches

Figure 2. Combustion Air Drawn from Inside

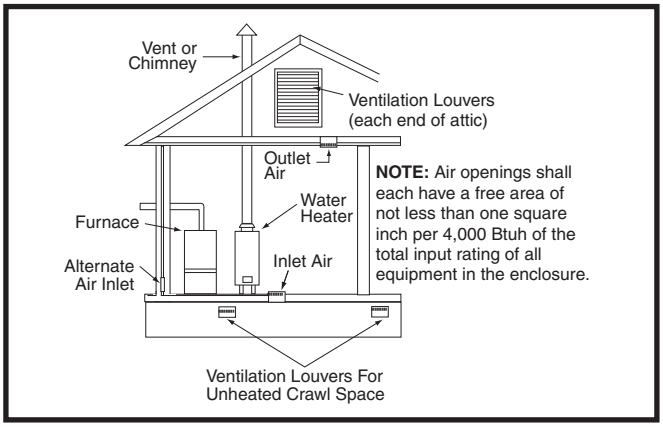


Figure 3. Combustion Air Drawn from a Crawl Space or Vented Attic

Outdoor Air from a Crawl Space or Vented Attic

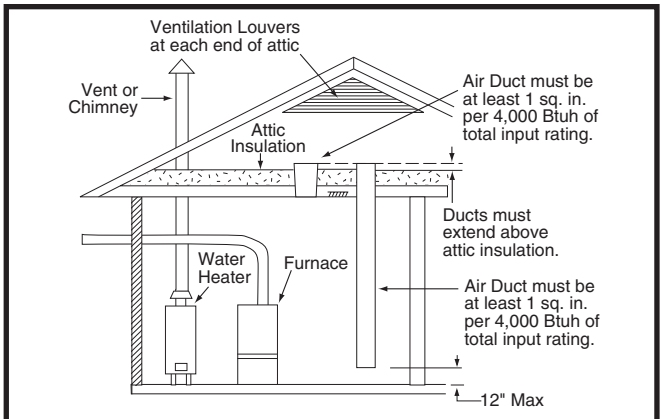
When the openings can freely exchange air with the outdoors, each opening shall have a minimum free area of 1 square inch per 4,000 Btuh of total appliance input. The openings shall exchange directly, or by ducts, with the outdoor spaces (crawl or attic) that freely exchange with the outdoors. See Figure 3.

Outdoor Air Using Vertical Ducts

If combustion air is taken from outdoors through vertical ducts, the openings and ducts must have a minimum free area of one square inch per 4,000 Btuh of total appliance input. Attics or crawl spaces must connect freely with the outdoors if they are the source of air for combustion and ventilation. See Figure 4.

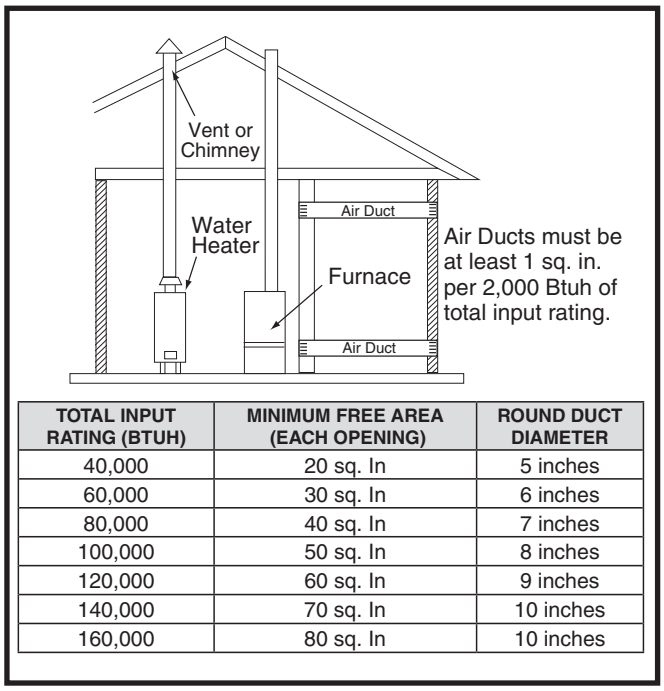
Outdoor Air Using Horizontal Ducts

If combustion air is taken from outdoors through horizontal ducts, the openings and ducts must have a minimum free area of one square inch per 2,000 Btuh of total appliance input. Ducts must have cross - sectional area at least as large as the free area of their respective openings to the furnace space. See Figure 5 (page 8).



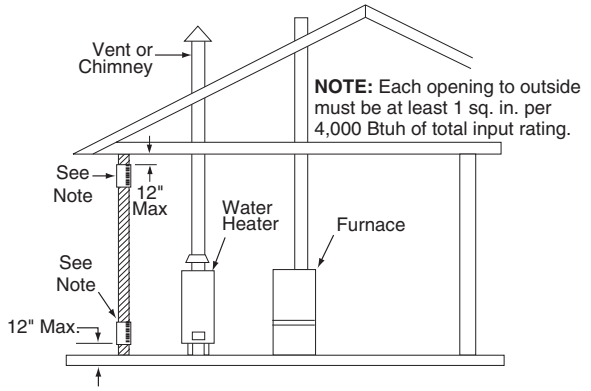
TOTAL INPUT RATING (BTUH)	MINIMUM FREE AREA (EACH OPENING)	ROUND DUCT DIAMETER
40,000	10 sq. In	4 inches
60,000	15 sq. In	5 inches
80,000	20 sq. In	5 inches
100,000	25 sq. In	6 inches
120,000	30 sq. In	6 inches
140,000	35 sq. In	7 inches
160,000	40 sq. In	8 inches

Figure 4. Combustion Air Drawn from Outside Through Vertical Ducts



TOTAL INPUT RATING (BTUH)	MINIMUM FREE AREA (EACH OPENING)	ROUND DUCT DIAMETER
40,000	20 sq. In	5 inches
60,000	30 sq. In	6 inches
80,000	40 sq. In	7 inches
100,000	50 sq. In	8 inches
120,000	60 sq. In	9 inches
140,000	70 sq. In	10 inches
160,000	80 sq. In	10 inches

Figure 5. Combustion Air Drawn from Outside Through Horizontal Ducts



TOTAL INPUT RATING (BTUH)	MINIMUM FREE AREA (EACH OPENING)	ROUND DUCT DIAMETER
40,000	10 sq. In	4 inches
60,000	15 sq. In	5 inches
80,000	20 sq. In	5 inches
100,000	25 sq. In	6 inches
120,000	30 sq. In	6 inches
140,000	35 sq. In	7 inches
160,000	40 sq. In	8 inches

Figure 6. Combustion Air Drawn from Outside Through an Exterior Wall

Air Directly Through An Exterior Wall

If combustion air is provided directly through an exterior wall, the two openings must each have free area of at least one square inch per 4,000 Btuh of total appliance input. See Figure 6 (page 9).

Alternate Method of Providing Air from Outside

If acceptable under local Codes, it is permitted to provide outside air using one opening (See NFGC).

Generally, confined spaces must have two openings in the space for combustion air. One opening must be within 12 inches of the ceiling, and the other must be within 12 inches of the floor. However, an alternative method recently adopted by the NFGC uses one opening within 12 inches of the top of the space. This method may be used if it is acceptable to the local codes.

THE FOLLOWING CONDITIONS MUST BE MET:

1. The opening must start within 12” of the top of the structure and connect with the out of doors through vertical or horizontal ducts or be ducted to a crawl or attic space that connects with the out of doors.
2. The opening must have a minimum free area of 1 sq. in. per 3,000 Btu per hour of the total input rating of all equipment located in the enclosure.
3. The free area must not be less than the sum of all the areas of the vent connectors in the enclosure.

Installation in Unconfined Spaces

An unconfined space is an area including all rooms not separated by doors with a volume greater than 50 cubic feet per 1,000 Btuh of the combined input rates of all appliances which draw combustion air from that space.

In general, a furnace installed in an unconfined space will not require outside air for combustion. However, in homes built for energy efficiency (low air change rates), it may be necessary to provide outside air to ensure adequate combustion and venting, even though the furnace is located in an unconfined space. See example.

Example:
A space with a water heater rated at 45,000 Btuh input and a furnace rated at 75,000 Btuh requires a volume of 6,000 cubic feet [50 x (45 + 75) = 6,000] to be considered unconfined. If the space has an 8 foot ceiling, the floor area of the space must be 750 square feet (6,000 / 8 = 750).

Category IV Venting

⚠ WARNING:

Upon completion of the furnace installation, carefully inspect the entire flue system both inside and outside the furnace to assure it is properly sealed. Leaks in the flue system can result in serious personal injury or death due to exposure of flue products, including carbon monoxide.

This furnace is classified as a “Category IV” appliance, which requires special venting materials and installation procedures. This section specifies installation requirements for direct vent (2-pipe) piping.

This type of appliance operates with positive vent pressure and therefore requires the furnace to be vented to the outdoors and thoroughly sealed. They also produce liquid condensate, which is slightly acidic and can cause severe corrosion of ordinary venting materials. Furnace operation can be adversely affected by restrictive vent and combustion air piping.

The inducer assembly on this furnace can be rotated to vent the flue products out of the top, left or right side. This increases the flexibility of which direction the vent pipe can exit the furnace.

Vent Pipe Material

Vent and combustion air pipe and fittings must be one of the following materials in the list and must conform to the indicated ANSI/ASTM standards.

MATERIALS	STANDARDS
Schedule 40PVC	D1785
CPVC	D1784
PVC-DWV	D2665
SDR-21 & SDR-26	D2241
ABS-DWV	D2661
Schedule 40 ABS	F628
Foam / Cellular Core PVC	F891
*PolyPro® by DuraVent	ULC-S636
*InnoFlue® by Centrotherm	UL1738 and ULC-S636

*When using PolyPro® or InnoFlue®, all venting and fittings must be from the same manufacturer with no interchanging of other materials. Refer to specific instructions supplied with the PolyPro and InnoFlue vent kits.

When joining PVC to PVC, use cement that conforms to ASTM standard D2564. PVC primer must meet standard ASTM F656. When joining ABS to ABS, use cement that conforms to ASTM standard D2235. When joining PVC to ABS, use cement as specified in procedure from ASTM standard D3138.

In Canada, all plastic vent pipes and fittings including any cement, cleaners, or primers must be certified as a system to ULC S636. However, this requirement does not apply to the finish flanges or piping internal to the furnace.

FURNACE MODELS (BTU)	FURNACE INSTALLATION	DUAL VENT PIP LENGTH (FT.) WITH 1 LONG RADIUS ELBOW ON EACH PIPE†	
		INLET / OUTLET 2" DIAMETER	INLET / OUTLET 3" DIAMETER
54,000	Upflow	70	90
72,000	Upflow	50	90
80,000	Downflow	30	90
90,000	Upflow	60	90
108,000	Upflow	N/A	90

†NOTES:

- The length of 2" pipe needed between the inducer and the exit hole (top of cabinet) is 8 3/4" for upflow models and 16" for downflow models.
- Subtract 2.5 ft. for each additional 2 inch long radius elbow, 5 ft. for each additional 2 inch short radius elbow, 3.5 ft. for each additional 3 inch long radius elbow, and 7 ft. for each additional 3 inch short radius elbow. ubtract 5 ft for each 2" tee and 8 ft for each 3" tee.
- Two 45 degree elbows are equivalent to one 90 degree elbow.
- This table applies for elevations from sea level to 2,000 ft. For higher elevations, decrease pipe lengths by 8% per 1,000 ft of altitude.

Table 1. Vent Pipe Lengths

Vent Pipe Length & Diameter

In order for the furnace to operate properly, the combustion air and vent piping must not be excessively restrictive.

- The venting system should be designed to have the minimum number of elbows or turns.
- Transition to the final vent diameter should be done as close to the furnace outlet as practical.
- Always use the same size or a larger pipe for combustion air that is used for the exhaust vent.

Table 1 specifies the maximum allowable pipe length for vent and combustion air for a furnace of known input rate, when installed with piping of selected diameter and number of elbows. Before using the table, the furnace input rate, the centerline length and the number of elbows on each pipe must be known.

When estimating the length of vent runs, consideration must be made to the effect of elbows and other fittings. This is conveniently handled using the idea of "equivalent length". This means the fittings are assigned a linear length that accounts for the pressure drop they will cause. For example: a 2" diameter, long radius elbow is worth the equivalent of 2.5 feet of linear run. A 90 degree tee is worth 7 ft.

The equivalent lengths of tees and various elbows are listed in Table 1. Measure the linear length of your vent run and then add in the equivalent length of each fitting. The total length, including the equivalent fitting lengths, must be less than the maximum length in the table.

Vent Pipe Installation

⚠ CAUTION:

Combustion air must not be drawn from a corrosive atmosphere.

This furnace has been certified for installation with zero clearance between vent piping and combustible surfaces. However, it is good practice to allow space for convenience in installation and service.

- The quality of outdoor air must also be considered. Be sure that the combustion air intake is not located near a source of solvent fumes or other chemicals which can cause corrosion

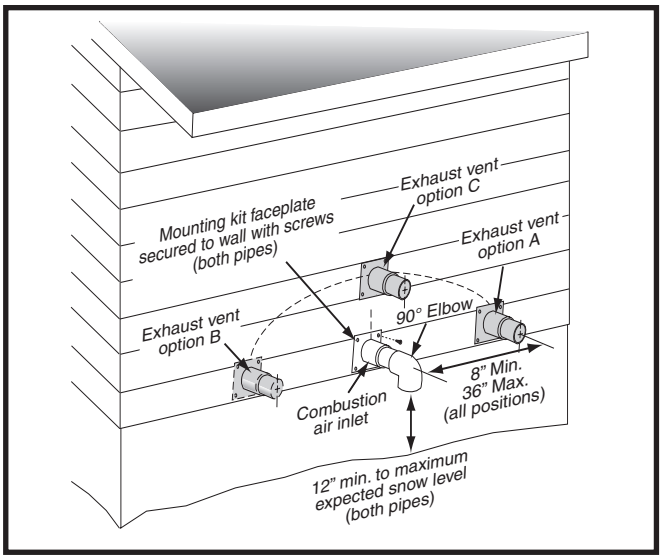


Figure 7. Inlet & Exhaust Pipe Clearances

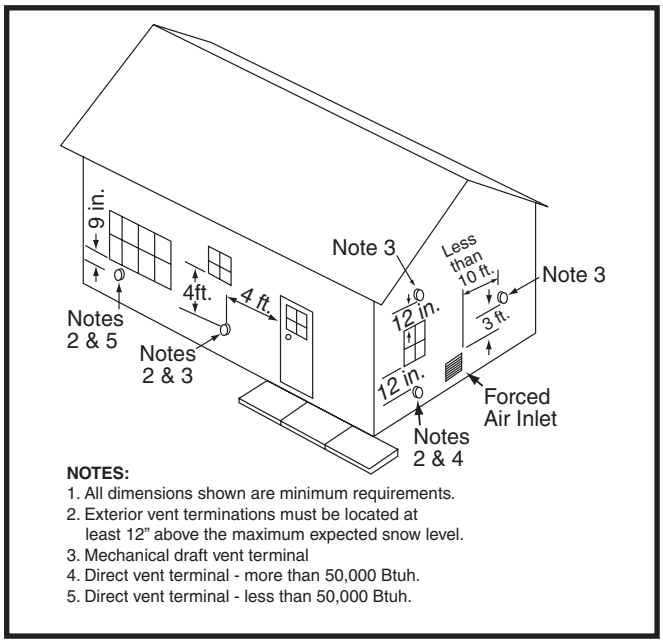


Figure 8. Vent Locations

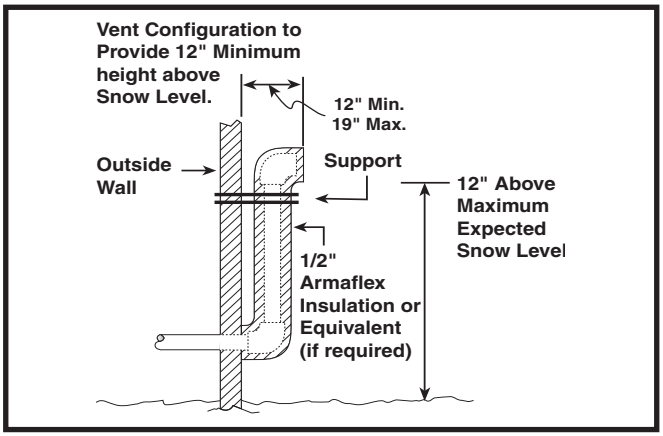


Figure 9. Alternate Horizontal Vent Installation

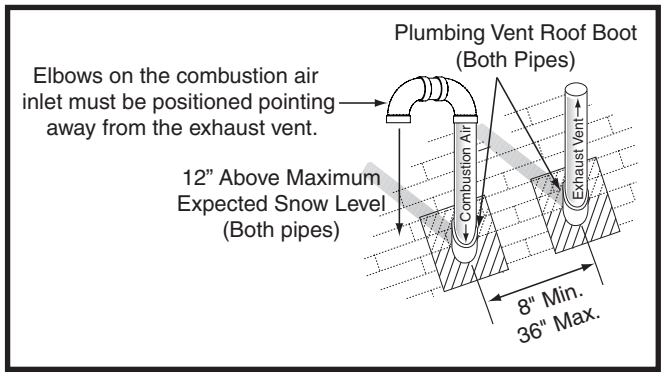


Figure 10. Vertical Vent Termination

of the furnace combustion system. See list of substances on page 4.

- Route piping as direct as possible between the furnace and the outdoors. Horizontal piping from inducer to the flue pipe must be sloped 1/4" per foot to ensure condensate flows towards the drain tee or PVC trap. Longer vent runs require larger pipe diameters. Refer to the Inducer & Venting Options section on page 18 for additional information..
- The combustion air intake and the vent exhaust must be located in the same atmospheric pressure zone. This means both pipes must exit the building through the same portion of exterior wall or roof as shown in Figure 7 (page 10), Figure 8, Figure 9 (page 10), & Figure 10.
- Piping must be mechanically supported so that its weight does not bear on the furnace. Supports must be at intervals no greater than 5 ft. Supports may be at shorter intervals if necessary to ensure that there are no sagging sections that can trap condensate.

Outdoor Terminations - Horizontal Venting

Vent and combustion air intake terminations shall be installed as depicted in Figure 7, Figure 8, and in accordance with these instructions:

- Vent termination clearances must be consistent with the NFGC, ANSI 2223.1/NFPA 54 and/or the CSA B149.1, Natural Gas and Propane Installation Code.
- All minimum clearances must be maintained to protect building materials from degradation by flue gases as shown in Figure 8.
- Vent and combustion air intake terminations must be located to ensure proper furnace operation and conformance to applicable codes. The minimum distance from any door, open window, or air gravity inlet is 1ft. below, 1ft. horizontally, or 1ft. above. In Canada, CSA B149.1 takes precedence over these instructions. Table 20 (page 50) lists the necessary distances from the vent termination to windows and building air intakes.
- The vent termination shall be located at least 4 ft. horizontally from any electric meter, gas meter, regulator and any relief equipment. These distances apply ONLY to U.S. installations. In Canada, the Canadian Fuel Gas Code takes precedence over these instructions.
- Do not install the vent terminal such that exhaust is directed into window wells, stairwells, under decks or into alcoves or similar recessed areas, and do not terminate above any public walkways.
- If venting horizontally, a side wall vent kit is available according to the pipe diameter size of the installation. 2 inch and 3 inch kits are available. Refer to the technical sales literature for part numbers. **Please follow the instructions provided with the kit.**
- Concentric vent kits are available for both 2" and 3" applications. Each size has one that meets UL 1738 and one that meets ULC S636. Refer to the technical sales literature for kit numbers.
- When the vent pipe must exit an exterior wall close to the grade or expected snow level where it is not possible to obtain clearances shown in Figure 7, a riser may be provided as shown in Figure 9 (page 10). Insulation is required to prevent freezing of this section of pipe. For vent freezing protection, see page 12.

⚠ WARNING:

The combustion air vent and exhaust vent must be configured as shown in Figure 9. Improper vent terminations can cause the recirculation of flue gases which may result in furnace vibration. In severe cases, the furnace will cycle, due to the intermittent contact between the flame and the flame sensor. If you notice these oscillations occurring, check the vent configuration to make sure the exhaust vent does not have a 90 degree termination.

- For optimal performance, vent the furnace through a wall that experiences the least exposure to winter winds.
- Termination kits consist of two face plates and an insulating gasket to seal the exterior surface.
- The hole in the wall must be sized closely to the diameter of the pipe.
- The pipe that penetrates the wall should be long enough that it can be held in place by standard close fitting couplings.
- Face plates are secured to both sides of the wall by the couplings, and the gasket is retained against the wall by the exterior face plate.
- Face plates must be fastened to the wall. Exterior face plates must be flashed to prevent water infiltration.

If termination kits are not used, these requirements must be followed:

- The hole size cut through the exterior wall is smaller than the outside diameter of the couplings.
- The vent pipe extends through the wall approximately 1" and the gap between the wall and pipe is sealed.
- Couplings are applied to the vent pipe on the interior and exterior sides of the wall. **NOTE:** This insures the pipe can not be pushed or pulled through the wall.
- The combustion air inlet pipe must have a 90 degree termination elbow, and pointed downwards as shown in Figure 7 (page 10).

Outdoor Terminations - Vertical Venting

Termination spacing requirements from the roof and from each other are shown in Figure 10.

- The roof penetration must be properly flashed and waterproofed with a plumbing roof boot or equivalent flashing.
- The combustion air intake must be provided with an elbow opening downward.

Vent and combustion air piping may be installed in an existing chimney which is not in use provided that:

- Both the exhaust vent and air intake run the length of the chimney.
- The top of the chimney is sealed and weatherproofed.
- The termination clearances shown in Figure 10 are maintained.
- No other gas fired or fuel-burning equipment is vented through the chimney.

Winter Design Temperature	Maximum Flue Pipe Length in Unconditioned and Exterior Spaces	
	Without Insulation (feet)	With Insulation (feet)*
20	45	70
0	20	70
-20	10	60

* = Insulation thickness greater than 3/8 inch, based on an R value of 3.5 (ft x F x hr) / (BTU x in.)

Table 2. Vent Protection

Vent Freezing Protection

⚠ CAUTION:

When the vent pipe is exposed to temperatures below freezing (i.e., when it passes through unheated spaces, chimneys, etc.) the pipe must be insulated with 1/2 inch thick sponge rubber insulation, Armaflex-type insulation or equivalent. Insulating pipe is important to avoid condensate icing.

- Table 2 lists the maximum length of flue pipe that can travel through an unconditioned space or an exterior space. The total vent length must not exceed the lengths noted in Table 1 (page 10). For Canadian installations please refer to the Canadian Installation Code (CAN/CGA-B149.1 or 2) and/or local codes.
- For extremely cold climates or conditions of short furnace cycles (i.e. set back thermostat conditions), the last 18 inches of vent pipe can be reduced from 3" to 2-1/2", 3" to 2" or 2" to 1-1/2" if the total vent length is at least 15 feet in length and the vent is sized in accordance with Table 1. The length of the 2 inch pipe must not be longer than 18 inches. Smaller vent pipes are less susceptible to freezing, but must not be excessively restrictive.
- If a furnace is installed horizontally, make sure the drainage port in the inline drain assembly is pointed downward to ensure proper drainage of condensate.
- To prevent debris or creatures from entering the combustion system, a protective screen may be installed over the combustion air intake opening. The screens hole size must be large enough to prevent air restriction

Existing Installations

When an existing furnace is removed from a vent system serving other appliances, the existing vent system may not be sized properly to vent the remaining appliances (Example: water heater). An improperly sized venting system can result in the formation of condensate, leakage, or spillage. The existing vent system should be checked to make sure it is in compliance with NFGC, ANSI Z223.1, or CAN/CGA B149 and must be brought into compliance before installing the furnace.

NOTE: If replacing an existing furnace, it is possible you will encounter an existing plastic venting system that is subject to a Consumer Product Safety Commission recall. The pipes involved in the recall are High Temperature Plastic Vent (HTPV). **If your venting system contains these pipes DO NOT reuse this venting system!** This recall does not apply to other plastic vent pipes, such as white PVC or CPVC. Check for details on the CPSC website or call their toll-free number (800) 758-3688.

Concentric Vent Termination

A concentric vent termination is approved for use with these furnaces. Refer to the technical sales literature for part numbers. Please follow the installation instructions provided with the kit for proper installation.

Condensate Disposal

The method for disposing of condensate varies according to local codes. Consult your local code or authority having jurisdiction. A neutralizer kit is available for use with this furnace. Refer to the technical sales literature for part numbers. **Please follow the instructions provided with the kit.**

This furnace has multiple options for positioning the vent pipe as described in the Inducer & Venting Options section (page 18). Each of the condensate drain lines must be J-trapped using field supplied parts.

After the condensate lines are J-trapped, they may be combined together when routed to the drain. Avoid areas where condensate drainage may cause problems by dropping onto planters, patios, etc.

NOTE: Industry research studies indicate that when condensate is routed to an active drain, household detergents, etc., buffer its acidity. If the drain is not actively used or if codes require, obtain a neutralizer kit (usually contains limestone). Proper drains and connections to the condensate tubing are required as Nordyne cannot be held responsible for water leakage which occurs due to loose hose connections or improperly sealed drain line pipes.

CIRCULATING AIR REQUIREMENTS

⚠ WARNING:

Do not allow combustion products to enter the circulating air supply. Failure to prevent the circulation of combustion products into the living space can create potentially hazardous conditions including carbon monoxide poisoning that could result in personal injury or death.

All return ductwork must be secured to the furnace with sheet metal screws. For installations in confined spaces, all return ductwork must be adequately sealed. When return air is provided through the bottom of the furnace, the joint between the furnace and the return air plenum must be air tight.

The surface that the furnace is mounted on must provide sound physical support of the furnace with no gaps, cracks or sagging between the furnace and the floor or platform.

Return air and circulating air ductwork must not be connected to any other heat producing device such as a fireplace insert, stove, etc. This may result in fire, explosion, carbon monoxide poisoning, personal injury, or property damage.

Plenums & Air Ducts

- Plenums and air ducts must be installed in accordance with the Standard for the Installation of Air Conditioning and Ventilating Systems (NFPA No. 90A) or the Standard for the Installation of Warm Air Heating and Air Conditioning Systems (NFPA No. 90B).
- Table 9 (page 33), Table 10 (page 37), Table 11 (page 38), Table 12 (page 39), & Table 13 (page 40) contain the maximum airflow and temperature rise data. If the maximum airflow is 1,600 CFM or more, it is recommended that two openings be used for return air on upflow furnaces. Downflow furnaces can only use one return opening.
- It is recommended that the outlet duct contain a removable access panel. The opening should be accessible when the furnace is installed in service and shall be of a size that smoke or refelcted light may be observed inside the casing to indicate the presence of leaks in the heat exchanger. The cover for the opening shall be attached in such a manner as to prevent leaks.
- If outside air is used as return air to the furnace for ventilation or to improve indoor air quality, the system must be designed so that the return air is not less than 60° F (15° C) during operation. If a combination of indoor and outdoor air is used, the ducts and damper system must be designed so that the return air supply to the furnace is equal to the return air supply under normal, indoor return air applications.
- When a cooling system is installed which uses the furnace blower to provide airflow over the indoor coil, the coil must be installed downstream (on the outlet side) of the furnace or in parallel with the furnace.
- If a cooling system is installed in parallel with the furnace, a damper must be installed to prevent chilled air from entering the furnace and condensing on the heat exchanger. If a manually operated damper is installed, it must be designed so that the furnace will not operate when the damper is in the cooling position or when in heating position, the cooling system is inoperable.
- It is good practice to seal all connections and joints with industrial grade sealing tape or liquid sealant. Requirements for sealing ductwork vary from region to region. Consult with local codes for requirements specific to your area.

Return Air Connections

In applications where the supply ducts carry heated air to areas outside the space where the furnace is installed, the return air must be delivered to the furnace by duct(s) secured to the furnace casing, running full size and without interruption. Do not use the back of the furnace for return air.

- Upflow furnaces draw the return air from the base of the furnace. A stand or return air duct must be supplied to the furnace to provide the required return air.
- Downflow models draw the return air from the top of the furnace. The minimum required clearance to the top of the furnace is detailed on the furnace rating plate. Additional clearance may be required depending upon filter accessibility.

For each U.S.A. application, the home manufacturer shall comply with all of the following conditions to have acceptable return air systems for closet installed forced air heating appliances:

- Regardless of the location, the return air opening into the closet shall not be less than specified in the appliance's listing.
- Means shall be provided to prevent inadvertent closure by a flat object placed over the return air opening when it is located in the floor of the closet (versus the vertical front or side wall).
- The cross-sectional area of the return duct system leading into the closet shall not be less than 390 in^2.
- The total free area of openings in the floor or ceiling registers serving the return air duct system must be at least 352 in^2. At least one register should be located where it is not likely to be covered by carpeting, boxes and other objects.
- Materials located in the return duct system must have a flame spread classification of 200 or less. This includes a closet door if the furnace is in a closet.
- Noncombustible pans having 1" upturned flanges are located beneath openings in a floor duct system.
- Wiring materials located in the return duct system shall conform to Articles 300-22 of the National Electrical Code (ANSI C1/NFPA-70).
- Gas piping is not run in or through the return duct system.
- Test the negative pressure in the closet with the air-circulating fan operating at high speed and the closet closed. The negative pressure is to be no more negative than minus 0.05 inch water column.
- Air conditioning systems may require more duct, register and open louver area to obtain necessary airflow. Use Nordyne's certiduct program to determine proper duct size for A/C.
- For floor return systems, the manufactured home manufacturer shall affix a prominent marking on or near the appliance where it can be easily read when the closet door is open. The marking shall read:

⚠ CAUTION:

HAZARD OF ASPHYXIATION: Do not cover or restrict return air opening.

Supply Air Connections

For proper air distribution, the supply duct system must be designed so that the static pressure measured external to the furnace does not exceed the listed static pressure rating shown on the furnace rating plate. **The supply air must be delivered to the heated space by duct(s) secured to the furnace casing, running full size and without interruption.**

Three typical distribution systems are shown in Figure 11. The location, size, and number of registers should be selected on the basis of best air distribution and floor plan of the home.

Acoustical Treatments

Damping ducts, flexible vibration isolators, or pleated media-style filters on the return air inlet of the furnace may be used to reduce the transmission of equipment noise eminating from the furnace. These treatments can produce a quieter installation, particularly in the heated space. However, they can increase the pressure drop in the duct system. Care must be taken to maintain the proper maximum pressure rise across the furnace, temperature rise and flow rate. This may mean increasing the duct size and/or reducing the blower speed. These treatments must be constructed and installed in accordance with NFPA and SMACNA construction standards. Consult with local codes for special requirements. For best sound performance, install all the needed gaskets and grommets around penetrations into the furnace, such as for electrical wiring.

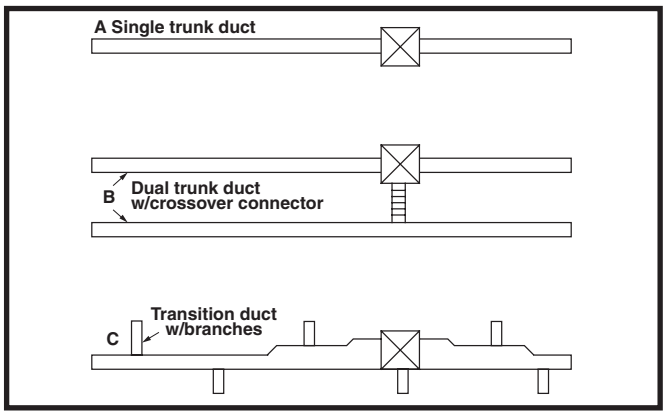


Figure 11. Typical Supply Duct System

FURNACE INSTALLATION

NOTE: These Installation procedures are suggested for typical furnace installations. Since each installation is different, the sequence of instructions may differ from the actual installation.

ONLY QUALIFIED HVAC TECHNICIANS SHOULD INSTALL THIS FURNACE.

The installer must be familiar with and comply with all codes and regulations applicable to the installation of these heating appliances and related equipment. In the absence of local codes, the installation must be in accordance with the current provisions of one or more of the following standards.

- Federal Manufactured Home Constructions & Safety Standard (H.U.D. Title 24, Part 3280.707[a][2])
- The Standard for Manufactured Home Installations (Manufactured Home Sites, Communities, and Set-Ups) ANSI A225.1 and/or CAN/CSA-2240 MH Series).
- American National Standard (ANSI-119.2/NFPA-501C) for all recreational vehicle installations.
- American National Standard (ANSI-Z223.1/NFPA-54) and/or CAN/CGA B149 for all gas-fired furnace models.
- American National Standard (ANSI-C1/NFPA-70) and/or CSA 22.1 Canadian Electric Code Part 1 for all electrical field wiring.

About The Furnace

The MG3 Series furnace is designed only for indoor installations and can be readily connected to the high static duct system of a home. Units are approved for single/multistory residential or mobile/modular/manufactured structures in freestanding/closet/alcove downflow only configurations.

MG3P series gas furnaces are shipped ready for installation in the upflow position with upflow return air. MG3S series gas furnaces may only be used for downflow operation. See Figure 1 (page 5) for the required clearances needed to move the furnace to its installation point (hallways, doorways, stairs, etc).

Upflow and downflow models must be installed with an approved A/C coil box which is listed according to the cabinet size of the furnace. Refer to the technical sales literature for part numbers.

Approved installation, operation, and maintenance of this appliance must be in accordance with the listed specifications contained in these instructions and other documents supplied with the furnace and/or optional air conditioning equipment. Unless it is noted differently in this manual, only use factory authorized kits and accessories on this appliance. Refer to local authorities having jurisdiction for further information.

Before You Install this Furnace

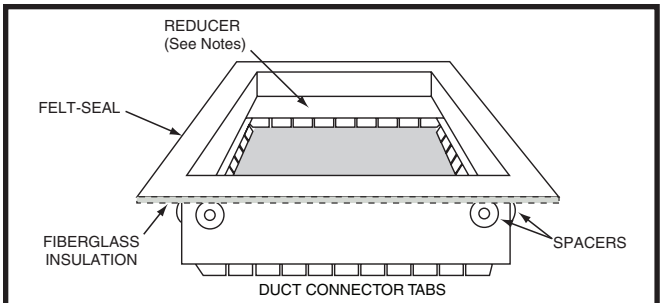
√ This equipment is securely packaged at the time of shipment and upon arrival should be carefully inspected for damage prior to installing the equipment at the job site. Claims for damage (apparent or concealed) should be filed immediately with the carrier.

√ Check the electrical supply and verify the power supply is adequate for unit operation. The system must be wired and provided with circuit protection in accordance with local building codes. If there is any question concerning the power supply, contact the local power company.

√ Verify the air delivery of the furnace is adequate to handle the static pressure drop of the coil, filter, and duct work.

Locating the Furnace

- The dimensions of the room or alcove must be able to accommodate the overall size of the unit and required clearances to combustible materials listed in Figure 1 (page 5). Access for positioning and servicing must also be considered when locating the unit. To determine the required clearances needed for installation and combustible materials, refer to Figure 45 (page 42) for cabinet dimensions.
- The furnace must be installed on a solid surface and must be level front-to-back and side-to-side at installation. The surface that the furnace is mounted on must provide sound physical support of the unit.
- The furnace should be installed as close to the center of the air distribution system as possible and attached to a properly installed duct system. **Do not use the back of the furnace for return air.** See pages 12 - 13 for circulating air requirements.
- The furnace must be installed so that all electrical components are protected from water.
- The plenum attached to the A/C coil box and ductwork within 3 ft. of the furnace must be installed so that surfaces are at least 1/4" from combustible construction.
- When installed in a residential garage, the furnace must be positioned so the burners and the source of the ignition are located no less than 18 inches above the floor and protected from physical damage by vehicles.
- This furnace is certified for use on wood flooring or supports, but must not be installed directly on carpeting, tile, or any combustible material other than wood flooring. **NOTE:** The furnace may be installed on combustible flooring when installed on a manufacturer approved duct connector. See Figure 12 (page 15). This factory supplied accessory must be installed in the floor cavity and attached to the supply air duct before the downflow furnace is installed.
- The furnace must be installed upstream from a refrigeration system.



NOTES:
With reducer installed: Opening to duct is 10-1/4" x 13-1/4".
With reducer removed: Opening to duct is 13-1/4" x 13-1/4".

Figure 12. Duct Connector

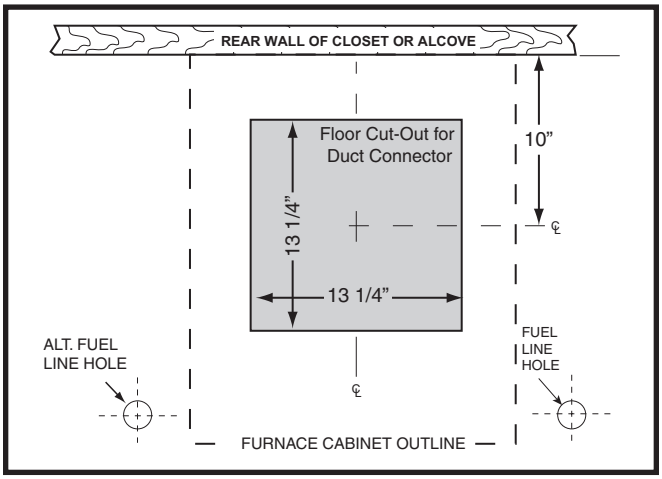
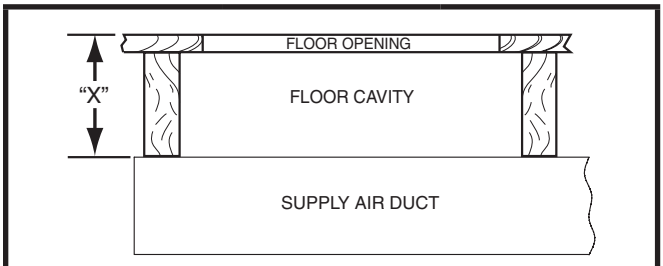


Figure 13. Floor Cutout Dimensions



If Floor Cavity ("X") is:	Duct Connector Type & Part Number	
	Finger Tab	Screw Down
7/8" (22)	901987A	904008
2" (51)	901988A	904009
4-1/4" (108)	901989A	904010
6-1/4" (159)	901990A	904011
8-1/4" (210)	901991A	904012
10-1/4" (260)	901992A	904013
12-1/4" (311)	901993A	904014

NOTE: Dimensions shown as Inches (Millimeter)

Table 3. Duct Connector Sizes

Downflow Furnace Installation

NOTE: These Installation procedures are suggested for typical furnace installations. Since all installations are different from each other, the sequence of instructions may differ from the actual installation.

⚠ WARNING:

The furnace must not be installed directly on carpeting, tile, or any combustible material other than wood flooring.

The MG3S series gas furnace is certified for use on wood flooring or supports, but must be installed on a special duct connector (Figure 12). This factory supplied accessory must be installed in the floor cavity and attached to the supply air duct before the downflow furnace is installed.

The depth of the floor cavity (shown as "X" in Table 3) will determine the duct connector size to use. Several connector sizes are listed in Table 3.

Locating & Cutting Floor Openings

IMPORTANT NOTE:
Cut-outs in the floor, must be carefully located to avoid misalignment of the furnace. To locate standard ducts, see Figure 8 (page 10).

1. Measure from the rear wall or alcove and mark the centerline of the cut-out on the floor. Using the centerline as a starting point, draw the rest of the duct cut-out to the dimensions shown in Figure 13.
2. Cut out the floor opening to within 1" of the actual cutout drawn.
3. Measure from the top of the floor down to the top of the supply air duct to obtain the depth of the floor cavity.**NOTE:** The depth of the floor cavity shown as "X" in Table 3 will determine the correct duct connector.
4. Determine which duct connector to use from the table.
5. Measure and drill gas hole and cut out for cooling coil (if applicable).

Installing Finger Tabbed Duct Connectors

The standard duct connector is designed for use on ducts 12" in width. However ducts narrower than 12" may not allow sufficient clearances for this type of installation. See Narrow Duct Attachment for an alternate installation method.

1. Center the duct connector in the floor opening with bottom tabs resting on top of the supply air duct.
2. Mark the cut-out area on the supply air duct by tracing around the connector tabs (Figure 14 (page 16)) of the duct connector.
3. Remove the duct connector and cut out the marked area of the supply air duct 1/16" larger the actual cutout drawn.
4. Install the duct connector back in the floor opening with the bottom tabs extending into the supply air duct.
5. Install the mounting plate (Figure 14) under the back side of the duct connector. Align the screw holes in both components.
6. Secure the duct connector and the mounting plate to the wood floor with appropriate size screws.
7. Secure the duct connector and the mounting plate to the wood floor with appropriate size screws.
8. Install 2 plates (Figure 15) on top of the duct connector, one on each side (left and right) of the opening. Align the screw holes in both components.
9. Secure both plates and duct connector to the wood floor with appropriate size screws.

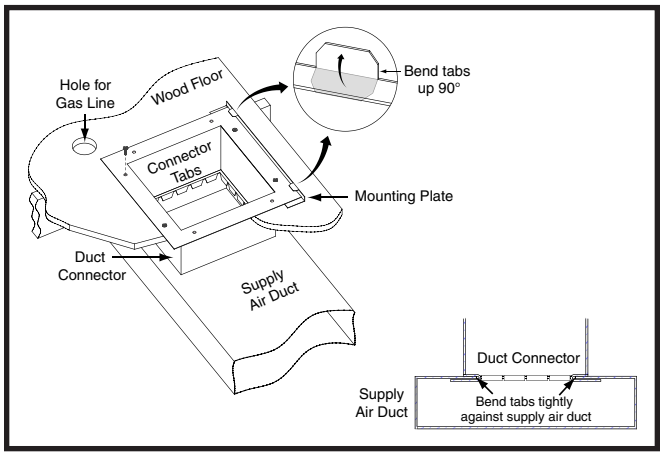


Figure 14. Duct Connector Installed

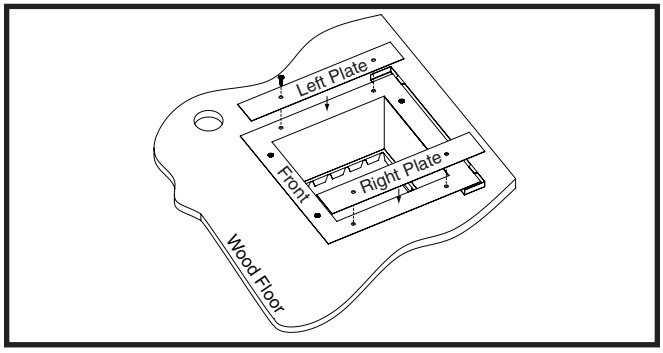


Figure 15. Duct Connector Side Plates

10. Bend the connector tabs on the bottom of the duct connector upwards and as tight as possible against the supply air duct.
11. Bend both tabs on the mounting plate (Figure 14) up 90°.
12. Seal all connections with industrial grade sealing tape or liquid sealant. **NOTE:** Requirements for sealing ductwork vary from region to region. Consult with local codes for requirements specific to your area.

Narrow Duct Attachment - Option 1

Thes alternate attachment methods may be used to install a furnace duct connector to narrow metal ductwork if insufficient clearances prevent the bending of the duct connector tabs at the side of the duct.

1. Select Option A or Option B in Figure 16 and cut the top of the supply air duct. Remove metal flaps from the duct (shaded area) if Option A is selected.
2. Fold the duct flaps up to form an opening for the duct connector (applies to Options A or B).
3. Install the duct connector with the bottom tabs extending into the supply air duct.
4. Bend the tabs on the bottom of the duct connector upwards and as tight as possible against the removed ends of the supply air duct.
5. Form the duct flaps up against the side of the duct connector as tight as possible. See Figure 16.
6. Secure the duct connector flaps to the supply air duct with staples (3 minimum) or if a 2x block/joist is not provided, use sheet metal screws (2 minimum).

   NOTE: The duct connector tabs may be attached to the air duct with sheet metal screws or other suitable fasteners as long as the duct connector and the air duct are securely attached.

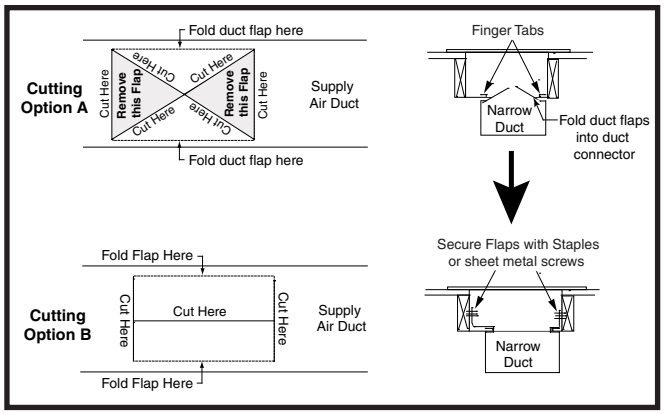


Figure 16. Narrow Ducts - Option 1

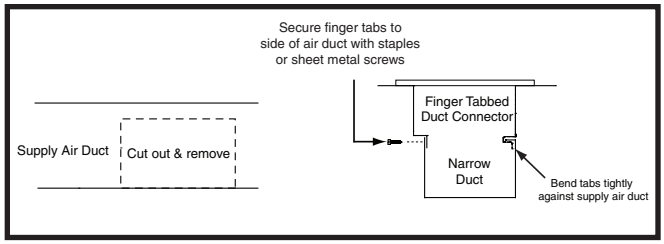


Figure 17. Narrow Air Ducts - Option 2

7. Seal all connections with industrial grade sealing tape or liquid sealant.

   NOTE: Requirements for sealing ductwork vary from region to region. Consult with local codes for requirements specific to your area.

Narrow Duct Attachment - Option 2

The alternate attachment methods listed below may be used to install a furnace duct connector to narrow metal ductwork if insufficient clearances prevent the bending of the duct connector tabs at the side of the duct.

1. Cut and remove the top of the supply air duct as shown in Figure 16.
2. Install the duct connector with the bottom tabs extending into the supply air duct.
3. Bend the tabs on the bottom of the duct connector upwards and as tight as possible against the supply air duct. See Figure 17 (page 16).
4. Secure the duct connector tabs to the supply air duct with staples (3 minimum) or sheet metal screws (2 minimum).

Installing Screw-Down Duct Connectors

1. Bend both tabs (Figure 18) on the mounting plate up 90°.
2. Apply a bead of caulking, mastic, or other approved sealant around bottom side of 1/2” flange and restrictor plate (when applicable).
3. Locate the screw down duct connector over the duct and carefully lower it into place. See Figure 18.
4. Secure the duct connector to the floor using flat head screws or nails. **NOTE:** Make sure the duct connector flanges stay in contact with the duct.
5. Secure the plenum to the duct using sheet metal screws making sure a tight seal is made between the duct and the duct connector. **NOTE:** Additional screws may be added if required.
6. Cut away along edge of flange allowing the center to drop into the duct. **NOTE:** Remove section of duct with caution, as edges will be sharp.

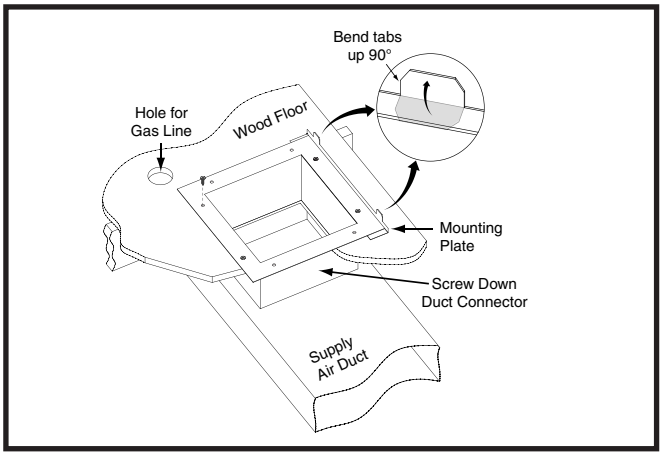


Figure 18. Screw-Down Duct Connector

Installing the Downflow Furnace

1. Prepare the AC coil box for installation by removing 2 screws from the sides of the A/C coil box.
2. Install the close-off plate on the bottom of the of the coil box. See Figure 19.
3. Align the screw holes in the close off plate and the coil box. Secure both components with the screws removed in step 1.
4. Place the A/C coil box on the duct connector until the back side butts firmly against the mounting plate tabs. **NOTE:** Mounting plate tabs must be bent upwards as shown in Figure 14 (page 16) to prevent interference with furnace.
5. Secure the A/C coil box to the connector assembly and wood floor with appropriate size screws at all four corners. **NOTE:** To minimize coil box damage, see Figure 20 for appropriate screw locations.
6. Install the furnace on top of the A/C coil box. Align the furnace evenly on the coil box from front to back and side to side.
7. Secure the furnace to the A/C coil box with an attachment bracket on both sides of the furnace. **NOTE:** The attachment brackets must be evenly positioned over the seam between the A/C coil box and the furnace. Install 4 self drilling screws in each bracket. See Figure 21.

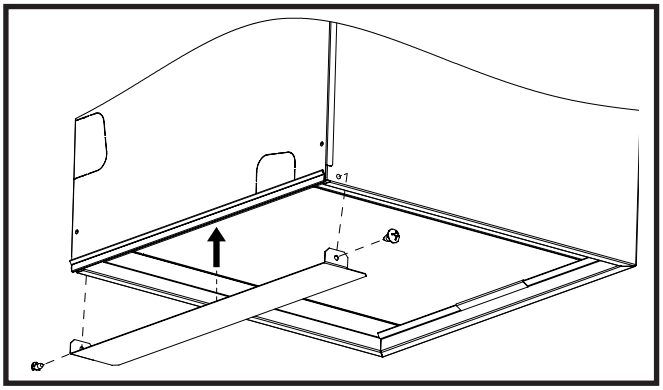


Figure 19. Close-Off Plate

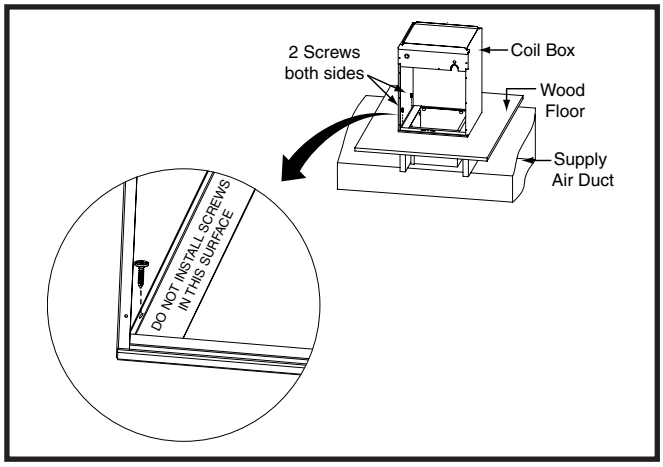


Figure 20. A/C Coil Box Installation

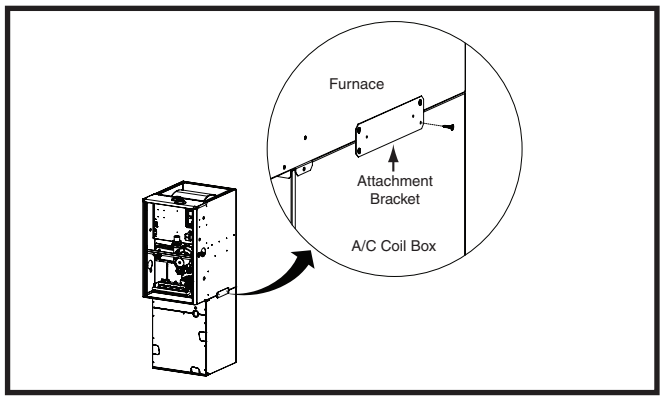


Figure 21. Attachment Bracket

Upflow Furnace Installation

⚠ WARNING:

The furnace must not be installed directly on carpeting, tile, or any combustible material other than wood flooring.

The MG3P series gas furnace is certified for use on wood flooring or supports. The upflow furnace is shipped with the bottom panel (Figure 45 (page 42)) installed and must be removed from the bottom of the cabinet before positioning and installing the furnace. See Bottom Removal section for removal instructions.

NOTE: These Installation procedures are suggested for typical furnace installations. Since all installations are different from each other, the sequence of these steps may differ from the actual installation.

1. Position the furnace on top of the return air ductwork or return air stand ensuring even alignment of furnace air opening and return air duct. **NOTE:** The ductwork or stand must have an opening equal to that of the return air opening of the furnace. See the cabinet dimensions in Figure 45 for the proper return air opening size.
2. Secure the furnace to the floor or base. Check for level from front to back and side to side. **NOTE:** Additional fasteners may be used at rear, sides or through door frame, as desired, to secure furnace to closet or alcove framing.
3. Secure the return air ductwork to the bottom of the furnace with self drilling screws.

4. Position the A/C coil box on the top of the furnace and secure in place using the provided attachment brackets. To install the brackets: position one bracket on side of furnace and using the provided self-drilling screws, secure the bracket to the A/C coil box and the furnace. Repeat for other side of furnace.
5. Position the plenum on top of the coil box and secure together with sheet metal screws. The screws must penetrate the sheet metal casing and coil box flange.
6. Secure the supply air ductwork to the plenum. Tape or seal all seams if required by local code.

Bottom Panel Removal

The steps listed below describe how to remove the bottom panel from the furnace. Figure 22.

1. Remove the door from the blower compartment.
2. Disconnect the blower motor wires from the blower motor plug.
3. Remove two screws securing the blower assembly to the furnace.
4. Carefully pull the blower assembly out thru the front of the furnace.
5. Remove all screws securing bottom panel to bottom of furnace and front brace.
6. Lift up and slide bottom panel out through front of furnace.
7. Reinstall the blower assembly in reverse order.

Alternate Bottom Panel Removal

If the bottom panel cannot be removed using the previous instructions, the steps below are an alternate method for removing the bottom panel. See Figure 23 (page 18).

1. Remove the door from the blower compartment .
2. Remove all screws securing the bottom panel to the front brace.
3. Remove two screws securing the furnace cabinet to the blower deck.
4. Remove all screws securing the furnace cabinet to the bottom panel.
5. Remove the screw securing the bottom corner of the furnace cabinet to the front brace.
6. Carefully spread the bottom corner of the furnace cabinet outwards while sliding the bottom panel out through the front of the furnace.
7. Reassemble the furnace in reverse order.

Inducer & Venting Options

To increase installation flexibility, the inducer assembly can be rotated up to 3 different positions. Each variation has slightly different requirements with regard to condensate disposal and, in some cases, the need to seal the furnace cabinet.

1. Prior to vent installation, determine the number of pipes to be connected to the furnace (1-pipe or 2-pipe), the airflow of the furnace (upflow or downflow), and then the side that the pipes will exit from the furnace.
2. Select the option from Table 4 that properly matches your installation type and then find your setup (by Option number) in Figure 54 (page 53) & Figure 55 (page 54).

IMPORTANT NOTE: The inducer assembly must never be positioned to vent downwards.

It is important that Direct Vent (2-pipe) systems maintain an airtight flow path from the air inlet to the flue gas outlet. The furnace ships from the factory with two holes in the cabinet for the air inlet and flue gas outlet. In certain configurations, it is necessary to remove and relocate a plastic cap in the furnace cabinet. If changing the position of the air inlet and flue gas outlet, it is required that the previous hole be closed off with the plastic

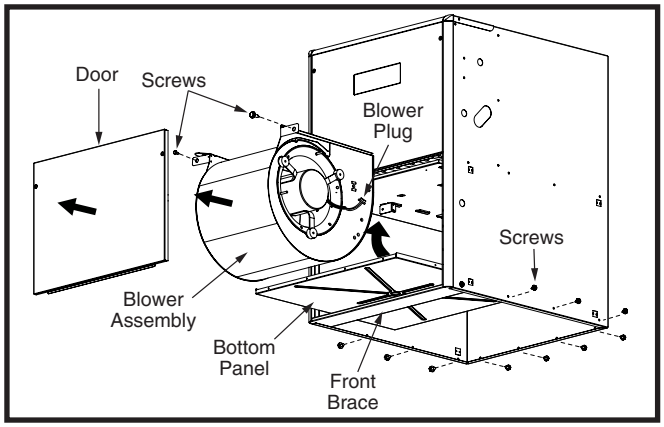


Figure 22. Bottom Panel Removal

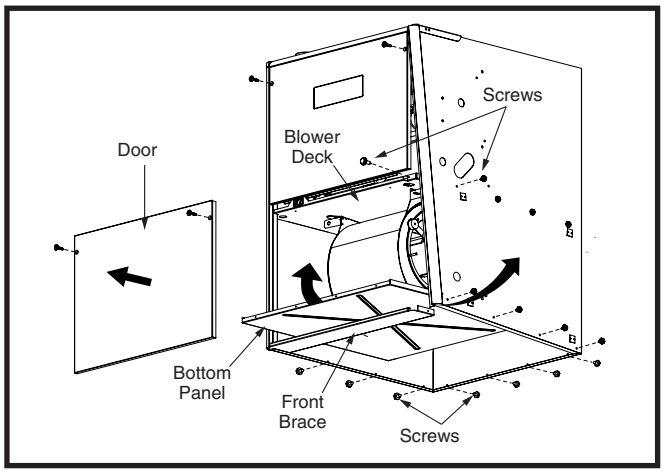


Figure 23. Alternate Removal Method

1 PIPE INSTALLATIONS		
VENT	**UPFLOW (MG3P)**	**DOWNFLOW (MG3S)**
Up	Option 1	Option 8
Right	Option 2	Option 7
Left	Option 3	Option 9
2-PIPE INSTALLATIONS		
VENT	**UPFLOW (MG3P)**	**DOWNFLOW (MG3S)**
Up	Option 4	Option 11
Right	Option 5	Option 10
Left	Option 6	Option 12

Table 4. Vent & Inducer Blower Options

cap to maintain air tightness in the furnace. Measurements for hole locations on MG3 series furnaces are shown in Figure 45 (page 42).

Inducer Assembly Rotation

⚠ WARNING:

Inducer rotation must be completed before the furnace is connected to gas and electric. If both utilities have been connected, follow the shutdown procedures printed on the furnace label and disconnect the electrical supply.

⚠ CAUTION:

It is good practice to label all wires prior to disconnection. Wiring errors can cause improper and dangerous operation.

1. Disconnect the electrical harness from the inducer assembly.
2. Remove the inducer assembly ground wire from the blower deck.
3. Remove three screws securing the inducer assembly to the header box.
4. Rotate the inducer assembly to its new position.
5. Secure the inducer assembly to the header box by reinstalling the three screws. If the inducer assembly is rotated to the left or right side of the furnace, use the extra screw provided in the parts package.
6. Remove the cabinet plug from side of furnace and reinstall in hole on opposite side of cabinet. NOTE: The cabinet plug must always be used to close the hole in the side of the furnace when rotating the inducer.
7. Install in-line drain assembly and tubing.
8. If applicable, install the condensate drain lines. For MG3P series see Figure 55. For MG3S series see Figure 56.
9. Reconnect the electrical harness to the inducer assembly.
10. Reconnect the inducer assembly ground wire to the blower deck or door.
11. Verify operation as detailed on the furnace label.

Pressure Switch Tubing

Figure 24 (page 19) & Figure 25 (page 19) display the proper routing of pressure switch tubing for MG3 Series furnaces. All upflow (MG3P) furnaces have two switches, one connected to the static tap on the inducer assembly and the other to the collector box. Downflow (MG3S) furnaces require only one switch connected to the inducer's static tap as shown in Figure 25.

Alternate Pressure Switch Location

In some inducer orientations, the inducer pressure switch may interfere with gas pipe installation. Check the side of the cabinet the gas pipe will enter and determine if the inducer pressure switch needs to be moved. If the switch interferes with gas pipe installation, please follow these instructions for relocating it to the alternate location:

1. Shut off any electrical power to the furnace.
2. Label and disconnect the tubing and wires from the pressure switch.
3. Remove two screws securing the pressure switch to the inducer housing.
4. Remove the pressure switch from the mounts on the inducer housing and relocate it to the other set of mounts 90° from previous location. See Figure 26.
5. Secure the pressure switch with two screws.
6. Reconnect the tubes and wires to the pressure switch.

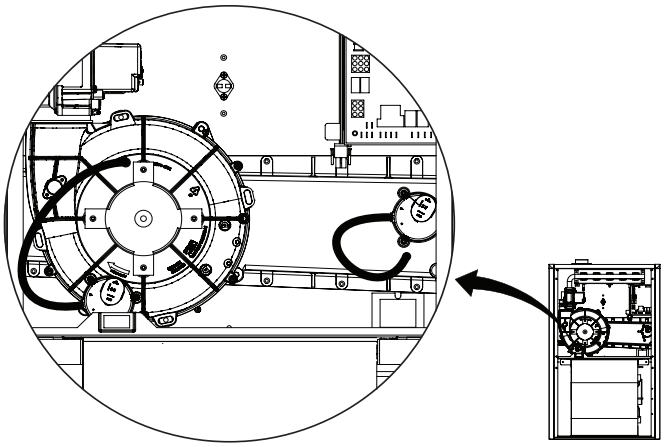


Figure 24. Pressure Switch Tubing for Upflow Furnaces (Models: MG3P-054 & MG3P-090)

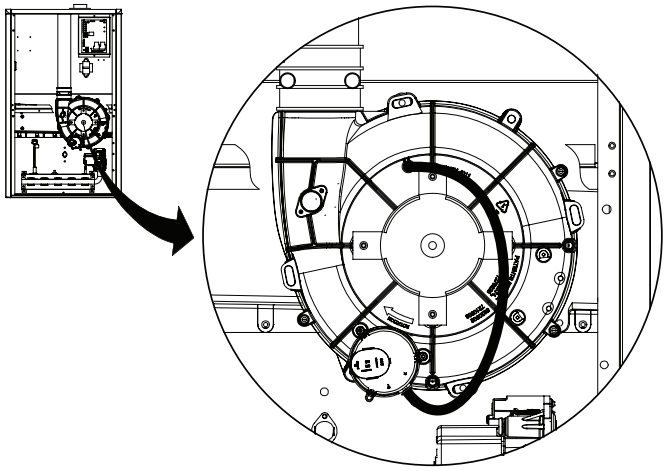


Figure 25. Pressure Switch Tubing for Downflow Furnaces (Model: MG3S-080)

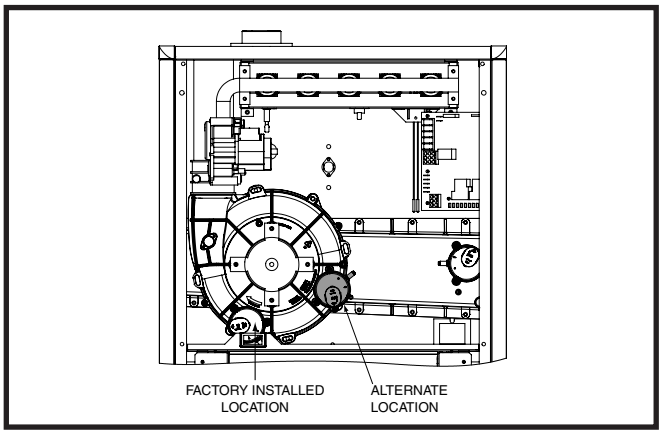


Figure 26. Alternate Pressure Switch Location

Accessories

The components in Figure 27, Figure 28 (page 20), Figure 29, & Figure 30 are included in the extra parts bag that is supplied with the purchase of MG3(P,S) furnaces. Depending on your particular installation, some of these components are optional and may not be used. Please refer to the descriptions and accompanying figures when installing these items.

Finish Flange

The finish flange must be installed to vent the combustion air pipe through the top of the furnace. See Figure 27.

NOTE: For proper installation, it is important that the pipe and screw holes in the finish flange, gasket, and cabinet are aligned.

1. Position flange gasket and finish flange on top of the furnace cabinet. Evenly align vent hole and screw holes in gasket, flange, and cabinet.
2. Position finish flange on top of the flange gasket with the FRONT lettering nearest to the front of the furnace.
3. Secure flange and gasket to cabinet with three field supplied sheet metal screws.

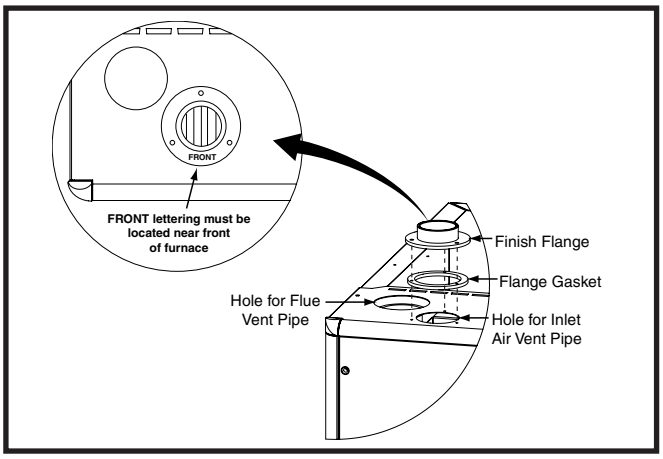


Figure 27. Finish Flanges

Rubber Grommets

The 2 1/4" rubber grommet is used to seal the opening between the furnace cabinet and the 2" PVC vent pipe. The rubber grommet should be installed in one of the 3" holes prior to running the vent pipe out of cabinet. No sealants are required. See Figure 28.

The 7/8" rubber grommet is used to seal the opening between the furnace cabinet and the gas pipe. The rubber grommet should be installed in the 1 5/8" hole prior to running the gas pipe into the cabinet. No sealants are required.

The 3/4" rubber grommet is used if venting out the left side of the cabinet and the drain tube is routed through the blower deck. Remove the plastic plug from the hole and install the grommet before routing the drain tube.

Inline Drain Assembly

1. If applicable, install the inline drain assembly on the inducer assembly. See Figure 29.
2. Insert the vent pipe through the hole in the cabinet and into the inline drain assembly.
3. Verify the vent pipe, inline drain assembly, and inducer are aligned properly for drainage of condensate.
4. Tighten both clamps to secure the inline drain assembly.
5. Insert smaller end of the 3/8" x 1/2" hose barb into the lowest port of the inline drain assembly. Connect the condensate drain tube to the hose barb and cap off the other port.

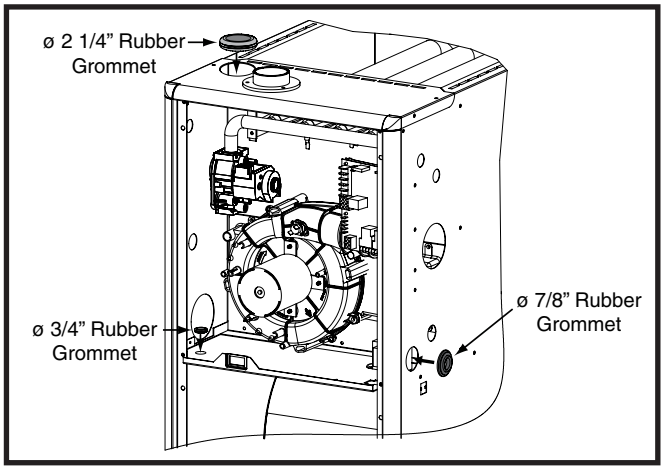


Figure 28. Rubber Grommets

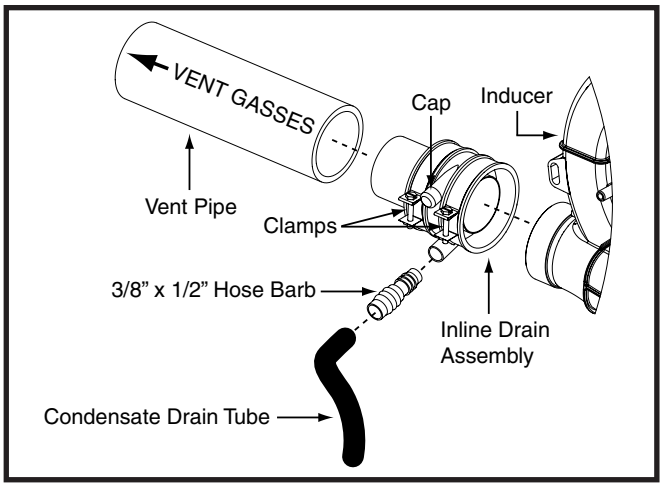


Figure 29. Inline Drain Assembly

PVC Components

IMPORTANT NOTES:

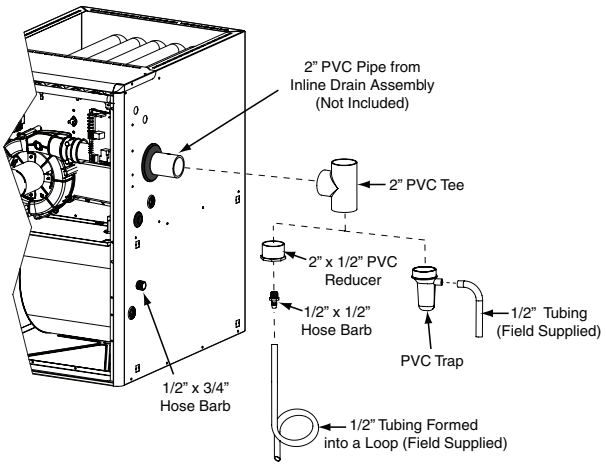
- **Before permanently installing these components, it is recommended you dry-fit them first to ensure proper fit and alignment with other vent pipes.**
- **The PVC components shown in Figure 30 are not provided in the extra parts bag. However the PVC Trap (P/N 664659) can be purchased thru your local distrubtor.**

The PVC tee with PVC Trap or the reducer and 1/2" X 1/2" hose barb are used when the inducer is rotated to vent out thru the left or right side of the furnace cabinet. See Figure 30 (page 21). **NOTE:** If supplied with your furnace, PVC trap (P/N 664659) may be used in place of the reducer and 1/2" X 1/2" hose barb

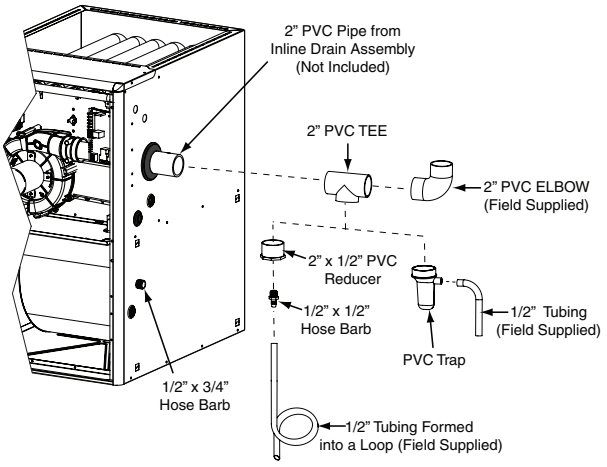
The 1/2" x 3/4" hose barb can be used to route the condensate drain to the outside of the cabinet. It must be installed from inside the cabinet with the threaded end inserted thru the 1 1/16" hole. The Condensate drain should be connected to the barbed end. Attach 1" PVC drain line to the threaded end.

Typical Orientation

1. Install the PVC Tee vertically on the 2" vent pipe that is extending out the side of the cabinet. Permanently bond them together using appropriate primer and cement. Refer to the typical orientation shown in Figure 30.



Installation of PVC Components (Typical Orientation)



Installation of PVC Components (Alternate Orientation)

Figure 30. PVC Components

2. Install the reducer or PVC trap (if supplied) on the bottom end of the PVC Tee. Permanently bond them together using appropriate primer and cement.
3. Install the 1/2" x 1/2" hose barb on the 2" PVC reducer. **NOTE:** Do not over tighten! Use an adequate amount of Teflon tape on the threads. Do not use liquid sealants.
4. Verify all connections and joints for tight fit and proper alignment with other vent pipes.

Alternate Orientation

1. Install the 2" PVC Tee horizontally on the 2" vent pipe that is extending out the side of the cabinet. Permanently bond them together using appropriate primer and cement. Refer to the alternate orientation shown in Figure 30.
2. Install the 2" PVC Elbow on the end of the 2" PVC Tee. Permanently bond them together using appropriate primer and cement.
3. Install the reducer or PVC trap (if supplied) on the bottom end of the PVC Tee. Permanently bond them together using appropriate primer and cement.
4. Install the 1/2" x 1/2" hose barb on the 2" PVC reducer. **NOTE:** Do not over tighten! Use an adequate amount of Teflon tape on the threads. Do not use liquid sealants.
5. Verify all connections and joints for tight fit and proper alignment with other vent pipes.

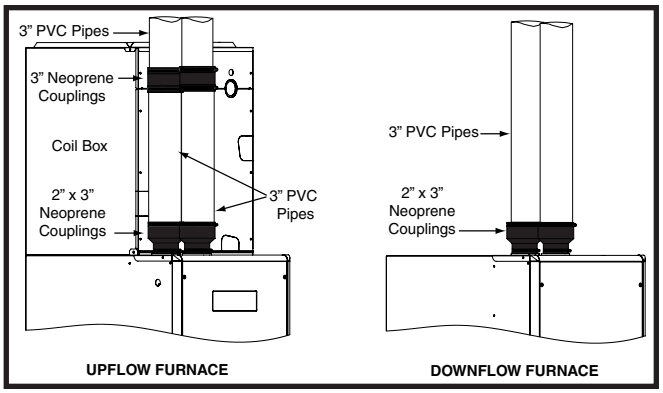


Figure 31. Vent Couplings

Vent Couplings

MG3 series furnaces require couplings to be installed over the combustion air finish flange and where the vent pipe exits the furnace cabinet. See Figure 31.

NOTE: These couplings are not supplied in the MG3S extra parts bag.

- Each coupling must be secured to the finish flange or vent pipe with a hose clamp (if using neoprene couplings).
- Upflow furnaces require the 3" neoprene coupling clamps to be installed above the coil box.

Upflow Furnaces: Combustion air and exhaust vent piping must have removable connections between the furnace flanges and vent pipes when installed vertically in front of the coil box. NOTE: Both vent pipes must be long enough to clear the height of the coil box when installed. This allows for future servicing or maintenance of the coil.

Position the 2" x 3" neoprene coupling between the top of the 2" vent pipe and the 3" vent pipe. Secure both ends of the couplings with hose clamps, ensuring that the connection is tight and leak free.

Downflow Furnaces: Since there is no coil box above the furnace, both 3" vent pipes can be run vertically for the entire length of the pipes from the 2" x 3" coupling to the outdoors. Secure both ends of the couplings, ensuring that the connection is tight and leak free.

Filter Retainer Brackets

1. Bend the rear, right and left side furnace flanges upward 90° with a pair of wide duct pliers. See Figure 32 (page 22).
2. Install three filter retainer brackets on the furnace flanges. **NOTE:** Press down firmly to ensure brackets are tightly installed on the furnace flanges.
3. Position a furnace filter on top of the filter brackets.

VentilAire™ Bracket

Ventilation must be provided for homes built to HUD Manufactured Homes Safety and Construction Standards. This ventilation can be supplied by a VentilAire™ kit. Please refer to the technical sales literature for part numbers. Alternate means for providing ventilation air must meet the requirements of all applicable local and federal codes.

Upflow Furnaces: the means for providing the required ventilation must be incorporated into the upflow furnace base or the return air ductwork to the furnace.

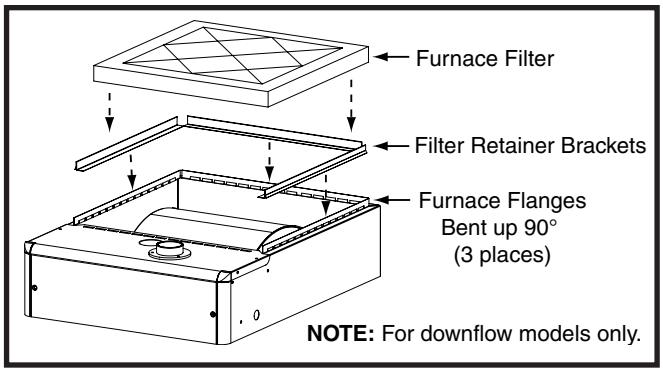


Figure 32. Filter Retainer Brackets

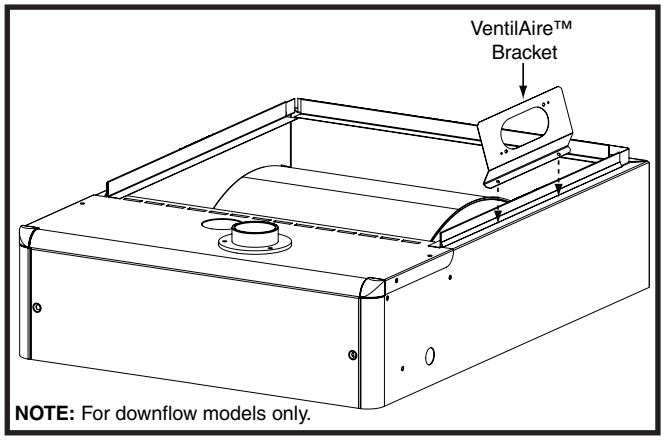


Figure 33. VentilAire™ Bracket

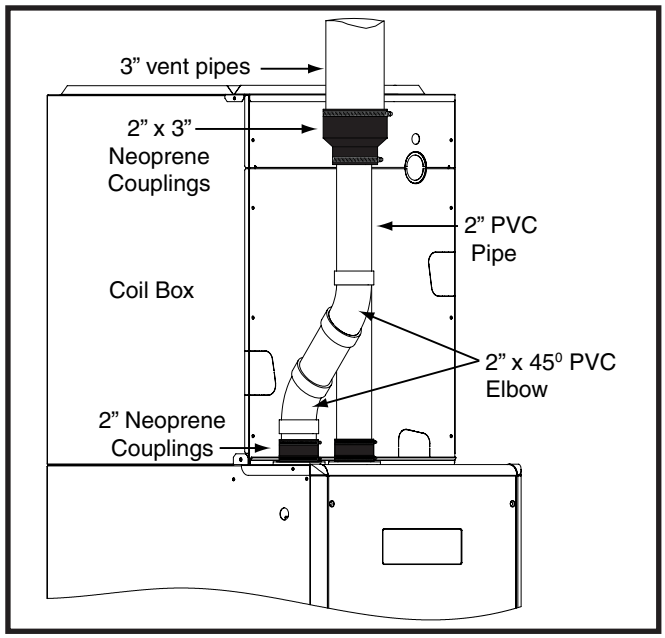


Figure 34. Alternate vent Pipe Installation

Downflow Furnaces: a special mounting bracket is supplied with the furnace for installation of the VentilAire™ supply air system. The bracket is installed on the right hand side at the top of the cabinet, as shown in Figure 33 (page 22). The bracket can be secured to the unit using the self-drilling screws supplied with the kit. **Please follow the instructions provided with the kit.**

Condensate Drain Lines

IMPORTANT NOTE:

If the furnace is installed in an area where temperatures fall below freezing, special precautions must be made for insulating condensate drain lines that drain to the outdoors. If condensate freezes in the lines, this will cause improper operation or damage to the furnace. It is recommended that all drain lines on the outside of the residence be wrapped with an industry approved insulation or material allowed by local code.

The placement of the condensate drain lines will depend on the configuration selected in Table 4 (page 18). The drain lines can be routed out the left or right side of the furnace, but must maintain a downward slope to ensure proper condensate drainage. The J-trap may need to be rotated to the side that matches your setup in Figure 54 (page 53) & Figure 55 (page 54). To rotate the J-trap, loosen the clamp on the drain tube, rotate the J-trap to either side, and retighten the clamp

THREE GENERAL RULES APPLY:

- Each condensate drain line must be separately trapped using a J-Trap or field supplied loop. After individually trapping the condensate lines, it is acceptable to combine the drains.
- A drain must always be attached to the collector at the outlet of the secondary heat exchanger.
- A drain must always be at the lowest point of the venting system. **NOTE:** If using a condensate pump, the furnace drain line must be installed above the pumps water line.

EXCEPTIONS & CLARIFICATIONS TO THE GENERAL RULES:

- If venting out the left or right side of the cabinet, the vent must be turned vertically with a tee. The drip leg formed by the tee, reducer, and hose barb must be drained as shown in Options 2, 3, 5, 6, 8, 9, 11, & 12.
- In certain cases, the inducer may be drained back into the collector pan (Options 1, 2, 4, 5, 7, 8, 10, & 11). Take care that this drain tube does not sag in the middle.
- Sometimes the lowest point in the vent system is where it connects to the inducer (Options 3, 6, 9, & 12). If the distance between the exhaust pipe and the cabinet is 6 inches or less, one drain at this location is sufficient. If the distance is more than 6 inches, then another drain will need to be added to the bottom of the tee.

Alternate Vent Pipe Installation

When running the 2” PVC pipe out through the top of the MG3S upflow furnace, there may be possible clearance issues when transitioning the PVC pipe from 2” to 3”.

- To increase the size of the PVC flue from 2” to 3”, you may use two, 2” x 45° PVC elbows to achieve the clearances needed between the coil box and the 2” x 3” neoprene coupling. See Figure 34.
- Install the 2” x 3” neoprene coupling in the vertical run only. If the coupling is installed horizontally, it will allow water to build up inside the furnace and cause a lock out condition.

GAS SUPPLY & PIPING

⚠ WARNING:

FIRE OR EXPLOSION HAZARD

- **Failure to follow safety warnings exactly could result in serious injury, death or property damage.**
- **Installation and service must be performed by a qualified installer, service agency or the gas supplier.**
- **Do not store or use gasoline or other flammable vapors and liquids in the vicinity of this or any other appliance.**

WHAT TO DO IF YOU SMELL GAS

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

⚠ AVERTISSEMENT :

RISQUE D'INCENDIE OU D'EXPLOSION

- **Le non-respect des avertissements de sécurité pourrait entraîner des blessures graves, la mort ou des dommages matériels.**
- **L'installation et l'entretien doivent être effectués par un installateur qualifié, un organisme de service ou le fournisseur de gaz.**
- **Ne pas entreposer ni utiliser de l'essence ni d'autres vapeurs ou liquides inflammables dans le voisinage de cet appareil, ni de tout autre appareil.**

QUE FAIRE S'IL Y A UNE ODEUR DE GAZ

- **Ne tentez pas d'allumer quelque appareil que ce soit.**
- **Ne touchez à aucun interrupteur électrique; n'utilisez pas de téléphone dans votre immeuble.**
- **Évacuer l'immeuble immédiatement.**
- **Appelez immédiatement votre fournisseur de gaz à l'aide du téléphone d'un voisin. Suivez les directives données par le fournisseur de gaz.**
- **Si vous ne pouvez pas joindre le fournisseur de gaz, appelez les pompiers.**

- **All gas piping must be installed in compliance with local codes and utility regulations. In the absence of local codes the gas line installation must comply with the latest edition of the National Fuel Gas Code (ANSI Z223.1) or (CAN/CGA B149.1 or .2) Installation Codes.**
- **Some local regulations require the installation of a manual main shut-off valve and ground joint union external to the furnace. The shut-off valve should be readily accessible for service and/or emergency use. Consult the local utility or gas supplier for additional requirements regarding placement of the manual main gas shut-off.**
- **Per ANSI 21.47, A 1/8-inch NPT plugged tapping, accessible for test gauge connection, must be installed immediately upstream of the gas supply connection to the furnace external to the cabinet. If local codes allow the use of a flexible gas appliance connector, always use a new listed connector. Do not use a connector that has previously serviced another gas appliance.**
- **Gas piping must never run in or through air ducts, chimneys, gas vents, or elevator shafts.**
- **Compounds used on threaded joints of gas piping must be resistant to the actions of liquefied petroleum gases.**
- **The main gas valve and main power disconnect to the furnace must be properly labeled by the installer in case emergency shutdown is required.**
- **Flexible gas connectors are not recommended for this furnace but may be used if allowed by local jurisdiction. Only new flexible connectors may be used. DO NOT reuse old flexible gas connectors.**
- **A drip leg should be installed in the vertical pipe run to the unit. See Figure 35 (page 25).**

This furnace may be installed for either left or right side gas entry. When connecting the gas supply, provide clearance between the gas supply line and the entry hole in the furnace casing to avoid unwanted noise and/or damage to the furnace. Typical gas service hookup for upflow and downflow furnaces is shown in Figure 35 (page 25). Table 15 (page 49) lists gas flow capacities for standard pipe sizes as a function of length in typical applications based on nominal pressure drop in the line.

Leak Check

⚠ WARNING:

FIRE OR EXPLOSION HAZARD

Failure to follow safety warnings exactly could result in serious injury or property damage.

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. A fire or explosion may result causing property damage, personal injury or loss of life.

⚠ AVERTISSEMENT :

RISQUE D'INDENDIE OU D'EXPLOSION

Le non-respect des avertissements de sécurité pourrait entraîner des blessures graves, la mort ou des dommages matériels.

Ne jamais utiliser une flamme nue pour vérifier la présence de fuites de gaz. Pour la vérification de tous les joints, utiliser plutôt une solution savonneuse commerciale fabriquée spécifiquement pour la détection des fuites de gaz. Un incendie ou une explosion peut entraîner des dommages matériels, des blessures ou la mort.

After the gas piping to the furnace is complete, all connections must be tested for gas leaks. This includes connections at

the main gas valve, emergency shutoff valve and flexible gas connectors (if applicable). The soap and water solution can be applied on each joint or union using a small paintbrush. If any bubbling is observed, the connection is not sealed adequately and must be retightened. Repeat the tightening and soap check process until bubbling ceases.

IMPORTANT NOTE:

When pressure testing gas supply lines at pressures greater than 1/2 psig (14 inch W.C.), the gas supply piping system must be disconnected from the furnace to prevent damage to the gas control valve. If the test pressure is less than or equal to 1/2 psig (14 inch W.C.), close the manual shut-off valve.

High Altitude Application

High altitude conversion with this furnace depends on the installation altitude and the heating value of the gas. The installation of this furnace at altitudes above 2,000 feet must meet the requirements of the National Fuel Gas Code or local jurisdiction. In Canada, the requirements for high altitude are different and governed by CGA B149.1. Always consult your local code authority.

⚠ WARNING:

The reduction of input rating necessary for high altitude installation may only be accomplished with factory supplied orifices. Do not attempt to drill out orifices in the field. Improperly drilled orifices may cause fire, explosion, carbon monoxide poisoning, personal injury or death.

This furnace is shipped from the factory with orifices and gas regulator settings for natural gas operation at sea level altitudes. At 2000 feet, the NFGC requires that this appliance be derated 4% for each 1000 feet of altitude. For example, the input needs to be reduced 8% at 2,000 feet, 12% at 3,000 feet and etc. This deration is in reference to the input rate and gas heating value at sea level.

To derate the furnace requires knowing the heating value of the gas at the installation site. Heating values at particular job sites vary for two reasons:

1. The chemical mixture of the gas varies from region to region and is expressed as the “sea level heating value”.
2. The heating value varies by altitude. For this reason, especially in high altitude areas, the local gas utility specifies the heating value at the residence’s gas meter as the “local value”.

For added flexibility, two tables have been provided for natural gas installations with high or low heating values at sea level. Table 17 (page 50) & Table 18 (page 50) contain the manifold pressure and orifice sizes to use at various altitudes. Table 17 (HIGH) is for natural gas installations with a heating value of more than 1,000 Btu per cubic foot and Table 18 (LOW) is for less than 1,000 Btu per cubic foot. To determine which table to use:

1. Consult the local utility for the local heating value at your installation site.
2. From Table 16 (page 49), find your local heating value as supplied by the utility company. Follow down the column and stop at your altitude level.
3. If your sea level heating value is HIGH, use Table 17 or if it’s LOW, use Table 18. See example.

After changing the regulator pressure or the orifices, it is required that you measure the gas input rate. This may be accomplished in the usual way, by clocking the gas meter and using the local gas heating value. See Verifying and Adjusting the Input Rate (page 30).

Installation Example

Elevation: .....5,000 feet
Type of Gas:..... Natural Gas
Local Heating Value of Gas: 750

Determine which natural gas table to use. From Table 16, find 750 and follow down the column, stop at the 5,000 feet row. The heating value listed is LOW. Table 18 will be used to determine orifice size and manifold pressure.

IMPORTANT NOTE:

Observe the action of the burners to make sure there is no yellowing, lifting or flashback of the flame.

Conversion to LP/Propane

⚠ WARNING:

This furnace was shipped from the factory equipped to operate on natural gas. Conversion to LP/propane gas must be performed by qualified service personnel using factory supplied conversion parts. Failure to use the proper conversion kit can cause fire, explosion, property damage, carbon monoxide poisoning, personal injury, or death.

This furnace can be converted from factory-equipped natural gas to Liquid Propane gas. Conversion of this valve requires replacement of the burner orifices on the manifold assembly and flipping the regulator cap to the side marked LP. See Figure 36 below. The orifices required for conversion are supplied with the furnace.

For altitudes between 0 and 1,999 feet, only the orifice is changed. Altitudes between 2,000 and 10,000 feet require both the orifice and regulator pressure to be changed. See Table 19 (page 50) to determine the correct orifice size and manifold pressure to use at different altitudes.

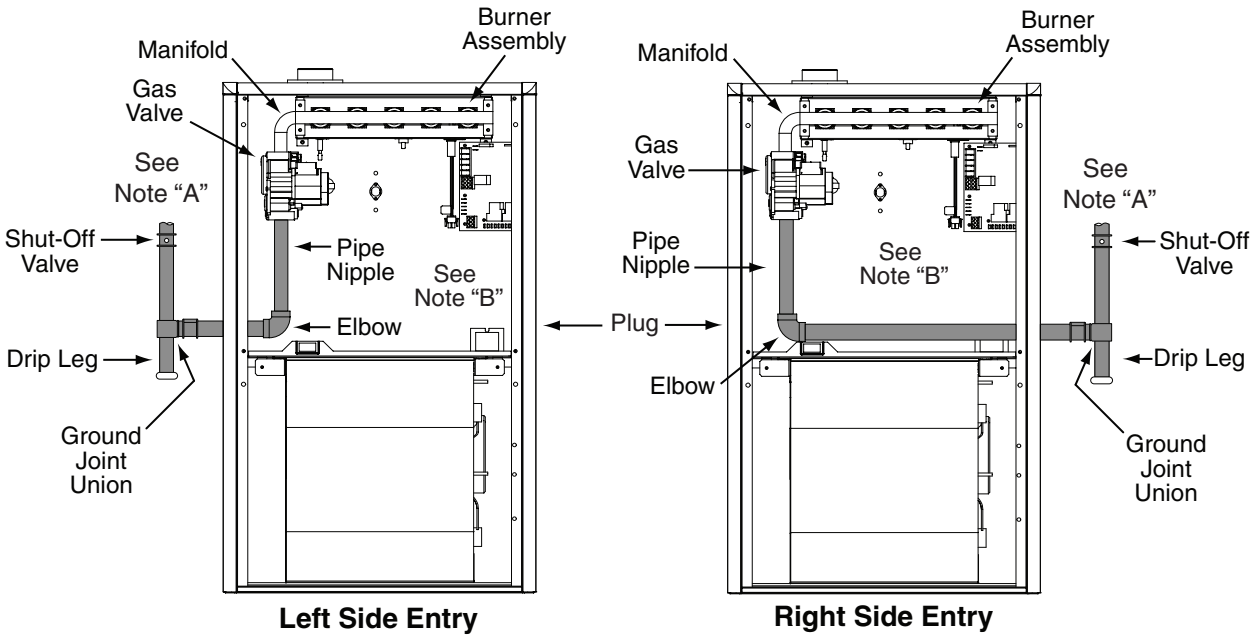
⚠ WARNING:

Shut off the gas supply at the manual gas shutoff valve, before disconnecting the electrical power. A fire or explosion may result causing property damage, personal injury or loss of life. Failure to follow the safety warnings exactly could result in serious injury, death or property damage.

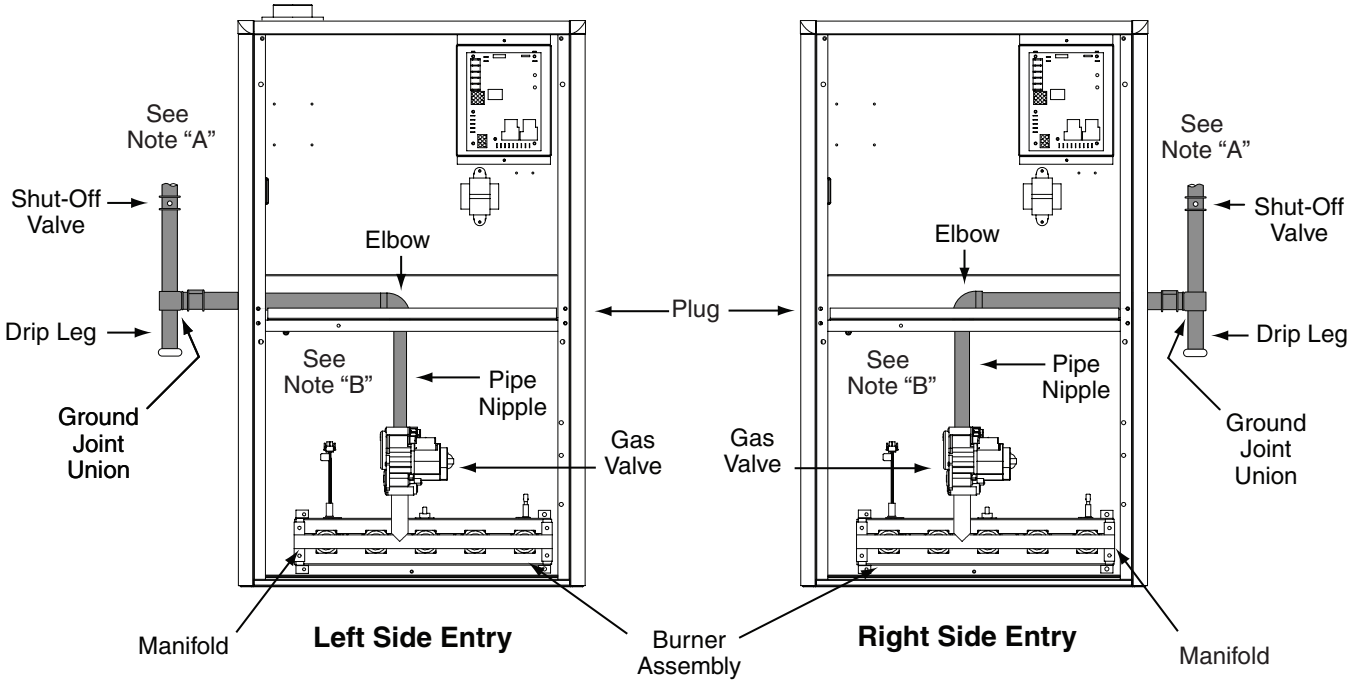
⚠ WARNING:

To avoid electric shock, personal injury, or death, turn off the electric power at the disconnect or the main service panel before making any electrical connections.

Upflow Models



Downflow Models



NOTE A: Consult local codes for Shut-Off Valve location requirements
NOTE B: Inducer assembly omitted for clarity of pipe installatio

Figure 35. Typical Gas Connections

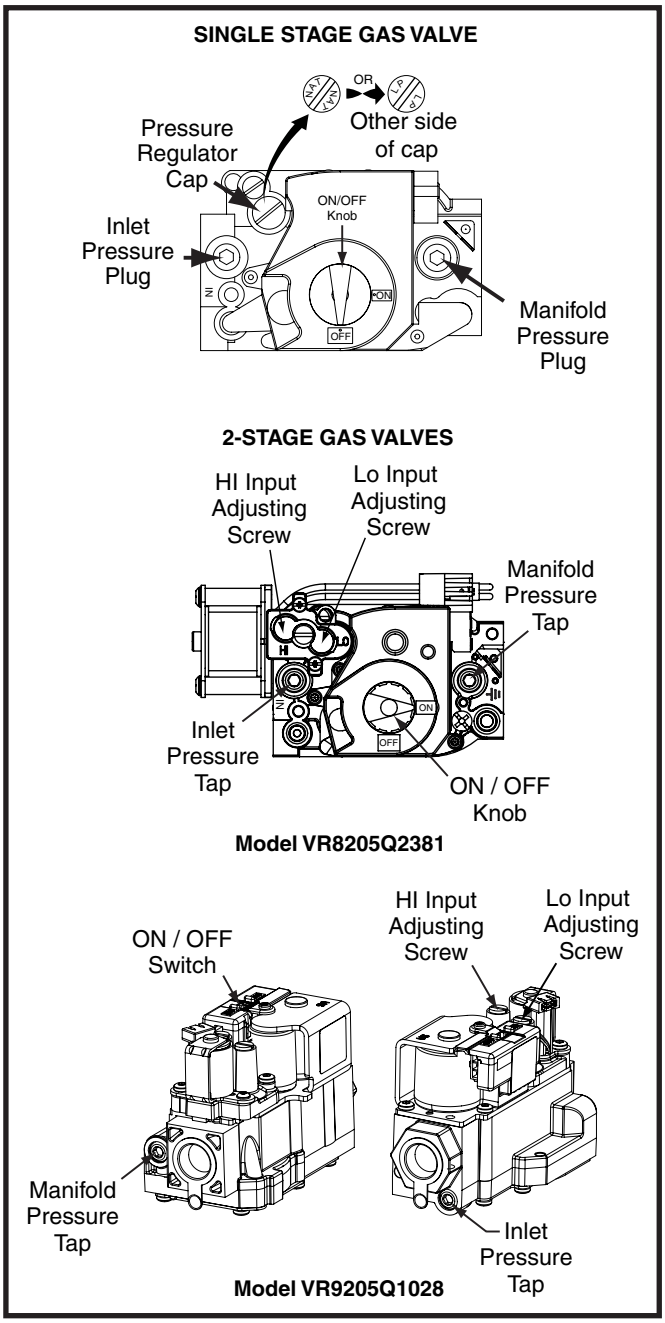


Figure 36. Gas Valve - Top View

Removing The Burner Orifices

1. Adjust the thermostat to the OFF position, or its lowest temperature setting.
2. Turn the main gas supply valve (on the outside of the unit) to the OFF position.
3. Turn off all electrical power to the furnace.
4. Remove the door from the burner compartment. See Figure 37 (page 27).
5. Turn the gas valve ON/OFF knob to the OFF position.

⚠ CAUTION:

It is good practice to label all wires prior to disconnection. Wiring errors can cause improper and dangerous operation.

6. Disconnect the wires from the terminals.
7. Remove the supply gas piping from the gas valve inlet.
8. Remove four screws securing the gas manifold assembly to the burner assembly.
9. Set aside the screws and remove the gas manifold assembly from the burner assembly.

⚠ WARNING:

Do not attempt to drill the gas orifices. Use only factory supplied orifices. Improperly drilled orifices may cause fire, explosion, carbon monoxide poisoning, personal injury or death.

10. Carefully remove the burner orifices from the gas manifold assembly.
11. Read the rating plate affixed to the appliance to determine its rated input (Btu/hr) and the size of the factory installed orifices. **NOTE**: Natural Gas furnaces may be equipped with one of three orifices.

⚠ WARNING:

Do not use Teflon tape or pipe joint compound on the orifice threads. The hole in the orifice may become blocked and cause fire, explosion, property damage, carbon monoxide poisoning, personal injury, or death.

IMPORTANT NOTES:

- **Before installing an orifice, check the face or side of the orifice for the drill number to ensure that it is the appropriate size.**
- **To prevent cross threading, screw the orifices into the gas manifold assembly by hand until snug, then tighten with a wrench.**

12. Install the appropriate LP/Propane orifices into the gas manifold assembly.

MG3P MODELS ONLY:

a.) Remove the pressure regulator cap (Figure 36) from the gas valve.
b.) Invert the cap so that the letters facing up represent the type of gas being used for the furnace.

NOTE: The cap is marked NAT on one end for natural gas and LP on the other end for propane. If converting to LP propane, make sure the LP end is facing up when installed.

c.) Replace the cap and tighten firmly.

MG3S MODELS ONLY:

IMPORTANT NOTES:

- **When converting to LP/Propane gas from natural gas, the springs from gas valve must be replaced by the larger springs from the kit. The LP/Propane springs for both HIGH & LOW fire are the same size, shape and color.**
- **Use only a Torx-25 (included with this kit) or 3/16" flathead screwdriver when removing adjustment screws or during pressure adjustment.**

a.) Remove the HIGH fire cap screw. See Figure 2 (page 3).
b.) Remove and discard the HIGH fire adjustment screw from the gas valve.
c.) Remove the spring from the gas valve and discard.
d.) Install a larger spring from the conversion kit.

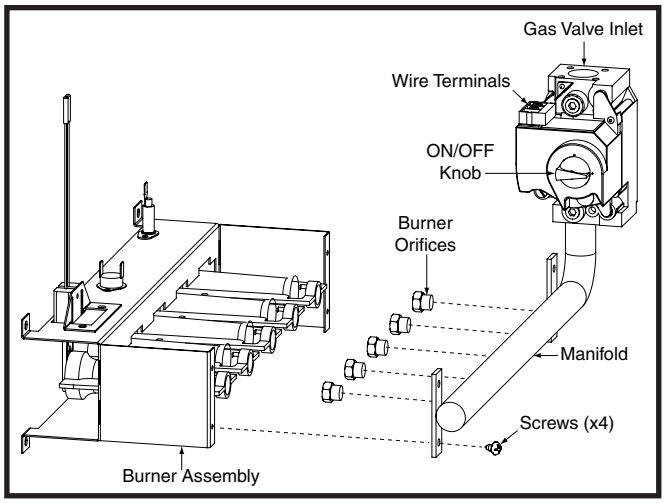


Figure 37. Burner & Manifold Assembly

e.) Install a new adjusting screw from the kit.
f.) Repeat steps 8 thru 12 for replacement of the LOW fire spring and adjustment screw.
g.) Check and adjust the regulator setting. See Gas Pressure Adjustment Section.
h.) Reinstall the cap screws on the HIGH and LOW regulators. Replacement cap screws are provided in the conversion kit.
i.) Affix the label from the conversion kit to the gas valve.

13. Install the gas manifold assembly back into the burner assembly. Make sure the center of the orifices are aligned with center of the burners.
14. Secure the manifold assembly to the burner assembly with the four screws, removed in step 8.
15. Reconnect the gas piping to the gas valve inlet.
16. Reconnect the wires to the gas valve terminals.

Measuring the Supply Gas Pressure

To obtain an accurate pressure reading, turn off all gas appliances (i.e. Dryers, water heaters, stoves, etc.) at their ON/OFF control or individual gas valves.

1. Remove the inlet pressure plug (Figure 36 (page 26)) from the INLET side of the gas valve with a 3/16 Allen wrench.
2. Install a 1/8 NPT fitting, which is compatible with a manometer or similar pressure gauge.
3. Connect the manometer or pressure gauge to the inlet pressure tap.
4. Turn on all electrical power to the furnace.
5. Turn the main gas supply valve (on the outside of the unit) to the ON position.
6. Start the furnace by adjusting the thermostat to it's highest setting. Allow the furnace to run for 10 minutes.
7. Check the incoming gas line pressure. Propane gas furnaces must be between 11.0"-14.0" W.C. Natural gas installations must be between 4.5"-10.0" W.C. If the pressure is not between these specified ranges, contact your local gas supplier for adjustment.
8. Adjust the thermostat to it's lowest setting and allow the unit to cycle off.
9. Turn the main gas supply valve (on the outside of the unit) to the OFF position.
10. Turn off all electrical power to the furnace.
11. Disconnect the manometer or pressure gauge.
12. Remove the NPT fitting and reinstall the inlet pressure plug. **NOTE**: To prevent cross threading, hand tighten the plug first, then tighten with 3/16 Allen wrench.

Measuring the Manifold Pressure

The manifold pressure must be measured by installing a pressure gauge (Manometer, Magnehelic Meter, etc.) to the outlet end of the gas valve.

1. Remove the manifold pressure plug (Figure 36 (page 26)) from the outlet side of the gas valve with a 3/16 Allen wrench.
2. Install a 1/8 NPT fitting, which is compatible with a Manometer or similar pressure gauge.
3. Connect the manometer or pressure gauge to the pipe thread fitting.
4. Start the furnace by adjusting the thermostat 5 degrees above room temperature. Allow the furnace to operate for 3 minutes.
5. Measure the manifold pressure on the manometer or pressure gauge. Compare the measured value to the value in Table 19 (page 50).
6. If the manifold pressure is not set to the pressure specified in Table 19, remove the pressure regulator cap (Figure 36) from the gas valve. Slowly turn the adjusting screw underneath the cap with a small screwdriver until the appropriate manifold pressure is obtained. **NOTE**: Turning the screw clockwise increases the pressure, turning the screw counter-clockwise decreases the pressure.
7. After the manifold pressure is properly set, replace the cap so that the letters facing up represent the type of gas being used for the furnace. See Figure 36.
8. Adjust the thermostat to its lowest setting.
9. Turn off the main gas supply to the unit at the manual shut-off valve, which is located outside of the unit.
10. Turn off all of the electrical power to the furnace.
11. Disconnect the manometer or pressure gauge.
12. Remove the 1/8 NPT fitting and reinstall the manifold pressure plug. **NOTE**: To prevent cross threading, hand tighten the plug first then tighten with 3/16 Allen wrench.

Completing the Conversion

1. Turn the main gas supply valve (on the outside of the furnace) to the ON position.

⚠ WARNING:

FIRE OR EXPLOSION HAZARD

Never test for gas leaks with an open flame. Check all connections using a commercially available soap solution. A fire or explosion may result causing property damage, personal injury or loss of life. Failure to follow the safety warnings exactly could result in serious injury, death or property damage.

2. Check all gas connections for leaks with a soap and water solution. If the solution bubbles there is a gas leak which must be corrected.
3. Turn on all electrical power to the furnace.
4. Turn the gas valve ON/OFF knob (Figure 36) to the ON position.
5. Start the furnace by adjusting the thermostat 5 degrees above room temperature.
6. Check the furnace for proper ignition and operating sequence (See page 32).
7. After ignition, visually inspect the burner assembly to verify that the flame is drawn directly into the center of the heat exchanger tube.

NOTES:

In a properly adjusted burner assembly, the flame color should be blue with some light yellow streaks near the outer portions of the flame.

The ignitor may not ignite the gas until all of the air is bled from the gas line. If the ignition control locks out, adjust the thermostat to its lowest setting and wait one minute. Adjust the thermostat 5 degrees above room temperature and the ignitor will try again to ignite the main burners. This process may have to be repeated several times before the burners will ignite. Once the burners are lit, check all gas connections for leaks again with the soap and water solution.

⚠ WARNING:

Do not alter or remove the original rating plate from the furnace.

8. Affix the conversion warning label to the outside of the unit door and the conversion information label near the rating plate inside the control area.
9. Affix the gas conversion label from the conversion kit on the gas valve. Each label should be prominent and visible after installation.
10. Reinstall the appliance door.
11. Run the appliance through three complete cycles to assure proper operation.

ELECTRICAL WIRING

⚠ WARNING:

ELECTRICAL SHOCK, FIRE OR EXPLOSION HAZARD

Failure to follow safety warnings exactly could result in serious injury, death 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.**

⚠ AVERTISSEMENT :

RISQUE DE DÉCHARGE ÉLECTRIQUE, D'INCENDIE OU D'EXPLOSION

Le non-respect des avertissements de sécurité pourrait entraîner des blessures graves, la mort ou des dommages matériels.

Un entretien inapproprié peut provoquer un fonctionnement dangereux, des blessures graves, la mort ou des dommages matériels.

- **Avant toute intervention, couper l'alimentation électrique du générateur d'air chaud.**
- **Pour l'entretien des commandes, étiqueter tous les fils avant de les débrancher. Rebrancher les fils correctement.**
- **Vérifier le bon fonctionnement après l'intervention.**

- Electrical connections must be in compliance with all applicable local codes with the current revision of the National Electric Code (ANSI/NFPA 70).
- For Canadian installations the electrical connections and grounding shall comply with the current Canadian Electrical Code (CSA C22.1 and/or local codes).

IMPORTANT NOTE:

If replacing any of the original wires supplied with the furnace, the replacement wire must be copper wiring and have a temperature rating of at least 105°F (40°C). For electrical specifications, refer to the furnace nameplate or Table 5 (page 31).

Line Voltage Wiring

It is recommended that the line voltage (115 VAC) to the furnace be supplied from a dedicated branch circuit containing the correct fuse or circuit breaker for the furnace as listed in Table 5.

IMPORTANT NOTES:

- **An electrical disconnect must be installed readily accessible from and located within sight of the furnace. See Figure 41 (page 31) or the wiring diagram label inside of the control door. Any other wiring methods must be acceptable to authority having jurisdiction.**
- **Proper line voltage polarity must be maintained in order for the control system to operate correctly. Verify the incoming neutral line is connected to the white wire and the incoming "hot" line is connected to the black wire. The furnace will not operate unless the polarity and ground are properly connected as shown in Figure 41.**

Thermostat / Low Voltage Connections

- The furnace is designed to be controlled by a 24 VAC thermostat. The thermostat's wiring must comply with the current provisions of the NEC (ANSI/NFPA 70) and with applicable local codes having jurisdiction.
- The thermostat must be installed according to the instructions supplied by the thermostat manufacturer. Low voltage connections (24 VAC) from the thermostat are wired to the terminal strip on the integrated control in the furnace. Figure 44 (page 36) contains the proper connections for heating only (two-wire) and heating/cooling (four-wire) applications. Recommended minimum wire gauge for thermostat wiring is shown in Table 5 (page 31).
- The thermostat should be mounted about 5 feet above the floor on an inside wall. DO NOT install the thermostat on an outside wall or any other location where its operation may be adversely affected by radiant heat from fireplaces, sunlight, or lighting fixtures, and convective heat from warm air registers or electrical appliances. Refer to the thermostat manufacturer's instruction sheet for detailed mounting information.

Single Stage AC & Single Stage Thermostat

This option does not use the full two-stage control capability of the furnace, but the possibility of timed autostaging is available. See also Autostaging for Single Stage Thermostats.

- Connect the thermostat's **W** output to the furnace control boards **W1** terminal. This allows the furnace to always run in low output mode. See Figure 38 (page 29).
- Always connect the thermostat **C** & **R** to the furnace control board **C** & **R**.
- For cooling, connect the thermostats Y signal to the furnace control board **Y** / **Y2** terminal.
- Field supplied wires should also connect **Y** / **Y2** & **C** to the outdoor unit's **Y** & **C** terminals.

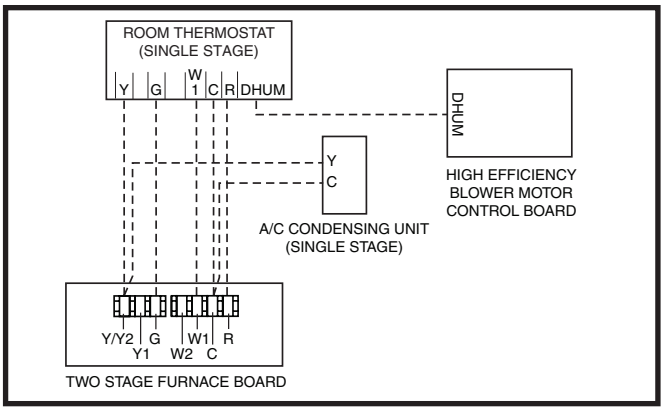


Figure 38. Wiring Configuration 1

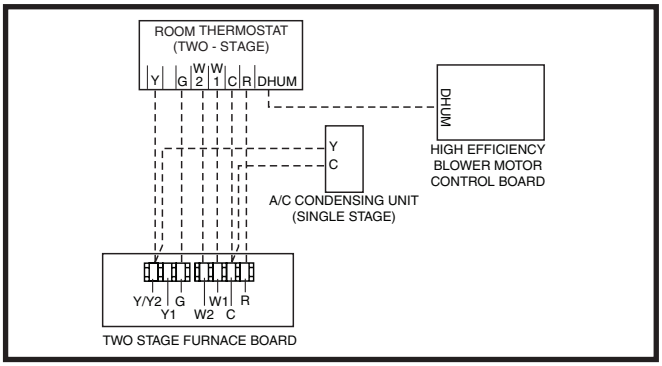


Figure 39. Wiring Configuration 2

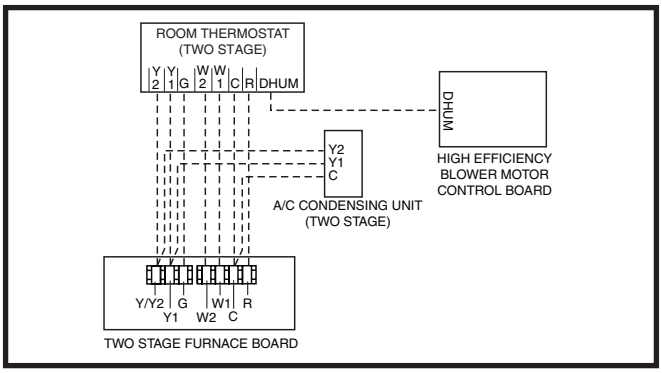


Figure 40. Wiring Configuration 3

Single Stage AC & Two Stage Thermostat

This option uses the full two stage heating capability of the furnace with a single stage outdoor unit. See Figure 39 (page 29).

- Connect the thermostat's **W1** & **W2** outputs to the furnace control board's **W1** & **W2** terminals.
- Always connect the thermostat **C** & **R** to the furnace control board **C** & **R**
- For cooling, connect the thermostats **Y** signal to the furnace control board **Y** / **Y2** terminal.
- Field supplied wires should also connect **Y** / **Y2** & **C** to the outdoor unit's **Y** & **C** terminals.

Two-Stage AC & Two-Stage Thermostat

This option uses the full two stage heating capability of the furnace with a two stage outdoor unit. See Figure 40 (page 29).

- Connect the thermostat's **W1** & **W2** outputs to the furnace control board's **W1** & **W2** terminals.
- Always connect the thermostat **C** & **R** to the furnace control board **C** & **R**.
- For cooling, connect the thermostat Y & Y1 to the furnace control board's **Y** / **Y2** & **Y1** terminal's.
- Field supplied wires should also connect the **Y** / **Y2** & **Y1** signals to the outdoor unit's **Y** & **Y1** terminals.
- Connect terminal **C** to the outdoor unit's **C**.

Autostaging for Single Stage Thermostats

The Autostaging feature makes it possible to use a single stage thermostat and still receive some of the benefits of 2-stage furnace operation. If Autostage is enabled, the furnace will drop to **LOW** fire after initially starting in **HIGH** fire. After a period of 10 minutes, the furnace will then stage up to **HIGH** fire, until the heating load is met. See Figure 38 and the Low Voltage Connection section on page 28.

The autostaging option on the furnace control board is selected using the autostage jumper located near the thermostat terminal block. See Figure 51 and Figure 52 (page 48). When the autostage jumper is moved from **OFF** to **ON**, the following occurs during a call for heat:

Setting the Autostage jumper in the **ON** position signals the control to utilize a 10 minute delay between **LOW** fire and **HIGH** fire when a call for heat is supplied via 24V signal to **W1**. This setting is the same as jumping **R** to **W2.**

NOTE: If the autostage jumper is in the **ON** position and a **W1** demand is present when power is applied to the furnace, the first heat cycle will run in second stage heat with no autostaging. After the first cycle, the furnace will resume normal autostaging operation. **DO NOT jump W1 & W2 together while the autostage jumper is in the ON position**.

Autostaging for Two-Stage Thermostats

The Autostage setting on the furnace control board (Figure 51 and Figure 52 (page 48)) is disabled when shipped from the factory. This feature will be not used when paired with a two-stage thermostat. The autostage jumper setting (**P7**) must be kept on **OFF** to allow the thermostat to adjust stages.

Blower Speed Configuration

Two-stage furnaces use high efficiency circulating air motors that come in two variations and both are controlled differently. The fixed speed furnace uses a motor control board that maintains constant motor torque, while the variable speed furnace uses a motor control board that maintains constant CFM airflow. Both boards use the same furnace control board.

MG3S ONLY

NOTE: This section applies only to furnaces with model numbers suffixed with two numbers, followed by a letter, such as 35C or 45D. If your model has suffix VB, VC, or VD, please consult the Variable Speed Blower Application section below.

The fixed speed motor control board (Figure 50 (page 47)) contains a set of dip switches for setting the blower speed. Use pins 1 to 4 to set the blower speed for heating and pins 5 to 8 to set the speed for cooling. To determine the appropriate switch settings for your installation, see the separate blower table attachment.

For thermostats with a dehumidifier output, use a field supplied wire to connect the thermostat's dehumidifier output to the terminal marked **DEHUM**. The thermostat should be set so that the **DEHUM** output should be high (positive) when dehumidification is needed. See also Dehumidification Options section.

⚠ CAUTION:

The terminal marked "Y1_IN" on the variable speed motor control board is not an output to drive the outdoor unit. DO NOT connect Y1_IN on the motor control board to the outdoor unit.

Heat Anticipator Setting

Please Set the heat anticipator according to the instructions supplied by the thermostat manufacturer. To determine the heat anticipator setting:

1. Add the current draw of the system components; or
2. Measure the current flow on the thermostat **R-W** circuit after the circulating blower motor has started.

Grounding

⚠ WARNING:

To minimize personal injury, the furnace cabinet must have an uninterrupted or unbroken electrical ground. The controls used in this furnace require an earth ground to operate properly. Acceptable methods include electrical wire or conduit approved for ground service. Do not use gas piping as an electrical ground!

START-UP & ADJUSTMENTS

Pre-Start Check List

√ Verify the polarity of the connections are correct, the line voltage power leads are securely connected and the furnace is properly grounded.
√ Verify the thermostat wires (**R**, **W**, **Y**, & **G**) are securely connected to the correct leads on the terminal strip of the circuit board.
√ Verify the jumper on the Nordyne/UTEC board or dipswitch on the Emerson board (for fan speed) on the control board. To select fan speed, see Figure 42 and Figure 43 (page 31) and set the jumper on the control board.
√ Verify the gas line service pressure does not exceed 10.0 inches of W.C., and is not less than 4.5 inches W.C. for natural gas. For LP gas the line service pressure must not exceed 14 in. W.C., and must not be less than 11.0 in. W.C.
√ Verify the roll-out and manual reset switch is closed. If necessary, press the red button to reset a switch. DO NOT install a jumper wire across a switch to defeat its function. If a switch reopens on startup, **DO NOT reset the switch without identifying and correcting the fault condition**.
√ Verify the blower door is in place, closing the door switch in the line voltage circuit.
√ Verify the gas line has been purged and all connections are leak free.

Start-up Procedures

Do not perform these steps until all of the checks in the previous steps have been completed:

1. Set the thermostat to the lowest setting.
2. Turn off all electrical power to the furnace.
3. Follow the Operating Instructions on the label attached to the furnace.
4. Set the thermostat above room temperature and verify the Operating Sequence (page 32).
5. After 5 minutes of operation, set the thermostat below room temperature and verify steps 9 & 10 of the Operating Sequence.

Verifying & Adjusting Input Rate

IMPORTANT NOTE:

The input rate must not exceed the rate shown on the furnace rating plate. At altitudes above 2,000 feet, it must not exceed that on the rating plate less 4% for each 1,000 feet.

The input rate must be verified for each installation to prevent over-firing of the furnace. To determine the exact input rate, perform the following procedures:

1. Shut off all other gas fired appliances.
2. Start the furnace and run it for at least 3 minutes.
3. Measure the time (in seconds) required for the gas meter to complete one revolution.
4. Convert the time per revolution to cubic feet of gas per hour using Table 14 (page 41).

EXAMPLE:

- Time for 1 revolution of a gas meter with a 1 cubic ft dial = 40 seconds.
- From Table 14 read 90 cubic ft gas per hr.
- Local heating value of the gas (obtained from gas supplier) = 1,040 Btu per cubic ft.
- Input rate = 1,040 x 90 = 93,600 Btuh.

5. Multiply the gas flow rate in cubic ft per hr by the heating value of the gas in Btu per cubic ft to obtain the input rate in Btuh. See example.
6. The manifold pressure must be set to the appropriate value for each installation by a qualified installer, service agency or the gas supplier. See page 27.

Verifying & Adjusting Temperature Rise

Confirm the temperature rise through the furnace is within the limits specified on the furnace rating plate. Any temperature rise outside the specified limits could result in premature failure of the heat exchanger.

1. Place thermometers in the return and supply air stream as close to the furnace as possible. The thermometer on the supply air side must be shielded from direct radiation from the heat exchanger to avoid false readings.
2. Adjust all registers and duct dampers to the desired position and run the furnace for 10 to 15 minutes before taking any temperature readings. The temperature rise is the difference between the supply and return air temperatures.

For typical duct systems, the temperature rise will fall within the limits specified on the rating plate with the blower speed at the factory recommended setting. If the measured temperature rise is outside the specified limits, it may be necessary to change the speed of the blower.

NOTE: Lowering the blower speed will increase the temperature rise and a higher blower speed will decrease the temperature rise.

The furnace is equipped with a 5-speed ECM motor. Heating and cooling speed selection is made by moving the switch on the integrated control inside of the furnace. The furnace is shipped from the factory pre-wired for 4 blower speeds. There is a fifth alternate speed available on the motor. To utilize the alternate speed, remove the wire at the motor plug of the desired speed to be changed (H, MH, ML, L). Reconnect this wire to the alternate motor plug speed tap.

Verifying Burner Operation

⚠ CAUTION:

The door over the burners may only be opened for inspection purposes only. The door must be installed during unattended operation.

1. Remove the burner compartment door.
2. Set the thermostat 5 degrees above room temperature and observe the ignition sequence.

FURNACE MODEL NUMBER	FURNACE INPUT (BTUH)	CABINET WIDTH (IN.)	NOMINAL ELECTRICAL SUPPLY	MAXIMUM OPERATING VOLTAGE	MINIMUM OPERATING VOLTAGE	MAXIMUM FURNACE AMPERES
MG3P-054U1AAB1	54,000	17 ½	115-60-1	127	103	9.3
MG3P-072U1AAC1	72,000	21	115-60-1	127	103	9.3
MG3P-090U1AAC1	90,000	21	115-60-1	127	103	12
MG3S-080T2AAC1	80,000	21	115-60-1	127	103	8.7
MG3P-108U1AAD1	120,000	24 1/2	115-60-1	127	103	12

THERMOSTAT WIRE GAUGE	RECOMMENDED THERMOSTAT WIRE LENGTH	
	2 - WIRE (HEATING)	4 OR 5 WIRE (COOLING)
24	55 ft.	25 ft.
22	90 ft.	45 ft.
20	140 ft.	70 ft.
18	225 ft.	110 ft.

Table 5. Wire Length & Voltage Specifications

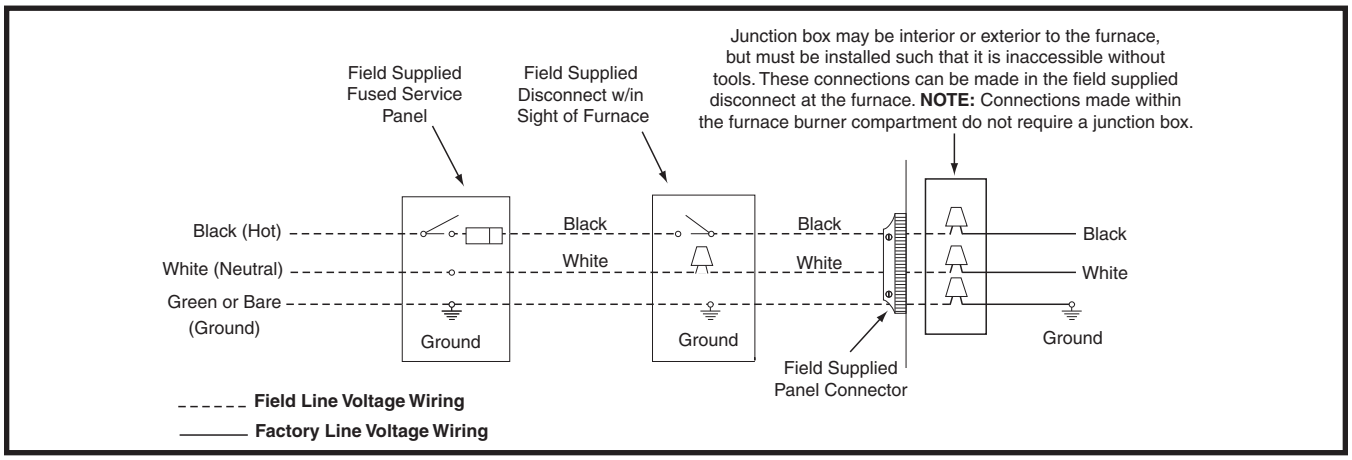


Figure 41. Line Voltage Field Wiring

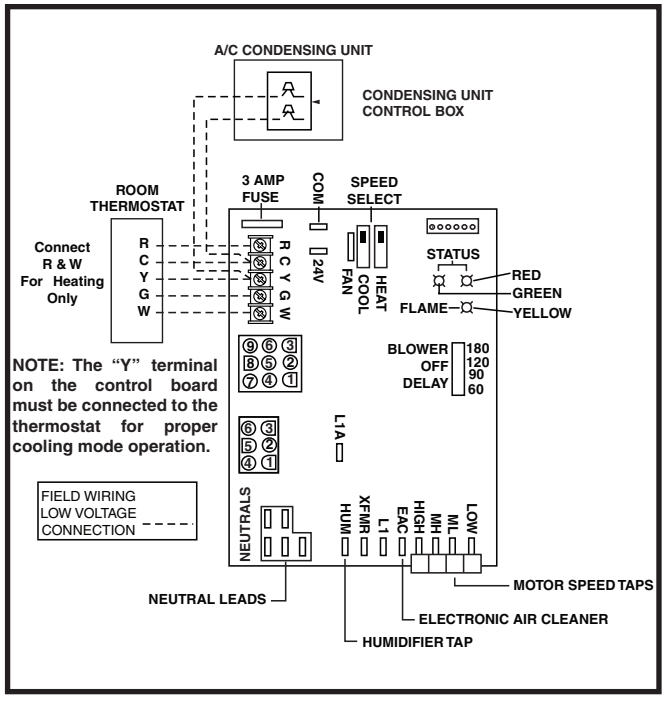


Figure 42. Nordyne/UTEC Emerson Low Voltage Field, Four-wire Heating/Cooling Applications

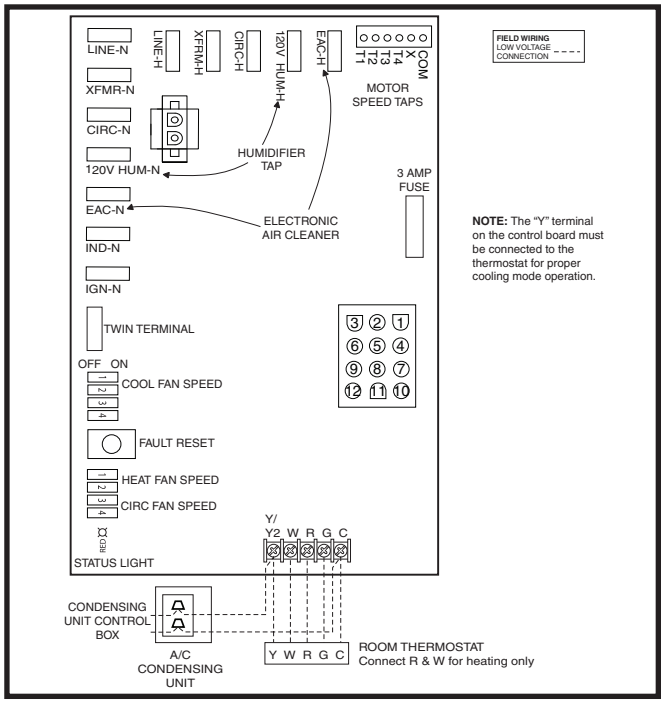


Figure 43. Emerson Low Voltage Field, Four-wire Heating/Cooling Applications

NOTE: The flame should carry over immediately between all burners without lifting off, curling, or floating. The flames should be blue, without yellow tips.

3. After validating the flame, change thermostat setting to below room temperature.
4. Verify the burner flame is completely extinguished.
5. Replace the burner compartment door.

Verifying Operation of the Supply Air Limit Switch

A properly functioning limit switch should turn off the gas valve when the return is blocked (time depends on how well the return air is blocked). The circulating air and combustion blowers should continue to run when the limit switch opens**.**

1. Verify the blower door is securely mounted in place and that there is power to the furnace.
2. Block the return airflow to the furnace by installing a close-off plate in place of or upstream of the filter(s).
3. Set the thermostat above room temperature and observe the Operating Sequence.
4. Remove the close-off immediately after the limit switch opens. If the furnace continues to operate with no return air, set the thermostat below room temperature, shut off the power to the furnace, and replace the limit switch.

MG3P OPERATING SEQUENCE

The operating sequences for the heating, cooling, and fan modes are described below. Refer to the field and furnace wiring and ladder diagrams: Figure 45 (page 42), Figure 46 (page 43), Figure 47 (page 44), & Figure 48 (page 45).

Heating Cycle

1. The thermostat calls for heat by energizing the W terminal with 24VAC.
2. The control verifies the pressure switch is open.
3. If the pressure switch is open, the control energizes the inducer and waits for the pressure switch to close. The pressure switch must close within 10 seconds.
4. The inducer runs for a 30 - 45 second pre-purge.
5. The control energizes the Hot Surface Igniter (HSI) output for the appropriate warm-up time limit.
6. The main gas valve energizes for 3 seconds.
7. If the flame proved and ignites the gas, the control de-energizes the HSI. The gas valve and inducer remains energized. The control goes to blower on delay.
8. If flame is present, the control energizes the blower on the selected HEAT speed 30 seconds after the gas valve opened. The gas valve and inducer remain energized.
9. When the thermostat demand for heat is satisfied, the control de-energizes the gas valve. The Inducer output remains on for a 30 - 45 second post-purge period.
10. Blower off timing begins when the thermostat is satisfied. The Nordyne/UTEC control will operate at the selected HEAT speed of 60, 90, 120, or 180 seconds. If the blower off delay jumper is not present, the fan should still operate for 120 seconds at the selected HEAT speed. The Emerson control board will operate the fan for 150 seconds at the selected HEAT speed. The Indoor blower motor is de-energized after a blower off delay as selected by the movable jumper.

Cooling Cycle

1. The thermostat calls for cooling by energizing the **G** & **Y** terminals with 24VAC.
2. The control energizes the blower in cooling speed and sends 24VAC to the contactor in the condensing unit.
3. When the thermostat removes the call for cooling, the contactor in the outdoor condensing unit is de-energized and the control continues to run the fan for a period of 60 seconds.

Fan Mode

- When the thermostat energizes the **G** terminal for continuous fan (without calling for heat or cooling), the indoor fan is energized on the selected FAN speed.
- If a call for cooling occurs during continuous fan, the blower will switch over to the selected COOL speed.
- If the **W** terminal receives a call for heat during continuous fan, the blower will de energize.
- A call for fan is ignored while in lockout.

MG3S OPERATING SEQUENCE

The operating sequences for the heating, cooling, and fan modes are described below. Refer to the field and furnace wiring and ladder diagrams: Figure 45 (page 42), Figure 46 (page 43), Figure 47 (page 44), Figure 48 (page 45), Figure 50 (page 47), & Figure 51 and Figure 52 (page 48).

Heating Cycle

1. The thermostat calls for heat by energizing the **W1** terminal with 24VAC.
2. The control checks to see the pressure switch is open. If the switch is closed, the furnace will shut down for 5 minutes before retrying
3. If the pressure switch is open, the control energizes the inducer motor and waits for the pressure switch to close. The pressure switch must close within 12 seconds.
4. The control runs the inducer for a 30 second pre-purge time.
5. The control energizes the igniter output for the appropriate adaptive warm-up time limit.
6. The furnace always ignites the burners in high fire. If the call for heat is for **low** rate, the furnace will move down to low fire after the flames stabilize.
7. If the flame is proved and ignites the gas, the control de-energizes the igniter. The gas valve and inducer remains energized. The control goes to blower on delay.
8. The control energizes the blower on the selected HEAT speed 22 seconds after the gas valve opened. The gas valve and inducer remain energized.
9. If there is a call for **high** fire, the gas valve moves to the **high** fire position and the blower speeds are increased. The furnace will remain in **high** fire until the demand for heat is satisfied.
10. If autostaging is enabled (single stage thermostat) the demand for heat has lasted more than the selected time, the furnace automatically moves up to **high** fire. Autostage time is ON (10 minutes) or **OFF**, depending on the Jumper (**P7**) setting on the furnace control board.
11. When the thermostat demand for heat is satisfied, the control de-energizes the gas valve. The inducer output remains on for a 30 second post-purge period.
12. The circulating air blower will continue to run for the selected Blower Off Delay(**P5**). This may be 60, 90, or 120 seconds depending on the jumper setting on the furnace control board.

Cooling Cycle

1. The thermostat calls for cooling by energizing the **Y / Y2** or **Y1** terminal with 24VAC.
2. The control energizes the blower in the cooling speed and sends 24VAC to the contactor in the condensing unit.
3. When the thermostat removes the call for cooling, the contactor in the outdoor condensing unit is de-energized and the control continues to run the fan for a period of 60 seconds.

Fan Mode

- When the thermostat energizes the **G** terminal for continuous fan (without calling for heat or cooling), the indoor fan is energized on the selected FAN speed.
- If a call for cooling occurs during continuous fan, the blower will switch over to the selected COOL speed.

- If the W terminal receives a call for heat during continuous fan, the blower will de energize.
- A call for fan is ignored while in lockout.
- For continuous fan operation, the blower motor will operate at 35% of the selected high-speed torque when equipped with a fixed speed motor control board.

TROUBLESHOOTING

If the furnace fails to operate check the following:

- Is the thermostat operating properly?
- Are the blower compartment door(s) in place?
- Is the furnace disconnect closed?
- Has the circuit breaker tripped or the control board fuse burned open?
- Is the gas turned on?
- Are any manual reset switches open?
- Is the filter dirty or plugged?
- Is the flame sensor coated? Remove and clean with steel wool. **(Do not use emery cloth or sandpaper!)**
- Is there blockage in the condensate drain switch? Also verify that there is no double trapping of condensate.
- Is the secondary heat exchanger free of debris and clogs?
- Is evaporator coil clean and free of debris (If applicable).
- Are all the LED's on the furnace control board constantly ON? If not, refer to Table 6 (page 33) or the wiring diagram (Figure 45 (page 42) and Figure 46 (page 43)) to determine fault condition.

IMPORTANT NOTE:

The furnace will lock out after 5 failed attempts for ignition and will try again every hour if the call for heat remains.

- If the Inducer Blower is operating, and items above have been verified, check the blower limit switch and reset if necessary. See Figure 56 (page 55) for component location.
- If the furnace operates when the blower limit switch is reset, contact a qualified service technician to identify and repair the problem.
- If the furnace still doesn't operate, check the flame roll-out switches (Figure 56) and reset if necessary.
- If the furnace operates when the flame rollout switch is reset, contact a qualified service technician to identify and repair the problem.

DIAGNOSTIC DESCRIPTION	GREEN LED	RED LED
Control Fault (No Power)	Off	Off
L1/Neutral Polarity Fault	Flash	Flash
1 Hour Lockout	Alternating Flash	
Normal Operation	On	On
Pressure Switch Closed Fault	On	Flash
Pressure Switch Open Fault	Flash	On
Open Limit Switch Fault	Flash	Off
DIAGNOSTIC DESCRIPTION	**YELLOW LED**	
Low Flame Sensor Signal	Continuous Flash	
Flame Present	On	

Table 6. Single Stage Nordyne/UTEC Control Board Fault Codes

DIAGNOSTIC DESCRIPTION	GREEN LED	RED LED
Control Fault (No Power)	Off	Off
L1/Neutral Polarity Fault	Flash	Flash
1 Hour Lockout	Alternating Flash	
Normal Operation	On	On
Pressure Switch Closed Fault	On	Flash
Pressure Switch Open Fault	Flash	On
Open Limit Switch Fault	Flash	Off
Motor Fault	On	Off
DIAGNOSTIC DESCRIPTION	**YELLOW LED**	
Low Flame Sensor Signal	Continuous Flash	
Flame Present	On	

Table 7. MG3S Furnace Control Board Fault Conditions

	DIAGNOSTIC DESCRIPTION	GREEN LED	RED LED
Fixed Speed Furnaces	Control Fault (No Power)	Off	Off
	Normal Operation	On	On
	Motor Fault	On	Flash
	Twin Fault (no motor fault)	Flash	On
	Communications Fault	Flash	Flash
Variable Speed Furnaces	Control Fault (No Power)	Off	Off
	Normal Operation	On	On
	Motor Fault	On	Flash
	Communications Fault	Flash	Flash

Table 8. MG3S Motor Control Board Fault Conditions

RED LED FLASH	ERROR/CONDITION
1	System Lockout (Retries Exceeded)
2	Pressure Switch Stuck Closed
3	Pressure Switch Stuck Open
4	Open High Temperature Limit Switch
5	Flame Sensed > 4.25 Seconds with Gas Valve De-Energized
6	Open Flame RO Switch
8	Igniter Relay Fault
10	Open Fuse
11	Igniter Open
12	Inducer Relay Error
Flash codes NOT stored in memory	
7	Low Flame Sense Signal
9	Twinning Fault
Off	Control Failure / No Power / Internal Fault / IRQ Loss Gas Heating Lockout (Gas valve energized when it should be de-energized) Or Gas Valve De-energized when it should be Energized
Rapid Flash	Reverse Polarity
Continuous On	Normal Operation

Table 9. Emerson Control Board Fault Conditions

⚠ WARNING:

ELECTRICAL SHOCK, FIRE OR EXPLOSION HAZARD

Failure to follow safety warnings exactly could result in serious injury, death 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.**

⚠ AVERTISSEMENT :

RISQUE DE DÉCHARGE ÉLECTRIQUE, D'INCENDIE OU D'EXPLOSION

Le non-respect des avertissements de sécurité pourrait entraîner des blessures graves, la mort ou des dommages matériels.

Un entretien inapproprié peut provoquer un fonctionnement dangereux, des blessures graves, la mort ou des dommages matériels.

- **Avant toute intervention, couper l'alimentation électrique du générateur d'air chaud.**
- **Pour l'entretien des commandes, étiqueter tous les fils avant de les débrancher. Rebrancher les fils correctement.**
- **Vérifier le bon fonctionnement après l'intervention.**

- Proper maintenance is most important to achieve the best performance from a furnace. Follow these instructions for years of safe, trouble free operation.
- These maintenance instructions are primarily intended to assist qualified technicians experienced in the proper maintenance and operation of this appliance.
- Always reinstall the doors on the furnace after servicing or cleaning/changing the filters. **Do not operate the furnace without all doors and covers in place.**
- Verify the thermostat is properly installed and will not be affected by drafts or heat from lamps or other appliances.
- To achieve the best performance and minimize equipment failure it is recommended that a yearly maintenance checkup be performed. **At a minimum, this check should include the following items:**

Air Filter(s) - An air filter is supplied with the furnace as shipped from the factory. It is recommended that filters be cleaned or replaced monthly during the heating season.

⚠ WARNING:

Never operate the furnace without a filter in place. Dust and lint can build up on internal components, resulting in loss of efficiency, equipment damage, and possible fire.

New or newly renovated homes may require more frequent changing until the construction dust has minimized. Filters designed to remove smaller particles such as pollen, may require additional maintenance. Filters for side return and bottom return applications are available from most local distributors.

Upflow Furnaces: the filter is located inside the blower compartment underneath the blower. To replace the filter:

1. Remove the lower compartment door.
2. Slide the filter backwards until the edge of the filter clears the front flange of the furnace.
3. Lift the filter up over the flange and out through the front of the furnace.
4. Install new filter in reverse order of the removal instructions. **NOTE**: Center the filter over the return opening and secure it to the fastener at the rear of the furnace compartment.

Downflow Furnaces: the filter sits on three filter brackets located on top of the furnace. The filter can be easily removed and replaced. Do not remove the filter brackets. When installing the new filter, make sure it is centered over the return air opening.

Blower Compartment - Dirt and lint can create excessive loads on the motor resulting in higher than normal operating temperatures and shortened service life. It is recommended th-at the blower compartment be cleaned of dirt or lint that may have accumulated in the compartment or on the blower and motor as part of the annual inspection.

Cleaning of Burners - If the burners must be cleaned, follow steps 1 - 12. See Figure 56 (page 55) for component location and identification.

1. Shut off gas supply to the furnace at the meter or at a manual valve in the supply piping.
2. Turn off all power to the furnace and set the thermostat to it's lowest setting.
3. Remove the burner door from the furnace.
4. Turn the gas control switch to the OFF position.
5. Disconnect the wires from the gas valve, igniter, flame sensor, and flame rollout switch.
6. Using two wrenches, separate the ground-joint union in the gas supply piping at the furnace.
7. Remove the piping between the Gas Valve and the ground-joint union. (If applicable).
8. Remove all screws securing the Manifold Assembly to the Burner Box.
9. Carefully remove the burner assembly from the furnace. **DO NOT DAMAGE THE IGNITER WHILE REMOVING THE BURNER ASSEMBLY.**
10. Inspect the burners for accumulated dust or debris. If necessary carefully clean them with a soft wire brush and a vacuum cleaner. **DO NOT DAMAGE THE IGNITER WHILE CLEANING THE BURNER.**
11. Replace all the parts in reverse order from which they were removed.
12. Follow the lighting instructions found on the furnace door to return the furnace to operation. Verify proper operation after servicing.

Heat Exchanger & Burner Maintenance - The furnace should operate for many years without soot buildup in the flue passageways, however, the flue, vent system, and burners should be inspected and cleaned (if required) by a qualified service technician annually to ensure continued safe operation. Pay attention to any deterioration from corrosion or other sources.

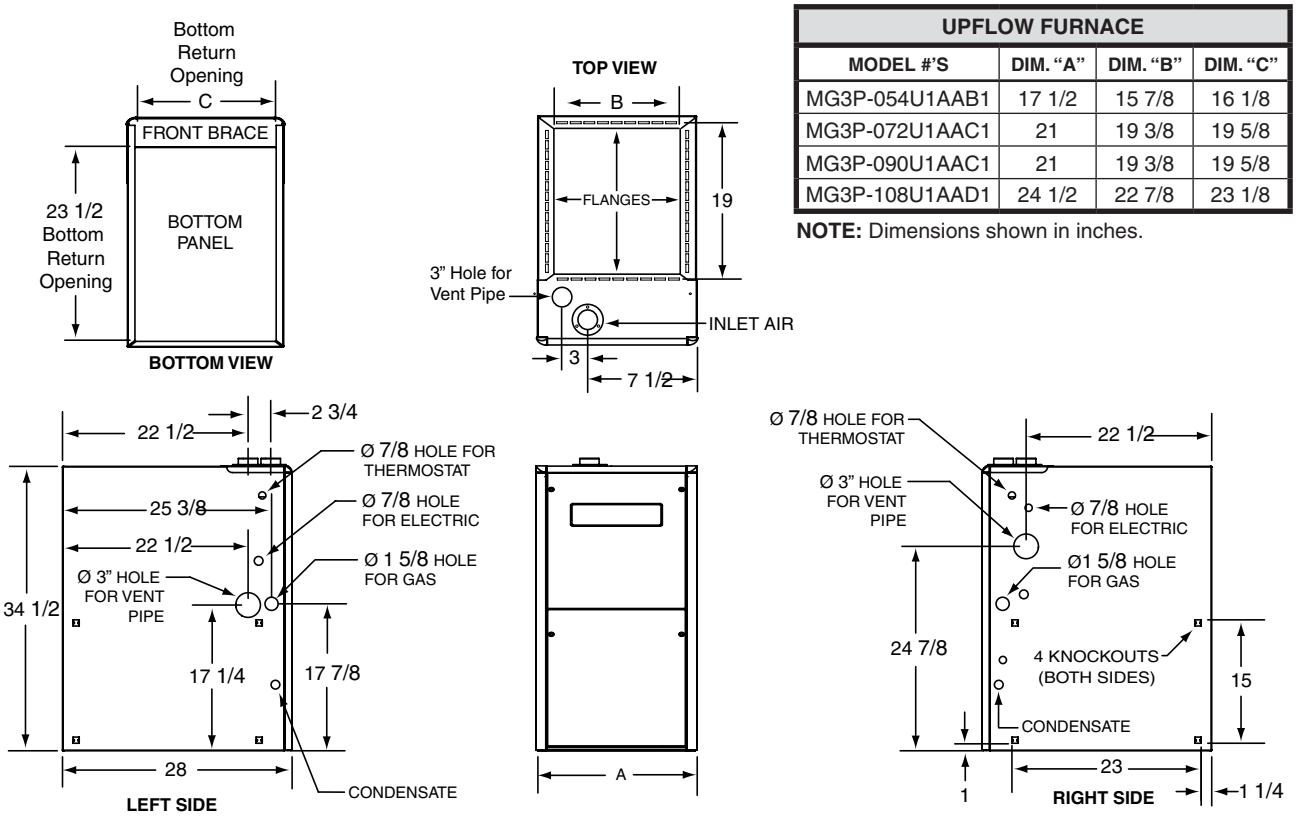
Lubrication - The bearings in the blower motor and inducer blower used in these furnaces are pre-lubricated and sealed by the manufacturer. No further oiling of the bearings is required for the life of the motor.

Vent System - Check the inlet pipe (if applicable) and outlet pipe to ensure they are not blocked by any debris. Damaged vent pipe sections must be replaced and any obstructions or blockages must be removed before operating the furnace.

⚠ WARNING:

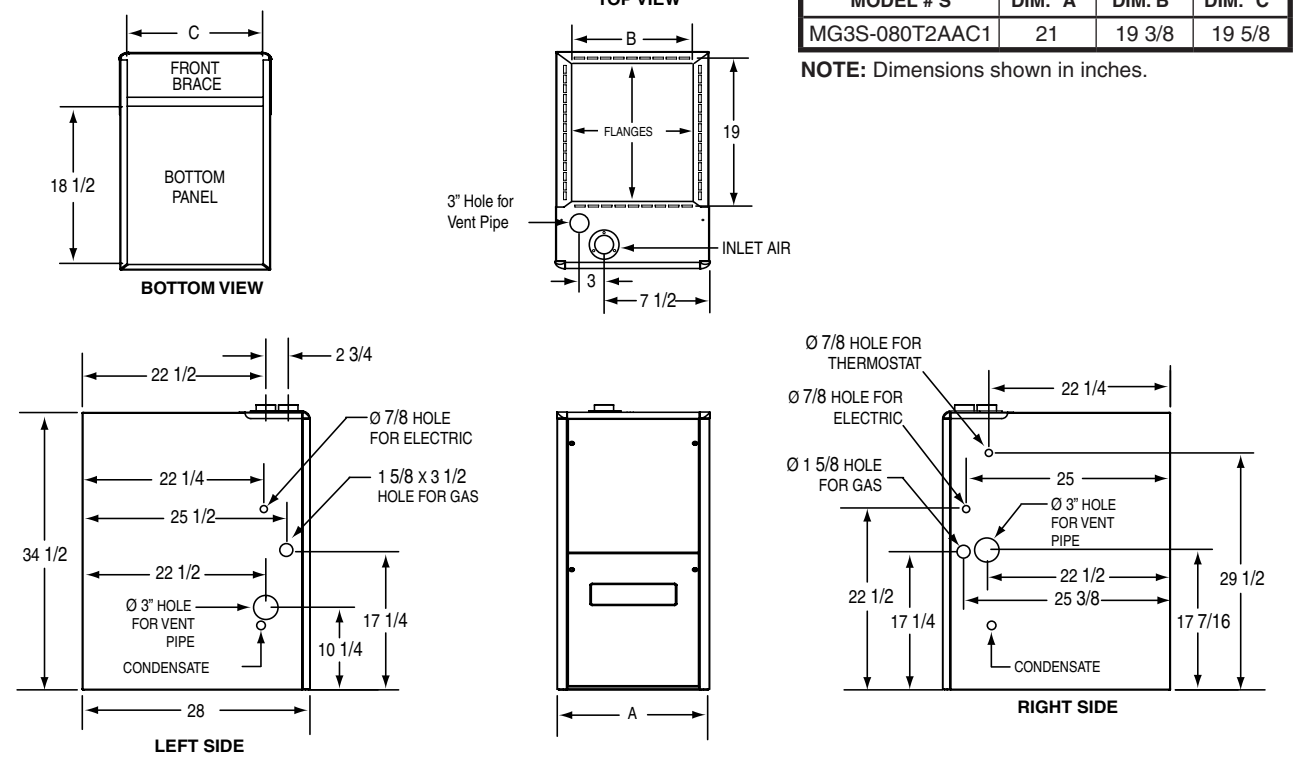
Holes in the vent pipe or heat exchanger can cause combustion products to enter the home. Replace the vent pipe or heat exchanger if leaks are found. Failure to prevent the circulation of combustion products into the living space can create potentially hazardous conditions including carbon monoxide poisoning that could result in personal injury or death.

FIGURES & TABLES



UPFLOW FURNACE			
MODEL #'S	DIM. "A"	DIM. "B"	DIM. "C"
MG3P-054U1AAB1	17 1/2	15 7/8	16 1/8
MG3P-072U1AAC1	21	19 3/8	19 5/8
MG3P-090U1AAC1	21	19 3/8	19 5/8
MG3P-108U1AAD1	24 1/2	22 7/8	23 1/8

NOTE: Dimensions shown in inches.



DOWNFLOW FURNACE			
MODEL #'S	DIM. "A"	DIM. B"	DIM. "C"
MG3S-080T2AAC1	21	19 3/8	19 5/8

NOTE: Dimensions shown in inches.

Figure 44. Furnace Dimensions

AIRFLOW DATA

HEATING AIRFLOW (CFM) & TEMPERATURE RISE (°F)											
MODEL NAME/ HEATING INPUT	RETURN AIR VIA:	MOTOR SPEED	External Static Pressure (in. w.c.)								
			0.1		0.2		0.3		0.4		0.5	
			CFM	RISE	CFM	RISE	CFM	RISE	CFM	RISE	CFM	RISE
MG3P-054U1AAB1 54,000 BTU/Hr	Bottom	5 - High*										
		4 - Alternate										
		3 - Med-High**	1,230	37	1,180	39	1,135	41	1,100	42	1,045	44
		2 - Med-Low	1,035	44	990	46	940	49	880	52	825	56
		1 - Low***	975	47	930	49	880	52	815	56		
	Side	5 - High*										
		4 - Alternate										
		3 - Med-High**	1,225	38	1,180	39	1,140	40	1,090	42	1,050	44
		2 - Med-Low	1,035	44	990	46	940	49	870	53	820	56
		1 - Low***	975	47	925	50	860	53	810	57		
	Side + Bottom or 2 sides	5 - High*										
		4 - Alternate										
		3 - Med-High**	1,230	37	1,175	39	1,140	40	1,100	42	1,055	44
		2 - Med-Low	1,035	44	990	46	935	49	880	52	825	56
		1 - Low***	980	47	925	50	875	53	820	56		

COOLING AIRFLOW (CFM)										
MODEL NAME/ HEATING INPUT	RETURN AIR VIA:	MOTOR SPEED	External Static Pressure (in. w.c.)							
			0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8
			CFM	CFM	CFM	CFM	CFM	CFM	CFM	CFM
MG3P-054U1AAB1 54,000 BTU/Hr	Bottom	5 - High*	1,855	1,820	1,780	1,745	1,700	1,660	1,615	1,580
		4 - Alternate	1,615	1,580	1,540	1,500	1,455	1,415	1,370	1,330
		3 - Med-High**	1,230	1,180	1,135	1,100	1,045	1,000	955	900
		2 - Med-Low	1,035	990	940	880	825	770	710	670
		1 - Low***	975	930	880	815	760	700	655	600
	Side	5 - High*	1,870	1,835	1,790	1,765	1,725	1,685	1,635	1,595
		4 - Alternate	1,620	1,590	1,540	1,510	1,465	1,425	1,375	1,335
		3 - Med-High**	1,225	1,180	1,140	1,090	1,050	995	945	900
		2 - Med-Low	1,035	990	940	870	820	765	710	665
		1 - Low***	975	925	860	810	755	700	645	600
	Side + Bottom or 2 sides	5 - High*	1,860	1,820	1,780	1,750	1,710	1,675	1,630	1,590
		4 - Alternate	1,625	1,585	1,545	1,500	1,465	1,425	1,380	1,335
		3 - Med-High**	1,230	1,175	1,140	1,100	1,055	1,005	955	905
		2 - Med-Low	1,035	990	935	880	825	765	715	660
		1 - Low***	980	925	875	820	760	700	655	600

***NOTES:**

1. To comply with government mandated efficiency standards, two openings are required for airflows above 1,600 CFM.
2. Data is shown without filter.
3. Temperature rises in the table are approximate. Actual temperature rises may vary.
4. Individual cells shaded in gray indicate a temperature rise outside of the recommended range.
5. To comply with government mandated efficiency standards, speed settings shaded in gray are not allowed in HEAT mode.
6. Unit ships with (4) speeds pre-wired. Use of the fifth speed will require changing the appropriate wires at the motor connection. Consult the wiring diagram for more information.

* Factory Set Cool
** Factory Set Heat
*** Factory Set Circulation

Table 10. MG3P-054U1AAB1 (With 5-speed ECM motor)

HEATING AIRFLOW (CFM) & TEMPERATURE RISE (°F)												
MODEL NAME/ HEATING INPUT	RETURN AIR VIA:	MOTOR SPEED	External Static Pressure (in. w.c.)									
			0.1		0.2		0.3		0.4		0.5	
			CFM	RISE	CFM	RISE	CFM	RISE	CFM	RISE	CFM	RISE
MG3P-072U1AAC1 72,000 BTU/Hr	Bottom	5 - High*										
		4 - Alternate										
		3 - Med-High**	1,685	36	1,630	38	1,580	39	1,525	40	1,470	42
		2 - Med-Low	1,305	47	1,245	49	1,180	52	1,120	55	1,055	58
		1 - Low***	1,200	51	1,115	55						
	Side	5 - High*										
		4 - Alternate										
		3 - Med-High**	1,675	37	1,620	38	1,565	39	1,515	40	1,460	42
		2 - Med-Low	1,300	47	1,235	50	1,175	52	1,115	55	1,050	58
		1 - Low***	1,185	52	1,105	56						
	Side + Bottom or 2 sides	5 - High*										
		4 - Alternate										
		3 - Med-High**	1,700	36	1,645	37	1,590	39	1,535	40	1,480	41
		2 - Med-Low	1,315	47	1,250	49	1,185	52	1,120	55	1,060	58
		1 - Low***	1,210	51	1,125	55						

COOLING AIRFLOW (CFM)									
MODEL NAME/ HEATING INPUT	RETURN AIR VIA:	MOTOR SPEED	External Static Pressure (in. w.c.)							
			0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8
			CFM	CFM	CFM	CFM	CFM	CFM	CFM	CFM
MG3P-072U1AAC1 72,000 BTU/Hr	Bottom	5 - High*	2,055	2,005	1,955	1,905	1,860	1,815	1,765	1,715
		4 - Alternate	1,815	1,765	1,715	1,665	1,610	1,565	1,510	1,450
		3 - Med-High**	1,685	1,630	1,580	1,525	1,470	1,415	1,360	1,310
		2 - Med-Low	1,305	1,245	1,180	1,120	1,055	995	935	870
		1 - Low***	1,200	1,115	1,050	990	920	855	795	735
	Side	5 - High*	2,035	1,985	1,935	1,890	1,845	1,800	1,755	1,700
		4 - Alternate	1,805	1,750	1,705	1,660	1,605	1,555	1,505	1,445
		3 - Med-High**	1,675	1,620	1,565	1,515	1,460	1,405	1,355	1,300
		2 - Med-Low	1,300	1,235	1,175	1,115	1,050	990	930	870
		1 - Low***	1,185	1,105	1,040	980	915	855	795	735
	Side + Bottom or 2 sides	5 - High*	2,075	2,025	1,975	1,925	1,880	1,825	1,775	1,730
		4 - Alternate	1,830	1,780	1,725	1,670	1,620	1,570	1,515	1,460
		3 - Med-High**	1,700	1,645	1,590	1,535	1,480	1,425	1,370	1,315
		2 - Med-Low	1,315	1,250	1,185	1,120	1,060	995	935	870
		1 - Low***	1,210	1,125	1,055	1,000	925	860	795	740

***NOTES:**

1. To comply with government mandated efficiency standards, two openings are required for airflows above 1,600 CFM.
2. Data is shown without filter.
3. Temperature rises in the table are approximate. Actual temperature rises may vary.
4. Individual cells shaded in gray indicate a temperature rise outside of the recommended range.
5. To comply with government mandated efficiency standards, speed settings shaded in gray are not allowed in HEAT mode.
6. Unit ships with (4) speeds pre-wired. Use of the fifth speed will require changing the appropriate wires at the motor connection. Consult the wiring diagram for more information.

* Factory Set Cool
** Factory Set Heat
*** Factory Set Circulation

Table 11. MG3P-072U1AAC1 (With 5-speed ECM motor)

HEATING AIRFLOW (CFM) & TEMPERATURE RISE (°F)												
MODEL NAME/ HEATING INPUT	RETURN AIR VIA:	MOTOR SPEED	External Static Pressure (in. w.c.)									
			0.1		0.2		0.3		0.4		0.5	
			CFM	RISE	CFM	RISE	CFM	RISE	CFM	RISE	CFM	RISE
MG3P-090U1AAC1 90,000 BTU/Hr	Bottom	5 - High*										
		4 - Alternate										
		3 - Med-High**	1,710	45	1,670	46	1,615	47	1,570	49	1,525	50
		2 - Med-Low	1,440	53	1,385	55	1,340	57	1,290	59	1,255	61
		1 - Low***										
	Side	5 - High*										
		4 - Alternate										
		3 - Med-High**	1,695	45	1,645	47	1,590	48	1,540	50	1,495	51
		2 - Med-Low	1,455	53	1,395	55	1,335	57	1,285	60	1,230	62
		1 - Low***										
	Side + Bottom or 2 sides	5 - High*										
		4 - Alternate										
		3 - Med-High**	1,730	44	1,685	45	1,630	47	1,585	48	1,535	50
		2 - Med-Low	1,485	52	1,410	54	1,360	56	1,315	58	1,250	61
		1 - Low***										

COOLING AIRFLOW (CFM)									
MODEL NAME/ HEATING INPUT	RETURN AIR VIA:	MOTOR SPEED	External Static Pressure (in. w.c.)							
			0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8
			CFM	CFM	CFM	CFM	CFM	CFM	CFM	CFM
MG3P-090U1AAC1 90,000 BTU/Hr	Bottom	5 - High*	2,305	2,260	2,215	2,170	2,130	2,100	2,100	2,045
		4 - Alternate	1,985	1,940	1,895	1,845	1,805	1,760	1,705	1,655
		3 - Med-High**	1,710	1,670	1,615	1,570	1,525	1,480	1,420	1,365
		2 - Med-Low	1,440	1,385	1,340	1,290	1,255	1,190	1,130	1,075
		1 - Low***	990	880	820	710	660	600	565	465
	Side	5 - High*	2,280	2,230	2,185	2,140	2,105	2,055	2,000	1,950
		4 - Alternate	1,965	1,925	1,875	1,830	1,785	1,740	1,695	1,645
		3 - Med-High**	1,695	1,645	1,590	1,540	1,495	1,450	1,415	1,355
		2 - Med-Low	1,455	1,395	1,335	1,285	1,230	1,210	1,130	1,080
		1 - Low***	960	885	740	685	605	555	485	455
	Side + Bottom or 2 sides	5 - High*	2,345	2,290	2,250	2,200	2,155	2,110	2,060	2,015
		4 - Alternate	2,015	1,965	1,915	1,875	1,825	1,775	1,735	1,685
		3 - Med-High**	1,730	1,685	1,630	1,585	1,535	1,490	1,440	1,385
		2 - Med-Low	1,485	1,410	1,360	1,315	1,250	1,205	1,160	1,095
		1 - Low***	970	900	820	720	630	590	570	445

***NOTES:**

1. To comply with government mandated efficiency standards, two openings are required for airflows above 1,600 CFM.
2. Data is shown without filter.
3. Temperature rises in the table are approximate. Actual temperature rises may vary.
4. Individual cells shaded in gray indicate a temperature rise outside of the recommended range.
5. To comply with government mandated efficiency standards, speed settings shaded in gray are not allowed in HEAT mode.
6. Unit ships with (4) speeds pre-wired. Use of the fifth speed will require changing the appropriate wires at the motor connection. Consult the wiring diagram for more information.

* Factory Set Cool
** Factory Set Heat
*** Factory Set Circulation

Table 12. MG3P-090U1AAC1 (With 5-speed ECM motor)

HEATING AIRFLOW (CFM) & TEMPERATURE RISE (°F)											
MODEL NAME/ HEATING INPUT	RETURN AIR VIA:	MOTOR SPEED	External Static Pressure (in. w.c.)									
			0.1		0.2		0.3		0.4		0.5	
			CFM	RISE	CFM	RISE	CFM	RISE	CFM	RISE	CFM	RISE
MG3P-108U1AAD1 108,000 BTU/Hr	Bottom	5 - High*										
		4 - Med-High**	2,040	45	1,985	46	1,940	47	1,890	49	1,835	50
		3 - Med-Low	1,845	50	1,795	51	1,735	53	1,685	55	1,635	56
		2 - Alternate	1,665	55	1,600	58	1,545	60	1,480	62	1,430	64
		1 - Low***										
	Side	5 - High*										
		4 - Med-High**	2,035	45	1,980	46	1,935	48	1,885	49	1,830	50
		3 - Med-Low	1,830	50	1,775	52	1,730	53	1,665	55	1,615	57
		2 - Alternate	1,665	55	1,610	57	1,555	59	1,500	61	1,445	64
		1 - Low***										
	Side + Bottom or 2 sides	5 - High*										
		4 - Med-High**	2,050	45	1,995	46	1,950	47	1,890	49	1,840	50
		3 - Med-Low	1,855	50	1,800	51	1,750	53	1,695	54	1,645	56
		2 - Alternate	1,675	55	1,620	57	1,560	59	1,505	61	1,450	63
		1 - Low***										

COOLING AIRFLOW (CFM)									
MODEL NAME/ HEATING INPUT	RETURN AIR VIA:	MOTOR SPEED	External Static Pressure (in. w.c.)							
			0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8
			CFM	CFM	CFM	CFM	CFM	CFM	CFM	CFM
MG3P-108U1AAD1 108,000 BTU/Hr	Bottom	5 - High*	2,265	2,210	2,170	2,120	2,070	2,030	1,975	1,925
		4 - Med-High**	2,040	1,985	1,940	1,890	1,835	1,785	1,735	1,690
		3 - Med-Low	1,845	1,795	1,735	1,685	1,635	1,580	1,535	1,480
		2 - Alternate	1,665	1,600	1,545	1,480	1,430	1,385	1,330	1,260
		1 - Low***	1,095	1,015	935	850	775	695	635	585
	Side	5 - High*	2,250	2,195	2,145	2,100	2,050	2,005	1,940	1,885
		4 - Med-High**	2,035	1,980	1,935	1,885	1,830	1,780	1,730	1,680
		3 - Med-Low	1,830	1,775	1,730	1,665	1,615	1,560	1,510	1,460
		2 - Alternate	1,665	1,610	1,555	1,500	1,445	1,385	1,330	1,280
		1 - Low***	1,095	1,000	920	835	745	665	605	550
	Side + Bottom or 2 sides	5 - High*	2,275	2,230	2,180	2,125	2,080	2,030	1,985	1,935
		4 - Med-High**	2,050	1,995	1,950	1,890	1,840	1,790	1,745	1,700
		3 - Med-Low	1,855	1,800	1,750	1,695	1,645	1,595	1,540	1,490
		2 - Alternate	1,675	1,620	1,560	1,505	1,450	1,395	1,345	1,285
		1 - Low***	1,125	1,025	925	845	765	660	595	545

***NOTES:**

1. To comply with government mandated efficiency standards, two openings are required for airflows above 1,600 CFM.
2. Data is shown without filter.
3. Temperature rises in the table are approximate. Actual temperature rises may vary.
4. Individual cells shaded in gray indicate a temperature rise outside of the recommended range.
5. To comply with government mandated efficiency standards, speed settings shaded in gray are not allowed in HEAT mode.
6. Unit ships with (4) speeds pre-wired. Use of the fifth speed will require changing the appropriate wires at the motor connection. Consult the wiring diagram for more information.

* Factory Set Cool
** Factory Set Heat
*** Factory Set Circulation

Table 13. MG3P-108U1AAD1 (With 5-speed ECM motor)

HEATING AIRFLOW (CFM) & TEMPERATURE RISE (°F)															
MODEL NUMBER/ HEATING INPUT	MOTOR SWITCH SETTINGS (0=OFF, 1=ON)				EXTERNAL STATIC PRESSURE (IN.W.C.)										
					0.1		0.2		0.3		0.4		0.5		
	1	2	3	4	CFM	RISE	CFM	RISE	CFM	RISE	CFM	RISE	CFM	RISE	
MG3S-080T2AAC1 80,000 BTU/hr	0	0	0	0	1,125	63									
	1	0	0	0	1,205	59	1,120	63							
	0	1	0	0	1,305	54	1,225	58	1,150	62					
	1	1	0	0	1,430	50	1,350	53	1,270	56	1,190	60	1,110	63	
	0	0	1	0	1,525	47	1,450	49	1,375	52	1,300	55	1,225	57	
	1	0	1	0	1,620	44	1,540	46	1,465	49	1,390	51	1,315	54	
	0	1	1	0	1,695	42	1,620	44	1,545	46	1,465	49	1,390	51	
	1	1	1	0	1,770	40	1,700	42	1,630	44	1,555	46	1,485	47	
	0	0	0	1	1,875	38	1,805	39	1,730	41	1,655	43	1,580	45	
	1	0	0	1	1,905	37	1,840	39	1,775	40	1,710	42	1,640	43	
	0	1	0	1	1,980	36	1,910	37	1,845	39	1,780	40	1,715	41	
	1	1	0	1	2,025	35	1,960	36	1,895	38	1,830	39	1,765	40	
	0	0	1	1			2,025	35	1,960	36	1,900	37	1,840	38	
	1	0	1	1					2,010	35	1,945	37	1,880	37	
	0	1	1	1							2,035	35	1,980	36	
	1	1	1	1											

COOLING AIRFLOW (CFM)													
MODEL NUMBER/ HEATING INPUT	MOTOR SWITCH SETTINGS (0=OFF, 1=ON)				EXTERNAL STATIC PRESSURE (IN.W.C.)							
					0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8
	5	6	7	8	CFM	CFM	CFM	CFM	CFM	CFM	CFM	CFM
MG3S-080T2AAC1 80,000 BTU/hr	0	0	0	0	1,125	1,040	960	880	795			
	1	0	0	0	1,205	1,120	1,040	960	875	795		
	0	1	0	0	1,305	1,225	1,150	1,070	995	915	840	
	1	1	0	0	1,430	1,350	1,270	1,190	1,110	1,030	950	865
	0	0	1	0	1,525	1,450	1,375	1,300	1,225	1,150	1,075	1,000
	1	0	1	0	1,620	1,540	1,465	1,390	1,315	1,240	1,165	1,090
	0	1	1	0	1,695	1,620	1,545	1,465	1,390	1,315	1,235	1,160
	1	1	1	0	1,770	1,700	1,630	1,555	1,485	1,410	1,340	1,265
	0	0	0	1	1,875	1,805	1,730	1,655	1,580	1,510	1,435	1,340
	1	0	0	1	1,905	1,840	1,775	1,710	1,640	1,575	1,510	1,445
	0	1	0	1	1,980	1,910	1,845	1,780	1,715	1,650	1,580	1,515
	1	1	0	1	2,025	1,960	1,895	1,830	1,765	1,700	1,635	1,570
	0	0	1	1	2,085	2,025	1,960	1,900	1,840	1,775	1,715	1,655
	1	0	1	1	2,135	2,070	2,010	1,945	1,880	1,815	1,750	1,685
	0	1	1	1	2,200	2,145	2,090	2,035	1,980	1,925	1,870	1,820
	1	1	1	1	2,280	2,225	2,170	2,115	2,065	2,010	1,955	1,900

***NOTES:**

1. Motor switch settings for heating speeds use HEAT switches 1, 2, 3, & 4 and for cooling speeds use COOL switches 5, 6, 7, & 8.
2. To comply with government mandated efficiency standards, two openings are required for airflows above 1,600 CFM.
3. Data is shown without filter.
4. Temperature rises in the table are approximate. Actual temperature rises may vary.
5. Individual cells shaded in gray indicate a temperature rise outside of the recommended range.
6. To comply with government mandated efficiency standards, speed settings shaded in gray are not allowed in HEAT mode.
7. When in low stage heat, the airflow is approximately 70% of the tables high value (2-stage furnaces only).

Table 14. MG3S-080T2AAC1 (FSHE)

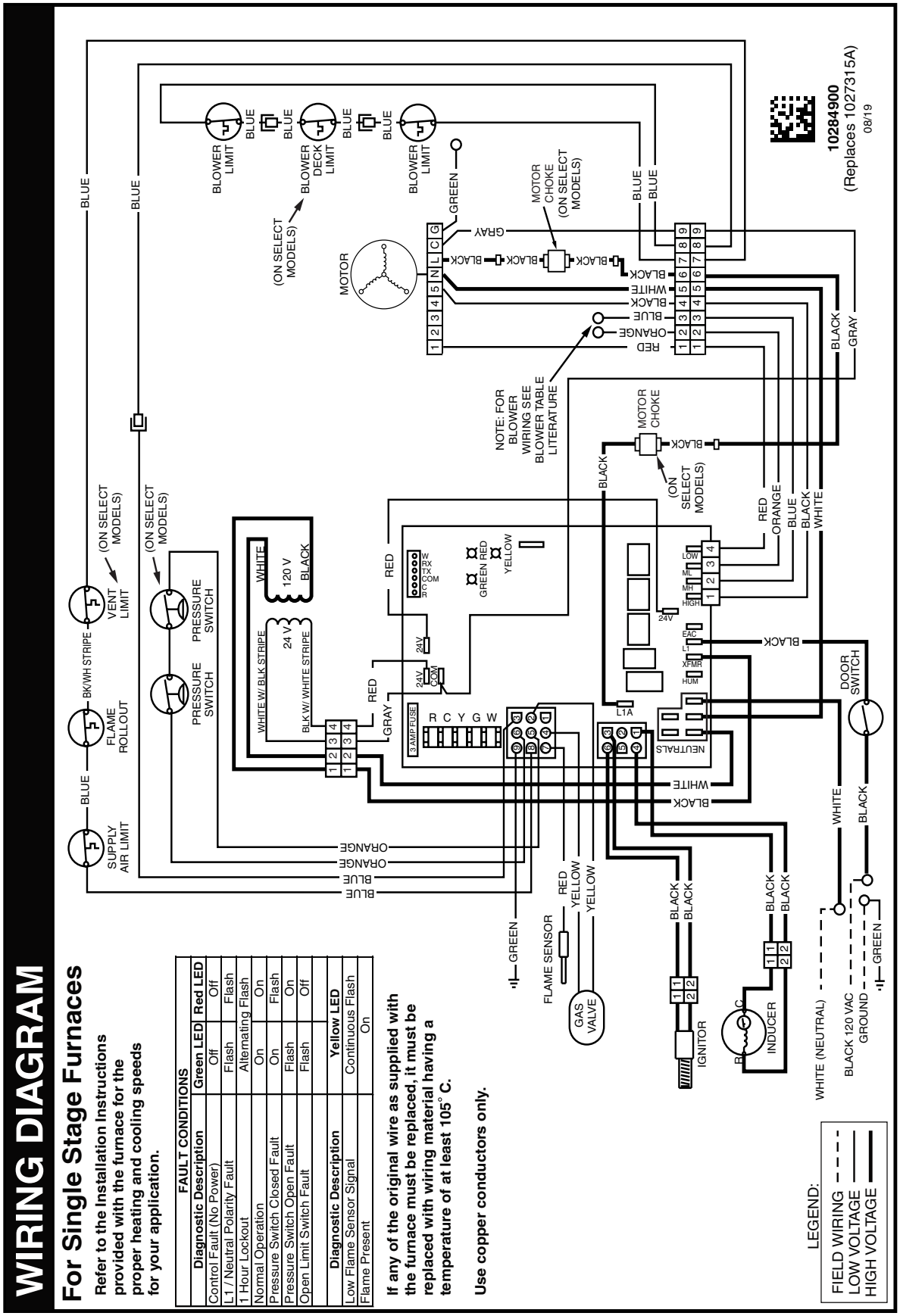


Figure 45. MG3P with Nordyne/UTEC Control Board Wiring Diagram

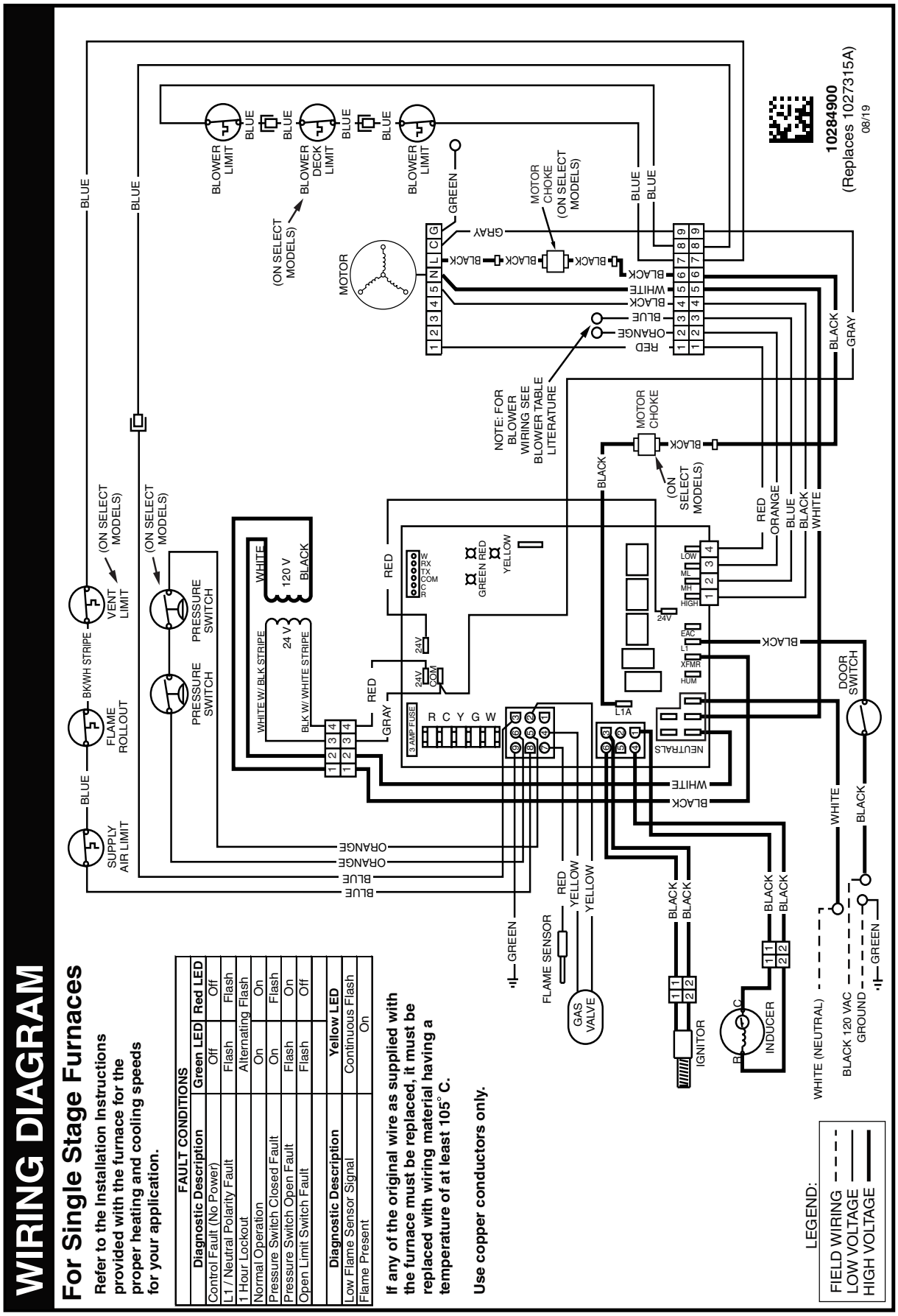


Figure 46. MG3P with Emerson Control Board Wiring Diagram

LADDER DIAGRAM

Single Stage Furnaces

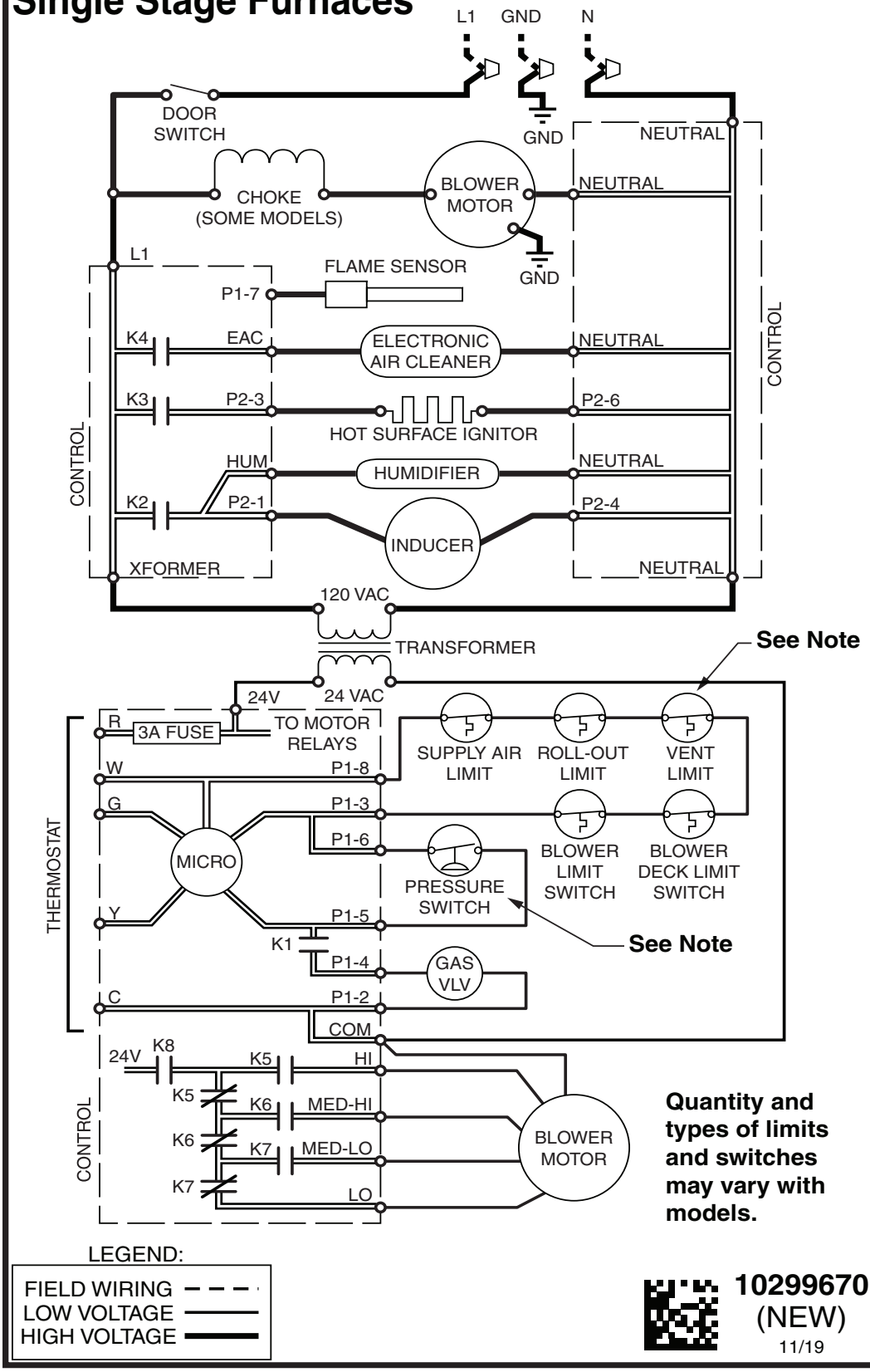


Figure 47. MG3P with Nordyne/UTEC Control Board Ladder Diagram

LADDER DIAGRAM

Single Stage Furnaces

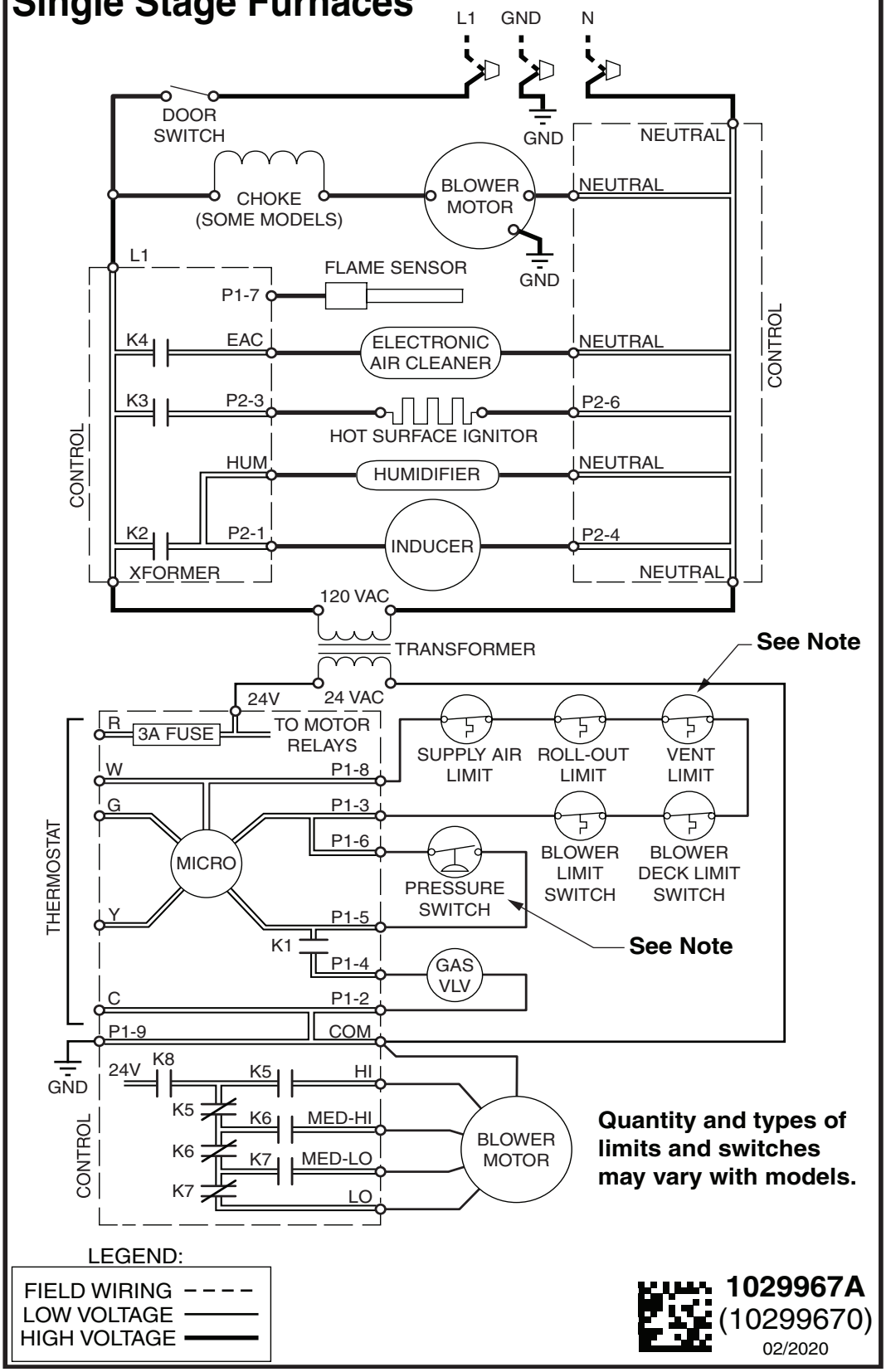


Figure 48. MG3P with Emerson Control Board Ladder Diagram

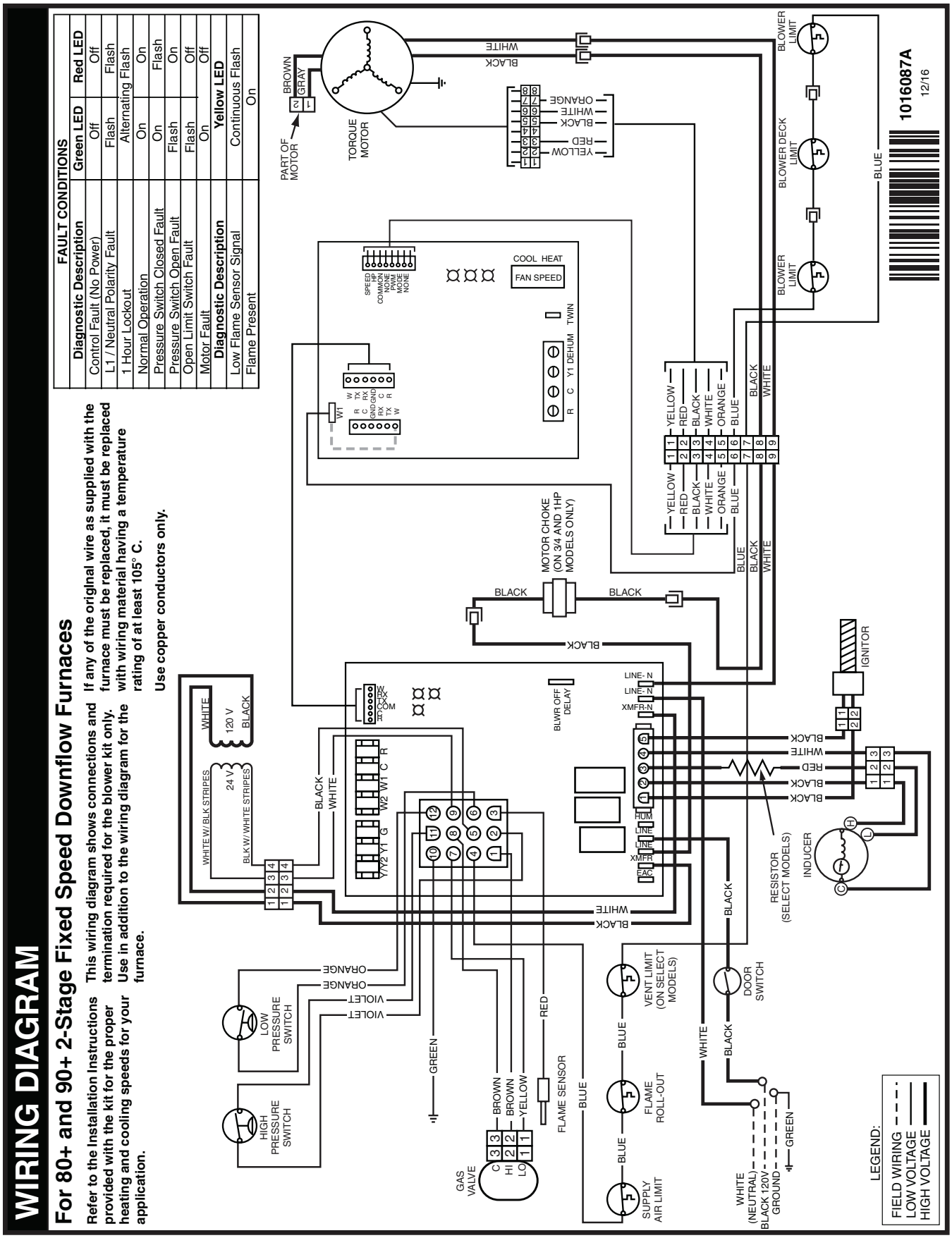


Figure 49. MG3S Wiring Diagram

LADDER DIAGRAM

2-Stage FSHE Furnaces

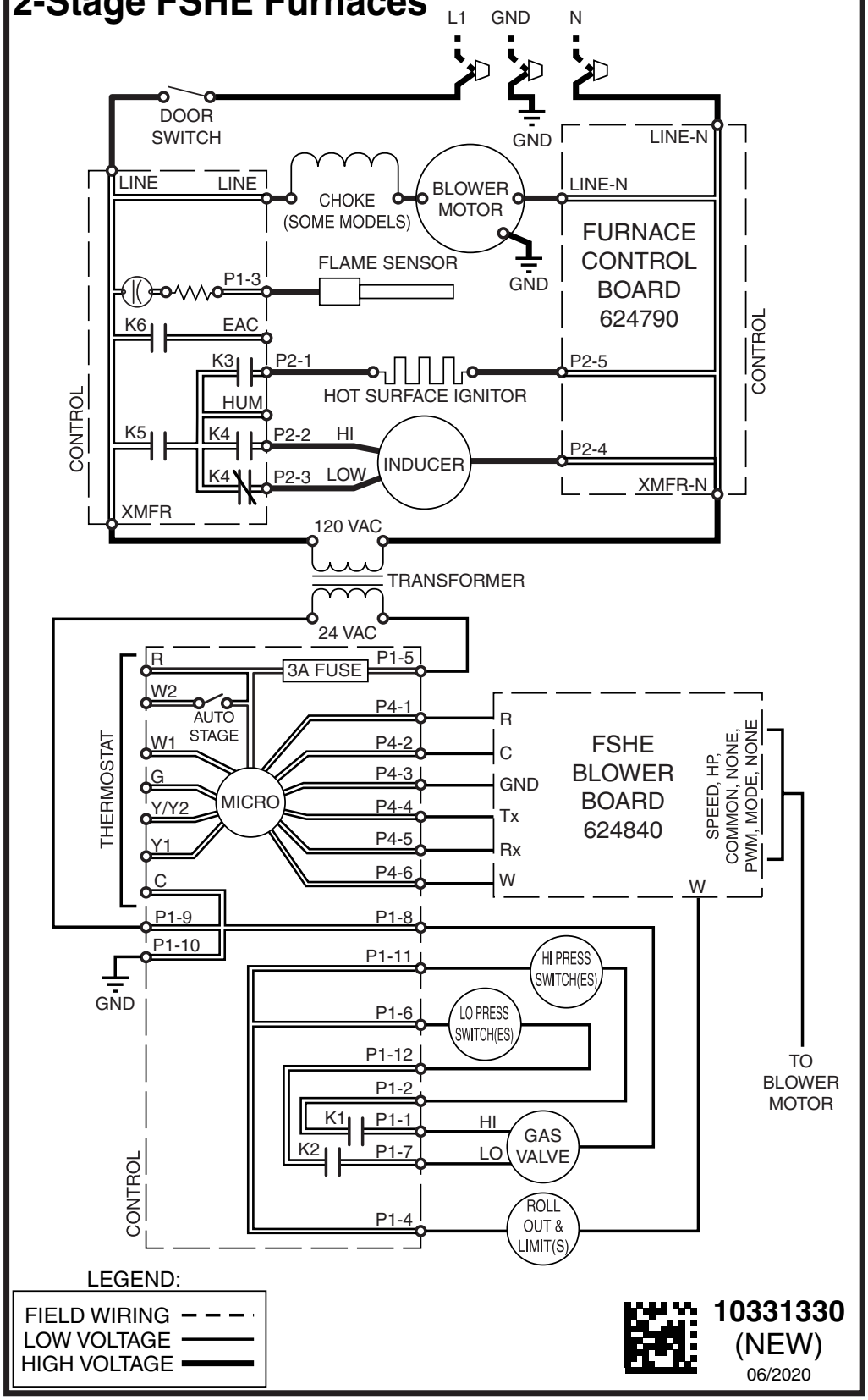


Figure 50. MG3S Ladder Diagram

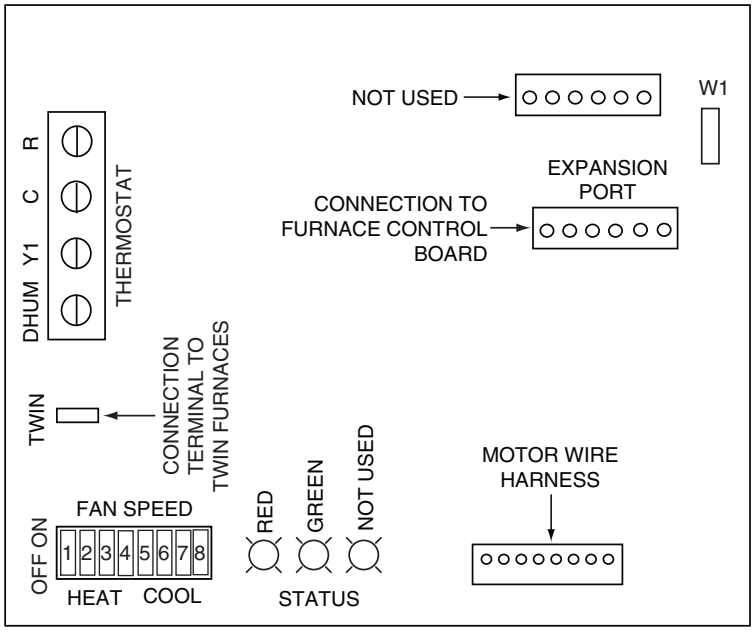


Figure 51. Two-Stage Fixed Speed Motor Control Board

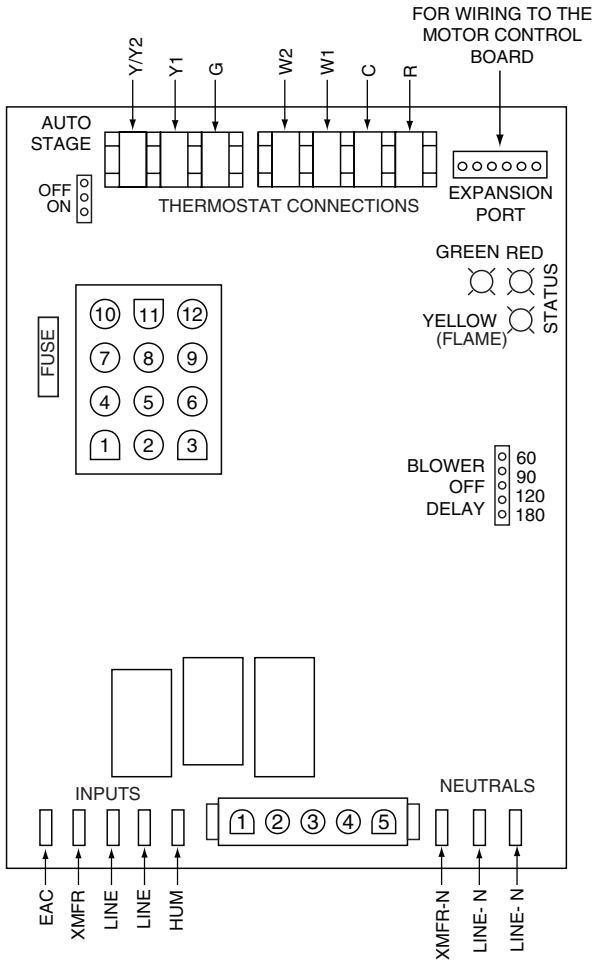


Figure 52. Two-Stage Furnace Control Board

Gas Information

GAS FLOW RATES (CUBIC FEET PER HOUR)			
TIME FOR ONE REVOLUTION (SECONDS)	CUBIC FEET PER REVOLUTION OF GAS METER		
	1	5	10
10	360	1,800	3,600
12	300	1,500	3,000
14	257	1,286	2,571
16	225	1,125	2,250
18	200	1,000	2,000
20	180	900	1,800
22	164	818	1,636
24	150	750	1,500
26	138	692	1,385
28	129	643	1,286
30	120	600	1,200
32	113	563	1,125
34	106	529	1,059
36	100	500	1,000
38	95	474	947
40	90	450	900
42	86	429	857
44	82	409	818
46	78	391	783
48	75	375	750
50	72	360	720
52	69	346	692
54	67	333	667
56	64	321	643
58	62	310	621
60	60	300	600
62	58	290	581
64	56	281	563

GAS FLOW RATES (CUBIC FEET PER HOUR)			
TIME FOR ONE REVOLUTION (SECONDS)	CUBIC FEET PER REVOLUTION OF GAS METER		
	1	5	10
66	55	273	545
68	53	265	529
70	51	257	514
72	50	250	500
74	49	243	486
76	47	237	474
78	46	231	462
80	45	225	450
82	44	220	439
84	43	214	429
86	42	209	419
88	41	205	409
90	40	200	400
92	39	196	391
94	38	191	383
96	38	188	375
98	37	184	367
100	36	180	360
102	35	176	353
104	35	173	346
106	34	170	340
108	33	167	333
110	33	164	327
112	32	161	321
114	32	158	316
116	31	155	310
118	31	153	305
120	30	150	300

Table 15. Gas Flow Rates

CAPACITY OF BLACK IRON GAS PIPE (CU. FT. PER HOUR) FOR NATURAL GAS W/ SPECIFIC GRAVITY = 0.60								
NOMINAL PIPE DIAMETER (IN.)	LENGTH OF PIPE RUN (FEET)							
	10	20	30	40	50	60	70	80
1/2	130	90	75	65	55	50	45	40
3/4	280	190	150	130	115	105	95	90
1	520	350	285	245	215	195	180	170
1 1/4	1,050	730	590	500	440	400	370	350
1 1/2	1,600	1,100	890	760	670	610		

$$\text{Cubic Feet Per Hour Required} = \frac{\text{Input To Furnace (Btu/hr)}}{\text{Heating Value of Gas (Btu/Cu. Ft.)}}$$

NOTE: The cubic feet per hour listed in the table above must be greater than the cubic feet per hour of gas flow required by the furnace. To determine the cubic feet per hour of gas flow required by the furnace, divide the input rate of the furnace by the heating value (from gas supplier) of the gas.

Table 16. Gas Pipe Capactities

ALTITUDE ABOVE SEA LEVEL	LOCAL HEATING VALUE, BTU PER CUBIC FOOT								
	650	700	750	800	850	900	950	1,000	1,050
2,000 FT	LOW	LOW	LOW	LOW	LOW	LOW	**HIGH**	**HIGH**	**HIGH**
3,000 FT	LOW	LOW	LOW	LOW	LOW	LOW	**HIGH**	**HIGH**	**HIGH**
4,000 FT	LOW	LOW	LOW	LOW	LOW	**HIGH**	**HIGH**	**HIGH**	**HIGH**
5,000 FT	LOW	LOW	LOW	LOW	LOW	**HIGH**	**HIGH**	**HIGH**	**HIGH**
6,000 FT	LOW	LOW	LOW	LOW	**HIGH**	**HIGH**	**HIGH**	**HIGH**	**HIGH**
7,000 FT	LOW	LOW	LOW	LOW	**HIGH**	**HIGH**	**HIGH**	**HIGH**	**HIGH**
8,000 FT	LOW	LOW	LOW	**HIGH**	**HIGH**	**HIGH**	**HIGH**	**HIGH**	**HIGH**
9,000 FT	LOW	LOW	LOW	**HIGH**	**HIGH**	**HIGH**	**HIGH**	**HIGH**	**HIGH**
10,000 FT	LOW	LOW	**HIGH**	**HIGH**	**HIGH**	**HIGH**	**HIGH**	**HIGH**	**HIGH**

Table 17. Natural Gas Heating Values

NATURAL GAS - HIGH HEATING VALUE			
ALTITUDE ABOVE SEA LEVEL	INPUT (BTU)		
	54,000	90,000	
0 to 1,999 FT	47	47	Orifice Size
	3.5	3.5	Manifold Pressure
2,000 to 2,999 FT	47	47	Orifice Size
	3.2	3.2	Manifold Pressure
3,000 to 3,999 FT	47	47	Orifice Size
	3.0	3.0	Manifold Pressure
4,000 to 4,999 FT	47	47	Orifice Size
	2.8	2.8	Manifold Pressure
5,000 to 5,999 FT	47	47	Orifice Size
	2.7	2.7	Manifold Pressure
6,000 to 6,999 FT	49	49	Orifice Size
	3.5	3.5	Manifold Pressure
7,000 to 7,999 FT	49	49	Orifice Size
	3.3	3.3	Manifold Pressure
8,000 to 8,999 FT	49	49	Orifice Size
	3.0	3.0	Manifold Pressure
9,000 to 9,999 FT	49	49	Orifice Size
	2.8	2.8	Manifold Pressure

Table 18. High Altitude Deration Chart for Natural Gas - High Heating Value

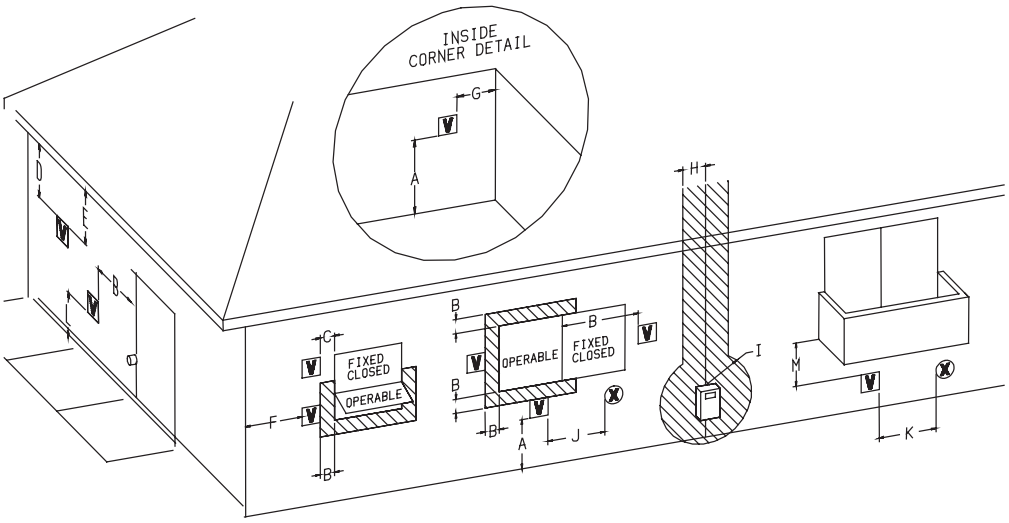
NATURAL GAS - LOW HEATING VALUE			
ALTITUDE ABOVE SEA LEVEL	INPUT (BTU)		
	54,000	90,000	
0 to 1,999 FT	47	47	Orifice Size
	3.5	3.5	Manifold Pressure
2,000 to 2,999 FT	47	47	Orifice Size
	3.5	3.5	Manifold Pressure
3,000 to 3,999 FT	47	47	Orifice Size
	3.3	3.3	Manifold Pressure
4,000 to 4,999 FT	47	47	Orifice Size
	3.1	3.1	Manifold Pressure
5,000 to 5,999 FT	47	47	Orifice Size
	2.9	2.9	Manifold Pressure
6,000 to 6,999 FT	47	47	Orifice Size
	2.8	2.8	Manifold Pressure
7,000 to 7,999 FT	49	49	Orifice Size
	3.4	3.4	Manifold Pressure
8,000 to 8,999 FT	49	49	Orifice Size
	3.2	3.2	Manifold Pressure
9,000 to 9,999 FT	49	49	Orifice Size
	2.9	2.9	Manifold Pressure

Table 19. High Altitude Deration Chart for Natural Gas - Low Heating Value

PROPANE GAS			
ALTITUDE ABOVE SEA LEVEL	INPUT (BTU)		
	54,000	90,000	
0 to 1,999 FT	56	56	Orifice Size
	10.0	10.0	Manifold Pressure
2,000 to 2,999 FT	56	56	Orifice Size
	9.0	9.0	Manifold Pressure
3,000 to 4,999 FT	56	56	Orifice Size
	8.5	8.5	Manifold Pressure
5,000 to 5,999 FT	57	57	Orifice Size
	10.0	10.0	Manifold Pressure
6,000 to 7,999 FT	57	57	Orifice Size
	9.0	9.0	Manifold Pressure
8,000 to 10,000 FT	57	57	Orifice Size
	8.5	8.5	Manifold Pressure

Table 20. High Altitude Deration Chart for Propane Gas

Venting Information



VENT TERMINAL **AIR SUPPLY INLET** **AREA WHERE TERMINAL IS NOT PERMITTED**

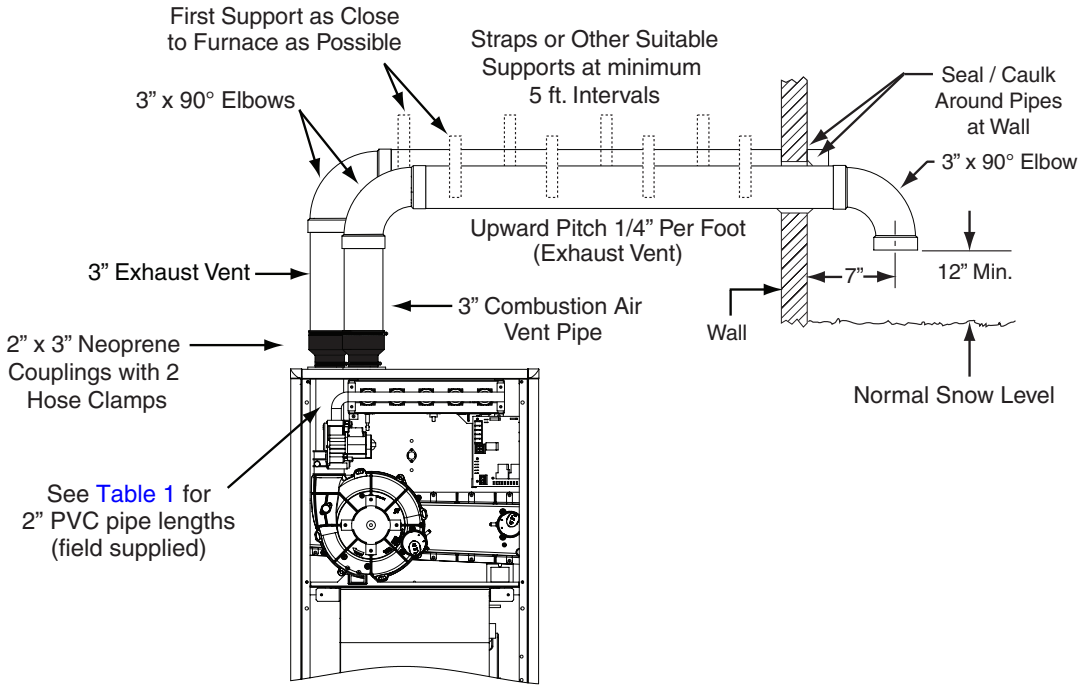
CLEARANCE LOCATION		CANADIAN INSTALLATIONS [A]	US INSTALLATIONS [B]	
		DIRECT VENT (2-PIPE) & CONVENTIONAL VENT (1-PIPE) FURNACES	DIRECT VENT (2-PIPE) FURNACES	CONVENTIONAL VENT (1-PIPE) FURNACES
A =	Clearance above grade, veranda, porch, deck, balcony, or maximum expected snow level.	12 inches (30cm)	12 inches (30cm)	12 inches (30cm)
B =	Clearance to window or door that may be opened.	6 inches (15cm) for appliances < 10,000 Btuh (3kW)	6 inches (15cm) for appliances < 10,000 Btuh (3kW)	4 ft. (1.2m) below or to side of opening; 1 ft. (300mm) above opening
		12 inches (30cm) for appliances 10,000 Btuh - 100,000 Btuh (30kW)	9 inches (23cm) for appliances 10,000 Btuh - 50,000 Btuh (30kW)	
		36 inches (91cm) for appliances > 100,000 Btuh (30Kw)	12 inches (30cm) for appliances > 50,000 Btuh (30Kw)	
C =	Clearance to permanently closed window	*	*	*
D =	Vertical clearance to ventilated soffit located above the terminal within a horizontal distance of 2 feet (61cm) from the center line of the terminal.	*	*	*
E =	Clearance to unventilated soffit.	*	*	*
F =	Clearance to outside corner.	*	*	*
G =	Clearance to inside corner.	*	*	*
H =	Clearance to each side of center line extended above meter/regulator assembly.	3 feet (91cm) within a height 15 feet above the meter/regulator assembly	*	*
I =	Clearance to service regulator vent outlet.	3 feet (1.83m)	*	*
J =	Clearance to non-mechanical air supply inlet to building or the combustion air inlet to any other appliance.	6 inches (15cm) for appliances < 10,000 Btuh (3kW)	6 inches (15cm) for appliances < 10,000 Btuh (3kW)	4 ft. (1.2m) below or to side of opening; 1 ft. (300mm) above opening
		12 inches (30cm) for appliances 10,000 Btuh - 100,000 Btuh (30kW)	9 inches (23cm) for appliances 10,000 Btuh - 50,000 Btuh (30kW)	
		36 inches (91cm) for appliances > 100,000 Btuh (30Kw)	12 inches (30cm) for appliances > 50,000 Btuh (30Kw)	
K =	Clearance to mechanical air supply inlet.	6 feet (1.83m)	3 feet (91cm) above if within 10 feet (3m) horizontally	3 ft. (91cm) above if within 10 feet (3m) horizontally
L =	Clearance above paved sidewalk or driveway located on public property.	7 feet (2.13m) [c]	*	7 ft. (2.13m)
M =	Clearance under veranda, porch, deck, or balcony.	12 inches (30cm) [d]	*	*

a: In accordance with the current CSA B149.1 Natural Gas and Propane Installation Guide Code
b: In accordance with the current ANSI Z223.1 / NFPA 54 Natural Fuel Gas Code
c: A vent shall not terminate directly above a sidewalk or paved driveway that is located between two single family dwellings and serves both dwellings.
d: 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, the following statement shall be included: “Clearance in accordance with local installation codes, and the requirements of the gas supplier and the manufacturers installation instructions”

Table 21. Vent Termination Clearances

MG3P HORIZONTAL VENTING

(2-Pipe, Upflow Furnace Shown)



MG3P VERTICAL VENTING

(2-Pipe, Upflow Furnace Shown)

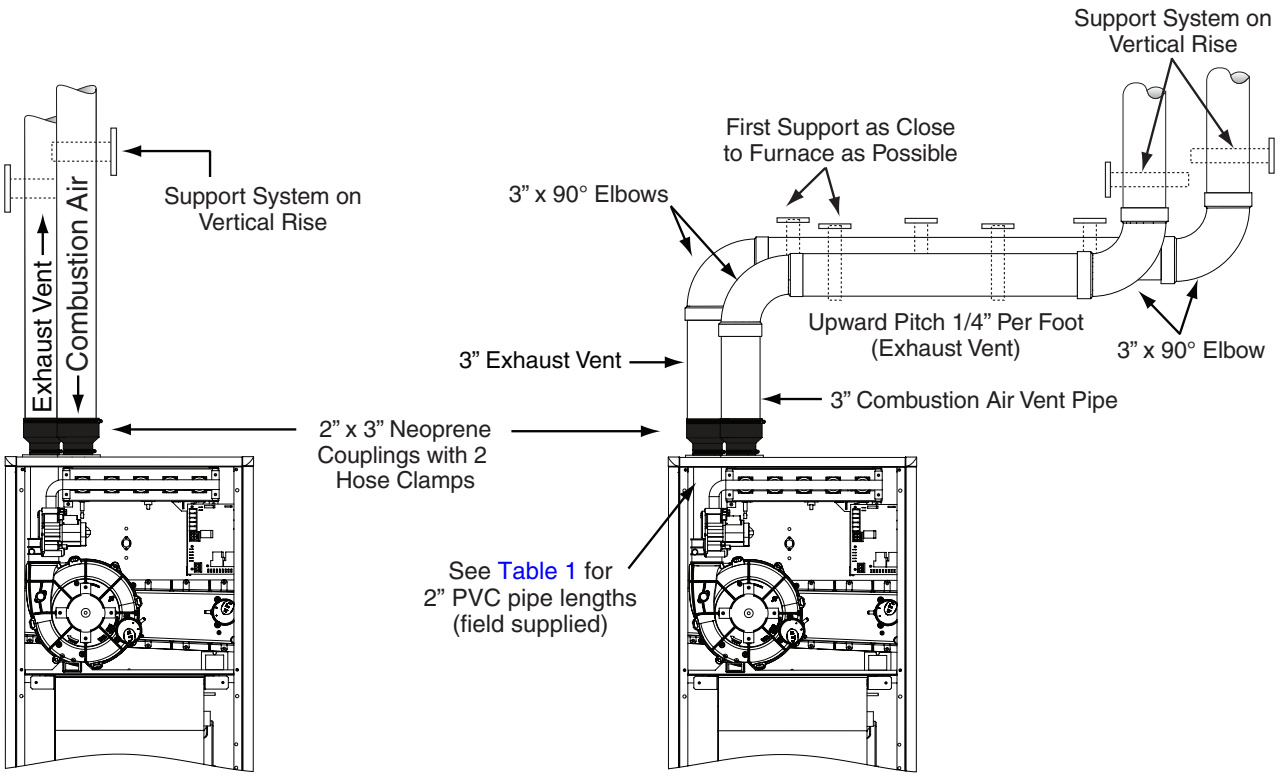
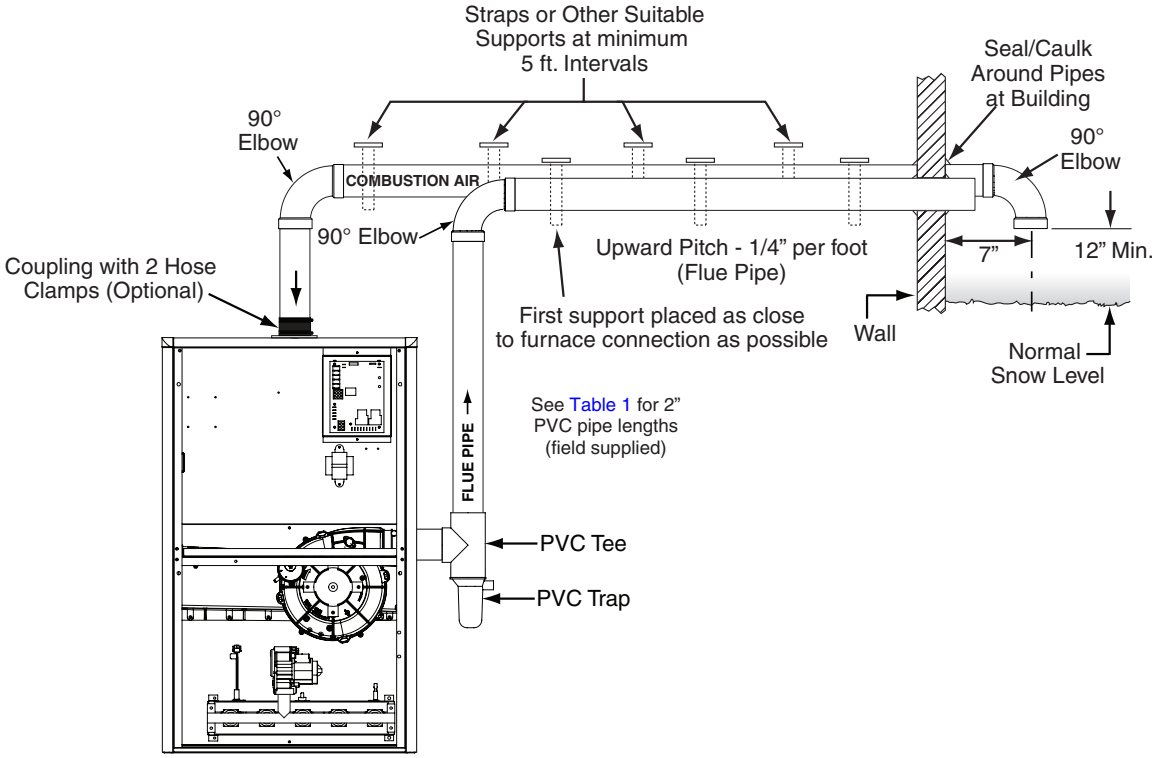


Figure 53. MG3P Horizontal & Vertical Venting

MG3S HORIZONTAL VENTING

(2-Pipe, Downflow Furnace Shown)



MG3S VERTICAL VENTING

(2-Pipe, Downflow Furnace Shown)

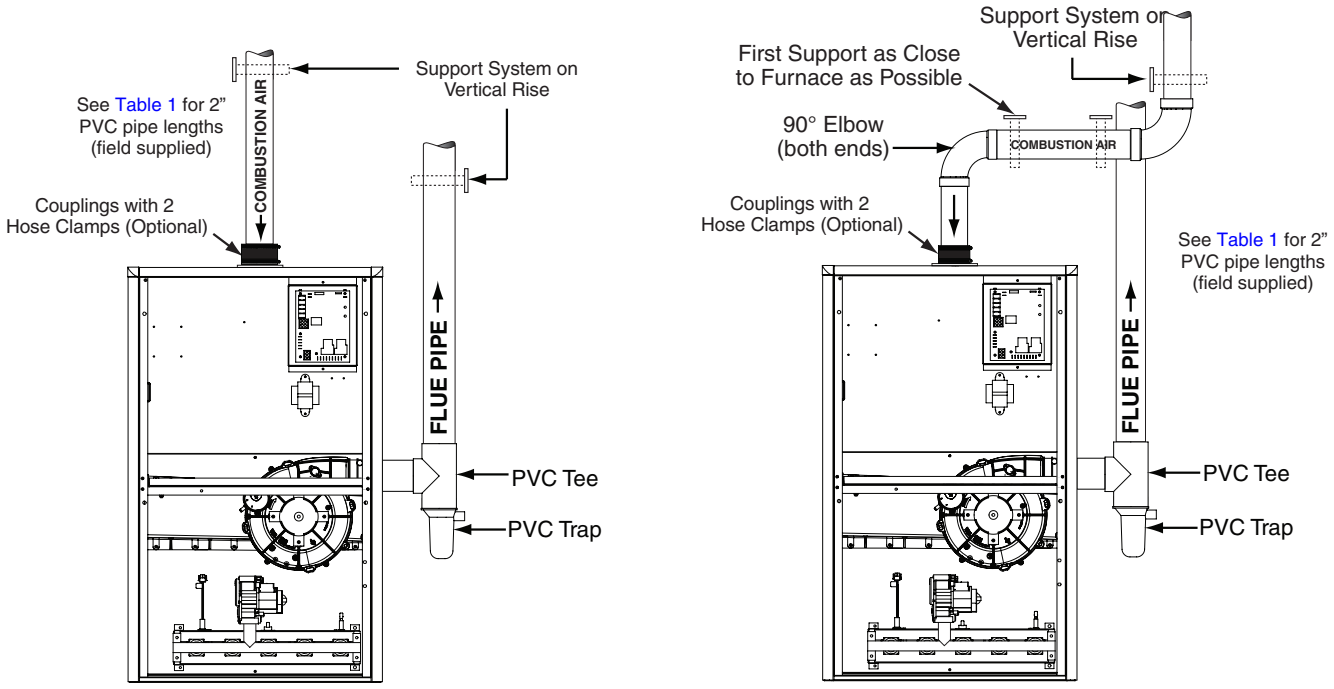
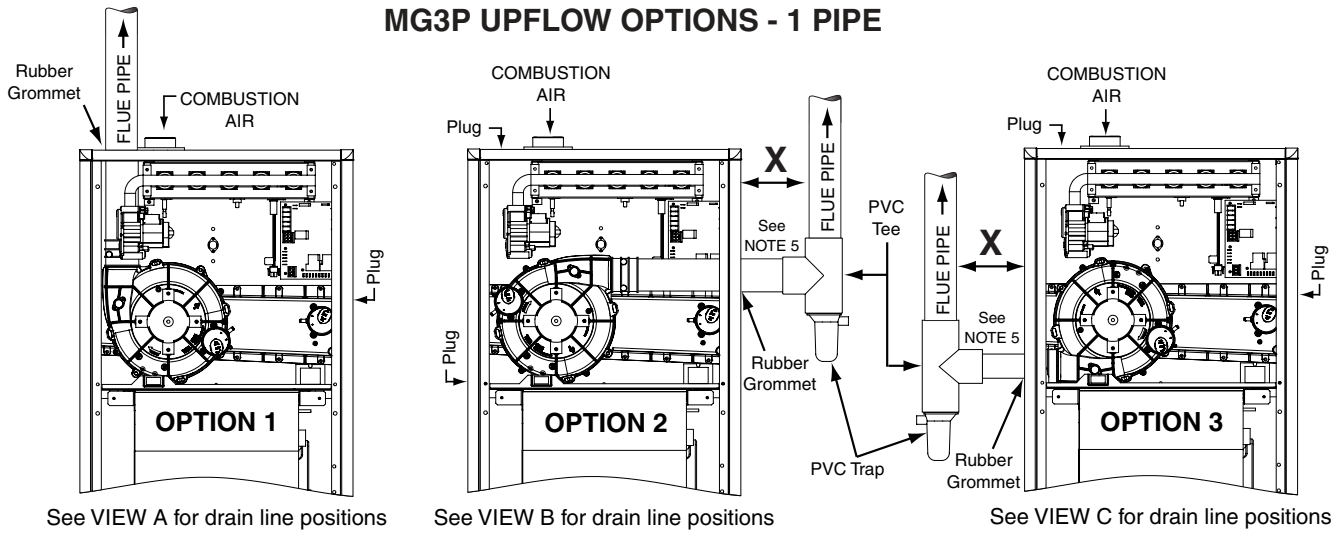
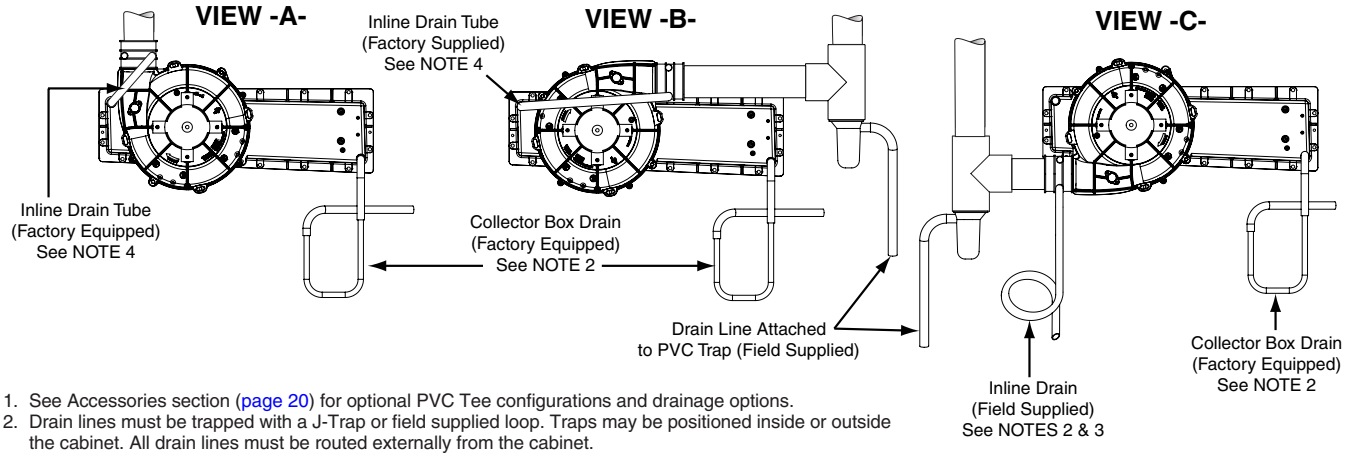


Figure 54. MG3S Horizontal & Vertical Venting

MG3P UPFLOW OPTIONS - 1 PIPE

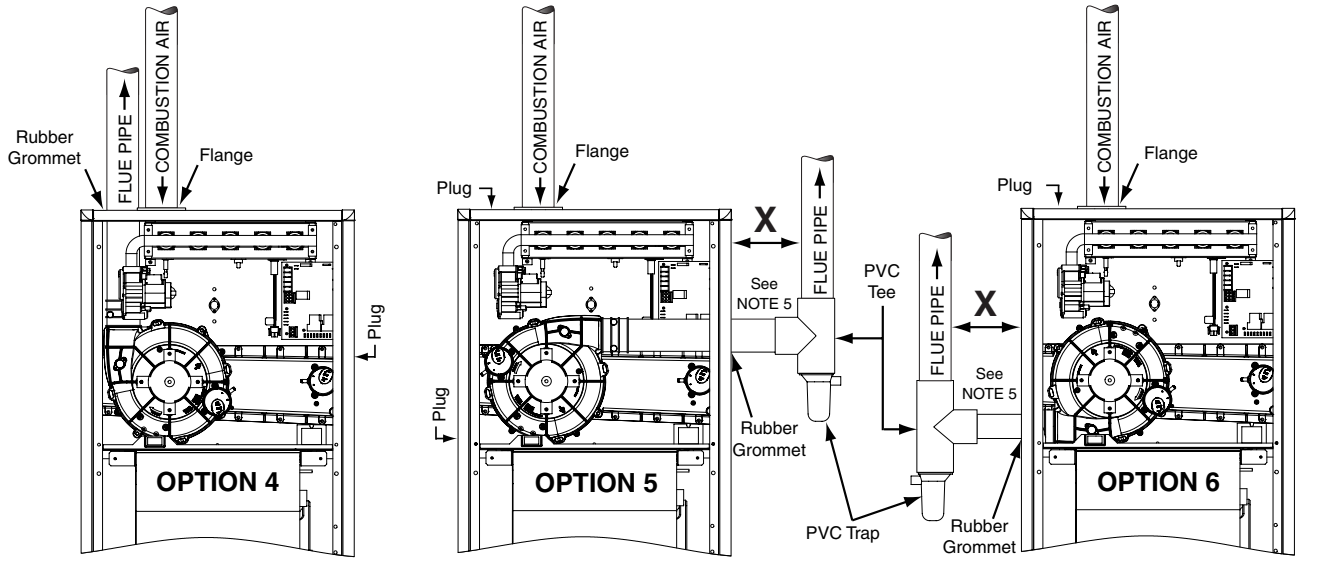


See VIEW A for drain line positions | See VIEW B for drain line positions | See VIEW C for drain line positions



1. See Accessories section (page 20) for optional PVC Tee configurations and drainage options.
2. Drain lines must be trapped with a J-Trap or field supplied loop. Traps may be positioned inside or outside the cabinet. All drain lines must be routed externally from the cabinet.
3. Inline drain is required only if "X" is greater than 6 feet.
4. Tubing needs to be cut to length and attached during unit installation.
5. Horizontal piping from inducer to flue pipe must be sloped 1/4" per foot to ensure drainage to PVC trap.

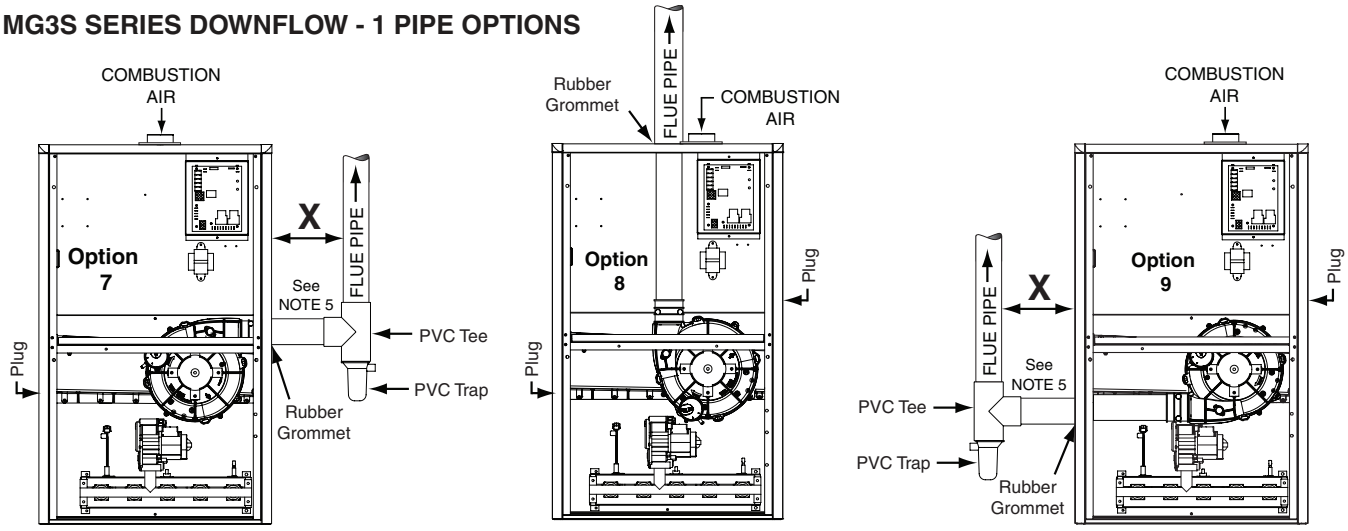
MG3P UPFLOW OPTIONS - 2 PIPE



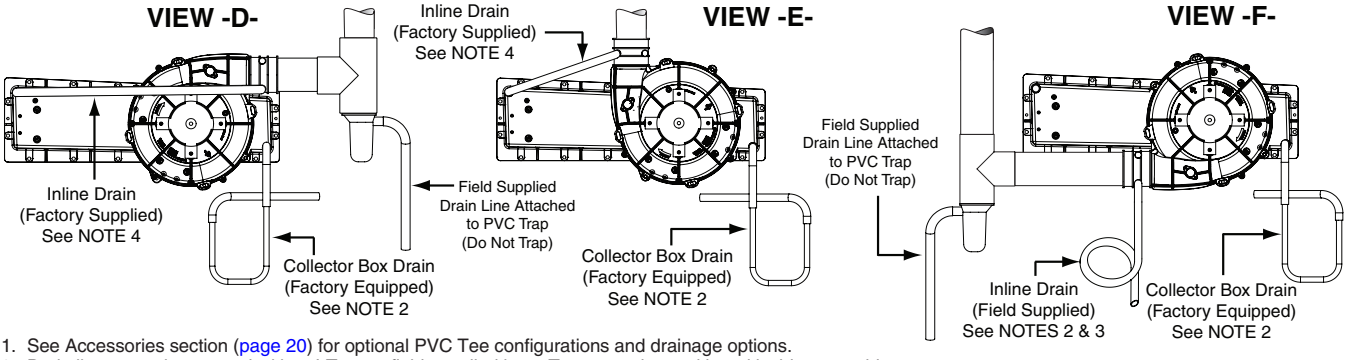
See VIEW A for drain line positions | See VIEW B for drain line positions | See VIEW C for drain line positions

Figure 55. MG3P Series - Upflow Options

MG3S SERIES DOWNFLOW - 1 PIPE OPTIONS

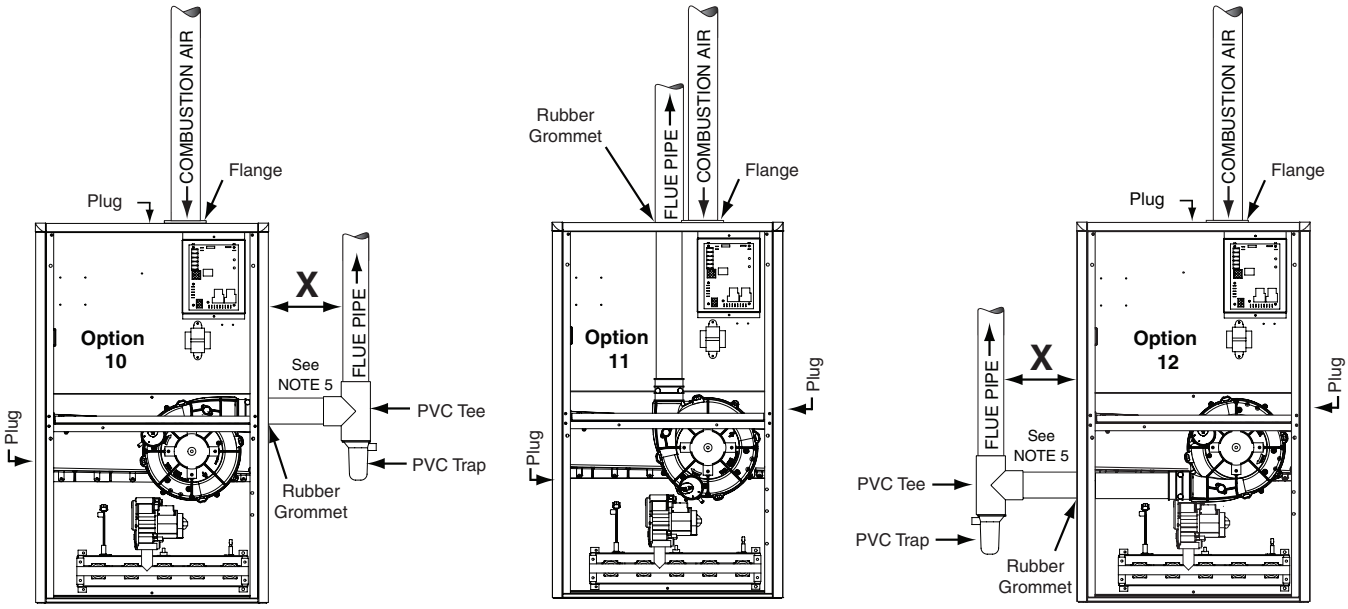


See VIEW D for drain line positions | See VIEW E for drain line positions | See VIEW F for drain line positions



1. See Accessories section (page 20) for optional PVC Tee configurations and drainage options.
2. Drain lines must be trapped with a J-Trap or field supplied loop. Traps may be positioned inside or outside the cabinet. All drain lines must be routed externally from the cabinet.
3. Inline drain is required only if "X" is greater than 6 feet.
4. Tubing needs to be cut to length and attached during unit installation.
5. Horizontal piping from inducer to flue pipe must be sloped 1/4" per foot to ensure drainage to PVC trap.

MG3S SERIES DOWNFLOW - 2 PIPE OPTIONS



See VIEW D for drain line positions | See VIEW E for drain line positions | See VIEW F for drain line positions

Figure 56. MG3S Series - Downflow Options

FURNACE COMPONENTS

The descriptions below are various functional components that affect the operation and shutting down of this furnace. Some of these components and their locations are shown in Figure 57. If any component of the furnace must be replaced, use only factory authorized replacement parts specified in the Replacement Parts List provided online.

Blower Limit Switch - The Blower switch prevents furnace operation when blower is not operational.

Condensate Drain Switch - The Condensate Drain Switch will shut down the furnace if the condensate drain from the Collector Pan becomes clogged.

Flame Sensor: The flame sensor verifies when a flame has carried over from the igniter to the opposite end burner. If no flame is detected, the furnace will shut down within 4 seconds.

Flame Roll-Out Switch - The flame roll-out switch verifies that the burner flames are drawn into the heat exchanger tubes. If the burner flames are not properly drawn into the heat exchanger, the flame roll-out switch will close the gas valve and initiate the shutdown cycle.

Gas Valve - The gas valve controls the flow of gas to the burners. When the gas valve is energized it automatically opens and regulates the gas pressure in the manifold.

Inducer Assembly - The inducer assembly vents products of combustion to the outside.

Pressure Switch - The pressure switch verifies that the inducer is drawing the combustion gases through the heat exchanger. If the flame is not properly drawn into the heat exchanger tube, the rollout switch or the flame sensor will shut the furnace down.

Supply Air Limit Switch - The supply air limit switch prevents the air temperature leaving the furnace from exceeding the maximum allowable outlet air temperature.

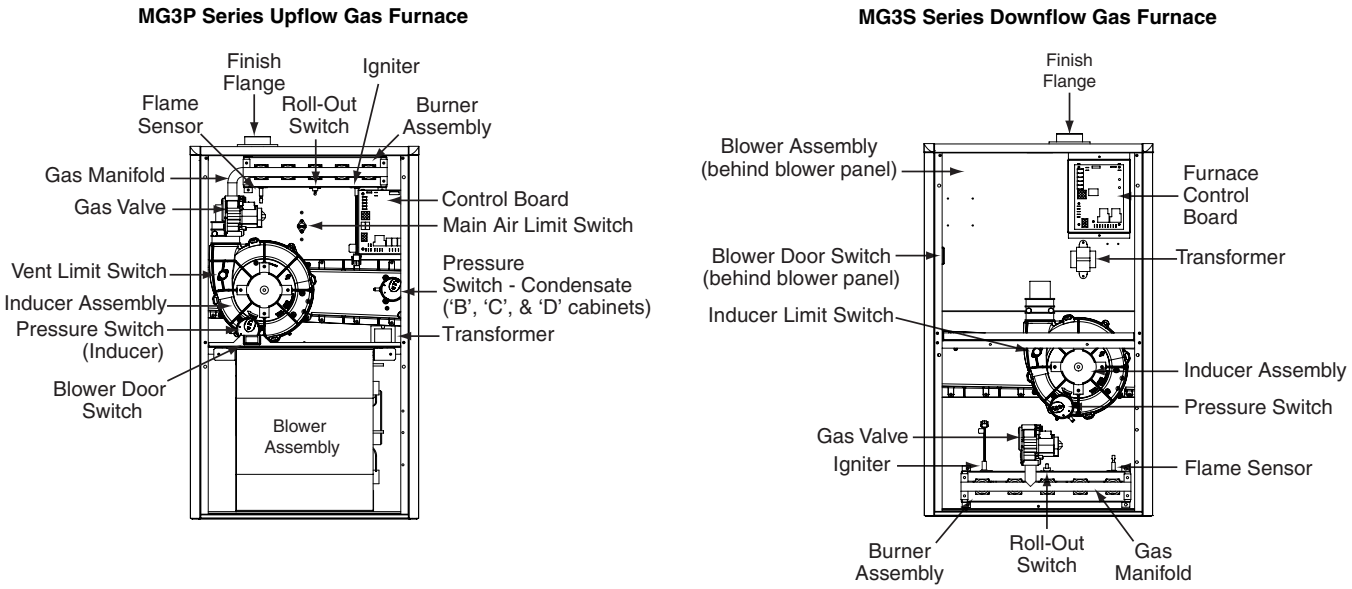


Figure 57. MG3(P,S) Component Locations

INSTALLATION CHECKLIST

ATTENTION INSTALLERS:

It is your responsibility to know this product better than your customer. This includes being able to install the product according to strict safety guidelines and instructing the customer on how to operate and maintain the equipment for the life of the product. Safety should always be the deciding factor when installing this product and using common sense plays an important role as well. Pay attention to all safety warnings and any other special notes highlighted in the manual. Improper installation of the furnace or failure to follow safety warnings could result in serious injury, death, or property damage.

These instructions are primarily intended to assist qualified individuals experienced in the proper installation of this appliance. Some local codes require licensed installation/service personnel for this type of equipment. Please read all instructions carefully before starting the installation. Return these instructions to the customer's package for future reference.

INSTALLER NAME:		
CITY:	STATE:	
INSTALLATION ADDRESS:		
CITY:	STATE:	
UNIT MODEL #		
UNIT SERIAL #		
Minimum clearances per Figure 1 (page 5)?	YES	NO
Has the owner's information been reviewed with the home-owner?	YES	NO
Has the literature package been left near the furnace?	YES	NO

ELECTRICAL SYSTEM		
Electrical connections tight?	YES	NO
Line voltage polarity correct?	YES	NO
Supply Voltage (VOLTS):		
Has the thermostat been calibrated?	YES	NO
Is the thermostat level?	YES	NO
Is the heat anticipator setting correct?	YES	NO

GAS SYSTEM		
Gas Type (circle one):	Natural Gas	Propane
Gas pipe connections leak tested?	YES	NO
Gas Line Pressure (in - W.C.):		
Installation Altitude (FT.):		
Deration Percentage (%):		
Furnace Input (Btuh):		
Supply Air Temperature (° F):		
Return Air Temperature (° F):		
Temperature Rise (° F):		

COMBUSTION AIR & VENTING SYSTEM		
Is there adequate fresh air supply for combustion and ventilation?	YES	NO
Vent free from restrictions?	YES	NO
Filter(s) secured in place?	YES	NO
Filter(s) clean?	YES	NO
Flue connections tight?	YES	NO
Is there proper draft?	YES	NO

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Residential Furnaces
DOE 10 CFR Part 430

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