

Detroit Radiant Products Company

FA Series Manual



Installation, Operation, Maintenance and Parts

The FA Series heater is a gas-fired unit heater. This manual provides specific information related to the FA Series models. All persons involved with the installation, operation and maintenance of the heater system must read and understand the information in this manual.

⚠ WARNING



Improper installation, adjustment, alteration, service or maintenance can cause property damage, serious injury or death. Read and understand the installation, operating and maintenance instruction thoroughly before installing or servicing this equipment.



This heater **must** be installed and serviced by trained gas installation and service personnel only. Failure to comply could result in personal injury, asphyxiation, death, and fire or property damage.



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

Do not use this heater in indoor living or sleeping quarters! Installation of this unit in a residential indoor living space may result in property damage, serious injury, asphyxiation or death.

For Your Safety

If you smell gas:

- Open windows.
- Do not touch any electrical switch.
- Extinguish any open flame.
- Do not use any phone in your building.
- Immediately call your gas supplier from a neighbor's phone.
- Follow the gas supplier's instructions.
- If you cannot reach your gas supplier, call the fire department.

INSTALLER: Present this manual to the end user.

Keep these instructions in a clean and dry place for future reference.

Model#: _____ Serial #: _____
(located on rating label)

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1.0 Introduction

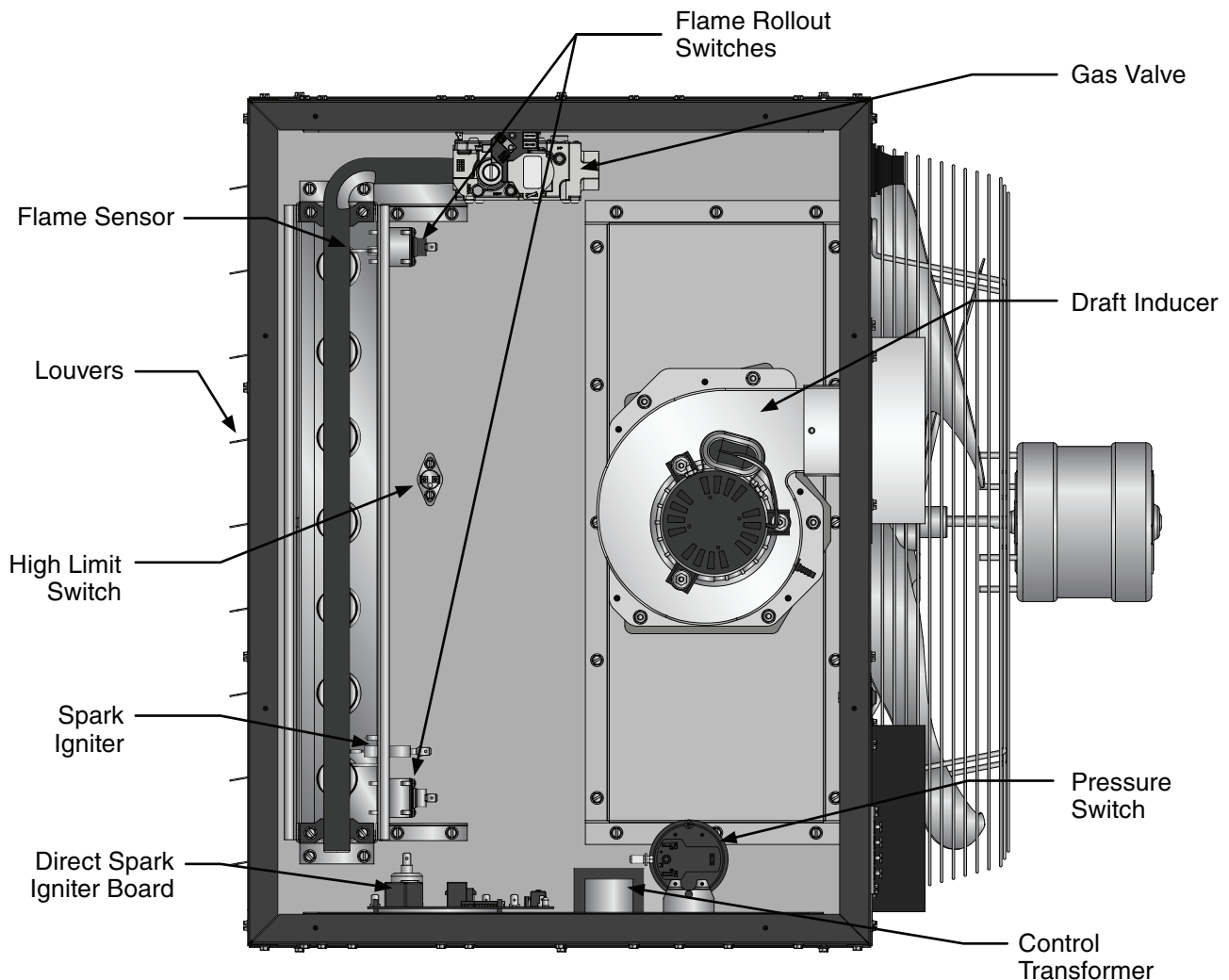
Overview

The intent of this manual is to provide information regarding safety, design guidelines, installation, operation and maintenance of the FA Series gas-fired unit heater. You must read and understand the instructions and all safety warnings before installing the gas-fired unit heater. This manual is property of the owner, and must stay with the owner or unit after installation is complete.

Heater Components

Prior to installation, verify that the heater's gas type and voltage (as listed on the rating plate) match that of your application. Also verify that you have received the entire heater contents included with your unit. Refer to page 56 for a list of the kit contents for your heater. Materials not included with the unit (e.g. screws, vent material, threaded rod, etc.) are the responsibility of the installer. Notify your product representative or the factory of any discrepancy of missing items prior to installing the unit.

Figure 1.1 • Heater Subcomponents



Initial Installation Considerations and Pre-Checks

WARNING



Improper installation, adjustment, alteration, service or maintenance can cause property damage, serious injury or death. Read and understand the installation, operating, and maintenance instructions thoroughly before installing or servicing this equipment. Only a trained, qualified installation or service personnel may install or service this equipment.

Placement of the heater is influenced by many factors. Aside from safety factors, considerations for the general space and heating requirements, availability of gas and electrical supply, and proximity of possible vent locations are a few examples of factors that should all be considered.

Inspect and evaluate the location of the heater to ensure that the structural support is adequate to support the unit's weight. The unit must be installed in a horizontally level position to ensure proper operation. To reduce noise attenuation along the structure caused by vibration of the unit, the heater should be installed within 15 feet of a primary building support. In the cases where this installation is not practical or feasible, the use of spring vibration isolators may be used, so long as they are rated for use of the unit's weight (see Chart 1.1).

Adequate space around the heater must also be considered in order to maintain the published minimum clearance to combustibles and recommended service clearances.

When designing a unit heater system, consider the following:

- Has the building's heat loss been evaluated?
- Does the design meet the needs of the space?
- Have the recommended mounting heights been observed?

WARNING

Do not locate any gas-fired units in area where chlorinated, halogenated, or acid vapors are present in the atmosphere. These substances can cause premature heat exchanger failure due to corrosion, which can cause property damage, serious injury or death.

Product Specifications

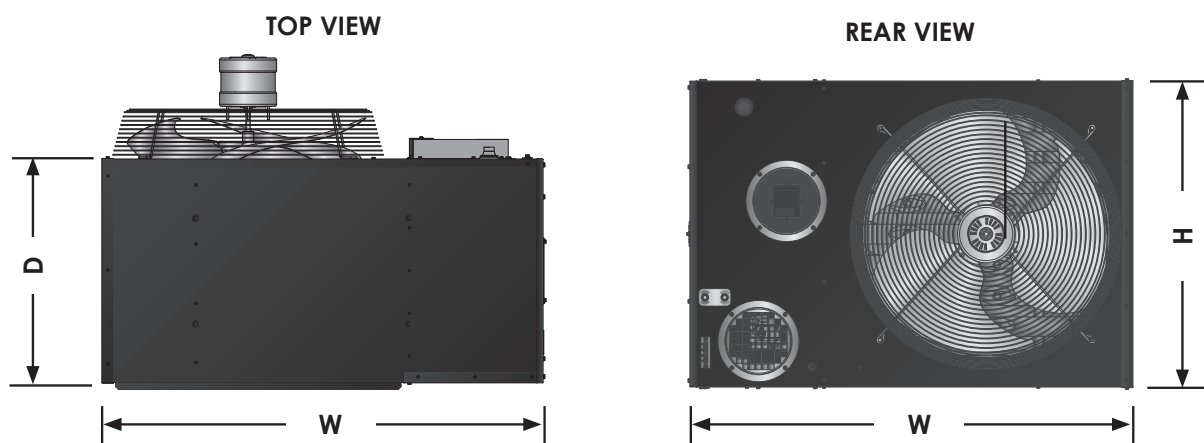
The FA Series unit heater is a single input warm air heater with an average thermal efficiency of 80%, unless otherwise indicated on the rating label. All units are to be supplied with single-phase 60 Hz 120VAC power. The exterior of all models are finished with industrial-grade colored enamel. For specific information on each model, see Chart 1.1, below.

Chart 1.1 • Specifications

Model Number	Cabinet Number	Gas Type	BTU/h Input	BTU/h Output	Physical Dimensions	Standard Weight	Recommended Mounting Height*	Gas Connection	Vent Connection	Inlet Connection	Axial Fan Rotation	Primary Voltage	Thermostat Voltage
FA-100	3	Nat or LP	100,000	80,000	40" W 20" D 21" H	118 Lbs.	12'-14'	1/2" NPT	4"	4"	CCW	120 VAC	24 VAC
FA-125	3	Nat or LP	125,000	100,000	40" W 20" D 21" H	118 Lbs.	14'-16'	1/2" NPT	4"	4"	CCW	120 VAC	24 VAC
FA-150	4	Nat or LP	150,000	120,000	40" W 20" D 27" H	159 Lbs.	14'-16'	1/2" NPT	6"	6"	CCW	120 VAC	24 VAC
FA-175	4	Nat or LP	175,000	140,000	40" W 20" D 27" H	159 Lbs.	15'-17'	1/2" NPT	6"	6"	CCW	120 VAC	24 VAC
FA-200	4	Nat or LP	200,000	160,000	40" W 20" D 27" H	159 Lbs.	15'-17'	1/2" NPT	6"	6"	CCW	120 VAC	24 VAC
FA-225	5	Nat or LP	225,000	180,000	40" W 20" D 30" H	176 Lbs.	16'-18'	3/4" NPT	6"	6"	CCW	120 VAC	24 VAC
FA-250	5	Nat or LP	250,000	200,000	40" W 20" D 30" H	176 Lbs.	16'-18'	3/4" NPT	6"	6"	CCW	120 VAC	24 VAC

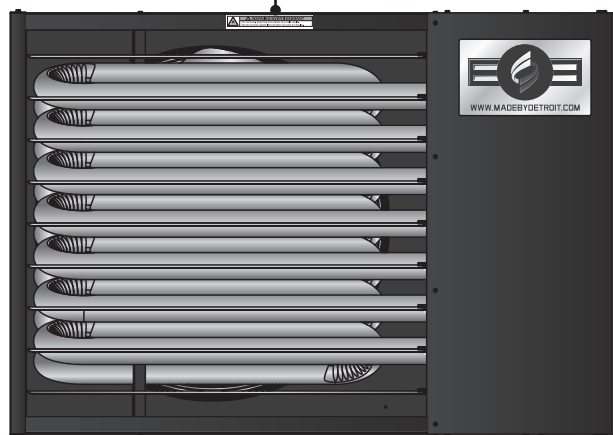
* Recommended mounting heights are provided as a guideline. Actual conditions may dictate variations from the above data. Clearance to combustibles must always be maintained.

Figure 1.2 • Dimensional Data (see Chart 1.1 for Physical Dimensions)



Safety Labels and Their Locations

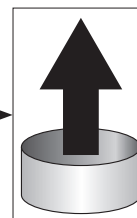
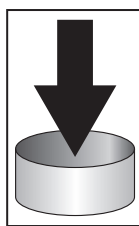
Product safety signs or labels should be replaced by the product user when they are no longer legible. Contact either your local distributor or product manufacturer for obtaining replacement signs or labels.



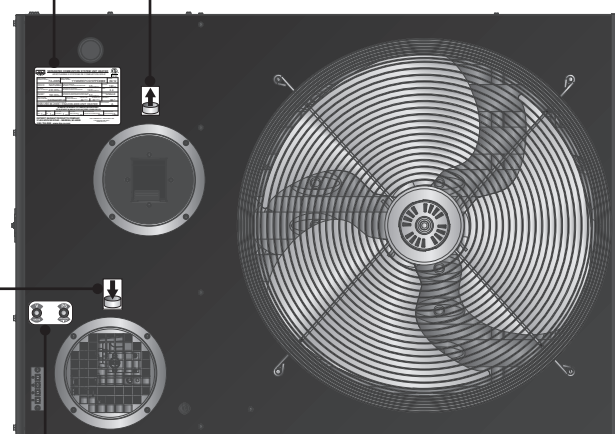
Front View

SEPARATED COMBUSTION SYSTEM UNIT HEATER AÉROTHÈRME À SYSTÈME DE COMBUSTION ISOLÉ			
MODEL NUMBER NOMBRE DE MODÈLE	FA-200N	SERIAL NUMBER NOMBRE DE SÉRIE	YYMMREPCSHIPPE####
TYPE OF GAS TYPE DE GAZ	NATURAL	MANIFOLD PRESSURE PRESSION À LA TIGERULE D'ALIMENTATION	3.5 INCHES W.C.
HEAT INPUT DEBIT CALORIFIQUE	200,000 BTU/H	MAXIMUM INLET PRESSURE PRESSION D'ALIMENTATION MAXIMALE	1.0 INCHES W.C.
HEAT OUTPUT RECHÈF	160,000 BTU/H	MINIMUM INLET PRESSURE PRESSION D'ALIMENTATION MINIMALE	5.0 INCHES W.C.
VENT CATEGORY ÉVÉNEMENT CATEGORIE	CATEGORY III	NATURAL GAS GAZ NATUREL	49 D.M.S.
THIS DESIGN COMPLIES WITH UNIT HEATER STANDARD ANSI Z83.8b-2006 • CSA 2.6B-2006 UNIT HEATER		PROPANE GAS GAZ PROPANE	57 D.M.S.
MINIMUM CLEARANCE TO COMBUSTIBLE MATERIAL DÉGAGEMENT MINIMUM POUR MATIÈRES COMBUSTIBLES		PHASE	SINGLE
TOP HAUT	BOTTOM BAS	RIGHT SIDE CÔTÉ DROIT	LEFT SIDE CÔTÉ GAUCHE
1 INCH	1 INCH	1 INCH	1 INCH
DETROIT RADIANT PRODUCTS COMPANY 21400 HOOVER ROAD - WARREN, MI 48089 (586) 756-0950 - www.drp-co.com		FOR COMMERCIAL / INDUSTRIAL USE. FOR INDOOR USE ONLY. MADE IN U.S.A.	

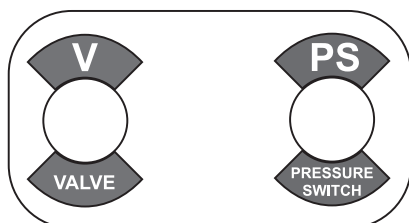
Rating Label (Inside of Panel)

F/N: LLUH005
Vent Out

F/N: LLUH004 - Air In



Rear View

F/N: LLV3EP6 - Gas Valve and
Pressure Switch Operation

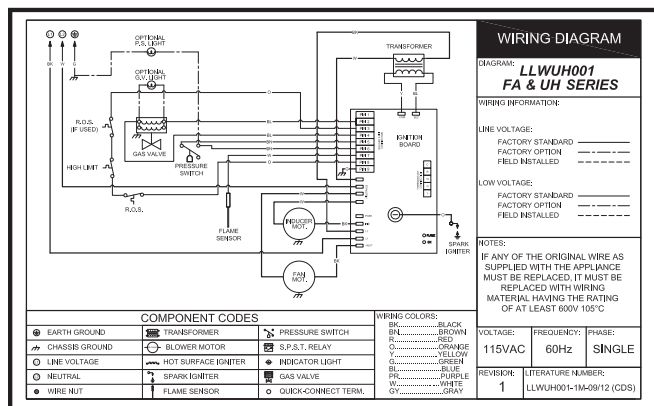
Notice



Follow venting instructions in the Installation and Service Manual. See manual for equivalent lengths of elbows. Minimum vent length is 3 ft.

Maximum Vent Lengths		
Model Size (MBH)	Exhaust Length	Air Intake Length
100-250	40 ft.	40 ft.

F/N: LLUH007
FA Vent Length Notice



F/N: LLWUH001 - Wiring Diagram

Status LED			
Each of the following status codes is determined by the number of flashes on the status light. See the Manual for additional information.			
United Technologies Circuit Board		Fenwal Circuit Board	
LED CODE (# of flashes)	GREEN LED STATUS / ERROR	LED CODE (# of flashes)	GREEN LED STATUS / ERROR
STEADY OFF	Internal Control Fault or No Power	SLOW FLASH	Normal Operation - No Call for Heat
STEADY ON	Control Ok	FAST FLASH	Normal Operation - Call for Heat
1	In Lockout from Failed Ignitions or Flame Losses	2	Ignition Lockout - No Flame Detected
2	Pressure Switch Open with Inducer ON	3	Airflow Fault - Pressure Switch Open or Closed
3	Pressure Switch Closed with Inducer OFF	4	High Limit or Rollout Switch Open
4	Limit Switch is OPEN	5	Flame Sense Error - Gas Valve Not Energized
5	In Lockout from False Flame	STEADY ON	Internal Control Failure
LED CODE (# of flashes)	AMBER LED STATUS / ERROR	LED CODE (# of flashes)	AMBER LED STATUS / ERROR
FAST FLASH	Flame Present With Gas Valve Off	OFF	Flame Signal is Below Required Level / No Flame Present
STEADY ON	Flame is Sensed	STEADY ON	Flame is Sensed

F/N: LLUH001 - LED Status

FOR YOUR SAFETY READ BEFORE OPERATING

WARNING: Improper installation, adjustment, alteration, service or maintenance can cause property damage, injury or death. Read the installation, operating and maintenance instructions thoroughly before installing or servicing this appliance.

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

WARNING: The use and storage of gasoline or other flammable vapors and liquids in open containers in the vicinity of the appliance is hazardous.

WARNING: Disconnect electric power before servicing. Unit must be wired in accordance with diagram provided.

This appliance must be installed in accordance with the manufacturer's instructions and local codes. In the absence of local codes, follow the National Fuel Gas Code ANSI Z223.1 or the CAN/CGA B149 Installation Codes.

A. This appliance does not have a pilot. It is equipped with an ignition device which automatically lights the burner. Do not attempt to light the burner by hand.

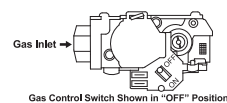
B. **BEFORE OPERATING** smell all around the appliance area for gas. Be sure to smell next to the floor because some gas is heavier than air and will settle on the floor.

WHAT TO DO IF YOU SMELL GAS:

- Do not try to light any appliance.
 - Do not touch any electrical switch; do not use any phone in the building.
 - Immediately call your gas supplier from a neighbor's phone. Follow the gas supplier's instructions.
 - If you cannot reach your gas supplier, call the fire department.
- C. Use only your hand to turn the manual shut-off knob. Never use tools. If the knob will not turn 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

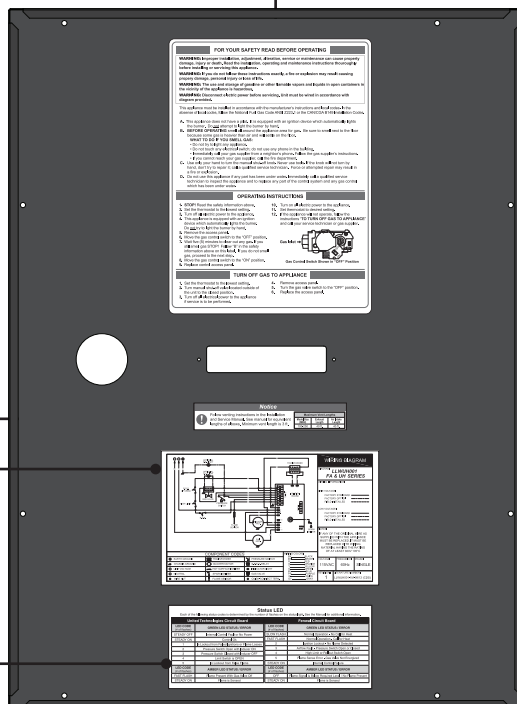
1. **STOP!** Read the safety information above.
2. Set the thermostat to the lowest setting.
3. Turn off all electric power to the appliance.
4. This appliance is equipped with an ignition device which automatically lights the burner. Do not try to light the burner by hand.
5. Remove the access panel.
6. Move the gas control switch to the "OFF" position.
7. Wait five (5) minutes to clear out any gas. If you still smell gas **STOP!** Follow "B" in the safety information above on this label. If you do not smell gas, proceed to the next step.
8. Move the gas control switch to the "ON" position.
9. Replace control access panel.
10. Turn on all electric power to the appliance.
11. Set thermostat to 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.



TURN OFF GAS TO APPLIANCE

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

F/N: LLUHCL001
For Your Safety



Service Access Door View
(Inside View)

2.0 Safety

Read and understand all safety information and warnings in this manual prior to installation, operation, and maintenance of this unit heater. Warnings indicate a potentially hazardous situation which, if not avoided, could result in death or injury.

⚠ WARNING



Improper installation, adjustment, alteration, service or maintenance can cause property damage, serious injury or death. Read and understand the installation, operating and maintenance instructions thoroughly before installing or servicing this equipment. Only trained qualified gas installation and service personnel may install or service this equipment.

Warning Symbols

Safety is the most important consideration during installation, operation and maintenance of the unit heater. You will see the following symbols and signal words when there is a hazard related to safety or property damage.

⚠ WARNING

Warning indicates a potentially hazardous situation which, if not avoided, could result in death or injury.

⚠ CAUTION

Caution indicates a potentially hazardous situation which, if not avoided, could result in minor or moderate injury.

NOTICE

Notice indicates a potentially hazardous situation which, if not avoided, could result in property damage.

Applications

This is **not** an explosion proof heater. This heater may not be used in a Class 1 or Class 2 Explosive Environment. Consult your local Fire Marshall, insurance carrier and other authorities for approval if the proposed installation is in question.

Commercial / Industrial

The FA Series unit heater is designed and certified for use in industrial and commercial buildings, such as warehouses, manufacturing plants, aircraft hangars, and vehicle maintenance shops. For maximum safety, the building must be evaluated for potential problems before installing the heater system. This unit is certified for use as furnished by the manufacturer. Do not alter the fan or operate motors at a reduced speed.

⚠ CAUTION

Installation of restrictive devices to the inlet or outlet of the fan motor may result in premature failure of the exchanger pipe, overheating of the appliance, or damage to the components. Do not attach ductwork, air filters, or poly-tubes to any FA Series unit heater.

Standards, Certifications and Government Regulations

Installation of this gas-fired heater must conform with all applicable local, state and national specifications, regulations and building codes. Contact the local building inspector and/or Fire Marshall for guidance.

In the absence of local codes, the installation must conform to the latest edition of:

United States: National Fuel Gas Code, ANSI Z223.1 (NFPA 54).

Canada: CAN/CGA B149.1 and .2, Canadian Electrical Code C22.1

Copies of these Standards can be viewed or purchased at www.nfpa.org or www.scc.ca.

Chart 2.1 • Standard and Code Installation Guidelines • Building Type

Building Type	Codes and Guidelines
Public Garages	Installation of this heater in public garages must conform to the following codes:
	<p>United States: Standard for Parking Structures NFPA 88A (latest edition) or the Code for Motor Fuel Dispensing Facilities and Repair Garages NFPA 30A (latest edition).</p> <p>Canada: Refer to CAN/CGA B149.1: Installation Codes for Gas Burning Appliances and applicable Standards for Public Garages.</p>
	Guidelines:
	<ul style="list-style-type: none"> • Heaters must not be installed less than 8 ft. (2.4 m) above the floor. Minimum clearances to combustibles must be maintained from vehicles parked below the heater. • When installed over hoists, minimum clearances to combustibles must be maintained from the upper most point of objects on the hoist.
Aircraft Hangars	Installation of this heater in aircraft hangars must be in accordance with the following codes:
	<p>United States: Refer to Standard for Aircraft Hangars, ANSI/NFPA 409 (latest edition).</p> <p>In Canada: Refer to Standard CAN/CGA B149.1 and applicable Standards for Aircraft Hangars.</p>
	Guidelines:
	<ul style="list-style-type: none"> • In aircraft storage and servicing areas, heaters shall be installed at least 10 ft. (3 m) from above the upper surface of wings or of the engine enclosures of the highest aircraft that may be housed in the hangar. The measurement shall be made from the wing or engine enclosure, whichever is higher from the floor, to the bottom of the heater. • In areas adjoining the aircraft storage area (e.g., shops, offices) the bottom of heaters shall be installed no less than 8 ft. (2.4 m) above the floor. • Suspended or elevated heaters shall be located in spaces where they shall not be subject to damage by aircraft, cranes, movable scaffolding or other objects. <p>Provisions shall be made to assure accessibility to suspended heaters for recurrent maintenance purposes.</p>

Chart 2.2 • Standard and Code Installation Guidelines • Building Location

Building Location	Guidelines
High Altitude	Guidelines
	Installation of this heater is approved, without modifications, for elevations up to 2,000 feet (610 m) above MSL (sea level) in the United States. For elevations above 2,000 feet, the heater input must be derated. See page 38 for details on how to derate. The type of gas appearing on the nameplate must be the type of gas used. Installation must comply with national and local codes and requirements of the local gas company.
Non-Standard BTU Gas	Guidelines:
	Unless otherwise noted on the rating plate, this heater is designed and orificed to operate on standard BTU gas. Contact the factory if utilizing non-standard BTU gas.

Chart 2.3 • Standard and Code Installation Guidelines • Building Aspect

Building Aspect	Codes and Guidelines
Electrical	The heater must be electrically grounded in accordance with the following codes:
	<p>United States: Refer to National Electrical Code®, ANSI/NFPA 70 (latest edition). Wiring must conform to the latest edition of National Electrical Code®, local ordinances, and any special diagrams furnished.</p> <p>Canada: Refer to Canadian Electrical Code CSA C22.1 Part 1 (latest edition).</p>
Venting	Venting must be installed in accordance with the requirements within this manual and the following codes:
	<p>United States: Refer to NFPA 54/ANSI Z223.1 (latest edition), National Fuel Gas Code.</p> <p>Canada: Refer to CAN/CGA B149.1 Installation Codes for Gas Burning Appliances.</p>

Applicable authorities governing the manufacturing or installation of this unit here include (but are not limited to) the following organizations:

In the United States:



- NFPA 54 / ANSI Z223.1 – National Fuel Gas Code.
- ANSI Z83.8 / CSA 2.6 – Gas Unit Heater Construction Standard.
- ANSI/NFPA 70 - National Electric Code.

In the Canada:

- CAN/CGA B149.1-10 – Natural Gas and Propane Installation Code.
- ANSI Z83.8 / CSA 2.6 – Gas Unit Heater Construction Standard.
- C22.1 Part 1 – Canadian Electrical Code.

Clearance to Combustibles

Clearance to combustibles is defined as the minimum distance that must exist between the specified feature of the heater, and any combustible items. It also pertains to the distance that must be maintained from moving objects around the unit heater. A recommended service clearance is defined as the minimum distance that is needed to properly service the heater. When installing the unit heater, clearances to combustibles for the model heater must be maintained. Refer to Chart 2.4 to determine the required distances for your model.



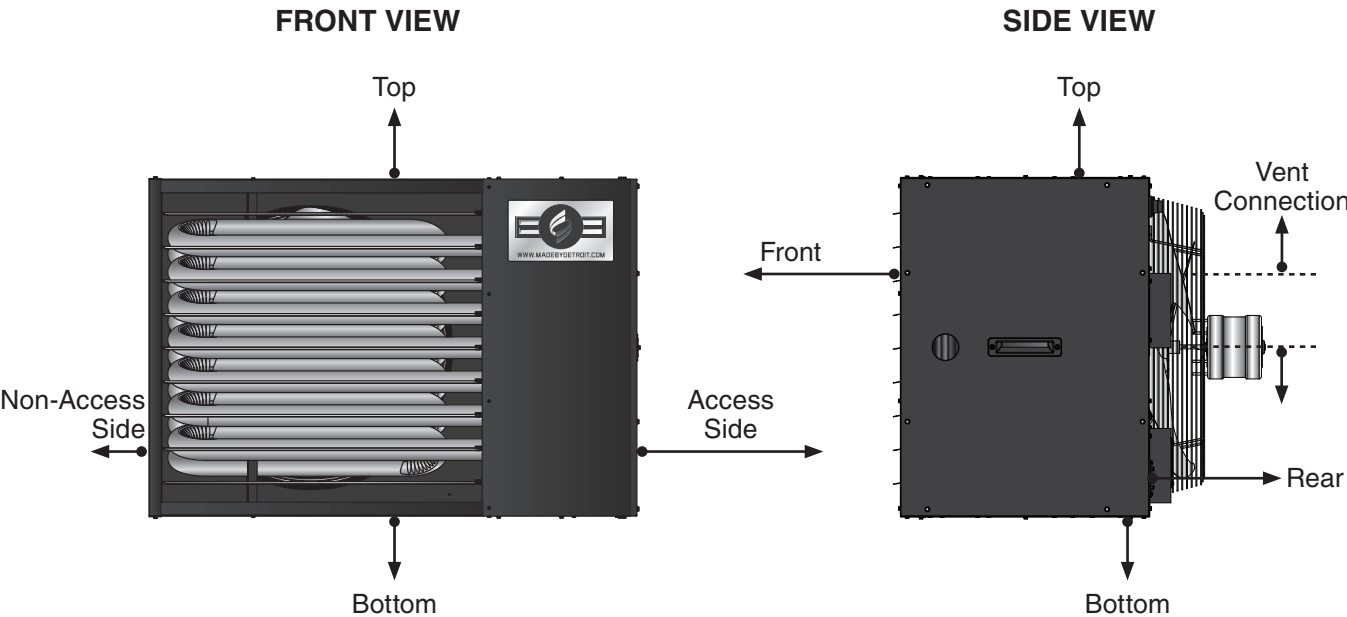
⚠ WARNING

Placement of explosive objects, flammable objects, liquids and vapors close to the heater may result in explosion, fire, property damage, serious injury or death. Do not store or use explosive objects, liquids or vapor in the vicinity the heater.

Chart 2.4 • Clearances to Combustible Materials (in Inches) Commercial Models

Unit Side	Front	Top and Bottom	Access Side	Non-Access Side	Rear	Vent Connection
Clearance to Combustibles	60	1	18	1	1	6
Clearance to Allow Service	60	1	18	1	18	6

Figure 2.1 • Clearance to Combustibles Diagram



3.0 Installation

Louver Installation

For 0° Mounting:

- ❶ Guide the plunger side of the louver into the larger of the two holes (as shown in Figure 3.1). The louver arch must face up.
- ❷ When the plunger is in the hole, press the louver in; collapsing the internal spring of the plunger.
- ❸ Guide the other side of the louver into place by aligning the indexing winglet into place (as shown in Figure 3.2).
- ❹ Repeat steps 1 through 3 above until all louvers are in place.
- ❺ Adjust pitch of louvers to give the desired direction of air flow.

For 180° Mounting:

- ❶ Drill all of the 0.10" holes on panel "A" with an 1/8" drill bit as indicated in Figure 3.3.
- ❷ Guide the plunger side of the louver into the larger of the two holes (as shown in Figure 3.1). The louver arch must face up.
- ❸ When the plunger is in the hole, press the louver in collapsing the internal spring of the plunger.
- ❹ Guide the other side of the louver into place by aligning the indexing winglet into place (as shown in Figure 3.2).
- ❺ Repeat steps 1 through 3 above until all louvers are in place.
- ❻ Adjust pitch of louvers to give the desired direction of air flow.

Figure 3.1 • Louver Installation

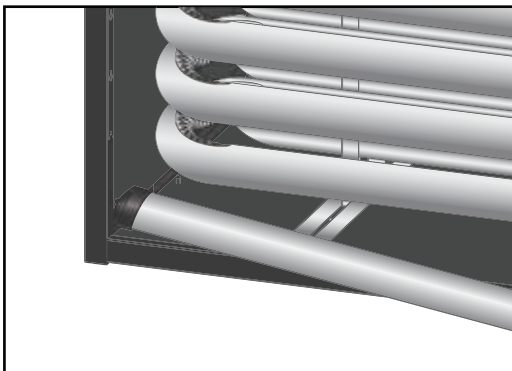


Figure 3.2 • Louver Installation

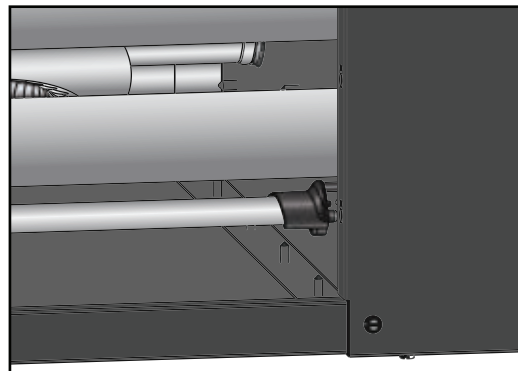
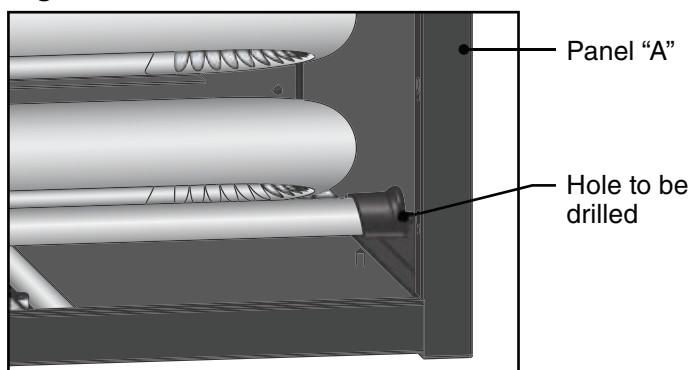


Figure 3.3 • Louver Installation



Hanging the Unit Heater

NOTICE

High humidity or saltwater atmospheres will accelerate heater corrosion and reduce useful life. Do not install the heater in locations where water (in the form of rain, drips, or spray) could fall onto the gas ignition components.

⚠ WARNING



Improper suspension of the unit heater may result in collapse and being crushed. Always suspend from a permanent part of the building structure that can evenly support the total force and weight of the heater.



Failure to maintain minimum clearance to combustibles may result in fire and/or explosion, property damage, serious injury or death. Always maintain minimum clearances.

The suspension of the heater must conform to all applicable codes referenced in the safety section and these instructions.

To ensure proper operation, the heater must be installed in a level horizontal position. The units are designed to be hung with threaded rod via the four (4) threaded inserts on the top panel of the heater.

- ① Determine desired mounting points, and mark the locations for the hanging points.
- ② Prepare the mounting surface. If necessary, weld blocks, drill holes, or install additional bracketing or steel channel.
- ③ Fasten beam clamp, screw hook, turnbuckle, steel channel, or other anchoring device to the suspension points.
- ④ Determine the desired mounting height. Cut four pieces of 3/8"-16 threaded rod of equal length in which the heater will be hung from. Ensure that the threads are not damaged during the cutting process.
- ⑤ Using 3/8"-16 threaded rod, thread a nut up one end at a distance of approximately 1 inch. This is the end that will be screwed into the heater.
- ⑥ Next, place a lock washer on top of the nut and thread the rod assembly into the unit heater's threaded inserts. A minimum of 2-3 complete threads must be exposed on the reverse side of the threaded insert (approx. 9-10 turns), but no more than 20 turns, as this may cause the threaded rod to collide with or damage the heat exchanger.
- ⑦ Tighten down the previously installed jam nuts to prevent the threaded rod from turning.
- ⑧ Attach threaded rod to prepared anchoring device. Adjust the threaded rod until the unit is level and equal weight distribution is achieved. Threaded rod must be perpendicular with the unit. Do not install threaded rods at an angle, as this can result in weakened structural integrity or undue noise.

Recommended Mounting Heights

Chart 3.1 • Recommended Mounting Heights*

Model	Typical Mounting Height	Approximate Heat Throw	Average Air Temperature Rise
FA-100	12 to 14 ft.	43 ft.	50°F
FA-125	14 to 16 ft.	57 ft.	50°F
FA-150	14 to 16 ft.	52 ft.	50°F
FA-175	15 to 17 ft.	51 ft.	50°F
FA-200	15 to 17 ft.	55 ft.	50°F
FA-225	16 to 18 ft.	59 ft.	50°F
FA-250	16 to 18 ft.	63 ft.	50°F

* Recommended mounting heights are provided as a guideline. Actual conditions may dictate variations from the above data. Clearance to combustibles must always be maintained.

The recommended mounting heights of the units are critical to its performance. Refer to the Chart 3.1 for specific recommended mounting heights. The mounting height is measured from the finished floor to the bottom of the unit. Units that are mounted higher than the recommended mounting heights may not directly deliver heated air to the floor level.

Gas Supply Installation Instructions

⚠ WARNING



Improperly connected gas lines may result in serious injury and death, explosion, poisonous fumes, toxic gases or asphyxiation. Connect gas lines in accordance to national, state, provincial and local codes.

Gas pressure to the appliance controls must never exceed ½" PSI (14" W.C.). Damage to the controls may result.

⚠ CAUTION

Gas lines should be purged of air as described in ANSI Z223.1 (NFPA 54) or CSA-B149.1— latest version. Installation of the piping must also conform with the local building codes, or in the absence of local codes, with the latest edition of the National Fuel Gas Code (NFPA 54). In Canada, installation must be in accordance with CSA-B149.1

NOTICE

The total input to the appliance must fall within +/- 5% of the rated input as indicated on the rating plate. Otherwise the heat exchanger may prematurely fail.

The gas supply to the unit heater must be connected and tested in accordance with national, state, provincial, and local codes along with guidelines in this manual. In the United States refer to the latest edition of the ANSI Z223.1 (NFPA54) Standard and in Canada refer to the latest edition of the CAN/GCA B149.1 Standard.

Supply gas piping to the unit should conform with the local and national requirements for type and volume of gas handled, and pressure drop allowed in the line. Avoid pipe sizes smaller than 1/2".

Refer to Chart 3.2 for natural gas and Chart 3.3 for propane to determine the cubic feet per hour (CFH) required for the type of gas and size of unit to be installed. To determine the proper pipe diameter, use the CFH value and the length of pipe necessary from Chart 3.4. In the case where several units are serviced by the same main gas line, the total capacity (CFH) and length of main must be adequate to service all appliances downstream of this main.

Chart 3.2 • Natural Gas Consumption

Model	Manifold Pressure (Inches W.C.)	Min. Inlet Pressure (Inches W.C.)	Max. Inlet Pressure (Inches W.C.)	Gas Consumption (CFH)*	Orifice Size	Number of Orifices
FA-100N	3.5	5.0	14.0	95.2	42 DMS	4
FA-125N	3.5	5.0	14.0	119.0	42 DMS	5
FA-150N	3.5	5.0	14.0	142.9	42 DMS	6
FA-175N	3.5	5.0	14.0	166.7	42 DMS	7
FA-200N	3.5	5.0	14.0	190.5	39 DMS	7
FA-225N	3.5	5.0	14.0	214.3	42 DMS	9
FA-250N	3.5	5.0	14.0	238.1	40 DMS	9

*Assumes an average heating value of 1050 BTU/SCF and a Specific Gravity of 0.60.

Chart 3.3 • Propane Gas Consumption

Model	Manifold Pressure (Inches W.C.)	Min. Inlet Pressure (Inches W.C.)	Max. Inlet Pressure (Inches W.C.)	Gas Consumption (CFH)*	Gallons per hour*	Orifice Size	Number of Orifices
FA-100P	10.0	11.0	14.0	40.0	1.10	54 DMS	4
FA-125P	10.0	11.0	14.0	50.0	1.37	54 DMS	5
FA-150P	10.0	11.0	14.0	60.0	1.65	54 DMS	6
FA-175P	10.0	11.0	14.0	70.0	1.92	54 DMS	7
FA-200P	10.0	11.0	14.0	80.0	2.20	1.45mm	7
FA-225P	10.0	11.0	14.0	90.0	2.47	54 DMS	9
FA-250P	10.0	11.0	14.0	100.0	2.75	1.45mm	9

*Assumes an average heating value of 2500 BTU/SCF and a Specific Gravity of 1.53.

Chart 3.4 allows for a 0.3 inch W.C. pressure drop in the supply pressure from the building main to the inlet of the unit. Refer to the chart for the appropriate range of inlet pressures for each gas type. When sizing the inlet gas pipe diameter, make sure that the unit supply pressure can be met after the 0.3 inch W.C. pressure drop has been subtracted from the main pressure. If the 0.3 inch W.C. pressure drop is too high, refer to NFPA 54 or the Gas Engineer's Handbook for other gas pipe capacities.

Chart 3.4 • Maximum capacity for Schedule 40 Metallic pipe, in CFH

Pipe Length (feet)	1/2"		3/4"		1"		1-1/4"		1-1/2"		2"	
	Nat	L.P.	Nat	L.P.	Nat	L.P.	Nat	L.P.	Nat	L.P.	Nat	L.P.
10'	132	86	278	182	520	340	1050	686	1600	1046	3050	1993
20'	92	60	190	124	350	229	730	477	1100	719	2100	1373
30'	73	48	152	99	285	186	590	386	890	582	1650	1078
40'	63	41	130	85	245	160	500	327	760	497	1450	948
50'	56	37	115	75	215	141	440	288	670	438	1270	830
60'	50	33	105	69	195	127	400	261	610	399	1150	752
70'	46	30	96	63	180	118	370	242	560	366	1050	686
80'	43	28	90	59	170	111	350	229	530	346	990	647
90'	40	26	84	55	160	105	320	209	490	320	930	608
100'	38	25	79	52	150	98	305	199	460	301	870	569
125'	34	22	72	47	130	85	275	180	410	268	780	510
150'	31	20	64	42	120	78	250	163	380	248	710	464
175'	28	18	59	39	110	72	225	147	350	229	650	425
200'	26	17	55	36	100	65	210	137	320	209	610	399

The FA Series heater is equipped to receive a gas supply line nipple of either 1/2"NPT or 3/4"NPT Schedule 40 metallic pipe. All piping must be installed in accordance with the requirements outlined in the National Fuel Gas Code ANSI/Z223.1 (latest edition) or CSA-B149.1 and B149.2. Support all gas supply piping with pipe hangers, metal strapping, or other suitable material. Do not rely on the heater to support the gas pipe.

When connecting piping to the unit, the use of a thread joint compound is required. The thread compound (pipe dope) shall be resistant to the action of liquefied petroleum gas or any other chemical constituents of the gas to be conducted through the piping. Use of Teflon® tape is not permitted.

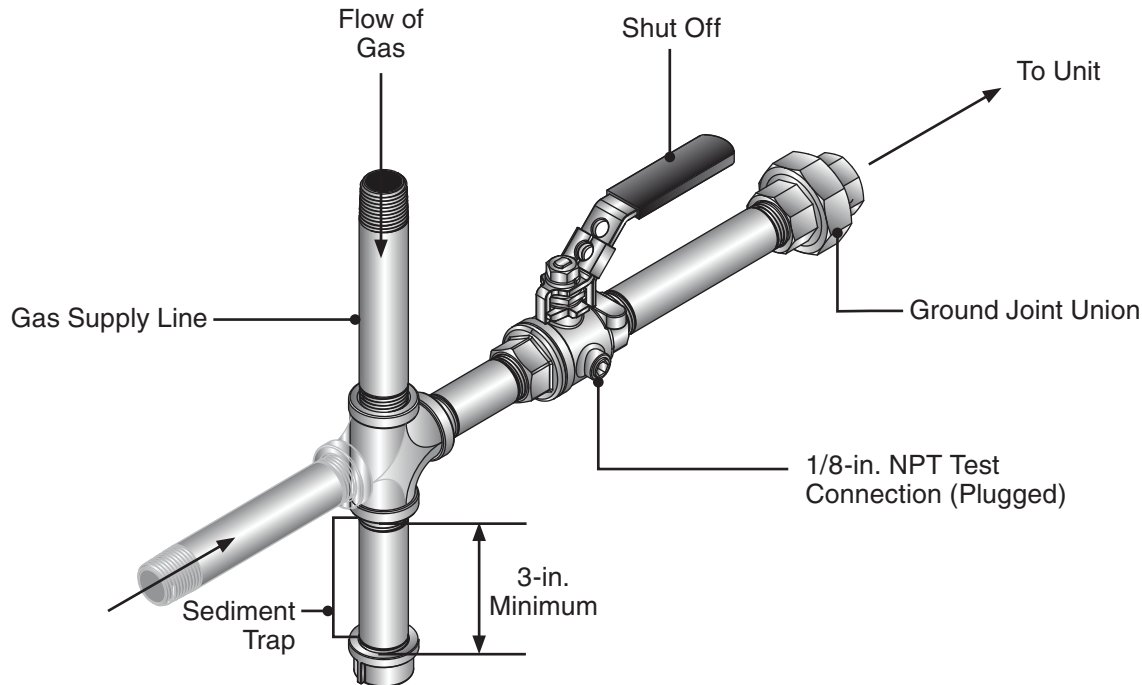
⚠ WARNING



Always use two (2) opposing wrenches to tighten mating pipe connections to prevent excessive torque on the gas valve and manifold pipe. Excessive torque can damage the valve and/or misalign the orifice, resulting in fire, explosion, serious injury or death.

Install a ground joint union with a brass seat and a manual shut off valve adjacent the unit for emergency shut off and easy servicing of controls. A 1/8" NPT plugged tap that is accessible for a test gauge connections is also recommended, as illustrated in Figure 3.1.

A sediment trap must be installed in the supply line in the lowest spot prior to connecting to the heater. The trap length shall be at least three inches long. Ideally, the trap would be installed as close as possible to the shut off, as shown in Figure 3.1.

Figure 3.1 • Recommended Hardware – Manual Shut Off and Sediment Trap

Leak Testing

⚠ WARNING



Use a soap solution or equivalent for leak testing. Never test for leak with an open flame. Failure to comply could result in personal injury, property damage or death.

Always leak test final gas assembly for gas leaks according to the procedures outlined in NFPA 54 and all local codes and/or Standards.

For leak testing on pressures below ½" PSI

Before leak testing, close the field installed manual shut off valve shown on Figure 3.1 on the supply line to isolate the gas valve from the pressure.

NOTE: All factory installed gas connections have passed an approved leak test.

For leak testing on pressures above ½" PSI

When leak testing with pressures above ½" PSI (14 inches W.C.), the unit must be isolated from the supply pipe. Close the field installed manual shut off valve, disconnect the supply line to the unit, and temporarily cap the supply line for testing purposes.

⚠ WARNING



Gas pressures to the appliance controls must never exceed 14 inches W.C. (½" PSI). Supply pressures greater than 14" W.C. can damage the controls, resulting in personal injury, property damage, or death.

Electrical Requirements and Wiring Diagrams

⚠ WARNING



Shock hazard. Disconnect power supply before making wiring connections to prevent electrical shock and equipment damage.

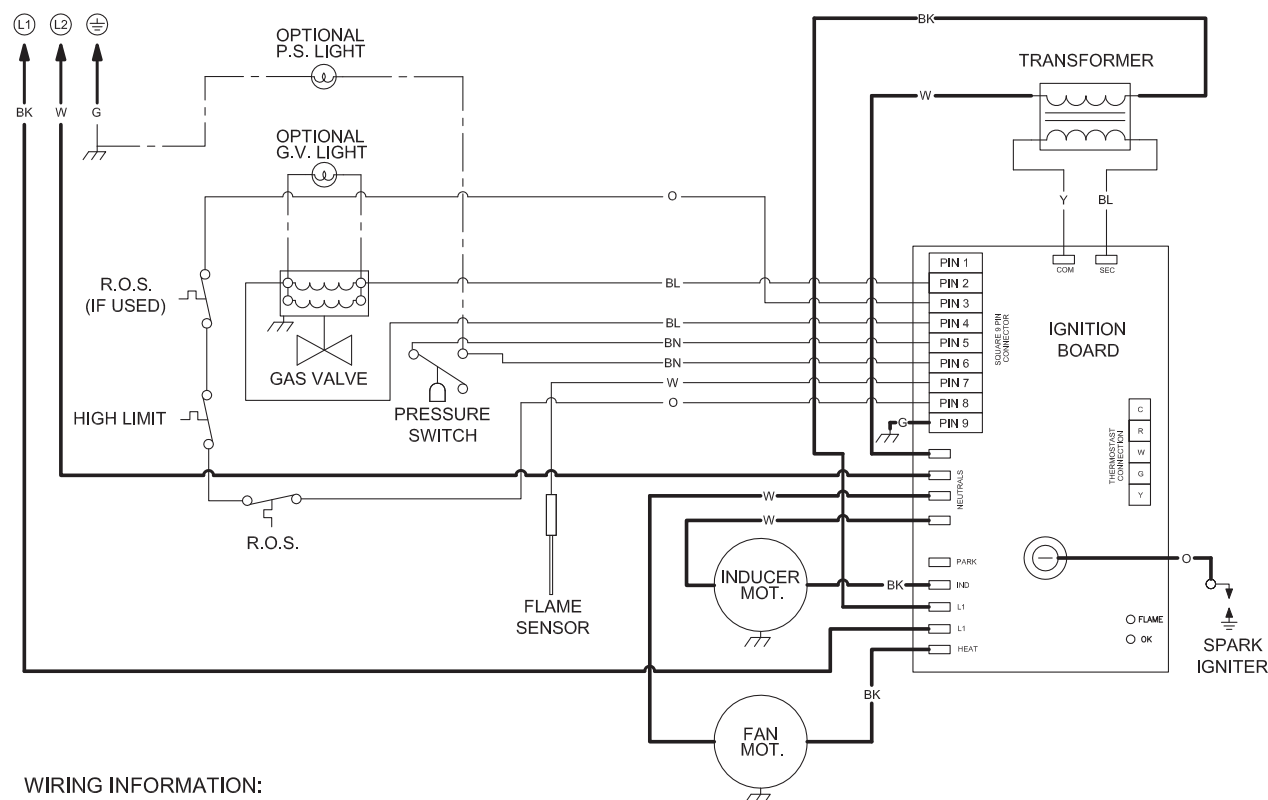
Any original factory wiring that requires replacement must be replaced with wiring material having a temperature rating of at least 105°C.

All field installed wiring to the unit heater must be done in accordance with national, state, provincial, local codes and to the guidelines in this manual. In the United States, refer to the most current revisions to the Electrical Code ANSI/NFPA 70 and in Canada refer to the most current revisions to the Canadian Electrical Code CSA C22.1 Part 1. The unit must be electrically grounded according to these codes. Line polarity must be observed when making field connections.

Internal Wiring Diagrams

Before wiring this appliance, check the existing wiring; replace if necessary. If any of the original wire supplied with the appliance must be replaced, it must be replaced with copper wiring material having a rating of at least 600V, 105°C.

Figure 3.2 • Internal Wiring Diagram



WIRING INFORMATION:

LINE VOLTAGE:

FACTORY STANDARD _____
 FACTORY OPTION -----
 FIELD INSTALLED - - - - -

LOW VOLTAGE:

FACTORY STANDARD _____
 FACTORY OPTION -----
 FIELD INSTALLED - - - - -

Field Wiring Supply Voltage

Before proceeding with electrical connections, ensure that the supply voltage, frequency, phase and current capacity meet the requirements specified on the rating plate. A dedicated line voltage supply with properly sized wire should run directly from the main electrical panel to the heater. The power to the unit must be protected with a circuit breaker appropriate for the load. The unit must be electrically grounded in accordance with local codes, or in their absence, with the latest edition of the National Electrical Code, ANSI / NFPA 70 and/or the Canadian Electrical Code CSA C22.1, latest edition.

CAUTION

The power supply to the heater must be within +/- 5% of the voltage rating as indicated on the rating plate of the appliance. If input power does not meet these specifications, contact your utility company.

An electrical service disconnect must be provided at the furnace location. A 2 x 4 junction box can be mounted directly to the unit panel utilizing the provided 1/2" knock-out. If conditions do not allow for this, locate the service disconnect not more than 5 feet away from the service access panel.

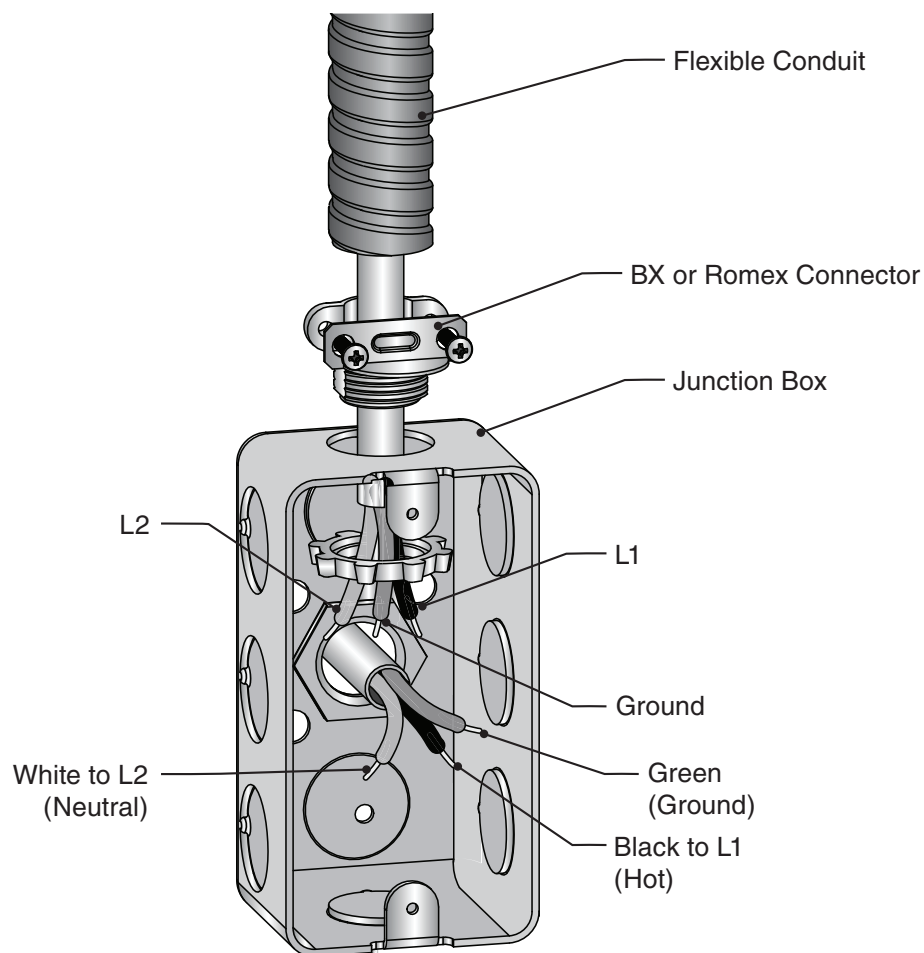
The main electrical supply enters at the rear of the heater utilizing 1/2" electrical knock-out (See Figure 3.3). When routing the electrical supply conduit to the unit, ensure that it does not interfere or obstruct the heater's service access panel.

Unit comes with three wire leads to connect the main power supply. Connect the hot, neutral and ground wires as shown in the field wiring diagram, Figure 3.3. When routing wires through the knock-out, use a UL Listed bushing or chase nipple to prevent damage to the wire insulation. When operating this unit as a sealed combustion appliance, the cabinet opening to the junction box must be sealed air tight using either a UL approved bushing or a non-reactive UL approved sealant to bushing.

WARNING



Edges of sheet metal holes may be sharp. Use gloves as a precaution when routing wires.

Figure 3.3 • Field Wiring

Connect wires together with UL approved wire connectors.

Green to Ground
Black to L1
White to L2

Note: A UL Listed switch may be installed in the 2x4 junction box for use as a service disconnect.

⚠ CAUTION

Route the field supplied power wires so that they do not come in contact with the flue wrapper or venter housing. These hot surfaces may damage the wire's insulation, resulting in damage to the unit.

Thermostat Connection

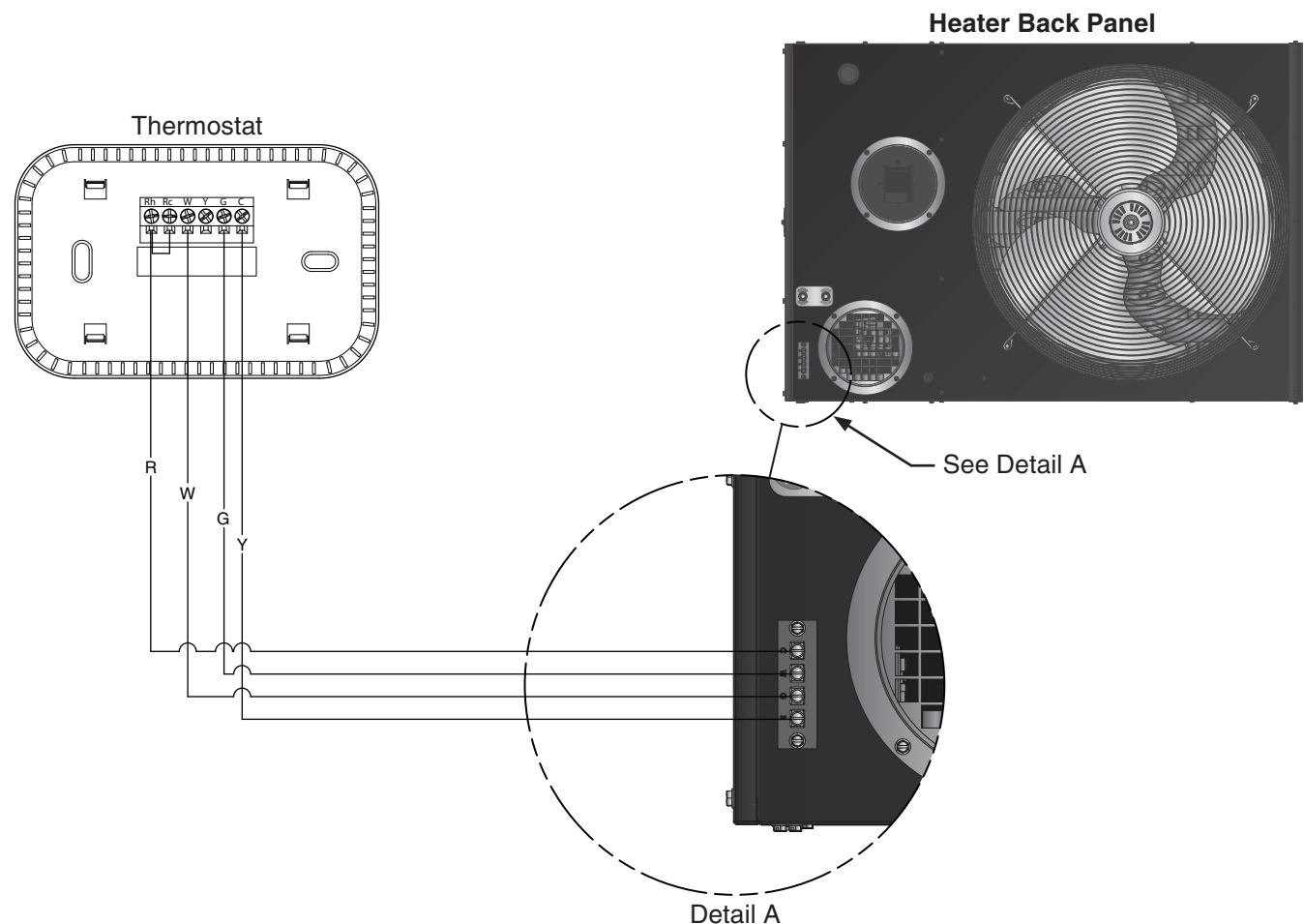
NOTE: Different thermostats operate according to their particular features. Refer to the thermostat's specifications for details.

Each FA Series heater requires a single stage thermostat rated for 24VAC to operate. The heater comes standard with a terminal strip for making the thermostatic connections, located on the back panel. The thermostat terminal designations are as follows:

- R:** 24VAC Power
- W:** Call for Heat
- G:** Continuous Fan
- C:** Common for 24VAC Power

24VAC is supplied from an internal 40VA transformer. Do not supply 24 Volts to the terminal strip. A minimum of 18 AWG low voltage thermostat wire must be used for connecting the thermostat to the heater. Follow the field wiring diagram in Figure 3.4 for wiring to a typical single-stage thermostat.

Figure 3.4 • Field Wiring Diagram



Thermostat Location

The location of the thermostat should be determined by the desired heating requirements and be mounted on an inside wall five (5) feet above the finished floor. Locate the thermostat in a conspicuous location, away from where it could be influenced by heat from the unit or other sources, as this may cause the unit to short cycle. Care should be given to locate the thermostat away from drafts or frequently opened doors. To prevent drafts inside the wall from affecting the thermostat's performance, plug hole for the wire with insulation or suitable caulk. For further information, see the accompanying instructions with the thermostat.

Venting

The FA Series unit heater must be vented as described here to properly direct the flue gases from the unit to the outside atmosphere. The venting can terminate vertically through the roof (up) or horizontally through a sidewall (sideways).

Follow these guidelines and all applicable codes for all models prior to installing the vent material. Local codes may vary. In the absence of local codes, refer and comply with the National Fuel Code ANSI Z223.1 (NFPA 54) latest edition or the National Standards of Canada.

⚠ WARNING



Gas-fired heaters must be vented. Do not operate unvented. A built in power exhauster is provided. Additional external power exhausters are not required or permitted.

Insufficient ventilation and/or improperly sealed vents may release gas into the building which could result in health problems, carbon monoxide poisoning or death. Improper venting may result in fire, explosion, injury or death.

All FA Series heaters come with a factory-installed vent and combustion air adapters for attaching vent pipe to the heater. Attach the venting material to the adapter with three (3) non-corrosive sheet metal screws. If necessary, drill pilot holes prior to attaching the vent pipe. The venting material must not be smaller than the factory installed adapter.

⚠ WARNING

Do not vent this appliance into another heater's vents or through a masonry chimney.

Do not use dampers in the heater vent pipe.

Single Wall vent pipe must not pass through any unoccupied attic, inside wall, concealed space, or floor.

Un-insulated single wall vent pipe must not be used outdoors for venting appliances in regions where winter design temperature is below freezing.

Replacing Existing Equipment

If the unit heater is replacing existing equipment and using an existing vent system, inspect the venting for proper size and horizontal pitch as directed in these instructions and the latest edition of the National Fuel Gas Code, ANSI Z223.1 (NFPA 54) or CSA B149.1 Installation Code.

Determine that there is not blockage or restriction, leakage, corrosion or other deficiencies that can cause hazards. The vent pipe should be corrosion-resistant galvanized steel of a thickness that meets the National Fuel Gas Code. Minimum thickness for connectors varies depending on the pipe diameter. Never vent the FA Series with PVC or plastic pipe.

⚠ WARNING



If replacing an existing heater, vents may require re-sizing. Improperly sized venting systems can result in vent gas leakage or condensation. Refer to the National Fuel Gas Code ANSI Z223.1 (NFPA 54) or CSA B149.1 - latest edition. Failure to follow these instructions can result in serious injury or death.

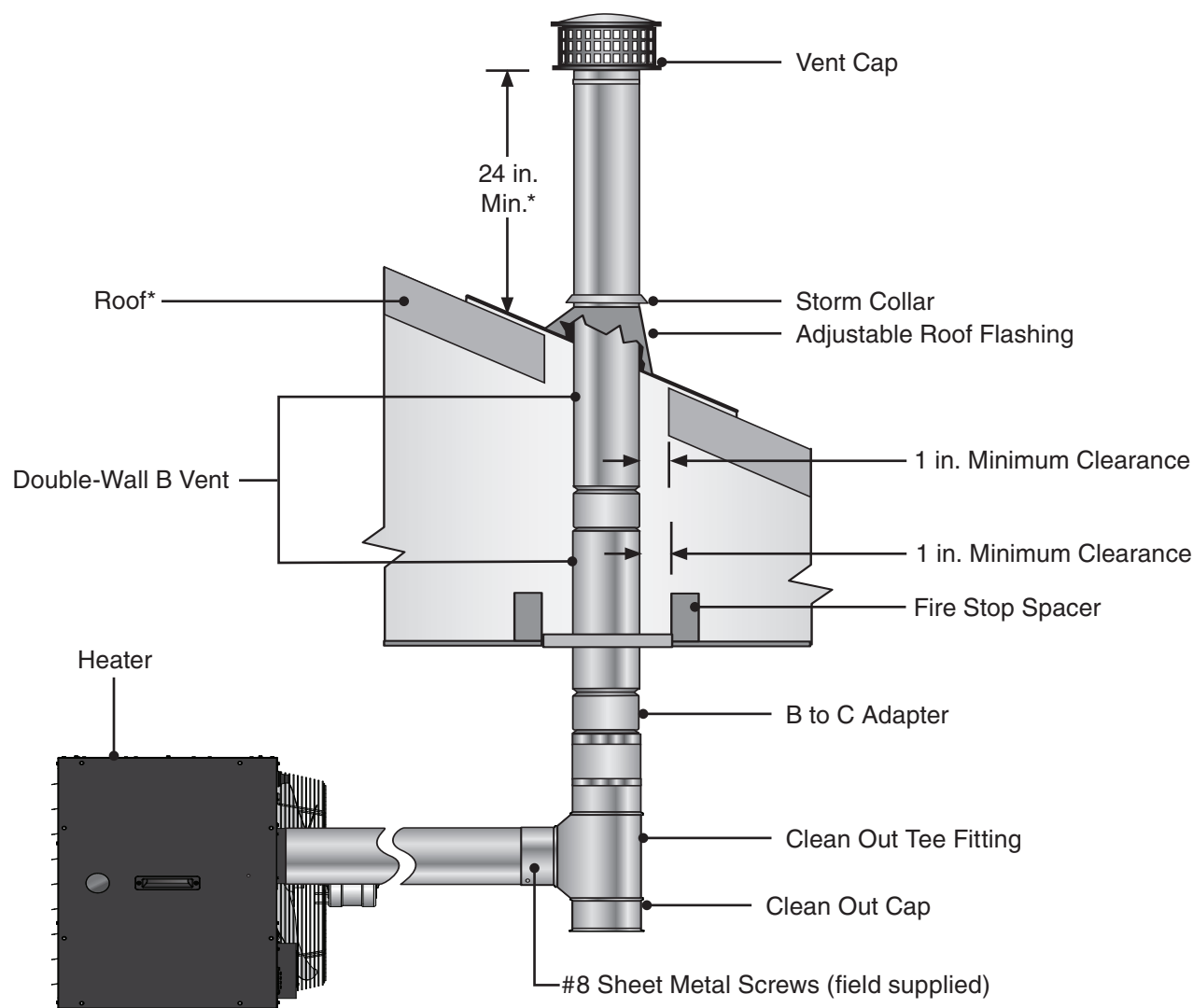
General Venting Requirements

The venting system for the FA Series heaters may terminate horizontally through a sidewall or vertically through the roof, and may be individually or commonly vented. Configuration of the vent termination determines the category type. All model heaters must be installed in accordance to the requirements of this section, as well as the requirements of its category determination, as described in this manual. To determine your applications category type, review 'Vertical Venting' (Category I) and 'Horizontal Venting' (Category III) sections of this manual.

All FA Series Model Requirements:

- Use vent pipe material that is corrosion-resistant galvanized steel of a thickness that meets the National Fuel Gas Code.
- Do not exceed a maximum vent length of 40 feet.
- Maintain a minimum vent length of 3 feet.
- Maintain a minimum 12 inches of straight pipe from the flue outlet before any directional changes are made in the venting system.
- Have all vent pipe seams or connectors fastened together with at least three corrosion resistant sheet metal screws (field supplied).
- Maintain a 6 inch clearance around all single wall vent pipe from any combustible materials. For double wall vent pipe (type B) follow the vent manufacturer's clearance to combustibles.
- The equivalent length for a 4 inch 90° elbow is 5 feet.
- The equivalent length for a 6 inch 90° elbow is 7 feet.
- Avoid using more than two 90° directional changes in the venting system.
- Horizontal sections of the vent pipe must be installed with an upward slope from the appliance at a pitch of ¼ inch per foot.
- Suspend and secure all horizontal runs at points no greater than 3 feet apart.
- Vent termination must maintain a minimum distance of 6 feet from any mechanical air supply inlet.
- Vent must terminate a minimum of 4 feet below, 4 feet horizontally from, or 1 foot above any window or door that may be opened or gravity air inlet into the building.
- Vent must terminate a minimum of 4 feet above grade level and must extend beyond any combustible overhang. Vents adjacent to the public walkways must terminate a minimum of 7 feet above grade level.
- The vent terminal must be installed to prevent any blockage by snow and protect building material from degradation by flue gases.
- The vent cap must be a minimum of 6 inches from the sidewall of the building.
- Vent must be a minimum of 36 inches below or extend beyond any combustible overhang.
- Consult NFPA ANSI Z223.1 Gas Vent Termination criteria for vents that terminate on a roof pitch that exceeds 9:12.
- **Canada:** Vents must terminate a minimum of 3 feet from a window or door that may be opened, and a non-mechanical air supply inlet or combustion air inlet into the building.

Figure 3.5 • General Vent Requirements



*Consult the NFPA ANSI Z223.1 Gas Vent Termination criteria if roof pitch exceeds 9:12

When possible, avoid venting through an unconditioned space. Venting through an unconditioned space promotes condensation. When venting through an unconditioned space is unavoidable, or if the unit is installed in an area that is prone to condensation, insulate venting runs greater than 5 feet to minimize the production of condensation. Inspect for leakage prior to insulating the venting and only use insulation that is non-combustible with a temperature rating of not less than 400°F. Install a tee fitting at the low point of the vent system and provide a drip leg with a clean out cap as shown in Figure 3.5.

When venting pipe passes through a combustible interior wall or floor, a metal thimble with a diameter 4 inches greater than the vent pipe diameter must be used. If there is 6 feet or more of vent pipe prior to passing through the combustible wall or floor, then the metal thimble need only be 2 inches greater than the vent pipe diameter. If a metal thimble is not used, all clearance to combustibles from the vent pipe must be 6 inches. Where permitted, type B vent may be used for the last section of vent pipe to reduce the required clearance to combustibles when passing through a combustible wall or floor. When using type B venting, follow the manufacturer's recommended clearance to combustibles. Any material used to close or insulate the opening must be non-combustible.

Vertical Venting (Category I)

An appliance that operates with a non-positive vent static pressure and with a vent gas temperature that avoids excessive condensate production in the vent is said to be 'Category I'. The FA Series heater is considered a Category I appliance if the venting system meets all of the following criteria:

- The vent system terminates vertically (up).
- The length of the horizontal portion of the vent run is less than 75% of the vertical rise length. (e.g.- If the vertical vent height is 10 feet, the horizontal run is less than 7-1/2 feet).
- The vent terminates a minimum of 5 feet above the vent connection on the unit.

For vertical vent termination, the venting must comply with all parts of this section, in addition to the requirements of the general venting.

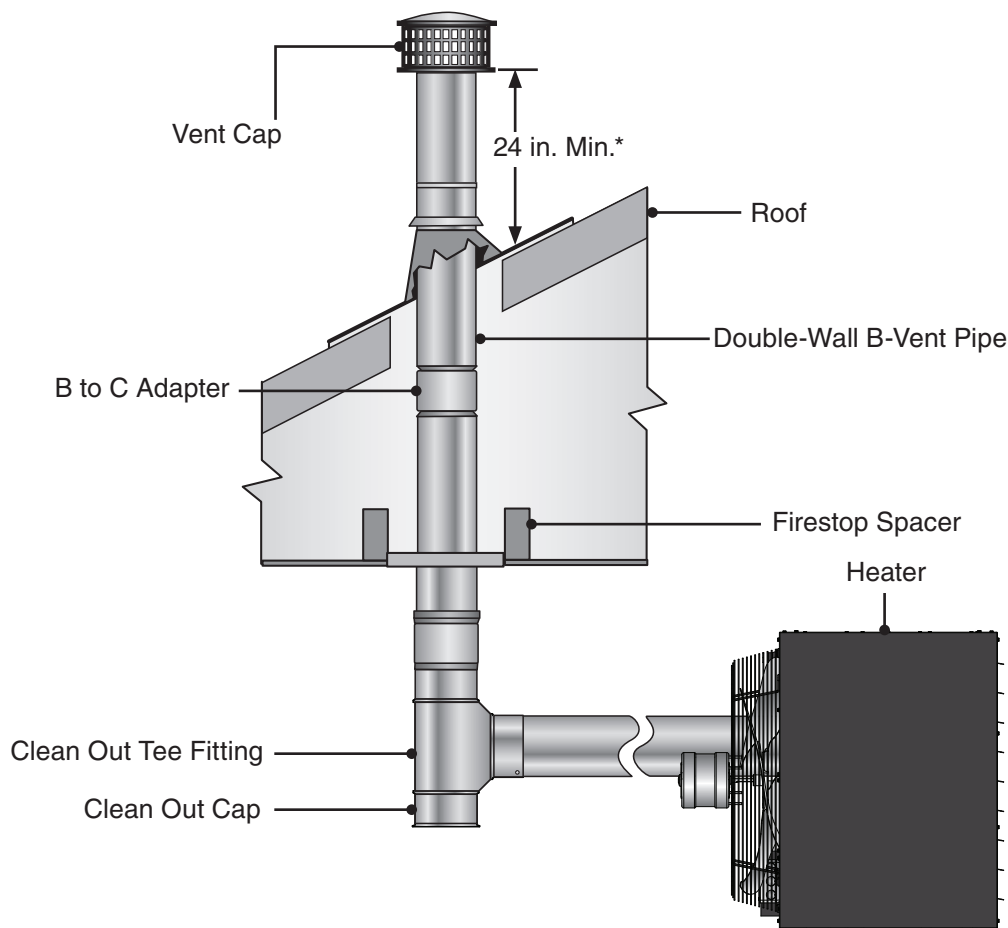
Category I (Vertical) venting is venting at a non-positive pressure. A furnace vented as a Category I is considered a fan-assisted appliance and the vent system does not have to be 'gas tight'. It is recommended that the venting system is installed with a tee, drip leg, and clean-out cap as shown in Figure 3.6.

Vent Locations and Clearances:

- Separate air intake duct from vent pipe by a minimum of 4 feet by placing vent pipes higher than adjacent air intake ducts.
- Utilize a listed type B vent termination cap.
- The vent terminal must extend a minimum of 2 feet above the roof.
- Vent caps should be located a minimum of 2 feet away from adjoining structures.

All vertically vented heaters that are Category I must be connected to a chimney or vent complying with a recognized Standard, or lined masonry (or concrete) chimney with a material acceptable to the authority having jurisdiction. Venting into an unlined masonry chimney is not permitted. Refer to the National Fuel Gas Code and page 24 of this manual.

Use a listed vent terminal to reduce down drafts and moisture in the vent.

Figure 3.6 • Rooftop Venting - Side View

*Consult the NFPA ANSI Z223.1 Gas Vent Termination criteria if roof pitch exceeds 9:12.

Horizontal Venting (Category III)

An appliance that operates with a positive vent static pressure and with a vent gas temperature that avoids excessive condensate production in the vent is said to be 'Category III'. The FA Series heater is considered a Category III appliance if the venting system meets all of the following criteria:

- The vent system terminates horizontally (sideways).
- The vent terminates vertically, but the length of the horizontal portion of the vent run exceeds 75% of the vertical rise length. (e.g.- If the vertical vent height is 10 feet, the horizontal run is greater than 7-1/2 feet).
- The vent terminates below 5 feet of the vent connection on the unit.

Seal vent pipes with high temperature sealant and three (3) #8 sheet metal screws. Vent enclosed spaces and buildings according to the guidelines in this manual and applicable national, state, provincial and local codes.

You may either use an agency certified Category III venting system, or single wall vent pipe with all the seams and joints sealed with metallic tape or silicone sealant suitable for temperatures up to 400°F. Wrap the tape two full turns around the vent pipe. For single wall vent systems, one continuous section of double wall vent pipe may be used with the vent system to pass through a wall or barrier.

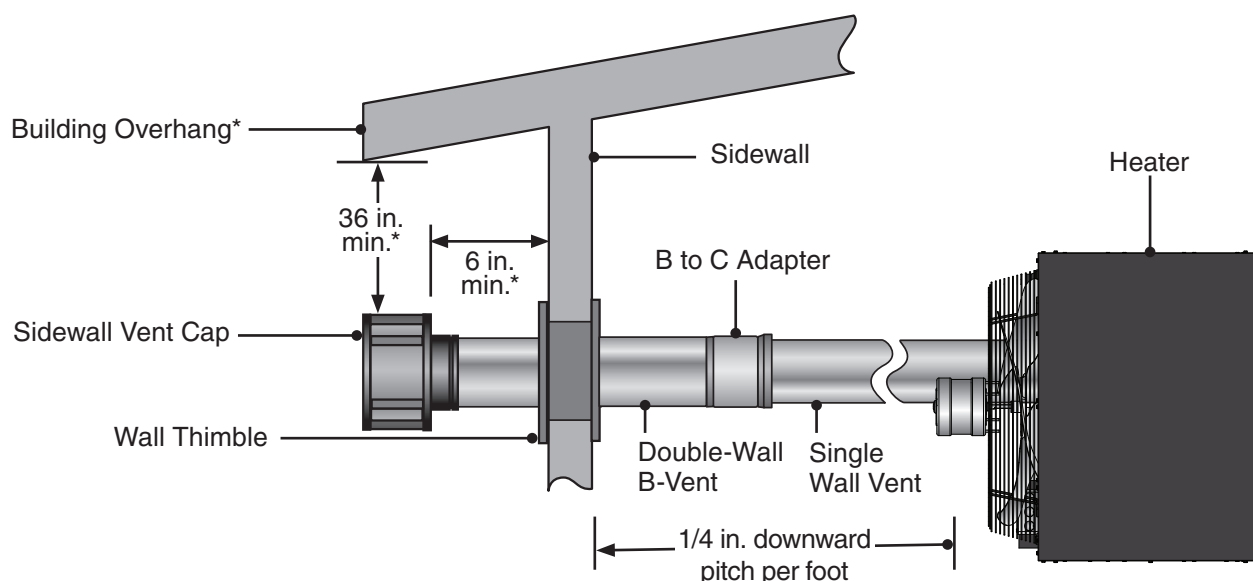
All horizontal Category III vents must be terminated with a Simpson-Duravent sidewall vent cap (P/N: SWD-4 for 4-inch venting or P/N: SWD-6 for 6-inch venting).

Vent Locations and Clearances:

- Category III venting systems may **NOT** be common vented, and no other gas units are allowed to be vented into it.
- Vent must terminate a minimum of 4 feet below, 4 feet horizontally from, or 1 foot above any window or door that may be opened or gravity air inlet into the building.
- Vent must terminate a minimum of 3 feet above any forced air inlet that is located within 10 feet.
- Horizontal venting sections of the vent pipe on a Category III termination must be installed with a downward slope from the appliance at a pitch of 1/4 inch per foot.
- The bottom of the vent terminate must be located a minimum of 12 inches above grade level and must extend beyond any combustible overhang. Vents adjacent to public walkways must terminate a minimum of 7 feet above grade level.
- The vent terminal must be installed to prevent blockage by snow and protect building materials from degradation by flue gasses.
- The vent cap must be a minimum of 6 inches from the sidewall of the building.
- Vent must be a minimum of 36 inches below or extend beyond any combustible overhang.
- Vents must terminate a minimum of 3 feet from a window or door that may be opened, and a non-mechanical air supply inlet or combustion air inlet into the building.
- Vents must terminate a minimum of 6 feet from a mechanical air supply inlet.

Never join two sections of double wall vent pipe within one horizontal vent system, as it is impossible to verify that inner pipes are completely sealed.

Figure 3.7 • Sidewall Venting Requirements



*Vent must extend beyond any combustible overhang if the vent is less than 36 in. below the combustible overhang.

Common Venting (Category I)

The common vent system and all attached appliances must be Category I.

The vent connector should be routed in the most direct route from the units to the common vent.

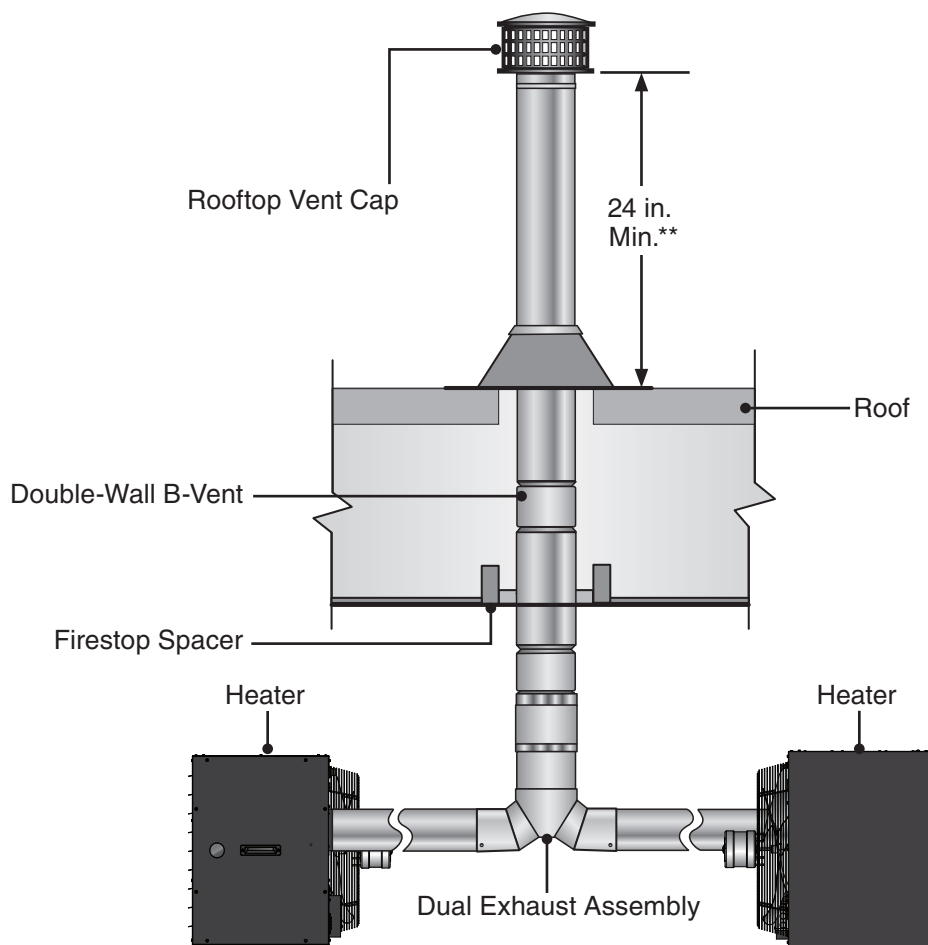
Where two or more vent connectors enter a common gas vent or chimney flue, the smaller connector shall enter at the highest level consistent with the available head room or clearance to combustible material.

Restrictions within the common vent such as elbows should be minimized. Each elbow installed within the common portion of the vent carrying system reduces the maximum common vent capacity by 10%. Refer to NFPA 54 IFEC tables 11.2 and 11.3 for capacity.

The vent connector capacities allow for the use of two 90° directional changes. For each additional required elbow, the vent connector capacity is reduced by 10%.

The common vent cross sectional area must be equal to or greater than the largest vent connector cross sectional area.

Figure 3.8 • Common Rooftop Venting - Side View



**Consult the NFPA ANSI Z223.1 Gas Vent Termination criteria if roof pitch exceeds 9:12.

Concentric Venting

Contact the factory for concentric venting requirements.

Combustion Air Requirements

Combustion air may be supplied to the heater by indoor or outdoor means. Follow these guidelines and all applicable codes for all models prior to installing the combustion air duct work. Local codes may vary. In the absence of local codes, refer and comply with the National Fuel Code ANSI Z223.1 (NFPA 54) latest edition or the National Standards of Canada.

WARNING



Sufficient combustion air must be supplied to the appliance at all times.
Lack of combustion air may result in property damage, serious injury or death.

This unit comes standard equipped for connection of supplied outdoor air for combustion. It is designed for outside air to be brought into the appliance from combustion intake ducts, and is referred to as a “Separated Combustion” appliance.

This heater must operate as a separated combustion system if any of the following criteria apply:

- Chemicals such as chlorinated or fluorinated hydrocarbons (typical sources are refrigerants, solvents, adhesives, degreasers, paints, paint removers, lubricants, pesticides, etc.) are present in the atmosphere.
- High humidity.
- Contaminants such as sawdust, welding smoke, etc.
- Negative building pressure.
- Unusually tight construction where the air infiltration rate is less than 0.40 air changes per hour.

If your application does not meet any of these criteria, then room air may be used as supplying combustion air to the heater. Refer to ‘Room Air Combustion Systems’ on page 33 for details on how to utilize room air for combustion.

Separated Combustion Systems

All FA Series heaters come with a factory-installed combustion air adapter for attaching air intake ducts to the heater. Attach the air intake duct material to the adapter with three (3) non-corrosive sheet metal screws. If necessary, drill pilot holes prior to attaching the air intake ducts. The diameter of the intake ducts must not be smaller than the factory installed adapter.

When operating this unit as a separated combustion unit heater system, combustion air must be supplied to the heater by outdoor means through the factory installed vent connector. The combustion air intake duct may terminate horizontally through a sidewall or vertically through the roof. Ideally, the intake should terminate within the same pressure zone as the venting terminates, which should minimize the effects of wind.

All Separated Combustion systems must comply with the following items:

- Air intake ducts must be of galvanized steel or an equivalent corrosion-resistant material.
- Do not exceed a length of 40 feet.
- Do not exceed more than two (2) 90° directional changes (elbows) in the system.
- Seal all joints with metallic tape or silicone sealant. Wrap the tape two full turns around the vent pipe.
- Slope air intake pipe ¼ inch per foot upward or downward away from the unit, as shown in Figure 3.9.
- Do not draw air from attic space.
- Do not draw fresh air from the remaining space around a chimney liner, gas vent, special gas vent, or plastic piping installed within masonry, metal, or factory built chimney.
- Combustion air ducts may be insulated if they pass through an unconditioned space.
- A factory approved sidewall intake cap must be used when terminating the combustion air ducts horizontally through the sidewall.
- When combustion air ducts terminate vertically through the roof, a minimum of 18 inches above the roof grade must be maintained (see Figure 3.10).
- Separate the air intake duct from vent pipe a minimum of 4 feet. Also, place vent pipe higher than adjacent air intake duct.
- Air intake duct must terminate a minimum of 3 feet below any forced air vent discharge that is located within 10 feet.
- The bottom of the air intake duct termination must be located a minimum of 12 inches above grade level. Air intake ducts that terminate adjacent to public walkways must be installed a minimum of 7 feet above grade level.
- The air intake duct must be installed to prevent blockage by snow, debris, or other possible obstructions.

Figure 3.9 • Outside Combustion Air Sidewall Intake - Side View

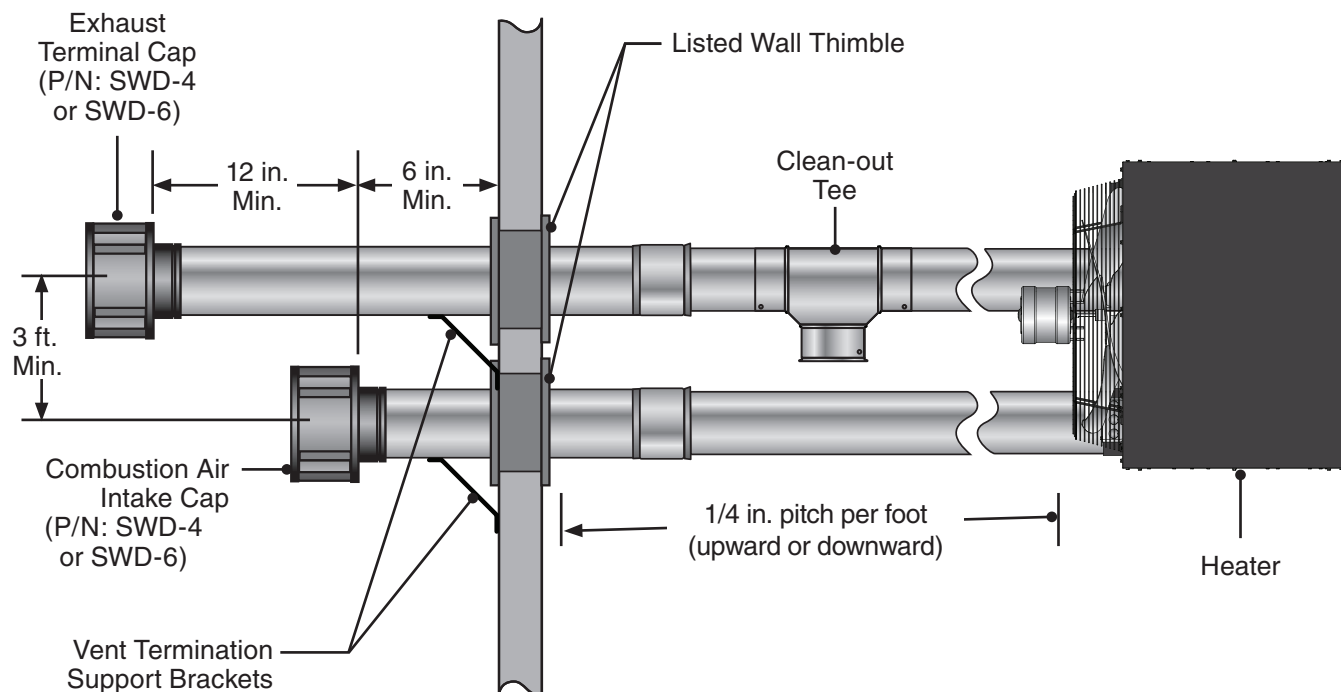
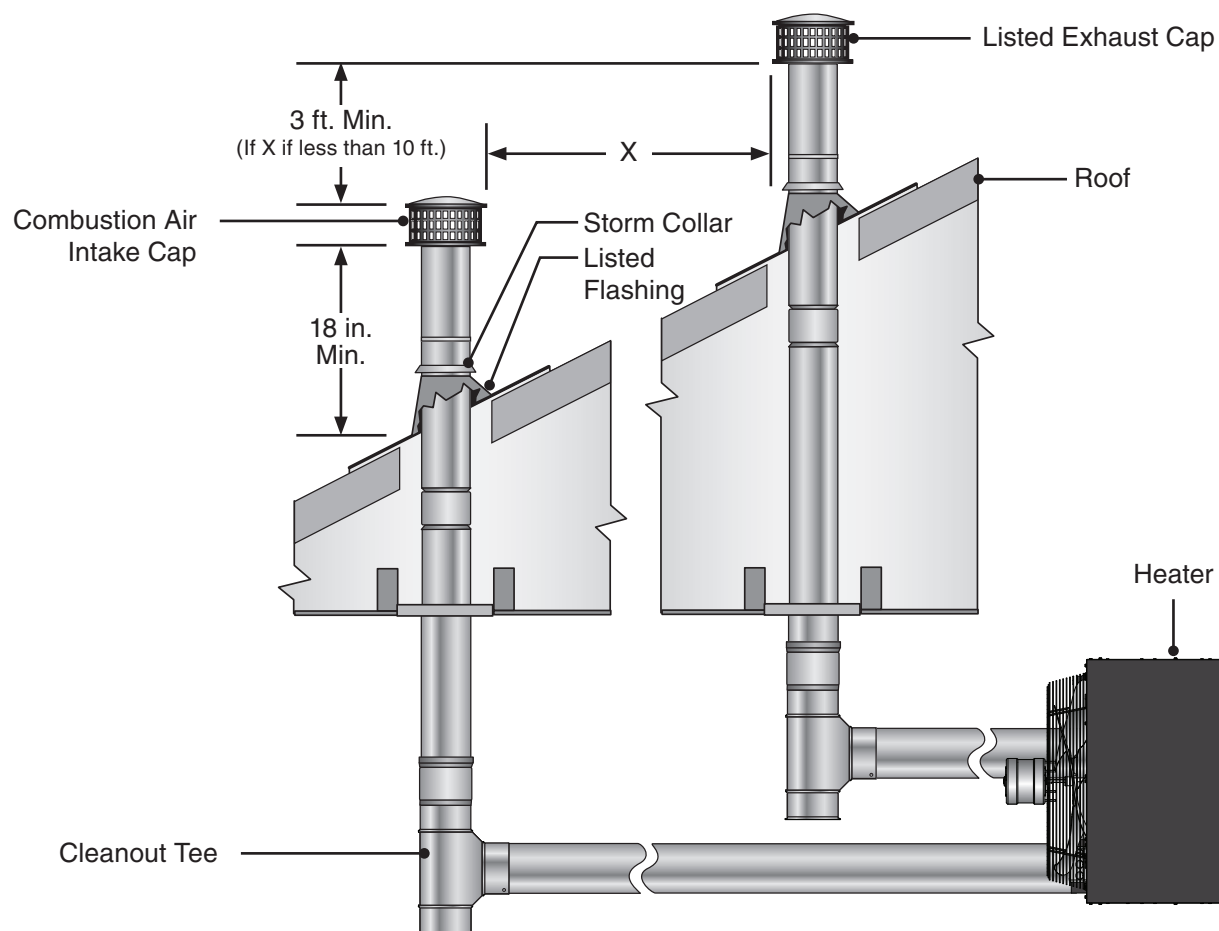


Figure 3.10 • Outside Combustion Air Vertical Intake - Side View



Room Air Combustion Systems

When operating this unit as a room air combustion appliance, the factory installed air intake collar may be removed and the required air for combustion can be taken into the appliance from the space, so long as it is not a confined space. (See Figure 3.11)

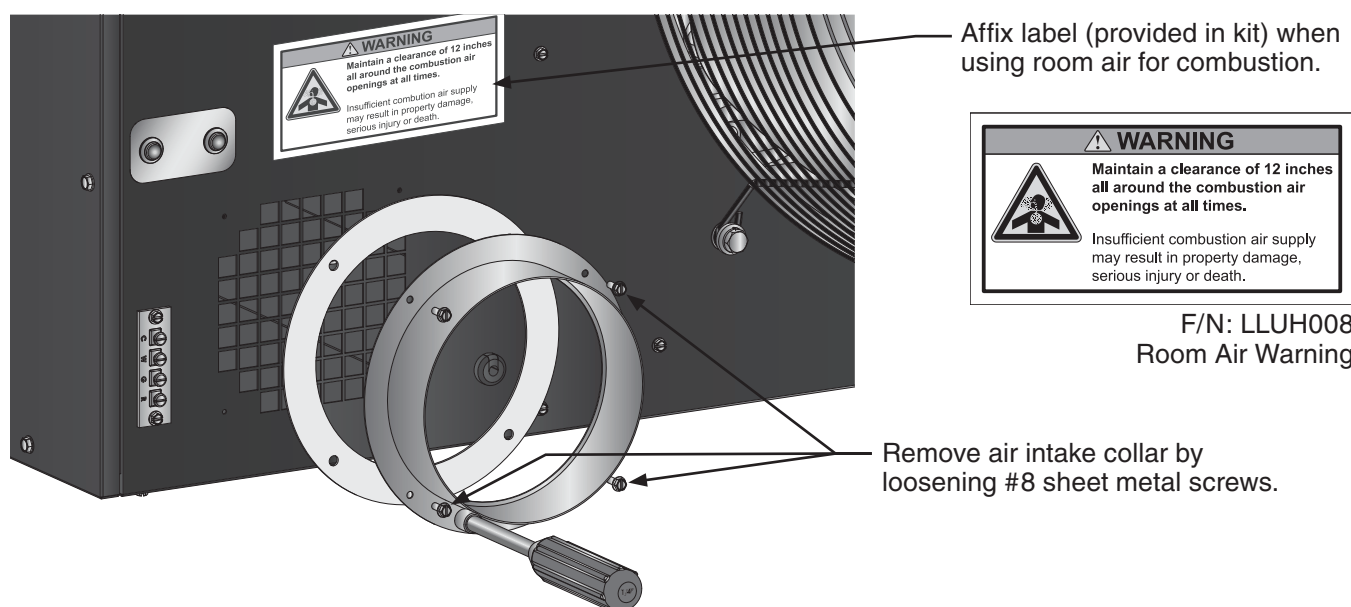
A “confined space” is defined as a space whose volume is less than 50 cubic feet per 1,000 BTU/h of all the installed heating appliances.

WARNING



Do not draw combustion air from the space if the appliance is located within a confined space. Insufficient combustion air may result in property damage, serious injury or death. Use room air for combustion in installations with proper ventilation rates only.

Figure 3.11 • Combustion Air Intake Collar Removal



If the combustion air is supplied from indoors, the required volume of the space must be a minimum of 50 ft³ per 1,000 BTU/h, unless the building is of unusually tight construction. If the building is of unusually tight construction with air infiltration rates of less than 0.40 air changes per hour, outside combustion air is typically needed unless the sheer size of the building allows otherwise. Contact the factory for further determination of the air infiltration rates.

The heater shall be located so as not to interfere with proper circulation of combustion air. A minimum clearance of 12 inches all around the combustion air openings must be maintained at all times. Special care should be taken to prevent inadvertent blockage of the combustion air inlet holes.

Affix warning label adjacent to air intake holes as shown in Figure 3.11 (label is provided in kit). It is the responsibility of the installer to ensure that there is a minimum 12 inch clearance around the air intake openings.

Unit Start-Up (Commissioning)

WARNING



Improper installation, adjustment, alteration, service or maintenance can cause property damage, serious injury, or death. This heater must be installed and serviced by a trained gas installation and service personnel only.

CAUTION



Shock Hazard.

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

Pre-Start Up Checks

Verify that the installation conforms to all of the specifications of the manual, as well as with local, state, national, and provincial codes. In absence of local codes, the unit heater must be installed according to the current National Fuel Gas Code ANSI Z223.1 (NFPA 54). In Canada, the installation must conform to the current National Standard of Canada CSA-B149 Sections 1 & 2.

Prior to starting up the unit, verify that:

- ✓ The gas type listed on the rating label matches that of your application.
- ✓ The gas connections have been purged of air and properly leak tested.
- ✓ The voltage type and frequency listed on the rating label matches that of your application.
- ✓ The unit is properly grounded as per the National Electrical Code, ANSI/NFPA 70 or Canadian Electrical code CSA C22.1 Part 1.
- ✓ The unit is properly mounted to a permanent structure able to bear the weight of the unit.
- ✓ The proper mounting height is observed for the application.
- ✓ All clearance to combustible distances or service clearances are maintained.
- ✓ The unit is properly isolated or installed to prevent excessive vibration.
- ✓ The unit is level horizontally.
- ✓ Venting is properly installed in accordance with this manual and any applicable codes.
- ✓ Combustion air supply is sufficient to support proper operation at all times.

Verify Proper Inlet Pressure

Before starting up the unit, smell all around the unit heater for gas. Be sure to smell next to the floor because some gas is heavier than air and will settle on the floor.

When turning the gas shut off valve, only use your hand. Never use tools to turn the knobs, as it may damage the valve resulting in a fire or explosion. If the knob is stuck, do not try to repair it, contact a qualified service technician or your local gas company.

To verify the proper inlet pressures, follow the following steps:

- ❶ Turn off the gas supply at the manual gas shut off valve.
- ❷ Remove the inlet pressure tap plug on the gas control valve (see Figure 3.12).
- ❸ Install a 1/8 inch NPT hose connector and connect the pressure gauge tube.
- ❹ Turn on the gas supply at the manual gas shut off valve.
- ❺ Turn on the electrical power to the unit heater.
- ❻ To light the main burners, set the room thermostat to a point above room temperature.

NOTE: This unit heater is equipped with an ignition device, which automatically lights the burner. This unit heater cannot be lighted manually. Do not try to light the burner by hand.

Verify minimum inlet gas supply pressure:

- ❷ Turn on all other gas appliances that are on the same supply line. If the other gas appliances have multiple inputs, set it to the maximum rating.
- ❸ Observe the pressure rating on the pressure gauge.

The minimum inlet gas supply pressure for:

- Natural gas is 5.0 inches W.C.
- Propane gas is 11.0 inches W.C.

Verify maximum inlet gas supply pressure:

- ❹ Turn off all other gas appliances on the same supply line.
- ❺ Observe the pressure reading on the pressure gauge.

The maximum inlet gas supply pressure for:

- Natural gas is 14.0 inches W.C.
- Propane gas is 14.0 inches W.C.

IMPORTANT: If the inlet gas supply pressure is not within the minimum and maximum range as shown on the rating plate, contact your gas supplier.

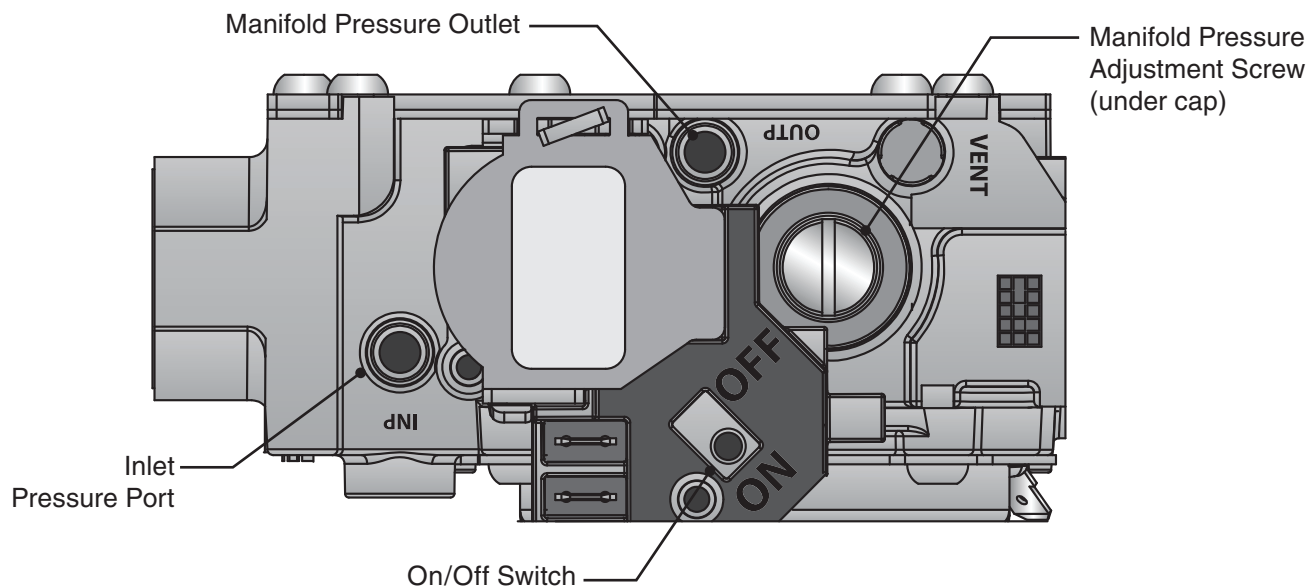
Removing pressure gauge from inlet port on gas valve.

Set thermostat or other control device to the lowest set point.

- ❺ After heater has completed the post-purge cycle, turn off the electrical power to the unit heater.
- ❻ Turn off the gas supply at the manual gas shut off valve.

- 13 Remove the pressure gauge tube and the 1/8 inch NPT hose connector.
- 14 Replace the inlet pressure tap plug on the gas control valve.
- 15 Leak check the re-installed pressure tap plug using a soap solution or equivalent method as described in ANSI Z223.1 (NFPA 54).

Figure 3.12 • Gas Valve Shown in ON Position



Verify Manifold Pressure

Before starting up the unit, smell all around the unit heater for gas. Be sure to smell next to the floor because some gas is heavier than air and will settle on the floor.

When turning the gas shut off valve, only use your hand. Never use tools to turn the knobs, as it may damage the valve resulting in a fire or explosion. If the knob is stuck, do not try to repair it, contact a qualified service technician or your local gas company.

To verify the proper manifold pressure, follow the following steps:

- 1 Turn off the gas valve with the switch located on the valve body (see Figure 3.12).
- 2 Remove the manifold pressure tap plug on the gas control valve (see Figure 3.12).
- 3 Connect the pressure gauge tube and manometer.
- 4 Turn on the gas valve with the switch located on the valve body.
- 5 Turn on the electrical power to the unit heater.
- 6 To light the main burners, set the room thermostat to a point above room temperature.

NOTE: This unit heater is equipped with an ignition device, which automatically lights the burner. This unit heater cannot be lighted manually. Do not try to light the burner by hand.

Verify manifold pressure:

- 7 After the unit has successfully ignited, wait five minutes prior to taking any readings. The unit heater must be in a steady state of operation prior to taking a manifold pressure reading.

- ⑧ While waiting for the unit to stabilize, observe the characteristics of the flame. The flame should be stable and should not lift from any burner. The burner color should be light blue, and not create excessive noise.
- ⑨ After five minutes, observe the pressure rating on the pressure gauge.

The target manifold gas supply pressure for:

- Natural gas is 3.5 inches W.C.
- Propane gas is 10.0 inches W.C.

NOTE: Manifold pressure of the heater is pre-set at the factory. No adjustment should be necessary.

During the verification process, a tolerance of +/- 5% of the full scale is acceptable due to varying atmospheric conditions.

If manifold pressure is outside of this tolerance, then an adjustment may be necessary.

Removing pressure gauge from manifold port on gas valve:

- ⑩ Set thermostat or other control device to the lowest set point.
- ⑪ After heater has completed the post-purge cycle, turn off the electrical power to the unit heater.
- ⑫ Turn off the gas valve with the switch located on the valve body (see Figure 3.12).
- ⑬ Remove the pressure gauge tube and the manometer.
- ⑭ Replace the manifold pressure tap plug on the gas control valve.
- ⑮ Leak check the re-installed pressure tap plug using a soap solution or equivalent method as described in ANSI Z223.1 (NFPA 54).

Prior to leaving the Job Site

Prior to leaving the job site, verify that:

- ✓ Service access door is properly secured to the unit with the sight glass aligned with the burner side.
- ✓ The heater is clear of any objects that would interfere with the proper air circulation or that violate the listed clearance to combustibles.
- ✓ Air directional louvers are adjusted for desired air flow and are not shut or adjusted beyond 60° from perpendicular to the face of the unit.
- ✓ Manual gas shut off is ON.
- ✓ Electrical power is ON.
- ✓ Thermostat is set to desired temperature.
- ✓ Properly dispose of all packaging materials.
- ✓ Check to be sure you have all of your tools.
- ✓ Leave the Installation, Operation, Maintenance and Parts Manual with the owner or end user.

High Altitude Operation

WARNING



Explosion hazard. This heater must be converted by a trained gas installation and service personnel only. Failure to comply could result in personal injury, asphyxiation, death, and fire or property damage.

The FA Series heater is factory configured for altitudes from 0 – 2,000 ft above sea level. If the unit heater is being installed at an elevation above 2,000 ft, the input rate will have to be de-rated to ensure proper operation. The deration is achieved by a gas orifice change.

The installation of the high altitude orifices must be done prior to putting the heater in operation and prior to connecting the gas supply line. The manifold pressure may need to be re-adjusted after orifices are installed. Refer to Charts 3.5 through 3.7 for proper high altitude conversion kit. For altitudes above 9,500 feet, consult factory.

High Altitude Conversion Kit Installation:

- ① Remove service access door by unscrewing the 5/16" (#10) sheet metal screws securing the door.
- ② Disconnect all wires connecting to the gas control valve.
- ③ Remove the manifold pipe from the burner assembly by removing the four mounting screws.
- ④ Slide the manifold pipe assembly out of the control compartment.
- ⑤ Remove gas orifices from the manifold using a 7/16" wrench.
- ⑥ Thread in the new orifices of the correct kit, starting threads by hand. Take care not to cross thread the orifices (See Charts 3.5 through 3.7 for proper kit number and orifice size).
- ⑦ Tighten gas orifices to a torque of 150 inch pounds. No thread sealant is necessary, as the brass is designed to seal to the steel manifold pipe at the proper torque.
- ⑧ Inspect all the newly installed orifices to ensure they are straight and aligned 90° to the manifold pipe. Correct or replace any misaligned orifices.
- ⑨ Reinstall the manifold pipe assembly to the unit, ensuring that each orifice is properly aligned with the burners. Secure with four 5/16" (#10) screws.
- ⑩ Reconnect all wires to the gas control valve.
- ⑪ Proceed with the installation of the gas supply line as described within this manual.

Chart 3.5 • High Altitude Conversion Kits for Elevations of 2,000 to 4,500 Feet

Model	Number of Orifices	Kit Number		Orifice Size	
		Natural Gas	Propane	Natural Gas	Propane
FA-100	4	HKN-43_4	HKP-55_4	43 DMS	55 DMS
FA-125	5	HKN-43_5	HKP-55_5	43 DMS	55 DMS
FA-150	6	HKN-43_6	HKP-55_6	43 DMS	55 DMS
FA-175	7	HKN-43_7	HKP-55_7	43 DMS	55 DMS
FA-200	7	HKN-41_7	HKP-54_7	41 DMS	54 DMS
FA-225	9	HKN-43_9	HKP-55_9	43 DMS	55 DMS
FA-250	9	HKN-42_9	HKP-54_9	42 DMS	54 DMS

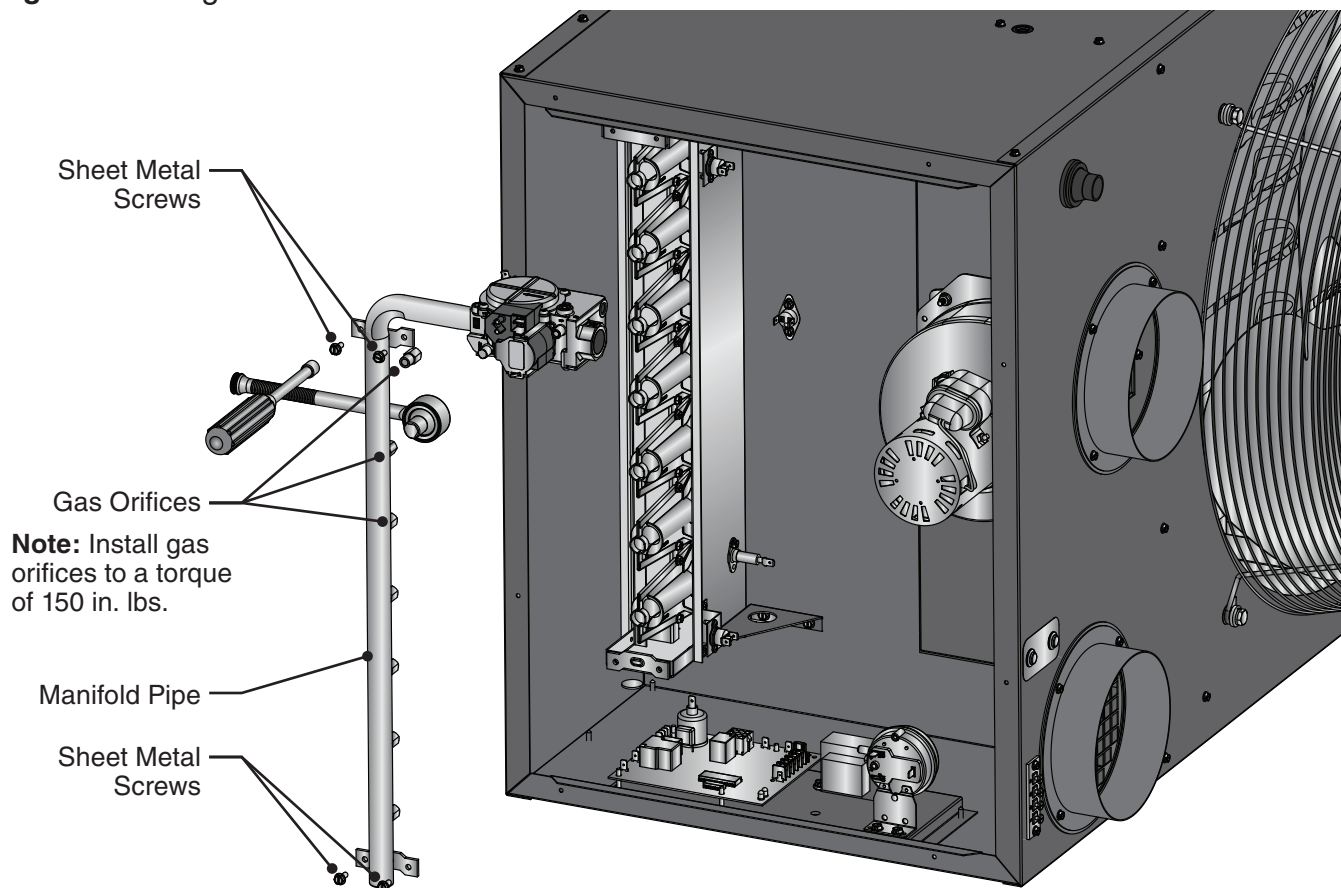
Chart 3.6 • High Altitude Conversion Kits for Elevations of 4,501 to 7,000 Feet

Model	Number of Orifices	Kit Number		Orifice Size	
		Natural Gas	Propane	Natural Gas	Propane
FA-100	4	HKH-44_4	HKP-55_4	44 DMS	55 DMS
FA-125	5	HKH-44_5	HKP-55_5	44 DMS	55 DMS
FA-150	6	HKH-44_6	HKP-55_6	44 DMS	55 DMS
FA-175	7	HKH-44_7	HKP-55_7	44 DMS	55 DMS
FA-200	7	HKH-43_7	HKP-54_7	43 DMS	54 DMS
FA-225	9	HKH-44_9	HKP-55_9	44 DMS	55 DMS
FA-250	9	HKH-42_9	HKP-54_9	42 DMS	54 DMS

Chart 3.7 • High Altitude Conversion Kits for Elevations of 7,001 to 9,500 Feet

Model	Number of Orifices	Kit Number		Orifice Size	
		Natural Gas	Propane	Natural Gas	Propane
FA-100	4	HKH-45_4	HKN-56_4	45 DMS	56 DMS
FA-125	5	HKH-45_5	HKN-56_5	45 DMS	56 DMS
FA-150	6	HKH-45_6	HKN-56_6	45 DMS	56 DMS
FA-175	7	HKH-45_7	HKN-56_7	45 DMS	56 DMS
FA-200	7	HKH-44_7	HKN-55_7	44 DMS	55 DMS
FA-225	9	HKH-45_9	HKN-56_9	45 DMS	56 DMS
FA-250	9	HKH-43_9	HKN-55_9	43 DMS	55 DMS

Figure 3.13 • High Altitude Kit Installation



4.0 Operation

⚠ WARNING



This appliance does not have a pilot ignition. It is equipped with an ignition device which automatically lights the burner. **Do not** attempt to light the system by hand.

Sequence of Operation

Standby: The ignition control continually checks for internal faults, circuit integrity and relay contact positioning. The LED is lit indicating power is applied.

Starting Circuit: Upon a call for heat, the control verifies that the limit switch is closed and the differential pressure switch is in the open position. The control energizes the induced draft motor. Once operational static pressure is achieved the differential switch will close initiating the ignition sequence. The control energizes the spark and main gas valve for 10 seconds. If the flame is not sensed, the control will attempt to re-ignite for a total of (3) tries for ignition before proceeding to soft lockout.

Running Circuit: After ignition, the flame rod monitors burner flame. If flame sense is not established within 10 seconds, the control will attempt two (2) additional ignition sequences before proceeding to soft lockout. The control can be reset by briefly interrupting the power source. If flame is sensed the control waits for a 30 second heat blower on delay and then energizes the indoor blower, the control proceeds to steady heat mode. If sense of flame is lost, the control closes the gas valve within 1 second and a new trial sequence (identical to the starting sequence) is initiated.


Shut Down: When the thermostat is satisfied, the control closes the valve and the induced draft motor remains on for a 5 second post-purge period. The indoor blower is de-energized after 120 seconds.

⚠ WARNING



Use only your hand to turn the manual shut off. Never use tools. If the knob will not turn by hand, don't try to repair it; call a qualified technician. Force or attempted repair may result in a fire or explosion.

Shutdown Procedures:

- ❶ Set the thermostat to the lowest setting.
- ❷ Turn OFF all electrical power to the appliance if service is to be performed.
- ❸ Turn manual shut off knob clockwise  to OFF. **Do not** force.

If the heater's internal diagnostic LED displays any of the signals listed in Charts 4.1-4.2, address the indicated problem as outlined.

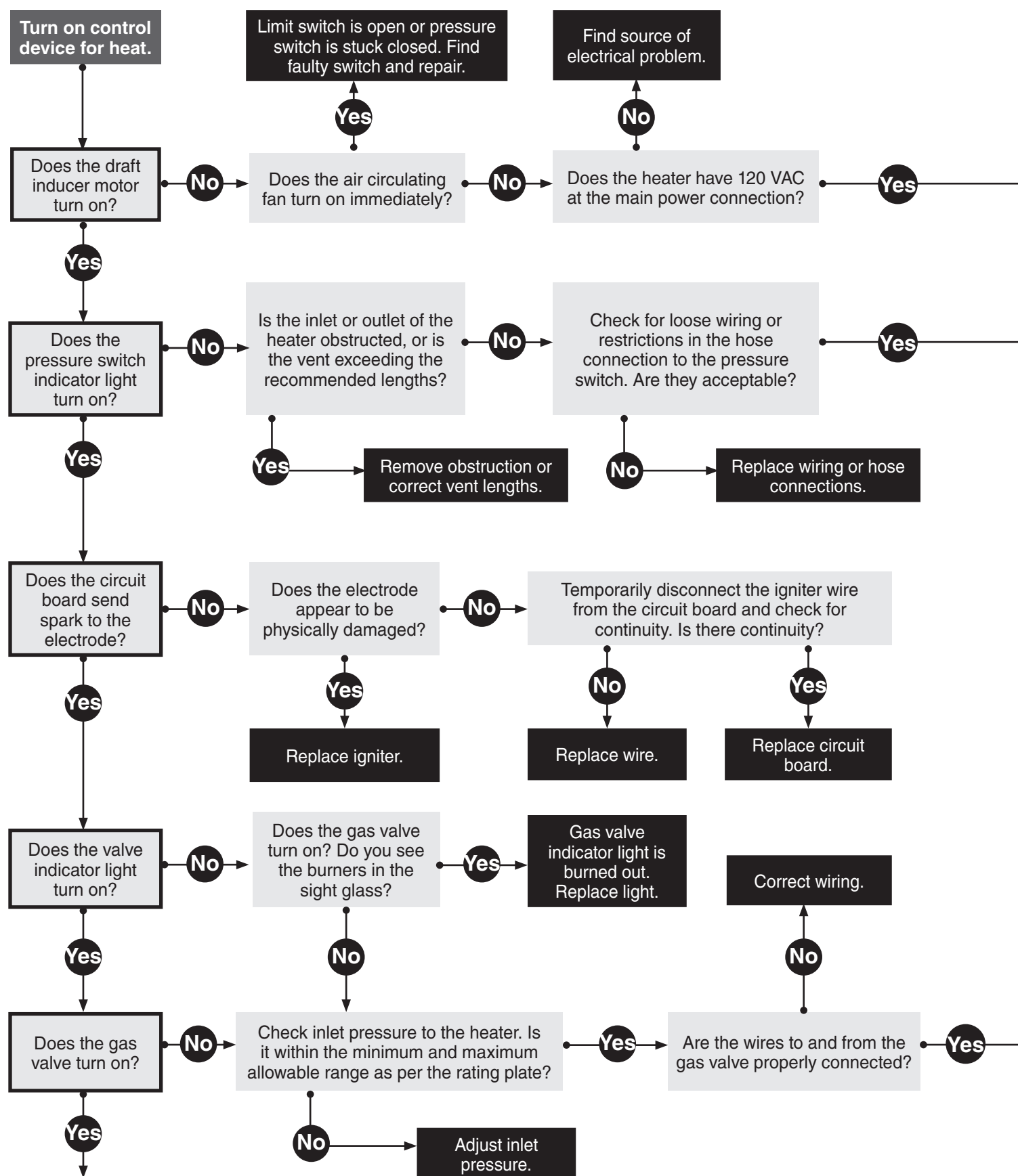
Chart 4.1 • LED Diagnostic Codes - United Technologies Circuit Board

LED CODE (# of flashes)	GREEN LED STATUS / ERROR
STEADY OFF	Internal Control Fault or No Power
STEADY ON	Control Ok
1	In Lockout from Failed Ignitions or Flame Losses
2	Pressure Switch Open with Inducer ON
3	Pressure Switch Closed with Inducer OFF
4	Limit Switch is OPEN
5	In Lockout from False Flame
LED CODE (# of flashes)	AMBER LED STATUS / ERROR
FAST FLASH	Flame Present With Gas Valve Off
STEADY ON	Flame is Sensed

Chart 4.2 • LED Diagnostic Codes - Fenwal Circuit Board

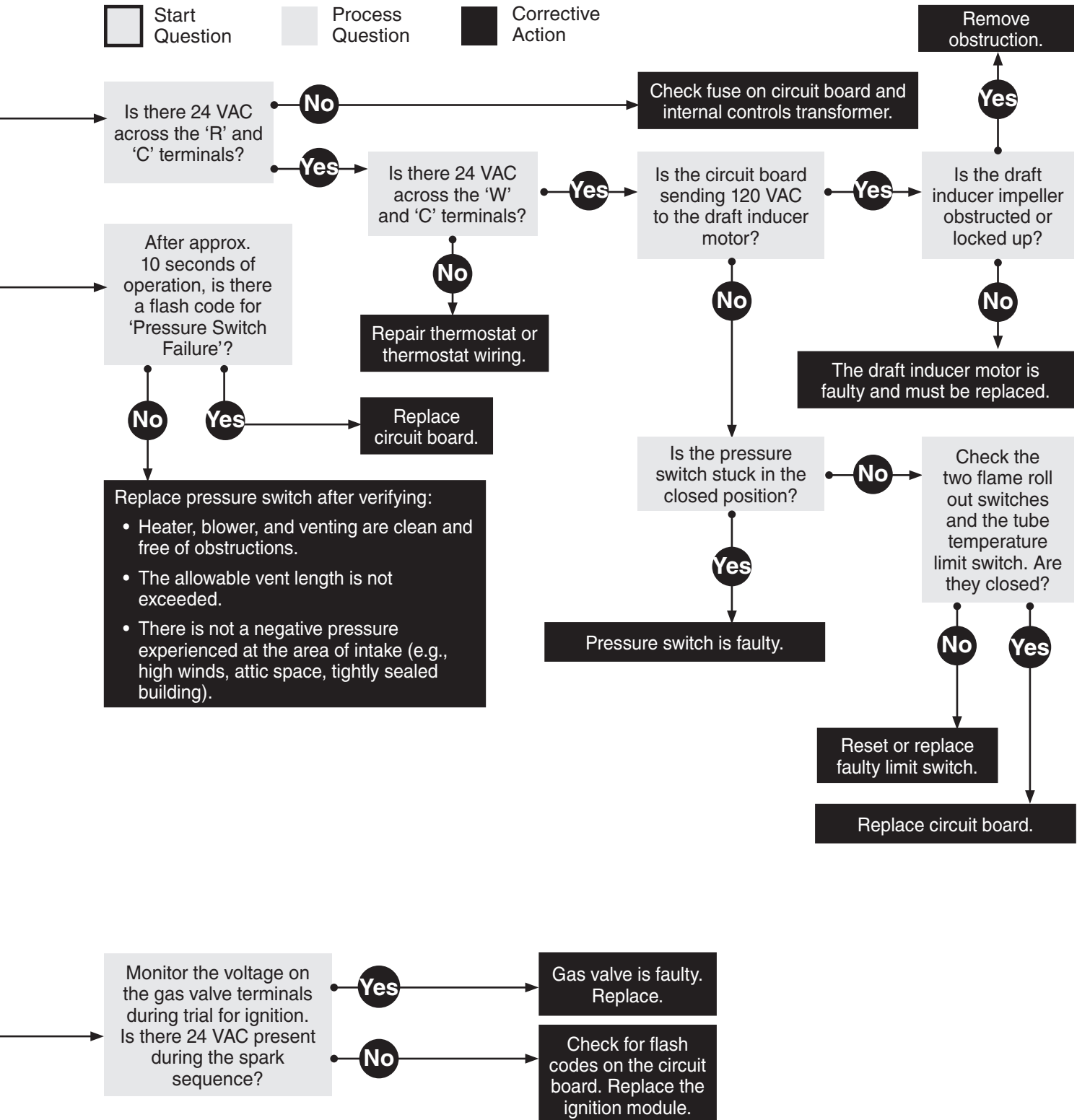
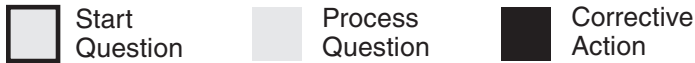
LED CODE (# of flashes)	GREEN LED STATUS / ERROR
SLOW FLASH	Normal Operation - No Call for Heat
FAST FLASH	Normal Operation - Call for Heat
2	Ignition Lockout - No Flame Detected
3	Airflow Fault - Pressure Switch Open or Closed
4	High Limit or Rollout Switch Open
5	Flame Sense Error - Gas Valve Not Energized
STEADY ON	Internal Control Failure
LED CODE (# of flashes)	AMBER LED STATUS / ERROR
OFF	Flame Signal is Below Required Level / No Flame Present
STEADY ON	Flame is Sensed

4.0 Troubleshooting Guide

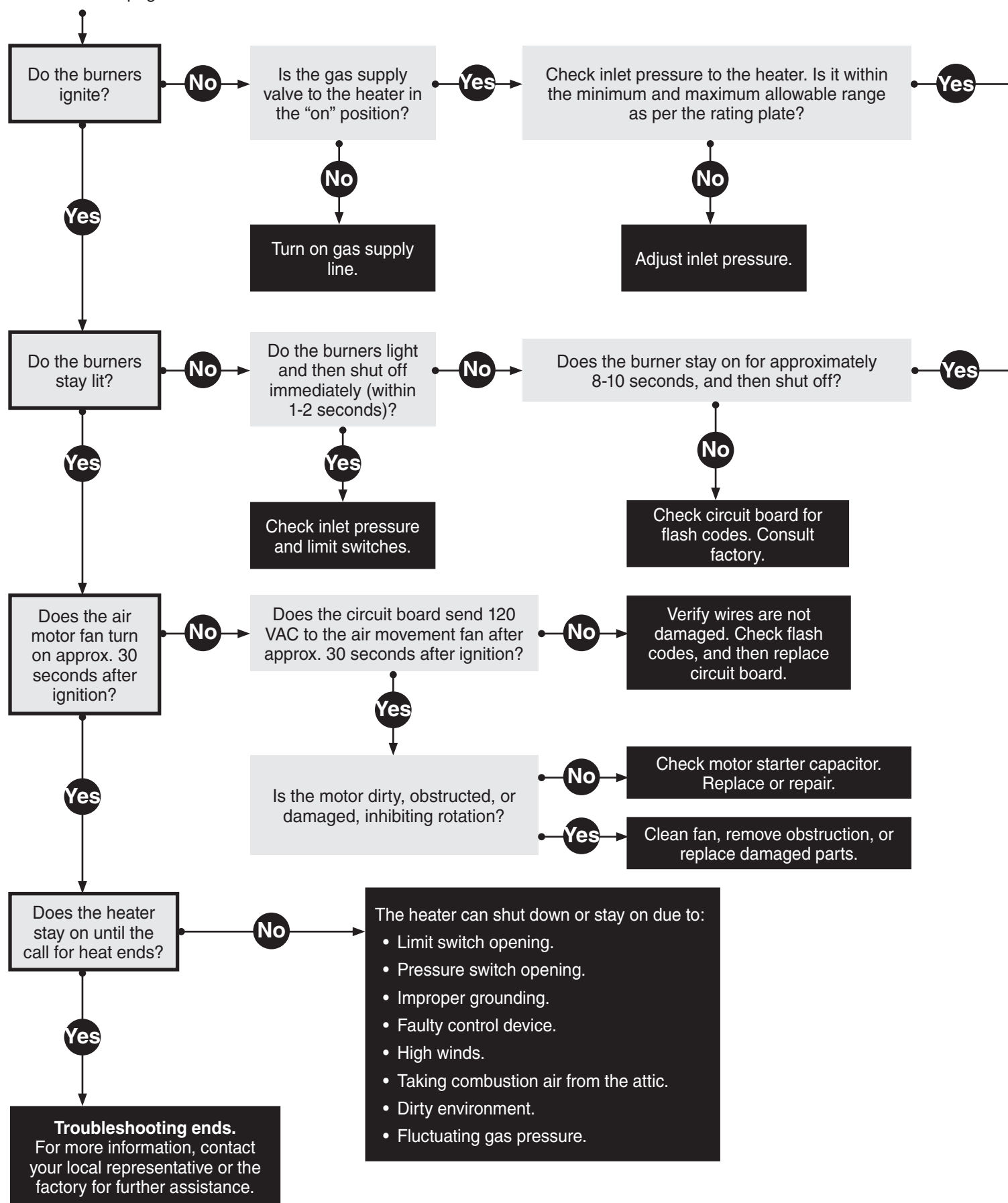


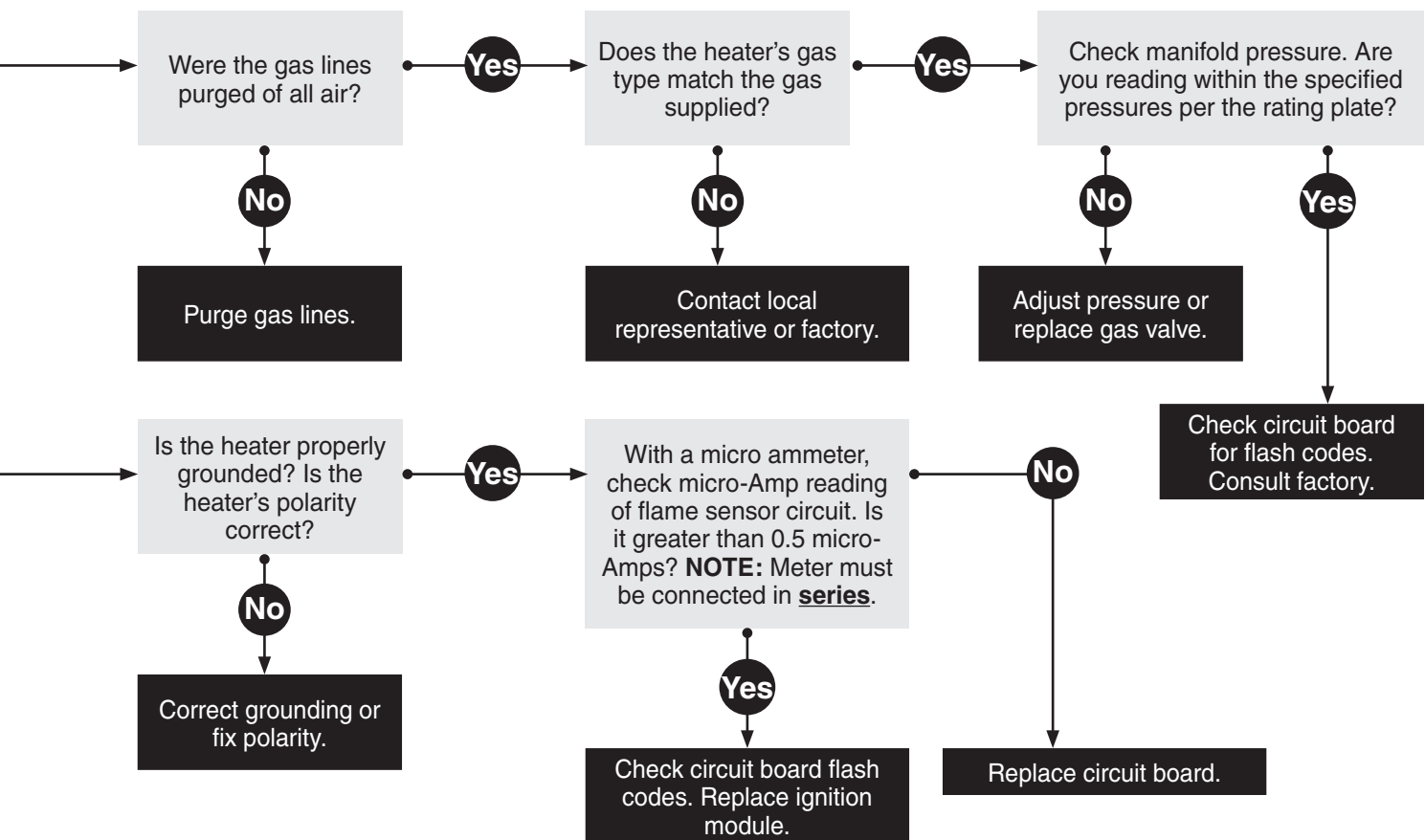
NOTICE

Bypassing any switch is intended for testing purposes only. Do not leave switch bypassed during normal operation or the heater's built-in safety mechanisms will be compromised.

Key

Continued from page 42.





LED Diagnostic Codes

United Technologies Circuit Board		Fenwal Circuit Board	
LED CODE (# of flashes)	GREEN LED STATUS / ERROR	LED CODE (# of flashes)	GREEN LED STATUS / ERROR
STEADY OFF	Internal Control Fault or No Power	SLOW FLASH	Normal Operation - No Call for Heat
STEADY ON	Control Ok	FAST FLASH	Normal Operation - Call for Heat
1	In Lockout from Failed Ignitions or Flame Losses	2	Ignition Lockout - No Flame Detected
2	Pressure Switch Open with Inducer ON	3	Airflow Fault - Pressure Switch Open or Closed
3	Pressure Switch Closed with Inducer OFF	4	High Limit or Rollout Switch Open
4	Limit Switch is OPEN	5	Flame Sense Error - Gas Valve Not Energized
5	In Lockout from False Flame	STEADY ON	Internal Control Failure
LED CODE (# of flashes)	AMBER LED STATUS / ERROR	LED CODE (# of flashes)	AMBER LED STATUS / ERROR
FAST FLASH	Flame Present With Gas Valve Off	OFF	Flame Signal is Below Required Level / No Flame Present
STEADY ON	Flame is Sensed	STEADY ON	Flame is Sensed

5.0 Maintenance

To check gas tightness of the safety shut off valves, turn off the manual valve upstream of the appliance combination control. Remove the hex head plug on the inlet side of the combination control and connect a manometer to that tapping.

Turn the manual valve on to apply pressure to the combination control. Note the pressure reading on the manometer, then turn the valve off. Any loss of pressure indicates a leak. If a leak is detected, use a soap solution to check all threaded connections. If no leak is found, combination control is faulty and must be replaced before putting appliance back in service.

Should maintenance be required, perform the following inspection and service routine:

- ① Inspect the area near the unit to be sure that there is no combustible material located within the minimum clearance requirements listed in this manual. Under no circumstances should combustible material be located within the clearances specified in this manual. Failure to provide proper clearance could result in personal injury or equipment damage from fire.
- ② Turn off the manual gas valve and electrical power to the unit heater. Remove service access panel.
- ③ To clean or replace the burner, remove retainer from around manifold orifice, disconnect flame sensor and igniter from control board, remove burner assembly mounting screws. With the burner removed, wire brush the inside surfaces of the heat exchanger.
- ④ Remove any dirt, dust, or other foreign matter from the burners using a wire brush or compressed air. Ensure that all parts are unobstructed. Then reassemble the unit heater by replacing all parts in reverse order.
- ⑤ Complete the appropriate unit startup procedure as given in the Operation section of this Manual. (See lighting instructions on the unit nameplate.)
 - Check the burner adjustment.
 - Also check all gas control valves and pipe connections for leaks.
- ⑥ Check the operation of the automatic gas valve by lowering the setting of the thermostat, stopping the operation of the gas unit heater. The gas valve should close tightly, completely extinguishing the flame on the burner.
- ⑦ Inspect and service motor/fan assembly. To maintain efficient air flow, inspect and clean the fan blades and guard to prevent buildup of foreign matter.
- ⑧ If combustion air is room supplied, ensure that a 12 inch clearance is maintained all around the inlet openings.

- ⑨ Check lubrication instructions on motor. If oiling is required, add three or four drops of SAE 20 electric motor oil:
- After three years or 25,000 hours (for light-duty operation).
 - Annually after three years or 8,000 hours (for medium-duty operation).
 - Annually after one year or 1,500 hours (for heavy-duty operation).

NOTICE

Never over-oil the motor, or premature failure may occur.

- ⑩ Check and test functions of all safety devices supplied with the heater.

FA Series Cabinet 3 (FA-100 & FA-125) Parts Listing

Figure 5.1 • Heater Assembly Components

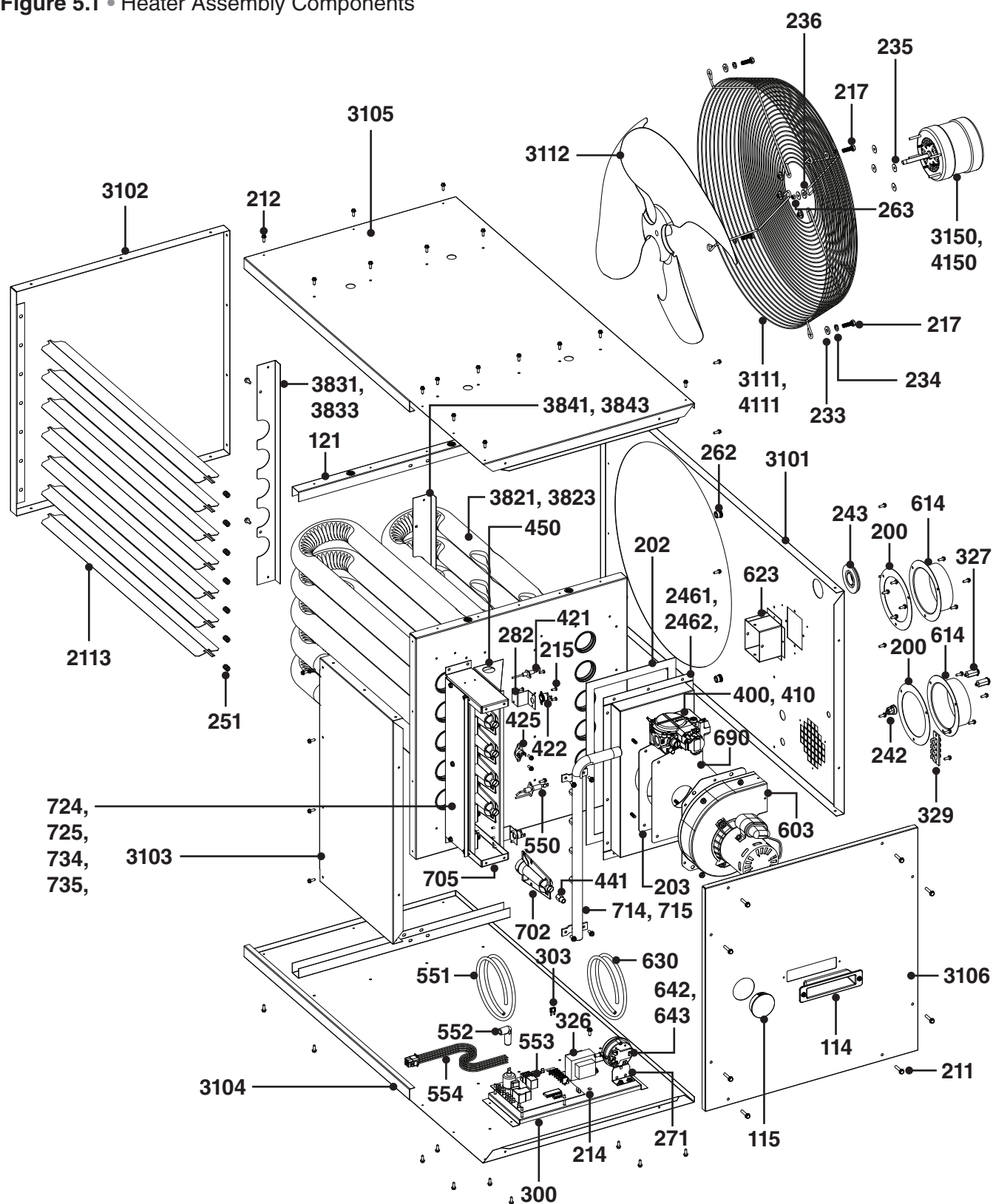


Chart 5.1 • FA Series Cabinet 3 (FA-100 & FA-125) Parts List

Part No.	Description	Part No.	Description
CKP_54_4	Propane Conversion Kit (FA-100)	UF-552	Spark Igniter Boot
CKP_54_5	Propane Conversion Kit (FA-125)	UF-553	Ignition Control Circuit Board
UF-114	Service Access Handle	UF-554	Wire Harness
UF-115	Burner Sight Glass	UF-603	Inducer Motor Assembly, Large
UF-121	Mounting Rail	UF-614	4" Vent Collar (Qty. 2)
UF-200	4" Vent Collar Gasket (Qty. 2)	UF-623	Fan Housing Outlet Collar
UF-202	Exhaust Collection Chamber Gasket	UF-630	Pressure Switch Tubing
UF-203	Restrictor Plate Gasket	UF-642	Pressure Switch, 1.55" WC (FA-100)
UF-211	#10 x 1" SMS - Point Tip	UF-643	Pressure Switch, 1.70" WC (FA-125)
UF-212	#8 x 1/2" SMS - Point Tip	UF-690	Restrictor Plate (Indicate Size)
UF-213	#10 x 1/2" SMS - Point Tip	UF-702	Inshot Burner, 5/16" Port
UF-214	#10-32 Ground Screw	UF-705	Burner Chamber Sides
UF-215	#2 Phillips Pan Head x 1/2" SMS - Blunt Tip	UF-714	Manifold Pipe, 4 Burner
UF-217	5/16" - 18 x 1" Bolt	UF-715	Manifold Pipe, 5 Burner
UF-233	5/16" Flat Washer	UF-724	Burner Mounting Rail, 4 Burner
UF-234	5/16" Lock Washer	UF-725	Burner Mounting Rail, 5 Burner
UF-235	#10 Flat Washer	UF-734	Burner Chamber Body, 4 Burner
UF-236	#10 Rubber Washer	UF-735	Burner Chamber Body, 5 Burner
UF-242	Strain Relief Bushing, Cordgrip	UF-2113	Louver
UF-243	1/2" Gas Pipe Grommet	UF-2461	Exhaust Collection Chamber, 4 Burner
UF-251	Louver Spring	UF-2462	Exhaust Collection Chamber, 5 Burner
UF-262	5/16"-18 Threaded Nut Insert	UF-3101	Back Panel #3
UF-263	#10-32 Nyloc Nut	UF-3102	Right Side Panel #3
UF-271	Pressure Switch Bracket	UF-3103	Front Panel #3
UF-282	Limit Switch Bracket	UF-3104	Bottom Panel #3
UF-300	Component Panel	UF-3105	Top Panel #3
UF-303	3 Amp ATO Fuse	UF-3106	Service Access Door #3
UF-326	40VA Transformer, 120/24	UF-3111	18" Fan Guard, Rectangle Pattern
UF-327	Indicator Light, 24VAC	UF-3112	18" Axial Fan Blade, 1/2" Hub
UF-329	Terminal Strip	UF-3150	Axial Fan Motor, 1/8 HP, 1075 RPM
UF-400	1/2" Gas Valve - Natural Gas	UF-3821	Tube and Vest Panel Assembly (4 Tubes)
UF-410	1/2" Gas Valve - Propane Gas	UF-3823	Tube and Vest Panel Assembly (5 Tubes)
UF-421	Flame Sensor	UF-3831	Left Tube Support (4 Tubes)
UF-422	Limit Switch, Flame Rollout	UF-3833	Left Tube Support (5 Tubes)
UF-425	Limit Switch, Tube Temperature	UF-3841	Right Tube Support (4 Tubes)
UF-441	Gas Orifice (Indicate Size)	UF-3843	Right Tube Support (5 Tubes)
UF-450	Burner Chamber Support Bracket	UF-4111	18" Fan Guard, Square Pattern
UF-550	Spark Igniter	UF-4150	Axial Fan Motor, 1/6 HP, 1625 RPM
UF-551	Spark Igniter Wire		

FA Series Cabinet 4 (FA-150, FA-175 & FA-200) Parts Listing

Figure 5.2 • Heater Assembly Components

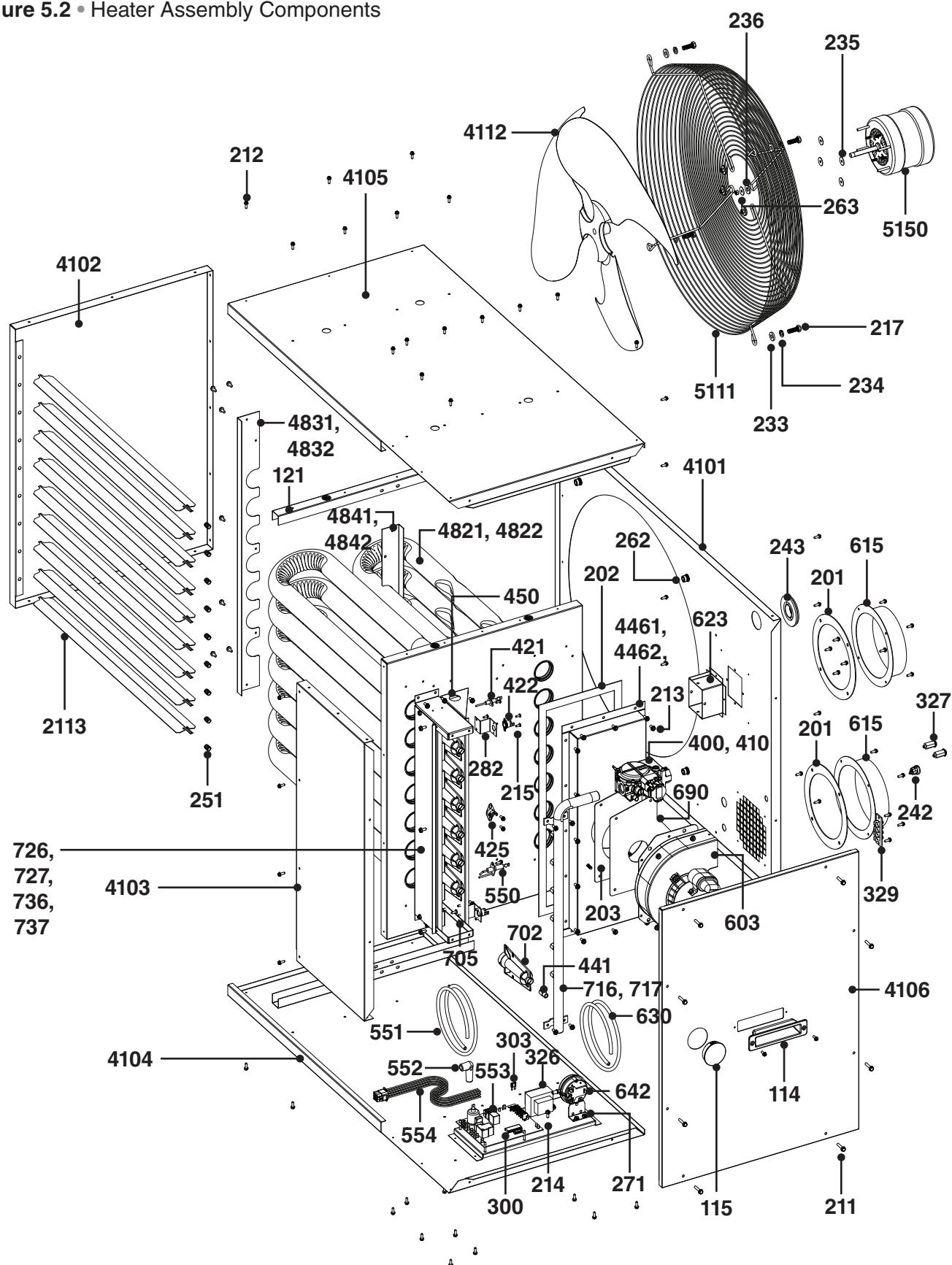


Chart 5.2 • FA Series Cabinet 4 (FA-150, FA-175 & FA-200) Parts List

Part No.	Description	Part No.	Description
CKP_54_6	Propane Conversion Kit (FA-150)	UF-551	Spark Igniter Wire
CKP_54_7	Propane Conversion Kit (FA-175)	UF-552	Spark Igniter Boot
CKP_1.45_7	Propane Conversion Kit (FA-200)	UF-553	Ignition Control Circuit Board
UF-114	Service Access Handle	UF-554	Wire Harness
UF-115	Burner Sight Glass	UF-603	Inducer Motor Assembly, Large
UF-121	Mounting Rail	UF-615	6" Vent Collar (Qty. 2)
UF-201	6" Vent Collar Gasket (Qty. 2)	UF-623	Fan Housing Outlet Collar
UF-202	Exhaust Collection Chamber Gasket	UF-630	Pressure Switch Tubing
UF-203	Restrictor Plate Gasket	UF-642	Pressure Switch, 1.55" WC
UF-211	#10 x 1" SMS - Point Tip	UF-690	Restrictor Plate (Indicate Size)
UF-212	#8 x 1/2" SMS - Point Tip	UF-702	Inshot Burner, 5/16" Port
UF-213	#10 x 1/2" SMS - Point Tip	UF-705	Burner Chamber Sides
UF-214	#10-32 Ground Screw	UF-716	Manifold Pipe, 6 Burner
UF-215	#2 Phillips Pan Head x 1/2" SMS - Blunt Tip	UF-717	Manifold Pipe, 7 Burner
UF-217	5/16" - 18 x 1" Bolt	UF-726	Burner Mounting Rail, 6 Burner
UF-233	5/16" Flat Washer	UF-727	Burner Mounting Rail, 7 Burner
UF-234	5/16" Lock Washer	UF-736	Burner Chamber Body, 6 Burner
UF-235	#10 Flat Washer	UF-737	Burner Chamber Body, 7 Burner
UF-236	#10 Rubber Washer	UF-2113	Louver
UF-242	Strain Relief Bushing, Cordgrip	UF-4101	Back Panel #4
UF-243	1/2" Gas Pipe Grommet	UF-4102	Right Side Panel #4
UF-251	Louver Spring	UF-4103	Front Panel #4
UF-262	5/16"-18 Threaded Nut Insert	UF-4104	Bottom Panel #4
UF-263	#10-32 Nyloc Nut	UF-4105	Top Panel #4
UF-271	Pressure Switch Bracket	UF-4106	Service Access Door #4
UF-282	Limit Switch Bracket	UF-4112	22" Axial Fan Blade, 1/2" Hub
UF-300	Component Panel	UF-4461	Exhaust Collection Chamber, 6 Burner
UF-303	3 Amp ATO Fuse	UF-4462	Exhaust Collection Chamber, 7 Burner
UF-326	40VA Transformer, 120/24	UF-4821	Tube and Vest Panel Assembly (6 Tubes)
UF-327	Indicator Light, 24VAC	UF-4822	Tube and Vest Panel Assembly (7 Tubes)
UF-329	Terminal Strip	UF-4831	Left Tube Support (6 Tubes)
UF-400	1/2" Gas Valve - Natural Gas	UF-4832	Left Tube Support (7 Tubes)
UF-410	1/2" Gas Valve - Propane Gas	UF-4841	Right Tube Support (6 Tubes)
UF-421	Flame Sensor	UF-4842	Right Tube Support (7 Tubes)
UF-422	Limit Switch, Flame Rollout	UF-5111	22" Fan Guard, Rectangle Pattern
UF-425	Limit Switch, Tube Temperature	UF-5150	Axial Fan Motor, 1/3 HP, 1075 RPM
UF-441	Gas Orifice (Indicate Size)		
UF-450	Burner Chamber Support Bracket		
UF-550	Spark Igniter		

FA Series Cabinet 5 (FA-225 & FA-250) Parts Listing

Figure 5.3 • Heater Assembly Components

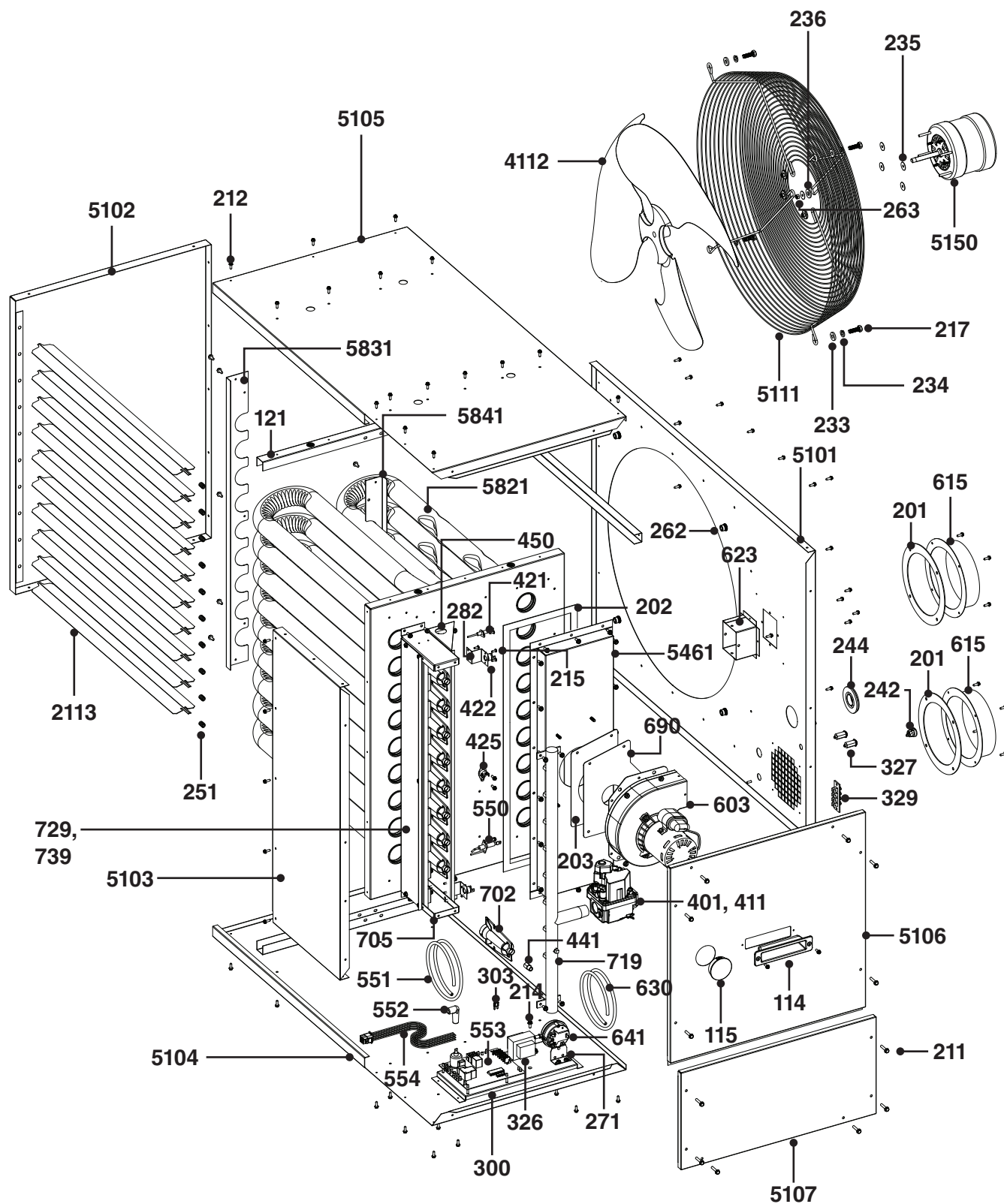


Chart 5.3 • FA Series Cabinet 5 (FA-225 & FA-250) Parts List

Part No.	Description	Part No.	Description
CKP_54_9	Propane Conversion Kit (FA-225)	UF-425	Limit Switch, Tube Temperature
CKP_1.45_9	Propane Conversion Kit (FA-250)	UF-441	Gas Orifice (Indicate Size)
UF-114	Service Access Handle	UF-450	Burner Chamber Support Bracket
UF-115	Burner Sight Glass	UF-550	Spark Igniter
UF-121	Mounting Rail	UF-551	Spark Igniter Wire
UF-201	6" Vent Collar Gasket (Qty. 2)	UF-552	Spark Igniter Boot
UF-202	Exhaust Collection Chamber Gasket	UF-553	Ignition Control Circuit Board
UF-203	Restrictor Plate Gasket	UF-554	Wire Harness
UF-211	#10 x 1" SMS - Point Tip	UF-603	Inducer Motor Assembly, Large
UF-212	#8 x 1/2" SMS - Point Tip	UF-615	6" Vent Collar (Qty. 2)
UF-213	#10 x 1/2" SMS - Point Tip	UF-623	Fan Housing Outlet Collar
UF-214	#10-32 Ground Screw	UF-630	Pressure Switch Tubing
UF-215	#2 Phillips Pan Head x 1/2" SMS - Blunt Tip	UF-641	Pressure Switch, 1.30" WC
UF-217	5/16" - 18 x 1" Bolt	UF-690	Restrictor Plate (Indicate Size)
UF-233	5/16" Flat Washer	UF-702	Inshot Burner, 5/16" Port
UF-234	5/16" Lock Washer	UF-705	Burner Chamber Sides
UF-235	#10 Flat Washer	UF-719	Manifold Pipe, 9 Burner
UF-236	#10 Rubber Washer	UF-729	Burner Mounting Rail, 9 Burner
UF-242	Strain Relief Bushing, Cordgrip	UF-739	Burner Chamber Body, 9 Burner
UF-244	3/4" Gas Pipe Grommet	UF-2113	Louver
UF-251	Louver Spring	UF-4112	22" Axial Fan Blade, 1/2" Hub
UF-262	5/16"-18 Threaded Nut Insert	UF-5101	Back Panel #5
UF-263	#10-32 Nyloc Nut	UF-5102	Right Side Panel #5
UF-271	Pressure Switch Bracket	UF-5103	Front Panel #5
UF-282	Limit Switch Bracket	UF-5104	Bottom Panel #5
UF-300	Component Panel	UF-5105	Top Panel #5
UF-303	3 Amp ATO Fuse	UF-5106	Service Access Door (Upper) #5
UF-326	40VA Transformer, 120/24	UF-5107	Service Access Door (Lower) #5
UF-327	Indicator Light, 24VAC	UF-5111	22" Fan Guard, Rectangle Pattern
UF-329	Terminal Strip	UF-5150	Axial Fan Motor, 1/3 HP, 1075 RPM
UF-401	3/4" Gas Valve - Natural Gas	UF-5461	Exhaust Collection Chamber, 9 Burner
UF-411	3/4" Gas Valve - Propane Gas	UF-5821	Tube and Vest Panel Assembly (9 Tubes)
UF-421	Flame Sensor	UF-5831	Left Tube Support (9 Tubes)
UF-422	Limit Switch, Flame Rollout	UF-5841	Right Tube Support (9 Tubes)

[illegible]

Limited Warranty Terms and Conditions

One-Year Limited Warranty. The heaters covered in this manual are warranted by Detroit Radiant Products Company to the original user against defects in workmanship or materials under normal use for one year after date of purchase. Any part which is determined to be defective in material or workmanship and returned to an authorized service location, as Detroit Radiant Products Company designates, shipping costs prepaid, will be, as the exclusive remedy, repaired or replaced at Detroit Radiant Products Company's option. For limited warranty claim procedures, see PROMPT DISPOSITION below. This limited warranty gives purchasers specific legal rights which vary from jurisdiction to jurisdiction.

Additional Limited Warranty. In addition to the above mentioned one-year warranty, Detroit Radiant Products Company warrants the original purchaser an additional extension on the heat exchangers and burners. This extension excludes electrical/purchased components.

General Conditions. The Company will not be responsible for labor charges for the analysis of a defective condition of the heater or for the installation of replacement parts. The warranties provided herein will not apply if the input of the heater exceeds the rated input at time of manufacturing or if the heater in the judgment of the Company has been subjected to misuse, excessive dust, improper conversion, negligence, accident, corrosive atmospheres, excessive thermal shock, excessive vibration, physical damage to the heater, alterations by unauthorized service personnel, operation contrary to the Company's instructions or if the serial number has been altered, defaced, or removed. The Company shall not be liable for any default or delay in the performance of these warranties caused by contingency beyond its control, including war, government restriction or restraints, strikes, fire, flood, short or reduced supply of raw materials, or parts.

Limitation of Liability. To the extent allowable under applicable law, Detroit Radiant Products Company's liability for consequential and incidental damages is expressly disclaimed. Detroit Radiant Products Company's liability in all events is limited to and shall not exceed the purchase price paid.

Warranty Disclaimer. Detroit Radiant Products Company has made a diligent effort to provide product information and illustrate the products in this literature accurately; however, such information and illustrations are for the sole purpose of identification, and do not express or imply a warranty that the products are merchantable, or fit for a particular purpose, or that the products will necessarily conform to the illustrations or descriptions. Except as provided below, no warranty or affirmation of fact, expressed or implied, other than as stated in the "LIMITED WARRANTY" above is made or authorized by Detroit Radiant Products Company.

Product Suitability. Many jurisdictions have codes and regulations governing sales, construction, installation, and/or use of products for certain purposes, which may vary from those in neighboring areas. While Detroit Radiant Products Company attempts to assure that its products comply with as many codes, it cannot guarantee compliance, and cannot be responsible for how the product is installed or used. Before purchase and use of a product, review the product applications, and all applicable national and local codes and regulations, and be sure that the product, installation, and use will comply with them. Certain aspects of disclaimers are not applicable to consumer products:

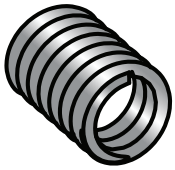
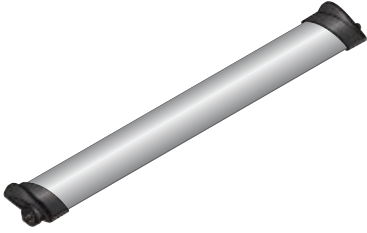

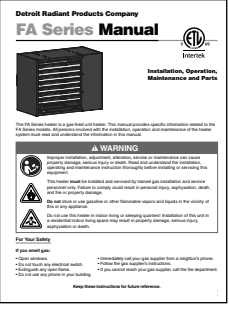
e.g., (a) some jurisdictions do not allow the exclusion or limitation of incidental or consequential damages, so the above limitation or exclusion may not apply to you: (b) also, some jurisdictions do not allow a limitation on how long an implied warranty lasts, consequently the above limitation may not apply to you: and (c) by law, during the period of this limited warranty, any implied warranties of implied merchantability or fitness for a particular purpose applicable to consumer products purchased by consumers, may not be excluded or otherwise disclaimed.

Prompt Disposition. Detroit Radiant Products Company will make a good faith effort for prompt correction or other adjustment with respect to any product which proves to be defective within limited warranty. For any product believed to be defective within limited warranty, first write or call dealer from whom the product was purchased. Dealer will give additional directions. If unable to resolve satisfactorily, write to Detroit Radiant Products Company at 21400 Hoover Road, Warren, Michigan 48089, listing dealer's name, address, date and number of dealer's invoice, and describe the nature of the defect. Title and risk of loss pass to buyer on delivery to common carrier. If product was damaged in transit to you, file claim with carrier.

Registration. Register on-line at www.drp-co.com/warranty.

Kit Contents Check List

Chart 5.4 • Kit Contents for FA Series

FA Series Kit Contents								
UF-251 Springs 		UF-2113 Louvers 		LLUH008 Room Air Clearance Label 		FA Series Manual F/N: LIOFA 		
Part No.	Description	FA-100	FA-125	FA-150	FA-175	FA-200	FA-225	FA-250
UF-251	Spring	7	7	9	9	9	10	10
UF-2113	Louver	7	7	9	9	9	10	10
LLUH008	Room Air Clearance Label	1	1	1	1	1	1	1
LIOFA	FA Series Installation Manual	1	1	1	1	1	1	1
Filled By:								

Approvals

- ANSI Z83.20b and CSA 2.34.
- Indoor approval.
- Commercial approval.

Limited Warranty

- 1 year - components.
- 5 years - heat exchangers.
- 10 years - burners.
- See page 55 for terms and conditions.



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