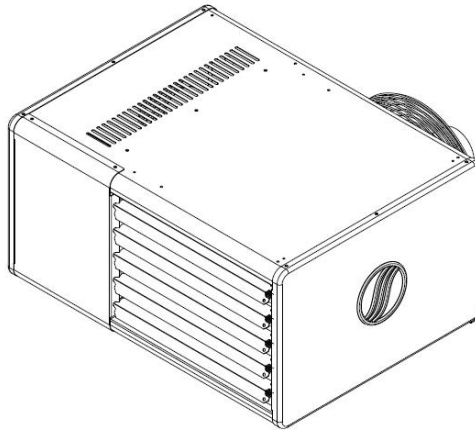




VENTED GARAGE HEATER

Model #GHBVN45, GHBVN75
GHBVL45, GHBVL75



▲ CAUTION - FOR YOUR SAFETY

▲ WARNING: IF THE INFORMATION IN THIS MANUAL IS NOT FOLLOWED EXACTLY, A FIRE OR EXPLOSION MAY RESULT CAUSING PROPERTY DAMAGE, PERSONAL INJURY, OR LOSS OF LIFE.

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

WHAT TO DO IF YOU SMELL GAS

- Do not try to light any appliance.
 - Do not touch any electrical switch; do not use any phone in your building.
 - 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.
- Installation and service must be performed by a qualified installer, service agency or the gas supplier.

INSTALLER: Leave this manual with the appliance. **CONSUMER:** Retain this manual for future reference.

▲ WARNING: Improper installation, adjustment, alteration, service or maintenance can cause injury or property damage. Refer to this manual for correct installation and operational procedures. For assistance or additional information consult a qualified installer, service agency or the gas supplier.



Questions about installation, operation, or troubleshooting? Before returning to your retailer, contact our customer service department at 1-877-886-5989, 8:00 a.m.- 4:30p.m., EST, Monday-Friday or e-mail customerservice@usaprocom.com.

GHBV48/78651

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⚠ WARNING: Read the installation & operation instructions before using this appliance.

IMPORTANT: Read instructions and warnings carefully before starting installation. Failure to follow these instructions may result in a possible fire hazard and will void the warranty.

PRODUCT SPECIFICATIONS

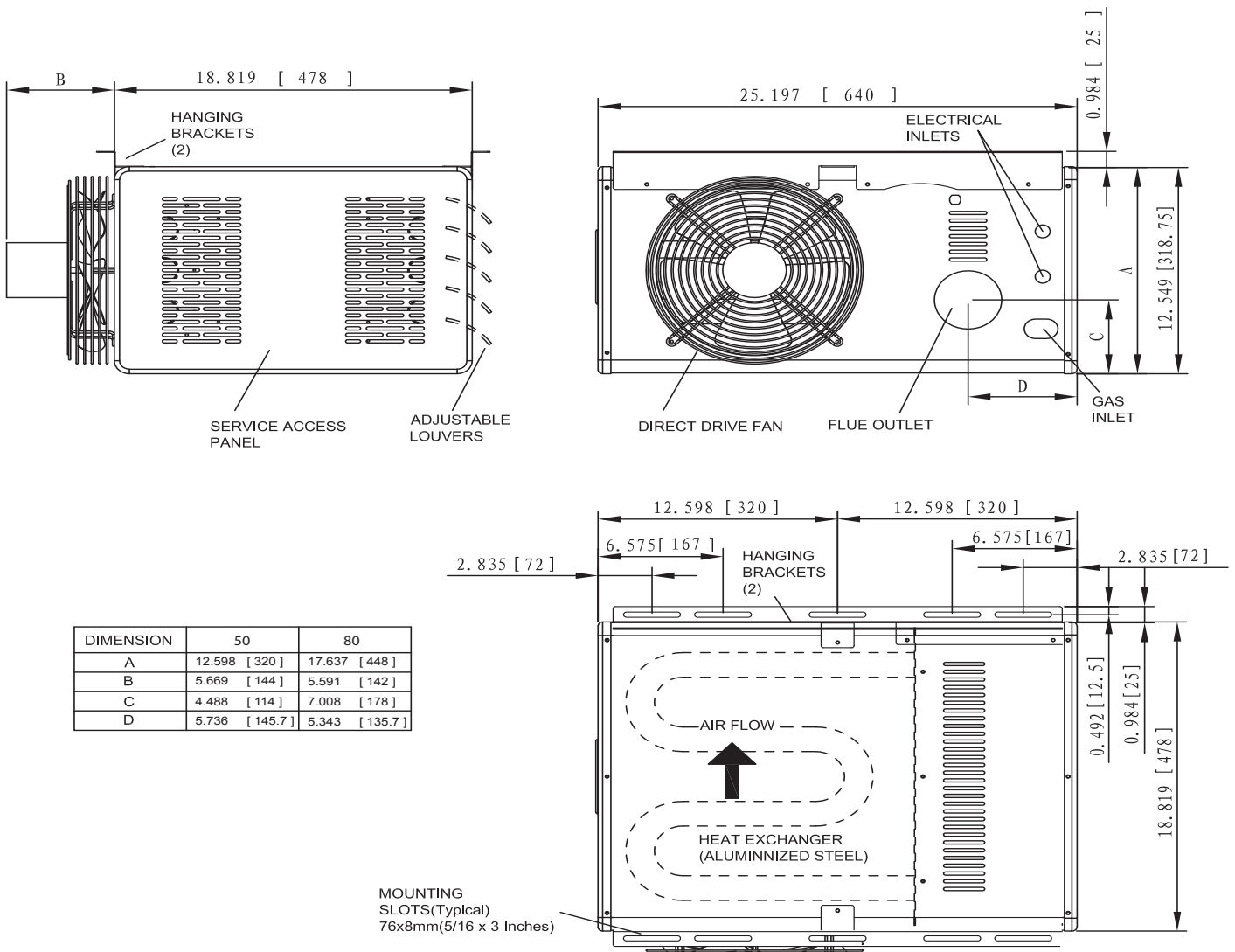


Fig. 1

IMPORTANT SAFETY INFORMATION

IMPORTANT: Read this owner's manual carefully and completely before trying to assemble, operate, or service this heater. Improper use of this heater can cause serious injury or death from burns, fire, explosion, electrical shock, and carbon monoxide poisoning.

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

⚠ WARNING: This product contains and/or generates chemicals known to the State of California to cause cancer or birth defects or other reproductive harm.

CARBON MONOXIDE POISONING: Early signs of carbon monoxide poisoning resemble the flu with headaches, dizziness, or nausea. If you have these signs, the heater may not be working properly. Get fresh air immediately! Have heater serviced. Some people are more affected by carbon monoxide than others. These include pregnant women, people with heart or lung disease, people who are anemic, those under the influence of alcohol, and those living in high altitudes.

NATURAL AND PROPANE/LP GAS: Natural and Propane/LP gases are odorless. An odor-making agent is added to the gas. The odor helps you detect a gas leak. However, the odor added to the gas can fade. Gas may be present even though no odor exists. Make certain you read and understand all warnings. Keep this manual for reference. It is your guide to operating this heater safely.

⚠ WARNING: Any change to this heater or its controls can be dangerous.

⚠ WARNING: Fire, burn, inhalation, and explosion hazard. Keep solid combustibles, such as building materials, paper or cardboard, a safe distance away from the heater as recommended by the instructions never use the heater in spaces which do or may contain volatile or airborne combustibles, or products such as gasoline, solvents, paint thinner, dust particles or unknown chemicals.

QUALIFIED INSTALLING AGENCY

Only a qualified agency should perform installation and replacement of gas piping, gas utilization equipment or accessories, and repair and servicing of equipment. The term "qualified agency" means any individual, firm, corporation, or company that either in person or through a representative is engaged in and is responsible for:

- a) Installing, testing, or replacing gas piping or
- b) Connecting, installing, testing, repairing, or servicing equipment; that is experienced in such work; that is familiar with all precautions required; and that has complied with all the requirement of the authority having jurisdiction.

UNPACKING

Shipping contents includes heater, installation instructions, two mounting brackets (shipped loose), thermostat and a flue transition. The heater is shipped completely assembled. Check the unit for shipping damage. The receiving party should contact the last carrier immediately if any shipping damage is found.

ANSI REQUIREMENTS IN USA

Installation of gas unit heaters must conform with local building codes or, in the absence of local codes, with the current ANSI Z223.1, National Fuel Gas Code.

Installation in parking structures must be in accordance with the current ANSI/NFPA No. 88A, Standard for Parking Structures.

Installation in repair garages must be in accordance with the current ANSI/NFPA No. 88B, Standard for Repair Garages.

These units are approved for residential garage or non-confined living space applications. For installation in a residential garage or non-confined living space, unit must be installed so that burners and ignition source are located no less than 18" (457mm) above floor. Heater must be located or protected to avoid physical damage by vehicles. Refer to the current edition of ANSI Z223.1, National Fuel Gas Code.

Authorities having jurisdiction should be consulted before installation. Air for combustion and ventilation must conform to the methods outlined in the current edition of ANSI Z223.1, Section 5.3, Air for Combustion and Ventilation, or applicable provisions of local building codes.

The National Fuel Gas Code is available from:
 American National Standard Institute Inc.
 11 West 42nd Street
 New York, NY 10036

These unit heaters are PFS designed certified. These unit heaters are certified for installation to combustible material as listed in Table 1 – Unit Clearances, and on unit rating plate.

Accessibility and service clearances must be observed in addition to fire protection clearances.

All electrical wiring and ground for unit must be in accordance with the regulations of the current edition of ANSI/NFPA No. 70, National Electric Code.

The National Electric Code is available from:
 National Fire Protection Association
 1 Batterymarch Park
 PO Box 9101
 Quincy, MA 02269-9101

CSA REQUIREMENTS IN CANADA

The instructions are intended only as a general guide and do not supersede local codes in any way. Authorities having jurisdiction should be consulted before installation. The installation must conform with local building codes or in the absence of local codes, with the current edition of CSA-B149 installation compliance codes. All electrical wiring and grounding for the unit must also comply with the current edition of CSA C22.1, Canadian Electrical Code.

These unit heaters are PFS-certified for the clearances to combustible material listed on the rating plate and table 1. Adequate clearance shall be provided around the appliance and around air openings into the combustion chamber. Provision shall be made for service accessibility to the heater.

NOTE: Fire protection clearances may be exceeded to provide additional space for service and accessibility.

**TABLE 1
 UNIT CLEARANCES**

Top		Side		Access Panel		Bottom		Back		Flue	
in	mm	in	mm	in	mm	in	mm	in	mm	in	mm
1	25	1	25	18	457	0	0	18	457	6	152

PRE-INSTALLATION PREPARATION

GARAGE INSTALLATIONS

1. In a storage area, clearance from heaters to combustible materials must be such that the material shall not attain a temperature above 160°F by continuous operation of the unit.
2. Maintain an 8 foot (2m) minimum clearance from the floor to the bottom of the heater. Refer to the current edition of CSA-B149 for installation compliance codes.

RESIDENTIAL

These units are approved for residential garage or non-confined living space applications. For installation in a residential garage or non-confined living space, unit must be installed so that burners and ignition source are located no less than 18" (457mm) above floor. Heater must be located or protected to avoid physical damage by vehicles. Refer to the current edition of CSA-B149 for installation compliance codes.

In a confined area, the heater must be installed in accordance with the current edition of CSA-B149 for installation compliance codes. Be sure to check with local codes and ordinances for additional requirements.

INSTALLATION

UNIT HEATER INSTALLATION

Unit is shipped ready for installation. Unit may be installed as shown in figure 2 or inverted 180° depending on desired location as governed by clearances, vent connection, air direction, gas supply, electrical supply and service accessibility.

1. If installing unit in an inverted position – Remove and retain screws securing door and rotate door 180°. Secure with retained screws. Rotate louvers directing airflow as desired.
2. Choose location for mounting brackets.
3. Remove and retain three screws along top edge (bottom edge when inverted) of front of unit.
4. Align screw holes on mounting bracket with holes along top edge (either upright or inverted) of unit. Secure one mounting bracket to front of unit with retained screws. Secure other mounting bracket to back of unit with screws provided in bag assembly containing flue transition.
5. To support unit, secure mounting bracket to ceiling joist or truss. Unit may also hang on support rods as shown in figure 2.

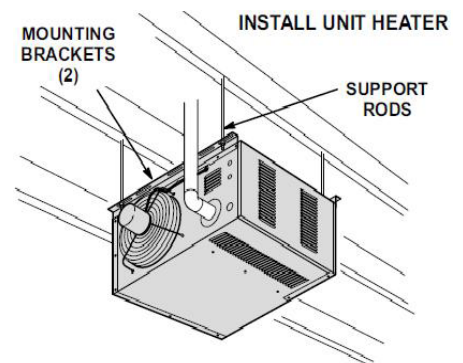


Fig. 2

VENTING INSTALLATION

Adequate facilities for supplying air for combustion and ventilation must be provided in accordance with the current editions of ANSI Z223.1, section 5.3, and CSA-B149 for installation compliance codes, or applicable provisions of local building codes.

All gas fired appliances require air to be used for the combustion process. In many buildings today, there is a negative indoor air pressure caused by exhaust fans, etc. If sufficient quantities of combustion air are not available, the heater or another appliance will operate in an inefficient manner, resulting in incomplete combustion which can result in the production of excessive carbon monoxide.

⚠ CAUTION Insufficient combustion air can cause headaches, nausea, dizziness, asphyxiation or death.

If indoor air is to be used for combustion, it must be free of the following substances or the life of the heat exchanger will be adversely affected: chlorine, carbon tetrachloride, cleaning solvent, halogen refrigerants, acids, cements and glues, printing inks, fluorides, paint removers, varnishes, or any other corrosives.

GENERAL RECOMMENDATIONS AND REQUIREMENTS

NOTE: The vent is a passageway, vertical or nearly so, used to convey flue gases from an appliance, or its vent connector, to the outside atmosphere. The vent connector is the pipe or duct that connects a fuel-gas burning appliance to a vent or chimney.

Unit heaters must be vented in compliance with ANSI Z223.1, section 5.3 and CSA-B149 for installation compliance codes, or applicable provisions of local building codes, and the following instructions.

A metal stamped/extruded transition is supplied with this certified unit. It must not be modified or altered and must be installed on the outlet of the combustion air inducer assembly prior to the installation of the vent connector. Failure to comply with this requirement will void the certification of the unit by the approval agencies. Single wall vent material shall have all seams and joints sealed with pressure sensitive aluminum tape or silicone rubber sealant. Aluminum tape must meet the provisions of SMACNA AFTS-100-73 Standards. The aluminum tape has a temperature rating of 400°F (204°C). Silicone rubber sealant must have a temperature rating of 482°F (250°C), For example, Dow Corning RTV-736 or equivalent. All joints shall be secured with at least two corrosion resistant screws. All accessible joints must be checked for gas tightness after installation.

VERTICAL VENTS USING METAL VENT PIPE – COMMERCIAL AND RESIDENTIAL INSTALLATIONS

These compact unit heaters are listed as Category 1 appliances for vertical vent installations.

1. These unit heaters are to be used with NFPA- or ANSI- approved chimneys or U.L. listed type B-1 gas vents, single wall metal pipe, or listed chimney lining system for gas venting where applicable, as well as the modifications and imitations listed in figure 3. Seal single wall vent material according to section General Recommendations and Requirements.
2. The vent connector shall be 4" (102mm) diameter on 45K Btuh units and 75K Btuh units. In all cases, a flue transition piece (supplied) is required to fit over the outlet of the induced draft assembly on the appliance.
3. Keep the vent connector runs as short as possible with a minimum number of elbows. Refer to the current editions of ANSI Z223.1, or CSA-B149 for installation compliance codes for maximum vent and vent connector lengths. Horizontal run of the vent connector from the induced draft blow to the chimney/vent cannot exceed the values in table 2. Single wall vent connector shall not be insulated.

**TABLE 2
MAXIMUM VENT CONNECTOR LENGTHS**

No. of Elbows	ft	m
1	25	7.6
2	20	6.1
3	15	4.6
4	10	3.0
5	5	1.5
Maximum length of vent connector not to exceed		

4. When the length of a single wall vent connector, including elbows, exceeds 5 feet (2m), the vent connector shall be insulated along its entire length with a minimum of 1/2" (15mm) thick foil faced fiberglass 1-1/2# density insulation. If a single wall vent connector is used in an unheated area it shall be insulated. Failure to do so will result in condensation of flue gases.
5. The unit may be vented vertically as a single appliance or as a common vent with other gas-fired appliances. In common venting situations, vent connectors for other appliances must maintain a 4" (102mm) vertical separation between the vent connectors. Refer to common venting tables in the current editions of ANSI Z223.1 or CSA-B149 for installation compliance codes for proper vent size.
6. Clearance to combustible material is 6" (152mm) for single wall vent material except where a listed clearance thimble is used. Clearance to combustible material for type B-1 vent or factory-built chimney is per manufacturer's instructions.

7. The vent connector shall be supported without any dips or sags. Vertical vents shall be supported in accordance with their listing and manufacturers' instructions. All horizontal vent connector runs shall have a slope up to the vertical vent of at least 1/4" per foot (1mm per 50mm).
8. All vertical type B-1 vents, single wall vents, or listed chimney lining system must be terminated with a listed vent cap or listed roof assembly.
9. The vent must extend at least 3 feet (1m) above the highest point where it passes through a roof of a building and at least 2 feet (1m) higher than any part of a building within a horizontal distance of 10 feet (3m) unless otherwise specified by the current editions of the ANSI Z223.1 or CSA-B149 for installation compliance codes. The vent must extend at least 5 feet (2m) above the highest connected equipment flue collar.

HORIZONTAL VENTING – GENERAL

NOTE: Common venting is not allowed when horizontally venting the unit heater. The minimum horizontal vent length is 3 feet (1m).

1. If possible, do not terminate the horizontal vent through a wall that is exposed to prevailing wind.
2. Exposure to excessive winds can affect unit performance. If such a termination is necessary, use a wind block to protect the vent termination from direct winds.
3. Vent termination must be free from obstructions and at least 12" (305mm) above grade level and maximum snow height.
4. Do not terminate vent directly below roof eaves or above a walkway, or any other area where condensate dripping may be troublesome and may cause some staining. Avoid windows where steam may cause fogging or ice buildup.
5. When horizontally vented, minimum clearance for termination from any door, window, gravity air inlet, gas or electric meter, regulators, and relief equipment is 4 feet (1m) for United States installations. Refer to latest editions of the ANSI Z223.1 or CSA-B149 for installation compliance codes and with local authorities with jurisdiction.

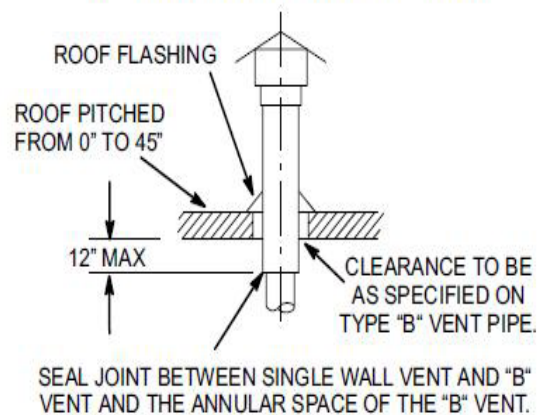
In Canada, vent termination must have a minimum 6-foot (2m) horizontal clearance from gas and electric meters and relief devices as specified in the CSA-B149.

6. Vent termination must be a minimum of 4 feet (1m) below, or 4 feet (1m) horizontally from any soffit or under-eave vent.
7. Vent must be a minimum of 6 feet (2m) from an inside corner formed by two exterior walls. If possible, leave a 10-foot (3m) clearance.
8. Vent termination must be a minimum of 10 feet (3m) from any forced air inlet (includes fresh air inlet for other appliances, such as a dryer).

9. When termination is routed through combustible wall, vent termination must be supported using a firestop to maintain clearances specified on unit rating plate. Where local authorities permit, a B-1 vent insert may be used as an alternative to the firestop. Refer to figure 3 for additional notes regarding B vent. Inside edge of vent termination must be at least 12" (305mm) from outside wall.
10. All horizontal vents must terminate with a tee. Opening end must face downward. Addition of 1/4" (6mm) mesh material as a bird screen in the tee openings may be used.
11. For horizontal venting, the vent pipe shall be supported with hangers no more than 3 feet (1m) apart to prevent movement after installation.

VENT TERMINATION ON SINGLE WALL VENT RUNS

DOUBLE WALL (TYPE B-1) TERMINATION



SINGLE WALL TERMINATION

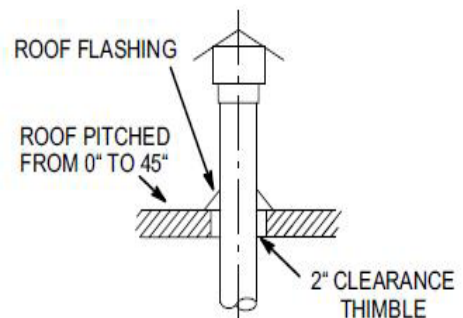


Fig.3

HORIZONTAL VENTING – COMMERCIAL

- Horizontal commercial installations are for buildings which are not attached to living spaces. The vent may be single wall vent material installed according to the sections General Recommendations and Requirements and Horizontal Venting – General and Horizontal Venting – Commercial. See figures 4, 5, and 6.
- The vent pipe diameter for horizontal commercial installations shall be 4" (102mm) on 45K Btu/hr units and 75K Btu/hr units. In most cases, a flue transition piece (supplied) is required to fit over the outlet of the induced draft assembly on the appliance.
- Refer to table 2 on page 6 for maximum vent connector lengths.
- Select a wall termination point that will maintain 1/4" (6mm) rise per foot (305mm) slope of horizontal run of vent pipe. The vent may be single wall material minimum 26 gauge galvanized steel or equivalent grade stainless steel. Seal single wall vent material according to the section General Recommendations and Requirements. In areas where local authorities having jurisdiction permit, a downward slope of maximum 1/4" (6mm) per foot (305mm) is also acceptable. In such cases, the vent must be listed special vent for Category III appliances or single wall vent pipe constructed of number 26 gauge galvanized steel or equivalent grade stainless steel. Seal single wall vent material according to the section General Recommendations and Requirements. Condensate drainage can be collected in a tee pipe section (figure 4) or allowed to drip through the vent termination, if permitted by local authorities.
- For upward sloped vent a condensate tee and drain must be installed within the first 5 feet (2m) from the unit heater to protect the appliance. If a flexible condensate drain line is used, the drain line must include a loop filled with water to prevent combustion products from entering the structure. If the unit is shut down for an extended period of time and will be exposed to sub-freezing temperatures, the condensate may freeze.

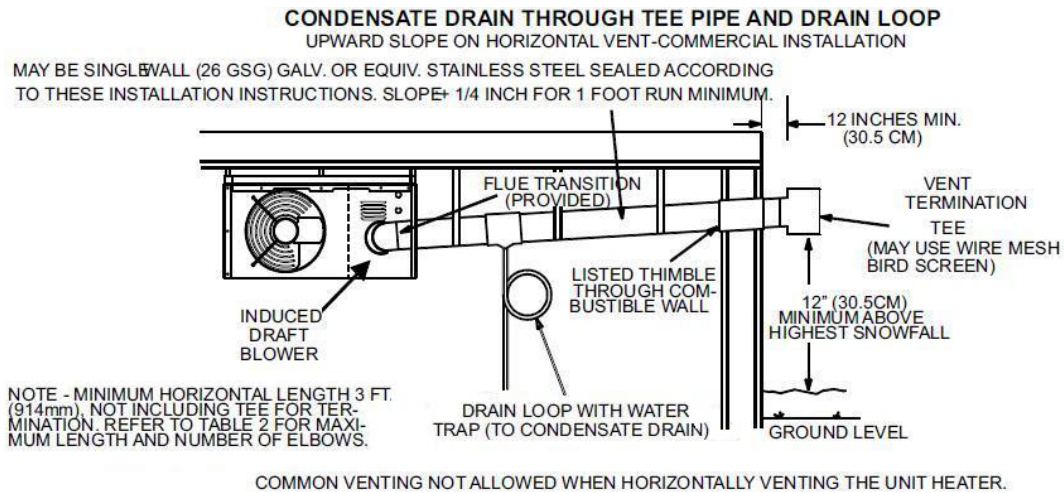


Fig.4

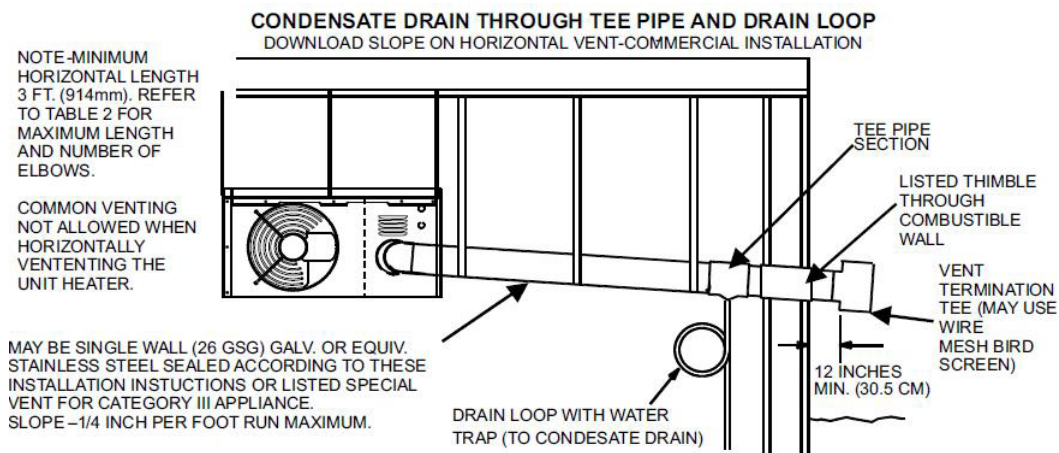


Fig.5

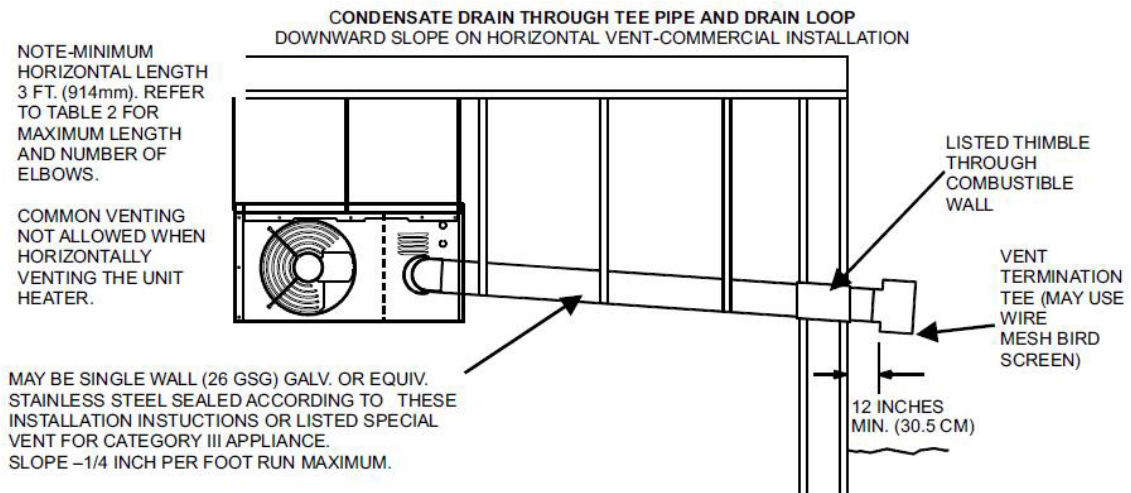


Fig.6

HORIZONTAL VENTING-RESIDENTIAL

1. For horizontal residential installations these units are certified as Category I appliances. The vent may be single wall material minimum 25 gauge galvanized steel or equivalent grade stainless steel or a single section of type B-1 vent installed according to the sections General Recommendations and Requirements and Horizontal Venting General and Horizontal Venting - Residential.
2. The vent pipe diameter for horizontal residential installations shall be 4" (102mm) on 45K Btu/hr units and 75K Btu/hr units. A standard vent transition is required at unit in addition to the transition supplied with the unit.
3. The maximum vent length is 5 feet (2m) plus one 90° elbow.
4. The vent must maintain a 1/4" (6mm) rise per foot (304.8mm) of slope upwards toward the termination
5. Unit models 45 and 75 must terminate with a 12"(305mm) vertical rise at the tee termination. See figure 7.

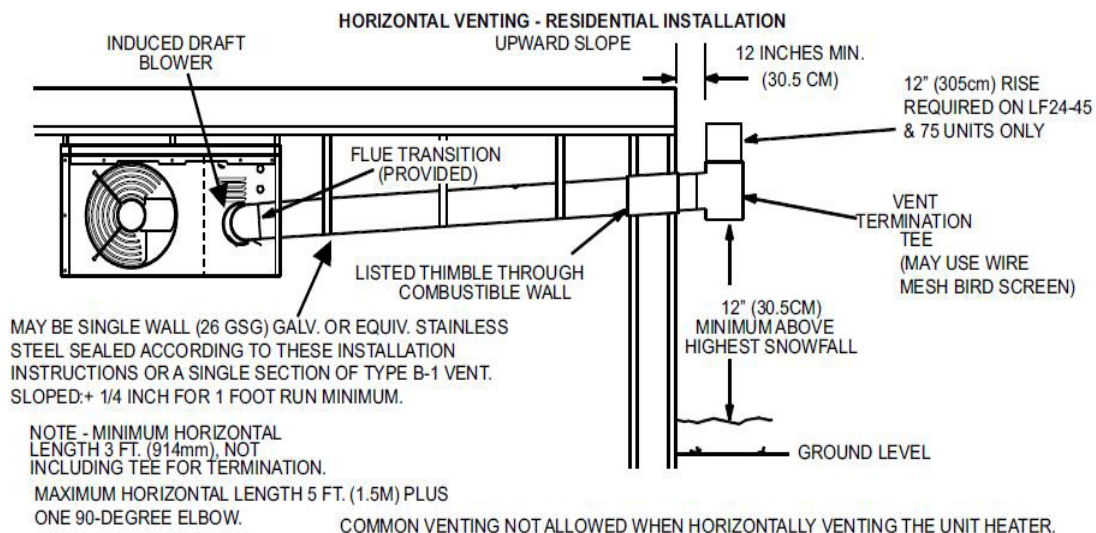


Fig.7

VENTING USING A MASONRY CHIMNEY

The following additional requirements apply when a lined masonry chimney is being used to vent the compact unit heater.

⚠ IMPORTANT: Single appliance venting of a fan assisted unit heater into a tile lined masonry chimney (interior or outside wall) is prohibited. The chimney must first be lined with either type B1 vent or an insulated single wall flexible vent lining system, sized in accordance with venting tables in the ANSI Z223.1, or CSA-B149 installation compliance codes.

1. Masonry chimneys used to vent Category I units heaters must be either tile-lined or lined with a listed metal lining system or dedicated gas vent. Unlined masonry chimneys are prohibited. A category I appliance must never be connected to a chimney that is servicing a solid fuel appliance. If a fireplace chimney flue is used to vent this appliance, the fireplace opening must be permanent sealed.
2. A fan assisted unit heater may be commonly vented into an existing lined masonry chimney provided:
 - a. The chimney is currently serving at least one draft-hood equipped appliance.
 - b. The vent connector and chimney are sized in accordance with venting tables.
3. A B1" double-wall vent or masonry chimney liner shall terminate above the roof surface with a listed cap or a listed roof assembly in accordance with the terms of their respective listings and the vent manufacturer's instructions.
4. Do not install a manual damper, barometric draft regulator, or flue restrictor between the unit heater and the chimney.
5. If type B-1" double-wall vent is used inside a chimney, no other appliance can be vented into the chimney. Outer wall of type B" vent pipe must not be exposed to flue products.
6. Insulation for the flexible vent pipe must be an encapsulated fiberglass sleeve recommended by the flexible vent pipe manufacturer.
7. The space between liner and chimney wall should NOT be insulated with puffed mica or any other loose granular insulating material.
8. If B-1 vent or an insulated flexible vent pipe cannot be used as liners, the chimney must be rebuilt to accommodate one of these methods or some alternate approved method must be found to vent the appliance. When inspection reveals that an existing chimney is not safe for the intended purpose, it shall be rebuilt to conform to nationally recognized standards, lined or relined with suitable materials or replaced with a gas vent or chimney suitable for venting unit heaters. The chimney passageway must be checked periodically to ensure that it is clear and free of obstructions.

REMOVAL OF UNIT FROM COMMON VENT

In the event that an existing unit heater is removed from a venting system commonly run with separate gas appliances, the venting system is likely to be too large to properly vent the remaining attached appliances. The following test should be conducted while each appliance is in operation and the other appliances are not in operation, yet remain connected to the common venting system. If the venting system has been installed improperly, the system must be corrected.

1. Seal any unused openings in the common 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. In so far as is practical, close all building doors and windows and all doors between the space in which the appliances remaining connected to the common venting system are located and other spaces of the building. Turn on clothes dryers and any appliances not connected to the common 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 summerexhaust fan. Close fireplace dampers.
4. Follow the lighting instructions. Place the appliance being inspected in operation. Adjust thermostat so appliance will operate continuously.
5. Test for spillage at the draft hood relief opening after five minutes of main burner operation. Use the flame of a match or candle, or smoke from a cigarette, cigar, or pipe.
6. After it has been determined that each appliance remaining connected to the common venting system properly vents when tested as outlined above, return doors, windows, exhaust fans, fireplace dampers and any other gas-burning appliance to their previous condition of use.
7. If improper venting is observed during any of the above tests, the common venting system must be corrected. The common venting system should be resized to approach the minimum size as determined by using the appropriate tables in Appendix G in the current editions of the ANSI Z223-1, or the appropriate Category I Natural Gas and Propane appliances venting sizing tables in the current standards of the CSA-B149 for installation compliance codes.

Electrical Connections

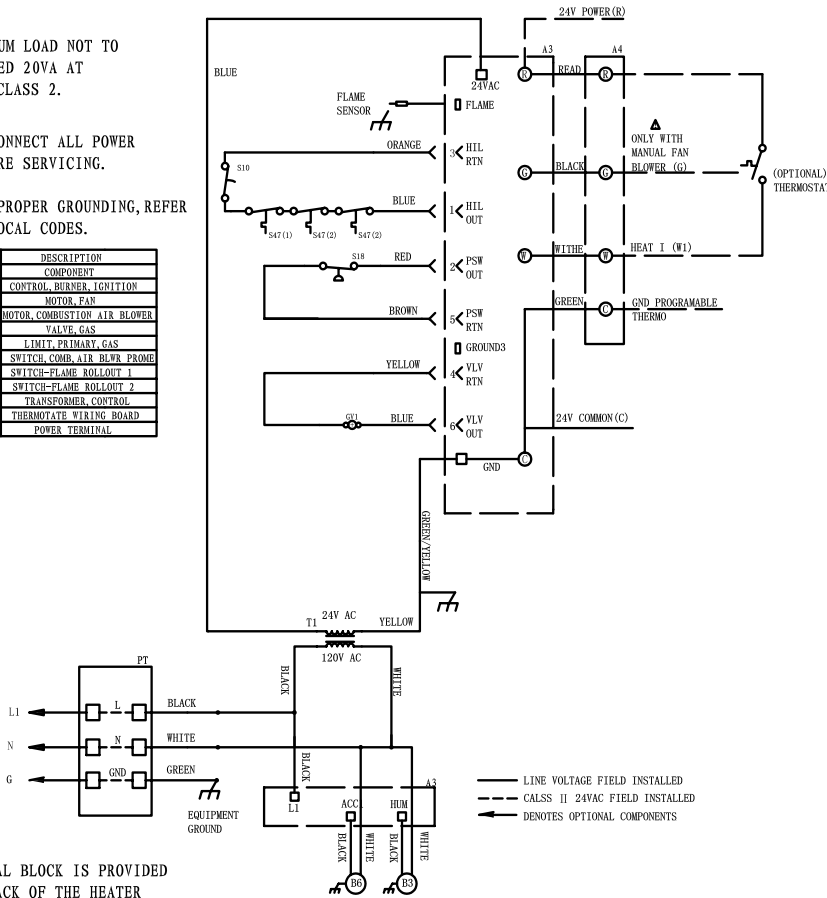
WIRING SCHEMATIC FOR UNITS WITH 6-PIN CONNECTOR PG01-1M CONTROL BOARD

▲ MAXIMUM LOAD NOT TO EXCEED 20VA AT 24V, CLASS 2.

DISCONNECT ALL POWER BEFORE SERVICING.

FOR PROPER GROUNDING, REFER TO LOCAL CODES.

KEY	DESCRIPTION
A3	CONTROL, BURNER IGNITION
B3	MOTOR, FAN
B6	MOTOR, COMBUSTION AIR BLOWER
GV1	VALVE, GAS
S10	LIMIT, PRIMARY GAS
S18	SWITCH, COMB. AIR BLWR PROMG
S47(1)	SWITCH-FLAME ROLLOUT 1
S47(2)	SWITCH-FLAME ROLLOUT 2
T1	TRANSFORMER, CONTROL
A4	THERMOSTATE WIRING BOARD
PT	POWER TERMINAL



OPTIONAL THERMOSTAT INSTALLATION

IT IS RECOMMENDED TO USE 18AWG WIRE WHEN INSTALLING THE THERMOSTAT. CONNECT THERMOSTAT WIRING TO TERMINALS 'R' AND 'W' AS ILLUSTRATED ON THE SCHEMATIC DIAGRAM.

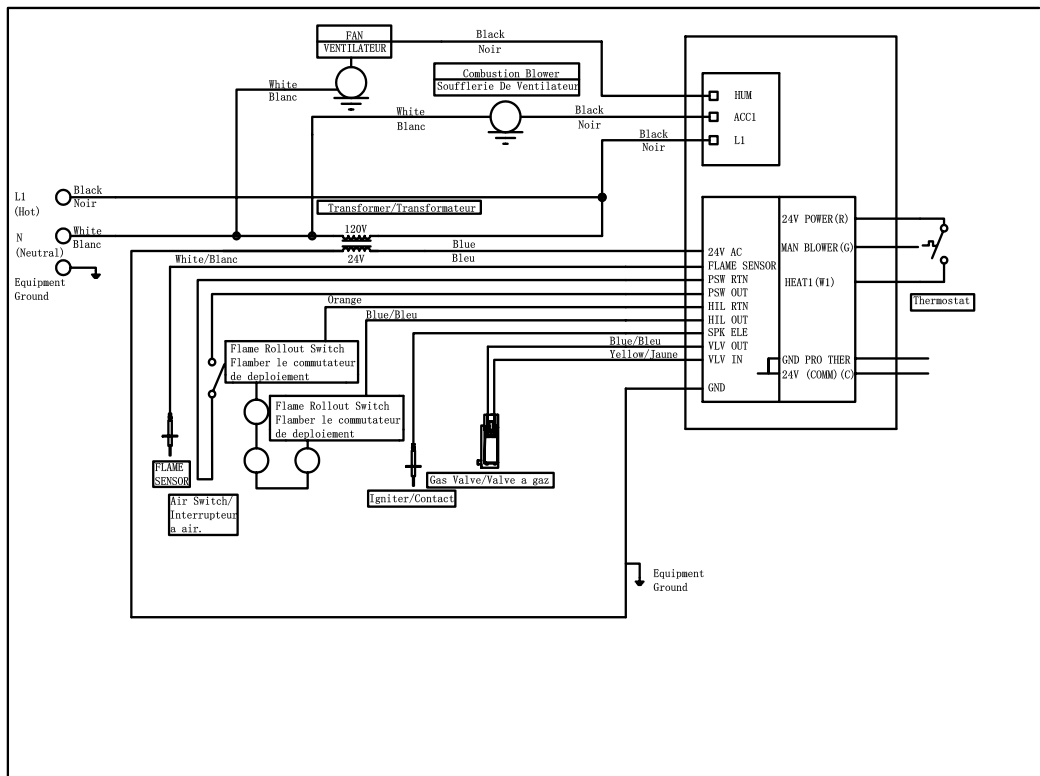
NOTE: IF ANY OF THE ORIGINAL WIRE AS SUPPLIED WITH THE APPLIANCE MUST BE REPLACED, IT MUST BE REPLACED WITH WIRING MATERIAL HAVING A TEMPERATURE RATING OF AT LEAST 105°C.

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

SET THERMOSTAT HEAT ANTICIPATION ROBERTSHAW VALVE.

NOTE: A TERMINAL BLOCK IS PROVIDED ON THE BACK OF THE HEATER FOR CONNECTION TO THE ELECTRICAL SUPPLY. THE SUPPLY VOLTAGE SHOULD 120 VOLT, 60Hz, 1 PHASE.

LADDER DIAGRAM

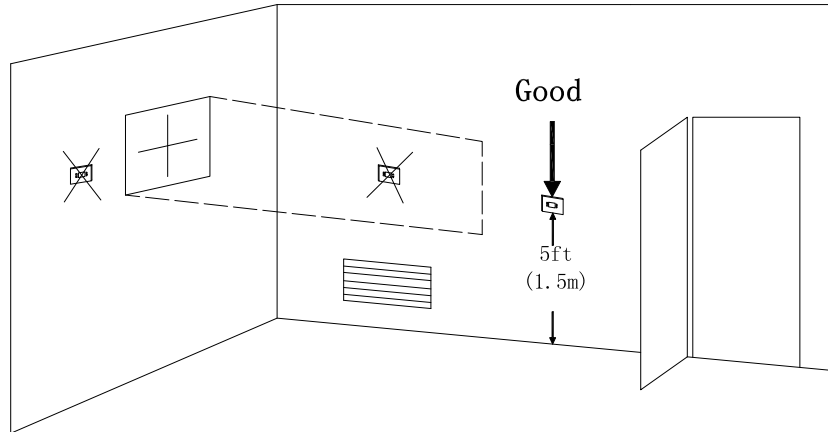


WALL THERMOSTAT INSTALLATION INSTRUCTIONS

PREPARATION BEFORE INSTALLATION

1. Remove the wall thermostat from package.
2. Confirm the garage heater is installed and control is in the "off" position.
3. Select location to install the wall thermostat. Prepare three 20~22AWG wires (not supplied) by cutting to the length that is needed for your particular installation.
4. Locate the thermostat on an inside wall, 5 ft. (1.5m) above the floor as shown in Fig. 8.

Fig 8 - Location Of Wall Thermostat



- Do not install thermostat where it will be subjected to heat, such as: in direct sunlight, near a lamp, radio, television, radiator register, or fireplace, near hot water pipes in a wall or on the other side of a wall oven.
- Do not allow thermostat to get wet, or install in a damp location. This can lead to corrosion that will shorten thermostat life.
- Do not locate where air circulation is poor, such as in a corner or an alcove or behind an open door.
- Do not install the unit until all construction work and painting has been completed.
- This thermostat does not require leveling.

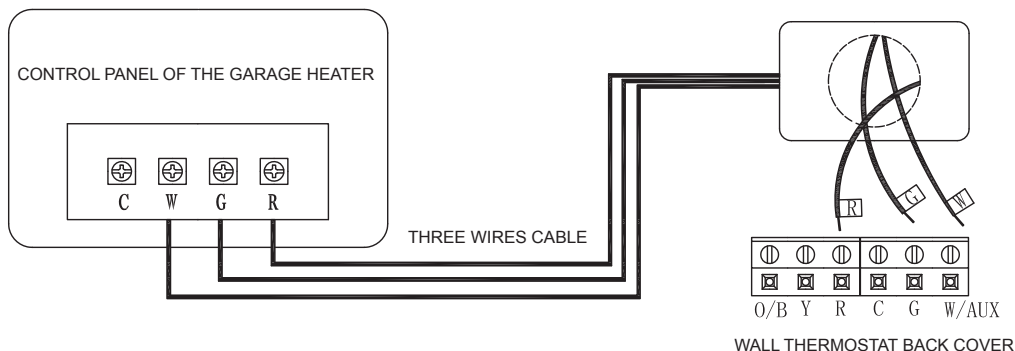
CAUTION:

- Your thermostat is a precise instrument. Please handle it with care.
- Turn off electricity to the appliance before installing or servicing thermostat or any part of the system. Do not turn electricity back on until work is completed.
- Do not short (jump) across electric terminals at controls on the heater to test the system, this will damage the thermostat and void your warranty.
- All wiring must conform to local codes and ordinances.
- This thermostat is designed for use with 24 volt AC and millivolt systems. The thermostat should be limited to a maximum of 1.0 amps; higher amperage may cause damage to the thermostat

INSTALL THE WALL THERMOSTAT

1. Remove the screws on the base of thermostat, separate the front panel from the base.
2. Strip off the suitable length of protective layer on the three (3) wires. Place labels on both ends of the wires. The wires should be labeled with R, W and G. Connect one end of the labeled wires to the designated terminals R, W, G terminal screws on the wall plate and then secure it. Connect the other end of the labeled wires to the designated terminals R, W, G on the control panel of the garage heater and then secure it. Refer to Fig. 9 below to be sure your system is wired correctly. Check all wire connections.

Fig 9 -WIRING DIAGRAM



3. Install the wall thermostat using screws included with your heater and screw into a wall stud. If unable to screw into a wall stud, screw anchors should be used.
Do not allow wires to touch each other or parts of thermostat. Wires must be routed through the hole in the back plate, below the terminal block.
4. For heating and cooling operation of the garage heater wall thermostat, please read the manual.

WIRE LABEL SYMBOL DEFINITION:

- R : HEAT/COOLING TRANSFORMER
- W : HEATING CONTROL
- G : FAN RELAY

CONNECTING TO GAS SUPPLY

⚠ WARNING: A qualified technician must connect heater to gas supply. Follow all local codes.

CAUTION: Never connect heater directly to the gas supply. This heater requires an external regulator (not supplied). The external regulator between the gas supply and heater must be installed. Gas supplier provides external regulator for natural gas.

INSTALLATION ITEMS NEEDED

Before installing heater, make sure you have the items listed below.

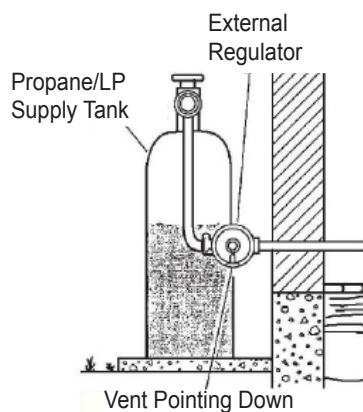
- piping (check local codes) sealant
- (resistant to propane/LP gas)
- equipment shutoff valve*
- test gauge connection**
- sediment trap
- tee joint
- pipe wrench
- flexible gas hose (check local code)

A CSA design-certified equipment shutoff valve with 1/8 in. NPT tap is an acceptable alternative to test gauge connection. Purchase the optional CSA design certified equipment shutoff valve from your dealer.

⚠ WARNING: Never connect heater to private (non-utility) gas wells. This gas is commonly known as wellhead gas.

The installer must supply an external regulator for liquid propane. The external regulator is provided by the gas supplier for natural gas. The external regulator will reduce incoming gas pressure. You must reduce incoming gas pressure to between 11 and 14 inches of water column for propane and between 5 and 10.5 inches of water column for natural gas. If you do not reduce incoming gas pressure, heater regulator damage could occur. Install external regulator with the vent pointing down as shown in Fig. 10. Pointing the vent down protects it from freezing rain or sleet.

Fig 10 - External Regulator With Vent Pointing Down



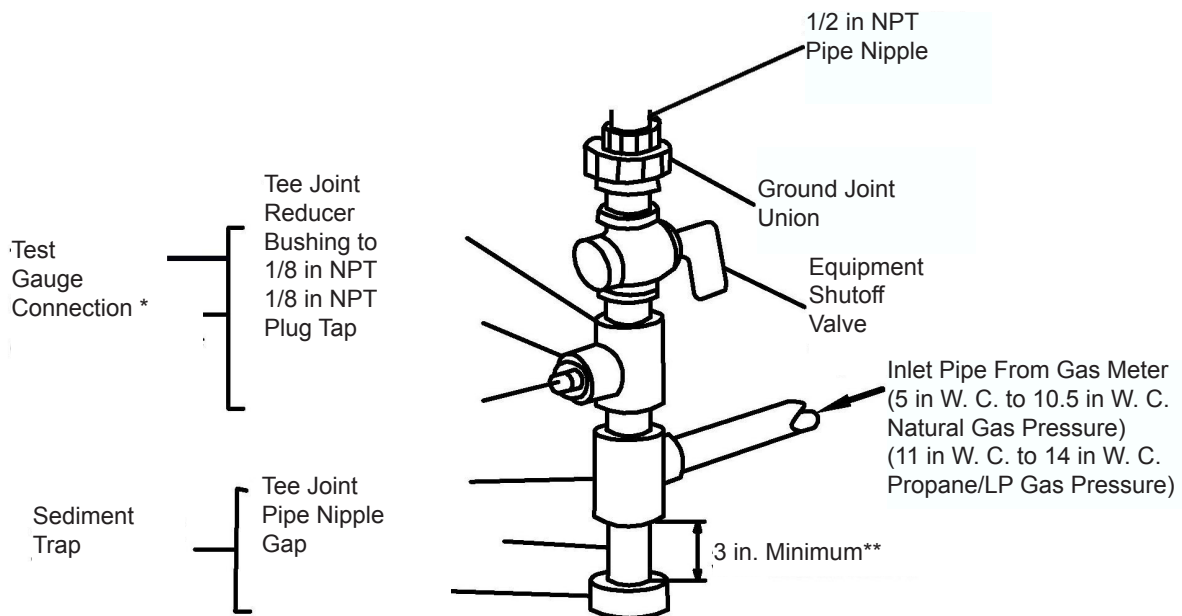
⚠ CAUTION: Use only new black iron or steel pipe. Internally tinned copper tubing may be used in certain areas. Check your local codes. Use pipe of ½ inch diameter or greater to allow proper volume gas to heater. If pipe is too small, loss of pressure will occur. Installation must include an equipment shutoff valve, union, and plugged 1/8-inch NPT tap. Locate NPT tap within reach for test gauge hook up. NPT tap must be upstream from heater (see Fig.11).

IMPORTANT: Install equipment shutoff valve in an accessible location. The equipment shutoff valve is for turning on or shutting off the gas to the appliance. Apply pipe joint sealant lightly to male threads. This will prevent excess sealant from going into pipe. Excess sealant in pipe could result in clogged heater valves.

⚠ CAUTION: Use pipe joint sealant that is resistant to gas (PROPANE or NG). We recommend that you install a sediment trap in a supply line as shown in Fig. 9. Locate sediment trap where it is within reach for cleaning and not likely to freeze. Install in the piping system between fuel supply and heater. A sediment trap traps moisture and contaminants. This keeps them from going into heater controls. If sediment trap is not installed or is installed incorrectly, heater may not run properly.

⚠ CAUTION: Avoid damage to regulator. Hold gas piping with wrench when connecting into gas piping and/or fittings. NG Models: 5 in. to 10.5 in. W.C. Gas supplier provides external regulator for natural gas.

Fig 11 - Gas Connection



*Purchase the optional CSA design-certified equipment shutoff valve from your dealer. See "Accessories".

** Minimum inlet pressure for purpose of input adjustment.

CHECKING GAS CONNECTIONS

⚠ WARNING: Test all gas piping and connections for leaks after installing or servicing. Correct all leaks immediately.

⚠ WARNING: Never use an open flame to check for a leak. Apply a mixture of liquid soap and water to all joints. If bubbles form, there may be a leak. Correct all leaks immediately.

Pressure Testing Gas Supply Piping System

Test Pressures In Excess Of 1/2 PSIG (3.5kPa)

1. Disconnect heater with its appliance main gas valve (control valve) and equipment shutoff valve from gas supply piping system. Pressures in excess of 1/2 PSIG will damage heater regulator.
2. Cap off open end of gas pipe where equipment shutoff valve was connected.
3. Pressurize supply piping system by either using compressed air or opening gas supply tank valve.
4. Check all joints of gas supply piping system. Apply mixture of liquid soap and water to gas joints. If bubbles form, there may be a leak.
5. Correct all leaks immediately.
6. Reconnect heater and equipment shutoff valve to gas supply. Check reconnected fittings for leaks.

Test Pressures Equal To or Less Than 1/2 PSIG (3.5 kPa)

1. Close equipment shutoff valve (see Fig. 12).
2. Pressure supply piping system by either using compressed air or opening gas supply tank valve.
3. Check all joints from gas meter to equipment shutoff valve (see Fig. 13). Apply mixture of liquid soap and water to gas joints. If bubbles form, there may be a leak.
4. Correct all leaks immediately.

Pressure Testing Heater Gas Connections

1. Open equipment shutoff valve (see Fig. 12).
2. Open gas supply tank valve.
3. Make sure control knob of heater is in the OFF position.
4. Check all joints from equipment shutoff valve to control valve (Fig. 13). Apply mixture of liquid soap and water to gas joints. If bubbles form, there may be a leak.
5. Light heater (see Operation, page 19). Check all other internal joints for leaks.
6. Turn off heater (see To "Turn Off Gas to Appliance," page 20).

Fig. 12 - Equipment Shut -off Valve

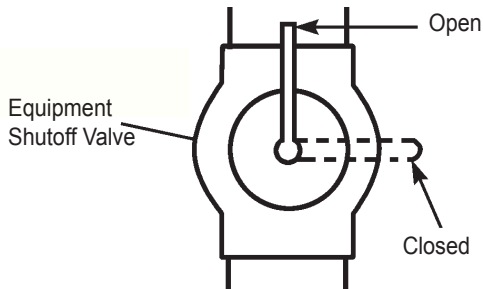
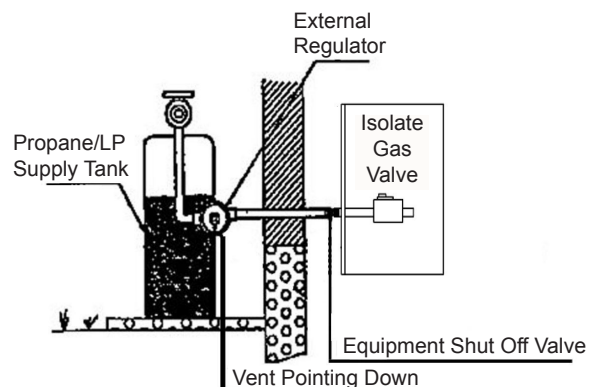


Fig. 13 - Checking Gas Joints



Convert Natural Gas To Propane/Lp Gas Instructions:

1. Remove the Access Door; see Figure 14.
2. Remove 5 screws as shown in Figure 15, unplug two wires from the valve, and then remove the manifold.
3. Replace LP gas orifices; see Figure 16
4. Follow the conversion kit instruction inside the package to replace the conversion kit;
5. Place the manifold back into the heater, and connect two wires back into the valve.
6. Install Access Door back to the heater.
7. Remove the conversion kit sticker from the package. Then place sticker over the natural gas certification label.

Fig. 14

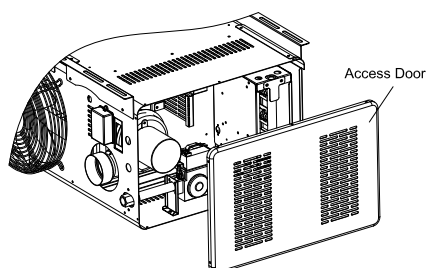


Fig. 15

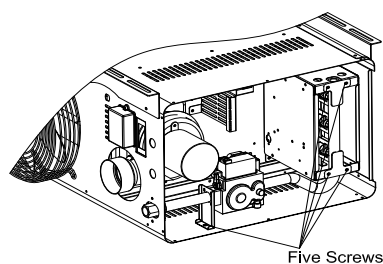
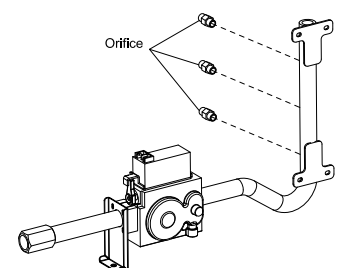


Fig. 16



OPERATION

FOR YOUR SAFETY READ BEFORE LIGHTING

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

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

WHAT TO DO IF YOU SMELL GAS

- Do not try to light any appliance.
 - Do not touch any electrical switch; do not use any phone in your building.
 - Immediately call your gas supplier from a neighbor's phone. Follow the gas supplier's instructions.
- If you cannot reach your gas supplier, call the fire department.
- C. Use only your hand to push in or turn the gas control knob. Never use tools. If 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.
- D. Do not use this appliance if any part has been under water. Immediately call a qualified service technician to inspect the appliance and to replace any part of the control system and any gas control, which has been under water.

LIGHTING INSTRUCTIONS

1. **STOP!** Read the safety information above.
2. Set the thermostat to lowest setting.
3. Turn off all electrical power to appliance.
4. This appliance is equipped with an ignition device which automatically lights burner. Do not try to light the burner by hand.

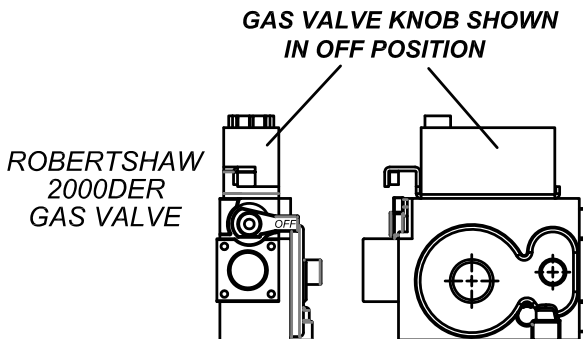



Fig. 17

5. Depress knob on gas valve; knob will snap to OFF. (See Figure 17)
6. Wait five (5) minutes to clear out any gas. Then smell for gas, including near the floor. If you then smell gas, **STOP! FOLLOW "B"** in the safety information above. If you do not smell gas, go to the next step.
7. Turn knob on gas valve 90° counterclockwise  to ON. Do not force.
8. Turn on all electrical power to the appliance.
9. Set the thermostat to desired setting. If the appliance will not operate, follow the instructions.
10. "TO TURN OFF GAS TO UNIT" and call your service technician or gas supplier.

TO TURN OFF GAS TO APPLIANCE

1. Set thermostat to lowest level.
2. Turn off all electrical power to unit if service is to be performed.
3. Depress knob on gas valve; knob will snap to OFF.
4. Replace heater access panel.

Ignition Control LED

The ignition control board contains a green LED which indicates the following:

**TABLE 3
IGNITION CONTROL LED**

LED	UNIT OPERATION
Slow. Flash*	Normal Operation – No call for heat
Fast Flash	Normal Operation – Call for heat
2 Flashes	System lockout – failed to detect or sustain flame
3 Flashes	Pressure switch failed closed before CAI is energized or failed open after CAI is energized
4 Flashes	High limit or rollout switch open
5 Flashes	Flame sensed and gas valve not energized
Steady Off	Loss of Power
Steady On	Ignition control failure

*When thermostat is placed in continuous fan mode LED will slowly flash.

High Altitude Adjustments

Units may be fired at full input up to 2000 feet. (610m) above sea level. Above 2000 feet (610m), manifold pressure must be adjusted on some units. Adjust pressure regulator to pressure shown in table 4 for natural gas and table 5 for LP/propane gas.

**TABLE 4
NATURAL GAS MANIFOLD PRESSURES – inch w.g. (kPa)**

INPUT (BTU/Hr)	Altitude in Feet (Meters)				
	0-3500 (0-1067)	35-4500 (1067-1372)	45-5500 (1372-1676)	55-6500 (1676-1981)	65-7500 (1981-2286)
45	3.5 (0.87)*	3.5 (0.87)*	3.5 (0.87)*	3.5 (0.87)*	3.4 (0.85)
75	3.5 (0.87)*	3.4 (0.85)	3.3 (0.82)	3.2 (0.80)	3.1 (0.77)

*No adjustment required.

**TABLE 5
LP/PROPANE GAS MANIFOLD PRESSURES – inch w.g. (kPa)**

INPUT (BTU/Hr)	Altitude in Feet (Meters)				
	0-3500 (0-1067)	35-4500 (1067-1372)	45-5500 (1372-1676)	55-6500 (1676-1981)	65-7500 (1981-2286)
45	9.5 (2.37)*	9.5 (2.37)*	9.5 (2.37)*	9.5 (2.37)*	9.2 (2.28)
75	9.5 (2.37)*	9.2 (2.28)	8.9 (2.21)	8.6 (2.13)	8.3 (2.06)

*No adjustment required.

A natural to LP/propane gas changeover kit is required to convert unit. Refer to the installation instructions supplied with the changeover kit for conversion procedure. If unit is installed at an altitude greater than 7500 feet (1372m), unit must be derated by four percent for each additional 1000 feet (305m) above 7500 feet or as specified by local authority having jurisdiction.

The combustion air inducer proving switch is factory set. No adjustment is necessary.

Gas Flow

To check for proper gas flow to the combustion chamber, determine the Btu input from the appliance rating plate. Divide this input rating by the Btu per cubic feet of available gas. Result is the required number of cubic feet per hour. Determine the flow of gas through the gas meter for two minutes and multiply by 30 to get the hourly flow of gas.

Gas Pressure Adjustment

1. Check gas line pressure with unit firing at maximum rate. A minimum of 7" (178mm) w.c. for natural gas or 10.4" (264mm) w.c. for LP/propane gas should be maintained for proper unit operation.
2. After line pressure has been checked and adjusted, check regulator pressure. Correct manifold pressure is shown on the unit rating plate. See figures 9 and 10 for gas pressure adjustment screw location. A natural gas to LP/propane gas changeover kit is required to convert unit. Refer to installation instructions provided with changeover kit for conversion procedure.

Limit Control

The limit control switch is factory set and not field adjustable.

Louver Vane Adjustment

Rotate louver vanes to direct airflow upward, downward, straight, or any combination of these directions. When unit is installed in an inverted position, louvers may be positioned in the same manner.

Combustion Air Pressure Switch

This pressure switch checks for proper combustion air inducer operation before allowing an ignition trial. The switch is factory set and no field adjustment is necessary.

Flame Rollout Switch

The flame rollout switch(es) are located on the burner box top, behind the ignition control board. This normally closed switch opens on a temperature rise. Check for adequate combustion air before manually resetting switch.

CARE AND MAINTENANCE

⚠ CAUTION: Turn off gas and electrical power to unit before performing any maintenance or service operations on this unit. Remember to follow lighting instructions when putting unit back into operation after service or maintenance.

BURNER

Periodically examine burner flames for proper appearance during the heating season. Before each heating season examine the burners for any deposits or blockage that may have occurred. Clean burners as follows:

- a. Turn off both electrical and gas supplies to unit.
- b. Disconnect gas supply piping, high tension and sensor leads. Remove gas manifold. Remove burner tray.
- c. Clean burners as necessary. Make sure that burner heads line up properly to ensure flame crossover. Check spark gap on electrode and adjust if required. The gap should be between 0.110" and 0.140" (3mm to 4mm). The gap may be checked with appropriately sized twist drills or feeler gauges.
- d. Reinstall burner tray, gas manifold, high tension and sensor leads. Reconnect gas supply piping.
- e. Restore electrical power and gas supply. Follow lighting instructions to light unit. Check burner flame.

FLUE PASSAGEWAY AND FLUE BOX

The flue passages and flue box should be inspected and cleaned prior to each heating season. The sequence of operation should be as follows:

1. Turn off both electrical and gas supply to unit.
2. Disconnect combustion air inducer wiring.
3. Remove screws securing flue box to unit. Remove flue box. If necessary, remove inducer assembly from flue box. Clean flue box with wire brush.
4. Remove turbulator retention bracket and turbulators. Clean turbulators with wire brush.
5. Remove burners as described in section "Burners" section.
6. Clean tubes with a wire brush.
7. Reassemble unit. The combustion air and flue box gaskets should also be replaced during reassembly.
8. Restore electrical power and gas supply. Follow lighting instructions to light unit. Check operation of unit.

COMBUSTION AIR INDUCER

Under normal operating conditions, the combustion air inducer should be checked and cleaned prior to the heating season with the power supply disconnected. Use a small brush to clean inducer wheel.

ELECTRICAL

1. Check all wiring for loose connections.
2. Check for correct voltage at unit (unit operating).
3. Check amperage draw.

FLUE AND CHIMNEY

Check all vent and vent connector joints for tightness. Ensure that connections are sealed and that there are no blockages.

FAILURE TO OPERATE

If unit fails to operate check the following:

1. Is thermostat calling for heat?
2. Is main disconnect closed?
3. Is there a breaker tripped or a fuse blown?
4. Is gas turned on at meter?
5. Is manual shutoff valve open?
6. Is unit ignition system in lock out? If unit locks out again, call service technician to inspect unit.
7. Is pressure switch closed? Obstructed flue will cause unit to shut off at pressure switch. Check flue passage and outlet.

SAFETY SHUT-OFF VALVE TEST

The safety shut-off valve test procedure is as follows:

1. Turn off the manual gas valve.
2. Set the thermostat to call for heat.
3. System begins normal sequence of operation.
4. After approximately 30 seconds (pre purge period) the LED will fast flash indicating the gas valve is powered.
5. After 10 seconds, the gas valve closes and steps 4 and 5 will repeat two additional times before locking flashes on the LED.
6. To restart the system, de-energize the thermostat call for heat and follow the operating instructions under Unit Start-Up and Operation.

REPLACEMENT PARTS

NOTE: Use only original replacement parts. This will protect your warranty coverage for parts replaced under warranty.

PARTS UNDER WARRANTY

Call Customer Service toll free at (877)886-5989 for referral information.

When calling Customer Service, have ready:

- Your name
- Your address
- Model and serial number of your heater
- How heater was malfunctioning
- Type of gas used (Propane/LP or Natural gas/NG)
- Purchase date
- Usually, we will ask you to return the defective part to the factory

PARTS NOT UNDER WARRANTY

Call Customer Service toll free at (877)886-5989 for referral information.

When calling Customer Service have ready:

- Model number of your heater
- The replacement part number

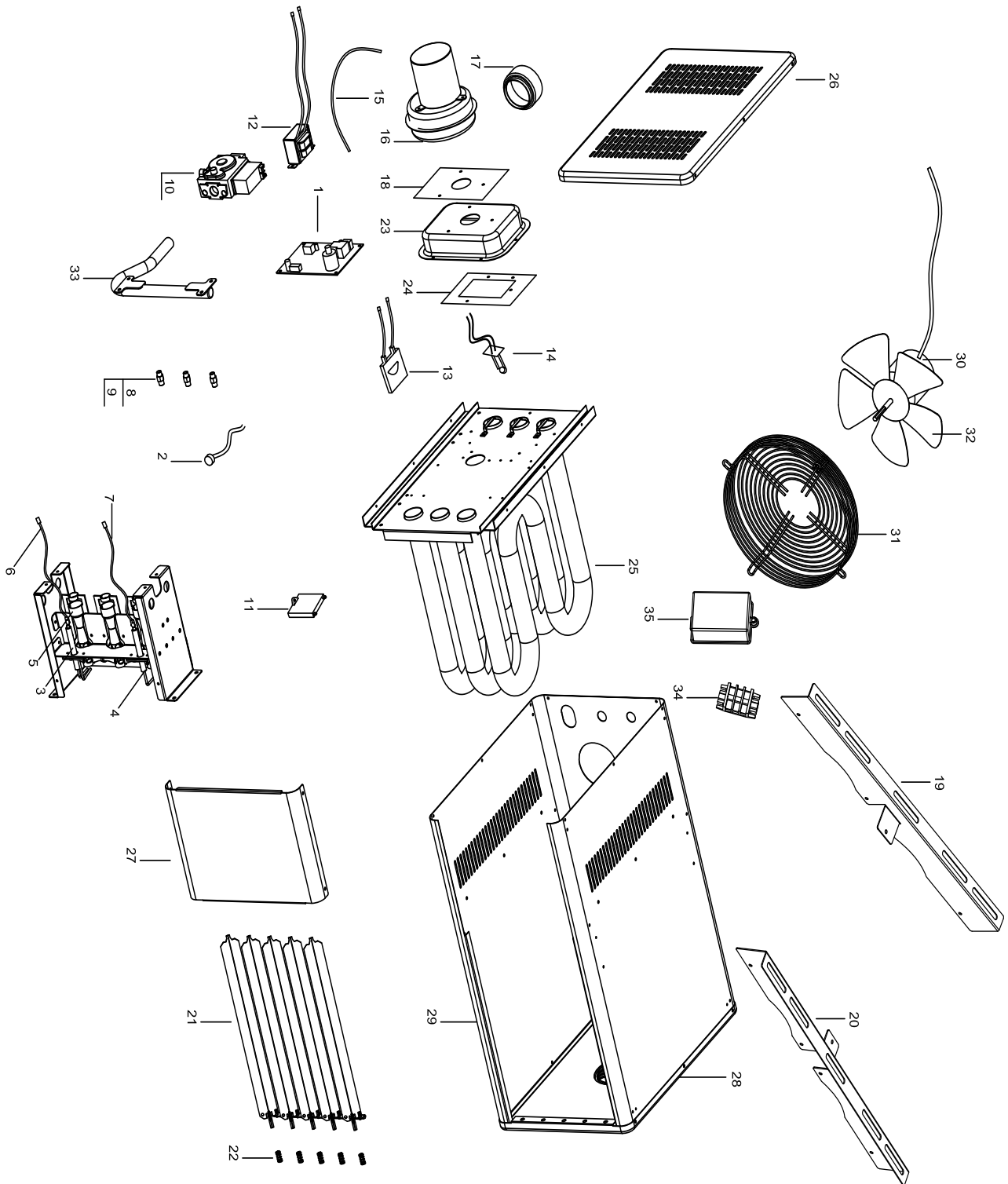
REPLACEMENT PARTS LIST

This list contains replaceable parts for your heater. When ordering replacement parts, follow the instructions listed under *Replacement Parts* on page 19 of this manual.

Key No.	Description	Part#		QTY
		GHBVN45	GHBVN75	
1	CIRCUIT BOARD	PG01-1M	PG01-1M	1
2	LIMIT SENSOR	KSD301-112		1
			KSD301-140	2
3	ELECTRODE IGNITER	GHBV48216	GHBV48216	1
4	ELECTRODE SENSOR	GHBV48215	GHBV48215	1
5	BURNER	GHBV48230		3
			GHBV48230	5
6	IGNITION LEAD	HYL-01-48	HYL-01-78	1
7	SENSOR LEAD	TL003TC	TL003TC	1
8	ORIFICE (NG)	GHBV48204		3
			GHBV48204	5
9	ORIFICE (LP)	GHBV48203		3
			GHBV48203	5
10	GAS VALVE(NG)	2000DER	2000DER	1
11	CAPACITOR STARTER		CBB61	1
12	TRANSFORMER	DB-57-10	DB-57-10	1
13	PRESSURE SWITCH	HYP-100-39		1
			HYP-100-62	1
14	HI LIMIT SENSOR HEAT EXCH	KSD301-080	KSD301-080	1
15	PRESSURE SWITCH TUBE	GHBV48306	GHBV48306	1
16	INDUCED DRAFT MOTOR	GHBV48320	GHBV48320	1
17	VENT ADAPTER	GHBV78321	GHBV78321	1
18	INDUCED DRAFT MOTOR GASKET	GHBV48220	GHBV48220	1
19	BACK BRACKET	GHBV48115	GHBV48115	1
20	FRONT BRACKET	GHBV48115	GHBV48115	1
21	LOUVERS	GHBV48112		5
			GHBV48112	7
22	LOUVER SPRING	GHBV48111		5
			GHBV48111	7
23	FLUE BOX	GHBV48214		1
			GHBV78214	1
24	FLUE BOX GASKET	GHBV48221		1
			GHBV78221	1
25	HEAT EXCHANGER	GHBV48201B		1
			GHBV78201B	1
26	ACCESS DOOR	GHBV48102		1
			GHBV78102	1
27	FRONT	GHBV48104		1
			GHBV78104	1
28	SIDE DOOR	GHBV48103		1
			GHBV78103	1
29	WRAPPER	GHBV48101		1
			GHBV78101	1
30	FAN MOTOR	GHBV48333		1
			GHBV78333	1
31	FAN GUARD	GHBV48331		1
			GHBV78331	1
32	FAN ASSEMBLY	GHBV48332		1
			GHBV78332	1
33	MANIFOLD	GHBV48206B		1
			GHBV78206B	1
34	POWER CODE TERMINAL	GHEP-3T	GHEP-3T	1
35	POWER CODE TERMINAL COVER	GHBV48228	GHBV48228	1
PART AVAILABLE - NOT SHOWN				
	HOUSING WIRING BOARD ASSEMBLY	PG01-1C	PG01-1C	1
	WALL THERMOSTAT SWITCH ASSEMBLY	PG01-TC	PG01-TC	1

ILLUSTRATED PARTS

GHBVN45, GHBVN47



WARRANTY INFORMATION

Keep This Warranty

IMPORTANT: We urge you to fill your warranty registration card within TEN(10) days of date of installation, complete with the entire serial number which can be found on the rating plate. Retain this portion of the card for your record.

Always specify model and serial numbers when communicating with customer service.

We reserve the right to amend these specifications at any time without notice. The only warranty applicable is our standard written warranty. We make no other warranty, expressed or implied.

LIMITED WARRANTY:

PRO-COM warrants this product to be free from defects in materials and components for TWO (2) years from the date of first purchase, provided that the product has been properly installed, operated and maintained in accordance with all applicable instructions, to make a claim under this warranty, the Bill of Sale or cancelled check must be presented.

RESPONSIBILITY OF OWNER

This warranty is extended only to the original retail purchaser. This warranty covers the cost of part(s) required to restore this heater to proper operating condition and an allowance for labor when provided by a PRO-COM Authorized Service Center. Warranty part(s) MUST be obtained through authorized dealers of this product and/or PRO-COM who will provide original factory replacement parts. Failure to use original factory replacement parts voids this warranty. The heater MUST be installed by a qualified installer in accordance with all local codes and instructions furnished with the unit.

WHAT IS NOT COVERED

This warranty does not apply to parts that are not in original condition because of normal wear and tear or parts that fail or become damaged as a result of misuse, accidents, lack of proper maintenance or defects caused by improper installation. Travel, diagnostic cost, labor, transportation and any and all such other costs related to repairing a defective heater will be the responsibility of the owner.

TO THE FULL EXTENT ALLOWED BY THE LAW OF THE JURISDICTION THAT GOVERNS THE SALE OF THE PRODUCT, THIS EXPRESS WARRANTY EXCLUDES ANY AND ALL OTHER EXPRESSED WARRANTIES AND LIMITS THE DURATION OF ANY AND ALL IMPLIED WARRANTIES. INCLUDING WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE TO TWO (2) YEARS ON ALL COMPONENTS FROM THE DATE OF FIRST PURCHASE. PRO-COM'S LIABILITY IS HEREBY LIMITED TO THE PURCHASE PRICE OF THE PRODUCT AND PRO-COM SHALL NOT BE LIABLE FOR ANY OTHER DAMAGES WHATSOEVER INCLUDING INDIRECT. INCIDENTAL OR CONSEQUENTIAL DAMAGES.

Some states do not allow a limitation on how long an implied warranty lasts or an exclusion or limitation of accidental or consequential damages, the above limitation on implied warranties, or exclusion or limitation on damages may not apply to you.

This warranty gives you specific legal right, and you may also have other rights that vary from state to state.