

Installation, Operation and Service Instructions

INFRARED HEATER



SUPERIOR
RADIANT PRODUCTS

Series ETS Infrared Heater
Two-Stage



WARNING: FOR OUTDOOR USE ONLY

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.

OWNER

Retain this Manual & ensure available for Service. Improper installation, adjustment, alteration, service or maintenance can cause injury, death or property damage.

Read the installation, operation and service instructions thoroughly before installing or servicing this equipment.

FOR YOUR SAFETY

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

If you smell gas:

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

INSTALLER

Provide Manual to owner upon completion of installation! Read and thoroughly understand these Instructions before attempting any installation.

Canada: 563 Barton Street, Stoney Creek, Ontario L8E 5S1

USA: 315 N Madison Street, Fortville, IN 46040

www.superiorradiant.com

DANGER - CARBON MONOXIDE HAZARD

This appliance can produce carbon monoxide which has no odor. Using it in an enclosed space can kill you. Never use this appliance in an enclosed space such as a camper, tent, car or home.

WARNING - ELECTRICAL GROUNDING INSTRUCTIONS

This heater is equipped with a three-prong (grounding) plug for your protection against shock hazard and should be plugged directly into a properly grounded three-prong receptacle. Do not cut or remove the grounding prong from this plug.

Keep any electrical supply cord away from any heated surfaces.

CAUTION - MAINTENANCE INSTRUCTION

1. Keeping the appliance area clear and free from combustible materials, gasoline and other flammable vapors and liquids.
2. Not obstructing the flow of combustion and ventilation air.
3. Visually checking burner flames.
4. Cleaning the appliance, including special surfaces, with recommended cleaning agents, if necessary.

Check the maintenance section in this manual for additional instructions.

CAUTION - INSTALLATION

This appliance shall be used only in a well-ventilated space and shall not be used in a building, garage or any other enclosed area.

The appliance may be installed with shelter no more inclusive than:

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

CALIFORNIA PROPOSITION 65

This appliance, its related accessories and by-product of operation, contain chemicals known to the State of California to cause cancer and birth defects or other reproductive harm. For more information go to www.P65Warnings.ca.gov.

CAUTION – FIRE OR BURN INJURY HAZARD

- At all times maintain clearance to combustible materials as further specified in this manual. Failure to do so can result in serious fire hazard.
- Never operate heaters in atmosphere containing flammable vapours or combustible dusts.
- This heater is equipped with an electronic and automatic ignition device. Do not attempt to light the burner by hand. Failure to comply can result in a serious fire and personal injury hazard.
- Certain materials, when stored under this heater are subjected to radiant heat can soften, distort or otherwise be damaged, special care should be taken of plastic materials
- Appliance surfaces, other than the obvious flame and emitter surfaces, attain elevated temperatures during operation. Do not touch the heater head during operation. Everyone should be alerted to this hazard to avoid burning.
- Children should be strictly supervised when in the area of this heating appliance. Playing or running around the structure should be strictly forbidden.
- Clothing or other flammable materials should not be hung on or near this heater.
- Any guard or other protective device removed for servicing the heater must be replaced prior to operating the heater.
- 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.

SAFETY REQUIREMENTS

- Never locate the heater directly below electrical lines, gas lines or sprinkler systems.
- Do not locate heater too close to vinyl or plastic wall coverings. These materials may discolour or soften well before they reach combustible limits.
- The heater requires a minimum clearance from combustible materials. See the Clearance to Combustible Materials section for specific requirements.
- Always allow room for maintenance purposes.
- The heater aspirates air for combustion. Do not locate heater where there are severe draft conditions or airflow restrictions to the burner.

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Introduction

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

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

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

SRP offers its 20 years of infrared expertise in a cost effective unitary heater design as culmination of that commitment. **Series ETS** models are low intensity infrared heaters that are easy to install and maintain, and which were engineered with significant input from our customers. They are designed to provide economical operation and trouble-free service for years to come.

Important

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

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

Installation Codes

Installations must comply with local building codes, or in their absence, the latest edition of the national regulations and procedures as listed below.

General Installation and Gas Codes

Heaters must be installed only for use with the type of gas appearing on the rating plate, and the installation must conform to the National Fuel Gas Code, ANSI Z223.1/NFPA 54 in the USA and CSA B149.1 and B149.2 Installation Codes in Canada.

This heater is approved for outdoor installation only. Not for use in residential dwellings, refer to Rating plate.

Gas Supply Lines

Gas supply pipe sizing must be in accordance with the National Fuel Gas Code, ANSI Z223.1/NFPA 54 in the USA and CSA B149.1 and B149.2 Installation Codes in Canada.

A 1/8" NPT plugged tap must be installed in the gas line connection immediately upstream of the burner farthest from the gas supply meter to allow checking of system gas pressure.

Electrical

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

General Specifications

Gas Supply

Inlet Pressure

	Natural Gas	Propane Gas
Minimum:	5.0" W.C.	11.5" W.C.
Maximum:	14.0" W.C.	14.0" W.C.

Manifold Pressure

ETS 50, ETS 60

	Natural Gas	Propane Gas
High Rate:	3.3" W.C.	10.2" W.C.
Low Rate:	2.0" W.C.	6.4" W.C.

ETS 40, ETS 80, ETS 100

High Rate:	3.3" W.C.	10.2" W.C.
Low Rate:	1.5" W.C.	4.2" W.C.

Inlet Connection

Natural Gas	Propane Gas
½" Female NPT	½" Female NPT

Electrical Supply

120 VAC 60Hz. 1Amp: 36" Cord with grounded 3 prong plug.

Configurations

Natural gas

		ETS 40	ETS 50	ETS 60	ETS 80	ETS 100
High Rate	BTU/hr	38,500	50,000	60,000	80,000	100,000
Low Rate	BTU/hr	23,000	35,000	45,000	50,000	62,000

Propane

		ETS 40	ETS 60	ETS 80	ETS 100
High Rate	BTU/hr	38,500	60,000	78,000	92,000
Low Rate	BTU/hr	23,000	45,000	49,000	58,000

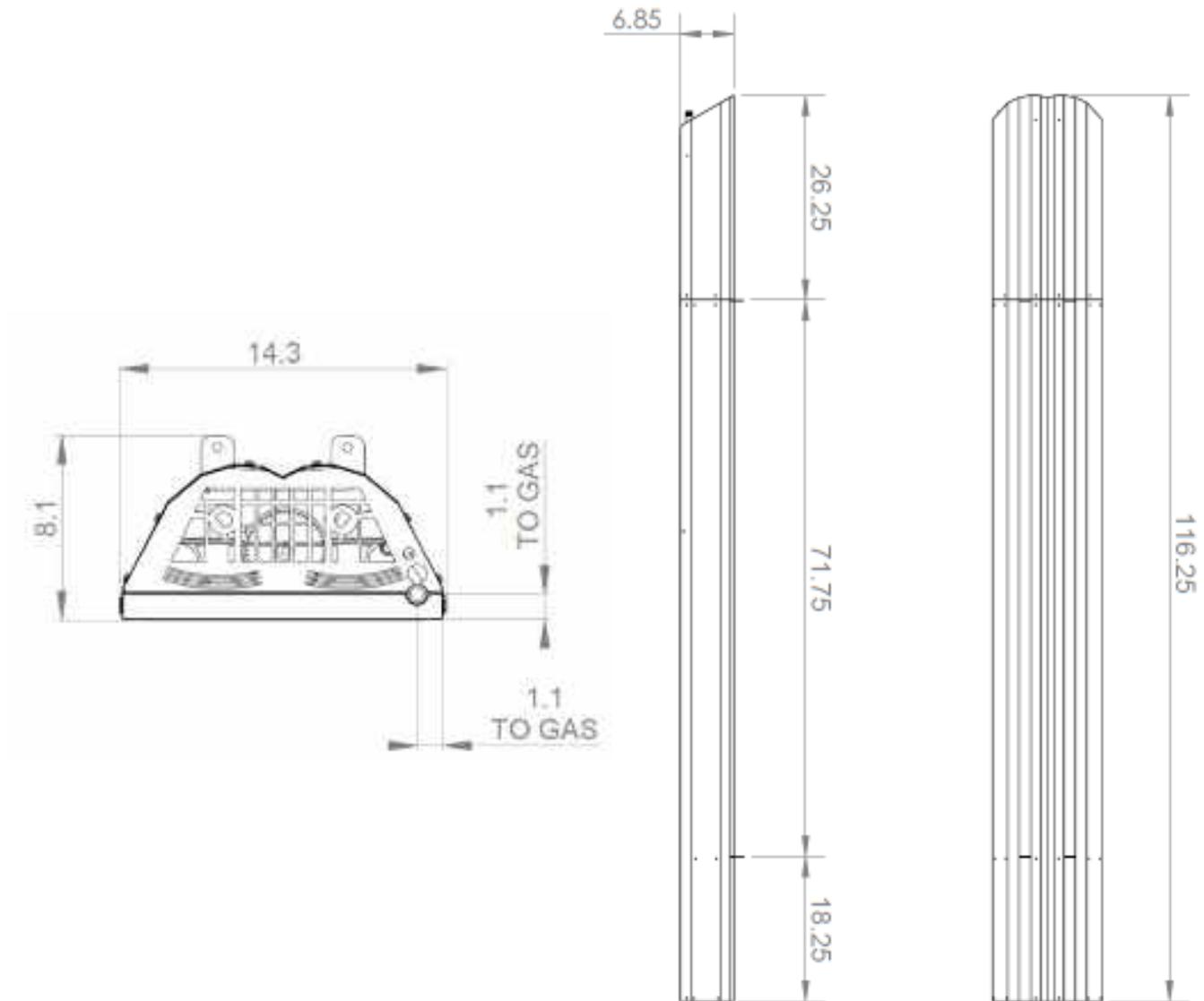
High Altitude

When installing this appliance over 4500 ft. above sea level in Canada, the appliance must be properly de-rated and installed according to local codes. In the absence of local codes the appliance must be de-rated in accordance with the most recent CSA - B149 code. In the United States for installations over 2000ft above sea level the appliance must be installed in accordance with the Current National Fuel Gas Code, ANSI Z223.1/NFPA 54. High altitude conversion kits are available, contact manufacturer for more details.

Dimensional Chart

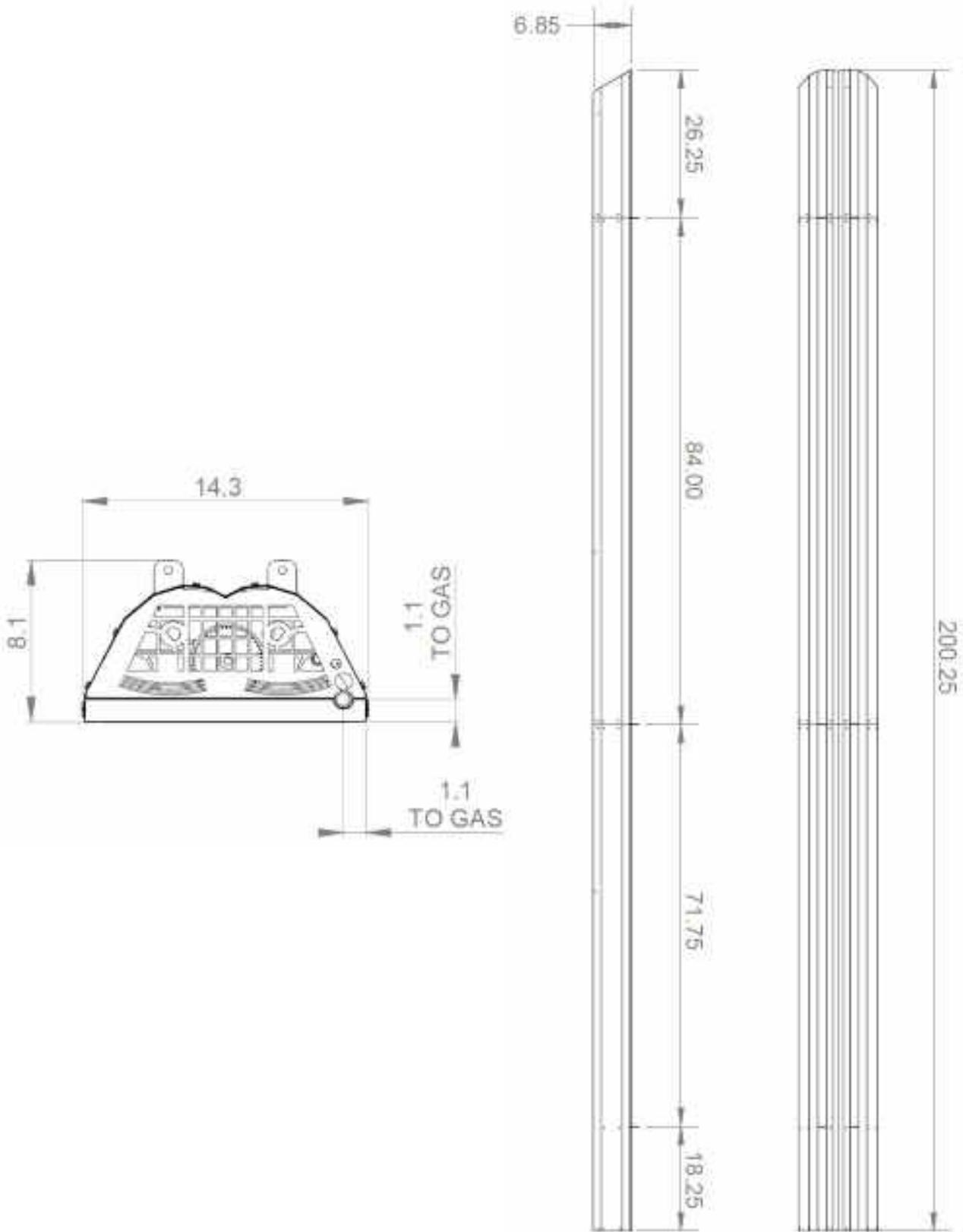
ETS 40, 50

Note: All dimensions are in inches.



ETS 60, 80, 100

Note: All dimensions are in inches.



Components

Heater Components for ETS 40, 50:



**Burner Head
(with Service Cover)**

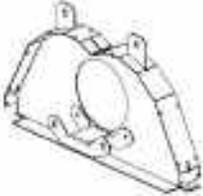
	5/16 Nut	QTY (4)
	5/16 Lock Washer	QTY (4)
	Gasket	QTY (1)



**#8-32 x 3/8"
Screws
QTY (55)**



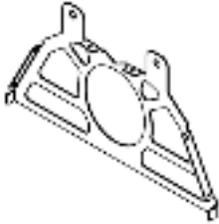
**Grill
QTY (1)**



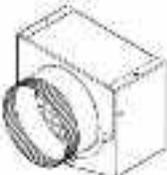
**Burner
Hanger
QTY (1)**



**End Cap
QTY (1)**



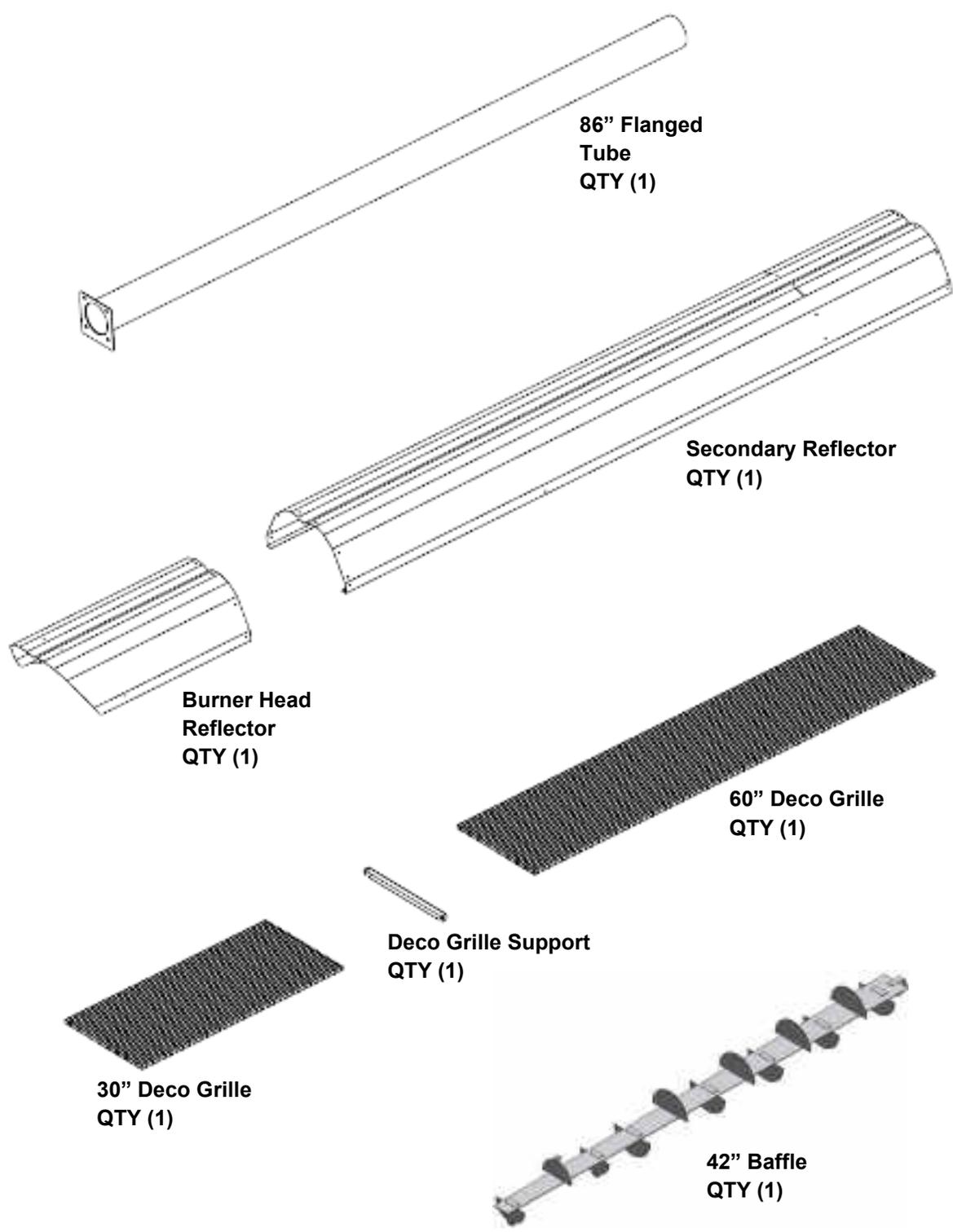
**Vent
Hanger
QTY (1)**



**Vent
Terminal
QTY (1)**



**#8 x 1/2"
Screws
Self-drilling
QTY (2)**



**86" Flanged
Tube
QTY (1)**

**Secondary Reflector
QTY (1)**

**Burner Head
Reflector
QTY (1)**

**60" Deco Grille
QTY (1)**

**Deco Grille Support
QTY (1)**

**30" Deco Grille
QTY (1)**

**42" Baffle
QTY (1)**

Heater Components for ETS 60, 80, 100:

**Burner Head
(with Service Cover)**

5/16 Nut QTY (4)

5/16 Lock Washer QTY (4)

Gasket QTY (1)

**#8-32 x 3/8"
Screws
QTY (55)**

**Grill
QTY (1)**

**Burner
Hanger
QTY (1)**

**Middle
Hanger
QTY (1)**

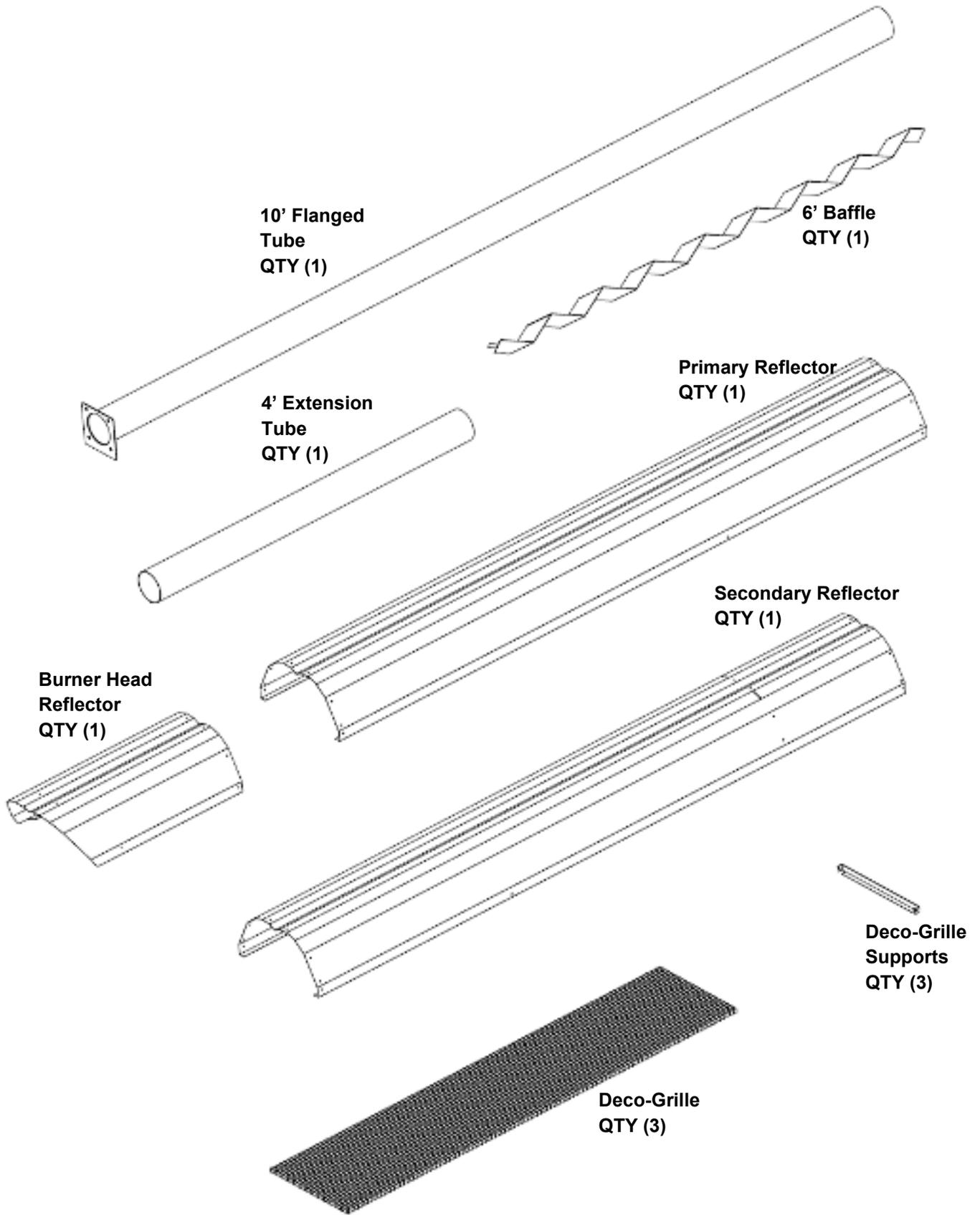
**Vent
Hanger
QTY (1)**

**Coupling
QTY (1)**

**End Cap
QTY (1)**

**Vent
Terminal
QTY (1)**

**#8 x 1/2"
Screws
Self-drilling
QTY (2)**



Installation Requirements

Clearance to Combustibles

A general clearance of 18" (0.5 m) in every direction is recommended for servicing around each Burner. This ensures adequate air flow in and around the Heating System.

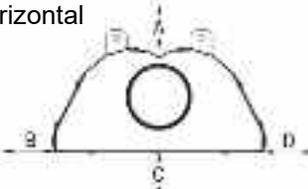
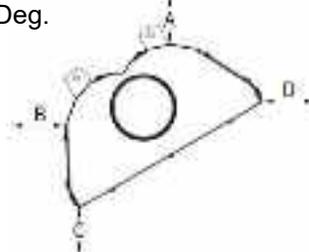
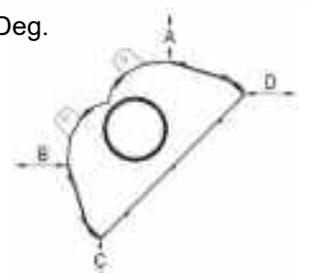
In addition to this it is very important to observe the minimum clearance to combustibles at all times to avoid any possibility of property damage or personal injury.

Table below lists the minimum clearance to combustible materials for various installation configurations. Additional clearance may be required for glass, painted surfaces and other materials which may be damaged by radiant or convective heat.

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

Adequate clearance to sprinkler heads must be maintained. **NOTE:** Sprinkler head heat fuse link performance may alter with age.

The stated clearance to combustibles represents a surface temperature of 65°C (117°F) **above** room temperature. Building materials with low heat tolerance (such as plastics, vinyl siding, canvas, tri-ply, etc.) may become subject to degradation at lower temperatures. It is the installer's responsibility to ensure that adjacent materials are protected from degradation.

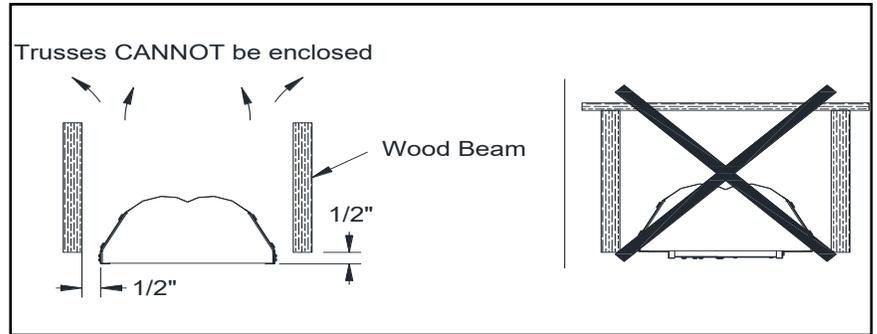
Reflector Configurations	Dim	ETS 40	ETS 50	ETS 60, 80, 100
Horizontal 	A	4"	5.5"	4"
	B	18"	25"	29"
	C	54"	66"	73.5"
	D	18"	25"	29"
30 Deg. 	A	6"	-	6"
	B	4"	-	6"
	C	42"	-	58"
	D	30"	-	41"
45 Deg. 	A	8"	8"	8"
	B	4"	3"	2.5"
	C	40"	50"	55.5"
	D	38"	40"	43"
Burner End		4"	4"	4"
Exhaust End		6"	6"	4"

Heater Mounting

This heater can be installed between wood beams with minimum distances as shown.

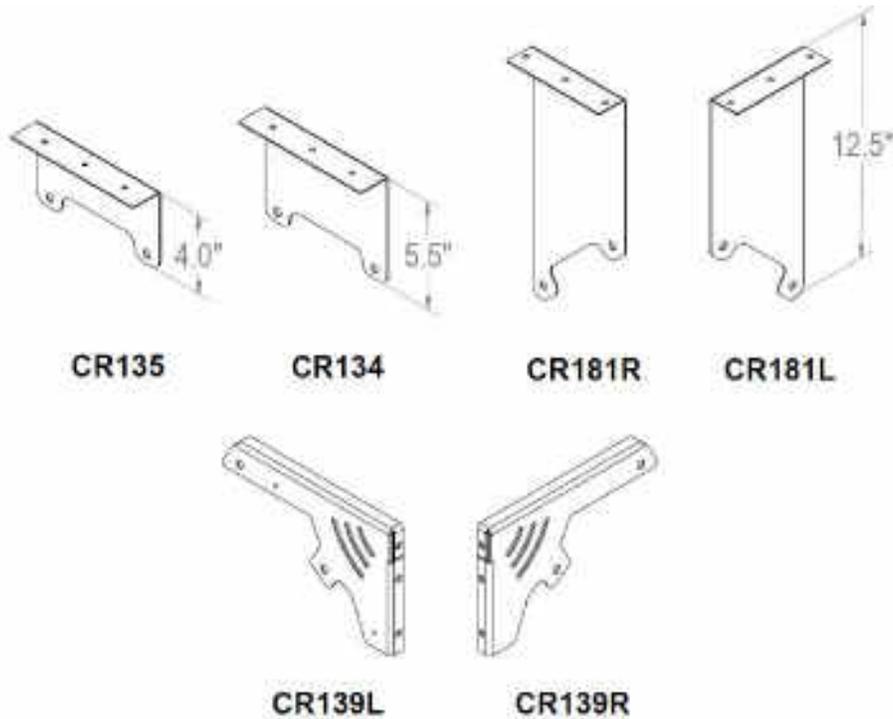
Air flow **MUST NOT** be restricted. The space above the heater must not be enclosed in order to allow air for ventilation.

Note: Surfaces between joists or flush with the heater must not exceed 50°C (90°F) above ambient temperature.



The heater can be mounted in a variety of ways, using a combination of chains and mounting bracket. It is critical that the heater is prevented from swaying and putting stress on the gas connection. Also, be sure to check local codes for seismic bracing requirements for outdoor heating equipment.

Note: Minimum mounting height is 7' in Canada and 8' in the US.



Venting

This heater does not require venting as it is approved for **OUTDOOR INSTALLATION ONLY**.

WARNING

- This heater is NOT approved for any indoor Residential application.
- If in doubt of your application, consult with your local fire marshal or gas authority having jurisdiction.
- Indoor spaces include but are not limited to: attached garages, solariums, living quarters etc.

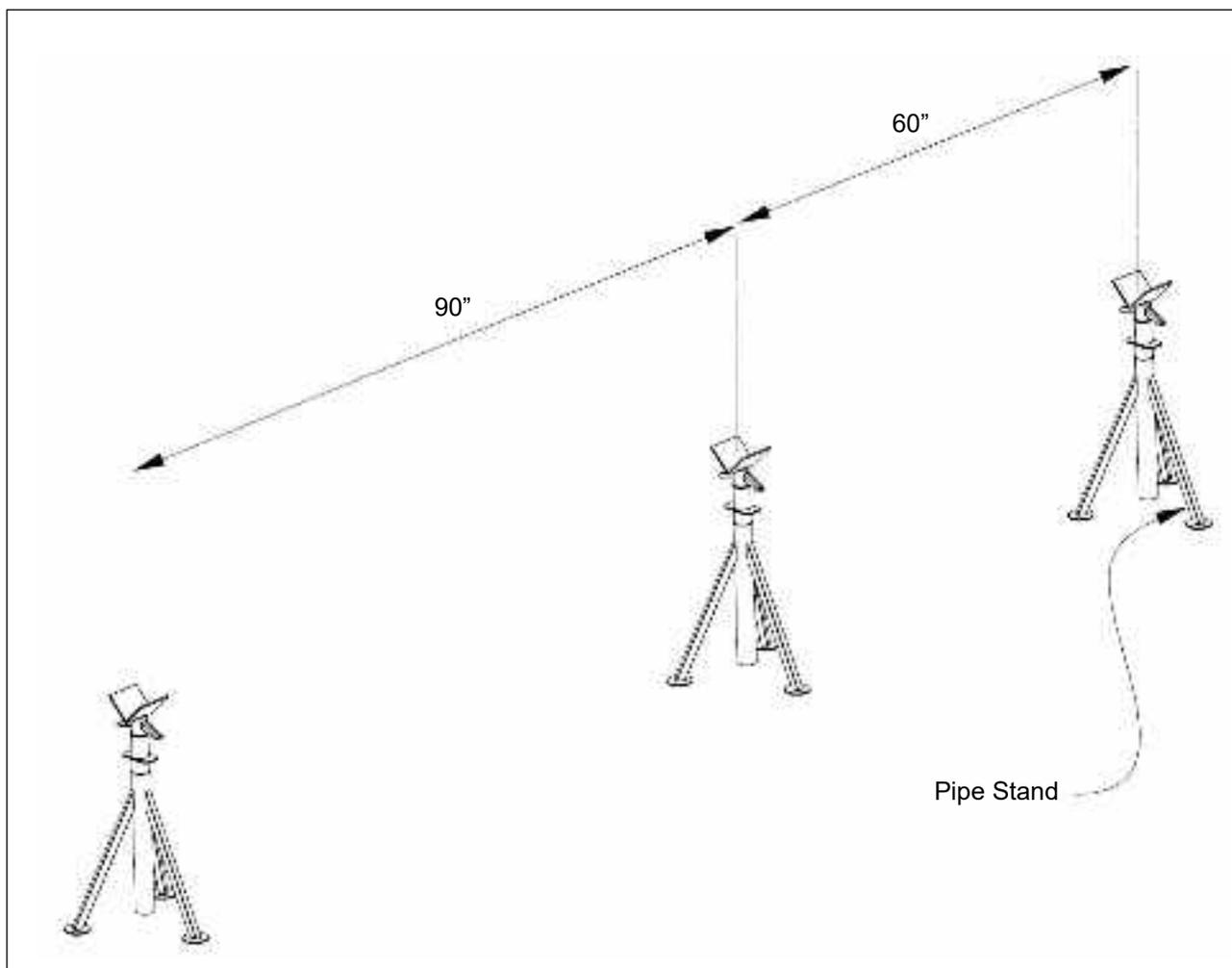
Installation Instructions

Generally, there is no unique sequence for installation of the burner or heat exchanger. A review of the job site will usually indicate a logical installation order. However, time and expense can be saved if installation is begun at the most critical dimension, watching for interference from overhead beams etc.

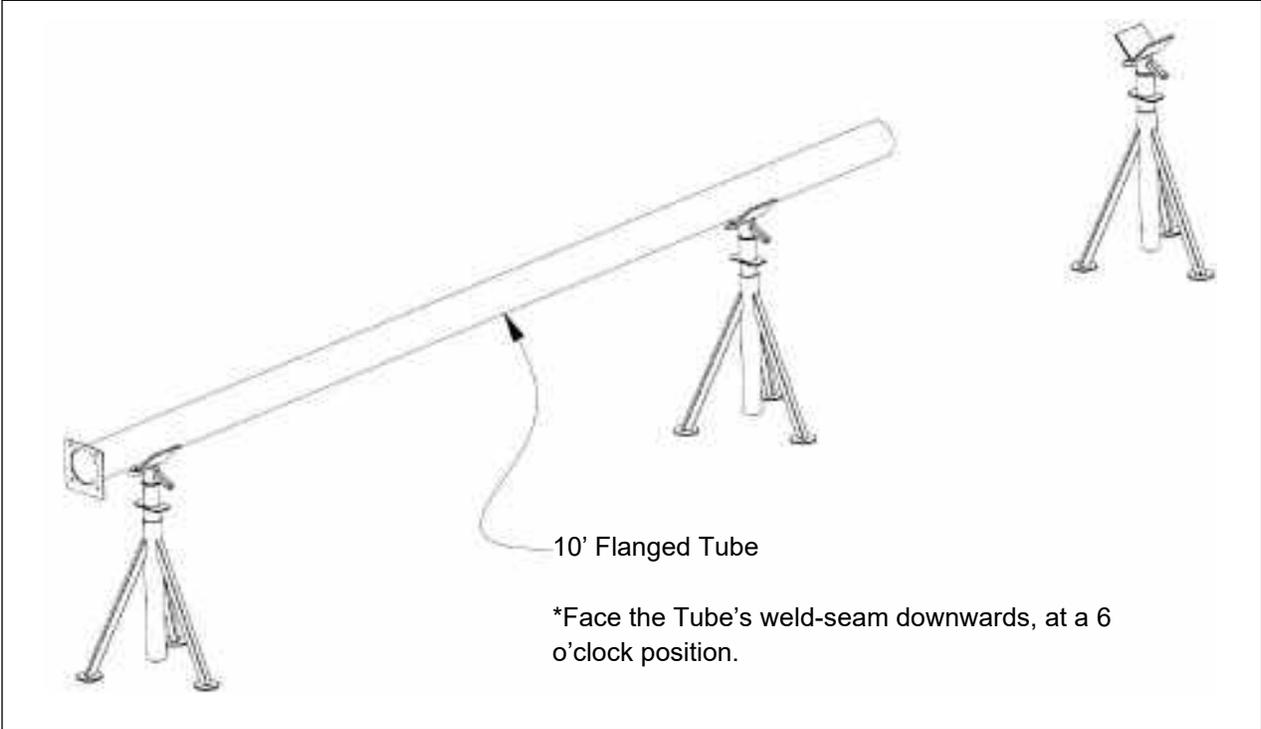
It is **RECOMMENDED** to follow the assembly sequence shown in the following pages for free hanging installation.

Installation – ETS 60, 80, and 100

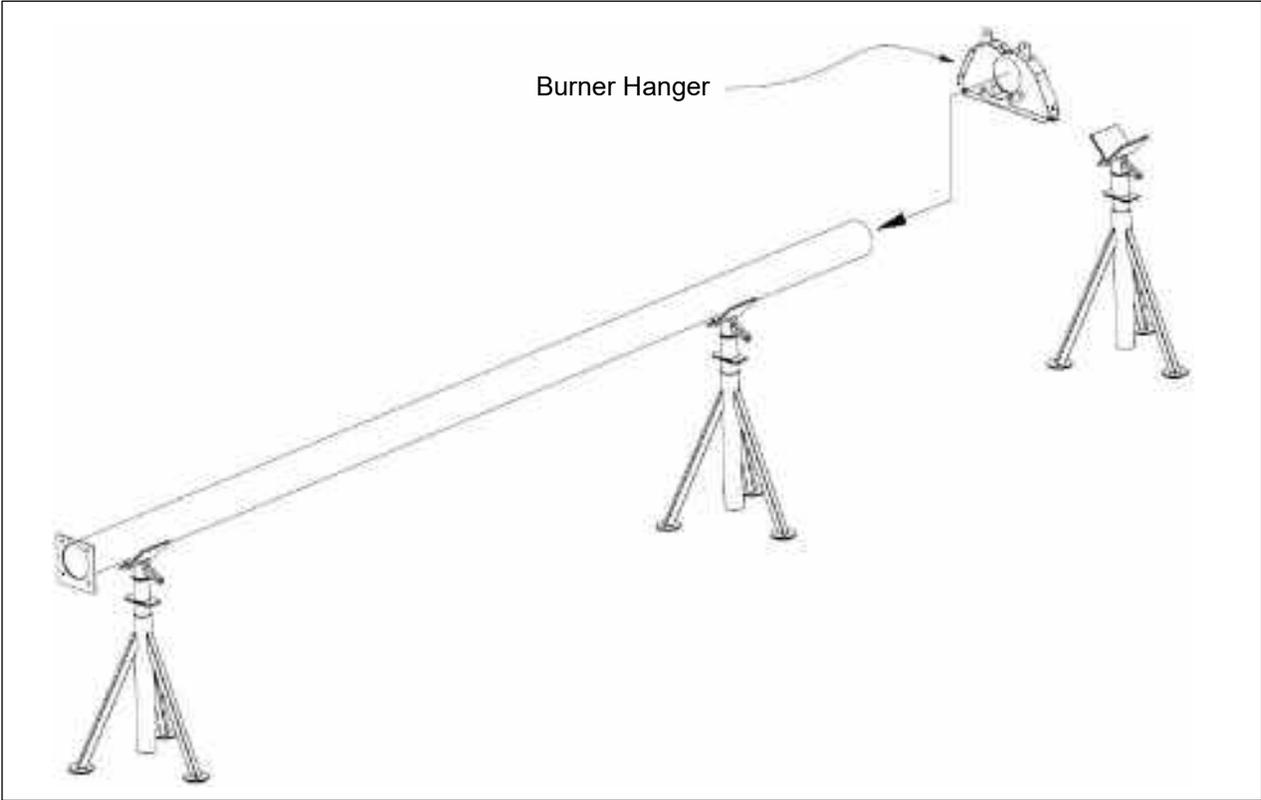
Step 1:



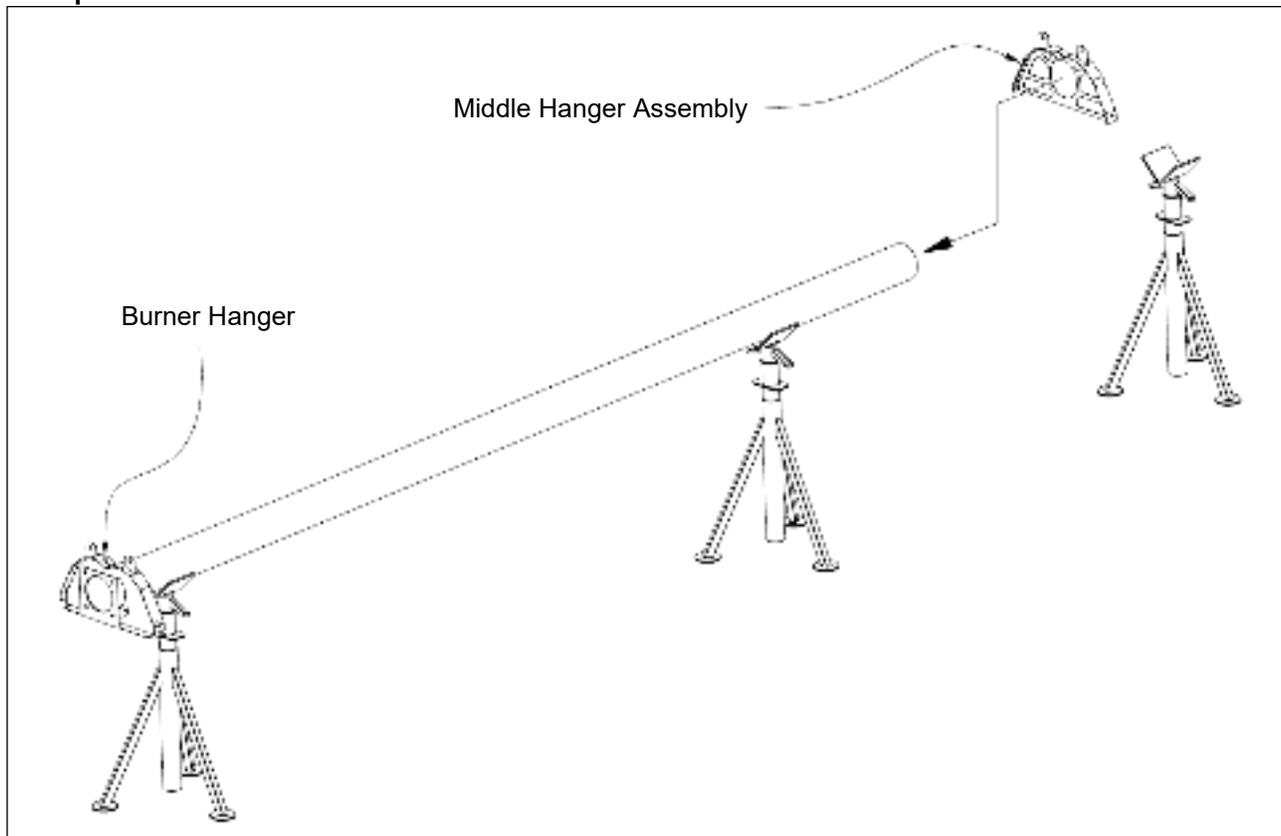
Step 2:



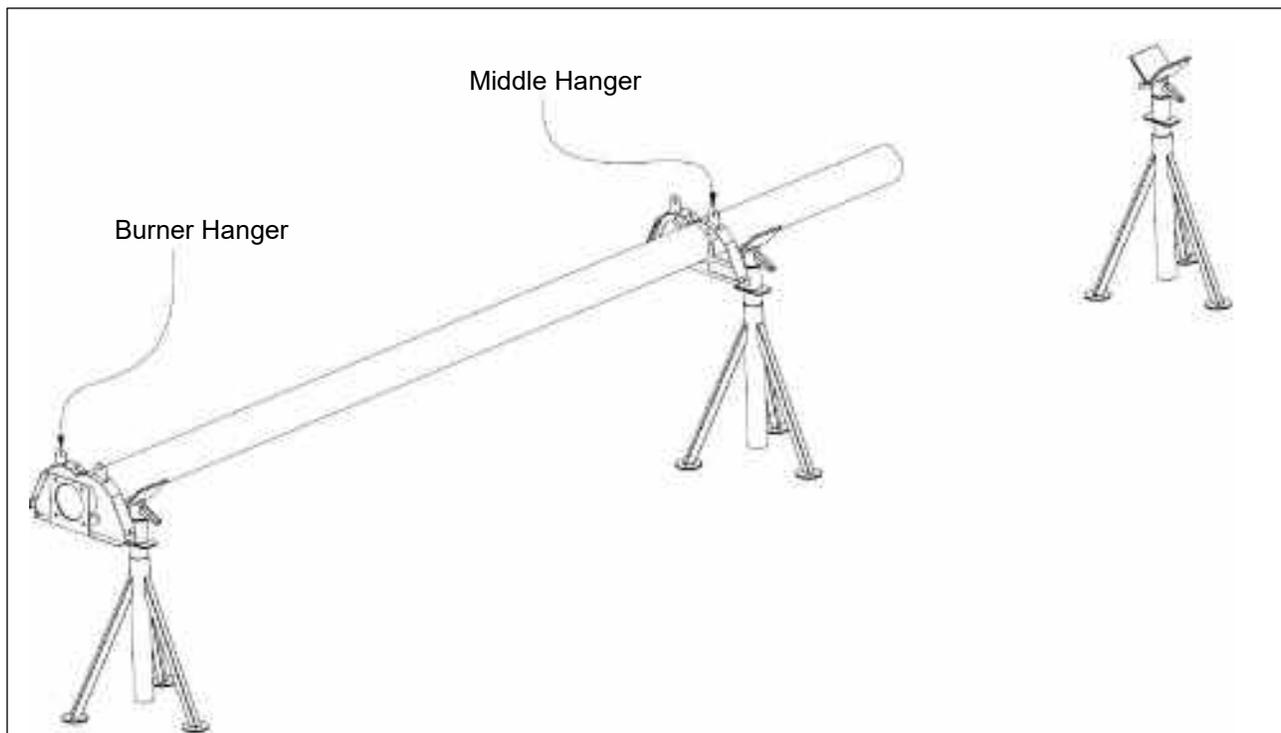
Step 3:



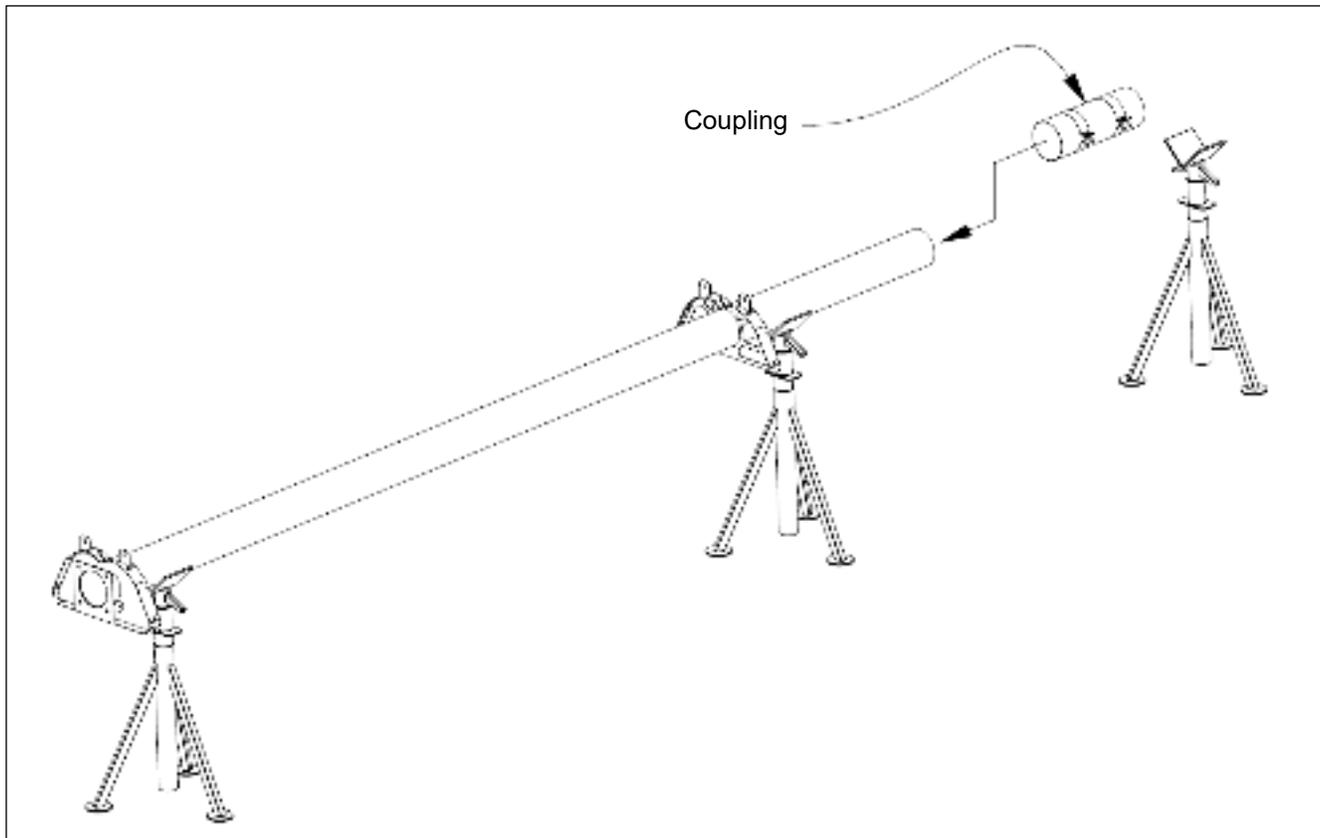
Step 4:



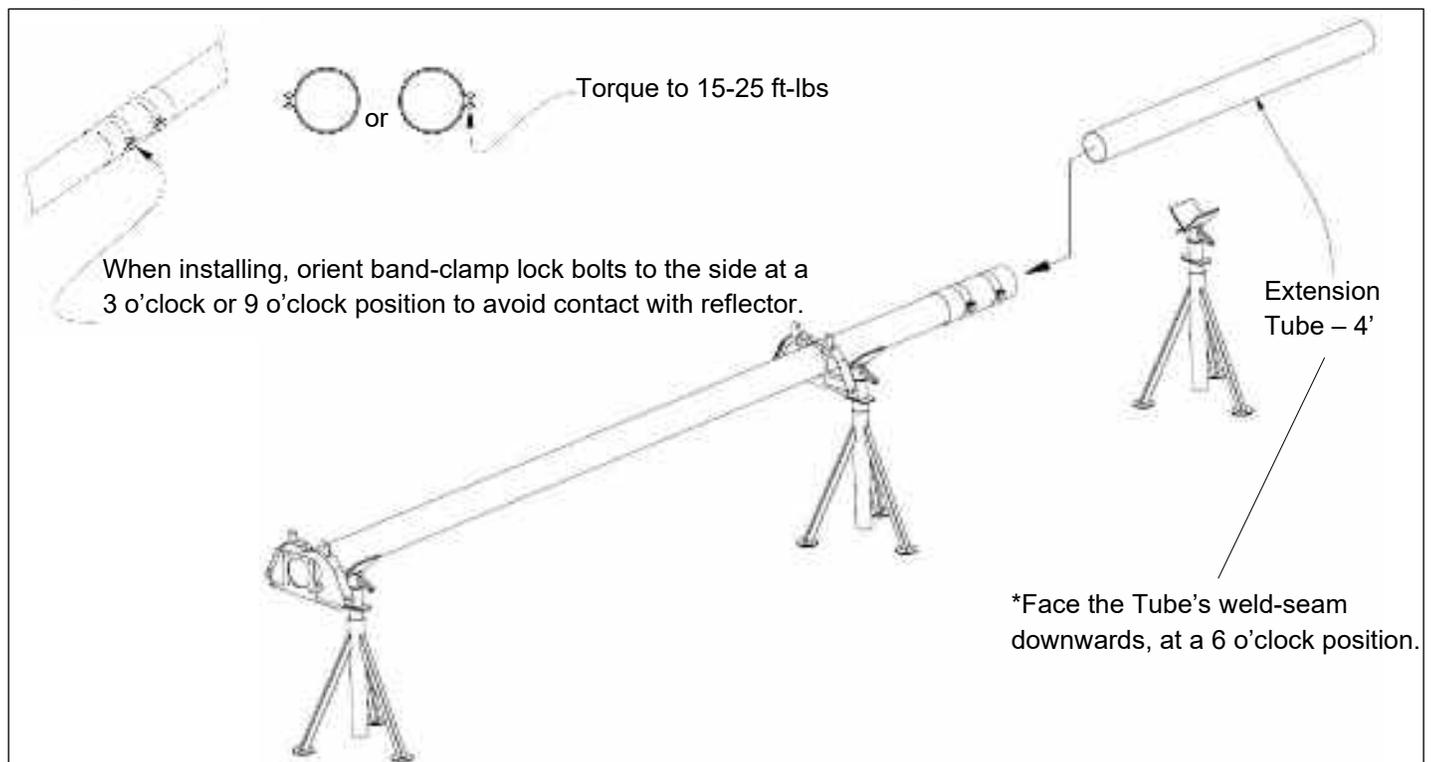
Step 5:



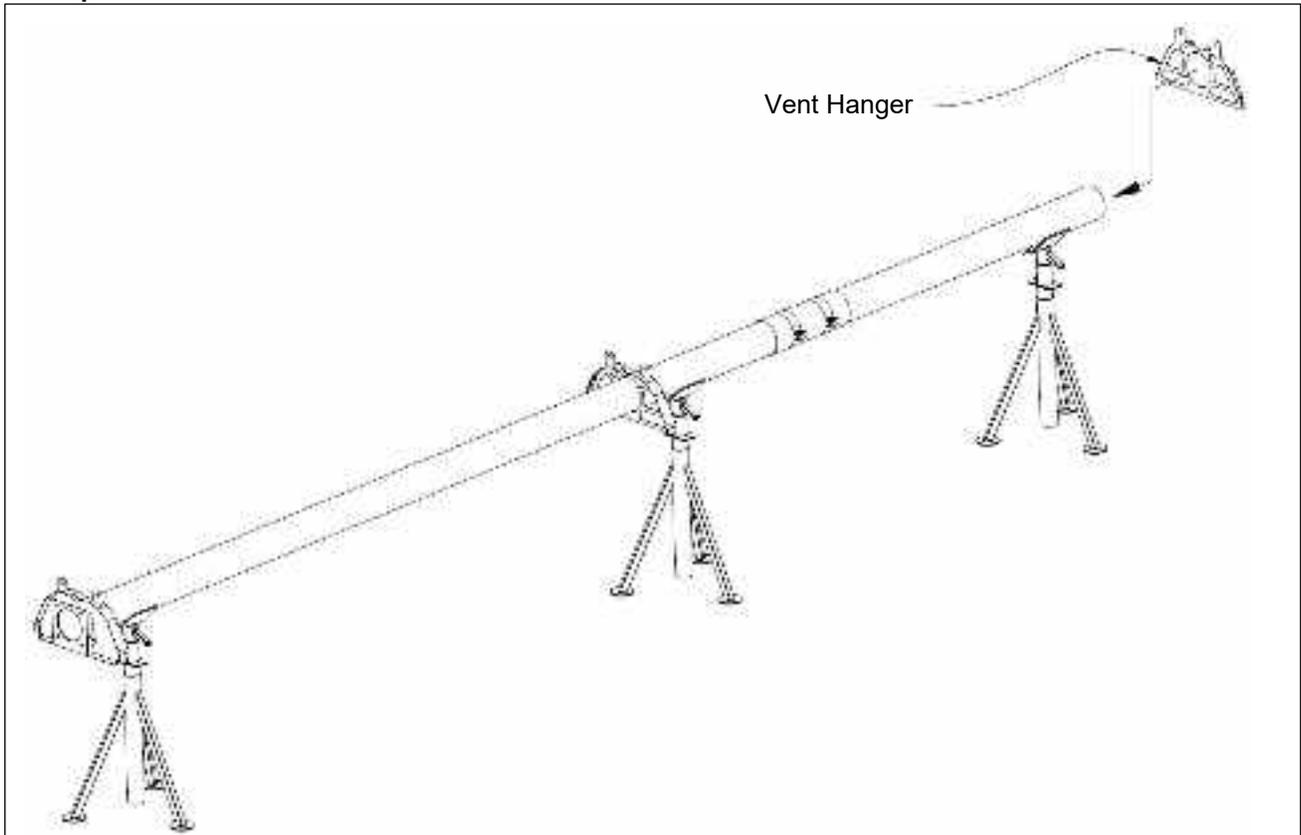
Step 6:



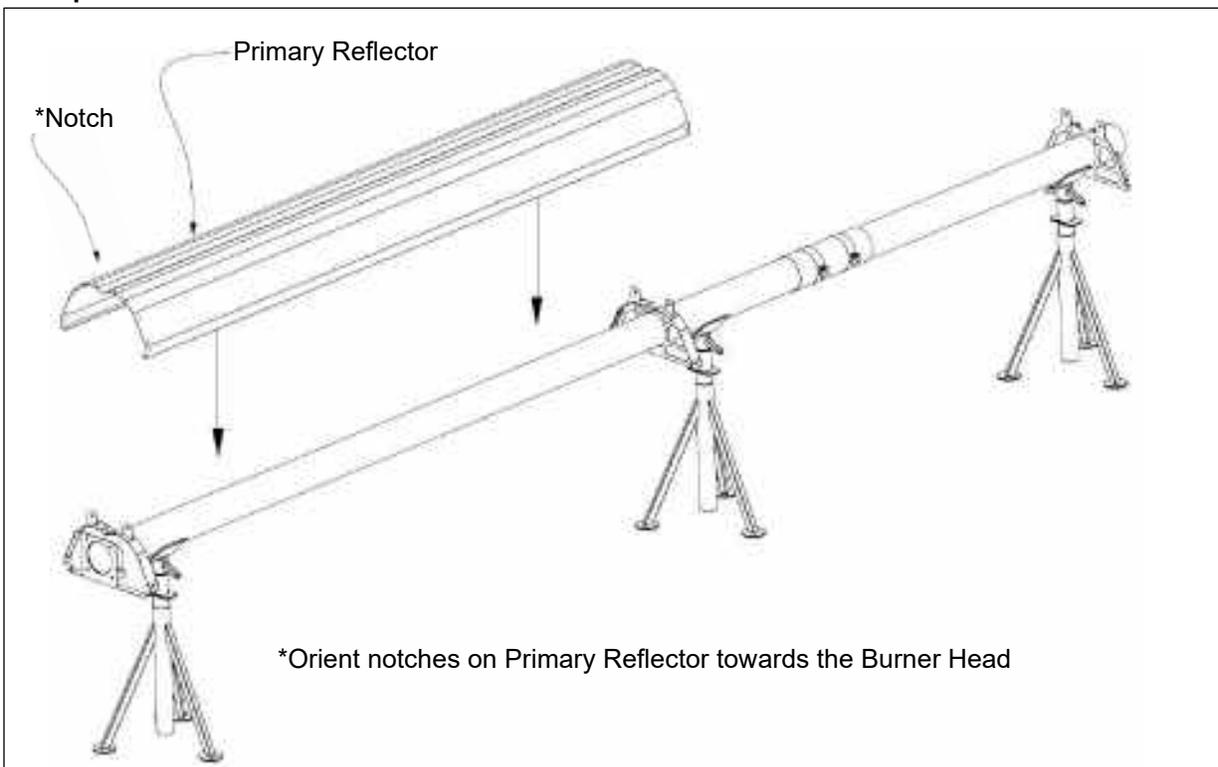
Step 7:



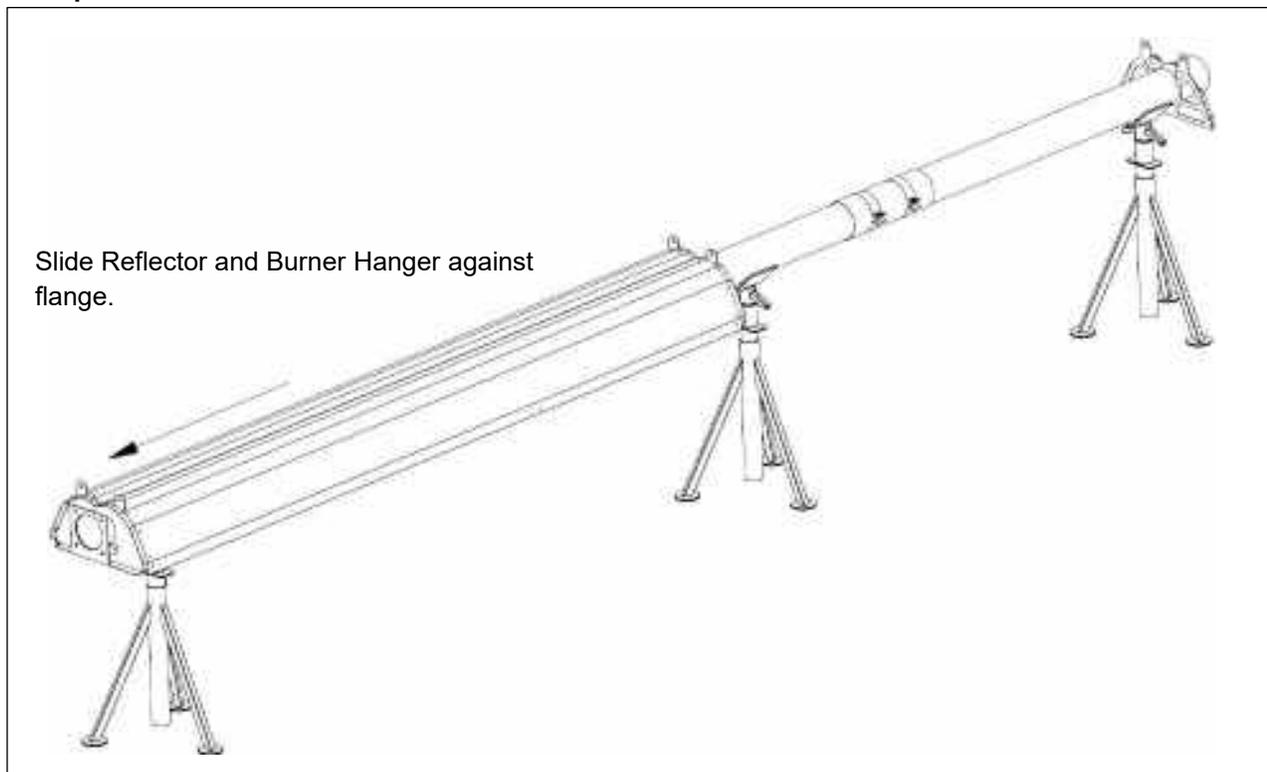
Step 8:



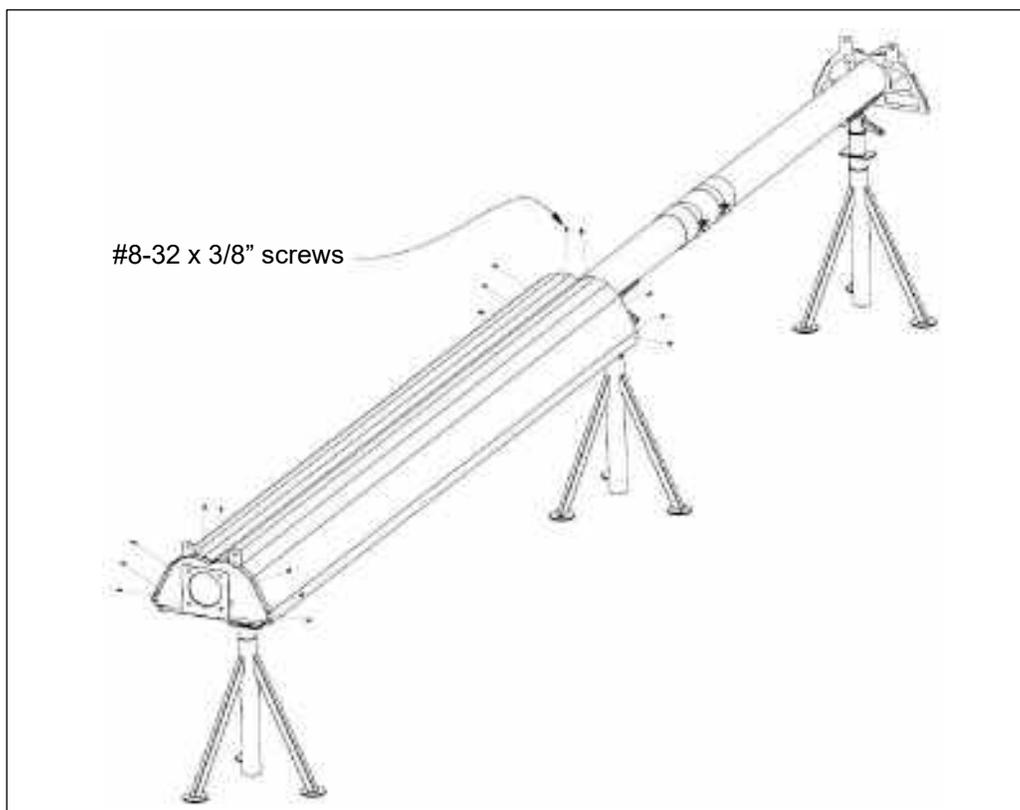
Step 9:



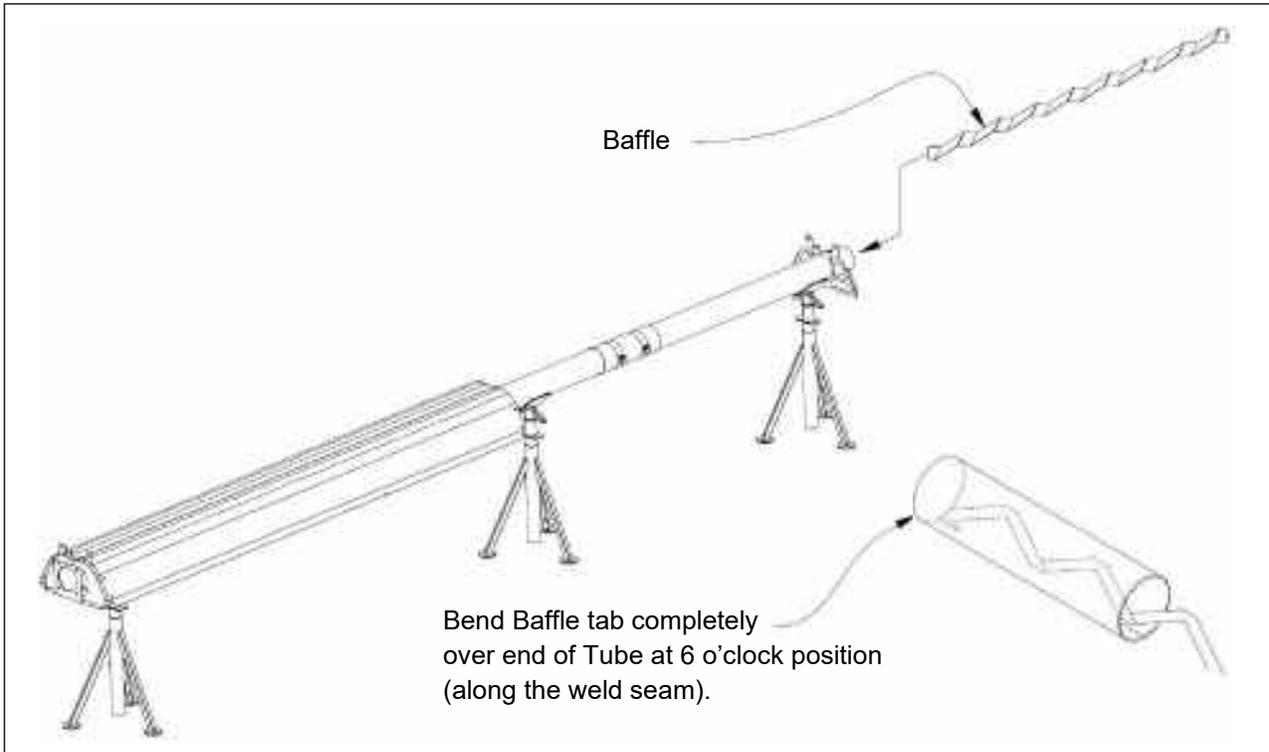
Step 10:



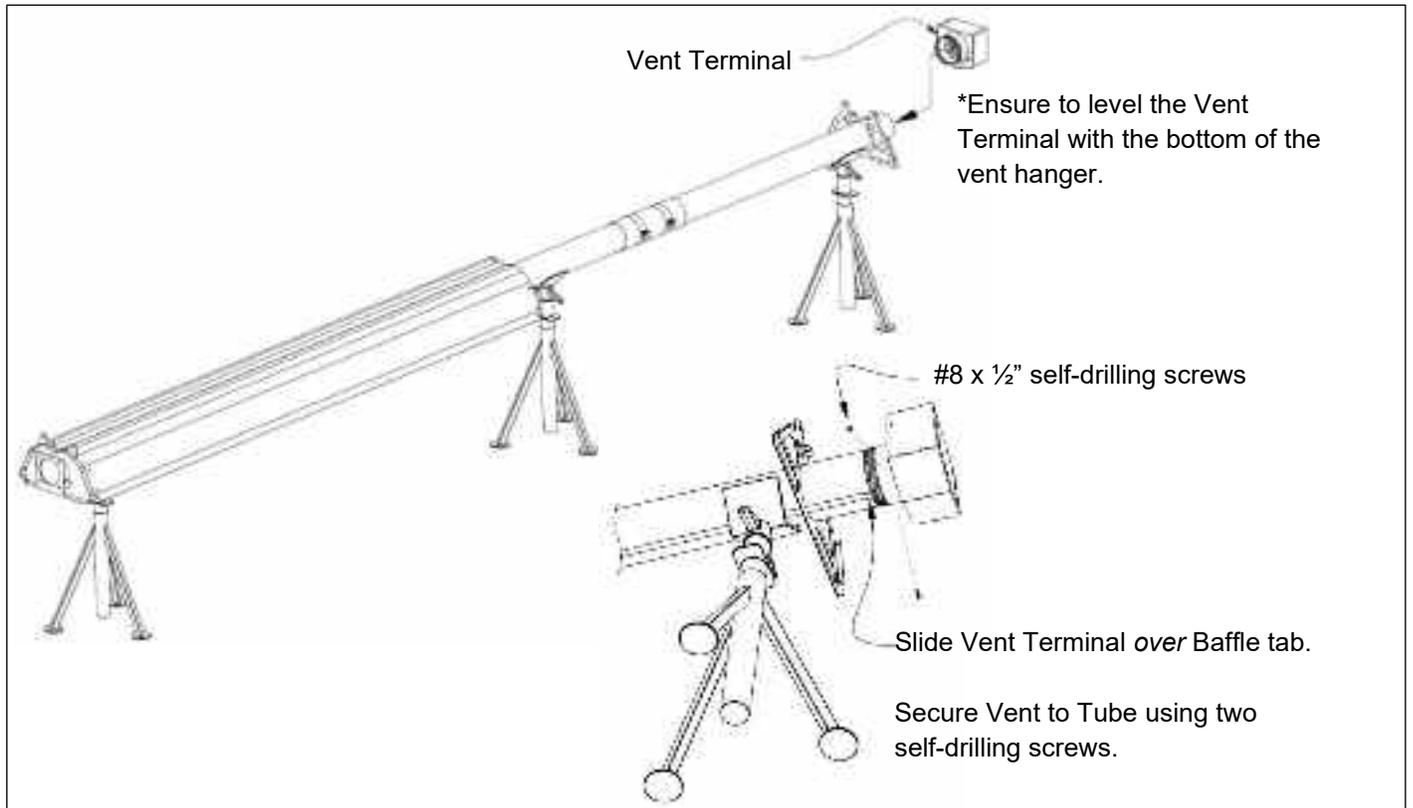
Step 11:



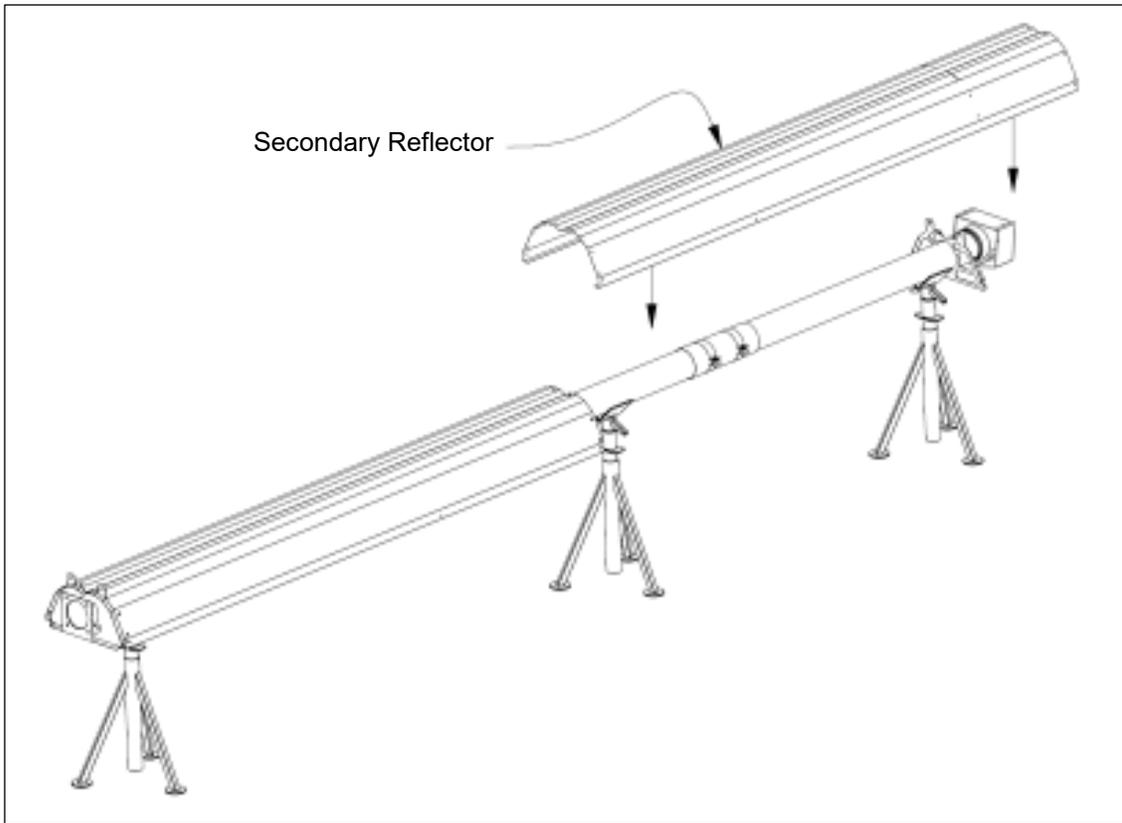
Step 12:



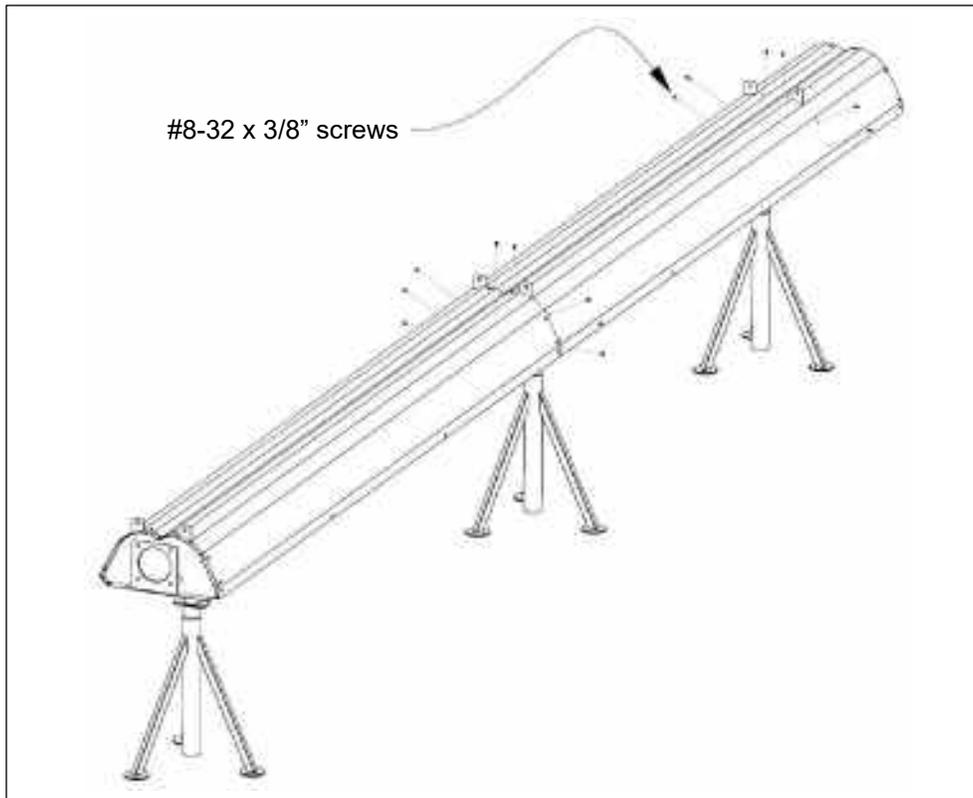
Step 13:



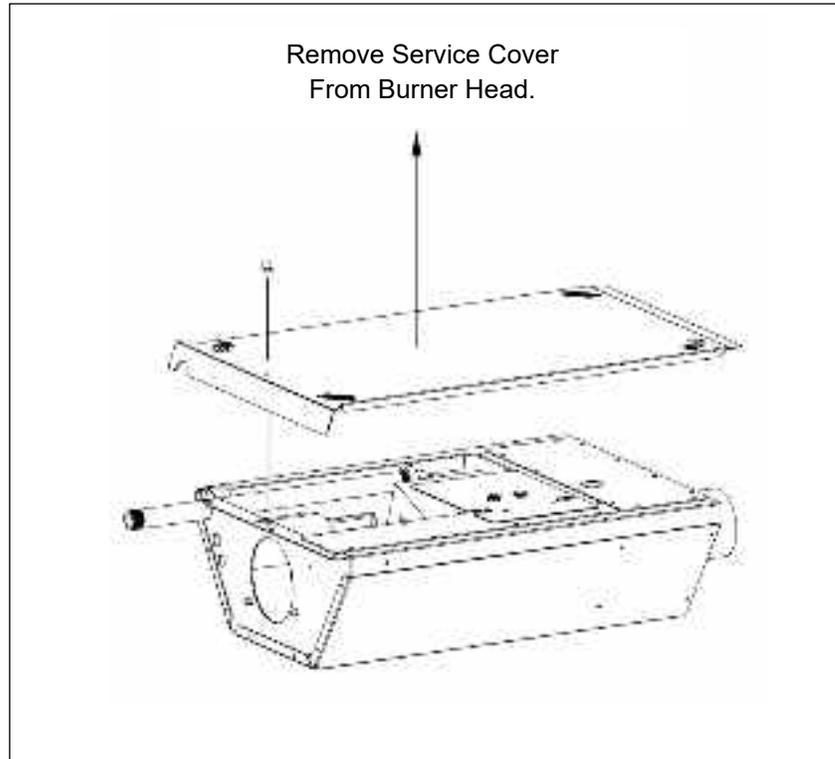
Step 14:



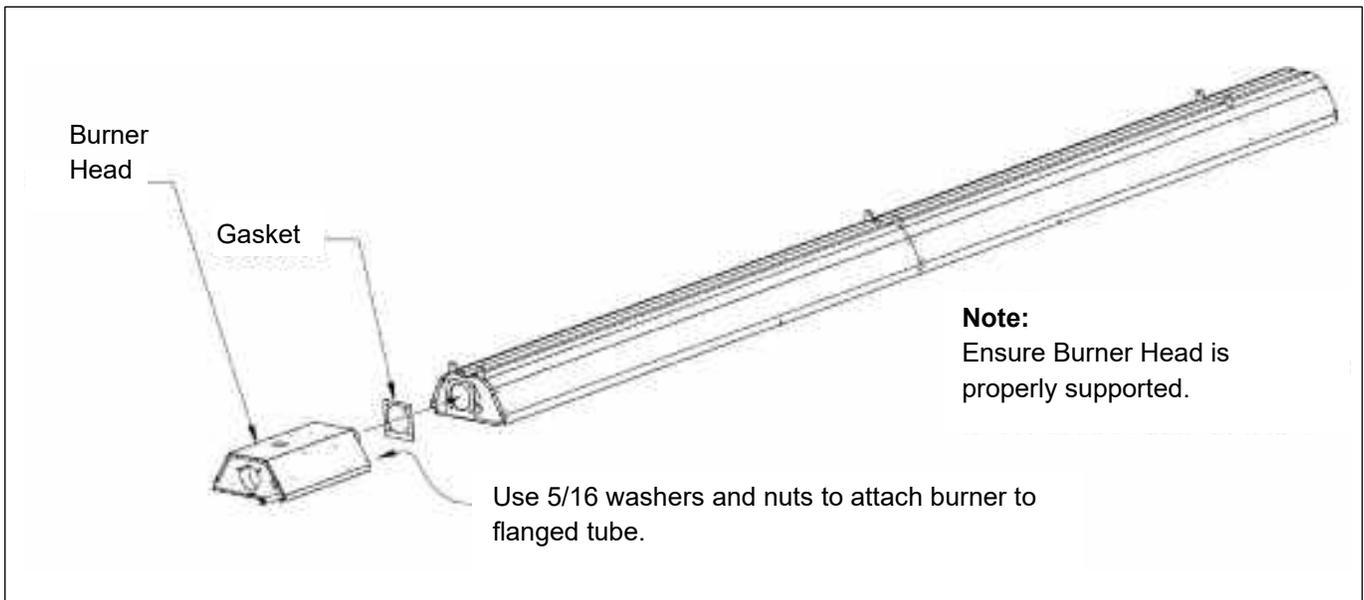
Step 15:



Step 16:

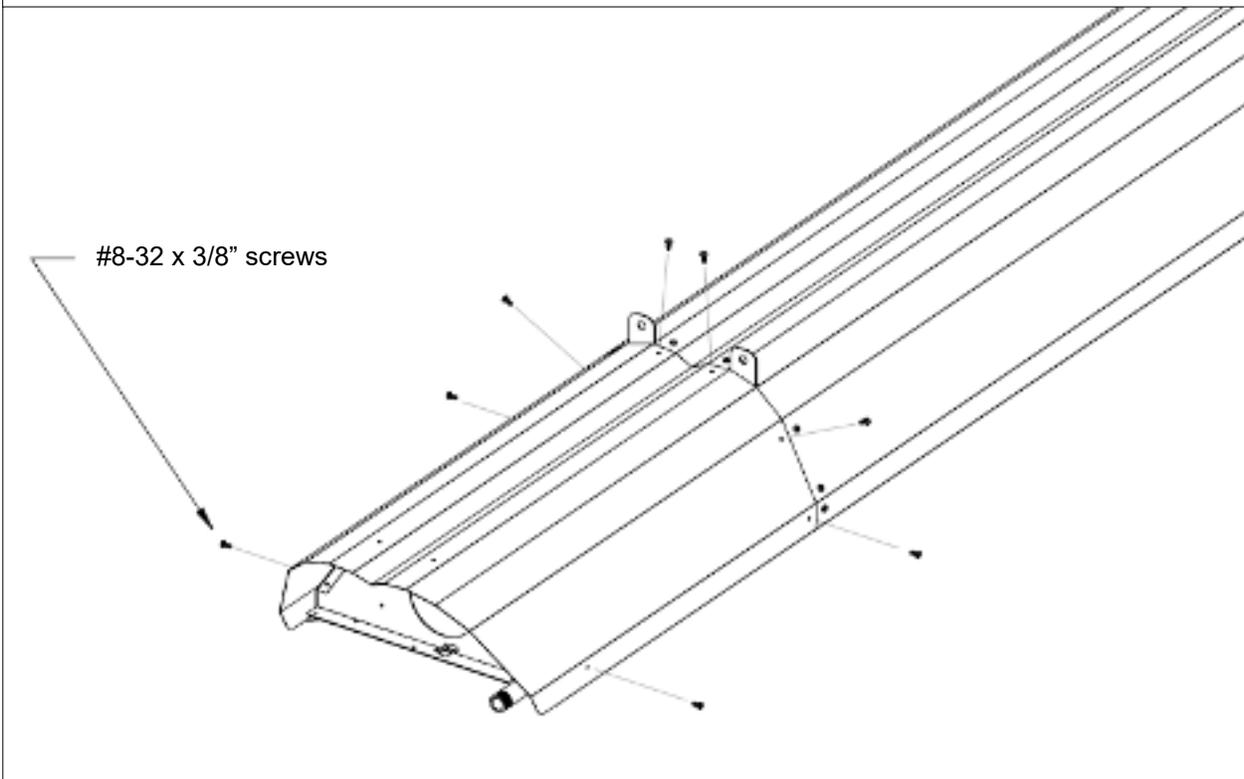
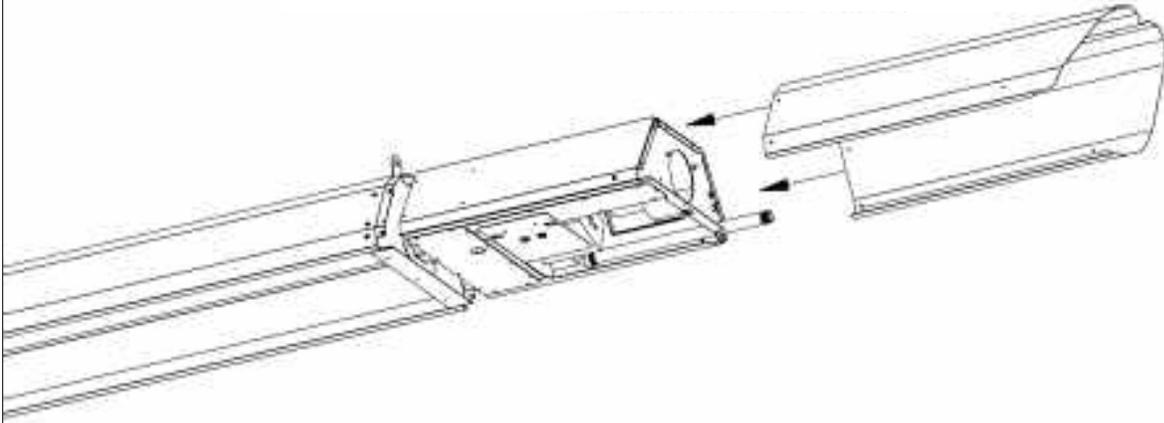


Step 17:

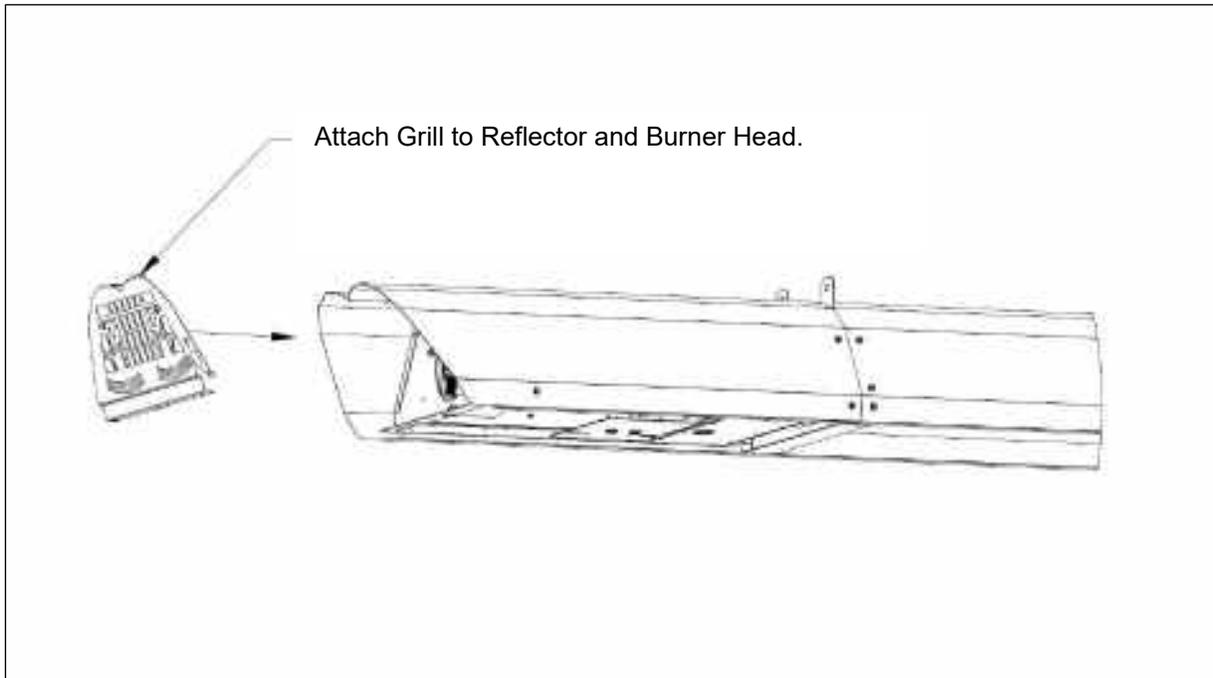


Step 18:

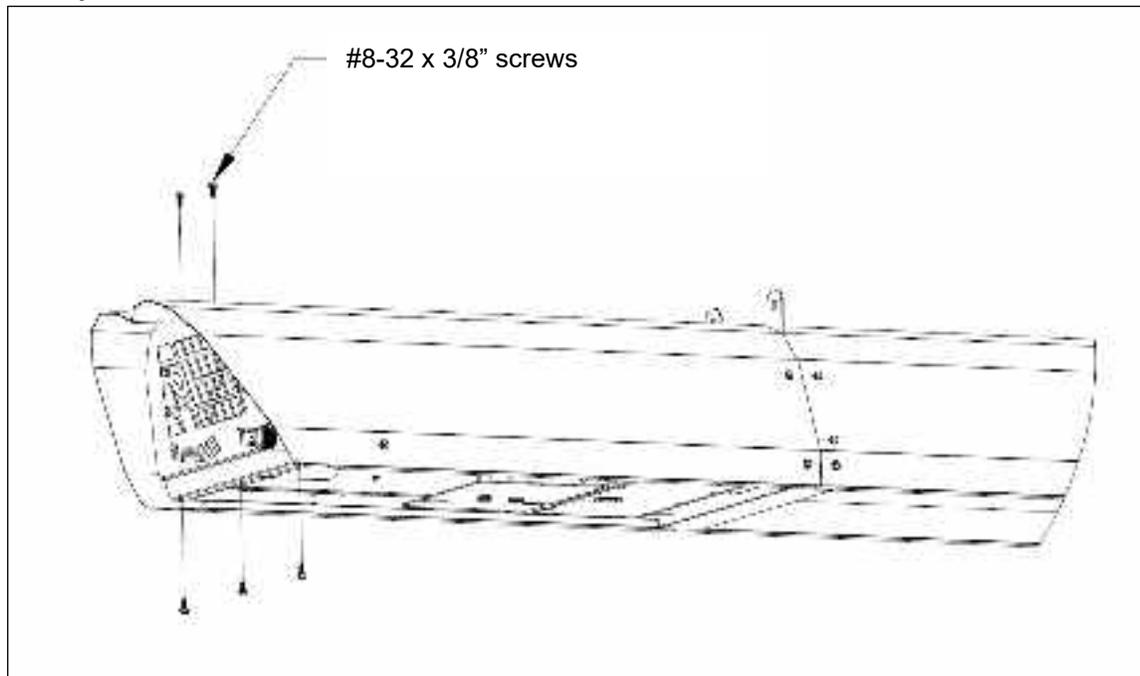
Slide Burner Head Reflector over Burner Head.



Step 20:

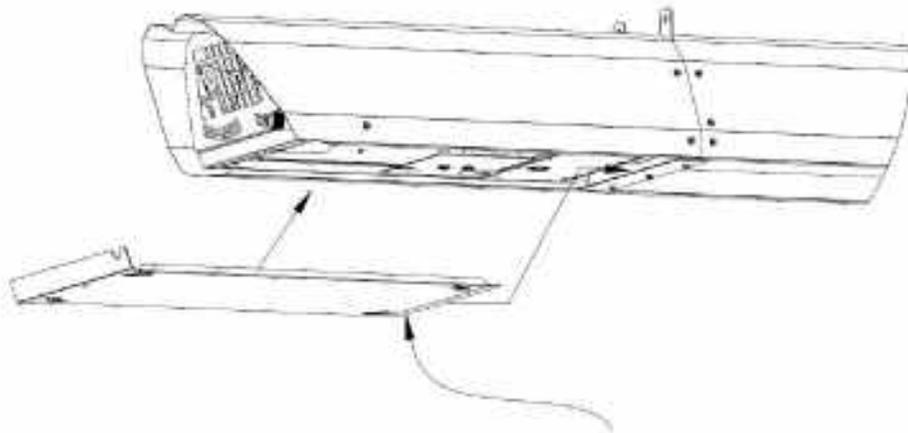


Step 21:



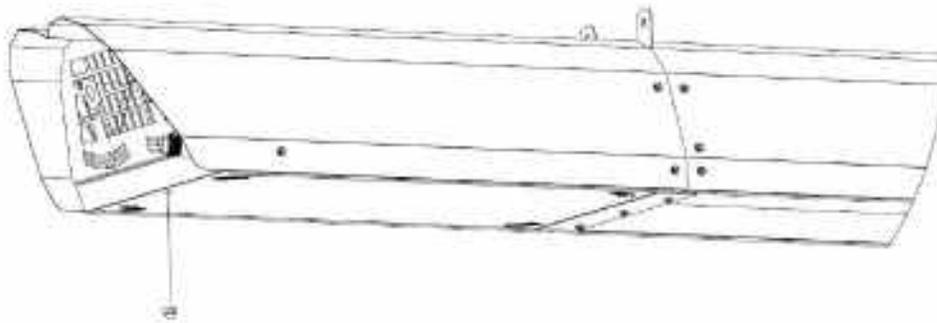
Step 22:

Re-attach Service Cover.



(tuck this edge up and in)

Step 23:

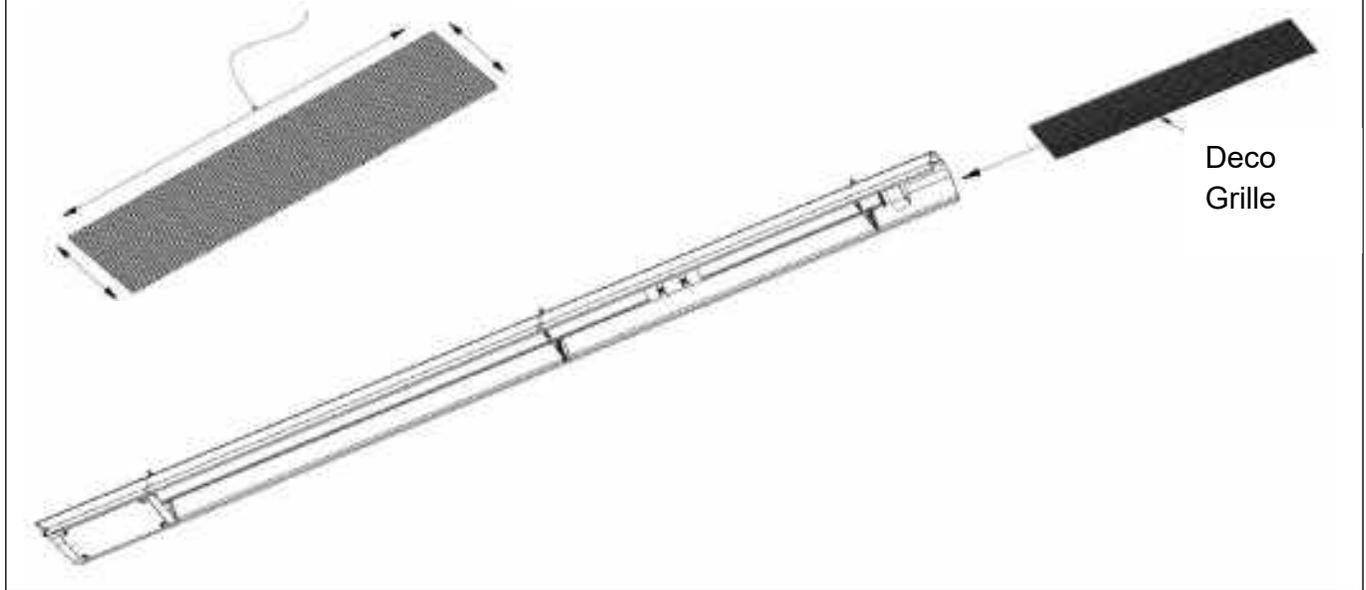


Fasten with acorn nut.

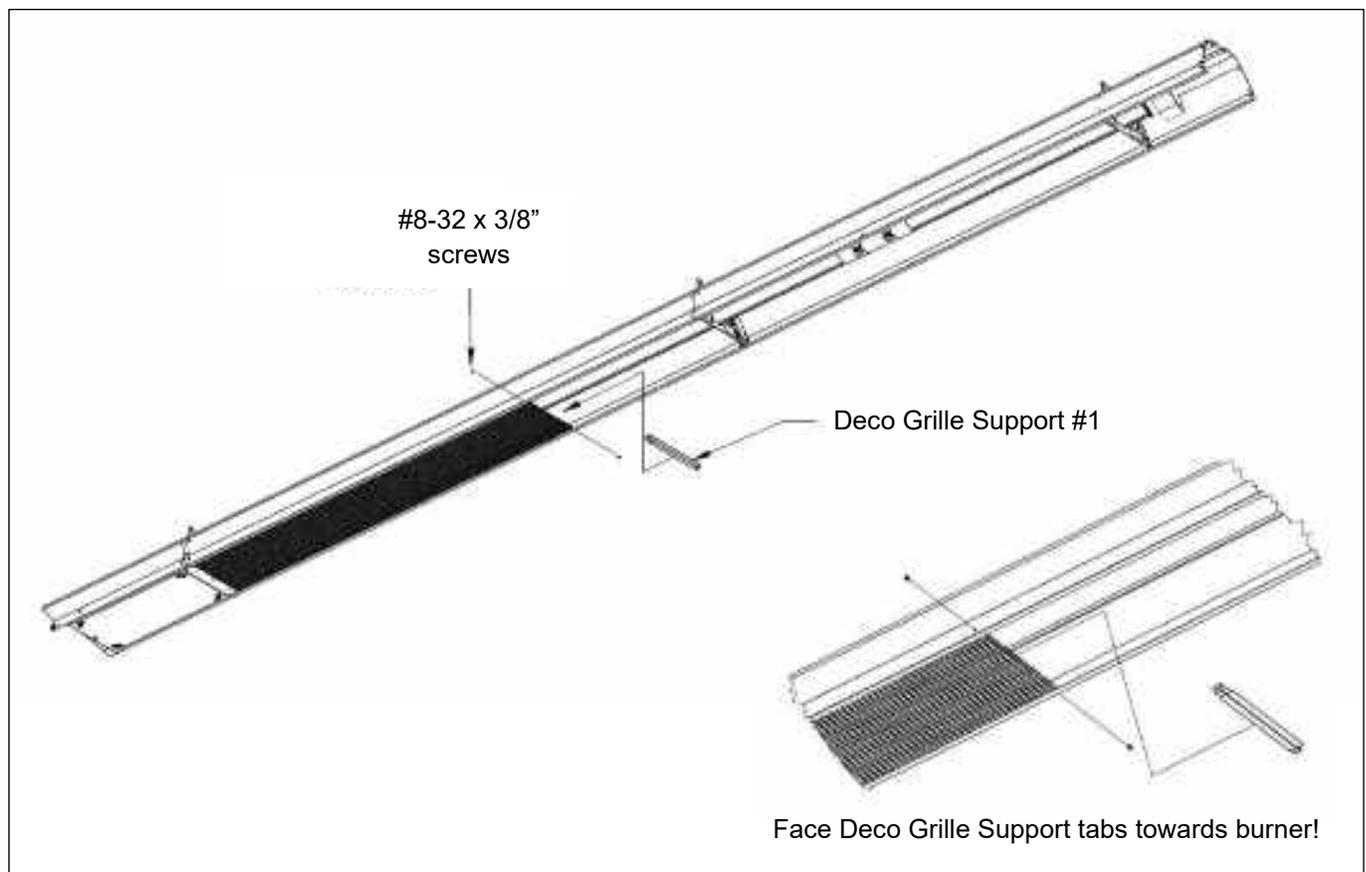
Step 24:

Before installing the Deco Grilles, **bend all the tabs** along one *long* side and both *short* sides of the Grille for easier fitment.

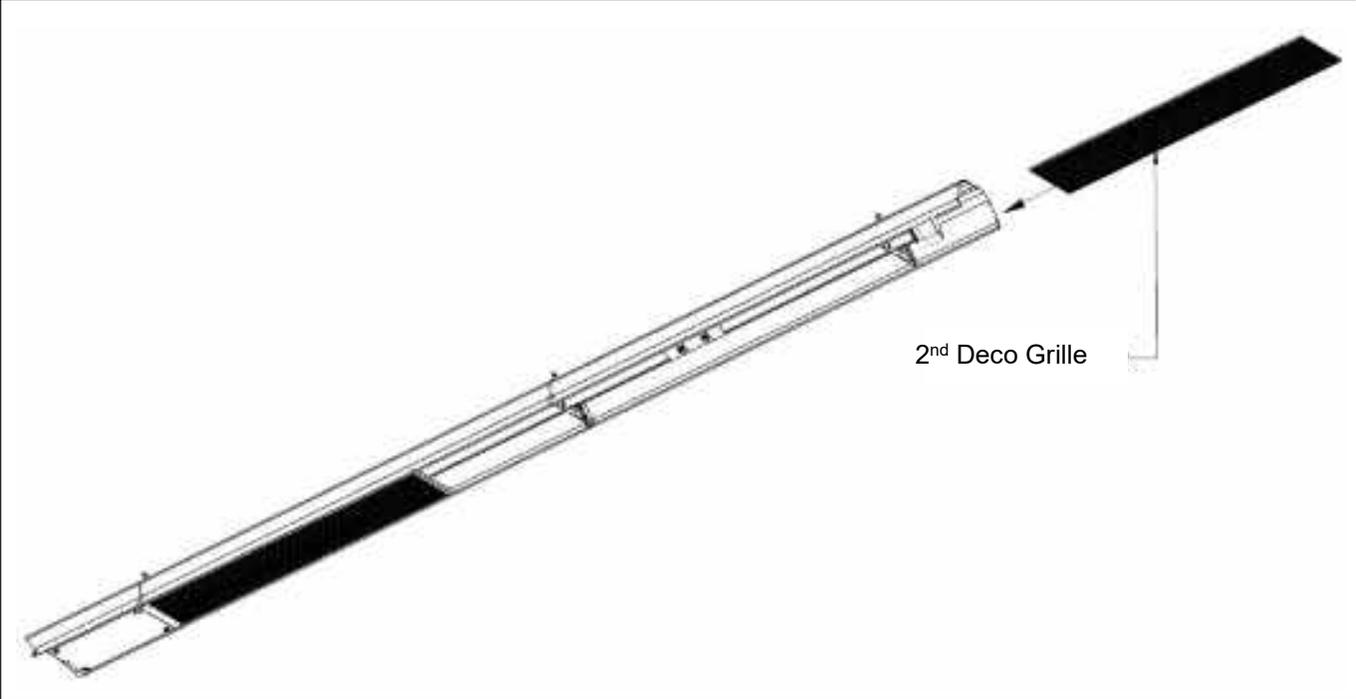
*Gloves recommended!



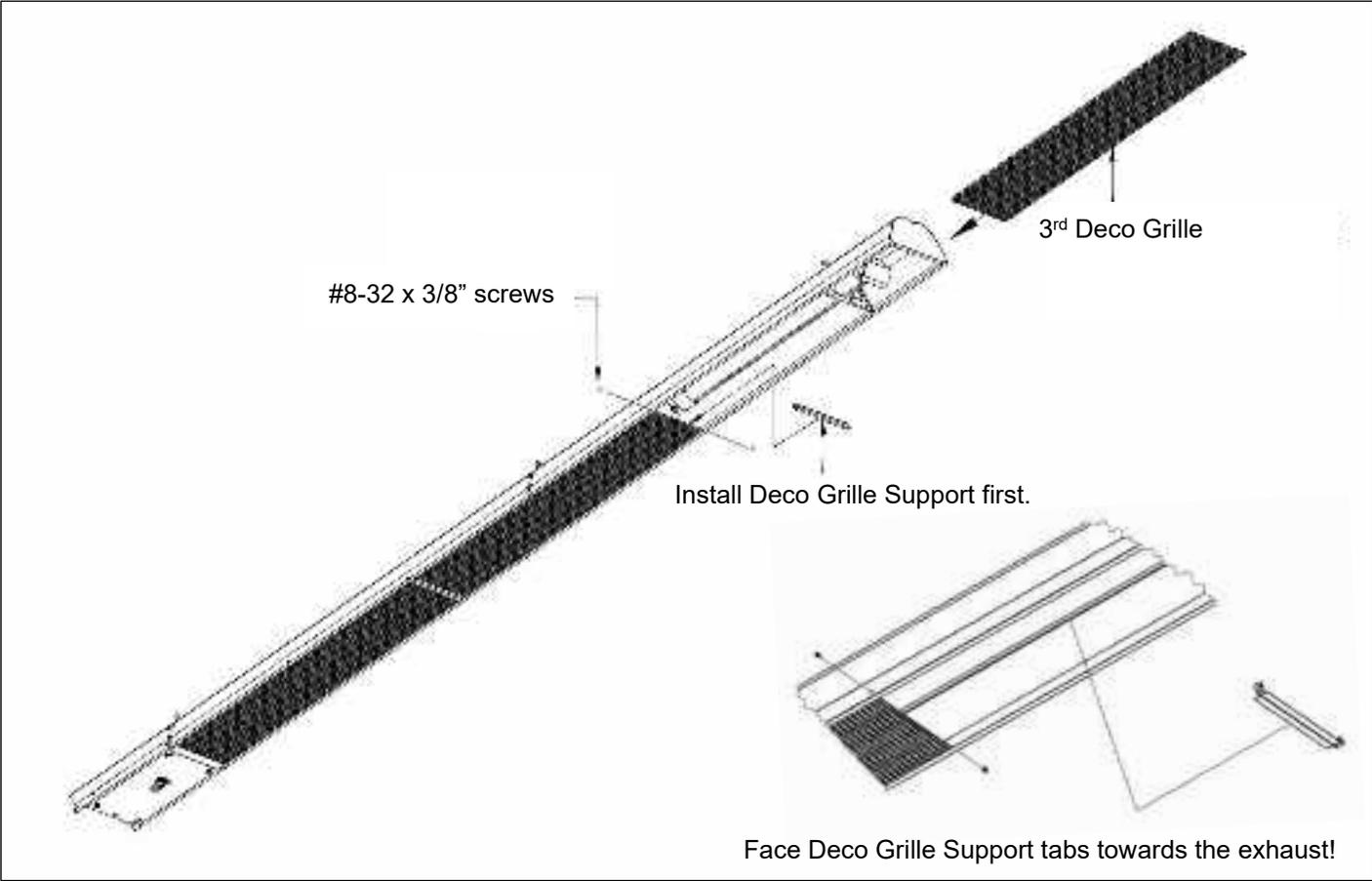
Step 25:



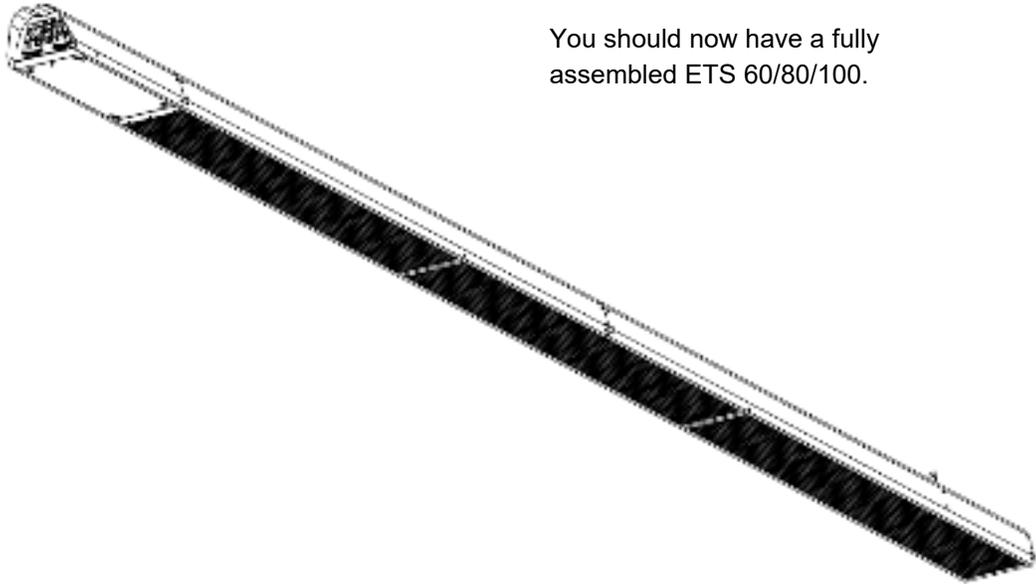
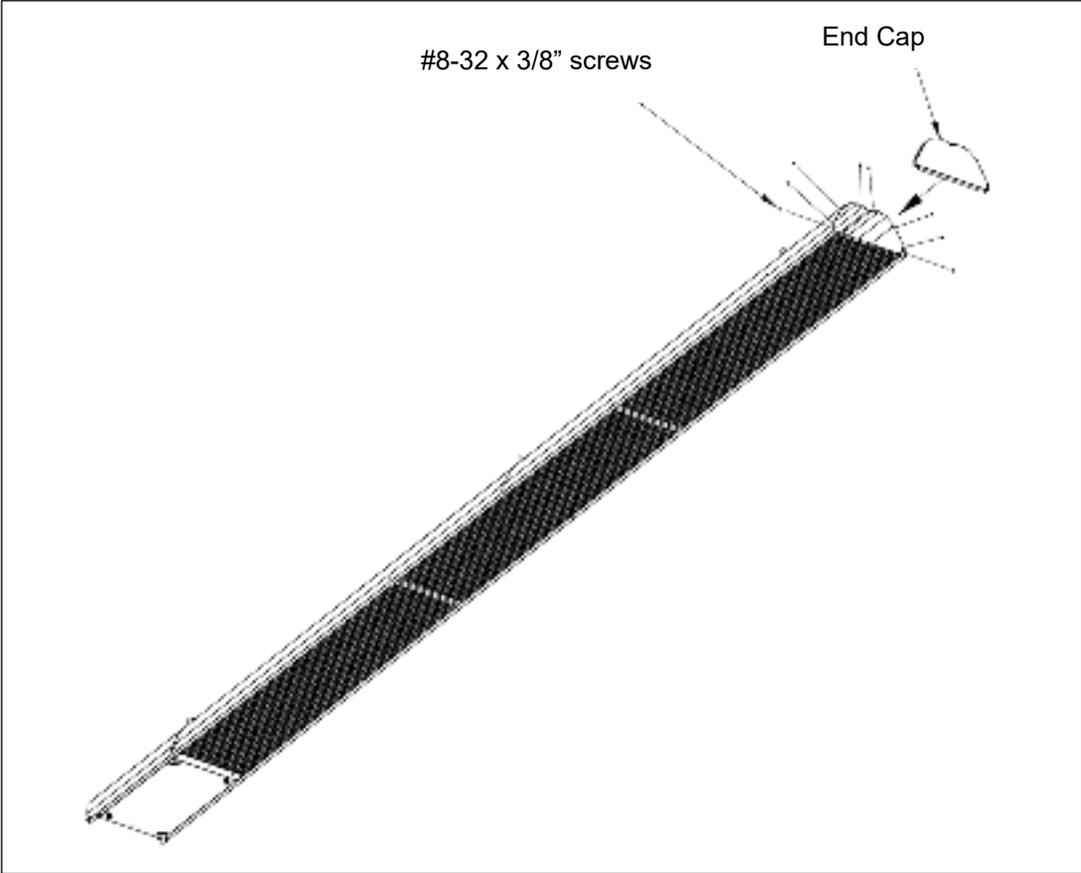
Step 26:



Step 27:

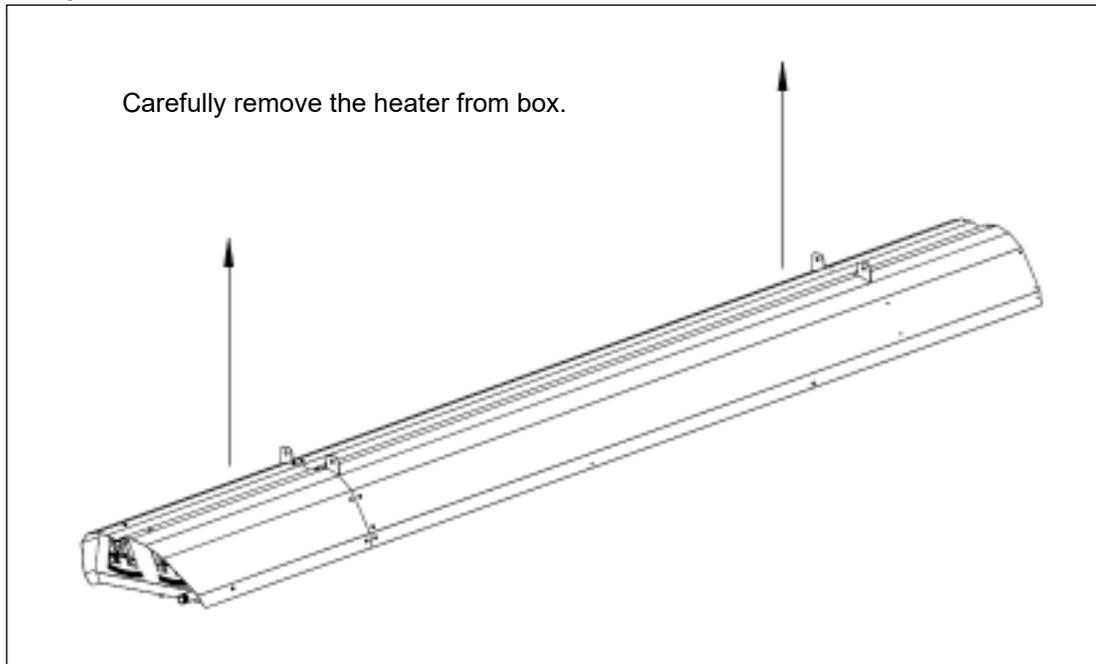


Step 28:



Installation – ETS 40, 50

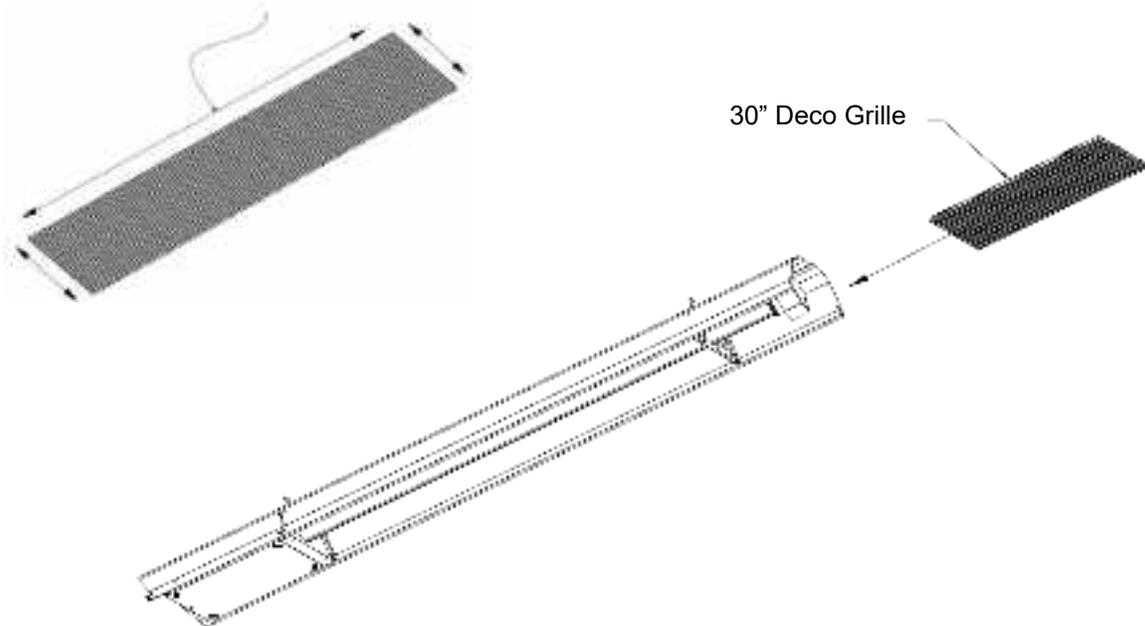
Step 1:



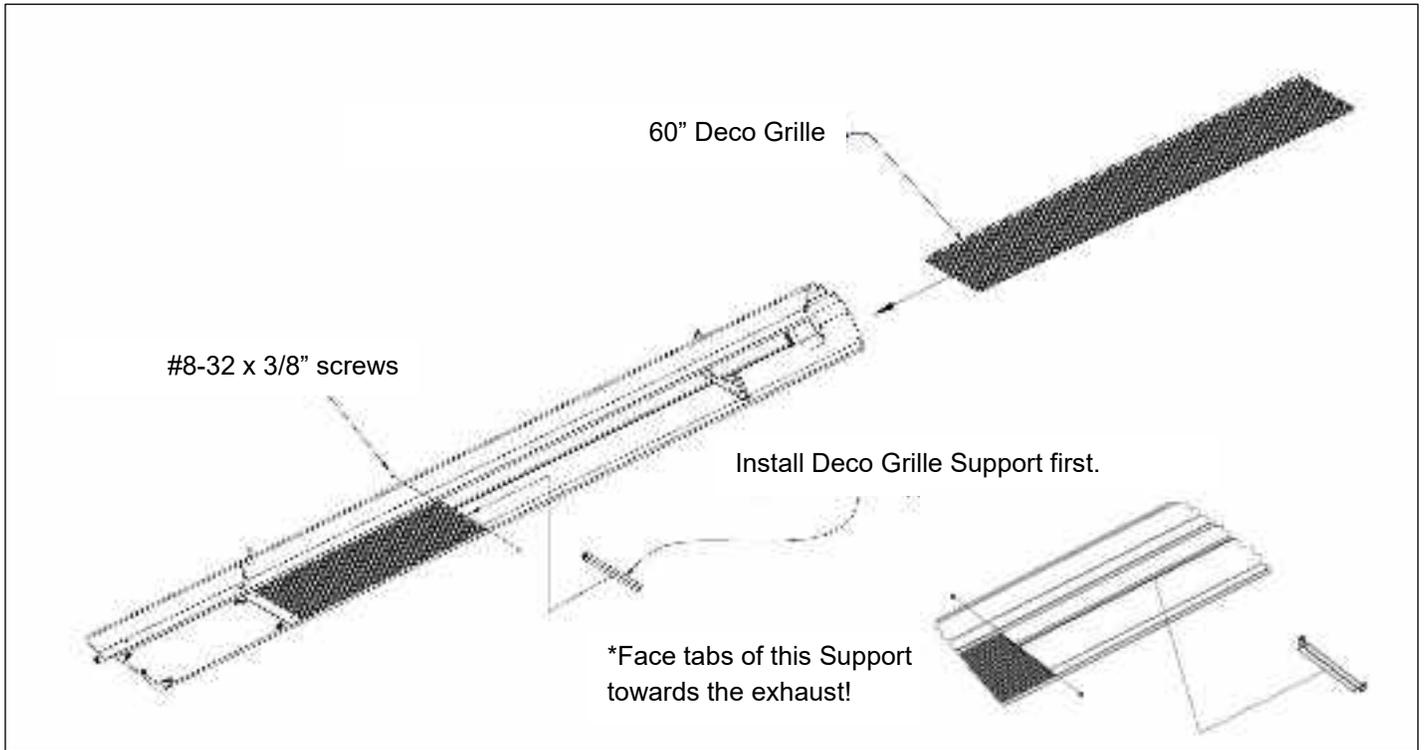
Step 2:

Before installing the Deco Grilles, **bend all the tabs** along one *long* side and both *short* sides of the Grille for easier fitment.

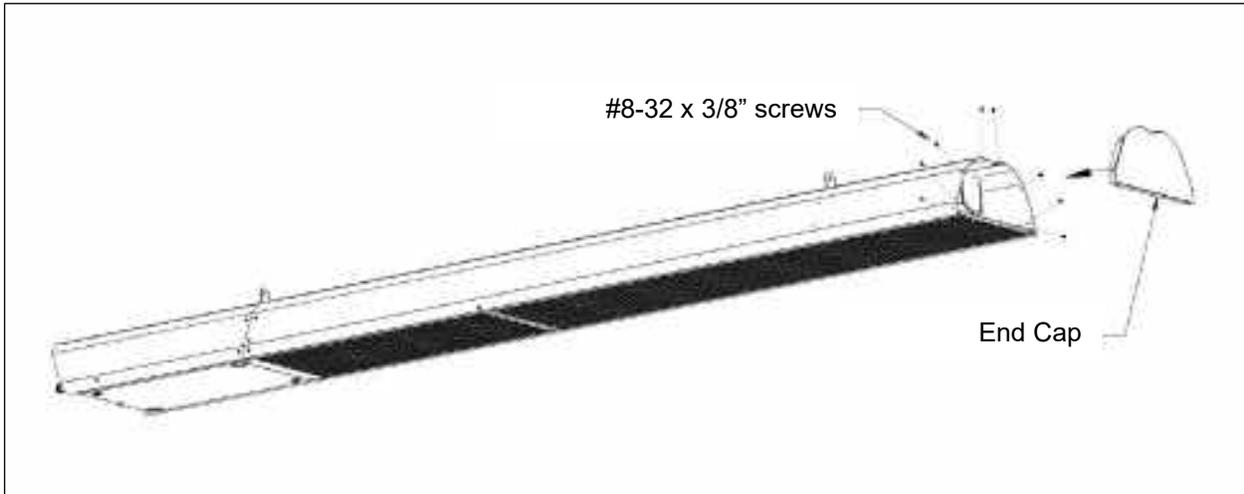
*Gloves recommended!



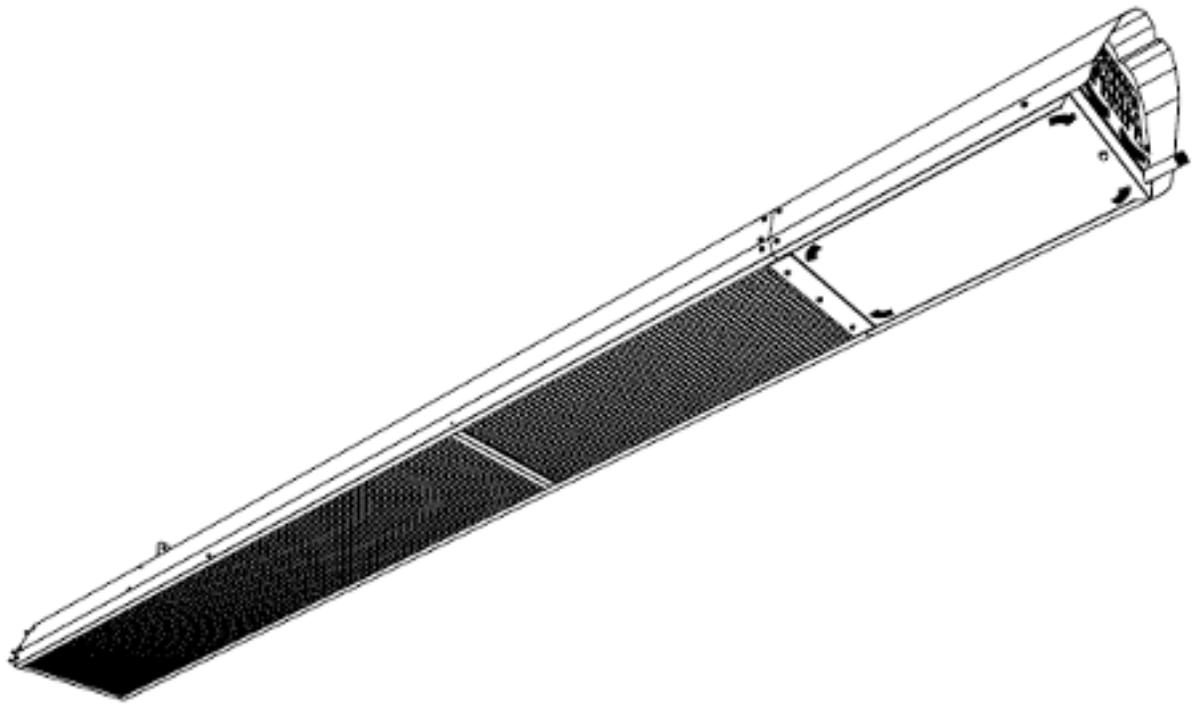
Step 3:



Step 4:

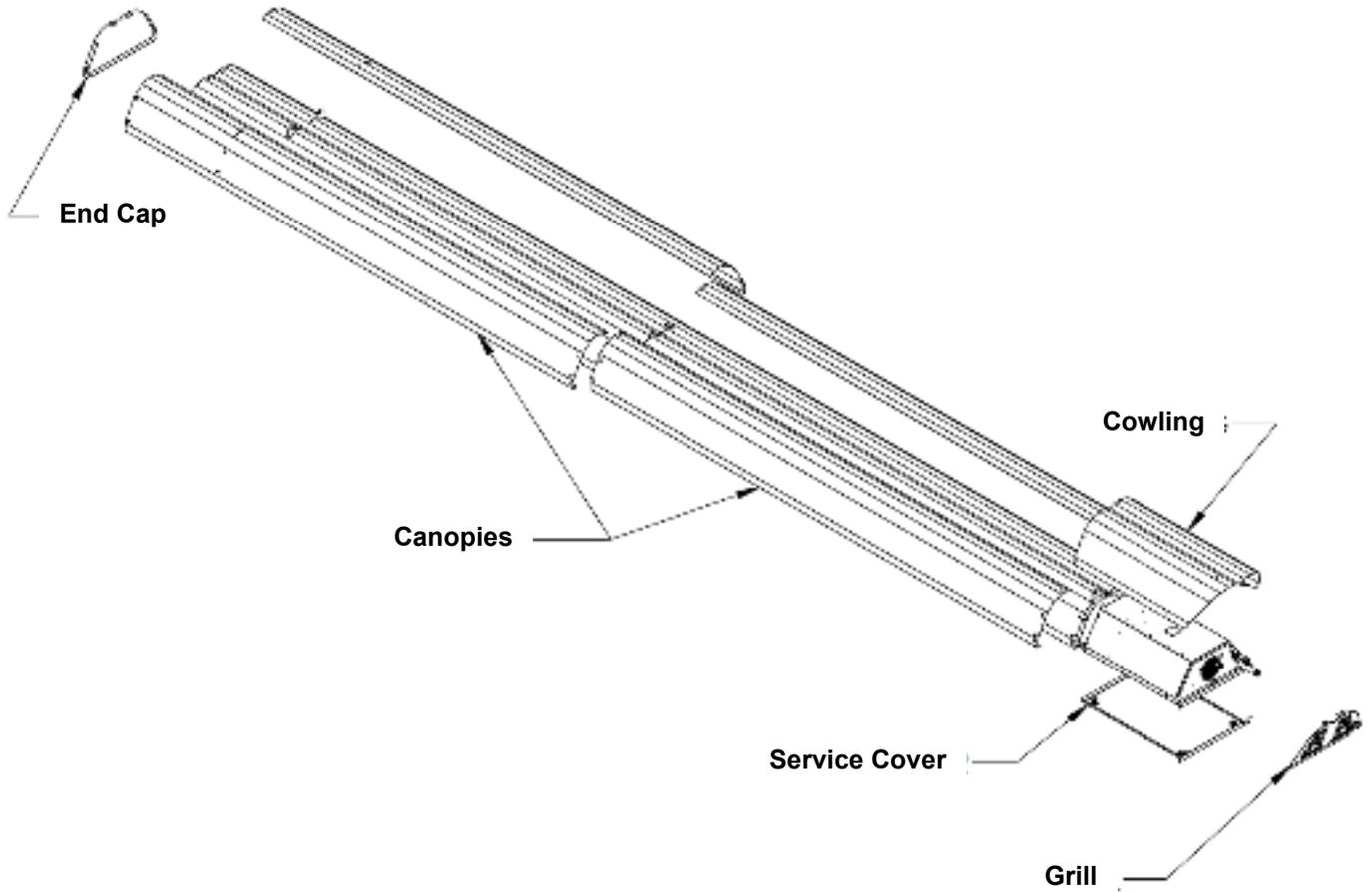


You should now have a fully assembled ETS 40/50.



Canopy Installation Instructions (Optional)

The following instructions demonstrate how to assemble the painted canopies of your heater. Contact manufacturer for more details regarding painted canopies.



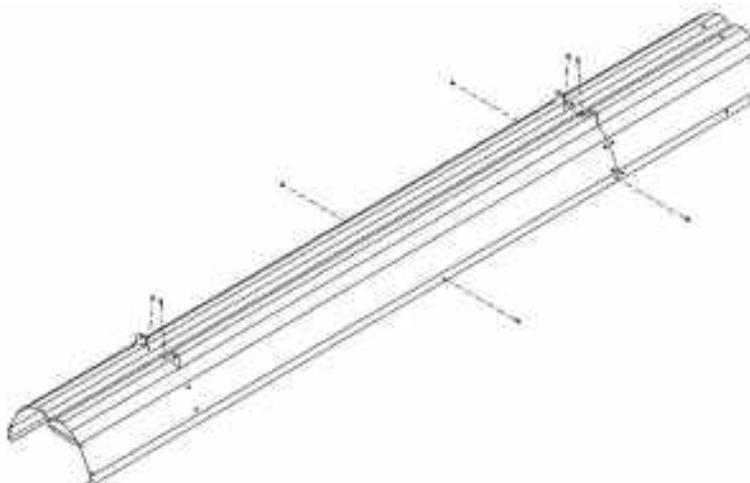
ETS 40, 50

STEP 1

Peel plastic off all parts.

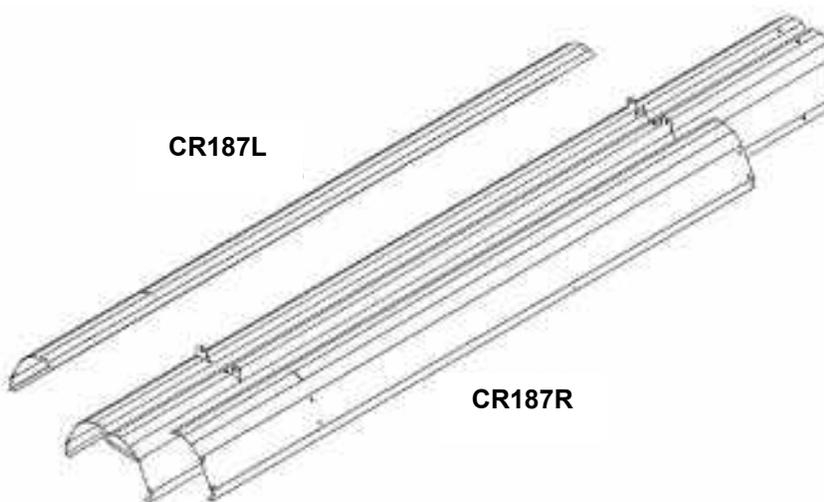
STEP 2

Remove **only** the screws shown on the right.



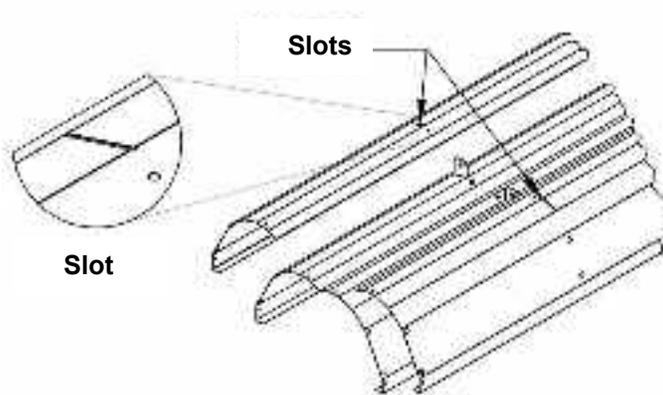
STEP 3

Install canopies (note part numbers) as shown to the right. After placing canopies on reflectors, fasten reflectors and canopies **together**.



STEP 3A

Note the slots in the canopies which allow the hanger to protrude.



ETS 60, 80, 100

STEP 1

Peel plastic off all parts.

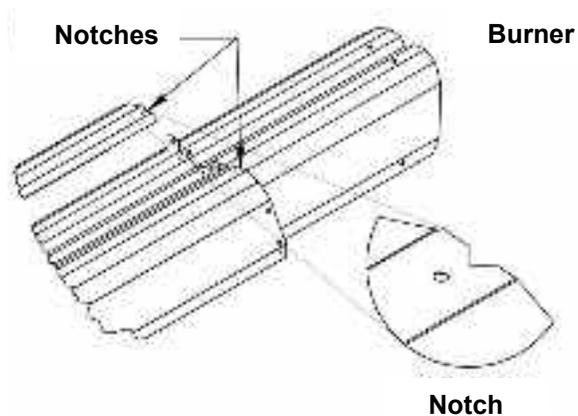


STEP 2

Install canopies (note part numbers) as shown to the right. After placing canopies on reflectors, fasten reflectors and canopies **together**.

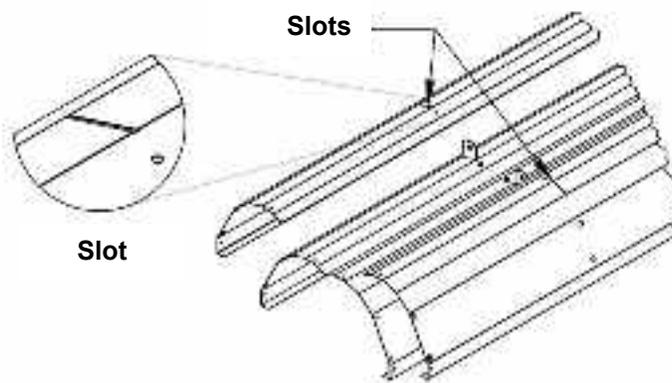
STEP 2A

Install primary canopies (CR186L & R) as shown. Note orientation of **notches** relative to the burner.



STEP 2B

Install secondary canopies (CR187L & R) as shown. Note the **slots** in the canopies which allow the hanger to protrude.



Gas Piping

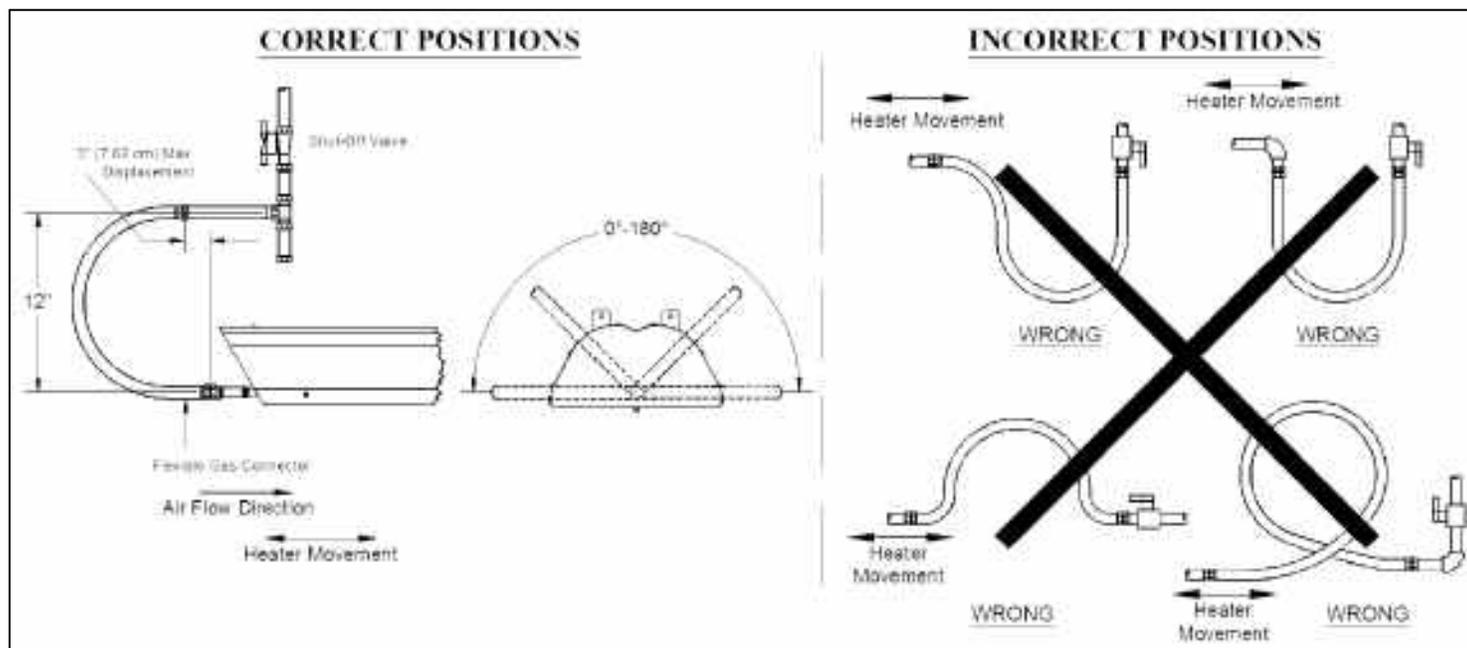
Installation / Code Requirements

Installation must comply with local building codes and/or, for the USA/National Fuel Gas Code, ANZI Z 223.1 (NFPA 54) and for Canada, CSA B149.1 National Gas and Propane Installation Code (latest editions).

Appliance must be electrically grounded in accordance with local codes or, in their absence; the National Electrical Code, ANSI/NFPA 70 in the USA, CSA C22.1 Canadian Electrical Code in Canada.

Notes:

- Check for gas leaks at all connections with appropriate soap solution.
- Never connect an unregulated gas supply to the heater.
- Do not use high pressure (above ½ psig) to test the gas supply system with the appliance connected. Failure to comply can result in damage to the appliance.



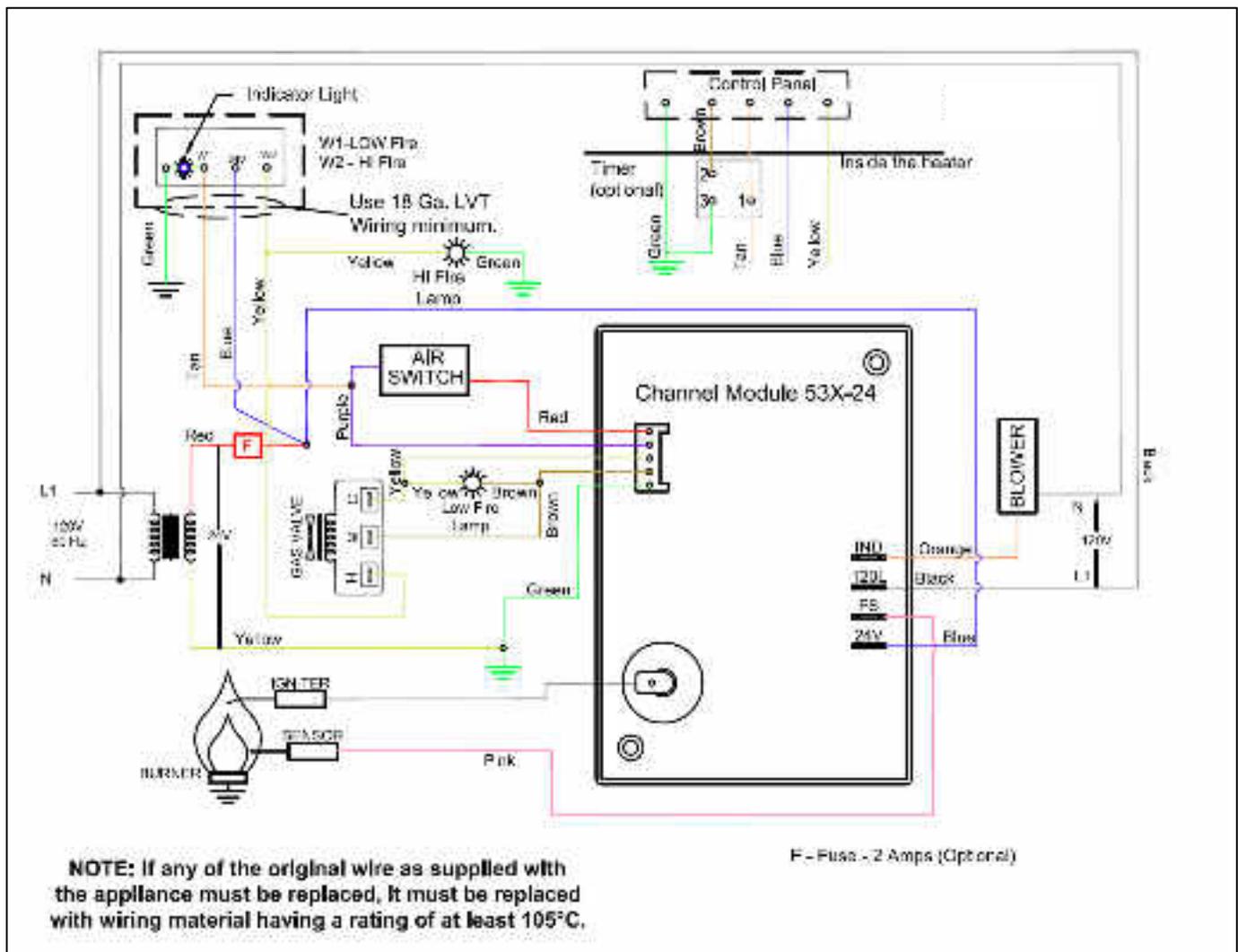
Electrical Wiring

General Requirements

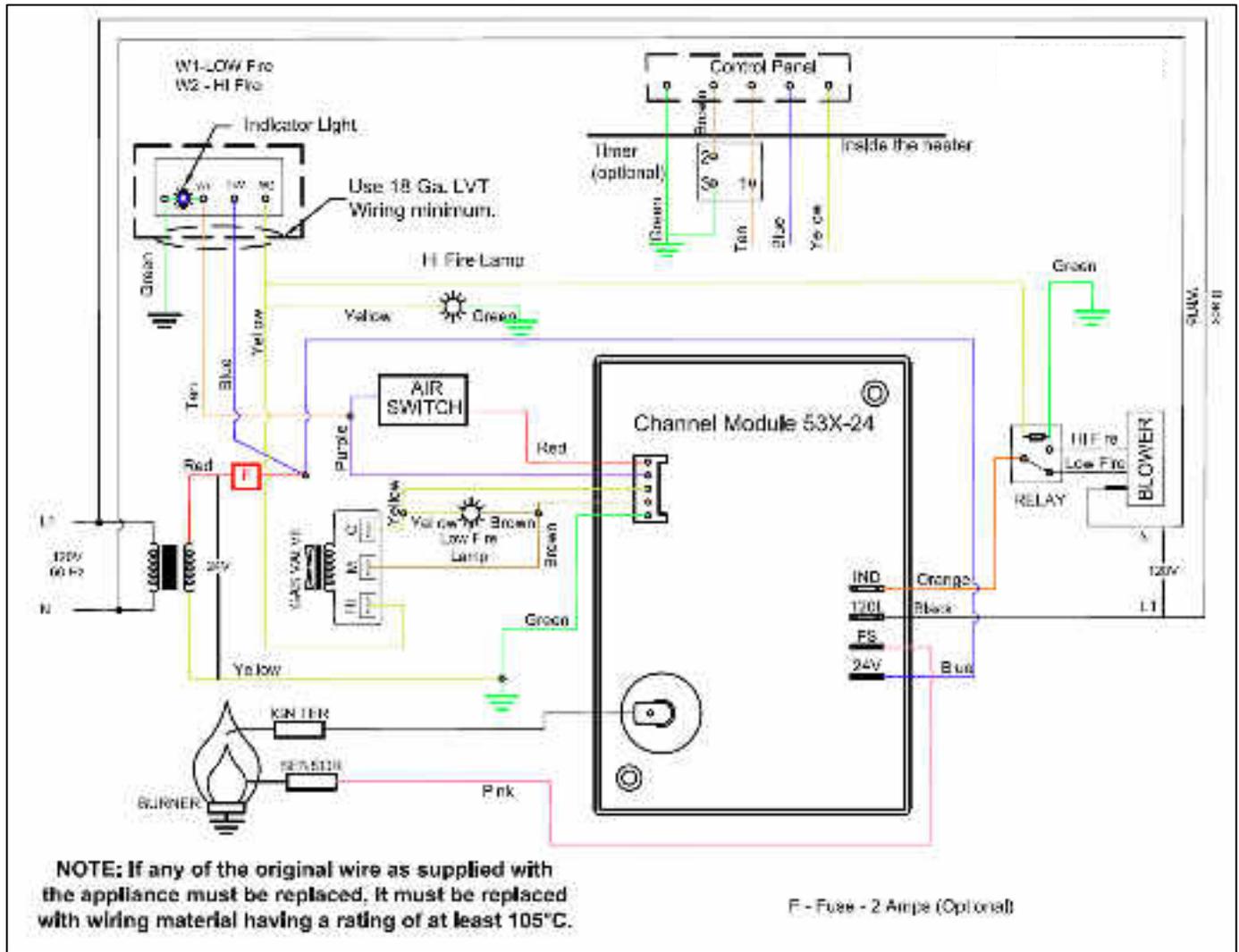
Heaters are normally controlled by line voltage (120V) or low voltage (24V) thermostats. Line voltage thermostats are wired directly while low voltage thermostats use a relay. In all cases, heaters must be grounded in accordance with the *National Electric Code*, ANSI/NFPA 70 in the US, and the *Canadian Electric Code*, CSA C22.1 in Canada, and must comply with all local requirements. Heaters may also be controlled with a manual line switch or timer switch in place of the thermostat. Refer to wiring diagrams below for guidance on electrical wiring of heaters.

If any of the original wire as supplied with the heater must be replaced, it must be replaced with wiring having a rating of at least 105°C temperature service and 600 volts capability.

Wiring for ETS 50, 60

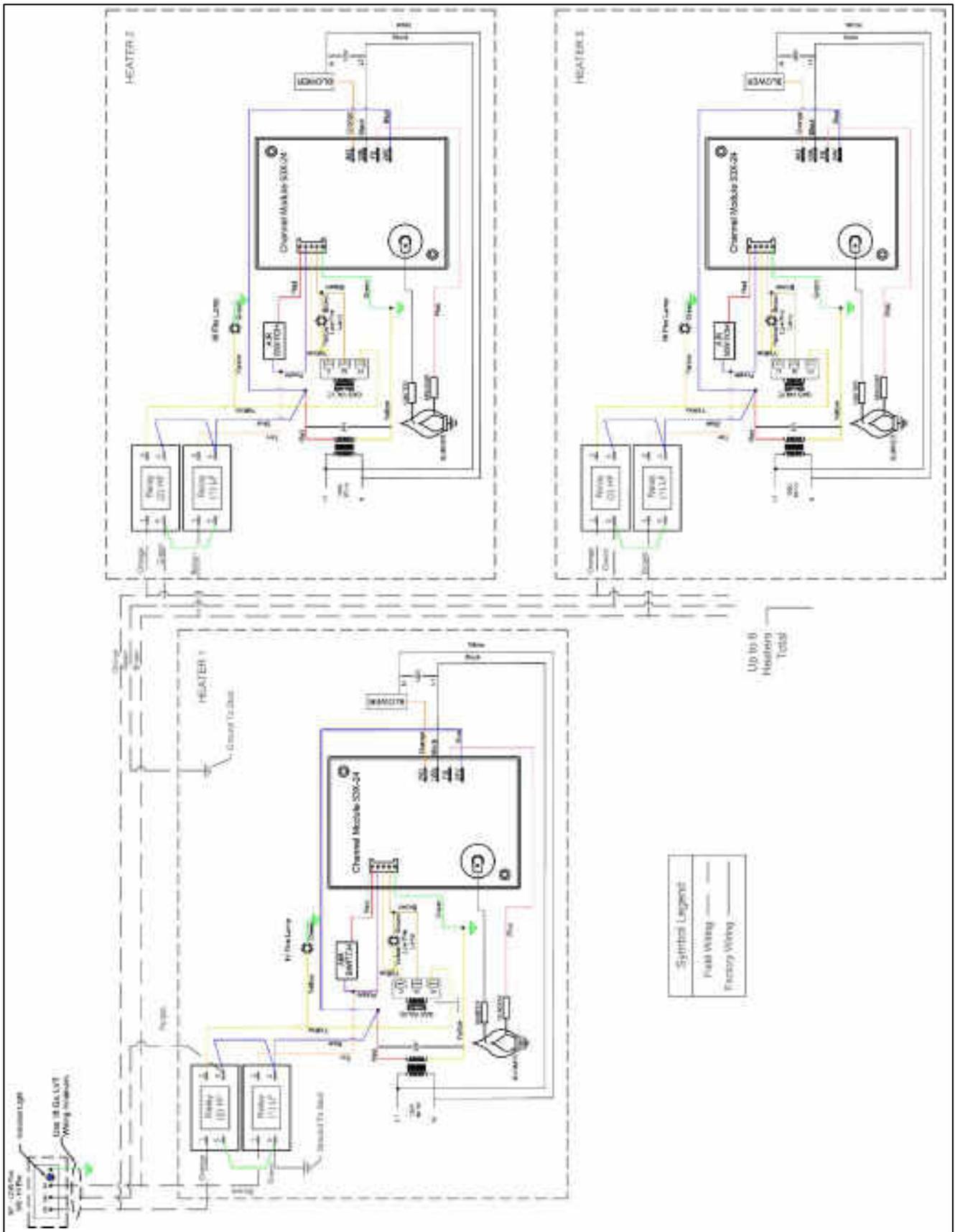


Wiring for ETS 40, 80, 100

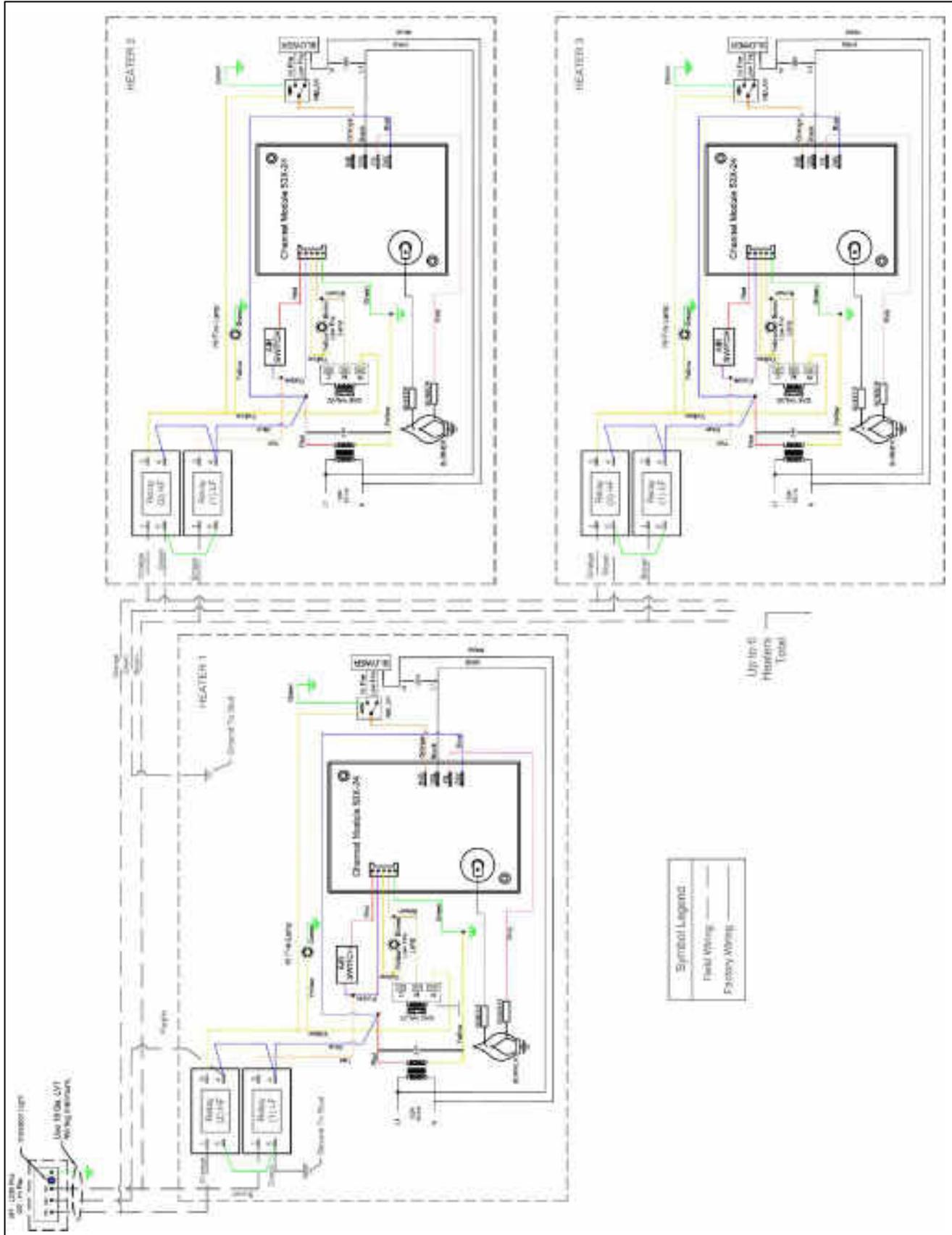


Multiple Heater Wiring

ETS 50, 60



ETS 40, 80, 100

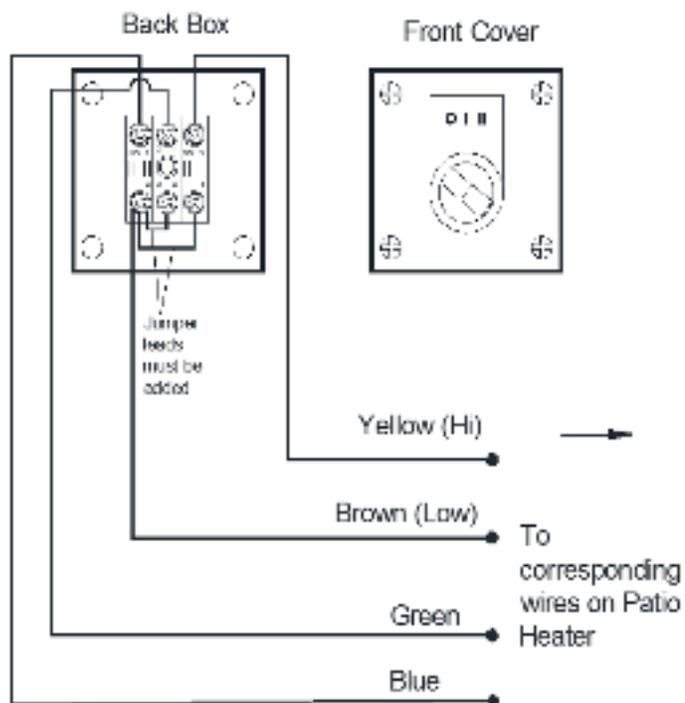


External Wiring Options (Outdoor Installation Only)

Two Stage Switch wiring diagram

Notes:

- Using 2-Stage switch (P/N EE020)

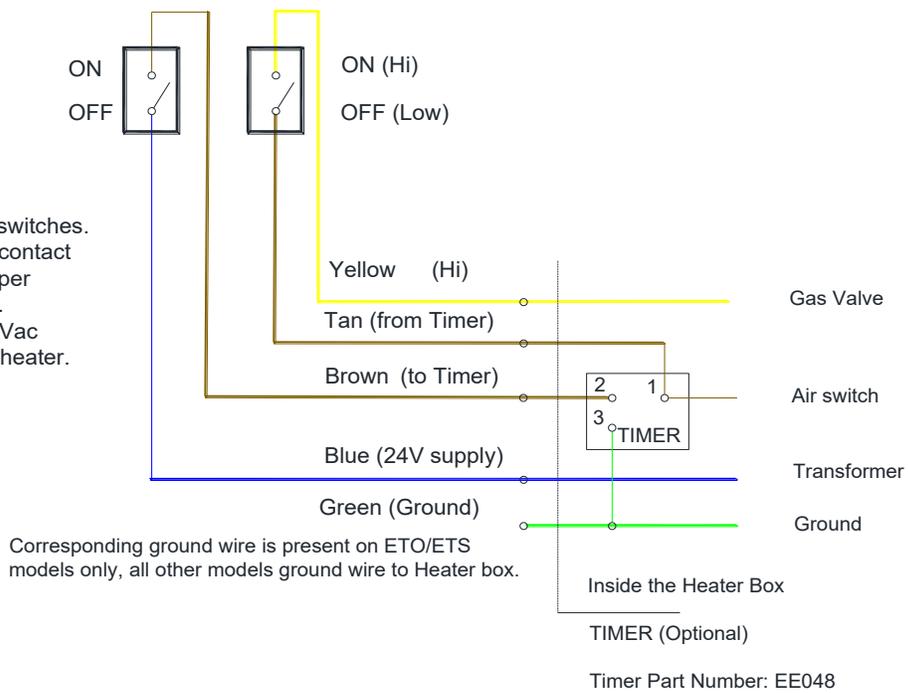


External Wiring Options (With Optional Timer)

Manual Line Switch

Notes:

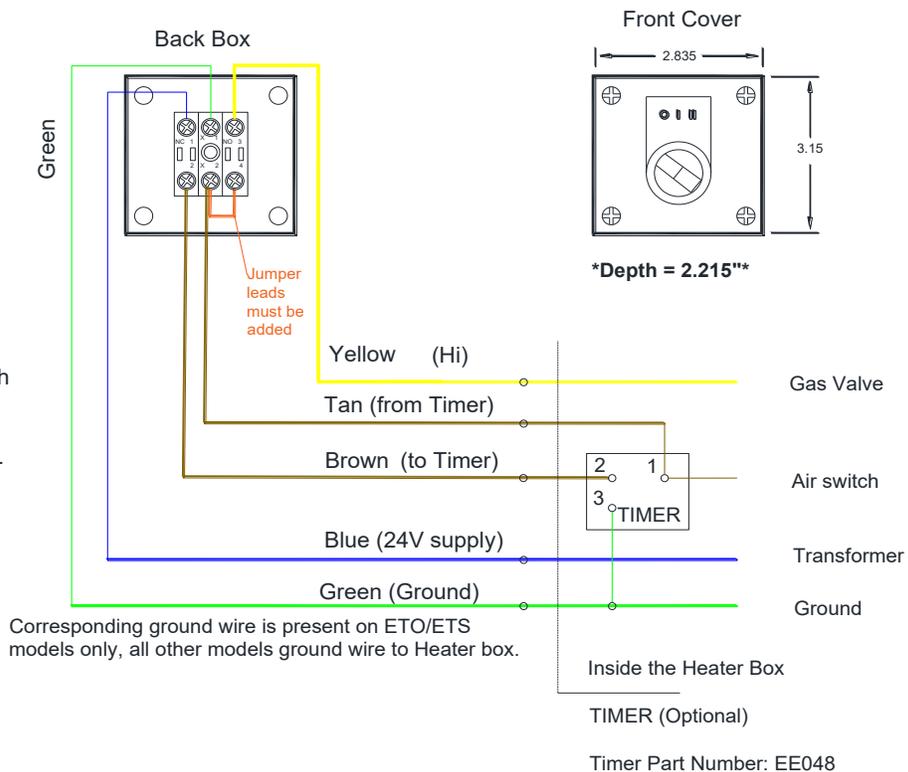
1. Using 2 Toggle switches.
2. Allow minimum contact rating of 1 Amp per heater inductive.
3. Allow 20VA / 24Vac transformer per heater.



Two Stage Switch

Notes:

1. 1 heater per switch unless using relay kits installed in each burner head.
2. Switch part number EE020.



Lighting & Shutdown Instructions

Lighting

1. Open manual gas supply valve (ensure gas supply lines have been purged).
2. Turn the thermostat up. When the thermostat calls for heat, blower motor will energize.
3. The blower motor will energize.
4. When the motor approaches nominal running RPM, the air-proving switch closes and activates the ignition module.
5. The ignition module, after a pre-purge period of approximately 30 seconds, energizes the igniter. Additionally, the gas valve is energized for this ignition trial period of 15 seconds.
6. If a flame is detected, the ignition sensing rod "reads" a rectification signal and the gas valve remains open. The sparking stops when the flame signal is established.
7. If no flame is detected, the gas valve closes and a 30 sec inter-purge period begins. After the inter-purge, the module repeats the trial for ignition period. If flame is still not established, a third and final inter-purge followed by a final ignition trial cycle begins. After three trials, the module will lockout for a period of approximately 1 hour or until reset. (*Reset is accomplished by removing power from the module for at least 5 seconds.*) After this 1-hour period, the module re-attempts the full ignition sequence.

Shut Down

1. Turn off power to electronic control.
2. For longer periods of shut down, also close manual gas supply valve.

Note: It is ideal to use a factory recommended "Hi-Lo switch" with this heater.

Maintenance & Trouble Shooting

Maintenance

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

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

Trouble Shooting

Blower Motor Fails to Run

- Is the heater plugged in? Is there 115V at the burner receptacle?
- Check blower for obstructions. Replace blower if necessary.

No Gas Supply

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

Burner Does Not Light

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

Burner Does Not Stay Lit

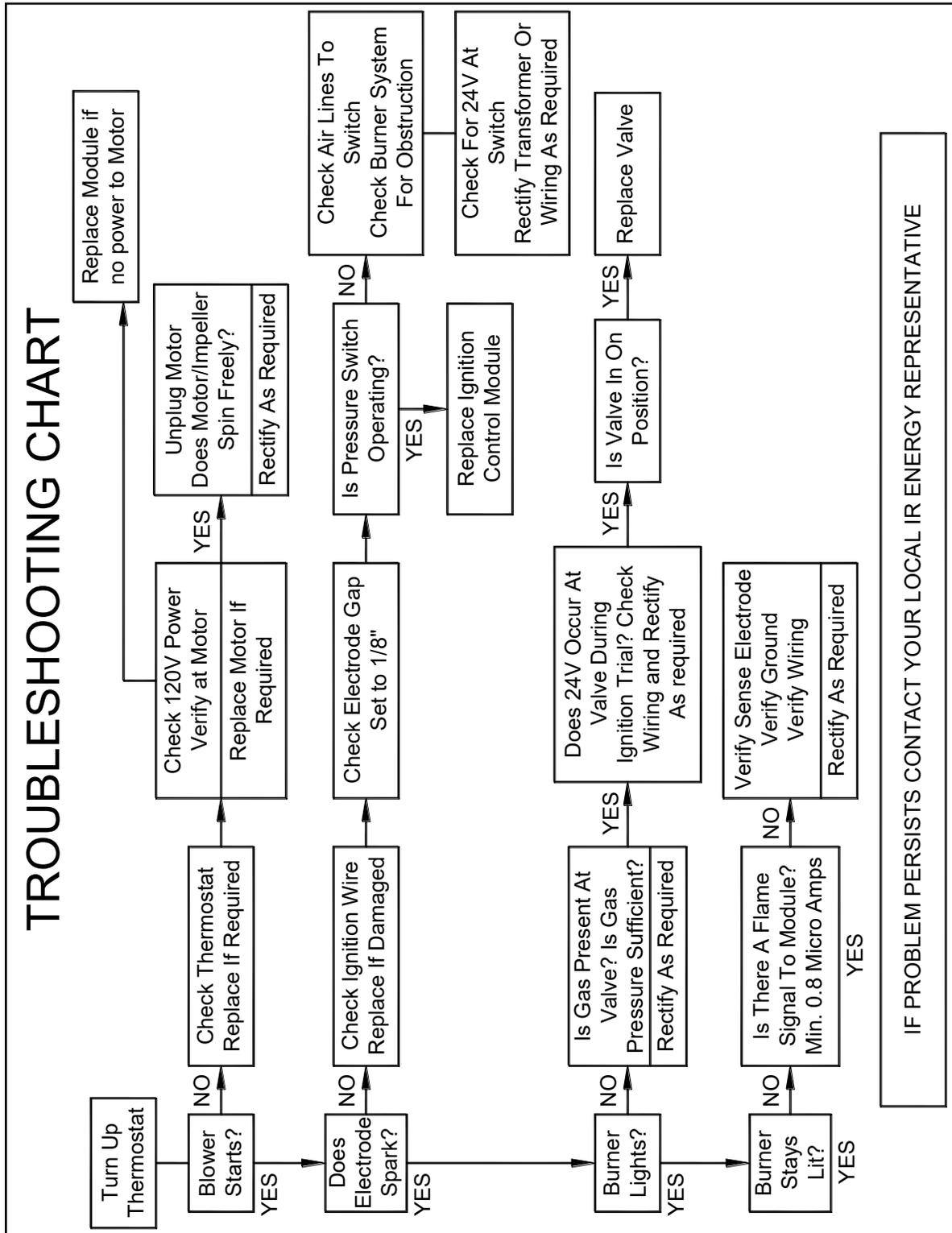
- Check ground wire continuity.
- Check insulation on the igniter leads.
- Measure flame signal current; it should be between 2 to 6 micro amps dc. Minimum 0.8 micro amps.
- Clean flame rod if necessary.
- Replace module if necessary.

Module Error Codes

POTTED [CHANNEL PRODUCTS]

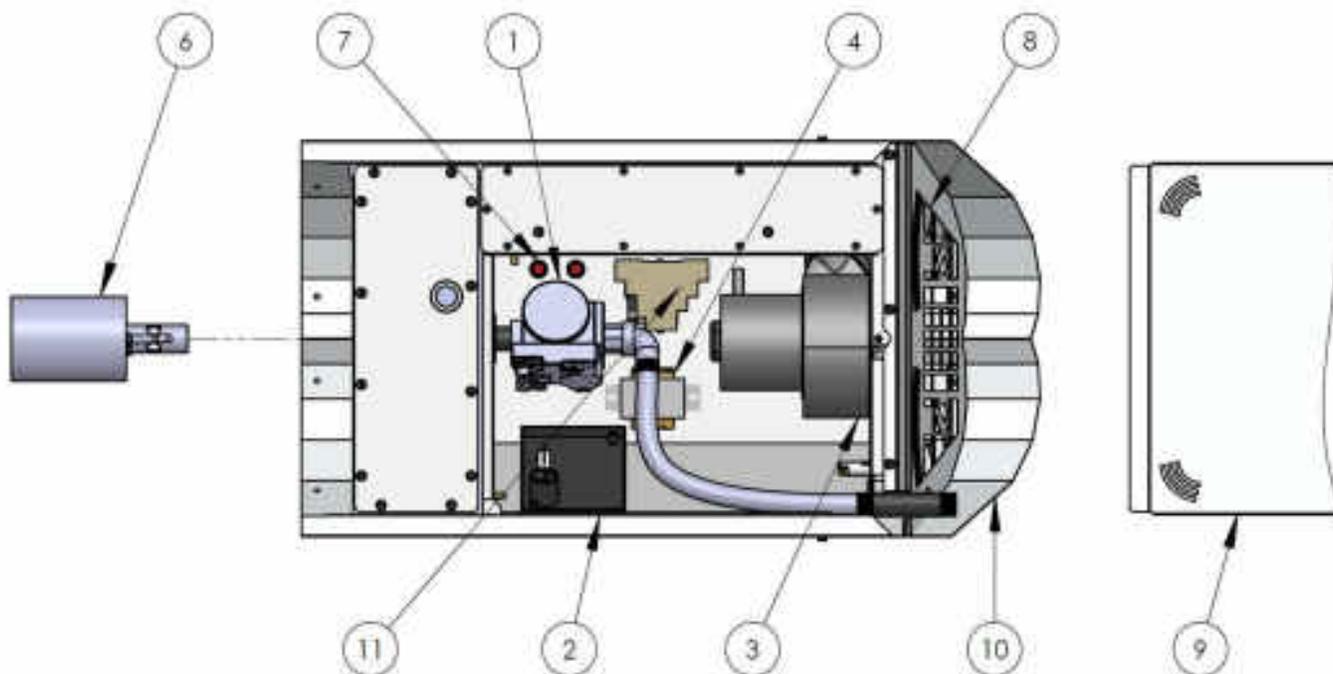
1. FLASH – Air Flow Fault
2. FLASH – Flame Sensor Issue
3. FLASH – Ignition Lockout After 3 Tries
1. FLASH – Gas Valve Not Connected

Troubleshooting Chart



Replacement Parts List

Item	Part No.	Description
1	UG105	Gas Train Assembly for Natural Gas
	UG106	Gas Train Assembly for Propane
2	CE201	Ignition Module
	CE202	Wire Harness w/5 pin PLUG to Ignition Module
3	CE011	For ETS 50, 60: Blower Motor Assembly w/ PSC Motor
	CE382	For ETS 40, 80, 100: Blower Motor Assembly w/ PSC 2SPD Motor
4	CE058	Transformer, 115V to 24VAC, 40VA
5	CE029	For ETS 40: Air Switch w/ Bracket, 0.59" w.c
	CE291	For ETS 50: Air Switch w/ Bracket, 0.50" w.c.
	CE028	For ETS 60: Air Switch w/ Bracket, 0.78" w.c.
	CE160	For ETS 80, 100: Air Switch w/ Bracket, 0.44" w.c.
6	UG001	Burner Cup
	CE002	Electrode for Sparking
	CE003	Electrode for Flame Sense
	CE006	Wire, Ignition
	CE036	Wire, Flame Sense
7	CE057	Operation Light, Amber, 28VAC
8	US225	Grill
9	US215	Service Door
10	US224	Cowling
11	CE173	For ETS 40, 80, 100: Blower Motor Relay
-	CE010	Power Cord <i>(Not Shown)</i>





SERIES ETS INFRARED HEATERS WARRANTY

The manufacturer warrants to the original owner that the product will be free of defects in material and workmanship as described below.

Series	Component	Warranty Period			
		3 Years	5 Years	7 Years	10 Years
ETS	Burner & Controls	*			
	Aluminized Heat Exchanger (Tube)				*

The Manufacturer's obligation under this warranty is limited to repair or replacement, F.O.B. its facility, of the defective part. In the case of replacement parts, the warranty period shall be the longer of the original warranty or a period of 12 months from the date of purchase. In no event shall the Manufacturer be liable for incidental expense or consequential damages of any kind.

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

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

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

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