



RSGS-2

RSG SERIES TUBE HEATERS

☐ RSG 25 ☐ RSG 35 ☐ RSG 45 (Check One)

□ NATURAL GAS □ PROPANE GAS (Check One)



EQUIPMENT USED:		
ACCESSORIES:		
☐ Chain Mounting Kit:	□ Vent Cap:	
☐ Thermostat:	Combustion Air Cap:	
☐ Gas Pressure Regulator:	Other:	
☐ Gas Shut-Off Valve:	Other:	



HVAC PRODUCTS 260 North Elm St., Westfield, MA 01085





1) GENERAL INFORMATION

This heater complies with ANZI Z83.20 (current standard) and CSA 2-34.

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 space heating of garages, vestibules and entry ways, workshops, enclosed patios, golf practice ranges and most industrial and commercial applications. **DO NOT** install this heater in residential bedrooms or bathrooms, mobile homes or recreational vehicles.

For indoor installation only. Not for use in residential dwellings.

INSTALLATION REQUIREMENTS

The installation must conform to local building codes or in the absence of local codes, with the National Fuel Gas Code ANSI Z223.1/NFPA54 or the Natural Gas and Propane Installation Code CSA B149.1. 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:

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. At least 8 feet above the floor in public garages.

A 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 CSA B149.1 (Natural Gas and Propane Installation Code).
- 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), Sterling will not recognize the warranty for any use other than space heating.

This heater is for Indoor Installation and Covered Patio Installation only 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.

High Altitude:

Appliances are supplied as standard for altitudes of 0 to 2,000 feet (0-610 m). High-altitude ratings are obtained by a change in the orifice size. When ordered for high altitude installations, burners are supplied by the factory ready for high altitude installation. Check the nameplate for altitude before proceeding with the installation. In Canada the adjustment for altitude is made in accordance with Standard CGA 2.17, Gas-Fired Appliances for Use at High Altitudes.

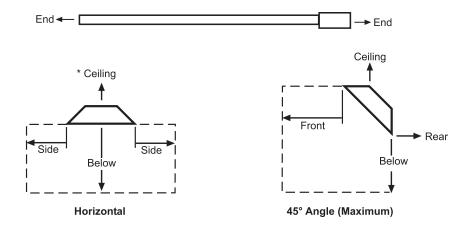




2) MINIMUM CLEARANCES TO COMBUSTIBLES

Minimum clearances to combustibles shall be measured from the outer surfaces as shown in the following diagram. For reduced clearances below the heater, use the Deflector Kit (Part No. 43504010), described in Section 5, and maintain the minimum clearances specified in the notes below. Follow the instructions packaged with the kit for installation.

AWARNING 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.



MINIMUM CLEARANCES TO COMBUSTIBLES							
	Mounted Horizontally Angle Mounted at 45°						
Model No.	Sides	Ceiling ¹	45° Front	45° Rear			
RSG 25	8"	4"	41" *	8"	30"	4"	
RSG 35, 45	12"	4"	57" **	8"	40"	4"	

¹ The clearance is 12" when installed in an UNVENTED configuration in industrial and commercial installations.

NOTE

- 1. 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." Sterling recommends posting these signs adjacent to the heater thermostat or other suitable location that will provide enhanced visibility.
- 2. The stated clearance to combustibles represents a surface temperature of 90°F (32°C) above room temperature. Building materials with a low heat tolerance (such as plastics, vinyl siding, canvas, tri-ply, etc.) may be subject to degradation at lower temperatures. It is the installer's responsibility to assure that adjacent materials are protected from degradation.

² IN CANADA, clearances below the heater are: RSG 25 - 36" (27" with deflector); RSG 35/45 - 48" (36" with deflector)

^{*} The clearance is 33" with deflector.

^{**} The clearance is 42" with deflector / 30" side clearance with deflector.





3) SPECIFICATIONS

				Flue Restrictor Plate				Orifice		Minimum Mounting Height*		-
		Heat	Total	nesui	Ctor Flate						@	
Model	Btu/hr	Exchanger	Heater		Part	Natura	al Gas	Propar	ne Gas	@	45°	
No.	Input	Length	Length	I.D.	Number					Horizontal	Angle	
RSG 25	25,000			7/8"	#42741120	#42	(0.094)	1.45mm	(0.057)	8'	8'	
RSG 35	35,000	16'	9'-3"	1"	#42741041	#35	(0.110)	1.75mm	(0.069)	8'	8'	
RSG 45	45,000			1-1/8"	#42741031	1/8"	(0.125)	5/64"	(0.078)	8'	8'	

^{*} MOUNT HEATERS AS HIGH AS POSSIBLE. Minimums are shown as a guideline for human comfort and uniform energy distribution for complete building heating applications. Consult your Sterling representative for the particulars of your installation requirements.

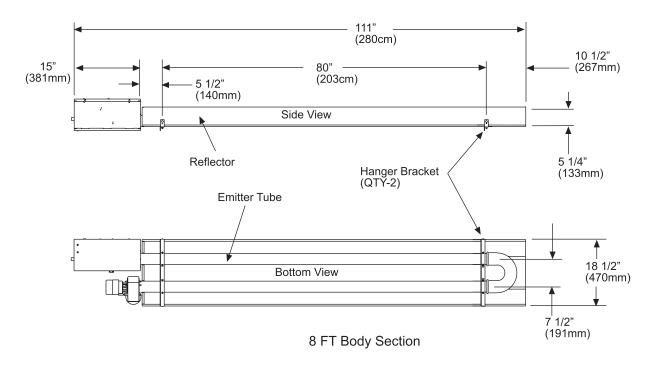
Type	Gas-Pipe	Tube	Flue	Fresh Air	Electrical	Current
Gas	Connection	Diameter:	Connection	Connection	Supply	Rating
Natural or Propane	1/2" MPT (Male)	3"	4" Round	4" Round	120 Volt, 60Hz. 1 Phase	2.6 Amp

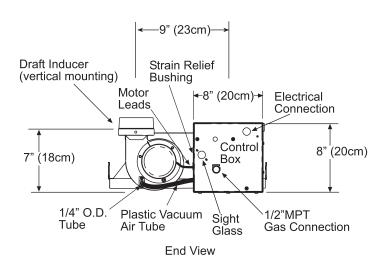
Firing Rating	Ignition System (Direct Spark)
Spark Module: 2 Amp 250V (for 24V Circuit)	30 second pre-purge period





4) DIMENSIONS



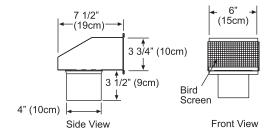




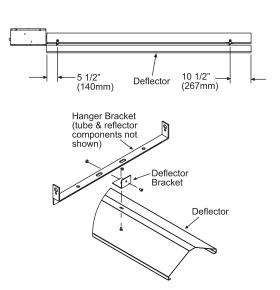


5) ACCESSORY PACKAGES

A. Exhaust Hood Package, Part #42924000



B. Deflector Kit, Part #43504010
The Deflector Kit is available for use to reduce the clearances to combustibles below the heater.
Refer to the "Minimum Clearances to Combustibles Table" in Section 2 when using this Deflector Kit. Heater must be mounted ONLY in the horizontal position when using this kit.





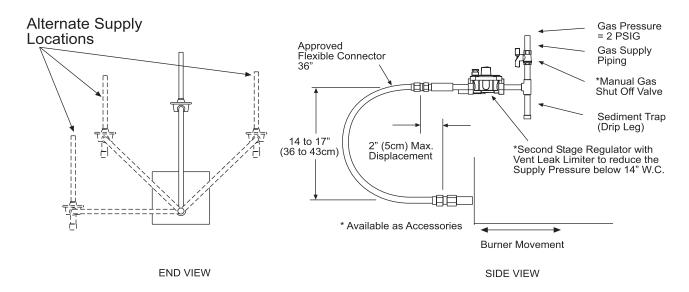


6) GAS CONNECTIONS AND REGULATIONS

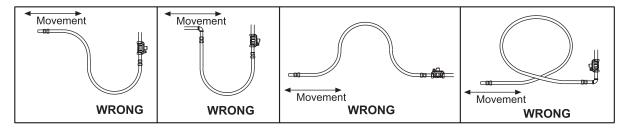
US ONLY: A gas connector certified for use on a tubular type infrared heater per the standard for Connectors for Gas Appliances, ANSI Z21.24/CSA 6.10 is supplied for installation in US only. The gas connector is 36" long and 1/2" nominal ID, and must be installed as shown above, in one plane, and without sharp bends, kinks or twists.

CANADA ONLY: A Type I hose connector should be used that is certified as being in compliance with the Standard for Elastomeric Composite Hose and Hose Couplings for Conducting Propane and Natural Gas (CAN/CGA 8.1) and is of length of 36+/- 6 in (90+/- 15 cm). The gas connector must be installed as shown above, in one plane, and without sharp bends, kinks or twists.

KEY DIMENSIONS AND COMPONENTS OF THE GAS CONNECTIONS



INCORRECT POSITIONS



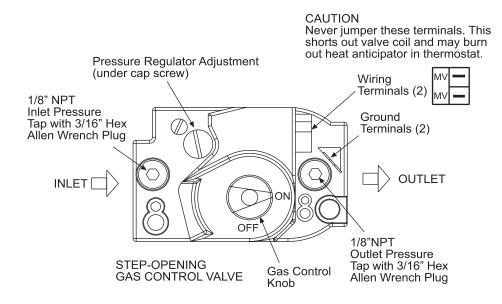




7) GAS PRESSURE TABLE

		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.



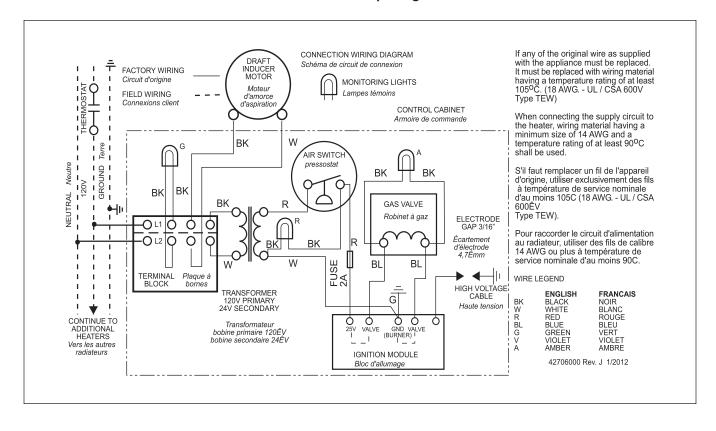
This appliance is equipped with a step-opening, combination gas valve. The maximum supply pressure to the appliance is 14" W.C. or 1/2 P.S.I. If the line pressure is more than the maximum supply pressure, then a second stage regulator which corresponds to the supply pressure must be used.





8) ELECTRICAL CONNECTIONS

INTERNAL CONNECTION WIRING DIAGRAM — Direct Spark Ignition

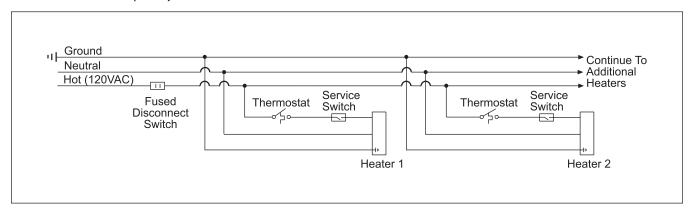




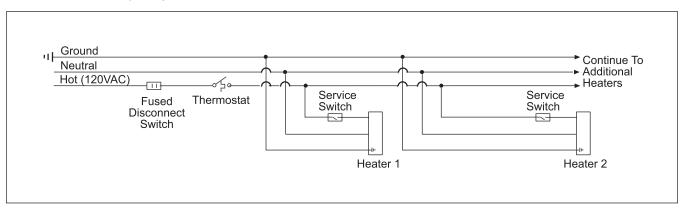


9) THERMOSTAT CONNECTION WIRING DIAGRAMS

A. LINE VOLTAGE (120V) THERMOSTAT CONNECTIONS - SINGLE HEATER PER THERMOSTAT



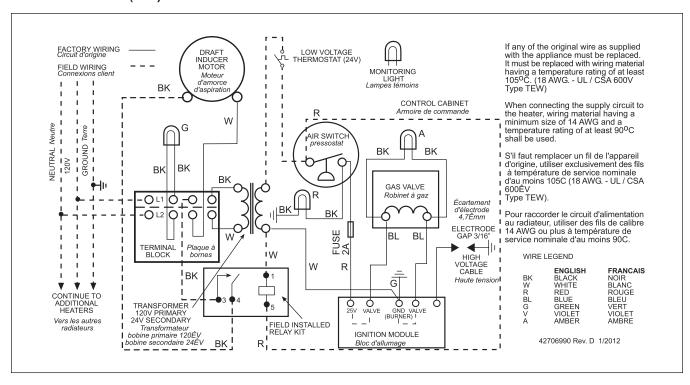
B. LINE VOLTAGE (120V) THERMOSTAT CONNECTIONS - MULTIPLE HEATERS PER THERMOSTAT







C. LOW VOLTAGE (24V) THERMOSTAT CONNECTIONS - SINGLE HEATER PER THERMOSTAT

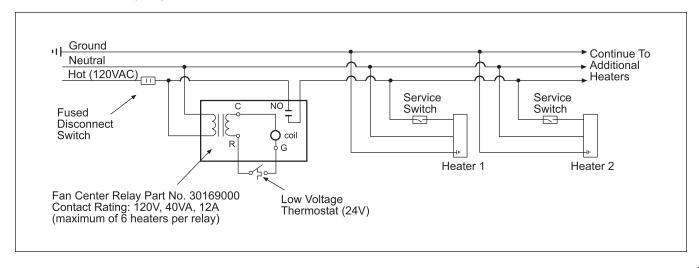


Order 24V Relay Kit (Part No. 43274020) for Low Voltage (24V) thermostat connection.

NOTES:

- a. If any of the original wire as supplied with the appliance must be replaced, it must be replaced with wiring material having a temperature rating of at least 105°C. (18 Ga. CSA 600V Type TEW)
- b. When connecting the supply circuit to the heater, wiring material having a minimum size of 14 AWG and a temperature rating of at least 90°C shall be used.
- c. A replaceable 2-amp fuse (1-1/4" long) is located inside the control box.

D. LOW VOLTAGE (24V) THERMOSTAT CONNECTIONS – MULTIPLE HEATERS PER THERMOSTAT







10) 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.

	Heat Exchanger	Maximum Ve (4" Dia	Maximum Fresh Air Intake Length ft		
Model	Length ft	Vertical Venting Sidewall Venting		(4" Diameter)	
RSG 25	15	100	75	50	
RSG 35	15	100	75	50	
RSG 45	15	100	75	50	

SINGLE HEATER VENTING (VERTICAL THROUGH THE ROOF)

Note: For residential applications, the heater must not be connected to a separate chimney, but must be installed using the venting system specified below.

- When venting the heater to outside of 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.
- A vent passing through a combustible roof shall extend through an approved clearance roof thimble. Double-wall, Type B vent must be used for the portion of the vent system which passes through the combustible roof. An approved vent cap must be attached to end of the flue.
- 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 for maximum vent lengths and vent pipe diameter.
 - Minimum Equivalent Length = 5 ft. of pipe
 - Maximum Equivalent Length = 75 ft. of pipe

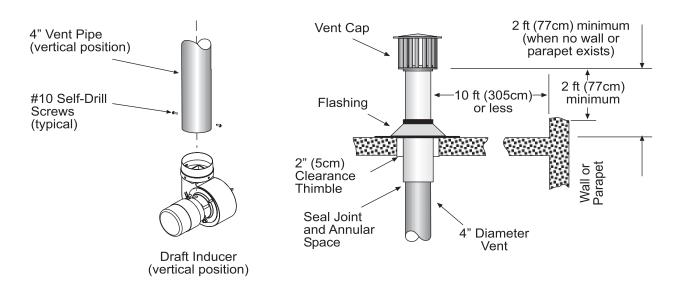
Use the following correction factors to obtain the equivalent length:

- · Subtract 15 ft. if the run is horizontal.
- · Subtract 10 ft. for an approved vent cap.
- Subtract 10 ft. for each elbow beyond 15 ft. from the heater.
- Subtract 15 ft. for each elbow within 15 ft. of the heater.
- 4. 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. For Residential Installations: The seams along the length of the piping and the joints between sections of piping should be sealed to prevent a potential leakage of flue gas into building. Use 100% RTV Silicone Rubber Adhesive sealant suitable for 500°F. For Commercial and Industrial Installations: Use aluminum or Teflon tape suitable for 550°F (3M Company tapes 433 or 363) or RTV silicone sealant.
- Avoid locating elbows in the first 5' 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.
- 6. All portions of the vent pipe shall be supported to prevent from sagging (6' spacing is recommended).





- 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.
- A venting system shall terminate at least 3 ft. above any forced air inlet located within 10 ft.







SINGLE HEATER VENTING (HORIZONTAL THROUGH SIDEWALL)

This heater, when horizontally vented, must be installed with the approved venting system. 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:

- For horizontal venting, the vent lengths may be as follows:
 - Minimum Equivalent Length = 5 ft. of pipe
 - Maximum Equivalent Length = 75 ft. of pipe

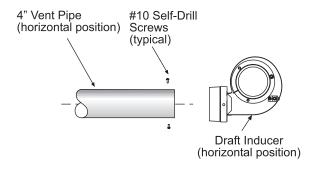
Use the following correction factors to obtain the equivalent length:

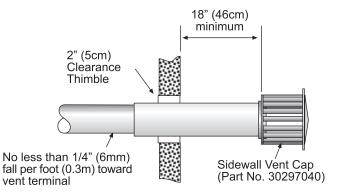
- Subtract 15 ft. if the run is horizontal.
- Subtract 10 ft. for an approved vent cap.
- Subtract 10 ft. for each elbow beyond 15 ft. from the heater.
- Subtract 15 ft. for each elbow within 15 ft. of the heater.

NOTE: To minimize problems associated with condensation in long horizontal runs, vent pipe can be insulated.

The horizontal venting system approved with this heater consists of the following components: one 4" Vent Cap (Part #30297040, one 4" x 36" 'B' Vent Section (Part #30496360), and one 4" Wall Thimble (Part #30500040). Please specify the appropriate number of 24-inch sections of single-wall vent pipe and elbows when ordering: Vent Pipe (Part #30497240), 90° Elbows (Part #30498040), and 45° Elbows (Part #30499040).

- Avoid locating elbows in the first 5 feet of vent pipe whenever possible. Limit the quantity of 90° elbows to two (2). When vent pipe is in a horizontal run, it must be pitched downward 1/4 inch per foot towards the vent terminal. The heater must be installed level.
- 4. A minimum clearance of 18 inches must be maintained between the outside wall and vent cap (18" clearance will provide stability under high wind conditions).
- 5. The horizontal venting system shall not terminate:
 - Less than 4 ft. (1.2m) below, 4 ft. (1.2m)
 horizontally from or 1 ft. (30cm) above any
 door, operable 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.
 - Less than 3 ft. (0.9m) from a combustion air inlet.
 - Less than 3 ft. (0.9m) from any other building opening or any gas service regulator.
 - Less than 7 ft. (2.1m) above public walkways.
 - 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.
 - Less than 12 inches (0.30m) when directly below a combustible overhang.
- 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.









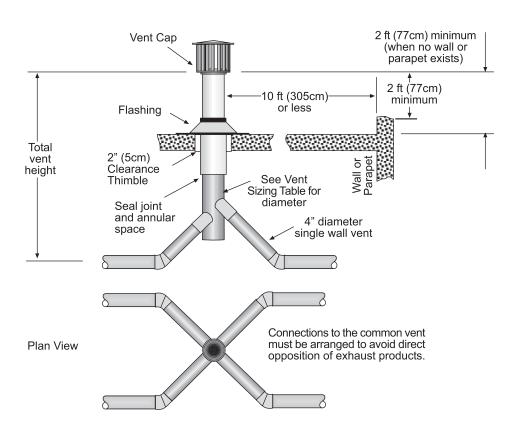
MULTIPLE HEATER VENTING (CONNECTIONS INTO A COMMON VENT OR MANIFOLD)

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

- 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 1/4 inch per foot 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.
- 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 insulated flue pipe or double-wall, Type B vent.
- 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.

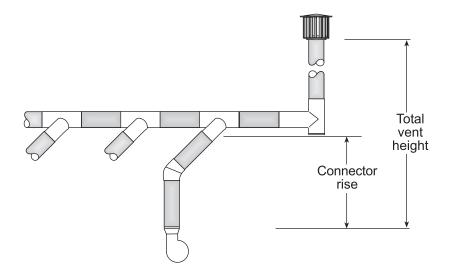
Multiple Heater Vertical Venting Arrangement







Multiple Heater Venting (Connections into a Manifold)



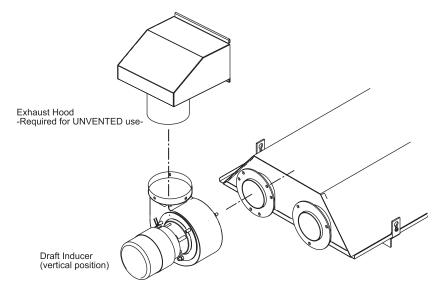
VENT SIZING TABLE — Multiple Heater Venting								
	Number of Heaters							
	1 2 3 4 5							
RSG 25	4"	4"	4"	5"	5"			
RSG 35	4"	4"	5"	5"	6"			
RSG 45	4"	4"	5"	5"	6"			

Common Vent Diameter (If a size is not available use the next larger size.)

The above 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 1988ASHRAE 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.

B. INDIRECT VENTING (UNVENTED HEATERS) — COMMERCIAL AND INDUSTRIAL INSTALLATIONS

ONLY — 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 (Part #42924000) must be placed on the outlet collar of the draft inducer or on the existing 4" starting collar when used unvented and must be mounted only in an upright position and directed towards the reflector body as shown.







11) 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 per hour of heater input. When outside air is used, the opening below the heater shall be one square inch of free area for each 4,000 Btu/hr of heater input.

In contaminated atmospheres or high humidity areas, optional outside air for combustion is recommended. 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.

12) 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.

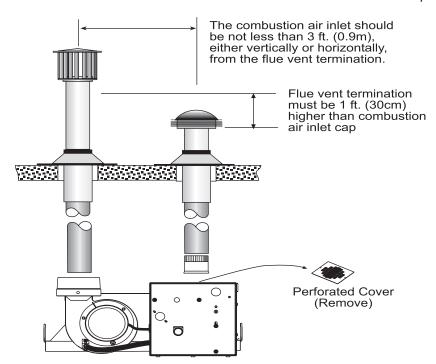
Outside combustion air can be brought directly to the heater by a 4" diameter duct less than 50 ft. long or equivalent (see table in Section 10 based on selected model and heat exchanger lengths). This is attached to the 4" diameter starting collar. The starting collar is fitted to the top of the control box cabinet after first removing and discarding the perforated cover. An approved vent cap must be placed directly on the end of the outside combustion air inlet pipe.

The combustion air inlet should be not less than 3 ft. (0.9m), either vertically or horizontally, from the flue vent termination. The air intake terminal

must be located not less than 1 ft. (30cm) above grade. It is good installation practice to supply combustion air from the same pressure zone as the vent outlet. Avoid bringing combustion air to the heater from an attic space. There is no guarantee that adequate combustion air will be supplied.

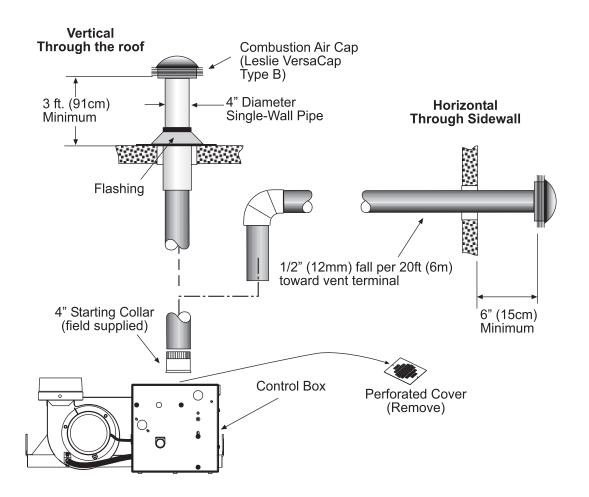
In colder climates, where necessary, insulate the outside combustion air duct. Avoid locating the outside combustion air duct directly above the control box. Provide a capped cleanout T as necessary. In high humidity applications, the control box should be sealed with silicone sealer.

In multiple heater applications, the combustion air intake may be ducted individually or common ducted in the same configuration as shown for venting in Section 10. For combustion air intake duct sizing, please refer to the Vent Sizing Table and use the diameter indicated, based on the number of heaters per duct.







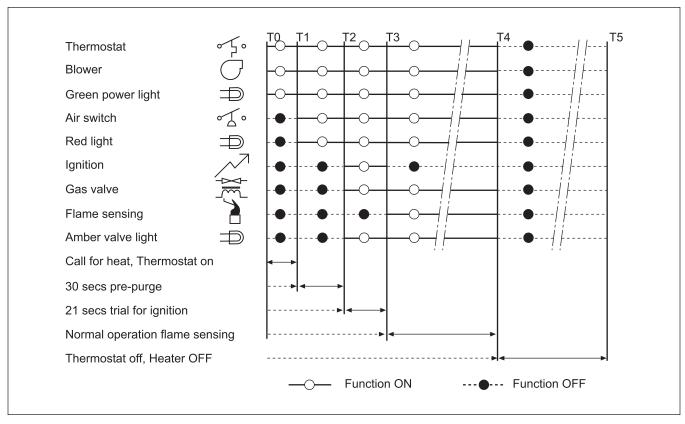






13) SEQUENCE OF OPERATION

The chart below shows the sequence of operation for the normal operating cycle.



If the flame is not sensed during sequence T3 then the burner will automatically begin ignition sequence T2. If the flame is not re-established the heater will go to lockout.

Warranty INFRARED HEATER

Sterling ("the Manufacturer") warrants to the original owner at the original installation site that the Sterling Model Infrared Heater will be free from defects in material and workmanship for one (1) year from the date of shipment from the factory. If upon examination by the Manufacturer the Product is shown to have a defect in material or workmanship during the warranty period, the Manufacturer will repair or replace, at its option, that part of the product which is shown to be defective.

Extended warranty:

In addition to the warranty stated above the following models will have:

 RSG – Tubes shall be free from defects in material and workmanship for five (5) years from the date of shipment from the factory. Burner Head shall be free from defects in material and workmanship for ten (10) years from the date of shipment from the factory.

This limited warranty does not apply:

- a) If the Product has been subjected to misuse or neglect, has been accidentally or intentionally damaged, has not been installed, maintained or operated in accordance with the furnished written instructions, or has been altered or modified in any way by an unauthorized person.
- b) To any expenses, including labor or material, incurred during removal or reinstallation of the Product.
- c) To any damage due to corrosion by chemicals, including halogenated hydrocarbons, precipitated in the air.
- d) To any workmanship of the installer of the Product.

This limited warranty is conditional upon:

- a) Advising the installing contractor, who will in turn notify the distributor or manufacturer.
- b) Shipment to the Manufacturer of that part of the Product thought to be defective. Goods can only be returned with prior written approval of the Manufacturer. All returns must be freight prepaid.
- c) Determination in the reasonable opinion of the Manufacturer that there exists a defect in material or workmanship.

Repair or replacement of any part under this Limited Warranty shall not extend the duration of the warranty with respect to such repaired or replaced part beyond the stated warranty period.

THIS LIMITED WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES, EITHER EXPRESS OR IMPLIED, AND ALL SUCH OTHER WARRANTIES, INCLUDING WITHOUT LIMITATION IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE, ARE HEREBY DISCLAIMED AND EXCLUDED FROM THIS LIMITED WARRANTY. IN NO EVENT SHALL THE MANUFACTURER BE LIABLE IN ANY WAY FOR ANY CONSEQUENTIAL, SPECIAL, OR INCIDENTAL DAMAGES OF ANY NATURE WHATSOEVER, OR FOR ANY AMOUNTS IN EXCESS OF THE SELLING PRICE OF THE PRODUCT OR ANY PARTS THEREOF FOUND TO DE DEFECTIVE. THIS LIMITED WARRANTY GIVES THE ORIGINAL OWNER OF THE PRODUCT SPECIFIC LEGAL RIGHTS. YOU MAY ALSO HAVE OTHER RIGHTS WHICH MAY VARY BY EACH JURISDICTION.



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