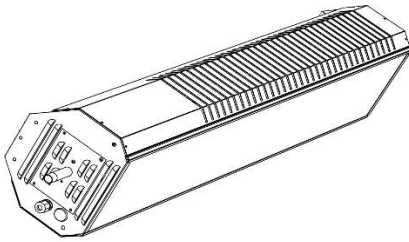




INSTALLATION AND OPERATION INSTRUCTIONS INFRARED RADIANT PATIO HEATER



SUNSTAR GLASSTM

Models: SGL35-(N7/L7/N10/L10-MG

Marine Grade with SS 316 Construction

**Two Stage UNVENTED - For all Outdoor application and
Indoor Non-Residential Spaces**

(N10/L10 models with remote control)

OWNER / INSTALLER: For your safety this manual must be carefully and thoroughly read and understood before installing, operating or servicing this heater. Make certain to follow the Clearances to Combustibles Section 4. This heater is intended for use with either Natural Gas or Propane Gas. It must be installed by a qualified service person or a licensed contractor in accordance with state and local codes.

⚠ 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 heater. For assistance or additional information, consult a qualified installer, service agency or the gas supplier.

For Indoor Installations INSPECT all combustion air openings into the building and, if necessary, clear if they become blocked.

FOR YOUR SAFETY: If this heater is installed indoors, it must be in a sufficiently ventilated space. Exhaust fans **MUST** be operating on an appropriate cycle when heaters are operating to avoid a high concentration of carbon monoxide. When installed in insufficient ventilated spaces this heater may give off carbon monoxide, an odorless and poisonous gas. **CARBON MONOXIDE POISONING MAY LEAD TO DEATH.** Early signs of carbon monoxide poisoning resemble the flu with headaches, dizziness and nausea. If you experience these signs, **GET FRESH AIR IMMEDIATELY!** Have the heaters serviced as soon as possible and check the ventilation into the building.

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

IF YOU SMELL GAS:

1. Shut off gas to the appliance.
2. Extinguish any open flame.
3. If odor continues, keep away from the appliance and immediately call your gas supplier.

⚠ DANGER

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

A propane cylinder not connected for use shall not be stored in the vicinity of this or any other appliance.

!IMPORTANT: SAVE THIS MANUAL FOR FUTURE REFERENCE.

SUNSTAR HEATING PRODUCTS, INC.

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WARNING:

California Proposition 65: This product can expose you to chemicals including ceramic fibers, which are known to the State of California to cause cancer, and carbon monoxide, which is known to the State of California to cause birth defects or other reproductive harm. For more information go to www.p65warnings.ca.gov

1.0) SAFETY

This heater is a self-contained infrared radiant ceramic heater. Safety information required during installation and operation of this heater is provided in this manual and the labels on the product. The installation, service and maintenance of this heater must be performed by a contractor qualified in the installation and service of gas fired heating equipment.

All personnel in contact with the heater must read and understand all safety information, instructions and labels before operation. The following symbols will be used in this manual to indicate important safety information.



Warning instructions must be followed to prevent or avoid hazards which may cause serious injury, property damage or death.



Caution instructions must be followed to prevent incorrect operation or installation of the heater which may cause minor injury or property damage.

2.0) INSTALLER RESPONSIBILITY

The installer is responsible for the following:

- The heater installation, electrical and gas supplies must be installed in accordance with these installation instructions and any applicable codes and regulations.
- Every heater shall be located with respect to building construction and other equipment so as to permit access to the heater.
- Each installer must follow the clearances to combustible materials for the heaters.
- It is important to read and understand section 4.0) where outdoor spaces are defined any space other than outdoors is an indoor installation.
- Install the heater so that the supports and hangers are correctly spaced in accordance with these instructions. The heater must be supported by materials having a working load limit of at least 115 lbs.
- To install the heater in an adequate free area to allow the products of combustion to freely escape from the heater. The heater must not be installed in recessed spaces or enclosure and alcoves.
- Supply the owner with a copy of these Installation and Operation Instructions.
- If the heater is installed indoors, ventilation by gravity or mechanical means shall be provided to supply at least 4 CFM of exhaust air per 1,000 Btu/hr of operating heat input.
- Never use the heater as a support for a ladder or other access equipment. Do not hang anything from the heater.
- Supply all installation materials necessary that are not included with the heater.
- Check the nameplate to make sure that the burner is correct for the gas type in the building.
- Use the provided angle gauge (see Section 12.1) to ensure the heater is installed at the approved installation angles of 0°, 15°, 30°, 45° and 60° degrees with the heat shield installed.

3.0) GENERAL INFORMATION

This heater is a self-contained infrared radiant ceramic patio heater for use in locations where flammable gases or vapors are not generally present and is intended for space heating **non-residential spaces**.

This patio heater model is approved to two different heater standards:

- A **"Patio Heater"** for **Outdoor Use** in Residential and Commercial/Industrial Applications.
- And as a **"Gas-Fired High Intensity Infrared Heater"** for **Indoor Spaces** of Commercial/ Industrial Applications. Not for use in residential dwellings.

Note: A residential dwelling is a domicile intended for use by one or more persons and that includes one or more areas, such as those used for cooking, eating, living, sleeping, or a sanitary facility. A residential dwelling does not include a workshop, or outdoors.

⚠ WARNING		
		<p>POISONING AND FIRE HAZARD</p> <p>This heater is not approved to be installed in any residential indoor application. This includes (but is not limited to) the home, living quarters, attached garages, solariums, RV's, mobile homes, etc.</p> <p>Installation in residential indoor spaces may result in property damage, asphyxiation, serious injury or death.</p>

SAFETY REQUIREMENTS

- The heater area must be kept clear and free from combustible materials, gasoline and other flammable vapors and liquids.
- This heater is designed for use with one type of gas (Propane or Natural). Make sure that the type of gas to be supplied to this heater matches that shown on the heater rating plate.
- **DO NOT** install this heater directly onto a propane container or propane cylinder. Propane containers (propane cylinders) must not be stored indoors or in the vicinity of any gas-burning appliance.
- **DO NOT** Store flammable materials near the heater.
- **DO NOT** locate gas and electric supply lines directly above the heaters path of flue products. The path of flue products will change if an optional low clearance heat shield is installed.
- Children and adults should be alerted to the hazards of high surface temperatures and should stay away to avoid burns or clothing ignition.
- Young Children should be carefully supervised when they are in the area of the heater.
- **DO NOT** spray aerosols or flammable materials in the vicinity of this appliance while it is in operation.
- Clothing or other flammable materials should not be hung from the heater or placed on or near the heater.
- **NEVER** attempt to service the heater while it is plugged in, operating or hot.
- Any guard or other protective device removed for servicing a heater must be replaced prior to operating the heater.
- **DO NOT** Install the heater in a recess, alcove or enclosure.
- Installation and repair should be done by a licensed contractor qualified in the installation and service of gas heating equipment. The heater should be inspected before use and at least annually by a qualified service person. More frequent cleaning may be required as necessary. It is imperative that the control compartment, air passageways and burner of the heater be kept clean.
- If any changes are made to the patio or building structure after the heaters are installed such as adding plastic curtains to enclose the patio the modified design must be checked by a qualified person to ensure that the clearance combustibles and ventilation requirements are maintained.
- **DO NOT** paint any surface of the heater.
- **DO NOT** throw objects at the heater.
- Avoid inhaling fumes emitted from the heater's first use. Smoke and odor from the burning of oils used in manufacturing will appear. Both the smoke and odor will dissipate after approximately 30 minutes.

INSTALLATION REQUIREMENTS

Installation of this heater must conform with local building codes or, in the absence of local codes, with the National Fuel Gas Code, ANSI Z223.1/NFPA 54, or the Natural Gas and Propane Installation Code, CSA B149.1 In Canada, the installation must conform to current CSA B149.1 (The Natural Gas and Propane 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.

Sunstar will not recognize the warranty for any use other than space heating.

This heater is for Indoor and Outdoor Installation and is used in Unvented mode. The term Unvented actually means Indirect Vented. While the products of combustion are expelled into the building, national codes require 4 CFM/1000

BTU of heater input 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.

This heater must be applied and operated under the general concepts of reasonable use and installed using best building practices.

It is the responsibility of the qualified installer to supply the appropriate lifting equipment to safely install the radiant heater. Tools required for the safe installation, startup and maintenance are various screwdrivers, wrenches, pipe wrenches, voltmeter, air and gas manometer, level and required tools to safely install the chosen hanging materials.

⚠ CAUTION Do not install this heater indoors in a structure with no insulation in the roof—condensation will occur.

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)

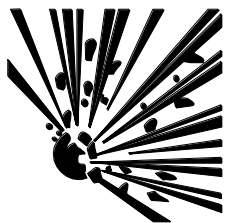
- a. Installation of this appliance is to be in accordance with latest edition of CSA B149.1 (Natural Gas and Propane Installation Code).
- b. For installation in public garages or aircraft hangars, the minimum clearances from the bottom of the infrared heater to the upper surface of the highest aircraft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

Note:

The SGL35-N7/L7/N10/L10-MG (Marine Grade) models provides superior corrosion resistance in salty and corrosive environments such as beach and ocean front installations. The Marine Grade patio heater is constructed out of 316 type stainless steel with a brushed finish. No paint is used. During operation the stainless steel will get hot and the stainless steel will slightly discolor (e.g. light “tea color”) in the center top of the heater. This is typically not visible from the ground and is normal for this heater type.

If a Marine Grade heat shield kit part number 44566350 is purchased the heat shield is delivered pre-heated showing a uniform “tea color”.

4.0) MINIMUM CLEARANCES TO COMBUSTIBLES

⚠ WARNING		
		FIRE AND EXPLOSION HAZARD Combustible material must be located outside the clearance dimensions listed. Failure to do so may result in death, serious injury or property damage.

A critical safety factor to consider before installation is the clearances to combustible materials. Clearance to combustibles is defined as the minimum distance you must have between the surfaces of the heater and the combustible item. Considerations must also be made for moving objects around the infrared heater.

⚠ WARNING This heater must not be installed where the products of combustion can build up and prevent them being exhausted to the atmosphere. This includes applications such as; enclosures, recessed ceilings and alcoves.

⚠ WARNING This heater can be equipped with a heat shield to reduce the clearances to combustibles towards the ceiling. Due to the variety of possible heater mounting angles the heat shield must be mounted in the correct location to match the heater mounting angle. See section 13.0 heat shield installation.

Approved installation angles are 0, 15, 30, 45 and 60 degrees with the heat shield installed.

⚠ 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.

For maximum safety the building must be evaluated for hazards before installing the heater system.

Examples include, but are not limited to:

- Gas and electrical lines
- Combustible and explosive materials
- Chemical storage areas
- Areas of high chemical fume concentrations
- Provisions for accessibility to the heater
- Adequate clearances around the openings
- Combustion and ventilating air supply
- Vehicles parking areas
- Vehicles with lifts or cranes
- Storage areas with stacked materials
- Lights
- Sprinkler heads
- Overhead doors and tracks
- Dirty, contaminated environment

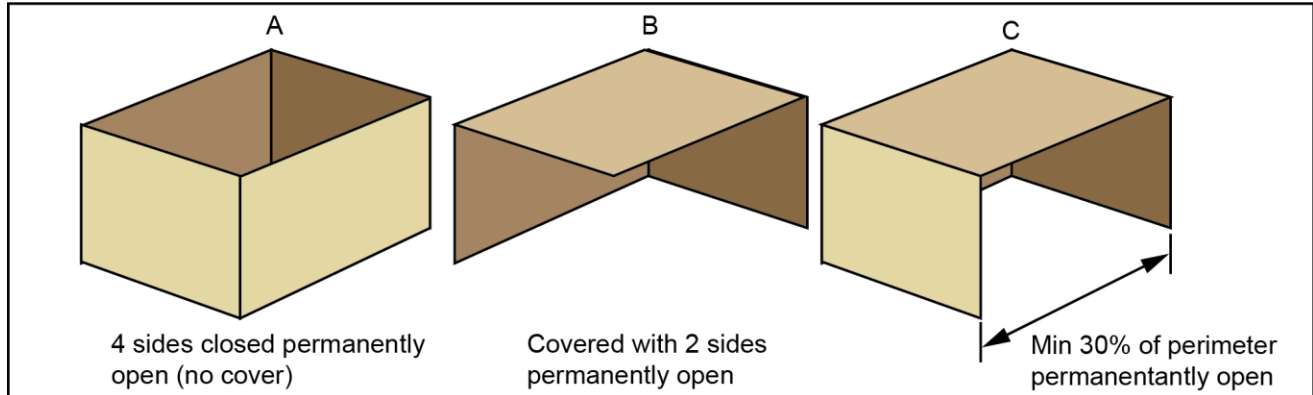
This heater is approved for both **INDOOR** and **OUTDOOR** installation. Both installation options have different clearances to combustibles as described below. These must be observed.

INDOOR clearances to combustibles are defined as a surface temperature of **90°F** above ambient temperature.

OUTDOOR clearances to combustibles are defined as a surface temperature of **117°F** above ambient temperature.

OUTDOOR Spaces are defined as a shelter no more inclusive than:

- a) with walls on all sides, but with no overhead cover.
- b) within a partial enclosure which includes an overhead cover and no more than two side walls. These side walls may be parallel, as in a breezeway, or at right angles to each other.
- c) Within a partial enclosure which includes an overhead cover and three side walls, as long as 30 percent or more of the horizontal periphery of the enclosure is permanently open.



⚠ WARNING For the purposes of clearances to combustibles and ventilation all applications not classified as outdoors according to the definitions above shall comply with the requirements for indoor installations.

Minimum clearances shall be measured from the outer surfaces of the heater or heat shield if installed, as shown in the diagrams for the different installation positions.

⚠ WARNING Fire sprinkler heads must be located at an appropriate distance from the heater. This distance may exceed the published clearance to combustibles. The exhaust gas temperature will be 800°F (426°C) and above where it exits the heater. Certain applications will require the use of high temperature sprinkler heads or relocation of the heaters. Sprinkler head temperatures lower than “blue color code” might not be suitable in the vicinity of the heater.

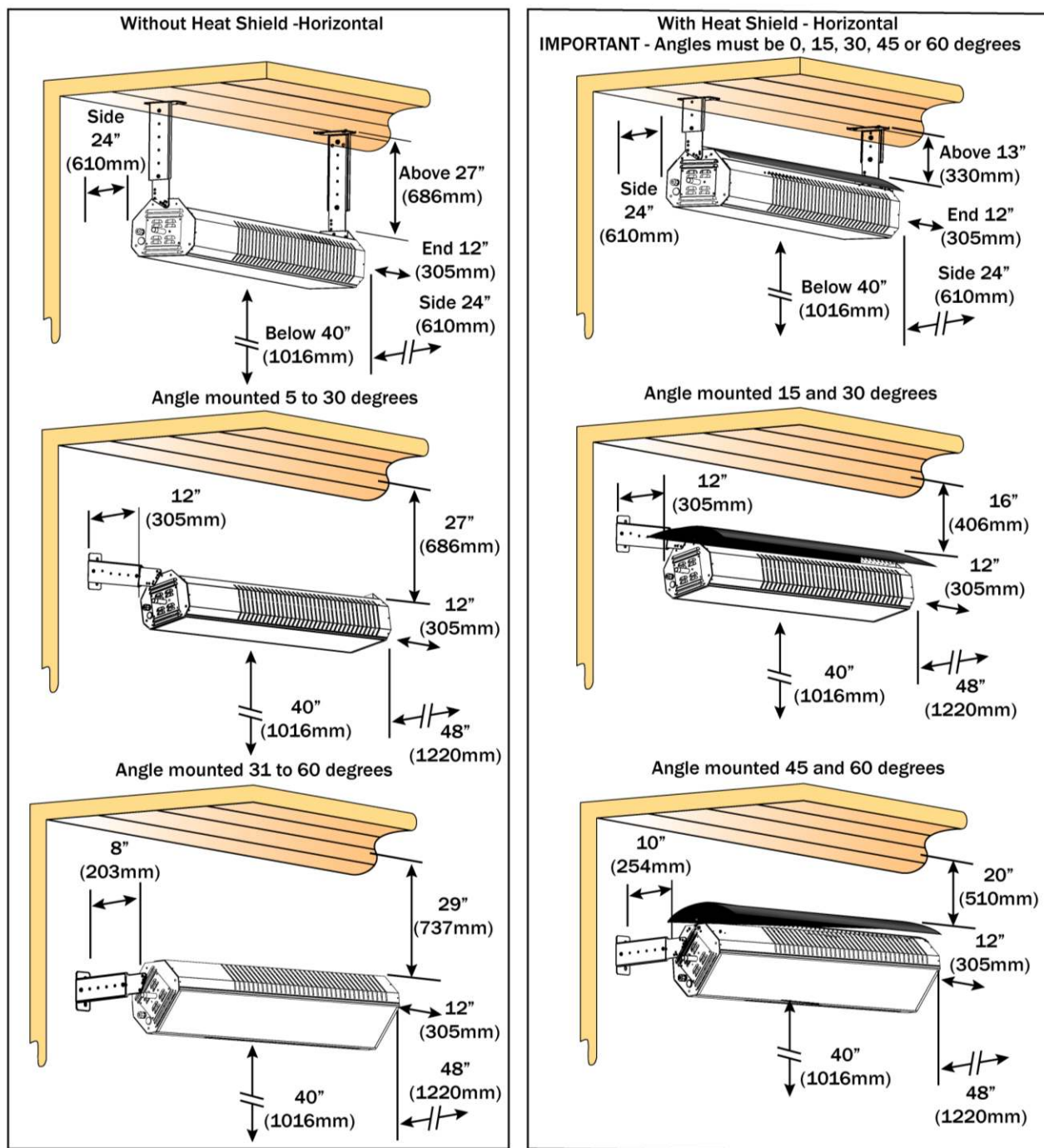
Sprinkler systems containing propylene glycol or other flammable substances are not to be used in conjunction with this heater without careful consideration for and avoidance of potential fire or explosion hazards. For further information consult the authority having jurisdiction. Always observe applicable state and local codes.

⚠ WARNING Always maintain minimum clearances and post signs where needed. This heater is supplied with a wall mounted sign shown below. It is the installers responsibility to ensure that the sign is completed with the correct clearance to combustible distances for the installation and that the sign is posted in a location where it is easily accessed.

⚠ WARNING	
	FIRE HAZARD Combustible material must be located outside the clearance distance listed from heater. Some objects will catch fire or explode when placed close to heater. Failure to follow to do so may result in death, injury or property damage.
Maintain the following clearances: _____ to the side, _____ above and 40" below the heater from combustible materials.	
ATTACH THIS INFORMATION CARD ADJACENT TO THE SUNSTAR HEATER(S) CONTROL(S)	
<ul style="list-style-type: none">● INSTALLER: Write the highest clearance distance any model in the blank spaces above using permanent ink. The clearances to combustibles can be located on a label attached to the heater or in the I & O Instructions. I & O's can also be located on www.sunstarheaters.com Phone 888.778.6782● Enclosing a patio with a wind break etc. may change the heater location from being OUTDOOR to INDOOR. See I & O instructions for INDOOR clearances to combustible and ventilation requirements.● Read the Installation and Operating Instructions (I & Os) thoroughly before installation, operation or service.	
	Installation and Service of SunStar equipment must be performed by a qualified contractor and conform with all requirements of I & O Instructions, National and Local codes. Annual inspection is recommended prior to the heating season to ensure proper operation of the heating equipment.
PN 43344940 NOV 2018	

⚠ WARNING Clearances to combustibles are posted on the heater. In areas used for storage of combustible materials where they may be stacked below the heater the installer must post signs that will "specify the maximum permissible stacking height to maintain the required clearances from the heater to combustibles." SunStar recommends posting these signs adjacent to the heater thermostat or other suitable location that will provide enhanced visibility.

4.1) INDOOR CLEARANCES TO COMBUSTIBLES

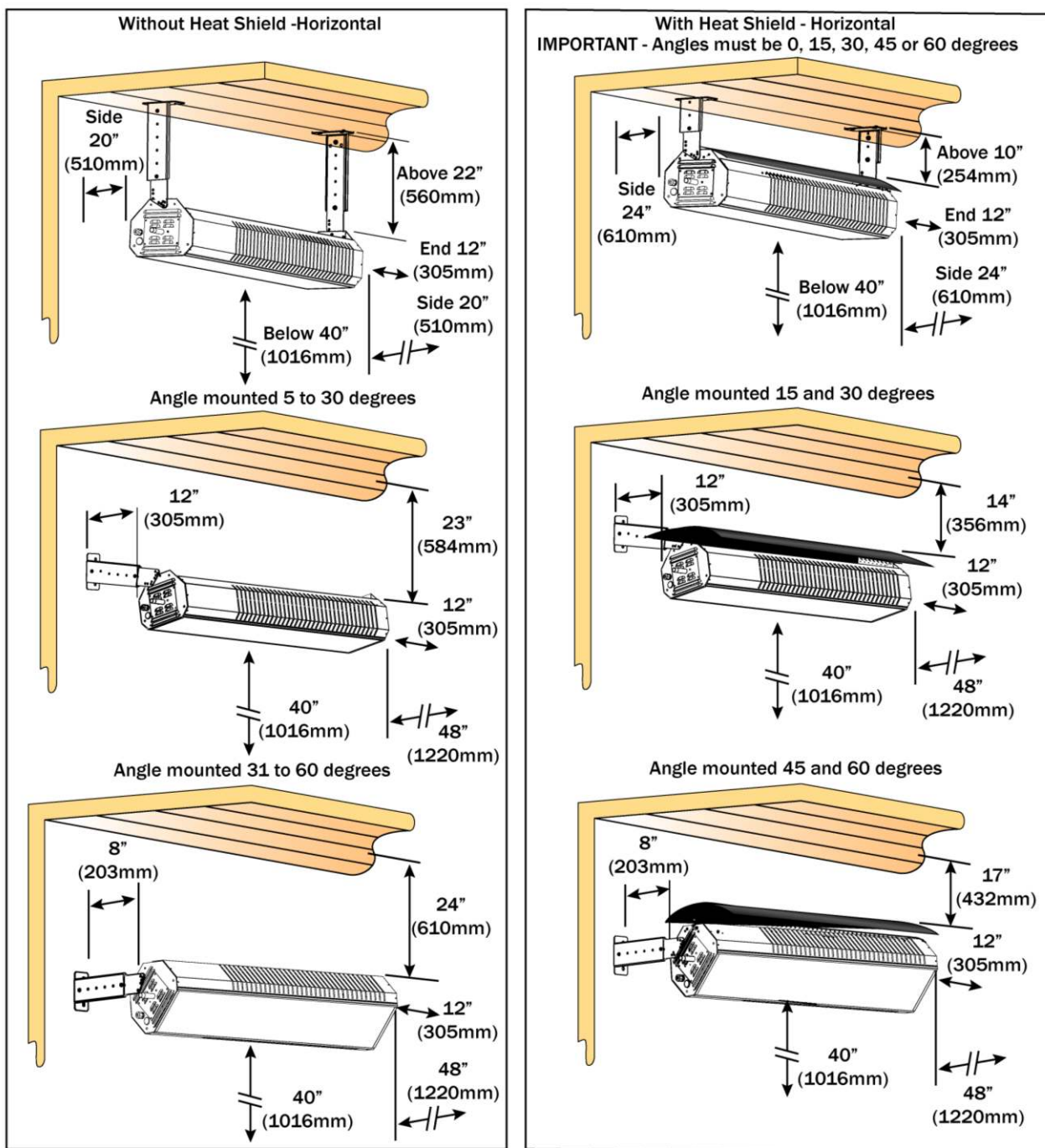


⚠ WARNING The stated clearance to combustibles represents a surface temperature of 90° F (50° C) above room temperature. Building materials with a low heat tolerance (such as plastics, vinyl siding, canvas, tri-ply, etc.) may be subject to degradation at lower temperatures. It is the installer's responsibility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

See below the possible surface temperature at the clearance to combustible distance for different ambient temperatures within the heated space.

Ambient Temperature	70° F (21.1° C)	65° F (18.3° C)	60° F (15.5° C)
Surface Temperature	160° F (71.1° C)	155° F (68.3° C)	150° F (65.6° C)

4.2) OUTDOOR CLEARANCES TO COMBUSTIBLES



⚠ WARNING The stated clearance to combustibles represents a surface temperature of 117° F (65° 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.

See below the possible surface temperature at the clearance to combustible distance for different ambient temperatures within the heated space.

Ambient Temperature	70° F (21.1° C)	65° F (18.3° C)	60° F (15.5° C)
Surface Temperature	187° F (86.1° C)	182° F (83.3° C)	177° F (80.6° C)

5.0) SPECIFICATIONS

Model No.	Btu/hr High Input	(2-stage) Btu/hr Low Input	Orifice Size				Recommended* Mounting Height		
			Natural Gas		Propane Gas		@ 0 °	@ 5 ° to 30 °	@ 30° to 60 °
SGL35-N7/L7-MG, SGL35-N10/L10-MG	35,000	24,000	#41	0.096 inch	#51	0.067 inch	8 to 11 ft	7 to 9 ft	6.5 to 8 ft

* For mounting heights outside the recommended distances consult your local Space-Ray Representative.

Model Identification:

Control Option Suffix	Gas Type	Description
N7	Natural	Two Stage White-Rodgers 36J Gas Valve – High/Low Fire
L7	Propane	Two Stage White-Rodgers 36J Gas Valve – High/Low Fire
N10	Natural	Two Stage White-Rodgers 36J Gas Valve – High/Low Fire (with remote)
L10	Propane	Two Stage White-Rodgers 36J Gas Valve – High/Low Fire (with remote)

Two stage heaters are supplied with a jumper to enable single stage (high fire only) operation. See electrical section 16.0 for instructions.

Type Gas	Gas Pipe Connection	Electrical Supply	Current Rating	Weight
Natural or Propane	½" NPT (Male)	120 Volt, 60Hz, 1 Phase	0.4 Amp	55 lbs

Module Electrical Rating:	Ignition System (direct spark):
Input-Control: 18-30 VAC 50/60 Hz (class 2 transformer) Input Power-Line: 120 VAC (L1, IND contacts only) Flame Sensitivity: 0.7 µA (microamps) minimum	10 second trial for ignition period 7 second pre-purge period 15 second inter-purge period 3 tries for ignition separate flame sensor potted, 100% water protected

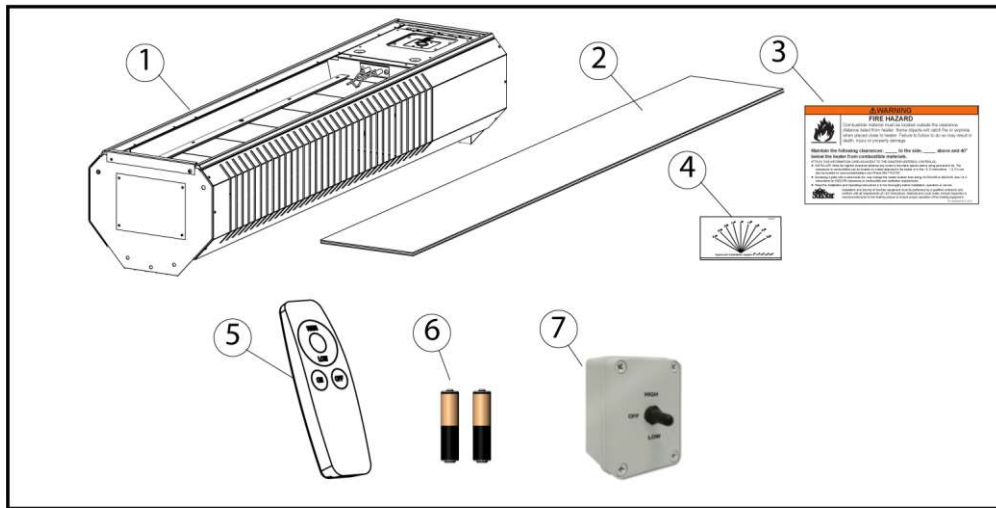
Approved installation angles are 0, 15, 30, 45 and 60 degrees with heat shield installed.

6.0) PACKING LIST

Package contents are listed below:

Model	Part Number	Gas Type
SGL35-N7-MG – 2 STAGE - Marine Grade	44629000	Natural
SGL35-L7-MG – 2 STAGE - Marine Grade	44629010	Propane
SGL35-N10-MG – 2 STAGE - Marine Grade (with remote)	44629040	Natural
SGL35-L10-MG – 2 STAGE - Marine Grade (with remote)	44629050	Propane

Number	Part Number	Description	Qty Per
1	See Above	Patio Heater	1
2	41373050	Ceramic Glass 4mm Black	1
3	43344940	SunStar Clearances sign	1
4	44568039	Angle Mounting Gauge Plate	1
5	30809980	Remote 2-stage Sunstar (N10/L10 models only)	1
6	30809950	AAA Battery 2 Pack (N10/L10 models only)	1
7	40147010	3 Position Switch Kit (N10/L10 models only)	1



7.0) HEATER SIZING GUIDELINES

Radiant heaters work like the sun to emit radiant heat directly to the space to increase the comfort of the patio guests. Suitable applications include patios, porches, outdoor shopping areas and pathways.

The amount of temperature increase in outdoor patio spaces will be dependent on the following factors:

1. The number of heaters in the space is important to provide good coverage of the area to be heated.
2. Take care not to mount the heaters too low or too close together this can make people directly below the heaters uncomfortable.
3. It is recommended to use a suitable windbreak to reduce the effects of direct wind on the patio. If an area is going to be unprotected and is a breezy location then heaters may need to be located closer together. Wind breaks must be designed to allow fresh air for ventilation.
4. Angling the heaters greater than 30 degrees should be avoided unless the mounting height is low, when the heaters are angled more than 30 degrees the radiant intensity is lower and will reduce the amount of heat felt by the guests.

⚠ CAUTION

When angle mounting the heater the radiant output will decrease approximately by following:

Mounting Angle	15 degree	30 degree	45 degree	60 degree
Radiant output reduction	3%	13%	29%	50%

5. It is recommended to place the heaters in the area of greatest heat loss facing into the patio area.

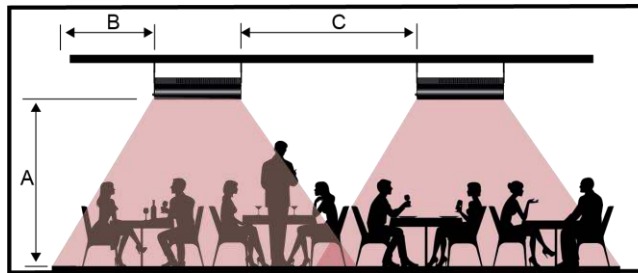
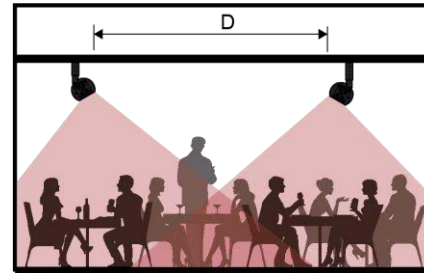
The table below shows minimum area coverage per heater for outdoor patio heating based on a 5 to 10°F (2.8 to 5.6°C) temperature rise.

Mounting Angle	Mounting Height	Breezy Exposed Location	Moderately Protected	Well Protected
Horizontal	8ft. – 11ft. (2.4 – 3.4m)	8 x 8 ft (2.4 x 2.4m)	10 x 10 ft. (3.0 x 3.0m)	12 x 12 ft. (3.7 x 3.7m)
Up to 30 Degrees Angled	7ft. – 9ft. (2.1 – 2.7m)	8 x 8 ft (2.4 x 2.4m)	9 x 9 ft. (2.7 x 2.7m)	11 x 11 ft. (3.4 x 3.4m)
30 to 60 Degrees Angled	6.5ft. – 8ft. (1.9 – 2.4m)	Not Recommended		8 x 8 ft. (2.4 x 2.4m)

Note: When sizing the number of heaters to warm the patio, the area coverage given above may not provide the stated temperature rise under all weather conditions and will be dependent on heater placement. Minimums are shown as a guideline for human comfort. For more assistance with patio heater sizing and layout please contact your local Space-Ray representative.

8.0) TYPICAL HEATER LAYOUTS

The diagram below shows the recommended spacing layout between heaters.

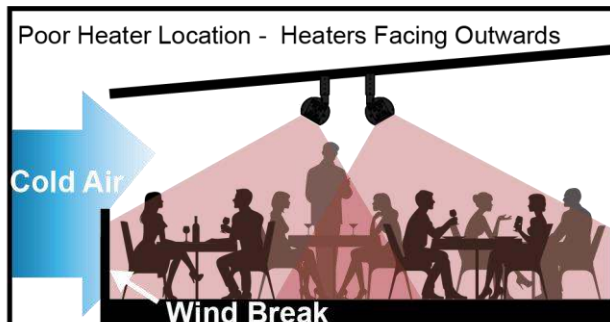
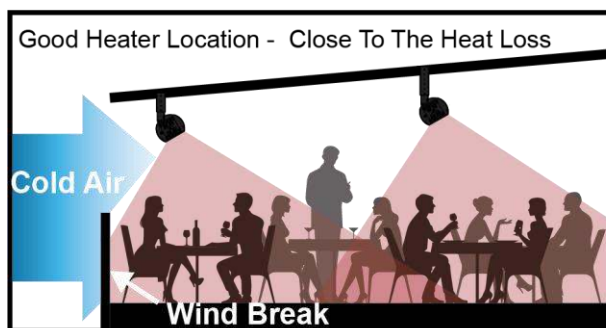
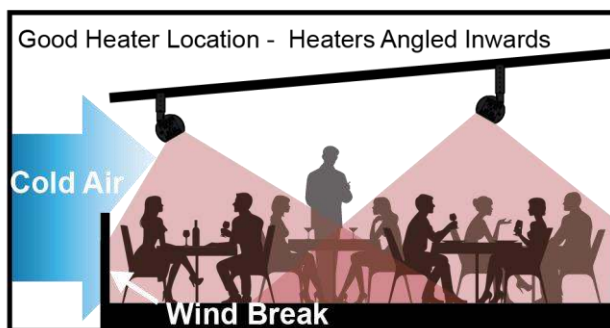
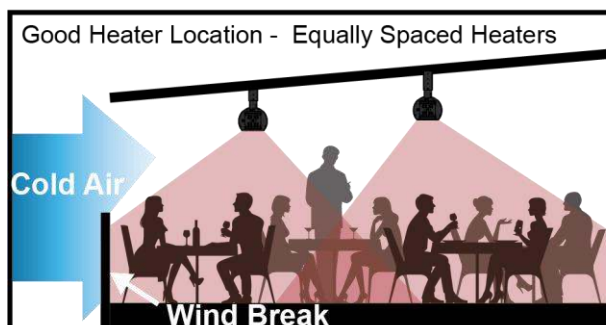


Dimension	Horizontal		15 to 30 degree angle		Above 30 degree angle	
	Min.	Max.	Min.	Max.	Min.	Max.
A. Mounting Height	8ft (2.4m)	11ft (3.4m)	7ft (2.1m)	9ft (2.7m)	6ft (1.8m)	8ft (2.4m)
B. Distance to the end of the patio	0ft (0m)	6ft (1.8m)	0ft (0m)	6ft (1.8m)	0ft (0m)	6ft (1.8m)
C. Distance between heaters.	8ft (2.4m)	12ft (3.7m)	7ft (2.1m)	11ft (3.4m)	6ft (1.8m)	10ft (3.0m)
D. Distance between heaters*	8ft (2.4m)	16ft (4.9m)	8ft (2.4m)	18ft (5.5m)	8ft (2.4m)	16ft (4.9m)

*Note the distance D for angled heaters applies when they are facing towards each other.

Note: Local codes may have special requirements regarding head clearance requirements. Some local codes require all portions of overhead radiant heaters to be located at least 8 feet above the floor.

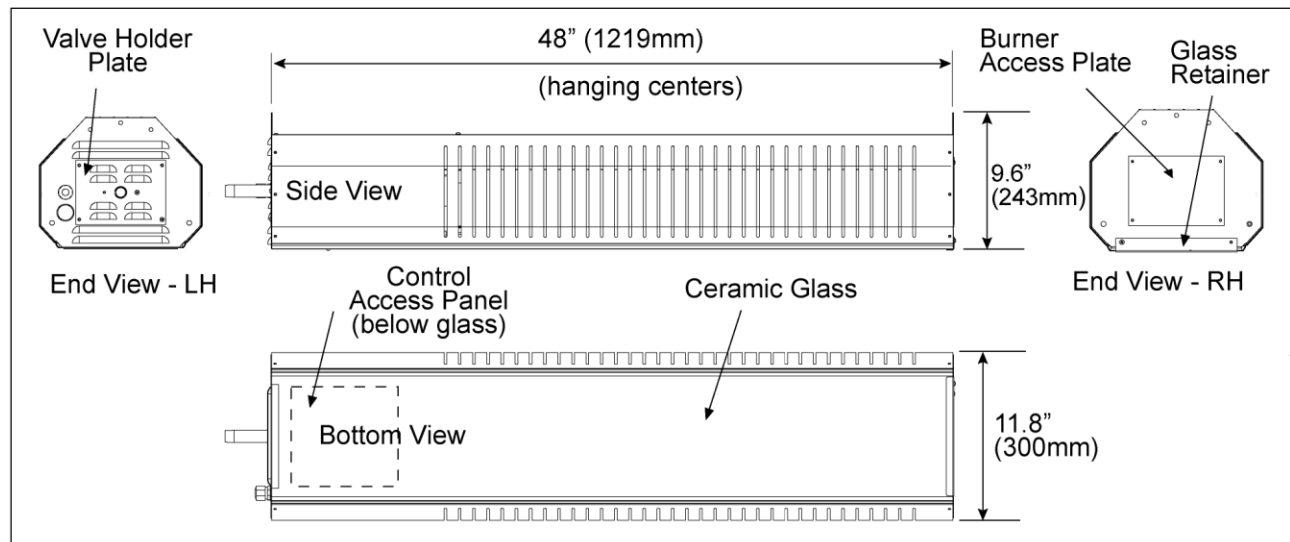
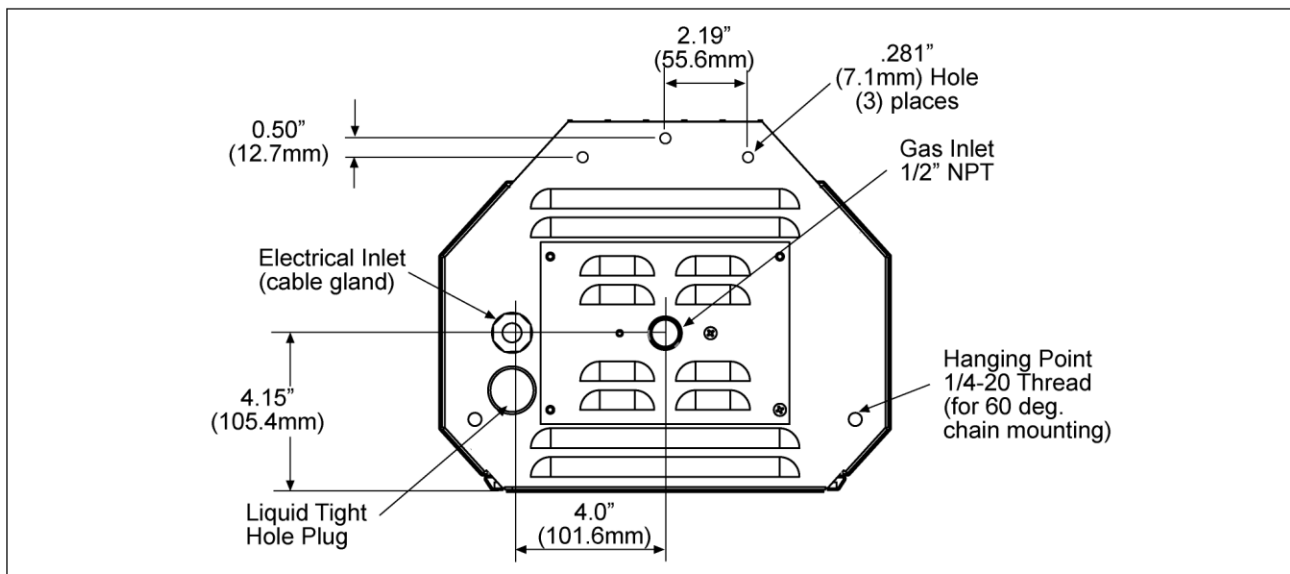
Below are examples of patio heating applications.



Positioning Tips

1. Avoid Direct wind, position wind breaks where possible. Wind breaks must not effect clearance to combustibles or ventilation.
2. Heaters mounted horizontally will radiate the most heat. The greater the mounting angle the lower the intensity.
3. Use mounting height and area coverage information to select the correct number of heaters.

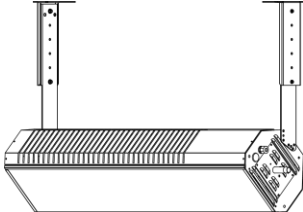
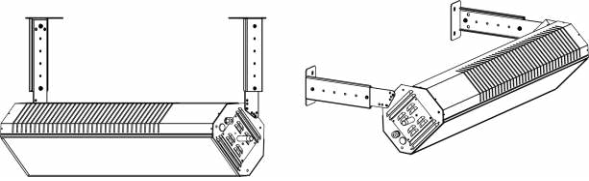
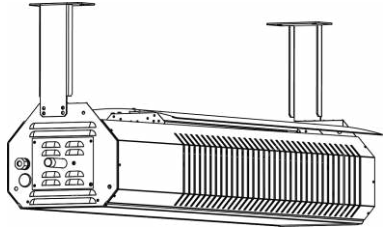
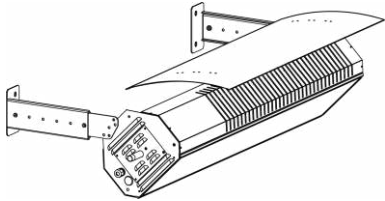
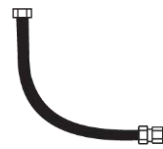
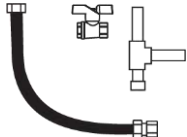
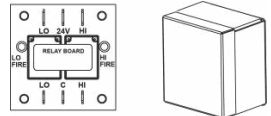
9.0) DIMENSIONS



10.0) ACCESSORIES

Below are the optional accessories available for the Wind Blocker Patio heater.

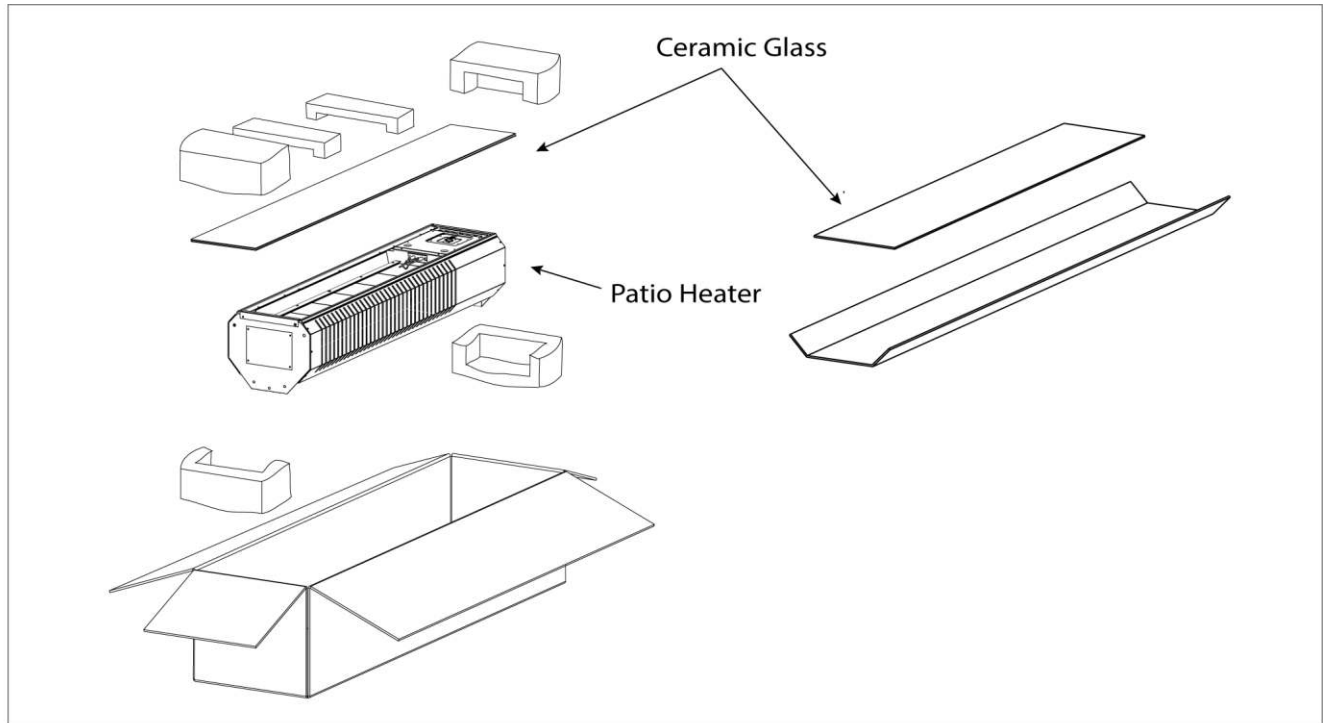
PN	Description	Picture
44560358 MARINE SS	Wall / Ceiling Telescopic Mounting Bracket Kit- 15"-22" overhead space (check clearances to combustibles space above the heater before ordering)	

PN	Description	Picture
44560359 MARINE SS	Ceiling Telescopic Mounting Bracket Kit- 22"-30" overhead space (check clearances to combustibles space above the heater before ordering)	
44560355 MARINE SS	Wall / Ceiling Telescopic Mounting Bracket Kit- 15"-30" overhead space (check clearances to combustibles space above the heater before ordering) includes both the 15-22" and 22-30" extension legs.	
44560356 MARINE SS	Ceiling Mount Bracket Kit- 10" fixed installation for minimum overhead clearance. This bracket is only for horizontal mounting with the heat shield	
44566350 MARINE SS	Heat Shield Kit - Reduced clearances to combustible option when installed. Mounting angles are restricted to 0, 15, 30, 45 and 60°.	
41690120	Chain Kit, 12 ft. chain w/ 8 hooks	
30302241	Gas Connector - Black Powder Coated Paint to match the heater. 1/2"OD -24" Long with 1/2MIP X 1/2 FIP Connection	
44604500	Gas Connection Kit- 1/2"-Includes Gas Connector, Manual Ball Valve, Sediment Trap (Tee, Cap, Nipple), Thread Sealing Compound	
03307260	Gas regulator 2psig to 11" w.c. 1/2" NPT inlet and outlet.	
40147010	3 Position Switch Kit, (High/Low/Off) for manual heater control. Included with models (N10/L10).	
44195000	Two Stage Relay Kit (one per heater required) for controlling multiple heaters w/a single 24V Two Stage thermostat	

11.0) UNPACKING THE HEATER

⚠ CAUTION The heater and ceramic glass are shipped separate but in the same box. Care must be taken when up-packing the heater. Carefully open the top of the heater as indicated on the labels at the side of the shipping box. An angle gauge is attached to the heater's control side with tape and is needed for installation (see Section 12.1).

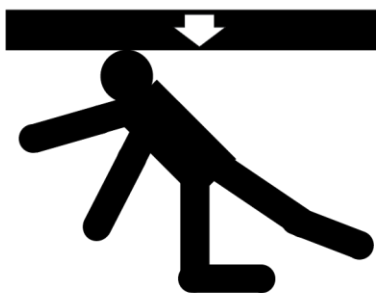
The glass is located on top of the heater and is wrapped in cardboard cradled into the foam end pieces. Carefully remove the top foam pieces and remove the cardboard wrapped glass. Care must be taken that during handling the glass does not slide out of the cardboard wrap. Store the glass in a secure location for later assembly.



⚠ CAUTION It is recommended that two people lift the heater out of the carton. Do not remove from the remaining packaging until the heater is ready to be hung.

12.0) INSTALLATION

⚠ WARNING



CRUSH HAZARD

All materials used to suspend the heater must have a minimum working load of 115 lbs. All "S" hooks must be crimped closed.

Never use the heater to support a ladder or other access equipment.

Always suspend from a permanent part of the building structure that can support the total force and weight of the heater.

Never use chain to suspend the heater outdoors.

Failure to do so may result in death, serious injury or property damage.

In order to protect the ceramic glass it is recommended to only insert the ceramic glass once all the other installation steps have been completed. The ceramic glass must be removed to wire the heater and for commissioning.

Various means of suspending the heater can be used. See the following drawings for typical examples.

- a) Heaters installed outdoors or in areas subject to strong winds must be installed using the optional hanging brackets or suitable rigid mount hardware. Chain, cable and other flexible hanging methods are not recommended.
- b) Use only noncombustible materials for suspending hangers and brackets.
- c) Turnbuckles can be used with chains to allow leveling of the heater. All "S" hooks and eye bolts must be manually crimped closed by the installer.
- d) Heaters must not be supported by gas or electric supply lines and must be suspended from a permanent structure with adequate load capacity.
- e) Hanging points are a fixed length between centers. Secondary steel work may be required to span between supporting beams.
- f) The appliance should be located with respect to building construction and other equipment to permit access to the appliance for servicing etc.
- f) The heater must be installed in an adequate free area to allow the products of combustion to freely escape from the heater. The heater must not be installed in recessed spaces or enclosure and alcoves.
- g) The heater must be suspended with its longitudinal axis horizontal, but may have its lateral axis at an angle from 0° to 60° from the horizontal, as shown in the minimum clearances to combustibles section 4.0).
- h) An optional heat shield may be installed to reduce the top distance of clearance to combustibles. This heat shield should be installed prior to hanging the heater. When using the heat shield at the minimum clearance distance the angles of installation are restricted to 0, 15, 30, 45 and 60°.
- i) Use the provided angle gauge to ensure that the heater is hung at the approved installation angles.
- j) The heater can be angle mounted on both sides of its lateral axis.
- k) Hanging brackets should first be fixed to the wall surface by means of 4 lag bolts – not supplied (3/8" x 1-1/2" minimum) through pre-formed holes in each of the brackets prior to installing heater.

12.1) HEATER MOUNTING ANGLE

⚠ WARNING



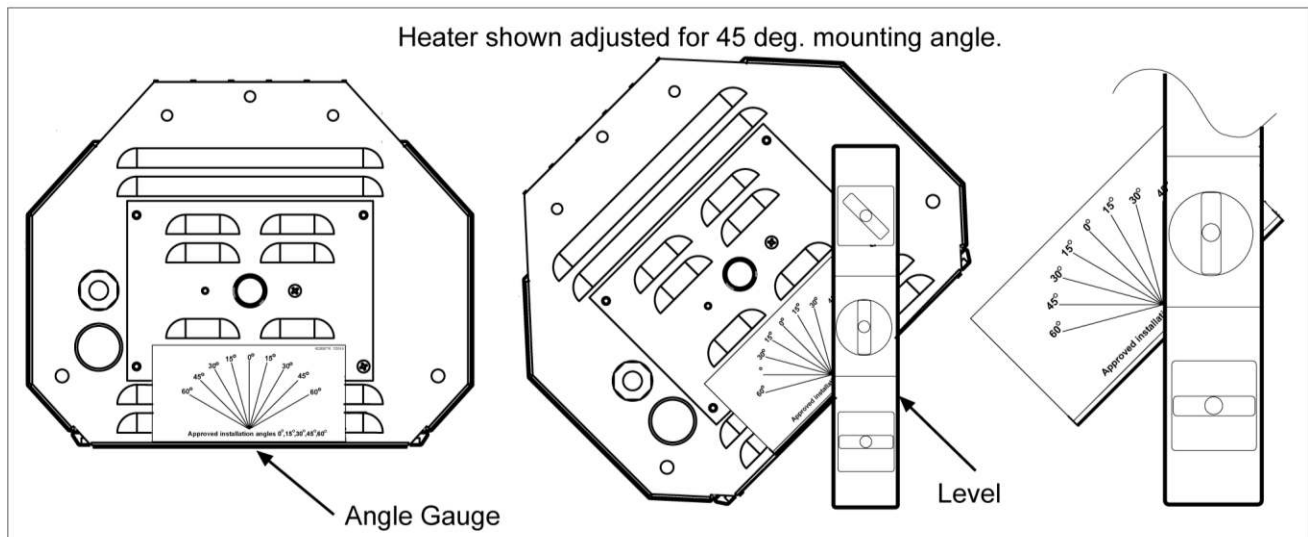
FIRE AND EXPLOSION HAZARD

Heat shield must be installed in the correct position for the installation angle. Failure to mount the shield correctly will result in higher surface temperatures and exceed the clearances to combustibles.

Approved installation angles are 0, 15, 30, 45 and 60 degrees with the heat shield installed.

Failure to do so may result in fire and/or explosion, property damage, serious injury or death.

Every heater is supplied with an angle gauge. The gauge is attached with tape to the heater control side.



The angle gauge is used in combination with a level to ensure that the heater is installed at one of the mounting angles of 0°, 15°, 30°, 45° and 60°.

Hold the side of the angle gauge without label flush against the glass surface. Hold a level against the other side of the angle gauge and find the desired installation angle of the heater. Verify that the level is vertical, adjust heater angle if needed.

Note: If a heat shield is installed its location must match the heaters angle (see Section 21.0).

This process must be repeated for both ends of the heater.

12.2) INDOOR INSTALLATION – HANGING METHODS

When the heater is used for an Indoor Installation then the following hanging methods may be used.

The heater can be hung from the ceiling, secondary steel work, etc. using chains, threaded rods and other approved hanging materials. All hanging materials must have a minimum working load of 115 lbs. Any “S” hooks must be crimped closed after installation.

Note:

When hanging the heater hanging materials which allow the heater to move the gas connection must be established using an approved flexible gas hose of a minimum of 24” length.

Diagram below shows Horizontal mounting with chain.

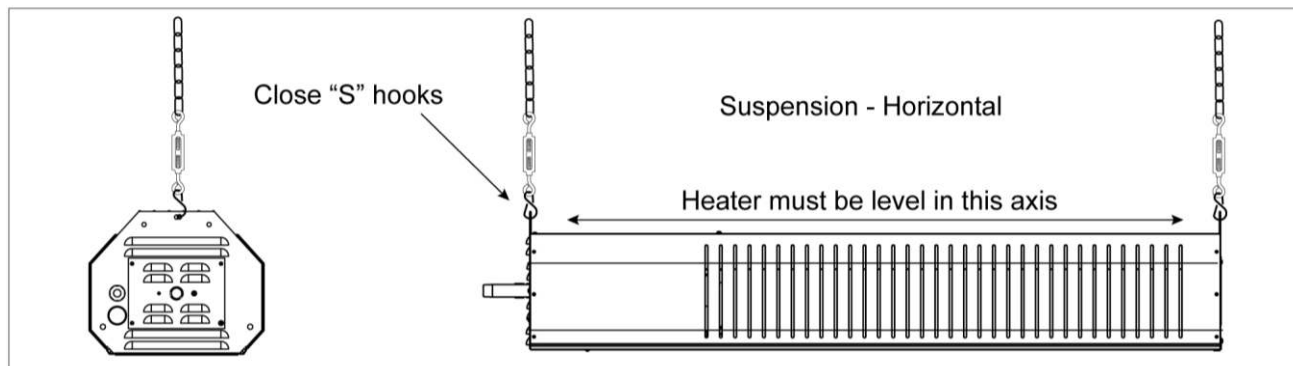
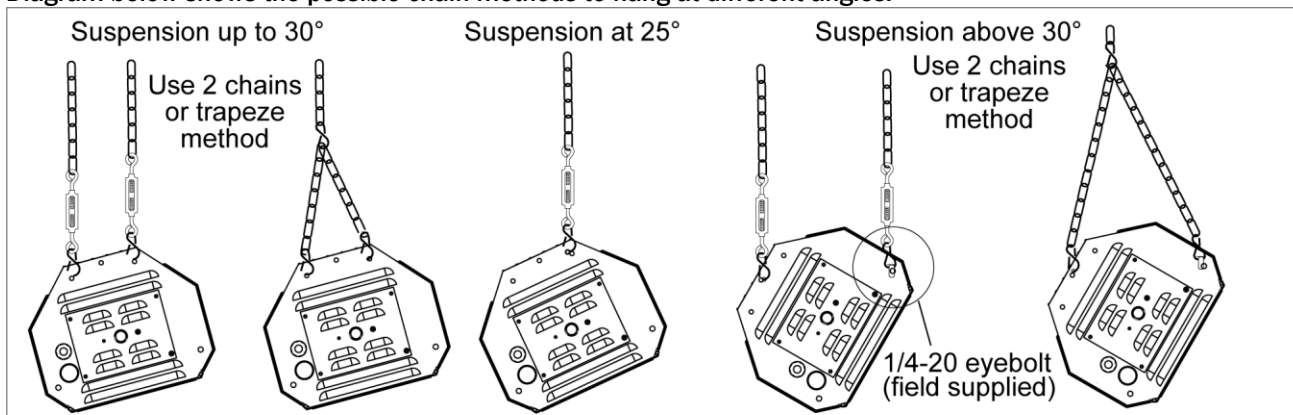


Diagram below shows the possible chain methods to hang at different angles.



Notes: When suspending at 25 degrees if the heat shield is installed use the 30-degree location for the heat shield.

12.3) INDOOR / OUTDOOR RIGID HANGING BRACKETS

Fixed hanging methods which prevent the heater from swaying must be used for outdoor installations.

Below are the bracket kits which can be used for ceiling and wall mount for patio heaters installed indoors and outdoors, with and without heat shields. The brackets provide for a range of lengths and approved mounting angles of 15°, 30°, 45° and 60°.

MG Model – Marine Grade SS 316 Construction Brackets

44560358-MARINE SS KIT, BRACKET - WALL/CEILING 15"-22" CEILING - FOR USE **WITH** HEAT SHIELD (telescoping)

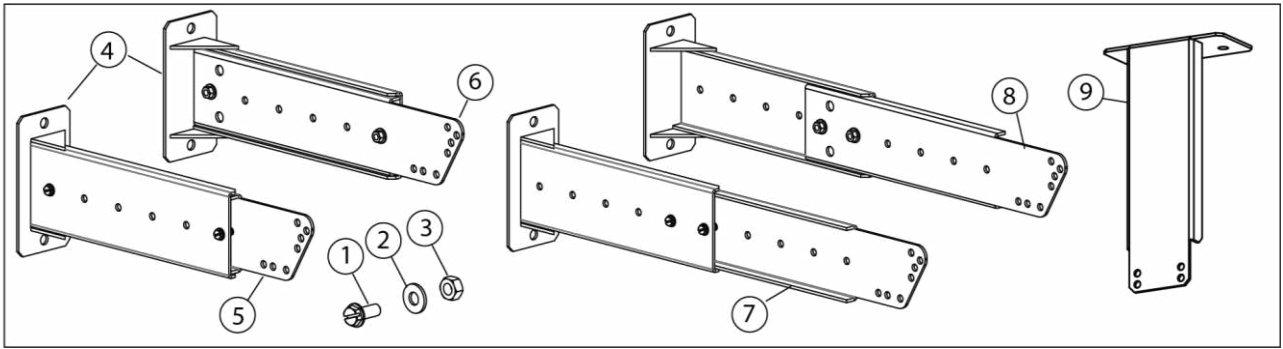
44560359-MARINE SS KIT, BRACKET - CEILING 22"-30" - FOR USE **WITHOUT** HEAT SHIELD (telescoping)

44560355-MARINE SS KIT, BRACKET - WALL/CEILING 15"-30" CEILING - FOR USE **WITH** HEAT SHIELD (telescoping)

44560356-MARINE SS KIT, BRACKET - CEILING 10" – FIXED (for outdoor only horizontal ceiling mount with heat shield)

The hanging brackets are supplied as an optional accessory item. Below are the kit contents (**MARINE SS**).

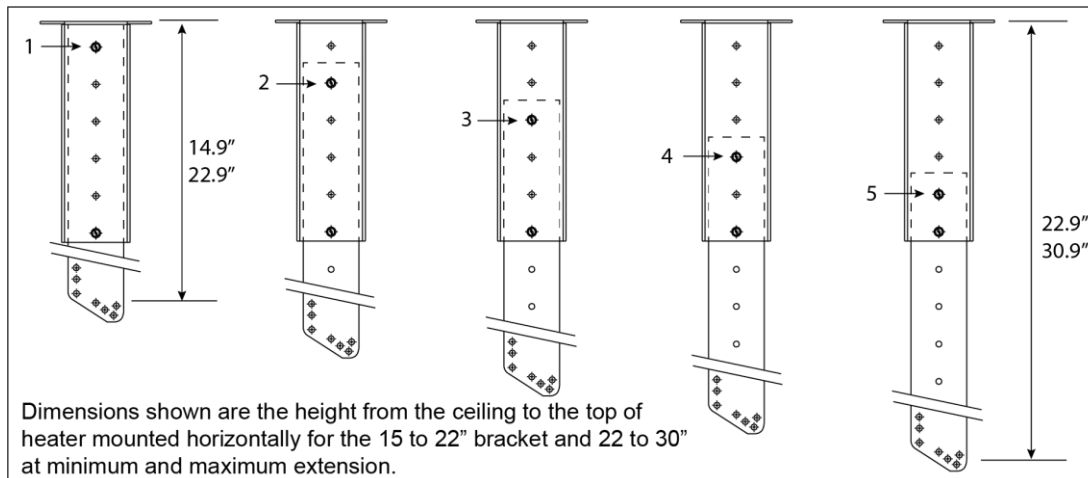
Item No.	Part No.	Description	44560358 Quantity	44560359 Quantity	44560355 Quantity	44560356 Quantity
1	02140040	HHCS, 1/4-20 x 1/2" SS	4	4	4	4
1a	02140140	HHCS, 1/4-20 x 1-1/2" SS	4	4	4	-
2	02129100	WASHER, FLAT 1/4"N SS	16	16	16	8
3	02363030	FLANGE NUT, 1/4-20 - SS	8	8	8	4
4	44560205	HANGER BRACKET – RECEIVER	2	2	2	-
5	44560265	SLIDER ARM – LH (15.75")	1	-	1	-
6	44560275	SLIDER ARM – RH (15.75")	1	-	1	-
7	44560285	SLIDER ARM – LH (23.75")	-	1	1	-
8	44560295	SLIDER ARM – RH (23.75")	-	1	1	-
9	44560805	FIXED ARM (10")	-	-	-	2



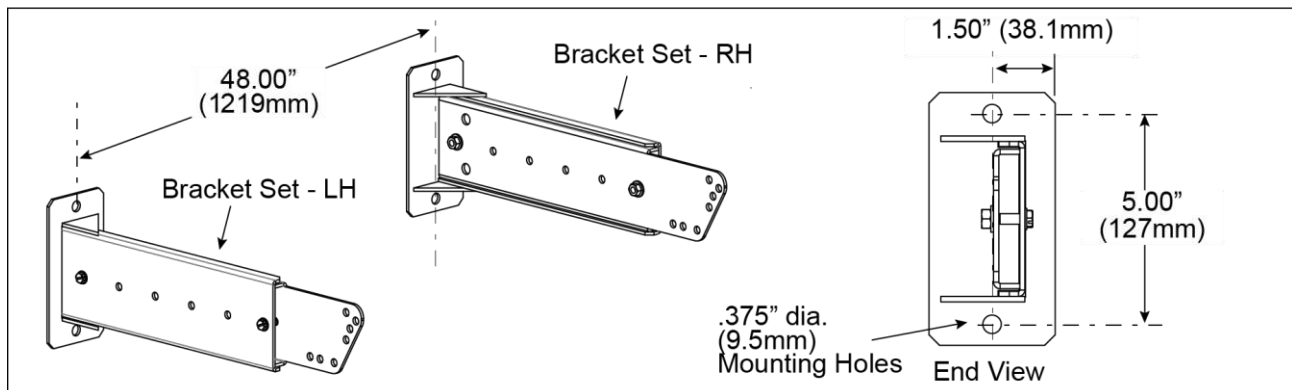
The tables below can be used to select the correct bracket to ensure that the heater is installed at the correct clearance to combustible distance from the ceiling depending on whether the heater is installed indoors or outdoors, the mounting angle and whether a heat shield is installed.

	15-22" Bracket (With heat shield) telescope hole positions*		22-30" Bracket (Without heat shield) telescope hole positions*	
Mounting Angle	INDOOR	OUTDOOR	INDOOR	OUTDOOR
0	1 to 5	1 to 5	3 to 5	1 to 5
15 and 30	2 to 5	1 to 5	3 to 5	1 to 5
45 and 60	4 or 5	2 to 5	4 or 5	2 to 5

* The above table relates to the holes positions as shown in the figure below for the two different length adjustable brackets.



12.3.1) HANGING BRACKETS ASSEMBLY



A left-hand LH and right-hand RH bracket must be assembled. Torque screws and locknuts to 5 lb/ft.

To mount the hanging brackets to the wall/ceiling:

1. Measure and mark distances for the hanger bracket holes.
2. Hanging brackets should first be fixed to the wall or ceiling surface by means of 4 lag bolts – (not supplied) (3/8" x 1-1/2" minimum) through pre-formed holes in each of the brackets prior to installing heater. All hanging materials must have a minimum working load of 115lbs

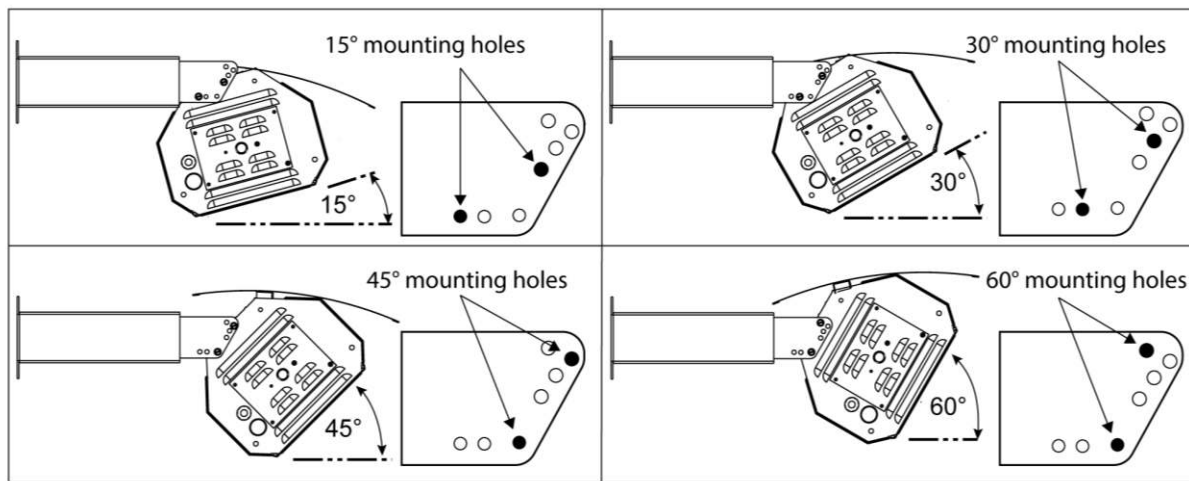
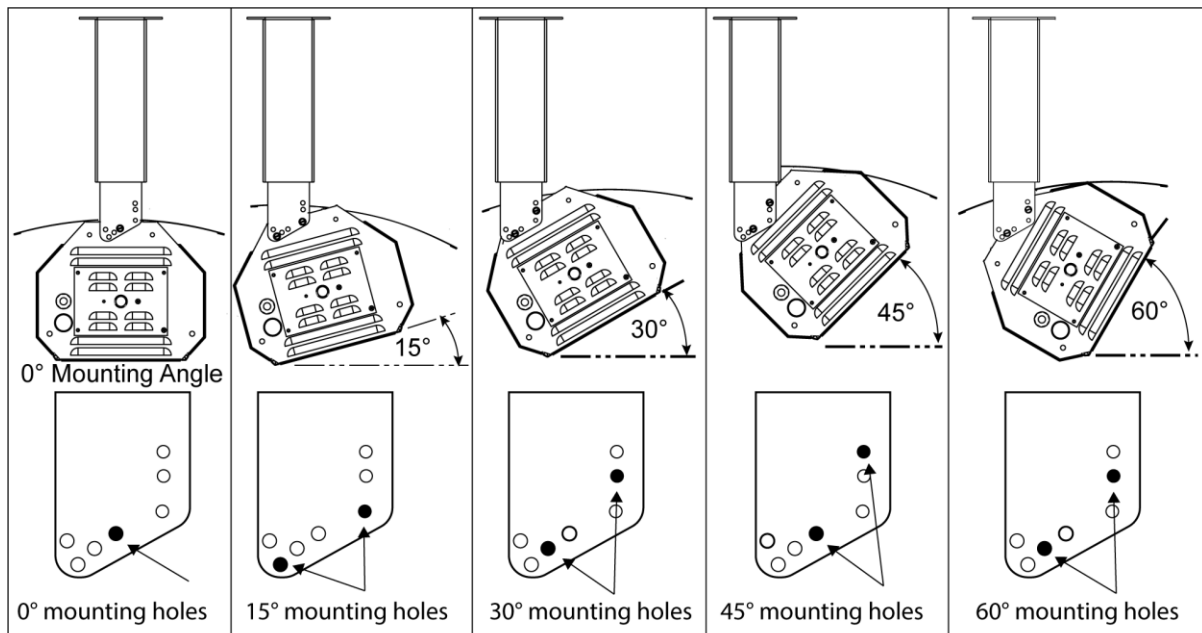
12.3.2) HEATER ATTACHMENT TO HANGING BRACKETS

The heater can be attached to the hanging brackets in angles of 15°, 30°, 45° and 60°. Choose the desired heater mounting angle and find the corresponding hole pattern as per the wall and ceiling mount figures below.

⚠ CAUTION When angle mounting the heater the radiant output will decrease approximately by following:

Mounting Angle	15 degree	30 degree	45 degree	60 degree
Radiant output reduction	3%	13%	29%	50%

Attach the heater to the brackets using (2) cap screws, flat washers and locknuts provided in the kit. Torque screws and locknuts to 5 lbf-ft. Minimum clearances to combustibles must be observed. See Section 4).



13.0) HEAT SHIELD INSTALLATION

⚠ WARNING



FIRE AND EXPLOSION HAZARD

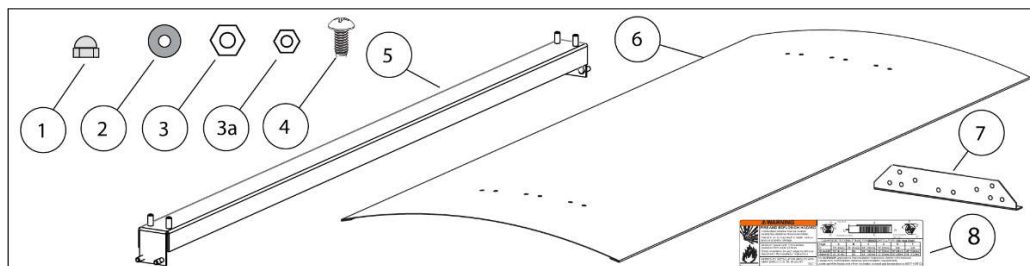
Heat shield must be installed in the correct position for the installation angle. Failure to mount the shield correctly will result in higher surface temperatures and exceed the clearances to combustibles.

Approved installation angles are 0, 15, 30, 45 and 60 degrees with the heat shield installed.

Failure to do so may result in fire and/or explosion, property damage, serious injury or death.

A heat shield can be used to reduce the clearance to combustible distances. Refer to Minimum Clearance to Combustibles in Section 4). The heat shield is available as an accessory Kit.

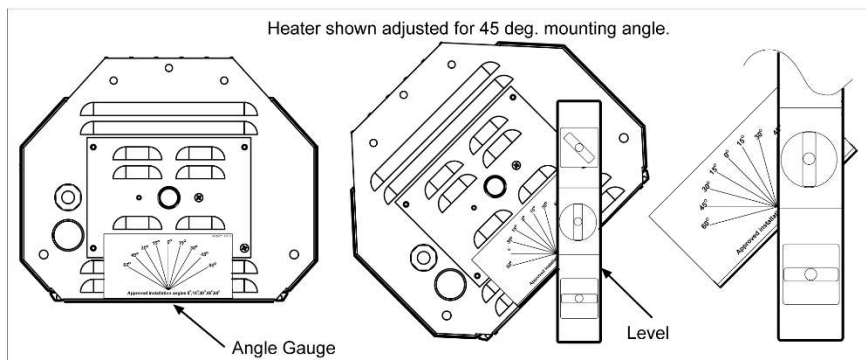
Item No.	Part No.	Description	Kit No. 44566350 (Marine SS)
1	02359000	#10-24 ACORN NUT	2
2	02358000	TEFLON WASHER	4
3	02186010	#10-24 SS LOCKNUT	2
3a	02167049	#8-32 SS LOCKNUT	4
4	02166040	PHMS #8-32 x 3/8" SS	4
5	44568132	RAIL - HEAT SHIELD HANGER - MARINE GRADE 316	1
6	44566185	HEAT SHIELD - ROLLED - MARINE GRADE 316	1
7	44568145	HOLDER BRACKET - MARINE GRADE 316	2
8	43247112	LABEL, INDOOR CLEARANCES (with heat shield)	1



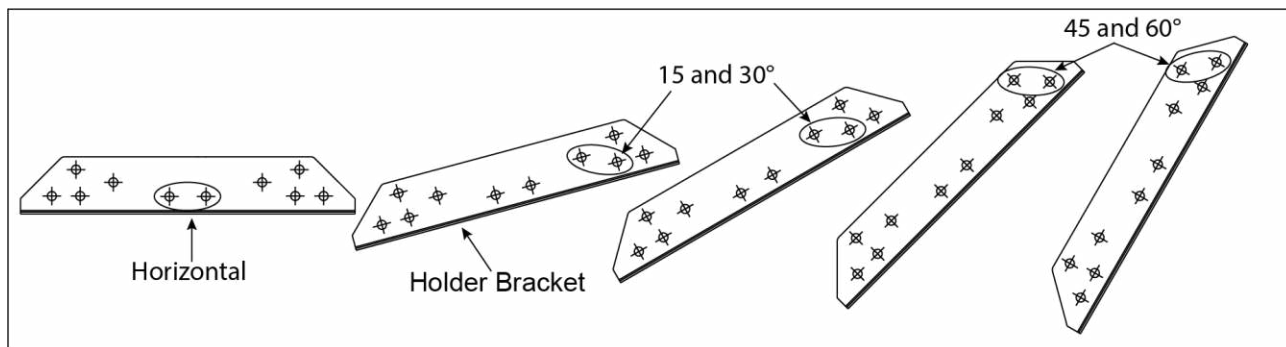
The heat shield position on the heater is dependent on the heater mounting angle. Use the angle gauge provided with the heater to determine the mounting angle before proceeding with the heat shield assembly. See Section 12.1

See below for installation steps.

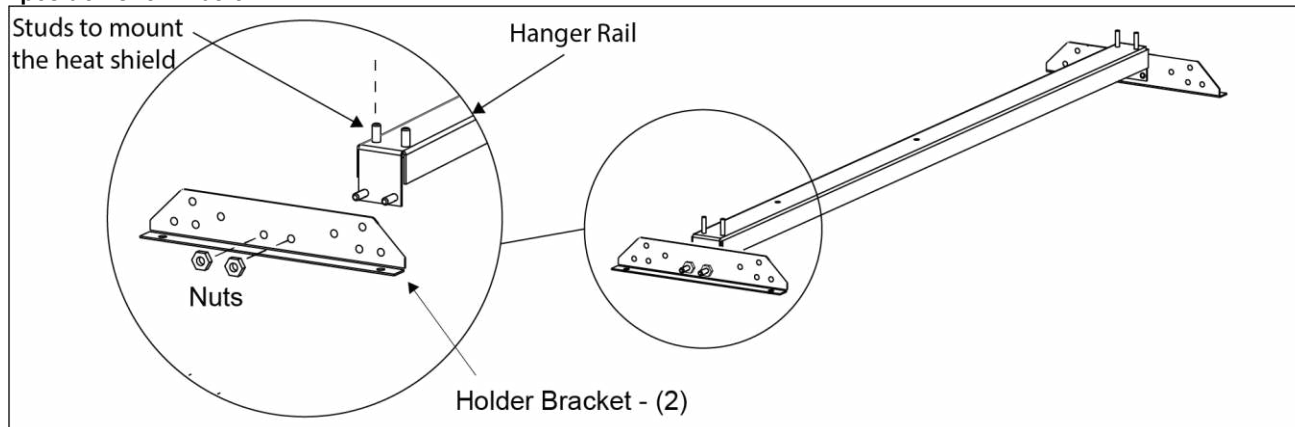
Step 1. Use the angle gauge shown below to determine the mounting angle of the heater.



Step 2. Identify the correct holes to mount the shield hanger rail from the illustration below.



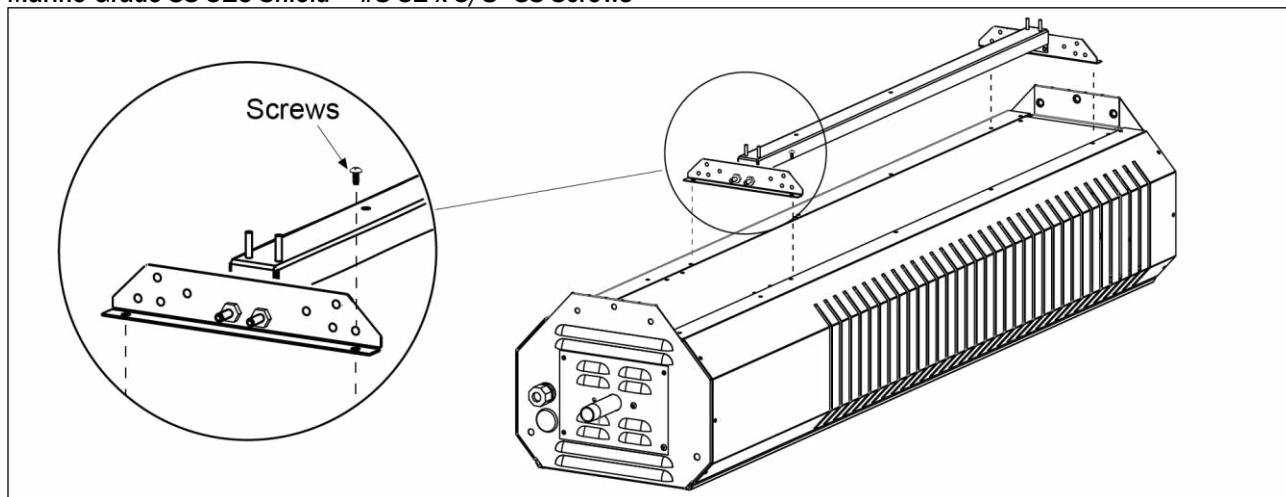
Step 3. Attach the holder brackets to the heat shield hanger rail using (2) #8-32 nuts on each end. Horizontal position shown below.



Step 4. Attach the hanger rail sub-assembly to the top of the heater using (2) screws per bracket as follows:

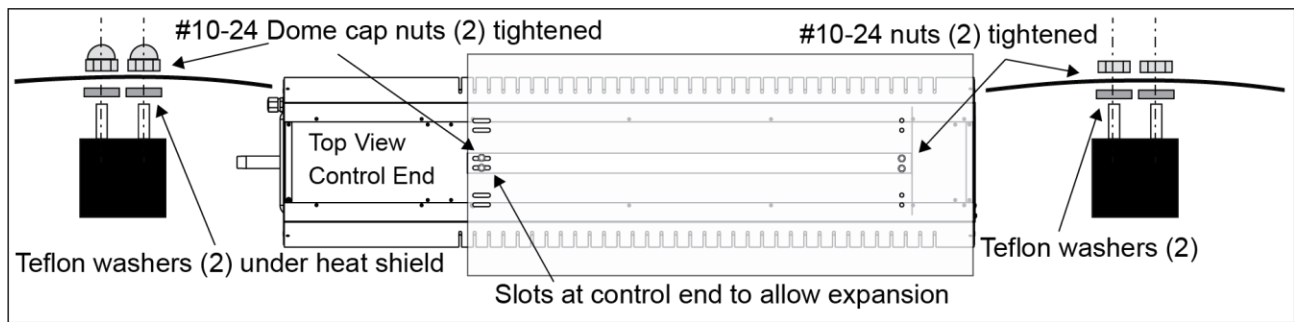
Painted Shield = #8 x 1/2" Black Oxide Screws

Marine Grade SS 316 Shield = #8-32 x 3/8" SS Screws

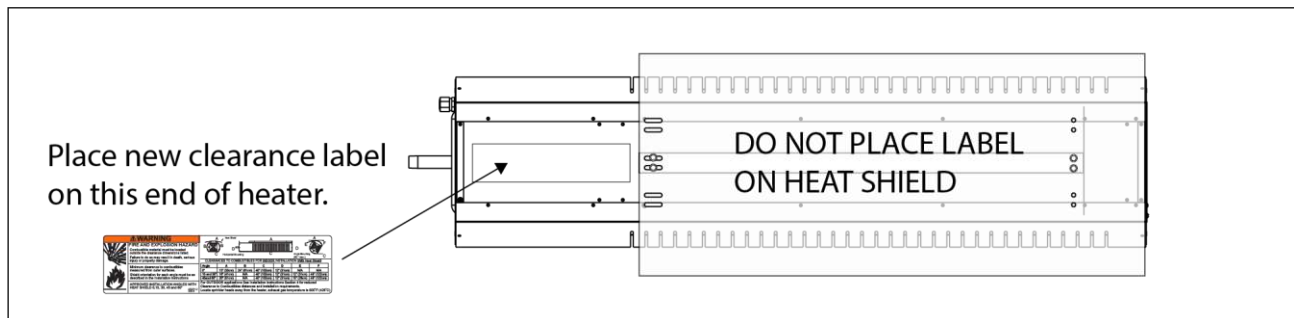


⚠ CAUTION IMPORTANT: Use the **Acorn nuts** at the control end of the heater as shown in the illustrations so that the heat shield can expand when the heater is turned on. Failure to do so may result in the heat shield distorting.

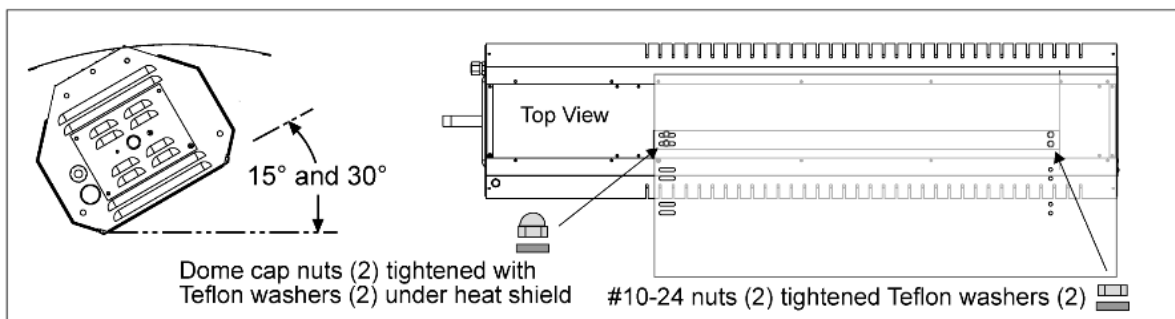
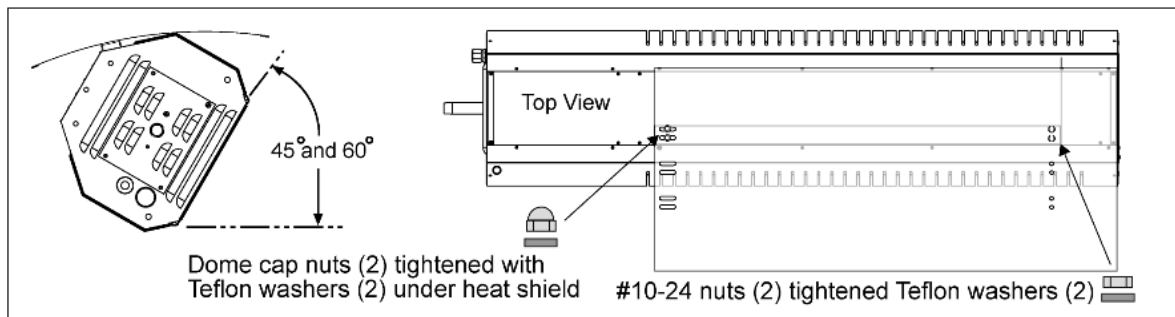
Step 5. Attach the heat shield to the hanger rail using the holes in the heat shield indicated below for horizontal mounting.



Step 6. Place the new clearance label on the control end of the heater. NO NOT PLACE LABEL ON THE HEAT SHIELD.



See below the correct holes to mount the heat shield to the hanger rail for other installation angles.



Note: When in operation the heat shield will deform slightly when installed at a mounting angle of 45 or 60 degrees. This is normal. After operation the heat shield should return to its normal shape.

14.0) ASSEMBLY OF THE CERAMIC GLASS

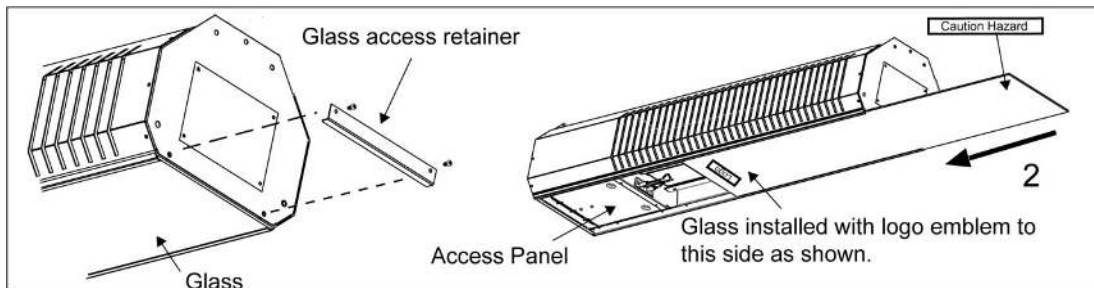
Only install the ceramic glass once the heater has been attached to a suitable gas (see Section 15.0), electrical supply (see Section 16.0) and has been commissioned (see Section 18.0).

Read this section to the end to avoid glass breakage.

1. Locate the "Glass Access Retainer" and carefully remove with a suitable Phillips screw driver the two (2) black oxide sheet metal screws holding it in place. Retain screws and Glass Access Retainer for later.
2. The side of the glass where the logo is attached must be slid in first for the logo's final position to be at the control side of the heater.
3. Slide the glass into the "Glass Retainer Rails". The glass must be held parallel to the Glass Retainer Rails during assembly. The glass will slide in easy with ample clearance. Slide the glass until it is positioned under the Glass Retainer at the heaters control enclosure side. At this point the glass will be flush with the heater at the insertion point.

Note: If the ceramic glass does not slide in easily review position of ceramic glass to glass retainers and adjust if needed. Do not force the ceramic glass into the glass retainers!

4. Reinstall the Glass Access Retainer removed in 1. with the two (2) sheet metal screws.



15.0) GAS CONNECTIONS AND REGULATION

⚠ WARNING



FIRE AND EXPLOSION HAZARD

An approved connector, suitable for the environment of equipment usage, is required. Visible or excessive swaying, flexing and vibration of the gas connections **must** be avoided to prevent failure. Neither the gas pipe nor the connector shall be placed in the "flue discharge area". In no case shall the gas supply support the weight of the heater.

Leak test all components of gas pipe work before operation.

Failure to do so may result in death, serious injury or property damage.

⚠ WARNING



FIRE AND EXPLOSION HAZARD

Tighten the flexible gas hose, gas piping and components securely.

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

Failure to do so may result in death, serious injury or property damage.

⚠ WARNING Use an approved flexible gas connector of 24" minimum length when installing the heater with flexible hanging methods as described in Section 12.0).

IMPORTANT BEFORE CONNECTING THE GAS TO THE HEATER

- a) Connect to the supply tank or manifold in accordance with state or local building codes. Authorities having jurisdiction should be consulted before the installation is made. (In Canada, refer to the latest edition of CSA B149.1, Natural Gas and Propane Installation Code.)

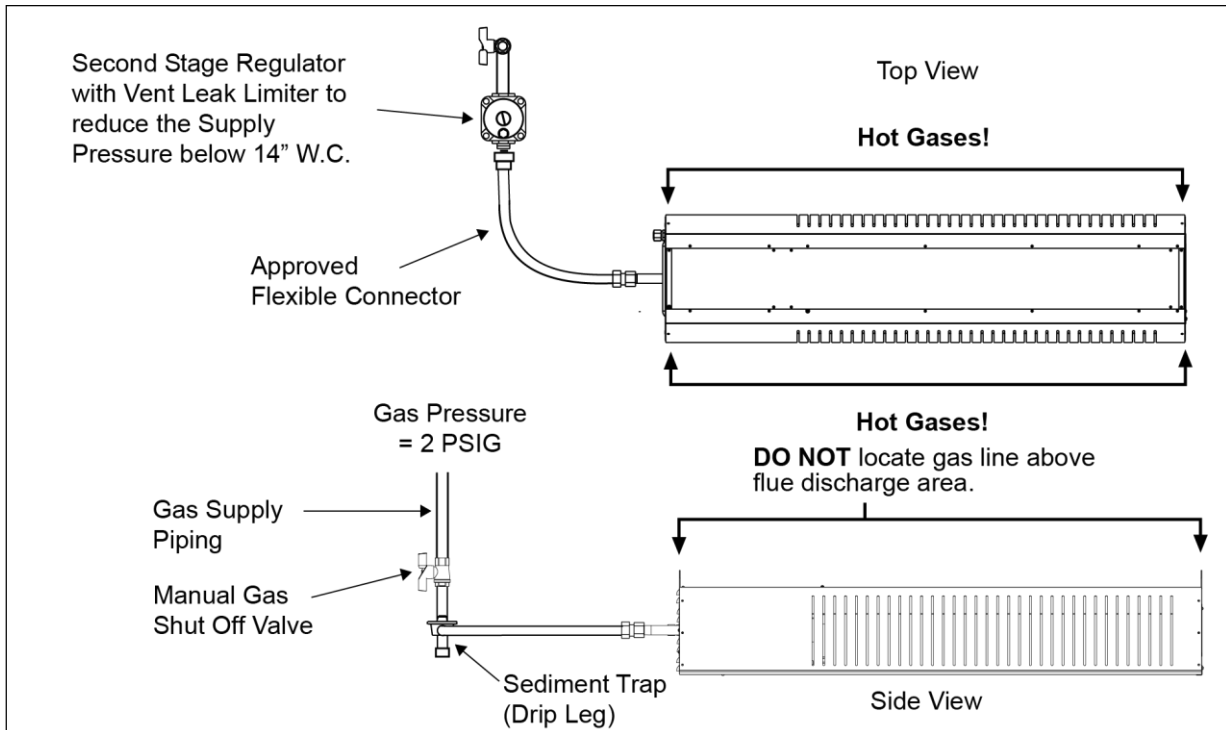
- b) Check that the gas fuel on the burner rating plate matches the fuel for the application.
- c) Check that the gas supply piping has the capacity for the total gas consumption of the heaters and any other equipment connected to the line.
- d) Check that the calculated supply pressure with all gas appliances and heaters operating will not drop below the minimum supply pressure required for these heaters. See table below.

GAS PRESSURE TABLE				
GAS TYPE	MANIFOLD PRESSURE		SUPPLY PRESSURE	
	High	Low (2-stage only)	Minimum*	Maximum
Natural Gas N7	6.0" W.C.	2.8" W.C.	7" W.C.	14" W.C.
Propane Gas L7	11.0" W.C.	5.0" W.C.	11.5" W.C.	14" W.C.

- e) All gas supply lines must be located in accordance with the required clearances to combustibles from the heater as listed on the clearances label of the heater and Section 4.0) of this manual.
- f) Pipe joint compounds must be resistant to the action of liquefied petroleum gases.
- g) The heater will move when installed with flexible hanging methods, see Section 12.0). Use an approved flexible connector for connections between the rigid piping and the heater. An approved shut off valve should be installed within 6ft of the heater.
- h) The gas pipe, flexible hose and connections must be self-supporting. The gas pipe work must not bear any of the weight of the heater or any other suspended assembly.
- i) This appliance is equipped with a fast-opening, combination gas valve. **The maximum supply pressure to the appliance is 14" W.C. (1/2 psig)** 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
- j) 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 slowly. Turn the gas supply pressure on and check for leaks.
- k) If a 2nd stage regulator is used, the ball valve before the heater in the supply line must be closed when purging the gas lines to prevent gas seeping through it. If initial gas pressure is higher than 14" W.C. 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.
- l) High gas pressure regulators need to be installed upstream of flexible gas lines.

⚠ WARNING The entire gas supply system must be checked for leaks prior to heater operation. **Do not use an open flame of any kind to test for leaks.**

Flexible Hose Connections



15.1) INSTRUCTIONS FOR PRESSURE TEST GAUGE CONNECTION

⚠ WARNING		
ELECTRIC SHOCK HAZARD	FIRE AND EXPLOSION HAZARD	BURN HAZARD
Disconnect electric before service. Heater must be connected to a properly grounded electrical source.	Turn off gas supply to heater before service.	Allow heater to cool 30 minutes before service. Glass and heater surfaces will still be hot after operation.
Failure to follow these instructions can result in death, serious injury or property damage.		

15.2) INLET GAS PRESSURE CHECK

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

15.3) OUTLET GAS PRESSURE CHECK AND ADJUSTMENTS

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 the heater and all other gas burning equipment that are connected to the gas supply system are operating at maximum capacity. The combination gas valve is factory set and should not need adjustment. If gas pressure adjustment is required, follow the instructions:

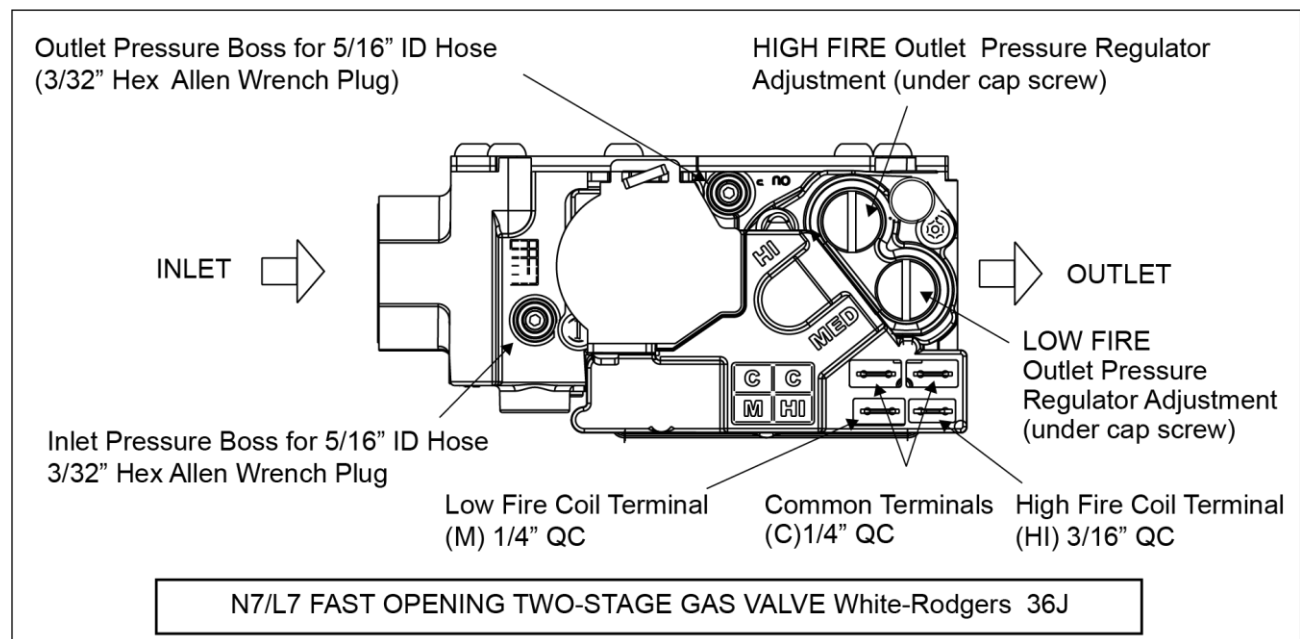
1. Turn off all electrical power to the system to connect manometer hoses.
2. Turn the pressure test screw (3/32" Hex) in the center of the boss **not more than one turn counterclockwise**. Attach a 5/16" hose and manometer over the tapered outlet pressure boss on the valve (see **Figure 1** below). If regulator needs to be adjusted, see instructions below.

TO ADJUST REGULATOR (two stage gas valves):

1. Turn on power and energize main gas valve solenoid. Do not energize the **HI** solenoid.
2. Remove regulator cover screw from the **low** outlet pressure regulator (see **Figure 1** below) and turn screw clockwise ⤵ to increase pressure, or counterclockwise ⤴ to decrease pressure. Replace regulator cover screw and tighten securely.
3. Energize main gas valve solenoid as well as the **HI** terminal.
4. Remove regulator cover screw from the **high** outlet pressure regulator (see **Figure 1** below) and turn screw clockwise ⤵ to increase pressure, or counterclockwise ⤴ to decrease pressure. Replace regulator cover screw and tighten securely.

DO NOT EXCEED THE PRESSURES SHOWN IN THE GAS PRESSURE TABLE.

5. After testing pressure and adjusting the regulator, turn off all electrical power to the system, remove manometer hoses, turn outlet test screw (3/32" Hex) clockwise to seal pressure port. Tighten to 7 in-lb minimum. Turn on system power.



GAS PRESSURE TABLE				
GAS TYPE	MANIFOLD PRESSURE		SUPPLY PRESSURE	
	High	Low (2-stage only)	Minimum*	Maximum
Natural Gas	6.0" W.C.	2.8" W.C.	7" W.C.	14" W.C.
Propane Gas	11.0" W.C.	5.0" W.C.	11.5" W.C.	14" W.C.

Minimum permissible gas supply pressure for purpose of input adjustment.