



# INSTALLATION INSTRUCTIONS

## FOA

### 45,000 to 125,000 Btuh Series

SEPARATED COMBUSTION

UNIT HEATERS

IM-FOA-45-125-0653334-05

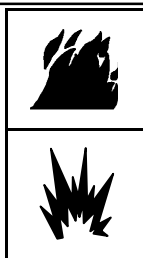
November 2011

Supersedes 065333404

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### RETAIN THESE INSTRUCTIONS FOR FUTURE REFERENCE



### ⚠ WARNING

#### FIRE OR EXPLOSION HAZARD.

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



Be sure to read and understand the installation, operation and service instructions in this manual.

Improper installation, adjustment, alteration, service or maintenance can cause serious injury, death or property damage.

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

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

#### WHAT TO DO IF YOU SMELL GAS:

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

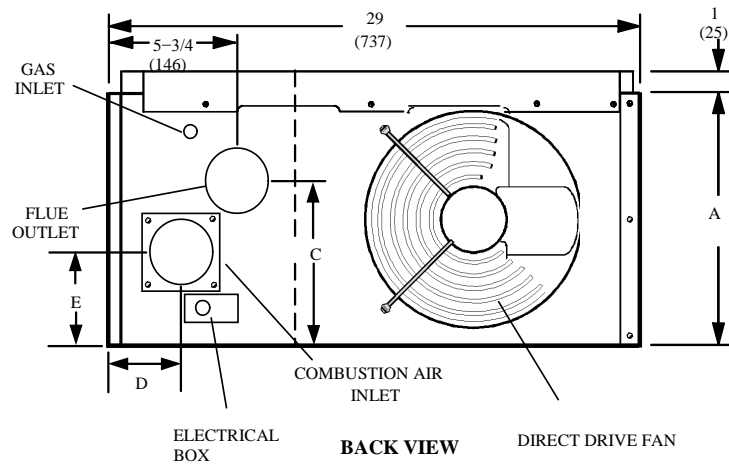
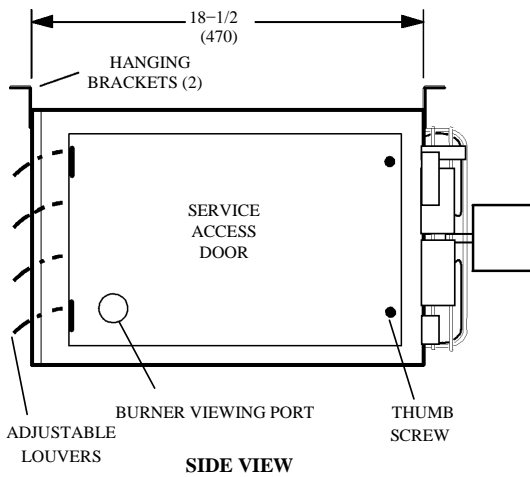
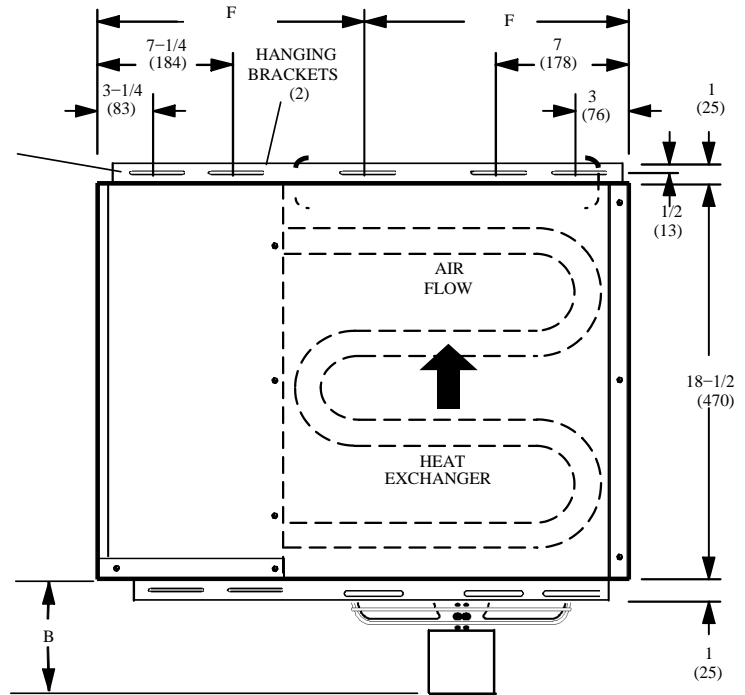
# Unit Dimensions

## FOA\*-45, -60, -75 UNIT DIMENSIONS

(NATURAL GAS & PROPANE)

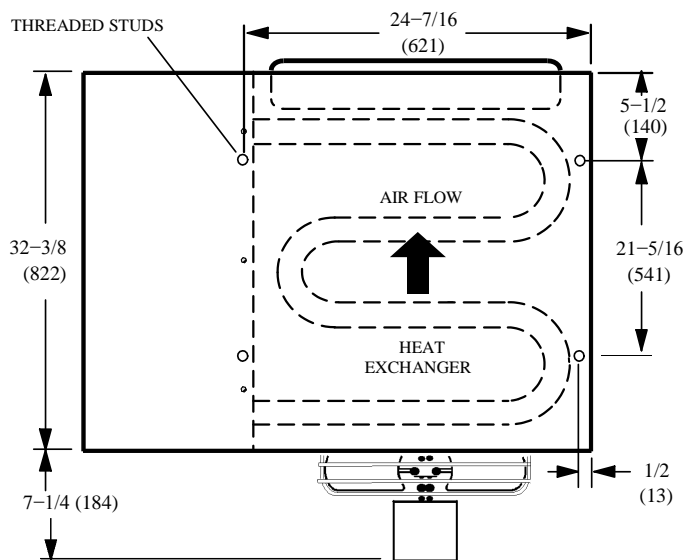
MOUNTING SLOTS (Typical)  
5/16 x 3 Inches (8 x 76 mm)

DIMENSION	45	60 / 75
A	12 (305)	17 (432)
B	5-1/2 (140)	6-1/2 (165)
C	7-3/4 (197)	10-1/4 (260)
D	1-3/4 (44)	3-1/4 (83)
E	5-1/4 (133)	5-3/4 (146)
F	13 (330)	14-1/2 (368)

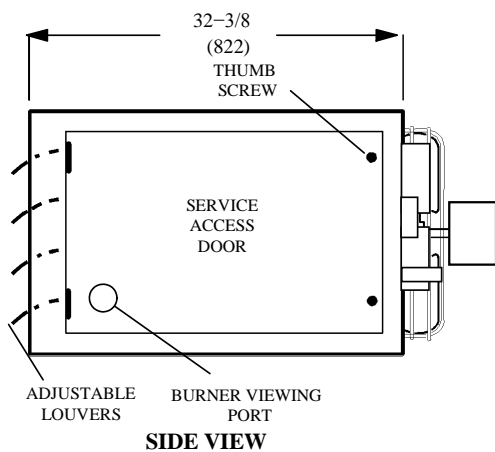


## FOA\*-100 & -125 UNIT DIMENSIONS (NATURAL GAS & PROPANE)

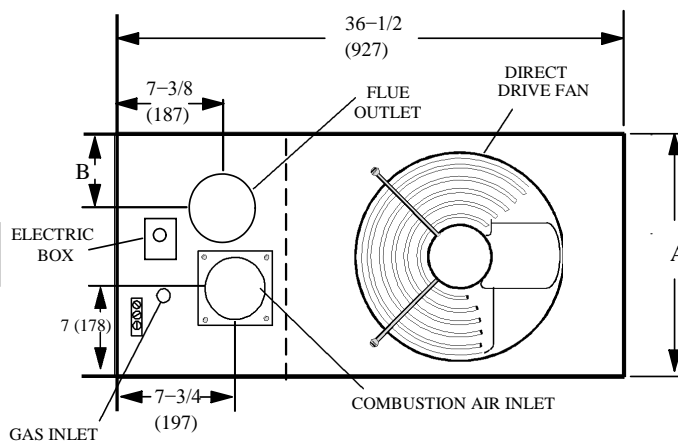
Model No.	FOA*-100 FOA*-125	
	in.	mm
A	21	533
B	8-1/2	216



**TOP VIEW**



**SIDE VIEW**



**BACK VIEW**

### Shipping

Shipping contents includes completely assembled heater, installation instructions, warranty certificate and two mounting brackets (shipped loose with -45 units). Check the unit for shipping damage. The receiving party should contact the last carrier immediately if any shipping damage is found.

### Optional Accessory

Units require a changeover kit when the unit is to be used with LP/propane gas. The kit is ordered separately.

### CSA Requirements in USA

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

Installation in aircraft hangars must be in accordance with the current edition of ANSI/NFPA No. 409, Standard for Aircraft Hangars.

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

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

These units are approved for installation in residential applications. Residential applications are defined as installations for heating nonliving spaces that are attached to, adjacent to or part of a structure that contains space for family living quarters. For installation in a residential garage, 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.

The National Fuel Gas Code (ANSI Z223.1) is available from:

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

Authorities having jurisdiction should be consulted before installation.

These unit heaters are CSA International design-certified. These unit heaters are certified for installation clearances to combustible material as listed in Table 1 and on unit rating plate.

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

All electrical wiring and grounding 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

These 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 CSA International design-certified for the installation clearances listed on the rating plate and in table 1. Adequate clearance must be provided around the appliance and around air inlet terminals. Provision shall be made for service accessibility.

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

#### GARAGE / WAREHOUSE INSTALLATIONS

- 1) In a storage area, clearance from heaters to combustible materials must be such that the combustible material must not attain a temperature above 160°F (71°C) by continuous operation of the unit.

**⚠ WARNING**

Combustible materials that are affected by exposure to temperatures LESS than 160°F (plastics, plastic wrap, styrofoam, cardboard, etc.) must be stored well away from this heater. Discharge air temperatures for these units can approach 200°F.

- 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.

**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

## AIRCRAFT HANGER

- 1) In an area where aircraft are housed or serviced, a 10-foot (3m) minimum clearance from the highest surface of the aircraft to bottom of the heater must be maintained.
- 2) In other areas, an 8-foot (2m) minimum clearance from the floor to bottom of heater must be maintained.
- 3) Heaters should be located so that they are protected from damage from aircraft or other appliances needed for servicing of aircraft. Refer to requirements of the enforcing authorities.

## RESIDENTIAL

These units are approved for installation in residential applications. Residential applications are defined as installations for heating non-living spaces that are attached to, adjacent to or part of a structure that contains space for family living quarters. For installation in a residential garage, 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.

Be sure to check with local codes and ordinances for additional requirements.

### Additional Requirements

The Commonwealth of Massachusetts stipulates the following additional requirements:

- 1) Gas furnaces shall be installed by a licensed plumber or gas fitter only.
- 2) The gas cock must be "T handle" type.

### Unit Heater Installation

## ⚠ WARNING

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

## ⚠ CAUTION

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

The appliance shall not be installed downstream from evaporator coils or cooling units.

Unit is shipped ready for installation. FOA\*-45, -60, & -75 units may be installed as shown in figure 1 or rotated 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 a rotated position:
  - a. Remove and retain screws securing door and rotate door 180°.
  - b. Resecure door using existing screws.
  - c. Rotate louvers to direct airflow as desired.
- 2) Choose location for mounting brackets.
- 3) Remove and retain three screws along top edge (bottom edge when rotated) of front of unit.
- 4) Align screw holes on mounting bracket with holes along top edge (either upright or rotated) of unit. Use existing screws to secure one mounting bracket to front of unit. Secure other mounting bracket to back of unit using screws provided in bag assembly.
- 5) To support unit, secure mounting bracket to ceiling joist or truss. Unit may also be supported using support rods as shown in figure 1.

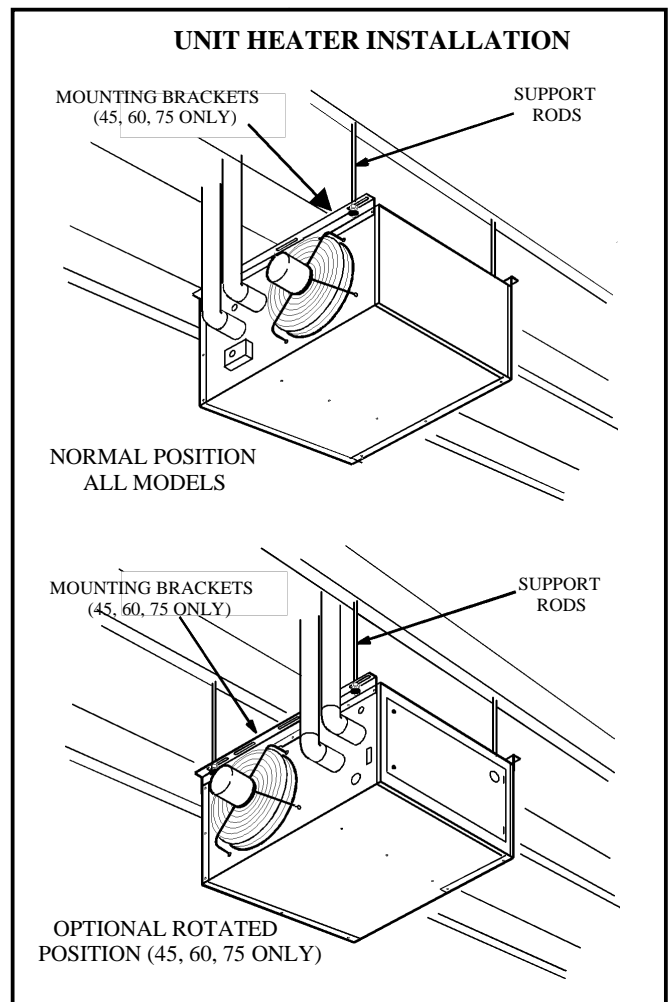


FIGURE 1

FOA\*-100 and -125 units may not be rotated. Threaded inserts (3/8" X 16) are provided in the top of the cabinet. Two of the inserts are located along one edge of the cabinet and two more are located in the divider panel between the heat exchanger and control compartments.

- 1) Cut threaded rods to desired length and thread a 3/8" nut onto the rod.
- 2) Slide a flat washer on the the threaded rod after the nut (7/16" I.D. X 1" O.D. X 1/16" THK washer).
- 3) Screw the four rods into the threaded inserts on the unit.
- 4) Tighten nuts to secure rods.

### Combustion and Ventilation Air

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

All gasfired appliances require air to be used for combustion. 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.

This unit must be provided with a combustion air pipe that is connected to the outside atmosphere. Outdoor air used for combustion 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.

### Exhaust Vent and Combustion Air Inlet

*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. The combustion air inlet is a pipe that connects the appliance to the outside atmosphere to convey oxygen from the air to the appliance burner.*

*NOTE – Local codes may supersede any of these provisions.*

## GENERAL RECOMMENDATIONS AND REQUIREMENTS

Unit heaters must be vented in compliance with the latest edition of the National Fuel Gas Code (NFPA 54 / ANSI Z223.1) in the USA and with CSA-B149.1 codes in Canada, as well as applicable provisions of local building codes, and the following instructions.

An exhaust outlet flange and combustion air inlet flange are attached to the back of the unit.

A single-wall vent connector may be used between the furnace and the vertical vent pipe in all applications; **however, single-wall vent material cannot be used for vertical vent piping in residential applications.**

**U.L.-approved Category III venting materials must be used in all residential applications which include horizontal vent piping.**

A single-wall vent pipe used as a vent connector in residential or commercial applications, or as a vertical vent in commercial applications, must 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 must have a temperature rating of 400°F (204°C). Silicone rubber sealant must have a temperature rating of 482°F (250°C), i.e., Dow Corning RTV-736 or equivalent.

All joints must be secured with at least two corrosion-resistant screws. All joints must be checked for gas tightness after installation.

Single-wall vent pipe used as vertical vent in commercial applications must not pass through any attic, interior wall, concealed space, or floor.

### VERTICAL VENTS USING METAL VENT PIPE – COMMERCIAL AND RESIDENTIAL

These compact unit heaters are listed as Category 1 appliances for vertical vent installations. See table 3 for vertical venting requirements.

- 1) These unit heaters are to be used with NFPA or ANSI-approved chimneys or U.L.-listed type B-1 gas vents, or listed chimney lining systems for gas venting where applicable, as well as the modifications and limitations listed in figure 2. Seal single-wall vent material according to **General Recommendations and Requirements** section. Air inlet pipe may be single-wall metal pipe or U.L.-listed single-wall metal flex connector.

- 2) The vent connector shall be 3" (76mm) diameter on 45K Btuh units, 4" (100mm) diameter on 60 & 75K Btuh units, and 5" (127mm) diameter on 100 and 125K Btuh units.

The air inlet pipe shall be 3" (76mm) diameter on 45K Btuh units and 4" (100mm) diameter on 60, 75, 100 and 125K Btuh units.

- 3) Keep the vent connector runs as short as possible with a minimum number of elbows. Refer to the current edition of ANSI Z223.1 or CSA-B149 installation compliance codes for maximum vent and vent connector lengths. Horizontal run of the vent connector from the combustion air inducer to the chimney/vent cannot exceed the values in table 2. Single-wall vent connector shall not be insulated.

**TABLE 2**  
**MAXIMUM HORIZONTAL VENT CONNECTOR**  
**AND HORIZONTAL VENT LENGTHS**

Number. of Elbows	Feet	Meters
1	25	7.6
2	20	6.1
3	15	4.6
4	10	3.0
5	5	1.5

- 4) The entire length of a single-wall metal vent connector shall be readily accessible for inspection, cleaning and replacement.
- 5) If a single-wall vent is used in an unheated area, it shall be insulated with a minimum of 1/2" thick foil-faced, 1-1/2# density insulation. Failure to do so will result in condensation of flue gases.

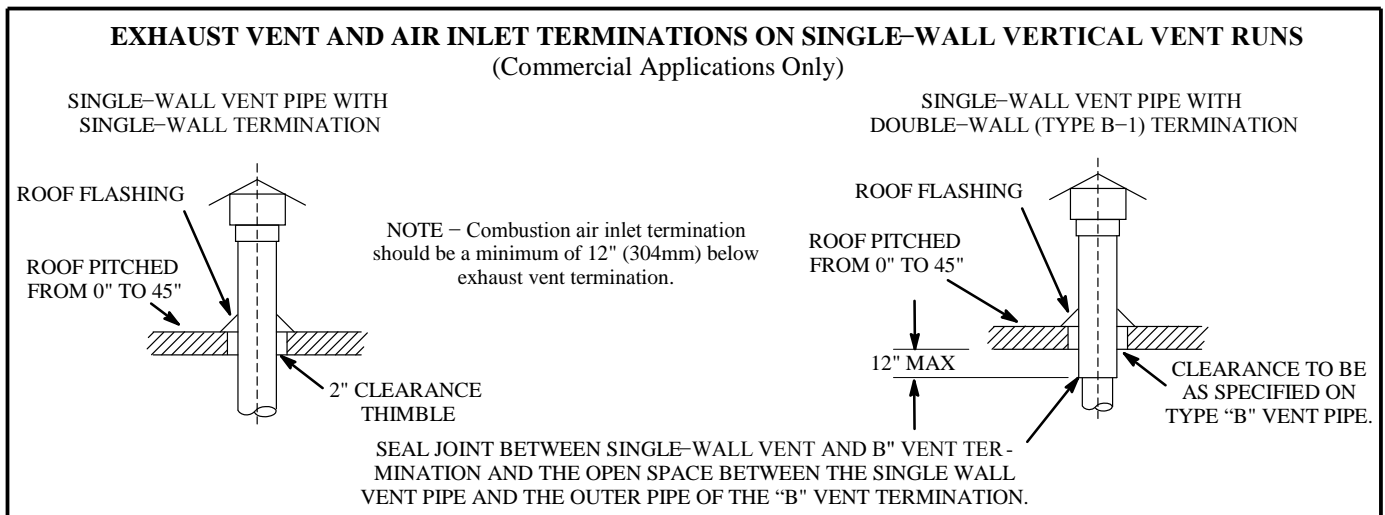
- 6) The unit may be vented vertically as a single appliance or in a common vent with other gas-fired appliances. In common venting situations, vent connectors for other appliances must maintain a 4" (102mm) vertical separation between the vent connectors. Refer to common venting tables in the current editions of ANSI Z223.1 or CSA-B149 installation compliance codes for proper vent size.

- 7) 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. Clearance to combustible material is 1" on vertical sections of the concentric vent/adapter/cap kit.

- 8) 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).

- 9) All vertical type B-1 vents, single-wall vertical vents (commercial applications), or listed chimney lining systems must be terminated with a U.L.-listed (or other equivalent agency) vent cap or listed roof assembly. See table 3.

- 10) The vent must extend at least 3 feet (1m) above the highest point where it passes through a roof of a building. The vent must also extend at least 2 feet (1m) higher than any part of a building within a horizontal distance of 10 feet (3m) unless otherwise specified by ANSI Z223.1 or CSA-B149 installation compliance codes. The vent must extend at least 5 feet (2m) above the highest connected equipment flue collar.



**FIGURE 2**

## HORIZONTAL VENTING

**NOTE** – Common venting is not allowed when horizontally venting the unit heater.

If the unit heater is to be horizontally vented, a positive pressure may be created in the vent. The unit heater, when installed with horizontal venting, will perform as a category III appliance. See table 4 for horizontal venting requirements

- 1) In residential applications which include horizontal venting, use only special vent materials approved for use with Category III appliances for the exhaust pipe. Refer to table 5 for venting components.

In commercial applications, single-wall (26 GSG) galvanized or equivalent stainless steel vent pipe sealed per these instructions, OR listed special vent for Category III appliances may be used for the exhaust pipe.

Single-wall vent pipe or U.L.-listed single-wall flex connector can be used for the combustion air inlet in both residential and commercial applications.

- 2) **In residential and commercial applications**, the exhaust pipe diameter for horizontal installations shall be 3" (76mm) on FOA-45 units, 4" (100mm) on -60 & -75 units, and 5" (127mm) on -100 and -125 units.

**In residential and commercial applications**, the combustion air inlet pipe diameter for horizontal installations shall be 3" (76mm) on FOA-45 units and 4" (127mm) on -60, -75, -100 & -125 units.

- 3) The minimum horizontal vent length is 5 feet (2m).
- 4) Refer to table 2 for maximum horizontal vent lengths.
- 5) If possible, do not terminate the horizontal vent through a wall that is exposed to prevailing wind. 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.
- 6) Horizontal vent termination must be free from obstructions and at least 12" (305mm) above grade level and maximum snow height.

- 7) Do not install a horizontal vent termination directly below roof eaves or above a public 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.

- 8) Minimum clearance for horizontal vent termination from any door, window, gravity air inlet, gas or electric meter, regulators, and relief equipment is 4 feet (1m) for United States installations.

In Canada, horizontal vent termination must have a minimum 6-foot horizontal clearance from gas and electric meters and relief devices.

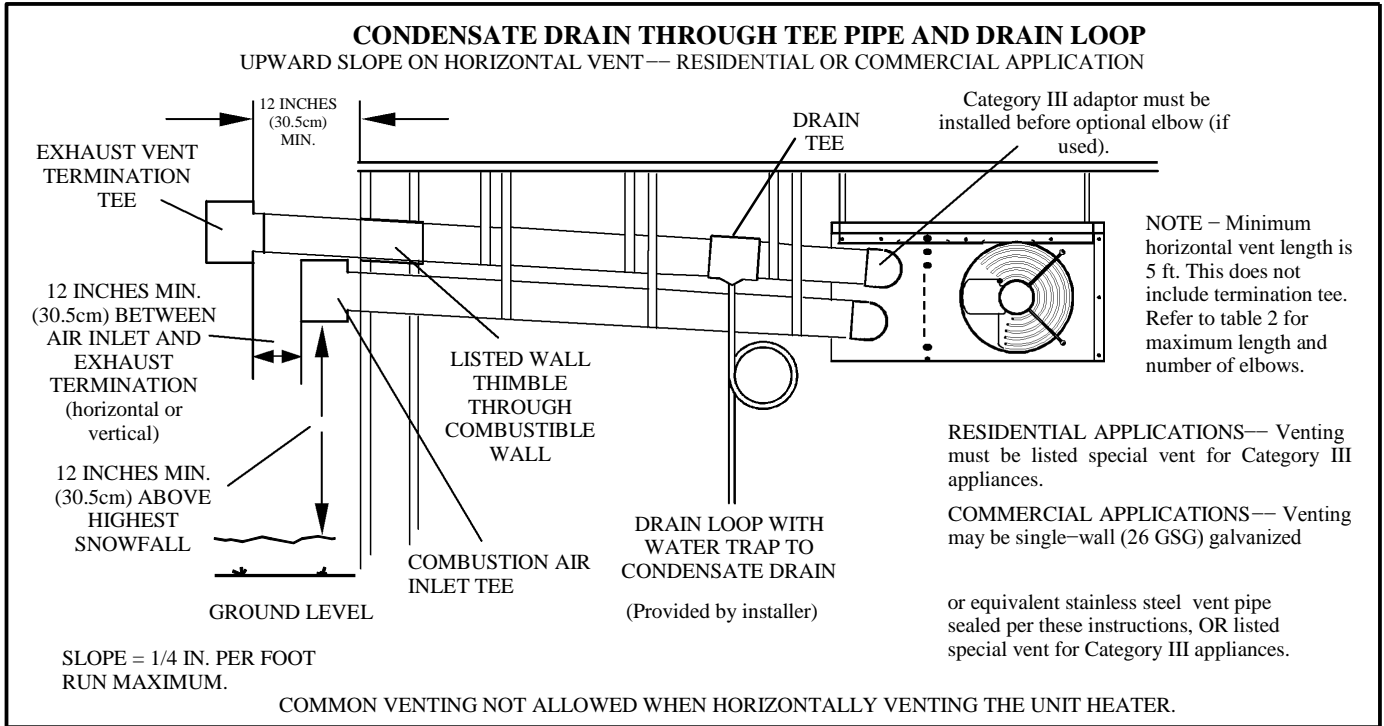
Refer to latest editions of the ANSI Z223.1 or CSA-B149 for installation compliance codes or check with local authorities having jurisdiction.

- 9) Vent termination must be a minimum of 4 feet (1m) below, or 4 feet (1m) horizontally, from any soffit or under-eave vent.
- 10) Vent termination 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.
- 11) 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).
- 12) When termination is routed through combustible wall, vent termination must be supported using a listed clearance thimble. Inside edge of vent termination must be at least 12" (305mm) from outside wall.
- 13) All horizontal vents which use special vent pipe for use with Category III appliances must terminate with an approved Category III tee. Opening end must face downward.
- 14) In commercial applications, clearance to combustible material is 6" (152mm) for single-wall vent material except where a U.L.-listed thimble is used. Follow manufacturer's instructions for clearance to combustible for type B-1 vent or factory-built chimney.
- 15) For horizontal venting, the vent pipe shall be supported with hangers no more than 3 feet (1m) apart to prevent movement after installation.
- 16) Select a wall termination point that will maintain 1/4" (6mm) rise per foot (305mm) slope of horizontal run of vent pipe.

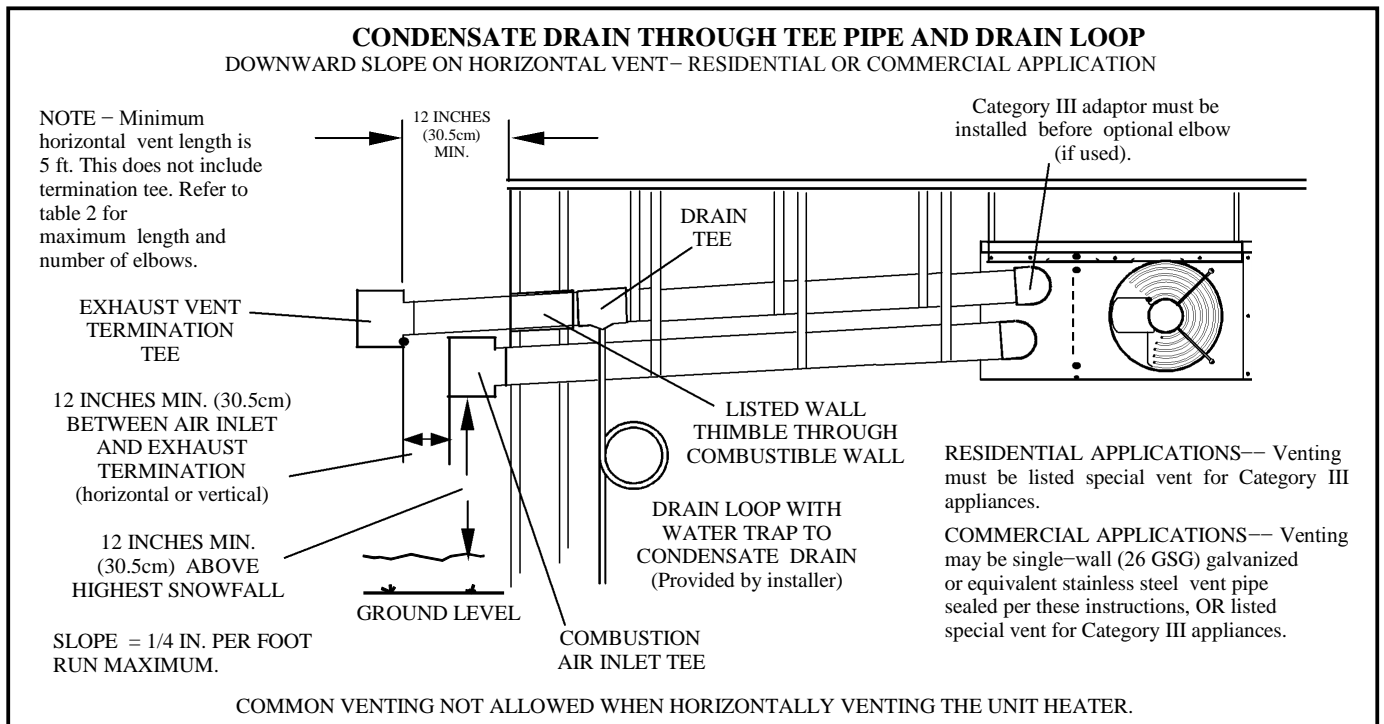


17) For upward sloped vent, a condensate tee and drain must be installed within the first 5 feet (2m) from the unit heater to protect the appliance. If a flexible condensate drain line is used, the drain line must include a loop filled with water to prevent combustion products from entering the structure. If the unit is shut down for an extended period of time and will be exposed to sub-freezing temperatures, the condensate may freeze.

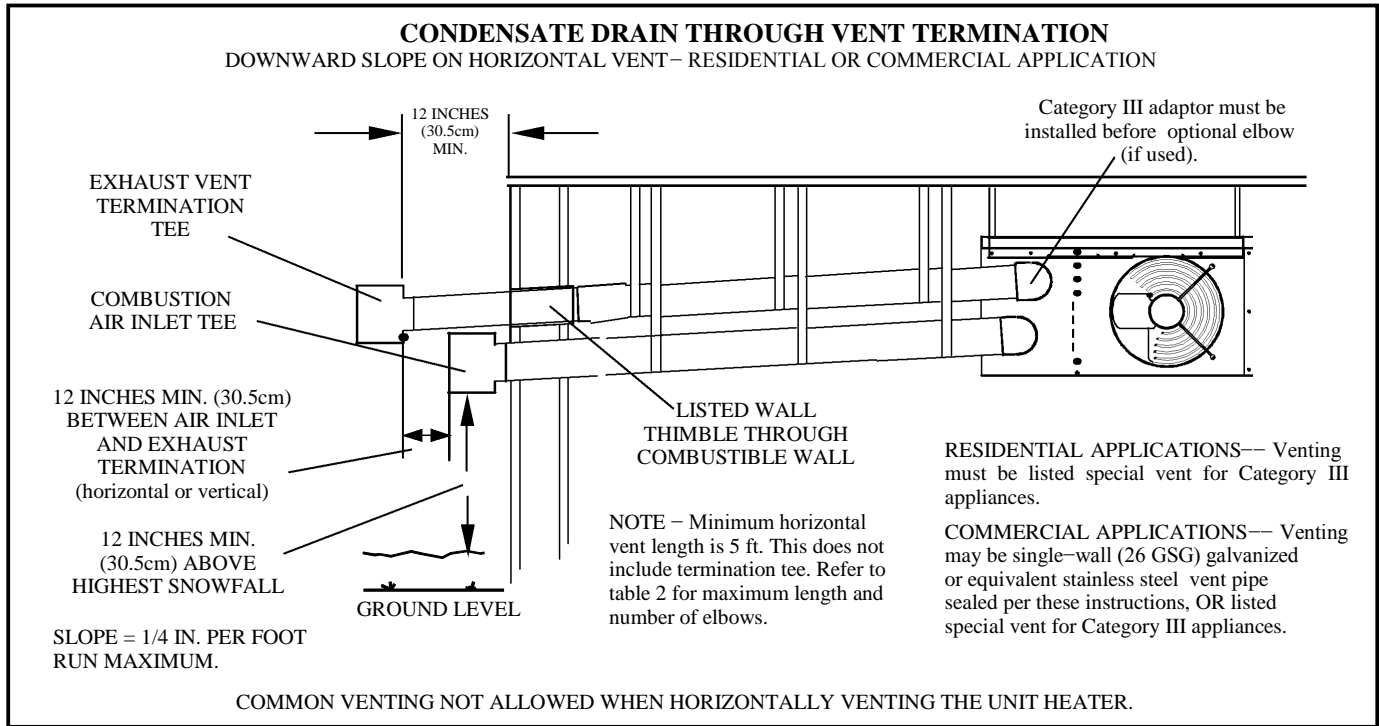
18) In areas where authorities having jurisdiction permit, a downward slope of maximum 1/4" per foot is also acceptable. Condensate drainage can be collected in a tee pipe section (figure 4) with drain loop similar to one used for upward slope vent, or allowed to drip through the vent termination, if permitted by authorities (figure 5).



**FIGURE 3**



**FIGURE 4**



**FIGURE 5**

**Table 3 - Vertical Venting Requirements (FOA 45 - 125)**

	Model Size (1000s BTUH)	Termination Type	Flue		Inlet air		Approved Caps	
			Material	Size	Material	Size	Flue	Inlet air
<b>FOA Vertical Commercial Applications</b>	45	Two Pipe	Single wall	3"	Single wall	3"	Any UL approved caps	
			Double Wall (B-1)					
	Concentric	Single wall	* 3"	Single wall	* 3"	Concentric vent kit (4"/7") Part # 65336800		
		Double Wall (B-1)						
	60, 75	Two Pipe	Single wall	4"	Single wall	4"	Any UL approved caps	
			Double Wall (B-1)					
Concentric	Single wall	4"	Single wall	4"	Concentric vent kit (4"/7") Part # 65336800			
	Double Wall (B-1)							
100, 125	Two Pipe	Single wall	5"	Single wall	4"	Any UL approved caps		
		Double Wall (B-1)						
Concentric	Single wall	5"	Single wall	**	4"	Concentric vent kit (5"/8") Part # 65336900		
	Double Wall (B-1)							
<b>FOA Vertical Residential Applications</b>	45	Two Pipe	Double Wall (B-1)	3"	Single wall	3"	Any UL approved caps	
			Double Wall (B-1)					
	Concentric	Double Wall (B-1)	* 3"	Single wall	* 3"	Concentric vent kit (4"/7") Part # 65336800		
		Double Wall (B-1)						
	60, 75	Two Pipe	Double Wall (B-1)	4"	Single wall	4"	Any UL approved caps	
			Double Wall (B-1)					
	Concentric	Double Wall (B-1)	4"	Single wall	4"	Concentric vent kit (4"/7") Part # 65336800		
		Double Wall (B-1)						
100, 125	Two Pipe	Double Wall (B-1)	5"	Single wall	4"	Any UL approved caps		
		Double Wall (B-1)						
Concentric	Double Wall (B-1)	5"	Single wall	**	4"	Concentric vent kit (5"/8") Part # 65336900		
	Double Wall (B-1)							

\* Field supplied 3" to 4" increaser required for connection to concentric adapter

\*\* Field supplied 4" to 5" increaser required for connection to concentric adapter

Note: Vent cap (for two pipe venting systems) 2 required per system

**Table 4 - Horizontal Venting Requirements (FOA 45 - 125)**

FOA Horizontal Commercial Applications	Model Size (1000s BTUH)	Termination Type	Flue		Inlet air		Approved Caps	
			Material	Size	Material	Size	Flue	Inlet air
	FOA Horizontal Residential Applications	45	Two pipe	Single wall	3"	Single wall	3"	Tee
Cat. III				Cat. III				Cat. III
Concentric			Single wall	* 3"	Single wall	* 3"	Concentric vent kit (4"/7") Part # 65336800	
			Cat. III					
60, 75		Two pipe	Single wall	4"	Single wall	4"	Tee	Tee
			Cat. III				Cat. III	Cat. III
		Concentric	Single wall	4"	Single wall	4"	Concentric vent kit (4"/7") Part # 65336800	
			Cat. III					
100, 125		Two pipe	Single wall	5"	Single wall	4"	Tee	Tee
			Cat. III				Cat. III	Cat. III
Concentric		Not available						

**TABLE 5**  
**Category III Horizontal Venting Components**  
 (Required for Residential Horizontal Vent Applications)

ADP Part Number	Description	FOA		
		45	60 75	100 125
<b>Category III Horizontal Vent Kits <sup>[1]</sup></b>				
66808901	<sup>[2]</sup> VENT KIT, UP SLOPED CAT III (3")	X		
66808902	<sup>[2]</sup> VENT KIT, UP SLOPED CAT III (4")		X	
66808903	<sup>[2]</sup> VENT KIT, UP SLOPED CAT III (5")			X
66809001	VENT KIT, DOWN SLOPED CAT III (3")	X		
66809002	VENT KIT, DOWN SLOPED CAT III (4")		X	
66809003	VENT KIT, DOWN SLOPED CAT III (5")			X
<b>Category III Components <sup>[3]</sup></b>				
66809101	90 DEGREE ELBOW CAT III (3")	X		
66809102	90 DEGREE ELBOW CAT III (4")		X	
66809103	90 DEGREE ELBOW CAT III (5")			X
66809201	STRAIGHT VENT PIPE 6" LEN (3")	X		
66809202	STRAIGHT VENT PIPE 12" LEN (3")	X		
66809203	STRAIGHT VENT PIPE 36" LEN (3")	X		
66809301	STRAIGHT VENT PIPE 6" LEN (4")		X	
66809302	STRAIGHT VENT PIPE 12" LEN (4")		X	
66809303	STRAIGHT VENT PIPE 36" LEN (4")		X	
66809401	STRAIGHT VENT PIPE 6" LEN (5")			X
66809402	STRAIGHT VENT PIPE 12" LEN (5")			X
66809403	STRAIGHT VENT PIPE 36" LEN (5")			X
66809601	HORIZ VENT / AIR INLET TEE (3")	X		
66809602	HORIZ VENT / AIR INLET TEE (4")		X	X
66809603	HORIZ VENT / AIR INLET TEE (5")			X

[1] Cat. III vent kit includes: (1) unit transition, (1) vent termination, and (1) wall thimble.

[2] Upslope kits have drain connection. Vent pipe sold separately.

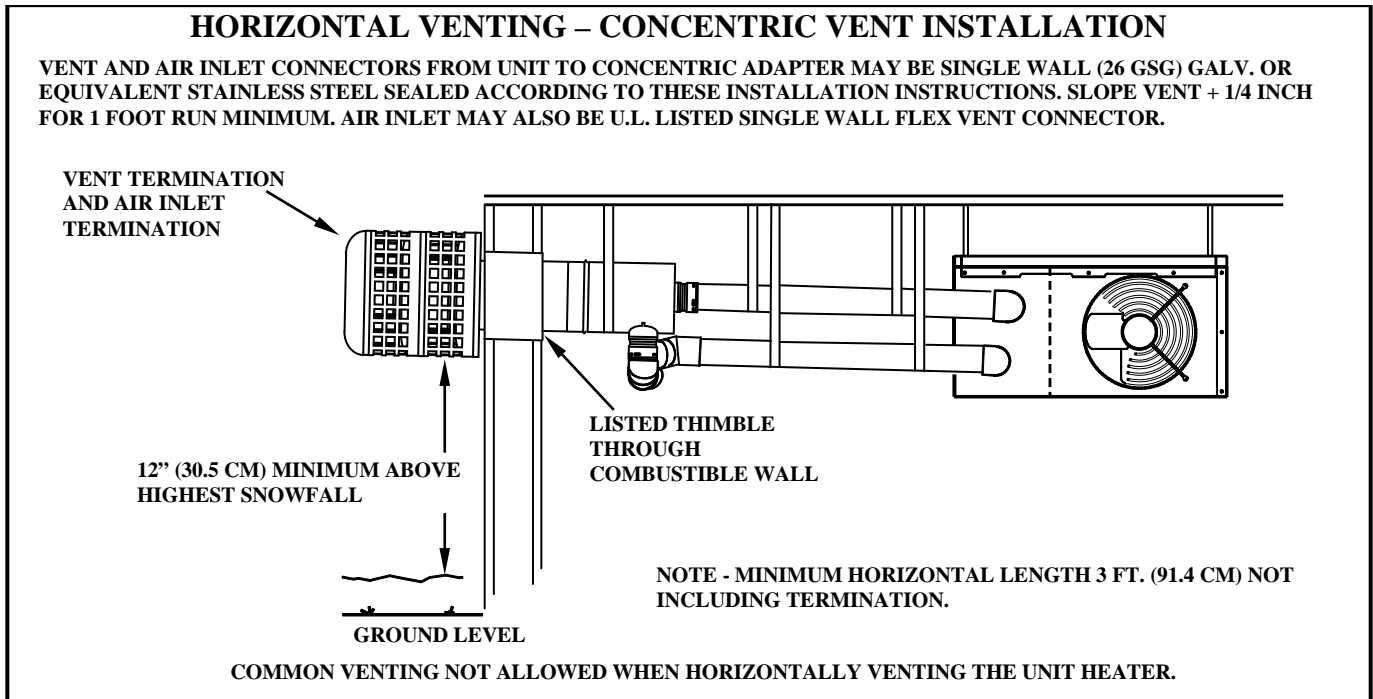
[3] Category III not required for air intake.

**VERTICAL VENTING CONCENTRIC KIT –  
RESIDENTIAL AND COMMERCIAL**

A concentric vent/adaptor/cap as specified in these instructions may be used for vertical termination. Refer to table 3.

**HORIZONTAL VENTING CONCENTRIC KIT –  
COMMERCIAL**

- 1) Horizontal commercial installations are for buildings that are not attached to living spaces. The only concentric vent/adaptor/cap kit that may be used is the kit supplied by Advanced Distributor Products. The kit may be used with 45/60/75 units. The vent used to connect from the concentric adapter to the unit may be single wall material minimum 25 GSG (0.46 mm) galvanized steel or equivalent grade stainless steel installed according to the Horizontal Venting sections. The air inlet may be single wall material or U.L. listed single wall flex vent connector.
- 2) The vent pipe diameter for horizontal commercial installations shall be 3” (76 mm) on 45 units and 4” (100 mm) on 60/75 units. Refer to Table 3.
- 3) Refer to Table 2 for maximum vent lengths.
- 4) Refer to Figure 5A for concentric kit termination, Figure 3 for upward slope with condensate trap, Figure 4 for downward slope with trap, and Figure 5 for downward slope with condensate drain through cap where permitted by local authorities.



**FIGURE 5A**

## 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 summer exhaust 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 damper 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

**NOTE** – Local codes may supersede any of the provisions outlined in this instruction.

The unit heaters use a direct spark ignition system. There is no pilot necessary as the spark lights the main burner as the gas valve is turned on. The direct spark ignition control board emits radio noise as the sparking process is under way. The level of energy may be sufficient to disturb a logic circuit in a microprocessor controlled thermostat. It is recommended that an isolation relay be used when connecting the unit heaters to a microprocessor controlled thermostat. Install the thermostat according to instructions provided. Install a separate fused disconnect switch, with the fuse sized according to blower motor size. Connect wiring through knockout on the junction box located on the side of the unit heater. Refer to heater wiring diagram for connection information. Use 18 gauge wire or larger for thermostat connections.

**NOTE** – Electrically ground unit in accordance with local codes or, in the absence of local codes, in accordance with the current editions of the ANSI/NFPA No. 70, National Electrical Code or CSA C22.1, Canadian Electrical Code, Part 1.

**NOTE** – Uninsulated ground wires must be wrapped in electrical tape to avoid damage to the electrical system.

Make line voltage connections as shown in figure 6. Connect field wiring as shown on wiring diagram on unit. Also refer to typical diagram in this manual. An additional thermostat wire must be run to terminal "G" on heater when continuous blower is desired.

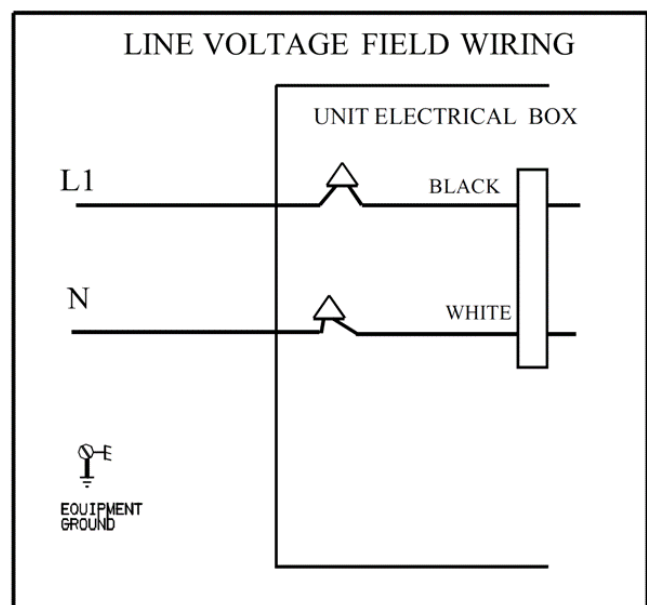


FIGURE 6

# TYPICAL FOA\*-45, -60, -75, -100, -125 WIRING SCHEMATIC

- ⚠ MAXIMUM LOAD NOT TO EXCEED 20VA AT 24V, CLASS 2
- ⚠ S43 IS USED ON FOA, TUA-150 THRU 300 UNITS.
- ⚠ DL36 IS A FIELD OPTION FOR MANIFOLD PURGE
- ⚠ FOA, TUA-60, 75 HAS (2) S47 ROLLOUT SWITCHES. FOA, TUA-45, 100, 125 HAS (1) S47.
- ⚠ B14 AND C10 ARE USED ON FOA, TUA-250, 300 UNITS ONLY.

KEY	DESCRIPTION
A3	CONTROL - BURNER, IGNITION
B3	MOTOR - BLOWER
B6	MOTOR - COMBUSTION AIR INDUCER
B14	MOTOR - BLOWER 2
C4	CAPACITOR - BLOWER MOTOR 1
C10	CAPACITOR - BLOWER MOTOR
DL36	RELAY - DELAY
GV1	VALVE - GAS
S10	LIMIT - PRIMARY, GAS
S18	SWITCH - COMB AIR BLWR PROVE
S43	SWITCH - LOW GAS PRESSURE
S47	SWITCH - FLAME ROLLOUT
S51	SWITCH - DOOR INTERLOCK
T1	TRANSFORMER - CONTROL

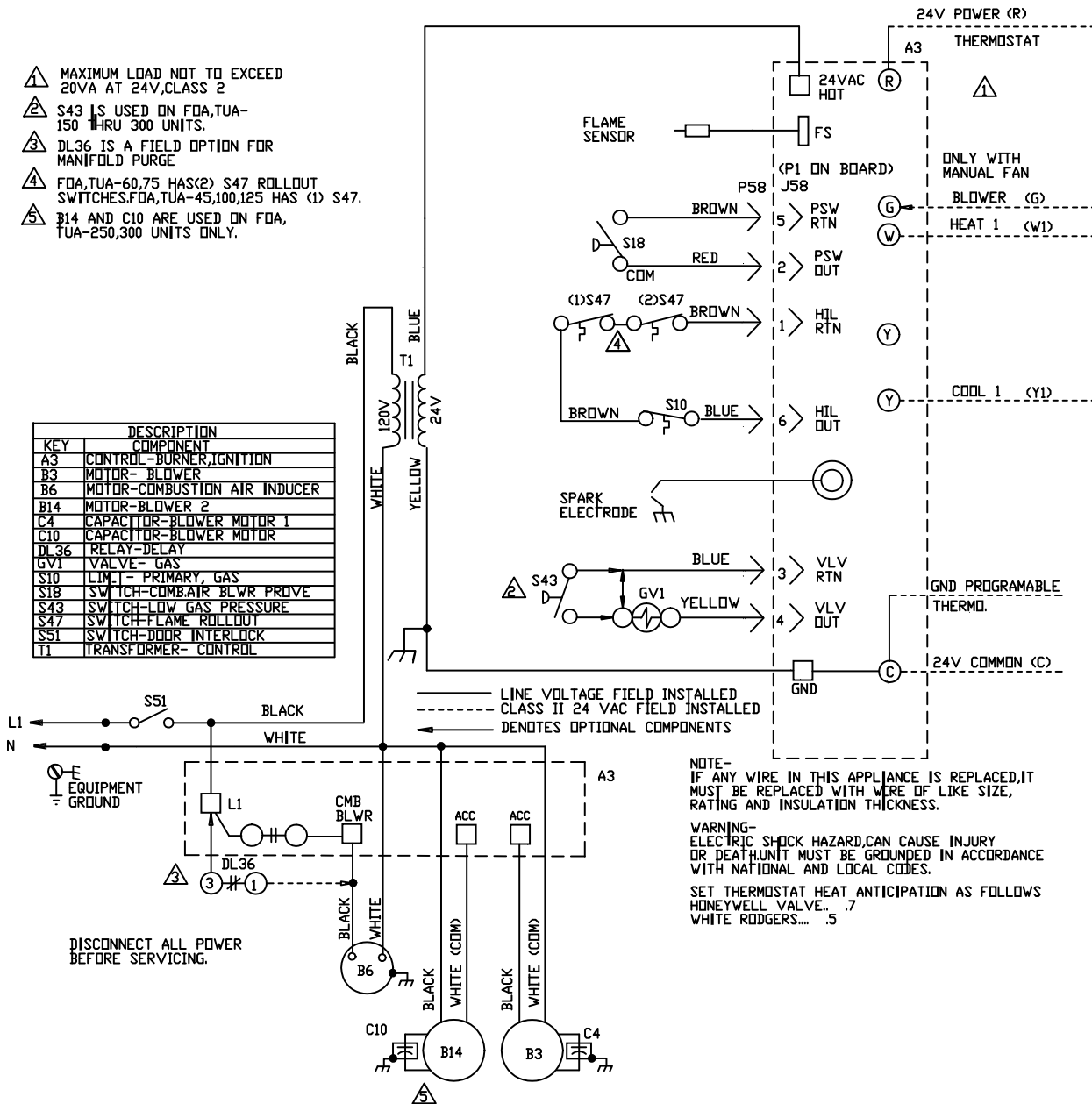


FIGURE 7

## Gas Connection

When connecting gas supply, the length of the run from the meter must be considered in determining the pipe size to avoid excessive pressure drop. A line pressure of 7" w.g. (1.74kPa.) for natural gas should be maintained when sizing piping. A line pressure of 13" w.c. (3.23kPa) should be maintained for liquefied petroleum (LP) gas. Minimum gas pressure of 5.0" w.c. for natural gas or 10.4" w.c. for LP/propane gas should be maintained. For correct sizing of piping, refer to the National Fuel Gas Code (ANSI Z223.1) in U.S. or CSA-B149 Installation Code in Canada or consult the utility having jurisdiction.

A drip leg should be installed in the vertical pipe run to the unit. In some localities, codes may require that a manual main shutoff valve and union (furnished by installer) be installed external to the unit. Union must be of the ground joint type. A drip leg should be readily accessible to permit cleaning and emptying. See figure 8. Leave 4" (102mm) clearance between electric box and drip leg.

**NOTE** – If a switch box is mounted over electrical knock-outs on back of unit, leave a minimum of 4" (102mm) clearance between switch box and drip leg.

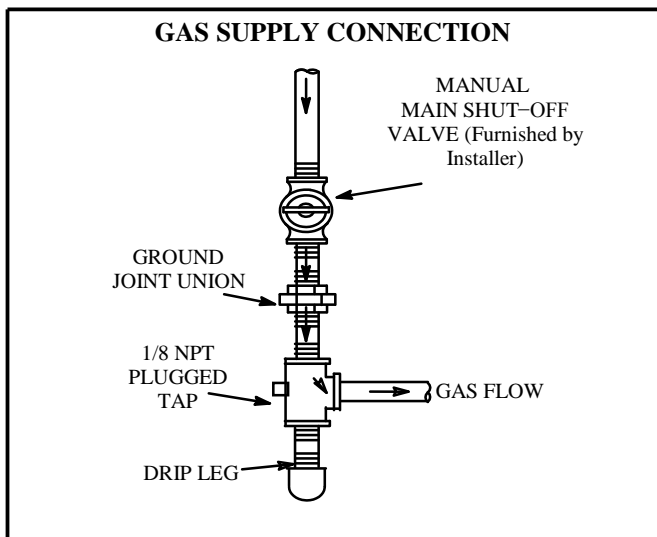


FIGURE 8

A 1/8" NPT plugged tap shall be installed immediately upstream of the gas supply connection to the heater.

**NOTE** – Compounds used on threaded joints of gas piping must be resistant to the actions of liquefied petroleum gases.

## Leak Check

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

## CAUTION

**DO NOT** use matches, candles, flame or other sources of ignition to check for gas leaks.

The appliance must be isolated from the gas supply piping system by closing its individual manual gas shutoff valve during any pressure testing of the gas supply system at test pressures equal to or less than 1/2 psig (3.45kPa).

## IMPORTANT

The heater and its individual 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 psig (3.45kPa). See figure 9.

**NOTE** – In case emergency shutdown is required, shut down main gas valve and disconnect main power to unit. These devices should be properly labeled by the installer.

## GAS SUPPLY TO UNIT HEATER

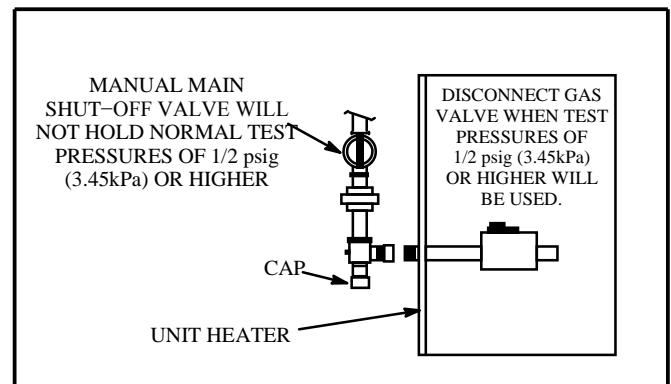


FIGURE 9

## Unit Start-Up

FOR YOUR SAFETY READ BEFORE LIGHTING

### ! WARNING



Electric shock hazard. Can cause injury or death. Do not use this heater if any part has been under water. Immediately call a qualified service technician to inspect the furnace and to replace any part of the control system and any gas control which has been under water.

### ! WARNING



Danger of explosion. Can cause injury or product or property damage. If overheating occurs or if gas supply fails to shut off, shut off the manual gas valve to the appliance before shutting off electrical supply.

### ! WARNING



Electric shock hazard. Can cause injury or death. Before attempting to perform any service or maintenance, turn the electrical power to unit OFF at disconnect switch(es). Unit may have multiple power supplies.

### ! WARNING



Danger of explosion and fire. Can cause injury or product or property damage. You must follow these instructions exactly.

BEFORE LIGHTING 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.

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.

These unit heaters are equipped with an automatic spark ignition system. There is no pilot. In case of a safety shutdown, move thermostat switch to **OFF**, then return the thermostat switch to **HEAT** position.

FOA unit heaters are equipped with an automatic spark ignition system. There is no pilot. In case of a safety shutdown, move thermostat switch to **OFF**, then return the thermostat switch to **HEAT** position.

## OPERATION OF HONEYWELL VR8205 SERIES GAS VALVE (FIGURE 10)

**NOTE – STOP!** Read the safety information at the beginning of this section.

- 1) Set thermostat to lowest setting.

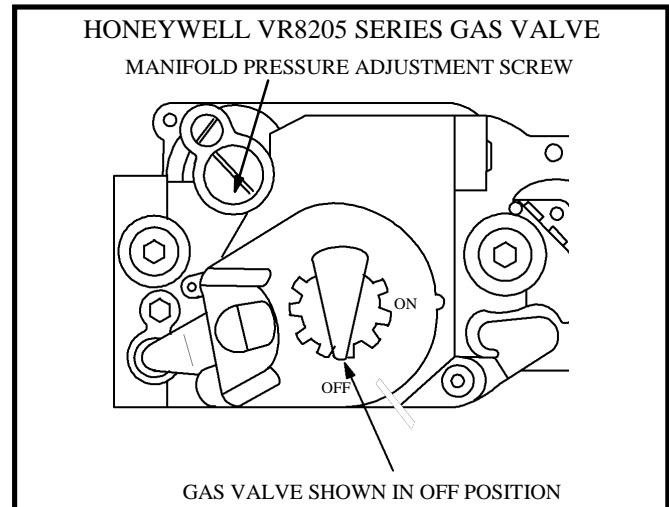



FIGURE 10

- 2) Turn off all electrical power to appliance.
- 3) This appliance is equipped with an ignition device which automatically lights burners. **DO NOT attempt to light the burners manually.**
- 4) Turn the manual knob on gas valve clockwise to OFF. Do not force.
- 5) Wait five minutes to clear out any gas. If you then smell gas, **STOP!** Immediately call your gas supplier from a neighbor's phone. Follow the gas supplier's instructions. If you do not smell gas, go to next step.
- 6) Turn manual knob on gas valve counterclockwise to ON.
- 7) Turn on all electric power to unit.
- 8) Set thermostat to desired setting.
- 9) The combustion air inducer will start. The burners will light within 40 seconds.
- 10) If unit does not light first time (gas line not fully purged) it will attempt up to two more ignitions before locking out.
- 11) If lockout occurs, repeat steps 1 through 9.
- 12) If appliance still will not operate, follow the instructions "**To Turn Off Gas to Unit**" and call your service technician or gas supplier.



## To Turn Off Gas to Unit

- 1) Set thermostat to lowest level.
- 2) Turn off all electrical power to unit if service is to be performed.
- 3) Turn knob on gas valve 90° clockwise  to OFF.

## Heating Sequence of Operation

- 1) When the thermostat calls for heat, the combustion air inducer starts immediately.
- 2) Combustion air pressure switch proves inducer operation before allowing power to the ignition controller. This switch is factory set and no adjustment is necessary.
- 3) After pre-purge of approximately 30 seconds, the spark ignition is energized and the solenoid valves open in the gas valve.
- 4) The spark then ignites the gas, the ignition sensor proves the flame and the combustion process continues.
- 5) In the event that the flame is not detected after the first 10-second trial for ignition, the controller will repeat steps 3 and 4 an additional two times before locking out the gas valve. Ignition control will then automatically repeat steps 3, 4, and 5 after 60 minutes.

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

- 6) The burners must light without noticeable crossover delay. There must be no flame lifting from the burner heads, flashback or burning within the burner. The flames should be predominantly blue in color and should be approximately centered in the tubes with no apparent impingement taking place.
- 7) The ignition control will energize the fan approximately 45 seconds after ignition is established.

- 8) After the thermostat demand is satisfied the gas valve is closed. Five seconds after the demand is satisfied, the combustion air inducer is shut off.
- 9) The ignition control will shut off the system fan approximately 120 seconds after the gas valve is de-energized.

## Ignition Control LED

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

**TABLE 6  
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 inducer is energized or failed open after inducer 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 flash slowly.

## Optional Gas Conversion Kit

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.

## High Altitude Adjustments

Units may be fired at full input up to 2000 feet (610m) above sea level. Above 2000 feet (610m), unit must be derated by four percent for each additional 1000 feet (305m) above sea level or as specified by local authority having jurisdiction. Adjust pressure regulator to pressure shown in table 7.

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

**TABLE 7  
NATURAL GAS MANIFOLD PRESSURES**

Model No. ft	Manifold Pressure – in. w.c.								
	0–2000	2001–3000	3001–4000	4001–5000	5001–6000	6001–7000	7001–8000	8001–9000	9001–10,000
Natural Gas									
All Models	<sup>1</sup> 3.5	2.7	2.5	2.2	2	1.8	1.6	1.4	1.3
LPG/Propane Gas									
FOA*-045, -60	<sup>1</sup> 9.5	7.4	6.7	6.1	5.5	4.9	4.4	3.9	3.4
FOA*- 75	<sup>1</sup> 9.5	7.0	6.4	6.1	5.5	4.9	4.4	3.9	3.4
FOA*-100, -125	<sup>1</sup> 9.0	7.0	6.4	5.8	5.2	4.7	4.2	3.7	3.2

<sup>1</sup> No adjustment required.

## 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 5" (127mm) w.g. for natural gas or 10.4" (264mm) w.g. 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 the unit in the field. Refer to installation instructions provided with changeover kit for conversion procedure.

## Limit Control

The limit control switch is factory-set and is 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. 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.

## Service

### **⚠ 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.

The unit heater and vent system shall be inspected once a year by a licensed professional service technician, or equivalent.

### **BURNERS**

- 1) Periodically examine burner flames for proper appearance during the heating season.
- 2) Before each heating season examine the burners for any deposits or blockage that may have occurred.
- 3) 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 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 out the gas valve, which will be indicated by two 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.

## REPAIR PARTS

When ordering repair parts, include the complete unit model number listed on the unit rating plate. For example: FOAN-45A-1-1-1.

## START-UP AND PERFORMANCE CHECKLIST

Job Name: _____	Job No.: _____	Date: _____
Job Location: _____	City: _____	State/Province: _____
Installer: _____	City: _____	State/Province: _____
Unit Model No.: _____	Serial No.: _____	Service Technician: _____
Electrical Connections Tight? _____	Air Shutters Properly Adjusted (If Installed)? _____	
Supply Voltage _____	Flue Connections Tight? _____	
Blower Motor Lubrication O.K.? _____	Fan Timer Operation Checked? _____	
Gas Piping Connections Tight & Leak-Tested? _____	THERMOSTAT	
Blower Motor Amps _____	Calibrated? _____	
Furnace Btu Input _____	Heat Anticipator Properly Set? _____	
Line Pressure _____	Level? _____	
Manifold Pressure _____ w.c.		



## Unit Heater Limited Warranty – Standard 2 Year

*(Applies only to product installed within the United States or Canada)*

**Term of Warranty:** Advanced Distributor Products (ADP) warrants that products sold shall be of merchandisable quality, free of defects in material and workmanship, under normal use and service, for a period of two (2) years from the date of installation, **not** to exceed three (3) years from the date of manufacture.

**Extended Components:** This warranty provides extended coverage on Aluminized Heat Exchangers for **ten (10) years** and Stainless Steel Heat Exchangers for **fifteen (15) years**. The extended warranty coverage begins with the installation date and represents the total warranty period for the specific component. ADP, at its option, will furnish a replacement heat exchanger or allow a credit (in the amount of the heat exchanger original selling price) toward the purchase of a new ADP unit heater. **No extended coverage** granted for **HED series** heat exchangers.

**Warranty Procedure:** Warranty parts should be replaced by a qualified local contractor or dealer and will require the following information: model number, serial number, date of installation and an accurate description of the problem. Contractor or dealer will contact a local ADP distributor for replacement parts.

**Replacement Parts:** If, during the term of this warranty, a warranted part fails, ADP will either provide a replacement part free of charge, or may at its option, grant a credit for the original purchase price of the defective article to a distributor of ADP products. ADP may require the return of a defective article for factory inspection to verify and/or determine the root cause of the failure. Covered components include all parts of this unit except for the following **excluded components**, which are not covered by this warranty: cabinet, cabinet pieces, wiring and wiring harnesses.

**Care of Equipment:** For this warranty to apply, ADP product must be properly installed, operated, and maintained in accordance with the installation, operation and maintenance instructions provided with each unit. Unauthorized alteration of ADP product may void this warranty.

**Conditions of Warranty:** Replacement parts furnished under this warranty will be warranted for the balance of the original warranty term of the unit (including any extended warranty) and will not serve to extend the original term. This warranty is void if the ADP product is removed from the original installation site. This warranty does not apply to damage caused by shipping, misuse, mishandling or damage caused by floods, winds, fires, lightning, or exposure to corrosive elements/environments (such as salt, chlorine, fluorine or other damaging chemicals).

**Limitations of Warranty:** The costs of miscellaneous material and labor charges for diagnostics, servicing or replacing parts are not covered. ADP shall have no liability for expenses incurred for repairs without prior, written authorization from ADP.

The foregoing is in lieu of all other warranties, express or implied, notwithstanding the provisions of the Uniform Commercial Code, the Magnuson-Moss Warranty-Federal Trade Commission Improvement Act, or any other statutory or common law, federal or state.

ADP makes no warranty, express or implied, of fitness for any particular purpose, or of any other nature whatsoever, with respect to products manufactured or sold by ADP hereunder, except as specifically set forth above and on the face hereof. It is expressly understood and agreed that ADP shall not be liable to buyer, or any customer of buyer, for direct or indirect, special, incidental, consequential or penal damages, or for any expenses incurred by reason of the use or misuse by buyer or third parties of said products. To the extent said products may be considered "consumer products", as defined in Sec. 101 of the Magnuson-Moss Warranty-Federal Trade Commission Improvement Act, ADP makes no warranty of any kind, express or implied, to "consumers," except as specifically set forth above on the face hereof.

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