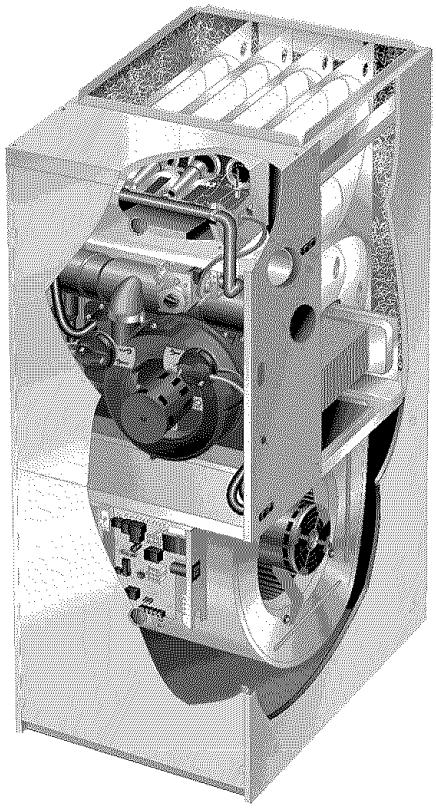
INSTALLATION INSTRUCTIONS

G51MP SERIES UNITS

GAS UNITS
505,065M
07/07
Supersedes 07/2005

Technical Publications
Litho U.S.A.



RETAIN THESE INSTRUCTIONS FOR FUTURE REFERENCE

Table of Contents

⚠ WARNING

FIRE OR EXPLOSION HAZARD.

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

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

Installation and service must be performed by a qualified installer, service agency or the gas supplier.

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.**

G51MP Unit Dimensions - inches (mm)

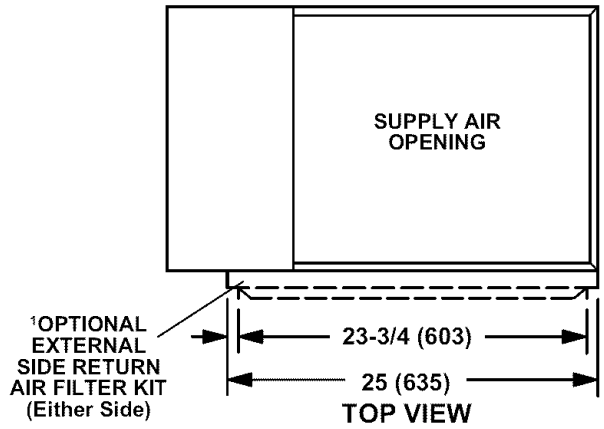
***NOTE - 60C and 60D size units installed in upflow applications that require air volumes over 1800 cfm (850 L/s) must have one of the following:**

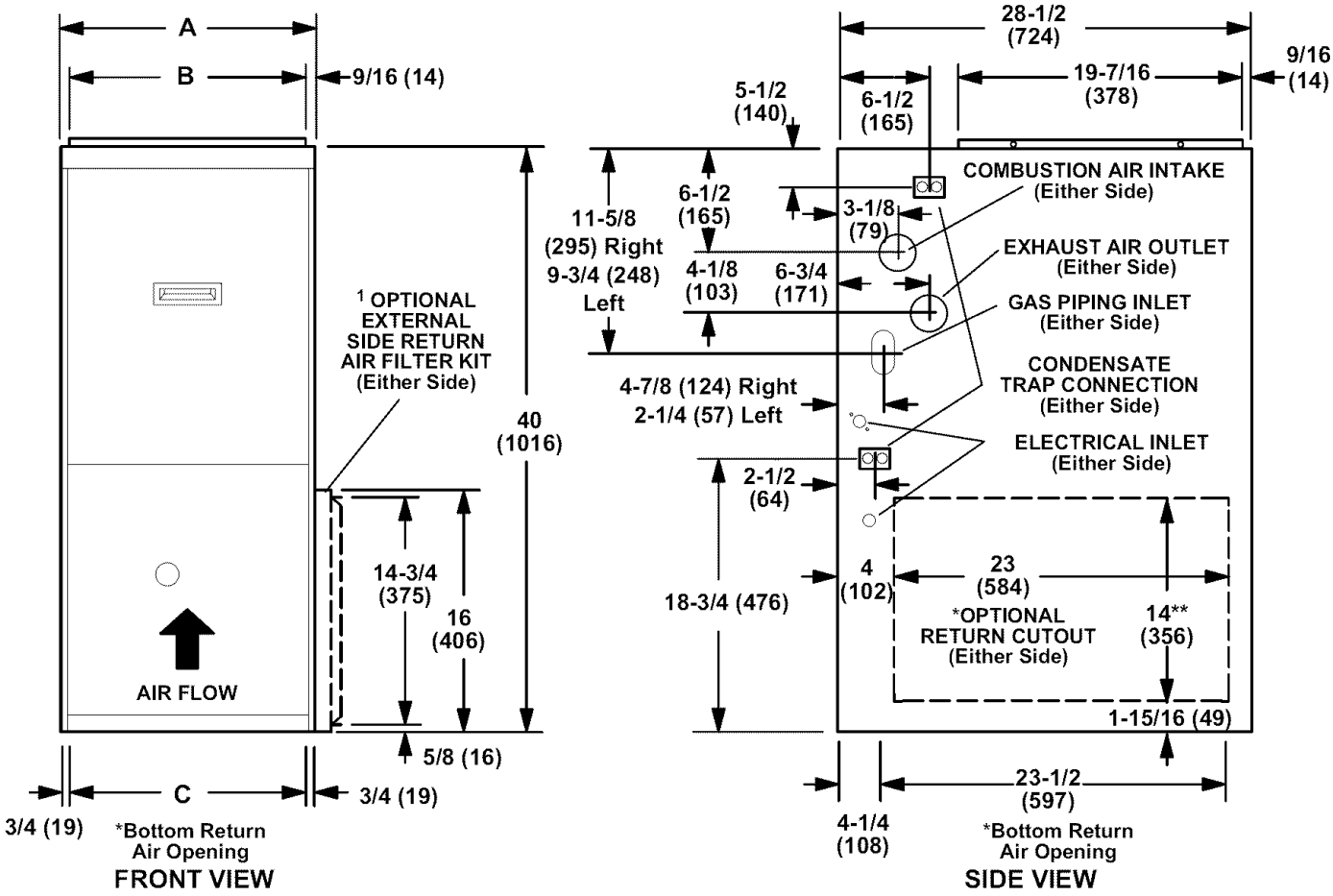
1. **Single side return air with transition, to accommodate 20 x 25 x 1 in. (508 x 635 x 25 mm) air filter. Required to maintain proper air velocity.**
2. **Single side return air with optional RAB Return Air Base**
3. **Bottom return air.**
4. **Return air from both sides.**
5. **Bottom and one side return air.**

Refer to Engineering Handbook for additional information.

****Consider sizing requirements for optional IAQ equipment before cutting side return opening.**

[1] Optional External Side Return Air Filter Kit is not for use with the optional RAB Return Air Base.





Model No.	A		B		C	
	in.	mm	in.	mm	in.	mm
G51MP-24B-045 G51MP-36B-045 G51MP-36B-070	17-1/2	446	16-3/8	416	16	406
G51MP-36C-090 G51MP-48C-090 G51MP-60C-090 G51MP-48C-110 G51MP-60C-110	21	533	19-7/8	454	19-1/2	495
G51MP-60D-135	24-1/2	622	23-3/8	546	23	584

G51MP Parts Arrangement

G51MP PARTS IDENTIFICATION

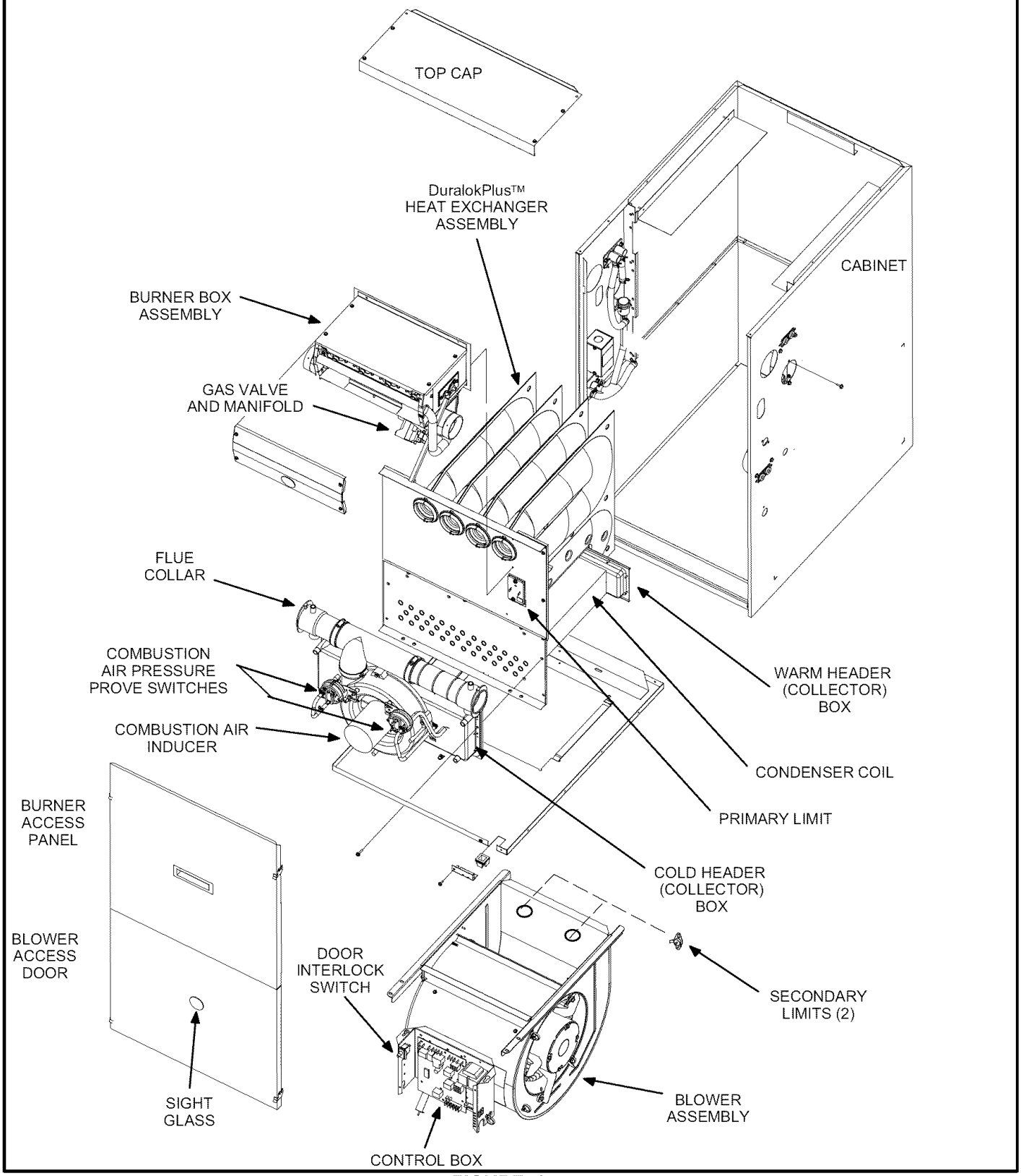


FIGURE 1

G51MP Gas Furnace

The G51MP gas furnace is shipped ready for installation in the upflow, downflow, horizontal left air discharge or horizontal right air discharge position. The furnace is shipped with the bottom panel in place. The bottom panel must be removed if the unit is to be installed in upflow applications with bottom return air. The bottom panel must also be removed and discarded in all downflow or horizontal applications.

The furnace is equipped for installation in natural gas applications. A conversion kit (ordered separately) is required for use in propane/LP gas applications.

The G51MP can be installed as either a Direct Vent or a Non-Direct Vent gas central furnace.

NOTE - In Direct Vent installations, combustion air is taken from outdoors and flue gases are discharged outdoors. In Non-Direct Vent installations, combustion air is taken from indoors and flue gases are discharged outdoors. See figure 2 for applications involving roof termination.

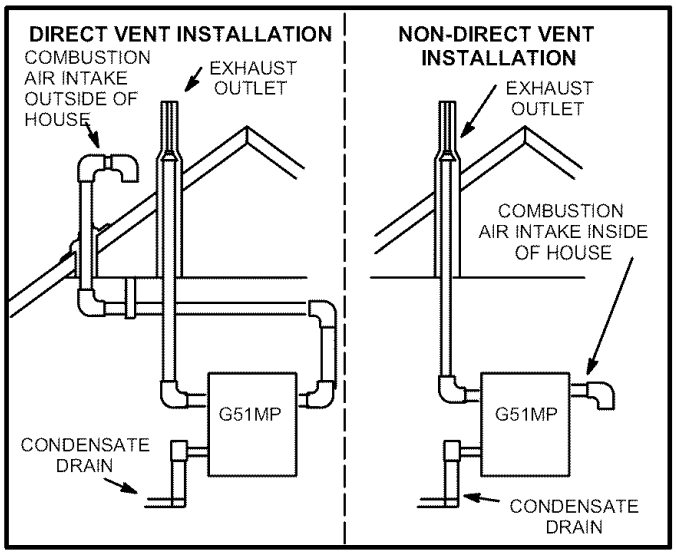


FIGURE 2

Shipping and Packing List

Package 1 of 1 contains

1 - Assembled G51MP unit

1 - Bag assembly containing the following:

- 3 - Screws
- 3 - Wire nuts
- 1 - Snap bushing
- 1 - Snap plug
- 1 - Wire tie
- 1 - Condensate trap
- 1 - Condensate trap cap
- 2 - 2" diameter vent / intake plugs
- 1 - 3" diameter cabinet plug (intake)
- 1 - 2" diameter debris screen

NOTE - G51MP-48C-110 and G51MP-60C-110 units also include a 2" diameter ABS street elbow, which is shipped on the blower deck in the heating compartment. G51MP-60D-135 units are shipped with a 3" to 2" ABS reducing elbow.

The following items may also be ordered separately:

1 - Thermostat

1 - Propane/LP changeover kit

Check equipment for shipping damage. If you find any damage, immediately contact the last carrier.

Safety Information

⚠WARNING

Improper installation, adjustment, alteration, service or maintenance can cause property damage, personal injury or loss of life. Installation and service must be performed by a qualified installer, service agency or the gas supplier.

⚠CAUTION

As with any mechanical equipment, personal injury can result from contact with sharp sheet metal edges. Be careful when you handle this equipment.

Use only the type of gas approved for use with this furnace. Refer to unit nameplate.

G51MP units are CSA International certified to ANSI Z21.47 and CSA 2.3 standards.

In the USA, installation of gas furnaces must conform with local building codes. In the absence of local codes, units must be installed according to the current National Fuel Gas Code (ANSI-Z223.1/NFPA 54). The National Fuel Gas Code is available from the following address:

American National Standards Institute, Inc.
11 West 42nd Street
New York, NY 10036

In Canada, installation must conform with current National Standard of Canada CSA-B149 Natural Gas and Propane Installation Codes, local plumbing or waste water codes and other applicable local codes.

In order to ensure proper unit operation in non-direct vent applications, combustion and ventilation air supply must be provided according to the current National Fuel Gas Code or CSA-B149 standard.

This furnace is CSA International certified for installation clearances to combustible material as listed on the unit nameplate and in the tables in figures 7, 12 and 16. Accessibility and service clearances must take precedence over fire protection clearances.

NOTE - For installation on combustible floors, the furnace shall not be installed directly on carpeting, tile, or other combustible material other than wood flooring.

For installation in a residential garage, the furnace must be installed so that the burner(s) and the ignition source are located no less than 18 inches (457 mm) above the floor. The furnace must be located or protected to avoid physical damage by vehicles. When a furnace is installed in a public garage, hangar, or other building that has a hazardous atmosphere, the furnace must be installed according to recommended good practice requirements and current National Fuel Gas Code or CSA B149 standards.

NOTE - Furnace must be adjusted to obtain a temperature rise within the range specified on the unit nameplate. Failure to do so may cause erratic limit operation and premature heat exchanger failure.

This G51MP furnace may be used as a high-static unit heater. The G51MP may also be installed in an aircraft hangar in accordance with the Standard for Aircraft Hangars (ANSI/NFPA No. 408-1990).

Installation in parking structures must be in accordance with the Standard for Parking Structures (ANSI/NFPA No. 88A-1991). Installation in repair garages must be in accordance with the Standard for Repair Garages (ANSI/NFPA No. 88B-1991).

This G51MP furnace must be installed so that its electrical components are protected from water.

When this furnace is used with cooling units, it shall be installed in parallel with, or on the upstream side of, cooling units to avoid condensation in the heating compartment. With a parallel flow arrangement, a damper (or other means to control the flow of air) must adequately prevent chilled air from entering the furnace. If the damper is manually operated, it must be equipped to prevent operation of either the heating or the cooling unit, unless it is in the full **HEAT** or **COOL** setting.

When installed, this furnace must be electrically grounded according to local codes. In addition, in the United States, installation must conform with the current National Electric Code, ANSI/NFPA No. 70. The National Electric Code (ANSI/NFPA No. 70) is available from the following address:

National Fire Protection Association
1 Battery March Park
Quincy, MA 02269

In Canada, all electrical wiring and grounding for the unit must be installed according to the current regulations of the Canadian Electrical Code Part I (CSA Standard C22.1) and/or local codes.

NOTE - This furnace is designed for a minimum continuous return air temperature of 60°F (16°C) or an intermittent operation down to 55°F (13°C) dry bulb for cases where a night setback thermostat is used. Return air temperature must not exceed 85°F (29°C) dry bulb.

The G51MP furnace may be installed in alcoves, closets, attics, basements, garages, and utility rooms.

This furnace design has not been CSA certified for installation in mobile homes, recreational vehicles, or outdoors.

Never use an open flame to test for gas leaks. Check all connections using a commercially available soap solution made specifically for leak detection.

Lennox does not recommend the use of G51MP units as a construction heater during any phase of construction. Very low return air temperatures, harmful vapors and operation of the unit with clogged or misplaced filters will damage the unit.

G51MP units may be used for heating of buildings or structures under construction, if the following conditions are met:

- *The vent system must be permanently installed per these installation instructions.*
- *A room thermostat must control the furnace. The use of fixed jumpers that will provide continuous heating is not allowed.*
- *The return air duct must be provided and sealed to the furnace.*
- *Return air temperature range between 60°F (16°C) and 80°F (27°C) must be maintained.*
- *Air filters must be installed in the system and must be maintained during construction.*
- *Air filters must be replaced upon construction completion.*
- *The input rate and temperature rise must be set per the furnace rating plate.*
- *One hundred percent (100%) outdoor air must be provided for combustion air requirements during construction. Temporary ducting may supply outdoor air to the furnace. Do not connect duct directly to the furnace. Size the temporary duct following these instructions in section for Combustion, Dilution and Ventilation Air in a confined space with air from outside.*
- *The furnace heat exchanger, components, duct system, air filters and evaporator coils must be thoroughly cleaned following final construction clean-up.*
- *All furnace operating conditions (including ignition, input rate, temperature rise and venting) must be verified according to these installation instructions.*

NOTE - The Commonwealth of Massachusetts stipulates these additional requirements:

- ***Gas furnaces shall be installed by a licensed plumber or gas fitter only.***
- ***The gas cock must be "T handle" type.***
- ***When a furnace is installed in an attic, the passageway to and service area surrounding the equipment shall be floored.***

General

These instructions are intended as a general guide and do not supersede local codes in any way. Consult authorities having jurisdiction before installation.

In addition to the requirements outlined previously, the following general recommendations must be considered when installing a G51MP furnace:

- Place the furnace as close to the center of the air distribution system as possible. The furnace should also be located close to the chimney or vent termination point.
- When the furnace is installed in non-direct vent applications, do not install the furnace where drafts might blow directly into it. This could cause improper combustion and unsafe operation.
- When the furnace is installed in non-direct vent applications, do not block the furnace combustion air opening with clothing, boxes, doors, etc. Air is needed for proper combustion and safe unit operation.
- When the furnace is installed in an attic or other insulated space, keep insulation away from the furnace.
- When the furnace is installed in an unconditioned space, consider provisions required to prevent freezing of condensate drain system.

⚠ CAUTION

G51MP unit should not be installed in areas normally subject to freezing temperatures.

⚠WARNING

Product contains fiberglass wool.

Disturbing the insulation in this product during installation, maintenance, or repair will expose you to fiberglass wool. Breathing this may cause lung cancer. (Fiberglass wool is known to the State of California to cause cancer.)

Fiberglass wool may also cause respiratory, skin, and eye irritation.

To reduce exposure to this substance or for further information, consult material safety data sheets available from address shown below, or contact your supervisor.

Lennox Industries Inc.
P.O. Box 799900
Dallas, TX 75379-9900

Combustion, Dilution & Ventilation Air

If the G51MP is installed as a Non-Direct Vent Furnace, follow the guidelines in this section.

NOTE - In Non-Direct Vent installations, combustion air is taken from indoors and flue gases are discharged outdoors.

⚠ WARNING

Insufficient combustion air can cause headaches, nausea, dizziness or asphyxiation. It will also cause excess water in the heat exchanger resulting in rusting and premature heat exchanger failure. Excessive exposure to contaminated combustion air will result in safety and performance related problems. Avoid exposure to the following substances in the combustion air supply:

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

In the past, there was no problem in bringing in sufficient outdoor air for combustion. Infiltration provided all the air that was needed. In today's homes, tight construction practices make it necessary to bring in air from outside for combustion. Take into account that exhaust fans, appliance vents, chimneys, and fireplaces force additional air that could be used for combustion out of the house. Unless outside air is brought into the house for combustion, negative pressure (outside pressure is greater than inside pressure) will build to the point that a downdraft can occur in the furnace vent pipe or chimney. As a result, combustion gases enter the living space creating a po-tentially dangerous situation.

In the absence of local codes concerning air for combustion and ventilation, use the guidelines and procedures in this section to install G51MP furnaces to ensure efficient and safe operation. You must consider combustion air needs and requirements for exhaust vents and gas piping. A portion of this information has been reprinted with permission from the National Fuel Gas Code (ANSI-

Z223.1/NFPA 54). This reprinted material is not the complete and official position of the ANSI on the referenced subject, which is represented only by the standard in its entirety.

In Canada, refer to the CSA B149 installation codes.

⚠CAUTION

Do not install the furnace in a corrosive or contaminated atmosphere. Meet all combustion and ventilation air requirements, as well as all local codes.

All gas-fired appliances require air for the combustion process. If sufficient combustion air is not available, the furnace or other appliance will operate inefficiently and unsafely. Enough air must be provided to meet the needs of all fuel-burning appliances and appliances such as exhaust fans which force air out of the house. When fireplaces, exhaust fans, or clothes dryers are used at the same time as the furnace, much more air is required to ensure proper combustion and to prevent a downdraft. Insufficient air causes incomplete combustion which can result in carbon monoxide.

In addition to providing combustion air, fresh outdoor air dilutes contaminants in the indoor air. These contaminants may include bleaches, adhesives, detergents, solvents and other contaminants which can corrode furnace components.

The requirements for providing air for combustion and ventilation depend largely on whether the furnace is installed in an unconfined or a confined space.

Unconfined Space

An unconfined space is an area such as a basement or large equipment room with a volume greater than 50 cubic feet (1.42 m^3) per 1,000 Btu (.29 kW) per hour of the combined input rating of all appliances installed in that space. This space also includes adjacent rooms which are not separated by a door. Though an area may appear to be unconfined, it might be necessary to bring in outdoor air for combustion if the structure does not provide enough air by infiltration. If the furnace is located in a building of tight construction with weather stripping and caulking around the windows and doors, follow the procedures in the air from outside section.

Confined Space

A confined space is an area with a volume less than 50 cubic feet (1.42 m^3) per 1,000 Btu (.29 kW) per hour of the com-bined input rating of all appliances installed in that space. This definition includes furnace closets or small equipment rooms.

When the furnace is installed so that supply ducts carry air circulated by the furnace to areas outside the space containing the furnace, the return air ***must be*** handled by ducts which are sealed to the furnace casing and which terminate outside the space containing the furnace. This is especially important when the furnace is mounted on a platform in a confined space such as a closet or small equipment room. Even a small leak around the base of the unit at the platform or at the return air duct connection can cause a potentially dangerous negative pressure condition. Air for combustion and ventilation can be brought into the confined space either from inside the building or from outside.

Air from Inside

If the confined space that houses the furnace adjoins a space categorized as unconfined, air can be brought in by providing two permanent openings between the two spaces. Each opening must have a minimum free area of 1 square inch (645 mm^2) per 1,000 Btu (.29 kW) per hour of total input rating of all gas-fired equipment in the confined space. Each opening must be at least 100 square inches (64516 mm^2). One opening shall be within 12 inches (305 mm) of the top of the enclosure and one opening within 12 inches (305 mm) of the bottom. See figure 3.

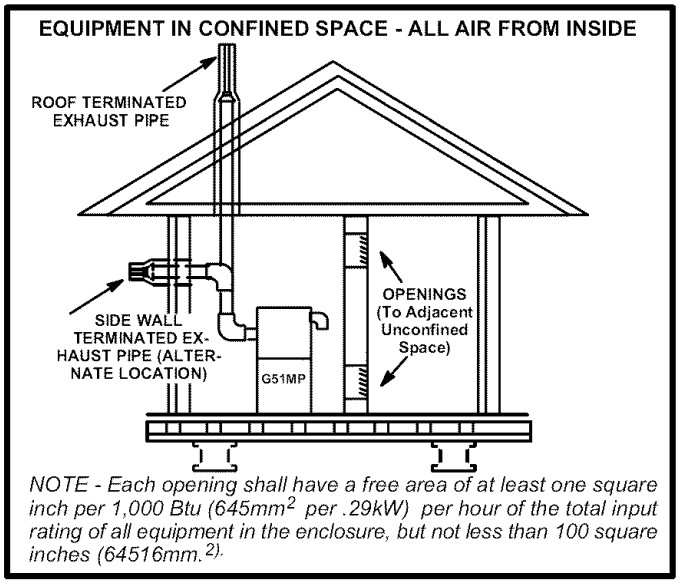


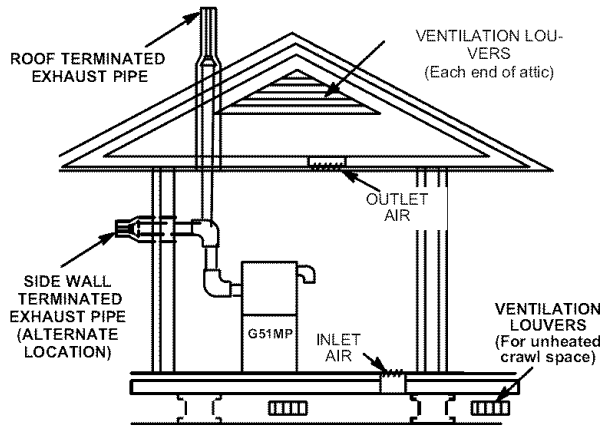
FIGURE 3

Air from Outside

If air from outside is brought in for combustion and ventilation, the confined space shall be provided with two permanent openings. One opening shall be within 12" (305mm) of the top of the enclosure and one within 12" (305mm) of the bottom. These openings must communicate directly or by ducts with the outdoors or spaces (crawl or attic) that freely communicate with the outdoors or indirectly through vertical ducts. Each opening shall have a minimum free area of 1 square inch per 4,000 Btu (645mm^2 per 1.17kW) per hour of total input rating of all equipment in the enclosure. When communicating with the outdoors through horizontal ducts,

each opening shall have a minimum free area of 1 square inch per 2,000 Btu (645mm^2 per .59kW) per total input rating of all equipment in the enclosure (See figure 4).

EQUIPMENT IN CONFINED SPACE - ALL AIR FROM OUTSIDE
(Inlet Air from Crawl Space and Outlet Air to Ventilated Attic)



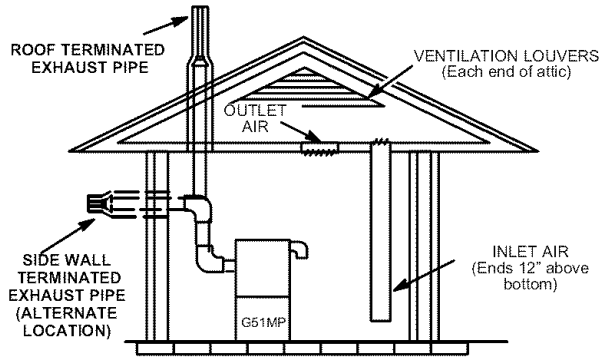
NOTE-The inlet and outlet air openings shall each have a free area of at least one square inch per 4,000 Btu (645mm^2 per 1.17kW) per hour of the total input rating of all equipment in the enclosure.

FIGURE 4

If air from outside is brought in for combustion and ventilation, the confined space must have two permanent openings. One opening shall be within 12 inches (305 mm) of the top of the enclosure and one opening within 12 inches (305 mm) of the bottom. These openings must communicate directly or by ducts with the outdoors or spaces (crawl or attic) that freely communicate with the outdoors or indirectly through vertical ducts. Each opening shall have a minimum free area of 1 square inch (645 mm^2) per 4,000 Btu (1.17 kW) per hour of total input rating of all equipment in the enclosure. See figures 4 and 5. When communicating with the outdoors through horizontal ducts, each opening shall have a minimum free area of 1 square inch (645 mm^2) per 2,000 Btu (.56 kW) per total input rating of all equipment in the enclosure. See figure 6.

When ducts are used, they shall be of the same cross-sectional area as the free area of the openings to which they connect. The minimum dimension of rectangular air ducts shall be no less than 3 inches (75 mm). In calculating free area, the blocking effect of louvers, grilles, or screens must be considered. If the design and free area of protective covering is not known for calculating the size opening required, it may be assumed that wood louvers will have 20 to 25 percent free area and metal louvers and grilles will have 60 to 75 percent free area. Louvers and grilles must be fixed in the open position or interlocked with the equipment so that they are opened automatically during equipment operation.

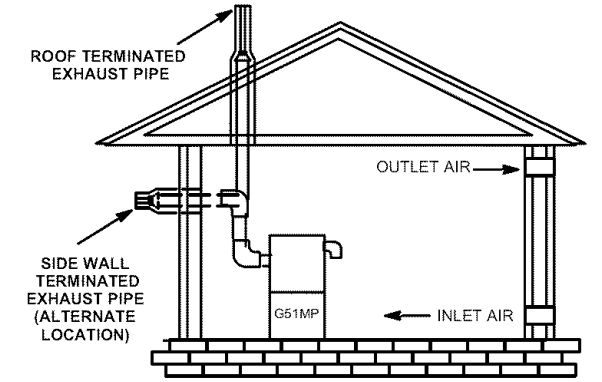
EQUIPMENT IN CONFINED SPACE - ALL AIR FROM OUTSIDE
(All Air Through Ventilated Attic)



NOTE-The inlet and outlet air openings shall each have a free area of at least one square inch per 4,000 Btu (645mm^2 per 1.17kW) per hour of the total input rating of all equipment in the enclosure.

FIGURE 5

EQUIPMENT IN CONFINED SPACE -
ALL AIR FROM OUTSIDE



NOTE-Each air duct opening shall have a free area of at least one square inch per 2,000 Btu (645mm^2 per .59kW) per hour of the total input rating of all equipment in the enclosure. If the equipment room is located against an outside wall and the air openings communicate directly with the outdoors, each opening shall have a free area of at least 1 square inch per 4,000 Btu (645mm^2 per 1.17kW) per hour of the total input rating of all other equipment in the enclosure.

FIGURE 6

Installation - Setting Equipment

⚠WARNING

Do not install the furnace on its front or its back. Do not connect the return air ducts to the back of the furnace. Doing so will adversely affect the operation of the safety control devices, which could result in personal injury or death.

Select a location that allows for the required clearances that are listed on the unit nameplate. Also consider gas supply connections, electrical supply, vent connection, condensate trap and drain connections, and installation and service clearances [24 inches (610 mm) at unit front]. *The unit must be level from front to back and side to side.*

NOTE - 1/3 hp blower motors are equipped with four flexible mounting legs, and 1/2 hp blower motors are equipped with three flexible legs and one rigid leg. The rigid leg is equipped with a shipping bolt and a flat white plastic washer (rather than the rubber mounting grommet used with a flexible mounting leg). ***The bolt and washer must be removed before the furnace is placed into operation.*** *After the bolt and washer have been removed, the rigid leg will not touch the blower housing.*

Allow for clearances to combustible materials as indicated on the unit nameplate. Minimum clearances for closet or alcove installations are shown in figures 7, 12 and 16.

⚠ WARNING

Blower access panel must be securely in place when blower and burners are operating. Gas fumes, which could contain carbon monoxide, can be drawn into living space resulting in personal injury or death.

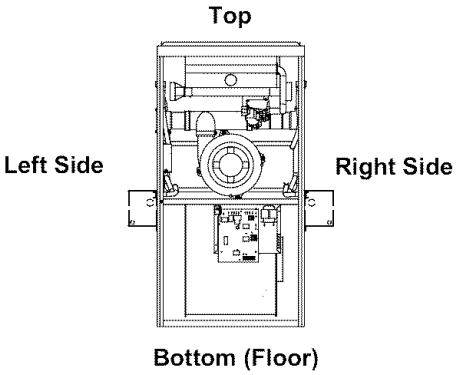
⚠ WARNING

Improper installation of the furnace can result in personal injury or death. Combustion and flue products must never be allowed to enter the return air system or air in the living space. Use sheet metal screws and joint tape to seal return air system to furnace.
In platform installations with furnace return, the furnace should be sealed airtight to the return air plenum. A door must never be used as a portion of the return air duct system. The base must provide a stable support and an airtight seal to the furnace. Allow absolutely no sagging, cracks, gaps, etc.
For no reason should return and supply air duct systems ever be connected to or from other heating devices such as a fireplace or stove, etc. Fire, explosion, carbon monoxide poisoning, personal injury and/or property damage could result.

Upflow Applications

The G51MP gas furnace can be installed as shipped in the upflow position. Refer to figure 7 for clearances.

Installation Clearances



Top/Plenum	1 in. (25 mm)
*Front	0
Back	0
Sides	0†
Vent	0
Floor	0‡

*Front clearance in alcove installation must be 24 in. (610 mm). Maintain a minimum of 24 in. (610 mm) for front service access.
†Allow proper clearances to accommodate condensate trap and vent pipe installation.
‡For installations on a combustible floor, do not install the furnace directly on carpeting, tile or other combustible materials other than wood flooring.

FIGURE 7

Return Air -- Upflow Units

Return air can be brought in through the bottom or either side of the furnace installed in an upflow application. If the furnace is installed on a platform with bottom return, make an airtight seal between the bottom of the furnace and the platform to ensure that the furnace operates properly and safely. The furnace is equipped with a removable bottom panel to facilitate installation.

Markings are provided on both sides of the furnace cabinet for installations that require side return air. Cut the furnace cabinet at the maximum dimensions shown on page 2.

NOTE - When air volumes over 1800 cfm (850 L/s) are required with 60C or 60D models in an upflow application, the following return air options are available:

1. ***Return air from single side with transition which will accommodate 20 x 25 x 1 in. (508 x 635 x 25 mm) air filter. (Required to maintain proper air velocity.) See figure 8.***
2. ***Return air from single side with optional RAB Return Air Base. See figure 10.***
3. ***Return air from bottom.***
4. ***Return air from both sides.***
5. ***Return air from bottom and one side.***

Refer to Engineering Handbook for additional information.

G51MP applications which include side return air and a condensate trap installed on the same side of the cabinet require either a return air base or field-fabricated transition to accommodate an optional IAQ accessory taller than 14.2".

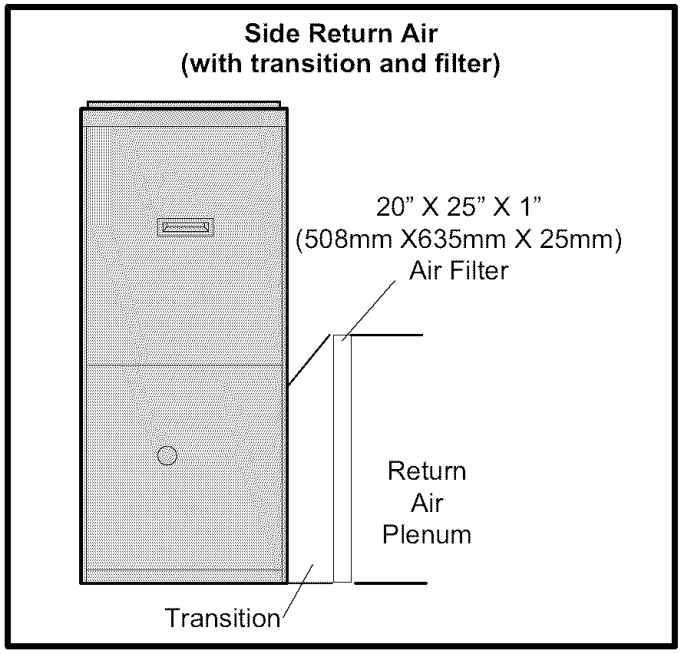


FIGURE 8

Removing the Bottom Panel

Remove the two screws that secure the bottom cap to the furnace. Pivot the bottom cap down to release the bottom panel. Once the bottom panel has been removed, reinstall the bottom cap. See figure 9.

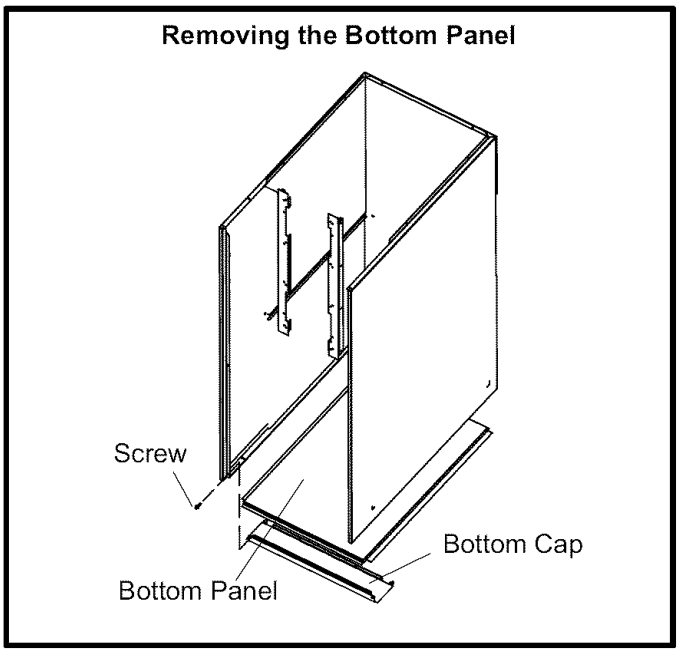
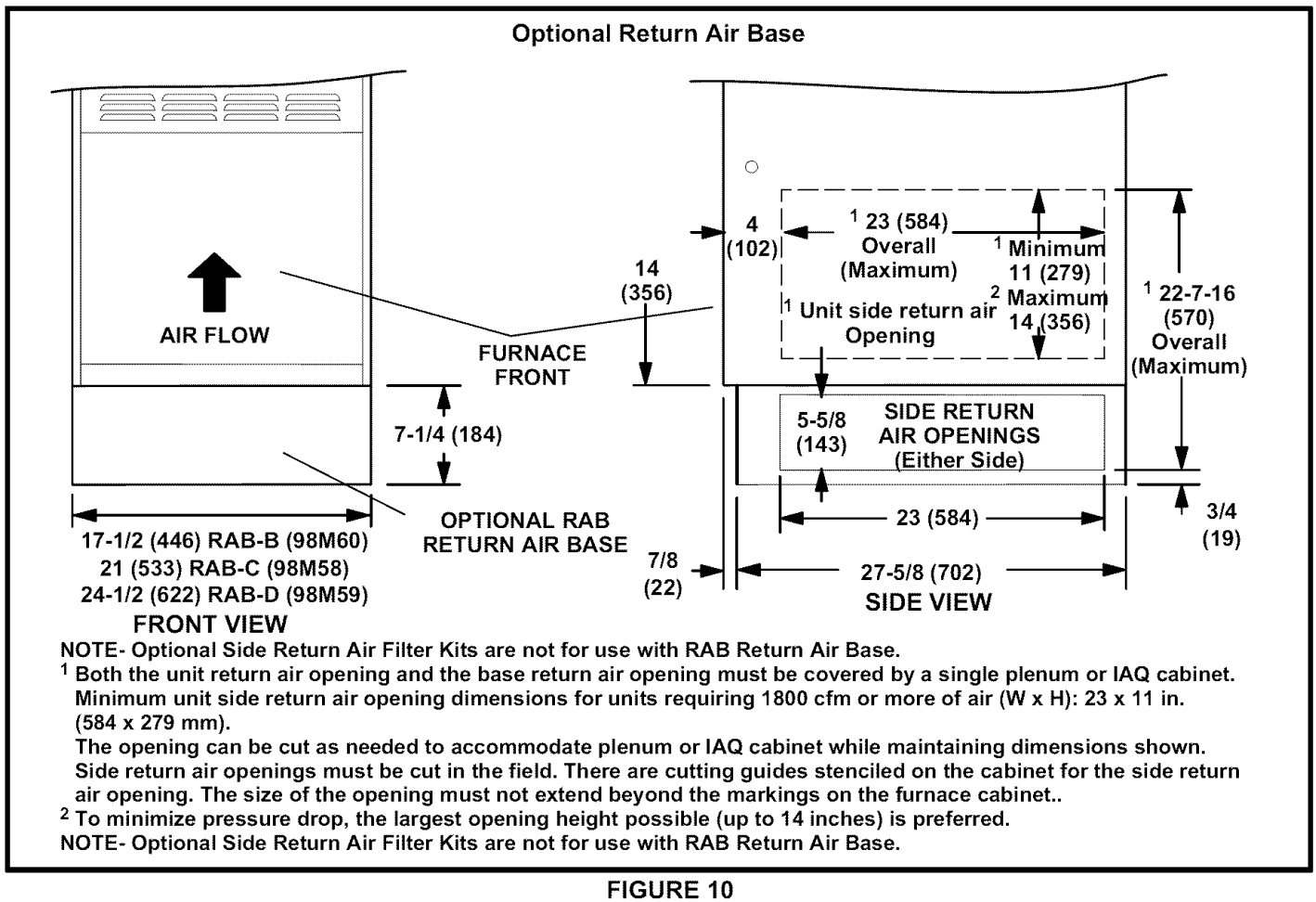


FIGURE 9



NOTE- Optional Side Return Air Filter Kits are not for use with RAB Return Air Base.

[1] Both the unit return air opening and the base return air opening must be covered by a single plenum or IAQ cabinet. Minimum unit side return air opening dimensions for units requiring 1800 cfm or more of air (W x H): 23 x 11 in. (584 x 279 mm).

The opening can be cut as needed to accommodate plenum or IAQ cabinet while maintaining dimensions shown. Side return air openings must be cut in the field. There are cutting guides stenciled on the cabinet for the side return air opening. The size of the opening must not extend beyond the markings on the furnace cabinet..

[2] To minimize pressure drop, the largest opening height possible (up to 14 inches) is preferred.

NOTE- Optional Side Return Air Filter Kits are not for use with RAB Return Air Base.

FIGURE 10

Leveling an Upflow Unit

When the side return air inlets are used in an upflow application, it may be necessary to install leveling bolts on the bottom of the furnace. Use field-supplied corrosion-resistant 5/16 inch machine bolts (4) and nuts (8). See figure 11.

NOTE - The maximum length of the bolt is 1-1/2 inches.

1 - Lie the furnace on its back and drill a 5/16 inch diameter hole in each corner of the furnace's bottom. See figure 11 for the correct location of the holes. Drill through the bottom panel and the bottom flange of the cabinet.
2 - Install one bolt and two nuts into each hole. Screw the first nut onto a bolt and then insert the bolt into a hole. A flat washer may be added between the nut and the bottom of the unit.
3 - Screw another nut onto the bolt on the inside of the furnace base. A flat washer may be added between the nut and the bottom of the unit.
4 - Adjust the outside nut to the appropriate height and tighten the inside nut to secure the arrangement.

NOTE - The unit may be tilted back-to-front a maximum of 1". This will ensure proper draining of the heat exchanger.

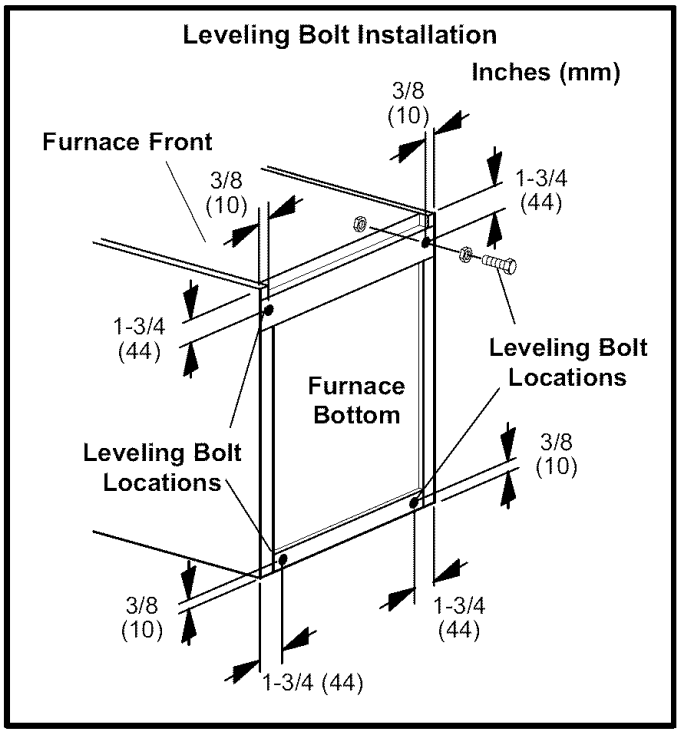


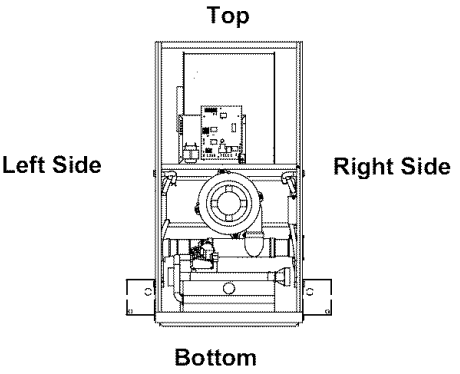
FIGURE 11

Downflow Applications

The unit may be installed three ways in downflow applications: on non-combustible flooring, on combustible flooring using an additive base, or on a reverse-flow cooling cabinet. **Do not drag the unit across the floor in the downflow position. Flange damage will result.**

Refer to figure 12 for clearances in downflow applications.

Downflow Application Installation Clearances



Top	0
*Front	0
Back	0
Sides	0†
Vent	0
Floor	NC‡

***Front clearance in alcove installation must be 24 in. (610 mm). Maintain a minimum of 24 in. (610 mm) for front service access.**
†Allow proper clearances to accommodate condensate trap and vent pipe installation.
‡The furnace may be installed on a combustible wood floor if an optional additive base is installed between the furnace and the combustible floor.

FIGURE 12

Installation on Non-Combustible Flooring

1 - Cut floor opening keeping in mind clearances listed on unit rating plate. Also keep in mind gas supply connections, electrical supply, flue and air intake connections and sufficient installation and servicing clearances. See table 1 for correct floor opening size.
2 - Flange warm air plenum and lower the plenum into the opening.
3 - Set the unit over the plenum and seal the plenum to the unit.
3 - Ensure that the seal is adequate.

TABLE 1
NON-COMBUSTIBLE FLOOR OPENING SIZE

Model No.	Front to Rear		Side to Side	
	in.	mm	in.	mm
B Cabinet (17.5")	19 - 3/4	502	16 - 5/8	422
C Cabinet (21")	19 - 3/4	502	20-1/8	511
D Cabinet (24.5")	19 - 3/4	502	23 - 5/8	600

NOTE - Floor opening dimensions listed are 1/4 inch (6 mm) larger than the unit opening. See dimension drawing on page 2.

Installation on Combustible Flooring

1 - When unit is installed on a combustible floor, an additive base must be installed between the furnace and the floor. The base must be ordered separately for the following cabinet sizes:
   - B cabinet 17.5" - # 11M60
   - C cabinet 21" - # 11M61
   - D cabinet 24.5" - # 11M62

   See table 2 for opening size to cut in floor.

⚠ CAUTION

The furnace and additive base shall not be installed directly on carpeting, tile, or other combustible material other than wood flooring.

TABLE 2
ADDITIVE BASE FLOOR OPENING SIZE

Model	Front to Rear		Side to Side	
	in.	mm	in.	mm
B Cabinet (17.5")	22	559	18 - 3/4	476
C Cabinet (21")	22	559	22 - 3/4	578
D Cabinet (24.5")	22	559	25 - 3/4	654

2 - After opening is cut, set additive base into opening.

3 - Check fiberglass strips on additive base to make sure they are properly glued and positioned.

4 - Lower supply air plenum into additive base until plenum flanges seal against fiberglass strips.

NOTE - Be careful not to damage fiberglass strips. Check for a tight seal.

5 - Set the furnace over the plenum.

6 - Ensure that the seal between the furnace and plenum is adequate.

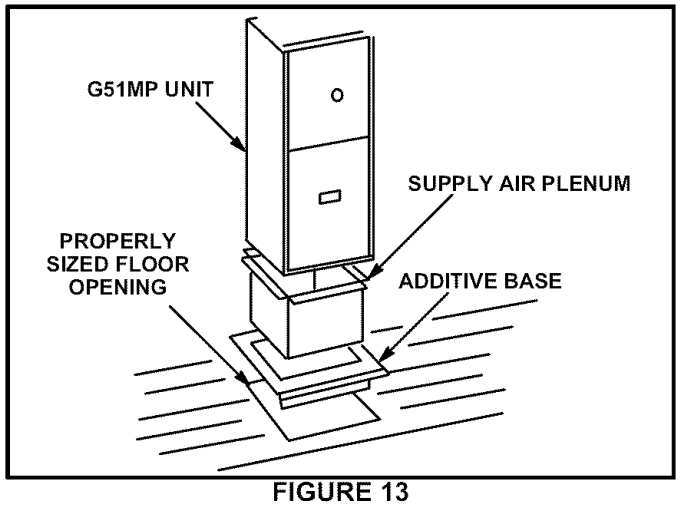


FIGURE 13

Installation on Cooling Cabinet

1 - Refer to reverse-flow coil installation instructions for correctly sized opening in floor and installation of cabinet.

2 - When cooling cabinet is in place, set and secure the furnace according to the instructions that are provided with the cooling coil. Secure the furnace to the cabinet.

3 - Seal the cabinet and check for air leaks.

Return Air Opening -- Downflow Units

The following steps should be taken when installing plenum:

1 - Bottom edge of plenum should be flanged with a hemmed edge (See figure 14 or 15).

2 - Sealing strips should be used to ensure an airtight seal between the cabinet and the plenum.

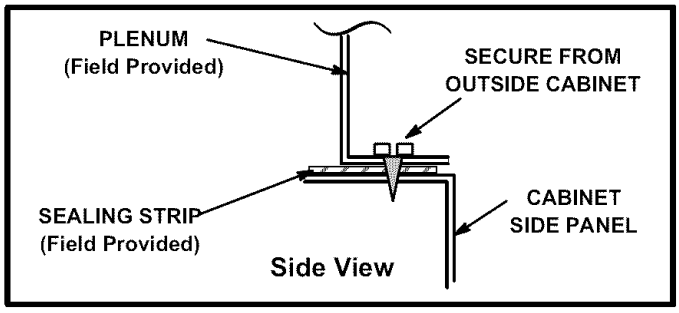


FIGURE 14

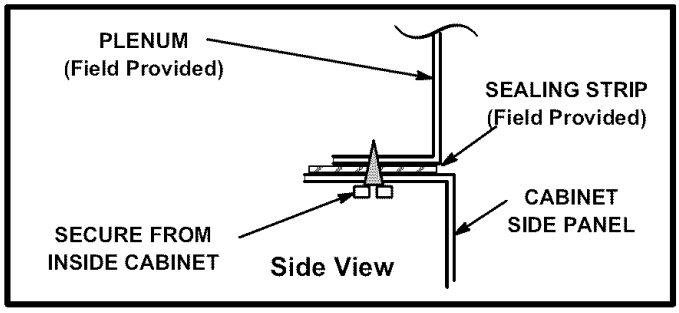


FIGURE 15

3 - In all cases, plenum should be secured to top of furnace using sheet metal screws.

4 - Make certain that an adequate seal is made.

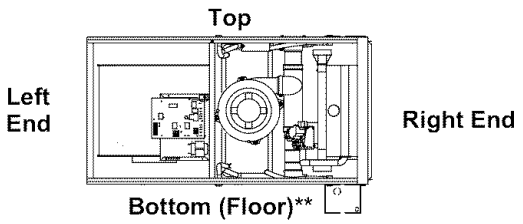
Horizontal Applications

The G51MP furnace can be installed in horizontal applications with either right- or left-hand air discharge.

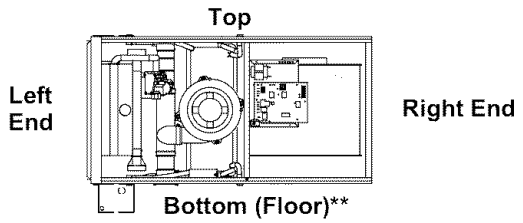
Refer to figure 16 for clearances in horizontal applications.

Horizontal Application Installation Clearances

Right-Hand Discharge



Left-Hand Discharge



Top	0
Front*	0
Back	0
Ends	0
Vent	0
Floor	0‡

*Front clearance in alcove installation must be 24 in. (610 mm). Maintain a minimum of 24 in. (610 mm) for front service access.
**A 5-1/2" service clearance must be maintained below the unit to provide for servicing of the condensate trap.
‡For installations on a combustible floor, do not install the furnace directly on carpeting, tile or other combustible materials other than wood flooring.

FIGURE 16

This furnace may be installed in either an attic or a crawlspace. The G51MP may also be installed as a unit heater. Either suspend the furnace from roof rafters or floor joists, as shown in figure 17, or install the furnace on a platform, as shown in figure 18. The unit must be supported at both ends and beneath the blower deck to prevent sagging.

*NOTE - **In horizontal applications, the unit must be level side to side.** The unit may be tilted back to front a maximum of 1". This will ensure proper draining of the heat exchanger.*

Installation of Horizontal Furnace Suspended in Attic

NOTE - If unit is suspended in attic or crawl space, horizontal support kit (Cat No 56J18 ordered separately) must be used to ensure proper unit support and coil drainage.

1 - Select location for unit keeping in mind service and other necessary clearances. See figure 16.

2 - Provide service platform in front of unit.

3 - Fabricate a drain pan fitted with a 1/2 inch or 3/4 inch N.P.T. fitting.

4 - Using 3/8 inch rods and support frame kit (ordered separately), fabricate suspension hangers for unit keeping in mind front service access clearances.

5 - Mount unit on support frame as shown in figure 17. Unit must be level to ensure proper coil drainage.

6 - Continue with exhaust, condensate and intake line piping instructions.

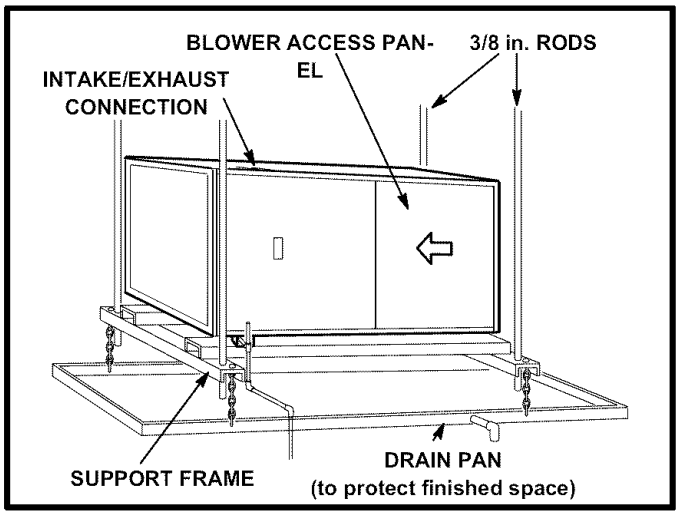


FIGURE 17

7 - Hang drain pan below support frame as shown in figure 17. Leave 5-1/2 inches for service clearance below unit for condensate trap.

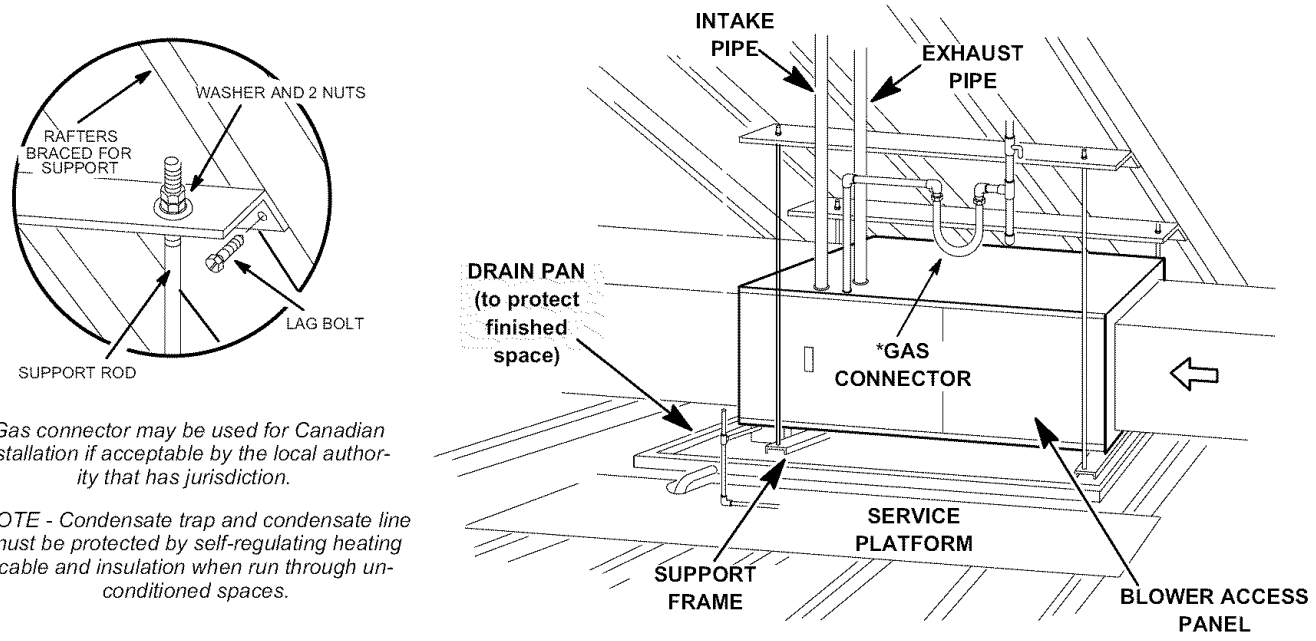
8 - Route auxiliary drain line so that water draining from this outlet will be easily noticed by the homeowner.

Platform Installation of Horizontal Unit in Attic

1 - Select location for unit keeping in mind service and other necessary clearances. See figure 16.

2 - Construct a raised wooden frame and cover frame with a plywood sheet. Provide a service platform and drain pan for unit.

TYPICAL HORIZONTAL APPLICATION (FORCED AIR FURNACE)



**Gas connector may be used for Canadian installation if acceptable by the local authority that has jurisdiction.*

NOTE - Condensate trap and condensate line must be protected by self-regulating heating cable and insulation when run through unconditioned spaces.

FIGURE 18

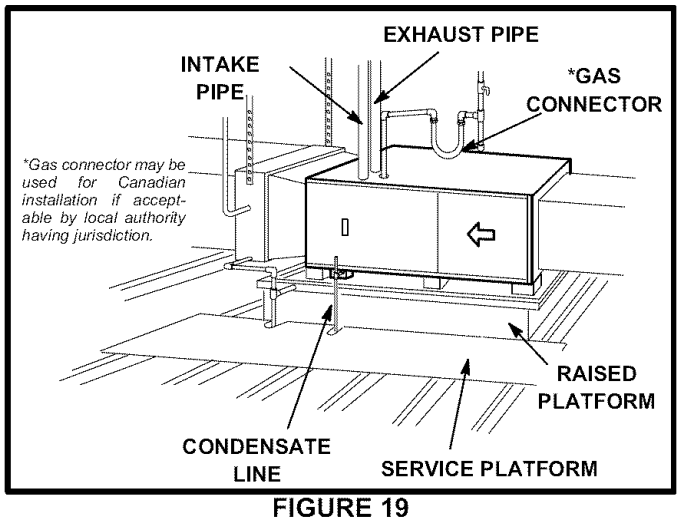


FIGURE 19

3 - Route auxiliary drain line so that water draining from this outlet will be easily noticed by the homeowner.

4 - Set unit in drain pan as shown in figure 19. Unit must be level to ensure proper coil drainage. Leave 5-1/2 inches for service clearance below unit for condensate trap.

5 - Continue with exhaust, condensate and intake piping installation according to instructions.

Installation of Horizontal Unit Suspended in Crawl Space

NOTE - If unit is suspended in attic or crawl space, support frame kit (Cat No 56J18 ordered separately) must be used to ensure proper unit support and coil drainage.

1 - Select location for unit keeping in mind service and other clearances. See figure 16.

2 - Using 3/8 inch rods and support frame kit, fabricate suspension hangers keeping in mind service access panel clearances.

3 - Install unit on support frame as shown in figure 20. Unit must be level to ensure proper coil drainage. Leave 5-1/2 inches for service clearance below unit for condensate trap.

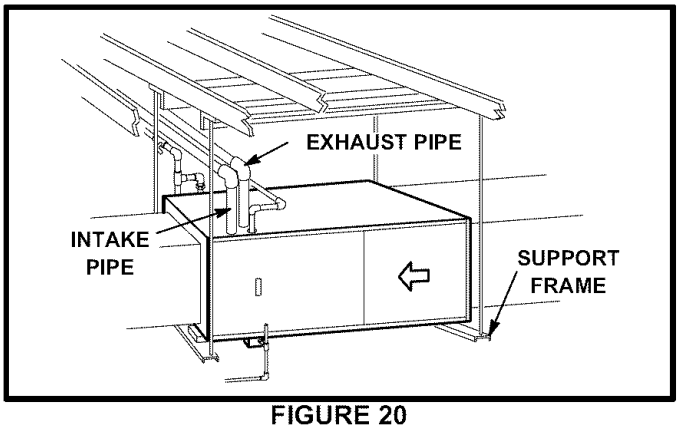


FIGURE 20

4 - Install exhaust and intake piping according to instructions given in following section. Condensate line should be run into condensate pump if necessary to meet drain line slope requirements.

Platform Installation of Horizontal Unit in Crawl Space

1 - Select location for unit, keeping in mind service and other clearances.

2 - After positioning cement blocks, mount support frame kit *(Cat No 56J18 ordered separately)* on top of blocks and install unit on frame. Unit must be level to ensure proper heat exchanger coil drainage. Leave 5-1/2 inches for service clearance) for condensate trap.

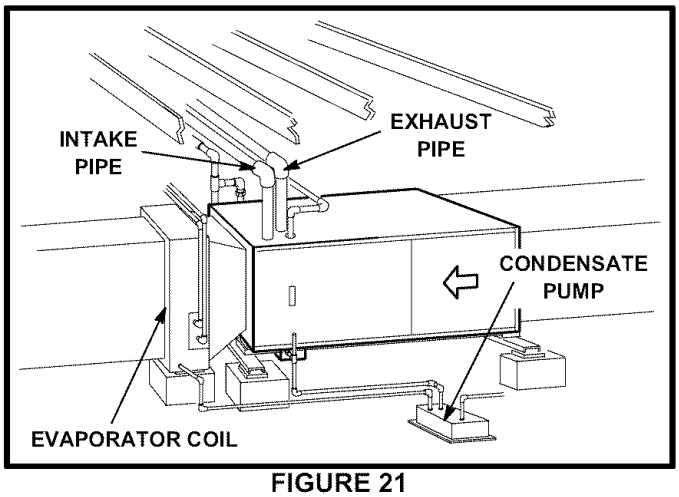


FIGURE 21

3 - Install exhaust and intake piping according to information given in following section. Condensate line should be run into condensate pump as shown in figure 21.

G51MP Installed in Unit Heater Applications

Horizontal unit heaters may be installed either suspended from the ceiling using the support frame kit or mounted on a field-fabricated platform. The condensate trap must be installed where it can be serviced at a later date.

Unit Heater Discharge Duct Guidelines

A field-fabricated and installed discharge air duct and grille cabinet is suitable for use with the G51MP heater. See figure 22. Keep the following items in mind when constructing the cabinet.

1 - Outer dimensions of cabinet should match those of the unit heater, so the duct/grille cabinet installs flush with the unit heater cabinet. See figure 22.

2 - Flange both ends of duct/grille cabinet so that screws can be used to secure cabinet to discharge end of unit heater.

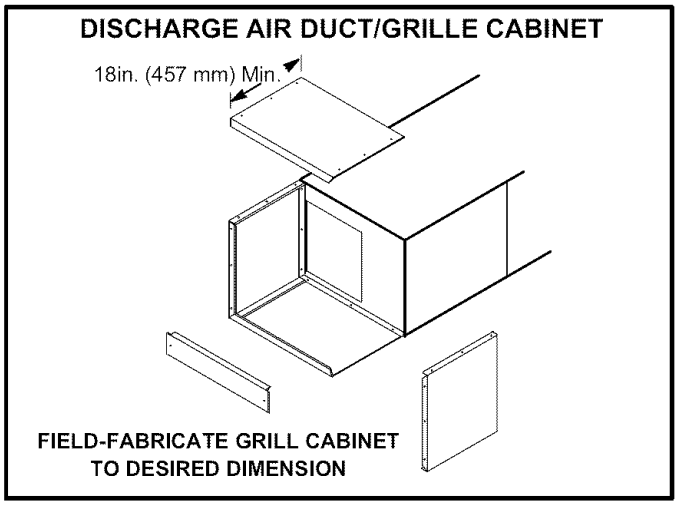


FIGURE 22

3 - To ensure proper operation, the duct/grille cabinet must be at least 18 inches long.

4 - Use #10-16 x 1/2 inch sheet metal screws to secure duct/grille cabinet to unit, taking care not to damage internal components of unit heater when drilling holes or installing screws. See figure 23.

5 - Use adjustable, double-deflection grille(s) to distribute discharge air. Adjust static pressure to be in the 0.06 inch to 0.10 inch w.c. range.

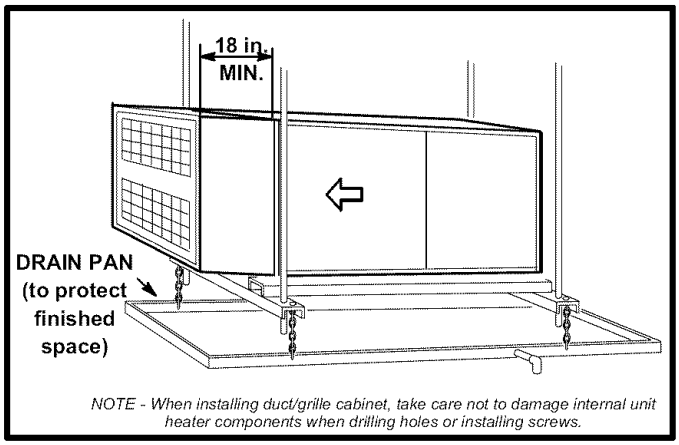


FIGURE 23

Installation of Horizontal Unit Heater Suspended from Ceiling

1 - Select location for unit keeping in mind service and other clearances.

2 - Fabricate a drain pan fitted with 1/2 inch (13 mm) or 3/4 inch (19 mm) N.P.T. fitting.

3 - Using 3/8 inch (9 mm) rods and support frame kit (ordered separately), fabricate suspension hangers, keeping in mind service access panel clearances.

4 - Hang drain pan below support frame as shown in figure 23. Route auxiliary drain line so that water draining from this outlet will be easily noticed by the homeowner.

5 - Mount unit on support frame as shown in figure 23. Unit must be level to ensure proper coil drainage. Leave 5-1/2 inches for service clearance below unit for condensate trap.

6 - Continue with exhaust, condensate and intake line piping instructions.

Platform Installation of Horizontal Unit Heater

1 - Select location for unit keeping in mind service and other necessary clearances.

2 - Construct a raised wooden frame and cover frame with a plywood sheet. Provide service platform and drain pan for unit. Route auxiliary drain line so that water draining from this outlet will be easily noticed by the homeowner.

3 - Set unit in drain pan as shown in figure 24. Unit must be level to ensure proper coil drainage. Leave 5-1/2 inches for service clearance below unit for condensate trap.

4 - Continue with exhaust, condensate and intake piping installation according to instructions which follow.

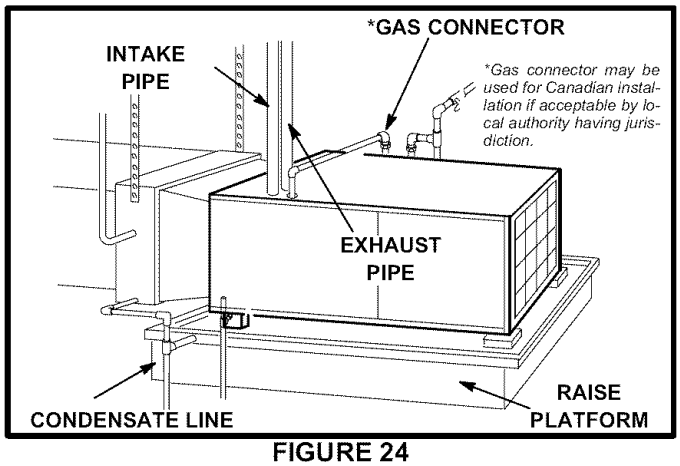


FIGURE 24

Return Air -- Horizontal Applications

Return air can be brought in through the end of a furnace installed in a horizontal application. The furnace is equipped with a removable bottom panel to facilitate installation. See figure 9.

Filters

This unit is not equipped with a filter or rack. A field-provided filter is required for the unit to operate properly. Table 3 lists recommended filter sizes.

A filter must be in place whenever the unit is operating.

TABLE 3

Furnace Cabinet Size	Filter Size	
	Side Return	Bottom Return
17-1/2"	16 X 25 X 1 (1)	16 X 25 X 1 (1)
21"	16 X 25 X 1 (1)	20 X 25 X 1 (1)
24-1/2"	16 X 25 X 1 (2)	24 X 25 X 1 (1)

Duct System

Use industry-approved standards to size and install the supply and return air duct system. This will result in a quiet and low-static system that has uniform air distribution.

NOTE - Operation of this furnace in heating mode (indoor blower operating at selected heating speed) with an external static pressure which exceeds 0.5 inches w.c. may result in erratic limit operation.

Supply Air Plenum

If the furnace is installed without a cooling coil, a removable access panel should be installed in the supply air duct. The access panel should be large enough to permit inspection (by reflected light) of the heat exchanger for leaks after the furnace is installed. The furnace access panel must always be in place when the furnace is operating and it must not allow leaks into the supply air duct system.

Return Air Plenum

Return air must not be drawn from a room where this furnace, or any other gas appliance (ie., a water heater), is installed. When return air is drawn from a room, a negative pressure is created in the room. If a gas appliance is operating in a room with negative pressure, the flue products can be pulled back down the vent pipe and into the room. This reverse flow of the flue gas may result in incomplete combustion and the formation of carbon monoxide gas. This toxic gas might then be distributed throughout the house by the furnace duct system.

Return air can be brought in through the bottom or either side of the furnace. If a furnace with bottom return air is installed on a platform, make an airtight seal between the bottom of the furnace and the platform to ensure that the unit operates properly and safely. Use fiberglass sealing strips, caulking, or equivalent sealing method between the plenum and the furnace cabinet to ensure a tight seal. If a filter is installed, size the return air duct to fit the filter frame.

Pipe & Fittings Specifications

All pipe, fittings, primer and solvent cement must conform with American National Standard Institute and the American Society for Testing and Materials (ANSI/ASTM) standards. The solvent shall be free flowing and contain no lumps, undissolved particles or any foreign matter that adversely affects the joint strength or chemical resistance of the cement. The cement shall show no gelation, stratification, or separation that cannot be removed by stirring. Refer to the table 4 below for approved piping and fitting materials.

TABLE 4
PIPING AND FITTINGS SPECIFICATIONS

PIPE & FITTING MATERIAL	ASTM SPECIFICATION
Schedule 40 PVC (Pipe)	D1785
Schedule 40 PVC (Cellular Core Pipe)	F891
Schedule 40 PVC (Fittings)	D2466
SDR-21PVC (Pipe)	D2241
SDR-26 PVC (Pipe)	D2241
Schedule 40 ABS Cellular Core DWV (Pipe)	F628
Schedule 40 ABS (Pipe)	D1527
Schedule 40 ABS (Fittings)	D2468
ABS-DWV (Drain Waste & Vent) (Pipe & Fittings)	D2661
PVC-DWV (Drain Waste & Vent) Pipe & Fittings)	D2665

⚠ CAUTION

Solvent cements for plastic pipe are flammable liquids and should be kept away from all sources of ignition. Do not use excessive amounts of solvent cement when making joints. Good ventilation should be maintained to reduce fire hazard and to minimize breathing of solvent vapors. Avoid contact of cement with skin and eyes.

Primers and solvents must meet ASTM specifications. PVC primer is specified in ASTM F 656. Use PVC solvent cement as specified in ASTM D 2564 and ABS solvent cement as specified in ASTM D 2235. Low temperature solvent cement is recommended. Metal or plastic strapping may be used for vent pipe hangers.

When making ABS joints, pieces can be prepared with a cleaner. When joining ABS to PVC materials, use PVC solvent cement. Refer to the procedure specified in ASTM D3138.

Canadian Applications Only - Pipe, fittings, primer and solvent cement used to vent this appliance must be certified to ULC S636 and supplied by a single manufacturer as part of an approved venting system. When bonding the vent system to the furnace, use ULC S636 approved One-Step Transition Cement to bond the pipe to the flue collar, 90° elbow or reducing 90° elbow as applicable. In addition, the first three feet of vent pipe from the furnace flue collar must be accessible for inspection.

Table 5 lists the available exhaust termination kits, as well as vent pipe equivalencies which must be used when sizing vent pipe. All Lennox vent terminations are PVC or ABS.

TABLE 5
OUTDOOR TERMINATION KITS AND CORRESPONDING EQUIVALENCIES

UNIT MODEL	VENT PIPE DIA. (in.)	Vent Pipe Length Equivalency (feet)								
		Outdoor Exhaust Accelerator (Dia. X Length)	Outdoor Exhaust Accelera-tor (Dia. X Length)	1-1/2" Concen-tric Kit	2" Con-centric Kit	3" Con-centric Kit	2" Wall Plate Kit	3" Wall Plate Kit	2" Wall Kit with Vent Ex-tension	2" Wall Ring Kit
		1-1/2" X 12"	2" X 12"	71M80	69M29	60L46	22G44 30G28	44J40 81J20	30G79	15F74
24B-045 36B-045	2	4	Not Allowed	12	Not Allowed	Not Allowed	4	4*	4	4
	2-1/2	5	Not Allowed	15	Not Allowed	Not Allowed	5	5*	5	5
	3	7	Not Allowed	21	Not Allowed	Not Allowed	7	7*	7	7
	4	14	Not Allowed	42	Not Allowed	Not Allowed	14	14*	14	14
36B-070	2	4	Not Allowed	12	Not Allowed	Not Allowed	4	4*	4	4
	2-1/2	5	Not Allowed	15	Not Allowed	Not Allowed	5	5*	5	5
	3	8	Not Allowed	24	Not Allowed	Not Allowed	8	8*	8	8
	4	14	Not Allowed	42	Not Allowed	Not Allowed	14	14*	14	14
36C-090 48C-090 60C-090	2	Not Allowed	1	Not Allowed	3	3	Not Allowed	1	Not Allowed	1**
	2-1/2	Not Allowed	2	Not Allowed	6	6	Not Allowed	2	Not Allowed	2**
	3	Not Allowed	2	Not Allowed	6	6	Not Allowed	2	Not Allowed	2**
	4	Not Allowed	4	Not Allowed	12	12	Not Allowed	4	Not Allowed	4**
48C-110 60C-110	2	Not Allowed	1	Not Allowed	3	3	Not Allowed	1	Not Allowed	1**
	2-1/2	Not Allowed	2	Not Allowed	6	6	Not Allowed	2	Not Allowed	2***
	3	Not Allowed	2	Not Allowed	6	6	Not Allowed	2	Not Allowed	2***
	4	Not Allowed	4	Not Allowed	12	12	Not Allowed	4	Not Allowed	4***
60D-135	3	Not Allowed	6	Not Allowed	Not Allowed	15	Not Allowed	6	Not Allowed	6***
	4	Not Allowed	10	Not Allowed	Not Allowed	25	Not Allowed	10	Not Allowed	10***

**Requires field-provided and installed 1-1/2" exhaust accelerator.*
***Requires field-provided and installed 2" exhaust accelerator.*
****For use only in non-direct vent applications, when snow riser is not required. Requires field-provided and installed 2" exhaust accelerator.*

Vent Piping Guidelines

The G51MP can be installed as either a Non-Direct Vent or a Direct Vent gas central furnace.

NOTE - In Non-Direct Vent installations, combustion air is taken from indoors and flue gases are discharged outdoors. In Direct Vent installations, combustion air is taken from outdoors and flue gases are discharged outdoors.

Intake and exhaust pipe sizing in Direct Vent applications and exhaust pipe sizing in Non-Direct Vent applications -- Size pipe according to tables 6 and 7. Table 6 lists the *minimum* equivalent vent pipe lengths permitted. Table 7 lists the *maximum* equivalent pipe lengths permitted.

Maximum vent length is defined as:

Total length (linear feet) of pipe,
Plus Equivalent length (feet) of fittings,
Plus Equivalent length (feet) of termination.
NOTE - Include ALL pipe and ALL fittings, both in doors and outdoors.

Regardless of the diameter of pipe used, the standard roof and wall terminations described in section *Exhaust Piping Terminations* should be used. Exhaust vent termination pipe is sized to optimize the velocity of the exhaust gas as it exits the termination. Refer to table 8.

**NOTE - The exhaust pipe should be offset a minimum of 12 inches to avoid the possibility of water droplets being released from the exhaust termination. The minimum exhaust vent length is 15 ft. Shorter exhaust vent lengths may result in the discharge of water droplets from the exhaust termination, in spite of the 12-inch vertical offset. See figure 25.*

Each 90° elbow (including those provided with the furnace) of any diameter is equivalent to 5 feet (1.52m) of vent pipe of the same diameter. Two 45° elbows are equivalent to one 90° elbow of the same diameter. One 45° elbow is equal to 2.5 feet (.76m) of vent pipe of the same diameter.

In some applications which permit the use of several different sizes of vent pipe, a combination vent pipe may be used. Contact Lennox' Application Department for assistance in sizing vent pipe in these applications.

NOTE - The flue collar on all models is sized to accommodate 2" Schedule 40 flue pipe. When vent pipe which is larger than 2" must be used in an upflow application, a 2" elbow must be applied at the flue collar in order to properly transition to the larger diameter flue pipe. This elbow must be added to the elbow count used to determine acceptable vent lengths. Assign an equivalent feet value to this elbow according to the larger size pipe being used. Contact the Application Department for more information concerning sizing of vent systems which include multiple pipe sizes.

Use the following steps to correctly size vent pipe diameter. ***Refer to Vent Pipe Size Determination Worksheet on page 48.***

1 - Determine the vent termination and its corresponding equivalent feet value according to table 5.
2 - Determine the number of 90° elbows required for both indoor and outdoor (e.g. snow riser) use. Calculate the corresponding equivalent feet of vent pipe.
3 - Determine the number of 45° elbows required for both indoor and outdoor use. Calculate the corresponding equivalent feet of vent pipe.
4 - Determine the length of straight pipe required.
5 - Add the total equivalent feet calculated in steps 1 through 4 and compare that length to the maximum values given in table 7 for the proposed vent pipe diameter. If the total equivalent length required exceeds the maximum equivalent length listed in the appropriate table, evaluate the next larger size pipe.

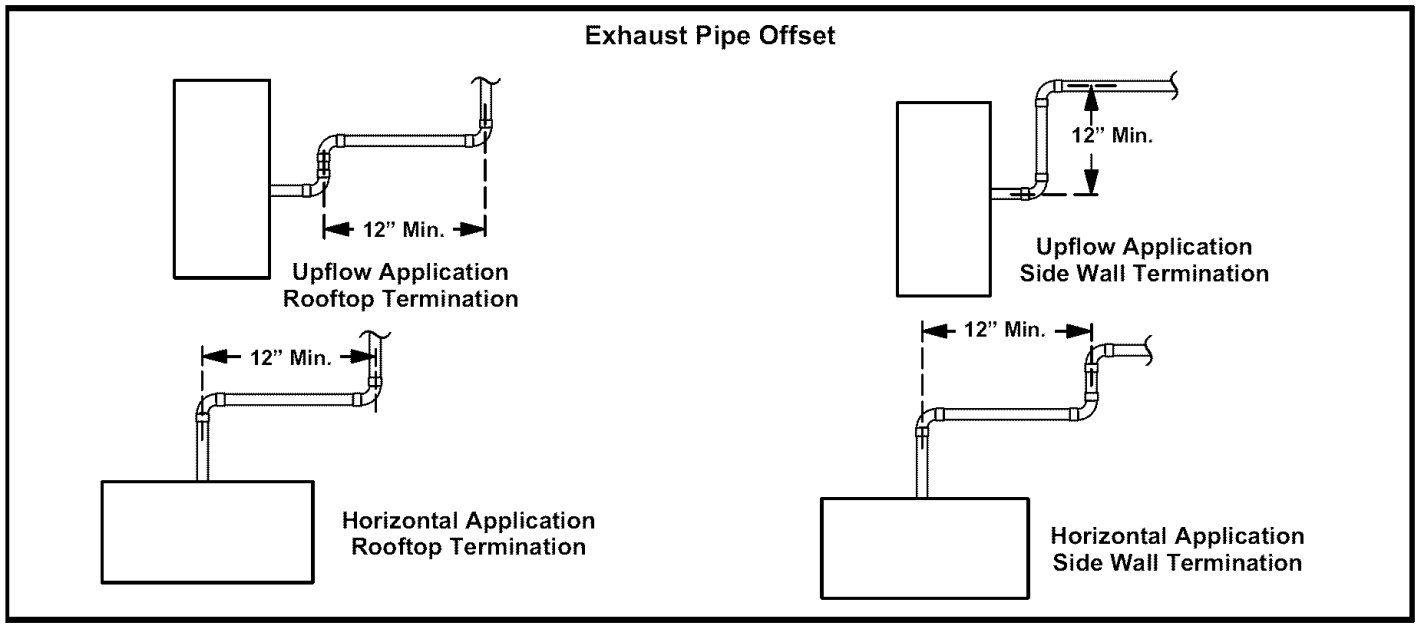


FIGURE 25

⚠ IMPORTANT

Do not use screens or perforated metal in exhaust terminations. Doing so will cause freeze-ups and may block the terminations.

TABLE 6
MINIMUM VENT PIPE LENGTHS

G51MP MODEL	MIN. EQUIV. VENT LENGTH	EXAMPLE
045, 070, 090	15 ft.*	5 ft. plus 2 elbows of 2", 2-1/2", 3" or 4" diameter pipe
110**		5 ft. plus 2 elbows of 2", 2-1/2", 3" or 4" diameter pipe
135***		5 ft. plus 2 elbows of 3" or 4" diameter pipe

**Any approved termination may be added to the minimum equivalent length listed.*

***G51MP-48C-110 and G51MP-60C-110 must have 90° street ell (supplied) installed directly into unit flue collar.*

****G51MP-60D-135 must have 3" to 2" reducing ell (supplied) installed directly into unit flue collar.*

TABLE 7
MAXIMUM VENT PIPE LENGTHS
DIRECT (2 PIPE) AND NON-DIRECT (1 PIPE) APPLICATIONS

ALTITUDE	G51MP MODEL	MAXIMUM EQUIVALENT VENT LENGTH FEET			
		2" dia.	2-1/2" dia.	3" dia.	4" dia.
0 - 2000 (0 - 609 m)	045	110	135	160	250
	070	70	135	160	250
	090	50	100	125	225
	110*	30	70	125	200
	135**	n/a	n/a	***125	180
2001 - 4500 (610 - 1371 m)	045	110	135	160	250
	070	70	135	160	250
	090	50	100	125	225
	110*	20	70	125	200
	135**	n/a	n/a	***90	180
4501-7500 (1372-2286 m)	045	110	135	160	250
	070	70	135	160	250
	090	30	100	125	225
	110*	n/a	70	125	200
	135**	n/a	n/a	***90	180
7501 - 10000 (2287 - 3048 m)	045	110	135	160	250
	070	70	135	160	250
	090	n/a	100	125	225
	110*	n/a	70	125	200
	135**	n/a	n/a	***90	180

n/a -- Not allowed.

**G51MP-48C-110 and G51MP-60C-110 must have 90° street ell (supplied) installed directly into unit flue collar.*

***G51MP-60D-135 must have 3" to 2" reducing ell (supplied) installed directly into unit flue collar.*

****90° elbows used in configuration of G51MP-60D-135 vent, must be limited to 3" sweep elbows.*

Joint Cementing Procedure

All cementing of joints should be done according to the specifications outlined in ASTM D 2855.

⚠ WARNING

DANGER OF EXPLOSION!

Fumes from PVC glue may ignite during system check. Allow fumes to dissipate for at least 5 minutes before placing unit into operation.

1 - Measure and cut vent pipe to desired length.

2 - Debur and chamfer end of pipe, removing any ridges or rough edges. If end is not chamfered, edge of pipe may remove cement from fitting socket and result in a leaking joint.

3 - Clean and dry surfaces to be joined.

4 - Test fit joint and mark depth of fitting on outside of pipe.

5 - Uniformly apply liberal coat of PVC primer for PVC or ABS cleaner for ABS to inside socket surface of fitting and male end of pipe to depth of fitting socket.

6 - Promptly apply solvent cement to end of pipe and inside socket surface of fitting. Cement should be applied lightly but uniformly to inside of socket. Take care to keep excess cement out of socket. Apply second coat to end of pipe.

NOTE - Time is critical at this stage. Do not allow primer to dry before applying cement.

7 - Immediately after applying last coat of cement to pipe, and while both inside socket surface and end of pipe are wet with cement, forcefully insert end of pipe into socket until it bottoms out. Turn PVC pipe 1/4 turn during assembly (but not after pipe is fully inserted) to distribute cement evenly. DO NOT turn ABS or cellular core pipe.

NOTE - Assembly should be completed within 20 seconds after last application of cement. Hammer blows should not be used when inserting pipe.

8 - After assembly, wipe excess cement from pipe at end of fitting socket. A properly made joint will show a bead around its entire perimeter. Any gaps may indicate a defective assembly due to insufficient solvent.

9 - Handle joints carefully until completely set.

Venting Practices

The thickness of construction through which vent pipes may be installed is 24" (610mm) maximum and 3/4" (19mm) minimum. If a G51MP furnace replaces a furnace which was commonly vented with another gas appliance, the size of the existing vent pipe for that gas appliance must be checked. Without the heat of the original furnace flue products, the existing vent pipe is probably oversized for the single water heater or other appliance. The vent should be checked for proper draw with the remaining appliance.

1 - Use recommended piping materials for exhaust piping.

2 - Secure all joints, including drip leg, gas-tight using approved cement.

Suspend piping using hangers at a minimum of every 5 feet (1.52m) for schedule 40 PVC and every 3 feet (.91m) for ABS-DWV, PVC-DWV, SPR-21 PVC, and SDR-26 PVC piping. A suitable hanger can be fabricated by using metal or plastic strapping or a large wire tie.

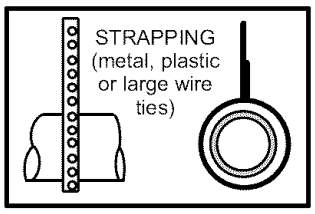


FIGURE 26

3 - In areas where piping penetrates joists or interior walls, hole must be large enough to allow clearance on all sides of pipe through center of hole using a hanger.

4 - Secure piping at the point where it exits the outside wall or roof in order to prevent transmission of vibration to the structure.

5 - When furnace is installed in a residence where unit is shut down for an extended period of time, such as a vacation home, make provisions for draining condensate collection trap and lines.

Exhaust Piping

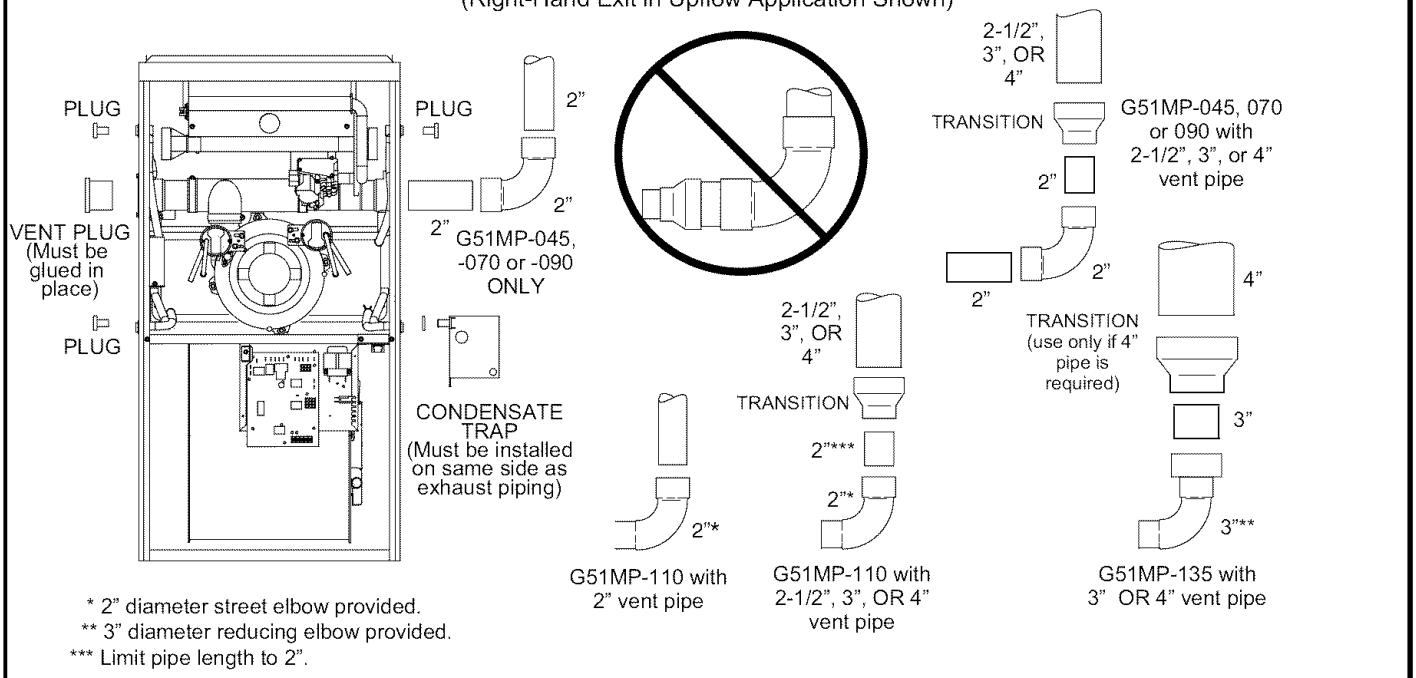
NOTE - A 2" diameter street ell is located on the blower deck of 48C-110 and 60C-110 units. Street ell ***must be*** *glued with ABS solvent cement directly into the unit flue collar. See figure 27. A 3" to 2" reducing ell is located on the blower deck of the 60D-135 units.* ***In upflow or downflow applications,*** *the reducing ell* ***must be*** *glued with ABS solvent cement directly into the unit flue collar.*

1 - Choose the appropriate side for venting in upflow or downflow positions. Exhaust piping exits from the top of the unit in horizontal air discharge applications. Glue the field-provided exhaust vent pipe (or provided street ell or reducing ell in upflow or downflow applications) to the flue collar. All PVC cement joints should be made according to the specifications outlined in ASTM D 2855. Refer to pipe and fittings specifications and gluing procedures.

TYPICAL EXHAUST PIPE CONNECTIONS AND CONDENSATE TRAP INSTALLATION

IN UPFLOW OR DOWNFLOW DIRECT OR NON-DIRECT VENT APPLICATIONS

(Right-Hand Exit in Upflow Application Shown)



* 2" diameter street elbow provided.
** 3" diameter reducing elbow provided.
*** Limit pipe length to 2".

FIGURE 27

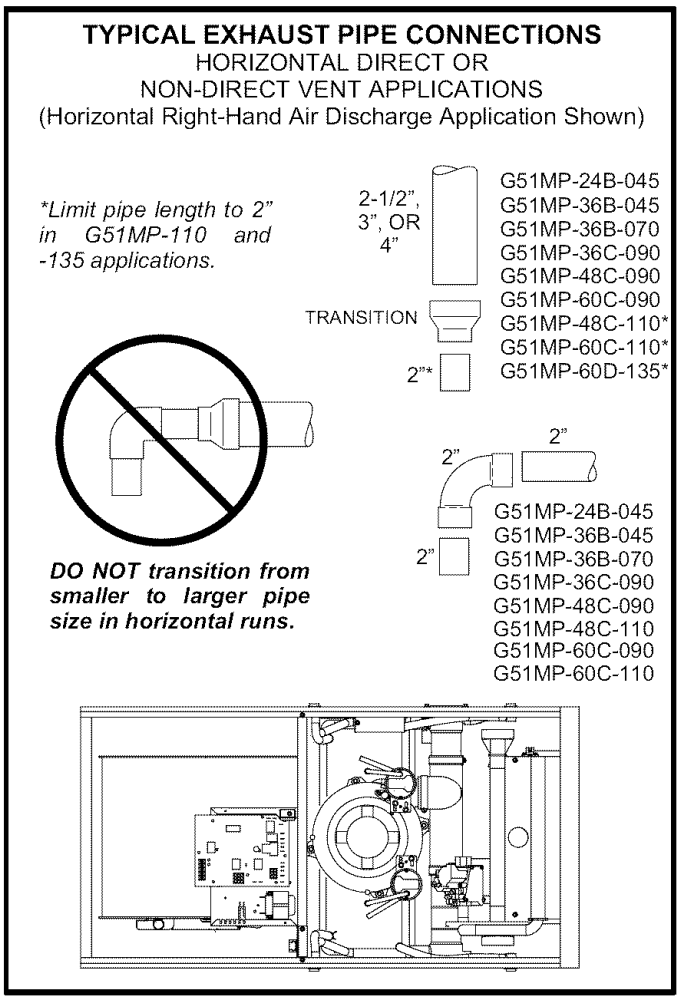


FIGURE 28

⚠ IMPORTANT

Exhaust piping and condensate trap must be installed on the same side of the unit in upflow and dowflow applications or use alternate drain kit 76M20.

2 - All horizontal runs of exhaust pipe must slope back toward unit. A minimum of 1/4" (6mm) drop for each 12" (305mm) of horizontal run is mandatory for drainage. Horizontal runs of exhaust piping must be supported every 5 feet (1.52m) using hangers.

NOTE - Exhaust piping should be checked carefully to make sure there are no sags or low spots.

3 - On the opposite side of the cabinet, glue the provided 2" vent plug into the unused flue collar.

4 - Route piping to outside of structure. Continue with installation following instructions given in piping termination section.

⚠ CAUTION

Do not discharge exhaust into an existing stack or stack that also serves another gas appliance. If vertical discharge through an existing unused stack is required, insert PVC pipe inside the stack until the end is even with the top or outlet end of the metal stack.

⚠ CAUTION

The exhaust vent pipe operates under positive pressure and must be completely sealed to prevent leakage of combustion products into the living space.

Intake Piping

The G51MP furnace may be installed in either **direct vent** or **non-direct vent** applications. In non-direct vent applications, when intake air will be drawn into the furnace from the surrounding space, the indoor air quality must be considered and guidelines listed in Combustion, Dilution and Ventilation Air section must be followed.

The G51MP unit is designed for either left-side or right-side air intake connections in either upflow or downflow applications. In horizontal applications, air intake must be brought in through the top. Intake air piping is independent of exhaust piping.

Follow the next four steps when installing the unit in **Direct Vent applications,** where combustion air is taken from outdoors and flue gases are discharged outdoors. **The provided air intake screen must not be used in direct vent applications.**

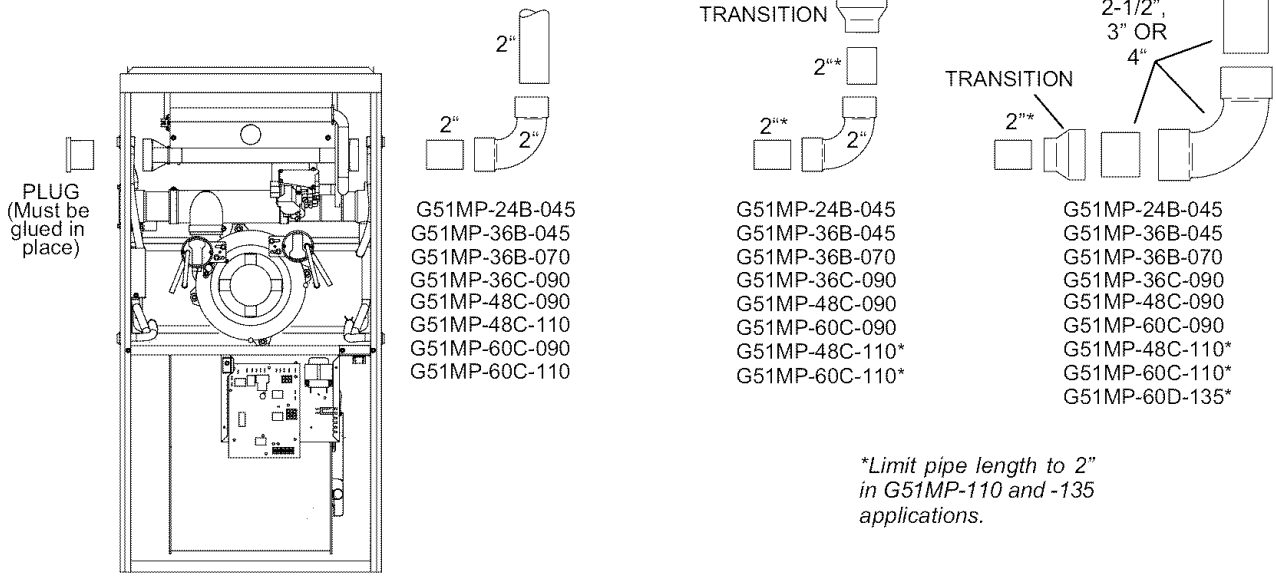
1 - Cement intake piping in slip connector located on the side of the burner box.

2 - Use a sheet metal screw to secure the intake pipe to the connector, if desired. A pilot indentation is provided in the slip connector to assist in locating and starting the fastener.

3 - Glue the provided 2" plug into the unused air intake connector on the opposite side of the cabinet.

4 - Route piping to outside of structure. Continue with installation following instructions given in general guide lines for piping terminations and in intake and exhaust piping terminations for direct vent sections. Refer to figure 29 for pipe sizes.

TYPICAL AIR INTAKE PIPE CONNECTIONS
UPFLOW OR DOWNFLOW DIRECT VENT APPLICATIONS
(Right-Hand Exit in Upflow Application Shown)



*Limit pipe length to 2" in G51MP-110 and -135 applications.

FIGURE 29

TYPICAL AIR INTAKE PIPE CONNECTIONS
HORIZONTAL DIRECT VENT APPLICATIONS
(Horizontal Right-Hand Air Discharge Application Shown)

*Limit pipe length to 2" in G51MP-110 and -135 applications.

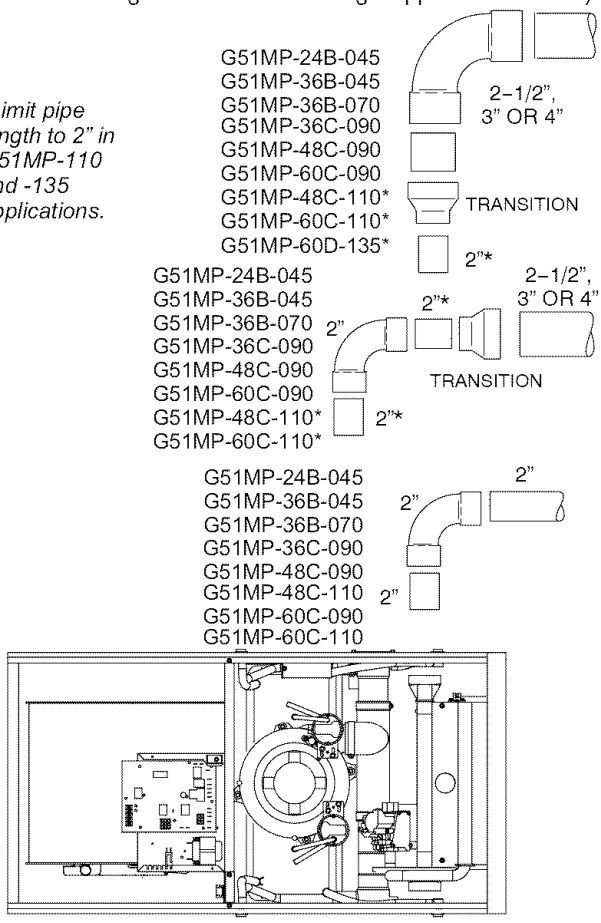
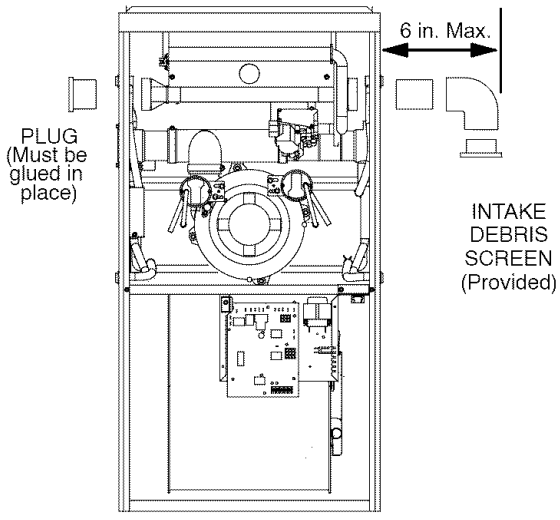


FIGURE 30

Follow the next three steps when installing the unit in **Non-Direct Vent applications** where combustion air is taken from indoors and flue gases are discharged outdoors.

TYPICAL AIR INTAKE PIPE CONNECTIONS
UPFLOW OR HORIZONTAL NON-DIRECT VENT APPLICATIONS
(Right-Hand Exit in Upflow Application Shown)



NOTE - Debris screen and elbow may be rotated, so that screen may be positioned to face forward, backward or downward.

FIGURE 31

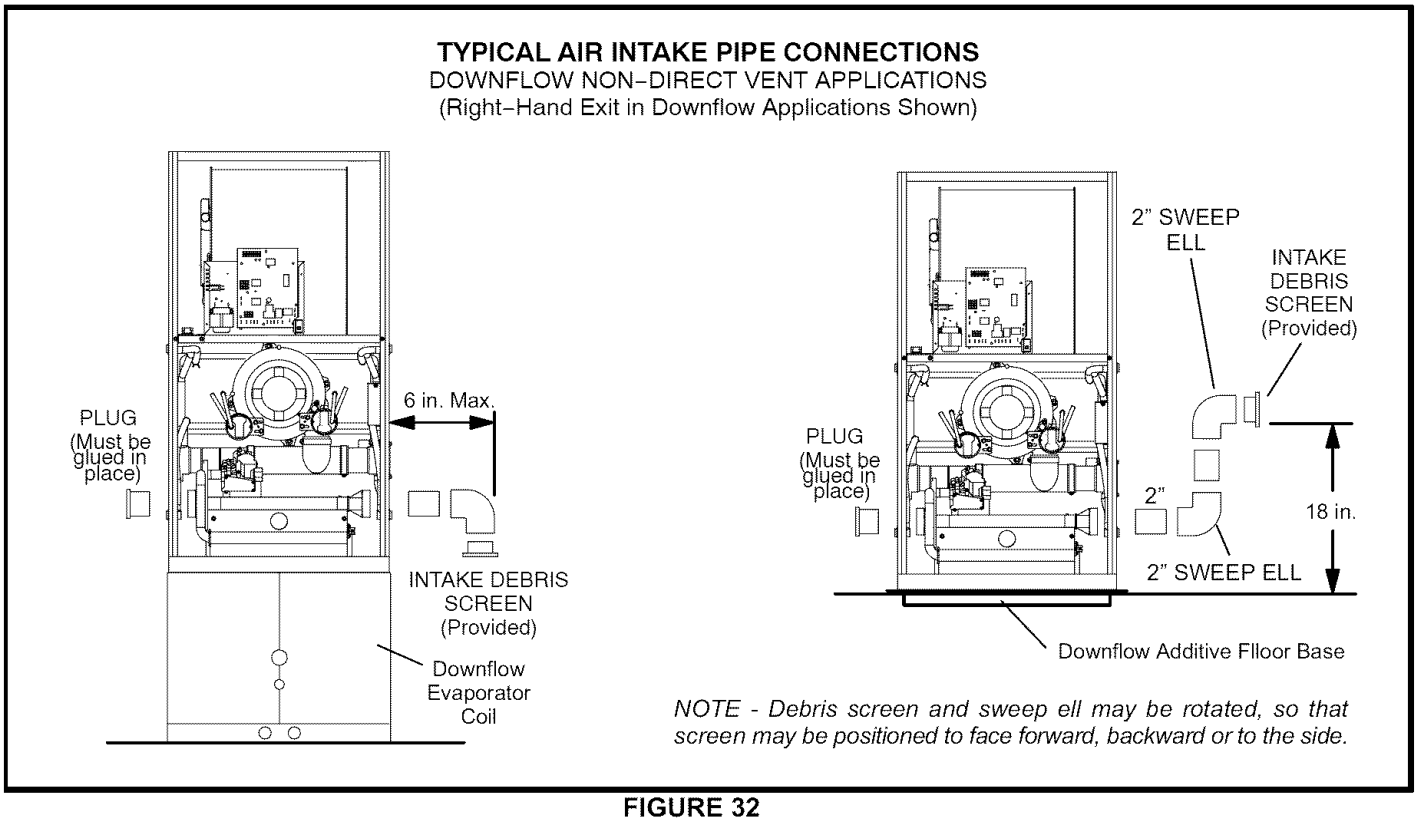


FIGURE 32

1 - Use field-provided materials and the factory-provided air intake screen to route the intake piping as shown in figures 31 and 32. Maintain a minimum clearance of 3" (76mm) around the air intake opening. The air intake opening (with the protective screen) should always be directed either downward or straight out. Use 2" pipe and fittings only and make sure that the air intake does not extend more than 6" beyond the G51MP cabinet. **The air intake connector must not be located near the floor. To avoid this complication in downflow applications which do not include a downflow evaporator coil,** the intake air routing should be modified as shown in figure 32.

2 - Use a sheet metal screw to secure the intake pipe to the connector, if desired. A pilot indentation is provided in the slip connector to assist in locating and starting the fastener.

3 - Glue the provided 2" plug into the unused air intake connector on the opposite side of the cabinet.

Testing for Proper Venting and Sufficient Combustion Air

(Non-Direct Vent Applications Only)

⚠ WARNING

CARBON MONOXIDE POISONING HAZARD!

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

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

After the G51MP gas furnace has been started, the following test should be conducted to ensure proper venting and sufficient combustion air has been provided to the G51MP, as well as to other gas-fired appliances which are separately vented. The test should be conducted while all appliances (both in operation and those not in operation) are connected to the venting system being tested. If the venting system has been installed improperly, or if provisions have not been made for sufficient amounts of combustion air, corrections must be made as outlined in the previous section.

1 - Seal any unused openings in the venting system.

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

3 - To the extent that it is practical, close all building doors and windows and all doors between the space in which the appliances connected to the venting system are located and other spaces of the building.

4 - Close fireplace dampers.

5 - Turn on clothes dryers and any appliances not connected to the venting system. Turn on any exhaust fans, such as range hoods and bathroom exhausts, so they will operate at maximum speed. Do not operate a summer exhaust fan.

6 - Follow the lighting instruction to place the appliance being inspected into operation. Adjust thermostat so appliance will operate continuously.

7 - Use the flame of match or candle to test for spillage of flue gases at the draft hood relief opening after 5 minutes of main burner operation.

8 - If improper venting is observed during any of the above tests, the venting system must be corrected or sufficient combustion/make-up air must be provided. The venting system should be re-sized to approach the minimum size as determined by using the appropriate tables in appendix G in the current standards of the National Fuel Gas Code ANSI-Z223.1/NPFA 54 in the U.S.A., and the appropriate Natural Gas and Propane appliances venting sizing tables in the current standard of the CSA-B149 Natural Gas and Propane Installation Codes in Canada.

9 - After determining that each appliance remaining connected to the common venting system properly vents when tested as indicated in step 3, return doors, windows, exhaust fans, fireplace dampers and any other gas-burning appliance to their previous condition of use.

General Guidelines for Vent Terminations for Non-Direct Vent Installations.

In Non-Direct Vent applications, combustion air is taken from indoors and the flue gases are discharged to the outdoors. The G51MP is then classified as a non-direct vent, Category IV gas furnace. In Non-Direct Vent applications, the vent termination is limited by local building codes. In the absence of local codes, refer to the current National Fuel Gas Code ANSI Z223-1/NFPA 54 in U.S.A., and current CSA-B149 Natural Gas and Propane Installation Codes in Canada for details.

Position termination end according to location given in figure 33. In addition, position termination end so it is free from any obstructions and above the level of snow accumulation (where applicable). The termination should be at least 12 inches (305mm) from any opening through which flue products could enter the building.

At vent termination, care must be taken to maintain protective coatings over building materials (prolonged exposure to exhaust condensate can destroy protective coatings). It is recommended that the exhaust outlet not be located within 6 feet (1.8m) of a condensing unit because the condensate can damage the painted coating.

NOTE - If winter design temperature is below 32°F (0°C), exhaust piping should be insulated with 1/2" (13mm), Armaflex or equivalent when run through unheated space. Do not leave any surface area of exhaust pipe open to outside air; exterior exhaust pipe should be insulated with 1/2" (13mm) Armaflex or equivalent. In extreme cold climate areas, 3/4" (19mm) Armaflex or equivalent may be necessary. Insulation on outside runs of exhaust pipe must be painted or wrapped to protect insulation from deterioration. Exhaust pipe insulation may not be necessary in some specific applications.

NOTE - During extremely cold temperatures, below approximately 20°F (6.7°C), units with long runs of vent pipe through unconditioned space, even when insulated, may form ice in the exhaust termination that prevents the unit from operating properly. Longer run times of at least 5 minutes will alleviate most icing problems. Also, a heating cable may be installed on exhaust piping and termination to prevent freeze-ups. Heating cable installation kit is available from Lennox. See Condensate Piping section for part numbers.

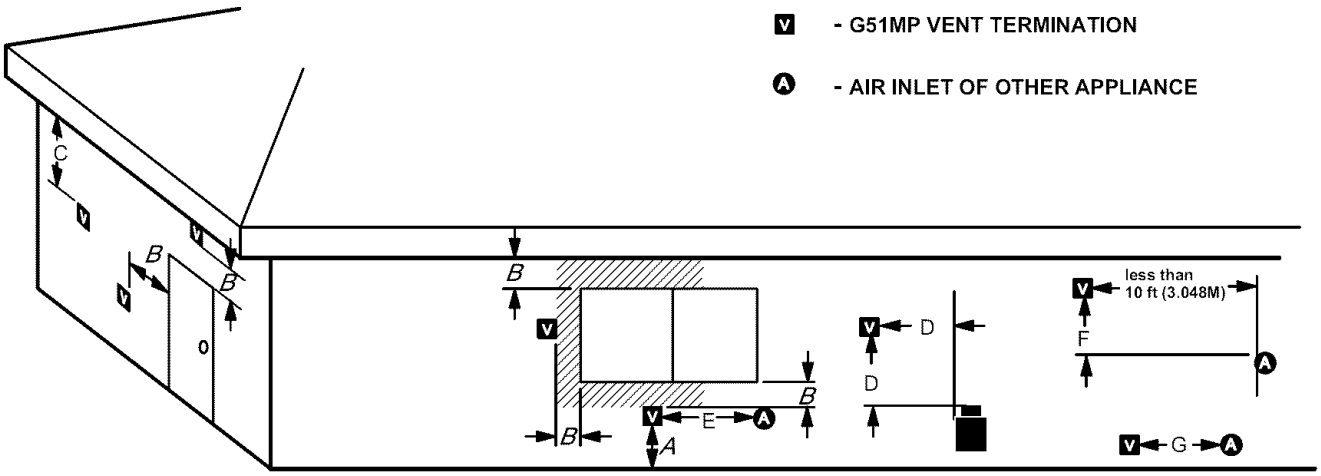
⚠ IMPORTANT

Do not use screens or perforated metal in exhaust terminations. Doing so will cause freeze-ups and may block the terminations.

⚠ IMPORTANT

For Canadian Installations Only:
In accordance to CSA International B149 installation codes, the minimum allowed distance between the combustion air intake inlet and the exhaust outlet of other appliances shall not be less than 12 inches (305mm).

VENT TERMINATION CLEARANCES FOR INSTALLATIONS IN THE USA AND CANADA*



A - *Clearance above grade* - 12 in. (305mm) minimum.

B - *Clearance to window or door* that may be opened -
for vent installations in USA - 12 in. (305mm) minimum.
for vent installations in Canada - 12 in. (305mm) minimum for appliances $\leq$ 100,000 Btuh (30 kW);
36 in. (0.9m) minimum for appliances > 100,000 Btuh (30 kW).

C - *Do not position terminations directly under roof eaves.*

D - *Clearance to electric meters, gas meters, regulators, and relief equipment* -
for vent installations in USA - 48 in (1219mm) minimum.
for vent installations in Canada - see current edition of CSA B149 Code.

E - *Clearance to non-mechanical air supply inlet* or outlet
for vent installations in USA - 48 in. (1219mm) minimum horizontal and below, 12 in. (305mm) minimum above.
for vent installations in Canada - 12 in. (305mm) minimum for appliances $\leq$ 100,000 Btuh (30 kW);
36 in. (0.9m) minimum for appliances > 100,000 Btuh (30 kW).

F - *Clearance to mechanical air supply inlet* --
for vent installations in USA - 36 in. minimum (914mm).

G - *Clearance to mechanical air supply inlet* --
for vent installations in Canada - 72 in. (1829mm) minimum.

H - *Do not point terminations into recessed areas such as window wells, stairwells or alcoves.*

J - *Do not position terminations directly above a walkway.*

* Note -
(I) Dimensions are from the current edition of The National Fuel Gas Code - ANSI-Z223.1/NFPA 54 for USA installations. In Canada, refer to current edition of CSA B149 installation codes. Local codes or regulations may require different clearances.

(II) In Non-Direct Vent installations, combustion air is taken from indoors and the flue gases are discharged to the outdoors.

FIGURE 33

Details of Intake and Exhaust Piping Terminations for Direct Vent Installations

NOTE - In Direct Vent installations, combustion air is taken from outdoors and flue gases are discharged to outdoors. Intake and exhaust pipes may be routed either horizontally through an outside wall or vertically through the roof. In attic or closet installations, vertical termination through the roof is preferred. Figures 34 through 42 show typical terminations.

1 - Exhaust and intake exits must be in same pressure zone. Do not exit one through the roof and one on the side. Also, do not exit the intake on one side and the exhaust on another side of the house or structure.

2 - Intake and exhaust pipes should be placed as close together as possible at termination end (refer to illustrations). Maximum separation is 3" (76mm) on roof terminations and 6" (152mm) on side wall terminations.

3 - If necessary, install a field-provided reducer to adapt larger vent pipe size to termination pipe size.

4 - On roof terminations, the intake piping should terminate straight down using two 90° elbows (See figure 34).

5 - Exhaust piping must terminate straight out or up as shown. In rooftop applications, a reducer may be required on the exhaust piping at the point where it exits the structure to improve the velocity of exhaust away from the intake piping. See table 8.

NOTE - Care must be taken to avoid recirculation of exhaust back into intake pipe.

TABLE 8
EXHAUST PIPE TERMINATION SIZE REDUCTION

G51MP MODEL	Exhaust Pipe Size	Termination Pipe Size
045 and 070	2", 2-1/2", 3" or 4"	1-1/2"
090	2", 2-1/2", 3" or 4"	2"
110	2", 2-1/2", 3" or 4"	2"*
135	3" or 4"	2"*

**Approved 3" concentric termination kit terminates with 2-5/8" ID pipe.*

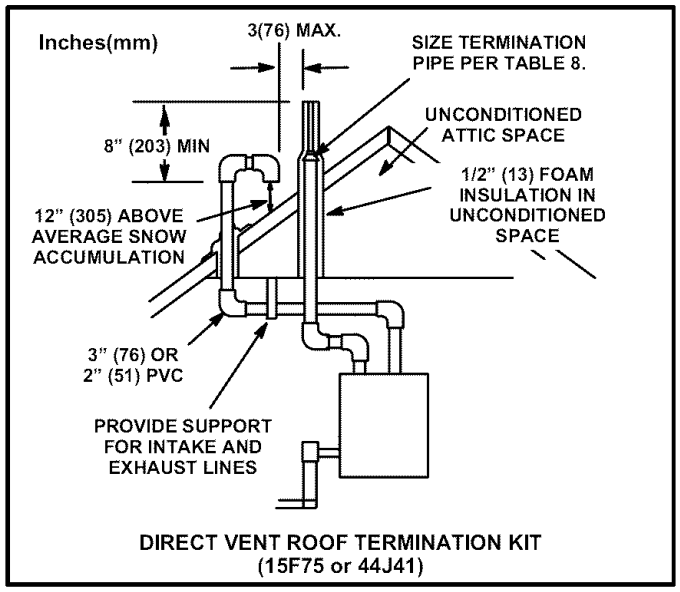


FIGURE 34

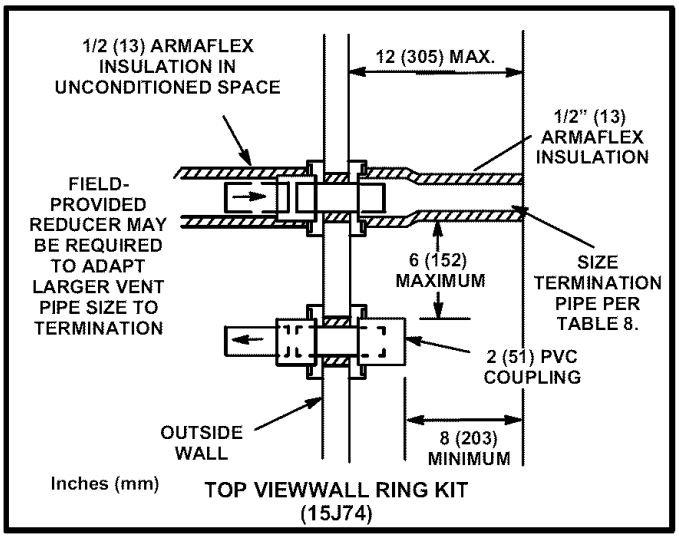


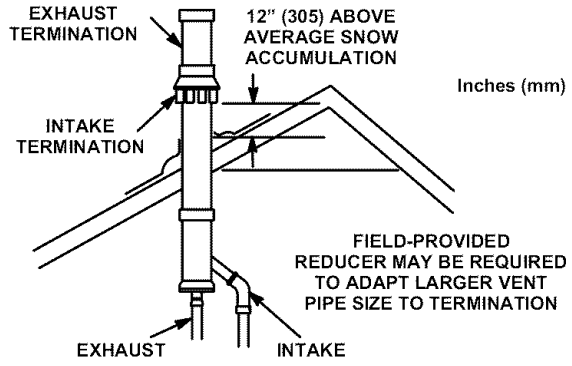
FIGURE 35

6 - On field supplied terminations for side wall exits, exhaust piping should extend a maximum of 12 inches (305mm) beyond the outside wall. Intake piping should be as short as possible. See figure 35.

7 - On field supplied terminations, a minimum separation distance between the end of the exhaust pipe and the end of the intake pipe is 8 inches (203mm).

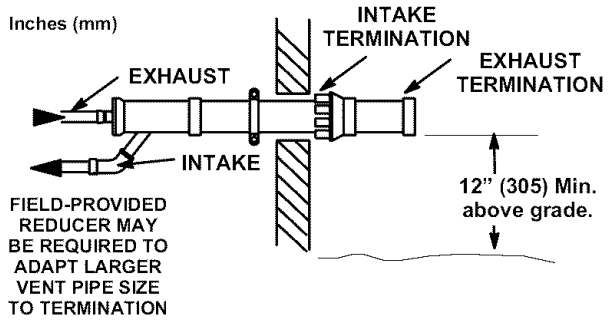
8 - If intake and exhaust piping must be run up a side wall to position above snow accumulation or other obstructions, piping must be supported every 3 ft. (.9m) as shown in figure 26. Refer to figure 38 for proper piping method. In addition, WTK wall termination kit must be extended for use in this application. See figure 41. When exhaust and intake piping must be run up an outside wall, the exhaust piping must be terminated with pipe sized per table 8. The intake piping may be equipped with a 90° elbow turndown. Using turndown will add 5 feet (1.5m) to the equivalent length of the pipe.

9 - Based on the recommendation of the manufacturer, a multiple furnace installation may use a group of up to four termination kits WTK assembled together horizontally, as shown in figure 40.



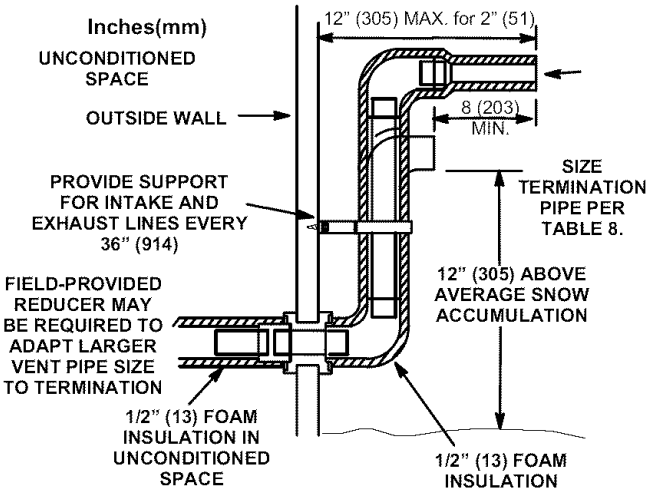
DIRECT VENT CONCENTRIC ROOFTOP TERMINATION
(71M80, 69M29 or 60L46)

FIGURE 36



DIRECT VENT CONCENTRIC WALL TERMINATION
(71M80, 69M29 or 60L46)

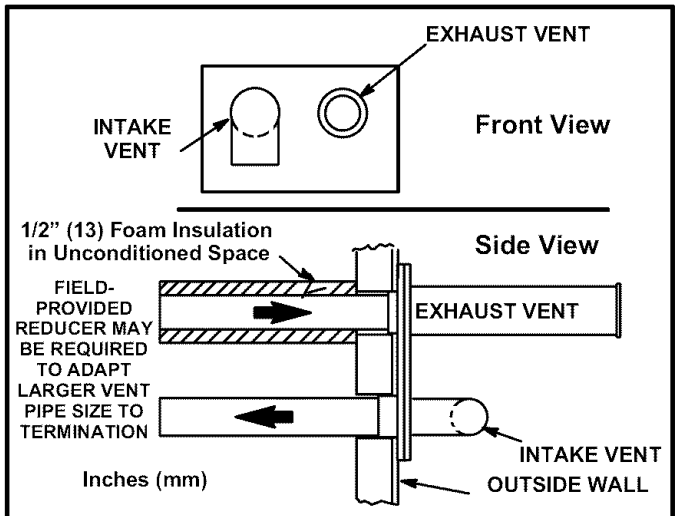
FIGURE 37



SIDE VIEW
DIRECT VENT WALL RING TERMINATION
(15F74)

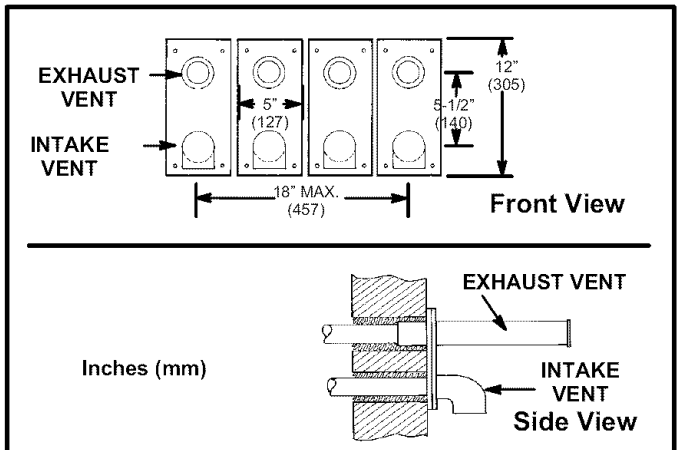
See venting table 7 for maximum venting lengths with this arrangement.

FIGURE 38



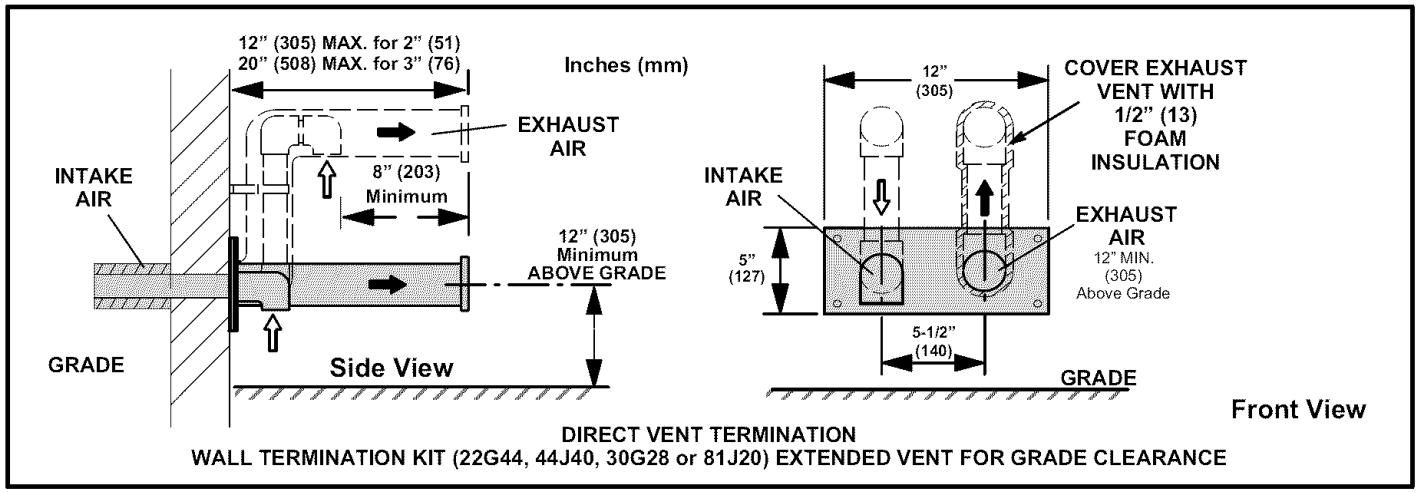
DIRECT VENT WALL TERMINATION KIT
(22G44, 44J40, 30G28 or 81J20)

FIGURE 39



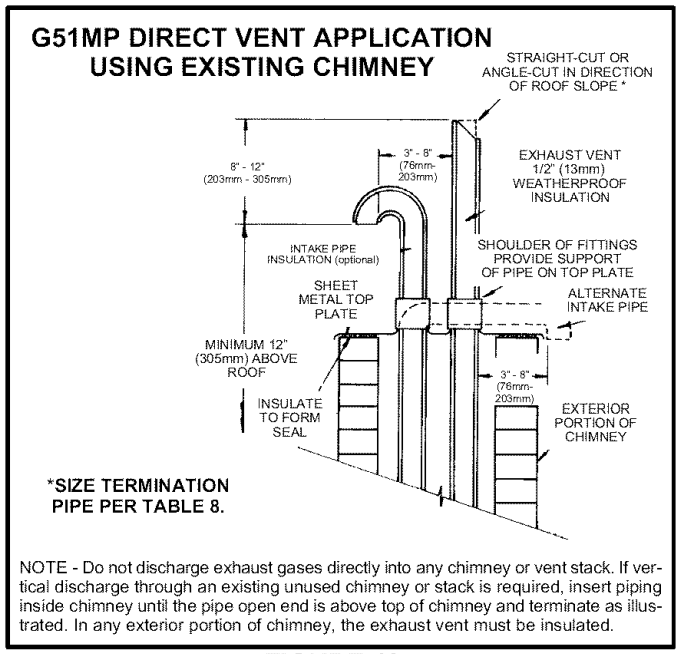
OPTIONAL VENT TERMINATION FOR MULTIPLE UNIT
INSTALLATION OF DIRECT VENT WALL TERMINATION KIT
(22G44, 44J40, 30G28 or 81J20)

FIGURE 40



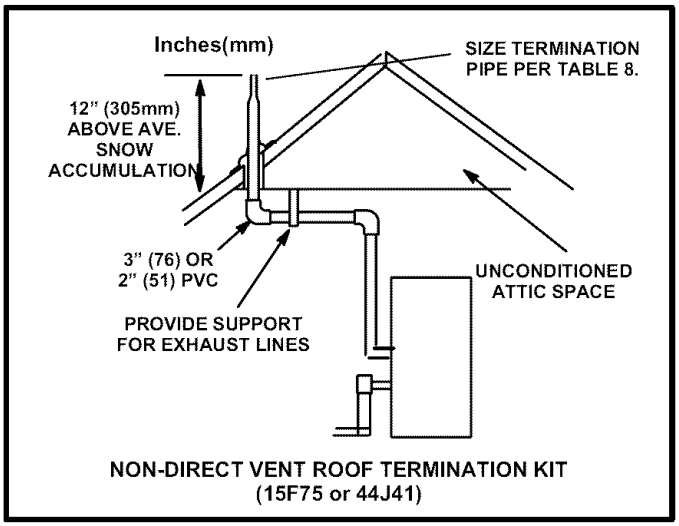
DIRECT VENT TERMINATION
WALL TERMINATION KIT (22G44, 44J40, 30G28 or 81J20) EXTENDED VENT FOR GRADE CLEARANCE

FIGURE 41



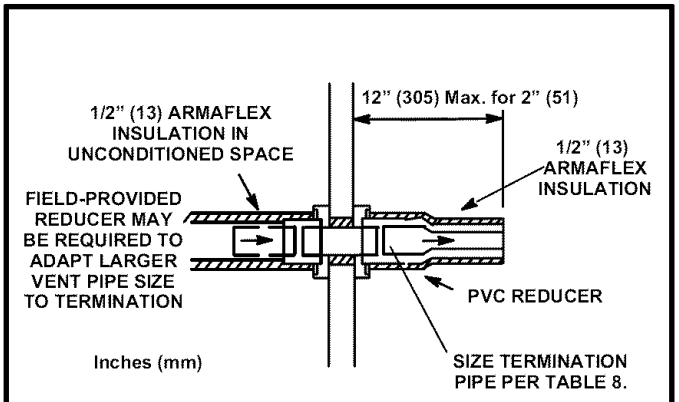
NOTE - Do not discharge exhaust gases directly into any chimney or vent stack. If vertical discharge through an existing unused chimney or stack is required, insert piping inside chimney until the pipe open end is above top of chimney and terminate as illustrated. In any exterior portion of chimney, the exhaust vent must be insulated.

FIGURE 42



NON-DIRECT VENT ROOF TERMINATION KIT
(15F75 or 44J41)

FIGURE 43



TOP VIEW
NON-DIRECT VENT WALL RING KIT
(15F74)

FIGURE 44

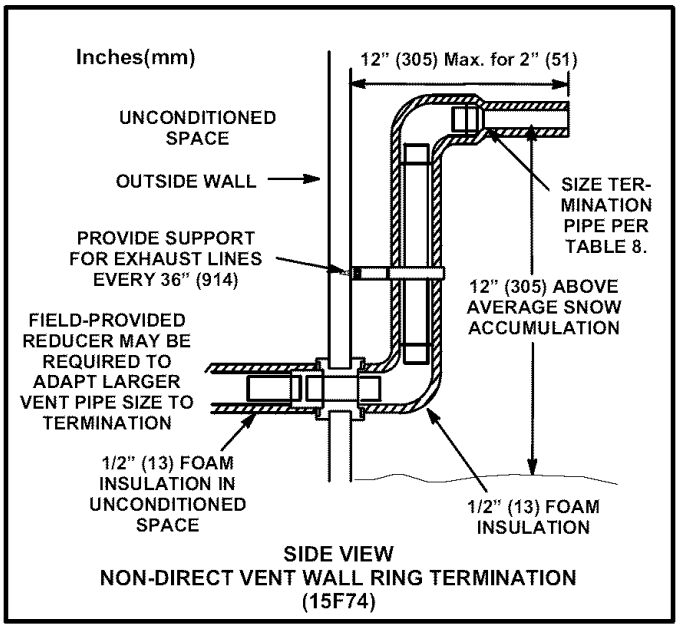
Details of Exhaust Piping Terminations for Non-Direct Vent Applications

Exhaust pipes may be routed either horizontally through an outside wall or vertically through the roof. In attic or closet installations, vertical termination through the roof is preferred. Figures 43 through 46 show typical terminations.

1 - Exhaust piping must terminate straight out or up as shown. The termination pipe must be sized as listed in table 8.The specified pipe size ensures proper velocity required to move the exhaust gases away from the building.

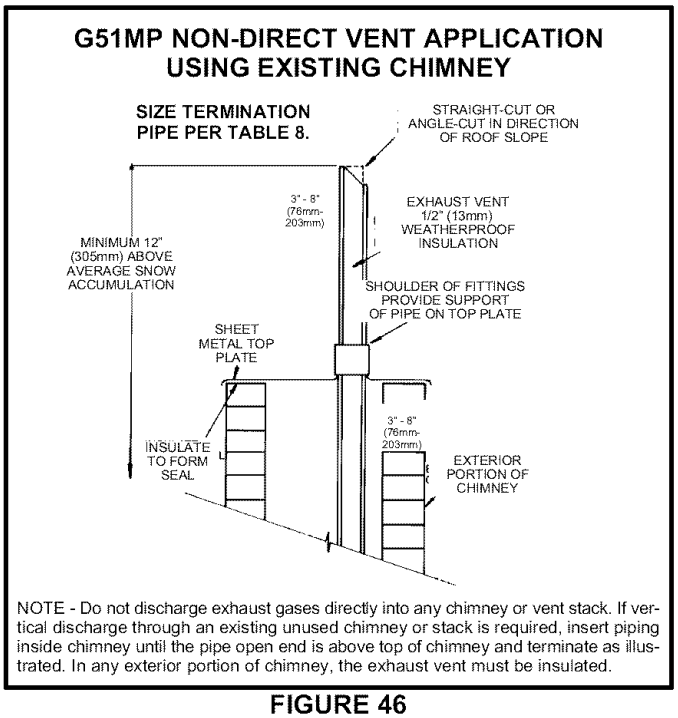
2 - On field supplied terminations for side wall exits, exhaust piping should extend a maximum of 12 inches (305mm) beyond the outside wall. See figure 44.

3 - If exhaust piping must be run up a side wall to position above snow accumulation or other obstructions, piping must be supported every 3 feet (.9m) as shown in figure 26. Refer to figure 45 for proper piping method. When exhaust piping must be run up an outside wall, any reduction in exhaust pipe size must be done after the final elbow.



SIDE VIEW
NON-DIRECT VENT WALL RING TERMINATION
(15F74)

FIGURE 45



NOTE - Do not discharge exhaust gases directly into any chimney or vent stack. If vertical discharge through an existing unused chimney or stack is required, insert piping inside chimney until the pipe open end is above top of chimney and terminate as illustrated. In any exterior portion of chimney, the exhaust vent must be insulated.

FIGURE 46

Condensate Piping

This unit is designed for either right- or left-side exit of condensate piping in either upflow or downflow applications; however, it must be installed on the same side of the unit as the exhaust piping. In horizontal applications, the condensate trap should extend below the unit. A 5-1/2" service clearance is required for the condensate trap. Refer to figure for condensate trap locations.

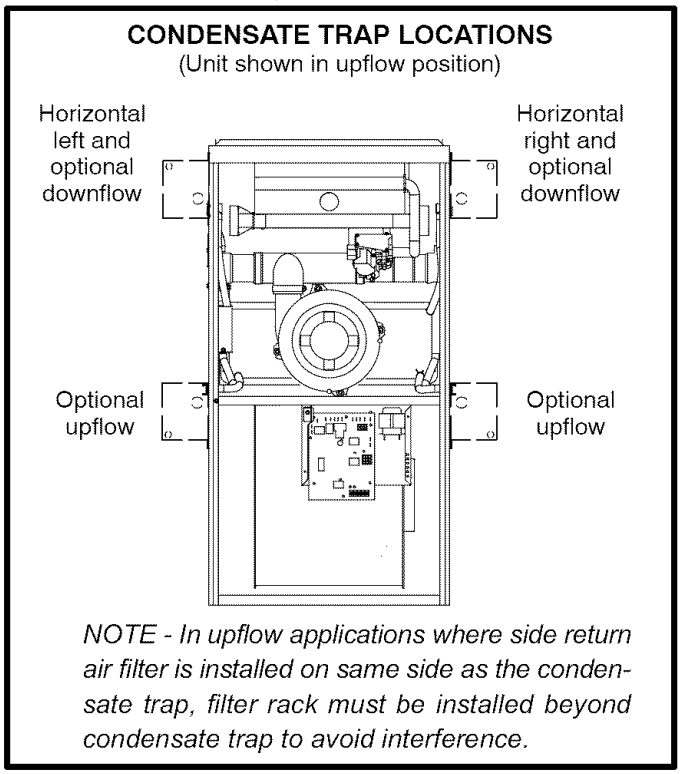


FIGURE 47

1 - Determine which side condensate piping will exit the unit. Remove plugs from the condensate collar at the appropriate location on the side of the unit.

NOTE - The condensate trap is factory-shipped with two rubber O-rings and two rubber clean-out caps installed. Check to make sure that these items are in place before installing the trap assembly.

2 - Install condensate trap onto the condensate collar. Use provided HI/LO screws to secure two upper flanges of the trap to the collar. Use provided sheet metal screw to secure bottom trap flange to side of unit. See figure 48.

NOTE - In upflow and downflow applications, condensate trap must be installed on the same side as exhaust piping.

⚠ CAUTION

DO NOT use a power driver to tighten screws which secure condensate trap to cabinet. Screws should be hand-tightened using a screw driver to avoid the possibility of damage to the trap assembly.

3 - Glue the field-provided coupling or pipe to the trap. Install a tee and vent pipe near the trap.

NOTE - The condensate trap drain stubs (both sides) have an outer diameter which will accept a standard 3/4" PVC coupling. The inner diameter of each stub will accept standard 1/2" diameter PVC pipe.

NOTE - Vinyl tubing may be used for condensate drain. Tubing must be 1-1/4" OD X 1" ID and should be attached to the drain stubs on the trap using a hose clamp.

4 - Glue the field-provided drain line to the tee. Route the drain line to an open drain. As an alternate, clear vinyl tubing may be used to drain condensate away from the trap. Secure the vinyl tubing to the drain stubs on the trap using a hose clamp. Do not overtighten the hose clamp.

Condensate line must be sloped downward away from condensate trap to drain. If drain level is above condensate trap, condensate pump must be used. Condensate drain line should be routed within the conditioned space to avoid freezing of condensate and blockage of drain line. If this is not possible, a heat cable kit may be used on the condensate trap and line. Heating cable kit is available from Lennox in various lengths; 6 ft. (1.8m) - kit no. 26K68; 24 ft. (7.3m) - kit no. 26K69; and 50 ft. (15.2m) - kit no. 26K70.

⚠ CAUTION

Do not use copper tubing or existing copper condensate lines for drain line.

5 - If unit will be started immediately upon completion of installation, prime trap per procedure outlined in Unit Start-Up section.

6 - Glue the provided cap onto the unused condensate drain line stub.

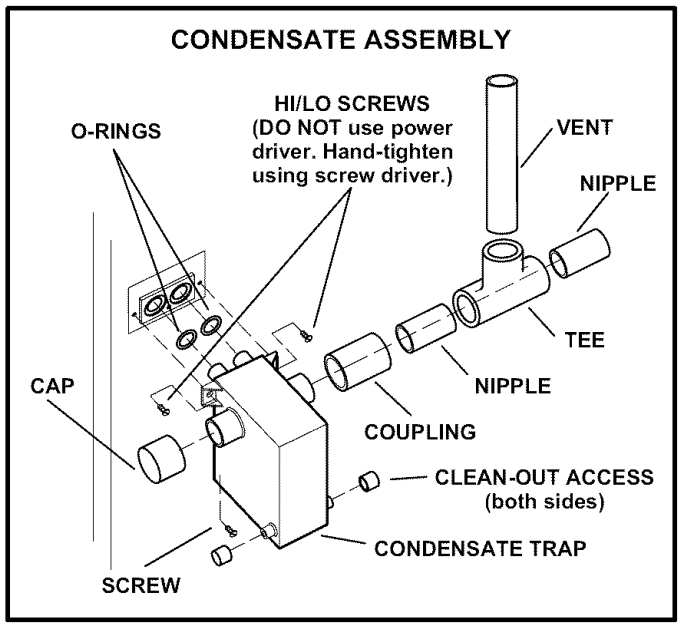


FIGURE 48

Gas Piping

⚠CAUTION

If a flexible gas connector is required or allowed by the authority that has jurisdiction, black iron pipe shall be installed at the gas valve and extend outside the furnace cabinet.

⚠WARNING

Do not exceed 600 in-lbs (50 ft-lbs) torque when attaching the gas piping to the gas valve.

1 - Gas piping may be routed into the unit through either the left- or right-hand side. Supply piping enters into the gas valve from the side of the valve as shown in figure 51 or 51.

⚠IMPORTANT

The Honeywell VR8205 gas valve requires a low inlet pressure switch in LP/propane applications. A 4" BIP nipple must be installed in the gas valve inlet when right-side gas entry is used in LP/propane applications. See figure 50 or 51.

2 - When connecting gas supply, factors such as length of run, number of fittings and furnace rating must be considered to avoid excessive pressure drop. Table 9 lists recommended pipe sizes for typical applications.

NOTE - Use two wrenches when connecting gas piping to avoid transferring torque to the manifold.

3 - Gas piping must not run in or through air ducts, clothes chutes, chimneys or gas vents, dumb waiters or elevator shafts. Center gas line through piping hole. Gas line should not touch side of unit. See figure 51 or 51.

4 - Piping should be sloped 1/4 inch per 15 feet (6mm per 5.6m) upward toward the gas meter from the furnace. The piping must be supported at proper intervals, every 8 to 10 feet (2.44 to 3.05m), using suitable hangers or straps. Install a drip leg in vertical pipe runs to serve as a trap for sediment or condensate.

5 - A 1/8" N.P.T. plugged tap or pressure post is located on the gas valve to facilitate test gauge connection. See figures 58 and 60.

6 - In some localities, codes may require installation of a manual main shut-off valve and union (furnished by installer) external to the unit. Union must be of the ground joint type.

⚠IMPORTANT

Compounds used on threaded joints of gas piping must be resistant to the actions of liquified petroleum gases.

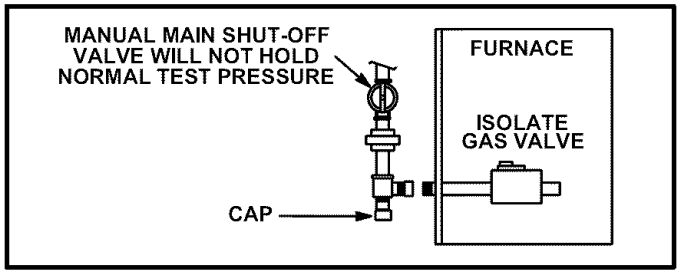


FIGURE 49

Leak Check

After gas piping is completed, carefully check all piping connections (factory- and field-installed) for gas leaks. Use a leak detecting solution or other preferred means.

The furnace must be isolated from the gas supply system by closing its individual manual shut-off valve during any pressure testing of the gas supply system at pressures less than or equal to *1/2 psig (3.48 kPa, 14 inches w.c.).*

⚠IMPORTANT

When testing pressure of gas lines, gas valve must be disconnected and isolated. See figure 49. Gas valves can be damaged if subjected to pressures greater than 1/2 psig (3.48 kPa).

⚠WARNING

FIRE OR EXPLOSION HAZARD

Failure to follow the safety warnings exactly could result in serious injury, death, or property damage. Never use an open flame to test for gas leaks. Check all connections using a commercially available soap solution made specifically for leak detection.Some soaps used for leak detection are corrosive to certain metals. Carefully rinse piping thoroughly after leak test has been completed.

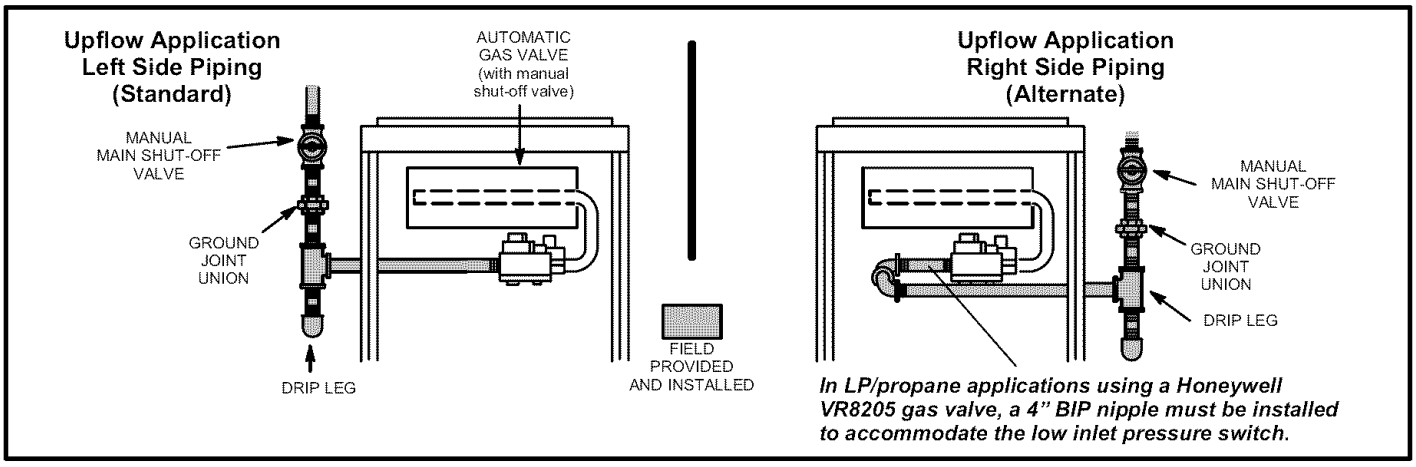


FIGURE 50

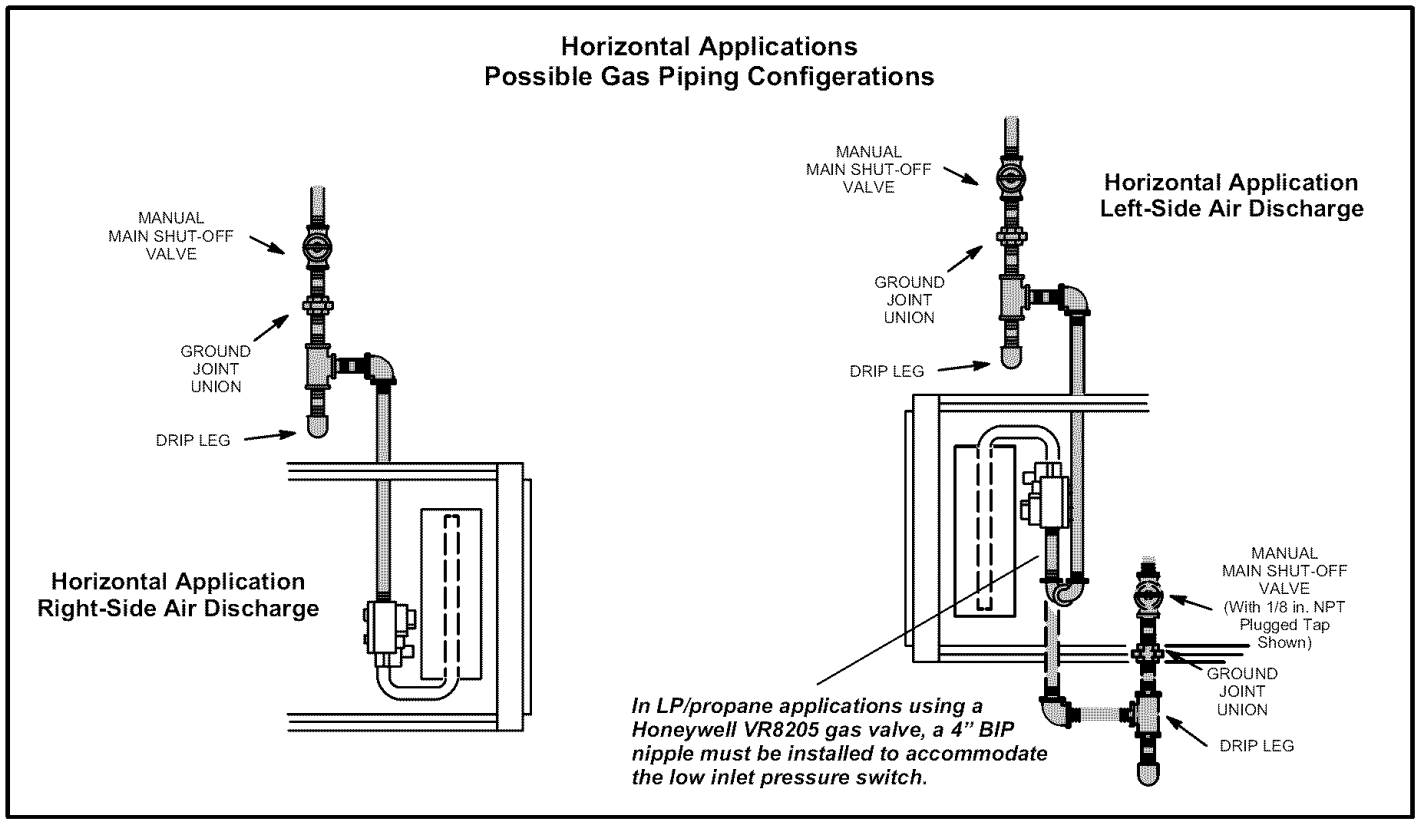


FIGURE 51

TABLE 9
GAS PIPE CAPACITY - FT³/HR (kL/HR)

Nominal Iron Pipe Size -Inches(mm)	Internal Diameter -Inches(mm)	Length of Pipe-Feet(m)									
		10 (3.048)	20 (6.096)	30 (9.144)	40 (12.192)	50 (15.240)	60 (18.288)	70 (21.336)	80 (24.384)	90 (27.432)	100 (30.480)
1/4 (6.35)	.364 (9.246)	43 (1.13)	29 (.82)	24 (.68)	20 (.57)	18 (.51)	16 (.45)	15 (.42)	14 (.40)	13 (.37)	12 (.34)
3/8 (9.53)	.493 (12.522)	95 (2.69)	65 (1.84)	52 (1.47)	45 (1.27)	40 (1.13)	36 (1.02)	33 (.73)	31 (.88)	29 (.82)	27 (.76)
1/2 (12.7)	.622 (17.799)	175 (4.96)	120 (3.40)	97 (2.75)	82 (2.32)	73 (2.07)	66 (1.87)	61 (1.73)	57 (1.61)	53 (1.50)	50 (1.42)
3/4 (19.05)	.824 (20.930)	360 (10.19)	250 (7.08)	200 (5.66)	170 (4.81)	151 (4.28)	138 (3.91)	125 (3.54)	118 (3.34)	110 (3.11)	103 (2.92)
1 (25.4)	1.049 (26.645)	680 (19.25)	465 (13.17)	375 (10.62)	320 (9.06)	285 (8.07)	260 (7.36)	240 (6.80)	220 (6.23)	205 (5.80)	195 (5.52)
1-1/4 (31.75)	1.380 (35.052)	1400 (39.64)	950 (26.90)	770 (21.80)	660 (18.69)	580 (16.42)	530 (15.01)	490 (13.87)	460 (13.03)	430 (12.18)	400 (11.33)
1-1/2 (38.1)	1.610 (40.894)	2100 (59.46)	460 (41.34)	1180 (33.41)	990 (28.03)	900 (25.48)	810 (22.94)	750 (21.24)	690 (19.54)	650 (18.41)	620 (17.56)
2 (50.8)	2.067 (52.502)	3950 (111.85)	2750 (77.87)	2200 (62.30)	1900 (53.80)	1680 (47.57)	1520 (43.04)	1400 (39.64)	1300 (36.81)	1220 (34.55)	1150 (32.56)
2-1/2 (63.5)	2.469 (67.713)	6300 (178.39)	4350 (123.17)	3520 (99.67)	3000 (84.95)	2650 (75.04)	2400 (67.96)	2250 (63.71)	2050 (58.05)	1950 (55.22)	1850 (52.38)
3 (76.2)	3.068 (77.927)	11000 (311.48)	7700 (218.03)	6250 (176.98)	5300 (150.07)	4750 (134.50)	4300 (121.76)	3900 (110.43)	3700 (104.77)	3450 (97.69)	3250 (92.03)
4 (101.6)	4.026 (102.260)	23000 (651.27)	15800 (447.39)	12800 (362.44)	10900 (308.64)	9700 (274.67)	8800 (249.18)	8100 (229.36)	7500 (212.37)	7200 (203.88)	6700 (189.72)

NOTE - Capacity given in cubic feet of gas per hour (kilo liters of gas per hour) and based on 0.60 specific gravity gas.

Electrical

ELECTROSTATIC DISCHARGE (ESD)
Precautions and Procedures

⚠CAUTION

Electrostatic discharge can affect electronic components. Take precautions during furnace installation and service to protect the furnace's electronic controls. Precautions will help to avoid control exposure to electrostatic discharge by putting the furnace, the control and the technician at the same electrostatic potential. Neutralize electrostatic charge by touching hand and all tools on an unpainted unit surface, such as the gas valve or blower deck, before performing any service procedure.

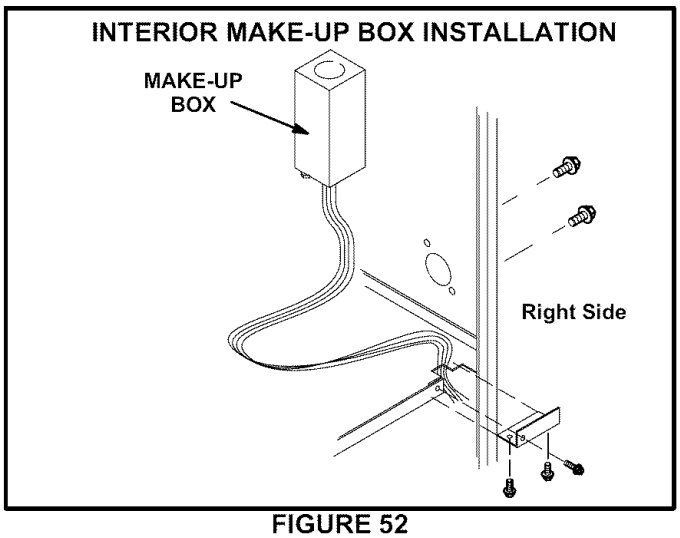


FIGURE 52

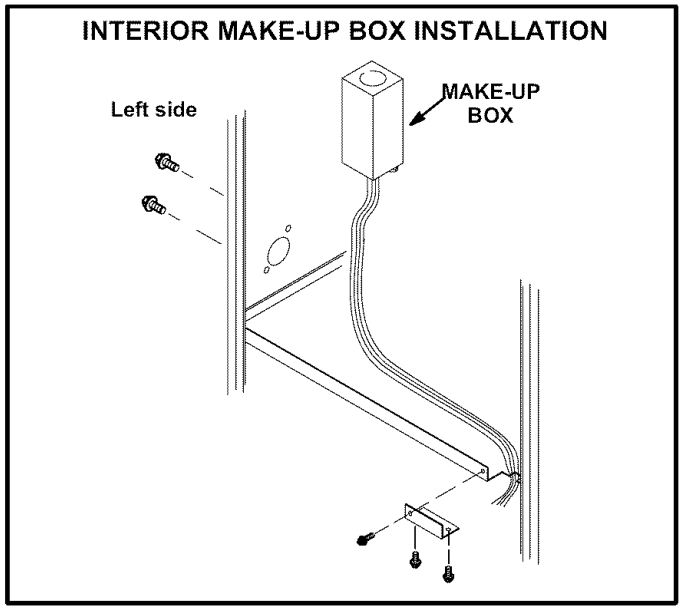


FIGURE 53

The unit is equipped with a field make-up box. The make-up box may be moved to the right side of the furnace to facilitate installation. If the make-up box is moved to the right side, the excess wire must be pulled into the blower compartment. Secure the excess wire to the existing harness to protect it from damage.

Refer to figure 55 for field wiring and figure 57 for schematic wiring diagram and troubleshooting.

1 - Select circuit protection and wire size according to the unit nameplate. The power supply wiring must meet Class I restrictions.

2 - Holes are on both sides of the furnace cabinet to facilitate wiring.

3 - Install a separate disconnect switch (protected by either fuse or circuit breaker) near the furnace so that power can be turned off for servicing.

4 - Before connecting the thermostat or the power wiring, check to make sure the wires will be long enough for servicing at a later date. Remove the blower access panel to check the length of the wire.

5 - Complete the wiring connections to the equipment. Use the provided unit wiring diagram and the field wiring diagram shown in figure 55. Use 18-gauge wire or larger that is suitable for Class II rating for thermostat connections.

6 - Electrically ground the unit according to local codes or, in the absence of local codes, according to the current National Electric Code (ANSI/NFPA No. 70) for the USA and current Canadian Electric Code part 1 (CSA standard C22.1) for Canada. A green ground wire is provided in the field make-up box.
NOTE - The G51MP furnace contains electronic components that are polarity sensitive. Make sure that the furnace is wired correctly and is properly grounded.

7 - One line voltage "EAC" accessory terminal is provided on the furnace control board. Any electronic air cleaner rated up to one amp can be connected to this terminal with the neutral leg of the circuit being connected to the any of the "NEUTRAL" terminals. See figure 56 for control board configuration. This terminal is energized whenever the blower is operating.

8 - One line voltage "HUM" accessory terminal is provided on the furnace control board. Any humidifier rated up to one amp can be connected to this terminal with the neutral leg of the circuit being connected to any of the "NEUTRAL" terminals. See figure 56 for control board configuration. This terminal is energized in the heating mode whenever the combustion air inducer is operating.

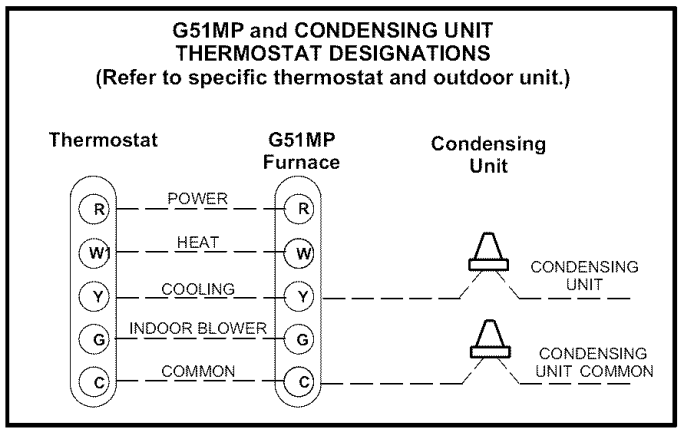


FIGURE 54

9 - One 24 volt "24V HUM" terminal is provided on the furnace control board. Any humidifier rated up to 0.5 amp can be connected to this terminal with the common leg of the circuit being connected to the "C" terminal of the thermostat terminal block, which is located on the control board.

10 - Install the room thermostat according to the instructions provided with the thermostat. See figure 54 for thermostat designations. If the furnace is being matched with a heat pump, refer to the FM21 installation instruction.

Indoor Blower Speeds

1 - When the thermostat is set to "FAN ON," the indoor blower will run continuously on the continuous low speed (FAN) when there is no cooling or heating demand.

2 - When the G51MP is running in the heating mode, the indoor blower will run on the heating speed.

3 - When there is a cooling demand, the indoor blower will run on the cooling speed.

TYPICAL G51MP FIELD WIRING DIAGRAM

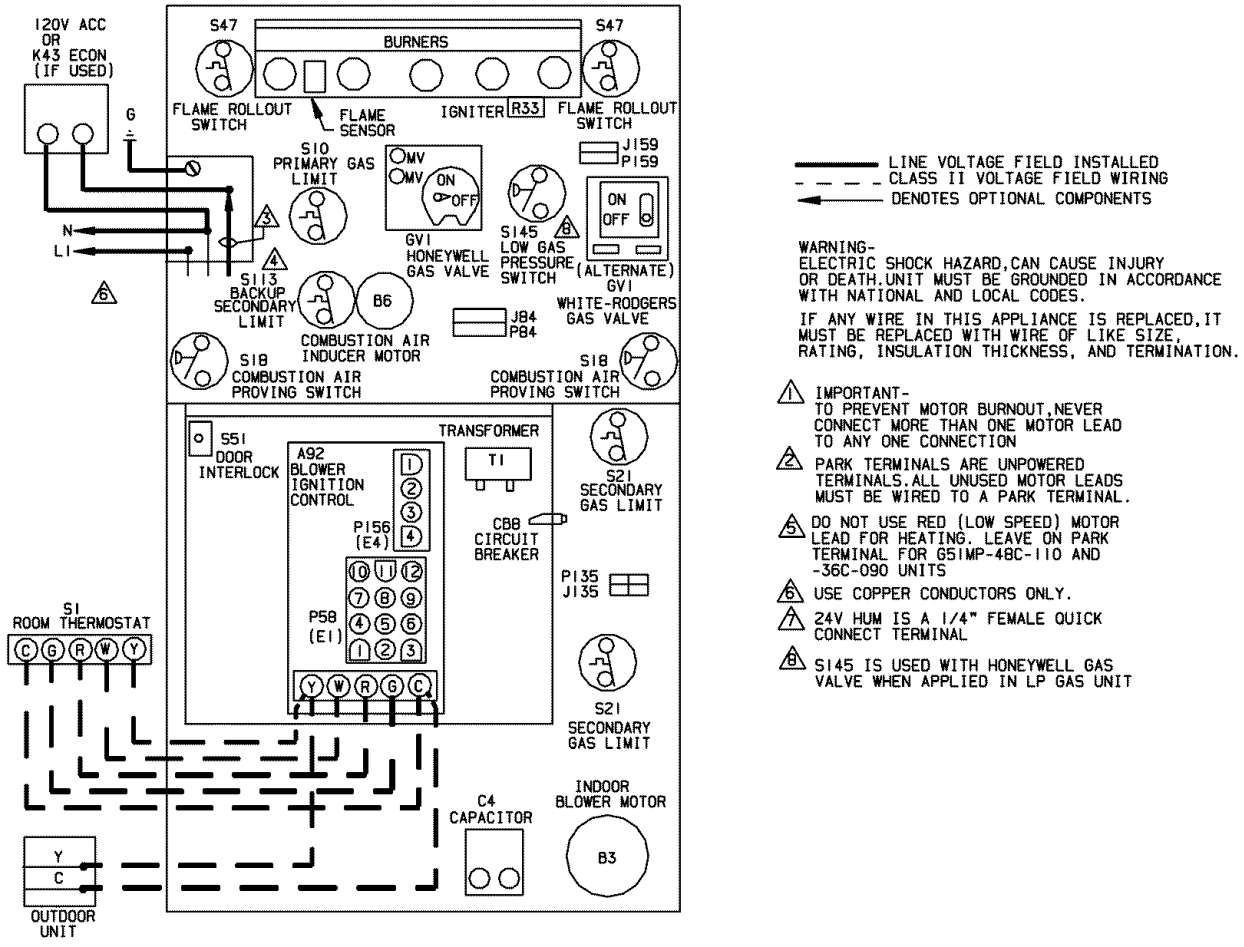
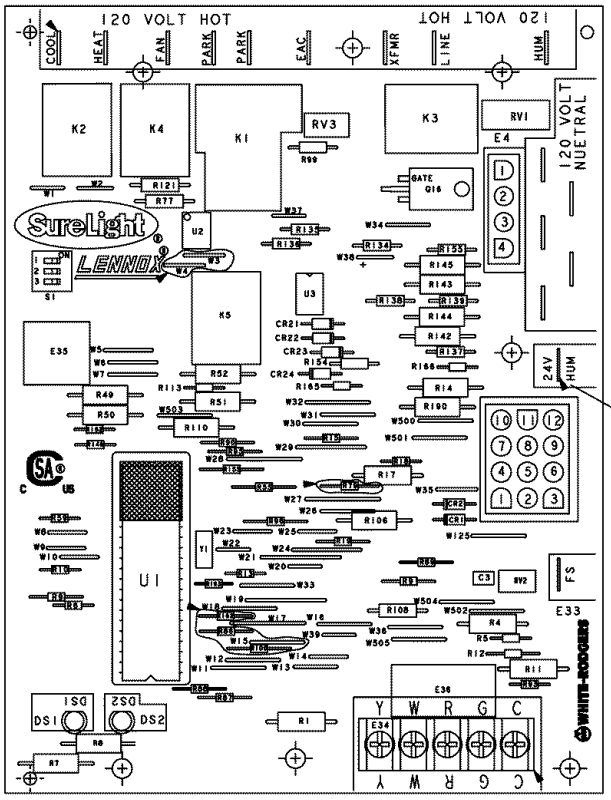


FIGURE 55

SURELIGHT® INTEGRATED CONTROL BOARD



1/4" FEMALE QUICK CONNECT

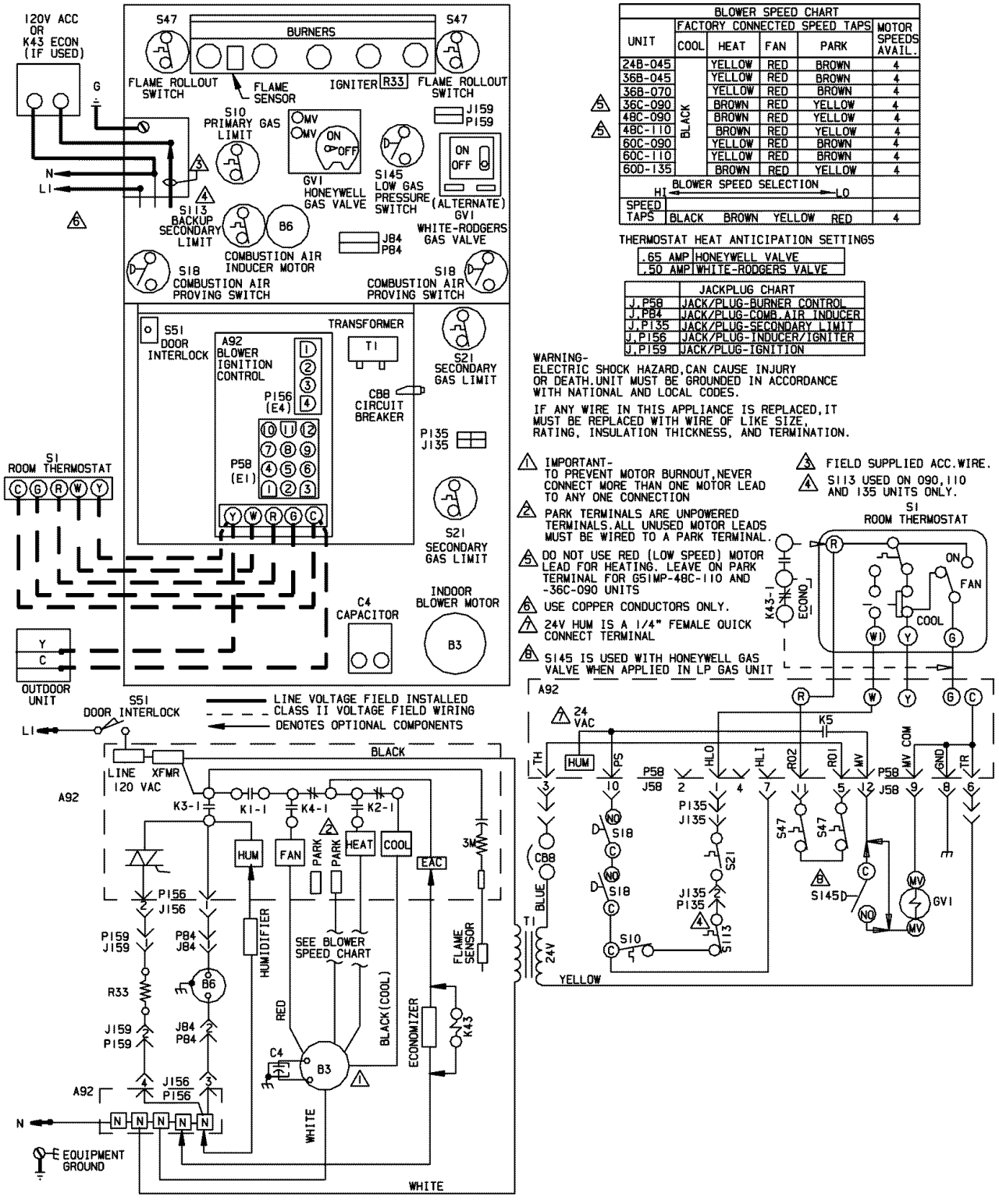
TERMINAL DESIGNATIONS	
COOL	Blower - Cooling Speed (120VAC)
HEAT	Blower - Heating Speed (120VAC)
PARK	Unused Blower (Not energized)
FAN	Continuous Low Blower Speed
EAC	Accessory Terminal (120VAC)
XFMR	Transformer (120VAC)
LINE	Input (120VAC)
HUM	Heat Only Accessory (120VAC)
5 Terminals	120 Volt Neutral
FS	Flame Sensor
24V HUM	Heat Only Accessory (24VAC)

SI DIP SWITCHES		
HEAT OFF DELAY		
1	2	SEC
OFF	OFF	60
OFF	ON	90 *
ON	OFF	120
ON	ON	180
COOL OFF DELAY		
3		SEC
OFF		2 *
ON		45

*Factory setting

FIGURE 56

TYPICAL G51MP WIRING DIAGRAM



BLOWER SPEED CHART						
UNIT	FACTORY CONNECTED SPEED TAPS					MOTOR SPEEDS AVAIL.
	COOL	HEAT	FAN	PARK		
24B-045	BLACK	YELLOW	RED	BROWN		4
36B-045		YELLOW	RED	BROWN		4
36B-070		YELLOW	RED	BROWN		4
36C-090		BROWN	RED	YELLOW		4
48C-090		BROWN	RED	YELLOW		4
48C-110		BROWN	RED	YELLOW		4
60C-090		YELLOW	RED	BROWN		4
60C-110		YELLOW	RED	BROWN		4
60D-135		BROWN	RED	YELLOW		4
BLOWER SPEED SELECTION HI ← → LO						
SPEED TAPS	BLACK	BROWN	YELLOW	RED		4

THERMOSTAT HEAT ANTICIPATION SETTINGS

.65 AMP	HONEYWELL VALVE
.50 AMP	WHITE-RODGERS VALVE

JACKPLUG CHART	
J.P58	JACK/PLUG-BURNER CONTROL
J.P84	JACK/PLUG-COMB.AIR INDUCER
J.P135	JACK/PLUG-SECONDARY LIMIT
J.P156	JACK/PLUG-INDUCER/IGNITER
J.P159	JACK/PLUG-IGNITION

WARNING-
ELECTRIC SHOCK HAZARD,CAN CAUSE INJURY OR DEATH.UNIT MUST BE GROUNDED IN ACCORDANCE WITH NATIONAL AND LOCAL CODES.

IF ANY WIRE IN THIS APPLIANCE IS REPLACED,IT MUST BE REPLACED WITH WIRE OF LIKE SIZE, RATING, INSULATION THICKNESS, AND TERMINATION.

1. IMPORTANT- TO PREVENT MOTOR BURNOUT,NEVER CONNECT MORE THAN ONE MOTOR LEAD TO ANY ONE CONNECTION
2. PARK TERMINALS ARE UNPOWERED TERMINALS.ALL UNUSED MOTOR LEADS MUST BE WIRED TO A PARK TERMINAL.
5. DO NOT USE RED (LOW SPEED) MOTOR LEAD FOR HEATING. LEAVE ON PARK TERMINAL FOR G51MP-48C-110 AND -36C-090 UNITS
6. USE COPPER CONDUCTORS ONLY.
7. 24V HUM IS A 1/4" FEMALE QUICK CONNECT TERMINAL
8. S145 IS USED WITH HONEYWELL GAS VALVE WHEN APPLIED IN LP GAS UNIT
3. FIELD SUPPLIED ACC.WIRE.
4. S113 USED ON 090,110 AND 135 UNITS ONLY.

FIGURE 57

Unit Start-Up

FOR YOUR SAFETY READ BEFORE OPERATING

⚠WARNING

Do not use this furnace if any part has been underwater. A flood-damaged furnace is extremely dangerous. Attempts to use the furnace can result in fire or explosion. Immediately call a qualified service technician to inspect the furnace and to replace all gas controls, control system parts, and electrical parts that have been wet or to replace the furnace, if deemed necessary.

⚠WARNING

Danger of explosion. Can cause injury or product or property damage. Should the gas supply fail to shut off or if overheating occurs, shut off the gas valve to the furnace before shutting off the electrical supply.

⚠CAUTION

Before attempting to perform any service or maintenance, turn the electrical power to unit OFF at disconnect switch.

Priming Condensate Trap

The condensate trap should be primed with water prior to start-up to ensure proper condensate drainage. Either pour 10 fl. oz. (300 ml) of water into the trap, or follow these steps to prime the trap:

1 - Follow the lighting instructions to place the unit into operation.

2 - Set the thermostat to initiate a heating demand.

3 - Allow the burners to fire for approximately 3 minutes.

4 - Adjust the thermostat to deactivate the heating demand.

5 - Wait for the combustion air inducer to stop. Set the thermostat to initiate a heating demand and again allow the burners to fire for approximately 3 minutes.

6 - Adjust the thermostat to deactivate the heating demand and again wait for the combustion air inducer to stop. At this point, the trap should be primed with sufficient water to ensure proper condensate drain operation.

BEFORE LIGHTING the unit, smell all around the furnace area for gas. Be sure to smell next to the floor because some gas is heavier than air and will settle on the floor.

The gas valve on the G51MP may be equipped with either a gas control lever or gas control knob. Use only your hand to push the lever or turn the gas control knob. Never use tools. If the the lever will not move or the knob will not push in or turn by hand, do not try to repair it. Call a qualified service technician. Force or attempted repair may result in a fire or explosion.

Placing the furnace into operation:

G51MP units are equipped with a SureLight® ignition system. Do not attempt to manually light burners on this furnace. Each time the thermostat calls for heat, the burners will automatically light. The ignitor does not get hot when there is no call for heat on units with SureLight® ignition system.

⚠WARNING

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

Gas Valve Operation (Figures 58 and 60)

1 - **STOP**! Read the safety information at the beginning of this section.

2 - Set the thermostat to the lowest setting.

3 - Turn off all electrical power to the unit.

4 - This furnace is equipped with an ignition device which automatically lights the burners. Do **not** try to light the burners by hand.

5 - Remove the upper access panel.

6 - *White Rodgers 36G Gas Valve or HoneywellVR8205 Gas Valve with ON/OFF Lever* - Switch gas valve lever to **OFF**. See figure 58 for the White Rodgers 36G valve. See figure 59 for the *HoneywellVR8205* valve. *Honeywell VR8205 Gas Valve with Knob* - Turn knob on gas valve clockwise ↷ to **OFF**. Do not force. See figure 60.

7 - Wait five minutes to clear out any gas. If you then smell gas, STOP! Immediately call your gas supplier from a neighbor's phone. Follow the gas supplier's instructions. If you do not smell gas go to next step.

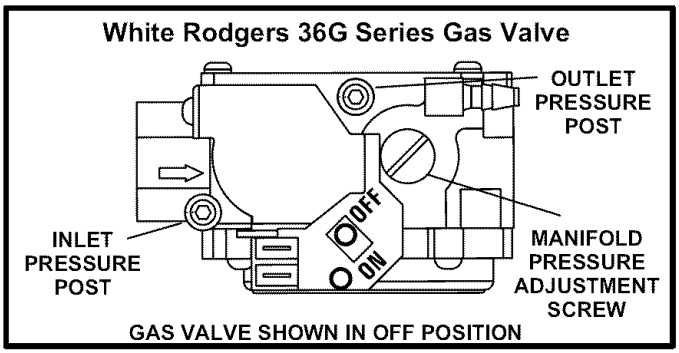


FIGURE 58

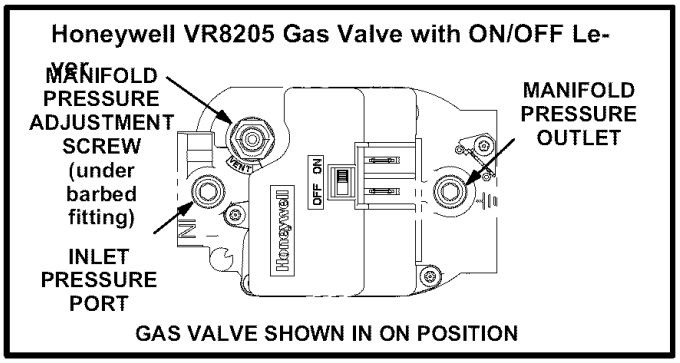


FIGURE 59

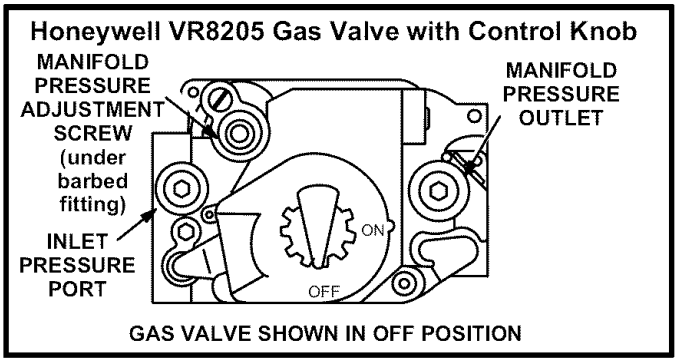


FIGURE 60

8 - *White Rodgers 36G Gas Valve or HoneywellVR8205 Gas Valve with ON/OFF Lever* - Switch gas valve lever to **ON**. See figure 58 for the White Rodgers 36G valve. See figure 59 for the *HoneywellVR8205* valve.
Honeywell VR8205 Gas Valve with Knob - Turn knob on gas valve counterclockwise to **ON**. Do not force. See figure 60.

9 - Replace the upper access panel.

10- Turn on all electrical power to to the unit.

11- Set the thermostat to desired setting.

NOTE - When unit is initially started, steps 1 through 11 may need to be repeated to purge air from gas line.

12- If the appliance will not operate, follow the instructions "Turning Off Gas to Unit" and call your service technician or gas supplier.

Turning Off Gas to Unit

1 - Set the thermostat to the lowest setting.

2 - Turn off all electrical power to the unit if service is to be performed.

3 - Remove the upper access panel.

4 - *White Rodgers 36G Gas Valve or HoneywellVR8205 Gas Valve with ON/OFF Lever* - Switch gas valve lever to **OFF**.
Honeywell VR8205 Gas Valve with Knob - Turn knob on gas valve clockwise to **OFF**. Do not force.

5 - Replace the upper access panel.

Heating Sequence Of Operation

1 - When thermostat calls for heat, combustion air inducer starts.

2 - Combustion air pressure switch proves blower operation. Switch is factory set and requires no adjustment.

3 - After a 15-second prepurge, the hot surface ignitor energizes.

4 - After a 20-second ignitor warm-up period, the gas valve solenoid opens.

5 - Gas is ignited, flame sensor proves the flame, and the combustion process continues.

6 - If flame is not detected after first ignition trial, the ignition control will repeat steps 3 and 4 four more times before locking out the gas valve ("WATCHGUARD" flame failure mode). The ignition control will then automatically repeat steps 1 through 6 after 60 minutes.

7 - To interrupt the 60-minute "WATCHGUARD" period, move thermostat from "Heat" to "OFF" then back to "Heat". Heating sequence then restarts at step 1.

Gas Pressure Adjustment

Gas Flow (Approximate)

1 - Operate unit at least 15 minutes before checking gas flow. Determine the time in seconds for one revolutions of gas through the meter. A portable LP gas meter (17Y44) is available for LP applications.

2 - Compare the number of seconds and the gas meter size in table 10 to determine the gas flow rate. Multiply the gas flow rate by the heating value to determine the unit input rate. If manifold pressure is correct and the unit input rate is incorrect, check gas orifices for proper size and restriction.

3 - Remove temporary gas meter if installed.

NOTE - To obtain accurate reading, shut off all other gas appliances connected to meter.

TABLE 10

Gas Flow Rate (Ft.^{3}/Hr.)		
Seconds for 1 Revolution	Gas Meter Size	
	1/2 cu ft Dial	1 cu ft Dial
10	180	360
12	150	300
14	129	257
16	113	225
18	100	200
20	90	180
22	82	164
24	75	150
26	69	138
28	64	129
30	60	120
32	56	113
34	53	106
36	50	100
38	47	95
40	45	90
42	43	86
44	41	82
46	39	78
48	38	75
50	36	72
52	35	69
54	33	67
56	32	64
58	31	62
60	30	60

Gas Pressure

1 - Check the gas line pressure with the unit firing at maximum rate. A minimum of 4.5 in. w.c. for natural gas or 11.0 in. w.c. for LP/propane gas should be maintained.

2 - After the line pressure has been checked and adjusted, check the regulator pressure. A natural gas to LP/propane gas changeover kit is required to convert the unit. Manifold pressures are given in table 11. See figures 58, 59 and 60 for the location of the manifold pressure adjustment screws.

⚠IMPORTANT

The White Rodgers 36G gas valve (figure 58) is equipped with pressure posts for measuring supply and manifold pressures. The posts provide built-in hose connections and have an integral 3/32" Allen-head screw. Rotate the screw counterclockwise one full turn to permit pressure measurement. Reseat the screw (rotate one full turn clockwise) after measurements have been taken to prevent gas leakage.

High Altitude Information

NOTE - In Canada, certification for installations at elevations over 4500 feet (1372 m) is the jurisdiction of local authorities.

The manifold pressure may require adjustment to ensure proper operation at higher altitudes. Refer to table 11 for proper manifold pressure settings at varying altitudes. Table 12 lists required pressure switch changes and conversion kits at varying altitudes.

The combustion air pressure switches are factory-set and require no adjustment.

TABLE 11
Manifold Pressure (Outlet) inches w.c.

Fuel	Model Input Sizes	Altitude (feet)				
		0-4500	4501-5500	5501-6500	6501-7500	7501-10,000
Nat. Gas	All sizes	3.5	3.5	3.5	3.5	3.5*
L.P. Gas	All sizes	10.0**	10.0**	10.0**	10.0**	10.0**

**Conversion kit required for applications at altitudes above 7501 ft. above sea level.*

***Conversion kit required for applications at all altitudes.*

NOTE - A natural to L.P. propane gas changeover kit is necessary to convert this unit. Refer to the changeover kit installation instruction for the conversion procedure.

TABLE 12
Conversion Kit and Pressure Switch Requirements at Varying Altitudes

Model Input Size	Gas	Altitude					
		0 - 4500 ft. (0 - 1372 m)		4,501 - 7500 ft. (1373 - 2286 m)		7501-10,000 ft. (2287 - 3048 m)	
		Required Conversion Kit	Pressure Switch	Required Conversion Kit	Pressure Switch	Required Conversion Kit	Pressure Switch
-045	Nat.	N/A	No Change	N/A	No Change	59M16	95M22
	LPG	83M74	No Change	83M74	No Change	83M75	95M22
-070	Nat.	N/A	No Change	N/A	56M05	59M16	56M06
	LPG	83M74	No Change	83M74	56M05	83M75	56M06
-090	Nat.	N/A	No Change	N/A	75M20	59M16	56M07
	LPG	83M74	No Change	83M74	75M20	83M75	56M07
-110	Nat.	N/A	No Change	N/A	75M20	59M16	56M07
	LPG	83M74	No Change	83M74	75M20	83M75	56M07
-135	Nat.	N/A	No Change	N/A	56M04	59M16	60M35
	LPG	83M74	No Change	83M74	56M04	83M75	60M35

Pressure switch is factory set. No adjustment necessary. All models use the factory installed pressure switch from 0-4500 feet (0-1370 m).

Other Unit Adjustments

Primary and Secondary Limits

The primary limit is located on the heating compartment vestibule panel. The secondary limits are located in the blower compartment, attached to the back side of the blower. These limits are factory set and require no adjustment.

Flame Rollout Switches (Two)

These manually reset switches are located on the burner box. If tripped, check for adequate combustion air before resetting.

Pressure Switches (Two)

The pressure switches are located in the heating compartment on the combustion air inducer. These switches check for proper combustion air inducer operation before allowing ignition trial. The switches are factory-set and require no adjustment.

Temperature Rise

After the furnace has been started and supply and return air temperatures have been allowed to stabilize, check the temperature rise. If necessary, adjust the blower speed to maintain the temperature rise within the range shown on the unit nameplate. Increase the blower speed to decrease the temperature. Decrease the blower speed to increase the temperature rise. Failure to adjust the temperature rise may cause erratic limit operation.

Fan Control

Heating Mode **--** The fan on delay of 45 seconds is not adjustable. The fan off delay (amount of time that the blower operates after the heat demand has been satisfied) may be adjusted by setting S1 switches 1 and 2 located on the SureLight® control. The unit is shipped with a factory fan off setting of 90 seconds. The fan off delay affects comfort and is adjustable to satisfy individual applications. Adjust the fan off delay to achieve a supply air temperature between 90° and 110°F at the exact moment that the blower is de-energized. Longer off delay settings provide lower return air temperatures; shorter settings provide higher return air temperatures. See figure 56.

Cooling Mode **--** The cooling mode fan off delay (amount of time that the blower operates after the cooling demand has been satisfied) may be adjusted by setting S1 switch 3 located on the SureLight® control. In the off position, the cooling fan off delay is 2 seconds. In the on position, the cooling fan off delay is 45 seconds. See figure 56.

Thermostat Heat Anticipation

Set the heat anticipator setting (if adjustable) according to the amp draw listed on the wiring diagram that is attached to the unit.

Electrical

1 - Check all wiring for loose connections.
2 - Check for the correct voltage at the furnace (furnace operating).
3 - Check amp-draw on the blower motor.
Motor Nameplate_____Actual_____

NOTE - Do not secure the electrical conduit directly to the air ducts or structure.

Blower Speeds

NOTE - CFM readings are taken external to unit with a dry evaporator coil and without accessories.

1 - Turn off electrical power to furnace.
2 - Remove blower access panel.
3 - Disconnect existing speed tap at control board speed terminal.

NOTE - Termination of any unused motor leads must be insulated.

4 - Refer to blower speed selection chart on unit wiring diagram for desired heating or cooling speed.
5 - Connect selected speed tap at control board speed terminal.
6 - Resecure blower access panel.
7 - Turn on electrical power to furnace.

Electronic Ignition

The SureLight® integrated control has an added feature of an internal Watchguard control. The feature serves as an automatic reset device for ignition control lockout caused by ignition failure. This type of lockout is usually due to low gas line pressure. After one hour of continuous thermostat demand for heat, the Watchguard will break and remake thermostat demand to the furnace and automatically reset the control to begin the ignition sequence.

Exhaust and Air Intake Pipe

1 - Check exhaust and air intake connections for tightness and to make sure there is no blockage.
2 - Are pressure switches closed? Obstructed exhaust pipe will cause unit to shut off at pressure switches. Check termination for blockages.
3 - Reset manual flame rollout switches on burner box cover.

Failure To Operate

If the unit fails to operate, check the following:

1 - Is the thermostat calling for heat?
2 - Are access panels securely in place?
3 - Is the main disconnect switch closed?
4 - Is there a blown fuse?
5 - Is the filter dirty or plugged? Dirty or plugged filters will cause the limit control to shut the unit off.
6 - Is gas turned on at the meter?
7 - Is the manual main shut-off valve open?
8 - Is the internal manual shut-off valve open?
9 - Is the unit ignition system in lock out? If the unit locks out again, call the service technician to inspect the unit for blockages.

Service

⚠WARNING

ELECTRICAL SHOCK, FIRE, OR EXPLOSION HAZARD.

Failure to follow safety warnings exactly could result in dangerous operation, 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. Take care to reconnect wires correctly.
Verify proper operation after servicing.

At the beginning of each heating season, system should be checked as follows by a qualified service technician:

Blower

Check the blower wheel for debris and clean if necessary. The blower motors are prelubricated for extended bearing life. No further lubrication is needed.

⚠WARNING

The blower access panel must be securely in place when the blower and burners are operating. Gas fumes, which could contain carbon monoxide, can be drawn into living space resulting in personal injury or death.

Filters

All G51MP filters are installed external to the unit. Filters should be inspected monthly. Clean or replace the filters when necessary to ensure proper furnace operation. Table 3 lists recommended filter sizes.

Exhaust and air intake pipes

Check the exhaust and air intake pipes and all connections for tightness and to make sure there is no blockage.

Electrical

1 - Check all wiring for loose connections.
2 - Check for the correct voltage at the furnace (furnace operating).
3 - Check amp-draw on the blower motor.
Motor Nameplate_____Actual_____

Winterizing and Condensate Trap Care

1 - Turn off power to the unit.
2 - Have a shallow pan ready to empty condensate water.
3 - Remove the drain plug from the condensate trap and empty water. Inspect the trap then reinstall the drain plug.

Cleaning Heat Exchanger

If cleaning the heat exchanger becomes necessary, follow the below procedures and refer to figure 1 when disassembling unit. Use papers or protective covering in front of furnace while removing heat exchanger assembly.

1 - Turn off electrical and gas supplies to the furnace.
2 - Remove the upper and lower furnace access panels.
3 - Mark all gas valve wires and disconnect them from valve.
4 - Remove gas supply line connected to gas valve. Remove gas valve/manifold assembly.
5 - Remove sensor wire from sensor. Disconnect 2-pin or 3-pin plug from the ignitor.
6 - Disconnect wires from flame roll-out switches.
7 - Remove burner box cover and remove four burner box screws at the vestibule panel and remove burner box. Set burner box assembly aside.
NOTE - If necessary, clean burners at this time. Follow procedures outlined in Burner Cleaning section.
8 - Loosen three clamps and remove flexible exhaust tee.
9 - Remove 3/8 inch rubber cap from condensate drain plug and drain. Replace cap after draining.
10 - Disconnect condensate drain line from the condensate trap. Remove condensate trap (it may be necessary to cut drain pipe). Remove screws that secure condensate collars to either side of the furnace and remove collars. Remove drain tubes from cold end header collector box.
11 - Disconnect condensate drain tubing from flue collar. Remove screws that secure both flue collars into place. Remove flue collars. It may be necessary to cut the exiting exhaust pipe for removal of the fittings.
12 - Disconnect the 2-pin plug from the combustion air inducer. Disconnect the two wires to the secondary limit, if applicable. Remove four screws which secure combustion air inducer to collector box Remove combustion air inducer assembly. Remove ground wire from vest panel.
13 - Mark and disconnect all combustion air pressure tubing from cold end header collector box.
14 - Mark and remove wires from pressure switches. Remove pressure switches. Keep tubing attached to pressure switches.
15 - Remove electrical junction box from the side of the furnace.
16 - Mark and disconnect any remaining wiring to heating compartment components. Disengage strain relief bushing and pull wiring and bushing through the hole in the blower deck.
17 - Remove the primary limit from the vestibule panel.
18 - Remove two screws from the front cabinet flange at the blower deck. Spread cabinet sides slightly to allow clearance for removal of heat exchanger.

19 - Remove screws along vestibule sides and bottom which secure vestibule panel and heat exchanger assembly to cabinet. Remove two screws from blower rail which secure bottom heat exchanger flange. Remove heat exchanger from furnace cabinet.

20 - Back wash heat exchanger with soapy water solution or steam. **If steam is used it must be below 275°F (135°C) .**

21 - Thoroughly rinse and drain the heat exchanger. Soap solutions can be corrosive. Take care to rinse entire assembly.

22 - Reinstall heat exchanger into cabinet making sure that the clamshells of the heat exchanger assembly are resting on the support located at the rear of the cabinet. Remove the indoor blower to view this area through the blower opening.

23 - Re-secure the supporting screws along the vestibule sides and bottom to the cabinet.

24 - Reinstall cabinet screws on front flange at blower deck.

25 - Reinstall the primary limit on the vestibule panel.

26 - Route heating component wiring through hole in blower deck and reinsert strain relief bushing.

27 - Reinstall pressure switches and reconnect pressure switch wiring.

28 - Carefully connect combustion air pressure switch hosing from pressure switches to proper stubs on cold end header collector box.

29 - Reinstall condensate collars on each side of the furnace. Reconnect drain tubing to collector box.

30 - Reinstall condensate trap on same side as exhaust pipe. Reconnect condensate drain line to the condensate trap.

31 - Reinstall electrical junction box.

32 - Reinstall the combustion air inducer. Reconnect the 2-pin or 3-pin plug to the wire harness. Reconnect the two wires to the secondary limit, if applicable.

33 - Use securing screws to reinstall flue collars to either side of the furnace. Reconnect exhaust piping and exhaust drain tubing.

34 - Replace flexible exhaust tee on combustion air inducer and flue collars. Secure using three existing hose clamps.

35 - Reinstall burner box assembly in vestibule area.

36 - Reconnect flame roll-out switch wires.

37 - Reconnect sensor wire and reconnect 2-pin plug from ignitor.

38 - Secure burner box assembly to vestibule panel using four existing screws. **Make sure burners line up in center of burner ports.**

39 - Reinstall gas valve manifold assembly. Reconnect gas supply line to gas valve.

40 - Reinstall burner box cover.

41 - Reconnect wires to gas valve.

42 - Replace the blower compartment access panel.

43 - Refer to instruction on verifying gas and electrical connections when re-establishing supplies.

44 - Follow lighting instructions to light and operate furnace for 5 minutes to ensure that heat exchanger is clean and dry and that furnace is operating properly.

45 - Replace heating compartment access panel.

Cleaning the Burner Assembly

1 - Turn off electrical and gas power supplies to furnace. Remove upper and lower furnace access panels.

2 - Mark all gas valve wires and disconnect them from the valve.

3 - Disconnect the gas supply line from the gas valve. Remove gas valve/manifold assembly.

4 - Mark and disconnect sensor wire from the sensor. Disconnect 2-pin plug from the ignitor at the burner box.

5 - Remove burner box cover and remove four screws which secure burner box assembly to vest panel. Remove burner box from the unit.

6 - Use the soft brush attachment on a vacuum cleaner to gently clean the face of the burners. Visually inspect the inside of the burners and crossovers for any blockage caused by foreign matter. Remove any blockage.

7 - Reconnect the sensor wire and reconnect the 2-pin plug to the ignitor wiring harness.

8 - Reinstall the burner box assembly using the existing four screws. Make sure that the burners line up in the center of the burner ports.

9 - Reinstall the gas valve manifold assembly. Reconnect the gas supply line to the gas valve. Reinstall the burner box cover.

10 - Reconnect the gas valve wires to the gas valve.

11 - Replace the blower compartment access panel.

12 - Refer to instruction on verifying gas and electrical connections when re-establishing supplies.

13 - Follow lighting instructions to light and operate furnace for 5 minutes to ensure that heat exchanger is clean and dry and that furnace is operating properly.

14 - Replace heating compartment access panel.

Repair Parts List

The following repair parts are available through Lennox dealers. When ordering parts, include the complete furnace model number listed on the CSA nameplate -- Example: G51MP-24B-045-1.

Cabinet Parts

- Upper access panel
- Blower access panel
- Top cap

Control Panel Parts

- Transformer
- SureLight® integrated control board
- Door interlock switch
- Circuit breaker

Blower Parts

- Blower wheel
- Motor
- Motor mounting frame
- Motor capacitor
- Blower housing cutoff plate

Heating Parts

- Flame Sensor
- Heat exchanger assembly
- Gas manifold
- Combustion air inducer
- Gas valve
- Main burner cluster
- Main burner orifices
- Pressure switches
- Ignitor
- Primary limit control
- Secondary limit control
- Flame rollout switches
- Combustion air inducer auxiliary limit

Ignition Control Board Diagnostic Codes

DIAGNOSTIC CODES

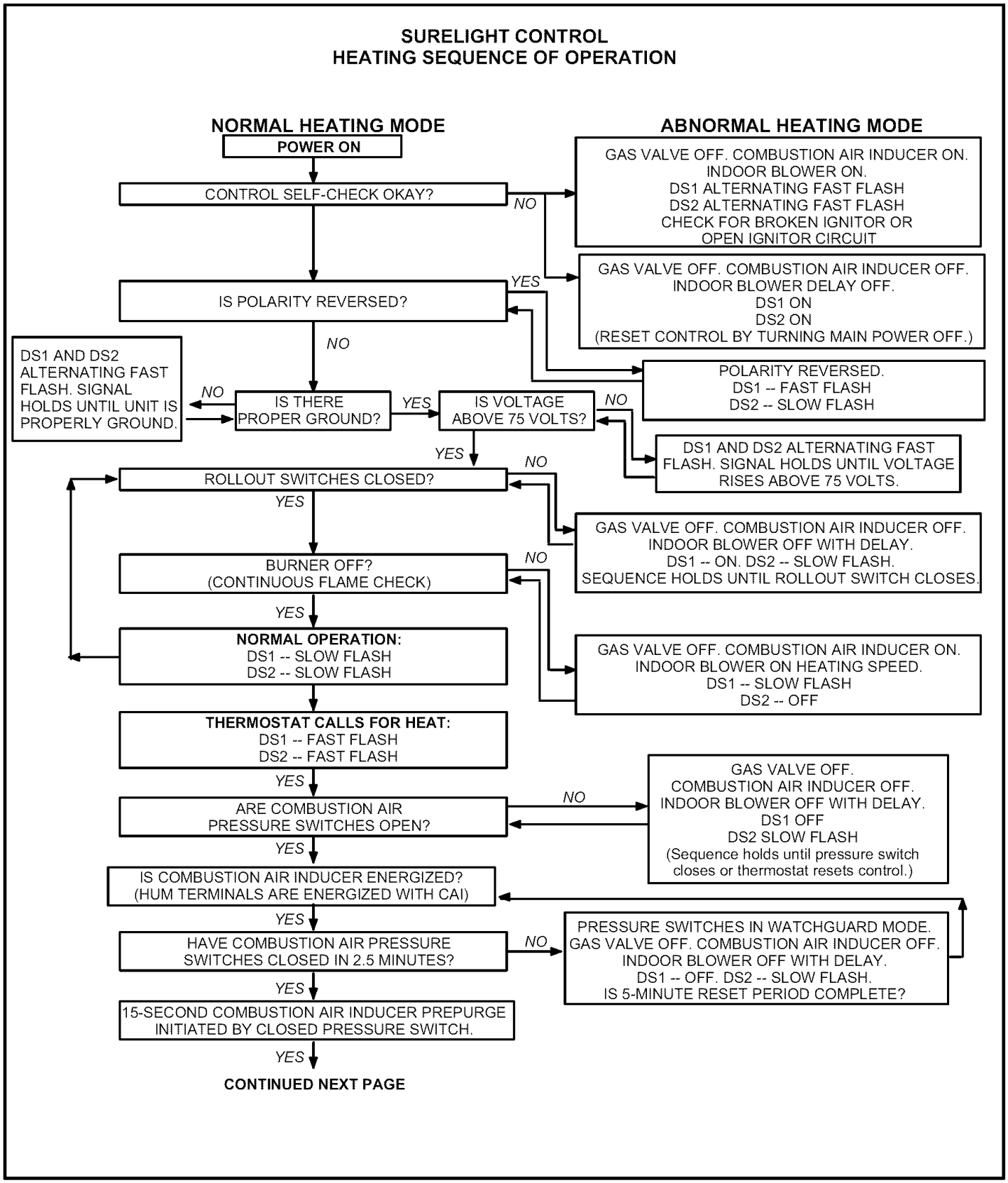
Make sure to Identify LED'S Correctly.

Refer to Installation Instructions for control board layout.

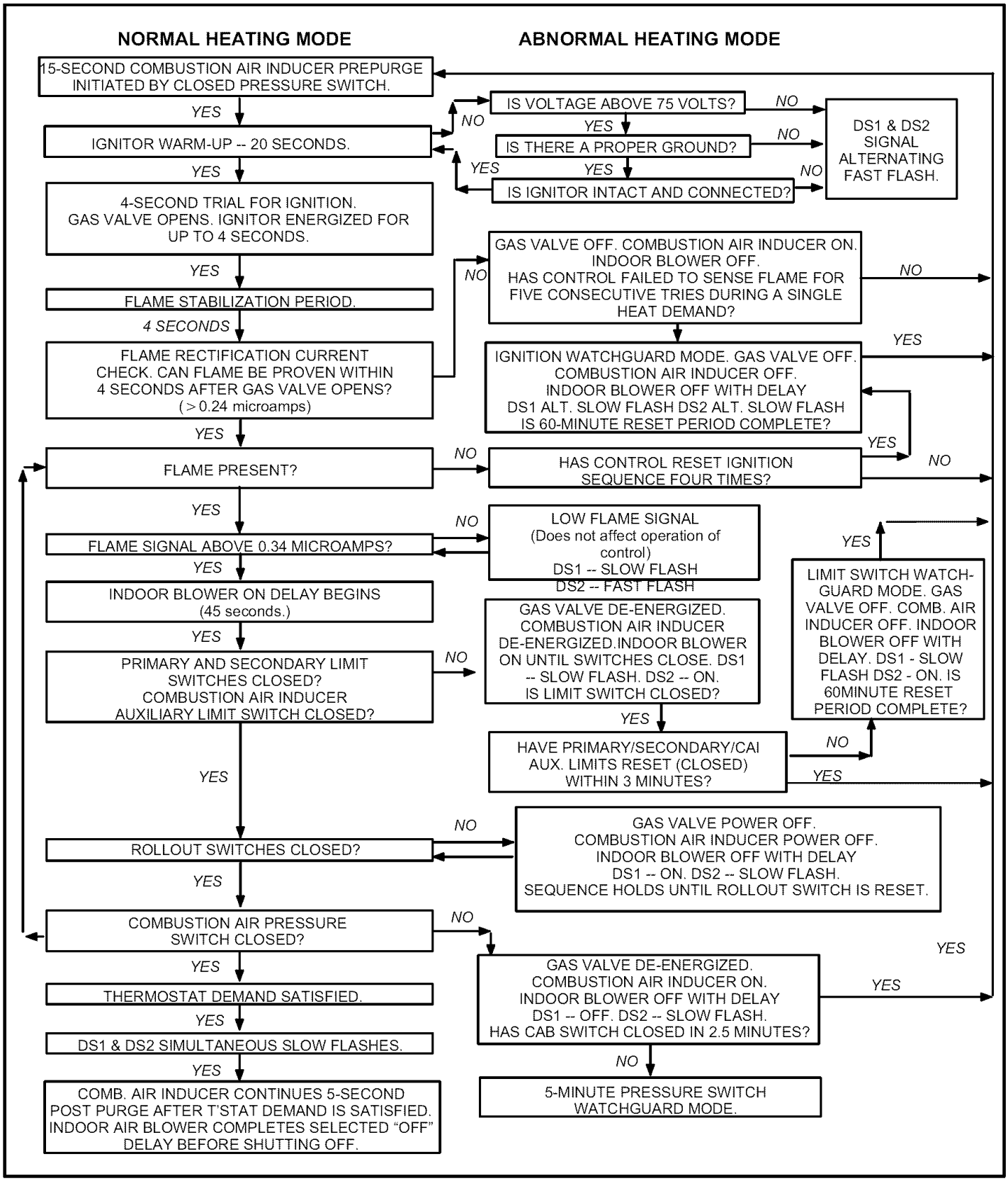
DS1 (Red or Green)	DS2 (Green)	DESCRIPTION
SIMULTANEOUS SLOW FLASH	SIMULTANEOUS SLOW FLASH	Power on -- Normal operation. Also signaled during cooling and continuous fan.
SIMULTANEOUS FAST FLASH	SIMULTANEOUS FAST FLASH	Normal operation -- Signaled when heating demand initiated at thermostat.
SLOW FLASH	ON	Primary or secondary limit switch open. Limit must close within 3 minutes or unit goes into 1-hour Watchguard.
OFF	SLOW FLASH	Pressure switch open; OR: Blocked inlet/exhaust vent; OR: Condensate line blocked; OR: Pressure switch closed prior to activation of combustion air inducer.
ALTERNATING SLOW FLASH	ALTERNATING SLOW FLASH	Watchguard -- Burners failed to ignite, limit open longer than 3 minutes, or flame sense lost 5 times in one heating cycle.
SLOW FLASH	OFF	Flame sensed without gas valve energized.
ON	SLOW FLASH	Rollout switch open.
ON ON OFF	ON OFF ON	Circuit board failure or control wired incorrectly. Check 24-volt and 115-volt connections to board.
FAST FLASH	SLOW FLASH	Main power polarity reversed. Switch line and neutral. Improper main ground.
SLOW FLASH	FAST FLASH	Low flame signal. Check flame sensor.
ALTERNATING FAST FLASH	ALTERNATING FAST FLASH	The following conditions are sensed during the ignitor warm-up period only: 1) Improper main ground; 2) Broken ignitor; OR: Open ignitor circuit; 3) Line voltage below 75 volts.

NOTE - Slow flash rate equals 1 Hz (one flash per second). Fast flash rate equals 3 Hz (three flashes per second). Drop out flame sense current = 0.15 - 0.24 microAmps.

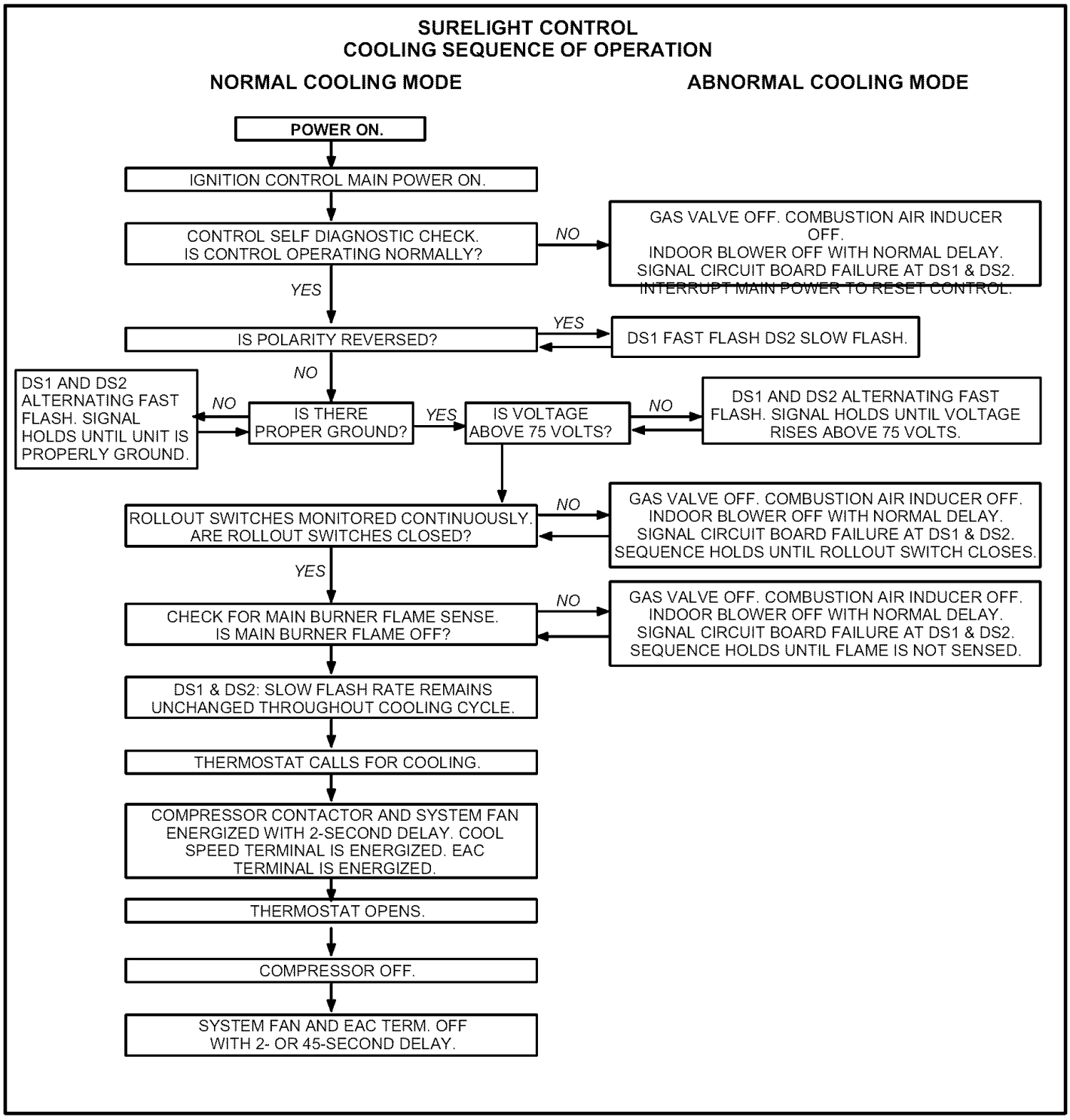
SureLight® Troubleshooting: Heating Sequence of Operation



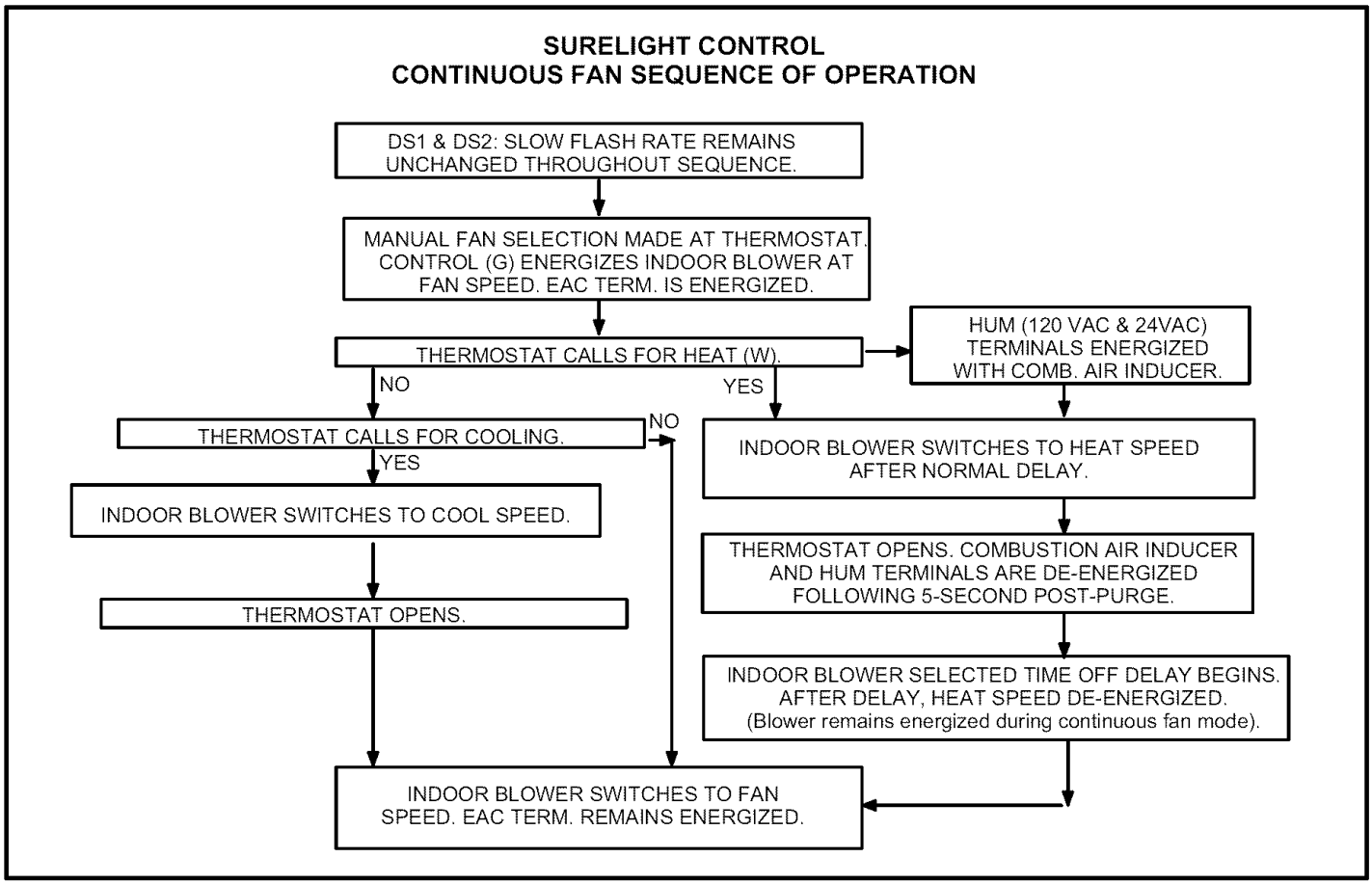
SureLight® Troubleshooting: Heating Sequence of Operation (Continued)



SureLight® Troubleshooting: Cooling Sequence of Operation



SureLight® Troubleshooting: Continuous Fan Sequence of Operation



Vent Pipe Sizing Worksheet

Step 1	**Proposed vent pipe size : _____**	**Equivalent Feet**
Step 2	**Termination kit catalog number : _____** **Vent pipe equivalency value from table 5 : _____**	
Step 3	**Total number of 90° elbows required (indoors and outdoors)** **_____ X 5 = _____ equivalent feet of pipe**	
Step 4	**Total number of 45° elbows required (indoors and outdoors)** **_____ X 2.5 = _____ equivalent feet of pipe**	
Step 5	**Linear feet of straight pipe required : _____**	
Step 6	**Add equivalent feet of vent pipe listed in steps 2 through 5.**	**TOTAL**

If the total is equal to, or less than, the allowable maximum given in table 7, the proposed pipe size is acceptable. If the total exceeds the maximum allowed vent pipe length, repeat the process above using the next larger diameter pipe until an acceptable total is achieved.

NOTE - In Direct Vent systems, total the equivalent length of either the exhaust OR intake piping run, depending upon which will be LONGER. Intake and exhaust pipe diameter must be the same size and must be terminated in the same pressure zone. Intake and exhaust pipe should be roughly the same length.

G51MP Start-Up & Performance Check List

Job Name _____ Job No. _____ Date _____

Job Location _____ City _____ State _____

Installer _____ City _____ State _____

Unit Model No. _____ Technician _____

Serial No. _____

Heating Section

Electrical Connections Tight? ☐

Supply Voltage _____ Blower Motor H.P. _____

Blower Motor Amps ☐ Gas Piping Connections Tight & Leak-Tested? ☐

Fuel Type: Natural Gas? ☐ LP/Propane Gas? ☐

Furnace Btu Input _____

Line Pressure _____

Regulator Pressure ____ w.c. - Nat.: _____ w.c. - LP/Propane

Flue Connections Tight? ☐ Proper Draft? ☐

Condensate Connections Tight? ☐

Combustion Gas Tested? ☐ CO_2 ☐ CO

Fan Control Setting (45 Seconds Fixed On) _____

Fan Control Off Setting _____ Temperature Rise _____

Filter Clean & Secure? ☐ Vent Clear? ☐

Thermostat

Calibrated? ☐ Heat Anticipator Properly Set? ☐ Level? ☐