GAS FURNACE **80+ AFUE**

Installation Instructions

G7XA Series - Single Stage High Efficiency Furnace



Upflow/Horizontal Model

⚠ WARNING:

- **PROPOSITION 65 WARNING: This product contains chemicals known to the state of California to cause cancer, birth defects or other reproductive harm.**
- **This furnace is not approved for installation in mobile homes. Installing this furnace in a mobile home could cause fire, property damage, and/or personal injury.**

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.

⚠ WARNING:

FIRE OR EXPLOSION HAZARD

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

DO NOT DESTROY THIS MANUAL
KEEP IN A SAFE PLACE FOR FUTURE REFERENCE.

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SAFETY INFORMATION

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 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.

- Use only with type of gas approved for this furnace. Refer to the furnace rating plate.
- Install this furnace only in a location and position as specified in Table 1 (page 5).
- Provide adequate combustion and ventilation air to the furnace space as specified on pages 6 - 8.
- Combustion products must be discharged outdoors. Connect this furnace to an approved vent system only, as specified on page 8.
- Never test for gas leaks with an open flame. Use a commercially available soap solution to check all connections (page 11).
- This furnace is designed to operate with a maximum external pressure rise of 0.5 inches of water column. Consult Table 5 (pages 22 - 23), 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 temperature 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 9.
- A gas-fired furnace for installation in a residential garage must be installed as specified on page 6.

REQUIREMENTS AND CODES

This furnace must be installed in accordance with these instructions, all applicable local building codes or the current revision of the International Fuel Gas Code.

Any additional codes shown are for reference purposes only and do not necessarily have jurisdiction over local or state codes. Always consult with local authorities before installing any gas appliance.

GENERAL INSTRUCTIONS

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 the furnace is 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. For installations in confined spaces, see pages 6 - 7 for combustion air requirements.
- Installation 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

Clearances to Combustible Materials

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. However, 36 inches is strongly recommended.** Specific clearance information can be found on the furnace rating plate.

UPFLOW/HORIZONTAL INSTALLATION CLEARANCES*	
Left Side.....0 Inches	Back.....0 Inches
Right Side ..... 0 Inches	Top ..... 0 Inches
Vent.....1 Inch	Front..... 4 Inches†

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

† The IFGC requires that single wall metal vent connectors must maintain a minimum 5" clearance to combustibles, including the outer casing of the furnace.

NOTE: This furnace is listed for installation on combustible or non-combustible flooring. However, wood is the only combustible flooring allowed for installation.

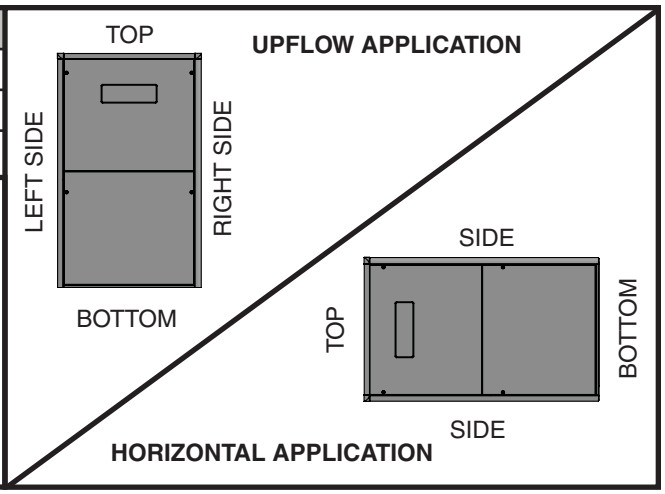


Table 1. Minimum Clearances to Combustible Materials

⚠ 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.**

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 and 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.

Heating Load

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. **Excessive oversizing of the furnace could cause the furnace and/or vent to fail prematurely.**

COMBUSTION AIR REQUIREMENTS

Provisions must be made during the installation of this furnace that provide an adequate supply of air for combustion.

General Information

- Instructions for determining the adequacy of an installation can be found in the current revision of the IFGC. **Consult local codes for special requirements**.

⚠ 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.

- Air openings on top of the furnace and 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. **This safety device is a manually reset switch. DO NOT reset or install jumper wires across this switch to defeat its function without identifying and correcting the fault condition.** If the switch must be replaced, use only the correct sized part specified in the Replacement Parts List provided online.

Installation In A Confined Space

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.

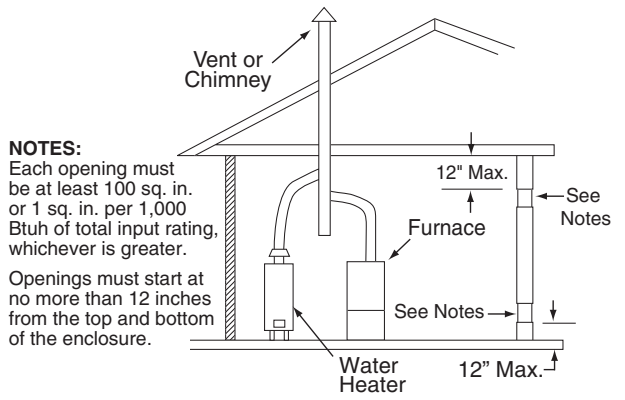
NOTE: The required sizing of these openings is determined by whether inside or outside air is used to support combustion, the method by which the air is brought to the space, and by the total input rate of all appliances in the space. In all cases, the minimum dimension of any combustion air opening 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 (Figure 1). See example.

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 1. Combustion Air Drawn from Inside

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 (Figure 2).

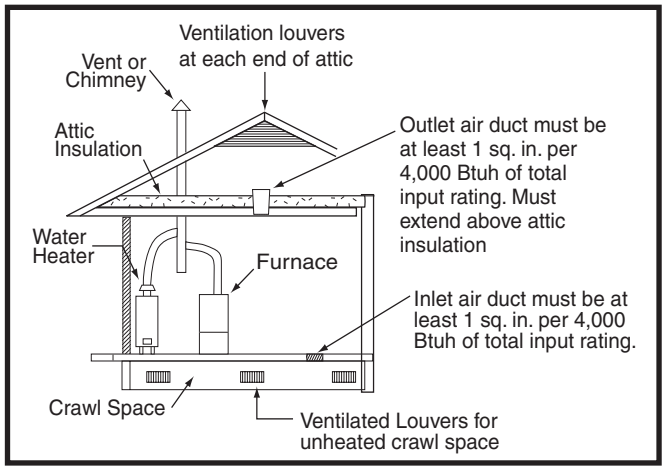
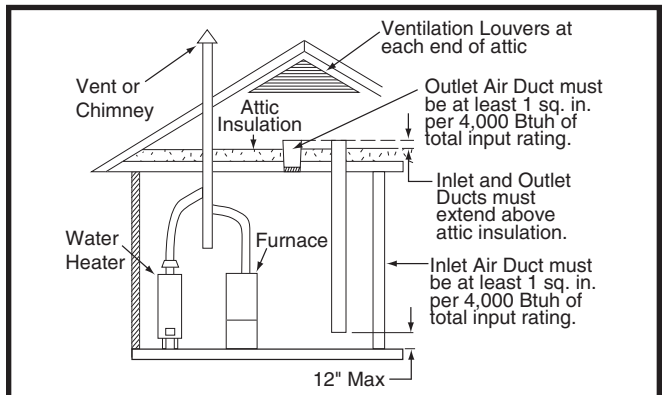


Figure 2. Combustion Air Drawn from a Crawl Space or Vented Attic

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. In installations drawing combustion air from a ventilated attic, both air ducts must extend above the attic insulation (Figure 3).

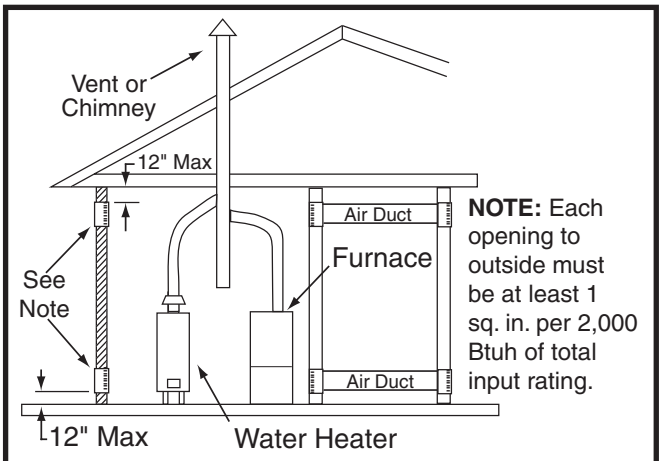


Total Input Rating (Btuh)	Minimum Free Area (Each Opening)	Round Duct Diameter
40,000	100 sq. In	12 inches
60,000	100 sq. In	12 inches
80,000	100 sq. In	12 inches
100,000	100 sq. In	12 inches
120,000	120 sq. In	13 inches
140,000	140 sq. In	14 inches
160,000	160 sq. In	15 inches

Figure 3. Combustion Air Drawn from Outside Through Vertical Ducts

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 (Figure 4).

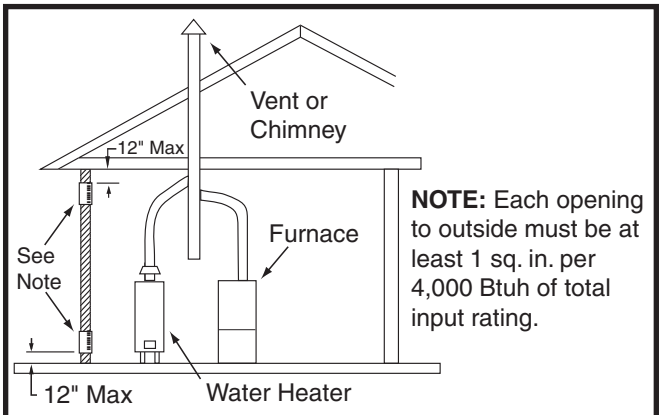


Total Input Rating (Btuh)	Minimum Free Area (Each Opening)	Round Duct Diameter
40,000	10 sq. In	5 inches
60,000	15 sq. In	6 inches
80,000	20 sq. In	7 inches
100,000	25 sq. In	8 inches
120,000	30 sq. In	9 inches
140,000	35 sq. In	10 inches
160,000	40 sq. In	10 inches

Figure 4. Combustion Air Drawn from Outside Through Horizontal Ducts

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 (Figure 5).



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 5. Combustion Air Drawn from Outside Through an Exterior Wall

Installation In An Unconfined Space
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).

VENTING REQUIREMENTS

⚠ 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 must be vented in compliance with the current revision of the International Fuel Gas Code and the instructions provided below. **Consult local codes for special requirements.**

Category I Venting
This furnace is listed as a Category I vented appliance. Category I furnaces generally operate with a slight negative pressure (draft) and must be vented vertically or near vertically. Additionally it is important to guard against excessive condensation.

IMPORTANT NOTE: This furnace must never be vented to a chimney or flue that services a fireplace or other appliance designed to burn solid fuel. If the furnace vent is to be connected to a chimney serving a fireplace, the fireplace must be sealed off from the chimney.

- Category I furnace installations must be connected to a factory built vent complying with a recognized standard, or a masonry or concrete chimney lined with a lining material acceptable to the authority having jurisdiction.

⚠ WARNING:

Venting into an unlined masonry chimney or concrete chimney is prohibited. This may result in improper draft and excess condensation forming in the chimney.

- This furnace may be vented with a dedicated venting system or common vented with other Category I appliances. The vent system dimensions and material must conform to local Codes.
- The venting system should be designed to have the minimum number of elbows or turns. All horizontal runs shall slope upwards from the furnace at ¼ inch per running foot of vent. Supports for the vent pipe must be installed a minimum of every five feet along the vent run to ensure no displacement after installation. **IMPORTANT NOTE: Under no circumstances shall any portion of the vent system extend into or pass through any return air duct, supply air duct, or plenum.**
- Single wall vent connectors may be used under the limited capacity ranges found in the vent sizing tables. **It is recommended that Type "B" double wall vent be used for the connector whenever possible.** An existing masonry chimney should be inspected and relined if necessary.
- Single wall metal vertical vents shall not be used for Category I venting. The furnace vent, if metal, may be insulated if local codes allow. Any part of the vent system, metal vent only, not exposed to weather, but which are exposed to temperatures below 35° F (1° C) must be insulated to prevent condensation. All vent insulation shall be foil backed fiberglass of one inch minimum thickness.
- Sheet metal fasteners should be used to secure the vent pipe to the furnace flue.
- When an existing furnace is removed from a vent system serving other appliances, the existing vent system may no longer be sized to properly vent the remaining appliances. An improperly sized venting system can result in the formation of condensate, leakage, or spillage. The existing vent system should also be checked to make sure it is in compliance with local codes. If it isn't, the vent system must be brought into compliance before installing the furnace.

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 and Air Ducts

- Supply and return air must be delivered to the furnace by duct(s) secured to the furnace casing, running full size and without interruption.
- Table 5 (pages 22 - 23) contains the maximum airflow and temperature rise data for each furnace input rate. **NOTE:** If the maximum airflow is 1,600 CFM or more, it is recommended that two openings be used for return air on upflow furnaces.
- It is recommended that the outlet duct contain a removable access panel that is accessible when the furnace is installed in service. The opening shall be of a size that smoke or reflected 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.
- If 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 specific requirements.

Supply Air Connections

To attach the supply air duct to the furnace, bend the furnace flanges (Figure 16, page 21) upward 90° with wide duct pliers. Position the duct on top of the furnace and secure together with sheet metal screws. The screws must penetrate the sheet metal casing and furnace flange. Tape or seal all seams if required by local code.

Return Air Connections

For upflow installations, the return air ductwork may be connected to the left side, right side, or bottom. The bottom panel (Figure 16) must be installed for left or right return air. **Do not use the back of the furnace for return air.**

Side Return Installations

⚠ WARNING:

The solid base of the furnace must be in place when the furnace is installed with side return air ducts. Removal of all or part of the base could cause circulation of combustible products into the living space and create potentially hazardous conditions, including carbon monoxide poisoning that could result in personal injury or death.

To attach the return air duct to the left or right side of the furnace, punch out the four knockouts (Figure 16) from the preferred side of the furnace. Using sharp metal cutters, cut an opening between all four knockouts to expose the blower assembly. Position the return air duct over the opening in the side and secure together with sheet metal screws. The screws must penetrate the duct and furnace cabinet.

Bottom Return Installations

The bottom panel (Figure 16) must be removed from the bottom of the furnace for bottom return air. Refer to pages 10 - 11 for removal instructions. Position the furnace over the return air duct and secure together with sheet metal screws. The screws must penetrate the duct and furnace cabinet.

FURNACE INSTALLATION

G7XA series gas furnaces are shipped ready for installation in the upflow or horizontal right or left positions. Access for positioning and servicing must be considered when locating the unit. See Table 1 (page 5) for the required clearances needed to move the furnace to its installation point (hallways, doorways, etc).

⚠ WARNING:

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

General Requirements

- The furnace must be leveled at installation and attached to a properly installed duct system. Refer to pages 8 - 9 for venting and circulating air requirements
- The furnace must be installed so that all electrical components are protected from water.
- The furnace must be installed upstream from a refrigeration system.

Upflow Installation

Side Return Air Inlet

This gas furnace is shipped with the bottom panel installed (Figure 16, page 21). If the upflow furnace is installed with side return air, the bottom panel must not be removed.

Bottom Return Air Inlet

If the furnace is installed where the bottom is the return air inlet, the bottom panel must be removed. See Bottom Panel Removal section.

Horizontal Installation

This gas furnace can be installed horizontally in an attic, basement, crawl space or alcove (Figure 6). It can also be suspended from a ceiling in a basement or utility room in either a right to left airflow or left to right airflow as shown in Figure 7.

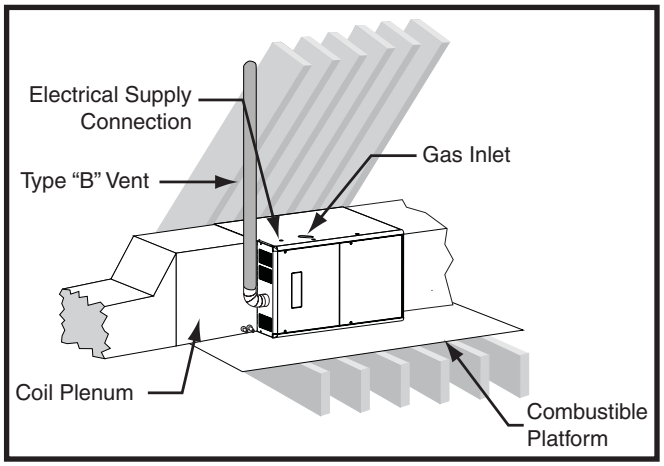


Figure 6. *XA Horizontal Installation on a Platform

The furnace is shipped with the bottom panel installed. If furnace is installed horizontally, remove the bottom panel from the furnace before attaching the duct system. See Bottom Panel Removal section.

If the furnace will be suspended from the ceiling, assemble a support frame (Figure 7) using slotted iron channel and full threaded rod. Fasten the frame together with nuts, washers, and lockwashers. Secure the support frame to the rafters with lag bolts. The furnace can also be suspended using steel straps around each end of the furnace. The straps should be attached to the furnace with sheet metal screws and to the rafters with bolts.

If the furnace is to be installed in an attic, it is required that a drip pan be placed under the furnace. If the installation is on a combustible platform (Figure 6), it is recommended that the drip pan extend at least 12 inches past the top and front of the furnace.

Note: It is recommended for further reduction of fire hazard that cement board or sheet metal be placed between the furnace and the combustible floor and extend 12 inches beyond the front of the door and top of the furnace.

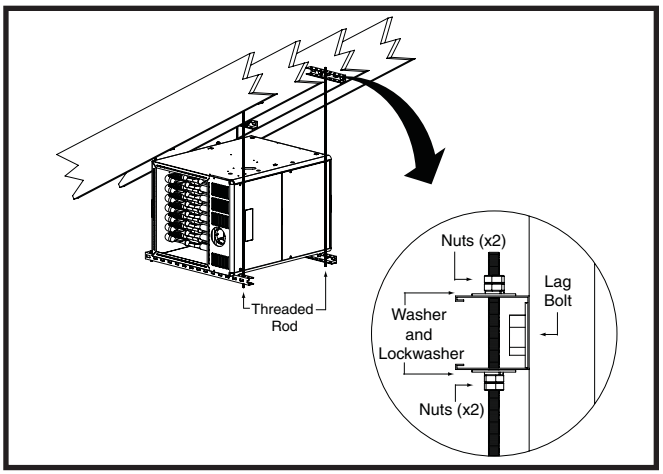


Figure 7. *XA Horizontally Suspended in Attic or Crawl Space

Bottom Panel Removal

The steps listed below explain how to remove the bottom panel from the furnace. See Figure 8 (page 11).

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

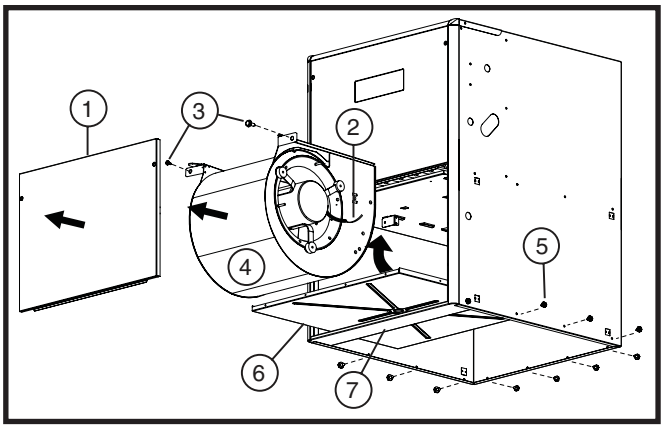


Figure 8. Bottom Panel Removal

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 9.

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

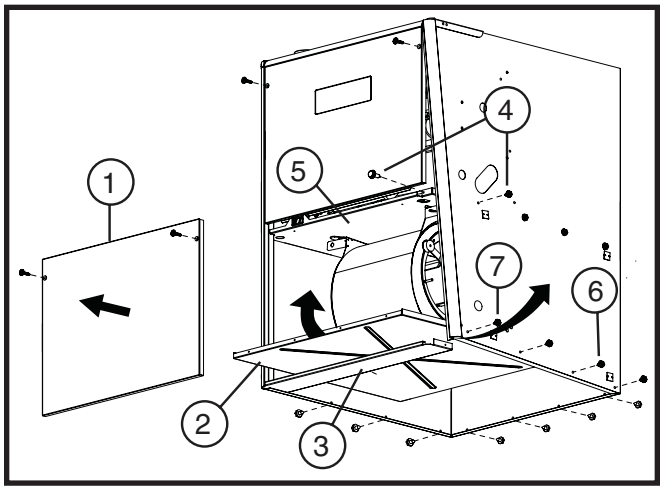


Figure 9. Alternate Removal Method

GAS SUPPLY AND PIPING

All gas piping must be installed in compliance with local codes and utility regulations.

IMPORTANT NOTES:

- **Some local regulations require the installation of a manual main shut-off valve and ground joint union external to the furnace as shown in Figure 10 (page 12). 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.**
- **Gas piping must never run in or through air ducts, chimneys, gas vents, or elevator shafts.**
- **Compounds used to seal joints on gas piping must be resistant to the actions of LP propane gas.**
- **The main gas valve and main power disconnect to the furnace must be properly labeled by the installer in case emergency shutdown is required.**
- **A drip leg should be installed in the vertical pipe run to the unit (Figure 10).**

Table 7 (page 25) lists gas pipe capacities for standard pipe sizes as a function of length in typical applications based on nominal pressure drop in the line. Table 8 (page 26) contains the orifice sizes and manifold pressure at various altitudes for natural gas installations.

The furnace may be installed for either left or right side gas entry. A typical gas service hookup is shown in Figure 10. **NOTE:** 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.

Leak Check

⚠ 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.

After the gas piping to the furnace is complete, all connections must be tested for gas leaks. This includes pipe connections at the main gas valve, emergency shutoff valve and flexible gas connectors (if applicable). Apply the soap and water solution 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

The installation of this furnace at altitudes above 2,000 feet must meet the requirements of the International Fuel Gas Code or local codes. High altitude conversion of this furnace depends on the installation altitude and heating value of the gas (at sea level) from your local gas utility. **NOTE:** At high altitudes, the heating value is always lower than heating value at sea level.

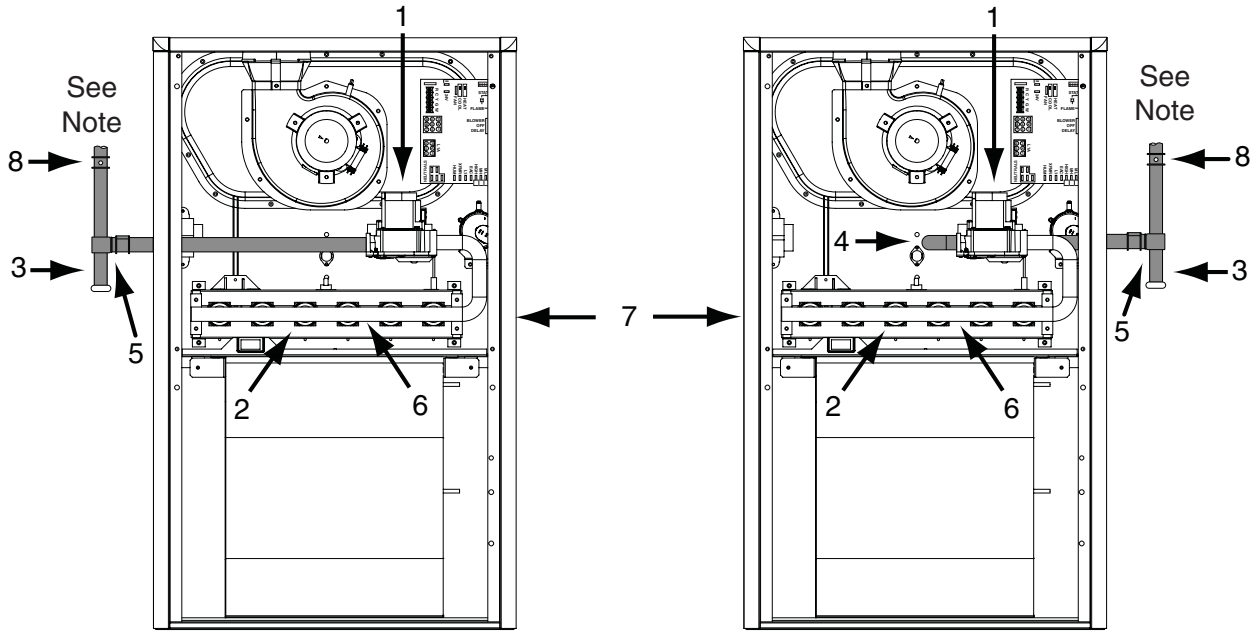
The *XA furnace is shipped from the factory with orifices and gas regulator settings for natural gas operation at sea level. At 2,000 feet, this appliance needs to be derated 4% per 1,000 feet of altitude. For example, the input needs to be reduced 8% at 2,000 feet, 12% at 3,000 feet, etc. This deration is in reference to the input rate and gas heating value at sea level.

⚠ 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.

From 2,000 to 5,000 feet, deration may be performed by adjusting the manifold pressure on the gas valve (see page 15). Above 5,000 feet, it is necessary to change both the orifice and manifold pressure. Table 8 (page 26) contains the manifold pressure and orifice sizes to use at various altitudes for natural gas installations.

UPFLOW FURNACE



Left Side Entry **Right Side Entry**

ITEM # and COMPONENT			
(1) Automatic Gas Valve (w/ manual shut-off)	(2) Burner Assembly	(3) Dripleg	(4) Elbow
(5) Ground Joint Union	(6) Manifold	(7) Plug	(8) Shut - Off Valve

NOTE: Some utilities require Shut- Off Valve to be 4 to 5 feet above floor.

Figure 10. Typical Gas Connection

When deration is completed, 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. **NOTE:** It will be necessary to check the input rate using the actual heating value, (which will be less) because the atmospheric pressure is also lower than sea level. See Verifying and Adjusting the Input Rate (page 15).

Conversion to LP/Propane

⚠ WARNING:

The 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 a factory supplied conversion kit. Failure to use the proper conversion kit can cause fire, explosion, property damage, carbon monoxide poisoning, personal injury, or death.

Conversion to LP/propane is detailed in the installation instructions provided with the conversion kit. Generally, this will require the replacement of the burner orifices and the spring found under the cap screw on the pressure regulator.

The LP/Propane Gas Sea Level and High Altitude Conversion Kit (P/N 904923) is an approved conversion kit for LP/propane conversion at altitudes between zero and 10,000 ft. above sea level. If the installation is above 2,000 ft., refer to Table 9 (page 26) to determine the correct orifice size and manifold pressure. When conversion is complete, verify the manifold pressure and input rate are correct as listed in Table 9. **Please follow the instructions provided with the kit**.

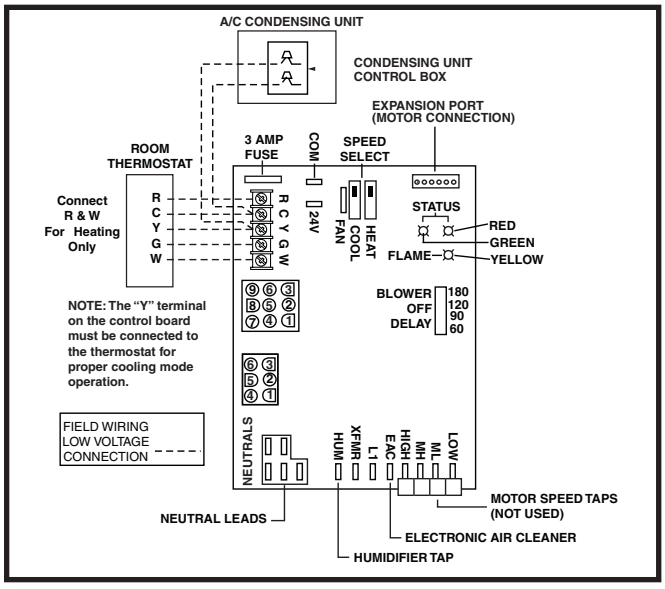


Figure 11. Low Voltage Field, Four-wire Heating/Cooling Applications

ELECTRICAL WIRING

Electrical connections must be in compliance with all applicable local codes. For electrical requirements, refer to Table 2 (page 14) or the furnace nameplate.

⚠ 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.

⚠ CAUTION:

Label all wires prior to disconnection when servicing controls. Wiring errors can cause improper and dangerous operation. Verify proper operation after servicing.

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).

Low Voltage Wiring

The thermostat must be installed according to the instructions supplied by the thermostat manufacturer. The thermostat must not be installed 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.

Low voltage connections (24 VAC) from the thermostat are wired to the terminal strip on the integrated control in the furnace. See Figure 11 for proper connections for heating only (two-wire) and heating/cooling (four-wire) applications. Recommended minimum wire gauge for thermostat wiring is shown in Table 2.

NOTE: Set the heat anticipator according to the instructions supplied by the thermostat manufacturer. To determine the heat anticipator setting, perform the following steps:

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.

Line Voltage Wiring

It is recommended that the line voltage (230 VAC) to the furnace be supplied from a dedicated branch circuit containing the correct fuse or circuit breaker for the furnace (Table 2).

IMPORTANT NOTES:

An electrical disconnect must be installed readily accessible from and located within sight of the furnace. Any other wiring methods must be acceptable to authority having jurisdiction.

Furnace Model Number G7XA	Furnace Input (Btu/hr)	Cabinet Width (in.)	Nominal Electrical Supply	Maximum Operating Voltage	Minimum Operating Voltage	Maximum Furnace Amperes	Minimum Wire Gauge	Maximum Fuse or Circuit Breaker Amps**
046-23A	46,000	14 ¼	230-50-1	230	208	6.3	14	15
061-24B	61,000	17 ½	230-50-1	230	208	9.7	14	20
076-24B	76,000	17 ½	230-50-1	230	208	9.7	14	20
092-35C	92,000	21	230-50-1	230	208	11.7	14	20
107-45D	107,000	24 ½	230-50-1	230	208	15.2	12	30

** Time-delay fuses or HACR-type circuit breakers are required.

Thermostat Wire Gauge	Recommended Thermostat Wire Length	
	2 - wire (Heating only)	4 or 5 wire (Heating/Cooling)
24	55 ft.	25 ft.
22	90 ft.	45 ft.
20	140 ft.	70 ft.
18	225 ft.	110 ft.

Table 2. Wire Length and Voltage Specifications

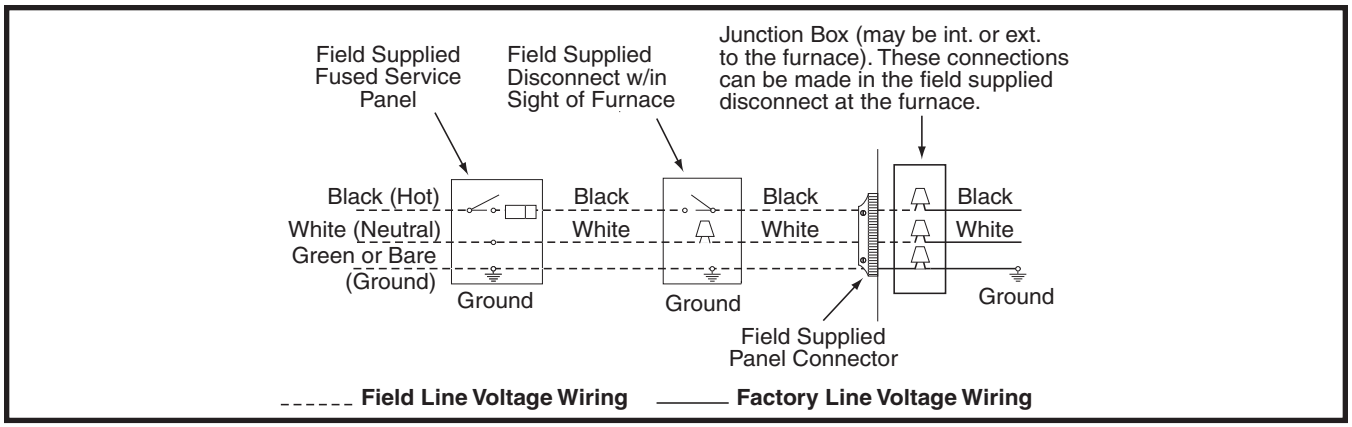


Figure 12. Line Voltage Field Wiring

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 12 or the wiring diagram label inside of the control door.

Twinning

The control boards on fixed speed furnaces are capable of being twinned to other furnaces of the same series, only if the following criteria are met:

- The circuit boards are the same.
- The thermostat wires and the 1/4 inch thick quick-connect terminals marked **"TWIN"** (Figure 13) on the furnace controls must be connected together.
- The fuses must remain installed on each board.
- Twinned furnaces must be properly grounded according to local codes.

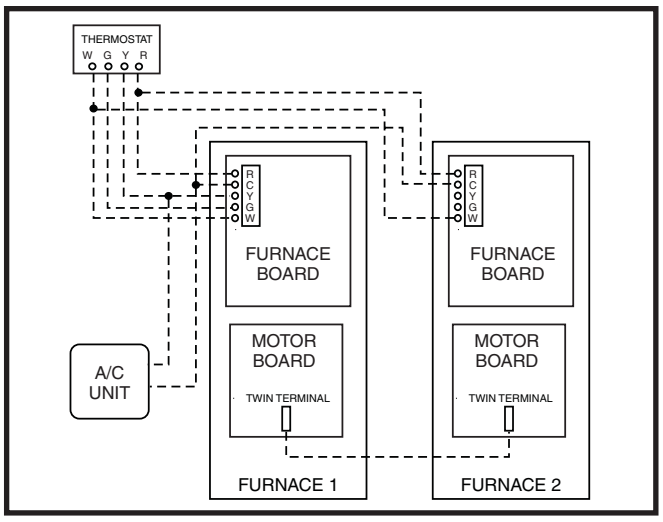


Figure 13. Twinning

IMPORTANT NOTE: G7 furnaces equipped with variable speed iSEER™ motors may not be twinned under any circumstances.

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 AND 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**, and **G**) are securely connected to the correct leads on the terminal strip of the circuit 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. If a switch reopens on startup, DO NOT reset the switch without identifying and correcting the fault condition. **DO NOT install a jumper wire across a switch to defeat its function.**

√ 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 17).
5. After 5 minutes of operation, set the thermostat below room temperature and verify steps 9 - 10 of the Operating Sequence.

Verifying and Adjusting Input Rate

The input rate must be verified at installation to prevent over-firing of the furnace. **The input rate must not exceed the specification listed 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.** To determine the exact input rate, perform these steps:

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 6 (page 25).
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.

Example:

- Time for 1 revolution of a gas meter with a 1 cubic ft dial = 40 seconds.
- From Table 6 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.

6. The manifold pressure must be set to the appropriate value for each installation by a qualified installer, service agency or the gas supplier.

⚠ 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.

a.) Obtain the manifold pressure setting required for this installation by referring to Table 8 (page 26) for Natural Gas or Table 9 for Propane gas

b.) Remove the regulator capscrew (Figure 14) from the INLET side of the regulator.

c.) Slowly turn the adjustment screw inside the regulator to obtain the appropriate manifold pressure. **NOTE:** Turning the screw clockwise increases the pressure and turning the screw counter-clockwise decreases the pressure. To prevent backing the screw all the way out from the valve, turn the screw slowly.

d.) Replace and tighten the regulator capscrew over the adjustment screw.

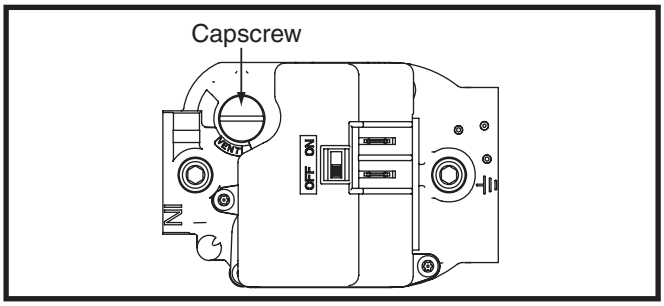


Figure 14. Regulator Capscrew

Verifying and 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.

The *XA furnace is equipped with a multi-speed motor. Heating, cooling, and fan speed selection is made by moving the switch located on the motor control board (Figure 15). **NOTE:** Lowering the blower speed will increase the temperature rise and a higher blower speed will decrease the temperature rise.

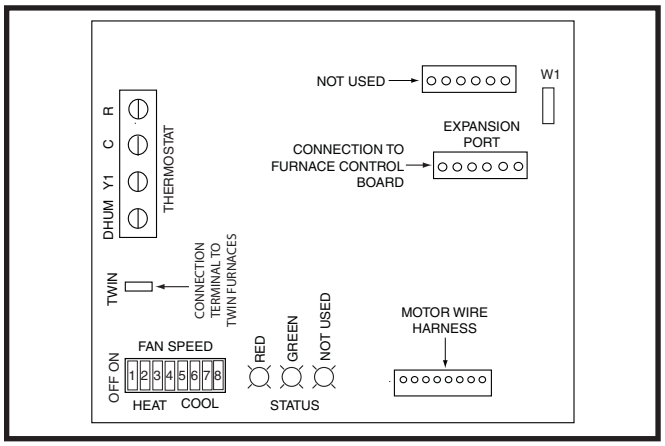


Figure 15. Motor Control Board

Verifying Burner Operation

⚠ CAUTION:

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

1. Remove the burner compartment door.
2. Set the thermostat above room temperature and observe the ignition sequence. **The burner 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 the thermostat setting to below room temperature.
4. Verify the burner flame is completely extinguished.
5. Replace the burner compartment door.

Verify 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 (page 17).
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.

OPERATING SEQUENCE

The operating sequences for the heating, cooling, and fan modes are described below. Refer to the field and furnace wiring diagrams: (Figure 11, page 13), (Figure 12, page 14), and (Figure 17, page 24).

Heating Cycle

1. The thermostat calls for heat by energizing the **W** terminal with 24VAC.
2. The control verifies if 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 control runs the inducer for a 30 second pre-purge.
5. The control energizes the igniter output for the appropriate warm-up time limit.
6. The control energizes the gas valve for 3 seconds.
7. If the flame 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. 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 second post-purge period.
10. Blower off timing begins when the thermostat is satisfied. The 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 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 **Y** terminal 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.

MAINTENANCE

⚠ WARNING:

These maintenance instructions are primarily intended to assist qualified technicians experienced in the proper maintenance and operation of this appliance.

To prevent electric shock, personal injury, or death, disconnect the electric power before performing any maintenance.

Proper maintenance is most important to achieve the best performance from a furnace. Follow these instructions for years of safe, trouble free operation.

- Always replace 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 is not being 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)

⚠ WARNING:

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

Air filter(s) are not supplied with the furnace as shipped from the factory. The installer must provide a high velocity filter and rack for a filter in the return air duct adjacent to the furnace, or in a return air grill to the furnace.

NOTE: It is recommended that filters be cleaned or replaced monthly. 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.

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 that 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. Refer to Figure 18 (page 27) for component locations.

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 its lowest setting.
3. Remove the burner door from the furnace.
4. Turn the gas control switch to the OFF position.

⚠ CAUTION:

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

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 burner assembly to the furnace.
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 that they were removed.
12. Follow the lighting instructions found on the furnace door to return the furnace to operation. Verify proper operation after servicing.

Cleaning Of Flue Passages

If the flue passages must be cleaned, follow the steps below. Refer to Figure 18 for component locations.

1. Shut off the gas supply to the furnace either at the meter or at the manual valve in the gas supply piping.
2. Turn off all power to the furnace and set the thermostat to the lowest temperature setting.
3. Remove the blower door from the furnace.
4. Turn the gas control switch to the OFF position.
5. Disconnect the wires from the gas valve, flame sensor, inducer, flame roll-out switch, limit switch, pressure switch and igniter.
6. Remove the silicone rubber tube from the inducer.
7. Using two wrenches, separate the ground-joint union in the gas supply piping at the furnace.
8. Remove the piping between the gas valve and the ground-joint union. (If applicable).
9. Remove all screws securing the burner assembly to the furnace.
10. Carefully remove the burner assembly from the furnace. **DO NOT DAMAGE THE IGNITER WHILE REMOVING THE BURNER ASSEMBLY.**
11. Remove all screws securing the inducer assembly to the vent pipe running out of the furnace.
12. Remove all screws securing the inducer assembly to the collector pan.
13. Carefully remove the inducer assembly and combustion tube assembly from the furnace.
14. Remove all screws securing the collector pan to the furnace.
15. Remove the collector pan and gasket from the furnace.
16. Attach a round wire brush to a length of high grade stainless steel cable. Attach the other end of the cable to a variable speed reversible drill. Slowly insert the cable into the top portion of the heat exchanger. Operate the drill alternating between forward and reverse, working the cable in and out several times to obtain sufficient cleaning. Repeat this sequence for each heat exchanger tube.
17. Remove all loosened debris from the heat exchanger tubes using a vacuum cleaner.
18. Using a bright light, check the condition of the upper and lower sections of the heat exchanger tubes.
19. Inspect the burners for accumulated dust or debris. If burners must be cleaned, see Cleaning of Burners section.
20. Replace all the parts in reverse order that they were removed.
21. Check gaskets for damage and replace if needed.
22. Follow the lighting instructions found on the furnace door to return the furnace to operation. Verify proper operation after servicing.

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.

Heat Exchanger and Burner Maintenance

The furnace should operate for many years without soot buildup in the flue passageways, however, the flue passageways, the vent system, and the burners should be inspected and cleaned (if required) by a qualified service technician annually to ensure continued safe operation. Particular attention must be given to identify deterioration from corrosion or other sources.

⚠ 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.

Vent System
Check the vent pipe and/or chimney to ensure that it is not corroded or blocked by debris. Any corroded section of vent pipe must be replaced, and any obstruction or blockage must be removed prior to operating the furnace.

DESCRIPTION OF COMPONENTS

The descriptions below are various functional components that affect the operation and shutting down of the furnace. Some of these components and their locations are shown in Figure 18 (page 27). Refer to the Operating Sequence section (page 17) for additional component information.

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
Blower switches prevent operation when blower is not operational.

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.

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).
- Are all the LED's on the furnace control board constantly ON? If not, refer to Tables 3 - 4 or the wiring diagram (Figure 17, page 24) 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 (Figure 18, page 27) and reset if necessary.
- 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 18, page 27) 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	

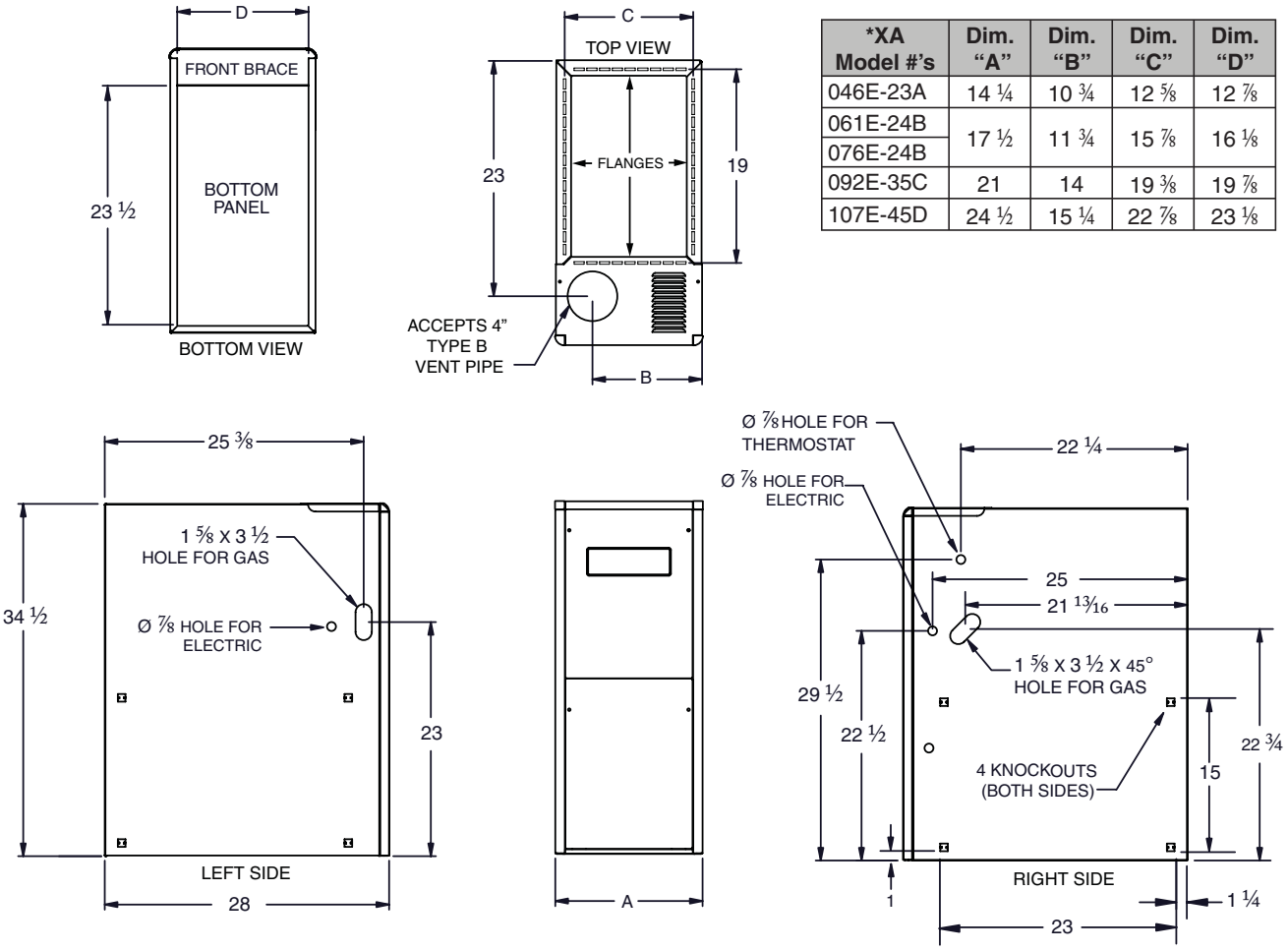
Table 3. Furnace Control Board Fault Conditions

Diagnostic Description	Red LED	Green LED
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

Table 4. Motor Control Board Fault Conditions

FIGURES AND TABLES

*XA 80+ Upflow/Horizontal Furnace



*XA Model #'s	Dim. "A"	Dim. "B"	Dim. "C"	Dim. "D"
046E-23A	14 ¼	10 ¾	12 ⅝	12 ⅞
061E-24B	17 ½	11 ¾	15 ⅞	16 ⅛
076E-24B				
092E-35C	21	14	19 ⅜	19 ⅞
107E-45D	24 ½	15 ¼	22 ⅞	23 ⅛

Figure 16. Furnace Dimensions

AIRFLOW DATA

*G7XA UPFLOW / HORIZONTAL GAS FURNACE																				
Model Number	Heating Input (Btuh)	Motor Switch Setting				External Static Pressure (in.w.c.)														
						0.1		0.2		0.3		0.4		0.5		0.6		0.7		0.8	
		1/5	2/6	3/7	4/8	CFM	Rise	CFM	Rise	CFM	Rise	CFM	Rise	CFM	Rise	CFM	Rise	CFM	Rise	CFM	Rise
XA046-A	46,000	0	0	0	0																
		1	0	0	0																
		0	1	0	0	600	57	555	61	510											
		1	1	0	0	705	48	670	51	635	54	600	57								
		0	0	1	0	775	44	740	46	705	48	665	51								
		1	0	1	0	900	38	870	39	835	41	800	43	765	45	730	47	695	49	660	52
		0	1	1	0	950	36	920	37	890	38	855	40	825	41	795	43	765	45	730	47
		1	1	1	0	1000	34	970	35	940	36	910	37	880	39	850	40	820	42	790	43
		0	0	0	1	1075	32	1045	33	1015	34	985	35	960	35	925	37	900	38	870	39
		1	0	0	1	1110	31	1080	32	1055	32	1025	33	1000	34	975	35	945	36	920	37
		0	1	0	1	1170	29	1140	30	1115	31	1090	31	1060	32	1035	33	1010	34	985	35
		1	1	0	1	1210	28	1185	29	1160	29	1130	30	1105	31	1080	32	1055	32	1025	33
		0	0	1	1	1520	22	1225	28	1200	28	1175	29	1150	30	1120	30	1095	31	1070	32
		1	0	1	1	1305	26	1280	27	1255	27	1230	28	1205	28	1180	29	1155	30	1130	30
		0	1	1	1	1350	25	1230	28	1305	26	1285	27	1260	27	1240	27	1215	28	1195	29
		1	1	1	1	1440	24	1400	24	1365	25	1230	28	1295	26	1255	27	1220	28	1185	29
XA061-B	61,000	0	0	0	0																
		1	0	0	0																
		0	1	0	0	600	74	555	80	510											
		1	1	0	0	705	63	670	66	635	70	600	74								
		0	0	1	0	775	57	740	60	705	63	665	67								
		1	0	1	0	900	49	870	51	835	53	800	56	765	58	730	61	695	64	660	67
		0	1	1	0	950	47	920	48	890	50	855	52	825	54	795	56	765	58	730	61
		1	1	1	0	1000	44	970	46	940	47	910	49	880	51	850	52	820	54	790	56
		0	0	0	1	1075	41	1045	43	1015	44	985	45	960	46	925	48	900	49	870	51
		1	0	0	1	1110	40	1080	41	1055	42	1025	43	1000	44	975	46	945	47	920	48
		0	1	0	1	1170	38	1140	39	1115	40	1090	41	1060	42	1035	43	1010	44	985	45
		1	1	0	1	1210	37	1185	38	1160	38	1130	39	1105	40	1080	41	1055	42	1025	43
		0	0	1	1	1520	29	1225	36	1200	37	1175	38	1150	39	1120	40	1095	41	1070	42
		1	0	1	1	1305	34	1280	35	1255	35	1230	36	1205	37	1180	38	1155	38	1130	39
		0	1	1	1	1350	33	1230	36	1305	34	1285	35	1260	35	1240	36	1215	37	1195	37
		1	1	1	1	1440	31	1400	32	1365	33	1230	36	1295	36	1255	35	1220	36	1185	38
XA076-B	76,000	0	0	0	0																
		1	0	0	0																
		0	1	0	0																
		1	1	0	0																
		0	0	1	0	775	73	740	76	705	80	665	85								
		1	0	1	0	900	63	870	65	835	67	800	70	765	74	730	77	695	81	660	85
		0	1	1	0	950	59	920	61	890	63	855	66	825	68	795	71	765	74	730	77
		1	1	1	0	1000	56	970	58	940	60	910	62	880	64	850	66	820	69	790	71
		0	0	0	1	1075	52	1045	54	1015	55	985	57	960	59	925	61	900	63	870	65
		1	0	0	1	1110	51	1080	52	1055	53	1025	55	1000	56	975	58	945	60	920	61
		0	1	0	1	1170	48	1140	49	1115	50	1090	52	1060	53	1035	54	1010	56	985	57
		1	1	0	1	1210	47	1185	48	1160	49	1130	50	1105	51	1080	52	1055	53	1025	55
		0	0	1	1	1520	37	1225	46	1200	47	1175	48	1150	49	1120	50	1095	51	1070	53
		1	0	1	1	1305	43	1280	44	1255	45	1230	46	1205	47	1180	48	1155	49	1130	50
		0	1	1	1	1350	42	1230	46	1305	43	1285	44	1260	45	1240	45	1215	46	1195	47
		1	1	1	1	1440	39	1400	40	1365	41	1230	46	1295	43	1255	45	1220	46	1185	48

Table 5. Maximum Airflow and Temperature Rises (°F) - Upflow/Horizontal Gas Furnaces

G7XA UPFLOW / HORIZONTAL GAS FURNACES																					
Model Number	Heating Input (Btuh)	Motor Switch Setting				External Static Pressure (in.w.c.)															
						0.1		0.2		0.3		0.4		0.5		0.6		0.7		0.8	
		1/5	2/6	3/7	4/8	CFM	Rise	CFM	Rise	CFM	Rise	CFM	Rise	CFM	Rise	CFM	Rise	CFM	Rise	CFM	Rise
XA092-C	92,000	0	0	0	0	1125	61	1040													
		1	0	0	0	1205	57	1120	61	1040	66										
		0	1	0	0	1305	52	1225	56	1150	59	1070	64								
		1	1	0	0	1430	48	1350	50	1270	54	1190	57	1110	61	1030	66				
		0	0	1	0	1525	45	1450	47	1375	50	1300	52	1225	56	1150	59	1075	63	1000	68
		1	0	1	0	1620	42	1540	44	1465	47	1390	49	1315	52	1240	55	1165	58	1090	63
		0	1	1	0	1695	40	1620	42	1545	44	1465	47	1390	49	1315	52	1235	55	1160	59
		1	1	1	0	1770	39	1700	40	1630	42	1555	44	1485	46	1410	48	1340	51	1265	54
		0	0	0	1	1875	36	1805	38	1730	39	1655	41	1580	43	1510	45	1435	47	1340	51
		1	0	0	1	1905	36	1840	37	1775	38	1710	40	1640	42	1575	43	1510	45	1445	47
		0	1	0	1	1980	34	1910	36	1845	37	1780	38	1715	40	1650	41	1580	43	1515	45
		1	1	0	1	2025	34	1960	35	1895	36	1830	37	1765	39	1700	40	1635	42	1570	43
		0	0	1	1	2085	33	2025	34	1960	35	1900	36	1840	37	1775	38	1715	40	1655	41
		1	0	1	1	2135	32	2070	33	2010	34	1945	35	1880	36	1815	38	1750	39	1685	40
		0	1	1	1	2200	31	2145	32	2090	33	2035	33	1980	34	1925	35	1870	36	1820	37
		1	1	1	1	2280	30	2225	31	2170	31	2115	32	2065	33	2010	34	1955	35	1900	36
XA107-D	107,000	0	0	0	0	1395	57	1350	59	1305	61	1260	63	1210	66	1165	68				
		1	0	0	0	1465	54	1420	56	1375	58	1330	60	1290	61	1245	64	1200	66		
		0	1	0	0	1555	51	1510	52	1470	54	1425	56	1380	57	1340	59	1295	61	1250	63
		1	1	0	0	1625	49	1585	50	1540	51	1500	53	1460	54	1415	56	1375	58	1335	59
		0	0	1	0	1690	47	1650	48	1610	49	1570	50	1530	52	1485	53	1445	55	1405	56
		1	0	1	0	1760	45	1715	46	1670	47	1625	49	1575	50	1530	52	1485	53	1440	55
		0	1	1	0	1835	43	1790	44	1745	45	1695	47	1650	48	1605	49	1555	51	1510	52
		1	1	1	0	1885	42	1840	43	1790	44	1745	45	1700	47	1655	48	1610	49	1565	51
		0	0	0	1	1945	41	1900	42	1850	43	1805	44	1760	45	1710	46	1665	48	1620	49
		1	0	0	1	1950	41	1905	42	1860	43	1820	44	1775	45	1735	46	1690	47	1650	48
		0	1	0	1	2075	38	2030	39	1990	40	1945	41	1900	42	1855	43	1810	44	1770	45
		1	1	0	1	2125	37	2085	38	2040	39	2000	40	1955	41	1910	41	1870	42	1825	43
		0	0	1	1	2170	37	2130	37	2090	38	2045	39	2005	40	1965	40	1925	41	1880	42
		1	0	1	1	2215	36	2180	36	2140	37	2105	38	2070	38	2035	39	2000	40	1965	40
		0	1	1	1									2225	36	2165	37	2100	38	2040	39
		1	1	1	1											2170	37	2120	37	2065	38

Notes:

1. Motor Switch Settings are for heating speeds using HEAT switches 1, 2, 3, & 4 and cooling speeds using COOL switches 5, 6, 7, & 8.
2. Two openings are recommended for airflows above 1,600 CFM if the filter(s) is (are) adjacent to the furnace.
3. Data is shown without filter.
4. Temperature rises in the table are approximate. Actual temperature rises may vary.
5. Temperature rises that are shaded in grey are for reference only. These conditions are not recommended.

Table 5. Continued

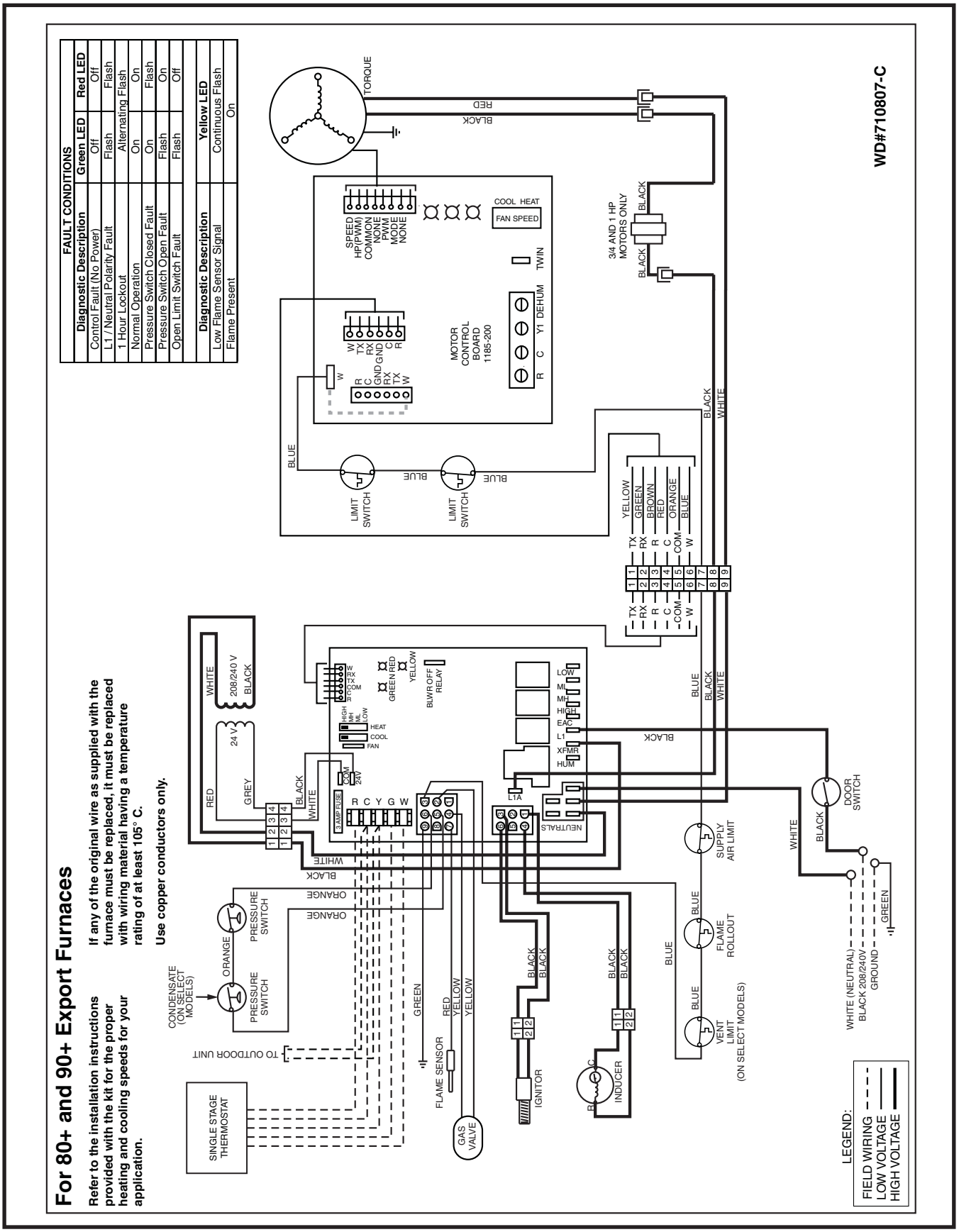


Figure 17. Wiring Diagram for G7XA Upflow Furnace

GAS INFORMATION

GAS FLOW RATES (CUBIC FEET PER HOUR)							
TIME FOR ONE REVOLUTION (SECONDS)	CUBIC FEET PER REVOLUTION OF GAS METER			TIME FOR ONE REVOLUTION (SECONDS)	CUBIC FEET PER REVOLUTION OF GAS METER		
	1	5	10		1	5	10
10	360	1,800	3,600	66	55	273	545
12	300	1,500	3,000	68	53	265	529
14	257	1,286	2,571	70	51	257	514
16	225	1,125	2,250	72	50	250	500
18	200	1,000	2,000	74	49	243	486
20	180	900	1,800	76	47	237	474
22	164	818	1,636	78	46	231	462
24	150	750	1,500	80	45	225	450
26	138	692	1,385	82	44	220	439
28	129	643	1,286	84	43	214	429
30	120	600	1,200	86	42	209	419
32	113	563	1,125	88	41	205	409
34	106	529	1,059	90	40	200	400
36	100	500	1,000	92	39	196	391
38	95	474	947	94	38	191	383
40	90	450	900	96	38	188	375
42	86	429	857	98	37	184	367
44	82	409	818	100	36	180	360
46	78	391	783	102	35	176	353
48	75	375	750	104	35	173	346
50	72	360	720	106	34	170	340
52	69	346	692	108	33	167	333
54	67	333	667	110	33	164	327
56	64	321	643	112	32	161	321
58	62	310	621	114	32	158	316
60	60	300	600	116	31	155	310
62	58	290	581	118	31	153	305
64	56	281	563	120	30	150	300

Table 6. Gas Flow Rates

CAPACITY OF BLACK IRON GAS PIPE (CU. FT. PER HOUR) FOR NATURAL GAS (SPECIFIC GRAVITY - 0.60)								
NOMINAL BLACK IRON PIPE DIAMETER (IN.)	LENGTH OF PIPE RUN (FT)							
	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		

NOTES

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.

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

Table 7. Black Iron Gas Pipe Capacities

NATURAL GAS					
ALTITUDE ABOVE SEA LEVEL	INPUT (BTU)				
	46,000	61,000	76,000	107,000	
0 to 1,999 FT	49	49	49	49	ORIFICE SIZE
	10.0	10.0	10.0	10.0	MANIFOLD PRESSURE
2,000 to 2,999 FT	49	49	49	49	ORIFICE SIZE
	9.0	9.0	9.0	9.0	MANIFOLD PRESSURE
3,000 to 4,999 FT	49	49	49	49	ORIFICE SIZE
	8.5	8.5	8.5	8.5	MANIFOLD PRESSURE
5,000 to 5,999 FT	51	51	51	51	ORIFICE SIZE
	10.0	10.0	10.0	10.0	MANIFOLD PRESSURE
6,000 to 7,999 FT	51	51	51	51	ORIFICE SIZE
	9.0	9.0	9.0	9.0	MANIFOLD PRESSURE
8,000 to 10,000 FT	51	51	51	51	ORIFICE SIZE
	8.5	8.5	8.5	8.5	MANIFOLD PRESSURE

Table 8. High Altitude Deration - Natural Gas

PROPANE					
ALTITUDE ABOVE SEA LEVEL	INPUT (BTU)				
	46,000	61,000	76,000	107,000	
0 to 1,999 FT	57	57	57	57	ORIFICE SIZE
	10.0	10.0	10.0	10.0	MANIFOLD PRESSURE
2,000 to 2,999 FT	57	57	57	57	ORIFICE SIZE
	9.0	9.0	9.0	9.0	MANIFOLD PRESSURE
3,000 to 4,999 FT	57	57	57	57	ORIFICE SIZE
	8.5	8.5	8.5	8.5	MANIFOLD PRESSURE
5,000 to 5,999 FT	59	59	59	59	ORIFICE SIZE
	10.0	10.0	10.0	10.0	MANIFOLD PRESSURE
6,000 to 7,999 FT	59	59	59	59	ORIFICE SIZE
	9.0	9.0	9.0	9.0	MANIFOLD PRESSURE
8,000 to 10,000 FT	59	59	59	59	ORIFICE SIZE
	8.5	8.5	8.5	8.5	MANIFOLD PRESSURE

Table 9. High Altitude Deration - Propane Gas

LOCATION OF FURNACE COMPONENTS

ITEM	COMPONENT NAME
1.	Blower Assembly
2.	Blower Door Switch
3.	Burner Assembly
4.	Flame Roll-Out Switch
5.	Flame Sensor
6.	Furnace Control Board
7.	Gas Manifold
8.	Gas Valve
9.	Igniter
10.	Inducer Assembly
11.	Main Air Limit Switch
12.	Motor Control Board
13.	Pressure Switch
14.	Transformer

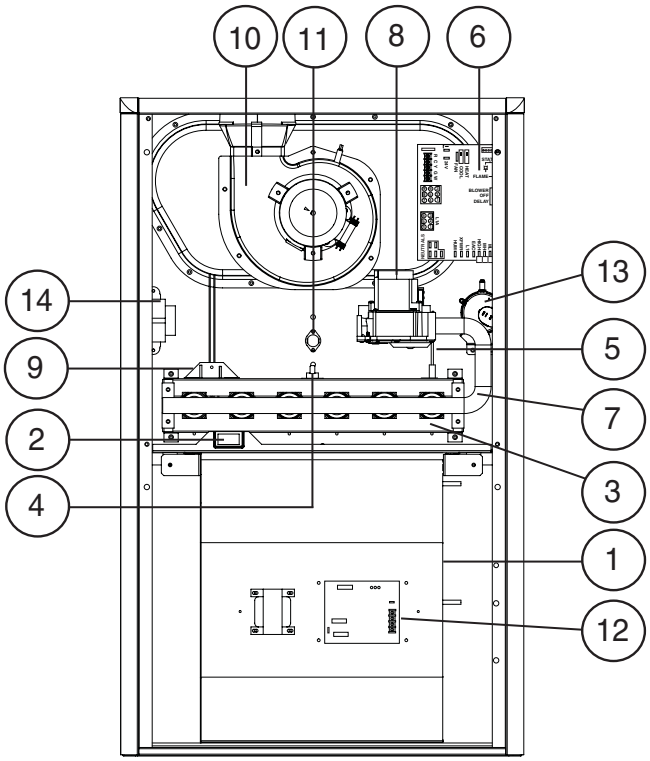


Figure 18. Upflow/Horizontal Gas Furnace

INSTALLATION/PERFORMANCE CHECK LIST

INSTALLER NAME:	
CITY _____	STATE _____

INSTALLATION ADDRESS:	
CITY _____	STATE _____

UNIT MODEL #_____
UNIT SERIAL # _____

Minimum clearances per Table 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.)		
Is there adequate fresh air supply for combustion and ventilation?	YES	NO
Installation Altitude: _____ (FT.)		
Deration Percentage: _____ (%)		
Furnace Input:_____ (Btuh)		
Supply Air Temperature: _____ (° F)		
Return Air Temperature: _____ (° F)		
Temperature Rise: _____ (° F)		

VENTING SYSTEM:		
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

CE 1450

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O'Fallon, MO

708910B

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