Series S Infrared Heater

Installation, Operation and Service Instructions

FOR YOUR SAFETY

If you smell gas:
1. Open windows
2. Don't touch electrical switches
3. Extinguish any open flame
4. Immediately call your gas supplier

FOR YOUR SAFETY

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

CONSIGNES DE SECURITE

Si vous sentez une odeur de gaz:
1. Ouvrez les fenetres
2. Ne touchez pas aux interupteurs electriques
3. Eteignez tout flamme nue
4. Contactez immediatment votre fournisseur de gaz

CONSIGNES DE SECURITE

Il est interdit d'utiliser des liquides inflammables ou degageant des vapeurs inflammables, a proximites de tout appareil fonctionnent au gaz.

Installer

Read and thoroughly understand these instructions before attempting any installation.

Owner

Retain this manual for reference.

WARNING

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

CSA CERTIFIED ®

SUN CLASSIC RADIANT HEATER

DESIGN CSA CERTIFIED ®

Superior Radiant Products

www.superiorradiant.com

CAUTION: FIRE OR EXPLOSION HAZARD

Maintain clearance to combustible constructions as further specified in this manual. Failure to do so could result in a serious fire hazard. Heaters should not be located in hazardous atmospheres containing flammable vapors or combustible dusts. Signs should be provided in storage areas specifying maximum safe stacking height.

CAUTION: MECHANICAL HAZARD

This equipment is designed and approved for indoor use only.

CAUTION: FIRE OR EXPLOSION HAZARD

This heater is equipped with an automatic ignition device. Do not attempt to light the burner by hand. Failure to comply could result in a serious fire and personal injury hazard.

CAUTION: MECHANICAL HAZARD

Do not use high pressure (above ½ psi) to test the gas supply system with the burners connected. Failure to do so could result in damage to the burner and its control components requiring replacement.

CAUTION: SERVICE LIFE RISK

Do no install equipment in atmospheres containing halogenated hydrocarbons or other corrosive chemicals. High intensity heaters are not recommended for installation in enclosed swimming pool areas. Failure to do so may lead to premature equipment failure and will in-validate the warranty.

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INTRODUCTION

Superior Radiant Products is a company in the infrared heating industry founded on the principles of product quality and customer commitment.

Quality commitments are evidenced by superior design, a regard for design detail and an upgrade of materials wherever justifiable.

Customer commitment is apparent through our ready responses to market demands and a never-ending training and service support program for and through our distributor network.

Important

These instructions, the layout drawing, local codes and ordinances, and applicable standards such as apply to gas piping and electrical wiring comprise the basic information needed to complete the installation, and must be thoroughly understood along with general building codes before proceeding.

Only personnel who have been trained and understand all applicable codes should undertake the installation. SRP Representatives are Factory Certified in the service and application of this equipment and can be called on for helpful suggestions about installation.

Installation Codes

Installations must comply with all local building codes or in their absence; the latest edition of the national regulations and procedures applicable to gas fired and suspended heaters.

General Installation and Gas Codes/Electrical Codes

Heaters must be installed only for use with the type of gas appearing on the rating plate, and the installation must conform to the National Fuel Gas Code, ANSI Z.223.1 (NFPA 54) in the US and CAN/CGA B149.1 and B149.2 Installation Codes in Canada. For electrical requirements refer to the latest editions of the National Electrical Code ANSI/NFPA 70 or Canadian Electrical Code C22.1

This heater maybe approved for either indoor or outdoor installation. Not for use in residential dwellings, refer to Rating plate.

Aircraft Hangar Installation

Installation in aircraft hangars must conform to the Standard for Aircraft Hangars, ANSI/NFPA 409 in the US and CAN/CGA B149.1 and B149.2 Installation Codes in Canada

Public Garages

Installation in public garages must conform to the Standard for Parking Structures, NFPA 88A or the Standard for Repair Garages, NFPA 88B, in the US and CAN/CGA B149.1 and B149.2 Installation Codes in Canada.

Parking Structures

Technical requirements are outlined in ANSI/NFPA 88A (USA)

LAYOUT RECOMMENDATIONS

Layout Considerations

1. Because high intensity heaters are un-vented, verify local codes for guidance on air supply and dilution air. Also see section on Ventilation.
2. Check local codes for mounting requirements and the requirement for flexible gas connectors or rigid mounting.
3. Do not locate heaters near windy locations such as door openings.
4. Do not locate heaters in very dusty environments
5. Avoid placing heaters below sprinkler heads or provide more than adequate clearance.

Spot Heating

High intensity heaters are ideal for spot heating applications. The following are key considerations to the success of the application:

1. Minimize any wind in order to maximize the effect of the radiant heat.
2. Placing two smaller heaters opposing each other will be more comfortable than placing one large heater.
3. Hang the heaters back and at an oblique angle (rather than directly overhead) in order to maximize the exposure of the peoples' bodies to radiant heat.

The following charts are intended for guidance only. Specific applications may require other parameters.

Suggested Minimum Mounting Heights				
Heater Input Rate	Mounting Angle			
BTU/hr	**10°**		**35°**	
	ft	m	ft	m
30,000-33,000	11 – 13	3.4 – 4.0	10 - 12	3.1 – 3.6
60,000-66,000	14.5 – 16.5	4.5 – 5.0	13 – 15	4.0 – 4.5
90,000-99,000	16 – 18.5	4.9 – 5.6	14.5 – 17	4.5 – 5.2
120,000-132,000	17.5 – 21	5.4 – 6.4	15.5 – 18.5	4.7 – 5.6
160,000	19 – 23	5.8 – 7.0	17 - 21	5.2 – 6.4

Suggested heat loading for indoor spot heating under stated conditions:

Ambient Air Temperature	BTU/hr per sq. ft of Floor Area to be Heated	
	At 50 ft/min of wind (15.2 m/min)	At 100 ft/min of wind (30.5 m/min)
40°F / 4°C	150—165	165—180
55°F / 13°C	75—88	85—100

Example:

Work counter for light assembly, space is 15 ft x 25 ft. (4.5 m x 7.6 m), ambient air temperature 40°F / 4°C, located near shipping doors.
Approximately 170 BTUH/sq.ft x (15x25) sq.ft = 63,750 BTUH
Two heaters at opposing locations would be preferred

Full Building Heat

Calculate the total heat input required, ensuring the inclusion of any unheated make-up air due to exhaust fans. Use the following chart as guidance to heater placement.

Model/BTUH		**S3 30-33,000**	**S6 60-66,000**	**S9 90-99,000**	**S12 120-132,000**	**S16 160,000**
Heater Mounting Height, ft (m)	Mounting Angle 10°	11-15 (3.4 – 4.6)	15-20 (4.6 – 6.1)	20-25 (6.1 – 7.6)	25-30 (7.6 – 9.2)	30-38 (9.2 – 11.6)
	Mounting Angle 35°	10-12 (3.1 – 3.6)	13-16 (4.0 – 4.9)	16-22 (4.9 – 6.7)	18-26 (5.5 – 7.9)	24-31 (7.3 – 9.4)
Distance of first heater row from outside wall, ft (m)		6 (1.9)	10 (3.1)	12 (3.7)	14 (4.3)	16 (4.9)
Distance between heaters along outside wall*, ft (m)		8-20 (2.5 – 6.1)	15-30 (4.6 – 9.2)	20-40 (6.1 – 12.2)	30-50 (9.2 – 15.2)	40-60 (12.2 – 18.3)
Distance between rows – out-side wall row to next interior row, ft (m)		30-60 (9.2 – 18.3)	50-80 (15.2 – 24.4)	75-110 (22.9 – 33.5)	90-115 (27.5 – 35.0)	100-125 (30.5 – 38.1)

* Distance between heaters along interior rows should be up to twice the indicated number

HEATER SPECIFICATIONS

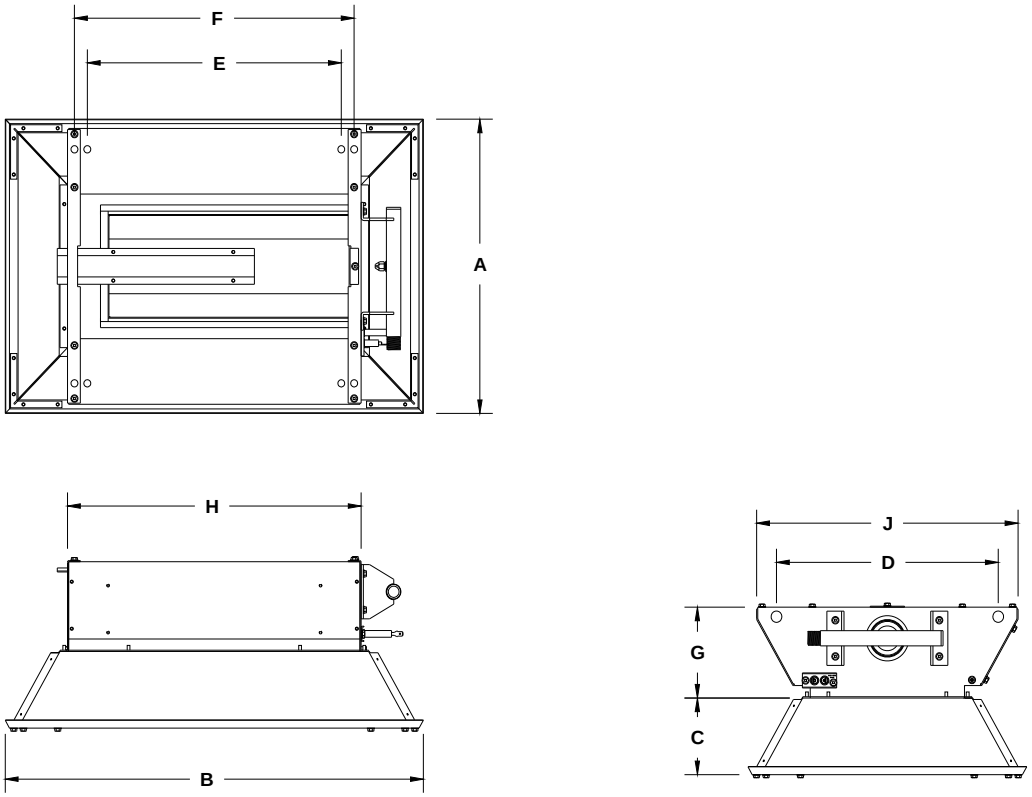


Figure 1: Overall Dimensional Information

Dimensional Chart

Model #		S3		S6		S9		S12		S16	
Input BTU/hr	Natural Gas	33,000		66,000		99,000		132,000		160,000	
	Propane Gas	30,000		60,000		90,000		120,000		N/A	
DIMENSION		in	cm	in	cm	in	cm	in	cm	in	cm
	A	16.3	41.4	23.1	58.7	30	76.2	36.9	93.7	36.9	93.7
	B	24.4	62	24.4	62	24.4	62	24.4	62	24.4	62
	C	4.2	10.7	4.2	10.7	4.2	10.7	4.2	10.7	4.2	10.7
	D	12.9	32.8	19.8	50.3	26.7	67.8	33.6	85.4	33.6	85.4
	E	14.8	37.6	14.8	37.6	14.8	37.6	14.8	37.6	14.8	37.6
	F	16.3	41.4	16.3	41.4	16.3	41.4	16.3	41.4	16.3	41.4
	G	5	12.7	5	12.7	5	12.7	5	12.7	5	12.7
	H	17.1	43.4	17.1	43.4	17.1	43.4	17.1	43.4	17.1	43.4
	J	15.2	38.6	22.1	56.1	29	73.7	35.9	91.2	35.9	91.2
Radiating Surface Area		in^2	cm^2	in^2	cm^2	in^2	cm^2	in^2	cm^2	in^2	cm^2
		90	581	180	1161	270	1742	360	2323	360	2323
Shipping Weight		lbs	Kg	lbs	Kg	lbs	Kg	lbs	Kg	lbs	Kg
		29	13.2	40	18.2	48	21.8	59	26.8	59	26.8

Gas Supply	**Natural Gas**		**Propane**	
Pressure	Minimum	6.5" W.C.	Minimum	11.0" W.C.
	Maximum	14.0" W.C.	Maximum	14.0" W.C.
Connection	½" female NPT			
Manifold Pressure	6.0" W.C.		10" W.C.	
Electrical Requirements (3 options)	120 V, 20 VA wired to junction box			
	24V, 20 VA			
	Millivolt pilot system			

CLEARANCE TO COMBUSTIBLES

The stated clearance to combustibles represents a surface temperature of 90°F (50°C) above room temperature. Building materials with low heat tolerance **(such as plastics, vinyl siding, canvas, tri-ply, etc…)** maybe subject to degradation at lower temperatures. **It is the installer's responsibility to assure that adjacent materials are protected from degradation.**

WARNING

Clearances as marked on the heater body must be maintained from vehicles parked beneath. Signs should be posted identifying any possible violation of the clearance distances from the heater in all vehicle areas.

Clearance to combustibles must be maintained according to the following chart. In storages areas, signs must be posted to specify the maximum permissible stacking height.

Adequate clearance to sprinkler heads must be maintained.

Model Number	Top	Sides	Rear	Below
S3	35" (89 cm)	28" (71 cm)	20" (51cm)	70" (178 cm)
S6	40" (102 cm)	35" (89 cm)	20" (51 cm)	80" (203 cm)
S9	50" (127 cm)	42" (107 cm)	28" (71 cm)	100" (254 cm)
S12	54" (137 cm)	46" (117 cm)	28" (71 cm)	110" (280 cm)
S16	60" (153 cm)	48" (122 cm)	34" (87 cm)	134" (341 cm)

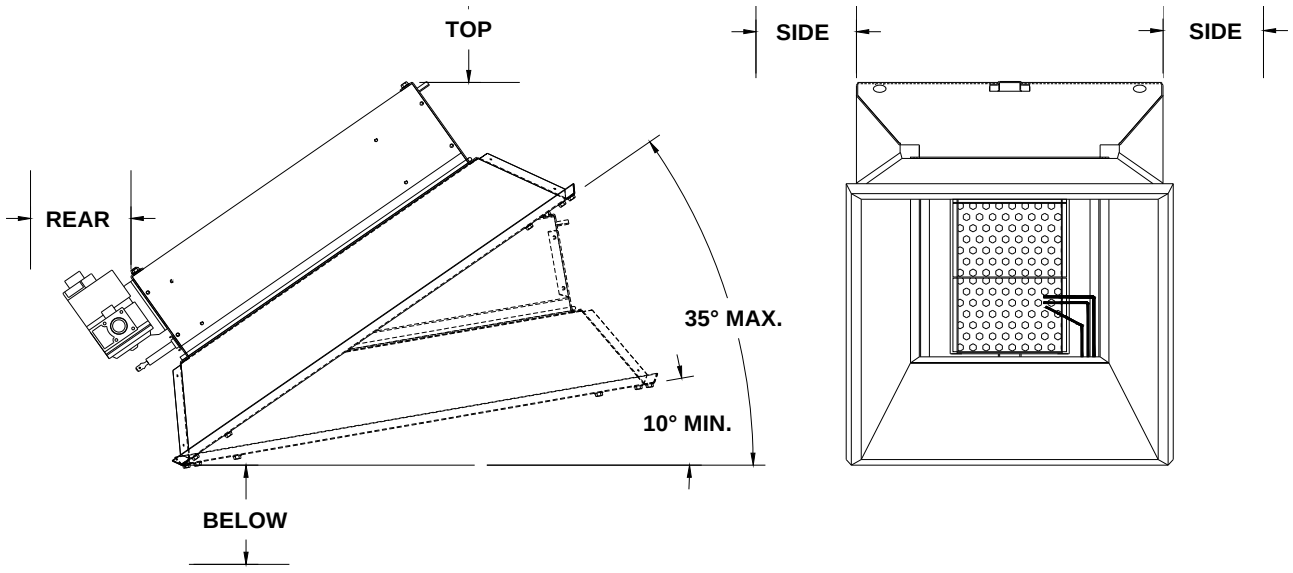


Figure 2: Clearance to Combustibles Diagram

Gas

- Figure 3 illustrate typical rigid and chain mounting configurations for the Series S heaters; verify which is permissible by local codes.
- Heaters must be hung at an angle between 10° and 35°. Typically, at the walls they are at 35° facing into the building. The gas manifold must always be at the lower side of the heater.
- Minimum 3/16" diameter S hooks and No. 1/0 chain (200 lb./ 91 kg working load) is recommended. Close S hooks after installation.
- Never use a gas line as a hanging support and never locate gas or electric lines over the heaters.
- Maintain clearance to combustibles.
- Ensure that there is a plugged tap upstream of the heater or a fitting on the valve itself to verify incoming pipeline pressure.
- Do not leave the heater connected when pressure testing the pipeline. The high pressure will damage the equipment.

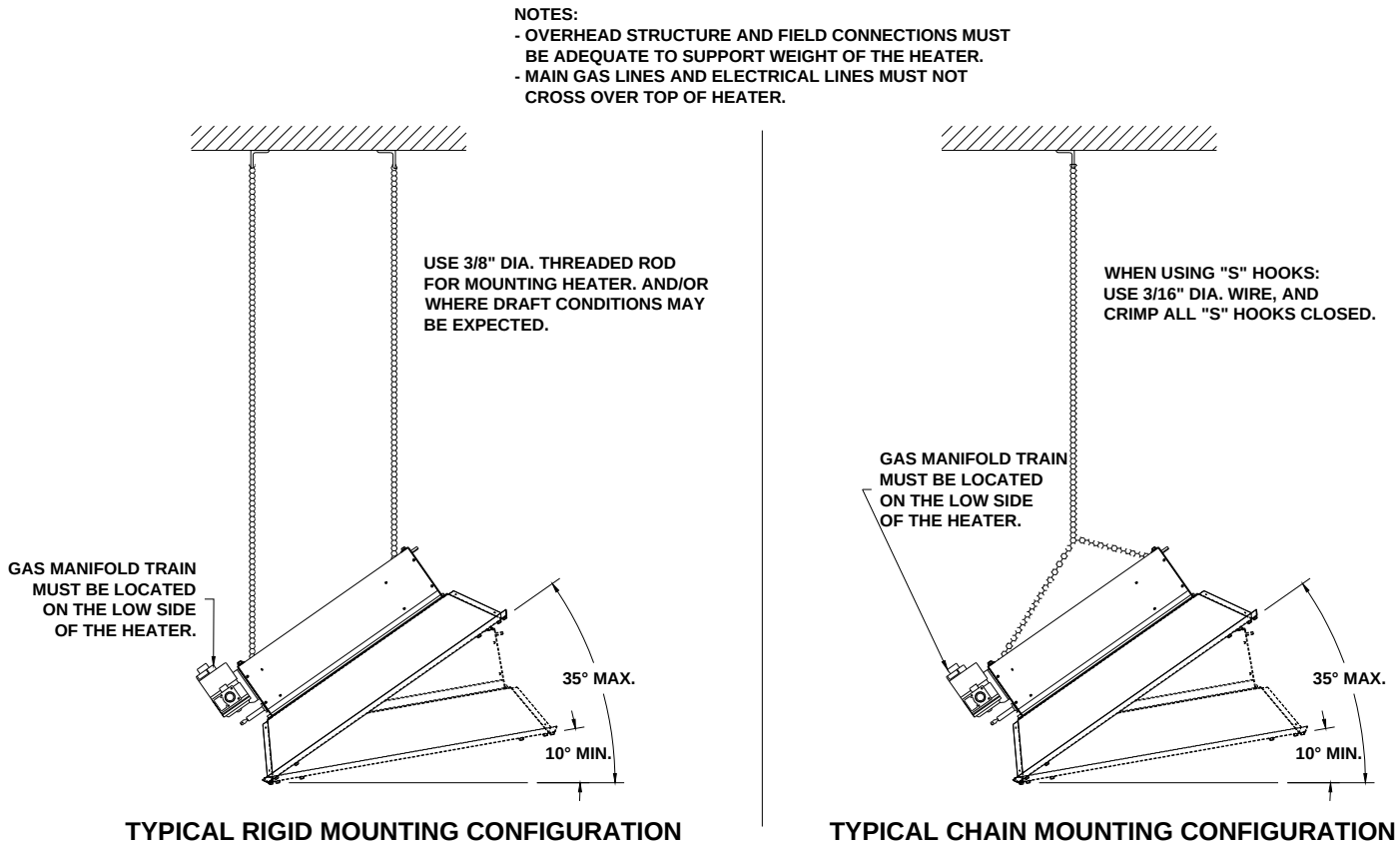


Figure 3: Mounting Configurations

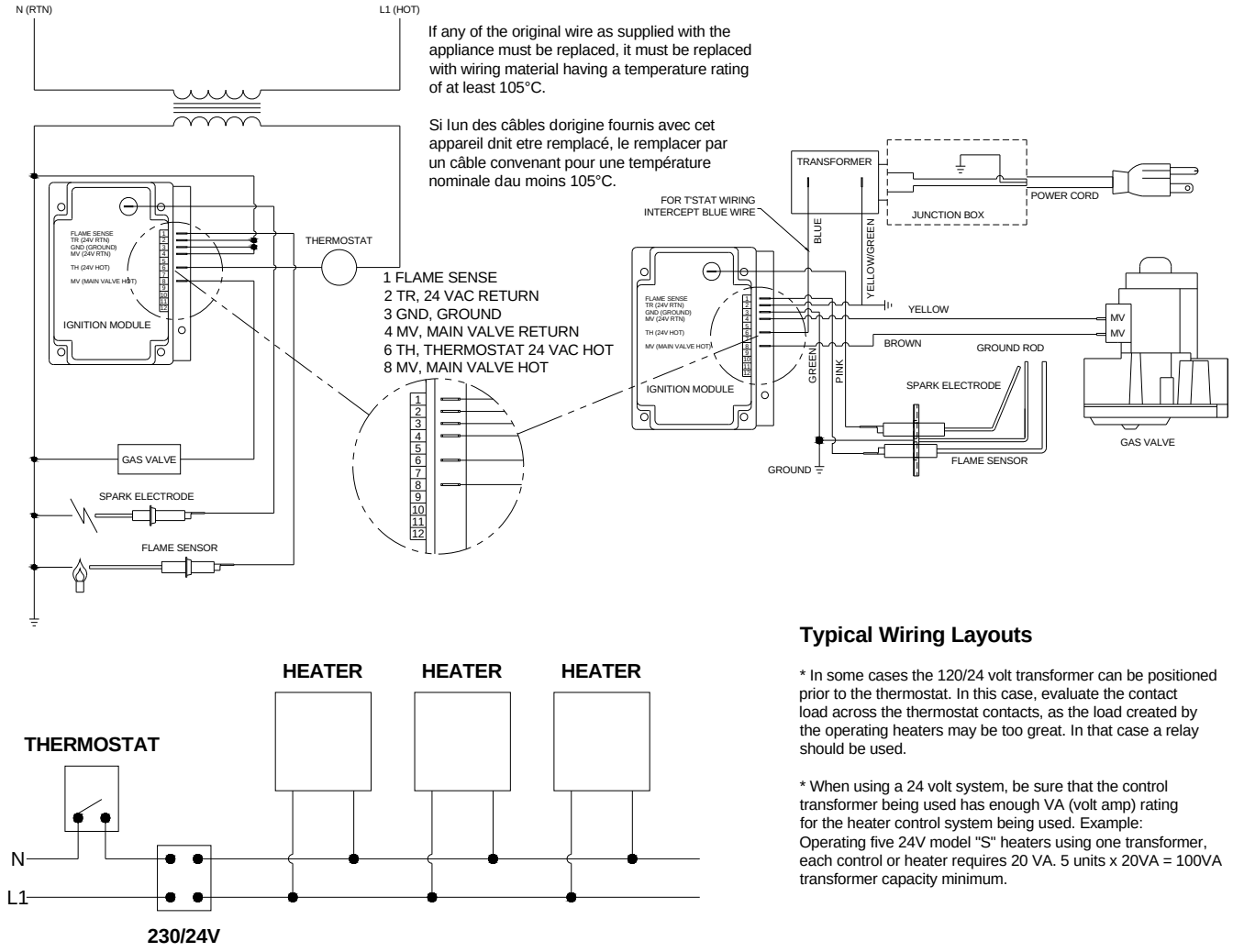
INSTALLATION

Electric

Figure 4 illustrates typical wiring arrangements for the Series S heater. Two options are available; 230V and 24V supply. Up to six heaters may be operated from one thermostat. (Verify thermostat electrical capacity if non SRP product is used.)

- Ensure the heaters are properly grounded.
- If mechanical exhaust is used in the building, it is typical to interconnect these in the heater circuit as shown in Figure 4.
- Perform all work in accordance with local codes or the National Electric Code ANSI/NFPA 70 or Canadian Electrical Code CSA C22.1.

CONTROL DESCRIPTION
24 VOLTS—DIRECT SPARK IGNITION
100% SHUT OFF
APPLIES TO NATURAL GAS OR PROPANE GAS



Typical Wiring Layouts

* In some cases the 120/24 volt transformer can be positioned prior to the thermostat. In this case, evaluate the contact load across the thermostat contacts, as the load created by the operating heaters may be too great. In that case a relay should be used.

* When using a 24 volt system, be sure that the control transformer being used has enough VA (volt amp) rating for the heater control system being used. Example: Operating five 24V model "S" heaters using one transformer, each control or heater requires 20 VA. 5 units x 20VA = 100VA transformer capacity minimum.

Figure 4: Wiring Diagram

Ventilation

Buildings using high intensity radiant heaters require ventilation. High Intensity type heaters are considered un-vented gas fired appliances, requiring ventilation to supply combustion air and dilute/remove the products of combustion.

Requirements for combustion air supply and dilution air vary by jurisdiction, building type and specific installation details. **See local codes for guidance**. In general, where heaters are installed without direct outside combustion air, fresh air ventilation must be provided to building space (3 cfm per 1000 BTU/Hr in Canada, 4 cfm per 1000 BTU/Hr in the USA), **Verify applicable local codes in the USA as requirements change by jurisdiction.**

- Mechanical exhaust should be electrically interconnected with the heaters and should always be installed in conjunction with inlet air openings. See "Block Diagram for Interconnecting Fan/Humidistat" above for details.
- Inlet air opening should be relatively small and distributed over the operating area of the heaters. They must always be located below the level of the heaters. One square inch of net free inlet area per 1000 BTUH is recommended.

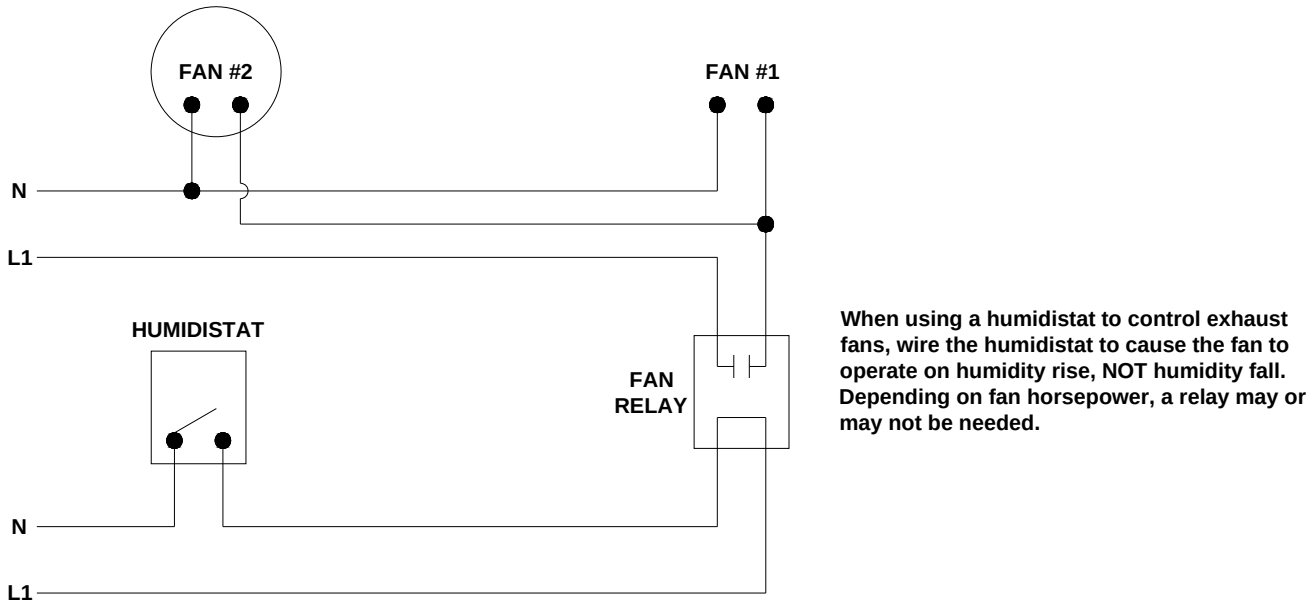


Figure 5: Block Diagram

Condensation

The products of combustion for natural gas contain up to 1 liter of water per 100,000 BTU consumed. This may add substantial amounts of moisture to the building air environment and may become a problem of condensation on cold surfaces within the building. This is particularly true for poorly insulated metal roof decks or structural steel framing.

- To decrease condensation, increase mechanical ventilation.
- Ensure that continuous waterproof barriers are used on the inside of all insulated surfaces.
- Ensure that exhausters pull air from the entire space and across the condensing surface.
- Humidistat controls may be integrated into the electrical control circuit of the heaters.

OPERATION / MAINTENENCE

Operation

Ensure the gas supply line has been purged.

Open all gas cocks to the heaters and electrically energize the system.

Follow the instructions on the heaters Lighting Instructions Label. Check to ensure that the thermostat starts and shuts down the system.

Control Operating Sequence—Direct Spark Ignition

1. The thermostat calls for heat.
2. The combination gas valve opens and the spark igniter sparks in an attempt to light the fuel at the face of the ceramic. The spark will continue for 15 seconds
3. Once flame is established (prior to complete steady-state conditions) the flame sensor signals the module and sparking stops. If the burner does not light in 15 seconds, the system will lockout, i.e. electric energy to the gas valve and electronic module is cut. The lighting sequence may be reset by an interruption of the electric power supply.
4. Once operating, the heater will continue to do so until the thermostat is satisfied; shutting the gas valve.

Annual Maintenance

1. Close the fuel gas valve and de-energize electrical power to the heater.
2. With an air hose regulated to no more than 15 psig blow away accumulated dust. Blow across the face of the ceramic tiles, not directly at them. Blow into each venturi for about one minute.
3. Verify that there are no cracked tiles.
4. Review the wiring for any loose connections.

Symptom	Possible Cause	Corrective Acton
Heaters will not turn off	Defective thermostat Stuck solenoid valve	Repair or replace Repair or replace
Gas Odor	Loose pipe connection	Verify all connections are sealed by using an appropriate leak test
Burning of gas/air mixture inside venturi (flashback)	Cracks between or across ceramic grids Excessive drafts	Replace burner head assembly Shield or relocate heater
Heaters Cycles on/off	Excessive drafts Flame sense not grounded Low gas pressure	Shield or relocate heater Verify wiring and correct Verify and correct
Low surface temperature on ceramic surface	Dirty or plugged ceramics Low inlet gas pressure Misaligned manifold/orifice Insufficient gas supply	See cleaning maintenance Verify and correct Replace manifold Verify capacity of fuel supply lines
No spark, no ignition	No power to control module Control module defective No power to spark electrode No equipment ground	} Verify and correct/replace
Heater sparks but will not light	No gas supply Defective gas valve solenoid Defective electronic control	Check shut off valve and combination gas valve } Verify and correct/replace
Heater lights but ‘locks out’ after about 10 seconds	Poor ground Reversed polarity on electric supply Sense electrode not sensing flame Defective electronic control	} Verify and correct/replace Check continuity of sense electrode Verify and/or replace

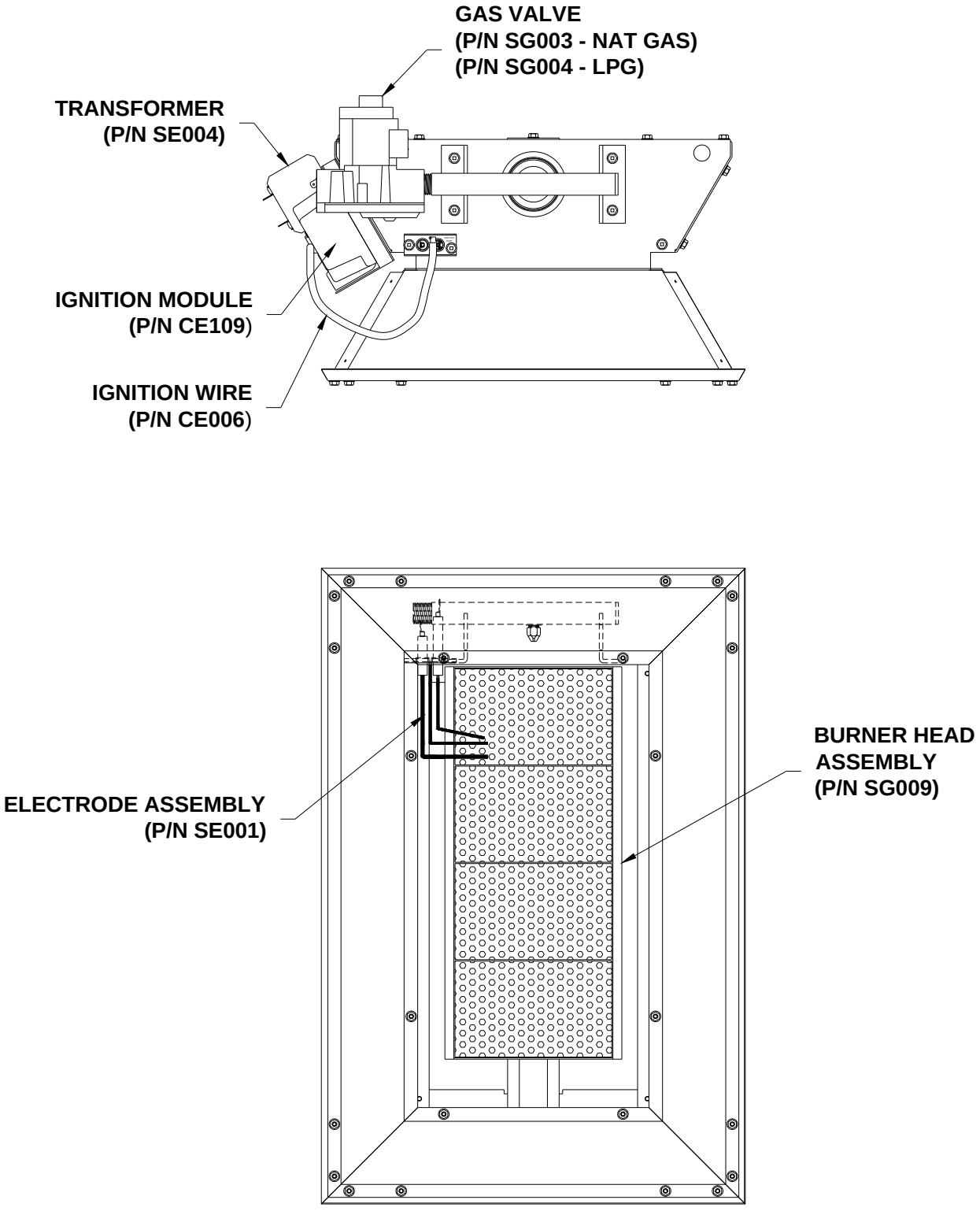


Figure 6: Replacement Parts

SERIES S INFRARED HEATERS
WARRANTY

The Manufacturer warrants to the original owner that the product will be free of defects in material and workmanship. For the Series S, the warranty for all components except for the ceramic burner head assembly is limited to 24 months from the date of installation. The ceramic burner head assembly shall be warranted for an additional eight years for units which are proven to the satisfaction of the manufacturer to be inoperative due to defects in material or workmanship.

The Manufacturer's obligation under this warranty is limited to repair or replacement, F.O.B. its facility, of the defective part. In no event shall the manufacturer be liable for incidental expense or consequential damages of any kind.

This warranty does not cover any shipping, installation or other labor costs incurred in the repair or re-placement of the product. No materials will be accepted for return without authorization.

This warranty will not apply if in the judgment of the Manufacturer the equipment has been improperly in-stalled, unreasonably used, damaged, or modified.

This warranty will not apply to damage to the product when used in corrosive atmospheres and in particular atmospheres containing halogenated hydrocarbons. No person is authorized to assume for the Manufacturer any other warranty, obligation or liability.

THE REMEDIES PROVIDED FOR IN THE ABOVE EXPRESS WARRANTIES ARE THE SOLE AND EXCLUSIVE REMEDIES. NO OTHER EXPRESS OR IMPLIED WARRANTIES ARE MADE INCLUDING, BUT NOT LIMITED TO, ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR USE OR PURPOSE.

Address questions to your local distributor

Heater Series :_____
Installed rate :_____Btu/hr
Serial Number :_____
Installed date :_____