SPACE-RAY®
INFRARED GAS HEATERS

INSTALLATION AND OPERATION INSTRUCTIONS

RSTP SERIES
INFRARED RADIANT TUBE HEATER

Models:

RSTP15C
RSTP17C

OWNER/INSTALLER: For your safety this manual must be carefully and thoroughly read and understood before installing, operating or servicing this heater.

FOR INDOOR OR OUTDOOR INSTALLATION
VENTED OR UNVENTED

!INSTALLER: This manual is the property of the owner. Please present this manual to the owner when you leave the job site.

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

!IMPORTANT: SAVE THIS MANUAL FOR FUTURE REFERENCE.

SPACE-RAY®
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FORM #43206000
April-06

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! WHAT TO DO IF YOU SMELL GAS:

- **! Do not try to light any appliance. Extinguish any open flame. Open windows.**
- **! Do not touch any electrical switch; do not use any telephone in your building.**
- **! Immediately call your gas supplier from a neighbor's telephone. Follow the gas supplier's instructions.**
- **! If you cannot reach your gas supplier, call the fire department.**

This heater complies with ANSI Z83.20 (current standard) and CSA 2.34. Copies of the National Fuel Gas Code (ANSI Z223.1-latest edition) are available from the CSA at 8501 East Pleasant Valley Road, Cleveland, Ohio 44131 or 55 Scarsdale Road, Don Mills, Ontario M3B 2R3. All NFPA codes are available from the National Fire Protection Association, Batterymarch Park, Quincy, Massachusetts 02269.

1) GENERAL INFORMATION

This heater is a self-contained infrared radiant tube heater for use in locations where flammable gases or vapors are not generally present (as defined by OSHA acceptable limits) and is intended for the heating of nonresidential spaces.

INSTALLATION REQUIREMENTS

Installation of this heater must be in accordance with all applicable codes shown in the instructions and/or the local codes and authorities having jurisdiction. In Canada, the installation must conform to current CAN/CGA-B149.1/2 Installation Code in the absence of local codes. Heaters shall be installed by a licensed contractor or licensed installer. Clearances to combustibles as outlined in this manual should always be observed. In areas used for storage of combustible materials where they may be stacked below the heater, NFPA54 requires that the installer must post signs that will "specify the maximum permissible stacking height to maintain the required clearances from the heater to combustibles."

Every heater shall be located with respect to building construction and other equipment so as to permit access to the heater. Each installer shall use quality installation practices when locating the heater and must give consideration to clearances to combustible materials, vehicles parked below, lights, overhead doors, storage areas with stacked materials, sprinkler heads, gas and electrical lines, and any other possible obstructions or hazards. Consideration also must be given to service accessibility.

The heater, when installed in aircraft hangars and public garages, must be installed in accordance with ANSI/NFPA 409-latest edition (Standard for Aircraft Hangars), ANSI/NFPA 88a-latest edition (Standard for Parking Structures), and ANSI/NFPA 88b-latest edition (Standard for Repair Garages) with the following clearances:

a. At least 10 feet above the upper surfaces of wings or engine enclosures of the highest aircraft that may be housed in the hangar and at least 8 feet above the floor in shops, offices, and other sections of hangars communicating with aircraft storage or service areas.
b. At least 8 feet above the floor in public garages. ▲**WARNING:** Minimum clearances marked on the heater must be maintained from vehicles parked below the heater.

(FOR CANADA ONLY)

a. Installation of this appliance is to be in accordance with latest edition of CAN 1-B149.1 (Installation Code for Natural Gas Burning Appliances and Equipment), and/or CAN B149.2 (Installation Code for Propane Gas Burning Appliances and Equipment).
b. For installation in public garages or aircraft hangars, the minimum clearances from the bottom of the infrared heater to the upper surface of the highest aircraft or vehicle shall be 50 percent greater than the certified minimum clearance, but the clearance shall not be less than 8 feet.

Although these heaters may be used in many applications other than space heating (e.g., process heating), Gas-Fired Products, Inc. will not recognize the warranty for any use other than space heating.

This heater is for **Indoor or Outdoor Installation** and can be used in either **Vented or Unvented mode**. The term Unvented actually means Indirect Vented. While the products of combustion are expelled into the building, national codes require ventilation in the building to dilute these products of combustion. This ventilation may be provided by gravity or mechanical means.

This heater is not an explosion proof heater. Where the possibility of exposure to volatile and low flash point materials exists, it could result in property damage or death. This heater must not be installed in a spray booth where the heater can operate during the spraying process. Consult your local fire marshal or insurance company.

▲WARNING: Certain materials or objects, when stored under the heater, will be subjected to radiant heat and could be seriously damaged. Observe the Minimum Clearances to Combustibles listed in the manual and on the heater at all times.

! ATTENTION: SAVE THIS MANUAL FOR FUTURE REFERENCE.

2) RSTP SERIES – SPECIFICATIONS

Model No.	Btu/hr Input	Orifice Size		Weight (lbs.)		Minimum Mounting Height	
		Natural Gas	*Propane Gas*	*Shipping*	*Unit*	*@ Horizontal*	*@45° Angle*
RSTP15C-N5D	150,000	#1 (0.220)	n/a	*256*	*216*	14 ft.	12 ft.
RSTP17C-N5D	175,000	"D" (0.246)	n/a	*256*	*216*	16 ft.	14 ft.
RSTP17C-L5D	175,000	n/a	#26 (0.147)	256	216	16 ft.	14 ft.

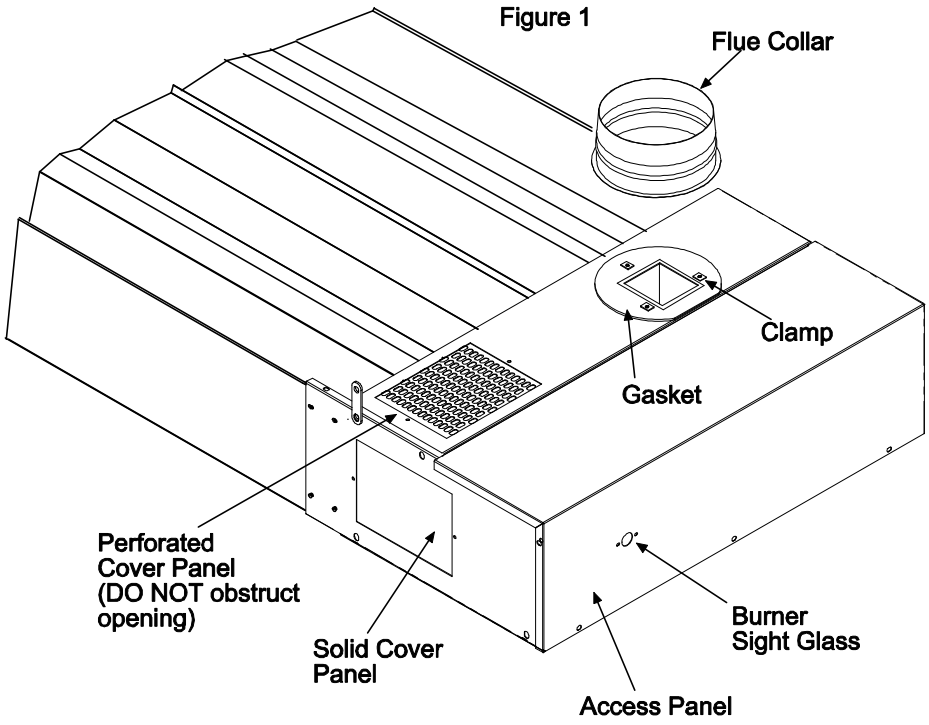
Type Gas:	Gas-Pipe Connection:	Tube Diameter:	Flue Connection:	Fresh Air Connection:
Natural or Propane	1/2" NPT (Female)	4"	6" Round	6" Round

Electrical Supply:	Current Rating:	Fuse Rating:	Ignition System:
120 Volt, 60Hz, 1 Phase	2.6 Amp	Spark Module 3 Amp 250 Volts (for 24V Circuit)	Direct Spark (with 30-second prepurge period)

3) RSTP SERIES – HEATER ASSEMBLY

1. This heater is completely factory assembled and requires no field assembly.
2. If the heater is to be used **Indoors and Vented** to the outside, install the flue collar supplied with the heater by placing the collar directly over the gasket. Secure the collar flange with clamps. See Figure 1.

Figure 1



3. Attach a 6" diameter flue pipe to the flue collar. Place an approved vent cap to the outside end of the flue pipe. See Section 9A for flue vent requirements.
4. If the heater is to be used **Indoors and Unvented**, order the Indoor Unvented Kit (Part #42406000). Remove the clamps and install the Exhaust Hood directly over the gasket. See Figure 2.
5. If the heater is to be used **Outdoors**, order the Outdoor Kit (Part #42411000). Install the Exhaust Hood as instructed above in #4. Remove the solid cover panel from the side and install the Inlet Air Hood. Remove the perforated cover panel from the top and replace it with the solid cover panel. See Figure 2. After completing the assembly, silicone sealant should be utilized to seal the access panel openings. If the installation site is subject to excessive wind conditions, it might be necessary to utilize pop rivets to secure the reflectors to the heater body.

NOTE: EXHAUST HOODS AND INLET AIR HOODS ARE SUPPLIED AS ACCESSORY ITEMS. REFER TO THE PART NUMBERS BELOW TO ORDER THE KIT YOUR APPLICATION MAY REQUIRE.

PART NO.	DESCRIPTION
42406000	Indoor Unvented Kit *(includes Exhaust Hood)*
42411000	Outdoor Kit *(includes Exhaust Hood and Inlet Air Hood)*

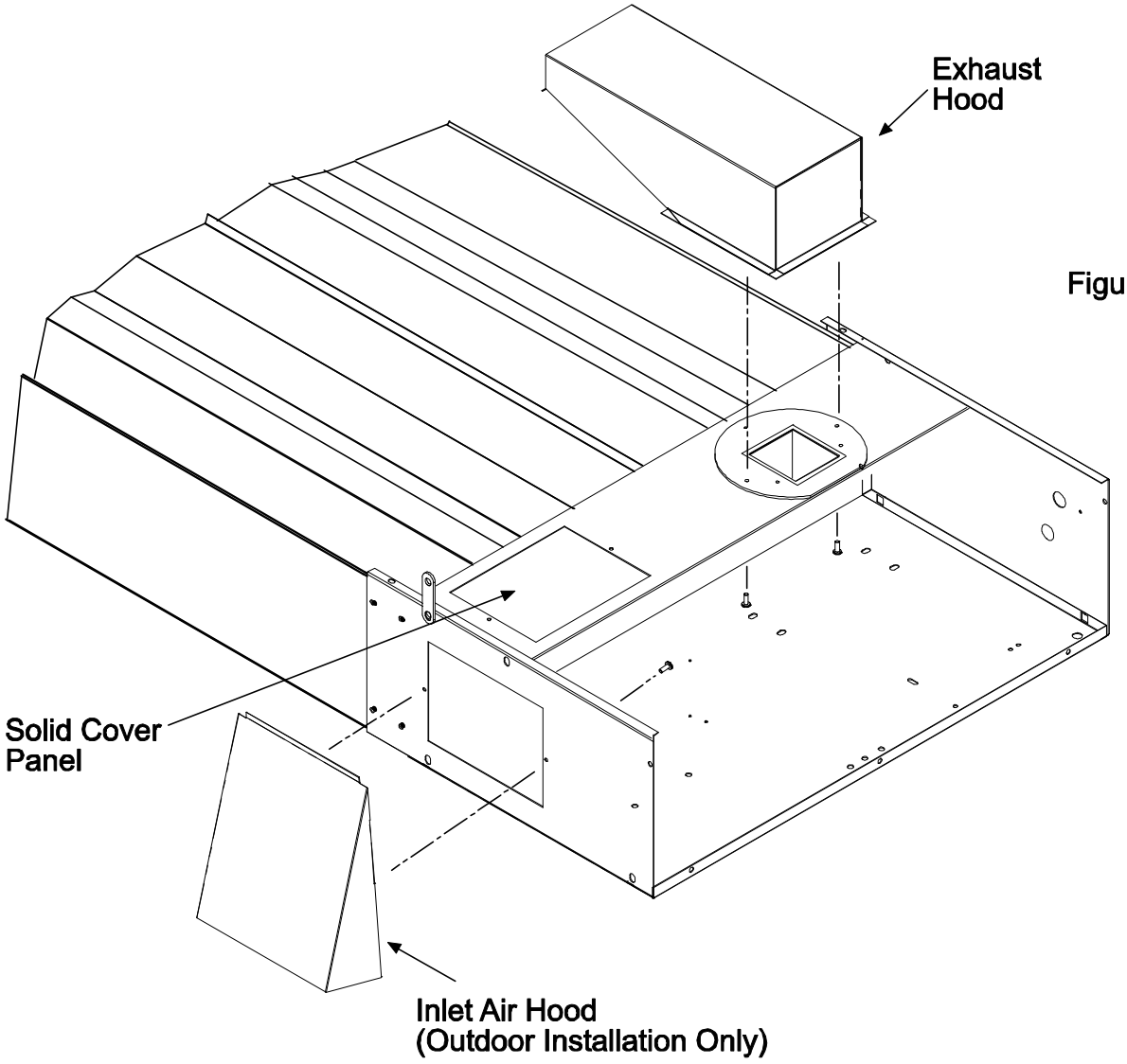


Figure 2

4) TYPICAL SUSPENSION METHODS

Various means of suspending the heater can be used. The following should be observed:

1. Use only noncombustible materials for hangers and brackets.
2. Heaters must not be supported by gas or electric supply lines and must be suspended from a permanent structure with adequate load capacity.
3. Heaters subject to vibration must be provided with vibration isolating hangers.
4. A minimum No. 2 chain with a working load limit of 115 lbs. is required when using four (4) separate chains. If a "trapeze" method of hanging is desired, you must use a chain with a load limit of at least 230 lbs.
5. The heater can be mounted horizontally or at angles of 30º, 60º, or 90º indoors. The maximum mounting angle is 45º when installed outdoors. **The long axis of the heater should be level whether is it mounted horizontally or angled.**
6. If the heater is to be mounted horizontally or at an angle up to 60º, use the hanging brackets installed on the heater. See Figure 3.
7. If the heater is to be mounted at a 90º angle, remove the existing hanging brackets from each end of the heater and replace with "L"shaped brackets. See Figure 4. (**Note**: "L" shaped brackets are supplied as an accessory item. Order Kit No. 42929000.)
8. **IMPORTANT**: When the heater is angle mounted, the exhaust side should be up. See Figure 5.

Figure 3

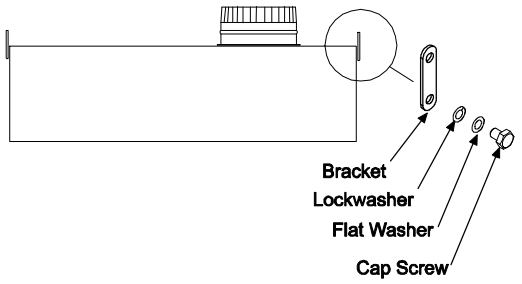


Figure 4

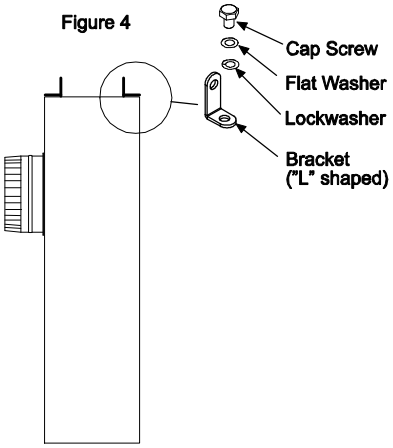
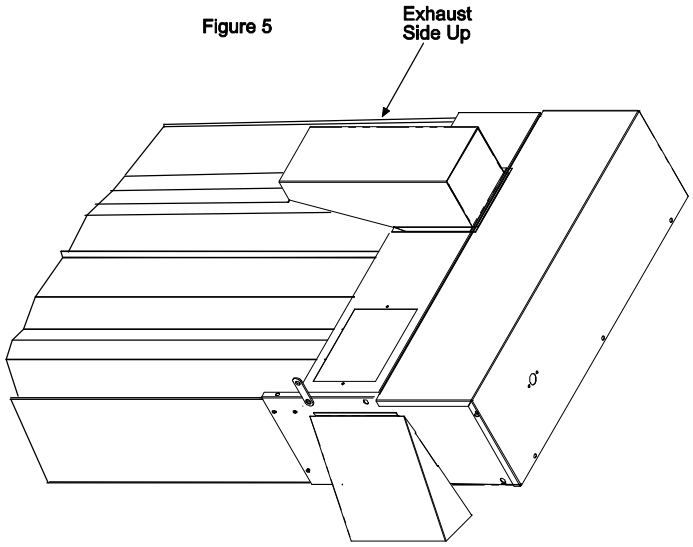
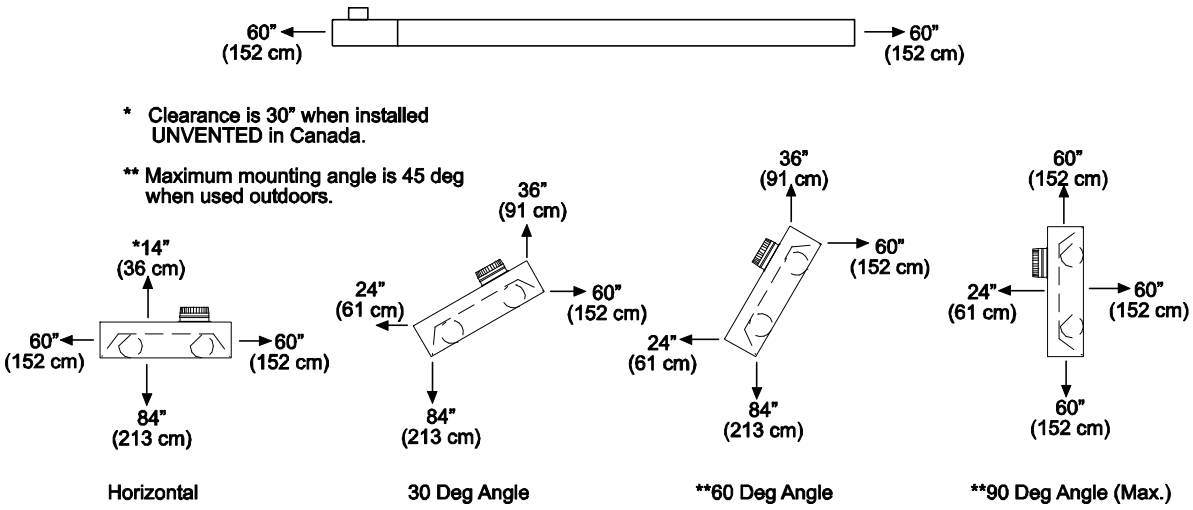


Figure 5



5) MINIMUM CLEARANCES TO COMBUSTIBLES

Minimum clearances to combustibles shall be measured from the outer surfaces as shown in the following diagram:



NOTE: The clearances specified above must be maintained to combustibles and other materials that may be damaged by temperatures 90°F above ambient temperature. Clearances to combustibles are posted on the control box. In areas used for storage of combustible materials where they may be stacked below the heater, NFPA54 requires that the installer must post signs that will "specify the maximum permissible stacking height to maintain the required clearances from the heater to combustibles." Space-Ray recommends posting these signs adjacent to the heater thermostat or other suitable location that will provide enhanced visibility.

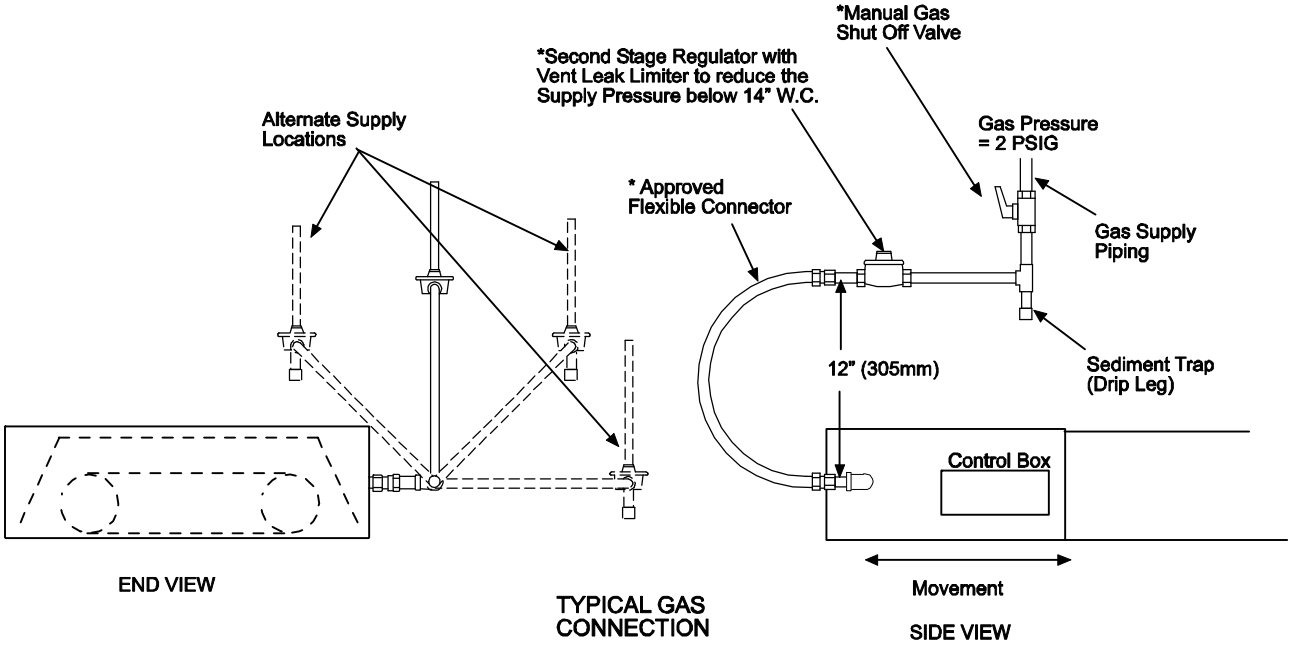
6) GAS CONNECTIONS AND REGULATIONS

1. Connect to the supply tank or manifold in accordance with the latest edition of National Fuel Gas Code (ANSI Z223.1), and local building codes. Authorities having jurisdiction should be consulted before the installation is made. (In Canada, refer to the latest edition of CAN Standard B.149-1 & -2, Installation Codes for Gas Burning Appliances and Equipment.)
2. All gas supply lines must be located in accordance with the required clearances to combustibles below the heater as listed on the nameplate of the heater.
3. Pipe joint compounds must be resistant to the action of liquefied petroleum gases.
4. Where local codes do not prohibit, a CSA or U.L. approved flexible connector (minimum 5/8" I.D.) is recommended between the rigid piping and the heater. A union and an approved shut off valve should be installed before the control valve inlet. The shut off valve should be installed within 6 feet of the union.
5. This appliance is equipped with a step-opening, combination gas valve. **The maximum supply pressure to the appliance is 14" W.C. or 1/2 P.S.I.** If the line pressure is more than the maximum supply pressure, then a second stage regulator that corresponds to the supply pressure must be used.
6. If a second stage regulator is used and gas seeps through it, the redundant combination gas valve is designed to lock out. Pressure build-up in the supply lines prior to the heater must be released before proper heater operation.
7. After all gas connections have been made, make sure the heater and all gas outlets are turned off before the main gas supply is turned on. Turn the gas pressure on and check for leaks. To check for leaks, apply a soapsuds solution to all connections and joints or check by one of the methods listed in Appendix D of the National Fuel Gas Code.

! DO NOT USE AN OPEN FLAME OF ANY KIND TO TEST FOR LEAKS.

Certified connectors are recommended to be installed as shown, in one plane, and without sharp bends, kinks or twists. The gas take off from the drop line must be parallel to the burner gas inlet connection.

If the maximum supply pressure is less than ½ psig, a second stage regulator is not required.



TYPICAL GAS CONNECTION

* Available as Accessories

7) INSTRUCTIONS FOR PRESSURE TEST GAUGE CONNECTION

Supply Pressure

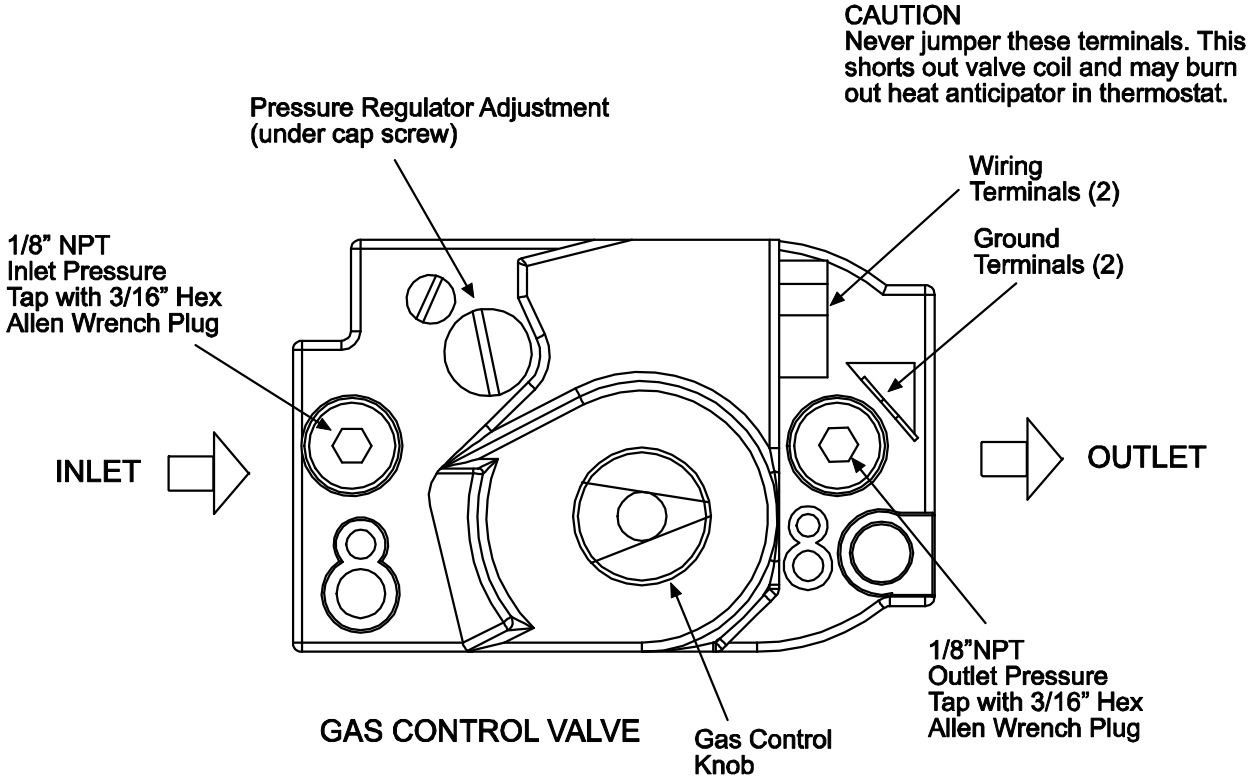
1. The installer will provide a 1/8" N.P.T. plugged tapping, accessible for test gauge connection immediately upstream of the gas supply connection to the heater.

Manifold Pressure

1. Turn the gas valve to the "OFF" position. Remove the 1/8" plug from the combination gas valve at the outlet pressure tap and connect a 1/8" nipple to the tapped hole. Connect the gauge to the nipple. Turn on the gas supply.
2. With the main burner operating, check the burner manifold pressure using a water manometer. Gauges that measure pressure in pounds per square inch are not accurate enough to measure or set the manifold pressure. All measurements **MUST BE** made when this heater and all other gas burning equipment that is connected to the gas supply system are operating at maximum capacity.
3. The combination gas valve is factory set and should not be adjusted. If full rate adjustment is required, remove the cover screw. Using a small screwdriver, turn the adjustment screw clockwise ↻ to increase or counterclockwise ↺ to decrease the gas pressure to the burner. Replace the cover screw. **NOTE: The step opening pressure of this gas valve is not adjustable.**
4. Check the burner at step pressure, observing burner ignition and flame characteristics. The burner should ignite properly and without flashback to the orifice, and should remain lit. Cycle the burner several times. Wait 30 seconds between cycles to allow the step opening combination gas valve or servo regulator to resume the first step action. Also, observe the burner operation at full pressure. Repeat after allowing to cool. (Gas pressures are shown in the following table.)

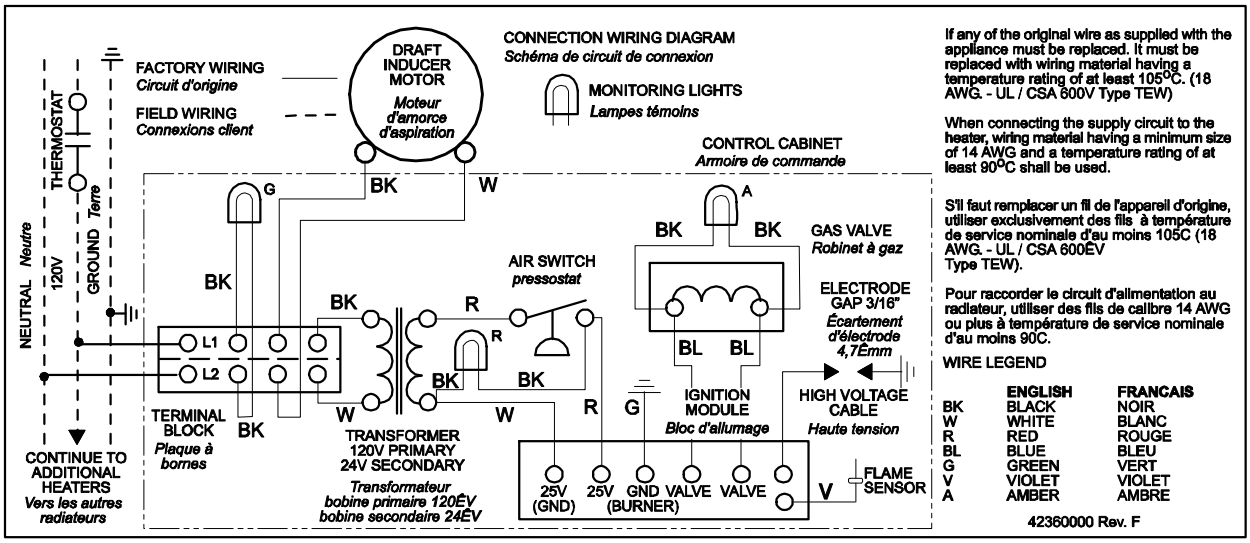
GAS PRESSURE TABLE			
		SUPPLY PRESSURE	
GAS TYPE	MANIFOLD PRESSURE	*Minimum*✳	*Maximum*
Natural Gas	3.5" W.C.	5" W.C.	14" W.C.
Propane Gas	10.0" W.C.	11" W.C.	14" W.C.

✳ Minimum permissible gas supply pressure for purpose of input adjustment.

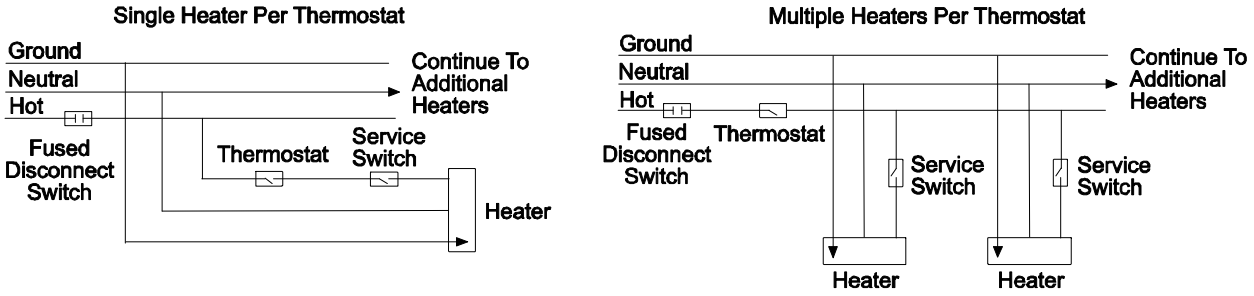


8) ELECTRICAL CONNECTIONS

1. All electric wiring shall conform to the latest edition of the National Electrical Code (ANSI/NFPA No. 70), or the code legally authorized in the locality where the installation is made.
2. The unit must be electrically grounded in accordance with the National Electrical Code (ANSI/NFPA No. 70-latest edition). In Canada, refer to current standard C22.1 Canadian Electrical Code Part 1.
3. The wiring providing power to the heater shall be connected to a permanently live electrical circuit, one that is not controlled by a light switch.
4. The power supply to the unit should be protected with a fused disconnect switch or circuit breaker. A service switch, as required by local codes, shall be located in the vicinity of the heater (check local codes for allowable distances) and should be identified as the Heater Service Switch. All electrical wiring must be located in accordance with the required Clearances to Combustibles below the heater as listed on the nameplate of the heater.
5. When connecting the supply circuit to the heater, wiring material having a minimum size of 14 AWG and a temperature rating of at least 90ºC shall be used.



TYPICAL WIRING AND THERMOSTAT CONNECTIONS



9) VENTING

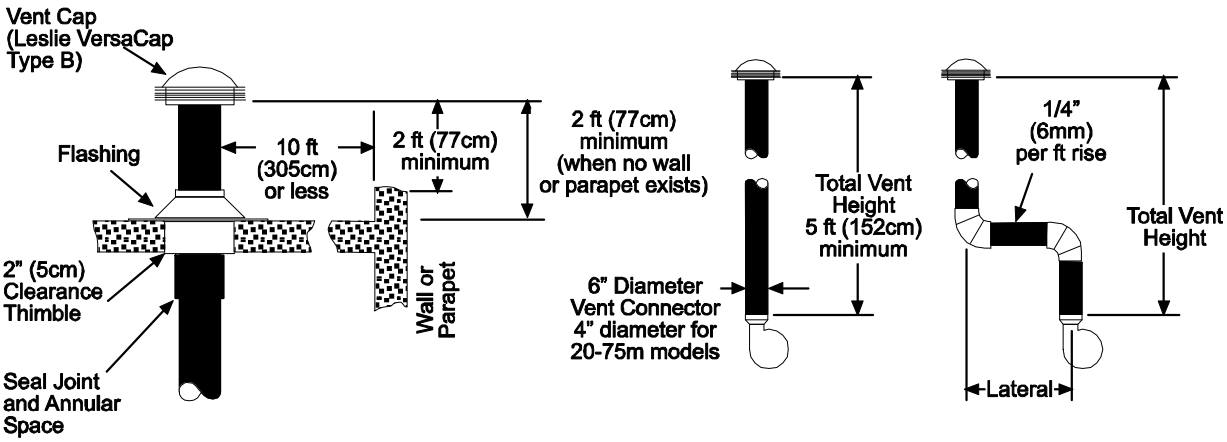
A. BASIC FLUE VENTING — Venting must comply with the latest edition of the National Fuel Gas Code (ANSI Z223.1-latest edition) or the authority having jurisdiction. Other venting references are in the equipment volume of the ASHRAE Handbook.

SINGLE HEATER VENTING (VERTICAL THROUGH THE ROOF)

1. When venting the heater to the outside of a building through a roof, use single-wall metal pipe. This is to be constructed of galvanized sheet metal or other approved noncombustible corrosion-resistant material as allowed by state or local codes.
2. A vent passing through a combustible roof shall extend through a 2-inch clearance roof thimble. Double-wall, Type B vent must be used for the portion of the vent system which passes through the roof. An approved vent cap (Leslie "VersaCap"-Type B) must be attached to end of the flue.

3. The maximum equivalent length of vent pipe should be carefully observed. A safety switch in the heater is designed to shut the heater off before excessive flue restriction causes bad combustion. Refer to the Vent Sizing Table at the end of this section for required vent pipe diameter.
   - Minimum Equivalent Length = 5 ft. of Pipe
   - Maximum Equivalent Length = 100 ft. of Pipe

   Use the following correction factors to obtain the equivalent length:
   a. Subtract 15 ft. if the run is horizontal.
   b. Subtract 10 ft. for an approved vent cap.
   c. Subtract 10 ft. for each elbow beyond 15 ft. from the heater.
   d. Subtract 15 ft. for each elbow within 15 ft. of the heater.
4. Avoid locating elbows in the first 5 ft. of vent pipe whenever possible. Limit to (2) 90° elbows. When vent pipe is in a horizontal run, it must have 1/4 inch per foot rise.
5. Joints between sections of piping shall be fastened by sheet metal screws or other approved means and should be sealed to prevent leakage of flue gas into building. Aluminum or Teflon tape suitable for 550°F (3M Company tapes 433 or 363) or silicone sealant is recommended.
6. All portions of the vent pipe shall be supported to prevent from sagging.
7. When the vent pipe passes through areas where the ambient temperature is likely to induce condensation of the flue gases, the vent pipe should be insulated and a condensation drain should be provided.
8. Minimum clearance for single-wall flue pipe to combustible material shall be 6 inches. This may be reduced when the combustible material is protected as specified in the National Fuel Gas Code or the authority having jurisdiction.
9. Single-wall metal pipe shall not originate in any unoccupied attic or concealed space and shall not pass through any attic, inside wall or concealed space, or through any floor. For the installation of a single-wall metal pipe through an exterior combustible wall, refer to latest edition of the National Fuel Gas Code or the authority having jurisdiction.
10. A venting system shall terminate at least 3 ft. above any forced air inlet located within 10 ft.



Vertical Through the Roof

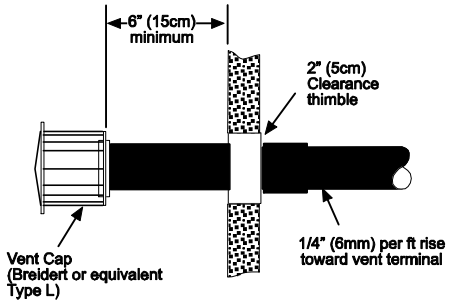
Single Heater Venting

SINGLE HEATER VENTING (HORIZONTAL THROUGH SIDEWALL)

When venting the heater horizontally through a combustible outside sidewall, the same requirements listed previously for venting **Vertical Through The Roof** apply *except* as follows:

1. A vent passing through a combustible wall must pass through a 2-inch clearance thimble (Air-Jet #4VT or #6VT or Ameri-Vent #4EWT or #6EWT) or other thimbles that are listed by a nationally recognized testing agency.
2. An approved vent cap (Breidert-Type L or equal) must be attached to the end of the vent pipe.
   - Minimum Equivalent Length = 5 ft. of Pipe
   - Maximum Equivalent Length = 75 ft. of Pipe

   NOTE: To minimize problems associated with condensation in long horizontal runs, vent pipe can be insulated.
3. When venting through a sidewall, the horizontal vent pipe shall rise not less than 1/4 inch per foot from the start of the vent system to the vent terminal. All portions of the vent pipe shall be supported to prevent sagging.
4. A minimum clearance of 6 inches must be maintained between the outside wall and vent cap.
5. The horizontal venting system shall not terminate:
   a. Less than 4 ft. (1.2m) below, 4 ft. (1.2m) horizontally from or 1 ft. (30cm) above any door, window or gravity air inlet into any building. The bottom of the vent terminal shall be located at least 7 ft. (2.1m) above grade or above snow accumulation level as determined by local codes.
   b. Less than 3 ft. (0.9m) from a combustion air inlet.
   c. Less than 3 ft. (0.9m) from any other building opening or any gas service regulator.
   d. Directly over areas where condensate or vapor could create a nuisance or hazard or be harmful to the operation of gas utility meters, regulators, relief valves, or other equipment. Building materials should be protected from flue gases and condensate.
6. In regions of the country where prevailing winds are consistently higher than 40 mph, it may be necessary to terminate the vent system above the roof level.



Horizontal Through Sidewall

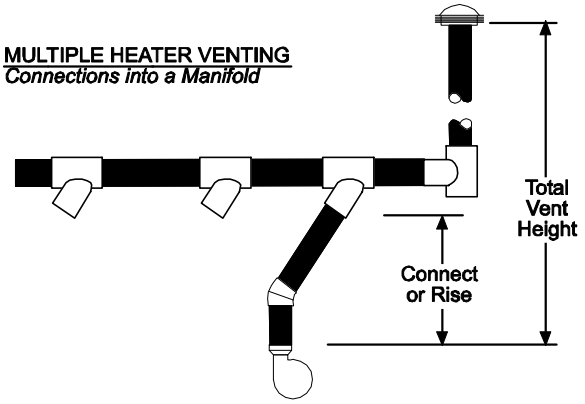
MULTIPLE HEATER VENTING (CONNECTIONS INTO A COMMON VENT OR MANIFOLD)

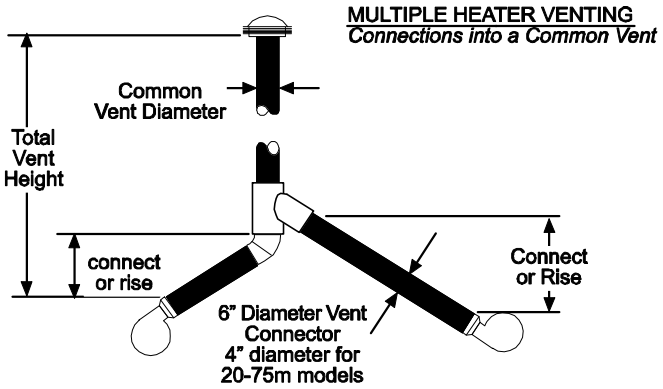
Requirements for venting of multiple heaters are the same as described for **SINGLE HEATER VENTING** *except* as follows:

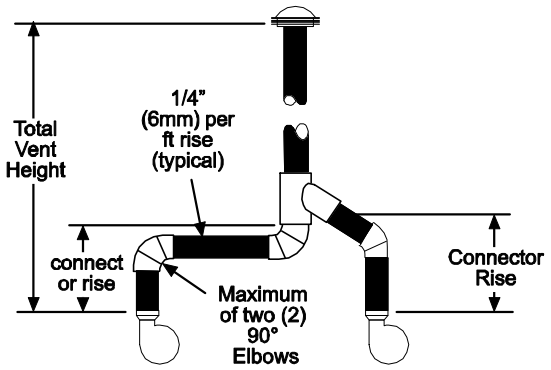
1. The common vent size and total vent height is normally determined by the number of heaters per common vent, length of horizontal connector runs, and connector rise. Connector lengths should be as short as possible and have a minimum ¼" per ft. rise. Without regard to connector rise and total vent height due to many possible venting configurations, the following should be observed:
   a. Common vent pipe & vent connector diameter should be no less than that shown in the following Vent Sizing Table.
   b. The connector length should be no more than 75% of the vertical portion of vent above the connector.
   c. Where possible, use a Y-connector to the common vent.
2. Material for connectors should be constructed of galvanized sheet metal or other approved noncombustible corrosion resistant material as allowed by state or local codes. All common vent pipe should be double wall, Type B vent.
3. Avoid unnecessary bends. Limit to two (2) 90° elbows.
4. The entire length of vent connector shall be readily accessible for inspection, cleaning and replacement.
5. Groups of heaters with a common vent must be controlled by a common thermostat.

▲WARNING: COMMON VENTING OF MULTIPLE HEATERS IN CONFINED SPACES IS PROHIBITED. If any heater connected to a common vent system for multiple heaters is found inoperative, the heater should be disconnected from the vent system and its entrance into the vent system capped.

THE ILLUSTRATIONS AND TABLE OF VENT SIZES FOR COMMON VENTING OF MULTIPLE HEATERS ARE IN ACCORDANCE WITH THE NATIONAL FUEL GAS CODE ANSI Z223.1-LATEST EDITION, NFPA #54-LATEST EDITION, EQUIPMENT VOLUME OF 1988 ASHRAE HANDBOOK, CURRENT CAN/CGA-B149.1/2-M86 INSTALLATION CODE, AND AGA PUBLICATION NO. 10M5.85 2.5-2 ON FUNDAMENTALS OF GAS APPLIANCE VENTING AND VENTILATION-REVISED BUT ARE NOT A PART OF THE CSA CERTIFICATION.







VENT SIZING TABLE							
	Number of Heaters						
	1	*2*	*3*	*4*	*5*	*6*	*8*
RSTP15 and RSTP17	6"	8"	10"	11"	12"	12"	14"
	COMMON VENT DIAMETER If a size is not available use the next larger size.						

B. INDIRECT VENTING (UNVENTED HEATERS) — This heater requires ventilation in the building to dilute the products of combustion and provide fresh air for efficient combustion. Where unvented heaters are used, gravity or mechanical means shall be provided to supply and exhaust at least 4 CFM per 1,000 Btu/hr input of installed heaters. Exhaust vents must be located at the highest point above and in the vicinity of the heaters, and the inlet vents must be located below the level of the heaters. An Exhaust Hood must be used as described in *Section 3*. **NOTE:** Exhaust Hoods and Inlet Air Hoods are supplied as Accessory items. Refer to the Part Numbers listed in *Section 3* to order the kit your unvented application requires.

10) AIR FOR COMBUSTION

If indoor combustion air is to be supplied for a tightly enclosed area, one square inch of free area opening shall be provided below the heater for each 1,000 Btu/hr of heater input. Adequate clearances around the perforated fresh air plate must be maintained at all times. In larger open areas of buildings, infiltration normally is adequate to provide air for combustion.

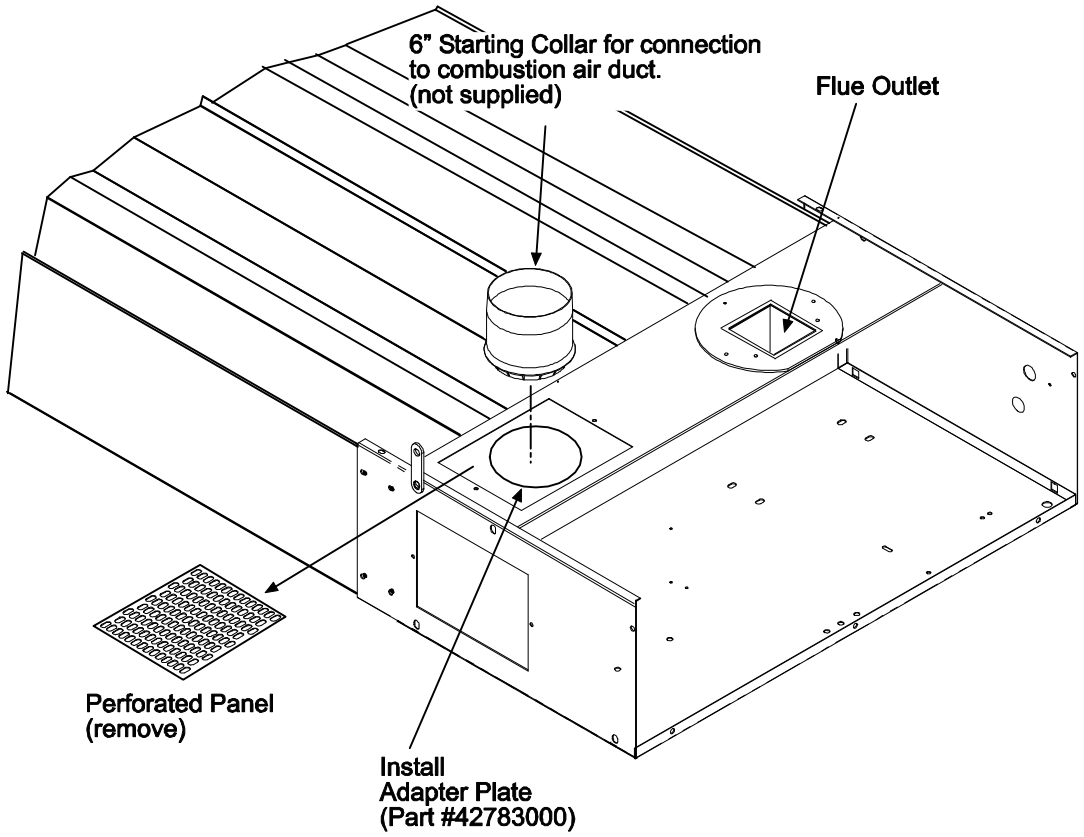
11) DIRECT OUTSIDE AIR FOR COMBUSTION

Outside combustion air should be supplied directly to the heater when the building is subject to negative pressure, or when contaminants or high humidity are present in the building air. These contaminants include paints, solvents, corrosive vapors or any other foreign particles that may cause damage to the heater or result in poor combustion.

- Products of combustion should be vented outside the building when bringing fresh air to the heater.
- The fresh air inlet and the flue outlet should be in the same outside pressure zone (both through the roof or both through the same sidewall).
- Outside combustion air can be brought directly to the heater by a 6" diameter duct that is no more than 50 ft. long . Use a larger diameter duct if the duct length is more than 50 ft.
- Use a 6" vent cap (Part #41000000) for fresh air inlet duct termination.
- To bring outside combustion air to the heater, you will need to order the RSTP Fresh Air Kit (Part #4278200), which includes one adapter plate. Refer to installation instruction below.

INSTALLATION INSTRUCTIONS -- RSTP FRESH AIR KIT -- Part #42782000

1. Remove the existing perforated panel from the top of the heater and replace it with the adapter plate from the Fresh Air Kit.
2. Insert a 6" starting collar (not supplied) and bend over the tabs to secure. Install the 6" diameter duct (not supplied) and vent cap per guidelines above.



12) LIGHTING AND SHUTDOWN INSTRUCTIONS

FOR YOUR SAFETY READ BEFORE LIGHTING. ▲WARNING: IF YOU DO NOT FOLLOW THESE INSTRUCTIONS EXACTLY, A FIRE OR EXPLOSION MAY RESULT CAUSING PROPERTY DAMAGE, PERSONAL INJURY OR LOSS OF LIFE.

A. This heater does not have a pilot. It is equipped with an electronic device that automatically lights the burner. **DO NOT** try to light the burner by hand.

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

C. Use only your hand to turn the gas control knob. Never use tools. If the knob will not turn by hand, do not try to repair it, call a qualified service technician. Force or attempted repair may result in a fire or explosion.

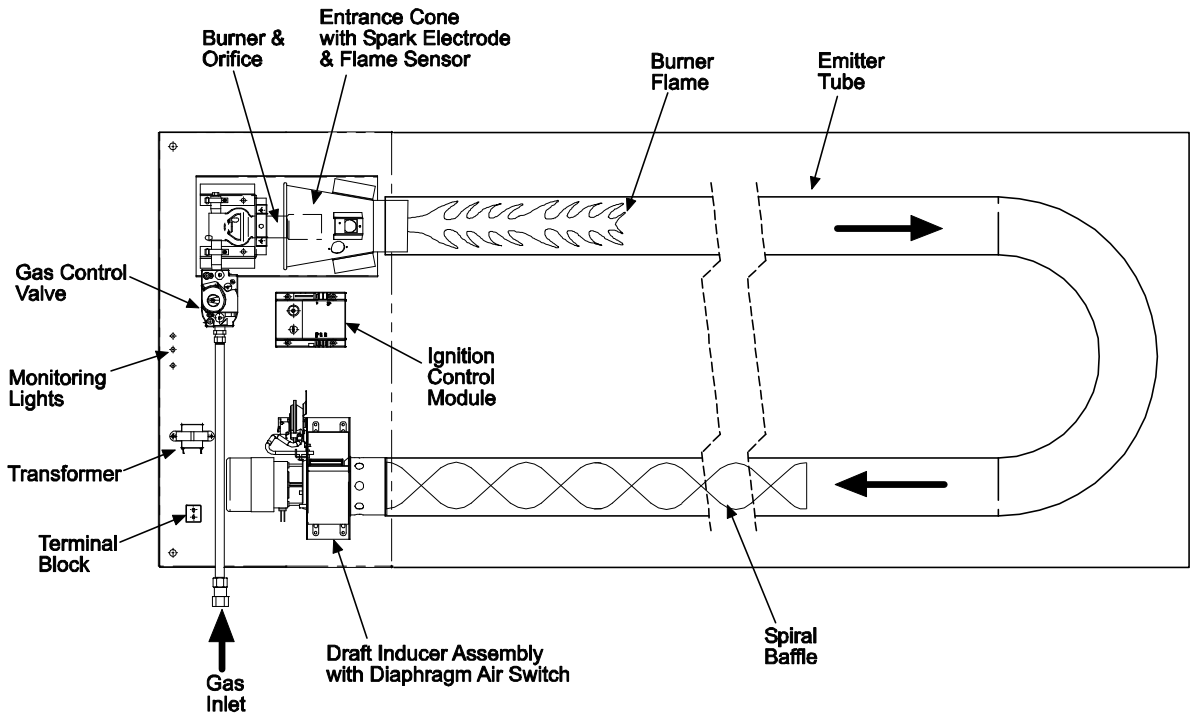
D. Do not use this heater if any part has been under water. Immediately call a qualified service technician to inspect the heater and to replace any part of the control system and any gas control that has been under water.

WHAT TO DO IF YOU SMELL GAS

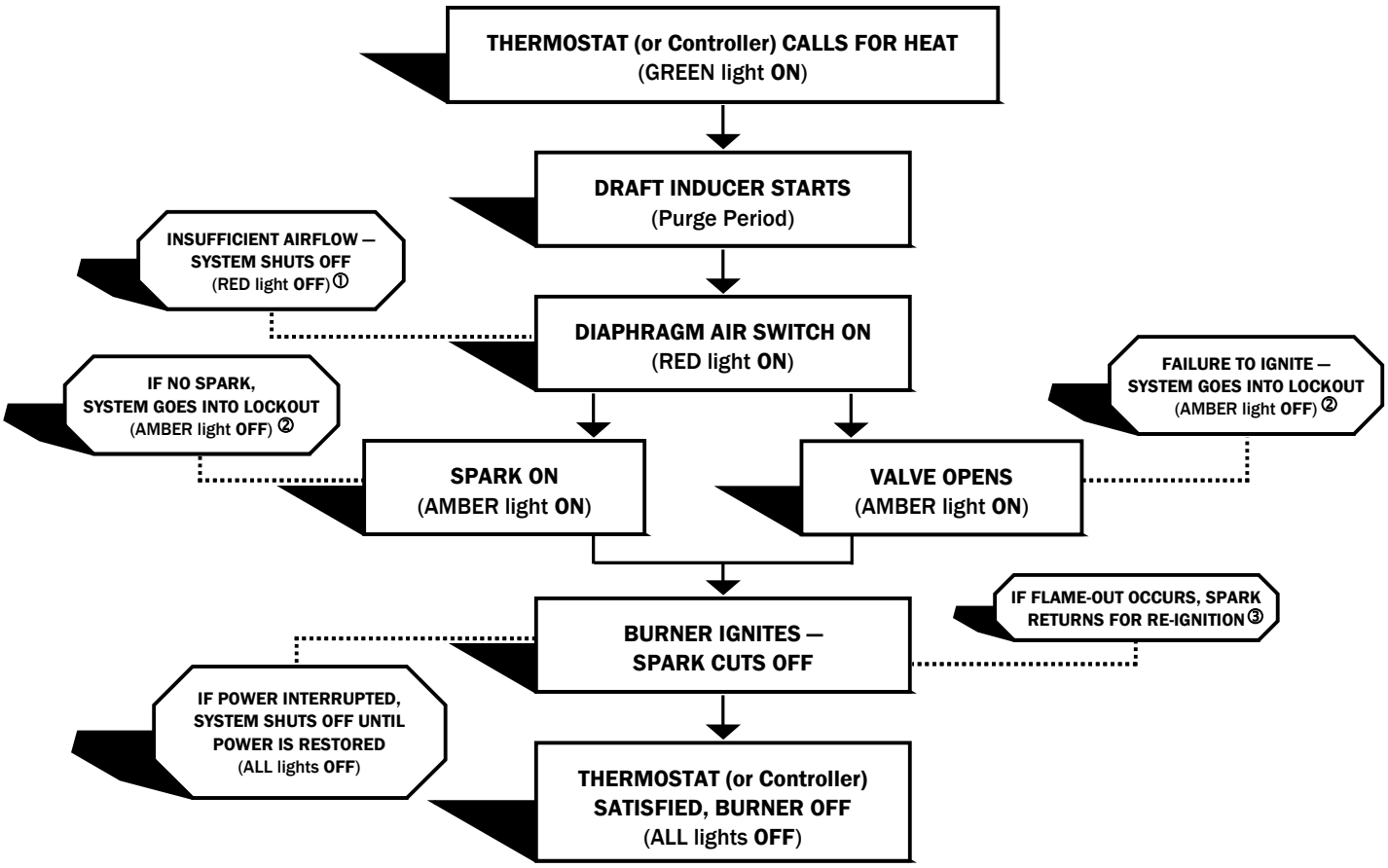
- **DO NOT** try to light any appliance.
- **DO NOT** touch any electric switch; DO NOT use any telephone in your building.
- **Immediately** call your gas supplier from a neighbor's telephone. Follow the gas supplier's instructions.
- If you cannot reach your gas supplier, call the Fire Department.

1) Turn on the gas supply.
2) Set the thermostat to call for heat.
3) Ignition should occur after the 30-second air purge.
4) If ignition fails, the unit will spark for approximately 21 seconds and go into safety lockout. Turn the thermostat (power) off for 60 seconds to take the system out of lockout.
5) If the heater does not light, shut off gas completely for 5 minutes before attempting to relight.
6) **▲CAUTION: The heater must be grounded.** Poor grounding will give nuisance lockouts, particularly during momentary power interruptions.
7) To shut down the heater, turn off the gas and the electrical supply.

NOTE: The Lighting and Shutdown Instructions are also shown on the permanent nameplate attached to the heater control box.



13 SEQUENCE OF OPERATION



NOTES:

① – Insufficient airflow indicates defective draft inducer or restricted flue.

② – Corrective action and system reset are necessary.

③ – If burner does not re-ignite, system goes into lockout. Corrective action and system reset are necessary.

ERROR -- Octagons represent actions resulting from possible malfunction.

14) IGNITION SYSTEM CHECKS

➤ **STEP 1: CHECK IGNITION CABLE.**

a) Make sure that the ignition cable does not touch any metal surface.
b) Make sure that connections to the stud terminal and the igniter/sensor are clean and tight.
c) Make sure that the ignition cable provides good electrical continuity.

➤ **STEP 2: CHECK IGNITION SYSTEM GROUNDING.**

(Nuisance shutdowns are often caused by a poor or erratic ground.) A common ground is required for the module, igniter, flame sensor and main burner.

a) Check for good metal-to-metal contact between the igniter bracket and the main burner.
b) Check the ground lead from the GND (BURNER) terminal on the module to the igniter bracket. Make sure connections are clean and tight. If the wire is damaged or deteriorated, replace it.
c) Replace igniter/sensor with factory replacement part if insulator is cracked.

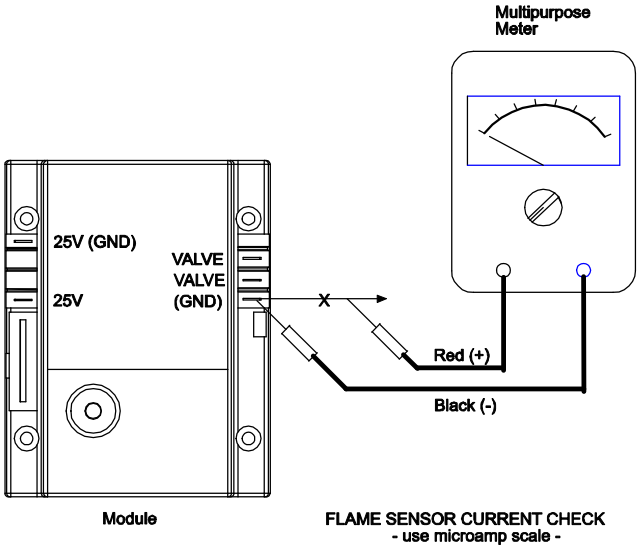
➤ **STEP 3: CHECK SPARK IGNITION CIRCUIT.**

⚠WARNING: **THE IGNITION CIRCUIT GENERATES A 20,000 VOLT OPEN CIRCUIT AND ELECTRICAL SHOCK CAN RESULT.**

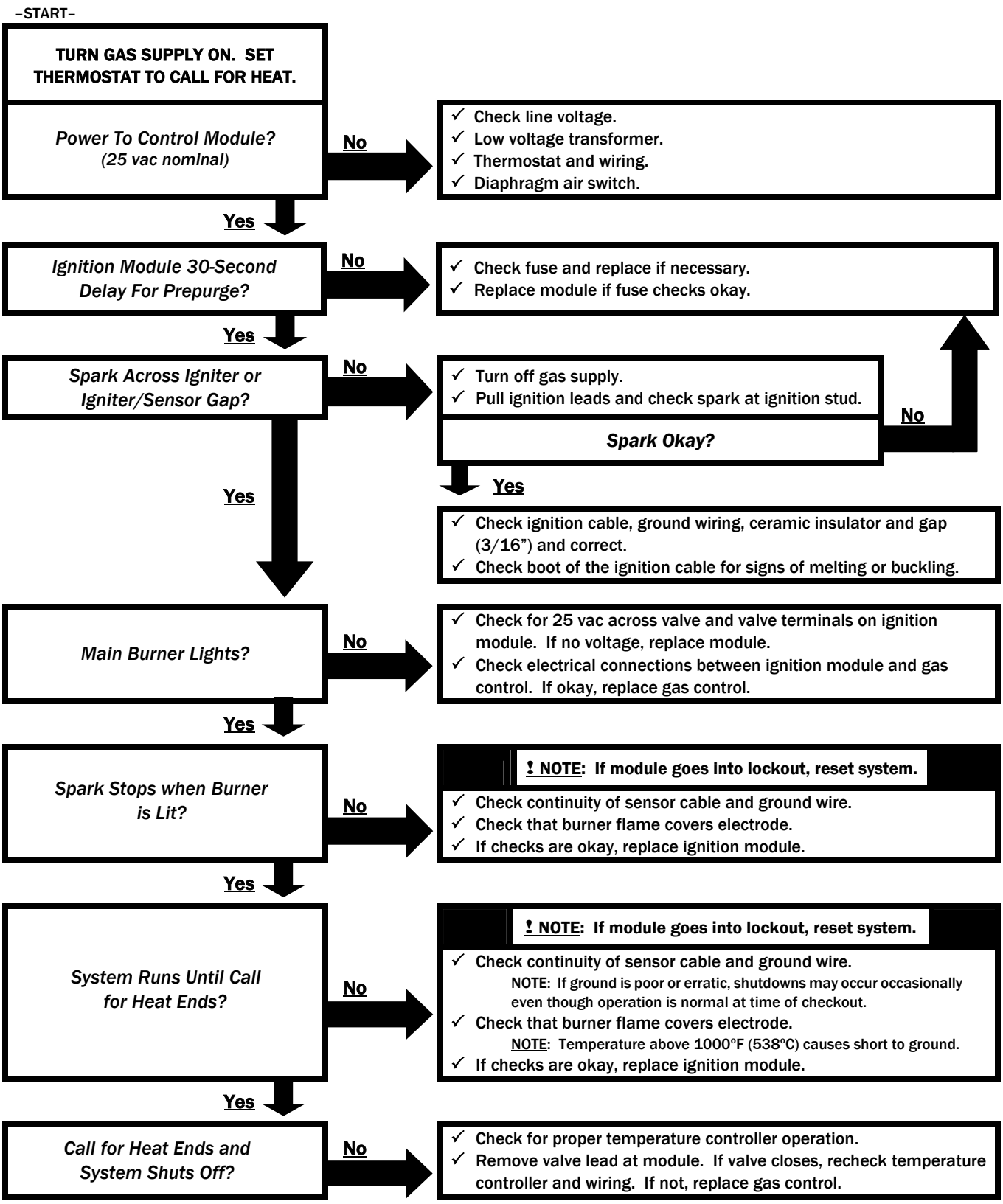
a) Check ignition cable.
b) Check external fuse on the module.
c) Verify power (24V) at module input terminals and output terminal to gas valve.
d) Replace spark module if fuse and power are OK.

➤ **STEP 4: CHECK FLAME SENSOR CIRCUIT.**

a) Turn off heater at thermostat.
b) Connect a meter (dc microammeter scale) in series with the ground lead as shown in the diagram. Use a Honeywell W136 Test Meter or equivalent. Connect the meter as follows:
   - Disconnect the ground lead at the electronic control.
   - Connect the black (negative) meter lead to the electronic control GND terminal.
   - Connect the red (positive) meter lead to the free end of the ground lead.
c) Restart the system and read the meter. The flame sensor current must be steady and measure at least 1.5 micro amps.
d) If the meter reads less than the minimum or if reading is unsteady:
   - Make sure burner flame is capable of providing a good rectification signal.
   - Make sure fasteners securing igniter/sensor are tightened to assure correct positions. DO NOT relocate igniter/sensor.
   - Check for excessive (over 1000°F) temperature at ceramic insulator on flame sensor. Excessive temperature can cause short to ground. DO NOT relocate igniter/sensor.
   - Check for cracked ceramic insulator, which can cause short to ground, and replace sensor if necessary.
   - Make sure that electrical connections are clean and tight. Replace damaged wire
e) Remove microammeter and reconnect ground wire. Return system to normal operation.



15) TROUBLESHOOTING GUIDE OF DIRECT SPARK IGNITION SYSTEM



–END TROUBLESHOOTING–

REPEAT PROCEDURE UNTIL TROUBLE-FREE OPERATION IS OBTAINED.

16) MOTOR AND BLOWER WHEEL CHECK

If draft inducer motor fails to run: A) Check power supply to junction box. B) Check for loose or broken motor lead wire. C) Check to see that blower wheel turns freely and is not rubbing housing. Blower wheel may have worked loose from shaft and jammed against housing. D) Check for blower wheel damage; replace if necessary. If no damage, readjust blower wheel on shaft & retighten set screw. E) If all above does not correct, replace motor.

17) CLEANING AND ANNUAL MAINTENANCE

This heater must be cleaned and serviced annually before the start of each heating season and at any time excessive accumulation of dust and dirt is observed. Maximum heating efficiency and clean combustion will be maintained by keeping the heater clean. To clean the heater, follow these instructions: 1) Turn off all electrical and gas supply to the heater. 2) Open the control box access panel. 3) Clean the access panel, the inside of the control box, the emitter tube and the reflector panels. (Dirty reflectors will reduce output.) 4) Visually inspect the spark electrode. Remove any foreign objects from electrode tip. Set the spark gap to the proper value of 3/16". **!CAUTION: The ceramic portion of the electrode is very fragile so any cleaning or adjustments must be done with care.** 5) Disconnect the vent stack and remove any foreign material that may have collected on the blower wheel. Make sure the blower wheel is clean. A dirty wheel can reduce the volume of air pulled and can result in premature tube failure.

18) REPLACING PARTS

Ensure that at all times when parts are being replaced, both gas and electrical supplies are disconnected. Various parts are available from the factory for replacement by a licensed person. Refer to the Replacement Parts Guide in Section 20 for all replacement parts.

19) INSTALLATION DATA

Date of Installation: _____ Number of Heaters in System: _____

Serial No. _____

Model No. RSTP

MODEL NUMBER SUFFIXES:
N = Natural Gas
L = Propane Gas
5D = Direct Spark Ignition of Main Burner

IMPORTANT:
- Please order by Part Number, not by Item Number.
- Refer to complete Model Number when ordering.
- All replacement part prices available when ordering.

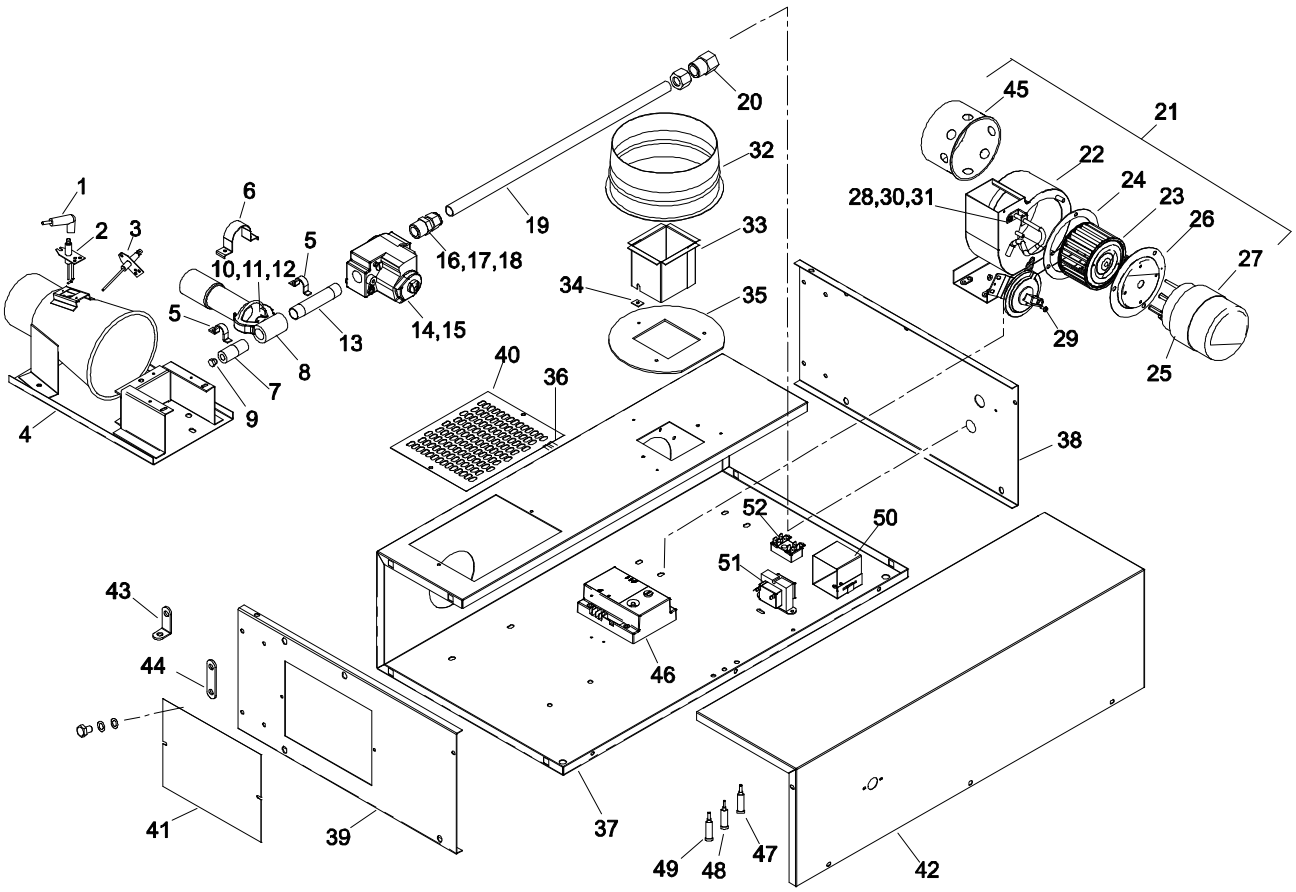
20) REPLACEMENT PARTS GUIDE

Models: RSTP15C & RSTP17C

CONTROL COMPONENTS

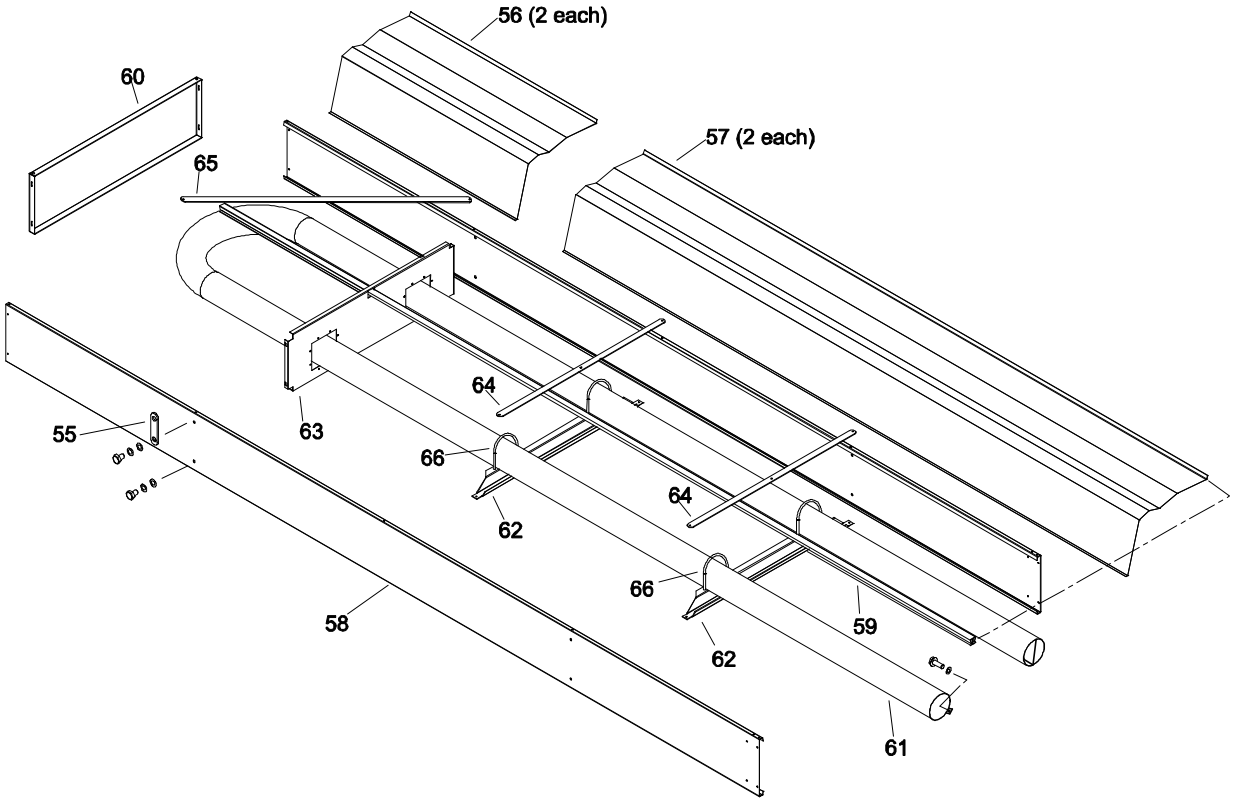
ITEM NO.	PART NO.	DESCRIPTION
1	30314120	Ignition Cable Assembly
2	30216000	Spark Electrode - #PSE-GF2
3	03763000	Flame Sensor - #PSE-GF3
4	42387000	Entrance Cone & Support Assembly
5	04702000	Clamp, Manifold
6	42393000	Clamp, Burner
7	30175000	Brass Nipple - 1/2
8	41971000	Burner Assembly
9	03339020	Plug - 1/8
10	03259010	Main Burner Orifice (#1) Nat. (RSTP15C)
11	03259950	Main Burner Orifice ("D") Nat.
12	03259260	Main Burner Orifice (#26) LP
13	03333140	Nipple - 1/2 x 4"
14	30333030	Gas Valve - VR8205A-2008 @ 3-1/2"WC Nat.
15	30333040	Gas Valve - VR8205A-2081 @ 10"WC LP
16	03602100	Compression Union - 5/8 Tube x 1/2 NPT
17	03600040	Compression Sleeve - 5/8 Tube
18	03601040	Compression Nut - 5/8 Tube
19	42372000	Manifold Tubing
20	30244000	Compression Fitting - 5/8 Tube x 1/2 NPT
21	43143000	Draft Inducer Assembly (w/Air Switch)
22	43142000	Draft Inducer Housing Assembly
23	03723000	Blower Wheel
24	43221000	Motor Gasket
25	30347000	Motor Spacer - 5/16"OD x 1"
26	42740000	Motor Plate
27	03721000	Motor - 115V 1/20HP 1.73A 60Hz
28	03988070	Tubing, Silicone - 7"
29	30186201	Air Switch #RSS-495-307 set @ -.11"WC
30	42744020	Air Sensing Tube
31	42742000	Air Sensing Tube Clamp
32	42377000	Flue Collar - Outlet
33	42851000	Vent Collar Assembly
34	42392000	Clamp - Flue Collar
35	42395000	Gasket - Flue Collar
36	42391000	Extrusion Bracket
37	42365000	Control Mounting Panel
38	42368000	Extension Panel - RH
39	42369000	Extension Panel - LH
40	42374000	Cover Panel - Perforated
41	42389000	Cover Panel - Solid
42	42448000	Access Panel Assembly
43	42929000	Suspension Bracket - "L" Shaped
44	40481000	Suspension Bracket - 3"
45	42376000	Flue Collar - Inlet (5/8" dia. holes)
46	30356040	Spark Module - #S87K-1032
47	30220010	Monitoring Light - Green
48	30220020	Monitoring Light - Red
49	30220030	Monitoring Light - Amber
50	42709000	Terminal Block Shield

51	30279000	Transformer - 120/24V 20VA 50/60Hz
52	30281000	Terminal Block - #EK-204
53	42360000	Connection Wire Diagram (not shown)
54	43206000	Manual (not shown)



BODY COMPONENTS

ITEM NO.	PART NO.	DESCRIPTION
55	40481010	Suspension Bracket - 4"
56	40531000	Reflector - Short
57	40531010	Reflector - Long
58	40788000	Side Rail
59	40919010	Extrusion - Reflector
60	42367000	Foot End Panel
61	43159000	Tube Assembly
62	42378010	Tube Channel Retainer
63	42386000	Suspension Panel Assembly
64	42396010	Brace - Cross
65	42396020	Brace - Diagonal
66	42873000	"U" Bolt Clamp



Most parts are assembled together at the factory using pop rivets. When replacing parts, these rivets may be substituted with standard screws, washers, and nuts, which can be purchased at any local hardware store.

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