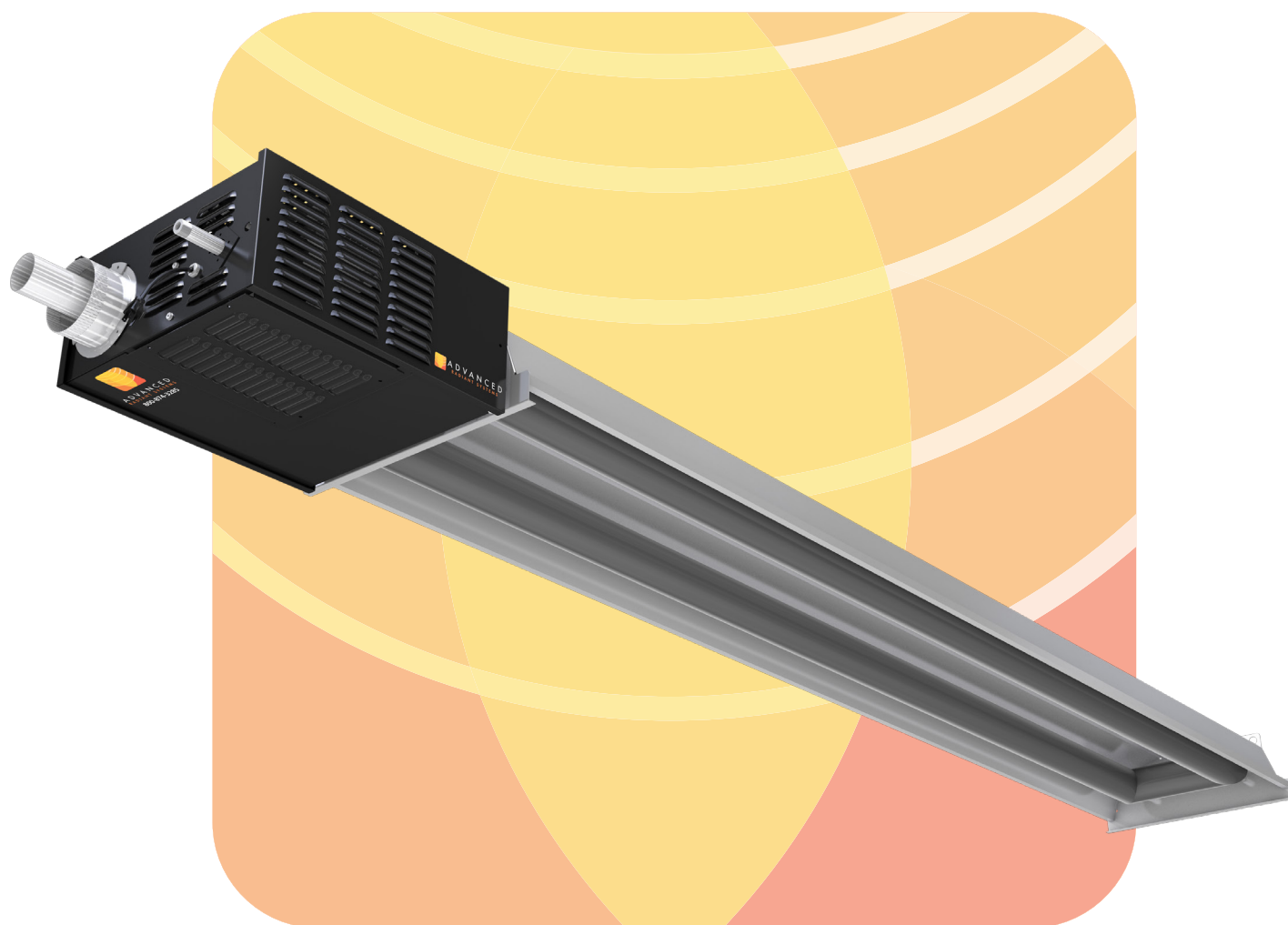




# ADVANCED RADIANT SYSTEMS

## Installation, Operation and Service Instructions



## RS RANGE RESIDENTIAL INFRARED HEATERS

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# WARNINGS

## WARNING

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

## FOR YOUR SAFETY

Do not store or use gasoline or other flammable vapors and liquids in the vicinity of this or any other appliance. If you smell gas:

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

## OWNER

Retain this Manual & ensure available for service. 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.

## INSTALLER

Provide Manual to Owner upon completion of installation!

Read and thoroughly understand these Instructions before attempting any installation

## 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 expands and contracts with each operating cycle. The gas connection, suspension hardware and the installation itself must safely allow this movement. Failure to do so could result in serious fire or explosion hazard.

## 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 1/2 psi) to test the gas supply system with the burners connected, doing so could result in damage to the burner and its control components requiring replacement.

## CAUTION: SERVICE LIFE RISK

Do not install equipment in atmospheres containing halogenated hydrocarbons or other corrosive chemicals, doing so may lead to premature equipment failure and invalidation of the warranty. Additionally, it is recommended that the equipment be installed with a slope downward and away from the burner of 1/4" (6mm) in 10' (3m) to allow start-up condensate drainage.

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# INTRODUCTION

Advanced Radiant Systems' Residential Range (RS) is exactly what it sounds like; a residential grade, unitary infrared heater. The RS is designed to optimize performance as well as aesthetics. The compact, preassembled, unitary design and custom mounting brackets make for a simple and minimally invasive installation. With lower output capacities, comfortable designs are easily maintained at lower hanging heights.

## 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. Representatives that 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 local building codes, or in their absence, the latest edition of the national regulations and procedures as listed below.

### General Installation and Gas 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 Z223.1/NFPA 54 in the US and CSA B149.1 and B149.2 Installation Codes in Canada. This heater may be 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 CSA B149.1 and B149.2 Installation Codes in Canada.

### Public Garage Installation

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

### Parking Structures

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

### Electrical

All heaters must be electrically grounded in accordance with the National Electric Code, ANSI/NFPA 70 in the US, and the Canadian Electric Code, CSA C22.1 in Canada, and must comply with all local requirements.

### Venting

Refer to the National Fuel Gas Code, ANSI Z223.1 (NFPA 54) in the USA and CSA B149.1 and B149.2 Installation Codes in Canada for proper location, sizing and installation of vents as well as information on clearance requirements for conventional venting methods. See venting section for horizontal venting requirements.

### High Altitude

When installing this appliance over 4500' above sea level in Canada, the appliance must be properly derated and installed according to local codes. In the absence of local codes the appliance must be derated in accordance with the most recent CSA B149 code. In the United States for installations over 2000' above sea level the appliance must be installed in accordance with the Current National Fuel Gas Code, ANSI Z223.1/NFPA 54.

### Safety Features

This heater utilizes an airflow switch as blocked vent shut off system. This system is designed to prevent the operation of the appliance if a fresh air supply is blocked or if the flue exhaust is blocked. If this system fails to operate DO NOT ATTEMPT ADJUSTMENTS. Disconnect power to the appliance and contact a qualified service person.

# GENERAL SPECIFICAT

## Gas Supply

### Inlet Pressure

<b>Natural Gas:</b>	Minimum	5.0" W.C.	<b>Propane Gas:</b>	Minimum	11.0" W.C.
	Maximum	14.0" W.C.		Maximum	14.0" W.C.

### Manifold Pressure

<b>Natural Gas:</b>	3.5" W.C.	<b>Natural Gas:</b>	10.5" W.C.
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### Inlet Connection

1/2" (12 mm) NPT

## Electrical Supply

120 VAC, 60 HZ, 1 Amp: 36" cord with grounded 3-prong plug

## Flue and Outside Air Connection

2" plastic flue adapter and connection for outside air (optional) provided at the heater

## Heater Specifications

### Input:

**Model RS-30** 30,000 BTU/h      **Model RS-45** 45,000 BTU/h

### Weight:

**Model RS-30** 100 lbs (45kg)      **Model RS-45** 100 lbs (45kg)

## Venting

**Horizontal Venting:** Maximum air vent / flue for either rate is 10' feet

**Roof Venting:** Refer to ANSI Z223.1 and CSA B149.1 and B149.2 fan assisted appliances for correct sizing.

**Flue Diameter:** 2" diameter (installed concentrically)

### Note:

The heater includes a horizontal vent installation kit. The kit contains all components necessary to vent the heater horizontally and is required. See page 10.

A vertical vent kit is available as an alternate venting method. This Kit Part # RS022 is available through Advanced Radiant Systems distributors and contains the appropriate adapters to allow the connection of B-vent material. See roof-venting page 12.

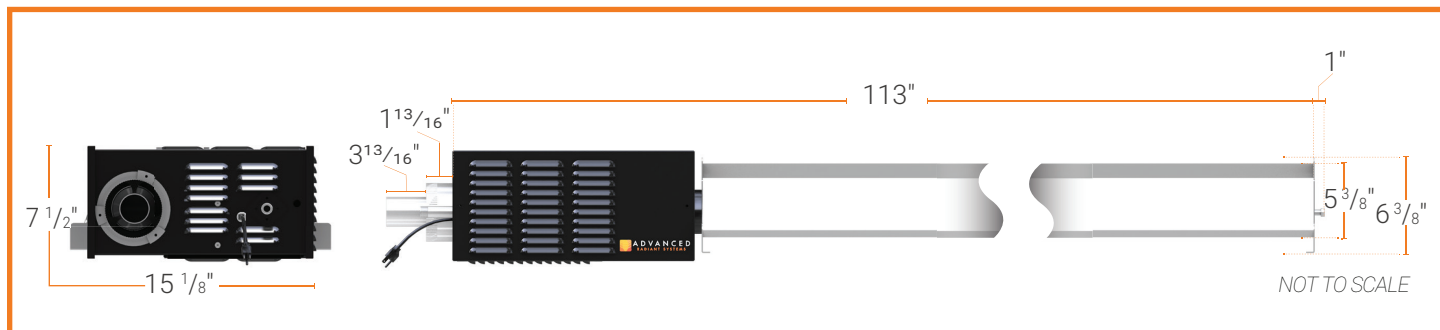


Figure 1: Overall Dimensional Information

# CLEARANCE TO COMBUSTIBLES

It is very important to observe the minimum clearance to combustibles at all times to avoid any possibility of property damage or personal injury.

## 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.
- Maximum allowable stacking height in storage areas should be identified with signs or appropriate markings adjacent to the thermostat or in a conspicuous location.

Table A lists the minimum clearance to combustible materials for various installation configurations. Note that standard clearances also apply to installation above T-bar ceilings and above decorative grills. Additional clearance may be required for glass, painted surfaces and other materials which maybe damaged by radiant or convective heat.

**Combustible materials** are considered to be wood, compressed paper, plant fibers, plastics, Plexiglas or other materials capable of being ignited and burned. Such materials shall be considered combustible even though flameproofed, fire-retardant treated or plastered.

Reflector miter kits are available for U-bends and elbows.

Adequate clearance to sprinkler heads must be maintained (NFPA 13: Standard for the Installation of Sprinkler Systems).

The stated clearance to combustibles represents a surface temperature of 90°F (32°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.

It is important to observe minimum clearance to combustibles at all times to avoid any possibility of property damage or personal injury. Clearances must be maintained from vehicles parked beneath heaters. Signs should be posted identifying any possible violation of the clearance distances from the heater in vehicle areas. Also maximum allowable stacking height in storage areas should be identified with signs or appropriate markings. Table A shows minimum clearance to combustible materials.

MODEL NUMBER	MINIMUM CLEARANCE TO COMBUSTIBLES								
	0° ANGLE INCHES (CM)				45° ANGLE INCHES (CM)				IF VENTED INCHES (CM)
	A	B	C	D	A	B	C	D	END
RS-30	2 (5)	18 (46)	36 (91)	18 (46)	2 (5)	2 (5)	33 (84)	33 (84)	5 (13)
RS-45	2 (5)	18 (46)	50 (127)	18 (46)	3 (8)	3 (8)	48 (122)	48 (122)	5 (13)

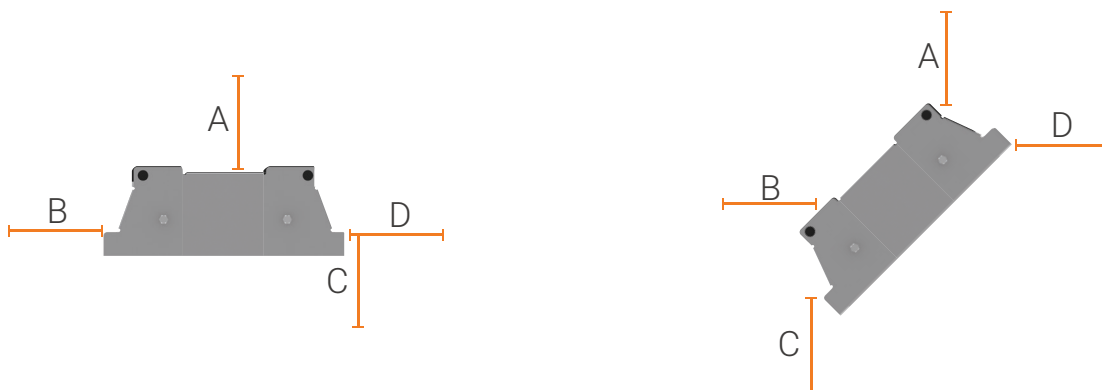


Table A: Clearance to Combustibles

**In all cases, the minimum hanging height from the floor shall be 8' in the U.S. and 7' in Canada**

# INSTALLATION

## Installation Sequence

The heater is sent with all parts necessary for installation with the exception of chain.

It is recommended that the heater be hung as high as possible and along an uncluttered wall to give the reflector a widest possible "view" of the space to be heated. Avoid installation directly over vehicle parking, over cabinets, or where an open door will interfere. Adhere to minimum clearances on the rating plate.

Leave adequate space around the burner box for future servicing.

Choose a location that permits easy installation of exterior venting. A horizontal vent length up to 10' is allowed. For vertical venting adhere to local venting tables and methods.

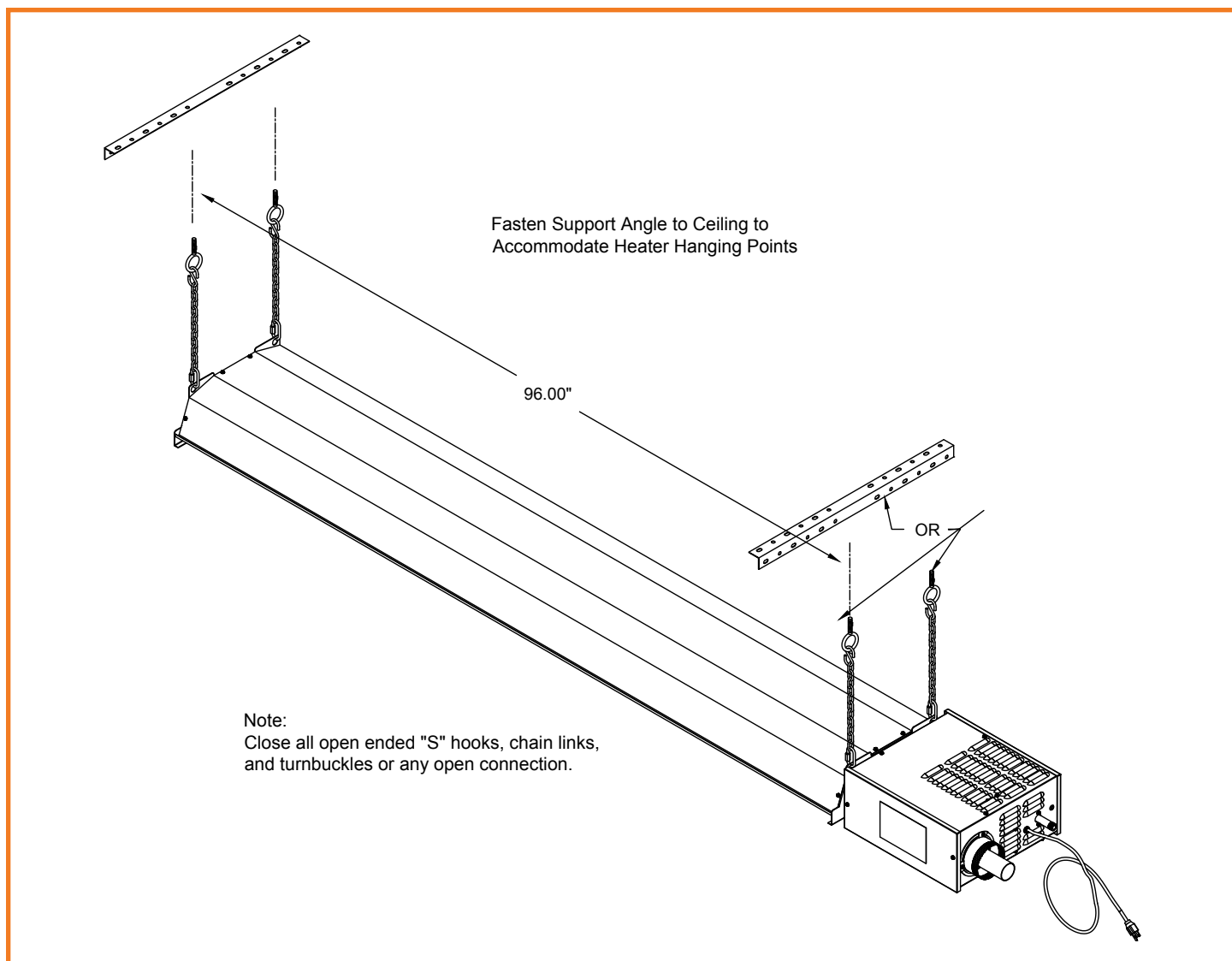


Figure 2: General Overview of Components Utilized in the Installation

As required, fasten hanging angles to ceiling such that heater-hanging points can be accommodated.

Each hanging point must be able to hold at least 150 lbs.

Allow for movement of heater during expansion and contraction during operating cycle.

Heater must fire horizontally. To tilt reflector at 45°, lengthen two of the hanging points to an appropriate length using chain. (Each chain length will be approximately 12" longer than the high side of the heater. **"Quick Links" are recommended (and available from the manufacturer) for connecting chain. If any open ended "S" hooks and turnbuckles are used, the open ends must be closed to avoid unhooking chain with inadvertent contact.**



## Outdoor Installation

For outdoor installations the heater must be installed not more than 8" from beneath awnings, and not less than 24" from back and side as shown in Figure 4. If the heater cannot be protected from the elements by an overhang, then a protective cover must be installed as shown in Figure 6, Figure 7 and Figure 8.

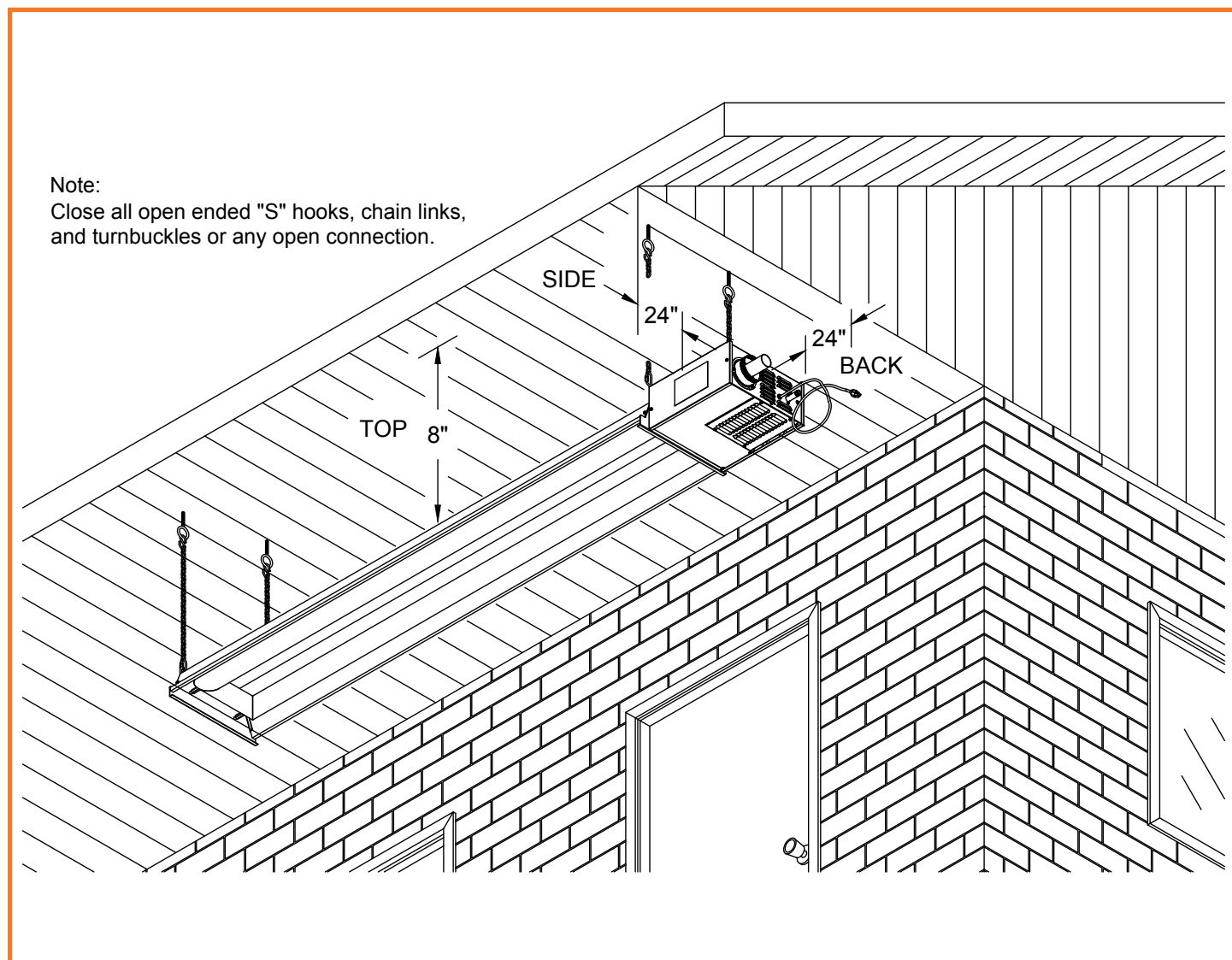


Figure 3: Outdoor Heater Installation

**When the heater is installed with back and side dimensions greater than the minimum of 24" then the top dimension may be increased. The new maximum Top dimension is  $\frac{1}{3}$  of the smallest side or back clearance.**

### Example:

**Given:** Side dimension = 36"

Back dimension = 48"

*A ratio of 3:1 must be maintained*

The side dimension gives us a maximum Top dimension of  $(36/3) = 12"$

The back dimension gives us a maximum Top dimension of  $(48/3) = 16"$

**The new Top dimension is 12", the lesser of the two.**

# INSTALLATION

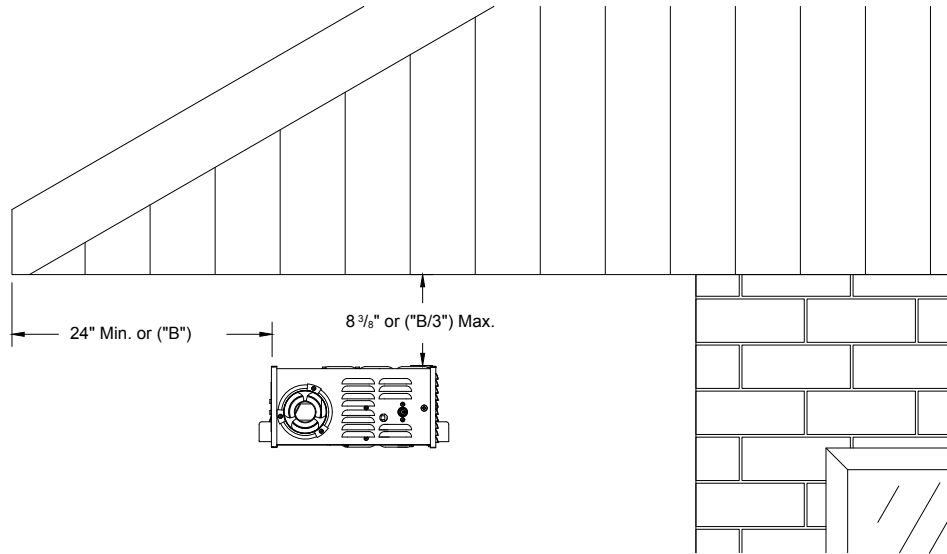


Figure 4: Mounting Distances for Outdoor Installations under Eaves

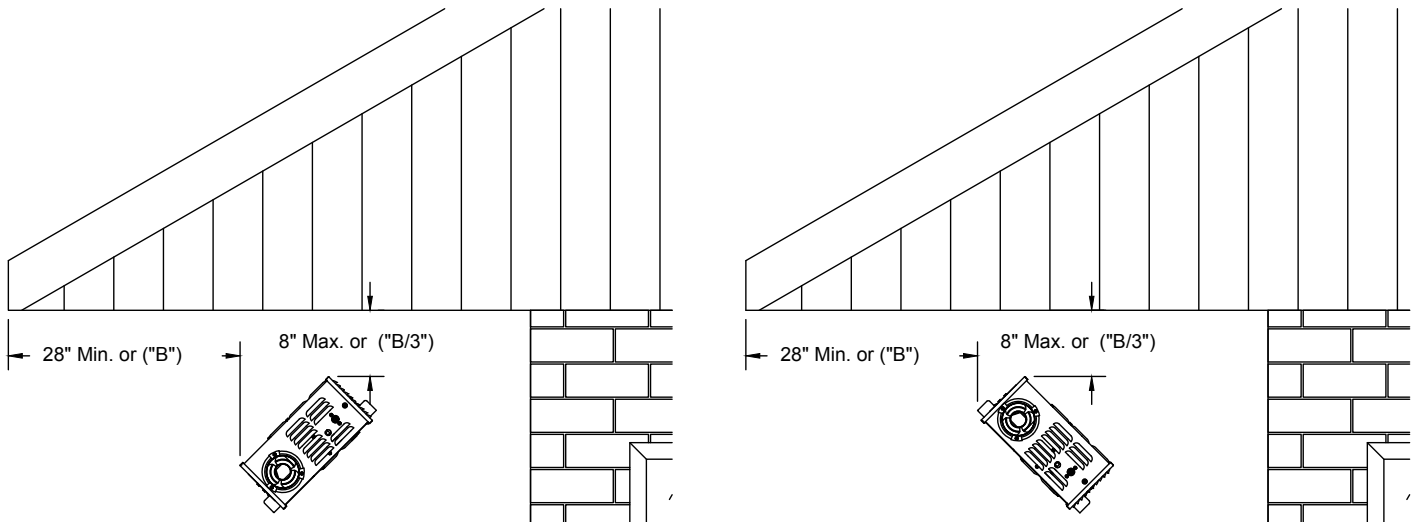


Figure 5: Mounting Distances for Tilted (45°) Outdoor Installations under Eaves.

In the case where the heater is installed at a 45° angle, the minimum dimension inside the overhang is 28" from both the back and side of the burner box and 8" maximum on the top. If the side or back dimensions are increased then the top clearance may be increased using the same rules as for a horizontal installation.

**NOTE: These dimensions are only for satisfying outdoor heater positioning.  
Clearance to combustible must also be satisfied.**

## Cover Installation Sequence

When a heater is installed outdoors without the presence of an adequate eave, then a protective cover must be installed as illustrated below. This cover is available from your local dealer (Part # R-RS020).

1. Install support brackets on to heater covers as shown in step 1 in Figure 6.
2. Preassembled the cover and its top covers and bottom cover as shown in step 2 in Figure 6.
3. Remove the two top screws holding the reflector in place.
4. Slide cover onto burner making sure the support brackets slide into slots on the bottom cover.
5. Secure cover to heater by screwing in the cover bracket in step 3B in Figure 7.
6. Install the extension covers (Front, Back, and Side) as shown in step 4 in Figure 7 if needed

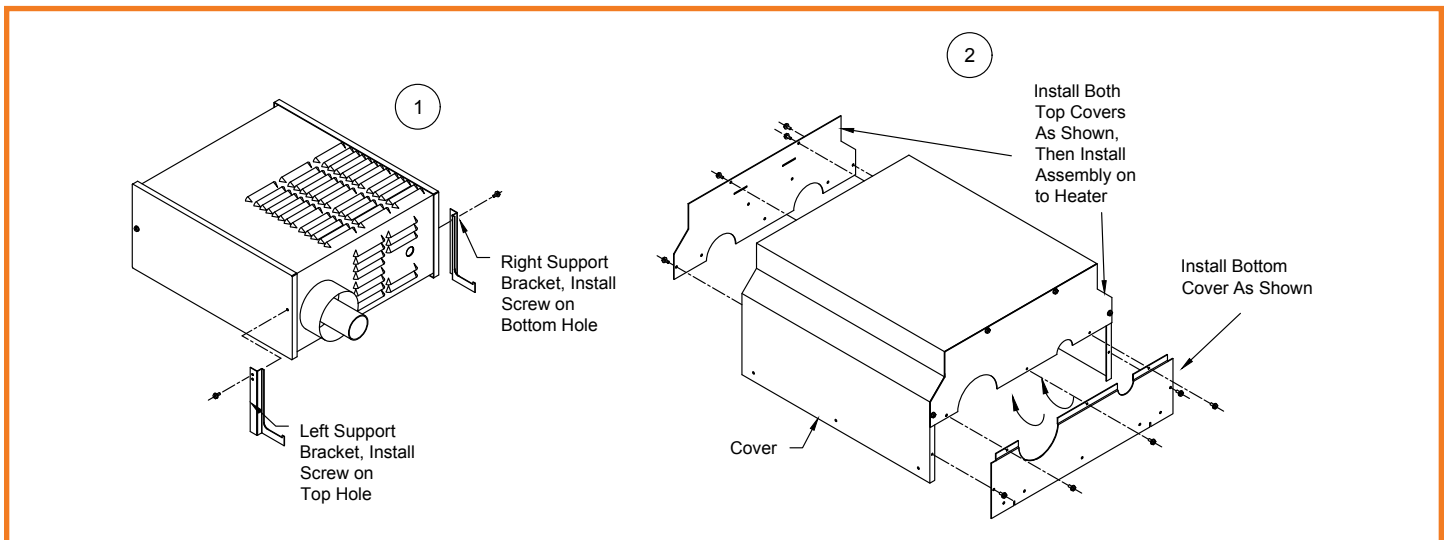


Figure 6: Cover Installation Sequence Steps 1 and 2

When a heater is to be installed outdoors at 45° without the presence of an adequate eave, an extension cover must be used to protect the heater, refer to step 4 in Figure 7. This extension cover is available through your local Dealer (Part # R-RS021). Note that both the cover and extension cover must be used in this case (refer to Figure 8 for completed assembly)..

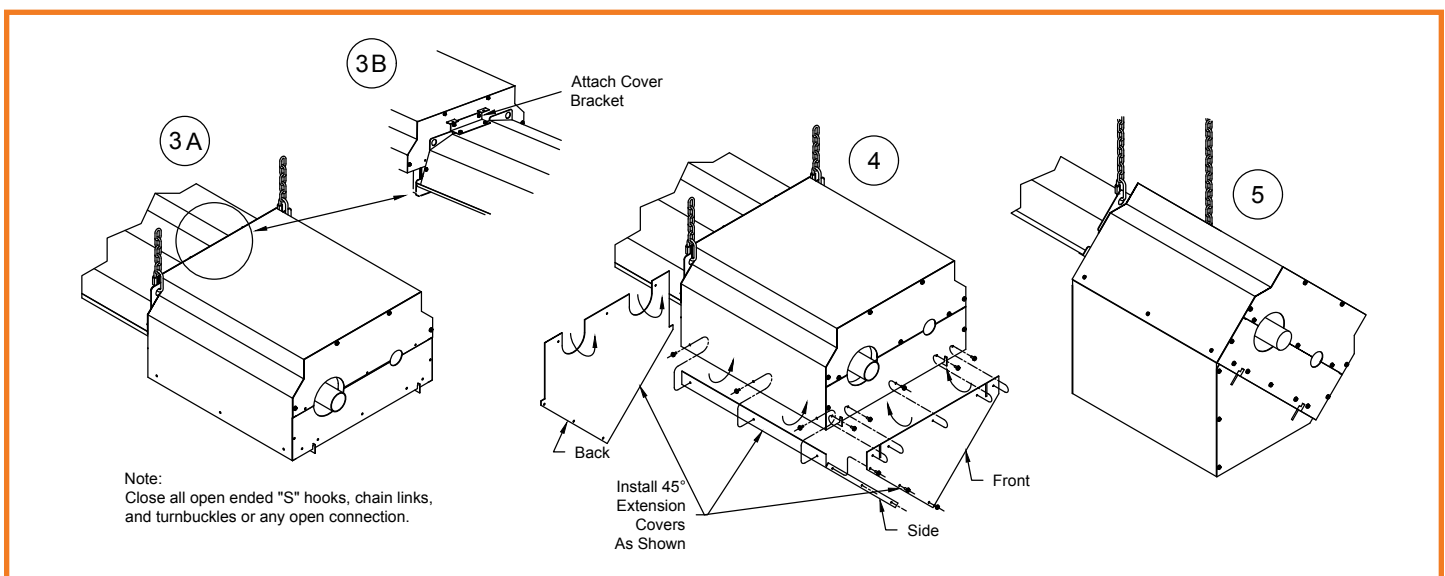


Figure 7: Cover Installation Sequence Steps 3 to 5

# INSTALLATION

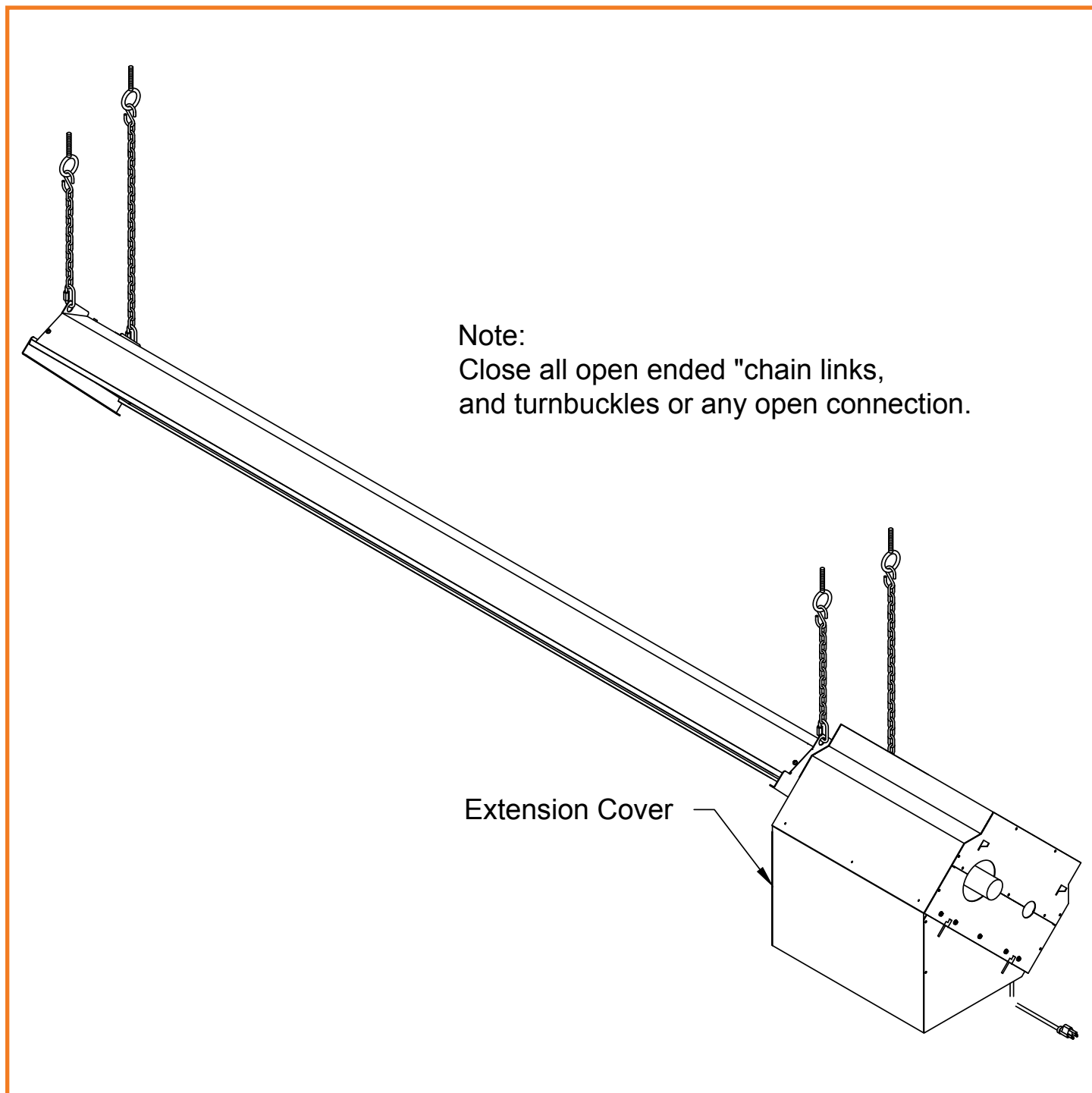


Figure 8: Extension Cover for 45° Outdoor Installations

# VENTING AND COMBUSTION AIR DUCTING

## General Requirements

- Refer to the National Fuel Gas Code, ANSI Z223.1 (NFPA 54) in the USA and CSA B149.1 and B149.2 Installation Codes in Canada, as well as all local requirements for vertical venting and general guidance for minimum distances to openings to the building.
- This equipment is of balanced flue construction and must be horizontally vented (see Figure 9). Vertical venting is permitted, but not as a balanced flue assembly. (See roof venting - Figure 12)

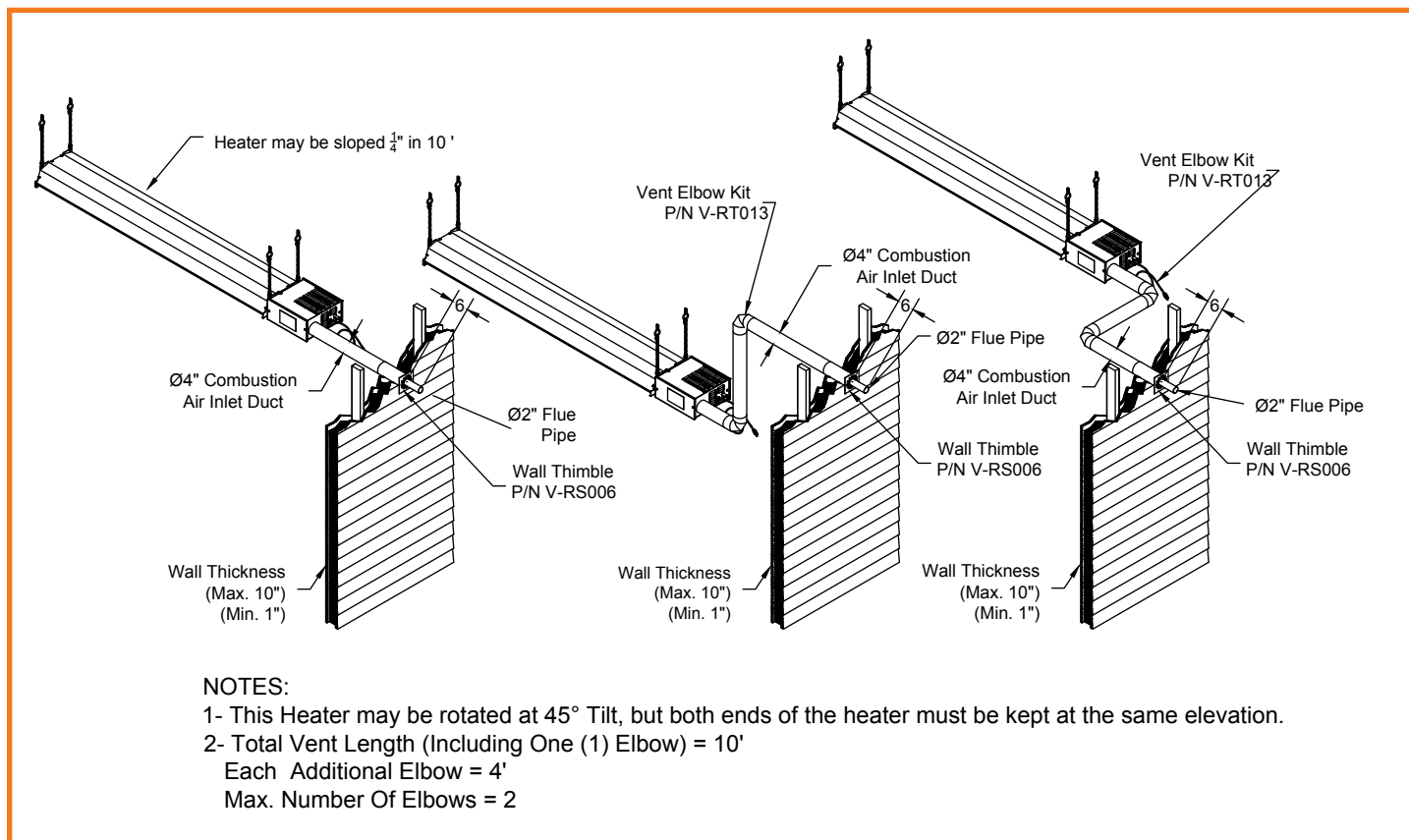


Figure 9: Various Venting Orientations

- A flue/air vent length of 8' or less is recommended, although a maximum of 10' is allowable (including one elbow).
- An approved Wall Terminal that allows the air duct to pass through the wall is required. This is included with your heater. The Wall Thimble is a zero clearance terminal for both combustible and non-combustible walls.
- For horizontal venting where an elbow is utilized an elbow kit (Part No. V-RT013) must be used, refer to Figure 9 for more details.
- The 2" flue pipe should extend a minimum of 6" beyond the end of the 4" wall terminal (for horizontally vented heaters only see Figure 11). Where the vent is under an eave the 2" vent pipe must have a minimum clearance of 7" from the centerline of the vent to the bottom of the eave, refer to Figure 10. However, when the 2" pipe is less than 18" from the bottom of the eave, we recommend the 2" flue extend just beyond the eave to prevent the possibility of frost. (Adhere to any code requirements for clearances to opening in the building).
- An optional "Horizontal Elbow Vent Terminal" kit for horizontal venting is also available; refer to Figure 11 and Figure 12.

# VENTING AND COMBUSTION AIR DUCTING

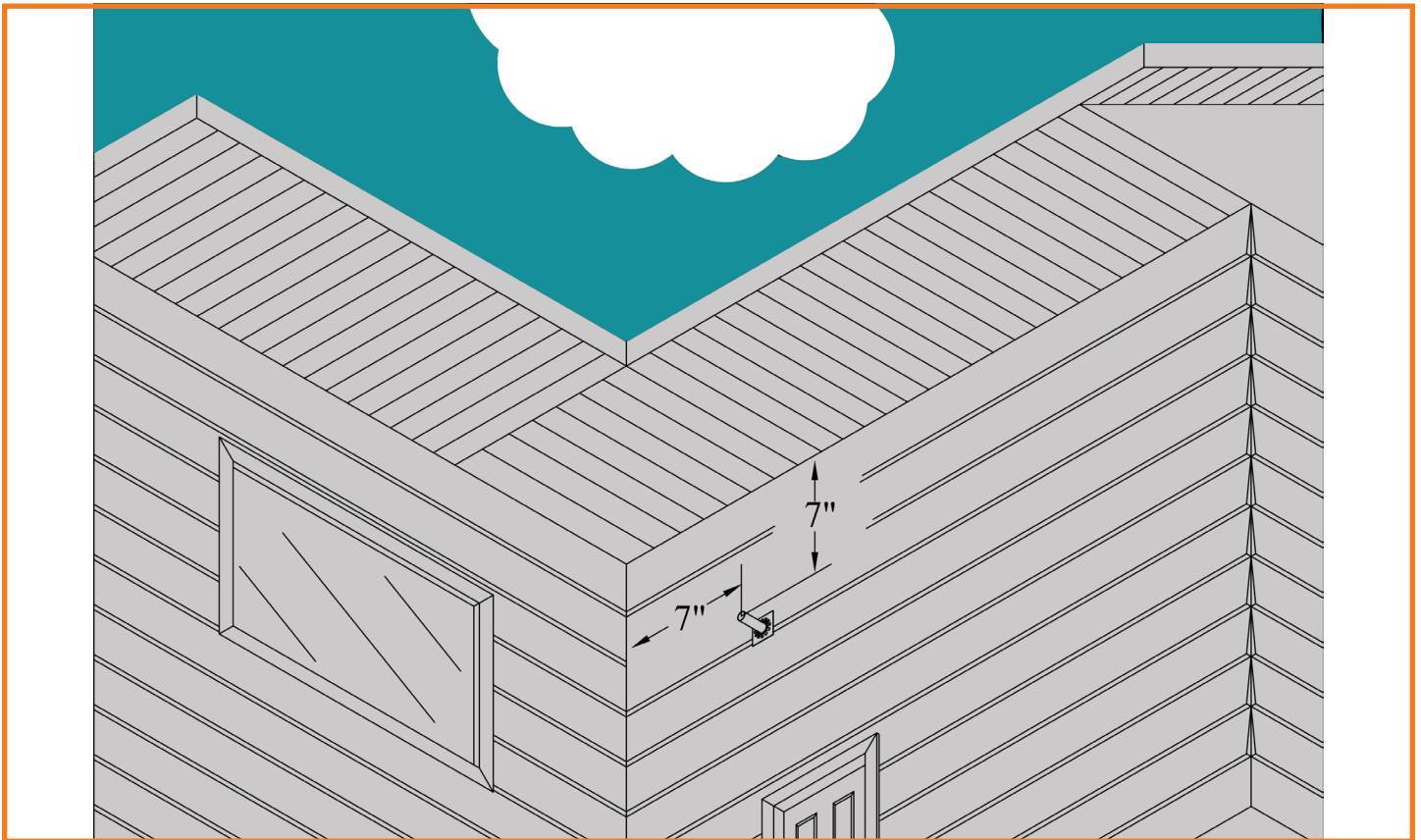


Figure 10: Minimum Clearance under an Eave

- The 2" flue vent is inside (concentric with) the 4" combustion air inlet duct. Each of the former must be seamless and all joints must be fastened with screws and sealed with GE RTV-106 high temperature sealant (or equivalent) refer to Figure 11. The exposed 4" combustion air intake pipe is zero clearance throughout its length.

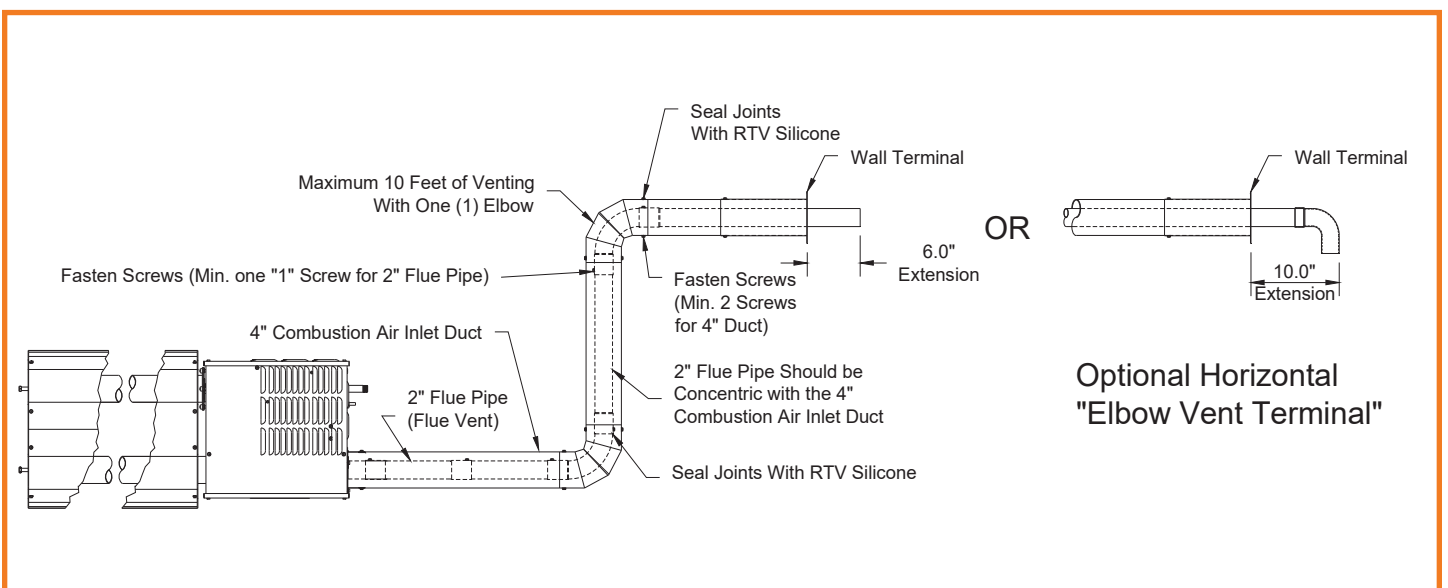


Figure 11: Venting & Combustion Air Ducting

## OPTIONAL HORIZONTAL ELBOW VENT TERMINAL

The RS Models are approved to be used with an elbow as a Horizontal Vent Terminal. See Figure 12 for installation details.

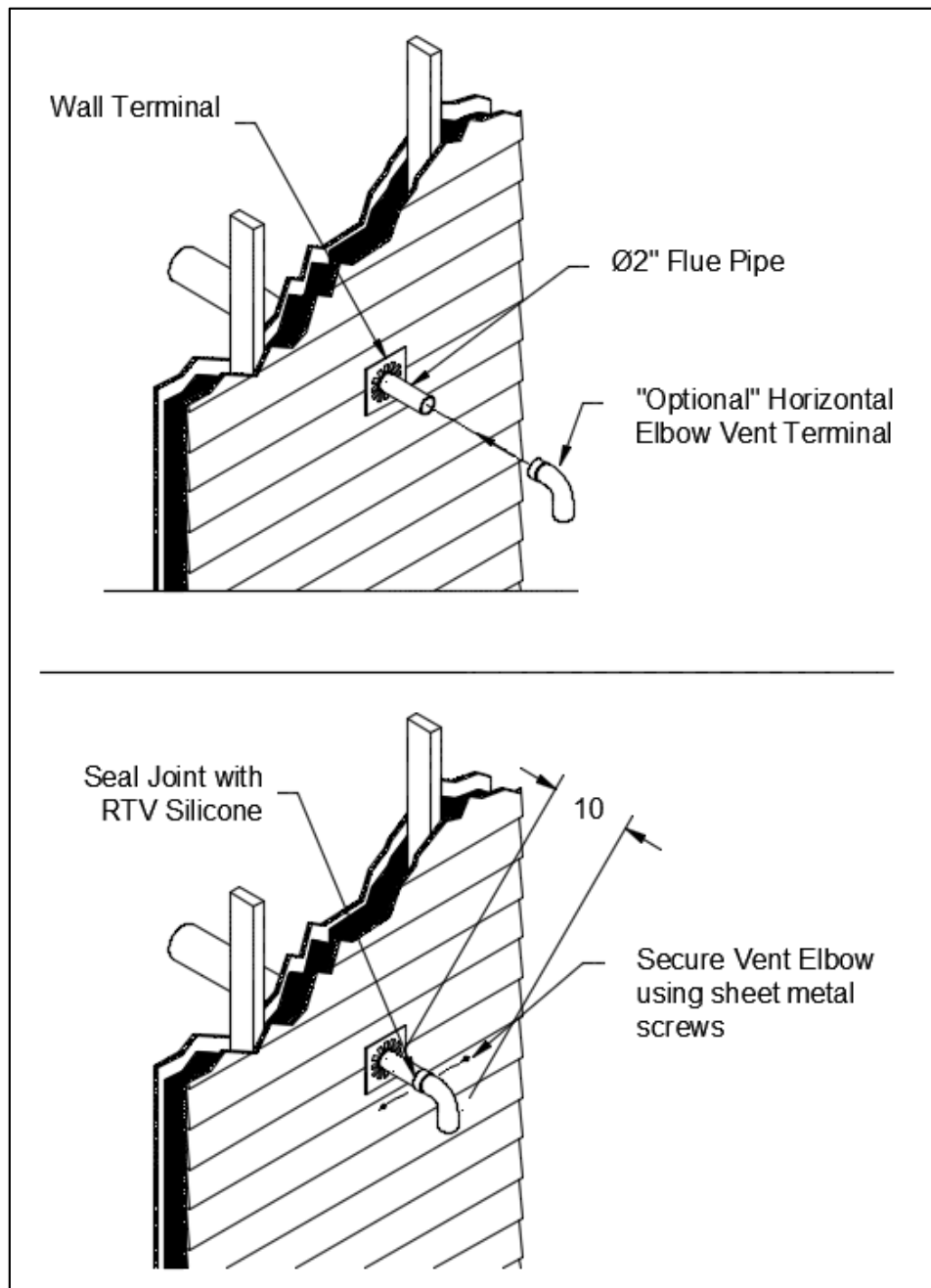


Figure 12: Optional Horizontal elbow Vent Terminal / Installation

# VENTING AND COMBUSTION AIR DUCTING

## Roof Venting

When heater is to be vented through a roof (Vertical Venting), a B-Vent adapter kit (Part # V-RS022) must be used. The B-vent must be installed in accordance to the National Fuel Gas Code, ANSI Z223.1 (NFPA 54) in the USA and CSA B149.1 and B149.2 Installation Codes in Canada. Refer to the former for correct sizing. Refer to Figure 13 for general overview.

Combustion air may be supplied from the outdoors using the material provided in the vent adapter kit (Part # V-RS022) available from your local dealer. Maximum length of fresh air is 10' including one elbow. Fresh air ducting is not provided in the kit.

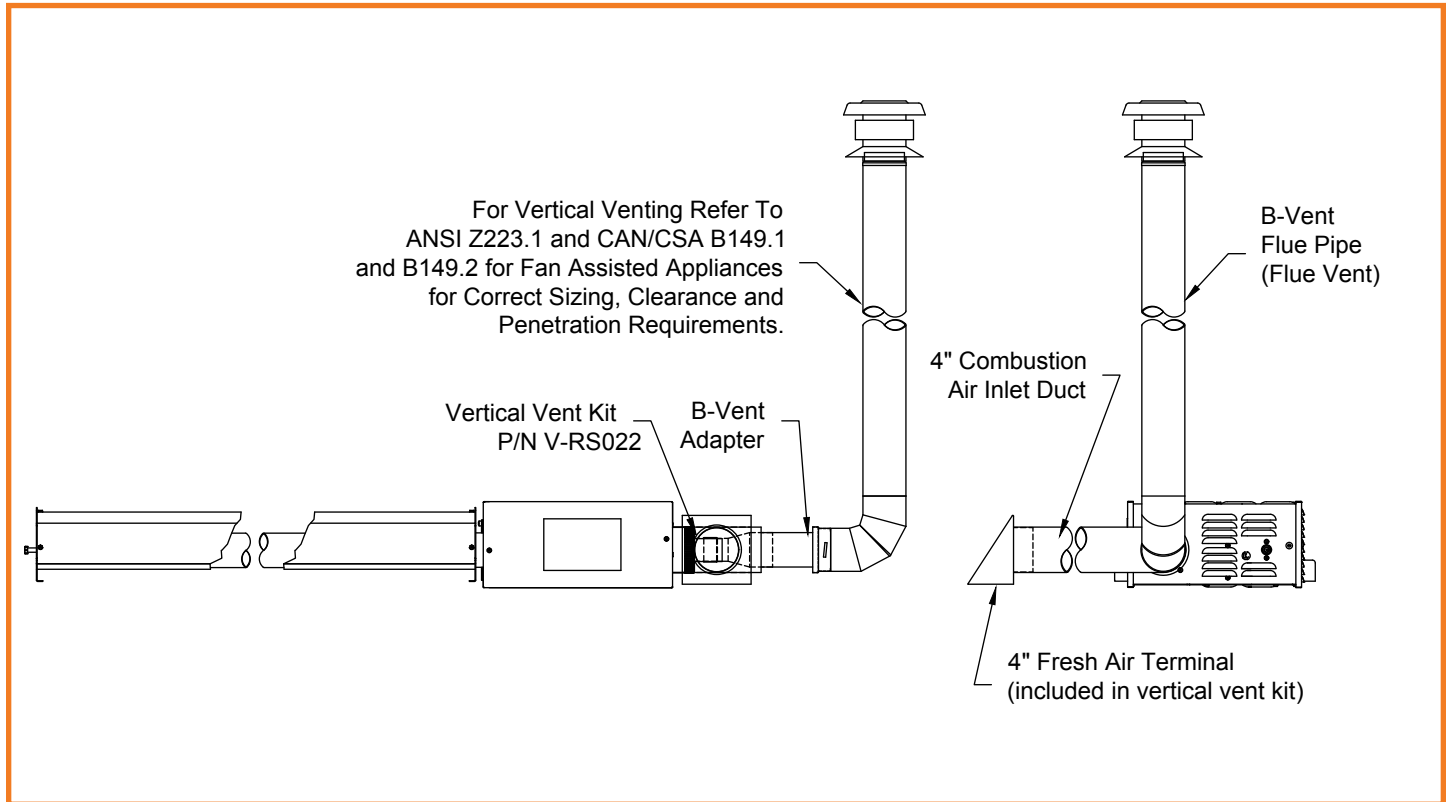


Figure 13: Roof Venting / Combustion Air Ducting

- ♦ The B-vent adapter must be secured with screws and sealed with high temperature silicone sealant.
- ♦ Install B-vent as per local code requirements.



## General Requirements

- The gas meter and service must be sufficiently large to supply gas to the connected building gas load including the heating equipment and any other gas fired equipment. Additionally, the gas distribution piping must be designed according to local and national ordinances. Generally (low pressure) systems designed with a maximum  $\frac{1}{2}$  in W.C. total pressure drop meet this requirement
- Gas supply pipe sizing must be in accordance with the National Fuel Gas Code, ANSI Z223.1 (NFPA 54) in the US and CSA B149.1 and B149.2 Installation Codes in Canada.
- Before connecting burners to the gas supply system, verify that high pressure testing of the system has been completed. Failure to do so may expose the burner components to damaging high pressure, requiring replacement of key components.
- Flexible gas connectors of approved type must be installed as shown in Figure 14, in one plane, and without sharp bends, kinks or twists. A smooth loop of approximately 12" (30 cm) in diameter is best. Failure to install the gas connection in the approved manner will result in a hazardous and potentially deadly situation due to the movement of the heat exchanger and burner in the normal course of operation.

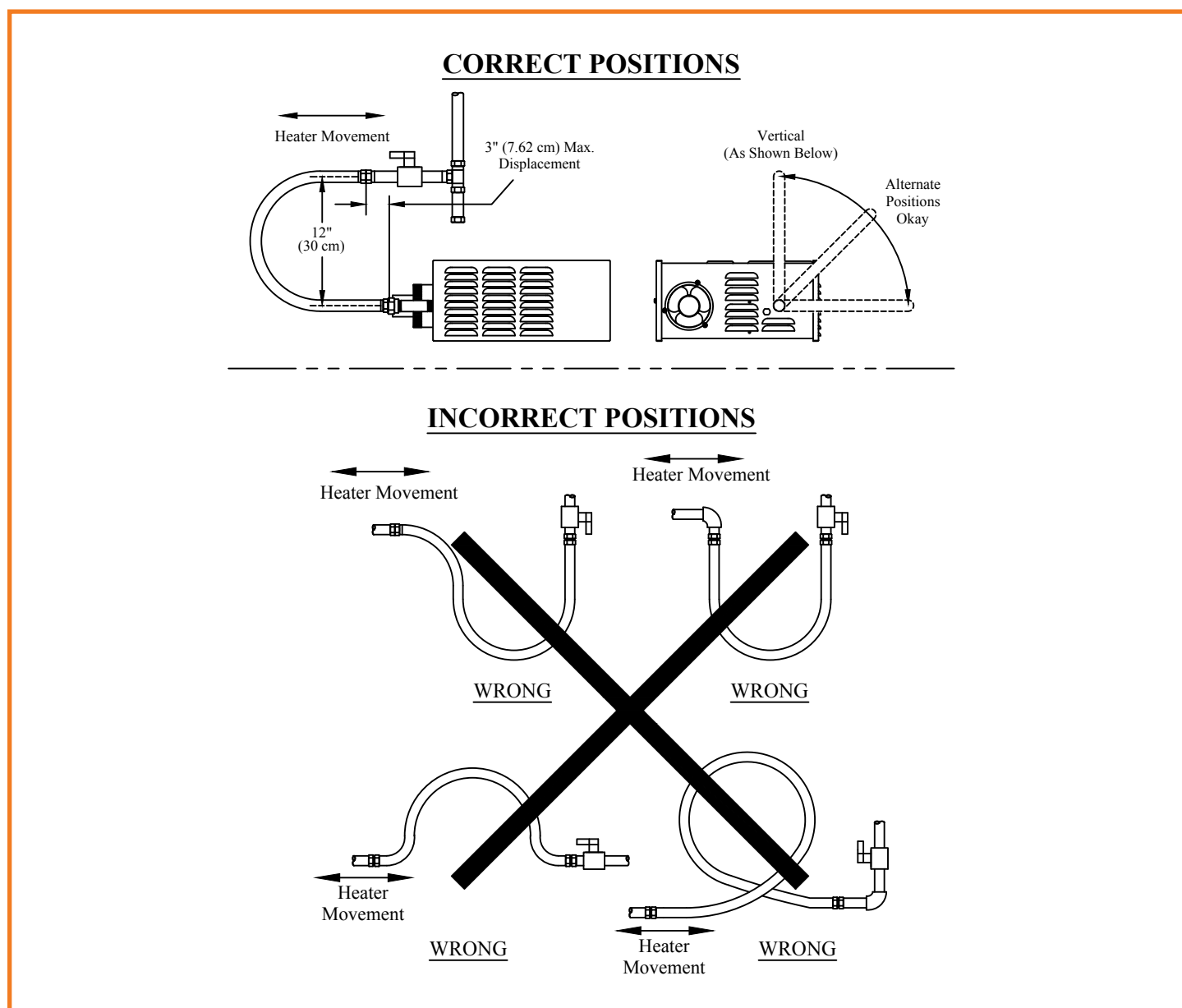


Figure 14: Flexible Gas Connections

# ELECTRICAL WIRING

## General Requirements

Heaters are normally controlled with the thermostat that is included with your equipment. A 24V signal is supplied by the heater control module for thermostat connection. Refer to wiring diagram, Figure 15. A bulkhead fitting in the back panel of the control box is provided for the appropriate wire. In all cases, heaters must be grounded in accordance with the National Electric Code, ANSI/NFPA 70 in the USA, and the Canadian Electric Code, CSA C22.1 in Canada, and must comply with all local requirements.

If any of the original wire as supplied with the heater must be replaced, it must be replaced with wiring having a rating of at least 221°F temperature service and 600 volts capability.

## Wiring Diagrams

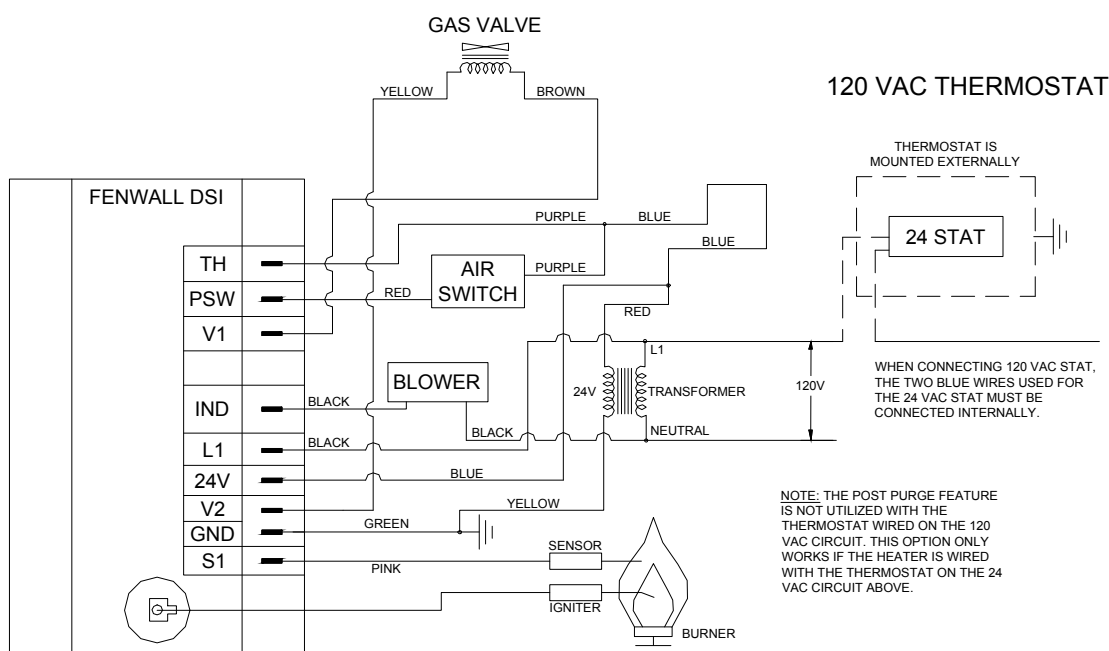
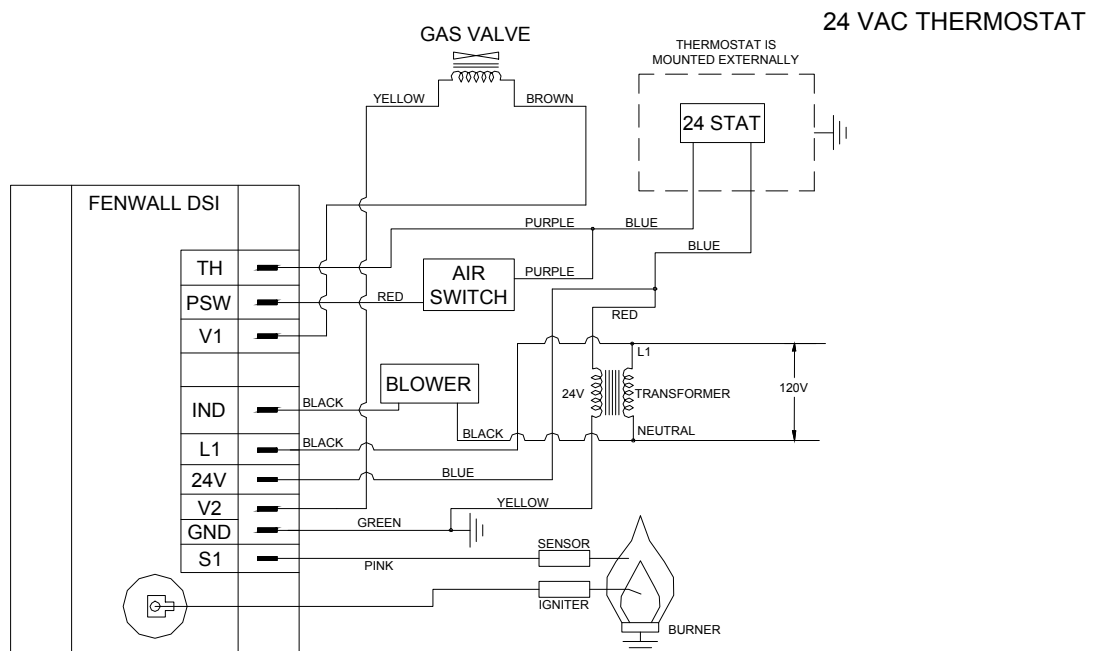


Figure 15: Internal Wiring

## Starting Sequence of Operation

- Turn the thermostat up. When the thermostat calls for heat, the blower motor will energize.
- When the motor approaches nominal running RPM, the air-proving switch closes and activates the ignition module.
- The ignition module, after a pre-purge period of approximately 30 seconds, energizes the igniter. Additionally, the gas valve is energized for this ignition trial period of 15 seconds.
  - If a flame is detected, the ignition sensing rod "reads" a rectification signal and the gas valve remains open. The sparking stops when the flame signal is established.
  - If no flame is detected, the gas valve closes and a 30 sec inter-purge period begins. After the inter-purge, the module repeats the trial for ignition period. If flame is still not established, a third and final inter-purge followed by a final ignition trial cycle begins. After three trials, the module will lockout for a period of approximately 1 hour or until reset. (Reset is accomplished by removing power from the module for at least 5 seconds.) After this 1-hour period, the module re-attempts the full ignition sequence.
- When using a 24V thermostat and the heat requirement has been met and the thermostat opens, the burner shuts off but the fan continues to run for approximately 30 seconds. This is referred to as a post purge. This allows the products of combustion to be removed from the heat exchanger to avoid nuisance condensation and increase heat exchanger life.
- When using a line voltage thermostat and the heat requirement has been met and the thermostat opens, the burner and fan shut off with no post purge.

## Maintenance

For best performance, the following minimal maintenance procedures should be performed before each heating season:

- Before performing any service or maintenance, shut off gas and electrical supply to heater.
- Check condition of forced air blower scroll and motor. Dirt and dust may be blown or vacuumed from the blower.
- Check condition of burner. Remove any foreign objects or debris from inside the burner box or burner cup.
- Inspect the igniter. Replace igniter if there is excessive wear or erosion, breakage or other defects.
- Check inside the heat exchanger tube visually with a flashlight. If carbon or scale are present, scrape or otherwise remove deposits (a wire brush works well).
- Be sure the burner observation window is clean and free of cracks or holes. Clean or replace as necessary.
- Check the flue pipe for soot or dirt and reattach to the heater after cleaning as necessary.
- The heat exchanger reflector sections may be cleaned by wiping with a damp cloth.
- A service agency qualified to adjust and repair infrared heaters should be engaged for service other than routine maintenance.
- Be sure vent terminal and fresh air inlet are free from obstructions. If either pipe is restricted, the safety air switch will not operate properly, and the heater could fail to operate.

# TROUBLESHOOTING

## Blower Motor Fails To Run

- Is the thermostat calling for heat? Is there 115V at the burner receptacle?
- Check blower side door for seal. Repair if necessary
- Check blower for obstructions. Replace blower if necessary.

## No Gas Supply

- Check to see if manual supply valve to heater is ON.
- Check to see if gas valve knob on heater gas control is ON.
- Supply gas pressure can be checked at 1/8" NPT pressure tapping in gas supply system.
- Is combination gas control opening? No manifold pressure indicates valve is closed. Gas pressure downstream of gas control can be measured by connecting a manometer to pressure tap on control. If the valve is closed, either the gas valve or the ignition module is faulty.

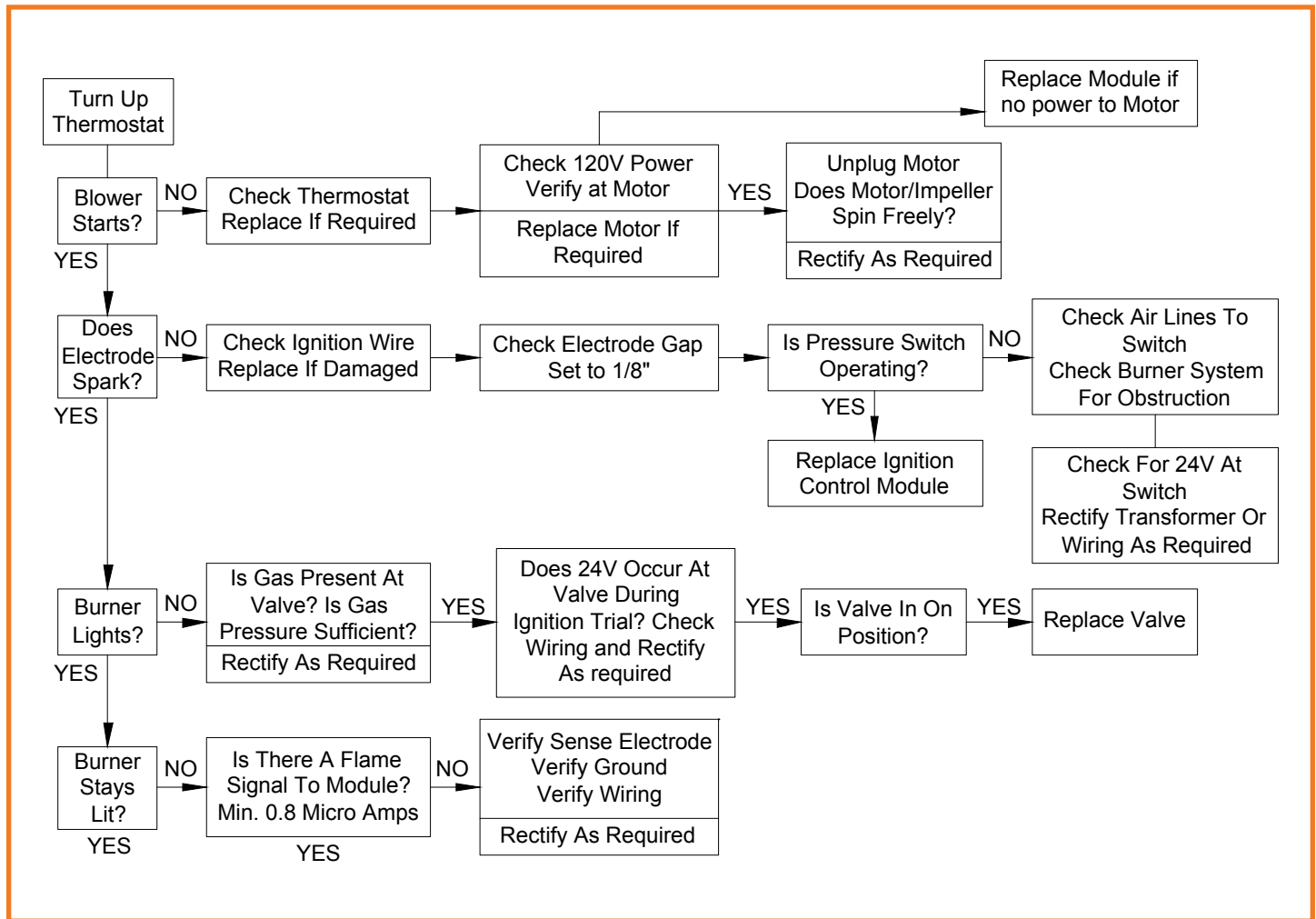
## Burner Does Not Light

- Is spark visible through site glass during ignition trial? If no, further electrical checks by a qualified service person are probably necessary.
- Check to see if gas lines were properly purged of air.
- Check inlet and outlet gas pressure during ignition period.
- Check for orifice and air plate obstruction.

## Burner Does Not Stay Lit

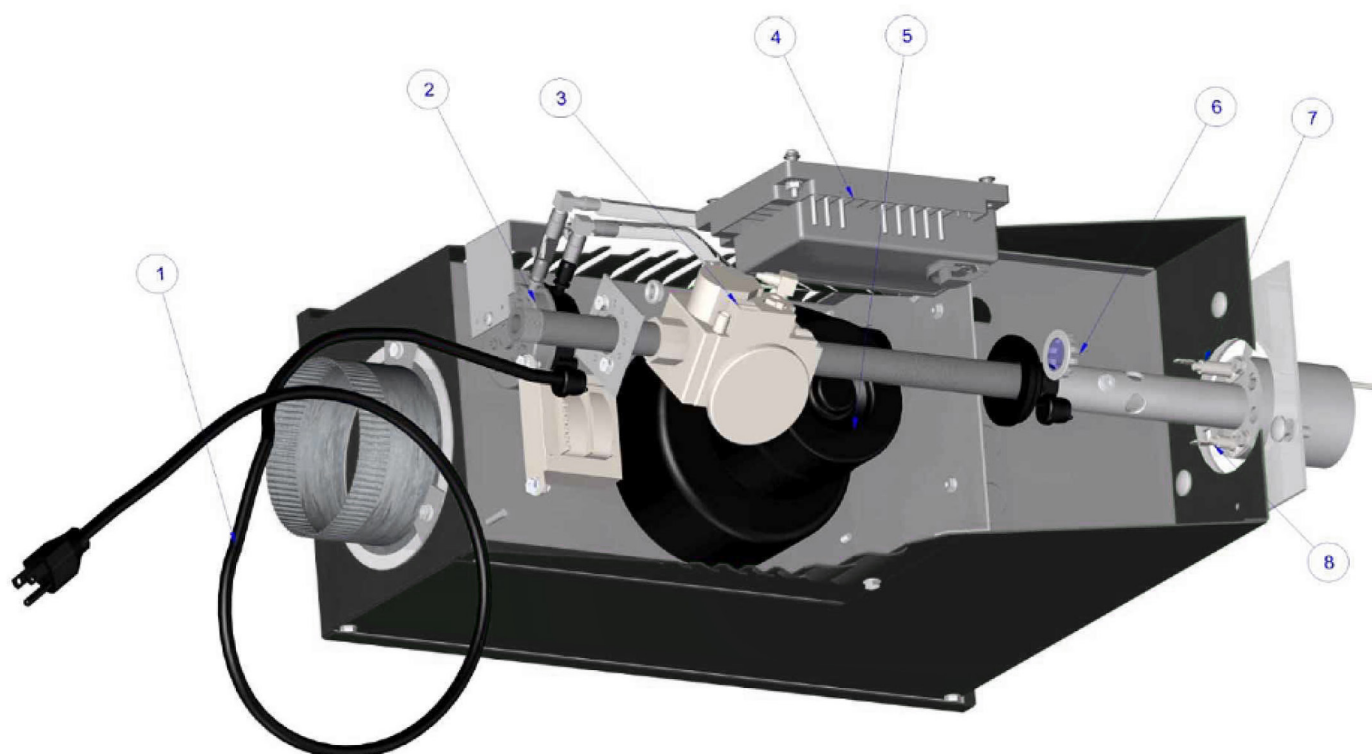
- Check ground wire continuity.
- Check insulation on the igniter leads.
- Measure flame signal current; it should be above 0.8 micro amps DC.
- Replace module if necessary.

## Troubleshooting Chart



***If problems persist contact your Advanced Radiant Systems Representative.***

## REPLACEMENT PARTS



REFERENCE.	PART NUMBER.	DESCRIPTION
1	P-CE010	POWER CORD
2	P-CE158	45,000 BTU PRESSURE SWITCH
	P-CE160	30,000 BTU PRESSURE SWITCH
3	P-RG021	VALVE TRAIN - NATURAL - HONEYWELL
	P-RG022	VALVE TRAIN - PROPANE - HONEYWELL
4	P-CE266	IGNITION MODULE
5	P-CE011	BLOWER MOTOR
6	P-CH011	SIGHT GLASS ASSY
7	P-CE003	FLAME SENSOR
8	P-RE019	IGNITER
Not Shown	P-CE008	TRANSFORMER
Not Shown	P-CE006	IGNITION WIRE
Not Shown	P-CE036	SENSE WIRE
Not Shown	P-RG027	BURNER CUP

## **RS RANGE INFRARED HEATERS WARRANTY**

The Manufacturer warrants to the original owner that the product will be free of defects in material and workmanship. This warranty is limited to 36 months from the date of installation for all components.

The Manufacturer's obligation under this warranty is limited to repair or replacement, F.O.B. the factory, of the defective part. In the case of replacement parts, the warranty period shall be the longer of the original warranty or a period of 12 months from the date of purchase. 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 costs incurred in the repair or replacement 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 installed, 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 MERCHANT ABILITY OR FITNESS FOR A PARTICULAR USE OR PURPOSE.

**Direct questions to your local distributor.**

**Heater Series:** \_\_\_\_\_

**Installed Rate:** \_\_\_\_\_ **BTU/hr**

**Serial Number:** \_\_\_\_\_

**Installed Date:** \_\_\_\_\_



# ADVANCED RADIANT SYSTEMS

315 N Madison Street  
Fortville, IN 46040

317-577-0337  
800-874-3285

[sales@advancedradiantsystems.com](mailto:sales@advancedradiantsystems.com)

[www.AdvancedRadiantSystems.com](http://www.AdvancedRadiantSystems.com)

