Calcana
INFRARED HEATERS

SR-Series

Specifications, Installation, Operation Service & Spare Parts Manual

calcana.com
Calgary, Alberta, Canada

SR-SERIES Specifications, Installation, Operation Service and Spare Parts Manual

Low Intensity Infrared Heater
For Either Indoor or Outdoor Installation
Also for Brooder Use
For Industrial, Commercial, Agricultural Applications.

⚠ WARNING: Improper installation, adjustment, alteration, service, or maintenance will void the warranty and can cause property damage, injury, or death. Read (refer to) the installation operating and maintenance instructions thoroughly before installing or servicing this equipment. For assistance or additional information consult a qualified installer, service agency or the gas supplier.

⚠ WARNING: If the information in these instructions is not followed exactly, a fire or explosion may result; causing property damage, personal injury, or loss of life.

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

⚠ DANGER: WHAT TO DO IF YOU SMELL GAS:

1) **Extinguish any open flame.**
2) **DO NOT try to light any appliance.**
3) **DO NOT use or touch any electrical switches.**
4) **DO NOT use any phone in your building.**
5) **Turn off gas.**
6) **Open Windows.**
7) **Leave the building.**
8) **Immediately call your gas supplier from a neighbor's phone or after you have left the building. Follow the gas supplier's instructions.**
9) **If you cannot reach your gas supplier, call the fire department.**

Installation and service must be performed by a qualified installer, service agency or the gas supplier.

⚠ WARNING: Heat exchanger surface is hot. Do not touch the surface or severe burns will result. Combustible material or articles should not be placed on or near the heater. Observe clearance to combustibles as noted on heater and in this manual.

INSTALLER: Leave this manual with the appliance.
CONSUMER: Retain this manual for future reference.

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Printed in Canada

Rev 1 08/15

CALCANA SR-SERIES HEATERS ARE CATEGORY III HEATERS.

WHEN AN EXISTING CATEGORY I HEATER IS REMOVED OR REPLACED, THE ORIGINAL VENTING SYSTEM MAY NO LONGER BE SIZED TO PROPERLY VENT THE ATTACHED APPLIANCES.

The effects of an improperly sized venting system can include but are not limited to the formation of condensate, leakage, spillage, etc. The following test procedure is required:

⚠ WARNING CARBON MONOXIDE POISONING HAZARD

Failure to follow the steps outlined below for each appliance connected to the venting system being placed into operation could result in carbon monoxide poisoning or death. The following steps shall be followed for each appliance connected to the venting system being placed into operation, while all other appliances connected to the venting system are not in operation:

1) Seal any unused openings in the venting system.
2) Inspect the venting system for proper size and horizontal pitch, as required in the **National Fuel Gas Code, ANSI Z223.1/NFPA 54** or the **Natural Gas and Propane Installation Code, CSA B149.1** and these instructions. Determine that there is no blockage or restriction, leakage, corrosion, and other deficiencies which could cause an unsafe condition.
3) As far as practical, close all building doors and windows and all doors between the space in which the appliance(s) connected to the venting system are located and other spaces of the building.
4) Close fireplace dampers.
5) Turn on clothes dryers and any appliance not connected to the venting system. Turn on any exhaust fans, such as range hoods and bathroom exhausts, so they are operating at maximum speed. Do not operate a summer exhaust fan.
6) Follow the lighting instructions. Place the appliance being inspected into operation. Adjust the thermostat so the appliance is operating continuously.
7) Test for spillage from draft hood equipped appliances at the draft hood relief opening after 5 minutes of main burner operation. Use the flame of a match or candle.
8) If improper venting is observed during any of the above tests, the venting system must be corrected in accordance with the **National Fuel Gas Code, ANSI Z223.1/NFPA 54** and/or **Natural Gas and Propane Installation Code, CSA B149.1**.
9) After it has been determined that each appliance connected to the venting system properly vents when tested as outlined above, return doors, windows, exhaust fans, fireplace dampers and any other gas-fired burning appliances to their previous conditions of use.

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2.0 SAFETY AND OPERATING INSTRUCTIONS

⚠ WARNING

Failure to follow these instructions may cause personal injury, property damage or death. Read the installation, operating and maintenance instructions thoroughly before installing or servicing this equipment.

SAFETY INSTRUCTIONS READ BEFORE OPERATING

A) This gas heater does not have a pilot. It is equipped with an ignition device which automatically lights the burner. DO NOT try to light the burner with a match or flame.

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

WHAT TO DO IF YOU SMELL GAS

- **Do not try to operate the heater.**
- **Do not touch any electric switch; do not use any phone in your building.**
- **Immediately call your gas supplier from a neighbor's phone. Follow the gas supplier's instructions.**
- **If you cannot reach your gas supplier, call the fire department.**

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

D) Do not use this heater if any part has been underwater. Immediately call a qualified service technician to inspect the heater and to replace any part of the control system which has been underwater.

OPERATING INSTRUCTIONS

- **STOP! Read the safety Instructions on this label.**
- **Open the manual gas valve in the heater supply line.**
- **Turn on electric power to the heater.**
- **Set the thermostat to the desired setting.**
- **This heater is equipped with an ignition device, which automatically lights the burner. Do not try to light the burner with a match or flame.**
- **If the heater will not operate, follow instructions "To Turn Off Gas to Heater" and call your service technician or gas supplier.**

TO TURN OFF THE GAS TO HEATER

- **Set the thermostat to the lowest setting.**
- **Turn off electric power to the heater if service is to be performed.**
- **Turn off the manual gas valve in the heater supply line.**
- **Wait 5 minutes before attempting to relight heater.**

3.0 OWNERS RESPONSIBILITY

Thank you for purchasing our product. We have designed this unit to provide you with years of trouble-free heating enjoyment.

READ THIS MANUAL IN ITS ENTIRETY! If you do not understand any of the safety or hazardous warnings contained in this manual, or have questions or concerns about the installation, operation, maintenance or service of this heater, or any other questions or concerns relating to this heater, you MUST CALL THE FACTORY at the telephone number noted on the front cover of this manual or as detailed on the rating plate on the heater before operating this heater.

Store this manual in a location near the heater, for future reference. Ensure installation is performed by qualified, licensed contractors in the required field of work. If in doubt, DO NOT allow the unit to be installed.

Failure to have qualified, licensed contractors in the required field of work complete installation can result in property damage, injury or death and will void the product warranty.

DO NOT park vehicles or place combustible objects close to the heater other than specified on the Clearance to Combustible chart located in this manual and on the heater. Failure to observe the clearance to combustibles can result in property damage, injury or death.

IMPORTANT NOTICE: The installation portion of these instructions are for the use of qualified individuals specially trained, licensed, and experienced in the installation of this type of equipment and related system components.

NOTE: - *The words "shall" or "must" indicate a requirement which is essential to satisfactory and safe performance.*

⚠ **GENERAL HAZARD WARNING:** The heater and related gas piping, fitting and wiring must be installed by individuals or firms qualified, licensed, specially trained and experienced in installation of this type of equipment and related system components.

Only persons who can understand and follow the instructions shall install or service this heater.

Persons not qualified shall not install this equipment nor interpret these instructions.

Failure to comply with the precautions and instructions provided with this heater can result in death, serious bodily injury and property loss or damage from hazards of fire, explosion, burn, asphyxiation, carbon monoxide poisoning, falling objects or electrical shock.

⚠ **WARNING:** Installation and repair should be done by a qualified service person. The heater should be inspected before use and at least annually by a qualified service person and prior to heating season. Heaters used in dusty locations such as brooder barns, sawmills, woodworking shops, etc. will require maintenance on a more regular basis and more frequent cleaning may be required as necessary. It is imperative that the control compartments, burner(s) and circulating air passageways of the appliance be kept clean. Periodic examination of the venting system is to be performed.

No one should work on a heater unless they are a licensed/qualified gas fitter or contractor. For all repairs, parts MUST originate from the manufacturer of this heater in order not to void CGA/AGA certification. Safety devices are not allowed to be rendered inoperative and left unattended as this action can cause property damage, injury, or death. Failure to do so will void the product warranty.

⚠ **WARNING:** Improper installation, adjustment, alteration, servicing, or maintenance can cause property damage, injury, or death and will void the product warranty.

⚠ **WARNING:** Do not store or use halogen-emitting substances in the vicinity of this heater. Such substances include chlorine-based cleaners and swimming pool chemicals, water softening chemicals, de-icing salts and chemicals, cleaning solvents such as carbon tetrachloride or perchloroethylene, halogen type refrigerants, printing inks, paint and paint removers, varnishes, hydrochloric acid, cements and glues, and masonry acid washing materials. The air used by the burner for combustion must be free of halogens to avoid possible corrosion to the heating surfaces, which could result in asphyxiation, fire and/or death.

⚠ **WARNING:** 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 same place as the heater.

Clothing or other flammable materials should not be hung from the heater or placed on or near the heater.

Any safety screen, guard or other protective device removed for servicing a heater must be replaced prior to operating the heater.

IMPORTANT NOTICE: Do not use this appliance if any part has been under water. Immediately call a qualified service technician to inspect the appliance and to replace any part of the control system and any gas control which has been underwater.

IMPORTANT NOTICE: This heater is not to be used as a construction heater to supply heat to an unfinished building during the finishing phases of construction. This practice exposes the unit to an abnormally corrosive atmosphere from sources such as paint, varnish and adhesives, which can lead to premature radiant exchanger tube or vent failure. The practice also allows foreign materials such as sawdust or sheet rock dust to enter the combustion blower, burner, heat exchanger and vent system, resulting in shorter life of the unit.

Use of the heater as a construction heater will void the warranty.

4.0 INSTALLER RESPONSIBILITY

⚠ WARNING

FIRE OR EXPLOSION HAZARD

The heater and related gas piping and wiring must be installed only by individuals or firms well qualified and licensed in the required field of work.

Read and understand this manual in its entirety BEFORE you install this heater. If you have any questions, call your local representative. Verify that the fuel on the installation site is the same as what is required for this heater. Check the heater for damage or missing parts. If damage has occurred, notify the carrier or point of purchase at once for reconciliation of damaged goods. Calcana is not responsible for transit damage. Do not install if the heater is damaged.

If you do not understand any of the safety or hazardous warnings contained in this manual, or have questions or concerns about the installation, operation, maintenance or service of this heater, or any other questions or concerns relating to this heater, you MUST CALL THE FACTORY at the telephone number noted on the front cover of this manual or as detailed on the rating plate on the heater before operating this heater.

Verify that model, input and length is what was ordered and is appropriate for installation. If the heater is too small for the heating load of the building, property damage can occur due to freezing. If the heater is too large, severe heat damage can occur to the building and/or its contents, or cause fire, explosion, injury, or death. If in doubt, compare the heat loss of the building with the unit on site. If you are unable to calculate heat loss, call your local representative for assistance.

Installation shall be in accordance with local codes. (See “CODE COMPLIANCE”).

If installation requires tilting, DO NOT over tilt the unit. Units are certified for installations up to 45°; however, the maximum recommended tilt is 25°.

Install the unit according to the Clearance to Combustibles for that heater model and type of installation. Ensure that clearances are maintained from vehicles parked or combustible objects below or in front of heater. Take into consideration hoists. Failure to do so could result in property damage, injury or death.

Ensure the unit is adequately suspended from the structure, ceiling or roof. Select a hanging location that has adequate strength to support the heater.

If combustion air is contaminated or if there is a negative air pressure in the building, install outside air for combustion (See pages 47 to 48).

If the unit is to be sidewall vented, use part #5200210 (Sidewall Vent Kit). Ensure the vent cap is past eave. Refer to the installation instructions in this manual for installation details.

⚠ **WARNING:** Do not render safety devices inoperable. Ensure the gas line and/or service have adequate capacity for the increased load of the heater or heaters.

Check line and manifold pressure with a manometer to confirm unit is set according to the specification on the rating plate. Perform checks with all gas-fired appliances operating per the instructions in this manual.

Provide adequate accessibility clearances for servicing.

Leave this copy of the manual with owner (or a copy) for future reference.

DO NOT INSTALL THIS UNIT IN RESIDENTIAL SPACES

HEATER OPERATION NOTE: Heater will have a higher heat output at the burner end as compared to the exhaust end.

SPACE HEATING: In general, it is suggested to locate the burner end toward the highest heat-loss area (such as doors) of the space being heated. If you have any concerns or questions concerning orientation or layout of the heater in your application, contact the factory for assistance.

SPOT HEATING: On heaters with a straight-line configuration as well as units that have the maximum length of radiant tube selected for the input capacity of a given burner, there will be a noticeable and more pronounced perception of greater heat output from the burner end of the heater as compared to the exhaust end. Generally, it is suggested for spot heating applications, to use a u-tube configuration to provide a more even source of heat. If you have any concerns or questions concerning orientation or layout of the heater in your application, contact the factory for assistance.

NOTE: A small amount of condensation may occur from the heater when it starts the heating cycle. The condensation will stop once the heater warms up. Ensure venting is sealed according to the section in this manual titled "VENTING".

Minimum run time is 10 minutes to help prevent tube corrosion from condensation on heater cycle.

5.0 CODE COMPLIANCE

Installation shall be in accordance with local building codes, or in the absence of local codes, in accordance with:

A. **FUEL SUPPLY**

CANADA: ***Natural Gas and Propane Installation Code, CSA B149.1*** *or latest edition.*
USA: ***National Fuel Gas Code, ANSI Z223.1/NFPA 54,*** *or latest edition.*

B. **ELECTRICAL GROUNDING**

CANADA: ***Canadian Electrical Code, CSA C22.1*** *or latest edition.*
USA: ***National Electrical Code, ANSI/NFPA* 70** *or latest edition.*
In Canada: Electrical equipment and wiring shall comply with the applicable provisions of the current ***Canadian Electrical Code, CAN/CSA C22.1, Part I and Part II, and CAN/CSA C22.2 No.3, Electrical features of Fuel Burning Equipment****.*

C. **PUBLIC GARAGE INSTALLATION**

Adequate clearances must be maintained according to the following standards:
CANADA: ***Natural Gas and Propane Installation Code, CSA B149.1*** *or latest edition.*
USA: ***Parking Structures, ANSI/NFPA 88A*** *or the standard for* ***Repair Garages, ANSI/NFPA 88B*** *or latest edition.*

- Heaters must be installed at a minimum of eight feet above the floor. The minimum required safe distances to combustibles must be maintained from vehicles parked below the heater.
- When installed over hoists, the minimum required safe distances to combustibles must be maintained from the uppermost point of the combustible materials placed on the hoist.

D. **AIRCRAFT HANGARS**

Adequate clearances must be maintained according to the following standards:
CANADA: ***Enforcing Authority****.*
USA: ***Aircraft Hangars, ANSI/NFPA 409***

- Heaters in aircraft storage or service areas must be installed a minimum of ten feet above the upper surface of wings or engine enclosures of the highest aircraft which may be housed in the hangar. (This should be measured from the bottom of the heater to the top of the wing or engine enclosure, whichever is highest from the floor).
- In other sections of aircraft hangars, such as shops or offices, heaters must be installed at a minimum of eight feet above the floor.
- Heaters installed in aircraft hangars shall be located so as not to be subject to damage by aircraft, cranes, movable scaffolding, or other objects.
- When installed over hoists, the minimum safe distances to combustibles must be maintained from the uppermost point of the combustible materials placed on the hoist.

E. **OTHER TYPES OF INSTALLATIONS**

If the installation is such that it doesn't meet the above-mentioned criteria or there is a possibility of airborne combustible vapor or material in the building (HAZARDOUS LOCATION), consult the local Fire Marshall, the Fire Insurance Carrier or other authorities for approval of the proposed installation prior to installing the heater.

6.0 SPECIFICATIONS

GENERAL SPECIFICATIONS

Rating: (Input: Natural Gas and Propane)

In Canada: 0 - 4,500' (1,372 m) **In USA**: 0 - 2,000' (610 m) - De-rate Above 2,000' (610 m) (see page 60)

MODEL	BURNER INPUT BTUH		TUBE LENGTH**	
	MIN	MAX	MIN	MAX
SR-40	N/A	40,000	10' (3 m)	20' (6.1 m)
SR-40HL	20,000	40,000	10' (3 m)	20' (6.1 m)
SR-40M	20,000	40,000	10' (3 m)	20' (6.1 m)
SR-50	N/A	50,000	20' (6.1 m)	20' (6.1 m)
SR-50HL	25,000	50,000	20' (6.1 m)	20' (6.1 m)
SR-50M	25,000	50,000	20' (6.1 m)	20' (6.1 m)
SR-60	N/A	60,000	20' (6.1 m)	40’ (12.2 m)
SR-60HL	30,000	60,000	20' (6.1 m)	40’ (12.2 m)
SR-60M	30,000	60,000	20' (6.1 m)	40’ (12.2 m)
SR-75	N/A	75,000	20' (6.1 m)	40’ (12.2 m)
SR-75HL	37,500	75,000	20' (6.1 m)	40’ (12.2 m)
SR-75M	37,500	75,000	20' (6.1 m)	40’ (12.2 m)
SR-80	N/A	80,000	20' (6.1 m)	40’ (12.2 m)
SR-80HL	40,000	80,000	20' (6.1 m)	40’ (12.2 m)
SR-80M	40,000	80,000	20' (6.1 m)	40’ (12.2 m)
SR-100	N/A	100,000	20' (6.1 m)	50’ (15.2 m)
SR-100HL	50,000	100,000	20' (6.1 m)	50’ (15.2 m)
SR-100M	50,000	100,000	20' (6.1 m)	50’ (15.2 m)
SR-125	N/A	125,000	30’ (9.14 m)	50’ (15.2 m)
SR-125HL	62,500	125,000	30’ (9.14 m)	50’ (15.2 m)
SR-125M	62,500	125,000	30’ (9.14 m)	50’ (15.2 m)
SR-150	N/A	150,000	40’ (12.2 m)	60’ (18.3 m)
SR-150HL	75,000	150,000	40’ (12.2 m)	60’ (18.3 m)
SR-150M	75,000	150,000	40’ (12.2 m)	60’ (18.3 m)
SR-175	N/A	175,000	40’ (12.2 m)	70’ (21.3 m)
SR-175HL	87,500	175,000	40’ (12.2 m)	70’ (21.3 m)
SR-175M	87,500	175,000	40’ (12.2 m)	70’ (21.3 m)
SR-200	N/A	200,000	50’ (15.2 m)	80’ (24.2 m)
SR-200HL	100,000	200,000	50’ (15.2 m)	80’ (24.2 m)
SR-200M	100,000	200,000	50’ (15.2 m)	80’ (24.2 m)
SR-225*	N/A	225,000	60’ (18.3 m)	80’ (24.2 m)
SR-225HL*	125,000	225,000	60’ (18.3 m)	80’ (24.2 m)
SR-225M*	125,000	225,000	60’ (18.3 m)	80’ (24.2 m)

* = Not current production ** = Including elbows/u-bends; deduct 10’ from maximum length for each 90° used

ELECTRICAL RATING:

DSI Ignition, 120V, 60hz, 1 Amps (40,000 to 80,000 BTUH Input), 2.25 Amps (100,000 to 200,000 BTUH Input), 120V grounded A/C connection, low or line voltage thermostat.

GAS PRESSURE AT MANIFOLD:

FUEL:	SINGLE INPUT:	2-STAGE AND VARIABLE INPUT:	
Natural Gas:	3.5" (8.89 cm) WC	Low: 1.25" (3.8 cm) WC	High: 3.5" (8.89 cm) WC
Propane:	10.5" (26.67 cm) WC	Low: 5.25" (13.97 cm) WC	High: 10.5" (26.67 cm) WC

Gas Connection 0.5" (1.27 cm) NPT

GAS INLET PRESSURE:

FUEL:	MINIMUM:	MAXIMUM:
Natural Gas:	4.5" (11.43 cm) WC	14.0" (35.56 cm) WC
Propane:	11.5" (29.21 cm) WC	14.0" (35.56 cm) WC

EXHAUST/FLUE Connection: 4" (10.16 cm)

COMBUSTION AIR INTAKE Connection:

40,000 to 80,000 BTUH Input:	4" (10.16 cm)
100,000 to 200,000 BTUH input:	6" (15.24 cm)

STANDARD EQUIPMENT:

Burner control housing is pre-assembled and pre-wired. Unit comes complete with the following: industry standard gas, electrical and venting connections, balanced air rotor, thermal overload protected motor, visual burner inspection sight glass, combustion and air proving safety switches, 3-try spark ignition control, low voltage thermostat connection, 36” flexible gas hose with connector, 4" aluminized steel combustion tube, polished aluminum standard reflector, 4" mild steel radiant heat exchanger, tube couplers, joint/hanger pieces, heat economizer baffle/turbulator, and 4” vent (flue) adaptor.

Optional Equipment:		
- 4” x 90° Elbow Kit	- 4” x 180° U-Bend Kit	- 4” Sidewall Termination Vent Kit
- Variable Input Control (Modulating) (special order)	- 2-Stage Control (special order)	- Outdoor Installation Kit
- Aluminized Steel Tubes	- Stainless Steel Construction (special order)	- Side Reflectors
- Low/Line Voltage Thermostat	- Hanging Chain Kit	- 5’, 10’ or 20’ Extension Kits

Special order items as identified above may be manufactured to order, have a slight variation in design or contain different internal components from a standard package and may not be able to be used as an “add-on” to an existing heater without modification or complete replacement. For example, the variable input control cannot be added to a standard burner head due to different burner head components that are required for modulation. For questions or compatibility checks, please contact the factory for assistance.

7.0 DIMENSIONS

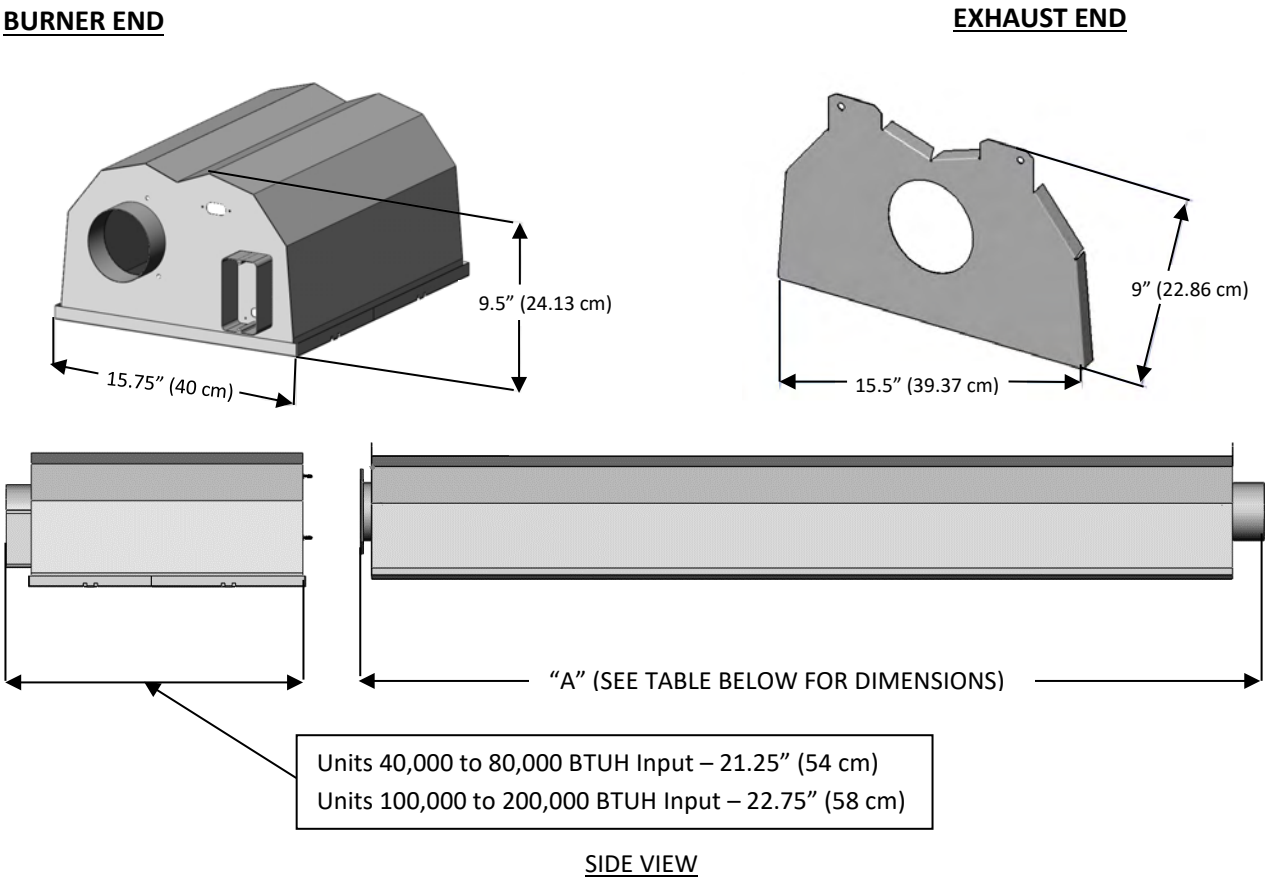


Figure 1. EQUIPMENT DIMENSION

Table of Dimensions:

UNITS	DIMENSION "A" LENGTH	
BURNER INPUT:	**MIN**	**MAX**
40,000 BTUH	10' 4" (3.15 m)	20' 4" (6.4 m)
50,000 BTUH	20' 4" (6.4 m)	20' 4" (6.4 m)
60,000 BTUH	20' 4" (6.4 m)	40' 4" (12.3 m)
75,000 BTUH	20' 4" (6.4 m)	40' 4" (12.3 m)
80,000 BTUH	20' 4" (6.4 m)	40' 4" (12.3 m)
100,000 BTUH	20' 4" (6.4 m)	50' 4" (15.3 m)
125,000 BTUH	30' 4" (9.25 m)	50' 4" (15.3 m)
150,000 BTUH	40' 4" (12.3 m)	60' 4" (18.4 m)
175,000 BTUH	40' 4" (12.3 m)	70' 4" (21.5 m)
200,000 BTUH	50' 4" (15.3 m)	80' 4" (24.5 m)
225,000 BTUH	60' 4" (18.4 m)	80' 4" (24.5 m)

8.0 INSTALLATION CLEARANCES AND CLEARANCE TO COMBUSTIBLES

Installation of overhead heaters in garages or hangars MUST meet the requirements for bottom (below) clearances detailed in **CANADA:** ***Natural Gas and Propane Installation Code, CSA B149.1*** or latest edition or **USA:** ***National Fuel Gas Code, ANSI Z223.1/NFPA 54***, or latest edition.

⚠ **WARNING:** In all situations, clearances to combustibles must be maintained. Minimum clearance from the heater must be maintained for vehicles parked or combustible objects below the heater. The posting of signs may be required in storage areas referring to clearances to combustibles to the heater and/or limiting the stacking height of stored items near the heater specifying a maximum height. Certain materials or items, when stored under the heater, will be subjected to radiant heat and could be seriously damaged.

⚠ **WARNING:** The stated clearance to combustibles represents a surface temperature of 90°F (32°C) above ambient temperature. Certain materials or items with low heat tolerance (such as plastics, vinyl siding, canvas, engineered woods, etc.) may be subject to degradation at lower temperatures. It is the installer's responsibility to ensure that adjacent materials are protected from degradation. When in doubt, check the heat tolerance of building material(s) with their manufacturer.

⚠ **WARNING:** The stated clearance to combustibles may not be applicable in enclosed or confined applications that are smaller than the minimum square footage for that heater model. Contact the factory for assistance in these applications.

END CLEARANCES

BURNER HEAD END

Minimum clearances from air intake end of burner head to object is 12" (30.5 cm).

Provide adequate accessibility clearances for servicing and proper operation. Do not install the unit in such a manner that the combustion air entering the heater is reduced in any manner.

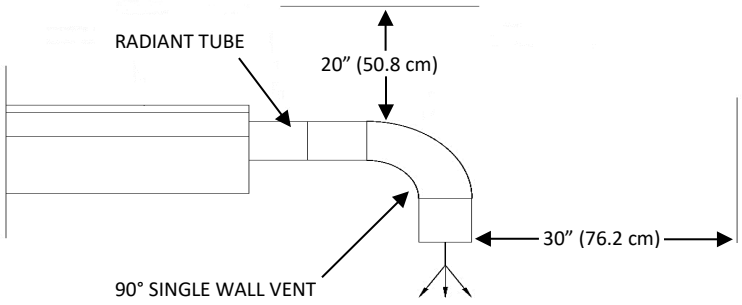
EXHAUST END

See section “HORIZONTAL AND VERTICAL VENTING APPLICATIONS” (Page 50) for Venting Clearances for Enclosed Applications.

END CLEARANCES FOR OUTDOOR APPLICATIONS ONLY (EXHAUST END)

(EXHAUST END)

OUTDOOR (UNENCLOSED) APPLICATIONS ONLY



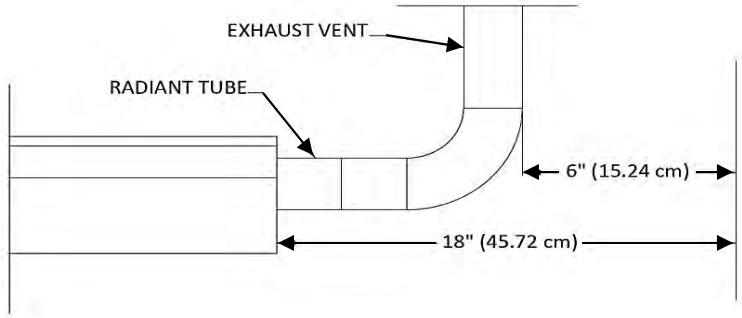
WARNING: DO NOT INSTALL IN ENCLOSED AREAS WITHOUT AN APPROVED VENTING SYSTEM.

For Brooder use and some industrial applications, unvented installations are permitted. In these applications refer to page 56 for details on clearances and ventilation requirements.

Figure 2. OUTDOOR EXHAUST END CLEARANCE TO STRUCTURE

(EXHAUST END)

ROOF VENTED



For horizontal (sidewall) venting, please refer to “HORIZONTAL AND VERTICAL VENTING APPLICATIONS” (Page 50) for Venting Clearances.

Figure 3. OUTDOOR VENTED CLEARANCES THROUGH THE ROOF

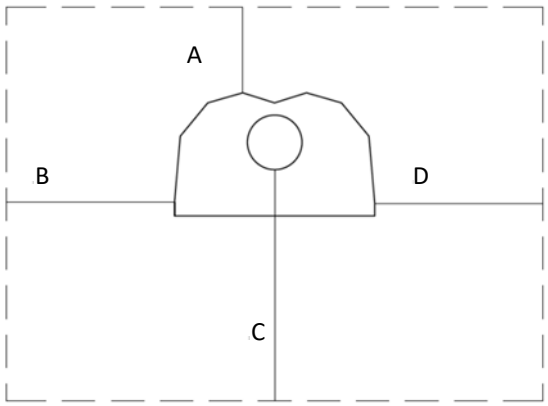
8.1 CLEARANCE TO COMBUSTIBLES FOR SPACE HEATING AND BROODER INSTALLATION

A. STANDARD REFLECTOR OR ONE SIDE REFLECTOR

⚠ **WARNING:** In all situations, clearances to combustibles must be maintained. Minimum clearance from the heater must be maintained for vehicles parked or combustible objects below the heater. The posting of signs may be required in storage areas referring to clearances to combustibles to the heater and/or limiting the stacking height of stored items near the heater specifying a maximum height. Certain materials or items, when stored under the heater, will be subjected to radiant heat and could be seriously damaged.

⚠ **WARNING:** The stated clearance to combustibles represents a surface temperature of 90°F (32°C) above ambient temperature. Certain materials or items with low heat tolerance (such as plastics, vinyl siding, canvas, engineered woods, etc.) may be subject to degradation at lower temperatures. It is the installer's responsibility to ensure that adjacent materials are protected from degradation. When in doubt, check the heat tolerance of building material(s) with their manufacturer.

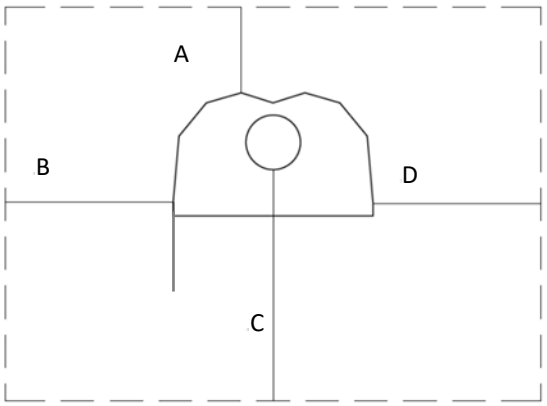
HEATER INSTALLATION CLEARANCES



INSTALLATION TYPE 1 - (inches) (cm)

Input*	A	B	C	D
40	6" (16 cm)	12" (31 cm)	36" (92 cm)	12" (31 cm)
50	6" (16 cm)	12" (31 cm)	36" (92 cm)	12" (31 cm)
60	6" (16 cm)	15" (39 cm)	44" (112 cm)	15" (39 cm)
75	6" (16 cm)	20" (51 cm)	50" (127 cm)	20" (51 cm)
80	6" (16 cm)	20" (51 cm)	53" (135 cm)	20" (51 cm)
100	6" (16 cm)	22" (56 cm)	55" (140 cm)	22" (56 cm)
125	6" (16 cm)	22" (56 cm)	55" (140 cm)	22" (56 cm)
150	6" (16 cm)	24" (70 cm)	60" (152 cm)	24" (70 cm)
175	6" (16 cm)	24" (70 cm)	65" (152 cm)	24" (70 cm)
175+20'**	6" (16 cm)	20" (51 cm)	45" (115 cm)	20" (51 cm)
200/225	6" (16 cm)	27" (69 cm)	65" (165 cm)	27" (69 cm)
200/225 +20'**	6" (16 cm)	20" (51 cm)	45" (115 cm)	20" (51 cm)

Figure 4. CLEARANCE STANDARD REFLECTOR



INSTALLATION TYPE 2 – (inches) (cm)

Input*	A	B	C	D
40	6" (16 cm)	12" (31 cm)	36" (92 cm)	36" (92 cm)
50	6" (16 cm)	12" (31 cm)	36" (92 cm)	36" (92 cm)
60	6" (16 cm)	12" (31 cm)	44" (112 cm)	36" (92 cm)
75	6" (16 cm)	12" (31 cm)	50" (127 cm)	36" (92 cm)
80	6" (16 cm)	20" (51 cm)	53" (135 cm)	40" (102 cm)
100	6" (16 cm)	22" (56 cm)	55" (140 cm)	40" (102 cm)
125	6" (16 cm)	22" (56 cm)	55" (140 cm)	40" (102 cm)
150	6" (16 cm)	24" (70 cm)	60" (152 cm)	40" (102 cm)
175	6" (16 cm)	24" (70 cm)	65" (165 cm)	40" (102 cm)
175+20'**	6" (16 cm)	16" (41 cm)	45" (115 cm)	36" (92 cm)
200/225	6" (16 cm)	27" (69 cm)	65" (165 cm)	40" (102 cm)
200/225 +20'**	6" (16 cm)	16" (41 cm)	45" (115 cm)	36" (92 cm)

Figure 5. CLEARANCE ONE SIDE REFLECTOR

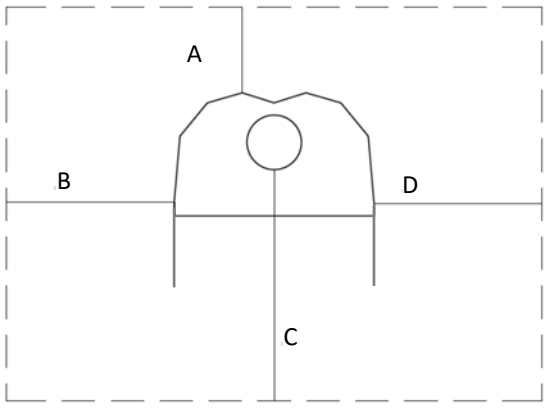
*** Per 1,000 BTUH input ** Clearance 20' (6.1 m) downstream from burner**

B. **TWO SIDE REFLECTORS OR 25° TO 45° TILT**

⚠ **WARNING:** In all situations, clearances to combustibles must be maintained. Minimum clearance from the heater must be maintained for vehicles parked or combustible objects below the heater. The posting of signs may be required in storage areas referring to clearances to combustibles to the heater and/or limiting the stacking height of stored items near the heater specifying a maximum height. Certain materials or items, when stored under the heater, will be subjected to radiant heat and could be seriously damaged.

⚠ **WARNING:** The stated clearance to combustibles represents a surface temperature of 90°F (32°C) above ambient temperature. Certain materials or items with low heat tolerance (such as plastics, vinyl siding, canvas, engineered woods, etc.) may be subject to degradation at lower temperatures. It is the installer's responsibility to ensure that adjacent materials are protected from degradation. When in doubt, check the heat tolerance of building material(s) with their manufacturer.

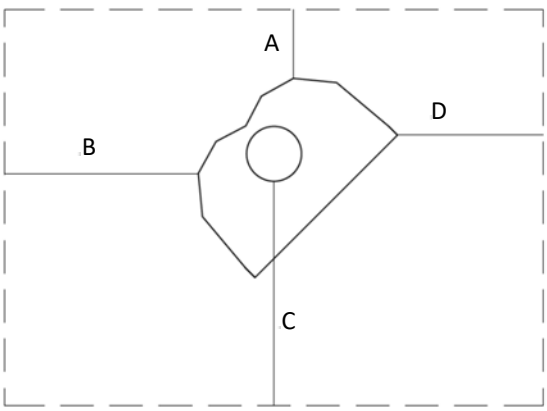
HEATER INSTALLATION CLEARANCES:



INSTALLATION TYPE 3 - (inches) (cm)

Input*	A	B	C	D
40	6" (16 cm)	15" (39 cm)	53" (135 cm)	15" (39 cm)
50	6" (16 cm)	20" (51 cm)	60" (152 cm)	20" (51 cm)
60	6" (16 cm)	23" (59 cm)	66" (168 cm)	23" (59 cm)
75	6" (16 cm)	25" (64 cm)	72" (183 cm)	25" (64 cm)
80	6" (16 cm)	25" (64 cm)	72" (183 cm)	25" (64 cm)
100	6" (16 cm)	27" (69 cm)	78" (199 cm)	27" (69 cm)
125	6" (16 cm)	32" (82 cm)	84" (214 cm)	32" (82 cm)
150	6" (16 cm)	32" (82 cm)	88" (224 cm)	32" (82 cm)
175	6" (16 cm)	32" (82 cm)	88" (224 cm)	32" (82 cm)
175+20'**	6" (16 cm)	24" (70 cm)	48" (122 cm)	24" (70 cm)
200/225	6" (16 cm)	32" (82 cm)	88" (224 cm)	32" (82 cm)
200/225 +20'**	6" (16 cm)	24" (70 cm)	48" (122 cm)	24" (70 cm)

Figure 6. CLEARANCE TWO SIDE REFLECTORS



INSTALLATION TYPE 4 – (inches) (cm)

Input*	A	B	C	D
40	6" (16 cm)	6" (16 cm)	36" (92 cm)	36" (92 cm)
50	6" (16 cm)	6" (16 cm)	36" (92 cm)	36" (92 cm)
60	6" (16 cm)	6" (16 cm)	44" (112 cm)	44" (112 cm)
75	6" (16 cm)	6" (16 cm)	50" (127 cm)	50" (127 cm)
80	6" (16 cm)	6" (16 cm)	53" (135 cm)	53" (135 cm)
100	6" (16 cm)	6" (16 cm)	55" (140 cm)	55" (140 cm)
125	6" (16 cm)	6" (16 cm)	55" (140 cm)	55" (140 cm)
150	6" (16 cm)	6" (16 cm)	60" (152 cm)	60" (152 cm)
175	6" (16 cm)	6" (16 cm)	65" (152 cm)	65" (152 cm)
175+20'**	6" (16 cm)	6" (16 cm)	45" (115 cm)	45" (115 cm)
200/225	6" (16 cm)	6" (16 cm)	65" (165 cm)	65" (165 cm)
200/225 +20'**	6" (16 cm)	6" (16 cm)	45" (115 cm)	45" (115 cm)

Figure 7. CLEARANCE 25° TO 45° TILT

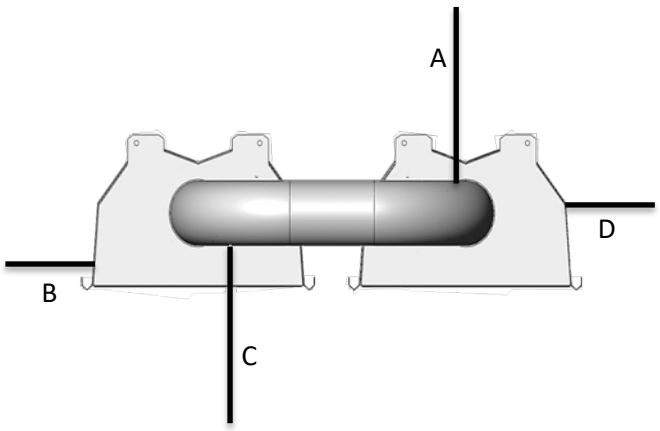
*** Per 1,000 BTUH input ** Clearance 20' (6.1 m) downstream from burner**

C. **180° U-BEND OR 180° U-BEND AT 25° TO 45° TILT**

⚠ **WARNING:** In all situations, clearances to combustibles must be maintained. Minimum clearance from the heater must be maintained for vehicles parked or combustible objects below the heater. The posting of signs may be required in storage areas referring to clearances to combustibles to the heater and/or limiting the stacking height of stored items near the heater specifying a maximum height. Certain materials or items, when stored under the heater, will be subjected to radiant heat and could be seriously damaged.

⚠ **WARNING:** The stated clearance to combustibles represents a surface temperature of 90°F (32°C) above ambient temperature. Certain materials or items with low heat tolerance (such as plastics, vinyl siding, canvas, engineered woods, etc.) may be subject to degradation at lower temperatures. It is the installer's responsibility to ensure that adjacent materials are protected from degradation. When in doubt, check the heat tolerance of building material(s) with their manufacturer.

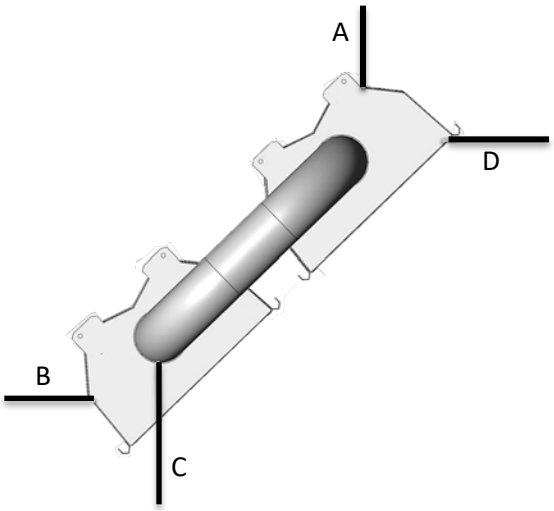
HEATER INSTALLATION CLEARANCES:



INSTALLATION TYPE 5 - (inches) (cm)

Input*	A	B	C	D
40	6" (16 cm)	12" (31 cm)	60" (152 cm)	12" (31 cm)
50	6" (16 cm)	12" (31 cm)	63" (161 cm)	12" (31 cm)
60	6" (16 cm)	12" (31 cm)	63" (161 cm)	12" (31 cm)
75	6" (16 cm)	12" (31 cm)	69" (176 cm)	12" (31 cm)
80	6" (16 cm)	20" (51 cm)	69" (176 cm)	20" (51 cm)
100	6" (16 cm)	22" (56 cm)	76" (194 cm)	22" (56 cm)
125	6" (16 cm)	22" (56 cm)	79" (201 cm)	22" (56 cm)
150	6" (16 cm)	24" (70 cm)	84" (214 cm)	24" (70 cm)
175	6" (16 cm)	24" (70 cm)	86" (219 cm)	24" (70 cm)
200	6" (16 cm)	27" (69 cm)	86" (219 cm)	27" (69 cm)
225	6" (16 cm)	27" (69 cm)	86" (219 cm)	27" (69 cm)

Figure 8. CLEARANCE U-BEND STANDARD



INSTALLATION TYPE 6 – (inches) (cm)

Input*	A	B	C	D
40	6" (16 cm)	6" (16 cm)	51" (130 cm)	40" (102 cm)
50	6" (16 cm)	6" (16 cm)	57" (145 cm)	40" (102 cm)
60	6" (16 cm)	6" (16 cm)	60" (152 cm)	43" (110 cm)
75	6" (16 cm)	6" (16 cm)	66" (168 cm)	47" (120 cm)
80	6" (16 cm)	6" (16 cm)	66" (168 cm)	47" (120 cm)
100	6" (16 cm)	6" (16 cm)	71" (181 cm)	53" (135 cm)
125	6" (16 cm)	6" (16 cm)	77" (196 cm)	62" (158 cm)
150	6" (16 cm)	6" (16 cm)	80" (204 cm)	67" (171 cm)
175	6" (16 cm)	6" (16 cm)	84" (214 cm)	70" (178 cm)
200	6" (16 cm)	6" (16 cm)	94" (214 cm)	70" (178 cm)
225	6" (16 cm)	6" (16 cm)	94" (214 cm)	70" (178 cm)

Figure 9. CLEARANCE U-BEND 25° TO 45° TILT

*** Per 1,000 BTUH input ** Clearance 20' (6.1 m) downstream from burner**

9.0 PRE-INSTALLATION INSPECTION

Refer to pages 16 to 25 for packaging contents.
Inspect the shipping container and heater for any evidence of shipping damage. If heater damage is found, notify the freight carrier and file a claim.

⚠ WARNING:

IF THE HEATER IS DAMAGED, DO NOT INSTALL

Check that all parts and pieces are present and accounted for. Report any missing items to the carrier or point of purchase at once.

Check that the overall general appearance, source of fuel required, and model numbers match unit requested. Report any discrepancy to carrier or point of purchase at once.

THOROUGHLY INSPECT THE EQUIPMENT IMMEDIATELY UPON ARRIVAL

OUR RESPONSIBILITY FOR THIS SHIPMENT CEASED WHEN THE CARRIER SIGNED THE WAYBILL.

If goods are received short or in damaged condition, it is important that you notify the carrier and insist on a notation of the loss or damage across the face of the freight bill; otherwise, no claim can be enforced against the transportation company. It is also good practice to take photos of the condition of the shipment received at the time of delivery.

If concealed loss or damage is discovered, notify your carrier at once and request an inspection. This is absolutely necessary. A concealed damage report must be made within 5 days of delivery of shipment. Unless you do this, the carrier will not entertain any claim for loss or damage. An agent will arrange an inspection and grant a concealed damage notation. **If you give the Transportation Company a clear receipt for goods that have been damaged or lost in transit, you do so at your own risk and expense.**

CALCANA IS WILLING TO ASSIST YOU IN EVERY POSSIBLE MANNER TO COLLECT CLAIMS FOR LOSS OR DAMAGE, BUT THIS WILLINGNESS ON OUR PART DOES NOT MAKE US RESPONSIBLE FOR THE COLLECTION OF CLAIMS OR REPLACEMENT OF MATERIAL. THE ACTUAL FILING AND PROCESSING OF THE CLAIM IS YOUR RESPONSIBILITY.

CALCANA IS NOT RESPONSIBLE FOR FREIGHT DAMAGED IN TRANSIT!

THE CARTON OR PACKAGING MAY NOT APPEAR TO HAVE DAMAGE, SO IT IS IMPERITIVE TO OPEN ALL THE PACKAGES TO INSPECT THE PRODUCT.

IF CONTENTS ARE DAMAGED:

A. MAKE CLAIM TO DELIVERY CARRIER AT ONCE
B. SAVE CARTONS FOR INSPECTION BY CARRIER

10.0 PACKAGING CONTENTS & PARTS DESCRIPTION

A. **BURNER HEAD PACKAGE**

An optional low/line voltage thermostat (not included) is available from the factory. Modulating burner heads are supplied with an additional wall controller (PIN #5110907).

BURNER HEAD PACKAGE

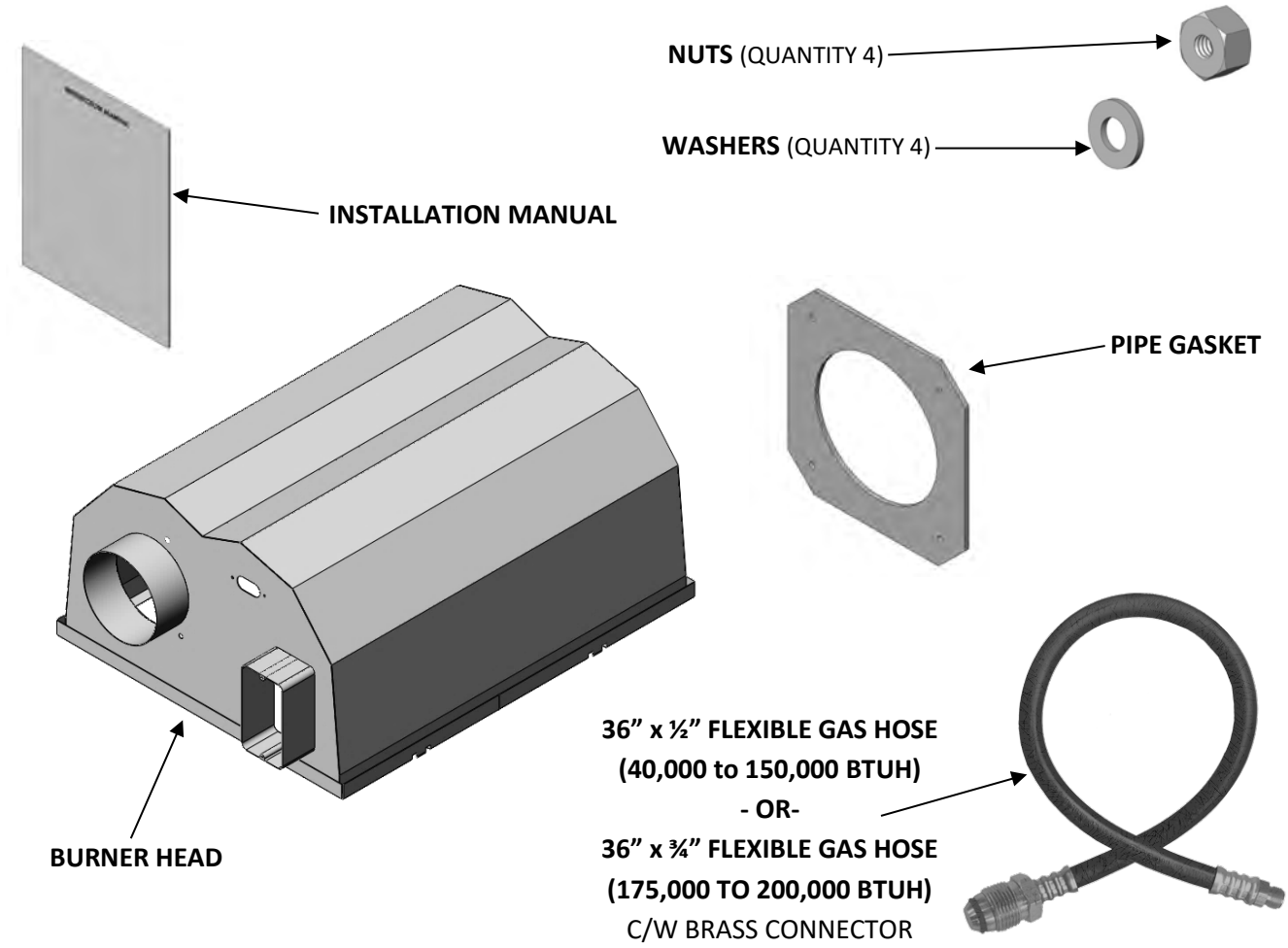


Figure 10. BURNER HEAD PACKAGE CONTENTS

B. **PIPE BOXES (A BOX AND B BOX)**

Reflector packages are supplied with pipe boxes as necessary to make up the balance of the required pipe quantities for each kit. For example, a 40’ (12.19 m) reflector package will have 1 x 10’ (3 m) flange tube installed in the pre-assembled section of the package and then will come with 1 x Pipe Box A and 1 x Pipe Box B. For pipe quantities required for each reflector package, consult the chart on page 21.

PIPE BOXES

NOTE: A 10’ (3 m) FLANGE TUBE IS INSTALLED IN THE PREASSEMBLED SECTION OF REFLECTOR PACKAGES.

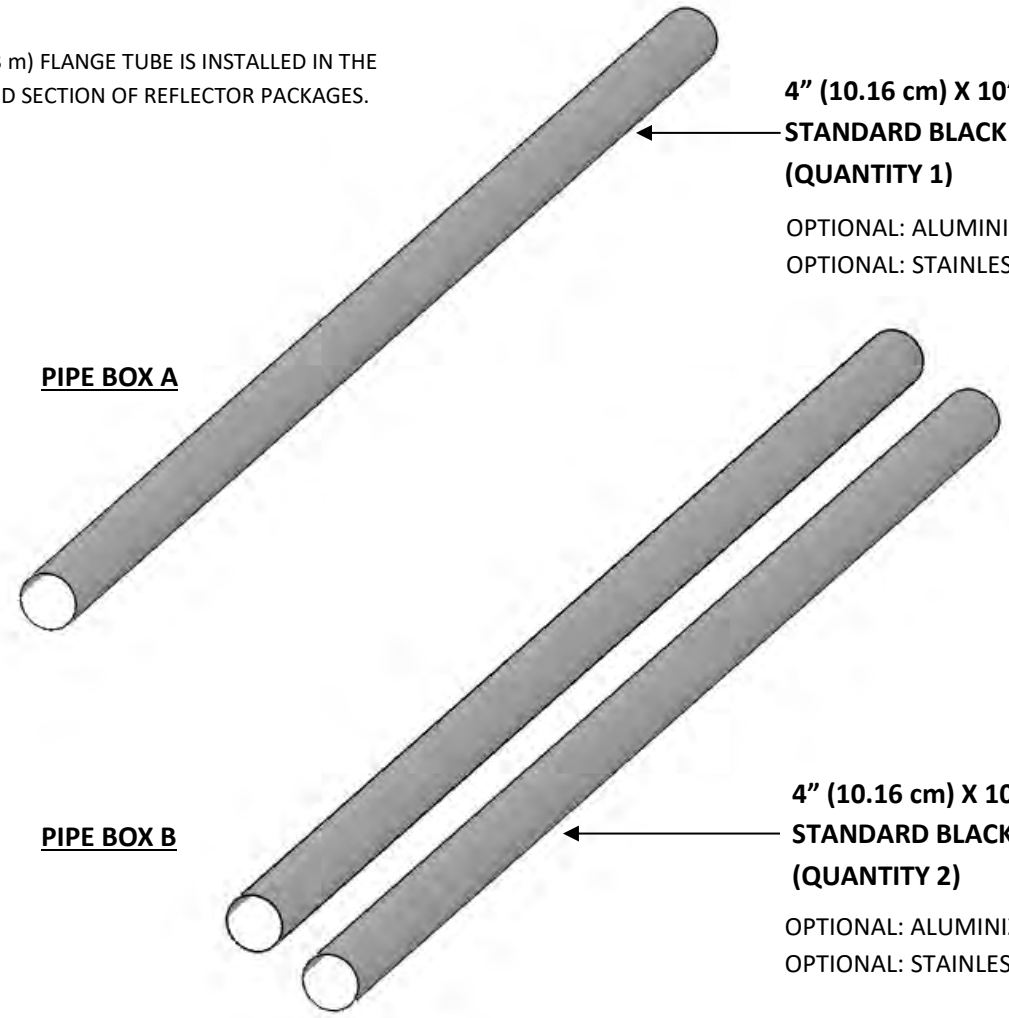


Figure 11. PIPE BOX CONTENTS

C. **10’ (3 M) REFLECTOR PACKAGE**

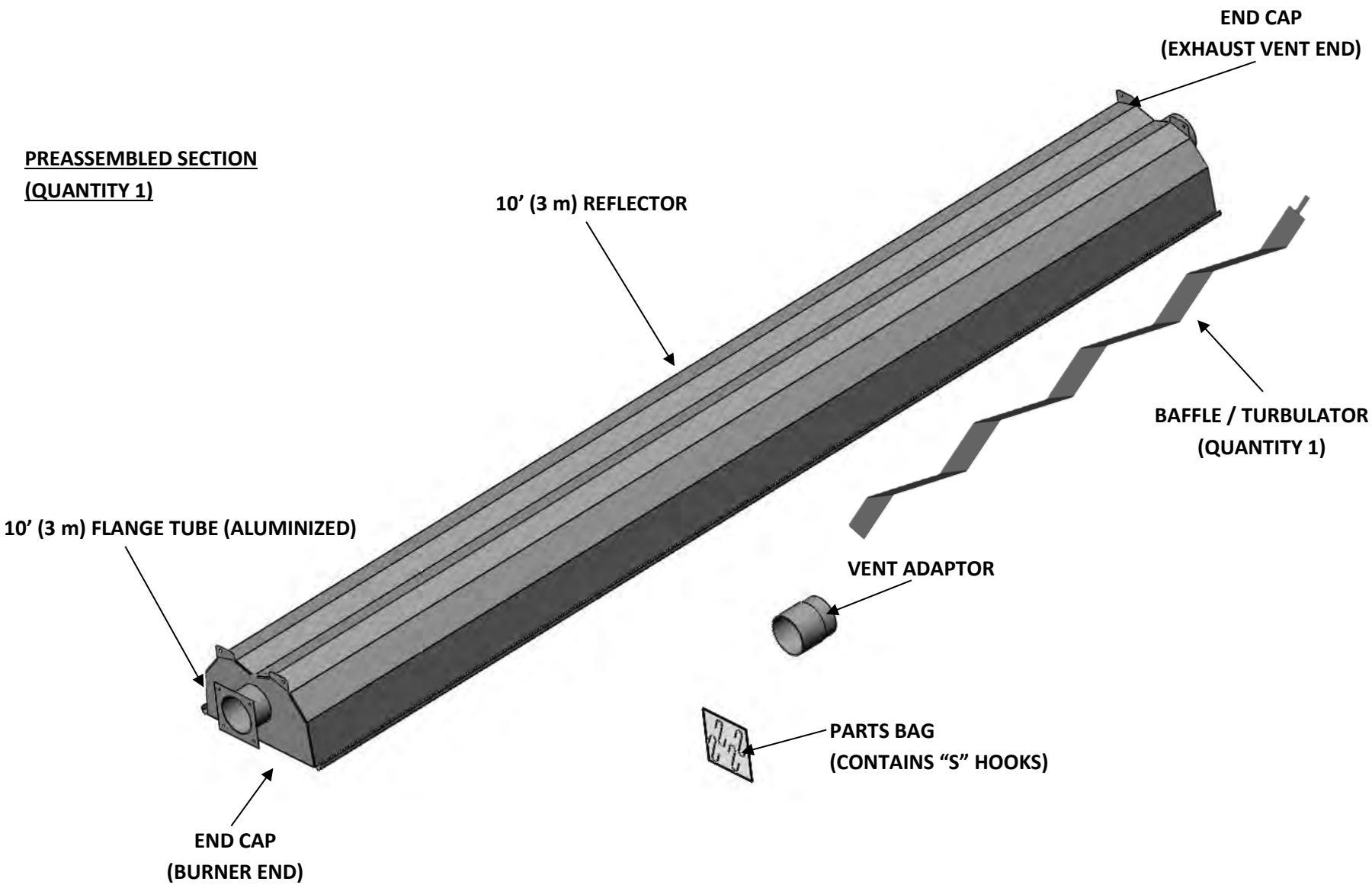


Figure 12. 10’ (3 m) REFLECTOR PACKAGE CONTENTS

D. **20’ (6.1 m), 30’ (9.1 m), 40’ (12.2 m), 50’ (15.2 m), 60’ (18.3 m), 70’ (21.3 m) REFLECTOR PACKAGE CONTENTS**

See chart on Page 21 for quantities of package contents.

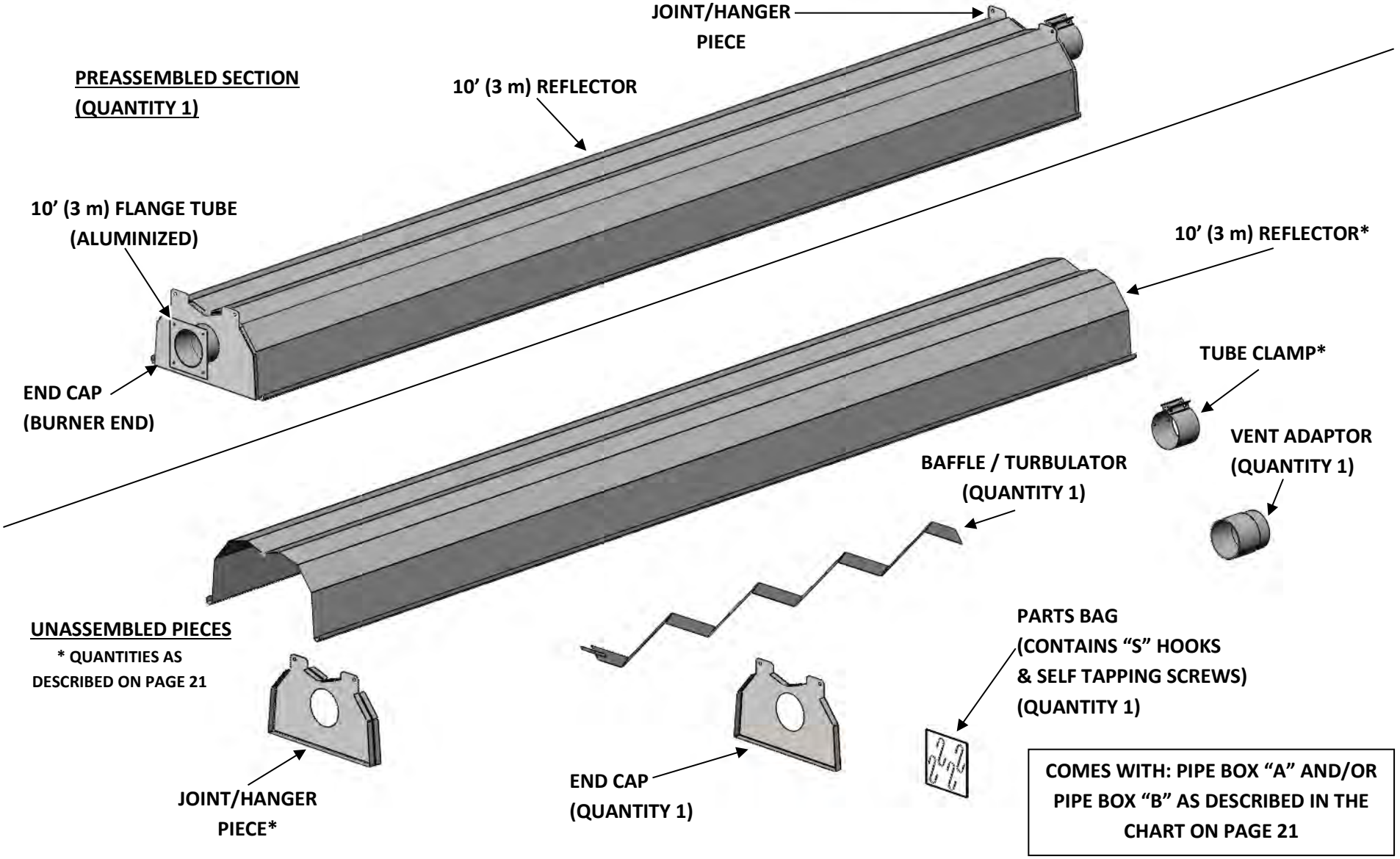


Figure 13. 20’ (6.1 m), 30’ (9.1 m), 40’ (12.2 m), 50’ (15.2 m), 60’ (18.3 m), 70’ (21.3 m) REFLECTOR PACKAGE CONTENTS

E. **80’ (24.4 m) REFLECTOR PACKAGE**

See chart on Page 21 for quantities of package contents.

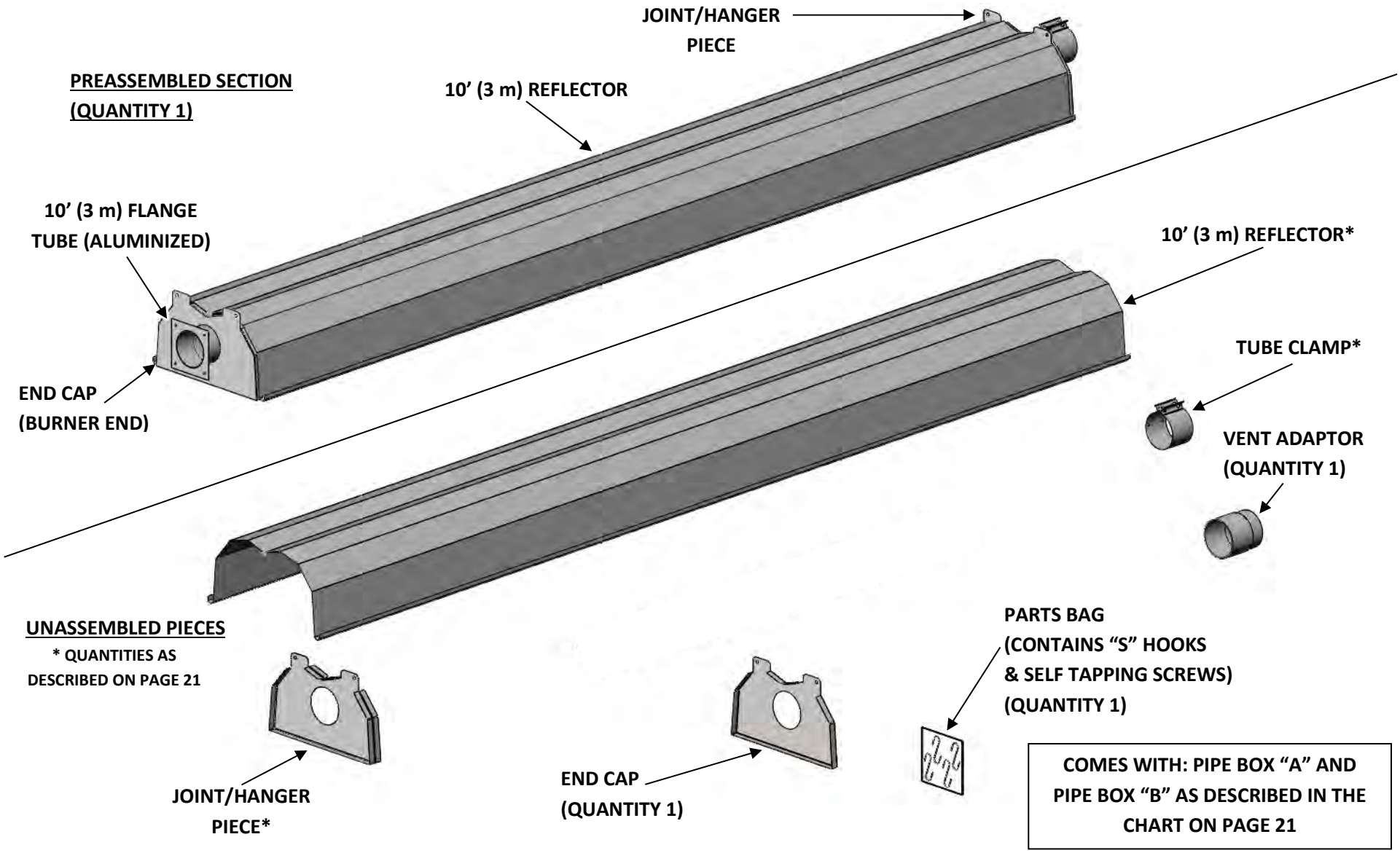


Figure 14. 80’ (24.4 m) REFLECTOR PACKAGE CONTENTS

F. **REFLECTOR PACKAGE PARTS CONTENTS CHART**
20’ (6.1 m), 30’ (9.1 m), 40’ (12.2 m), 50’ (15.2 m), 60’ (18.3 m), 70’ (21.3 m), 80’ (24.4 m)
See pages 19 and 20 for visual details.

	20’ (6.1 m)	30’ (9.1 m)	40’ (12.2 m)	50’ (15.2 m)	60’ (18.3 m)	70’ (21.3 m)	80’ (24.4 m)
10’ (3 m) PRE-ASSEMBLED SECTION	1	1	1	1	1	1	1
10’ (3 m) REFLECTOR	1	2	3	4	5	6	7
JOINT/HANGER PIECE	0	1	2	3	4	5	6
TUBE CLAMP	1	2	3	4	5	6	7
BAFFLE/ TURBULATOR	1	1	1	1	1	1	0
END CAP	1	1	1	1	1	1	1
PARTS BAG	1	1	1	1	1	1	1
VENT ADAPTOR	1	1	1	1	1	1	1
PIPE BOX A	1	0	1	0	1	0	1
PIPE BOX B	0	1	1	2	2	3	3

G. **EXTENSION PACKAGE (OPTIONAL)**

5' (1.53 m) - 1 - 5’ (1.53 m) Section c/w 1 - Tube Clamp and 1 - Joint/Hanger
10' (3.0 m) - 1 - 10’ (3 m) Section c/w 1 - Tube Clamp and 1 - Joint/Hanger
20' (6.1 m) - 2 - 10’ (3 m) Sections c/w 2 - Tube Clamps and 2 - Joint/Hangers

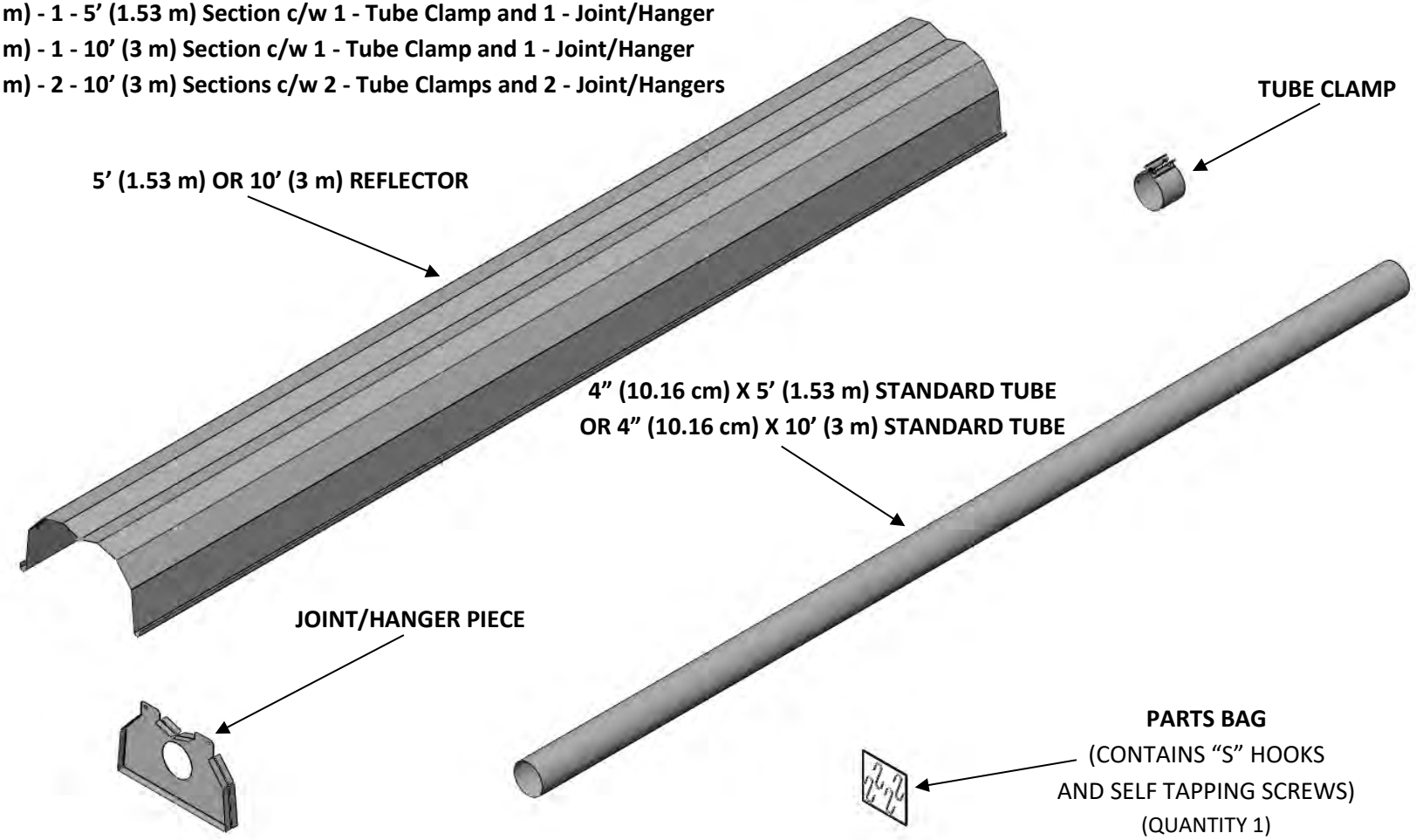


Figure 15. EXTENSION PACKAGE CONTENTS

H. **SIDE REFLECTOR PACKAGE (OPTIONAL)**

SIDE REFLECTOR NOTE:

THE NUMBER OF SIDE REFLECTOR IN A BOX WILL BE DETERMINED BY THE NUMBER ORDERED. QUANTITY IS MARKED ON THE SHIPPING BOX.

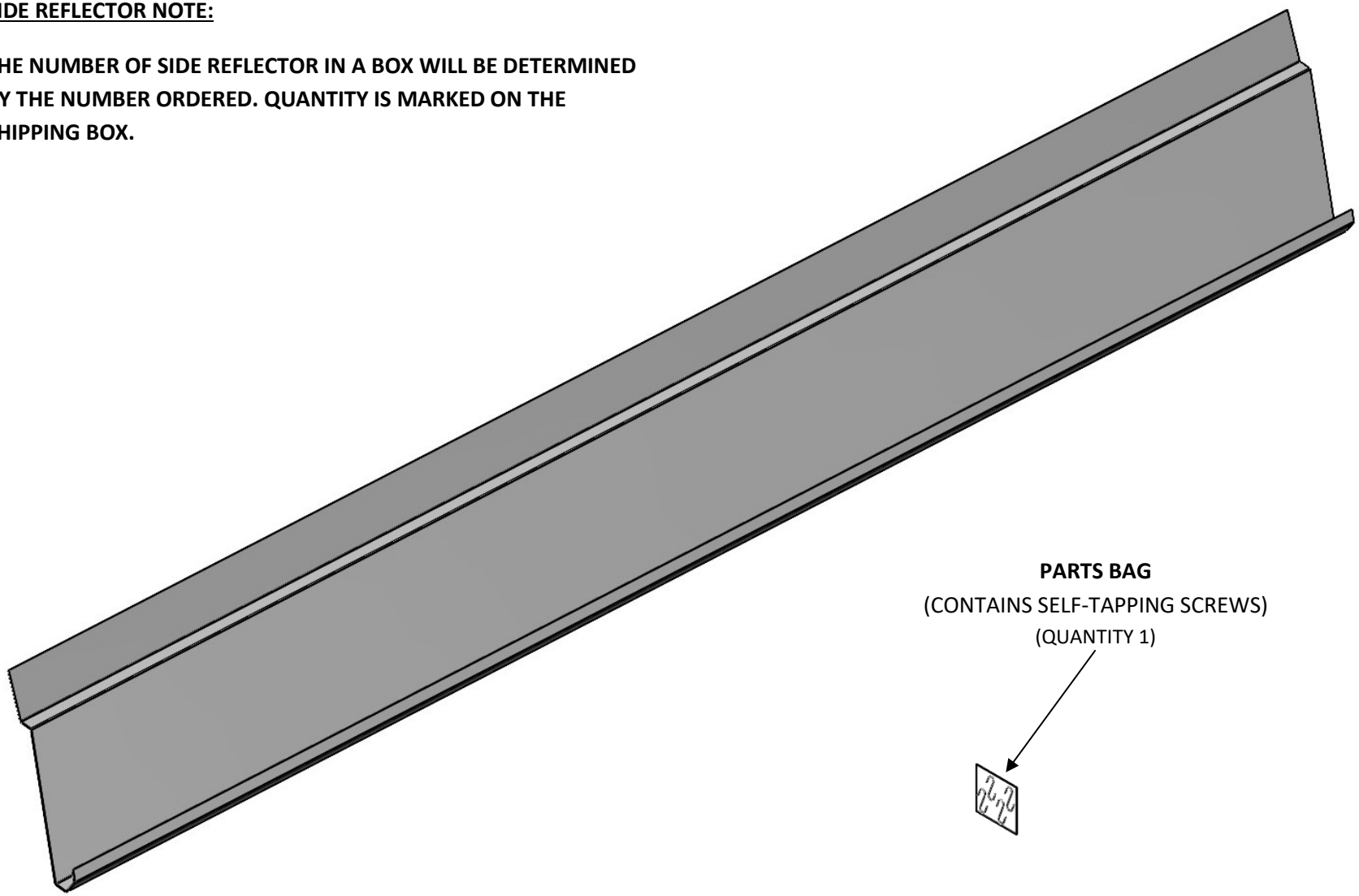


Figure 16. SIDE REFLECTOR PACKAGE CONTENTS

I. 90° ELBOW PACKAGE (OPTIONAL)

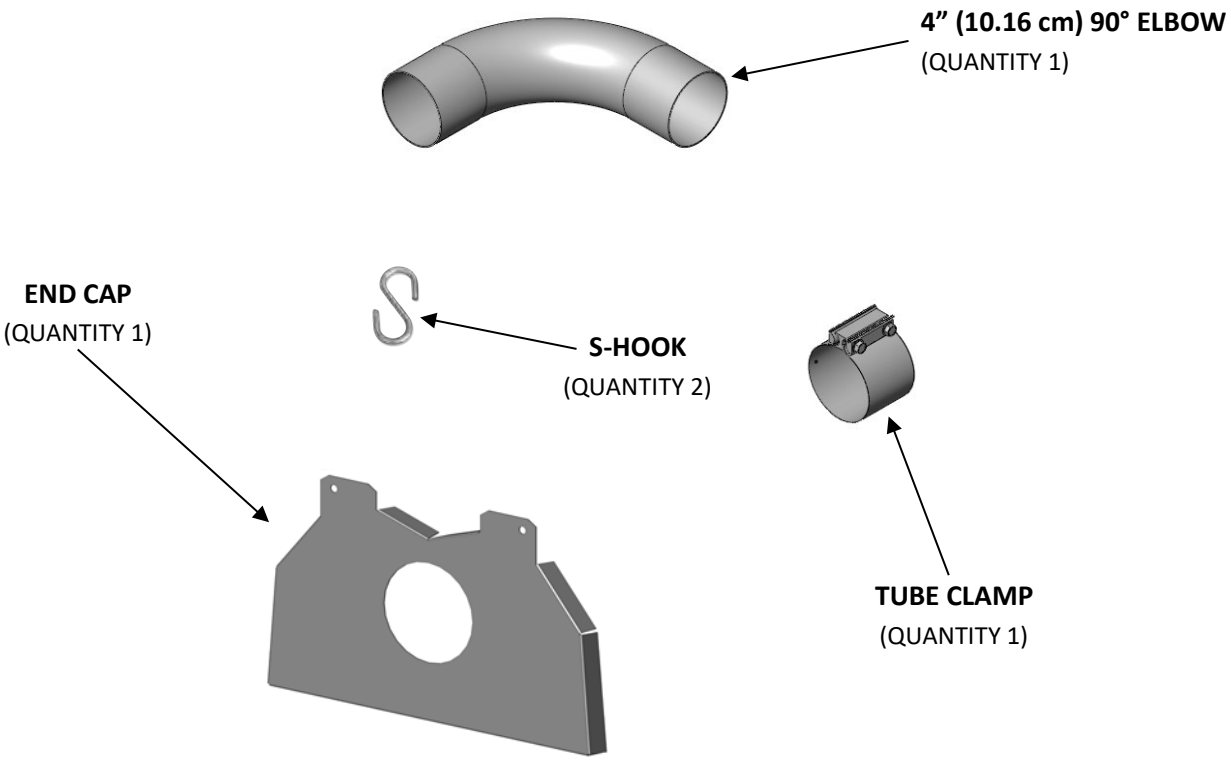


Figure 17. 90° ELBOW PACKAGE CONTENTS

J. 180° U-BEND PACKAGE (OPTIONAL)

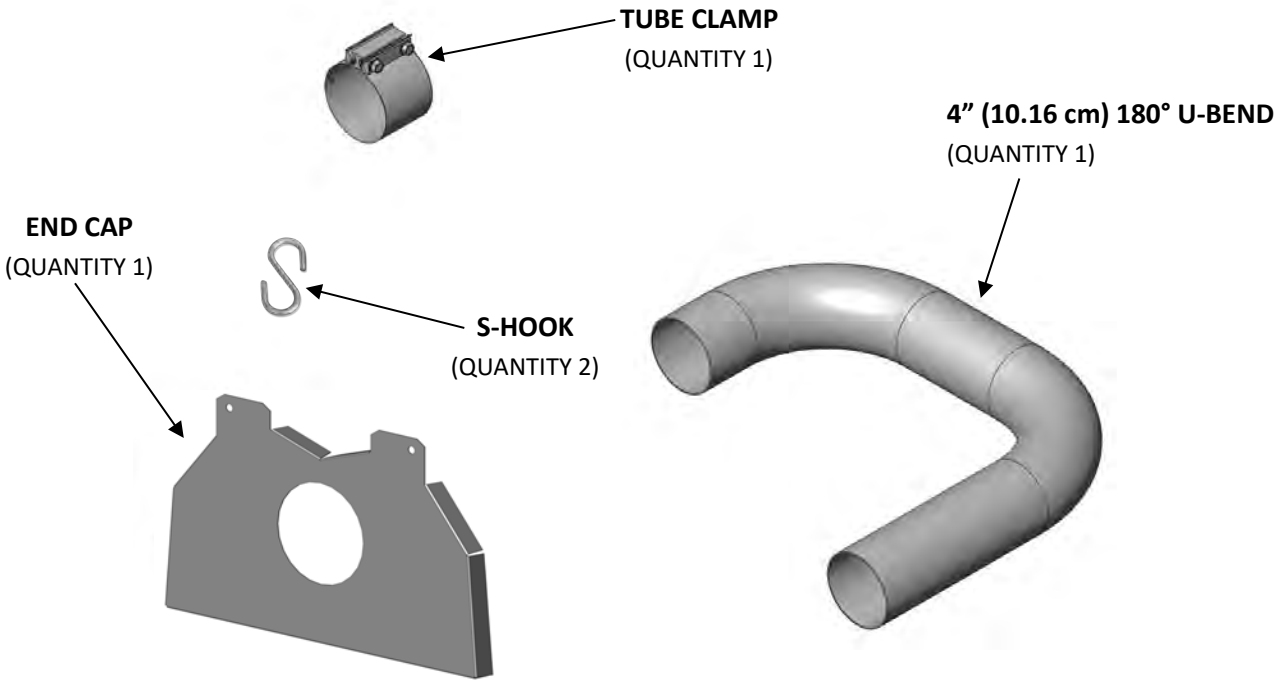


Figure 18. 180° U-BEND PACKAGE CONTENTS

K. **4” SIDE WALL VENT TERMINATION KIT (OPTIONAL)**

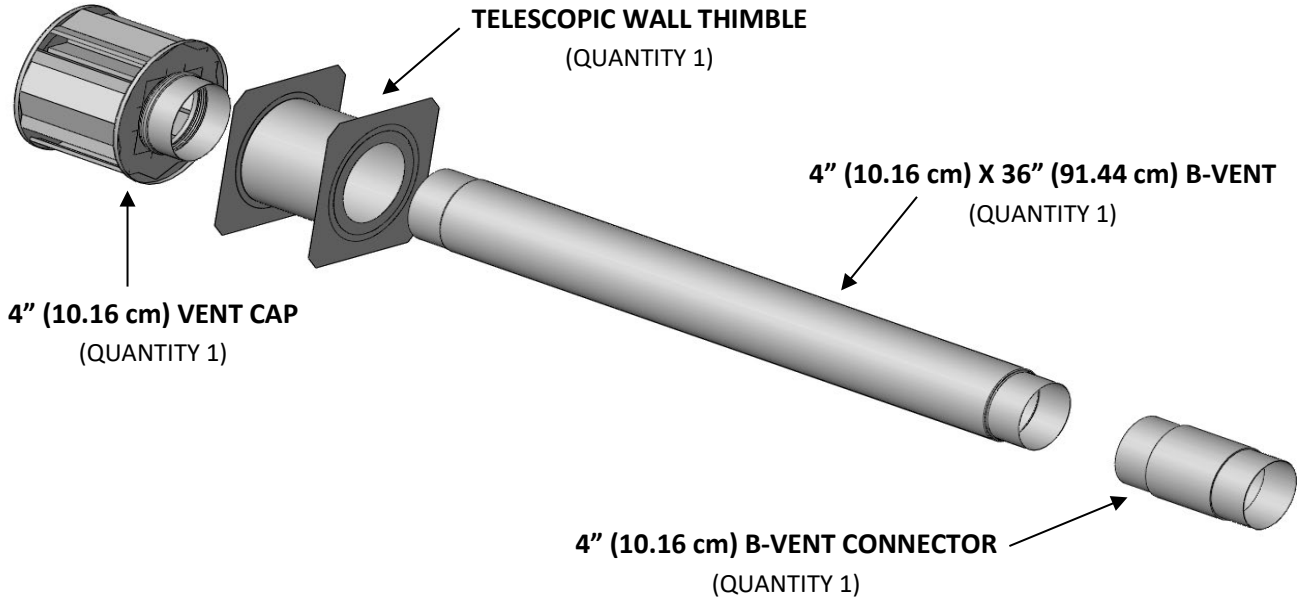


Figure 19. 4” (10.16 cm) SIDE WALL VENT TERMINATION KIT CONTENTS

L. **OUTDOOR INSTALLATION KIT (OPTIONAL)**

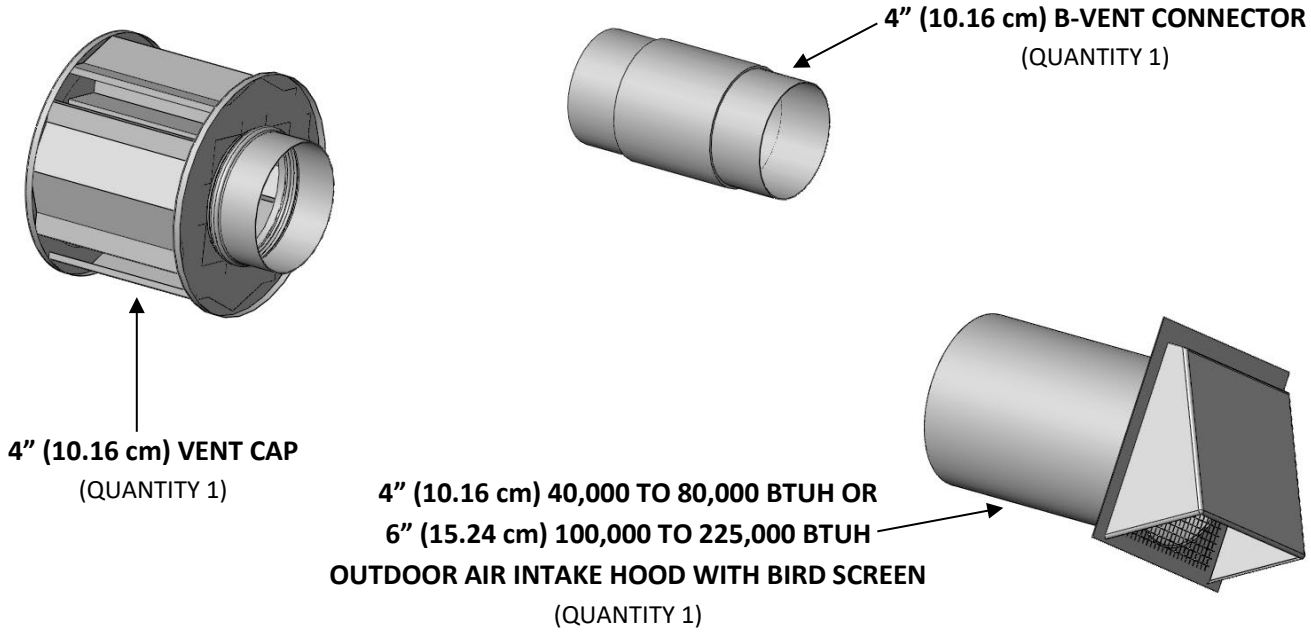


Figure 20. OUTDOOR INSTALLATION PACKAGE CONTENTS

11.0 INSTALLATION

Provide adequate clearance around air openings into the combustion chamber, clearances from combustible material, provisions for accessibility and for combustion and ventilating air supply.

11.1 PLANNING

- Familiarize yourself with the equipment and any accessories that you may require.
- Locate the area where the unit is to be installed.
- Locate the mounting location for the thermostat.
- Locate area where any holes might have to be cut for:
    - Electrical and control wire
    - Venting
    - Any gas piping requirements
- Ensure that there is no obstruction such as hidden electrical wiring, water lines, etc. in the areas of concern.

> ⚠ **WARNING:** Observe minimum clearance to combustibles. Refer to pages 10 through 14.

- Locate a grounded, 120V A/C electrical source.
- Measure the required amount of the various materials required to do the installation and have these materials on site in an organized manner prior to commencement.

12.0 SUSPENSION OF HEATER

12.1 HORIZONTAL INSTALLATION

Locate appropriate suspension points on ceiling or roof. Heater is suspended at 10' (3 m) intervals (refer to Figure 22 and Figure 23). Adequately secure chains to beam suspension points and size chain to suspend at the desired level. Heater tube and burner head are to be level once suspended. **NOTE:** End caps require individual chains for each suspension point; joint hangers can have a continuous loop.

A. **SUSPENSION POINTS**

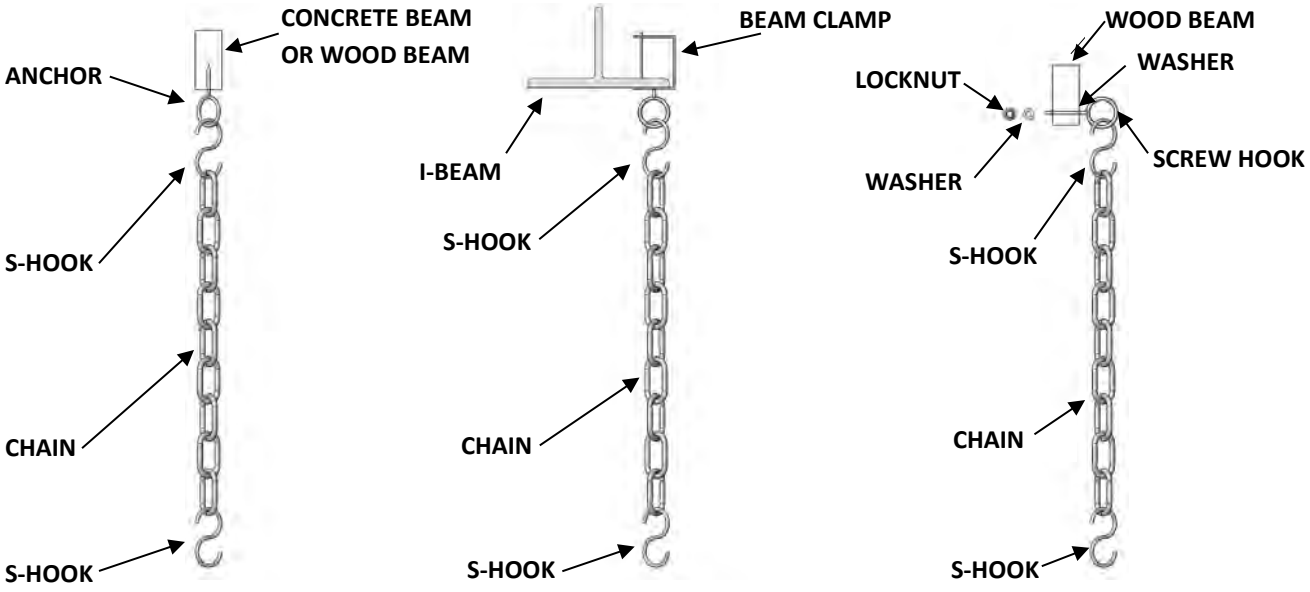


Figure 21. EXAMPLE SUSPENSION DETAILS

⚠ **WARNING: It is the responsibility of the installer to use hanging chain that is a minimum of 2/0 or with a minimum support capacity of 75 lbs. and to ensure all suspension points are adequate to support the weight of the heater as well as any accessories. All S-Hooks must be affixed properly, and the open ends squeezed closed. If the suspension system fails, it is the responsibility of the installer. A failed suspension system can cause property damage, severe injury and/or death.**

If utilizing brackets or another means of rigid suspension is used, ensure all brackets and fasteners have sufficient load bearing capacity to satisfy the local codes as well as the extra load that may be placed upon the heater and suspension methods encountered during windy conditions or snow loads.

A FAILED SUSPENSION SYSTEM CAN CAUSE PROPERTY DAMAGE, SEVERE INJURY AND/OR DEATH. THE INSTALLER TAKES FULL RESPONSIBILITY AND LIABILITY FOR THE CORRECT AND ADEQUATE METHOD OF INSTALLATION AND SUSPENSION OF THE HEATER FOR THE CONDITIONS AND/OR LOCATION THAT THE HEATER IS TO BE INSTALLED AT. THE SUSPENSION DETAILS IN THIS MANUAL ARE SUGGESTIONS ONLY. IF IN DOUBT AS TO THE CORRECT METHODS TO INSTALL THIS HEATER FOR YOUR LOCAL CODES AND CONDITIONS, DO NOT INSTALL THE HEATER. CONTACT LOCAL BUILDING OFFICIALS FOR FURTHER INFORMATION.

B. **HORIZONTAL INSTALLATION: SINGLE SECTION**

SUSPENSION LOCATIONS 10’ (3 m) REFLECTOR PACKAGE

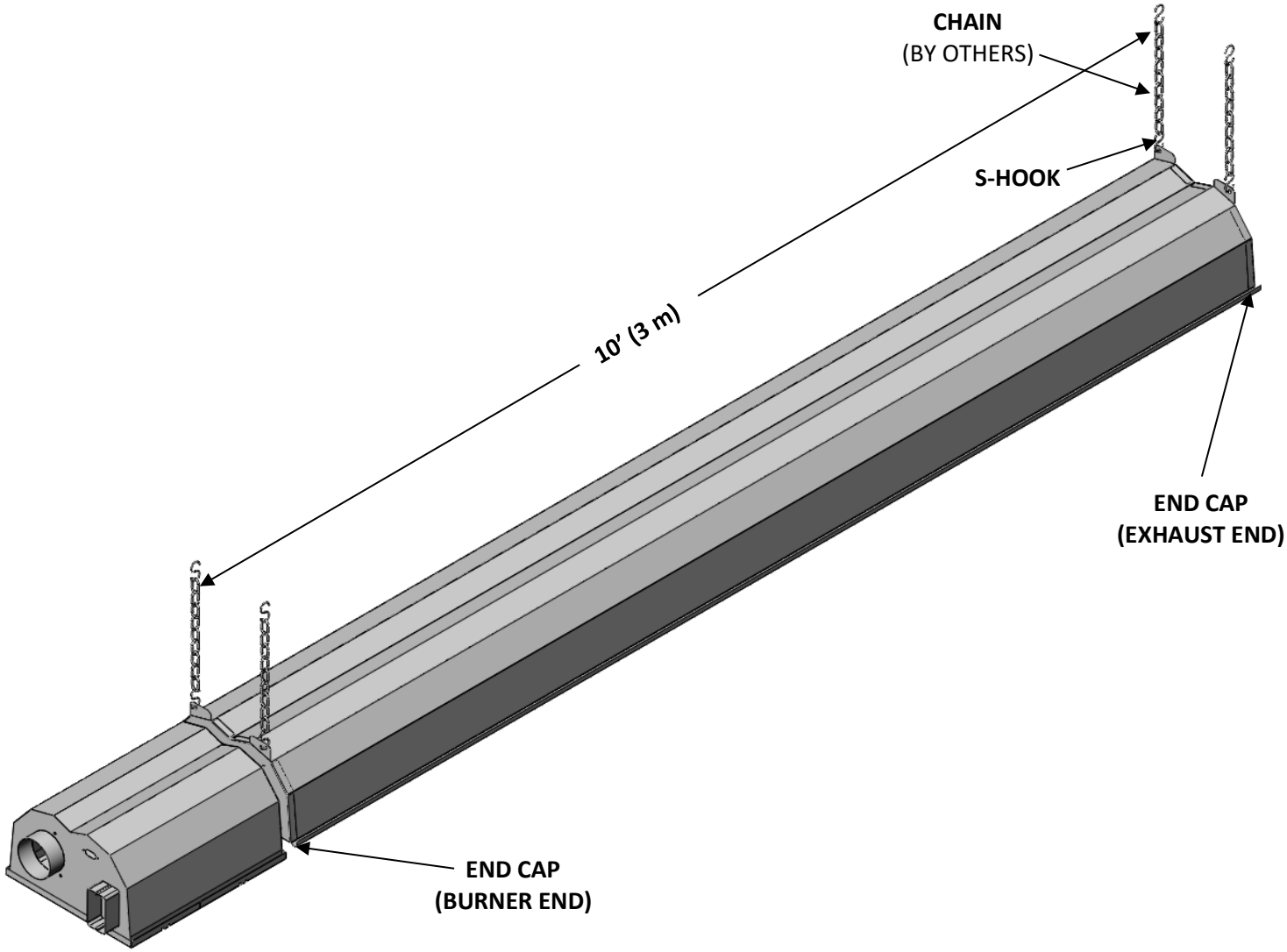


Figure 22. HORIZONTAL INSTALLATION - 10' (3 m) PACKAGE

C. **HORIZONTAL INSTALLATION: MULTIPLE SECTIONS**

SUSPENSION LOCATIONS 20’ (6.1 m) TO 80’ (24.4 m) REFLECTOR PACKAGES

20’ (6.1 m): 2 - 10’ (3 m) sections; **30’ (9.1 m)**: 3 - 10’ (3 m) sections; **40’ (12.2 m)**: 4 - 10’ (3 m) sections; **50’ (15.2 m)**: 5 - 10’ (3 m) sections; **60’ (18.3 m)**: 6 - 10’ (3 m) sections; **70’ (21.3 m)**: 7 - 10’ (3 m) sections; **80’ (24.4 m)**: 8 - 10’ (3 m) sections

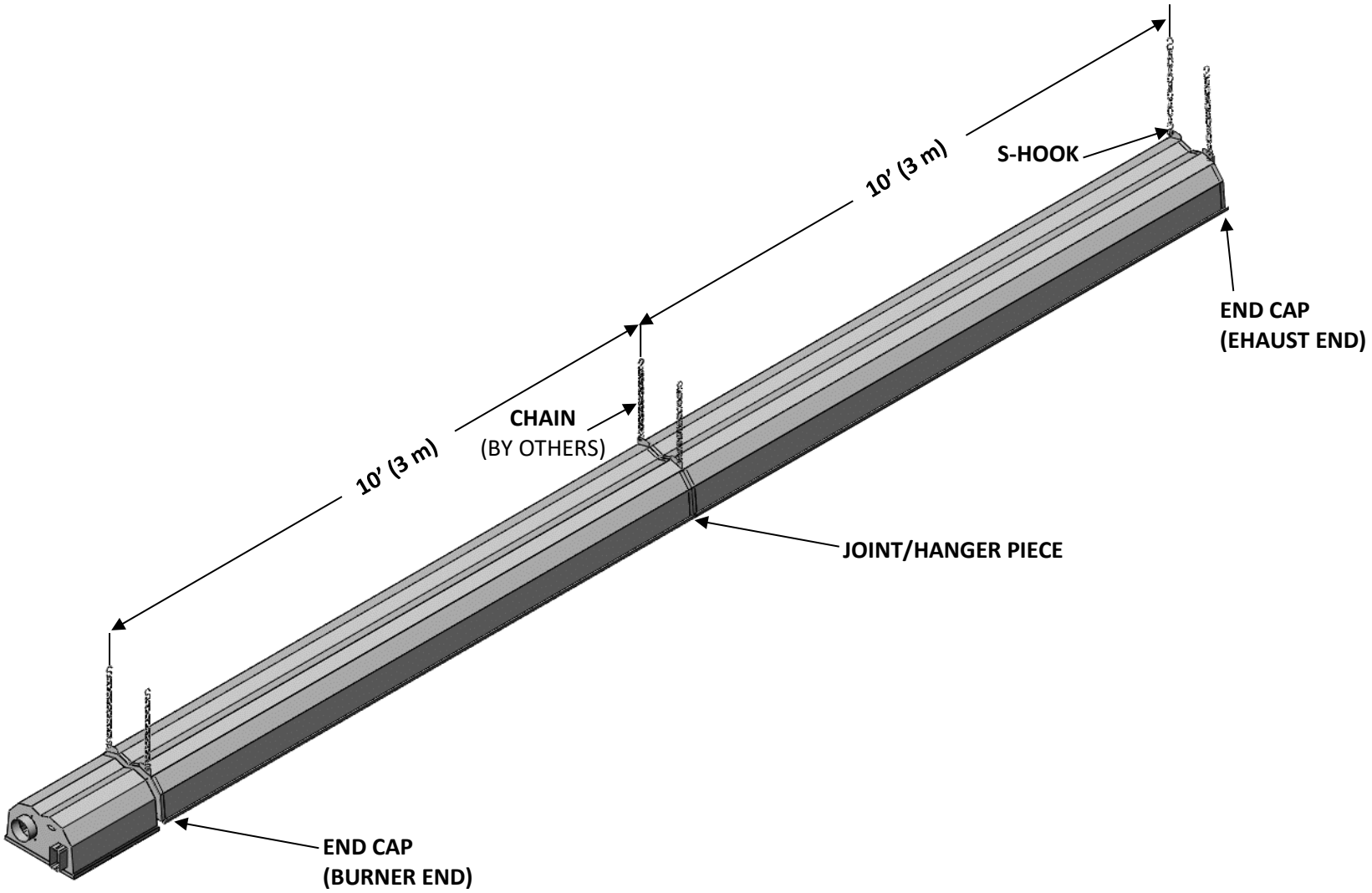


Figure 23. HORIZONTAL INSTALLATIONS – 20’ (6.1 m) TO 80’ (24.4 m) PACKAGES

12.2 TILT INSTALLATION

Refer to Figure 24 and Figure 25, for 25° to 45° tilts. Locate suspension points as described above under the title "HORIZONTAL INSTALLATION". It is important NOT to over-tilt the heater. Units are certified for installation up to 45°; however, the MAXIMUM recommend tilt is no greater than 25°.

⚠ **WARNING: It is the responsibility of the installer to use a hanging chain that is a minimum of 2/0 or with a minimum support capacity of no less than 75 lbs. Also make sure all suspension points are adequate to support the weight of the heater and any accessories. Also make sure all S-Hooks are affixed properly and the open ends squeezed closed. If the suspension system fails, it is the responsibility of the installer. A failed suspension system can cause property damage, severe injury and/or death.**

A. **25° TILT (ALL LENGTHS)**

NOTE: 25° Tilt is the maximum recommended tilt for most installations.

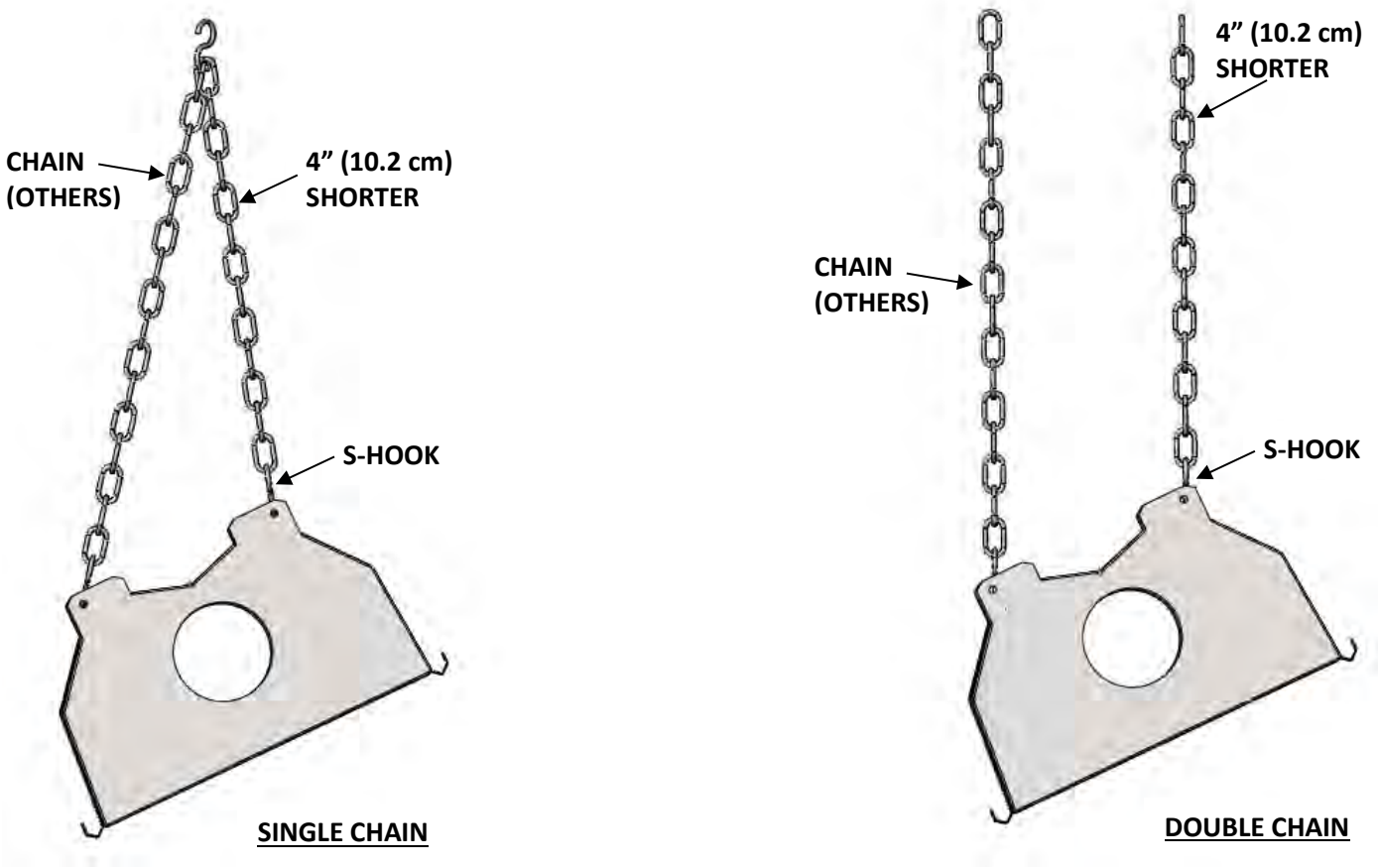


Figure 24. 25° TILT INSTALLATION

B. **45° TILT (ALL LENGTHS)**

NOTE: 45° Tilt is NOT RECOMMENDED. This tilt angle causes the ambient air to form a convection current over the tube. The net effect of this action is reduced infrared output (decreased heating capacity) as well as decreased exhaust temperature which may increase the chance of condensation of combustion by-products.

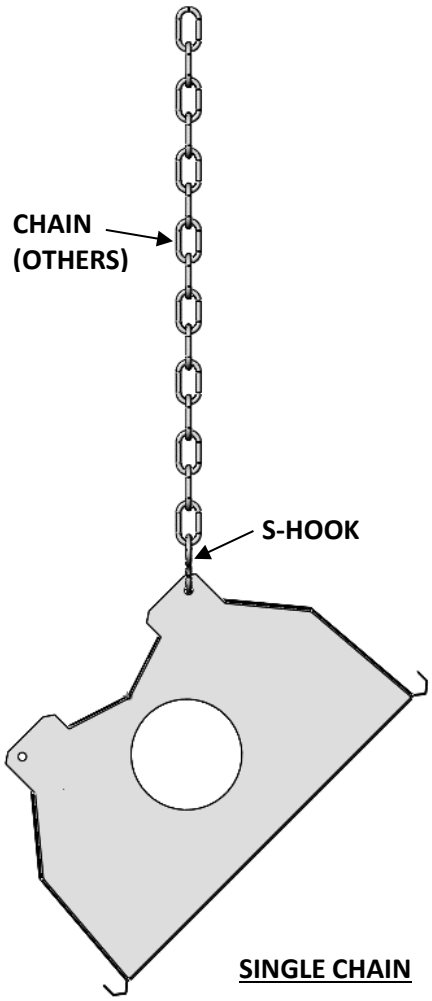


Figure 25. 45° TILT INSTALLATION

13.0 ASSEMBLY OF COMPONENTS

13.1 GENERAL INSTRUCTIONS

Refer to text and figures in section titled “ASSEMBLY OVERVIEW” (see page 35).
Refer to “COMPONENT ASSEMBLY” (see pages 32 to 34)

In all cases, ensure that the radiant tubes are installed with the **seam side down** (towards the floor).
Use TWO people to hang heaters to ensure safety and prevent heater damage.

1) Remove the turbulator/baffle from transport location on tube. Set it aside to be installed into last 10’ (3 m) section of heater. The 80’ (24.5 m) reflector package does not require a turbulator/baffle.
2) Attach the burner head to the pre-assembled reflector section via bolts and washers (see page 33).
3) Install s-hooks into joint hangers. Hang assembled section of heater from chains with adequate load rating (see warnings on page 27). NOTE: If installing 40,000 BTUH with 10’ (3 m), proceed to step 9.
4) Secure joint hanger to one end of the next reflector by overlapping onto joint hanger 3/4“ and secure via self-tapping screws (see page 33). The last section will have an end cap instead of a joint hanger.
5) Install s-hooks into joint hanger and hang the assembly from suspended chains via s-hooks, installed from ceiling trusses. (See warnings on page 27).
6) Attach the reflector section from step #4 to the joint hanger on the previously installed section by overlapping the reflector on the joint hanger 3/4" and securing via self-tapping screws (see page 33).
7) Install the radiant tube by positioning one end into the joint hanger and butting the other end to the previously installed radiant tube. Secure tubes with clamp and self-tapping screws.

IMPORTANT: Ensure to secure clamp to tube via self-tapping screws. (See Figure 30 on page 34). Failure to do so will cause tube separation during use and may result in personal injury, property damage or death.

8) Install remaining sections by repeating steps 4 through 8 until all sections have been installed.
9) Remove the sticker from the baffle. Install/position 7’ baffle into the last 10’ (3 m) section of the heater (from the exhaust end) and fold the tab over the end of the tube to secure. **A baffle is not required for an 80’ (24.5 m) reflector package.**
10) Install the flue/vent adaptor (see page 34).
11) Install any accessories as per their related instruction and illustrations contained in this manual.
12) If sidewall venting, install a flue/vent adaptor and continue with the installation of the venting. If venting through the roof, install a flue/vent adaptor and connect to an approved "B" vent chimney system.
13) Connect fuel supply, electrical supply and controls.

13.2 COMPONENT ASSEMBLY

A. TURBULATOR/BAFFLE - TRANSPORT POSITION

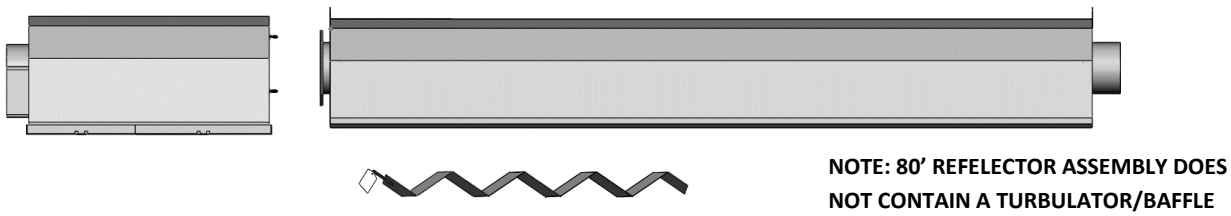


Figure 26. BAFFLE/TURBULATOR REMOVAL FROM TRANSPORTATION

B. BURNER HEAD TO FLANGE TUBE

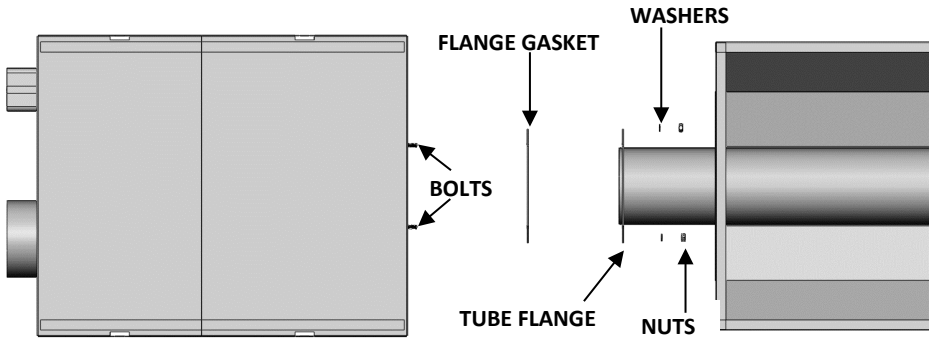


Figure 27. BURNER HEAD INSTALLATION

C. JOINT HANGER TO REFLECTOR

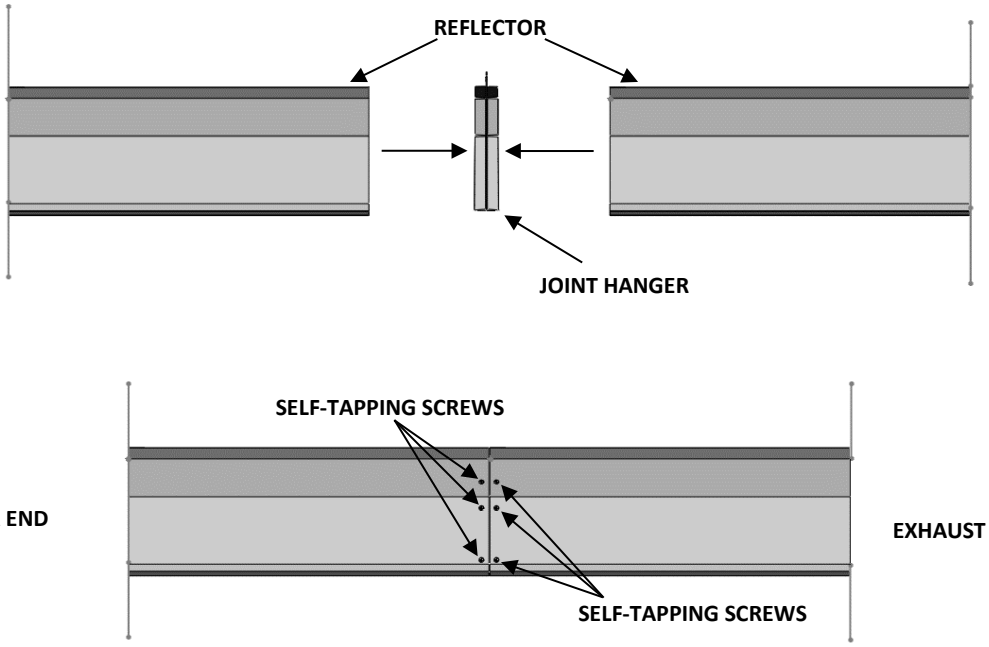


Figure 28. JOINT HANGER INSTALLATION

D. END CAP TO REFLECTOR

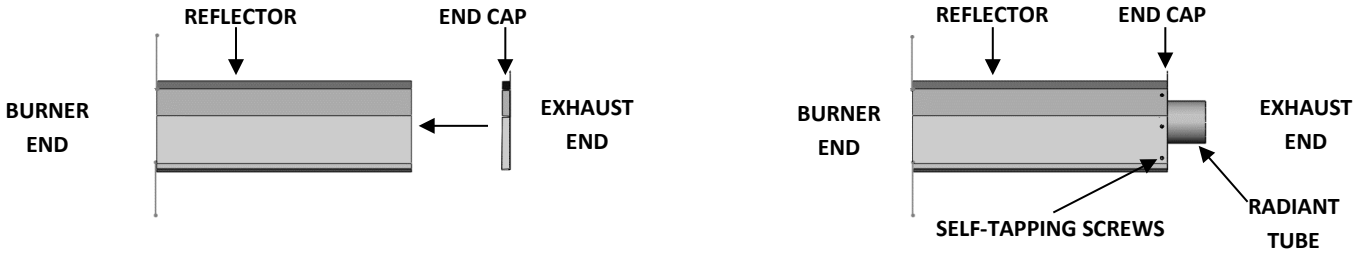


Figure 29. END CAP INSTALLATION

E. CLAMP COUPLER

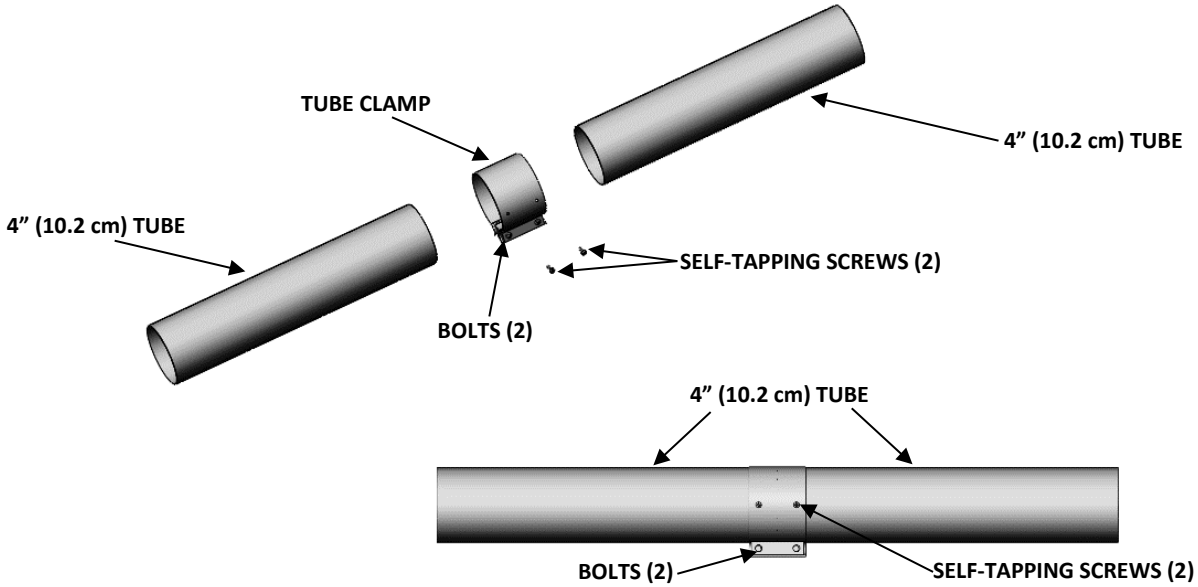


Figure 30. CLAMP COUPLER INSTALLATION

F. BAFFLE/TURBULATOR INSTALLATION

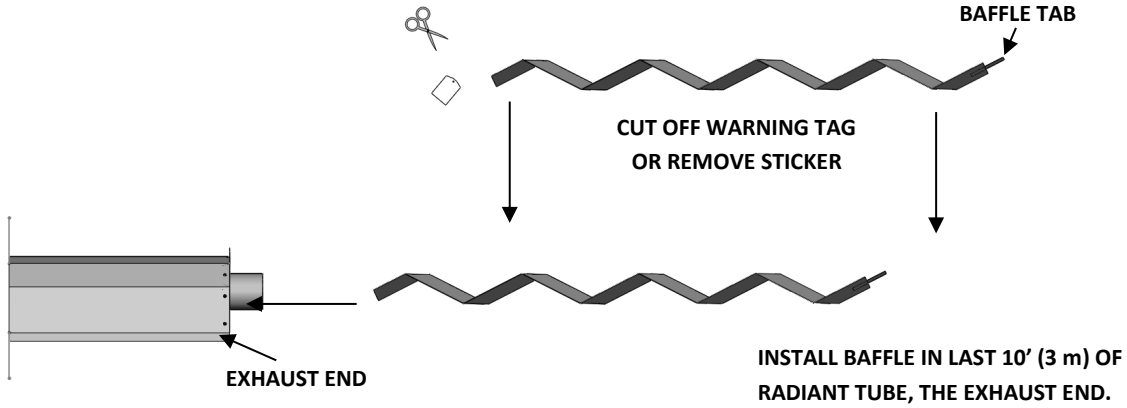


Figure 31. BAFFLE/TURBULATOR INSTALLATION

G. VENT ADAPTOR INSTALLATION

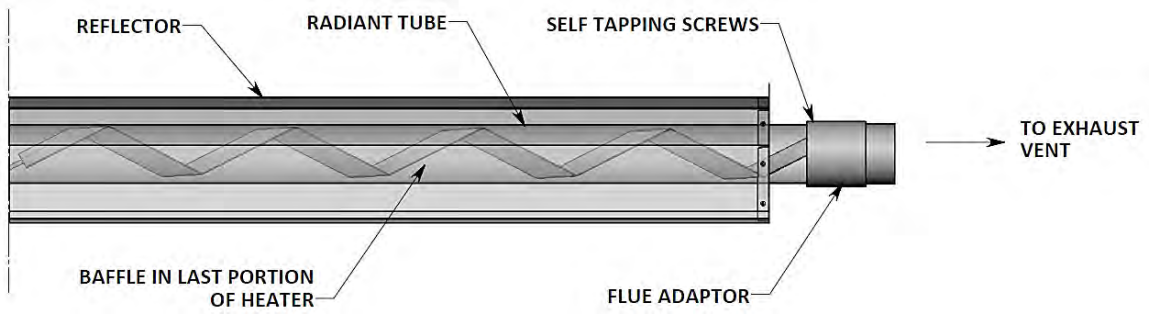


Figure 32. BAFFLE/TURBULATOR & FLUE ADAPTOR INSTALLATION

14.0 ASSEMBLY OVERVIEW

1) Verify the length of reflector package to be installed. Read “ASSEMBLY OF COMPONENTS", on page 32 and view related diagrams on pages 32 to 34.
2) Locate section of manual that corresponds with length to be installed. View the corresponding exploded view. The illustration contains the details required to install the unit.

REFLECTOR PACKAGE LENGTH	CORRESPONDING PAGE
10' (3 m)	**36**
20' (6.1 m)	**37**
30’ (9.1 m)	**38**
40’ (12.2 m)	**39**
50’ (15.2 m)	**40**
60’ (18.3 m)	**41**
70’ (21.3 m)	**42**
80’ (24.4 m)	**43**

14.1 ASSEMBLY OF OPTIONS

Refer to section of manual containing option to be installed.

OPTIONS	CORRESPONDING PAGE
Sidewall Vent Termination Kit	**44**
Outdoor Installation Kit	**44**
Combustion Air Kit	**47**
90° Elbow Kit	**45**
180° U-Bend Kit	**45**
Side Reflectors	**46**
Low Voltage Thermostat	**65**
Line Voltage Thermostat	**66**

View exploded illustration, install accordingly.

14.2 REFLECTOR ASSEMBLY

A. 10' (3 m) REFLECTOR PACKAGE

NOTE: THIS REFLECTOR PACKAGE CAN ONLY USED WITH THE FOLLOWING INPUTS:

- 40,000 BTUH

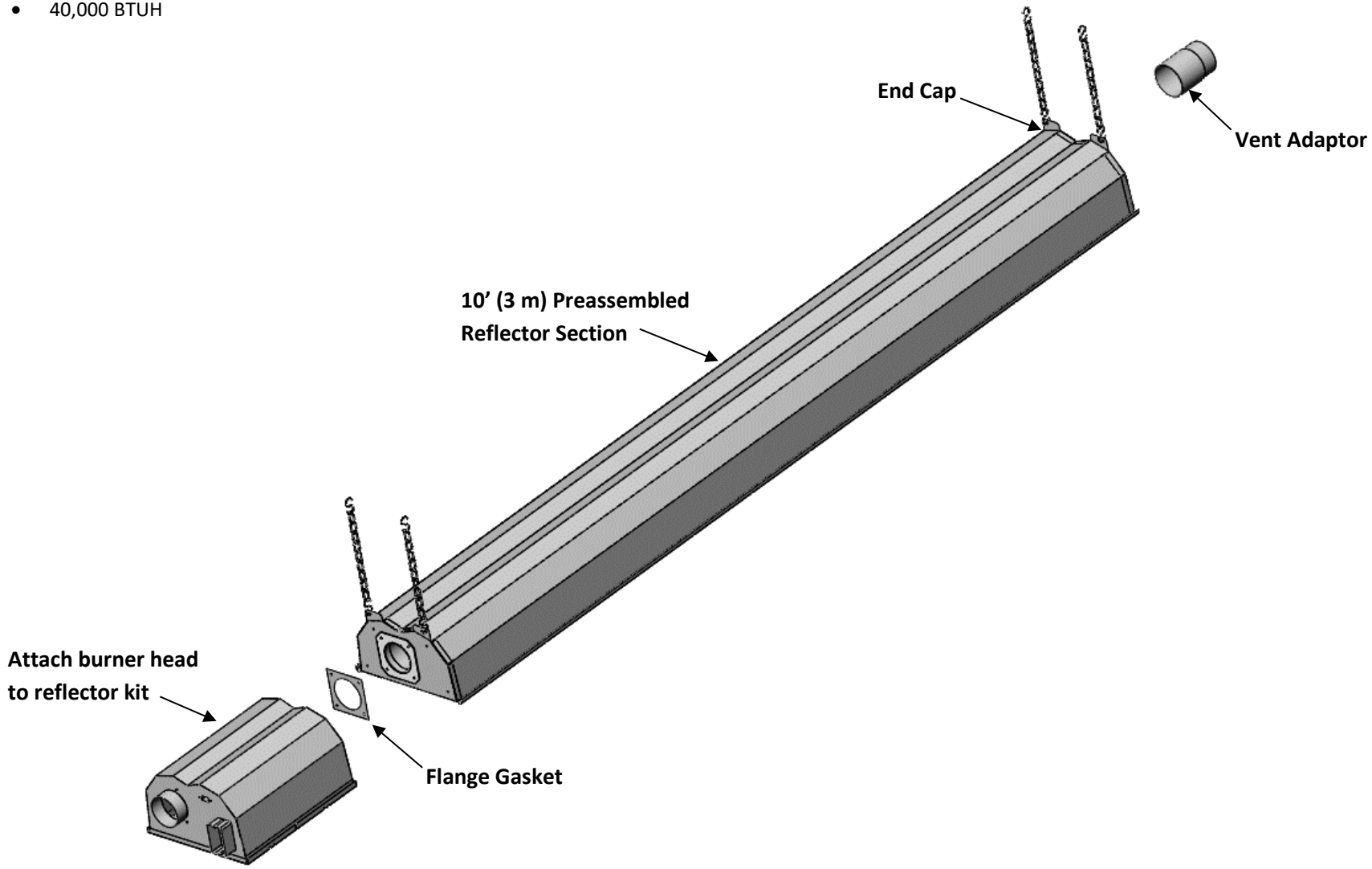


Figure 33. 10' (3 m) REFLECTOR PACKAGE INSTALLATION

B. 20' (6.1 m) REFLECTOR PACKAGE

NOTE: THIS REFLECTOR PACKAGE CAN ONLY USED WITH THE FOLLOWING INPUTS:

- 40,000 BTUH
- 50,000 BTUH
- 60,000 BTUH
- 75,000 BTUH
- 80,000 BTUH
- 100,000 BTUH

PIPE BOXES REQUIRED

(RADIANT TUBE)

QUANITY	TYPE
1	A

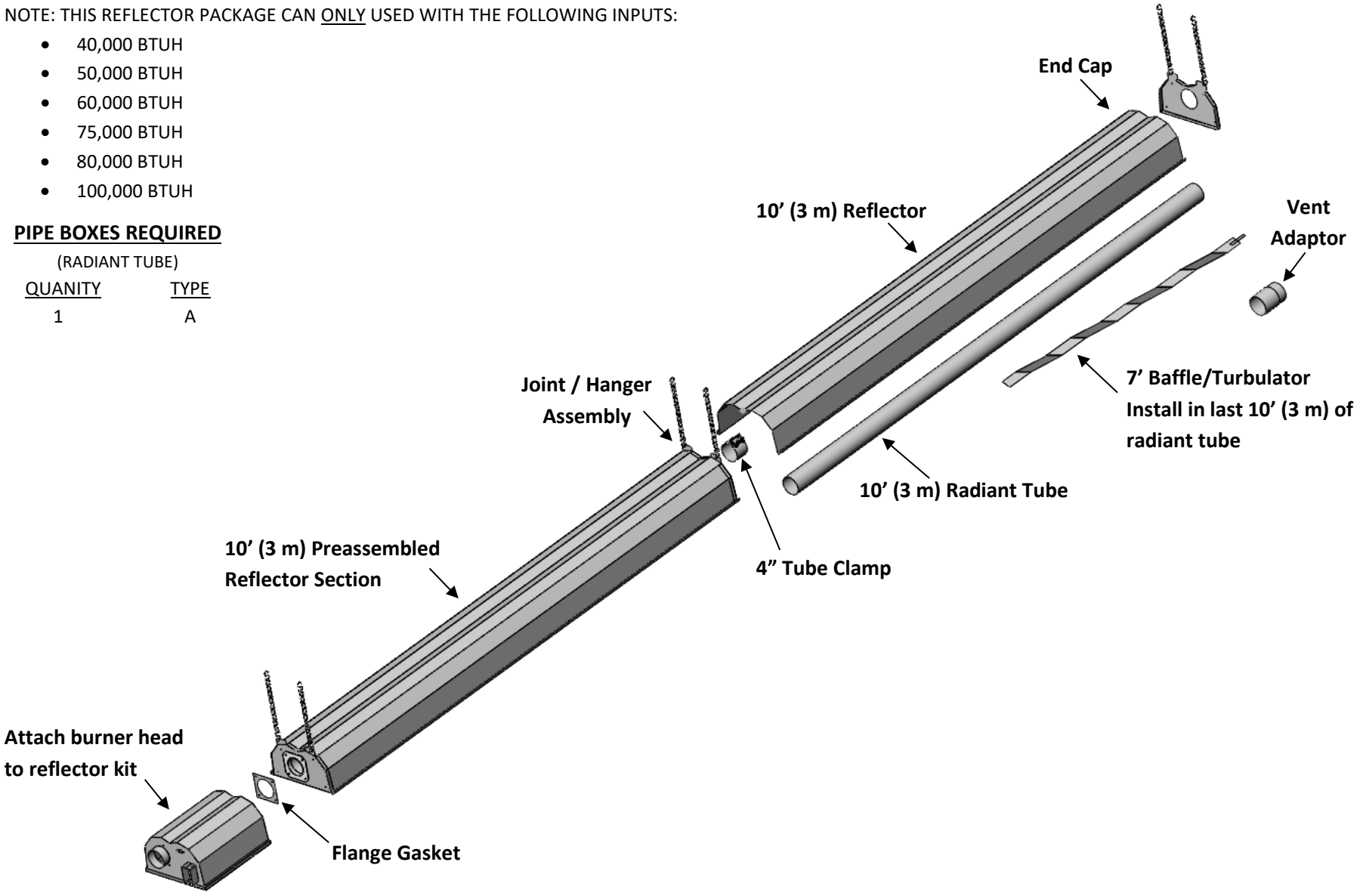


Figure 34. 20' (6.1 m) REFLECTOR PACKAGE INSTALLATION

C. **30' (9.1 m) REFLECTOR PACKAGE**

NOTE: THIS REFLECTOR PACKAGE CAN ONLY USED WITH THE FOLLOWING INPUTS:

- 60,000 BTUH
- 75,000 BTUH
- 80,000 BTUH
- 100,000 BTUH
- 125,000 BTUH

PIPE BOXES REQUIRED

(RADIANT TUBE)

QUANITY	TYPE
1	B

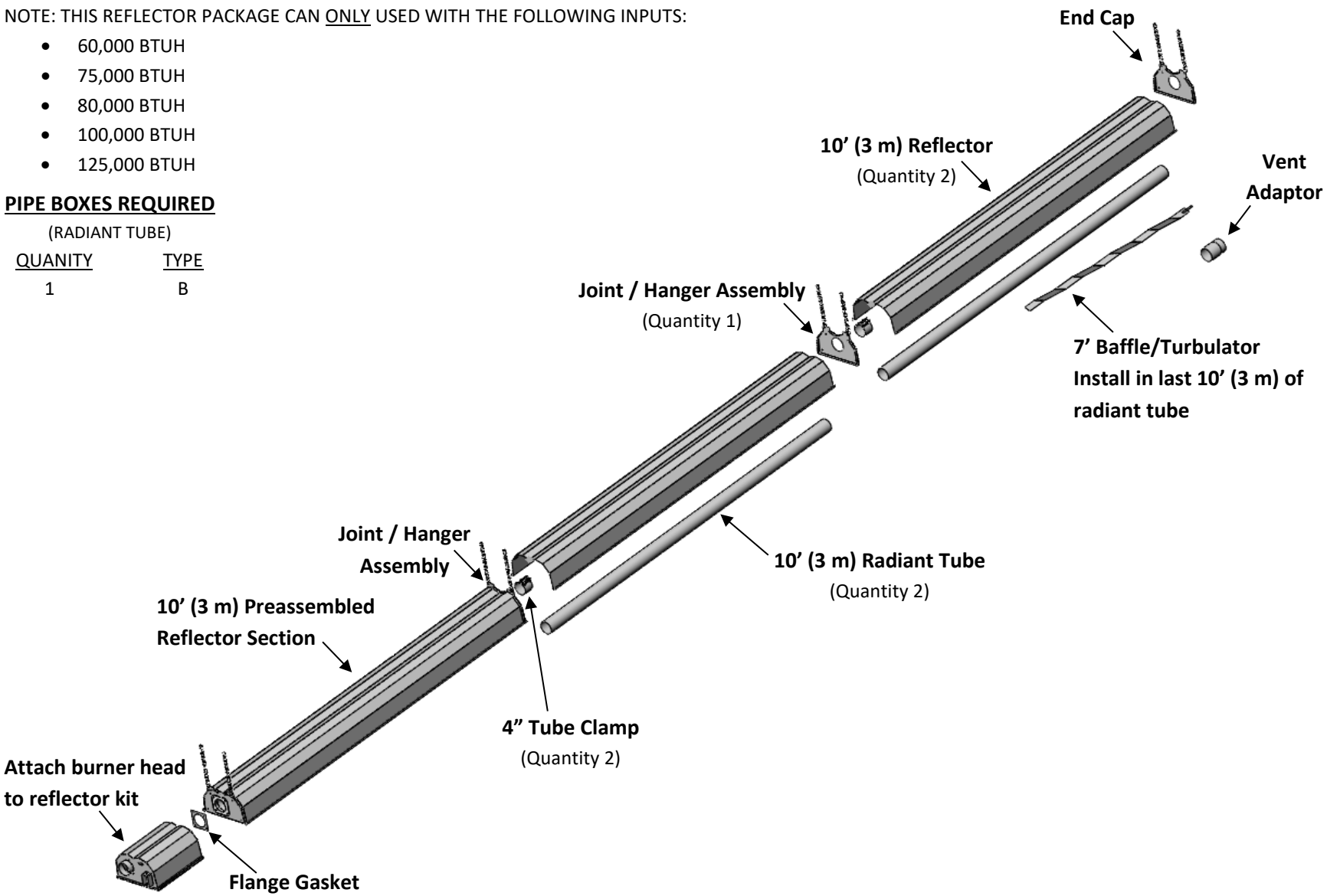


Figure 35. 30' (9.1 m) REFLECTOR PACKAGE INSTALLATION

D. 40' (12.2 m) REFLECTOR PACKAGE

NOTE: THIS REFLECTOR PACKAGE CAN ONLY USED WITH THE FOLLOWING INPUTS:

- 60,000 BTUH
- 75,000 BTUH
- 80,000 BTUH
- 100,000 BTUH
- 125,000 BTUH
- 150,000 BTUH
- 175,000 BTUH

PIPE BOXES REQUIRED

(RADIANT TUBE)

QUANITY	TYPE
1	A
1	B

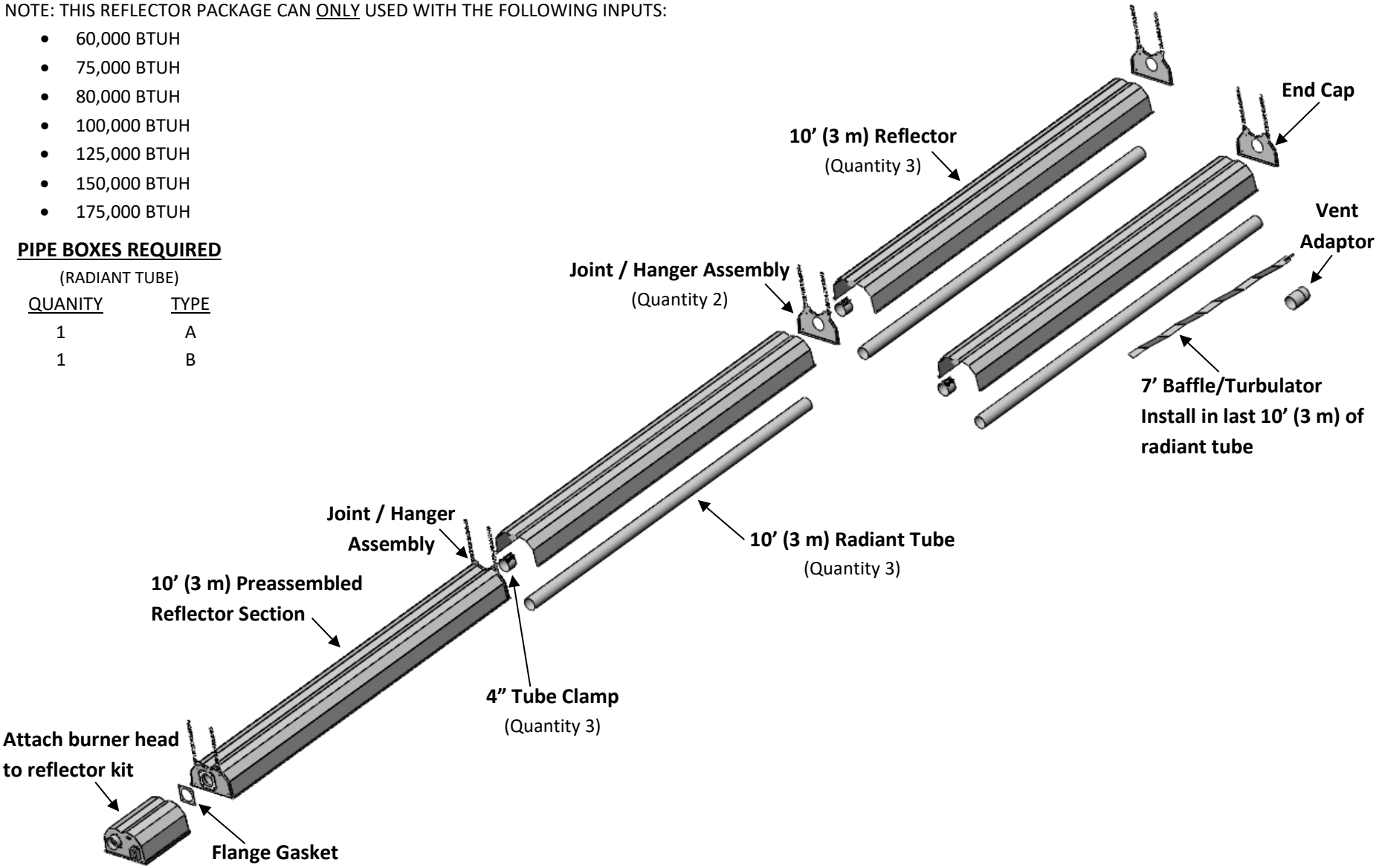


Figure 36. 40' (12.2 m) REFLECTOR PACKAGE INSTALLATION

E. **50' (15.2 m) REFLECTOR PACKAGE**

NOTE: THIS REFLECTOR PACKAGE CAN ONLY USED WITH THE FOLLOWING INPUTS:

- 100,000 BTUH
- 125,000 BTUH
- 150,000 BTUH
- 175,000 BTUH
- 200,000 BTUH

PIPE BOXES REQUIRED

(RADIANT TUBE)

QUANITY	TYPE
2	B

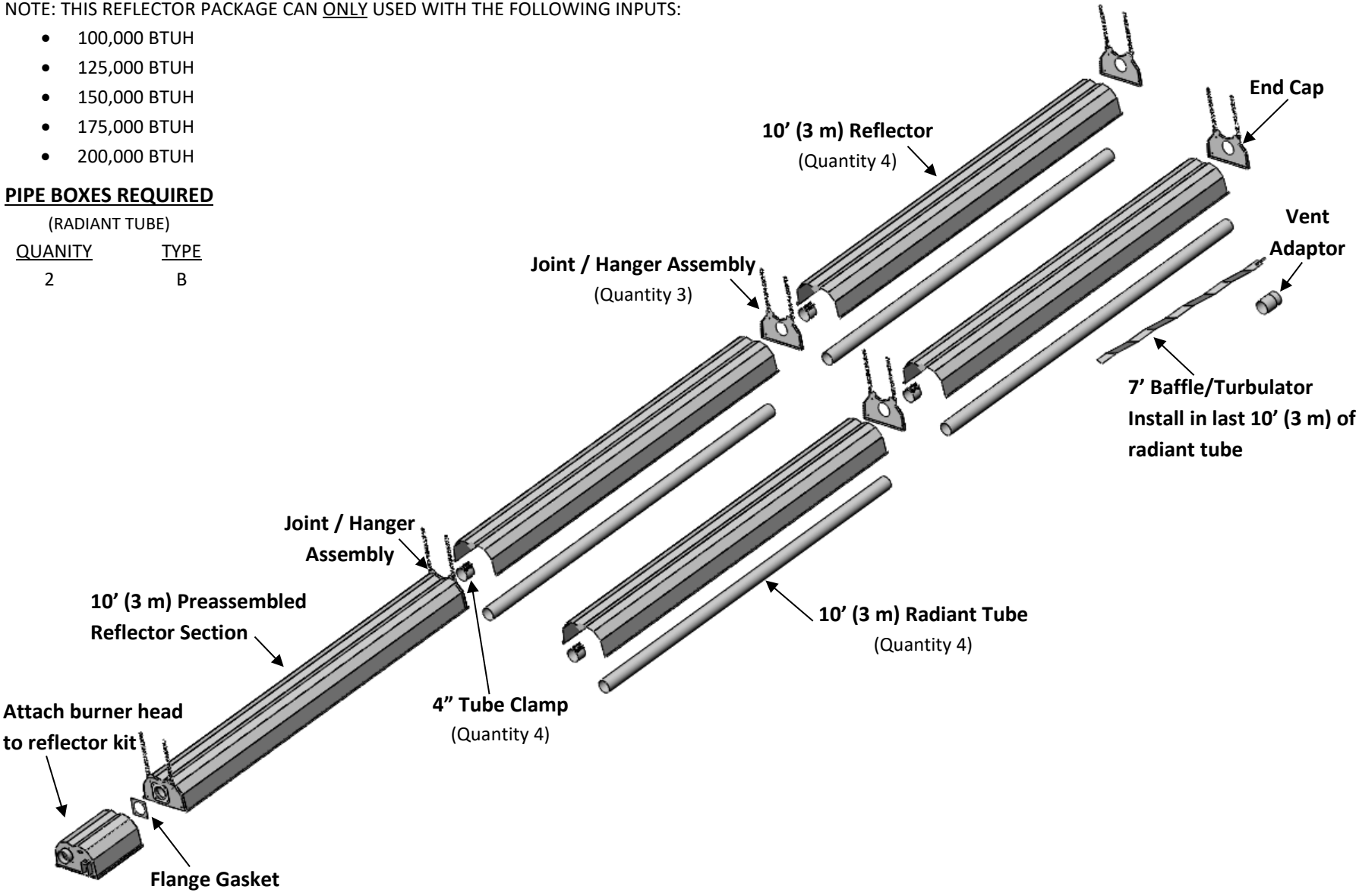


Figure 37. 50' (15.2 m) REFLECTOR PACKAGE INSTALLATION

F. 60' (18.3 m) REFLECTOR PACKAGE

NOTE: THIS REFLECTOR PACKAGE CAN ONLY USED WITH THE FOLLOWING INPUTS:

- 150,000 BTUH
- 175,000 BTUH
- 200,000 BTUH

PIPE BOXES REQUIRED

(RADIANT TUBE)

QUANITY	TYPE
1	A
2	B

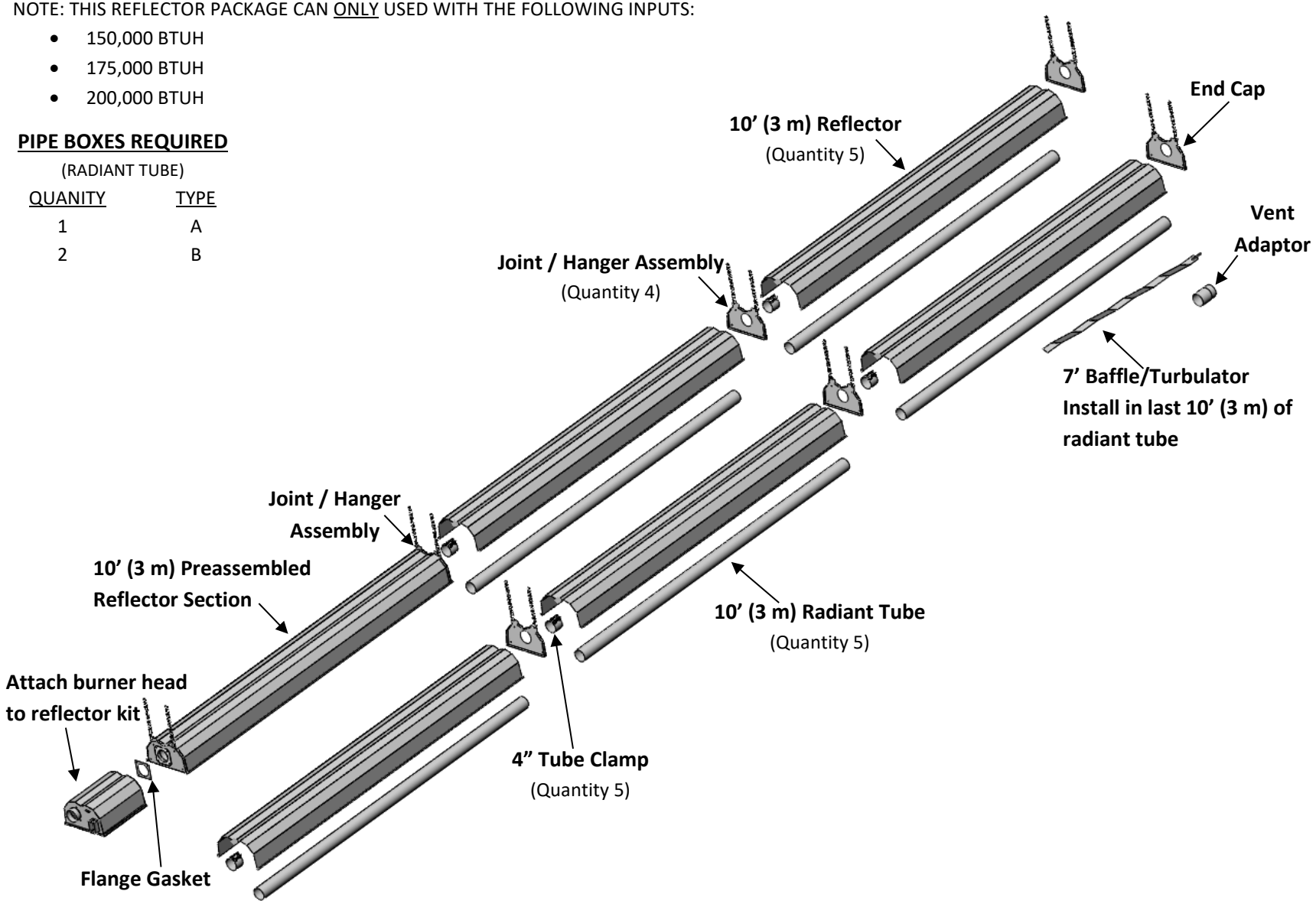


Figure 38. 60' (18.3 m) REFLECTOR PACKAGE INSTALLATION

G. 70' (21.3 m) REFLECTOR PACKAGE

NOTE: THIS REFLECTOR PACKAGE CAN ONLY USED WITH THE FOLLOWING INPUTS:

- 175,000 BTUH
- 200,000 BTUH

PIPE BOXES REQUIRED

(RADIANT TUBE)

QUANITY	TYPE
3	B

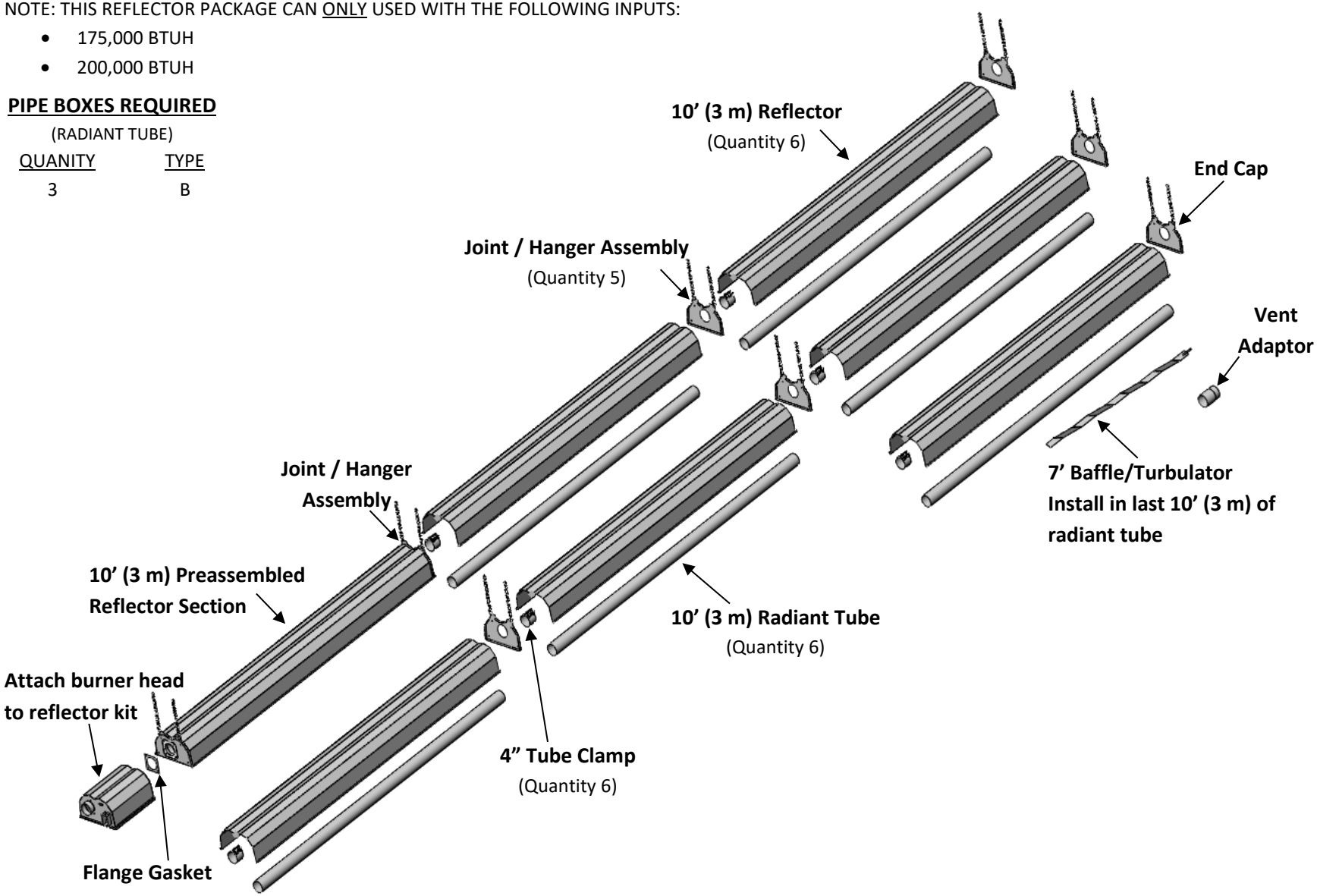


Figure 39. 70' (21.3 m) REFLECTOR PACKAGE INSTALLATION

H. 80' (24.4 m) REFLECTOR PACKAGE

NOTE: THIS REFLECTOR PACKAGE CAN ONLY USED WITH THE FOLLOWING INPUTS:

- 200,000 BTUH

PIPE BOXES REQUIRED

(RADIANT TUBE)

QUANITY	TYPE
1	A
3	B

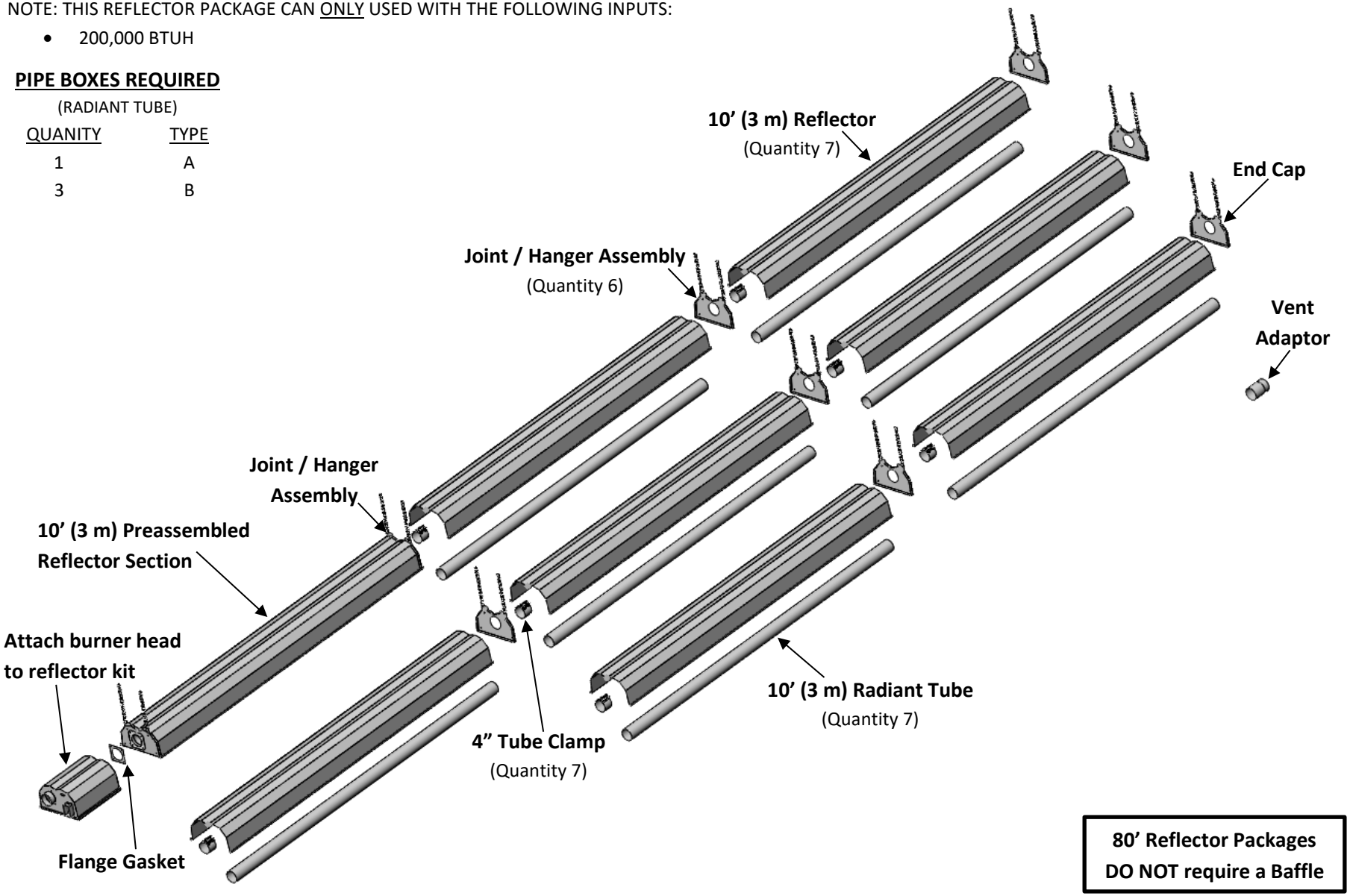


Figure 40. 80' (24.4 m) REFLECTOR PACKAGE INSTALLATION

I. 4” SIDE WALL VENT TERMINATION KIT

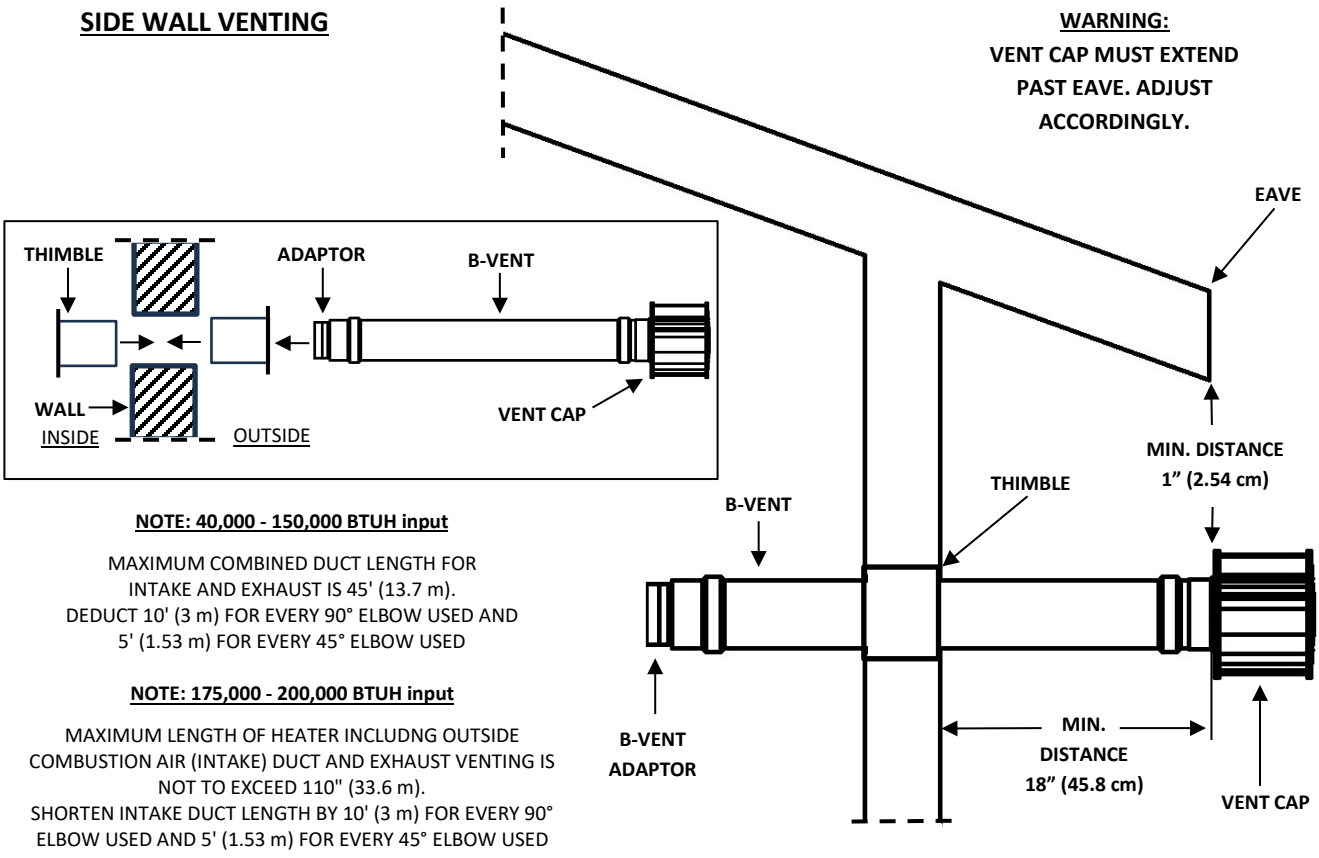


Figure 41. SIDE WALL VENT TERMINATION KIT INSTALLATION

J. OUTDOOR INSTALLATION KIT

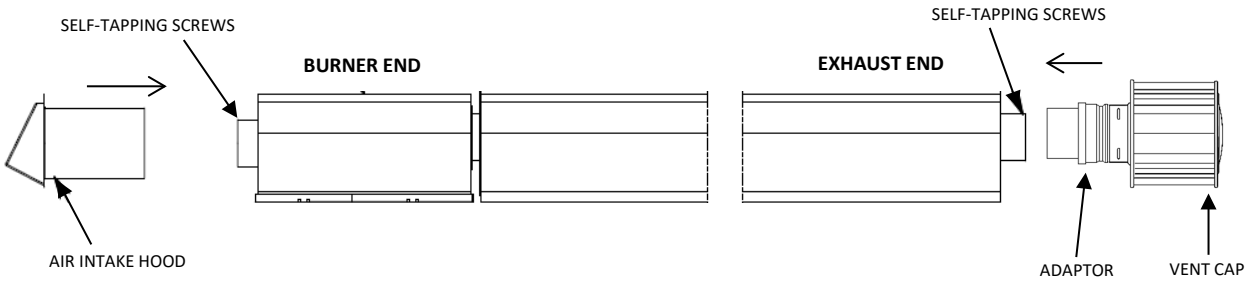
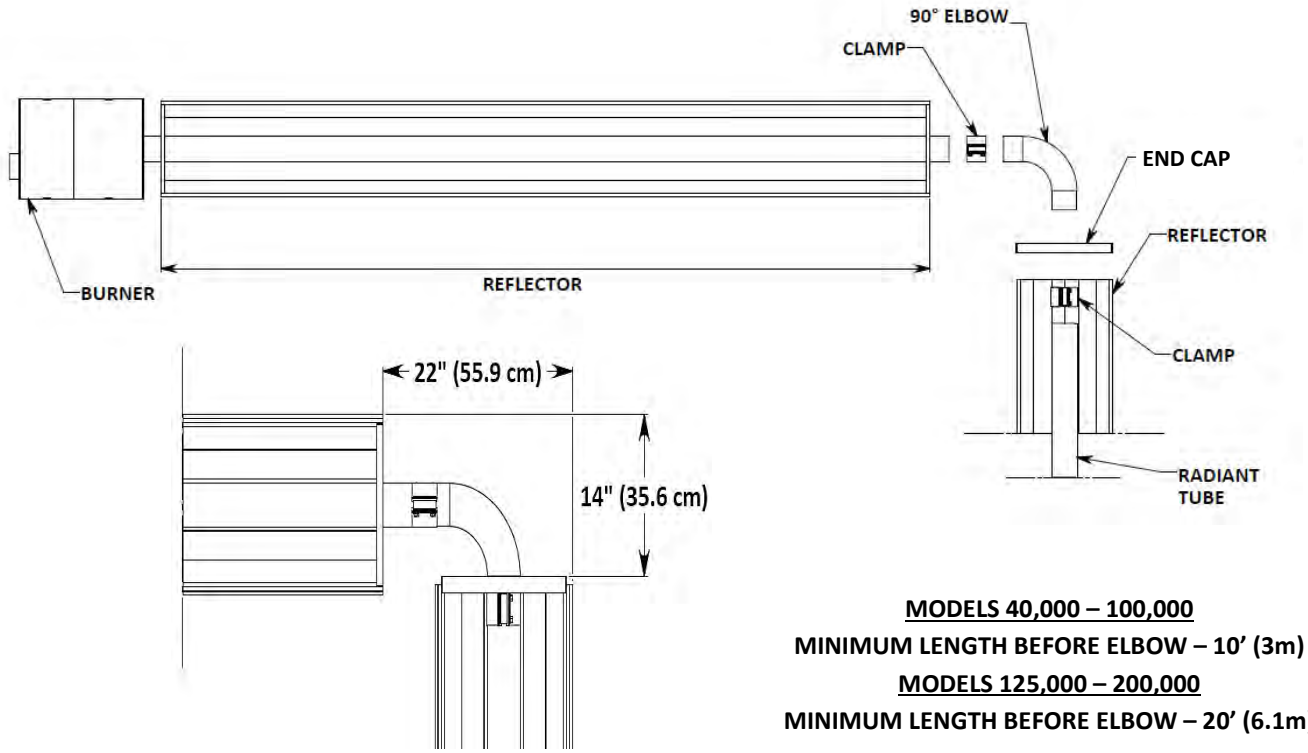


Figure 42. OUTDOOR KIT INSTALLATION

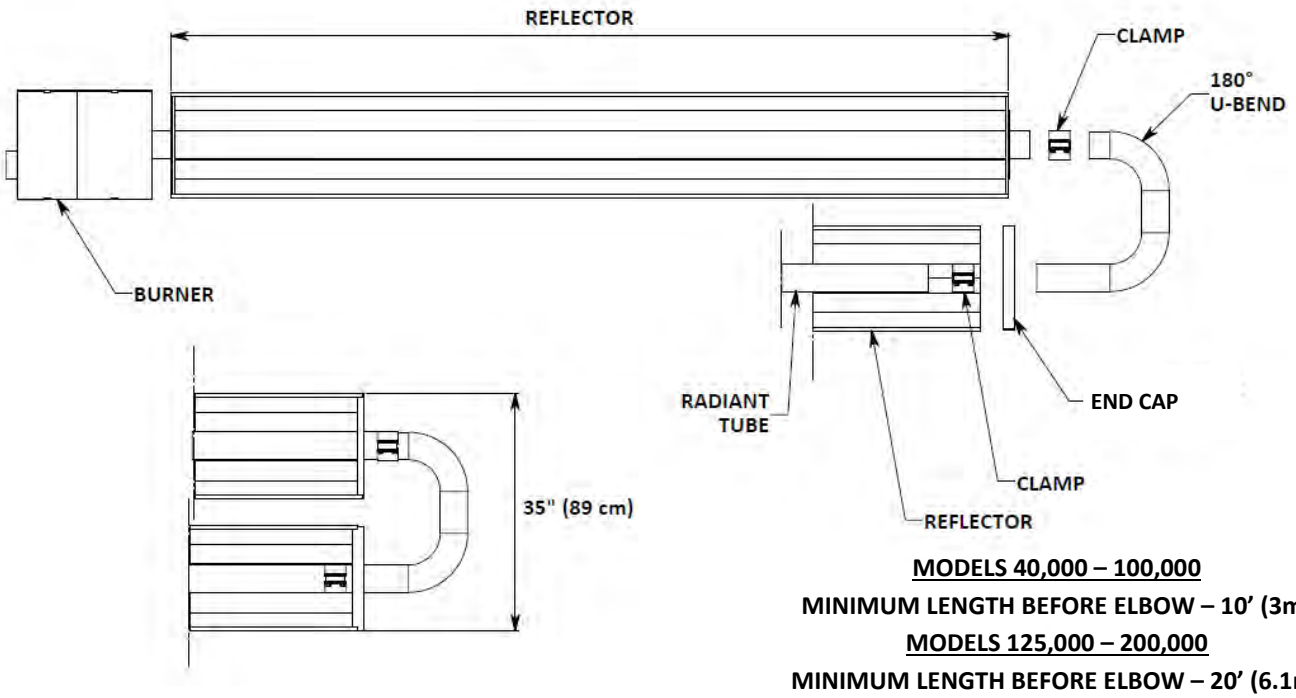
K. 90° ELBOW KIT



MODELS 40,000 – 100,000
MINIMUM LENGTH BEFORE ELBOW – 10' (3m)
MODELS 125,000 – 200,000
MINIMUM LENGTH BEFORE ELBOW – 20' (6.1m)

Figure 43. 90° ELBOW KIT INSTALLATION

L. 180° U-BEND KIT



MODELS 40,000 – 100,000
MINIMUM LENGTH BEFORE ELBOW – 10' (3m)
MODELS 125,000 – 200,000
MINIMUM LENGTH BEFORE ELBOW – 20' (6.1m)

Figure 44. 180° U-BEND KIT INSTALLATION

M. **SIDE REFLECTOR**

LOCATE SIDE REFLECTOR TO THE INSIDE OF THE REFLECTOR SHIELD AND SECURE WITH A MINIMUM OF TEN (10) SELF-TAPPING SCREWS SPACED EQUALLY ALONG THE LENGTH OF THE REFLECTOR

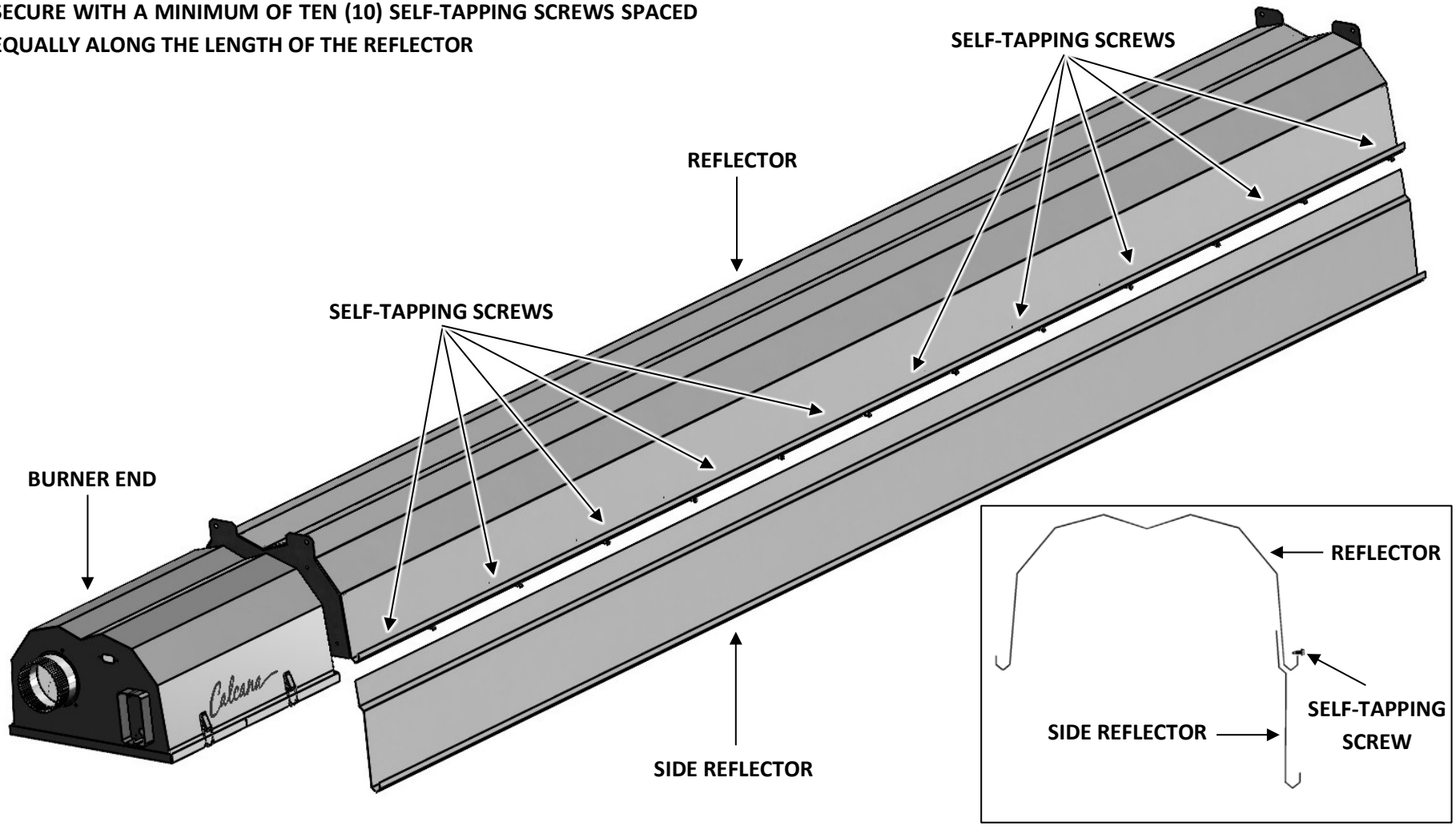


Figure 45. SIDE REFLECTOR INSTALLATION

15.0 OPTIONAL COMBUSTION AIR SUPPLY

(Refer to page 48)

The heater must be installed in a location where there is adequate air supply for combustion to take place.

If any of the following conditions are met, outside air must be brought to the unit:

1) If the heater is installed in a tightly closed building that has less than 1 sq inch (2.54 sq cm) of free opening for each 1,000 btu input of heater or less than 100 square inches of free opening or;
2) If the building has contaminants in the air or;
3) The air is under slight negative pressure.

IMPORTANT: Outside air supply duct is to be no less than 4" (10.2 cm) in diameter for Inputs from 40,000 to 80,000 BTUH, and 6" (15.24 cm) for inputs from 100,000 to 200,000 BTUH. Duct to be smooth, single wall or "B" vent style materials. Flexible semi-rigid aluminum ducting is acceptable if lengths are no greater than 36" (92 cm) in length. A combination of flexible semi-rigid aluminum ducting attached to the burner head with the balance of the air supply duct being rigid, smooth materials, is acceptable.

NOTE: Maximum combined duct length (intake and exhaust) for inputs of 40,000 to 150,000 BTUH is 45' (13.7 m). Deduct 10' (3 m) for every 90° elbow and 5' (1.52 m) for every 45° elbow used.

NOTE: Maximum intake duct length for inputs of 175,000 to 200,000 BTUH is 30' (9.1 m). The total length of heater including the length of intake and exhaust is not to exceed 110' (33.6 m). Shorten the length of intake by 10' (3 m) for every 90° elbow and 5' (1.53 m) for every 45° elbow used.

Example A
100,000 BTUH input-50' (15.2 m) reflector package, with 20' (6.1 m) of exhaust vent and 1 - 90° elbow.
Calculation:

Maximum combined duct length is:	45' (13.7 m)
Minus exhaust vent length:	-20' (6.1 m)
Minus 90° exhaust elbow:	-10' (3 m)

Conclusion:
The Maximum length of intake duct in this example is: **15' (4.6 m)**

Example B
200,000 BTUH input - 80' (24.4 m) reflector package, with 10’ (3 m) of exhaust vent and 1 - 90° elbow.
Calculation:
Total maximum length of heater including intake and exhaust is 110' (33.6 m).
Total combined length of heater and exhaust in this example is:

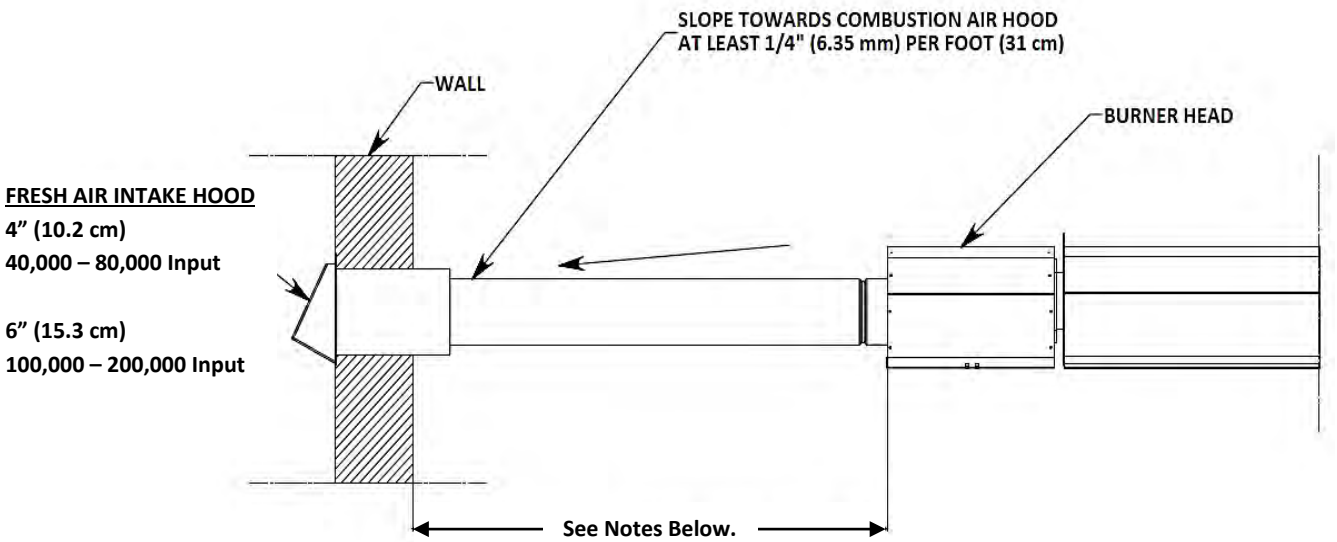
Heater Length:	80' (24.4 m)
Exhaust length:	10' (3 m)
90° Exhaust vent elbow:	10' (3 m)
TOTAL COMBINED LENGTH:	**100' (30.5 m)**
Amount to be deducted from available length:	-100' (30.5 m)

Conclusion:
The Maximum length of intake duct in this example is: **10’ (3 m)**

If condensation occurs, insulate the duct or contact a distributor for alternate methods for your installation. Slope duct down, away from burner box towards the combustion air intake hood. Insulation should not cover any connections in the ducting. The combustion air intake hood must be installed at a height sufficient to prevent any blockage by snow for your area.

A. **COMBUSTION AIR HORIZONTAL**

HORIZONTAL



NOTE: 40,000 – 150,000 BTUH Input
MAXIMUM LENGTH IS 45' (13.7 m) MINUS EXHAUST VENT LENGTH. DEDUCT 10' (3 m) FOR EVERY 90° ELBOW USED AND 5' (1.53 m) FOR EVERY 45° ELBOW USED.

NOTE: 175,000 – 200,000 BTUH Input
MAXIMUM LENGTH IS 30' (9.1 m). TOTAL LENGTH OF HEATER INCLUDING THE LENGTH OF OUTSIDE COMBUSTION AIR (INTAKE) DUCT AND EXHAUST VENTING IS NOT TO EXCEED 110' (33.6 m). SHORTEN DUCT LENGTH BY 10' (3 m) FOR EVERY 90° ELBOW USED AND 5' (1.53 m) FOR EVERY 45° ELBOW USED.

B. **COMBUSTION AIR VERTICAL**

VERTICAL

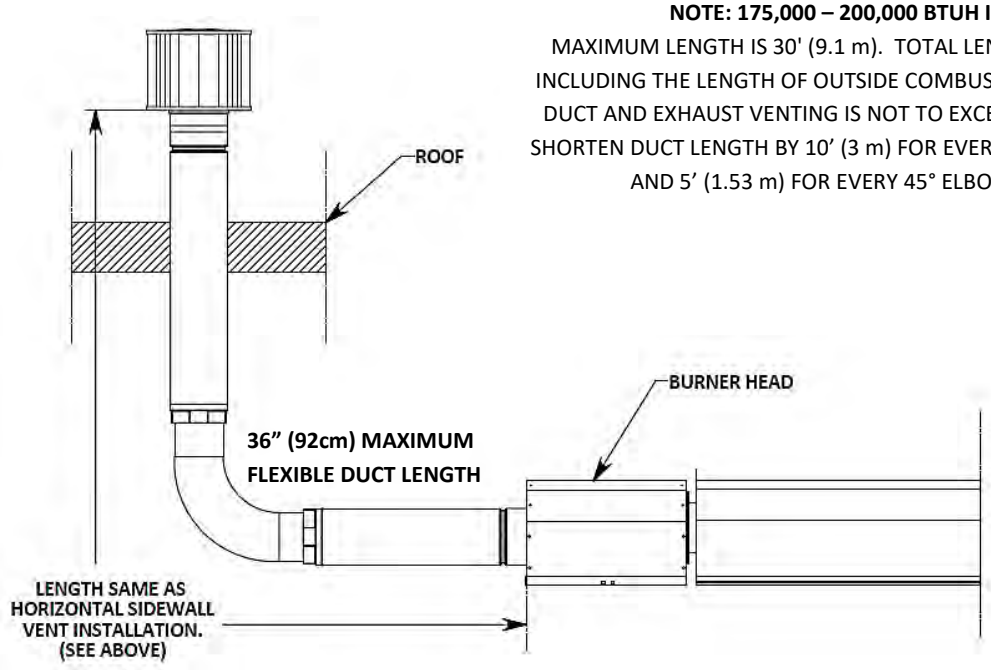


Figure 46. OUTSIDE COMBUSTION AIR SUPPLY

16.0 VENTING

VENTING MANUAL ANSI Z83.20-2016/CSA 2.34-2016
GAS PRODUCTS NO. 405
JANUARY 1, 2019

APPROVED CATEGORY III Venting Method

In North America (Canada and the USA) the SPECIAL VENTING method, as detail below, is approved as a Category III venting system for Calcana installations where venting is required.

The venting system is to be provided by the installer. The use of readily available, single wall venting materials with a thickness of no less than 26 gauge is to be used. If 26 gauge "C-vent" or galvanized "stove pipe" is selected, each joint will need to be sealed with high temperature silicone as prescribed below, as well as the connection will require a minimum of three (3) #8 sheet metal or self-tapping screws to be used in a pattern such that each screw is installed at a distance that is equal between the number of fasteners selected. If material other than the aforementioned is employed, connect sections of material in such a fashion that each connection is secure and sealed. A minimum 36" (91 cm) length of 4" (10 cm) single wall material, with a thickness no less than 26 gauge is to be installed at the exhaust end of heater. This length can include elbows. If a portion of venting is to pass through a wall, installer can continue the single wall vent so long as an approved combustible wall thimble is used to provide adequate clearance to combustibles, or "B-vent" (and related accessories) can be used. If a portion of the venting is to pass through a roof, the installer is to use "B-vent" (and related accessories) for these sections. Use an approved chimney cap for vertical installations and an approved high wind terminal for horizonal installations, as described on page 52. The installer is to adequately support the vent system to prevent sagging in a manner that is in accordance with codes for the area.

The installer is to ensure all flue joints are sealed. Use only suitable products equal to General Electric RTV106 or Permatex 81160 High-Temp Red RTV, Red High Temperature Silicone Adhesive Sealant (not supplied). Apply a minimum of ¼" x ¼" (6.35 mm x 6.35 mm) bead of silicone to each joint, and to each seam. The bead should be applied to venting material with a smaller diameter as compared to the larger opening of the mating material or in some instances, clamp, in such a fashion that when the joint is secured, the silicone is squeezed between the two materials to form a sealed connection. Apply additional silicone if needed to accomplish a sealed joint or seam.

Follow the silicone manufacturer's instructions for curing, and after the material has been cured, the installer is to perform a leak test on the venting system. A soap and water solution test, on the venting installed inside the occupied space, can be used. If seamed, where 26 gauge "C-vent" material is used, seal seam(s) with RTV high temperature silicone. Once the installer is satisfied that the venting system is sealed, the heater can be placed in permanent operation.

16.1 HORIZONTAL AND VERTICAL VENTING APPLICATIONS

Venting of the unit(s) must comply in Canada with the ***Natural Gas and Propane Installation Code, CSA B149.1*** or latest edition and in the USA, the ***National Fuel Gas Code, ANSI Z223.1/NFPA 54*** or latest edition. In Canada, vent terminal clearances shall be in accordance with the Canadian ***CSA B149.1, Natural Gas and Propane Gas Installation Code.***

A. Select exhaust point:

   A vent shall not terminate:

   a. within 6 feet (1.8 m) of a mechanical air supply inlet to a building;
   b. above a meter/regulator assembly within 3 feet (0.9 m) horizontally of the vertical center line of the regulator;
   c. within 6 feet (1.8 m) of any gas service regulator vent outlet;
   d. less than 1 foot (0.3 m) above grade level;
   e. less than 7 feet (2.1 m) above a paved sidewalk or a paved highway;
   f. within 3 feet (0.3 m) of a window or door which can be opened in any building, any non-mechanical air supply inlet to any building or the combustion air inlet or any other appliances.
      i. NOTE: May be reduced to 1 foot for inputs up to 100,000 BTUH (30 kW).

   In the USA.: The National Fuel Gas code, ***ANSI Z223.1/NFPA 54***, specifies a 4-foot (1.22 m) vent terminal clearance from gas and electrical meters, regulators and relief equipment.

A. The vent terminal **MUST** be installed at a height sufficient to prevent any blockage from snow.
B. Protect building materials from any degradation that may be caused by flue gases.
C. Support vent to prevent sagging.

Alternative venting systems: At the choice of the installer, a ULC-S636 or UL 1738 Listed Category III venting system can be used.

Ensure that all flue joints are sealed. Use only suitable products equal to General Electric RTV106 or Permatex 81160 High-Temp Red RTV, Red High Temperature Silicone Adhesive Sealant (not supplied).

For sidewall venting, the heater must not be connected to a separate chimney but must be installed using the venting system supplied with the heater.

If condensation in exhaust venting is present, then venting should be insulated or shortened. In Canada, install according to the ***Natural Gas and Propane Installation Code, CSA B149.1*** or latest edition and in the USA, the ***National Fuel Gas Code, ANSI Z223.1/NFPA 54*** or latest edition.

NOTE: For venting of two or more heaters into one common chimney, in Canada refer to the ***Natural Gas and Propane Installation Code, CSA B149.1*** or latest edition and in the USA, the ***National Fuel Gas Code, ANSIZ223.1/NFPA 54*** or latest edition.

NOTE: A small amount of condensation may occur from the heater when it starts the heating cycle. The condensation will stop once the heater warms up. Ensure venting is sealed adequately. The minimum run time for all models is 10 minutes to help prevent tube corrosion from condensation on heater cycle.

MAXIMUM LENGTHS FOR HORIZONTAL AND VERTICAL VENTING

Maximum venting lengths, inclusive of any venting u-bends or elbows, must be maintained.

NOTE: Maximum combined duct length (intake and exhaust) for inputs of 40,000 to 150,000 BTUH is 45' (13.7 m). Deduct 10' (3 m) for every 90° elbow and 5' (1.52 m) for every 45° elbow used.

NOTE: Maximum intake duct length for inputs of 175,000 to 200,000 BTUH is 30' (9.1 m). The total length of heater including the length of intake and exhaust is not to exceed 110' (33.6 m). Shorten the length of intake by 10' (3 m) for every 90° elbow and 5' (1.53 m) for every 45° elbow used.

Example A
100,000 BTUH input-50' (15.2 m) reflector package, with 20' (6.1 m) of exhaust vent and 1 - 90° elbow.
Calculation:

Maximum combined duct length is:	45' (13.7 m)
Minus exhaust vent length:	-20' (6.1 m)
Minus 90° exhaust elbow:	-10' (3 m)

Conclusion:
The Maximum length of intake duct in this example is: **15' (4.6 m)**

Example B
200,000 BTUH input - 80' (24.4 m) reflector package, with 10’ (3 m) of exhaust vent and 1 - 90° elbow.
Calculation:
Total maximum length of heater including intake and exhaust is 110' (33.6 m).
Total combined length of heater and exhaust in this example is:

Heater Length:	80' (24.4 m)
Exhaust length:	10' (3 m)
90° Exhaust vent elbow:	10' (3 m)
TOTAL COMBINED LENGTH:	**100' (30.5 m)**
Amount to be deducted from available length:	-100' (30.5 m)

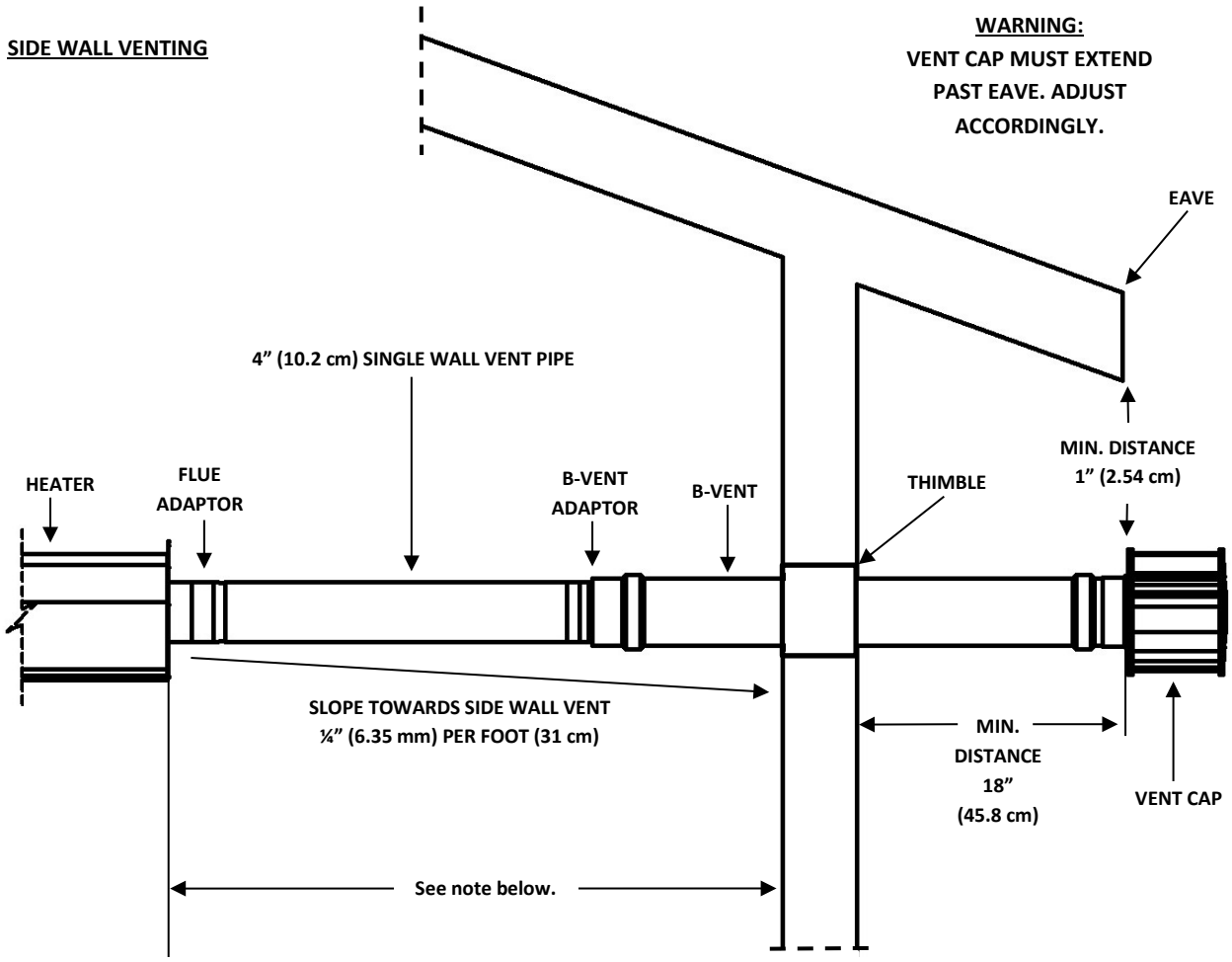
Conclusion:
The Maximum length of intake duct in this example is: **10’ (3 m)**

If condensation occurs, insulate the duct or contact a distributor for alternate methods for your installation. Slope duct down, away from burner box towards the combustion air intake hood. Insulation should not cover any connections in the ducting. The combustion air intake hood must be installed at a height sufficient to prevent any blockage by snow for your area.

IMPORTANT NOTE: Each 180° venting u-bend is equivalent to 20 feet in the overall exhaust length; each 90° venting elbow is equivalent to 10 feet in the overall exhaust length; each 45° venting elbow is equivalent to 5 feet in the overall exhaust length.

A. **HORIZONTAL VENTING: SINGLE UNIT**

For horizontal, sidewall venting a single unit, use 4" (10.16 cm) “B-Vent” equal to DuraVent pin# 4GV36 in combination with an approved combustible wall thimble is used to provide adequate clearance to combustibles, a “B-Vent” to “C-Vent” (single wall) adaptor equal to DuraVent pin #4GVC, and high wind vent terminal equal to DuraVent pin# 4GVVTH.



NOTE: 40,000 - 150,000 BTUH input

MAXIMUM COMBINED DUCT LENGTH FOR INTAKE AND EXHAUST IS 45' (13.7 m).

DEDUCT 10' (3 m) FOR EVERY 90° ELBOW USED AND 5' (1.53 m) FOR EVERY 45° ELBOW USED

NOTE: 175,000 - 200,000 BTUH input

MAXIMUM LENGTH OF HEATER INCLUDNG OUTSIDE COMBUSTION AIR (INTAKE) DUCT AND EXHAUST VENTING IS NOT TO EXCEED 110" (33.6 m).

SHORTEN INTAKE DUCT LENGTH BY 10' (3 m) FOR EVERY 90° ELBOW USED AND 5' (1.53 m) FOR EVERY 45° ELBOW USED

Figure 47. SIDE WALL VENTING, SINGLE UNIT

NOTE: ENSURE THAT ALL FLUE/EXHAUST JOINTS ARE SEALED. USE ONLY SUITABLE PRODUCTS EQUAL TO GENERAL ELECTRIC RTV106 OR PERMATEX 81160 HIGH-TEMP RED RTV, RED HIGH TEMPERATURE SILICONE ADHESIVE SEALANT. (NOT SUPPLIED)

B. **ROOF EXHAUST: SINGLE UNIT**

Use 'B' style chimney.

SIDE VIEW

WARNING: ENSURE VENT CAP IS NOT OBSTRUCTED BY SNOW. ADJUST ACCORDINGLY.

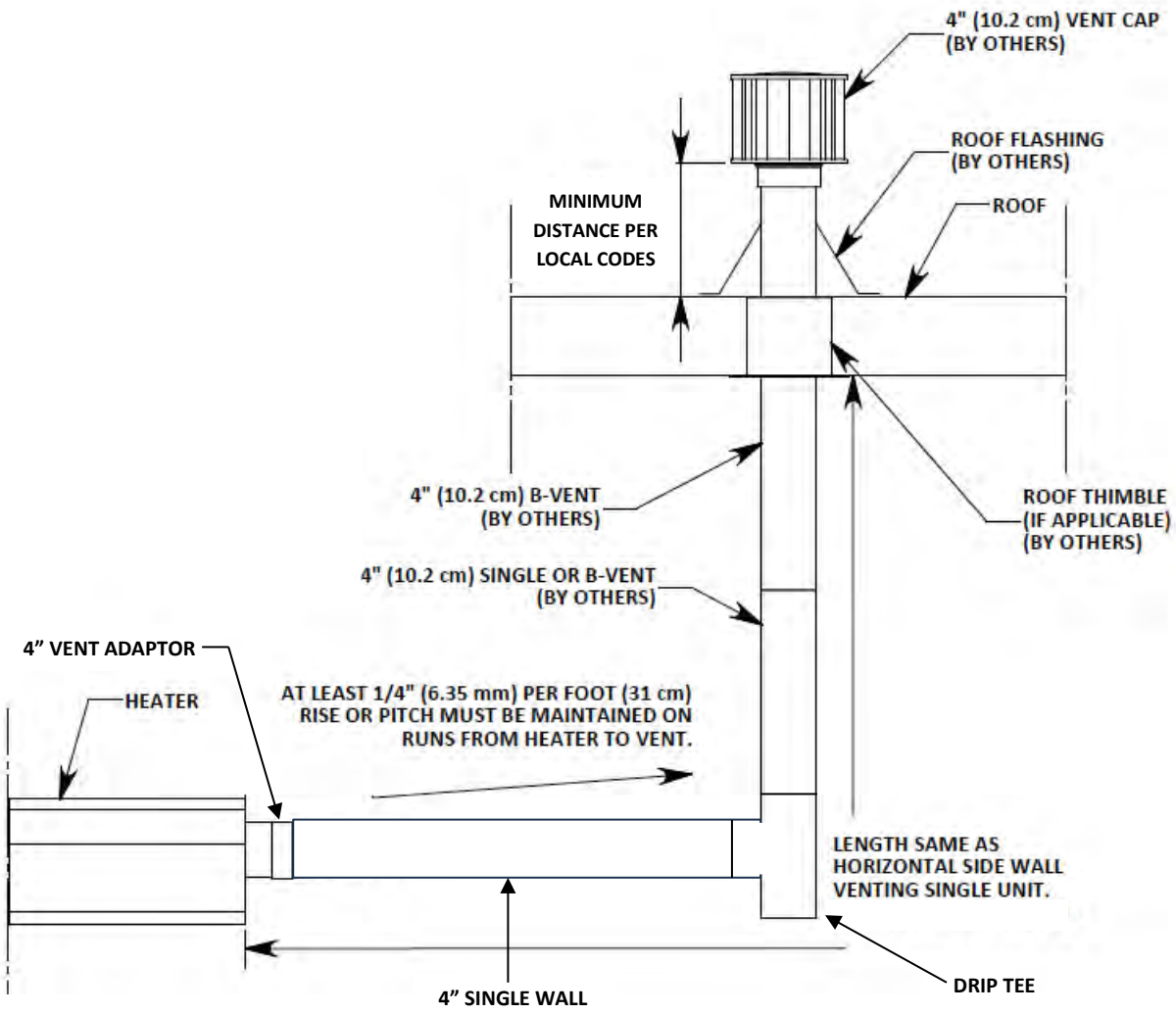


Figure 48. VERTICAL VENTING, SINGLE UNIT

C. **ROOF EXHAUST: TWO OR MORE UNITS**

Use 'B' style chimney.

NOTE: For venting of two or more heaters into one common chimney, in Canada refer to the ***Natural Gas and Propane Installation Code, CSA B149.1*** or latest edition and in the USA, the ***National Fuel Gas Code, ANSI Z223.1/NFPA 54*** or latest edition.

Units that are commonly vented must be controlled by the same line voltage thermostat.

TWO OR MORE UNITS INTO A COMMON CHIMNEY – SIDE VIEW

WARNING: ENSURE VENT CAP IS NOT OBSTRUCTED BY SNOW. ADJUST ACCORDINGLY.

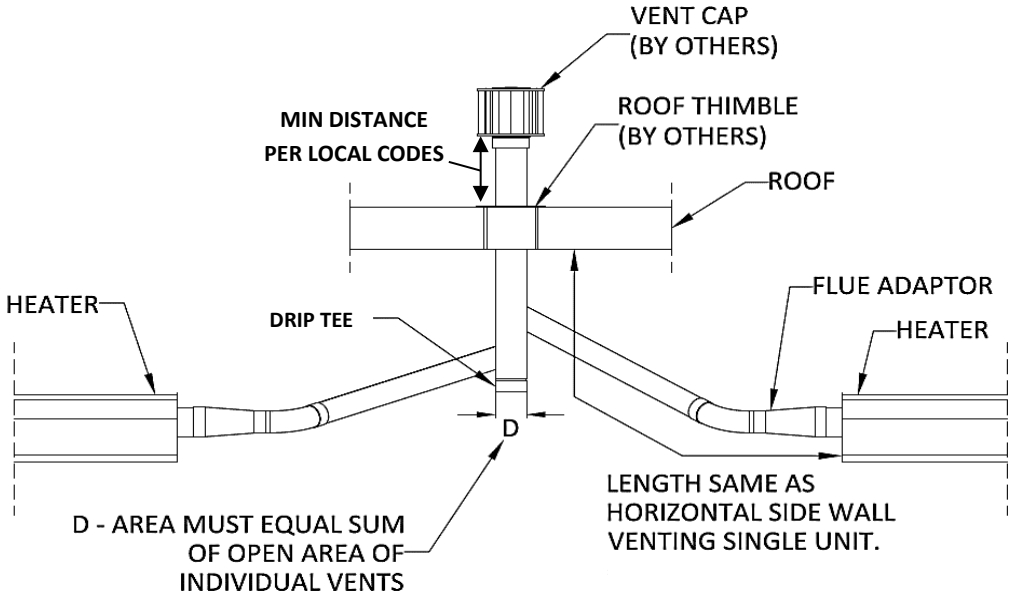


Figure 49. TWO OR MORE UNITS INTO A COMMON CHIMNEY – SIDE VIEW

TWO OR MORE UNITS INTO A COMMON CHIMNEY – TOP VIEW

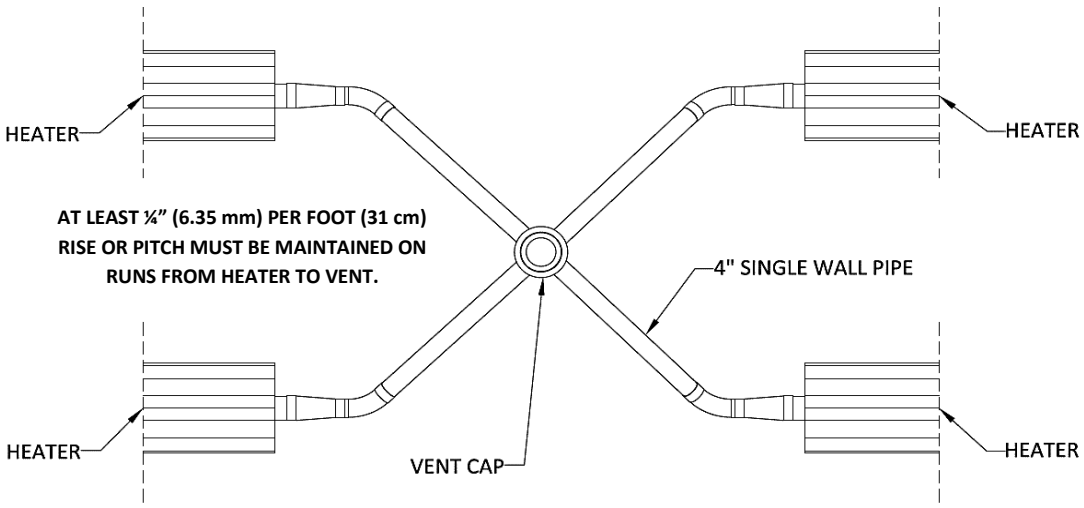


Figure 50. TWO OR MORE UNITS INTO A COMMON CHIMNEY – TOP VIEW

17.0 OUTDOOR APPLICATIONS

Units can be installed in outdoor locations by ordering the following options:

Part Number	Description
5200312	Outdoor Installation Kit for 40,000 to 80,000 BTU units
5200313	Outdoor Installation Kit for 100,000 to 200,000 BTU units

Procedure:

- Attach outdoor air intake hood to the air intake collar located on end of burner box with three (3) screws. Apply silicone adhesive to seal joint.
- Attach vent adaptor to exhaust end of radiant tube with two (2) screws.
- Attach vent cap to adaptor/reducer with two (2) screws.
- FUEL SUPPLY: Via approved flexible connector for installations specified by local codes or authorities .
  CANADA: ***Natural Gas and Propane Installation Code, CSA B149.1*** or latest edition.
  USA: ***National Fuel Gas Code, ANSI Z223.1/NFPA 54***, or latest edition.
- Electrical connections for outdoor locations must be made in accordance with:

  ELECTRICAL GROUNDING:

  CANADA: ***Canadian Electrical Code, CSA C22.1*** or latest edition.
  USA: ***National Electrical Code, AN51/NFPA 70*** or latest edition.

  In Canada: Electrical equipment and wiring shall comply with the applicable provisions of the current Canadian Electrical Code, **CAN/CSA C22.1, Part I and Part II**, and **CAN/CSA C22.2 No. 3, Electrical features 0/ Fuel Burning Equipment**.

A. OUTDOOR INSTALLATIONS

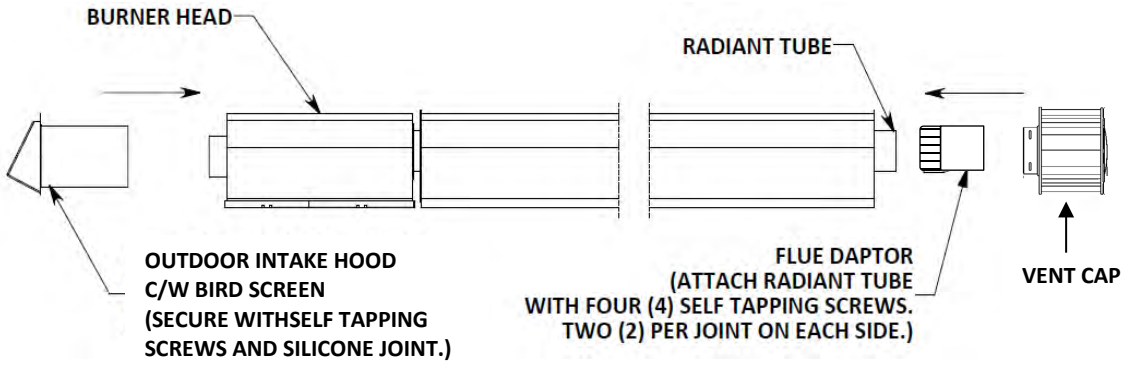


Figure 51. OUTDOOR INSTALLATIONS

18.0 UNVENTED APPLICATIONS

UNVENTED INSTALLATIONS: BROODER OR APPROVED INDUSTRIAL APPLICATIONS

Units may **ONLY** be installed in unvented installations such as brooder barns or industrial buildings if the following conditions are met:

1) A 4" (10.2 cm) diameter by 90° elbow must be attached to the flue, vent or exhaust end of heater and turned down pointing towards the floor, see Figure 52.
2) The heater must be interlocked with an exhaust fan sized at 4 (four) CFM (114 Liters) for every 1,000 BTUH input.
3) For BROODER INSTALLATION ONLY, the fan interlock is not required only if the maximum input does not exceed 30 BTUH per cubic foot (28.32 Liters) of volume of air in the building or the input specified by local codes or authorities.
4) Maintain clearance to combustibles at exhaust (vent) end as noted in Figure 53.

A. UNVENTED INSTALLATIONS

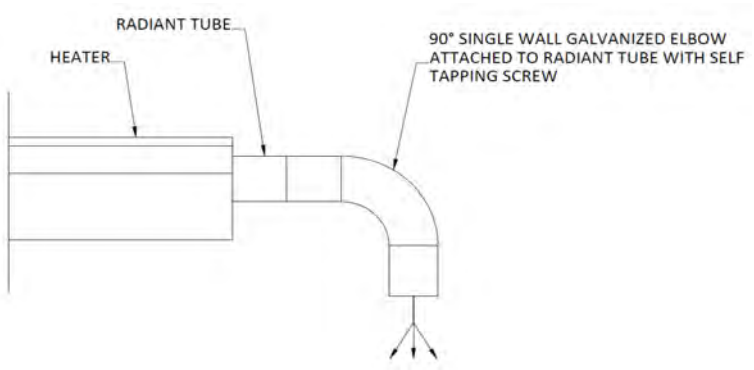


Figure 52. UNVENTED INSTALLATIONS

B. UNVENTED INSTALLATION END CLEARANCES

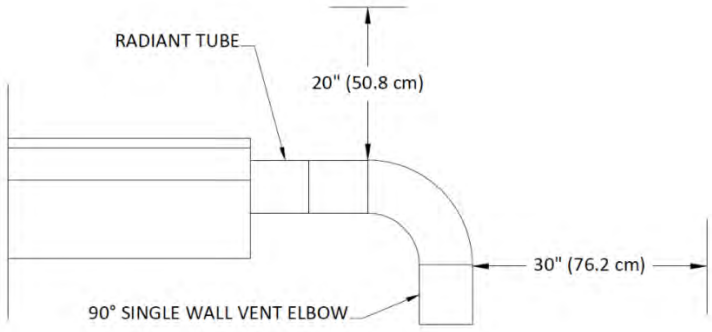


Figure 53. END CLEARANCES UNVENTED INSTALLATIONS

19.0 GAS PIPING

⚠ **WARNING:** All gas work MUST be performed by qualified/licensed personnel with adequate training and experience in this field.

⚠ **WARNING:** Use only the type of gas for which the heater is equipped. Using the wrong gas could create a hazard, resulting in damage, personal injury or death.

In Canada refer to the *Natural Gas and Propane Installation Code,* CSA B149.1 or latest edition and in the USA, the *National Fuel Gas Code, ANSI Z223.1/NFPA* 54 or latest edition.

a) Adequate supply of gas to the heater is required for it to produce the designed amount of heat output.
b) The gas meter must be large enough capacity to handle the extra consumption required by the heater.
c) The gas line must be of an adequate size to deliver the necessary amount of fuel to the unit.
d) If there is any question concerning a) or b) call your local gas company for further assistance.
e) Ensure that all piping is supported properly.
f) All connections must have a special sealing compound applied to them.
g) A drip leg must be installed before the heater to prevent contaminating matter interfering with the operation of the unit.
h) Check piping for leaks via pressure test. **Install a 1/8" (3.175 mm) NPT plugged tapping** immediately ahead of heater in gas supply. Use this location for test gauge. A soap and water test can be used to verify the location of any possible leak.

⚠ **WARNING: Do not use an open flame for testing!**

⚠ **WARNING:** For high pressure testing, disconnect heater(s) and shut-off cocks and cap off pipe for test. Failure to do so will damage pressure ratings on the above-mentioned equipment and cause a complete replacement of these parts.

⚠ WARNING:

The heater and its individual shutoff valve must be disconnected from the gas supply piping system during any pressure testing for that system at test pressures in excess of ½ PSIG.

The heater must be isolated from the gas supply piping system by closing its individual manual shutoff valve during any pressure testing of the gas supply piping system at test pressures equal to or less than ½ PSIG.

Refer to pages 58 and 59 for gas connection to heater.

20.0 GAS CONNECTION

A. **FLEX CONNECTOR**

⚠ WARNING:

FIRE AND/OR EXPLOSION HAZARD

Can cause property damage, severe injury or death.

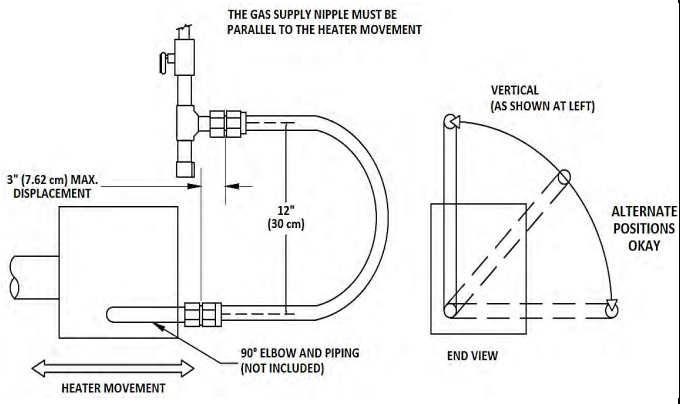
With each firing cycle, the radiant pipe will expand and contract which can cause the burner head to move horizontally with reference to the gas supply line.

If the gas connection is not Installed In strict accordance as shown in Figure 54, a gas leak can occur resulting in an extreme unsafe condition.

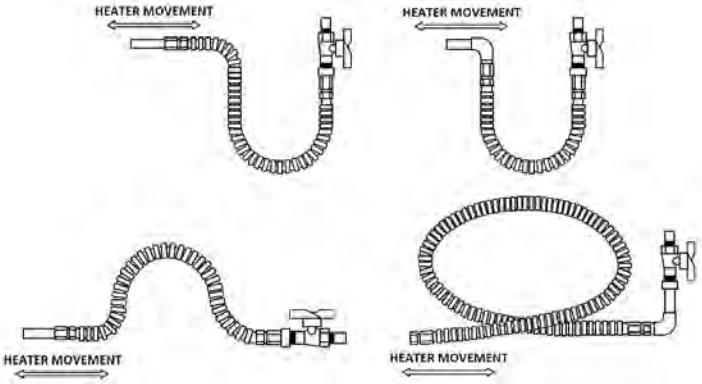
"Certified connectors are recommended to be installed as shown, (Figure 54, page 59) in one plane, and without sharp bends, kinks, or twists. The gas take off must be parallel to the burner gas inlet connection. "

(CSA)

CORRECT POSITIONS



INCORRECT POSITIONS



⚠ WARNING:

CONNECTOR MUST BE INSTALLED AS PER THE CONFIGURATION ILLUSTRATED ABOVE.

USE ONLY THE 36" (90 cm) CONNECTOR OF ½" (1.27 cm) NOMINAL ID FOR LENGTHS FROM 10' (3m) TO 70' (21.3 m) AND A 36" (90 cm) CONNECTOR OF ¾" (1.905 cm) NOMINAL ID FOR LENGTHS GREATER THAN 70' (21.3 m).

IN CANADA: "A radiant tube-type infrared heater shall only be connected with a Type 1 hose connector that is (a) certified as being in compliance with the **Standard for Elastomeric Composite Hose and Hose couplings for Conducting Propane and Natural Gas, CAN/CGA 8.1** and (b) of a length of 36 +/- 6" (90 +/-15 cm)."

IN USA: Flexible Metallic connectors must be certified for use on a radiant tube-type infrared heater as per the **Standard tor Connectors for Gas Appliances, ANSI Z21.24/CSA 6.10**.

Connector is available from manufacturer.

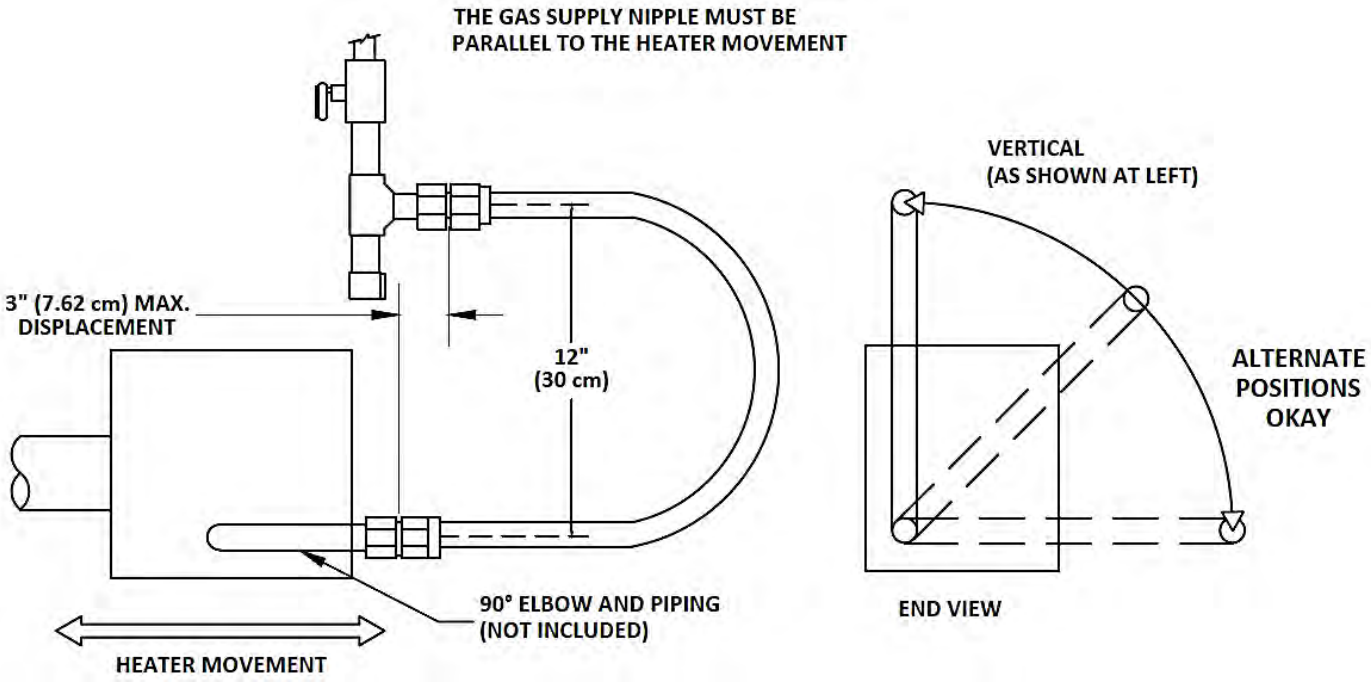


Figure 54. GAS LINE CONNECTION WITH CERTIFIED FLEXIBLE GAS CONNECTION

21.0 GAS INPUT RATE

⚠ WARNING:

Natural gas heating values can vary widely. It is the responsibility of the Installer to make sure that the input rate to the heater as installed does not exceed the nameplate rating of the heater. Failure to do so can cause radiant tube failure, resulting in injury or death.

The maximum BTUH input capacity for each model is shown on the heater's rating plate and in the specification table. This input must not be exceeded.

The input shown may be used in geographic area where the elevation is from 0 to 4,500 feet (1,372m) above sea level (Canada only) in accordance with **CGA 2.17-M91 (R2003**), no change required to main orifice. For installations above 4,500 (1,372 m) refer to ***Natural Gas and Propane Installation Code, CSA*** **B149.1** or latest edition, or contact the factory.

In the USA: For installations above 2,000 feet (610 m), the appliance shall be de-rated 4 percent (%) for each 1,000 feet (305 m) of elevation above sea level. The BTUH input depends on the calorific heating value of the gas, orifice size, and manifold pressure. Orifice sizes are based upon values of 1,000 BTUH/cubic foot (.028316 cubic meter) for natural gas and 2,500 BTUH/cubic foot (.028316 cubic meter) for propane.

⚠ WARNING:

NEVER ATTEMPT TO MODIFY THIS HEATER - FIRE, EXPLOSION, OR ASPHYXIATION MAY RESULT. If a malfunction is apparent, contact qualified service agency and/or gas utility for assistance.

How to Determine Gas Input Rate:

Where gas is metered, the input rate may be determined by the following method: contact the gas supplier, public utility company, or propane distributor to obtain the calorific gas value of the gas being used. When checking the gas input rate, any other gas burning appliances connected to the same meter must be completely off. The heater should be allowed to operate for 5 minutes before attempting to check the gas input rate.

To check the flow rate, observe the one cubic foot dial on the gas meter and determine the number of seconds required for the dial hand to complete one revolution (seconds to flow one cubic foot).

To determine the number of seconds per cubic foot that is necessary to achieve the correct input rate, use the following formula:

GAS VALUE X 3,600 seconds / DESIRED INPUT = SECONDS NEEDED

Example: 1,000 BTU gas with heater input 100,000 BTUH

Seconds for one cubic foot = 1,000 X 3,600 /100,000 = 36 seconds

If when clocking the meter, the one cubic foot dial makes a complete revolution in less time than was calculated that it should be de-rated. If it takes more time for the meter to make one revolution than was calculated, the unit is under-fired.

The orifice size must be changed to correct an over-fired or under-fired condition. If it is determined that different orifices are needed, please contact your distributor for assistance in selecting the correct replacement.

22.0 ELECTRICAL CONNECTION

Connecting incorrect wiring or power can result in electrical component damage or failures. Component failure or damages due to incorrect site wiring or shorts are not covered by warranty.

Refer to rating plate on heater for electrical specifications. All electrical connections must be made by a qualified/licensed experienced electrician.

Supply grounded, adequate electricity to the 120V electrical connection attached to the burner head.

⚠ **WARNING:** DO NOT operate the heater until it has been thoroughly installed, inspected and is ready for the initial fire-up.

NOTE: All electrical connections and wiring must be made in accordance with the following:

CANADA: *Canadian Electrical Code, CSA C22.1* or latest edition.
USA: *National Electrical Code, ANSI/NFPA* 70 or latest edition

In Canada: Electrical equipment and wiring shall comply with the applicable provisions of the current *Canadian Electrical Code, CAN/CSA C22.1, Part I and Part II, and CAN/CSA C22.2 No.3, Electrical features of Fuel Burning Equipment.*

If any of the original wire supplied with the appliance must be replaced, it must be replaced with wiring material having a temperature rating of at least 105 degrees C (221 °F).

A. ELECTRICAL CONNECTION BURNER HEAD

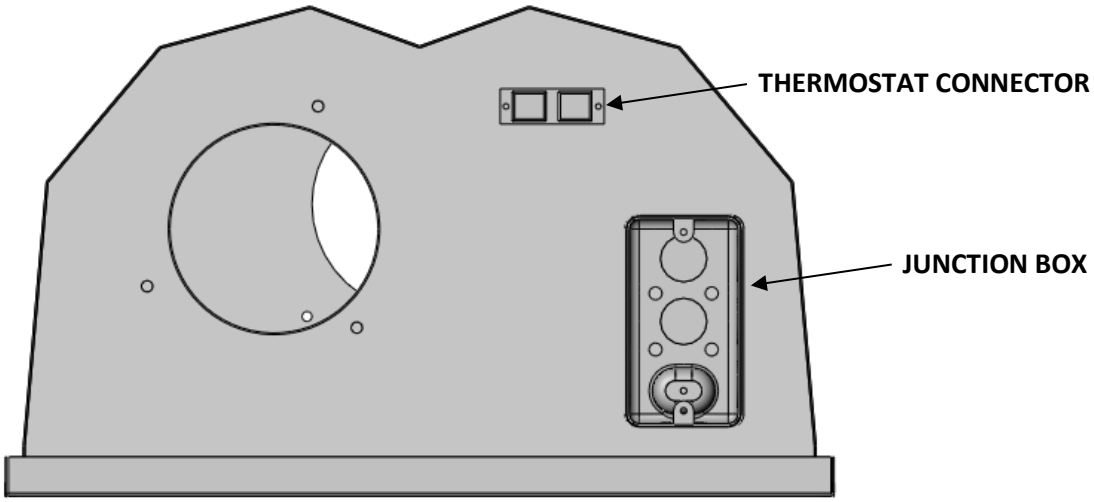


Figure 55. ELECTRICAL JUNCTION BOX

23.0 WIRING DIAGRAM

23.1 SR SERIES SINGLE INPUT WIRING DIAGRAM

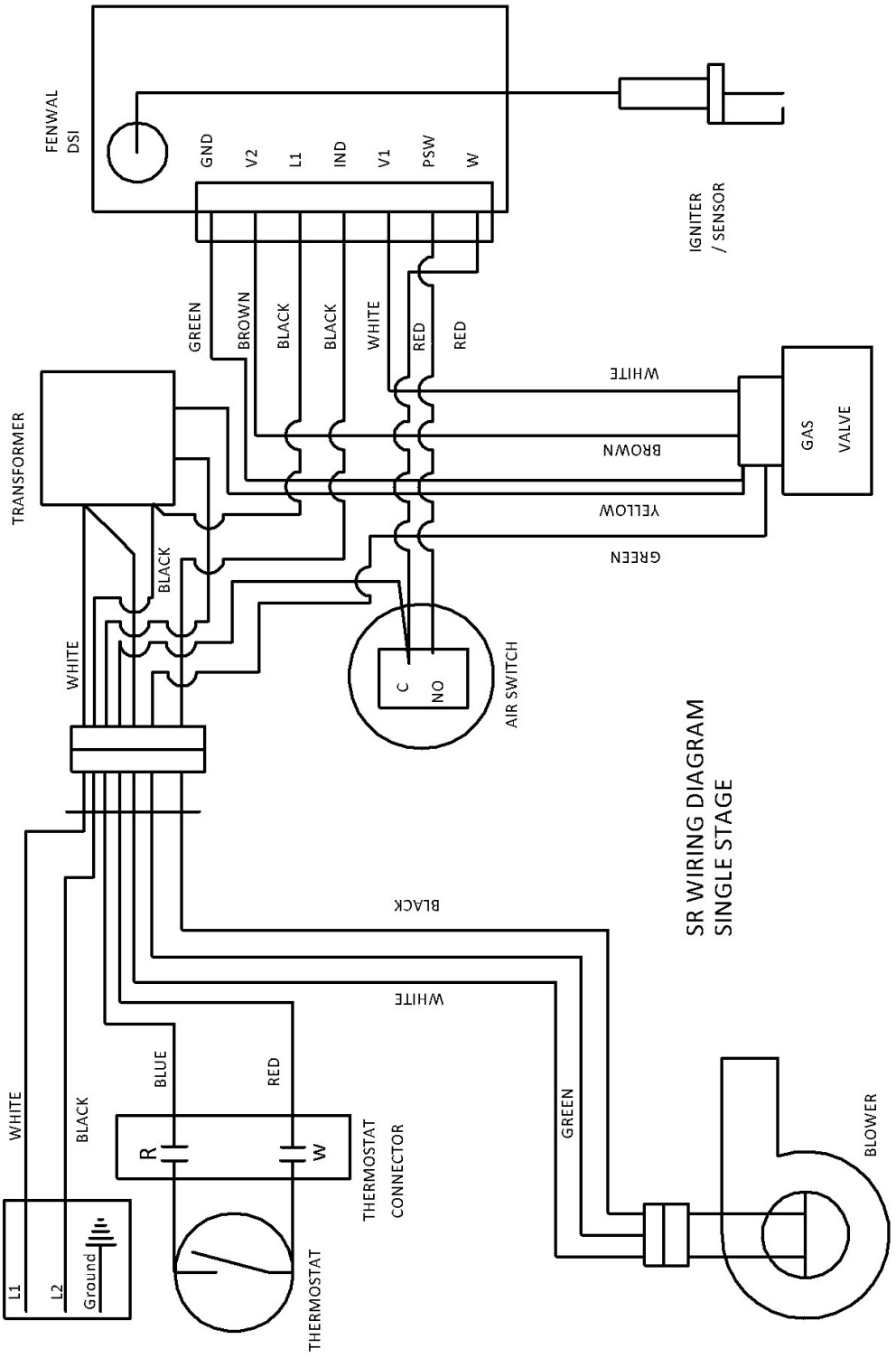


Figure 56. SINGLE INPUT 120 VOLT WIRING DIAGRAM

If any of the original wire supplied with the appliance must be replaced, it must be replaced with wiring material having a temperature rating of at *least* 105 degrees C (221 °F).

23.2 SR SERIES 2-STAGE WIRING DIAGRAM

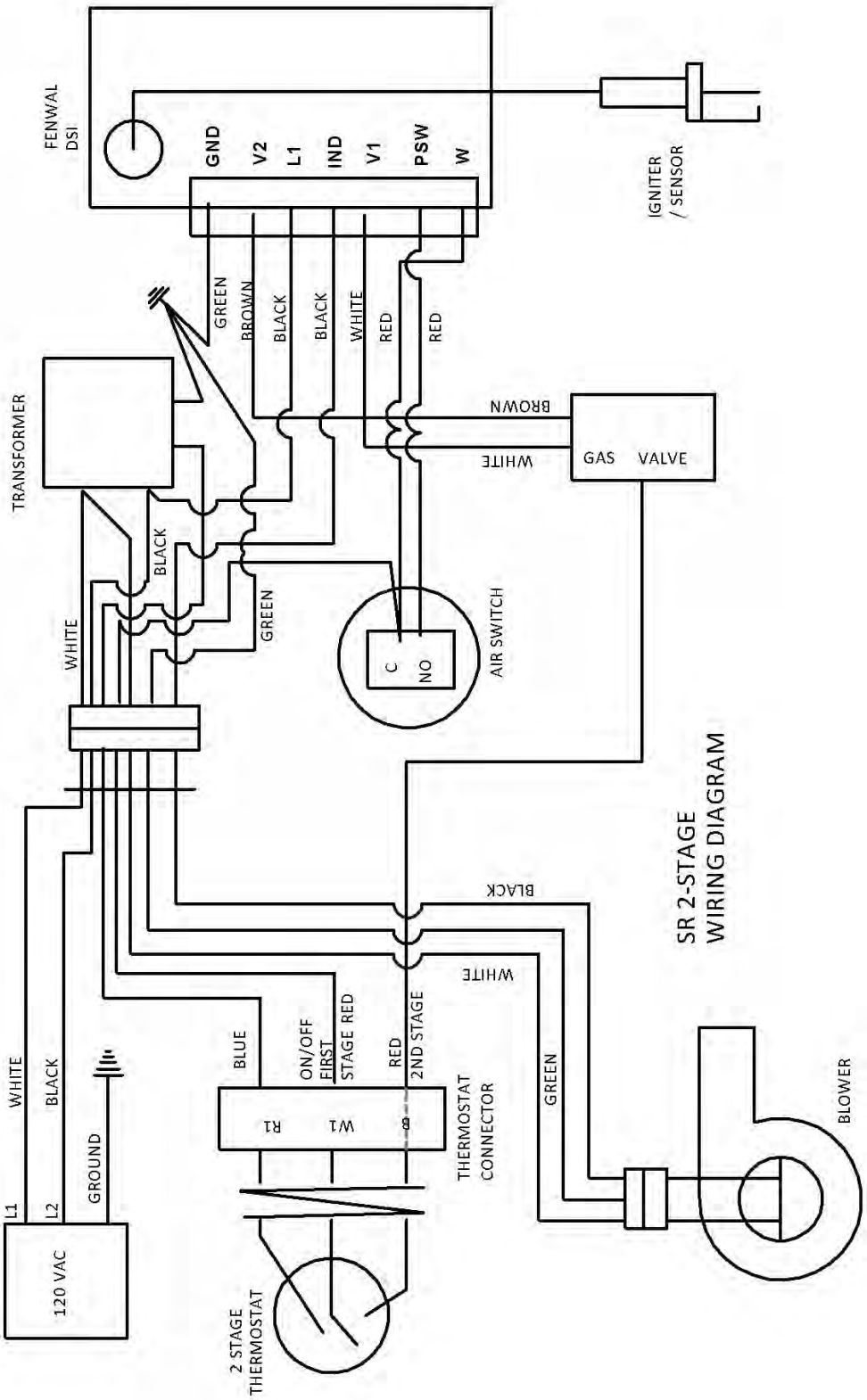


Figure 57. 2-STAGE 120 VOLT WIRING DIAGRAM

If any of the original wire supplied with the appliance must be replaced, it must be replaced with wiring material having a temperature rating of at *least* 105 degrees C (221 °F).

23.3 SR SERIES MODULATING WIRING DIAGRAM

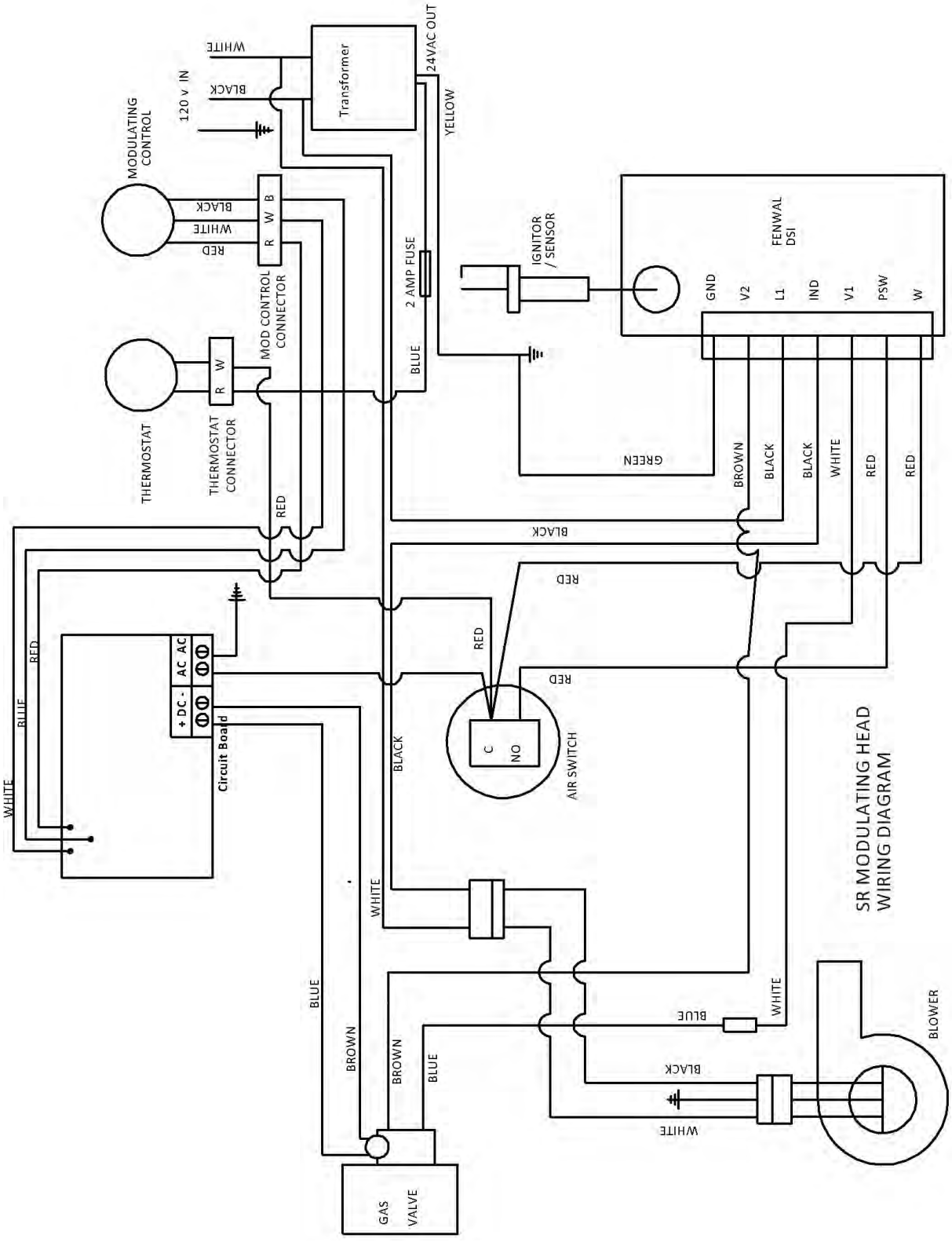


Figure 58. MODULATING 120 VOLT WIRING DIAGRAM

If any of the original wire supplied with the appliance must be replaced, it must be replaced with wiring material having a temperature rating of at *least* 105 degrees C (221 °F).

24.0 THERMOSTATS

24.1 LOW VOLTAGE (SINGLE HEATER)

(For wiring diagrams, refer to pages 62 to 64)

DO NOT use thermostats that have heat anticipators in them. The heat anticipators ***will*** cause the unit to cycle unnecessarily, reducing its heating capacity, which can cause incomplete combustion and turn combustion byproducts to condensate. **A suitable thermostat can be purchased from Calcana (part # 3060225) for this heater.**

a) Locate thermostat in a convenient location away from drafts and on an inside wall that is ideally adjacent to the wall where the heater is mounted, but at a location that is not in the direct path of the heater's radiant heat.
b) Mount thermostat to wall with hardware supplied.
c) Attach low voltage wire to connector block on heater.
d) Run wire from unit to thermostat securing wire to joists or studs along the way.
e) Trim excess wire and attach to thermostat accordingly.

NOTE: Thermostat part #3060225 can be used for line or low voltage applications. For low voltage applications, simply connect the two wire leads on the thermostat to the low voltage wiring that is attached to the low voltage thermostat connector on heater and ignore the line voltage wiring diagram on the thermostat packaging. DO NOT CONNECT LINE VOLTAGE TO THE THERMOSTAT WHEN USING THE LOW VOLTAGE OPTION TO CONTROL THE HEATER OTHERWISE SEVERE, UNWARANTABLE DAMAGE WILL RESULT.

LOW VOLTAGE: ONE THERMOSTAT - ONE HEATER

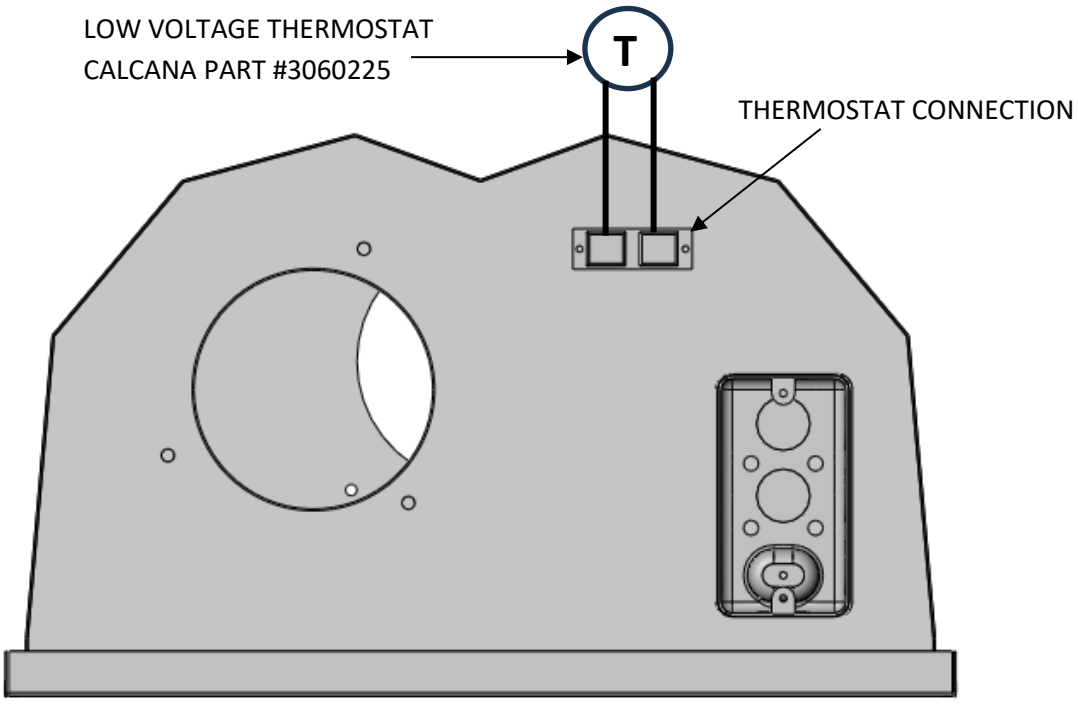


Figure 59. LOW VOLTAGE THERMOSTAT WIRING

24.2 LINE VOLTAGE (TWO OR MORE HEATERS)

If two or more heaters are to be controlled by one common thermostat, proceed as follows:
(For wiring diagrams, refer to pages 62 to 64)

a) Plug each heater into a wall plug on the same line as the thermostat.
b) Connect a short piece of wire between the two low voltage thermostat connections to close low voltage circuit.

Recommended line voltage thermostats are as follows:

Honeywell (or equivalent):

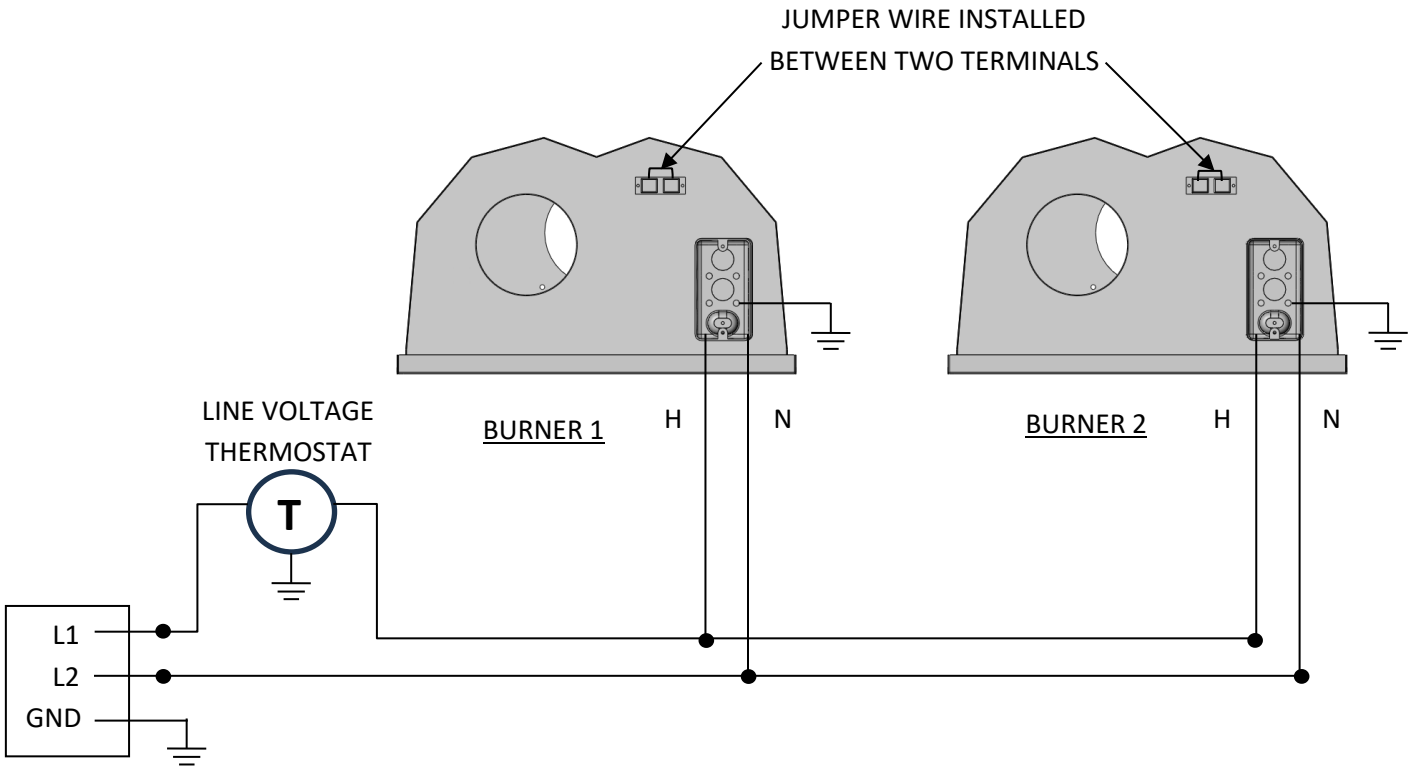
- T631
- T409BA
- T410A

White Rodgers/Emerson (or equivalent):

- 1G65-601

Thermostat part #3060225 can be purchased from Calcana.

LINE VOLTAGE: ONE THERMOSTAT – TWO OR MORE HEATERS



MAXIMUM BURNERS PER THERMOSTAT IS DETERMINED

BY THERMOSTAT RATED AMPERAGE CAPACITY

Figure 60. LINE VOLTAGE THERMOSTAT WIRING

25.0 INITIAL START-UP

⚠ WARNING:
DO NOT ATTEMPT TO MANUALLY IGNITE HEATER!

Procedure:

a) Ensure the gas is turned on.
b) Check for any possible blockages in combustion air intake and exhaust areas of the unit.
c) Ensure that venting material is properly fastened to the unit.
d) Ensure all options are attached securely.
e) Locate manifold pressure tap/boss/post for the valve you are adjusting. Open the manifold pressure tap/boss/post by using a small flathead screwdriver to turn the screw inside the port counterclockwise 1 turn. DO NOT REMOVE THIS SCREW.
f) Connect a manometer that registers pressure in inches of water column (" WC) to the manifold pressure tap.
g) Ensure electricity is on to unit. Turn the thermostat up past room temperature.
h) Check the flame port to see flame has established. If flame is not established, turn the thermostat down for 5 seconds then turn it back up or interrupt electrical supply to unit for 5 seconds, and allow unit to try again.
i) Verify gas input rate.
    a. ***Single Stage Heaters***: Verify the manifold pressure on the gas valve is the same as the rating plate on the heater; for natural gas 3.5" WC and for propane 10.5" WC. Use a manometer that measures inches of water column for this procedure. If adjustment is required, remove the cap-screw from the pressure regulator housing. Adjust the white pressure regulator adjusting screw clockwise to increase pressure, counterclockwise to reduce pressure. Replace cap-screw.
    b. ***2-Stage Heaters***: Switch the toggle to the low setting. Verify manifold pressure for the low setting; for natural gas 1.25" WC and for propane 5.25" WC. If adjustment is required, remove regulator cover screw from the low outlet pressure regulator adjust tower and turn screw clockwise to increase pressure, or counterclockwise to decrease pressure. Replace regulator cover screw. Switch the toggle to the high setting. Verify manifold pressure for the high setting; for natural gas 3.5" WC and for propane 10.5" WC. If adjustment is required, remove regulator cover screw from the high outlet pressure regulator adjust tower and turn screw clockwise to increase pressure, or counterclockwise to decrease pressure. Replace regulator cover screw.
    c. ***Modulating Heaters***: please see instructions on pages 71 to 72.
j) Turn off all electrical power to the system. Remove manometer and close the manifold pressure tap/boss/post by turning the screw inside the port clockwise until closed. DO NOT OVER TIGHTEN.
k) Ensure electricity is on to unit. Turn the thermostat up past room temperature.
l) Perform leak test.

NOTE: Some smoke might appear off the exchanger tube after it heats up for initial firing. Do not be alarmed. The smoke is just a small amount of oil on the surface of the tube from manufacturing. If smoke is excessive, open the door and 'air out' the building until smoke is removed.

NOTE: Heater has a higher heat output at the burner end as compared to the exhaust end. This is normal.
NOTE: A small amount of condensation may occur from the heater when it starts the heating cycle. The condensation will stop once the heater warms up. Ensure venting is sealed.

26.0 GAS VALVES

26.1 GAS VALVES, WHITE RODGERS 36J22 SINGLE INPUT

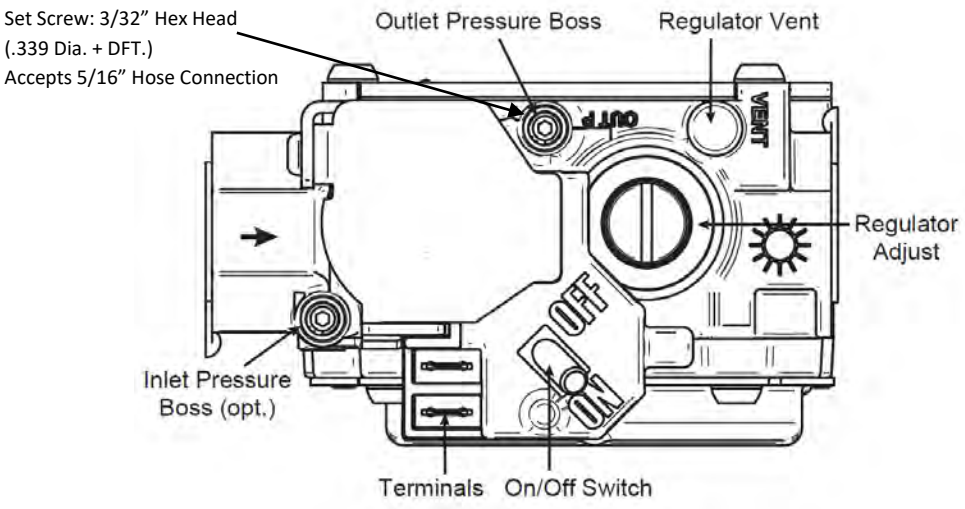


Figure 61. GAS VALVE, WHITE RODGERS 36J22 SINGLE INPUT

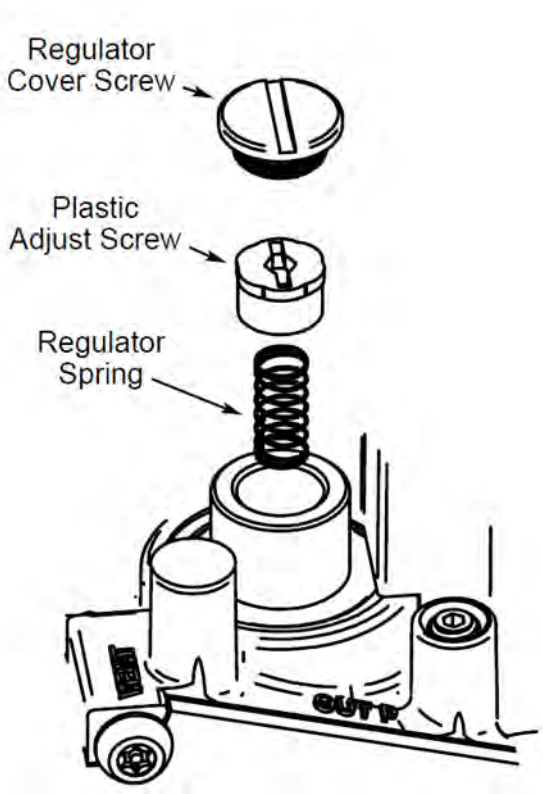


Figure 62. PRESSURE REGULATOR, WHITE RODGERS 36J22 SINGLE INPUT

26.2 GAS VALVES, WHITE ROGERS 36J54 2-STAGE INPUT

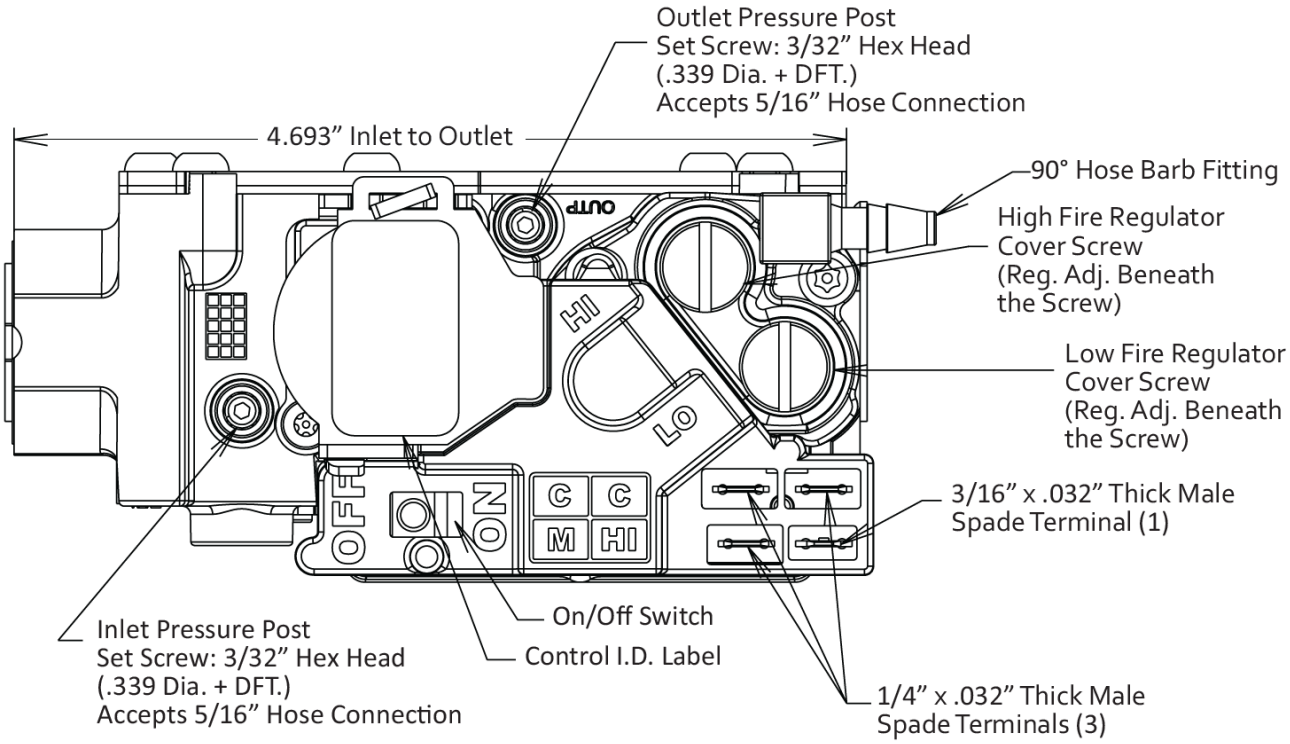


Figure 63. GAS VALVE, WHITE ROGERS 36J54 2-STAGE INPUT

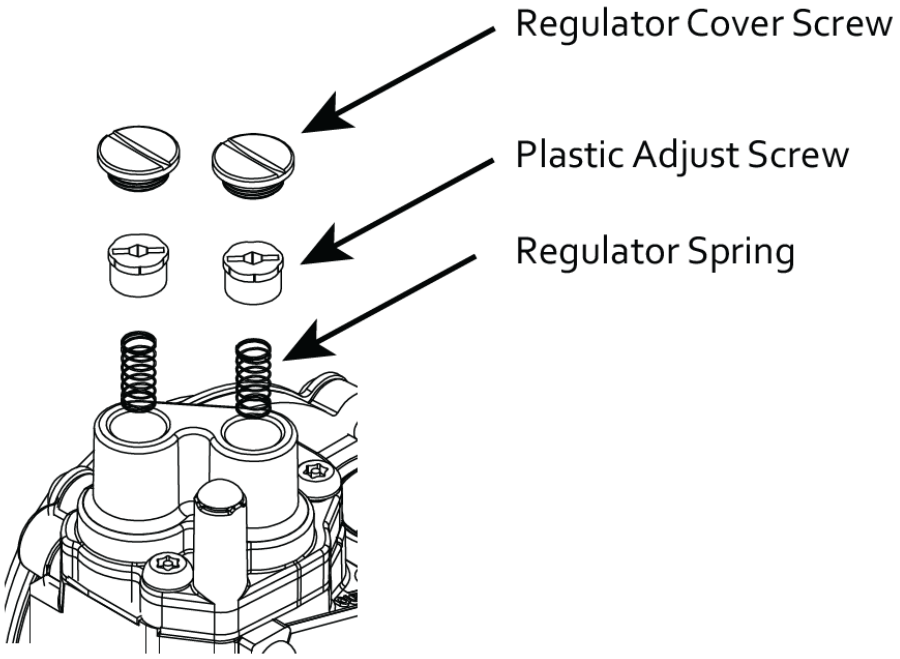


Figure 64. PRESSURE REGULATOR, WHITE ROGERS 36J54 2-STAGE INPUT

26.3 GAS VALVES, SIGMA SIT 845 MODULATING

1 On-off solenoid valve EV1.

2 On-off solenoid valve EV2.

3 Inlet pressure test point.

4 Outlet pressure test point.

5 Connection for pressure regulator / combustion chamber compensation.

6 Servo-pressure regulator.

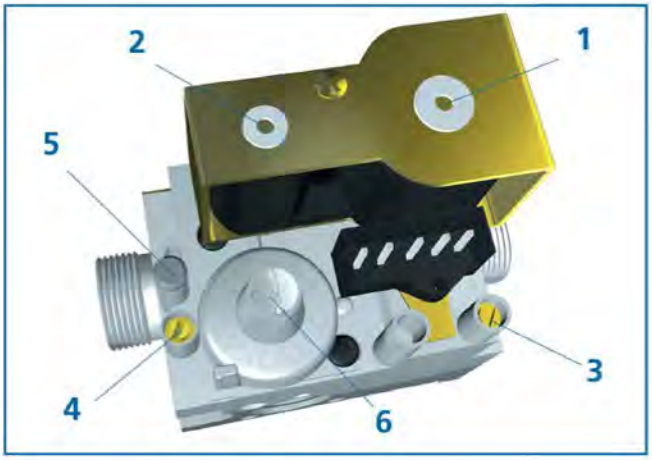
7 Gas outlet pressure modulator.

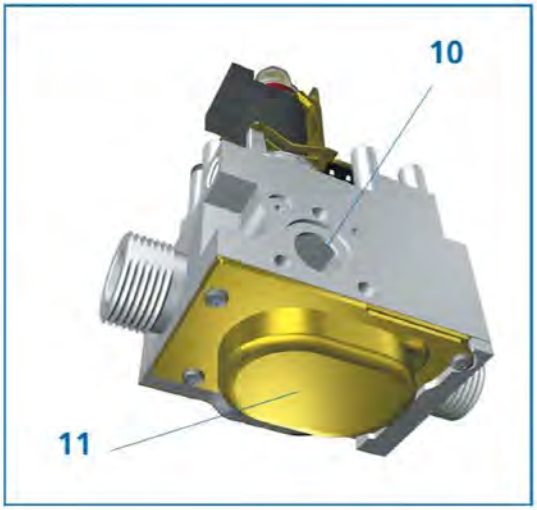
8 Pilot outlet.

9 Main gas outlet.

10 Side outlet.

11 Slow opening device.





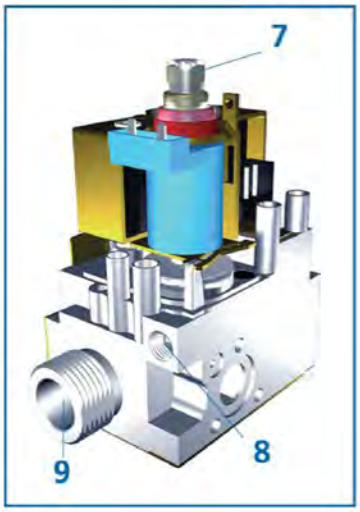


Figure 65. GAS VALVE & PRESSURE REGULATOR, SIGMA SIT 845 MODULATING

26.1 GAS VALVES, SIGMA SIT 845 - MANIFOLD ADJUSTMENT AND VERIFICATION PROCEDURE

⚠ WARNING ⚠

THE INSTALLER MUST VERIFY AND MAKE ANY REQUIRED ADJUSTMENTS TO THE MANIFOLD OPERATING PRESSURE ACCORDING TO THE INSTALLATION MANUAL AND RATING PLATE OF THIS HEATER.
FAILURE TO DO SO WILL VOID ALL WARRANTIES AND MAY CAUSE DAMAGE, INJURY AND/OR DEATH.
IF YOU DO NOT UNDERSTAND OR HAVE ANY QUESTIONS CONCERNING THESE INSTRUCTIONS, CONTACT CALCANA AT 800-778-6729 AND DO NOT PROCEED WITH ANY MANIFOLD VERIFICATION OR ADJUSTMENT.

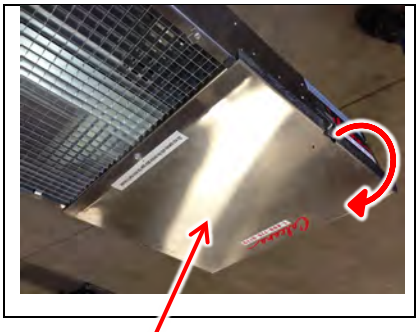
Only licensed/qualified and insured contractors trained in the appropriate trade or technical fields (Gasfitting-HVAC-Electrician) shall perform any work related to the installation and/or service of this heater. Person(s) who service and/or install this unit accept full liability and responsibility for its operation.

TOOLS REQUIRED

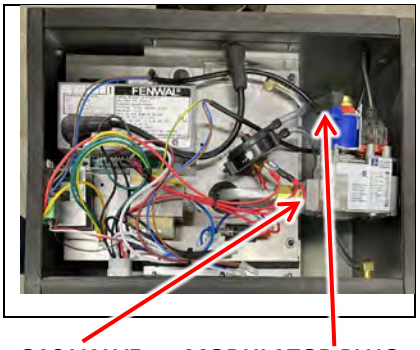
- Small Flathead Screwdriver
- 10 mm Wrench
- Manometer that measures inches of water column (“ WC)

INITIAL STEPS:

1. Verify the heater being installed matches the fuel type available on site, including any necessary adjustments for high altitude. Ensure adequate fuel supply to operate all gas appliances, including the heater(s), at their maximum rated capacity simultaneously. Verify that gas lines and pressure regulators can provide the correct line pressure within the required range for your fuel type (5” to 14” WC for natural gas and 12” to 14” WC for propane), with all gas appliances operating at the same time. If the required line pressures cannot be maintained during use, you won't be able to verify or adjust the manifold pressure, leading to improper heater operation. If fuel pressure is too low, the heater will not have enough fuel to achieve its maximum heat output and if the fuel pressure is too high, the valve can be damaged.
2. Ensure all gas-fired appliances on the same gas line, excluding the heater, are on and operating simultaneously. Otherwise, an inaccurate reading of manifold pressure may occur.
3. Ensure the heater is turned off and not operating when you begin this process.
4. The control panel must be installed and connected to the heater prior to initiating this procedure.
5. ***START BY*** opening the service door and identifying the location of the gas valve and the modulator plug.



SERVICE DOOR



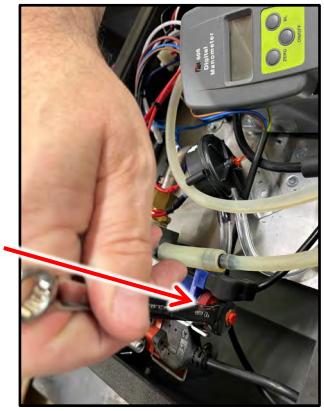
GAS VALVE **MODULATOR PLUG**

MANIFOLD PRESSURE TAP

6. Locate manifold pressure tap. Open the manifold pressure tap by using a small flathead screwdriver to turn the screw inside the port counterclockwise 3 turns. **DO NOT REMOVE THIS SCREW.**
7. Connect a manometer that registers pressure in inches of water column (“ WC) to the manifold pressure tap.

FOR HIGH PRESSURE VERIFICATION and/or ADJUSTMENT:

CAUTION: Always adjust the high pressure setting first.

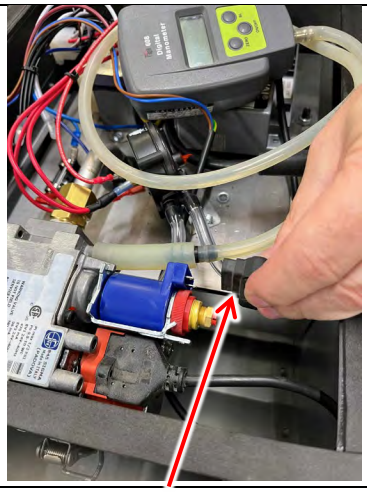


8. Using the wall control, turn on the heater, set the dial to high and take pressure reading. The required manifold pressure on the high setting for natural gas is 3.5“ WC and for propane is 10.5” WC. Manifold pressure information is also located on the rating plate affixed to the side of heater near the service lid.
9. If an adjustment is needed, use a 10mm wrench to turn the adjustment nut counterclockwise to lower pressure and clockwise to increase pressure.
10. Once proper pressure is confirmed, turn off the heater, and proceed to step 11) for low pressure verification and/or adjustment instructions.

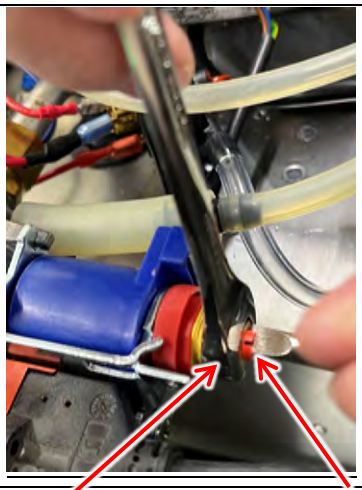
FOR LOW PRESSURE VERIFICATION and/or ADJUSTMENT:

CAUTION: Always adjust the high pressure setting first.

11. Remove the modulator plug from the modulator (this will disconnect the potentiometer on the wall control from the valve). Using the wall control, turn on the heater, and take pressure reading. The required manifold pressure on the low setting for natural gas is 1.25“ WC and for propane is 5.25” WC.



Modulator Plug

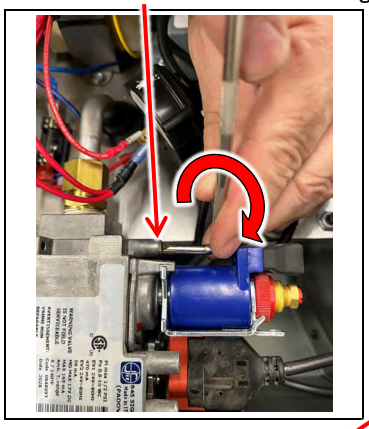


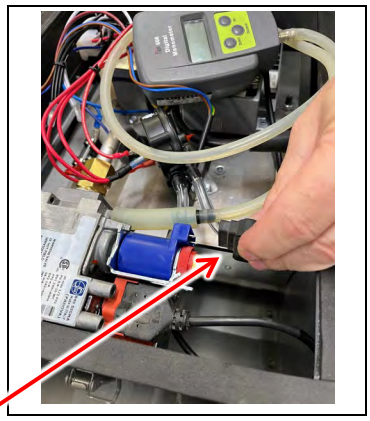
Adjustment Nut Adjustment Screw

12. If adjustment is needed, hold the high-pressure adjustment nut in place with a 10mm wrench. Use a small flathead screwdriver to adjust the low-pressure adjustment screw (bright orange plastic head). Turn counterclockwise to lower pressure and clockwise to increase pressure.

FINAL STEPS:

13. Once proper pressure is confirmed, turn off the heater, remove the manometer, and use a small flathead screwdriver to turn screw inside brass fitting clockwise until tight. **DO NOT OVER TIGHTEN.**





14. Replace the modulator plug and insert the screw.

15. Close and secure the service lid.

27.0 FUEL CONVERSION

27.1 CONVERSION KIT FOR SINGLE INPUT GAS VALVES

FOR USE WITH WHITE RODGERS PART #F92-0656 Propane AND #F92-0659 Natural Gas or

WITH HONEYWELL PART #393691 Propane AND #394588 Natural Gas

The conversion shall be carried out in accordance with the requirements of the provincial/state authorities having jurisdiction and in accordance with the requirements as follows:

CANADA: ***Natural Gas and Propane Installation Code, CSA B149.1*** or latest edition.
USA: ***National Fuel Gas Code, ANSI Z223.1/NFPA 54***, or latest edition.

⚠ **WARNING:** This conversion kit shall be installed by a qualified service agency in accordance with the manufacturer's instructions and all applicable codes and requirements of the authority having jurisdiction. If the information in these instructions is not followed exactly, a fire, explosion or production of carbon monoxide may result causing property damage, personal injury or loss of life. The qualified service agency is responsible for the proper installation of this kit. The installation is not proper and complete until the operation of the converted appliance is checked as specified in the manufacturer's instructions supplied with the kit. The installer of this conversion kit assumes full responsibility and liability for the installation of this conversion kit. If you do not understand these instructions or the information contained in the installation manual, DO NOT INSTALL THIS CONVERSION KIT OR OPERATE THE UNIT ASSOCATED WITH THIS GAS CONVERSION.

DIRECTIONS:

1) **CAUTION**: the gas supply shall be shut off prior to disconnecting the electrical power, before proceeding with the conversion.
2) Turn off electrical supply to heater
3) Disconnect gas supply line to heater
4) Disconnect electrical supply to heater
5) Disconnect thermostat control wire from heater
6) Remove burner head from reflector assembly being careful to support burner head in such a fashion that it will not fall from the location overhead where it was installed. Use two people if necessary.
7) Remove service door that provides access to gas valve location
8) Remove igniter assembly
9) Use deep wall socket to remove orifice spud
10) Install correct orifice for the fuel that you are converting to. **CHECK TWICE TO ENSURE.** Reference chart below.
11) Locate gas valve. Identify manufacturer of gas valve. Ensure you use the correct kit as manufactured for the gas valve that is installed in heater and following instructions as detailed on the enclosed White Rodgers or Honeywell instruction sheets for the associated Gas Conversion Kits. Ensure you have the correct conversion spring for the fuel type you are converting to.
12) Verify Manifold pressure using a manometer. Adjust pressure if necessary (see valve instructions for details). Manifold Pressure is: Natural Gas: 3.5" WC. Propane: 10.5" WC. Leak Test all Fittings Prior to Operation.
13) When the conversion is complete, fill out the information as required on the enclosed conversion label
14) **Attach completed label on or near the rating plate**

Conversion Chart with Corresponding Orifice Sizes

Model	From	To	Orifice
SR/SLR 40	Natural Gas	Propane	#51
SR/SLR 50	Natural Gas	Propane	1.95 mm
SR/SLR 60	Natural Gas	Propane	#45
SR/SLR 75	Natural Gas	Propane	#42
SR/SLR 80	Natural Gas	Propane	2.4 mm
SR/SLR 100	Natural Gas	Propane	#36
SR/SLR 125	Natural Gas	Propane	#31
SR/SLR 150	Natural Gas	Propane	#3.4 mm
SR/SLR 175	Natural Gas	Propane	#25
SR/SLR 200	Natural Gas	Propane	#20

Model	From	To	Orifice
SR/SLR 40	Propane	Natural Gas	#31
SR/SLR 50	Propane	Natural Gas	3.3 mm
SR/SLR 60	Propane	Natural Gas	#28
SR/SLR 75	Propane	Natural Gas	#21
SR/SLR 80	Propane	Natural Gas	#19
SR/SLR 100	Propane	Natural Gas	#13
SR/SLR 125	Propane	Natural Gas	5.3 mm
SR/SLR 150	Propane	Natural Gas	6.1 mm
SR/SLR 175	Propane	Natural Gas	#H
SR/SLR 200	Propane	Natural Gas	7.3 mm

NOTE: CONVERSION KITS COME WITH GAS VALVE CONVERSION SPRING, PREDRILLED ORIFICE AND CONVERSION LABEL.
CONVERSION KITS ARE FOR UNITS RATED FOR THE FOLLOWING LOCATIONS AND ELEVATIONS: **CANADA: 0 – 4,500 FT (1,372 m), USA: 0 – 2,000 FT (610 m)**
FOR INSTALLATIONS ABOVE THE DESIGNATED ELEVATIONS, CONTACT FACTORY.

27.2 CONVERSION KIT FOR 2-STAGE GAS VALVES

FOR USE WITH WHITE RODGERS PART #F92-1008 Propane AND # F92-1011 Natural Gas

The conversion shall be carried out in accordance with the requirements of the provincial/state authorities having jurisdiction and in accordance with the requirements as follows:

CANADA: ***Natural Gas and Propane Installation Code, CSA B149.1*** or latest edition.
USA: ***National Fuel Gas Code, ANSI Z223.1/NFPA 54***, or latest edition.

⚠ **WARNING:** This conversion kit shall be installed by a qualified service agency in accordance with the manufacturer's instructions and all applicable codes and requirements of the authority having jurisdiction. If the information in these instructions is not followed exactly, a fire, explosion or production of carbon monoxide may result causing property damage, personal injury or loss of life. The qualified service agency is responsible for the proper installation of this kit. The installation is not proper and complete until the operation of the converted appliance is checked as specified in the manufacturer's instructions supplied with the kit. The installer of this conversion kit assumes full responsibility and liability for the installation of this conversion kit. If you do not understand these instructions or the information contained in the installation manual, DO NOT INSTALL THIS CONVERSION KIT OR OPERATE THE UNIT ASSOCATED WITH THIS GAS CONVERSION.

DIRECTIONS:

1) **CAUTION**: the gas supply shall be shut off prior to disconnecting the electrical power, before proceeding with the conversion.
2) Turn off electrical supply to heater
3) Disconnect gas supply line to heater
4) Disconnect electrical supply to heater
5) Disconnect thermostat control wire from heater
6) Remove burner head from reflector assembly being careful to support burner head in such a fashion that it will not fall from the location overhead where it was installed. Use two people if necessary.
7) Remove service door that provides access to gas valve location
8) Remove igniter assembly
9) Use deep wall socket to remove orifice spud
10) Install correct orifice for the fuel that you are converting to. **CHECK TWICE TO ENSURE.** Reference chart below.
11) Locate gas valve. Identify manufacturer of gas valve. Ensure you are using the correct kit as manufactured for the gas valve that is installed in heater and following instructions as detailed on the enclosed White Rodgers instruction sheets for the associated Gas Conversion Kit. Ensure you have the correct conversion springs for the fuel type you are converting to.
12) Verify manifold pressure using a manometer for low and high settings. Adjust pressure if necessary (see valve instructions for details). Manifold Pressure is: Natural Gas: High 3.5" WC and Low 1.25" WC; Propane: High 10.5" WC and Low 5.25" WC.
13) When the conversion is complete, fill out the information as required on the enclosed conversion label
14) **Attach completed label on or near the rating plate**

Conversion Chart with Corresponding Orifice Sizes

Model	From	To	Orifice
SR/SLR 40	Natural Gas	Propane	#51
SR/SLR 50	Natural Gas	Propane	1.95 mm
SR/SLR 60	Natural Gas	Propane	#45
SR/SLR 75	Natural Gas	Propane	#42
SR/SLR 80	Natural Gas	Propane	2.4 mm
SR/SLR 100	Natural Gas	Propane	#36
SR/SLR 125	Natural Gas	Propane	#31
SR/SLR 150	Natural Gas	Propane	#3.4 mm
SR/SLR 175	Natural Gas	Propane	#25
SR/SLR 200	Natural Gas	Propane	#20

Model	From	To	Orifice
SR/SLR 40	Propane	Natural Gas	#31
SR/SLR 50	Propane	Natural Gas	3.3 mm
SR/SLR 60	Propane	Natural Gas	#28
SR/SLR 75	Propane	Natural Gas	#21
SR/SLR 80	Propane	Natural Gas	#19
SR/SLR 100	Propane	Natural Gas	#13
SR/SLR 125	Propane	Natural Gas	5.3 mm
SR/SLR 150	Propane	Natural Gas	6.1 mm
SR/SLR 175	Propane	Natural Gas	#H
SR/SLR 200	Propane	Natural Gas	7.3 mm

NOTE: CONVERSION KITS COME WITH GAS VALVE CONVERSION SPRING, PREDRILLED ORIFICE AND CONVERSION LABEL.
CONVERSION KITS ARE FOR UNITS RATED FOR THE FOLLOWING LOCATIONS AND ELEVATIONS: **CANADA: 0 – 4,500 FT (1,372 m), USA: 0 – 2,000 FT (610 m)**
FOR INSTALLATIONS ABOVE THE DESIGNATED ELEVATIONS, CONTACT FACTORY.

27.3 CONVERSION KIT FOR VARIABLE INPUT GAS VALVES

The conversion shall be carried out in accordance with the requirements of the provincial/state authorities having jurisdiction and in accordance with the requirements as follows:

CANADA: ***Natural Gas and Propane Installation Code, CSA B149.1*** or latest edition.
USA: ***National Fuel Gas Code, ANSI Z223.1/NFPA 54***, or latest edition.

⚠ **WARNING:** This conversion kit shall be installed by a qualified service agency in accordance with the manufacturer's instructions and all applicable codes and requirements of the authority having jurisdiction. If the information in these instructions is not followed exactly, a fire, explosion or production of carbon monoxide may result causing property damage, personal injury or loss of life. The qualified service agency is responsible for the proper installation of this kit. The installation is not proper and complete until the operation of the converted appliance is checked as specified in the manufacturer's instructions supplied with the kit. The installer of this conversion kit assumes full responsibility and liability for the installation of this conversion kit. If you do not understand these instructions or the information contained in the installation manual, DO NOT INSTALL THIS CONVERSION KIT OR OPERATE THE UNIT ASSOCATED WITH THIS GAS CONVERSION.

DIRECTIONS:

1) **CAUTION**: the gas supply shall be shut off prior to disconnecting the electrical power, before proceeding with the conversion.
2) Turn off electrical supply to heater
3) Disconnect gas supply line to heater
4) Disconnect electrical supply to heater
5) Disconnect thermostat control wire from heater
6) Remove burner head from reflector assembly being careful to support burner head in such a fashion that it will not fall from the location overhead where it was installed. Use two people if necessary.
7) Remove service door that provides access to gas valve location
8) Remove igniter assembly
9) Use deep wall socket to remove orifice spud
10) Install correct orifice for the fuel that you are converting to. **CHECK TWICE TO ENSURE.** Reference chart below.
11) Sigma SIT 845 valves are adjustable for use with both natural gas and propane and require a manifold pressure adjustment.
12) Locate the gas valve and adjust manifold pressure to the required fuel type (see page 71 to 72). **CHECK TWICE TO ENSURE.**
13) Verify Manifold pressure using a manometer. Manifold Pressure is: Natural Gas: High 3.5“ WC and Low 1.25” WC; Propane: High 10.5” WC and Low 5.25” WC. Leak Test all Fittings Prior to Operation.
14) When the conversion is complete, fill out the information as required on the enclosed conversion label.
15) **Attach completed label on or near the rating plate**

Conversion Chart Corresponding Orifice Sizes

Model	From	To	Orifice
SR/SLR 40	Natural Gas	Propane	#51
SR/SLR 50	Natural Gas	Propane	1.95 mm
SR/SLR 60	Natural Gas	Propane	#45
SR/SLR 75	Natural Gas	Propane	#42
SR/SLR 80	Natural Gas	Propane	2.4 mm
SR/SLR 100	Natural Gas	Propane	#36
SR/SLR 125	Natural Gas	Propane	#31
SR/SLR 150	Natural Gas	Propane	#3.4 mm
SR/SLR 175	Natural Gas	Propane	#25
SR/SLR 200	Natural Gas	Propane	#20

Model	From	To	Orifice
SR/SLR 40	Propane	Natural Gas	#31
SR/SLR 50	Propane	Natural Gas	3.3 mm
SR/SLR 60	Propane	Natural Gas	#28
SR/SLR 75	Propane	Natural Gas	#21
SR/SLR 80	Propane	Natural Gas	#19
SR/SLR 100	Propane	Natural Gas	#13
SR/SLR 125	Propane	Natural Gas	5.3 mm
SR/SLR 150	Propane	Natural Gas	6.1 mm
SR/SLR 175	Propane	Natural Gas	#H
SR/SLR 200	Propane	Natural Gas	7.3 mm

NOTE: CONVERSION KITS COME WITH A PREDRILLED ORIFICE AND CONVERSION LABEL.
CONVERSION KITS ARE FOR UNITS RATED FOR THE FOLLOWING LOCATIONS AND ELEVATIONS: **CANADA: 0 – 4,500 FT (1,372 m), USA: 0 – 2,000 FT (610 m)**
FOR INSTALLATIONS ABOVE THE DESIGNATED ELEVATIONS, CONTACT FACTORY.

27.4 EXAMPLE OF CONVERSION KIT LABEL
TO BE COMPLETED AS PER INSTRUCTIONS IN KIT

This appliance was converted on DAY: _____

MONTH: _____YEAR: _____

to Natural Gas: _____ Propane: _____

with Kit # _____

By: NAME: _____

COMPANY: _____

ADDRESS: _____

CITY/TOWN: _____ STATE/PRO: _____

TELEPHONE: _____

Orifice Size: _____ Leak Test Performed? Yes: _____

Manifold Pressure: Min_____ Max_____

Input: _____ Altitude: _____

(The name of the individual and organization making this conversion accepts the responsibility that this conversion has been properly made and has performed a leak test on the appliance prior to placing into service.) Locate label in a conspicuous location on the appliance near rating plate.

28.0 MAINTENANCE

Maintenance is required once a year. Annually inspect your heater, before the heating season starts. If the unit is in a dusty environment, maintenance will be required more often. If dust conditions are extreme, monthly or weekly maintenance may be required.

⚠ WARNING:

Disconnect electrical supply to heater and shut off gas prior to inspection.

A. Check combustion air intake for blockage.
B. Check the vent terminal and/or roof terminal for blockage. Remove as necessary for cleanliness and then reinstall. Check for cracks or holes and replace them as necessary.
C. Open service door.
D. Check the blower motor and scroll for dirt and/or locked rotor. Remove dirt with compressed air or vacuum cleaner. If the rotor is locked, replace the assembly.
E. If the burner cap needs cleaning, remove the burner head from the tube and use a combination of compressed air and/or a wire brush to remove any deposits or debris that may be on the burner cap.
F. Ensure all the wiring is intact and in good condition.
G. Check the air switch and vinyl tubing and adjust or replace as necessary. To adjust, remove the silicone covering the set screw (used to prevent screw movement during normal heater operation).
H. Check electrode for proper gap and cleanliness. Clean or replace as necessary.
I. Check the ignition system for spark. Replace as necessary.
J. Check exchanger tube for holes and/or cracks, dirt and/or deposits. Clean and/or replace as necessary.
K. Wash any dirt or dust off the unit with a soap and water solution.
L. Check any gas connections that were disconnected during maintenance for leaks. Use soap and water solution. Do not use flame.
M. Test fire unit by setting thermostat above room temperature. Ensure the unit is operating quietly and efficiently.
N. Periodically, visually check the burner cap through the view port to confirm proper operation.
O. Check all couplers for tightness and/or leakage.

⚠ WARNING:

Only qualified/licensed service people, trained to service gas fired heating equipment, are to perform repairs on this unit. All replacement parts MUST originate from the manufacturer of this heater in order not to void CGA/AGA certification and warranty. Safety devices are not allowed to be rendered inoperative.

⚠ 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.

The heater area must be kept clear and free from combustible materials, gasoline and other flammable vapors and liquids. The flow of combustion and ventilation air to heater must not be obstructed.

29.0 SEQUENCE OPERATION

29.1 DESCRIPTION OF 3-TRY DIRECT SPARK IGNITION

The FENWAL 35-6X Series (previously FENWAL/TRITON 2461D) is a 24 VAC Microprocessor Based Direct Spark Ignition Control designed for use in all types of heating applications such as gas furnaces, boilers, water heaters and other similar appliances. The control utilizes a microprocessor to continually and safely monitor, analyze and control the proper operation of the gas burner. Value added features such as combustion blower control, LED diagnostics, automatic one hour reset, and flame current test pins highlight the controls' benefits.

29.2 OPERATIONS

A. **POWER UP/STANDBY**

- Upon applying power (24 volts) to 24 VAC/R, the control will reset, perform a self-check routine, initiate fulltime flame sensing, flash the diagnostic LED for up to one second, and enter the thermostat scan state.

B. **HEAT MODE**

- When a call for heat is received from the thermostat supplying 24 volts to TH/W, the control will check the pressure switch for normally open contacts. The combustion blower is then energized and once the pressure switch contacts close, a pre-purge delay begins. Following the pre-purge period, the gas valve is energized, and sparks commence for the trial for ignition period.

- When a flame is detected during the trial for ignition, sparks are shut off immediately and the gas valve and combustion blower remain energized. The thermostat, air pressure switch, and main burner flame are constantly monitored to ensure the system continues to operate properly. When the thermostat is satisfied and the demand for heat ends, the main valve is de-energized immediately, the control senses the loss of flame signal and de-energizes the combustion blower.

C. **FLAME FAILURE - RE-IGNITION**

- If the established flame signal is lost while the burner is operating, the control will respond within 0.8 seconds. The HV spark will be energized for a trial for ignition period in an attempt to re-light the burner. If the burner does not light, the control will make two more attempts to re-light the burner. If the burner does not re-light, the control will go into lockout and flash the LED 3-times. If the flame is re-established, normal operation resumes.

30.0 TROUBLESHOOTING

⚠ WARNING:

Only qualified, licensed, service people trained to service gas fired heating equipment are to perform repairs on this unit. All replacement parts **MUST** originate from the manufacturer of this heater in order not to void CGA/AGA certification and warranty.

Safety devices are not allowed to be rendered inoperative and left unattended. Failure to do any of the above can cause property damage, injury, or death.

A. **NO POWER TO HEATER**

1) INITIAL ELECTRICAL CHECKS

a) Ensure the thermostat is calling for heat.
b) Ensure all site electrical connections and wiring are secure.
   a. Check site wiring for continuity.
c) Check electrical supply for blown fuse or breaker.
d) Test for power to burner head.

2) INITIAL GAS CHECKS

a) Ensure the gas supply manual valve is turned on.
b) Ensure the gas valve switch is turned on.
c) Check for gas supply and proper pressure to valve.
d) Check the wires and ensure that they and their connections are in good condition.
e) Check for power to valve.

B. **ELECTRICITY AND GAS TO HEATER, BUT STILL INOPERATIVE**

If after confirming that adequate gas and electricity are present and unit still does not operate, review the symptoms below. After the symptom has been identified, refer to the corresponding cause/cure, Review **CHECK CONTROL BOARD** section, and finalize troubleshooting procedure.

When checking the wiring to components, refer to wiring diagrams on pages 62 to 64. Also refer to legend below; this legend is located on the control module.

TERMINAL DESIGNATIONS

S1	**NOT USED**
GND	**SYSTEM GROUND (GREEN)**
V2	**VALVE GROUND (BROWN)**
R	**NOT USED**
L1	**120/240 VAC INPUT (HOT) (BLACK)**
IND	**INDUCER FAX OUTPUT (BLACK)**
V1	**VALVE POWER (WHITE)**
PSW	**AIR PRESSURE SWITCH INPUT (RED)**
W	**THERMOSTAT INPUT (RED)**

CAUTION: *Label all wires prior to disconnecting when servicing the heater. Wiring errors can cause improper and dangerous operation. A functional checkout of replacement control is recommended. Verify proper operation after servicing.*

Symptom	Cause/Cure
1. Thermostat on – Burner Head Dead	**A) Bad thermostat (check W terminal voltage)** **B) Air switch is stuck closed (try adjustment)** **C) Transformer bad** **D) Bad ignition module (check LED for steady on)**
2. Thermostat on - No Blower Output	**A) Wiring (check blower motor connection plug)** **B) Verify DSI voltage (Check L1 to GND and IND to GND terminal voltage)** **a. If 120V at IND but no power, call the factory.** **C) Bad ignition module (check LED for steady on)**
3. Unit energizes, but no TFI after purge delay	**A) Air switch is stuck open (try adjustment)** **a. Wiring (check PSW to GND terminal voltage)** **B) Check ignition module for flash code, proceed to section CHECK CONTROL BOARD**
4. Valve on, no spark	**A) Shorted electrode** **B) Open HV cable** **C) Bad ignition module**
5. Spark on, no valve	**A) Valve coil open** **B) Open valve wire** **C) Bad ignition module (check voltage between V1 and V2)**
6. Flame okay during TFI, no flame sense (after TFI)	**A) Bad electrode. Check for condition or cracks. Check location (see PROPER ELECTRODE LOCATION).** **B) Bad HV wire** **C) Poor ground at burner** **D) Check flame current (see FLAME SENSOR CURRENT CHECK)**

NOTE: TFI = Trial for Ignition HV = High Voltage

FLAME SENSOR CURRENT CHECK

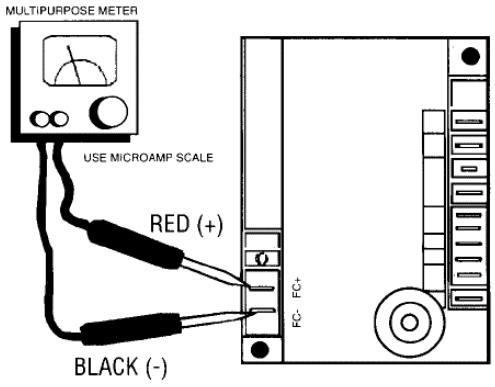


Figure 66. FLAME SENSOR CURRENT CHECK

Flame current is the current which passes through the flame from the sensor to the ground. The minimum flame current necessary to keep the system from locking out is 0.7 micro amps. To measure flame current, connect an analog DC micro ammeter to the FC- FC terminals per figure. Meter should read 0.7 µA or higher. If the meter reads below "0" on scale, the meter leads are reversed. Disconnect power and reconnect the meter leads for proper polarity.

PROPER ELECTRODE LOCATION

Proper location of the electrode assembly is important for optimum system performance. The electrode assembly should be located so that the tips are inside the flame envelope about ¾" (1.9 cm) to 1" (2.54 cm).

CAUTIONS:

1) Ceramic insulators should not be in or close to the flame.
2) Electrode assemblies should not be disassembled; Electrodes should have a gap spacing of .125" (3.175 mm). If this spacing is not correct, the assembly must be replaced.
3) Electrodes that have excessive corrosion or degradation must be replaced.
4) Exceeding the temperature limits can cause nuisance lockouts and premature electrode failure.

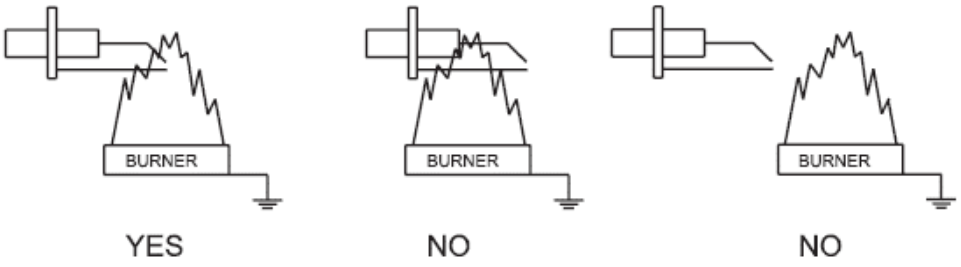


Figure 67. PROPER ELECTRODE LOCATION

C. **CHECK CONTROL BOARD**

Open the access door and view the diagnostic red LED, located on the direct spark ignition (DSI) module. If the DSI module is in a lockout state, the LED will flash on for ¼ second, then off for ¼ second during a fault condition. The pause between fault codes is 3 seconds.

FAULT CONDITIONS

Error Mode	LED Indication
1. Internal Control Fault / Failure	Steady On
2. Air Flow Fault	1 flash
3. Flame with No Call for Heat	2 flashes
4. Ignition Lock Out	3 flashes

1. **INTERNAL CONTROL FAULT**
   - If power supply cycles fluctuate beyond 50/60 cycles such as with an un-stabilized power supply from a generator, unit will not operate. If the ignition module is faulty the unit will not operate.

2. **AIRFLOW FAULT - LOCK OUT (COMBUSTION AIR FLOW PROBLEMS)**
   - **NOTE** the air/pressure switch is field adjustable and can be checked or adjusted if required.
     - To adjust the air switch, remove the silicone covering the set screw (used to prevent screw movement during normal heater operation) and use a 3mm allen key.
   - Combustion airflow is continually monitored during an ignition sequence by the air switch (PSW). If during the initial call for heat the pressure switch contacts are in the closed position for 30-seconds without an output to the Combustion Blower, an airflow fault will be declared, and the control will remain in this mode with the combustion blower off.
   - If the airflow switch remains open for more than 30-seconds after the combustion blower output (L1 and IND) is energized, an airflow fault will be declared, and the control will stay in this mode with the combustion blower off.
   - If the airflow signal is lost while the burner is firing, the control will immediately de-energize the gas valve and the combustion blower will remain on. If the call for heat remains, the control will wait for proper airflow to return. If proper airflow air is not detected after 30-seconds an airflow fault signal will be declared.

   Proceed as follows to verify reason for airflow lockout:

   1. Check air intake and exhaust for blockage. Remove any blockage.
   2. Check the combustion air blower for dirt. Clean and/or replace as necessary.
   3. If there is no blockage, disconnect combustion air intake from the burner head (if equipped). Retry for ignition. If the unit ignites, check to verify that duct size to unit is of proper size and length and that there is no blockage. Replace the ducting as necessary to decrease the air restriction to unit.
   4. If the unit still does not ignite, disconnect the exhaust vent at heater and retry for ignition. If the unit ignites, check to verify that the vent is of proper size and length and that there is no blockage, see VENTING on pages 49 to 54. Replace the venting as necessary to decrease the air restriction.
   5. If after 2, 3 and 4 are performed and the unit still does not operate, verify air switch replacement.
      a) Contact the factory for instructions on testing the air switch.
   6. Replace any necessary components, reconnect venting and ducting, verify operation of unit.

3. **FLAME WITH NO CALL FOR HEAT (FLAME FAULT)**
   - If at any time the main valve fails to close completely and maintains a flame, the full-time flame sense circuit will detect it and energize the combustion blower. Should the main valve later close off completely removing the flame signal, the combustion blower will power off.

4. **IGNITION LOCK OUT (FAILURE TO LIGHT)**
   - FENWAL DSI Module will attempt three ignition trials before going into lockout. The valve relay will be de-energized immediately, and the combustion blower will be turned off.
   - Recovery from lockout requires a manual reset by either resetting the thermostat or removing 24 volts or removing the electrical power supply for a period of 5-seconds.
   - If the thermostat is still calling for heat after one hour, the control will automatically reset and attempt to ignite the burner again.

If the unit still does not operate, contact the factory for additional troubleshooting.

If you have a modulating burner head that will not change the output, especially where a transformer has been replaced due to a short circuit, contact the factory for assistance.

31.0 PARTS

31.1 SINGLE STAGE AND 2-STAGE BURNER HEAD PARTS

(Refer to pages 86 to 88 for part number and description)

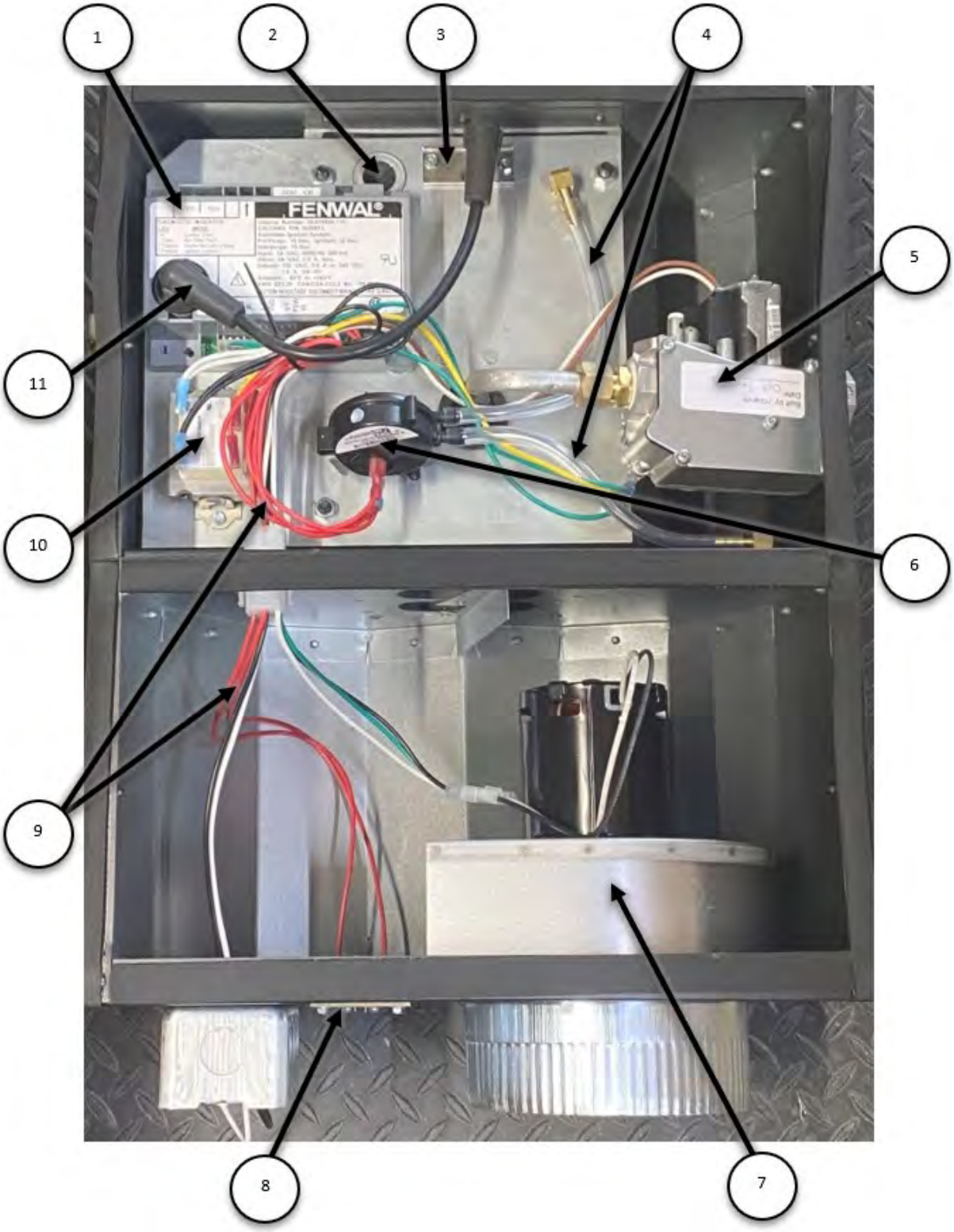


Figure 68. SINGLE STAGE AND 2-STAGE BURNER HEAD PARTS

31.1 MODULATING BURNER HEAD PARTS

(Refer to pages 86 to 88 for part number and description)

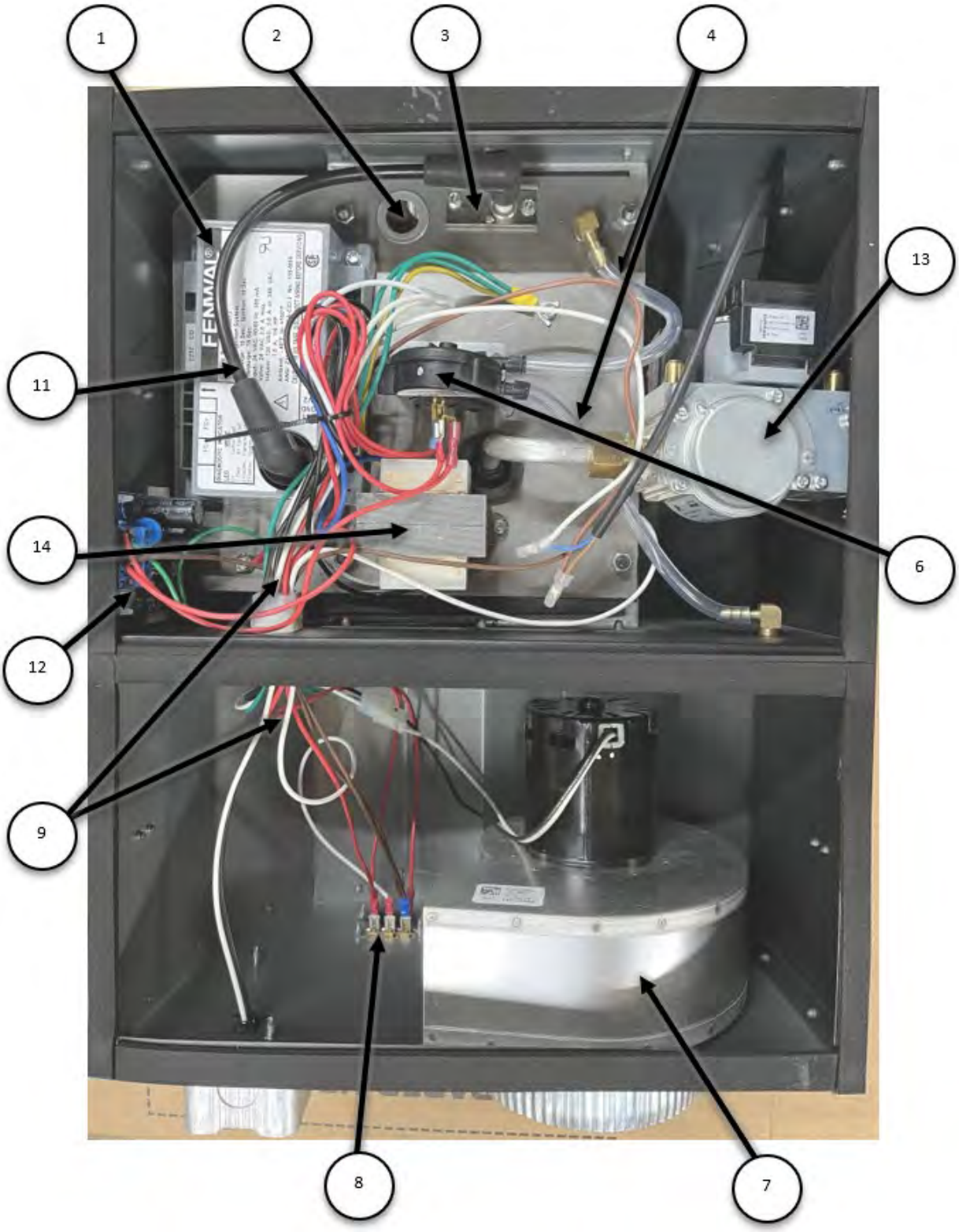


Figure 69. MODULATING BURNER HEAD PARTS

31.2 REFLECTOR AND TUBE PARTS

(Refer to page 89 for part number and description)

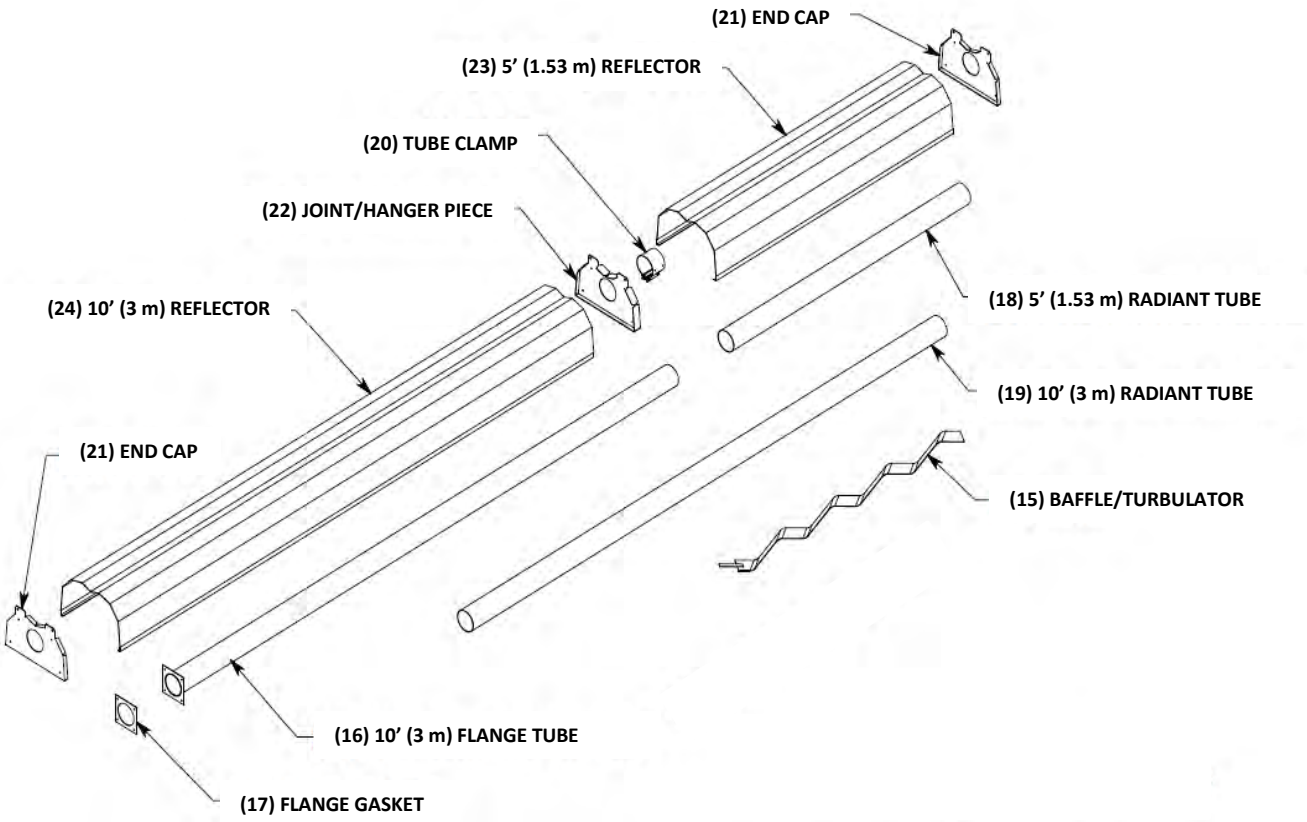


Figure 70. REFLECTOR AND TUBE PARTS

31.3 PARTS LIST

A. REPLACEMENT BURNER HEADS

(See pages 83 to 84 for visual details)

REPLACEMENT BURNER HEADS:

For models not listed below and all burner heads with blue housing, please contact the factory for replacement of burner heads and components.

All blue burner heads and model SR-225 are not in production.
Contact the factory to verify the parts required as current components and can differ from older models.
Part numbers are subject to change.

PIN	MODEL	INPUT	FUEL	WEIGHT
5120181	SR-40	40,000	Natural Gas	36 lbs. (16.4 kg)
5120182	SR-40	40,000	Propane	36 lbs. (16.4 kg)
5120203	SR-40HL	20,000 or 40,000	Natural Gas	36 lbs. (16.4 kg)
5120204	SR-40HL	20,000 or 40,000	Propane	36 lbs. (16.4 kg)
5120223	SR-40M	20,000 up to 40,000	Natural Gas	36 lbs. (16.4 kg)
5120224	SR-40M	20,000 up to 40,000	Propane	36 lbs. (16.4 kg)
5120183	SR-50	50,000	Natural Gas	36 lbs. (16.4 kg)
5120184	SR-50	50,000	Propane	36 lbs. (16.4 kg)
5120205	SR-50HL	25,000 or 50,000	Natural Gas	36 lbs. (16.4 kg)
5120206	SR-50HL	25,000 or 50,000	Propane	36 lbs. (16.4 kg)
5120225	SR-50M	25,000 up to 50,000	Natural Gas	36 lbs. (16.4 kg)
5120226	SR-50M	25,000 up to 50,000	Propane	36 lbs. (16.4 kg)
5120185	SR-60	60,000	Natural Gas	36 lbs. (16.4 kg)
5120186	SR-60	60,000	Propane	36 lbs. (16.4 kg)
5120207	SR-60HL	30,000 or 60,000	Natural Gas	36 lbs. (16.4 kg)
5120208	SR-60HL	30,000 or 60,000	Propane	36 lbs. (16.4 kg)
5120227	SR-60M	30,000 up to 60,000	Natural Gas	36 lbs. (16.4 kg)
5120228	SR-60M	30,000 up to 60,000	Propane	36 lbs. (16.4 kg)
5120187	SR-75	75,000	Natural Gas	36 lbs. (16.4 kg)
5120188	SR-75	75,000	Propane	36 lbs. (16.4 kg)
5120209	SR-75HL	37,500 or 75,000	Natural Gas	36 lbs. (16.4 kg)
5120210	SR-75HL	37,500 or 75,000	Propane	36 lbs. (16.4 kg)
5120229	SR-75M	37,500 up to 75,000	Natural Gas	36 lbs. (16.4 kg)
5120230	SR-75M	37,500 up to 75,000	Propane	36 lbs. (16.4 kg)
5120189	SR-80	80,000	Natural Gas	36 lbs. (16.4 kg)
5120190	SR-80	80,000	Propane	36 lbs. (16.4 kg)
5120211	SR-80HL	40,000 or 80,000	Natural Gas	36 lbs. (16.4 kg)
5120212	SR-80HL	40,000 or 80,000	Propane	36 lbs. (16.4 kg)
5120231	SR-80M	40,000 up to 80,000	Natural Gas	36 lbs. (16.4 kg)
5120232	SR-80M	40,000 up to 80,000	Propane	36 lbs. (16.4 kg)
5120191	SR-100	100,000	Natural Gas	36 lbs. (16.4 kg)
5120192	SR-100	100,000	Propane	36 lbs. (16.4 kg)
5120213	SR-100HL	50,000 or 100,000	Natural Gas	36 lbs. (16.4 kg)
5120214	SR-100HL	50,000 or 100,000	Propane	36 lbs. (16.4 kg)
5120233	SR-100M	50,000 up to 100,000	Natural Gas	36 lbs. (16.4 kg)
5120234	SR-100M	50,000 up to 100,000	Propane	36 lbs. (16.4 kg)

REPLACEMENT BURNER HEADS CONTINUED:				
PIN	**MODEL**	**INPUT**	**FUEL**	**WEIGHT**
5120193	SR-125	125,000	Natural Gas	36 lbs. (16.4 kg)
5120194	SR-125	125,000	Propane	36 lbs. (16.4 kg)
5120215	SR-125HL	62,500 or 125,000	Natural Gas	36 lbs. (16.4 kg)
5120216	SR-125HL	62,500 or 125,000	Propane	36 lbs. (16.4 kg)
5120235	SR-125M	62,500 up to 125,000	Natural Gas	36 lbs. (16.4 kg)
5120236	SR-125M	62,500 up to 125,000	Propane	36 lbs. (16.4 kg)
5120195	SR-150	150,000	Natural Gas	36 lbs. (16.4 kg)
5120196	SR-150	150,000	Propane	36 lbs. (16.4 kg)
5120217	SR-150HL	75,000 or 150,000	Natural Gas	36 lbs. (16.4 kg)
5120218	SR-150HL	75,000 or 150,000	Propane	36 lbs. (16.4 kg)
5120237	SR-150M	75,000 up to 150,000	Natural Gas	36 lbs. (16.4 kg)
5120238	SR-150M	75,000 up to 150,000	Propane	36 lbs. (16.4 kg)
5120197	SR-175	175,000	Natural Gas	36 lbs. (16.4 kg)
5120198	SR-175	175,000	Propane	36 lbs. (16.4 kg)
5120219	SR-175HL	87,500 or 175,000	Natural Gas	36 lbs. (16.4 kg)
5120220	SR-175HL	87,500 or 175,000	Propane	36 lbs. (16.4 kg)
5120239	SR-175M	87,500 up to 175,000	Natural Gas	36 lbs. (16.4 kg)
5120240	SR-175M	87,500 up to 175,000	Propane	36 lbs. (16.4 kg)
5120199	SR-200	200,000	Natural Gas	36 lbs. (16.4 kg)
5120200	SR-200	200,000	Propane	36 lbs. (16.4 kg)
5120221	SR-200HL	100,000 or 200,000	Natural Gas	36 lbs. (16.4 kg)
5120222	SR-200HL	100,000 or 200,000	Propane	36 lbs. (16.4 kg)
5120241	SR-200M	100,000 up to 200,000	Natural Gas	36 lbs. (16.4 kg)
5120242	SR-200M	100,000 up to 200,000	Propane	36 lbs. (16.4 kg)
5120300	SR-40 STAINLESS	40,000	Natural Gas	36 lbs. (16.4 kg)
5120301	SR-40 STAINLESS	40,000	Propane	36 lbs. (16.4 kg)
5120302	SR-50 STAINLESS	50,000	Natural Gas	36 lbs. (16.4 kg)
5120304	SR-50 STAINLESS	50,000	Propane	36 lbs. (16.4 kg)
5120305	SR-60 STAINLESS	60,000	Natural Gas	36 lbs. (16.4 kg)
5120306	SR-60 STAINLESS	60,000	Propane	36 lbs. (16.4 kg)
5120307	SR-75 STAINLESS	75,000	Natural Gas	36 lbs. (16.4 kg)
5120308	SR-75 STAINLESS	75,000	Propane	36 lbs. (16.4 kg)
5120309	SR-80 STAINLESS	80,000	Natural Gas	36 lbs. (16.4 kg)
5120310	SR-80 STAINLESS	80,000	Propane	36 lbs. (16.4 kg)
5120311	SR-100 STAINLESS	100,000	Natural Gas	36 lbs. (16.4 kg)
5120312	SR-100 STAINLESS	100,000	Propane	36 lbs. (16.4 kg)
5120313	SR-125 STAINLESS	125,000	Natural Gas	36 lbs. (16.4 kg)
5120314	SR-125 STAINLESS	125,000	Propane	36 lbs. (16.4 kg)
5120315	SR-150 STAINLESS	150,000	Natural Gas	36 lbs. (16.4 kg)
5120316	SR-150 STAINLESS	150,000	Propane	36 lbs. (16.4 kg)
5120317	SR-175 STAINLESS	175,000	Natural Gas	36 lbs. (16.4 kg)
5120318	SR-175 STAINLESS	175,000	Propane	36 lbs. (16.4 kg)
5120319	SR-200 STAINLESS	200,000	Natural Gas	36 lbs. (16.4 kg)
5120320	SR-200 STAINLESS	200,000	Propane	36 lbs. (16.4 kg)

B. **BURNER HEAD COMPONENTS**

(See pages 83 to 84 for visual details)

BURNER HEAD COMPONENTS:				
ITEM	**PIN**	**MODELS**	**DESCRIPTION**	**WEIGHT**
1	3030613	All	Fenwal Direct Spark Ignition Module	**
2	3110022	All	View Port - Mica Window assembly	**
3	3030376	All	Electrode Assembly	**
4	3010012	All	Vinyl Hose for Air Switch	**
5	3020004	Single Stage	White Rodgers 36J22 Natural Gas Valve	**
5	3020000	Single Stage	White Rodgers 36J22 Propane Gas Valve	**
5	3020013	2-Stage	White Rodgers 36J54 Natural Gas Valve	**
5	3020014	2-Stage	White Rodgers 36J54 Propane Gas Valve	**
6	3070420	40,000 BTU	Air Switch (SR-40)	**
6	3070423	50,000 to 80,000 BTU	Air Switch (SR-50, 60, 75 and 80)	**
6	3070424	100,000 BTU	Air Switch (SR-100)	**
6	3070425	125,000 BTU	Air Switch (SR-125)	**
6	3070426	150,000 BTU	Air Switch (SR-150)	**
6	3070428	175,000 to 200,000 BTU	Air Switch (SR-175 and 200)	**
7	5010436	40,000 to 80,000 BTU	Blower Motor Assembly (SR-40 to SR-80)	**
7	3010002	100,000 to 200,000 BTU	Blower Motor Assembly (SR-100 to SR-200)	**
8	3070025	All Models	Thermostat Connector	**
9	3070322	All	Wire Harness	**
10	3070016	Single Stage	Transformer 20VA	**
10	3070017	2-Stage	Transformer 50VA Variable Input	**
11	3030026	All	High Voltage Ignition Wire	**
12	P000196	Modulating	DC Power Supply Circuit Board (3 Lead)	**
13	3020018/19/20	Modulating	Sigma SIT 845 Gas Valve	**
14	3070017	Modulating	Transformer 50VA Variable Input	**
-	P000682	Modulating	Modulating Controller with POT for SIT Valve	**

** UNDER 5 LBS

C. **TUBE COMPONENTS**

(See page 85 for visual details)

TUBE COMPONENTS:				
ITEM	**PIN**	**KIT TYPE**	**DESCRIPTION**	**WEIGHT**
15	5170743	All	Baffle/Turbulator	5 lbs. (2.3 kg)
16	5170163	BT, AL, ALSSH	Flanged AL Tube 4" (10.2 cm) x 124" (315 cm)	30 lbs. (13.7 kg)
16	3170707	SSTH, SSTR	Flanged SS Tube 4" (10.2 cm) x 124" (315 cm)	35 lbs. (15.9 kg)
17	5080319	All	Flange Gasket	**
18	5170171	BT	Standard Black Tube 4" (10.2 cm) x 5' (1.53 m)	15 lbs. (6.8 kg)
18	5170255	AL, ALSSH	Aluminized Tube 4" (10.2 cm) x 5' (1.53 m)	15 lbs. (6.8 kg)
19	5180150	BT	Standard Black Tube 4" (10.2 cm) x 10' (3 m) (Qty 1)	30 lbs. (13.7 kg)
19	5180151	BT	Standard Black Tube 4" (10.2 cm) x 10' (3 m) (Qty 2)	60 lbs. (27.3 kg)
19	5180152	AL, ALSSH	Aluminized Tube 4" (10.2 cm) x 10' (3 m) (Qty 1)	30 lbs. (13.7 kg)
19	5180153	AL, ALSSH	Aluminized Tube 4" (10.2 cm) x 10' (3 m) (Qty 2)	60 lbs. (27.3 kg)
19	5180154	SSTH, SSTR	Stainless Steel Tube 4" (10.2 cm) x 10' (3 m) (Qty 1)	35 lbs. (15.9 kg)
19	5180155	SSTH, SSTR	Stainless Steel Tube 4" (10.2 cm) x 10' (3 m) (Qty 2)	70 lbs. (31.8 kg)
20	3170201	BT, AL, ALSSH	Tube Clamp	**
20	3170632	SSTH, SSTR	Stainless Steel Tube Clamp	**

** UNDER 5 LBS.

D. **REFLECTOR COMPONENTS**

(See page 85 for visual details)

REFLECTOR COMPONENTS:				
ITEM	**PIN**	**KIT TYPE**	**DESCRIPTION**	**WEIGHT**
21	5190139	BT, AL, ALSSH	End Cap	**
21	3190620	SSTH, SSTR	Stainless Steel End Cap	**
22	5190137	BT, AL, ALSSH	Joint/Hanger Piece	**
22	3190621	SSTH, SSTR	Stainless Steel Joint/Hanger Piece	**
23	5180163	BT, AL, ALSSH	Aluminum Reflector 5' (1.52 m)	10 lbs. (4.6 kg)
23	5180706	SSTH, SSTR	Stainless Steel Reflector 5' (1.52 m)	15 lbs. (6.8 kg)
24	5180164	BT, AL, ALSSH	Aluminum Reflector 10' (3 m)	15 lbs. (6.8 kg)
24	5180706	SSTH, SSTR	Stainless Steel Reflector 10' (3 m)	25 lbs. (11.4 kg)
-	5180240	BT, AL, ALSSH	Side Reflector 10' (3 m)	8 lbs. (3.7 kg)

** UNDER 5 LBS

32.0 WARRANTY

Non-Transferable / Limited Warranty - Calcana Heaters

Calcana Industries Ltd. ('the Manufacturer") warrants to the original owner at the original installation site that the heater manufactured by the manufacturer ('the Product") will be free from defects in material and workmanship for one (1) year from date of shipment from the factory. Calcana further warrants that the heat exchanger, reflectors, brackets, burner and burner box will be free from defects in material and workmanship for three (3) years from the date of shipment from the factory. If upon examination by the Manufacturer the Product is shown to have a defect in the material or workmanship during the warranty period, the Manufacturer will repair or replace, at its option, that part of the Product which is shown to be defective. In no event shall the customer be entitled to consequential, indirect or special damages of any nature for defective merchandise, and in no instance may damages include loss of profit. Calcana reserves the right to inspect the system involved in any claim against the warranty. The warranty is null and void if any of the components installed are not original Calcana parts or the installation does not conform to the supplied installation manual.

This limited warranty does not apply:

a) If the Product has been subjected to misuse or neglect, has been accidentally or intentionally damaged, has not been installed, maintained or operated in accordance with the furnished written instructions, or has been altered or modified in any way by an unauthorized person.
b) To any expenses, including labor or material, incurred during removal or reinstallation of the Product.
c) To any damage due to corrosion by chemicals, including halogenated hydrocarbons precipitated in the air.
d) To any workmanship of the Installer of the Product
e) If Product is not paid for in a timely manner and in accordance with payment terms
f) If Product or any part of it is damaged by any act of nature including, but not limited to; hurricanes, gales, tornadoes, wind snow, sleet, hail, rain, flood, fire or any other similar or dissimilar condition, or by normal wear and tear, which included marks and/or dents to the reflector caused by improper transportation or installation.
g) If Product or any part of it is damaged by vandalism, improper use, accumulation of weight or heavy loads on the heater.
h) If Product is damaged due to lack of cleaning or maintenance, whether routine or otherwise.

The limited warranty is conditional upon:

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

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

All labor during the warranty period is the responsibility of the installing person or contractor.

This Limited Warranty is in lieu of all other warranties, either express or implied, and all such other warranties, including without limitation implied warranties of merchantability and fitness for a particular purpose, are hereby disclaimed and excluded from this limited warranty. The warranty cannot be transferred or assigned by the Customer. All disputes arising from this warranty are to be governed by the laws of the Province of Alberta and any action to enforce this warranty must be initiated in the Province of Alberta. In no event shall the Manufacturer be liable, in any way for any consequential, special, or incidental damages of any nature whatsoever, or for any amount in excess of the selling price of the Product or any parts thereof found to be defective. This Limited Warranty gives the original owner of the Product specific legal rights. You may also have other rights which may vary by each jurisdiction.

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