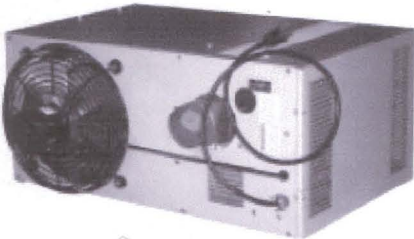
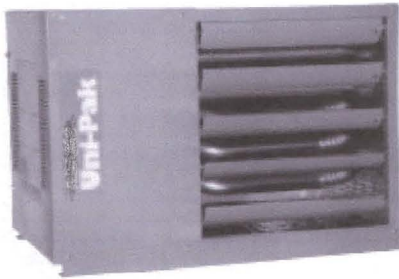


## LOW PROFILE HEATERS

Certified for Natural & LP Gases

### Installation, Operation, Maintenance Manual



#### GH & DGH Series

##### **WARNING !**

If the information in these instructions are not followed exactly a fire or explosion may result, causing property damage, personal injury or death.

Code compliance is the sole responsibility of the installer.

##### **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.
- If you cannot reach your gas supplier call the fire department.

##### **CAUTION !**

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

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



**Installer:** Affix this manual adjacent to the heater!

Inform and demonstrate the correct operation and maintenance of the heater.

## **UNPACKING AND INSPECTION**

1. Examine unit as received for any damages. If any damage is found, proper notation should be made on the carrier's freight bill. Claims should be made at once.
2. If any parts are missing, claims of shortage should be made to the manufacturer within five (5) days.
3. Check rating plate for correct type of gas and input.
4. Verify that the electrical rating shown on the rating plate will meet available power supply at the point of installation.

## **GENERAL**

When consulting codes or standards referenced in this manual, consult the most recent edition of the code or standard.

Installation shall conform with local codes or, in the absence of local codes, with the National Fuel Gas Code, ANSI Z223.1 or the CAN/CGA B149 Installation Codes (latest editions).

This appliance is a gas-fired power vented unit heater with propeller-type fan, designed for suspended mounting in commercial, industrial and residential buildings. The unit heater is completely assembled and wired. Only the usual mounting brackets, gas, electric and flue connections are needed to put heater into operation. The unit heater is certified by the Canadian Standard Association in accordance with the American National Standard/Canadian Gas Association Standard for Gas Unit Heaters and Gas-Fired Duct Furnaces, ANSI Z83.8/CGA 2.6 and Z83.8a/CGA 2.6a for use with natural or LP gases and IAS U. S. Requirement No. 10-96 for Unit Heaters For Residential Use.

## **WARNINGS**

Should over heating occur, or the gas supply fail to shutoff, shutoff the manual gas valve to the appliance before shutting off the electrical supply.

When replacing an existing heater, it may be necessary to re-size the venting system. Improperly sized venting system can result in vent gas leakage or condensation formation. Refer to the National Fuel Gas Code ANSI Z223.1 or CAN/CGA B 149.1 or .2 latest edition. Failure to follow these instructions may result in serious injury or death.

This unit heater comes equipped with a power exhaust system. **Failure to follow these instructions** may result in possible serious injury or even death.

## **PRECAUTIONS**

1. Do read these instructions for safe, efficient and trouble-free operation.
2. Do disconnect electrical power supply before making any wiring connections. Unit must be wired per the wiring diagram furnished with this heater.
3. Do turn off all gas before installing unit heater(s).
4. Do make sure that gas pressure never exceeds 14" w.c. (3.5 kPa).
5. Do check gas inlet supply pressure immediately upstream of combination control. The inlet supply pressure should measure 6-7" w.c. (1.5-1.7kPa) for natural gas or 12-14" w.c. (3-3.5kPa) on LP gases.
6. Do vent unit(s) to the outside.

7. Do maintain a rear clearance of 18" (45.7cm) or 6" (15.2cm) beyond motor at rear of unit or whichever is greater and access side provide ample air for combustion and fan operation.
8. Do maintain minimum clearances from combustible material based on a 160°F (70°C) surface temperature.
9. Do consult piping, electrical and venting sections in this manual before finalizing installation.
10. Do keep all literature with this unit heater.
11. Do not install in potentially explosive or flammable atmosphere laden with grain dust, sawdust, or other air-borne materials. If this installation application is used, install heater in a separate room with ducting making sure that a back flow prevention dampers are used in the dust-laden room.
12. Do not install heaters where there is high humidity or salt water atmospheres. This will cause corrosion resulting in reduction of the normal life of heater.
13. Do not locate in areas where there is a high concentration of chlorinated, halogenated or acid vapors in the atmosphere, this will reduce heat exchangers life.
14. Do not install in tightly sealed rooms or small compartments (confined spaces) without provisions for adequate combustion air and venting.
15. Do not install heater outdoors.
16. Do not install heater closer to any combustible materials than what the heater was tested and listed.
17. Do not block air intake and discharge of the unit heater.
18. Do not attach duct work, air filters or

plastic vent pipe to this unit heater.

19. Do not install below 7'(2.1m) measured from bottom of heater to the floor in commercial applications and 5' (1.5m) for residential applications.
20. Do not use this appliance if it has been under water. Immediately call a qualified service technician to inspect the appliance and replace any damage equipment that has been under water.

## LOCATION

In locating units, consideration should be given to the space heating requirements, availability of gas and proximity to vent location. The direction of the air stream should be pointed toward the area of greatest heat loss. Multiple units should be located so that the air streams set up a circulatory movement within the area being heated. Adjustable louvers are factory installed on front of the heater.

Do not install unit heater(s) in a confined space without providing wall openings to and from this space. Mounting height at which heaters are to be installed is critical. The critical height is from floor to the bottom of the unit(s) where heater will not deliver the required amount of heated air to the floor.

**Unit heaters installed in Aircraft Hangers, Parking Structures and Repair Garages as applicable, must be installed in accordance with the Standard on Aircraft Hangers, ANSI/NFPA 409, the Standard for Parking Structures, ANSI/NFPA 88A and the Standard for Repair Garages, ANSI/NFPA 88B, and with the CAN1-B149 codes - latest editions.**

**WARNING:** Gas-fired appliances are not designed for use in hazardous atmospheres containing chlorinated or halogenated hydrocarbons.

## SUSPENSION

Unit(s) must be supported from the structural part of the building. Do not support from ceiling boards, roof panels or plaster ceiling.

Each unit is provided with two (2) angle brackets for mounting purposes. See figure 1 for a typical suspension of the heater.

The heater must be installed in a level horizontal position so that the heater will operate properly. See Figures 1 and 1A on page 4.

Mounting brackets must be installed first before lifting heater. Decide if the unit is to be installed as received; that is with the controls on the left side when looking at the front of the appliance.

Remove and retain the (3) screws along the top edge of both the front and back of unit. Make sure the screws line up on the mounting brackets with the holes along the front and back top edges. Secure (1) mounting bracket to front of the appliance with the retained screw. Secure the other mounting bracket to the back side in the same way that the front one was done.

To suspend the heater, fasten the mounting brackets to the ceiling joist or truss, using 1/4" (.6cm) screws with 1/2" (1.3cm) washers. The mounting brackets are slotted to accommodate joists on 16" - 24" (4.9-7.3m) centers.

This heater may also be hung using same mounting brackets along with threaded rods. Attach threaded rod to the heater mounting brackets, fastening with a top and bottom nut.

Next, drill holes into a steel channel or angle iron at the same centerline dimensions chosen for the heater being installed. The steel channels or angle iron pieces must span and then be fastened to the appropriate structural members. Cut the rods to the desired length, push through

holes that were made before and secure with washers and lock nuts, lock washers and nuts, or a double nut arrangement similarly used on the unit heater mounting brackets.

This heater also can be installed on a shelf. The mounting brackets need to be attached as previously indicated. However, for shelf mounting the brackets will have to be secured to the bottom of the unit. The brackets are then attach using similar screws (1/4" (.6cm) screws with 1/2" (1.3cm) washers) as overhead joist or truss mounting. Be sure all clearances to combustible materials are met.

These unit heaters may also be turned 180° around from the way they were produced at the factory. Follow these steps for right side "turned over" installation (See figure 1B on page 4):

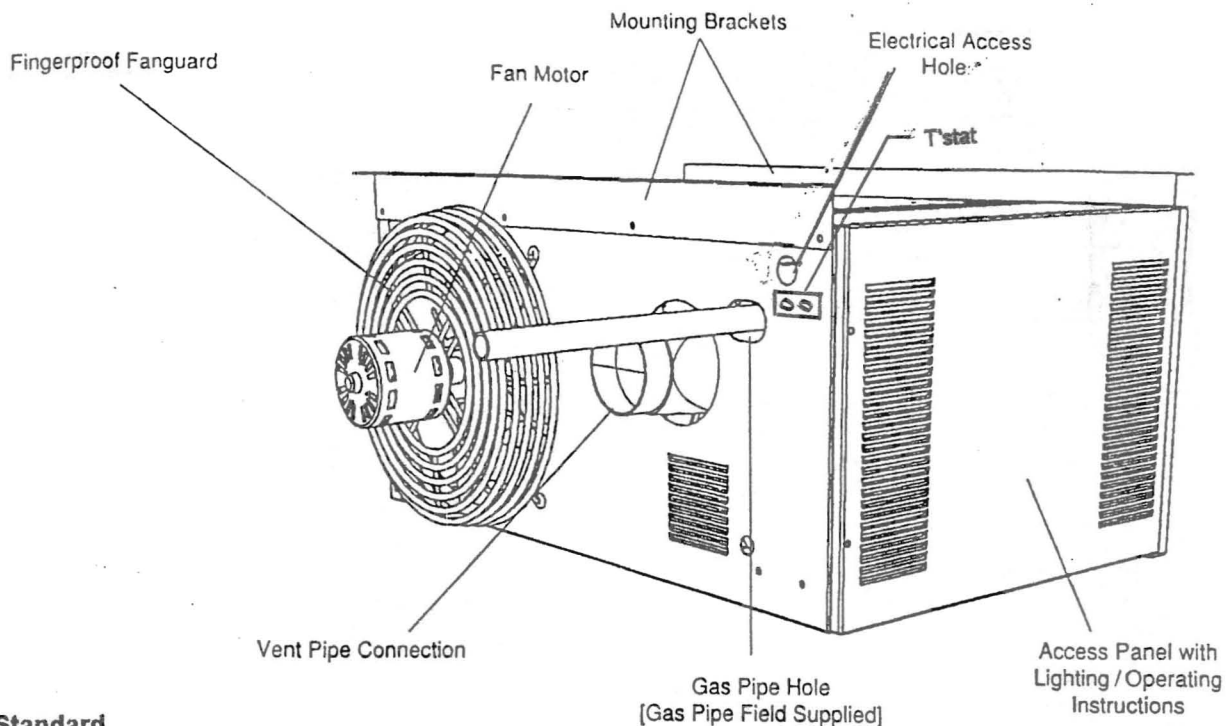
1. Sides become opposite but the front and back remain in the same relative position. Bottom panel now becomes the top and vise-versa.
2. Remove access panel and rotate 180°, reattach it to the unit. This make sure that all labels may be read.
3. Remove the louvers and springs. Turn them over so that the air is deflected opposite to what it was originally. Replace louvers and springs. Adjust so that they are open and positioned to direct heated air to the floor.

## COMBUSTION AIR

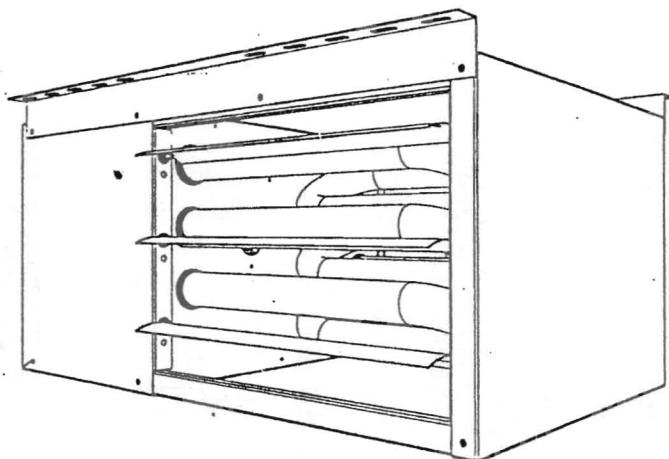
Adequate provisions of combustion air must be provided for this unit heater.

Since todays buildings and homes are more tightly build so that less air infiltrates from the outside, it is very important that all heating equipment have adequate combustion air.

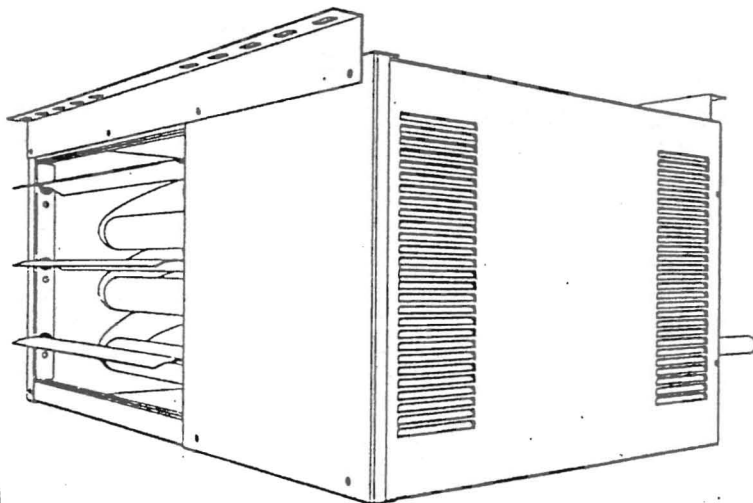
**Figure 1  
Unit Heater Rear View**



**Figure 1A  
Unit heater in Standard  
Mounting Configuration  
(from factory this orientation-brackests not attached)**



**Figure 1B  
Unit Heater Turned 180°  
(Access Panel and Heated Air Outlet Change Sides)**



The requirements for combustion and ventilation air depends on how unit will be installed. That is either in confined or unconfined spaces. In both cases enough incoming air is required to eliminate negative pressure.

### Confined or Unconfined Space

The National Fuel Gas Code defines an "unconfined space" as a space whose volume is greater than 50 cubic feet per 1000 Btu/Hr input of the installed appliance(s). A confined space is 50 cubic feet or less per 1000 Btu/Hr input of the installed appliance(s).

These unit heaters are not recommended for installation in residential confined spaces. This is due to the fact at some point in time these air openings may become blocked or eliminated by the owner. If they are to be installed in residential confined spaces, then the owner must strictly adhere to the guidelines detailed in the National fuel Gas code ANSI Z223.1 or CAN/CGA B149 Installation Code, latest edition.

These unit heaters may be installed in confined spaces for commercial/ industrial installation as long as these are two permanent openings located one at the top and one at the bottom. Each opening shall have a free area not less than one square inch (6.4cm<sup>2</sup>) per 1,000 Btu/Hr of total input rating of all units in the confined space and communicating with interior areas having adequate infiltration from the outside.

**WARNING:** Combustion air openings must be kept free of obstructions. Any obstructions will cause improper burner operation and may result in a fire hazard or carbon monoxide injury.

### VENTING

Venting installations shall be in accordance with Part 7, Venting of Equipment, of the National fuel Gas Code, ANSI Z223.1 and applicable provisions of CAN/CGA B149 Installation Codes (latest editions), and any

applicable provisions of local building codes.

This unit heater series is equipped with power exhaust system. Do not use any additional power exhaust systems or vent dampers. If any are used or failure to follow the instructions provided may result in serious injury or death.

#### A.) Use the following steps to ensure venting system is adequately sized:

1. Make sure that all unused openings have been sealed.
2. The venting system must be inspected for proper size and required horizontal pitch. Verify there is no blockage or restrictions leakage, corrosion or other deficiencies that may lead to unsafe conditions.
3. Close all building doors, windows, doors leading between the space in which appliance(s) are located and other spaces of the building. Also turn on all exhaust fans so that they all operate at there maximum speeds. However, do not run summer exhaust fans and make sure all fireplace dampers are closed.
4. Start up unit heater(s) per the lighting instructions provided and adjust thermostat so that appliance will operate continuously.
5. With the unit in operation, check all draft hood equipped appliances after 5 minutes for any spillage by using either a burning match or candle.
6. Once each appliance, which has been connected to the venting system, properly vents when tested from the method outlined above, all doors, windows, exhaust fans, fireplace dampers and other gas-burning appliances may be returned to their earlier conditions of use.

7. If improper venting is observed during any of the above tests, the venting system must be corrected.
8. Should the venting system need to be revised, it must conform with the National Fuel Gas Code ANSI Z223.1 or CAN/CGA B149 Installation Codes-latest edition. Should the venting system need revising, it must approach minimum sizing as determined by the appropriate table in Appendix "G" of the National Fuel Gas Code ANSI Z223.1.

**TABLE 1  
ANSI UNIT HEATER VENTING CRITERIA**

Category	Description	Venting Criteria
I	Negative vent pressure Non-condensing	Follow standard venting criteria
II	Negative vent pressure Condensing	Condensate must be drained
III	Positive vent pressure Non-condensing	Vent must be gas tight
IV	Positive vent pressure Condensing	Vent must be liquid and gas tight. Condensate must be drained

Note: A vent is the vertical passageway to convey flue gases from to the outside atmosphere. A vent connector pipe connects the units outlet to a vent or chimney. Vent connectors serving a category I appliances shall not be connected into any portion of mechanical draft systems operating under positive pressure.

All vertically vented unit heaters are category I venting and all horizontally vented unit heaters are category III venting.

Use Table I in determining the category requirements. Category III heaters, which are horizontally vented, shall conform to the venting requirements in Table I shown above along with detailed section on installing the vent pipe.

Unit heaters for vertical venting may be vented either with single wall or double wall vent pipe, and comply with the combustible clearances provided.

Unit heaters come with the vent adaptor already attached so that piping may be installed. Drill three holes so that pipe can be attached with 3 non-corrosive screws.

Vent pipe used shall be no smaller than 3 inches(7.6cm). Check National fuel Gas Code for the minimum thickness allowed.

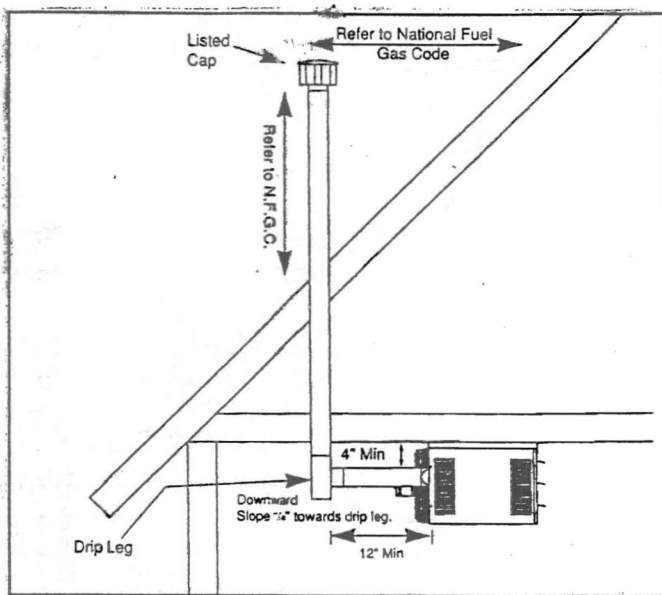
#### A.) Vertical Venting

1. Before venting vertically, a minimum of 12" (30.5cm) length of horizontal pipe is required from the exhaust outlet.
2. Install a tee fitting at the end of the horizontal run with a drip leg and cleanout cap as shown in figures 2 and 3. Slope downward 1/4" per foot (.6cm) towards the drip leg.
3. Avoid venting through unheated spaces. This could cause condensation problems. If vent pipe does pass through unheated space, insulate with insulation that is noncombustible and rated at 350°F (175°C), the first 5' (1.5m) or 6' (1.8m) of length.
4. Single wall vent pipe shall be at least 6" (15.2cm) from any combustible materials. Top clearances (top of heater) may be greater than specified if heat damage such as surrounding discoloration or material distortion is noticed.
5. If single wall vent does pass through combustible wall or floor a listed thimble shall be used. Should type B-0 double wall vent pass through combustible wall or floor maintain the vent pipe clearances as specified by the manufacturer. See figure 4.
6. Do Not use any additional power exhaust systems or dampers on this unit heater. Failure To Follow These Instructions could result in serious injury or even death.
7. These vertically vented unit heaters shall be connected to a factory built chimney or vented into a masonry (or concrete) chimney lined with material acceptable with recognized standards and the authority having jurisdiction.

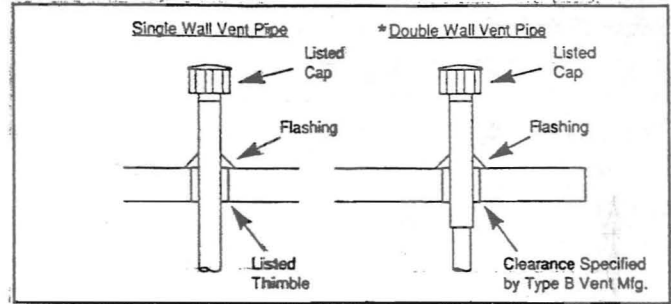
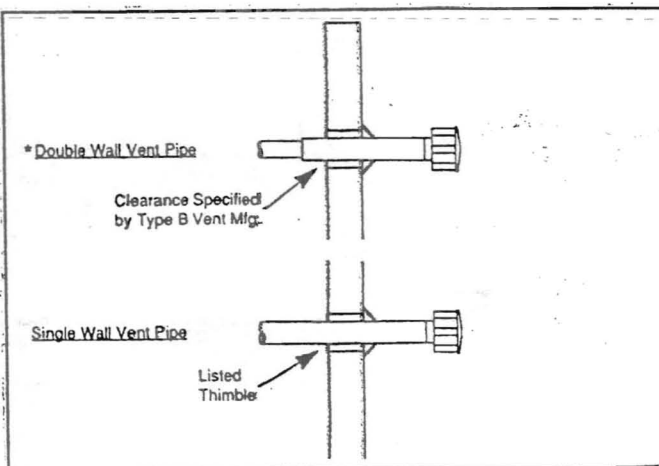
Venting into an unlined masonry chimney is not allowed. See the National Fuel Gas Code for common venting.

8. A minimum of 3 corrosion-resistant screws shall be used to secure all vent joints. A listed vent cap must be utilized to stop drafts and moisture in the vent.
9. Reference the National Fuel Gas Code for the vertical distance on a pitched roof that the cap shall extend. See figure 2.

**Figure 2 Vertical Venting sloped Roof**



**Figure 3 Venting Through Combustible Floor, Roof or Wall**



**B.) Instructions for Double Wall (Type B-0) Vent Pipe**

**1. Attaching Single Wall Vent Cap to Double Wall Vent Pipe (Type B-0):**

- a.) Check for the "Flow" arrow on the vent pipe. Attach vent pipe to exhaust end of the double wall pipe.
- b.) Slide the cap inside the pipe.
- c.) Drill 3 holes through both the pipe and cap. Use 3/4" (1.9cm) long sheet metal screws to secure cap to pipe.

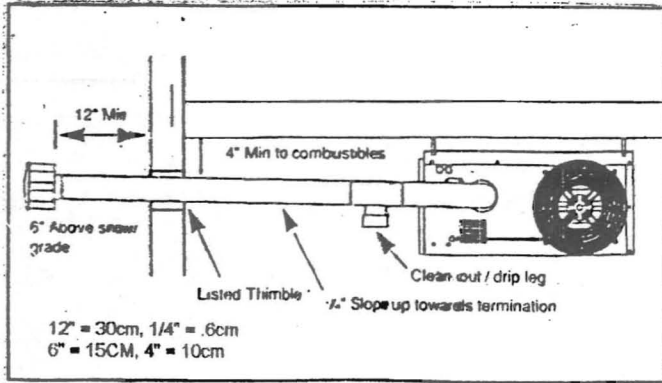
**2. Connecting Single Wall Vent Pipe to Double Wall (Type B-0) Vent Pipe:**

- a.) Slide single wall pipe into the inner wall of the double wall pipe.
- b.) Drill 3 holes through both walls of the double wall pipe and through single wall pipe using 3/4" (1.9cm) long sheet metal screws. Do not over tighten.

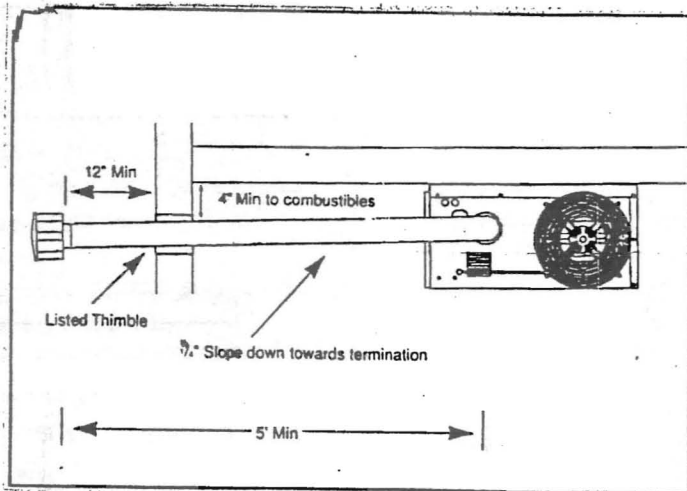
- c.) Seal the annular opening by running a large bead of 350°F (175°C) silicone. The "GAP" between single wall and double wall pipe shall be sealed. It is not necessary to fill the full volume of the annular area.



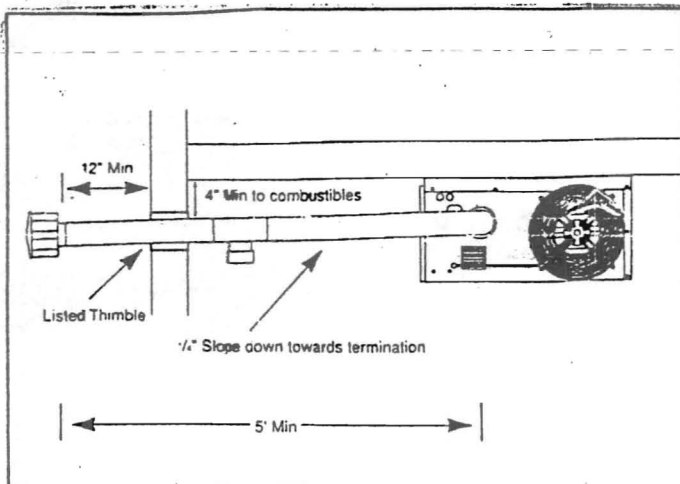
**Figures 4 Horizontal Venting With Upward Pitch**



**Figure 5 -- Downward Pitch With Drip Leg**



**Figure 6 Downward Pitch Condensation Drips Out End**



**C.) Requirements For Horizontal Venting:**

1.) Horizontally Vented Heaters Perform as Category III Appliances. This type of venting system follows special venting criteria:

a.) All residential horizontal installed heaters shall be vented with either 4" (10.2cm) B-0 double wall vent pipe, 3" (7.62cm) AL29-4C stainless steel or an agency certified category III venting system. Certified category III systems can be purchased from your vent pipe distributor. Be sure to follow the manufactures installation instructions for the category III vent. The minimum vent length for this system is 4' (1.2m) and the maximum length is 8' (2.4m). A Gary Steel #1092 or Breident Adams A1092, Type L vent caps may be used.

b.) All commercial and industrial horizontally vented heaters may use either certified category III venting system or single wall galvanized or stainless steel vent. Should unrecognized single wall be used, all joints must be sealed with metallic tape or a silicone suitable for temperatures above 400°F (202°C). Tape must be wrapped at least 2 times around the vent pipe. Insulate single wall vent pipe exposed to cold air or running through unvented areas. 3" (7.62cm) vent caps may be used in this application.

2.) Residential: Minimum vent length is 4' (1.2m) and maximum vent length is 8' (2.4m) of 4" (10.2cm) vent pipe. A 3" (7.6cm) to 4" (10.2cm) bell increaser will be required and 4" (10.2cm) vent cap. Commercial/Industrial: Minimum vent length is 5' (1.5m) and the maximum vent length is 30' (9.1m). Each 3" (7.6cm) elbow is approximately equal to 1 foot (.34m).

3.) Venting system shall terminate a minimum of 3' (.9m) above any forced system located within 10' (3.1m) and a minimum of 4' (1.2m) below, 4' (1.2m) horizontally from, or 1' (.34m) above any door, window, electric or gas meters, regulators or gravity air inlet into any building. The bottom of the vent terminal shall be located a minimum of 1' (.34m) above grade or above the snowline or whichever is the greater. The venting system shall terminate not less than 7' (2.1m) above grade adjacent to public walkways.

4.) Horizontal vents shall terminate with a listed "L" type vent cap. This cap shall maintain a 12" (.3cm) clearance from side of wall. See figures 4, 5 and 6.

5.) If condensation should occur, the venting system shall not terminate over public walkways or over areas where condensation or vapor will become a nuisance or hazard or detrimental to operation of regulators, relief openings or other equipment.

6.) This vent system must not be used for the purpose of venting other units.

7.) Always maintain a 1/4" (.6cm) per foot (2.54cm) rise away from the unit. Include a drain tee and cleanout near the vent connection. See figures 4 and 5. Where local authorities have jurisdiction, a 1/4" (.6cm) per foot (2.54cm) slope away from the heater is acceptable. Figure 6 allows for condensation to drain out the end by the vent cap.

8.) Support the venting (flue) system by screwing three (3) sheet metal screws into each pipe connection and then supporting at maximum intervals of 4' (1.2m) to prevent sagging (in Canada, support every 3' (1.0m) minimum intervals).

9.) Figure 4 shows how to vent piping through a combustible wall with either a thimble or type B-0 vent. Check with

local authorities having jurisdiction for the proper procedure.

## CLEARANCES

Unit heaters for commercial and industrial installation shall have a minimum clearance of 7' (2.1m) from bottom of the heater to floor and residential installation a minimum clearance of 5' (1.5m) from the bottom of the heater to floor.

Clearances to combustible material, which is based on a 160°F (70.4°C), must be held as follows:

Top & Bottom:	1" (2.54cm)
Vent connector:	4" (10.2cm)
Access side:	18" (45.7cm)
Non-access side:	1" (2.54cm)
Rear:	18" (45.7cm)

Make sure that the air intake and discharge air openings are not obstructed.

Accessibility clearances must take precedence over fire protection clearances.

Allow a minimum of 18" (45.7cm) clearance at the rear or 6" (15.2cm) beyond end of motor of heater. Make sure access side is provided with ample air for both combustion and proper fan operation.

## GAS CONNECTION

**WARNING: NEVER USE AN OPEN FLAME TO CHECK FOR GAS LEAKS. IF THERE IS A GAS LEAK, EXPLOSION OR INJURY CAN RESULT. ALWAYS CHECK FOR LEAKS USING A SOAP SOLUTION.**

## CAUTION

Check inlet supply pressure at the unit and upstream of the gas control. Make sure the inlet supply pressure for natural gas is 6-7" w.c. (1.2-1.7kPa) and 12-14" w.c. (3.0-3.5kPa) for LPG.

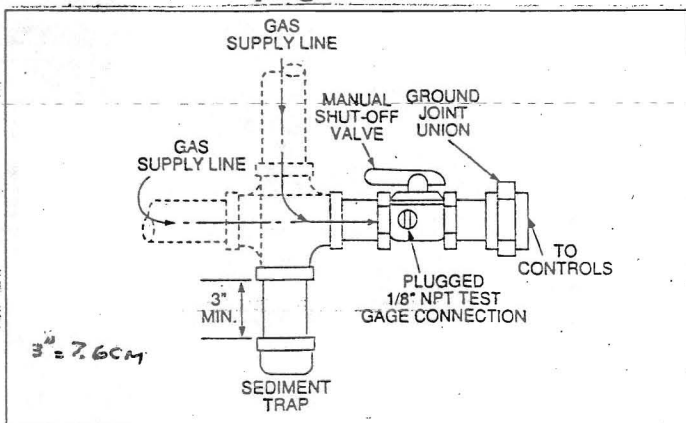
Purging air from gas lines and piping must be done in accordance to the instructions outlined in ANSI Z223.1-latest edition CAN/CGA-B149 codes.

Never exceed 14" w.c. (3.5kPa) gas pressure to the controls on the unit heater.

The gas line should be as short as possible, be of adequate size to prevent undue pressure drop and never be smaller than the connection provided at the heater. Consult the local utility for complete details on special requirements in sizing gas piping. See Table 2 on page 12.

Connect the gas pipe to the heaters' control, providing a ground joint union to the controls and manifold. Provide a drip leg. See figure 7. An additional manual shutoff valve with a 1/8" (.3cm) N.P.T. plugged tapping accessible for test gage connection shall be installed external to the unit.

**FIGURE 7 -- Piping to Controls**



Make sure the piping is pitched upward towards the unit at least 1/4" (.6cm) per 15' (4.6m) of horizontal run.

Propane units are provided with a regulator.

A regulator is also required on the propane tanks. Piping must be gas tight and a non-hardening pipe compound resistant to the actions of LP gases must be used.

Supply piping including union and external shutoff valve are not provided.

## GAS PRESSURES

**TABLE 3 -- PRESSURES**

GAS	MAN. PRESS. IN. W.C. (kPa)	SUPPLY PRESS. INCHES W.C. (kPa)	
		MAX.	MIN.
NAT.	3.5 (.87)	14.0 (3.5)	6.0 (1.2)
LPG	10.0 (2.5)	14.0 (3.5)	11.0 (2.7)

The manifold pressure may be measured by removing the pipe plug on the downstream side of the gas control and connecting a water manometer.

Only a small variation in gas input may be made by adjusting the regulator. In no case should the final manifold pressure vary by more than 0.3" w.c (.1kPa). from the above specified pressures shown in Table 3. Where the supplied gas pressure has a greater specific gravity use the multiplying factors shown in Table 4.

**TABLE 4 -- SPECIFIC GRAVITY CONVERSION FACTORS**

Multiply factors to be used with table 4 when the specific gravity of gas is other than 0.60.

Natural Gas		LP (Propane) Gas	
Specific Gravity	Factor	Specific Gravity	Factor
0.55	1.04	1.50	0.633
0.60	1.00	1.53	0.626
0.65	0.962	1.60	0.612

Follow these two (2) methods for input adjustment:

### (A) Method A -- Meter Timing

To check a heaters input rate, observe the gas meter, making sure all other appliances are turned off.

The test hand on the meter should be timed for at least one (1) revolution. Note the number of seconds for one (1) revolution. Use this formula to obtain the BTU/ Hr input rate:

$$\text{BTU/Hr} = (\text{Ft}^3/\text{rev.} \div \text{No. sec./rev.}) \times 3600 \times \text{Heating Value}$$

Your local utility or gas supplier can give you the heating value needed. However, the following representative values may be used:

GAS	BTU/FT <sup>3</sup>
Natural	1000 - 1150
LPG (Propane)	2500

Also, you may use Table 5 (meter-timings) based on different size meters.

**TABLE 5 --Meter-timing Gas**

(Timing required for one revolution is charted for various size meter dials and various rates of gas input in cu. ft. per hour. To convert to Btuh, multiply by the heating value of the gas used.)

Time for 1 Revolution, Sec.	Input, Cu. Ft. per Hour, when meter dial size is:			
	1/2 Ft <sup>3</sup>	1 Ft <sup>3</sup>	2 Ft <sup>3</sup>	5 Ft <sup>3</sup>
10	180	360	720	1800
12	150	300	600	1500
14	129	257	514	1286
16	112	225	450	1125
18	100	200	400	1000
20	90	180	360	900
22	82	164	327	818
24	75	150	300	750
26	69	138	277	692
28	64	129	257	643
30	60	120	240	600
35	51	103	206	514
40	45	90	180	450
45	40	80	160	400
50	36	72	144	360
55	33	65	131	327
60	30	60	120	300
70	26	51	103	257
80	22	45	90	225
90	20	40	80	200
100	18	36	72	180
120	15	30	60	150

If the regulator needs adjustment, the regulator adjusting screw may be turned clockwise to increase the pressure or

counterclockwise to decrease pressure. Never increase or decrease the manifold pressure by more than or less than 0.3" w.c. (.87kPa).

**(B) Method B -- Pressure Method**

This method determines the input rate by measuring the gas pressure in the manifold in inches water column.

Proceed as follows:

- 1.) Find the correct manifold pressure shown in Table 6.
- 2.) Locate the combination control inside the heater and then push in on the "on/off" lever so that it snaps to the closed position.
- 3.) Remove the 1/8" (.3cm) plugged tapping from outlet of the control and then attached either a water manometer or "U" shape tube which is at least 12" (.3cm) high.
- 4.) Put heater into operation per the lighting instructions and set the thermostat up so that the heater will continue to operate.
- 5.) If the manometer or "U" shape tube pressure indication is less than 1/2" w.c. (1.3cm) higher or lower than shown in Table 6, adjust the regulator as described in Table 6. If the manometer or "U" shape tube pressure indication is more than 1/2" w.c. (1.3cm) higher or lower than shown in Table 6, check the inlet gas pressure at heater. The inlet gas pressure should be not more than 7" w.c. (1.7kPa) but not less than 6" w.c. (1.5kPa).
- 6.) After adjustment has been completed, make sure the gas flow is shutoff at the heater by pressing in on the lever so that it snaps to the "off" position. Replace the 1/8" (.3cm) plug taps and turn gas on.

7.) Restart heater by following the lighting instructions. Set thermostat to the desired temperature setting.

**Table 6 -- Manifold Pressure and Gas Consumption**

Model	BTU/Cu. Ft. Spec. Gravity	Natural	LPG (Propane)	No. of Orifices
		1050 0.60	2500 1.53	
Man. Press. In. W.C.(kPa)		3.5 (.87)	10.0 (2.5)	
GH30	CFH	28.6	12.0	2
	Gal/Hr. LPG		.33	
	Sec/Cu. ft. Orifice DMS	12.6 49	300 56	
GH45	CFH	42.9	18.0	3
	Gal/Hr. LPG		.50	
	Sec/Cu. ft. Orifice DMS	84 49	200 56	
GH60	CFH	57.1	24.0	4
	Gal/Hr. LPG		.66	
	Sec/Cu. ft. Orifice DMS	63 49	150 56	
GH75	CFH	71.4	30.0	5
	Gal/Hr. LPG		.83	
	Sec/Cu. ft. Orifice DMS	50 49	180 56	

**ELECTRICAL CONNECTIONS**

**CAUTION**

Power supply must be disconnected before making any wiring connections to prevent electrical shock and equipment damage. Units must be wired strictly in accordance with the wiring diagram furnished with the heater.

A fused circuit or circuit breaker must be used to protect the heater at all times.

This appliance must be electrically grounded in accordance with local codes, or in the absence of local codes, with the latest edition of the National Electrical Code, ANSI/NFPA 70, and/or the CSA C22.1 Canadian Electrical Code, if an external electrical source is utilized.

Use wiring with a temperature rating of 105°C; run the 115 volt, 60 hertz electric power supply through either a 15 amp fused circuit or 15 amp circuit breaker to the junction box of the heater as shown in the wiring diagram. See figure 8.

**Table 2 -- Gas Pipe Capacities**

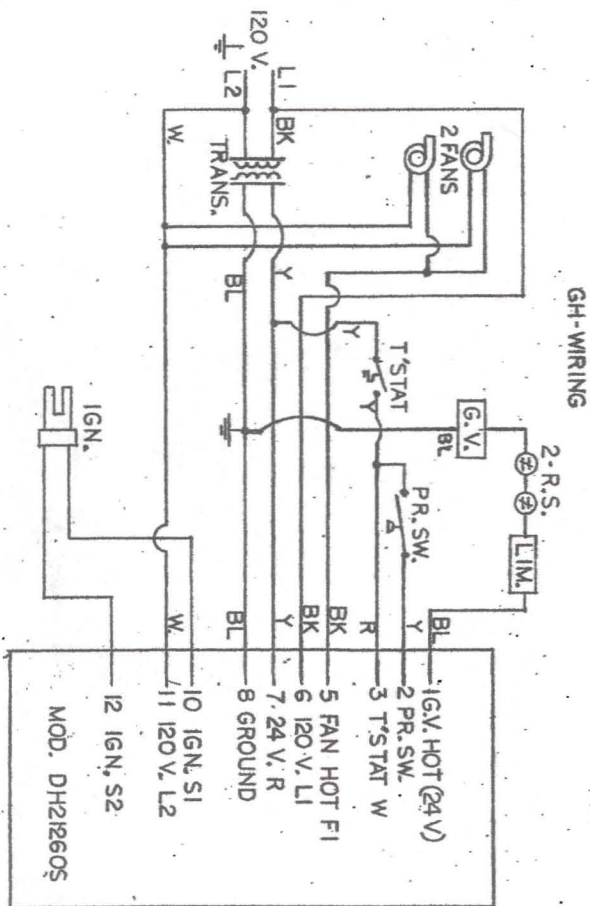
In Cu. Ft. per Hour with Pressure Drop of 0.3 in. w.c. (.1kPa) with Specific Gravity of 0.60.

Length of Pipe in Ft.(m)	Diameter of Pipe - Inches(cm)			
	1/2 (1.3)	3/4 (1.9)	1 (2.54)	1-1/4 (3.2)
15(4.6)	76	218	440	750
30(9.1)	73	152	285	590
45(15.7)	44	124	260	435
60(18.3)	50	105	190	400
75(22.9)		97	200	345
90(27)		88	160	320
105(32)		80	168	285
120(36)			158	270
150(46)			120	242
180(55)			128	225
210(64)				205
240(73)				190
270(82)				178
300(91)				170
450(137)				140
600(183)				119

If any of the original wire supplied with the heater must be replaced, replace it with wiring material having a temperature rating of at least 105°C.

Install the thermostat according to directions furnished. The thermostat should be located on an inside wall about 5' (1.5m) above a level floor.

FIGURE 8 -- Wiring Diagram



**Check polarity of electrical outlet if heater does not stay lit.**

## BEFORE OPERATING UNIT HEATER

Follow these on-site pre-operational procedures before putting unit heater into operation:

- 1.) Turn off power supply.
- 2.) Check all clearances.
- 3.) Make sure fan is not contacting casing when blade is spun by hand.
- 4.) Check to make sure deflector blades are at a 30° minimum angle from the horizontal.
- 5.) Make sure all electrical connections are secure.
- 6.) Check for gas leaks.

## LIGHTING /OPERATING INSTRUCTIONS

### FOR YOUR SAFETY READ BEFORE OPERATING

**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 burner 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

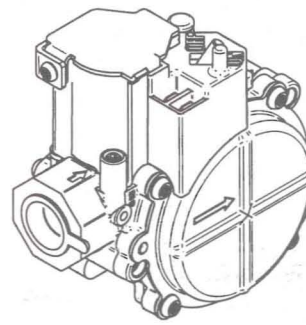
- \* Do not try to light any appliance.
- \* Do not touch any electric switch: do not use any phone in your building.

- \* Immediately call your gas supplier from a neighbors phone. Follow the gas supplier's instructions.
- \* If you cannot reach your gas supplier, call the fire department.

- C. Use only your hand to move the gas control switch. Never use tools. If the switch will not move by hand, don't 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.

#### OPERATING INSTRUCTIONS

1. STOP! Read the safety information above.
2. Set thermostat to lowest setting.
3. Turn off all electric power to the appliance.
4. This appliance is equipped with an ignition device which automatically lights the burner. Do not try to light the burner by hand.
5. Remove the access panel.
6. Push in on control lever. Lever will spring to the "OFF" position.
7. Wait five (5) minutes to clear out any gas. Then smell for gas, including near the floor. If you smell gas, STOP! follow "B" above. If you don't smell gas, go to next step.
8. Move gas lever counter clockwise to the "ON" position.
9. Replace control access panel.
10. Turn on all electric power to the appliance.
11. Set thermostat to the desired setting.
12. If the appliance will not operate, follow the instructions "To Turn Off Gas To Appliance" and call your service technician or gas supplier.



#### TO TURN OFF GAS TO APPLIANCE

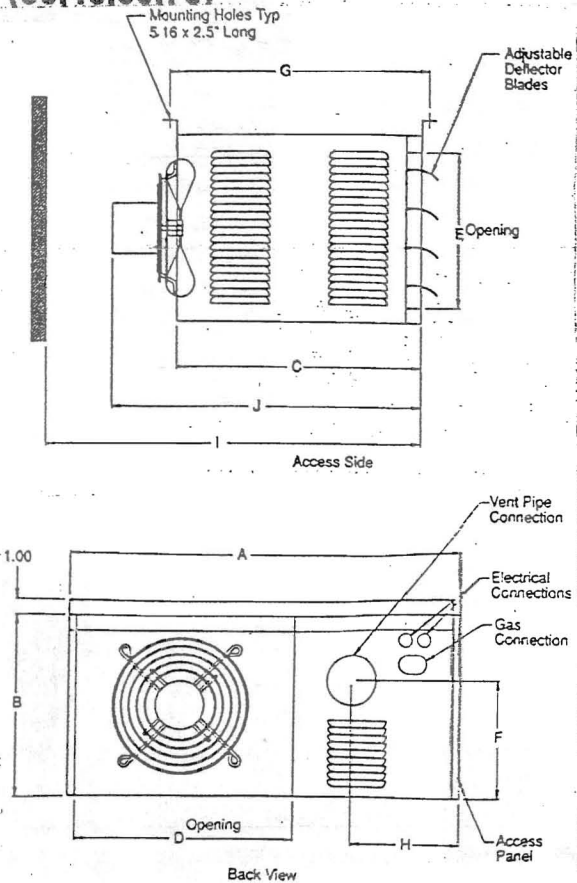
1. Set the thermostat to lowest setting
2. Turn manual shut-off valve located outside of the unit to the closed position.
3. Turn off all electric power to the heater, If service is to be performed.
4. Remove access panel.
5. Turn gas valve control switch to the "off" position.
6. Replace the access panel.

#### OPERATING SEQUENCE

Upon call from the thermostat, power is supplied to the exhaust and circulating motors. As the exhaust motor speeds up, the pressure switch circuit closes allowing the hot surface ignitor to become energized. Following the ignition heat-up period the main gas valve will open to allow gas flow to the burners. Once the flame has been detected, the ignitor is de-energized. When the thermostat is satisfied and the demand for heat ends, the main gas valve is de-energized immediately stopping the flow of gas to the burners until the next call for heat. The circulating and exhaust blowers continue to operate for another 60 seconds before shutting off. If a flame is not sensed for any reason, there will be three (3) tries for ignition and the ignition module will go into lockout shutting down the entire system at which time either the thermostat will need to be manually reset or the power shut-off for 5 seconds.

## TECHNICAL/ DIMENSIONS

(30.45.60.75)



## TECHNICAL

Models	30	45	60	75
BTUH Input	30,000	45,000	60,000	75,000
BTUH Output	24,000	36,000	48,000	60,000
In air-flow CFM	505	720	990	1160
Outlet Vel.	523	749	653	769
Temp. Rise °F/°C	44/8.6	46/7.7	45/7.2	48/8.8
Max. Mtg. Height ft./m	10/3	10/3	12/3.6	12/3.6
Heat throw ft./m	25/7.6	27/8.2	36/10.9	38/11.6
Hp	1/15	1/15	1/12	1/12
RPM	1550	1550	1625	1625
Type	S.P.	S.P.	P.S.C.	P.S.C.
Amp	1.5	2.4	1.2	1.2
Total Amps	2.8	3.7	2.5	2.5
Vent Dia. in./cm	3/7.6	3/7.6	3/7.6	3/7.6

## Dimensions inches/cm

Models	30	45	60	75
A	26.8/68	26.8/68	26.8/68	26.8/68
B	12.2/31	12.2/31	18.0/46	18.0/46
C	16.5/42	16.5/42	16.5/42	16.5/42
D	14.9/38	14.9/38	14.9/38	14.9/38
E	10.1/26	10.1/26	15.9/26	15.9/26
F	7.7/19	7.7/19	13.7/35	13.7/35
G	17.5/44	17.5/44	17.5/44	17.5/44
H	7.0/18	7.0/18	7.0/18	7.0/18
Gas Conn.	1/2/1.3	1/2/1.3	1/2/1.3	1/2/1.3
I	28/71	28/71	31/71	31/71
J	22/56	22/56	25/56	25/56
Fan Dia.	10/25.4	10/25.4	14/25.4	14/25.4
Weightlbs/kg	55/25	60/27	80/36	85/38

## MAINTENANCE & SERVICE

SERVICING OR REPAIRING THIS EQUIPMENT MUST BE PERFORMED BY A QUALIFIED SERVICE AGENCY.

Do not use this appliance if any part has been under water. Immediately call a qualified service technician to inspect the appliance and replace any gas control which has been under water.

Should overheating occur, or the gas valve supply fail to shut off, shut off the manual gas valve to the appliance before shutting off the electrical supply.

Before doing any maintenance or cleaning to the appliance make sure that all gas and electricity is turned off.

**The unit and venting system must be checked at least once a year before the heating season starts.**

To clean the outside of the appliance use a soft cloth and soap solution. Never use an abrasive to clean any surfaces.



## A.) MAINTENANCE

1. Remove the access panel.
2. Close manual gas valve and disconnect the union on the gas line.
3. Disconnect wires from the gas valve along with ignition wires from S1 and S2 on the module.
4. Remove the screws that attach the burner tray assembly from the vestibule panel. This entire assembly comes out as one complete piece.
5. Carefully clean the burners with a small wire brush and vacuum.
6. While assembly is out check the orifices to make sure there is no blockage.
7. Check each tube type heat exchanger for dirt or cracking. If dirty, clean with a wire brush and vacuum. If any cracks are seen replace the heat exchanger assembly.
8. Re-assemble burner tray assembly and gas piping. Make sure piping is tight.
9. Check all wiring for loose connections or cracks in the insulation. Also check to make sure the rubber tube connected to the pressure switch has not dried and cracked. Replace as necessary.
10. Re-connect wiring to the gas valve and to the terminals S1 and S2 on the module.
11. Check circulating blower assembly to make sure that there is no damage to the fan blade and that the blade is secured to the motor shaft.

12. Power exhaust assembly - The motor used is permanently lubricated. If this assembly needs cleaning blow out the cooling air passages of the motor with compressed air.
13. Turn gas and electricity back on and set the thermostat high enough to make the heater go through a complete cycle to ensure proper operation and that there is no gas leakage.
14. Replace access panel and set the thermostat at the desired setting.
15. Replace any worn or broken components and wiring as necessary to ensure trouble free operation.
16. The appliance and its shut-off valve must be disconnected from the gas supply piping system during any pressure testing of that system at test pressures in excess of 1/2 psi (3.5kPa).

The appliance must be isolated from the gas supply piping by closing its individual manual shut-off valve during any pressure testing of the gas supply piping system at test pressures equal to or less than 1/2 psi (3.5 kPa).

## B.) SAFETY DEVICES

### 1.) Limit control

This control is located in the access compartment and the element is located in the air stream by the tube heat exchanger. This control will shut off the gas to the burners should over-heating result. The limit control will function if the wall thermostat or some other component(s) malfunction. Once this limit cools, it will allow the heater to re-try for ignition. If the same problem occurs immediately shut the gas supply and electricity off. Call your service technician immediately for servicing.

## 2.) Rollout switches

The switches are located on the bottom burner panel. If for some reason flames rollout during an ignition cycle the flames will touch these switches shutting off gas flow. When cooled, the switches will have to be manually reset by pushing in on the push button located on top of each switch.

## 3.) Pressure Switch

This is a normally open type switch which works on pressure. When the inducer motor speeds up to produce enough pressure in the venting system the contacts in the pressure switch close completing the circuit to the ignition system. If for some reason the inducer motor fails to operate or the venting system becomes blocked, the pressure switch contacts open and the unit will not operate.

If the pressure switch contacts do not close check for the following:

1. Check venting system for blockage. Remove the obstruction(s).
2. Check to make sure the tube between power exhaust and pressure switch is secured and has not deteriorated. If bad replace.
3. See if there is air flow at the vent terminal. Replace pressure switch if there is air flow. Replace the power exhauster if there is no air flow.

## 4.) Hot surface Igniter

The igniter is made from a ceramic material which must glow red hot until it reaches a required temperature to ignite the gas flowing through the burners. If the igniter does not glow red hot, check the resistance. If less than 100 ohms,

replace the igniter.

To replace, disconnect the leads S1 and S2 from the module and remove the two (2) screws holding the igniter to burner box cover. **Be very careful when installing new igniter.** Re-connect leads to S1 and S2 on the module.

## LED DIAGNOSTIC CAPABILITY

The red LED on the ignition module indicates the condition of the control system. The following codes indicate what type of failure is occurring and are also shown on the module:

ERROR MODE	LED INDICATION
Normal Operation	Steady ON
No Power/Internal Fault	Steady OFF
Flame Sensed out of Sequence	1 Flash
Ignition Trail Lockout	2 Flash
Pressure Switch	3 Flash

The LED will flash on for 1/4 second, then 1/4 off second during a fault condition. The pause between fault codes is 3 seconds.

## TROUBLE SHOOTING INFORMATION

There are a few basic trouble shooting items that you may perform if for some reason the heater does not operate. All other trouble shooting **MUST BE DONE BY A QUALIFIED SERVICE AGENCY.**

### A.) If the heater does not light:

- 1.) Make sure thermostat is set above room temperature.
- 2.) Make sure there is power to the heater.
- 3.) Make sure the main gas supply is on at the manual shut-off valve.
- 4.) If none of the above solve the problem, contact a qualified service agency.

B.) Air feels cold coming out of the heater:

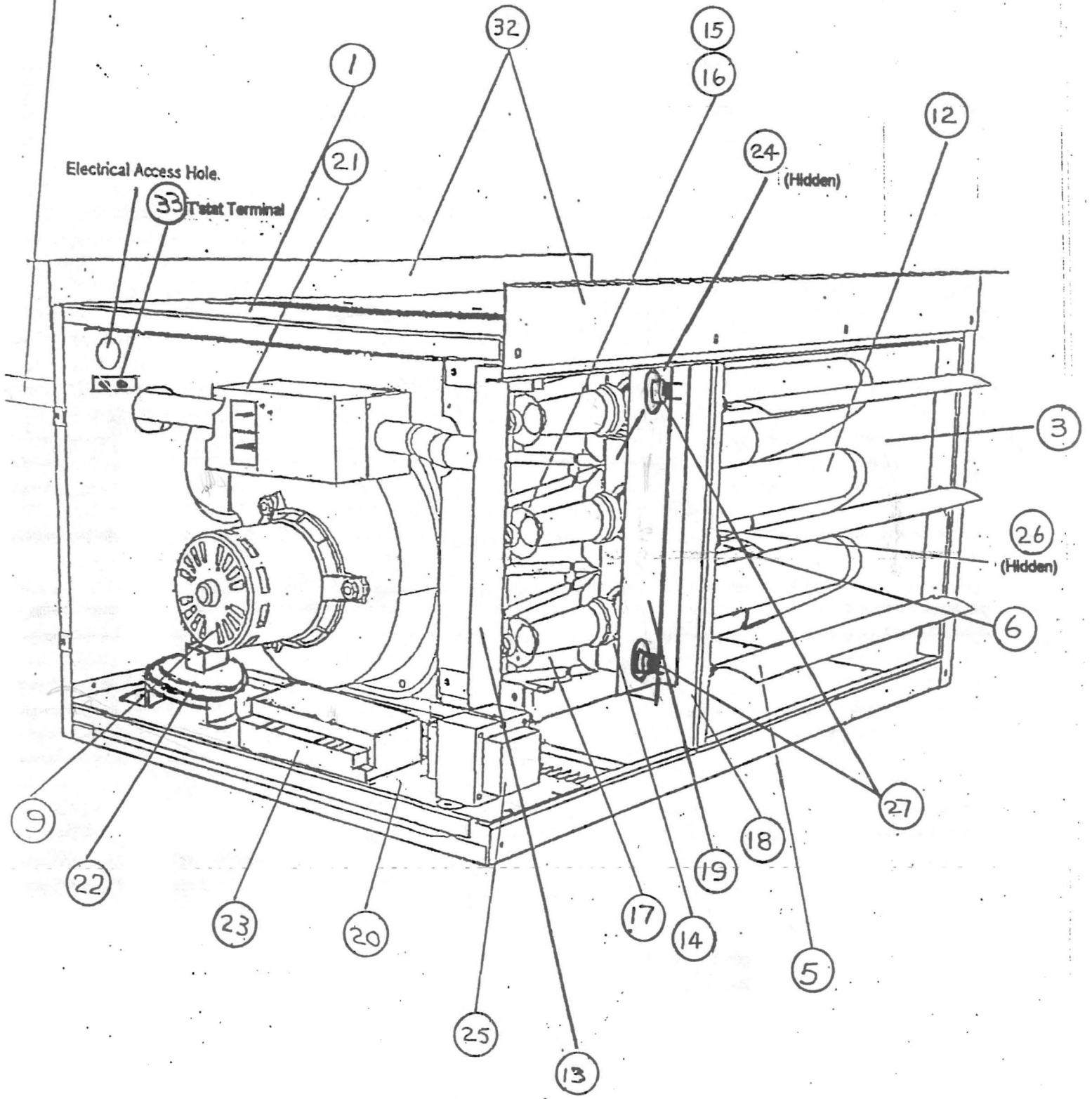
- 1.) Make sure burner is lit.
- 2.) If the room WAS cold, it will take a while for the air coming out of the heater to feel warm.
- 3.) If the air coming out of the heater continues to feel cold after 5 minutes and the room is not warming up, contact a qualified service agency.

#### **FOR SERVICING**

If a qualified service person cannot solve the problem, consult your local gas company or Wholesaler or Distributor.

**When servicing, repairing or replacing parts on these units always give the complete Model Number and Serial Number from the the unit rating plate.**

Field Supplied Gas Pipe



## PARTS LIST

REF	DESCRIPTION	30	45	60	75
1	Casing wrapper	GH-1001	GH-1001	GH-1025	GH-1025
2	*Cover panel	GH-1002	GH-1002	GH-1026	GH-1026
3	Front panel	GH-1003	GH-1003	GH-1027	GH-1027
4	*Side panel	GH-1004	GH-1004	GH-1028	GH-1028
5	louvers	GH-1005 (3)	GH-1005 (3)	GH-1005 (5)	GH-1005 (5)
6	Louver spring	GH-1005	GH-1005	GH-1005	GH-1005
7	*Collector box	GH-1008-1	GH-1008-2	GH-1030-1	GH-1030-2
8	*Collector box gasket	GH-1007	GH-1007	GH-1029	GH-1029
9	Ventor Assembly	GH-1040	GH-1040	GH-1040	GH-1040
10	*Ventor gasket	GH-1009	GH-1009	GH-1009	GH-1009
11	*Exhaust outlet	GH-1020	GH-1020	GH-1020	GH-1020
12	Heat exchanger assembly	GH-1018-1	GH-1018-2	GH-1018-3	GH-1018-4
13	Manifold	GH-1010-1	GH-1010-2	GH-1010-3	GH-1010-3
14	Burner	GH-1044 (2)	GH-1044 (3)	GH-1044 (4)	GH-1044 (5)
15	Orifice (Natural)	GH-1011 (2)	GH-1011 (3)	GH-1011 (4)	GH-1011 (5)
16	Orifice (LPG)	GH-1011-1 (2)	GH-1011-1 (3)	GH-1011-1 (4)	GH-1011-1 (5)
17	Burner Box Top	GH-1013-1	GH-1013-2	GH-1013-3	GH-1013-4
18	Burner Bracket	GH-1014-1	GH-1014-2	GH-1014-3	GH-1014-4
19	Burner box bottom	GH-1015-1	GH-1015-2	GH-1015-3	GH-1015-4
20	Control panel	GH-1016	GH-1016	GH-1016	GH-1016
21	Gas valve	GH-1032	GH-1032	GH-1032	GH-1032
22	Pressure switch	GH-1034	GH-1034	GH-1034	GH-1034
23	Ignition module	GH-1035-S	GH-1035-S	GH-1035-S	GH-1035-S
24	Hot surface igniter	GH-1039	GH-1039	GH-1039	GH-1039
25	Transformer	GH-1033	GH-1033	GH-1033	GH-1033
26	Limit control	GH-1037	GH-1037	GH-1037	GH-1037
27	+Rollout switch	GH-1038	GH-1038	GH-1038	GH-1038
28	*Pressure switch hose	GH-1041	GH-1041	GH-1041	GH-1041
29	*Fan Blade	GH-1042-1	GH-1042-1	GH-1042-2	GH-1042-2
30	*Fan guard	GH-1043-1	GH-1043-1	GH-1043-2	GH-1043-2
31	*Fan motor	GH-1036 (1/15)	GH-1036 (1/15)	GH-1036 (1/12)	GH-1036 (1/12)
32	Mounting Bracket	GH-1023	GH-1023	GH-1023	GH-1023
33	Thermostat Terminal	H-10021	H-10021	H-10021	H-10021
34	*Power Cord	H-3257	H-3257	H-3257	H-3257
35	*Terminal Block	GH-1059	GH-1059	GH-1059	GH-1059

\*NOT SHOWN; + MODELS USE TWO