



INSTALLATION AND OPERATION INSTRUCTIONS

OWNER / INSTALLER: For your safety this manual must be carefully and thoroughly read and understood before installing, operating or servicing this heater.

GOLF RANGE AND HOSPITALITY

INFRARED RADIANT TUBE HEATER

Single and Two Stage Push Through System (Positive Pressure)

Models:

SPH (20FT): (40, 50, 60, 75, 80, 100, 125) N5/L5/N7/L7

SPH (30FT): (50, 60, 75, 80, 100, 125) N5/L5/N7/L7

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

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

IF YOU SMELL GAS:

- ! DO NOT** try to light any appliance.
- ! DO NOT** touch any electrical switch; **DO NOT** use any telephone in your building.
- ! IMMEDIATELY** call your gas supplier from a neighbor's telephone. Follow the gas supplier's instructions. If you cannot reach your gas supplier, call the fire department.

FOR YOUR SAFETY

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

!IMPORTANT: SAVE THIS MANUAL FOR FUTURE REFERENCE.

Manufactured for:

SUNSTAR HEATING PRODUCTS, INC.

Post Office Box 36271 (28236) • 1700 Parker Drive (28208) • Charlotte, North Carolina
Phone (704) 372-3486 • Fax (704) 332-5843 • www.sunstarheaters.com • email: info@sunstarheaters.com

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This heater complies with ANSI Z83.20 (current standard) and CSA 2.34. Copies of the National Fuel Gas Code (ANSI Z223.1-latest edition) are available from the CSA at 8501 East Pleasant Valley Road, Cleveland, Ohio 44131 or 55 Scarsdale Road, Don Mills, Ontario M3B 2R3. All NFPA codes are available from the National Fire Protection Association, Batterymarch Park, Quincy, Massachusetts 02269.

1.0) SAFETY

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

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

WARNING

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

CAUTION

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

2.0) INSTALLER RESPONSIBILITY

The installer is responsible for the following:

- The heater and venting, as well as electrical and gas supplies must be installed in accordance with these installation instructions and any applicable codes and regulations.
- Every heater shall be located with respect to building construction and other equipment so as to permit access to the heater.
- Each installer must follow the clearances to combustible materials for the heaters.
- Install the heater so that the supports and hangers are correctly spaced in accordance with these instructions. The heater must be supported by materials having a working load limit of at least 115lbs.
- Ensure that the tube integrity safety system TISS™ supplied is installed in accordance with these instructions and that the tension is correct.
- Supply the owner with a copy of these Installation and Operation Instructions.
- Where unvented heaters are used, gravity or mechanical means shall be provided to supply and exhaust at least 4 CFM per 1,000 Btu/hr input of installed heaters.
- Never use the heater as a support for a ladder or other access equipment. Do not hang anything from the heater.
- Supply all installation materials necessary that are not included with the heater.
- Check the nameplate to make sure that the burner is correct for the gas type in the building and the installation altitude.

3.0) GENERAL INFORMATION

This heater is a self-contained infrared radiant tube heater for use in locations where flammable gases or vapors are not generally present (as defined by OSHA acceptable limits) and is intended for the heating of **nonresidential** spaces.

INSTALLATION REQUIREMENTS

The installation must conform to local building codes or in the absence of local codes, with the National Fuel Gas Code ANSI Z223.1/NFPA54 or the Natural Gas and Propane Installation Code CSA B149.1. Heaters shall be installed by a licensed contractor or licensed installer. Clearances to combustibles as outlined in this manual should always be observed. In areas used for storage of combustible materials where they may be stacked below the heater, NFPA54 requires that the installer must post signs that will “specify the maximum permissible stacking height to maintain the required clearances from the heater to combustibles.”

Every heater shall be located with respect to building construction and other equipment so as to permit access to the heater. Each installer shall use quality installation practices when locating the heater and must give consideration to clearances to combustible materials, vehicles parked below, lights, overhead doors, storage areas with stacked materials, sprinkler heads, gas and electrical lines and any other possible obstructions or hazards. Consideration also must be given to service accessibility.

The heater, when installed in aircraft hangars and public garages, must be installed in accordance with ANSI/NFPA 409-latest edition (Standard for Aircraft Hangars), ANSI/NFPA 88a-latest edition (Standard for Parking Structures), and ANSI/NFPA 88b-latest edition (Standard for Repair Garages) with the following clearances:

- a. At least 10 feet above the upper surfaces of wings or engine enclosures of the highest aircraft that may be housed in the hangar and at least 8 feet above the floor in shops, offices, and other sections of hangars communicating with aircraft storage or service areas.
- b. At least 8 feet above the floor in public garages. **▲WARNING:** Minimum clearances marked on the heater must be maintained from vehicles parked below the heater.

(FOR CANADA ONLY)

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

Although these heaters may be used in many applications other than space heating (e.g., process heating), SunStar will not recognize the warranty for any use other than space heating.

For indoor installation only. Not for use in residential dwellings.

This heater is for Indoor Installation and Covered Patio, Golf Range and Restaurant Installation only and can be used in either Vented or Unvented mode. The term Unvented actually means Indirect Vented. While the products of combustion are expelled into the building, national codes require ventilation in the building to dilute these products of combustion. This ventilation may be provided by gravity or mechanical means.

This heater is not an explosion proof heater. Where the possibility of exposure to volatile and low flash point materials exists, it could result in property damage or death. This heater must not be installed in a spray booth where the heater can operate during the spraying process. Consult your local fire marshal or insurance company.

High Altitude:

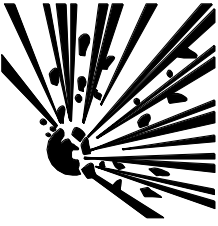

Appliances are supplied as standard for altitudes of 0 to 2,000 feet (0-610 m). High-altitude ratings are obtained by a change in the orifice size. When ordered for high altitude installations, burners are supplied by the factory ready for high altitude installation. Check the nameplate for altitude before proceeding with the installation. In Canada the adjustment for altitude is made in accordance with Standard CGA 2.17, Gas-Fired Appliances for Use at High Altitudes.



WARNING:

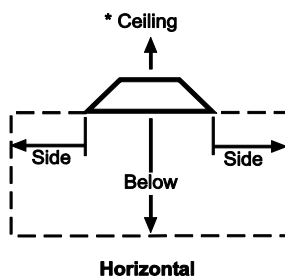
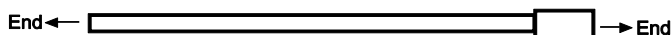
This product can expose you to chemicals including ceramic fibers, which are known to the State of California to cause cancer, and carbon monoxide, which is known to the State of California to cause birth defects or other reproductive harm. For more information go to www.p65warnings.ca.gov.

4.0) MINIMUM CLEARANCES TO COMBUSTIBLES

⚠ WARNING		
		<h3 style="margin: 0;">FIRE AND EXPLOSION HAZARD</h3> <p>Combustible material must be located outside the clearance dimensions listed.</p> <p>Failure to do so may result in death, serious injury or property damage.</p>

Install the warnings card (ordered separately) and complete the blank spaces using the clearances from combustibles table below. See Section 26 for a printed copy of the warnings card.

Minimum clearances to combustibles shall be measured from the outer surfaces as shown in the following diagram:



MINIMUM CLEARANCES TO COMBUSTIBLES					
Model No.	Mounted Horizontally				
	Sides	Ceiling (Vented)	*Ceiling (Unvented)	Below	Ends
SPH 40	22"	6"	8"	62"	15"
SPH 50	22"	6"	8"	66"	15"
SPH 60	22"	6"	8"	66"	15"
SPH 75, 80	22"	6"	8"	70"	15"
SPH 100	28"	6"	8"	80"	15"
SPH 125	28"	8"	10"	86"	20"

⚠ WARNING: Certain materials or objects, when stored under the heater, will be subjected to radiant heat and could be seriously damaged. Observe the Minimum Clearances to Combustibles listed in the manual and on the heater at all times.

NOTE:

1. The clearances specified above must be maintained to combustibles and other materials that may be damaged by temperatures 90°F above ambient temperature. Clearances to combustibles are posted on the burner box. In areas used for storage of combustible materials where they may be stacked below the heater, NFPA54 requires that the installer must post signs that will "specify the maximum permissible stacking height to maintain the required clearances from the heater to combustibles." SunStar recommends posting these signs adjacent to the heater thermostat or other suitable location that will provide enhanced visibility.

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

5.0) SPECIFICATIONS

Model No.	Btu/hr High Input	(2-stage) Btu/hr Low Input	Air Plate Part #	Orifice Size				Minimum * Mounting Height @ Horizontal	Turbulator Qty.
				Natural Gas		Propane Gas			
SPH 40	40,000	25,000	44140061	#32	(0.116)	#49	(0.073)	10 ft.	4
SPH 50	50,000	30,000	4414006H	3.5mm	(0.138)	#46	(0.081)	11 ft.	4
SPH 60	60,000	40,000	4414006H	#26	(.147)	#43	(.089)	11 ft.	4
SPH 75	75,000	50,000	44140063	#21	(0.159)	2.5mm	(0.098)	13 ft.	4
SPH 80	80,000	55,000	44140065	4.3mm	(0.169)	2.6mm	(0.102)	13 ft.	4
SPH 100	100,000	65,000	44140065	#12	(0.189)	#32	(0.116)	14 ft.	3
SPH 125	125,000	80,000	44140066	#4	(0.209)	#30	(0.129)	14 ft.	4

* MOUNT HEATERS AS HIGH AS POSSIBLE. Minimums are shown for indoor applications as a guideline for human comfort and uniform energy distribution for complete building heating applications. Consult your Space-Ray representative for the particulars of your installation requirements.

Model Identification:

Control Option Suffix	Gas Type	Description
N5	Natural	Single Stage Gas Valve - Single Stage Input
L5	Propane	Single Stage Gas Valve - Single Stage Input
N7	Natural	Two Stage Gas Valve - Modulating Input - High/Low Fire
L7	Propane	Two Stage Gas Valve - Modulating Input - High/Low Fire

Type Gas	Gas Pipe Connection	Tube Diameter	Flue Connection ¹	Fresh Air Connection ¹	Electrical Supply	Current Rating
Natural or Propane	½" MPT (Male)	4"	4" Round	4" Round	120 Volt, 60Hz, 1 Phase	1.74 Amp

¹ See Section 14.0) for vent sizes when multiple heaters are connected into a common vent

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

Available vented and unvented models

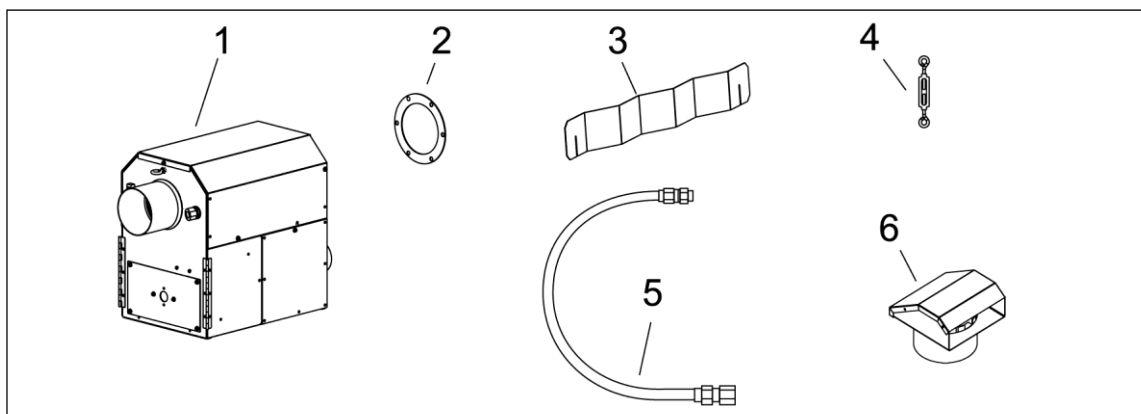
		Model SPH						
Body length		125	100	80	75	60	50	40
20 ft	unvented	x*	x	x	x	x	x	x
	vented	-	-	-	-	x	x	x
30 ft	unvented	x	x	x	x	x	x	-
	vented	-	-	-	x	x	x	-

*Special Application

6.0) PACKING LIST

A. SPH Burner Package

Ref.	Part #	Each Burner Package Includes:	Qty.
1	See Chart	Burner Package (Refer to the following chart for Package Part Numbers)	1
2	42907040	Control Fastener Kit - comprising of:	1
-	02189020	Screw, Hex Washer Head - #10 x 1/2" "TEKS"	2
-	02167010	Locknuts 1/4-20	3
-	42921000	Tube Flange Gasket	1
3	44152240	Turbulator 24" Long (See chart above for required quantities)	*
4	30545040	Turnbuckle	1
5	30302360	Gas Connector 5/8" OD x 36" - USA only	1
6	30779300	Exhaust Hood SPH Assembly (required for UNVENTED heaters only)	1
7	43343130	Installation & Operation Instruction Manual -not shown-	1



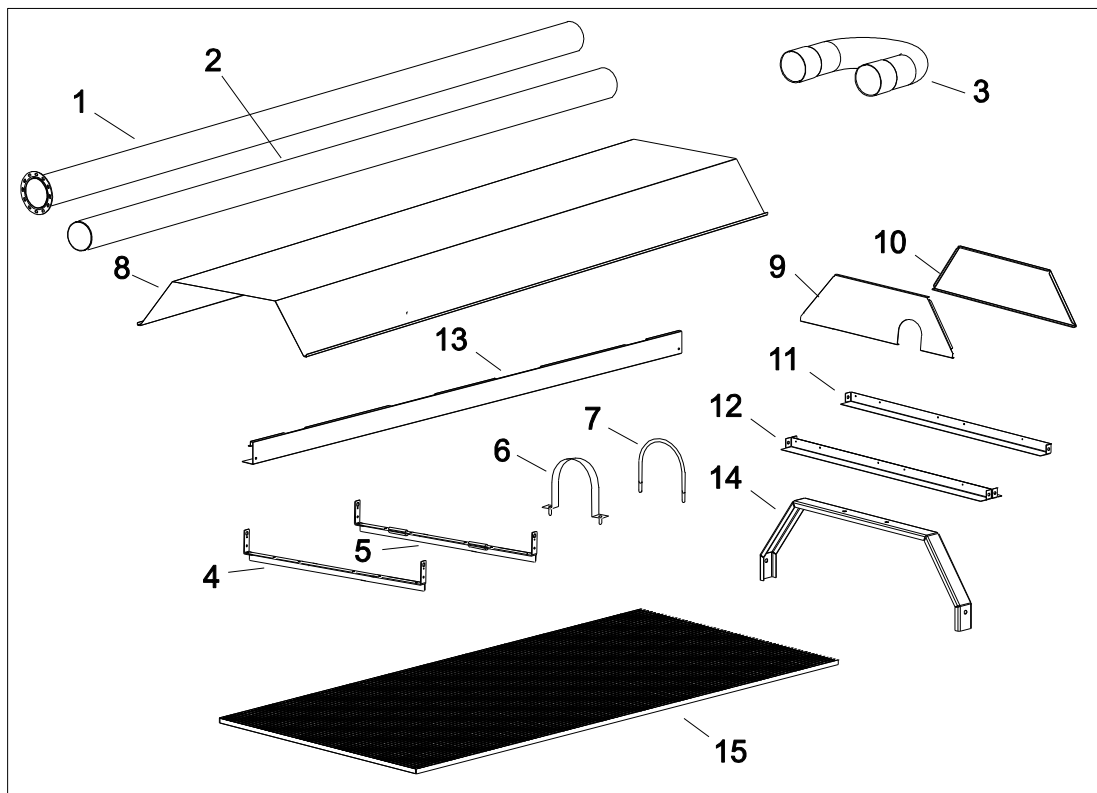
BURNER PACKAGE NUMBERS

SINGLE STAGE CONTROLS		
MODEL NO.	PART NO.	GAS TYPE
SPH 40-N5	44641010	NATURAL
SPH 50-N5	44641030	NATURAL
SPH 60-N5	44641050	NATURAL
SPH 75-N5	44641070	NATURAL
SPH 80-N5	44641090	NATURAL
SPH 100-N5	44641110	NATURAL
SPH 125-N5	44641130	NATURAL
SPH 40-L5	44641020	PROPANE
SPH 50-L5	44641040	PROPANE
SPH 60-L5	44641060	PROPANE
SPH 75-L5	44641080	PROPANE
SPH 80-L5	44641100	PROPANE
SPH 100-L5	44641120	PROPANE
SPH 125-L5	44641140	PROPANE

TWO STAGE CONTROLS		
MODEL NO.	PART NO.	GAS TYPE
SPH 40/25-N7	44641510	NATURAL
SPH 50/30-N7	44641530	NATURAL
SPH 60/40-N7	44641550	NATURAL
SPH 75/50-N7	44641570	NATURAL
SPH 80/55-N7	44641590	NATURAL
SPH 100/65-N7	44641610	NATURAL
SPH 125/80-N7	44641630	NATURAL
SPH 40/25-L7	44641520	PROPANE
SPH 50/30-L7	44641540	PROPANE
SPH 60/40-L7	44641560	PROPANE
SPH 75/50-L7	44641580	PROPANE
SPH 80/55-L7	44641600	PROPANE
SPH 100/65-L7	44641620	PROPANE
SPH 125/80-L7	44641640	PROPANE

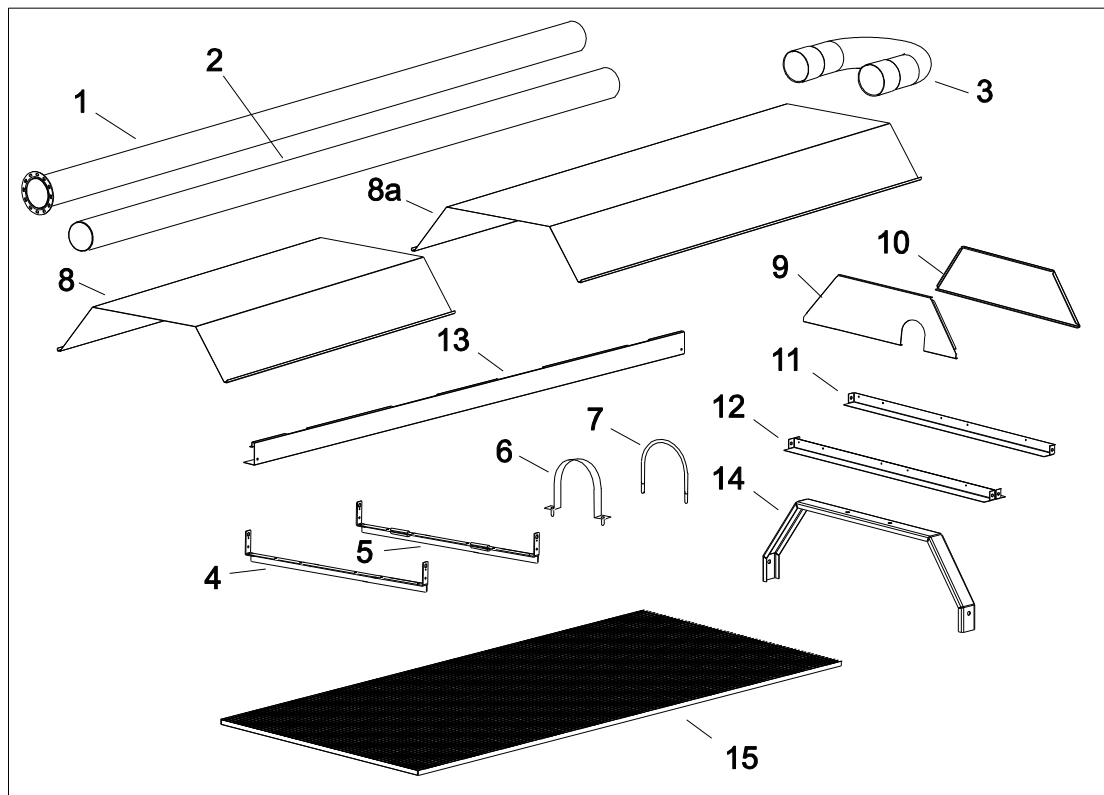
B. SPH 40 through 125 Series 20FT Body Package Descriptions – ALC (Aluminized Calorized)
 (Package Part Number is indicated on the outside of each corresponding carton.)

20FT SPH Body Packages – Aluminized Calorized			20 Ft. Package 42881260
Ref.	Part #	Each Body Package Includes:	Qty.
1	42912230	111" Tube with 12 Hole Flange (Aluminized)	1
2	41932080	104" Tube less Flanges (Aluminized)	1
3	42913008	U-Bend	1
4	42898100	Hanger Bracket	1
5	42898150	Hanger Bracket (with rollers)	2
6	40517059	Tube Retainer Strap	3
7	42873000	U-Bolt	3
8	42894100	Reflector, 28" x 119.5"	1
9	42895150	Reflector End – Burner End (1" lip)	1
10	42896160	Reflector End – U-Bend End (4" lip)	1
11	44616100	Support Grille End Reflector	2
12	44616500	Cross Brace Assembly – Grill Support	1
13	44617000	Side Rail – 61"	4
14	44618009	Suspension Bracket - Body	2
15	30366090	Decorative Grille 28" x 59.75"	2
16	42907011	Body Fastener Kit - comprising:	
	02104080	Nut, Speed #10	8
	02112010	Hex Head Cap Screw – 3/8-16 x 1/2"	4
	02127130	Nut, Hex – 3/8-16	4
	02130130	Lockwasher, Spring – 3/8	4
	02189030	Screw, Hex Washer Head - #8-18 x 1/2" "TEKS"	47
	02192010	Screw, Hex Washer Head - #10 x 1/2"	8



C. SPH 50 through 125 Series 30FT Body Package Descriptions – ALC (Aluminized Calorized)
 (Package Part Number is indicated on the outside of each corresponding carton.)

30FT SPH Body Packages – Aluminized Calorized			30 Ft. Package 42881250
Ref.	Part #	Each Body Package Includes:	Qty.
1	42912220	171" Tube with 12 Hole Flange (Aluminized)	1
2	41932130	164" Tube less Flanges (Aluminized)	1
3	42913008	U-Bend	1
4	42898100	Hanger Bracket	1
5	42898150	Hanger Bracket (with rollers)	2
6	40517059	Tube Retainer Strap	3
7	42873000	U-Bolt	3
8	42894080	Reflector, 28" x 100.0"	1
8a	42894100	Reflector, 28" x 119.5"	1
9	42895150	Reflector End – Burner End (1" lip)	1
10	42896150	Reflector End – U-Bend End (1.5" lip)	1
11	44616100	Support Grille End Reflector	2
12	44616500	Cross Brace Assembly – Grill Support	2
13	44617000	Side Rail – 61"	6
14	44618009	Suspension Bracket - Body	2
15	30366090	Decorative Grille 28" x 59.75"	3
16	42907011	Body Fastener Kit - comprising:	
	02104080	Nut, Speed #10	8
	02112010	Hex Head Cap Screw – 3/8-16 x 1/2"	4
	02127130	Nut, Hex – 3/8-16	4
	02130130	Lockwasher, Spring – 3/8	4
	02189030	Screw, Hex Washer Head - #8-18 x 1/2" "TEKS"	47
	02192010	Screw, Hex Washer Head - #10 x 1/2"	8



6.1) ACCESSORY PACKAGES

D. Kit, Control – 1 Timer/Switch.

Part #44610550

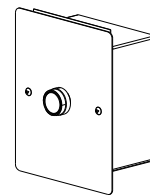
(Option for SPH Series)

Contains:

Timer Relay

24VAC 1Amp - 1 Hour Time Delay.....QTY - 1

Illuminated Switch (OFF/LOW/HIGH.....QTY - 1



E. Kit, Control – 2 Timer/Switch.

Part #44610560

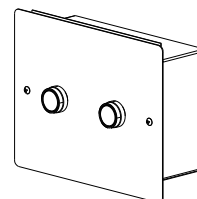
(Option for SPH Series)

Contains:

Timer Relay

24VAC 1Amp - 1 Hour Time Delay.....QTY - 2

Illuminated Switch (OFF/LOW/HIGH.....QTY - 2



F. Kit, 2-Stage Relay Board.

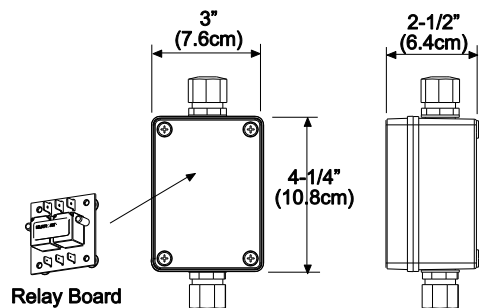
Part #44195000

Contains:

Relay Board , #30709058.....QTY-1

Enclosure, #30709059.....QTY-1

Cord Connector - 1/2", #30635040.....QTY-2



G. Hanger Bracket (Adjustable).

Part #44618050

Contains:

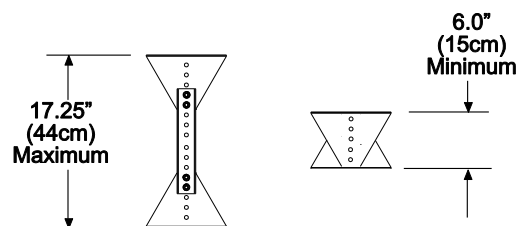
Strut Bracket , #44618069.....QTY-1

Base Bracket, #44618079.....QTY-2

Hex Head Screw 3/8" x 1/2", #02112010...QTY-4

Hex Nut 3/8". #02127130 ...QTY-4

Spring Lockwasher 3/8" ...QTY-4



H. Vent Kit

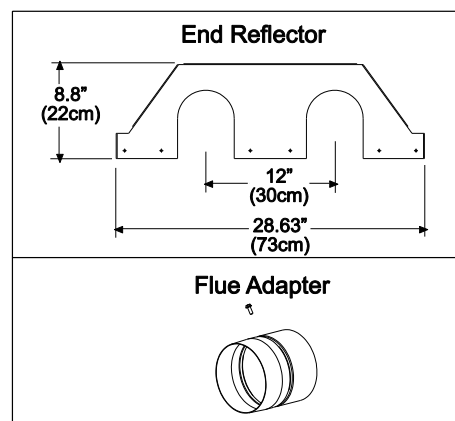
Part #44622000

(Option for SPH Series venting)

Contains:

End Reflector , #42895160.....QTY-1

Flue Adapter, #30504500.....QTY-1



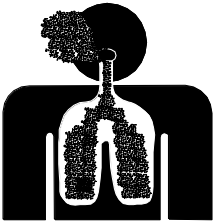
7.0) GENERAL HEATER ASSEMBLY REQUIREMENTS – ALL MODELS

! CAUTION	
	CUT HAZARD Sheet metal parts, particularly reflectors and vent have sharp edges. Always use gloves when handling. Failure to do so may result in death, serious injury or property damage.

During field assembly of the heater, the recommended procedure is as follows:


- a) Before hanging heater sections, first determine the actual layout of the system. See section 8.0 for complete heater dimensions. Consideration must also be taken for flue pipe, fresh air ducting, gas piping, clearances to combustibles, etc. before hanging heater. Typical suspension methods are shown in Section 9.0.

7.1) TYPICAL ASSEMBLY LAYOUT – (WITH TURBULATORS)

! WARNING	
	POISONOUS GAS AND SOOT HAZARD The heater must be assembled with the correct number of turbulator sections and tube length for the rated heat input. The turbulator must be installed in the last tube section as shown. Failure to do so may result in death, serious injury, property damage or illness from Carbon Monoxide poisoning.

20 FT. SYSTEM


Models SPH 40-125







Model	2 Ft. Turbulator (exhaust tube)
SPH 40	4
SPH 50	4
SPH 60	4
SPH 75	4
SPH 80	4
SPH 100	3
SPH 125	4

30 FT. SYSTEM

Models SPH 40-125

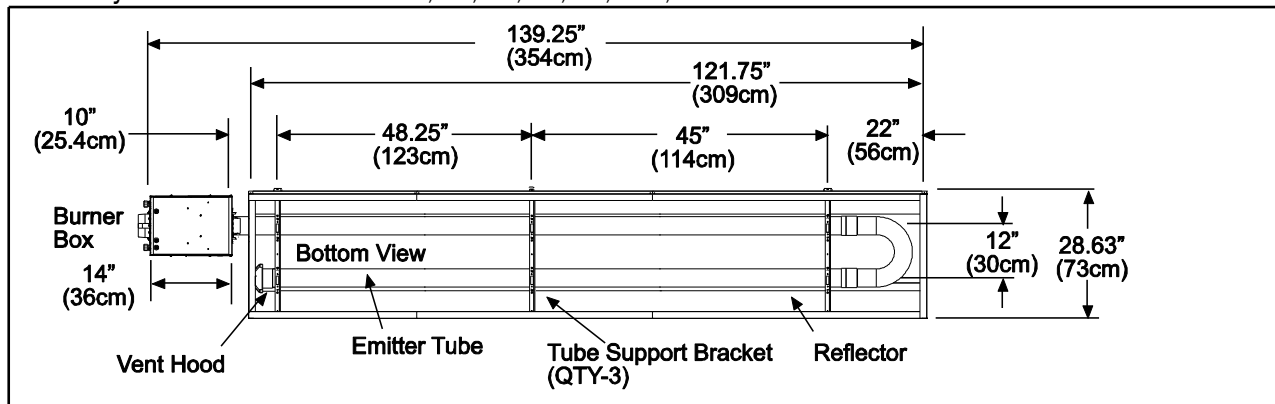


LEGEND	
	2ft Aluminized Steel Turbulator sections (see chart above for required quantities)
	104 in. or 164 in. Aluminized Tube (model dependent)
	111 in. or 171 in. Aluminized Tube with 12 Radial Hole Flange (model dependent)
	180 Deg. U-Bend

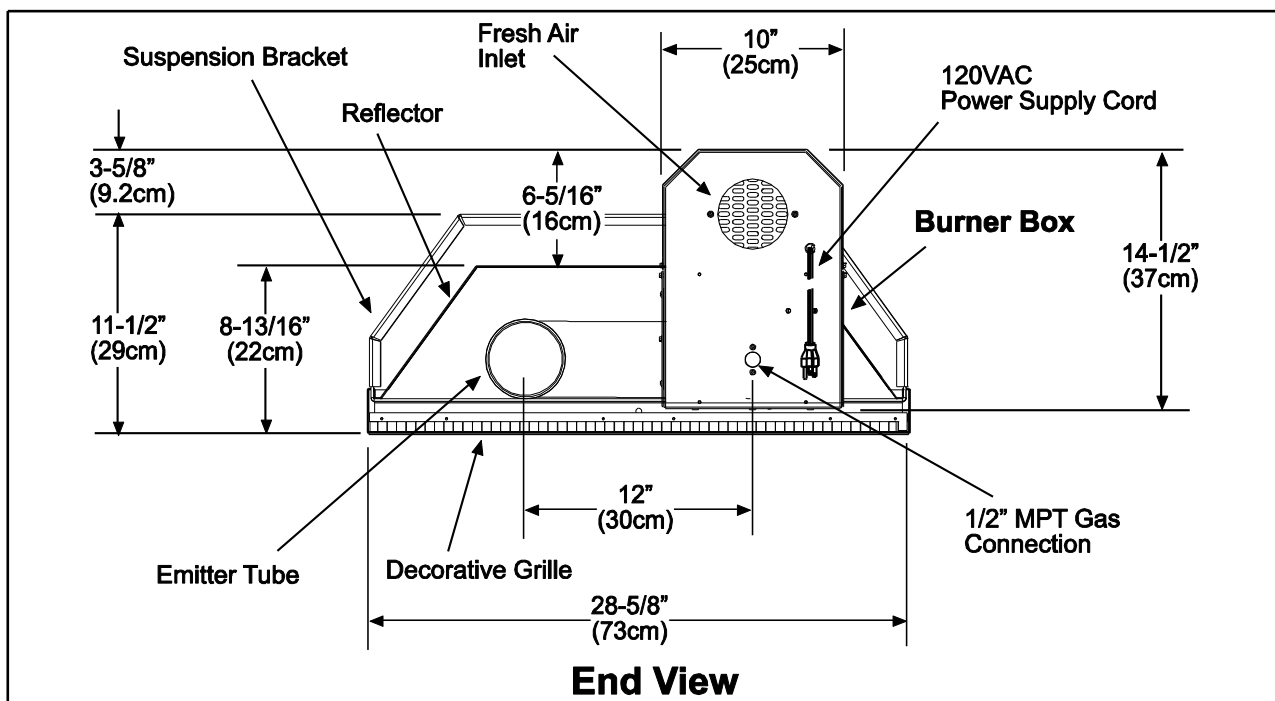
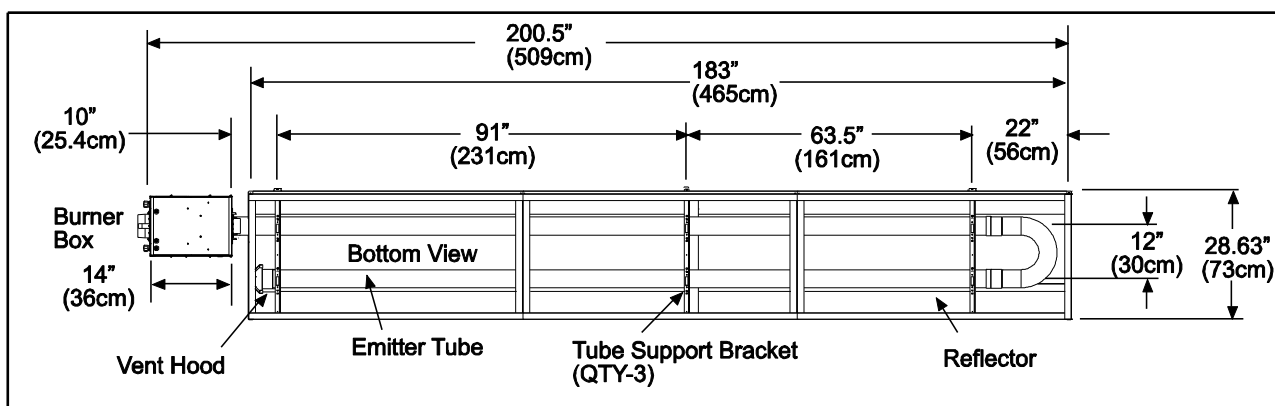
8.0) DIMENSIONS – SPH SERIES

Typical Dimensions (decorative grille not shown).

20FT Body Section – Models: SPH 40, 50, 60, 75, 80, 100, 125

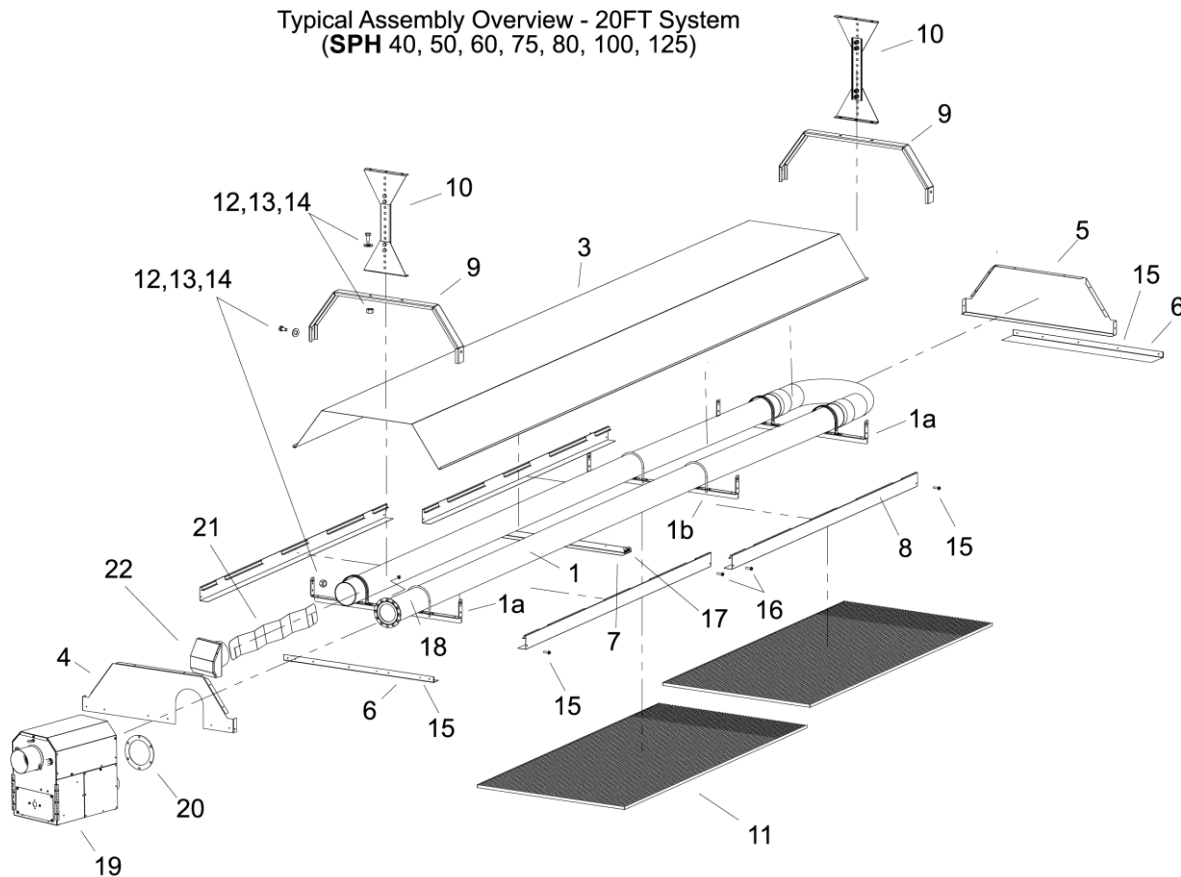


30FT Body Section – Models: SPH 75, 80, 100, 125



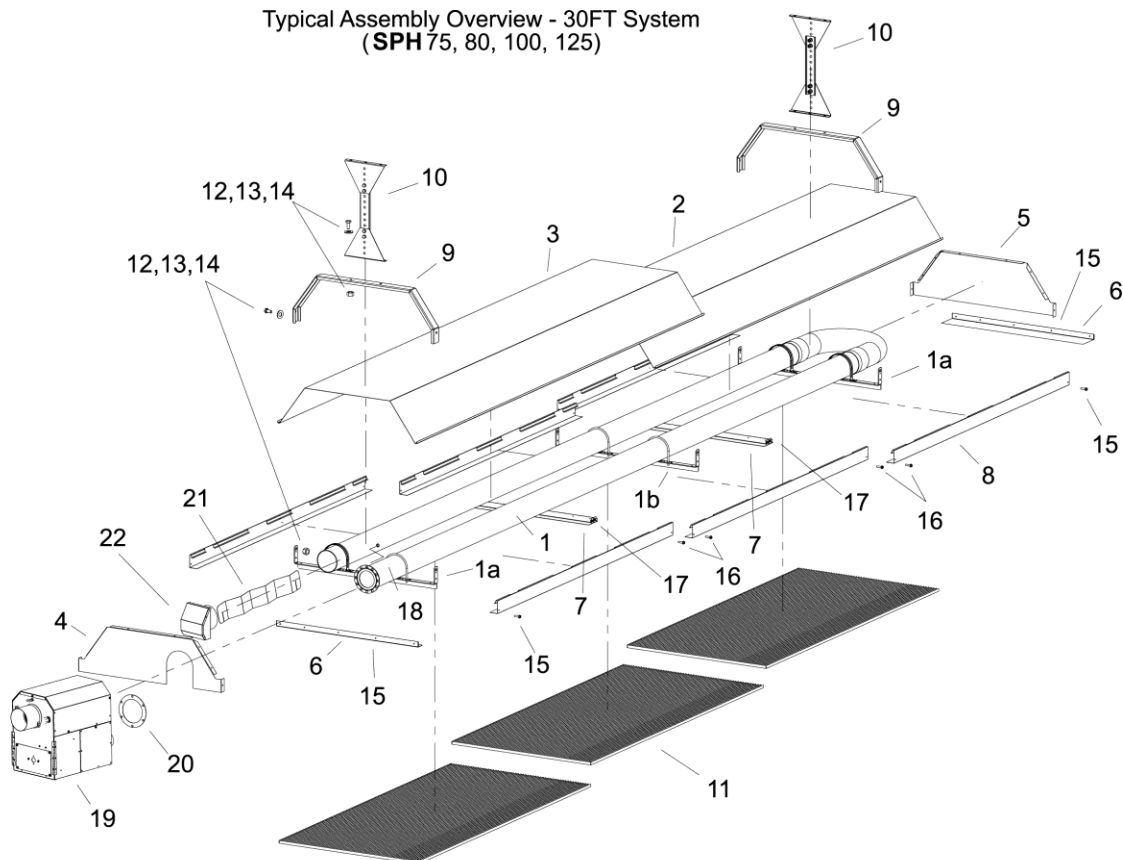
8.1) HEATER ASSEMBLY OVERVIEW – 20FT BODY MODELS SPH 40, 50, 60, 75, 80, 100, 125

Ref.	Part #	Description	Qty.
1	42914260	Tube Body Section – (pre-assembled)	1
1a	42898150	Hanger Bracket (with rollers)	2
1b	42898000	Hanger Bracket	1
2			
3	42894100	Reflector, 28" x 119.5"	1
4	42895150	Reflector End – Burner End	1
5	42896160	Reflector End – U-Bend End (3.5" lip)	1
6	44616100	Support Grille End Reflector	2
7	44616500	Cross Brace Assembly – Grill Support	1
8	44617000	Side Rail – 61"	4
9	44618009	Suspension Bracket - Body	2
10	44618050	Hanging Bracket Assembly (accessory)	2
11	30366090	Decorative Grille 28" x 59.75"	2
12	02112010	Hex Head Cap Screw – 3/8-16 x 1/2"	4
13	02127130	Nut, Hex – 3/8-16	4
14	02130130	Lockwasher, Spring – 3/8	4
15	02189030	Screw, Hex Washer Head – #8-18 x 1/2" "TEKS"	34
16	02192010	Screw, Hex Washer Head – #10 x 1/2"	6
17	02104080	Nut, Speed #10	6
18	02167010	Locknut 1/4-20 "KEPS" (included with control)	3
19	See Chart	Burner Control Assembly	1
20	42921000	Tube Flange Gasket (included with control)	1
21	44152240	Turbulator (included with control)	See Chart
22	30779300	Draft Hood (included with control)	1

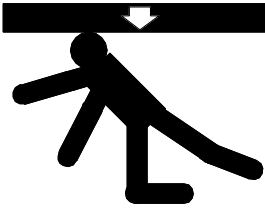


8.2) HEATER ASSEMBLY OVERVIEW – 30FT BODY MODELS SPH 50, 60, 75, 80, 100, 125

Ref.	Part #	Description	Qty.
1	42914250	Tube Body Section – (pre-assembled)	1
1a	42898150	Hanger Bracket (with rollers)	2
1b	42898000	Hanger Bracket	1
2	42894080	Reflector, 28" x 100.0"	1
3	42894100	Reflector, 28" x 119.5"	1
4	42895150	Reflector End – Burner End	1
5	42896150	Reflector End – U-Bend End (1" lip)	1
6	44616100	Support Grille End Reflector	2
7	44616500	Cross Brace Assembly – Grill Support	2
8	44617000	Side Rail – 61"	6
9	44618009	Suspension Bracket - Body	2
10	44618050	Hanging Bracket Assembly (accessory)	2
11	30366090	Decorative Grille 28" x 59.75"	3
12	02112010	Hex Head Cap Screw – 3/8-16 x 1/2"	4
13	02127130	Nut, Hex – 3/8-16	4
14	02130130	Lockwasher, Spring – 3/8	4
15	02189030	Screw, Hex Washer Head - #8-18 x 1/2" "TEKS"	47
16	02192010	Screw, Hex Washer Head - #10 x 1/2"	8
17	02104080	Nut, Speed #10	8
18	02167010	Locknut 1/4-20 "KEPS" (included with control)	3
19	See Chart	Burner Control Assembly	1
20	42921000	Tube Flange Gasket (included with control)	1
21	44152240	Turbulator (included with control)	See Chart
22	30779300	Draft Hood (included with control)	1



9.0) TYPICAL SUSPENSION METHODS

⚠ WARNING	
	SUSPENSION HAZARD
	Burner must be secured to the mounting flange with nuts.
	All materials used to suspend the heater must have a minimum working load of 115 lbs. All "S" Hooks must be crimped closed.
	Never use the heater to support a ladder or other access equipment. Failure to do so may result in death, serious injury or property damage.

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

1. Use only noncombustible materials for suspending hangers and brackets.
2. A minimum No. 2 chain with a working load limit of 115 lbs. is required.
3. Turnbuckles can be used with chains to allow leveling of the burner box. All "S" hooks and eye bolts must be manually crimped closed by the installer. See Figure A
4. For outdoor installations SunStar recommends that the body section be suspended using the adjustable suspension brackets (supplied as accessories) shown in Figure B. An optional method to suspend the body section using 3/8" threaded rod and nuts (not supplied) as shown in Figure C.
5. For indoor installations the heater may be suspended by chain. See Figure D.
6. Heaters must not be supported by gas or electric supply lines and must be suspended from a permanent structure with adequate load capacity.

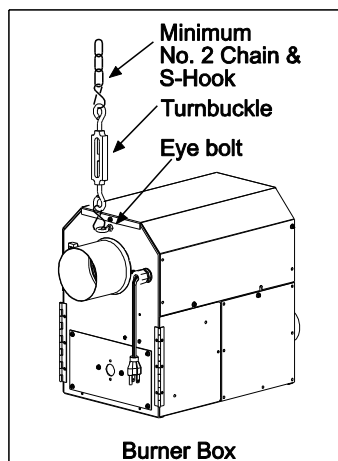


Figure A

OPTIONAL OUTDOOR SUSPENSION ACCESSORIES

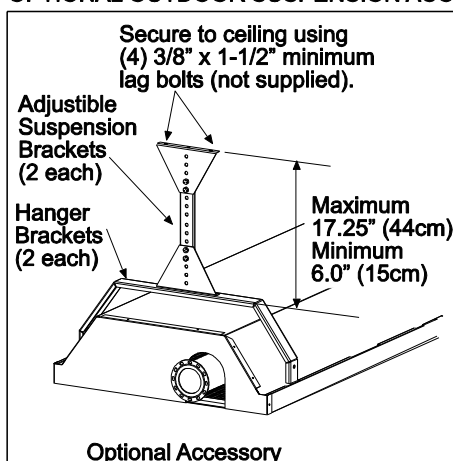


Figure B

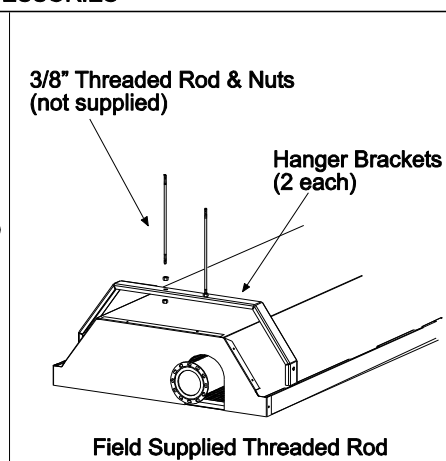


Figure C

OPTIONAL INDOOR SUSPENSION WITH CHAIN

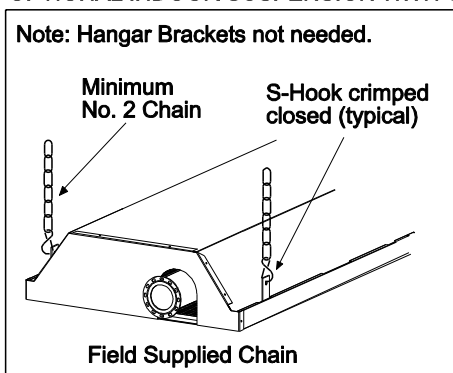
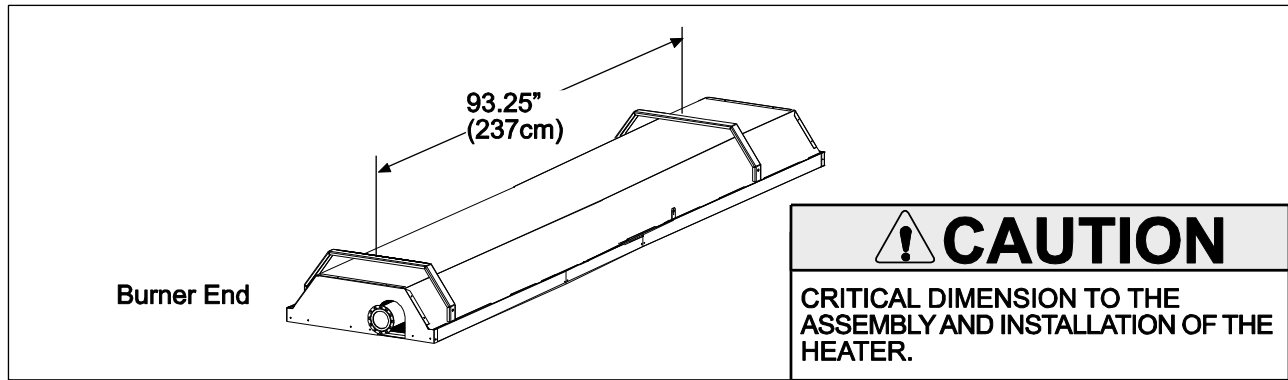
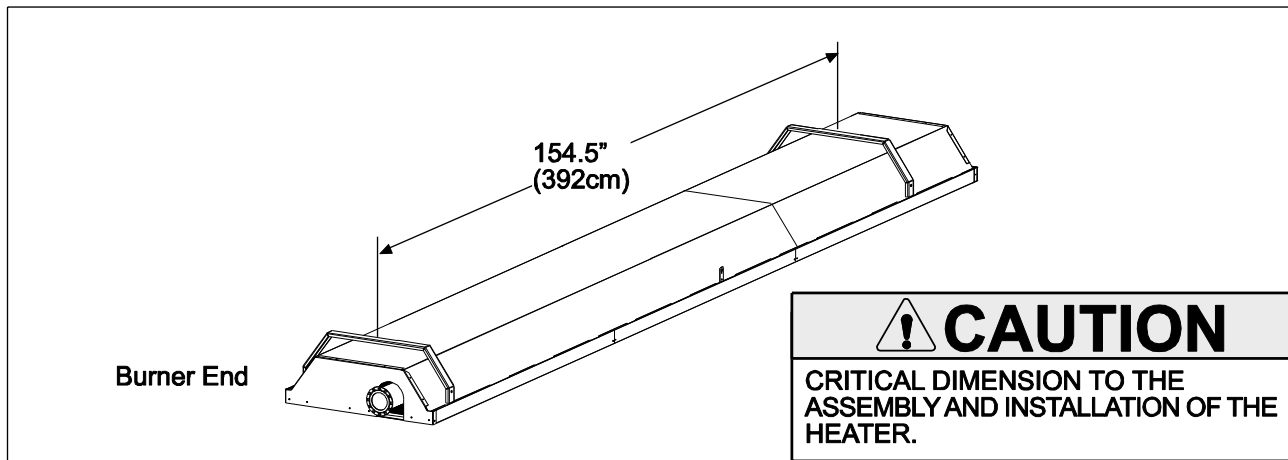


Figure D

Suspension – 20FT Body - Models: SPH 40, 50, 60, 75, 80, 100, 125



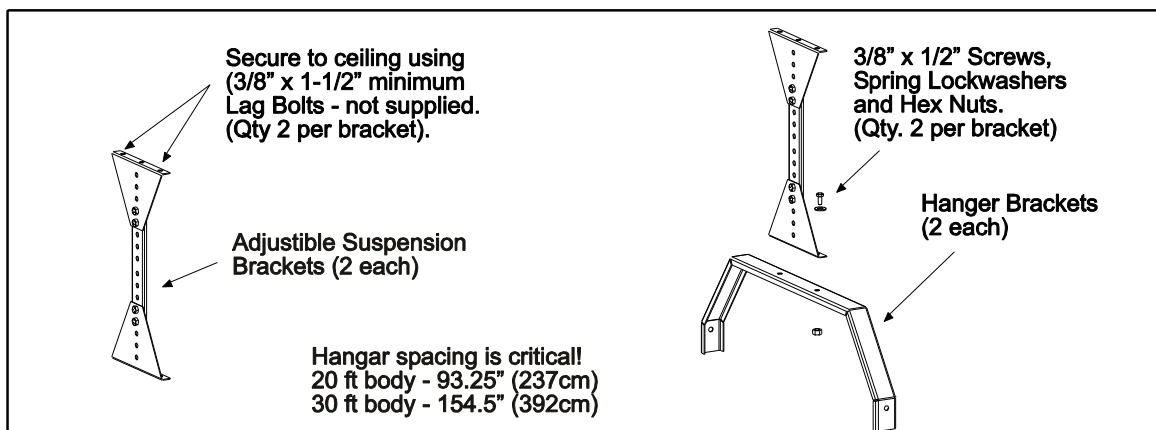
Suspension – 30FT Body - Models: SPH 50, 60, 75, 80, 100, 125



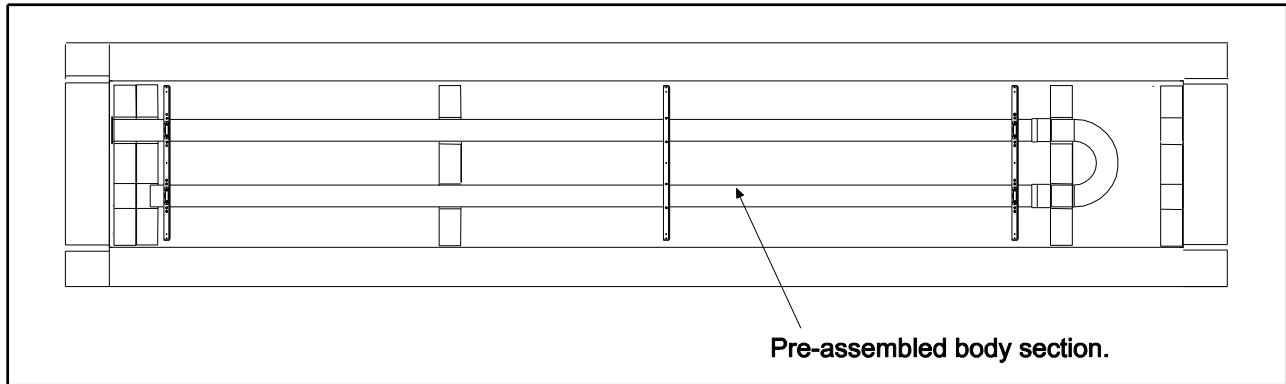
10.0) HEATER ASSEMBLY

! CAUTION	
	CUT HAZARD
	Sheet metal parts, particularly reflectors and vent have sharp edges. Always use gloves when handling.
	Failure to do so may result in death, serious injury or property damage.

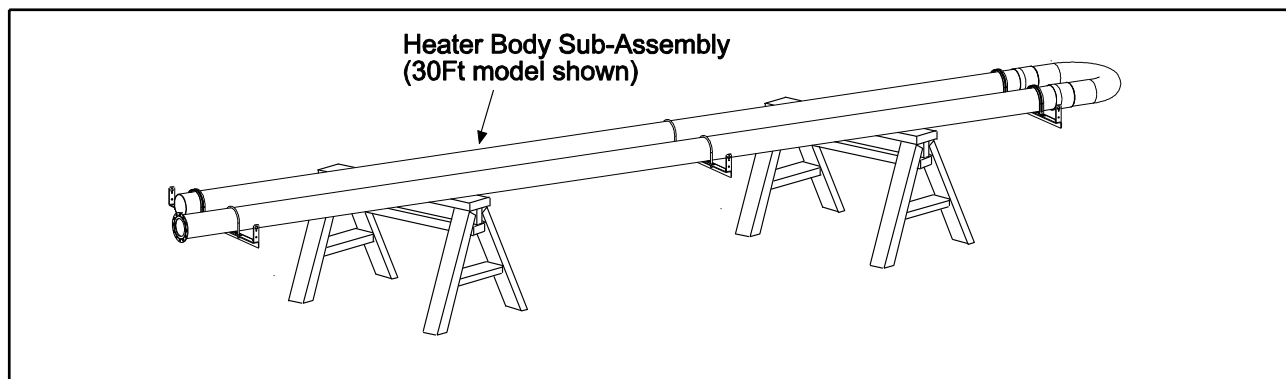
- Pre-assemble the adjustable suspension brackets (accessories only) or 3/8" threaded rod (field supplied) to the hanger brackets. Install these to the ceiling at the dimensions outlined in section 9.0 using best building practices.



8. The recommended method for assembling the heater is to assemble the tubes and reflectors portions at ground level and raise it into the final hanging position before final assembly.
9. Open the body packaging and lift the pre-assembled body section up and out.

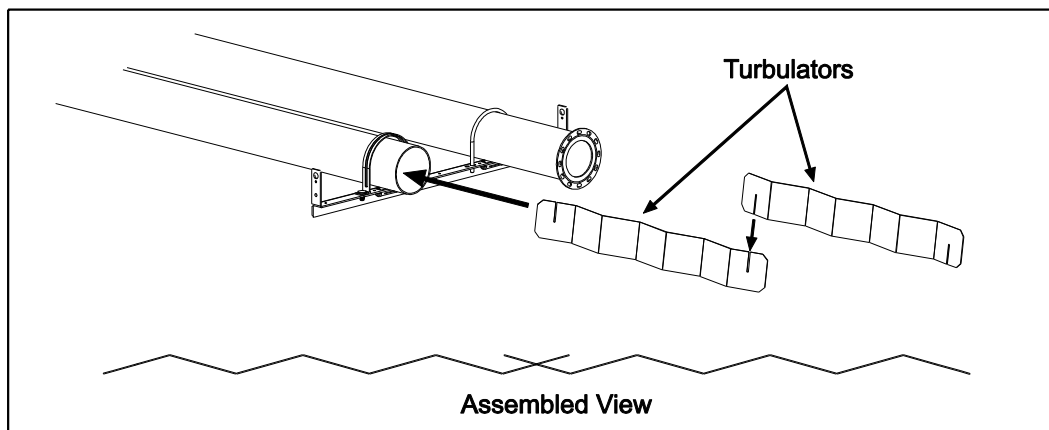


10. Roll the pre-assembled body section over and place on the sawhorses to begin the assembly.



11. Assemble the turbulators together by interlocking the slotted end portions. Slide these into the exhaust tube section until they are flush with the tube end. Refer to the table below for the required quantity of turbulators for each heater model.

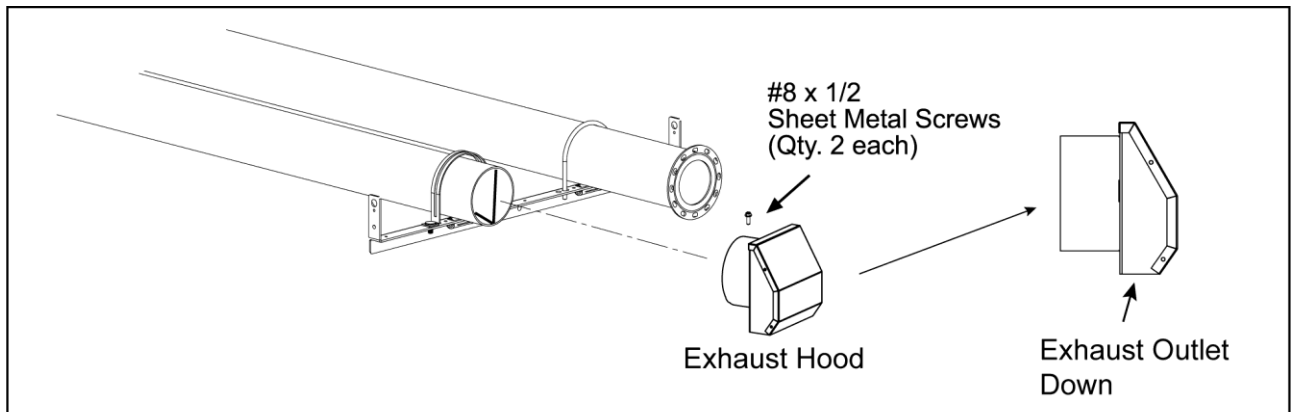
⚠ WARNING	
	<p style="text-align: center;">POISONOUS GAS AND SOOT HAZARD</p> <p>The heater must be assembled with the correct number of turbulator sections and tube length for the rated heat input.</p> <p>The turbulator must be installed in the last tube section as shown.</p> <p>Failure to do so may result in death, serious injury, property damage or illness from Carbon Monoxide poisoning.</p>



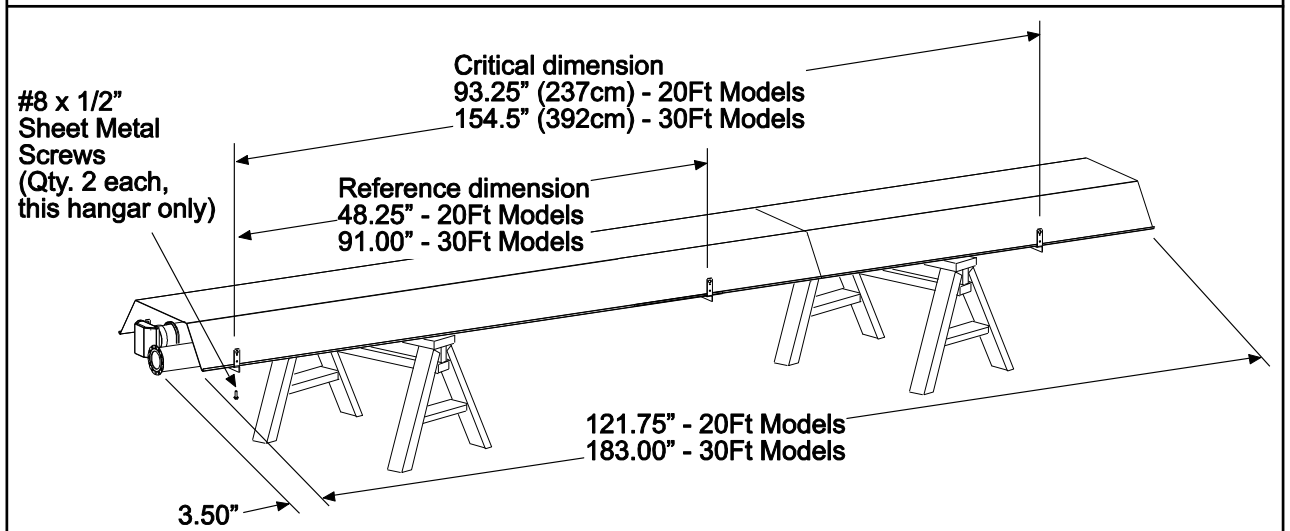
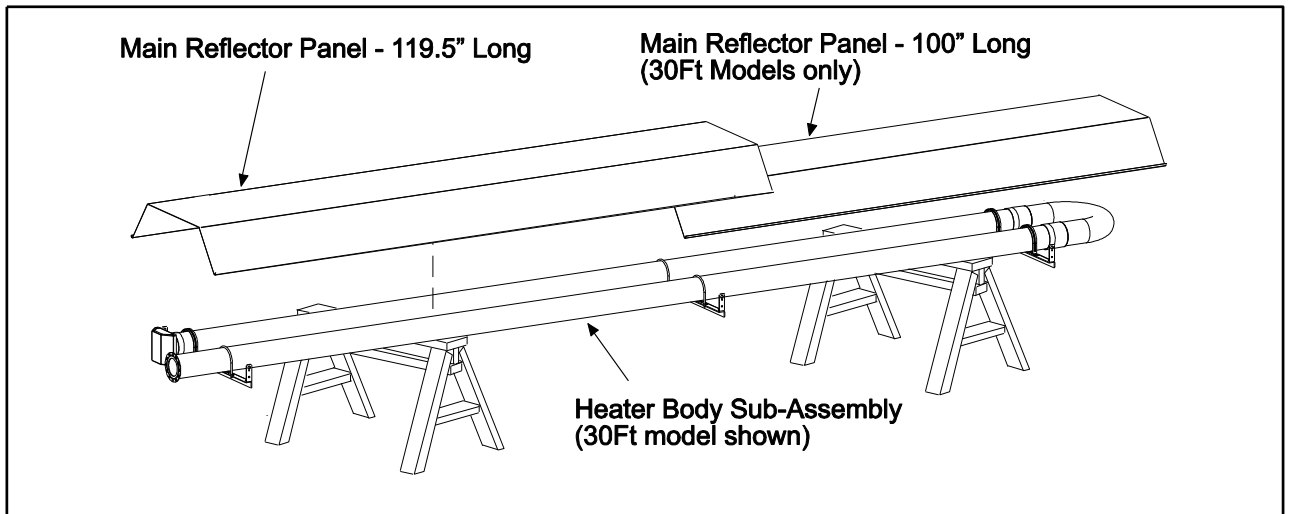
MODEL	2 Ft. Turbulator Sections
SPH 40	4
SPH 50	4
SPH 60	4
SPH 75	4
SPH 80	4
SPH 100	3
SPH 125	4

12. Attach the exhaust draft hood to the exhaust tube of the heater using #8 sheet metal screws provided. **The exhaust hood outlet must be pointing down.**

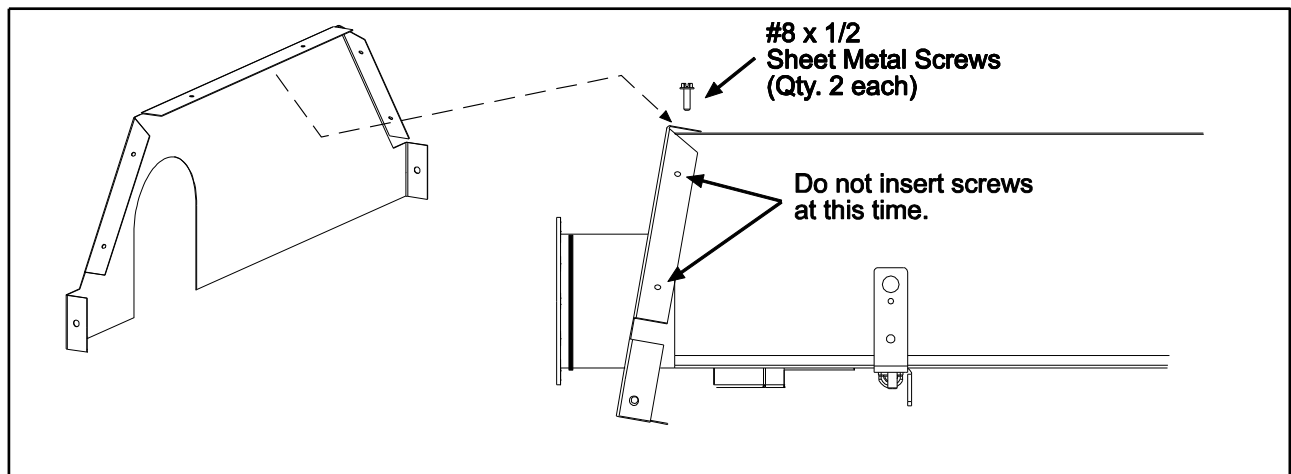
Note: The draft hood is required for **UNVENTED** use only. If the heater is to be **VENTED** use the 4" flue adapter collar (PN 30504500) and the end reflector accessory having (2) slotted holes (PN 42895160). The optional accessories vent kit PN 44622000 is required. Refer also to the Venting Section 14 of the manual.



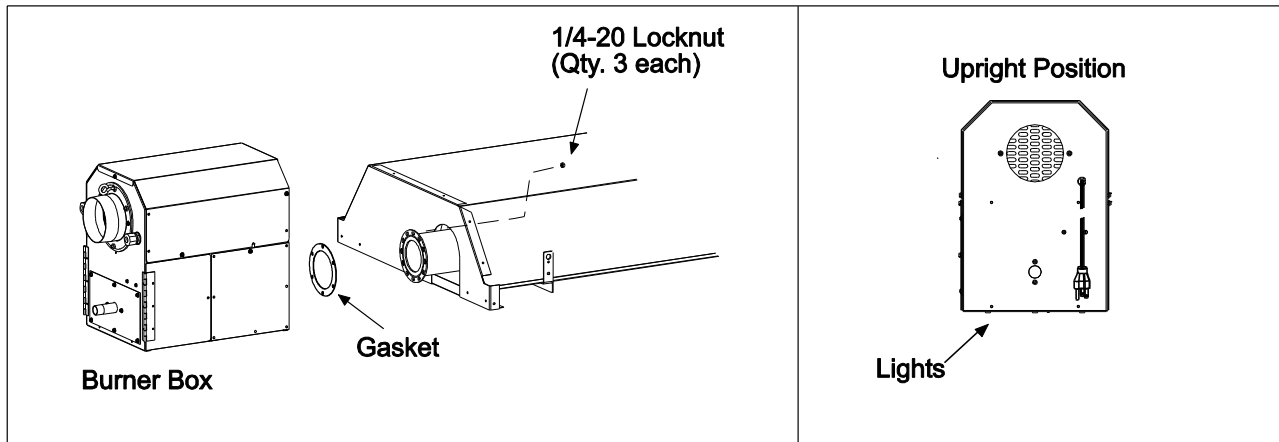
13. Install the reflectors onto the pre-assembled body section. Measure from end of reflector to tube flange and set at specified distance. Install sheet metal screws through first hanging bracket and into reflector to keep it in place. Note: 20Ft models require (1) reflector only.



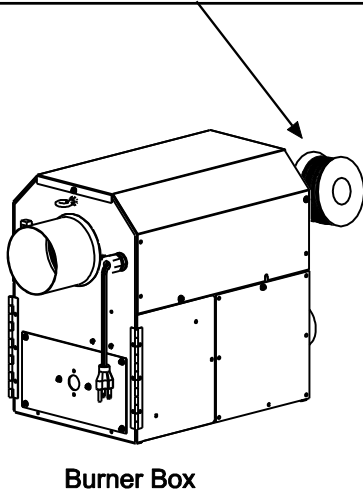
14. Place the reflector end to the top end portion of the reflector and secure with (2) #8 sheet metal screws provided. **DO NOT** insert any other screws at this time.



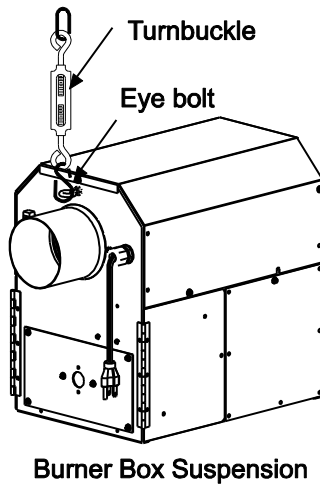
15. Attach the burner box and gasket to end of tube flange and secure with 1/4-20 locknuts provided. The heater must be mounted **horizontally** and the burner control **must** be positioned **upright** as shown below. **Failure to install the burner control in an UPRIGHT position will VOID the manufacturer's warranty.**



! CAUTION
 DO NOT lift burner or support it's weight using the TISS wire. It will break under heavy load.



! CAUTION
 Failure to install the burner box suspension chain will void manufacturers warranty.



! CAUTION

The burner box weights 38 lbs. Use caution when handling it.
Failure to install the burner box in an upright position and lights facing the floor will void the manufacturer's warranty.

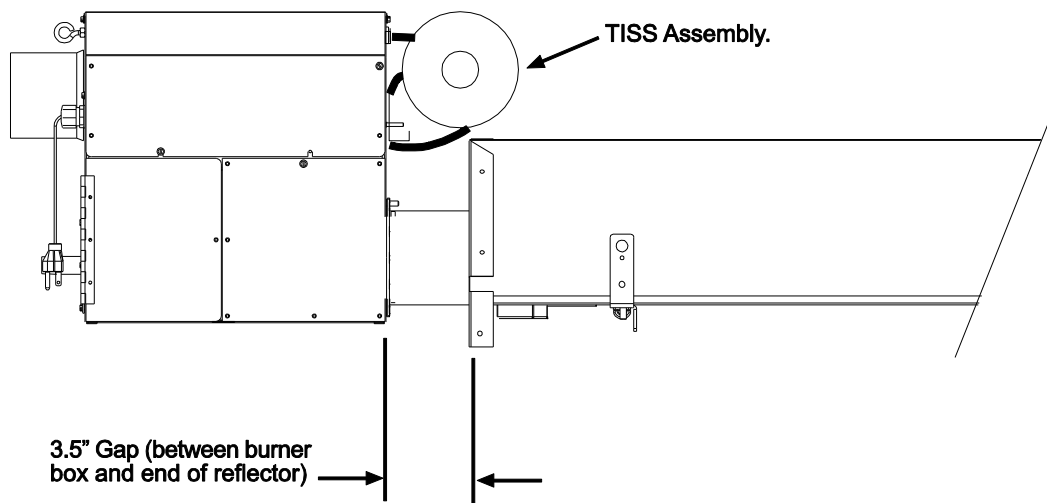
CONNECTING THE TISS SYSTEM

The heater can be used without a TISS wire when installed below a non-combustible ceiling only. For other installations with combustible ceilings the TISS wire must be added as shown below.

Description: The TISS (Tube Integrity Safety System) is designed to shut the main burner off in the event that a burnout occurs in the first 10ft. section of firing tube. **Note:** When replacing the firing tube a new TISS wire assembly PN 44176510 (spring and spring retainer clamp not included) must also be installed.

Instructions:

- A. Make sure that the gap between the burner box and end of reflector is 3.5" and the reflector is securely attached to the reflector support bracket. Make adjustments if necessary.

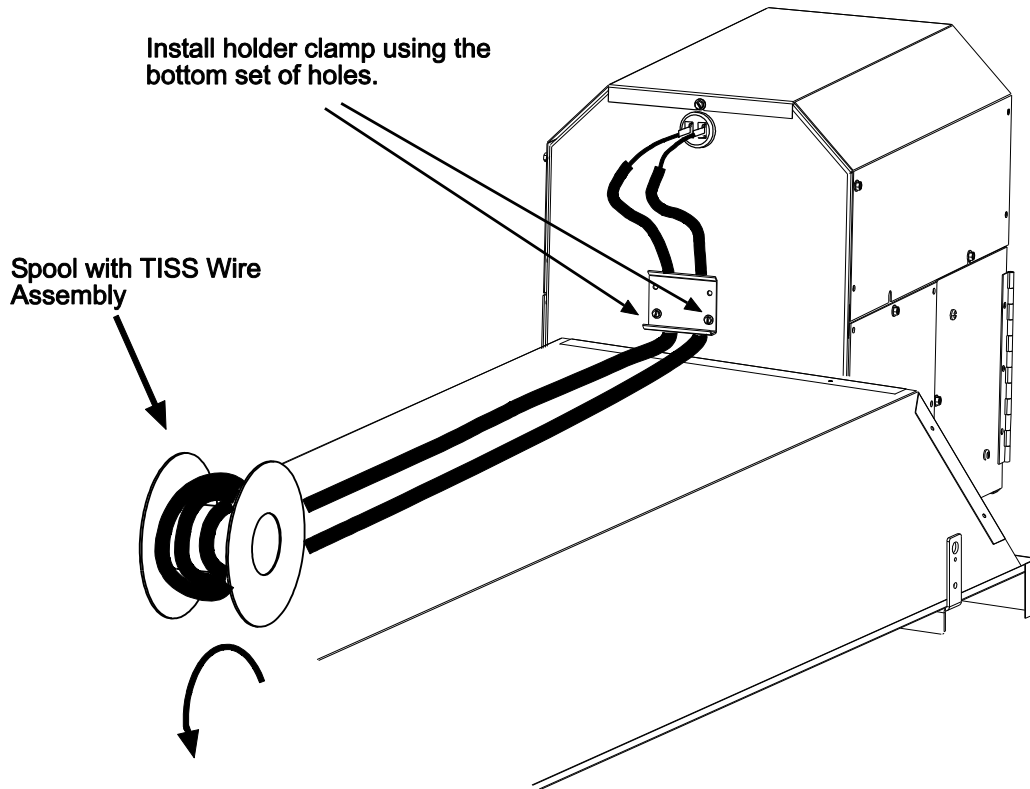


Step 1

CAUTION

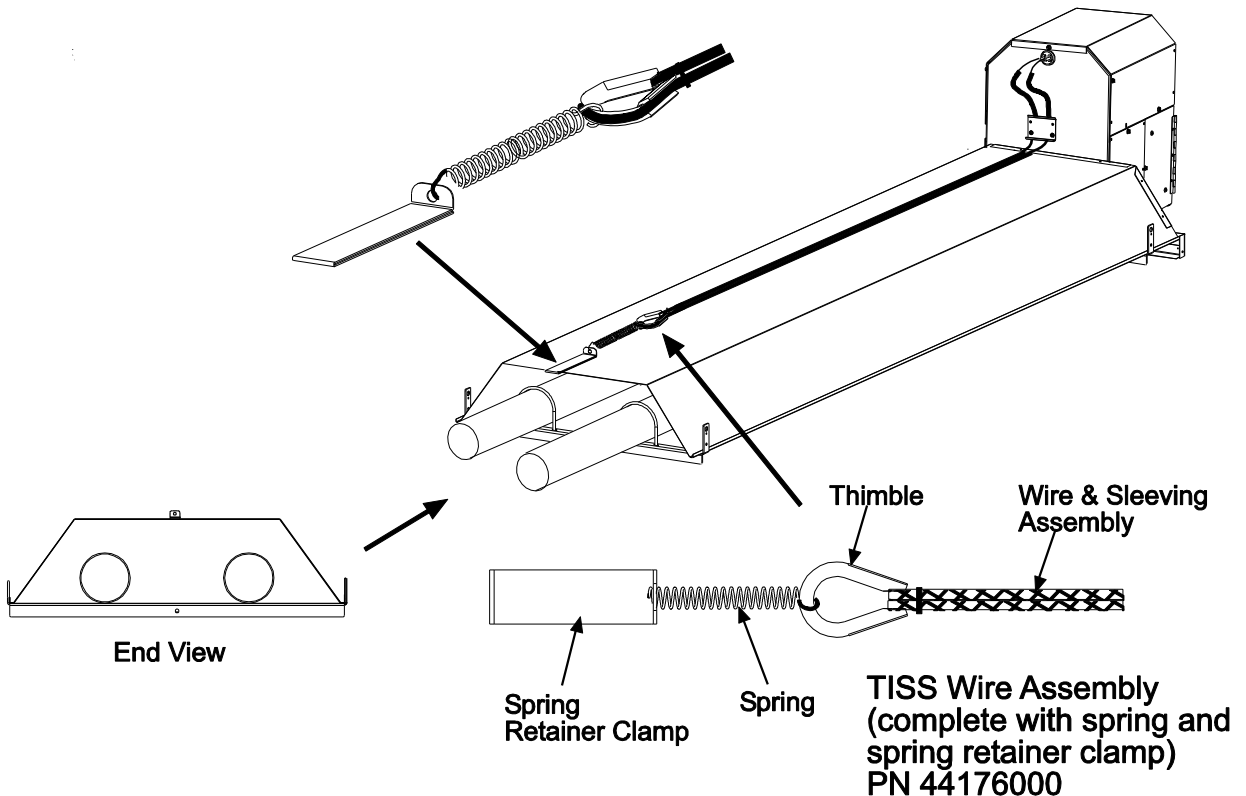
Failure to maintain 3.5" gap as shown will result in pre-mature TISS wire failure.

- B. Un-roll the TISS wire assembly from the spool. Be careful not to kink the wires. The holder clamp must be installed to the burner control using the bottom set of holes as shown in the label view.



Step 2

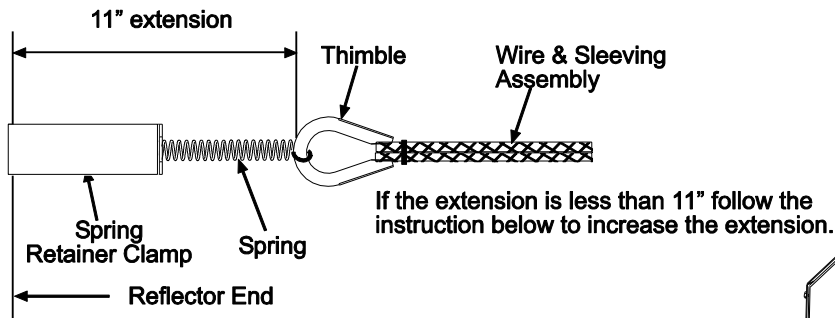
- C. Hold the spring retainer clamp and pull the **TISS** wire assembly to end of reflector at overlap joint. Slide spring retainer clamp over end of reflector as shown.



Step 3

D. After attachment of the TISS, check to make sure that there is sufficient tension on the wire. Follow the diagram below to increase or decrease the tension as necessary.

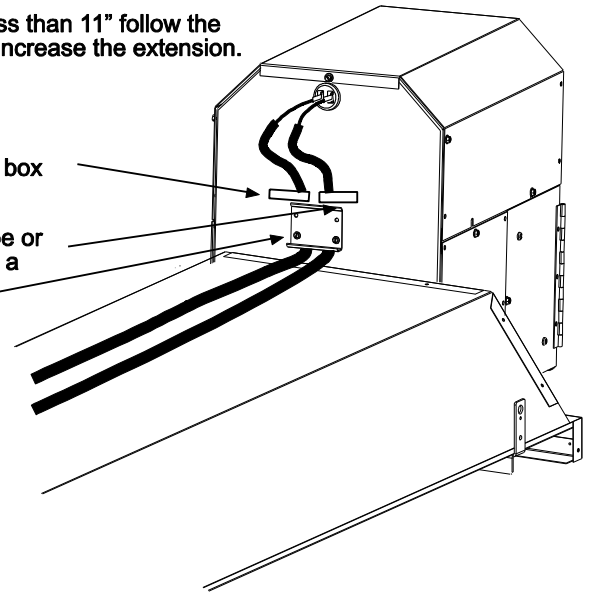
1. Measure the extension of the spring from the end of the reflector to the thimble as shown below.



2. Tape one end of the sleeve to the burner box or use a marker.

3. Mark the other end of the sleeve with tape or other marker. Use the top of the retainer as a reference.

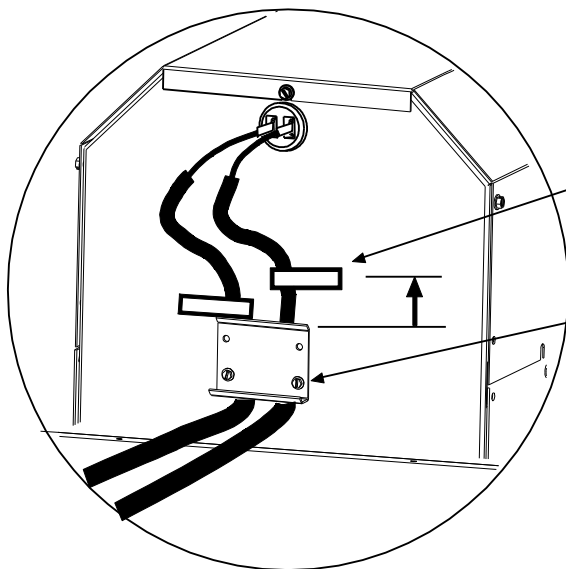
4. Loosen screws.



5. Pull one end of the sleeve and wire inside until the marker is raised by the total adjustment length. ie. if the extension is 10" then pull through 1" to increase the extension to 11".

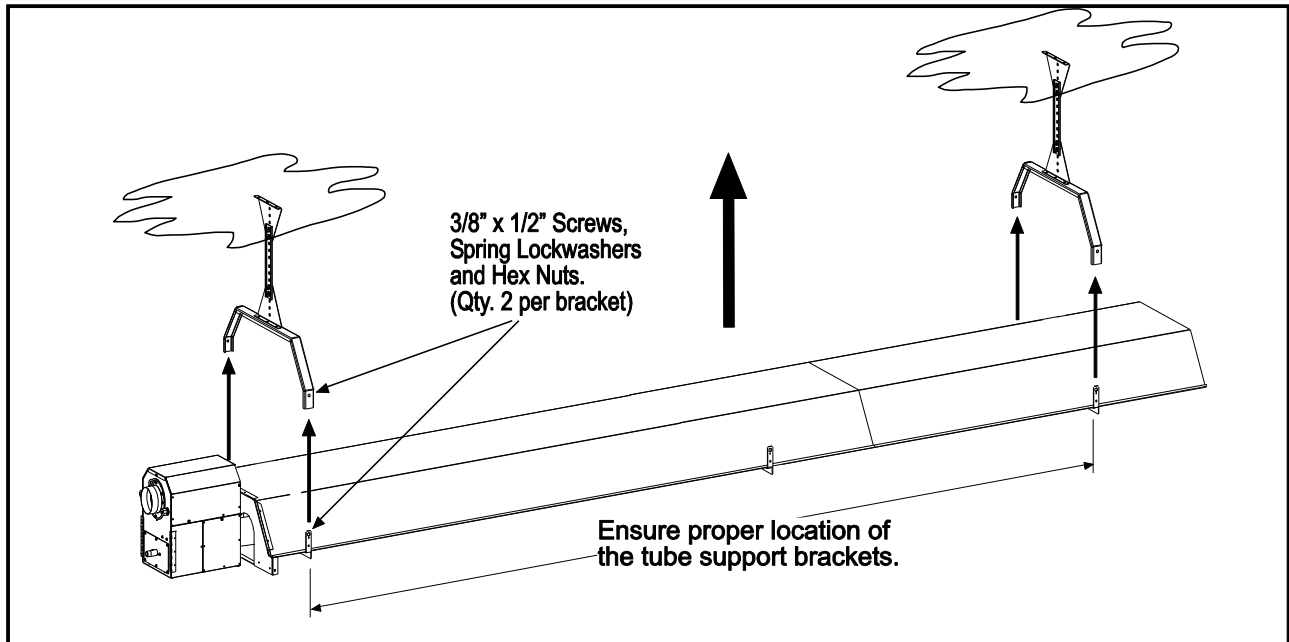
6. Tighten screws.

7. Check extension using the method in step 1.

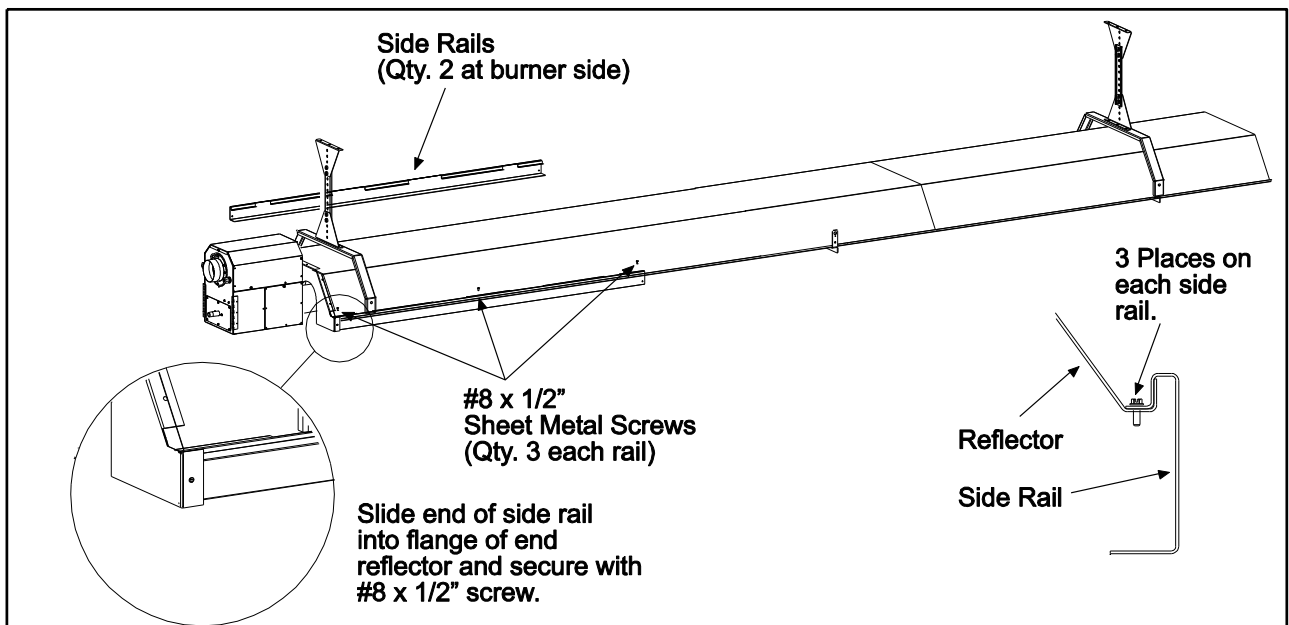


Step 4

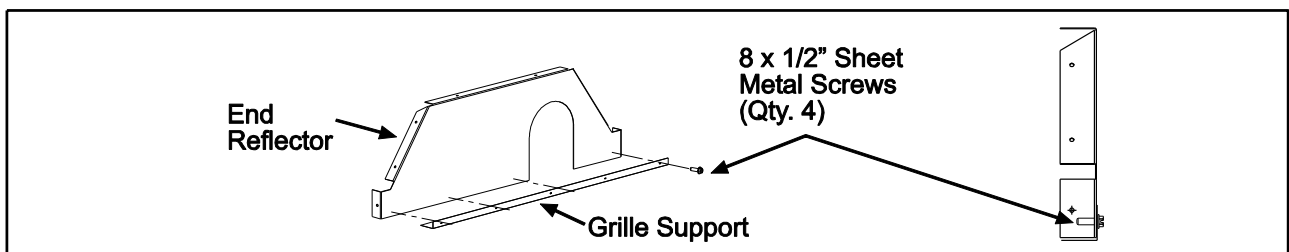
16. Lift the heater into place and attach to the tube support brackets previously installed to the ceiling. Use the 3/8" x 1/2" screws, spring lock washers and hex nuts supplied in the fastener kit.



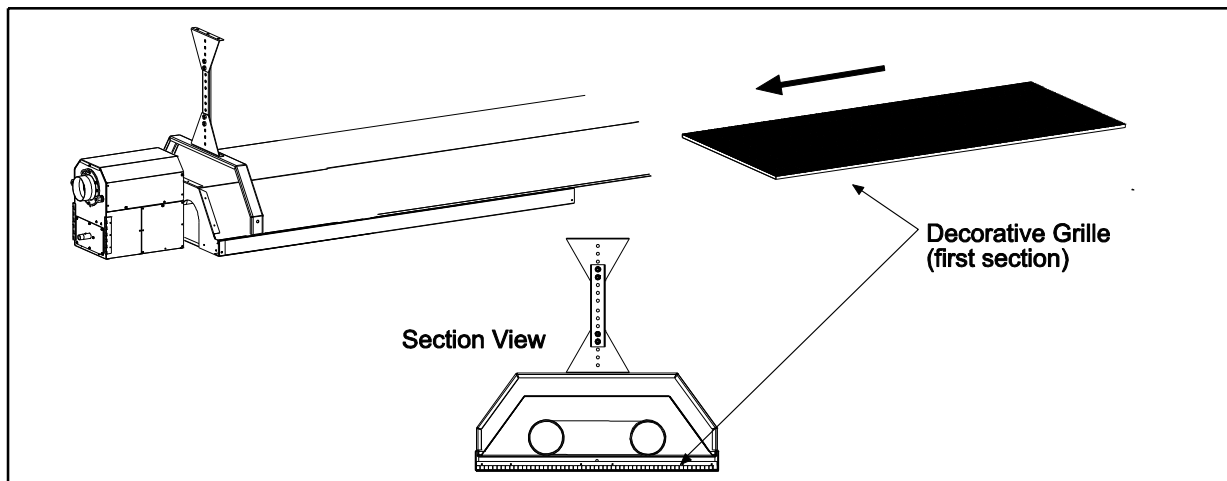
17. Install (2) side rails on the burner end of heater and align with edge of reflector. The side rail rests inside the reflector lip. Attach each side rail to the reflector from the top using (3) #8 sheet metal screws provided.
18. Slide end of side rail into flange of end reflector and secure with (1) #8 sheet metal screw provided. Finish securing the end reflector using (4) #8 sheet metal screws provided.



19. Secure support grille to end reflector with (4) #8 sheet metal screw provided.

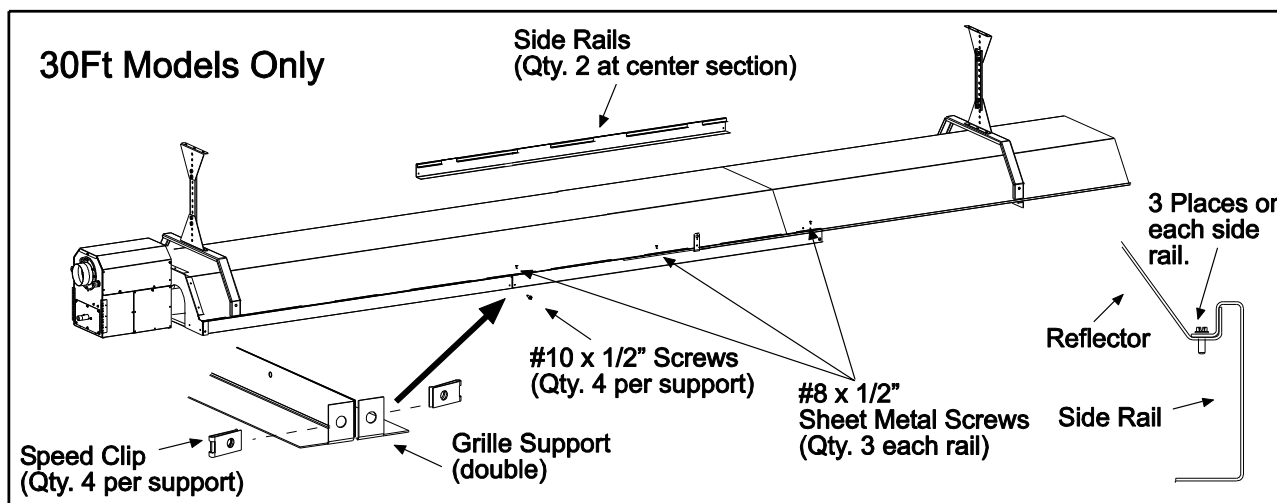


20. Slide one decorative grille panel into the side rails of the heater body.

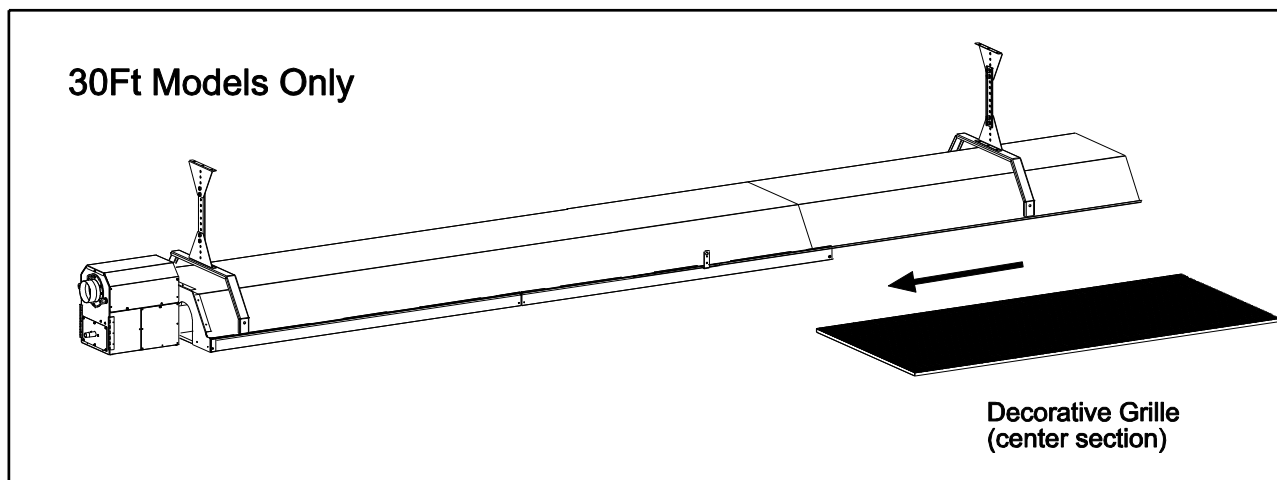


21. Install the double grill support at the end of the side panels. Fasten this in place using (1) speed clip and #10 screw provided on each side of the grill support.

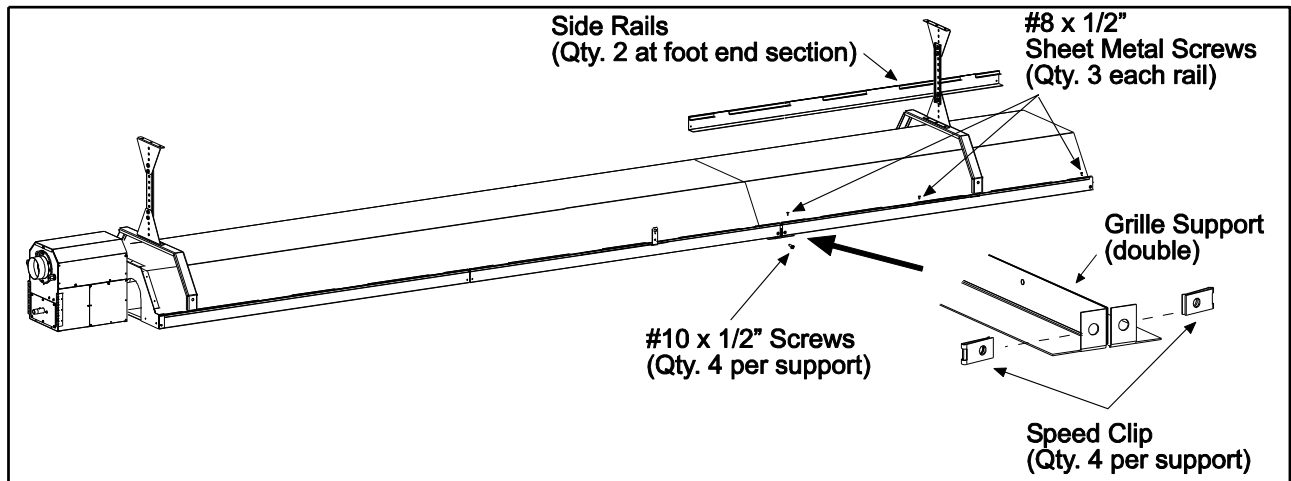
22. Install (2) side rails on the center section of heater. Attach each side rail to the reflector from the top using (3) #8 sheet metal screws provided. Attach each side rail using (1) speed clip and #10 screw provided on each side of the grill support. Note: The center double grill support and side rails are used on the 30Ft models only.



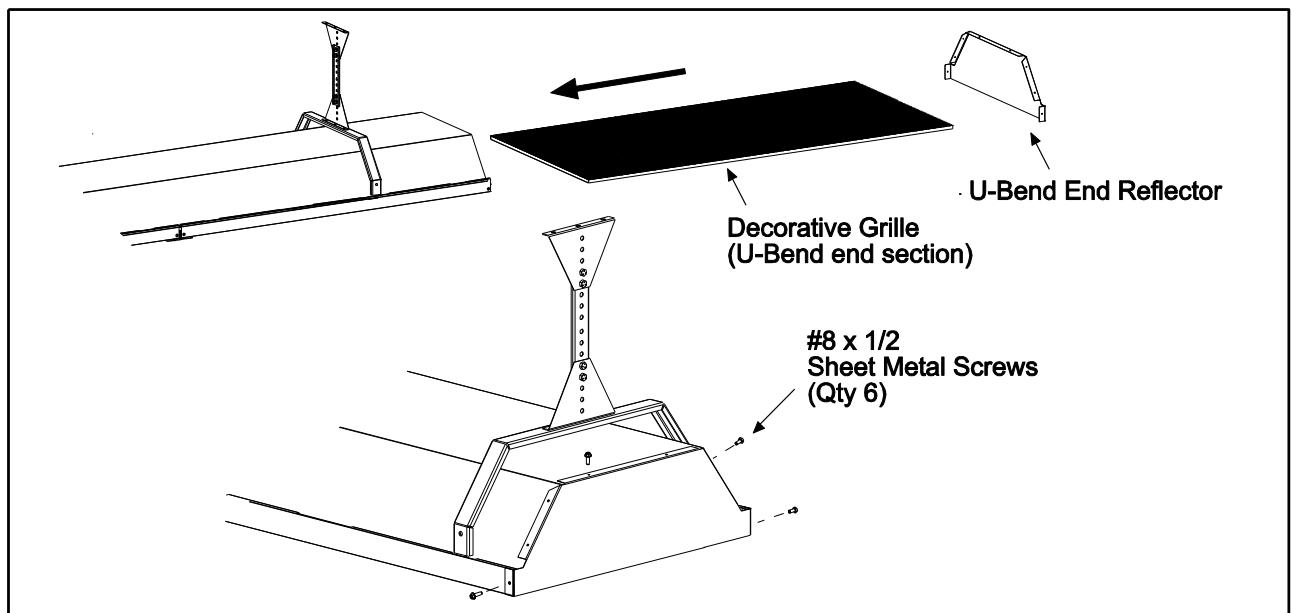
23. Slide one decorative grille panel into the side rails of the center section. Note: This decorative grill panel is used on the 30Ft models only.



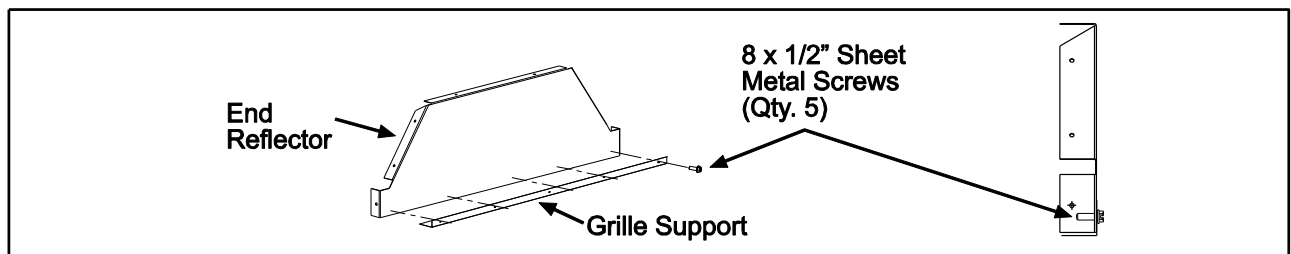
24. Install the remaining double grill support at the end of the center side rails. Fasten this in place using (2) speed clips and #10 screws provided on each side of the grill support. Note: This double grille support is used on the 30Ft models only.
25. Install the remaining (2) side rails on the foot end section of heater. Attach each side rail to the reflector from the top using (3) #8 sheet metal screws provided. Attach each side rail using (1) speed clip and #10 screw provided on each side of the grill support. Note: The center double grill support and side rails are used on the 30Ft models only.



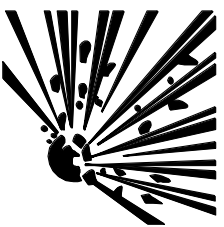

26. Slide the remaining decorative grille panel into the side rails of the foot end section of the heater.
27. Attach the foot end reflector flush with the main body reflector using (8) #8 sheet metal screws provided.



28. Secure support grille to end reflector with (4) #8 sheet metal screw provided.



11.0) GAS CONNECTIONS AND REGULATIONS

⚠ WARNING		
		FIRE AND EXPLOSION HAZARD Tighten flexible gas hose and components securely. Flexible metal gas hoses must be installed without any twists or kinks in them. The hose will move during operation of the heater and it can crack if it is twisted. Failure to do so may result in death, serious injury or property damage.

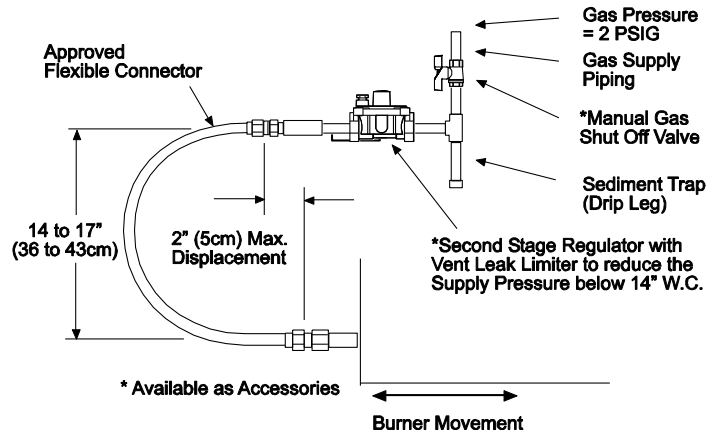
IMPORTANT BEFORE CONNECTING THE GAS TO THE HEATER

1. Connect to the supply tank or manifold in accordance with the latest edition of National Fuel Gas Code (ANSI Z223.1), and local building codes. Authorities having jurisdiction should be consulted before the installation is made. (In Canada, refer to the latest edition of CSA B149.1, Natural Gas and Propane Installation Code.)
 - A. Check that the gas fuel on the burner rating plate matches the fuel for the application.
 - B. Check that the gas supply piping has the capacity for the total gas consumption of the heaters and any other equipment connected to the line.
 - C. Check that the calculated supply pressure with all gas appliances and heaters operating will not drop below the minimum supply pressure required for these heaters. Check inlet supply pressures on Section 12.0).
 - D. All gas supply lines must be located in accordance with the required clearances to combustibles from the heater as listed on the clearances label of the heater and Section 4.0) of this manual.
 - E. Pipe joint compounds must be resistant to the action of liquefied petroleum gases.
 - F. Tube heaters will expand/contract during operation. Where local codes do not prohibit, a CSA or U.L. approved flexible connector supplied with this heater is required for connections between the rigid piping and the heater. A union should be installed before the burner box inlet. An approved shut off valve should be installed within 6 feet of the union.
 - G. The gas pipe, flexible hose and connections must be self-supporting. The gas pipe work must not bear any of the weight of the heater or any other suspended assembly.
 - H. This appliance is equipped with a step-opening, combination gas valve. **The maximum supply pressure to the appliance is 14" W.C. or 1/2 P.S.I.** If the line pressure is more than the maximum supply pressure, then a second stage regulator which corresponds to the supply pressure must be used.
 - I. After all gas connections have been made, make sure the heater and all gas outlets are turned off before the **main gas supply is turned on slowly**. Turn the gas supply pressure on and check for leaks. To check for leaks, check by one of the methods listed in Appendix D of the National Fuel Gas Code.
 - J. If a 2nd stage regulator is used, the ball valve down-stream in the supply line must be closed when purging the gas lines to prevent gas seeping through it. If initial gas pressure is higher than 14" w.c. the redundant combination gas valve is designed to lock out. Pressure build-up in the supply lines prior to the heater must be released before proper heater operation.

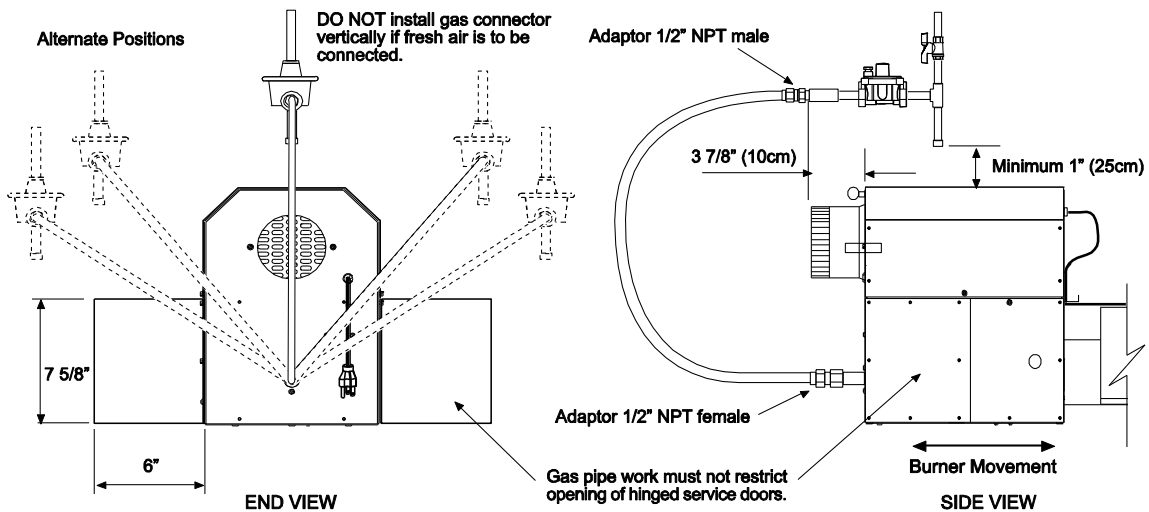
⚠ WARNING

Do not use an open flame of any kind to test for leaks.

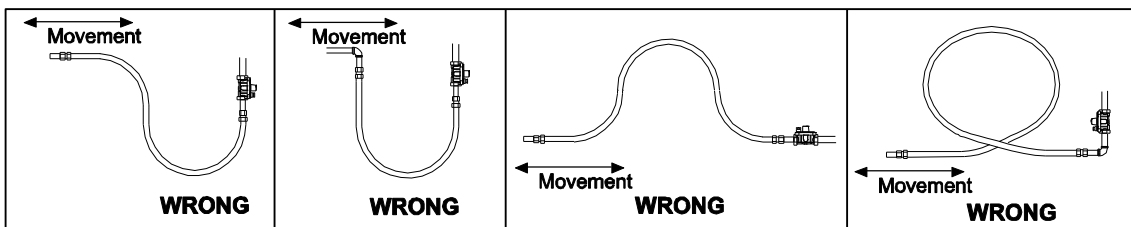
KEY DIMENSIONS AND COMPONENTS OF THE GAS CONNECTIONS



RECOMMENDED GAS CONNECTION POSITIONS WITH 36" FLEXIBLE GAS HOSE



INCORRECT POSITIONS



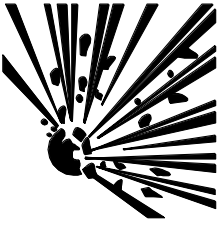

⚠ WARNING

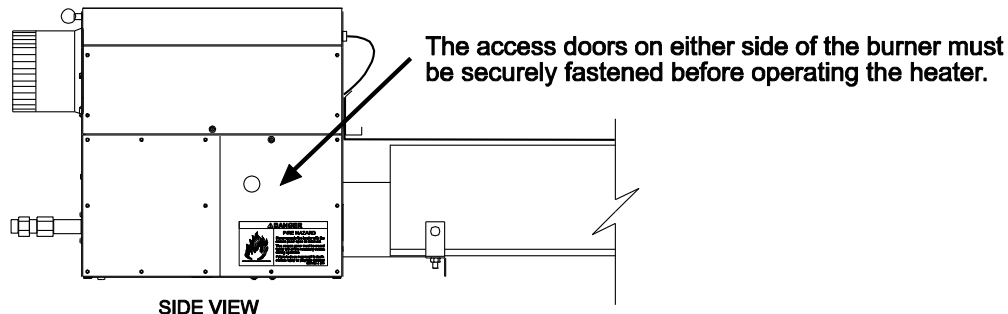
US ONLY: Connector MUST be installed in "⌋" configuration. Use only the 36" long connector that was furnished with this heater.

US ONLY: A gas connector certified for use on a tubular type infrared heater per the standard for Connectors for Gas Appliances, ANSI Z21.24/CSA 6.10 is supplied for installation in US only. The gas connector is 36" long and 1/2" nominal ID, and must be installed as shown above, in one plane, and without sharp bends, kinks or twists.

CANADA ONLY: A Type I hose connector should be used that is 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 is of length of 36+/- 6 in (90+/- 15 cm). The gas connector must be installed as shown above, in one plane, and without sharp bends, kinks or twists.

12.0) INSTRUCTIONS FOR PRESSURE TEST GAUGE CONNECTION

⚠ WARNING		
		<p style="text-align: center;">FIRE AND EXPLOSION HAZARD</p> <p>Never operate the heater with the access panel open or removed.</p> <p>The access panels must be closed tightly with all the necessary screws during operation.</p> <p>Failure to do so may result in death, serious injury or property damage.</p>



SUPPLY PRESSURE



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

OUTLET GAS PRESSURE CHECK AND ADJUSTMENTS

Gauges that measure pressure in pounds per square inch are not accurate enough to measure or set the manifold pressure. All measurements **MUST BE** made when the heater and all other gas burning equipment that are connected to the gas supply system are operating at maximum capacity. The combination gas valve is factory set and should not need adjustment. If gas pressure adjustment is required, follow the instructions:

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

TO ADJUST REGULATOR (single stage gas valves):

1. Turn on power and energize the main gas valve. Remove regulator cover screw (see **Figure 1** below). Turn regulator adjustment screw **clockwise**  to **increase pressure**, or **counterclockwise**  to decrease pressure. Replace regulator cover screw and tighten securely.

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

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

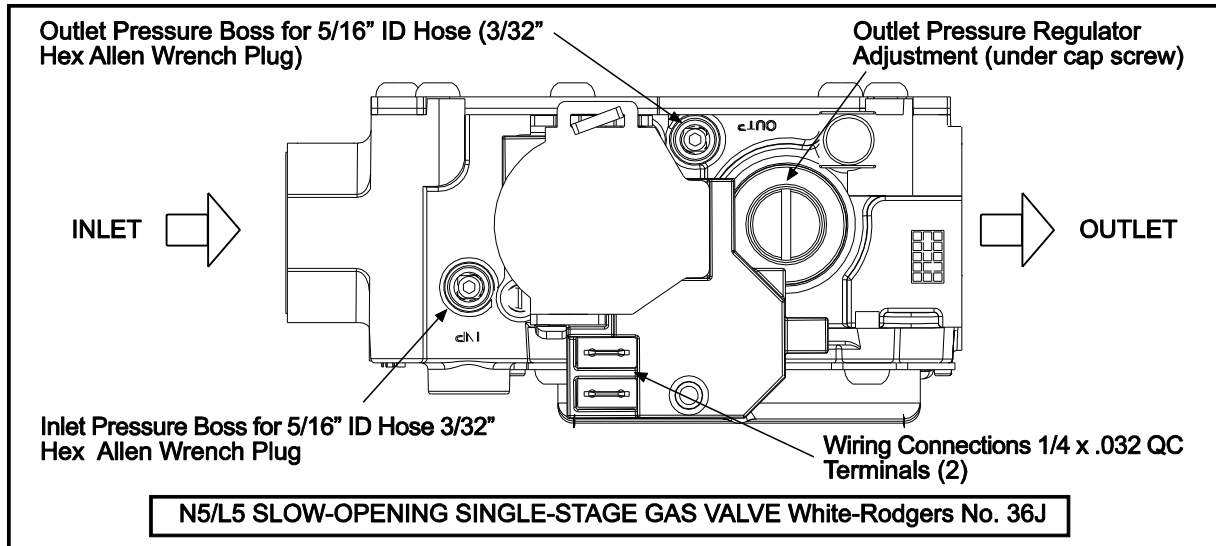


Figure 1

TO ADJUST REGULATOR (two stage gas valves):

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

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

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

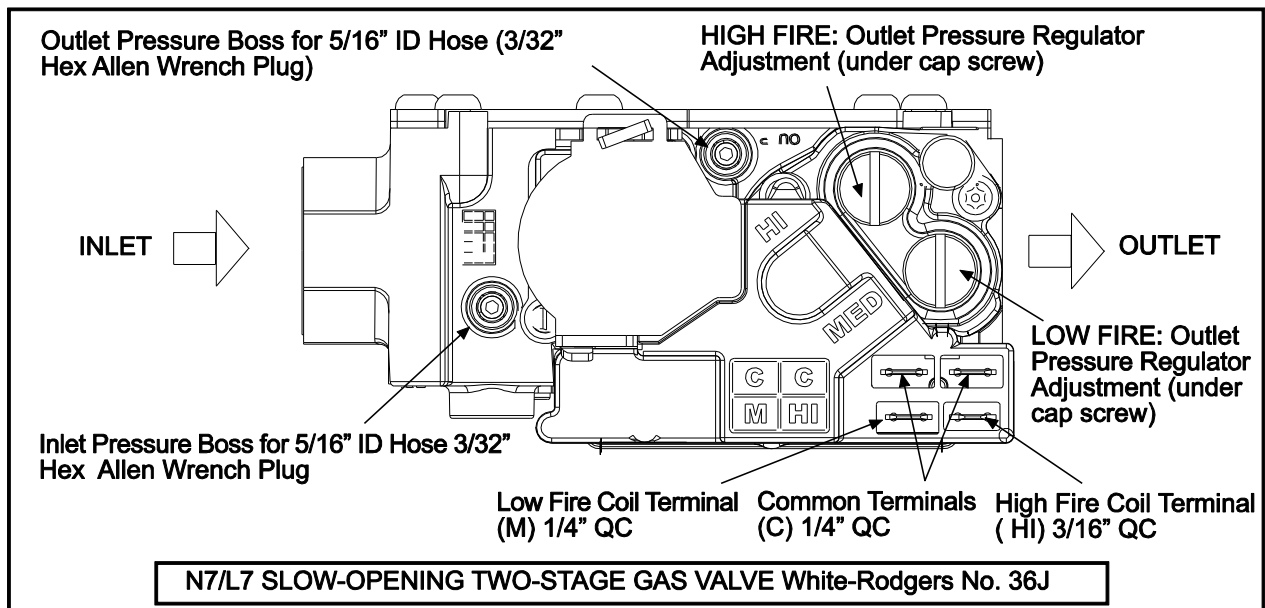
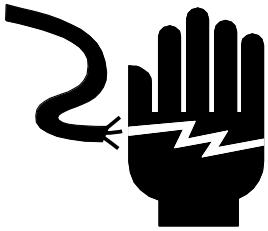


Figure 2

GAS PRESSURE TABLE				
GAS TYPE	MANIFOLD PRESSURE		SUPPLY PRESSURE	
	High	Low (2-stage only)	Minimum*	Maximum
Natural Gas	3.5" W.C.	1.4" W.C.	5" W.C.	14" W.C.
Propane Gas	10.0" W.C.	4.0" W.C.	11" W.C.	14" W.C.

* Minimum permissible gas supply pressure for purpose of input adjustment.

13.0) ELECTRICAL CONNECTIONS

⚠ WARNING	
	<p>ELECTRIC SHOCK HAZARD</p> <p>Disconnect electrical power and gas supply before servicing.</p> <p>This appliance must be connected to a properly grounded electrical source.</p> <p>Failure to do so may result in death or serious injury.</p>

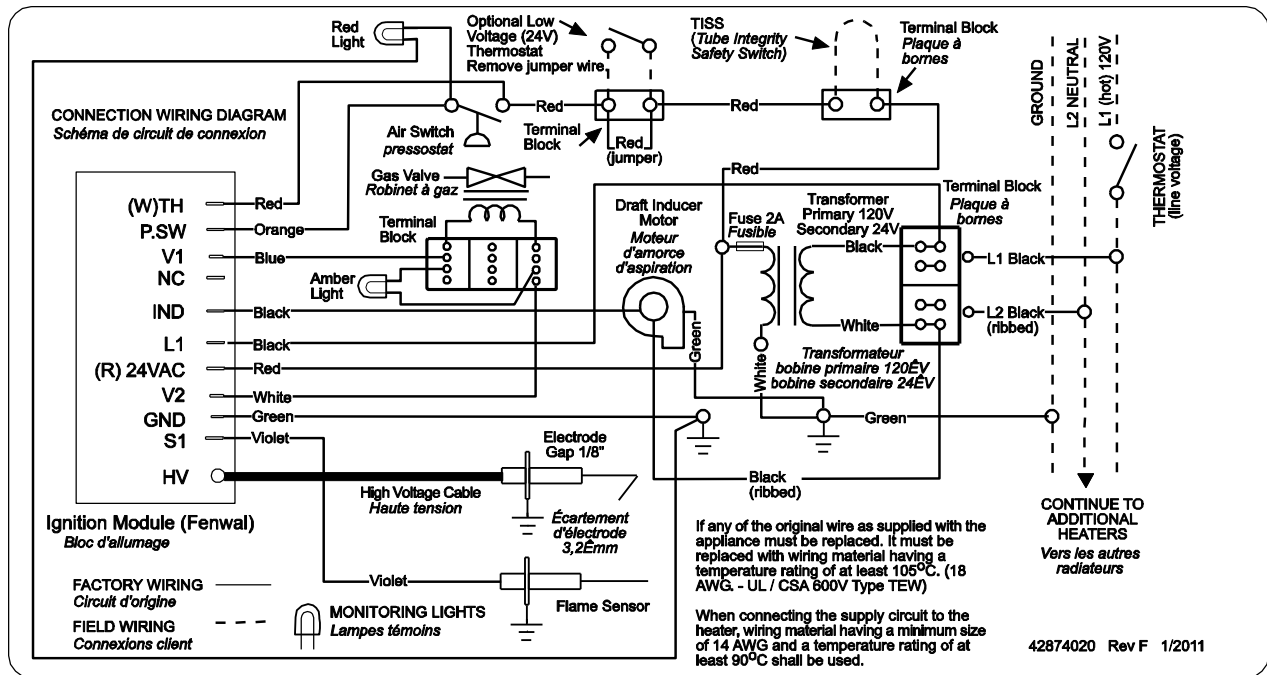
1. All electric wiring shall conform to the latest edition of the National Electrical Code (ANSI/NFPA No. 70), or the code legally authorized in the locality where the installation is made.
 - A. The unit must be electrically grounded in accordance with the National Electrical Code (ANSI/NFPA No. 70-latest edition). In Canada, refer to current standard C22.1 Canadian Electrical Code Part 1.
 - B. The wiring providing power to the heater shall be connected to a permanently live electrical circuit, one that is not controlled by a light switch.
 - C. The power supply to the unit should be protected with a fused disconnect switch or circuit breaker. A service switch, as required by local codes, shall be located in the vicinity of the heater (check local codes for allowable distances) and should be identified as Heater Service Switch.

All electrical wiring must be located in accordance with the required Clearances to Combustibles from the heater as listed on the nameplate on the heater.

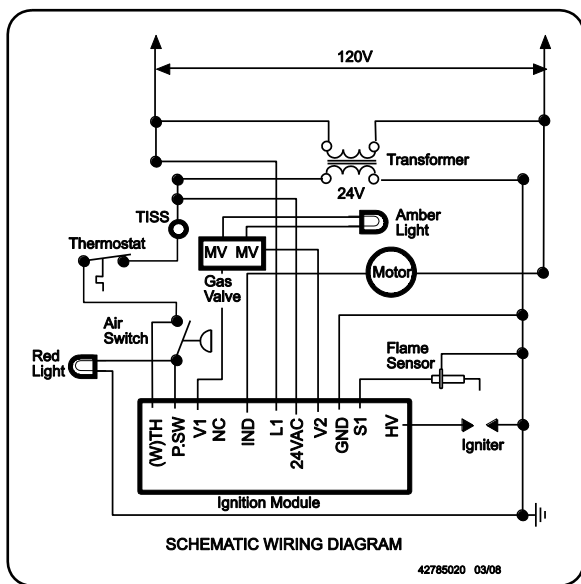
 - D. Connection to the power supply is provided by an 18/3 gauge x 72" long cord with grounded 3 prong plug.
 - E. The post purge function of the burner (fan on for 30 seconds after the call for heat) will only be enabled when using a 24 Volt thermostat. With the line Voltage thermostat post purge operation is disabled.
 - F. If any of the original wire as supplied with the appliance must be replaced, it must be replaced with wiring material having a temperature rating of at least 105°C. (18 Ga. CSA 600V Type TEW)
 - G. When connecting the supply circuit to the heater, wiring material having a minimum size of 14 AWG and a temperature rating of at least 90°C shall be used.

13.1) SINGLE STAGE (N5/L5) INTERNAL AND THERMOSTAT CONNECTIONS

SINGLE STAGE CONTROLS - INTERNAL CONNECTION WIRING DIAGRAM



SINGLE STAGE CONTROLS - SCHEMATIC WIRING DIAGRAM



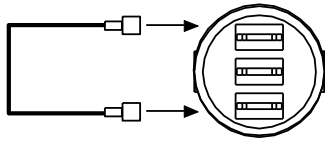
IGNITION MODULE TERMINAL DESIGNATIONS

24VAC/R	24 VAC Supply to Module
TH/W	Thermostat Input
PS/W	Pressure Switch Input
GND	System Ground
V1	Valve Power
V2	Valve Ground
L1	120/240 VAC Input (Hot)
IND	Blower Output

SINGLE STAGE CONTROLS - THERMOSTAT WIRING DIAGRAMS

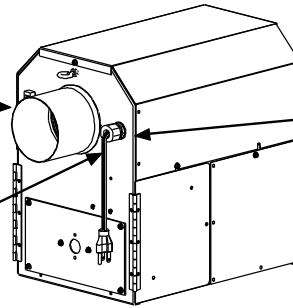
SINGLE STAGE CONTROLS

Optional 24V thermostat connection



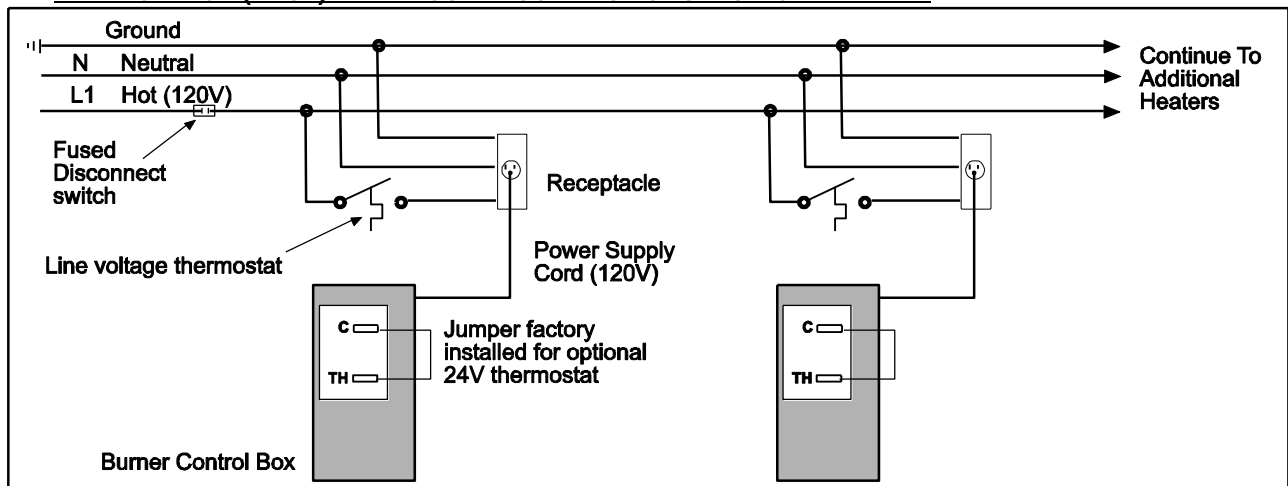
Jumper wire with 1/4" terminals pre-installed. Remove the jumper and use these two terminals for the 24V thermostat connection if required.

72" grounded 3 prong electrical cord

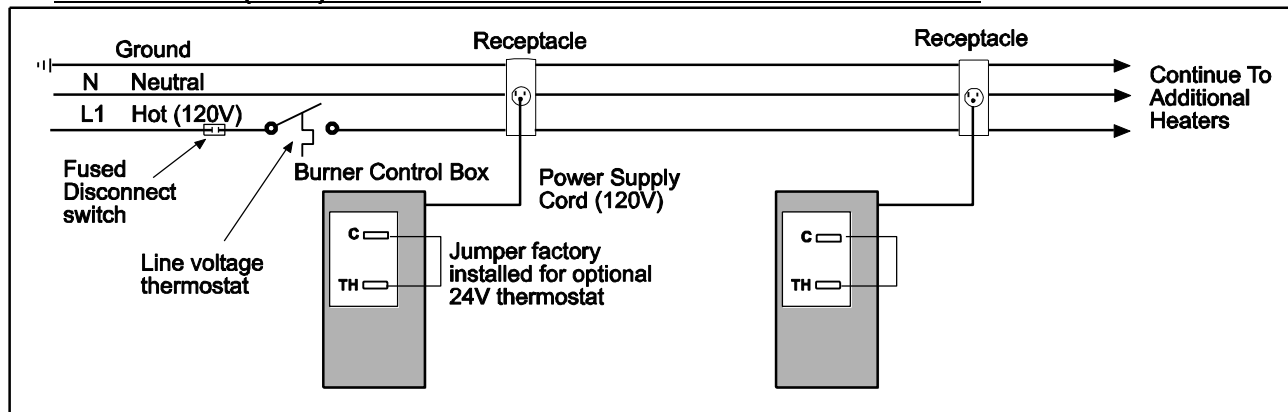


Liquid tight fitting must be tight to prevent ingress of moisture in harsh environments.

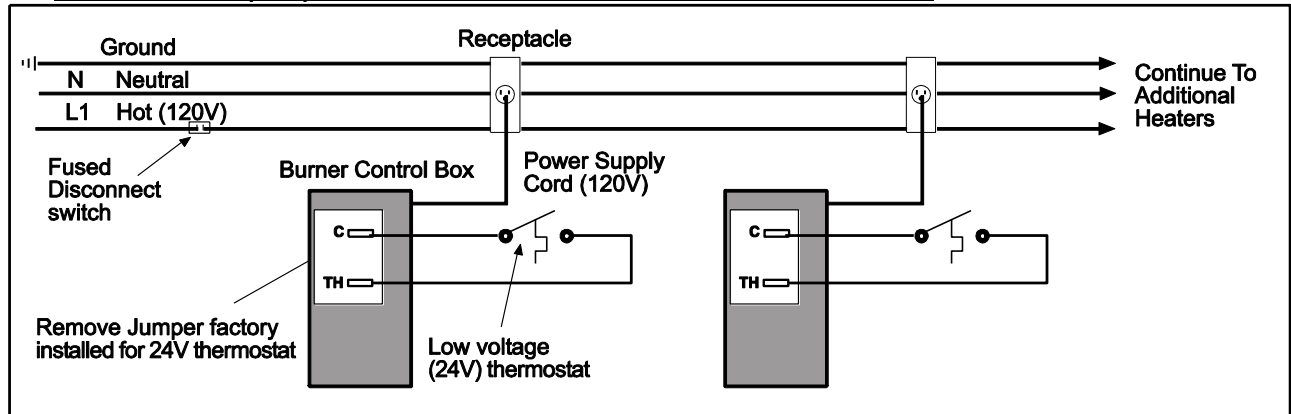
H. LINE VOLTAGE (120V) THERMOSTAT CONNECTIONS - SINGLE HEATER



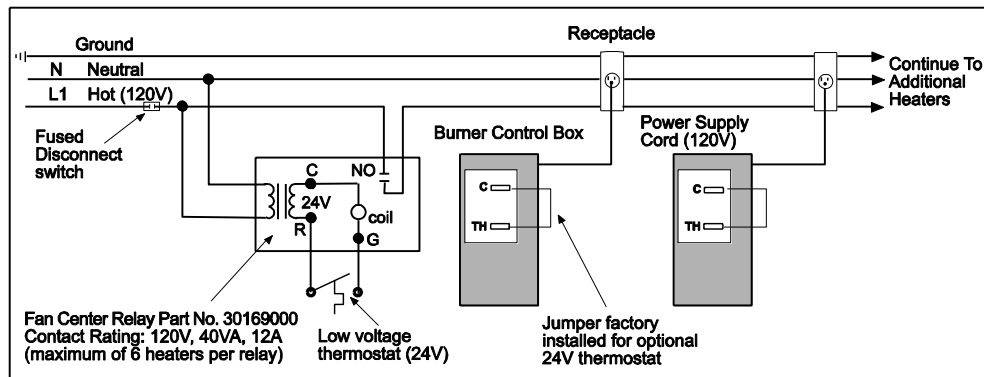
I. LINE VOLTAGE (120V) THERMOSTAT CONNECTIONS - MULTIPLE HEATERS



J. LOW VOLTAGE (24V) THERMOSTAT CONNECTIONS - SINGLE HEATERS

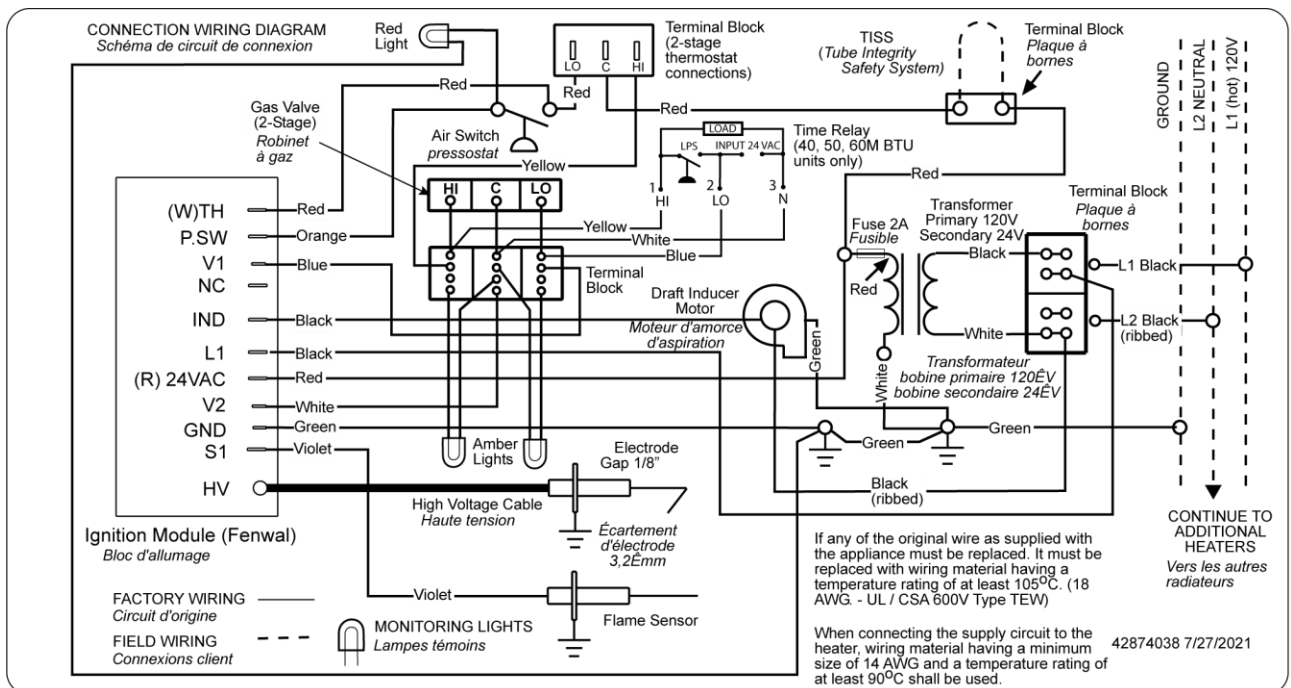


K. LOW VOLTAGE (24V) THERMOSTAT CONNECTIONS - MULTIPLE HEATERS (utilizing a fan center relay)

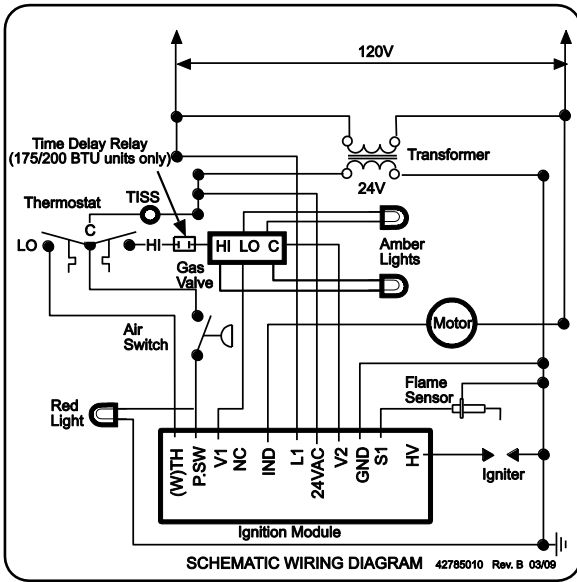


13.2) TWO STAGE (N7/L7) INTERNAL AND THERMOSTAT CONNECTION

TWO STAGE CONTROLS - INTERNAL CONNECTION WIRING DIAGRAM



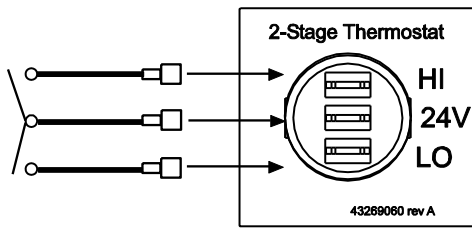
TWO STAGE CONTROLS - SCHEMATIC WIRING DIAGRAM



IGNITION MODULE TERMINAL DESIGNATIONS	
24VAC/R	24 VAC Supply to Module
TH/W	Thermostat Input
PS/W	Pressure Switch Input
GND	System Ground
V1	Valve Power
V2	Valve Ground
L1	120/240 VAC Input (Hot)
IND	Blower Output

TWO STAGE CONTROLS - THERMOSTAT WIRING DIAGRAMS

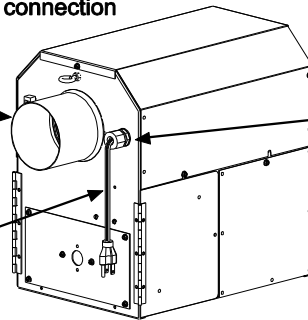
TWO STAGE CONTROLS



Use these three terminals for the 24V thermostat connection.

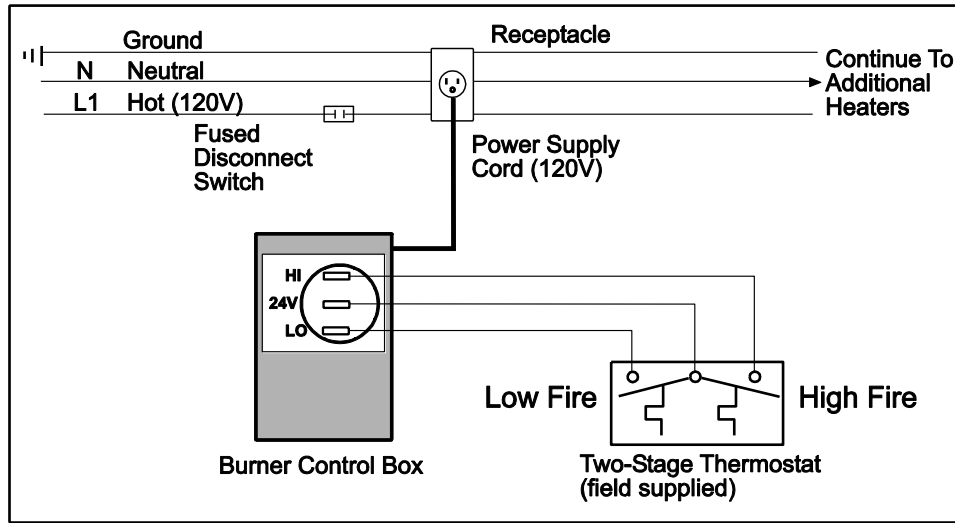
24V 2 stage thermostat connection

72" grounded 3 prong electrical cord

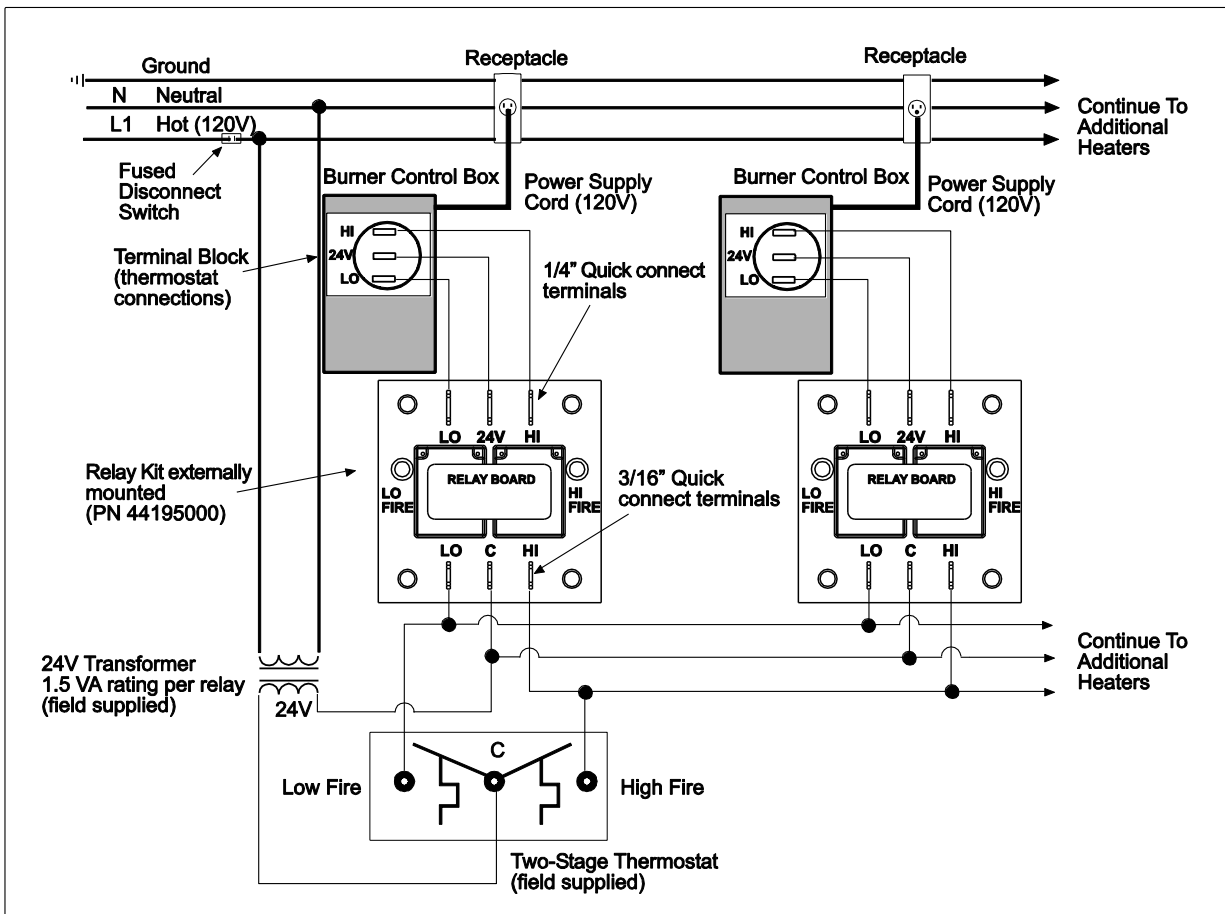


Liquid tight fitting must be tight to prevent ingress of moisture

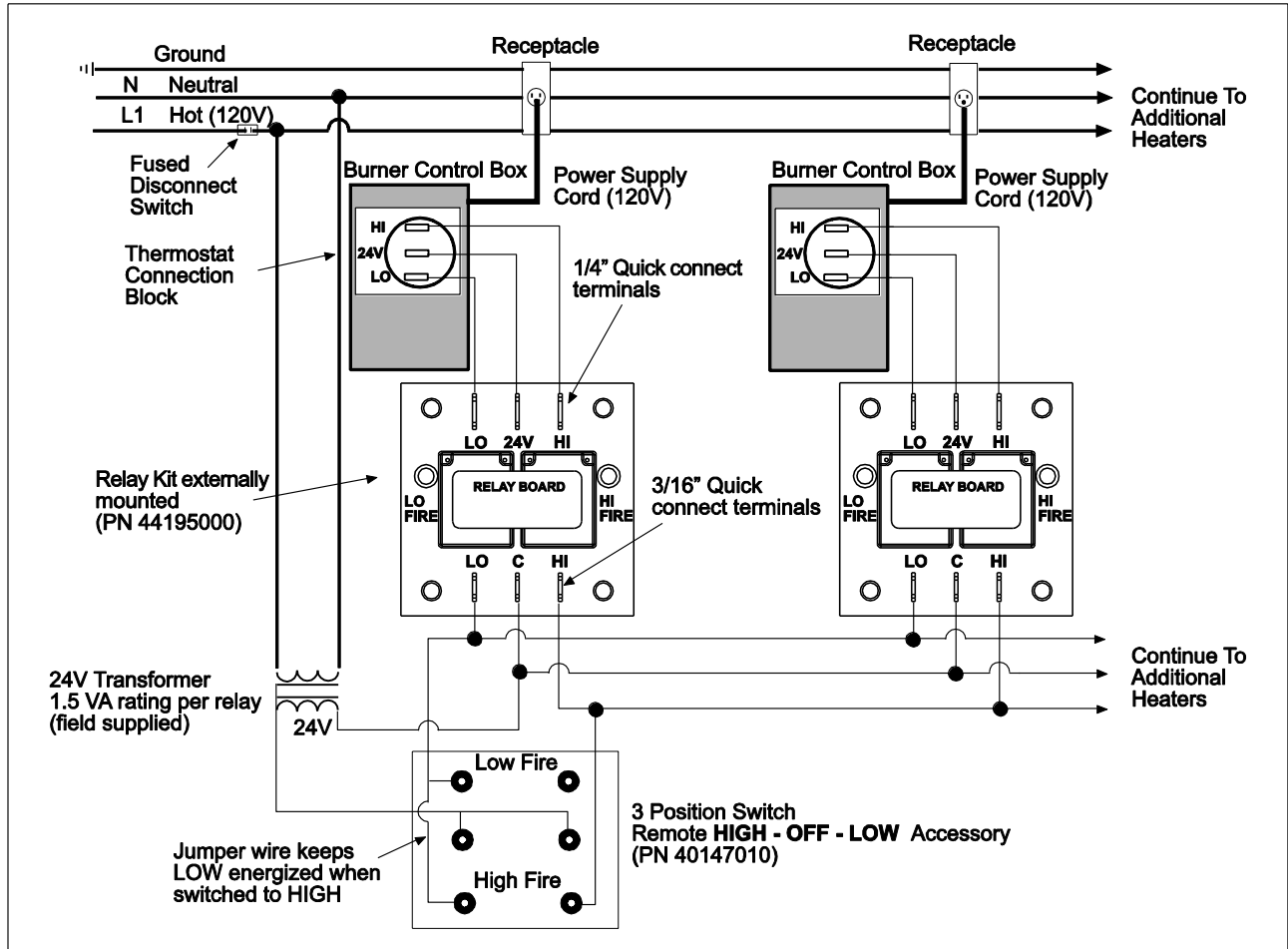
A. LOW VOLTAGE (24V) THERMOSTAT CONNECTIONS – SINGLE HEATERS



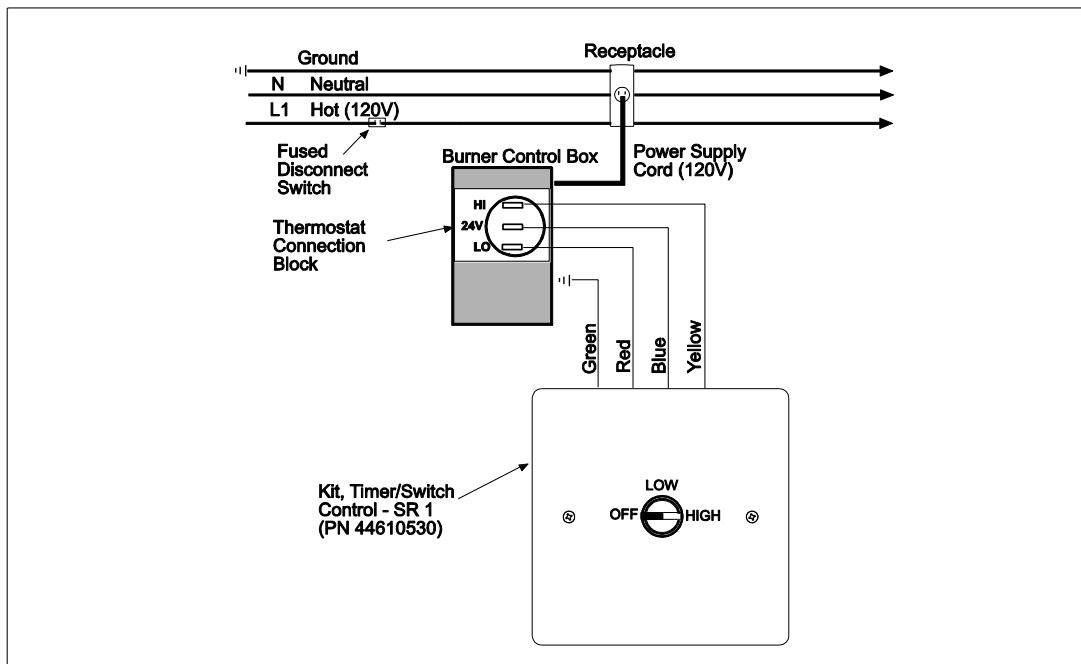
B. LOW VOLTAGE (24V) THERMOSTAT CONNECTIONS – MULTIPLE HEATERS



C. LOW VOLTAGE (24V) 3 WAY MANUAL SWITCH CONNECTIONS - MULTIPLE HEATERS



D. TWO STAGE 60 MINUTES - TIMER/SWITCH WIRING - FOR INDIVIDUAL HEATERS

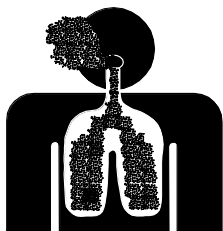


For recessed wall application with (7 x7) faceplate.

Note: Dual heater Timer/Switch is available (PN 44610540).

14.0) VENTING

⚠ WARNING



CARBON MONOXIDE HAZARD

Heaters installed in an unvented mode require a minimum ventilation flow of 4 CFM per 1,000 Btu/hr of total installed capacity.

In buildings with airborne contamination the heater must be installed with fresh air for combustion.

Failure to do so may result in death, serious injury, property damage or illness from Carbon Monoxide poisoning.

This is a category III appliance.

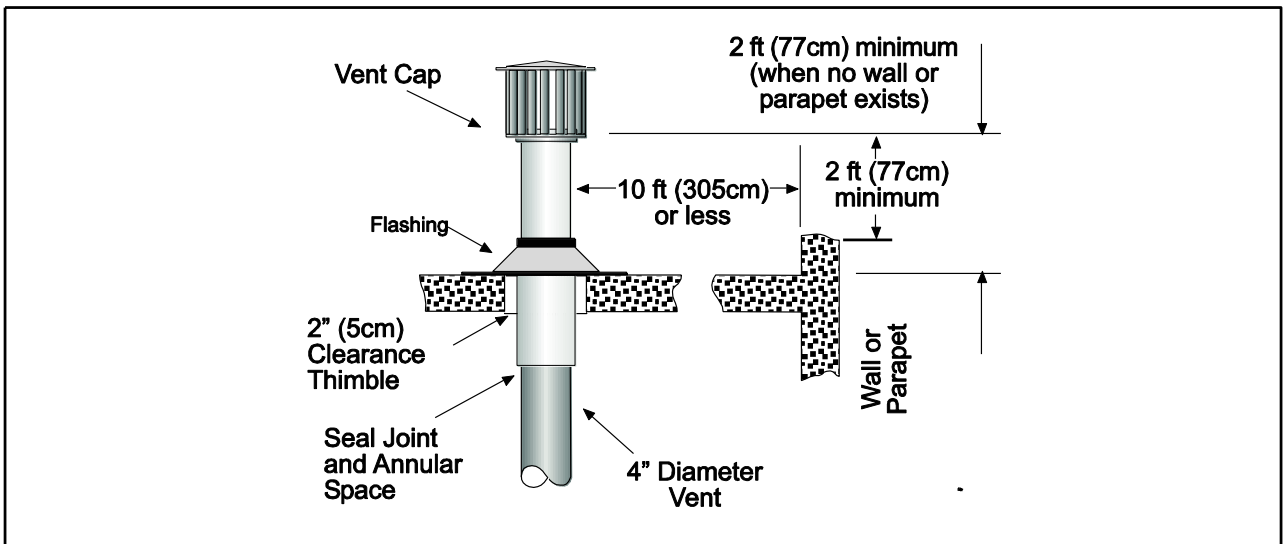
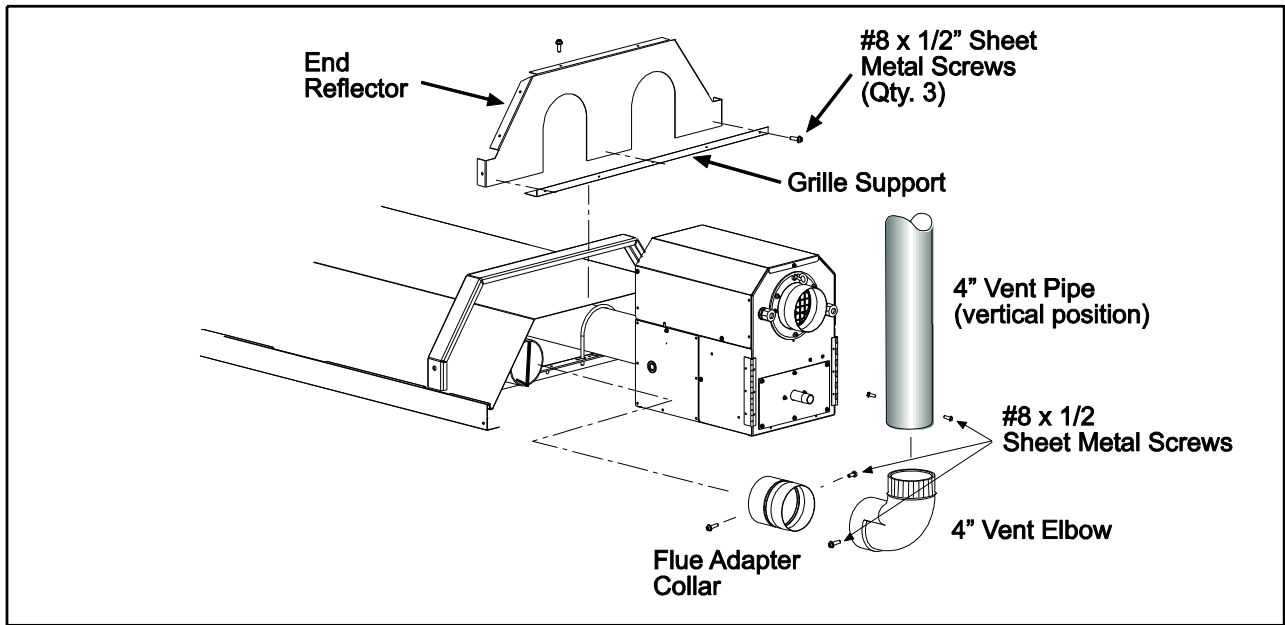
- A. **BASIC FLUE VENTING** – Venting must comply with the latest edition of the National Fuel Gas Code (ANSI Z223.1-latest edition) or the authority having jurisdiction. Other venting references are in the equipment volume of the ASHRAE Handbook.

Model	Heat exchanger length ft	Maximum vent length ft. (4" diameter)	Maximum Fresh air intake length ft (4" diameter)	Max. combination of fresh air and vent ft. (4" diameter)
SPH 40	20	45	50	75
SPH 50	20	45	50	75
SPH 60	20	25	30	55
SPH 75	30	25	30	55

Vent lengths shown in the table are for horizontal and vertical venting. If a longer length of vertical or horizontal venting is required contact the manufacturer for assistance with vent sizing.

SINGLE HEATER VENTING (VERTICAL THROUGH THE ROOF)

- When venting the heater to outside of building through a roof, use single-wall metal pipe. This is to be constructed of galvanized sheet metal or other approved noncombustible corrosion-resistant material as allowed by state or local codes.
- A vent passing through a combustible roof shall extend through an approved clearance roof thimble. Double-wall, Type B vent must be used for the portion of the vent system which passes through the combustible roof. An approved vent cap must be attached to end of the flue.
- The maximum equivalent length of vent pipe should be carefully observed. A safety switch in the heater is designed to shut the heater off before excessive flue restriction causes bad combustion. Refer to the Vent Sizing Table for maximum vent lengths and vent pipe diameter.
- Joints between sections of piping shall be fastened by sheet metal screws or other approved means and should be sealed to prevent leakage of flue gas into building. Aluminum or Teflon tape suitable for 550°F (3M Company tapes 433 or 363) or silicone sealant is recommended.
- All portions of the vent pipe shall be supported to prevent from sagging (6' spacing is recommended).
- When the vent pipe passes through areas where the ambient temperature is likely to induce condensation of the flue gases, the vent pipe should be insulated and a condensation drain should be provided.
- Minimum clearance for single-wall flue pipe to combustible material shall be 6 inches. This may be reduced when the combustible material is protected as specified in the National Fuel Gas Code or the authority having jurisdiction.
- Single-wall metal pipe shall not originate in any unoccupied attic or concealed space and shall not pass through any attic, inside wall or concealed space, or through any floor. For the installation of a single-wall metal pipe through an exterior combustible wall, refer to latest edition of the National Fuel Gas Code or the authority having jurisdiction.
- A venting system shall terminate at least 3 ft. above any forced air inlet located within 10 ft.

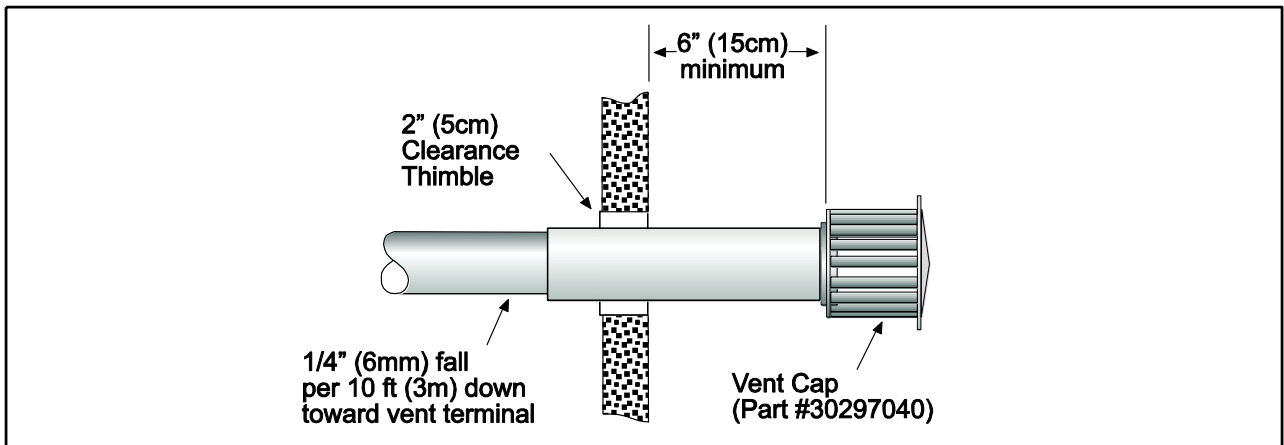
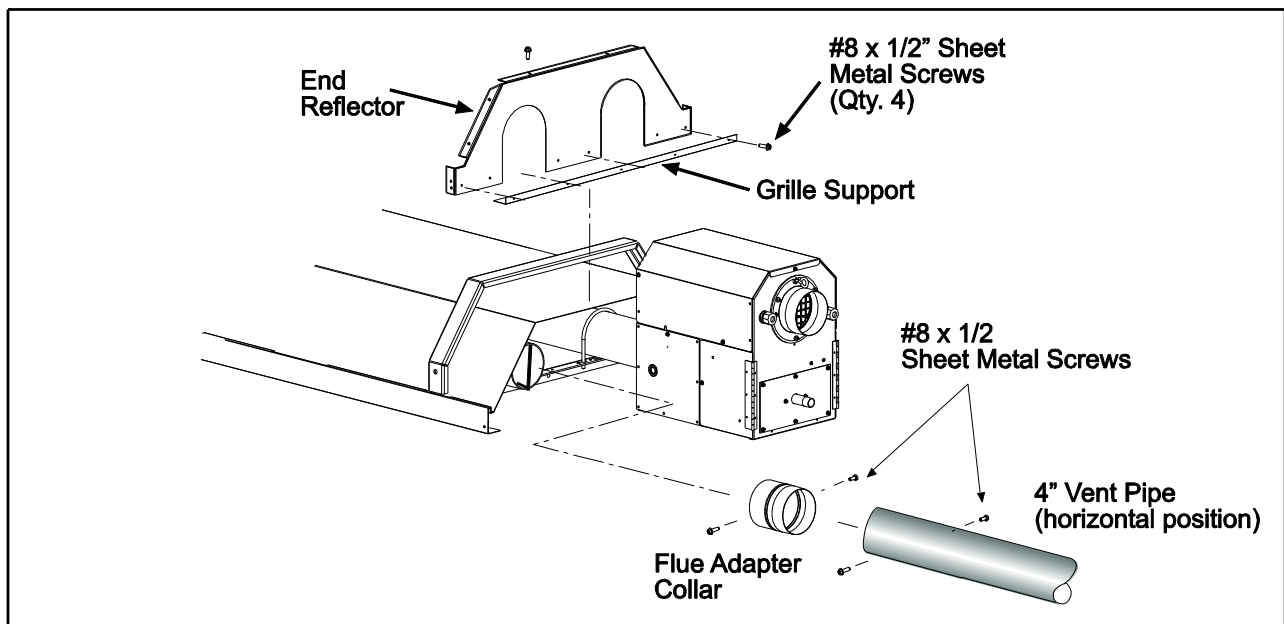


SINGLE HEATER VENTING (HORIZONTAL THROUGH SIDEWALL)

When venting the heater horizontally through a combustible outside sidewall, the same requirements listed previously for venting **Vertical Through The Roof** apply except as follows:

10. A vent passing through a combustible wall must pass through an approved clearance thimble (Air-Jet #4VT or Ameri-Vent #4EWT or other thimbles) that are listed by a nationally recognized testing agency; double wall Type B vent must be used for the portion of the vent system which passes through the combustible sidewall.
 11. An approved vent cap (Brediert or equal) must be attached to the end of the vent pipe.
- NOTE:** To minimize problems associated with condensation in long horizontal runs, vent pipe can be insulated.
12. Use the following correction factors to obtain the equivalent length when elbows are used:
 - Subtract 10 ft. for each elbow beyond 15 ft. from the heater.
 - Subtract 15 ft. for each elbow within 15 ft. of the heater.
 13. Limit to (2) 90° elbows in the vent system.
 14. When venting through a sidewall, the horizontal vent pipe shall fall 1/4 inch per 10 feet down from the start of the vent system to the vent terminal. All portions of the vent pipe shall be supported to prevent sagging. (6' spacing is recommended)

15. A minimum clearance of 6 inches must be maintained between the outside wall and vent cap (18" clearance will provide stability under high wind conditions).
16. The horizontal venting system shall not terminate:
 - Less than 4 ft. (1.2m) below, 4 ft. (1.2m) horizontally from or 1 ft. (30cm) above any door, operable window or gravity air inlet into any building. The bottom of the vent terminal shall be located at least 7 ft. (2.1m) above grade or above snow accumulation level as determined by local codes.
 - Less than 3 ft. (0.9m) from a combustion air inlet.
 - Less than 3 ft. (0.9m) from any other building opening or any gas service regulator.
 - Less than 7 ft. (2.1m) above public walkways.
 - Directly over areas where condensate or vapor could create a nuisance or hazard or be harmful to the operation of gas utility meters, regulators, relief valves, or other equipment. Building materials should be protected from flue gases and condensate.
 - Less than 18" (0.45m) when directly below a combustible overhang.
17. In regions of the country where prevailing winds are consistently higher than 40 mph, it may be necessary to terminate the vent system above the roof level.



MULTIPLE HEATER VENTING (CONNECTIONS INTO A COMMON VENT OR MANIFOLD)

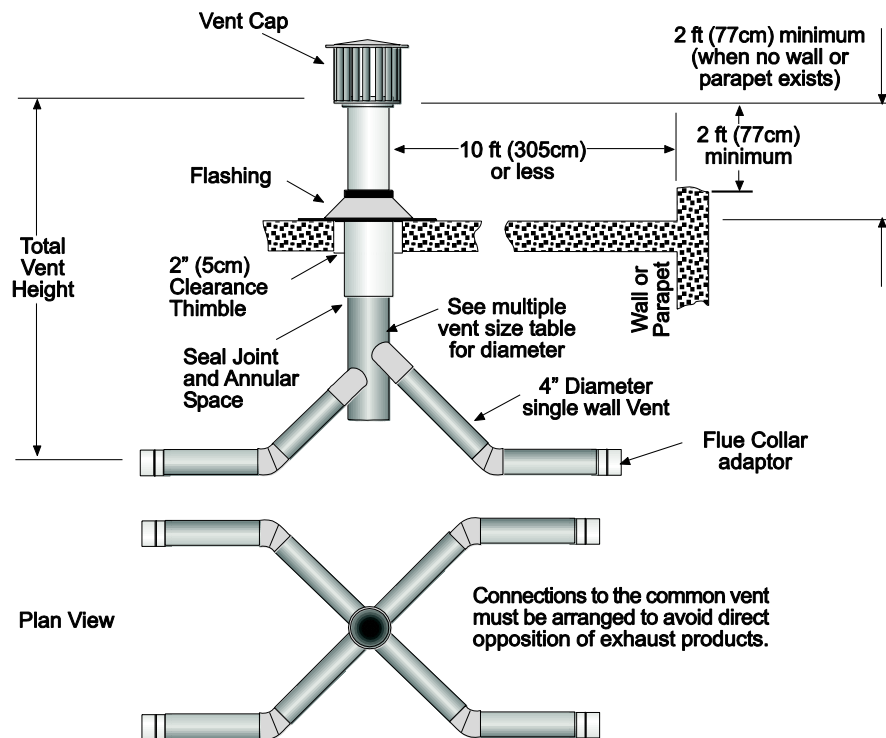
Requirements for venting of multiple heaters are the same as described for **SINGLE HEATER VENTING** except as follows:

18. The common vent size and total vent height is normally determined by the number of heaters per common vent, length of horizontal connector runs, and connector fall. Connector lengths should be as short as possible and have a minimum 1/4 inch per foot rise. Without regard to connector fall and total vent height due to many possible venting configurations, the following should be observed:
 - Common vent pipe & vent connector diameter should be no less than that shown in the following Vent Sizing Table.
 - A Y-connector must be used to the common vent.
19. Material for connectors and Y-connectors should be constructed of galvanized sheet metal or other approved noncombustible corrosion resistant material as allowed by state or local codes. All common vent pipe should be insulated flue pipe or double wall, Type B vent.
20. Avoid unnecessary bends. Limit to two (2) 90° elbows.
21. The entire length of vent connector shall be readily accessible for inspection, cleaning and replacement.
22. Groups of heaters with a common vent must be controlled by a common thermostat.

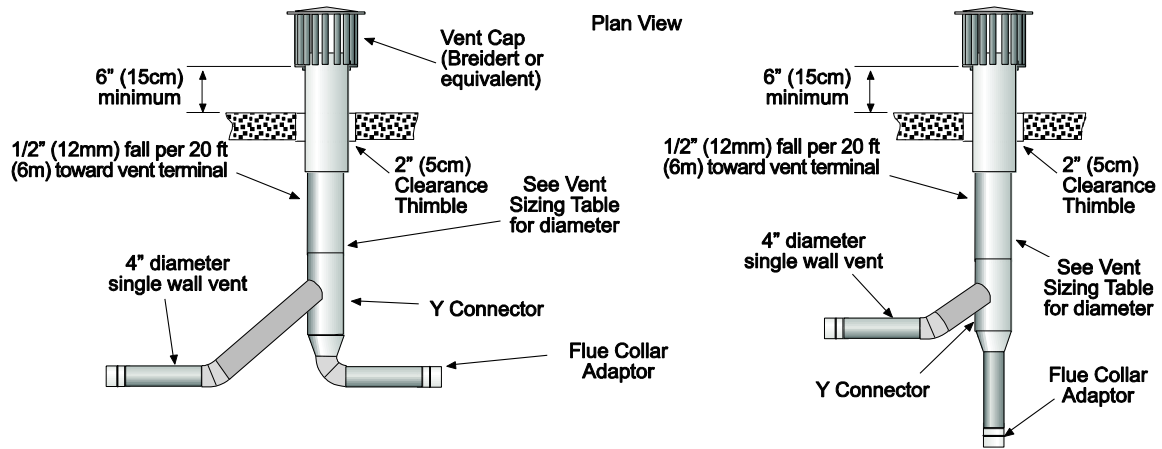
⚠ WARNING

If any heater connected to a common vent system for multiple heaters is found inoperative, the heater should be disconnected from the vent system and its entrance into the vent system capped.

Multiple Heater Vertical Venting Arrangement

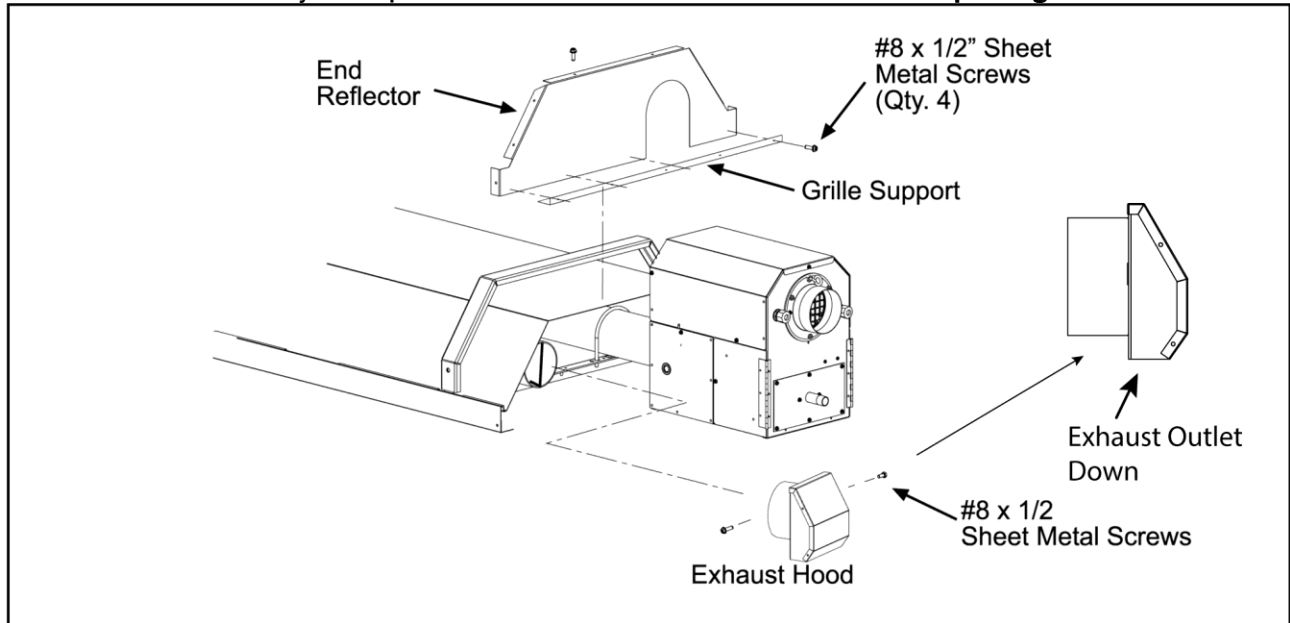


Multiple Heater Horizontal Venting Arrangement



VENT SIZING TABLE — Multiple Heater Venting				
	Number of Heaters			
	Horizontal and vertical		Vertical Only	
	1	2	3	4
SPH 40	4"	4"	4"	4"
SPH 50	4"	4"	4"	5"
SPH 60	4"	4"	4"	5"
SPH 75	4"	4"	5"	6"
COMMON VENT DIAMETER (If a size is not available use the next larger size.)				

B. INDIRECT VENTING (UNVENTED HEATERS) — This heater requires ventilation in the building to dilute the products of combustion and provide fresh air for efficient combustion. Where unvented heaters are used, gravity or mechanical means shall be provided to supply and exhaust at least 4 CFM per 1,000 Btu/hr input of installed heaters. Exhaust vents must be located at the highest point above and in the vicinity of the heaters, and the inlet vents must be located below the level of the heaters. An exhaust hood assembly (Part #30779300) must be placed on the end of the exhaust tube of the body section when used unvented and must be mounted only in the position shown. **The exhaust hood outlet must be pointing down.**



15.0) AIR FOR COMBUSTION

If indoor combustion air is to be supplied for a tightly enclosed area, one square inch of free area opening shall be provided below the heater for each 1,000 Btu/hr of heater input. When outside air is used, the opening below the heater shall be one square inch of free area for each 4,000 Btu/hr of heater input. In contaminated atmospheres or high humidity areas, optional outside air for combustion is recommended. Adequate clearances around the air inlet screen must be maintained at all times. In larger open areas of buildings, infiltration normally is adequate to provide air for combustion.

15.1) DIRECT OUTSIDE AIR FOR COMBUSTION

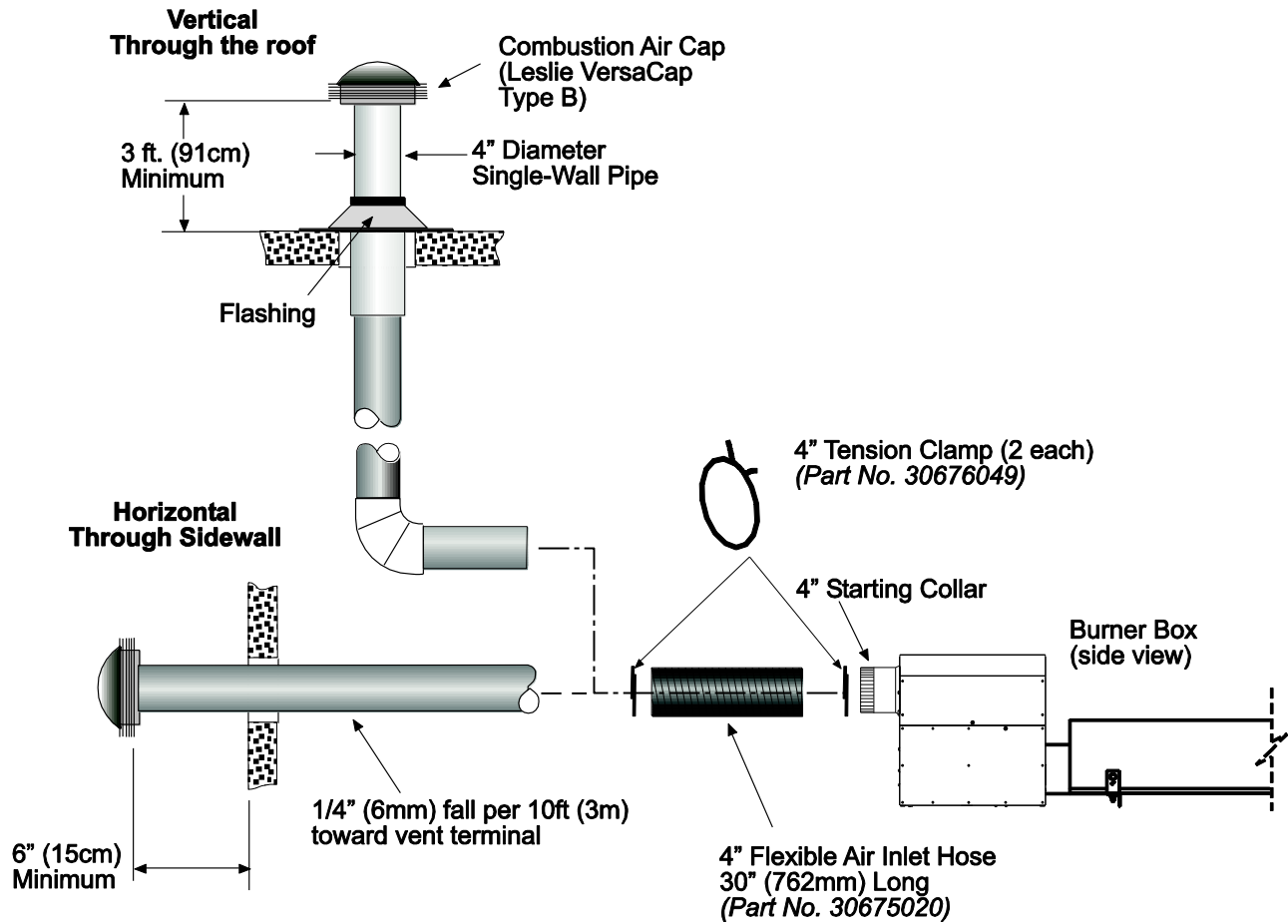
Outside combustion air should be supplied directly to the heater when the building is subject to negative pressure, or when contaminants or high humidity are present in the building air. These contaminants include paints, solvents, corrosive vapors or any other foreign particles that may cause damage to the heater or result in poor combustion.

Outside combustion air can be brought directly to the heater by a 4" diameter duct less than 50 ft. long or equivalent (see table in Section 14.0) based on selected model and heat exchanger lengths). This is attached to the 4" diameter starting collar (supplied with heater). The starting collar is fitted to the rear of the burner box cabinet as shown below. An approved vent cap must be placed directly on the end of the outside combustion air inlet pipe. The combustion air inlet should be not less than 3 ft. (0.9m), either vertically or horizontally, from the flue vent termination. The air intake terminal must be located not less than 1 ft. (30cm) above grade. It is good installation practice to supply combustion air from the same pressure zone as the vent outlet. Avoid bringing combustion air to the heater from an attic space. There is no guarantee that adequate combustion air will be supplied.

If the heater is installed less than 2 ft. from the ceiling, a combustion air inlet kit PN 44129510 must be provided to allow for expansion/contraction of tube heaters (SPH series).

In colder climates, where necessary, insulate the outside combustion air duct.

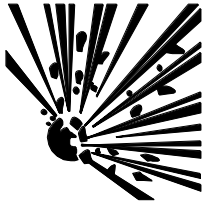
In **multiple heater applications**, the combustion air intake may be ducted individually or common ducted in the same configuration as shown for venting in Section 14.0). For combustion air intake duct sizing, please refer to the **Vent Sizing Table** and use the diameter indicated, based on the number of heaters per duct.




! WARNING All vent terminations and Combustion Air Intake Terminations must be at least 6" higher than anticipated snow depth.

16.0) LIGHTING AND SHUTDOWN INSTRUCTIONS

⚠ WARNING



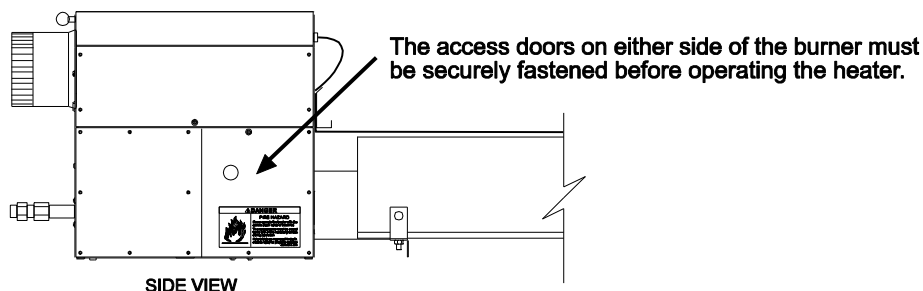


FIRE AND EXPLOSION HAZARD

Never operate the heater with the access panel open or removed.

The access panels must be closed tightly with all the necessary screws during operation.

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

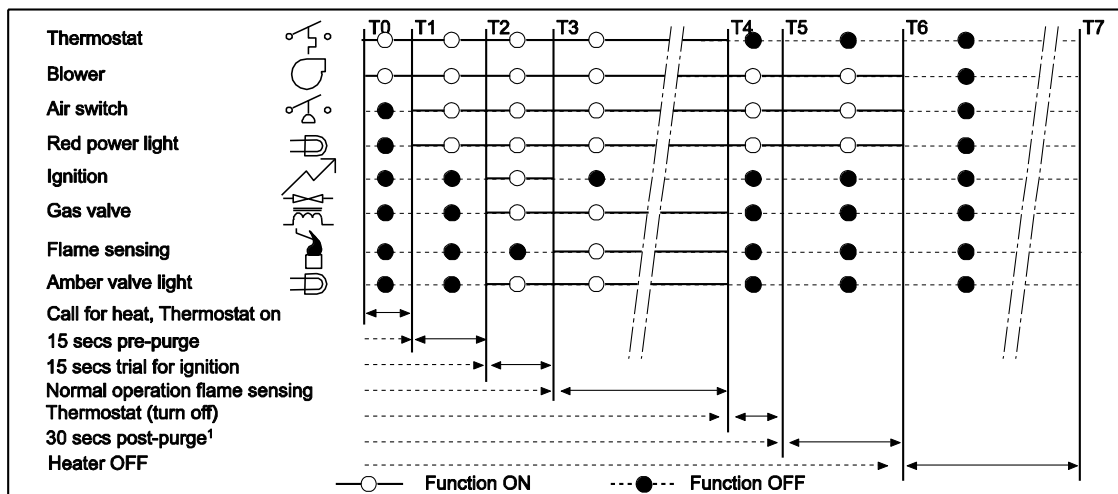


1. Turn on the gas and electrical supply.
2. Set the thermostat to call for heat. The blower motor will energize.
3. Ignition should occur after the 15-second pre-purge.
4. If the burner fails to light, or flame is not detected during the first trial for ignition (a period of approximately 15 seconds) the gas valve is de-energized and the control goes through an inter-purge delay of approximately 60 seconds before another ignition attempt. The control will attempt two additional ignition trials before going into lockout, and the valve relay will be de-energized immediately. The blower will be turned off following a post-purge period of approximately 30 seconds.
5. If the heater does not light, manually reset the thermostat or shut off power completely for 5 minutes before attempting to relight.
6. To permanently shut down the heater, turn off the gas and electrical supply.

NOTE: The lighting and shutdown instructions are also shown on the permanent nameplate label attached to the heater control box.

17.0) SEQUENCE OF OPERATION – SINGLE STAGE (N5/L5)

The chart below shows the sequence of operation for the normal operating cycle of the SPH when connected to a permanent 120V power supply and the heater is turned on and off by a remote 24V thermostat. (Electrical connection diagram C).

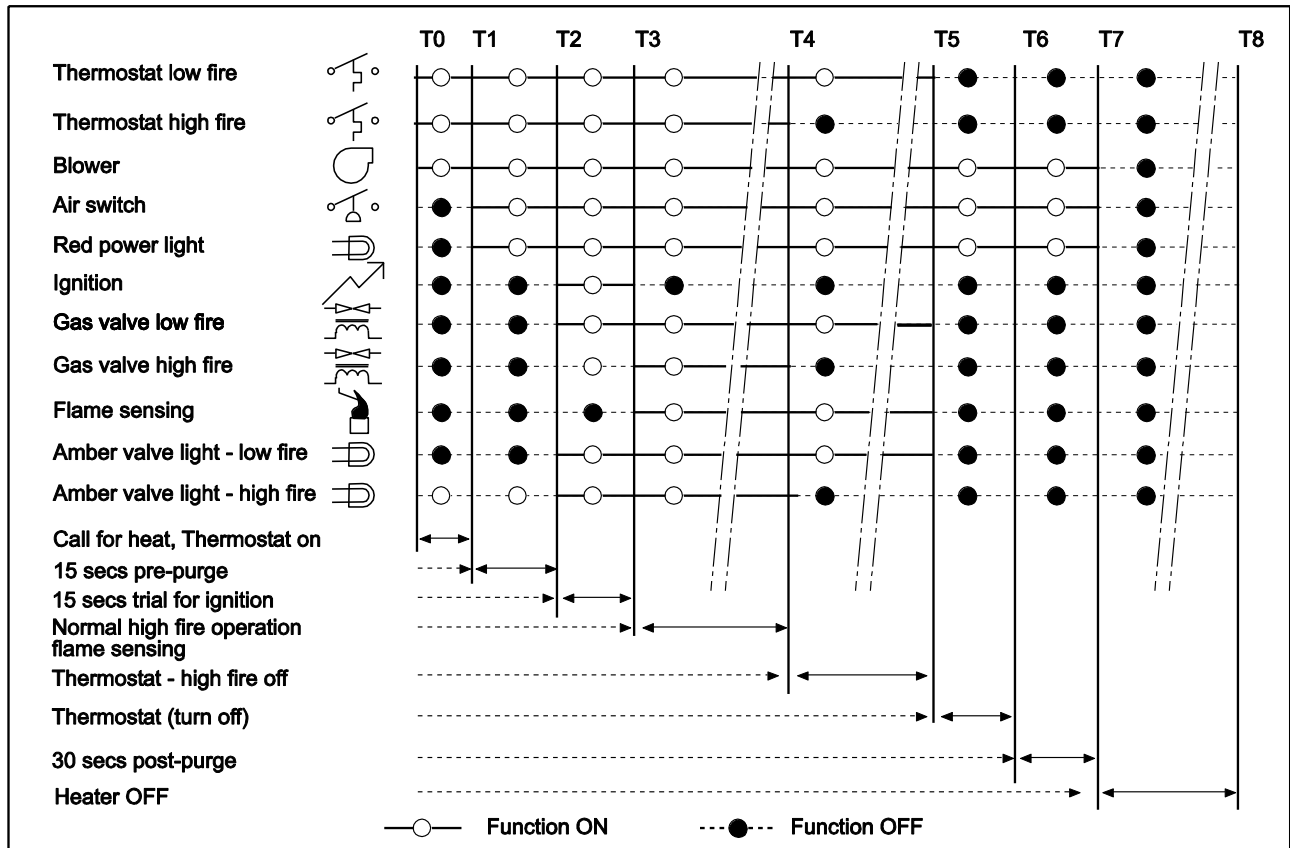


Note: When the SPH is operated by a thermostat interrupting the line voltage (120V) to the heater then the post purge function is disabled.

If the flame is not sensed during sequence T3 then the burner will automatically begin re-ignition sequence T2. The ignition sequence will be repeated three times with a 60 second inter-purge. If the flame is not re-established the heater will go to lockout.

17.1) SEQUENCE OF OPERATION – TWO STAGE (N7/L7)

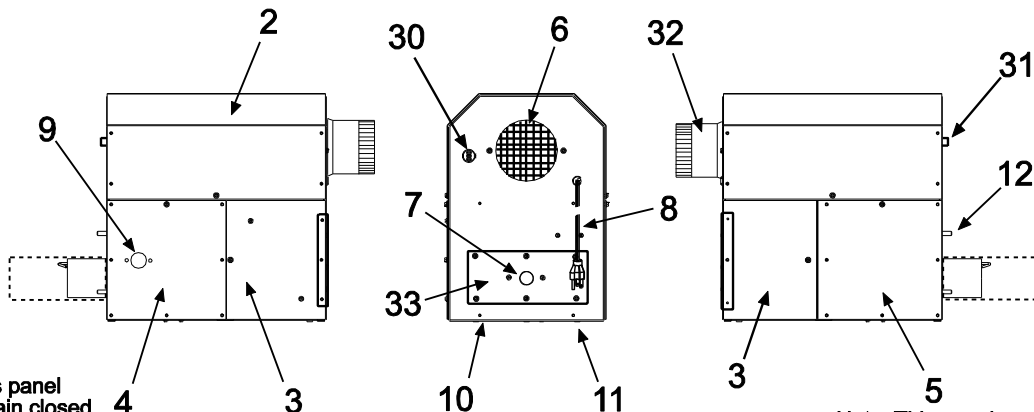
The chart below shows the sequence of operation for the normal operating cycle of the SPH (N7/L7) when connected to a permanent 120V power supply and the heater is turned on and off by a remote 24V thermostat.



Note:

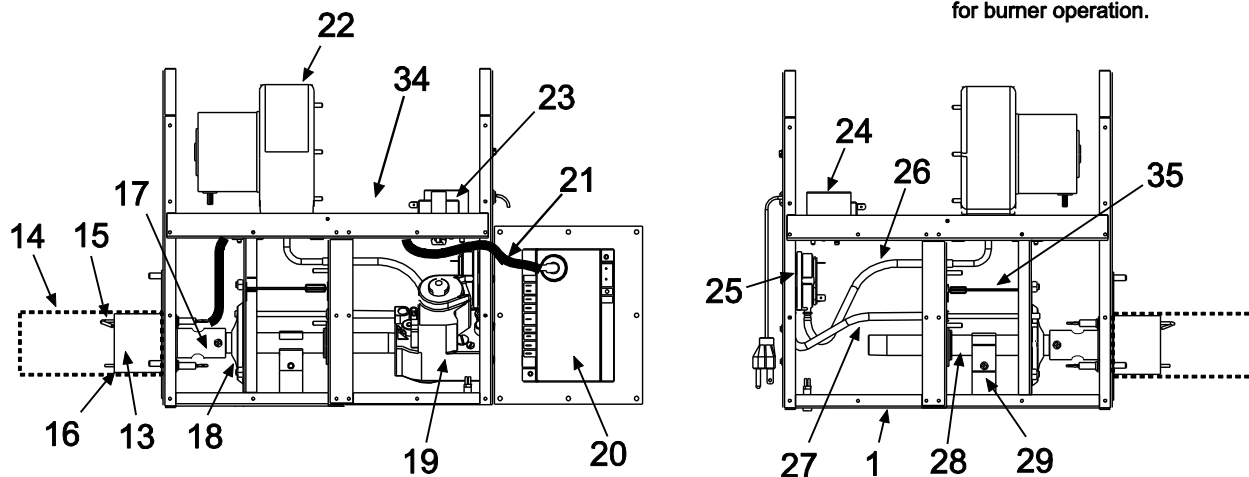
If the flame is not sensed during sequence T3 then the burner will automatically begin re-ignition sequence T2. The ignition sequence will be repeated three times with a 60 second inter-purge. If the flame is not re-established the heater will go to lockout.

18.0) CONTROL COMPONENT LOCATION



Note: This panel must remain closed for burner operation.

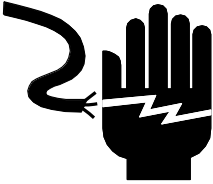
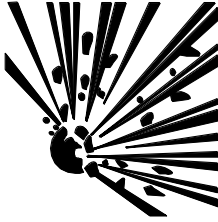
Note: This panel must remain closed for burner operation.



Legend:

1	Cabinet Assembly	19	Gas Control Valve
2	Access Panel - Top	20	Ignition Module
3	Access Panel - Hinged (2 ea)	21	Ignition Cable
4	Access Panel - LH Burner	22	Blower Assembly
5	Access Panel - RH Burner	23	Transformer - 120/24 VAC
6	Air Inlet Screen	24	Terminal Block/Fishpaper Shield
7	Gas Inlet Connection - 1/2"NPT	25	Air Switch
8	Power Supply Cord - 120V	26	Air Sensing Tube (P1+)
9	Burner Sight Glass	27	Air Sensing Tube (P2-)
10	Indicator Light - Amber (Gas Valve)	28	Manifold Pipe
11	Indicator Light - Red (Air Switch)	29	Manifold Support Bracket/Clamp
12	Tube Flange Connection	30	Thermostat Connection Block
13	Main Burner	31	Terminal Bushing (TISS connection)
14	Flame Screen (200m/BTU units only)	32	Starting Collar
15	Electrode	33	Valve Holder Plate
16	Flame Sensor	34	Fuseholder/Fuse (2 amp)
17	Main Burner Orifice	35	Combustion Air Restrictor Plate
18	Inlet Air Plate - Stamped		

19.0) CLEANING AND ANNUAL MAINTENANCE

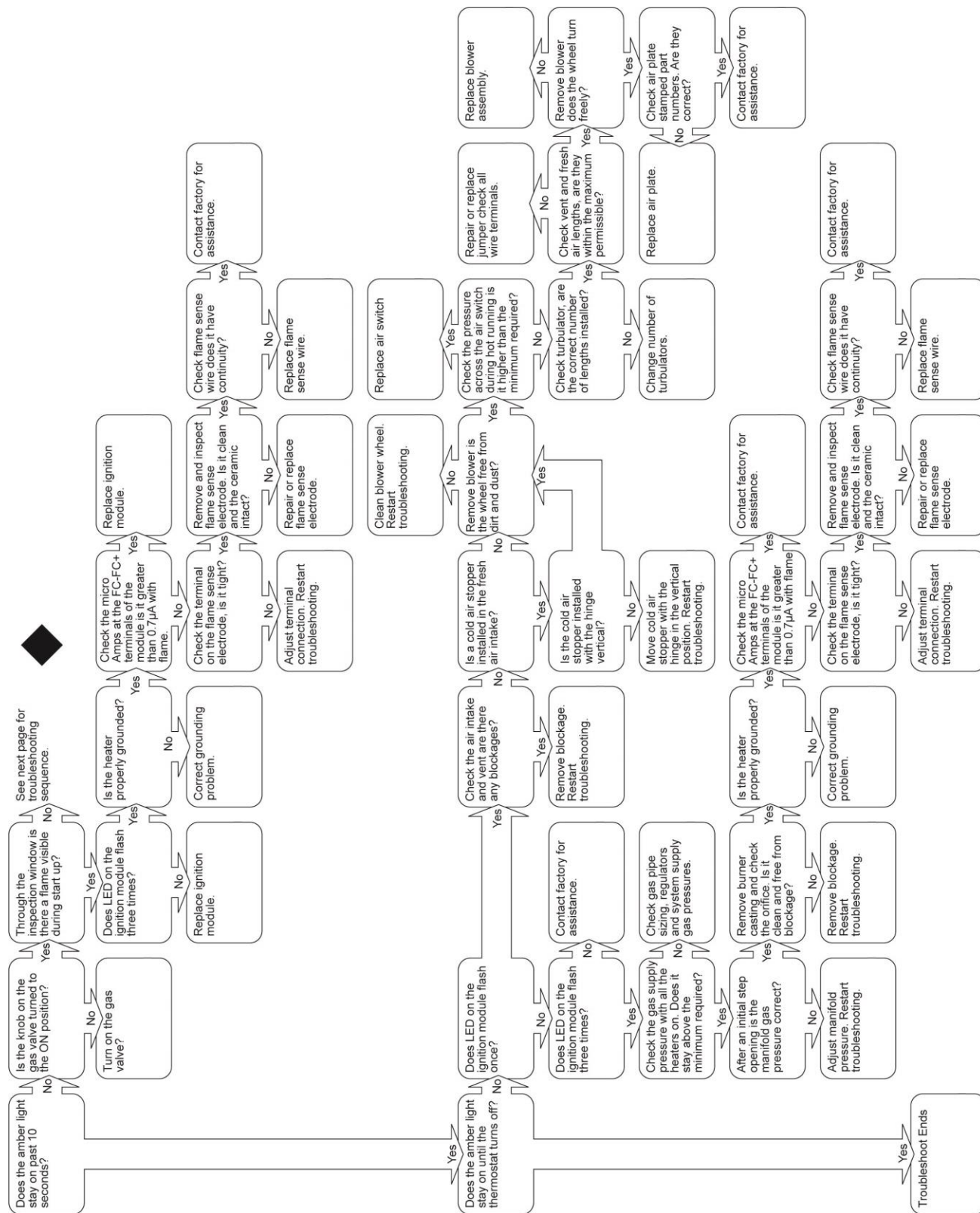
⚠ WARNING		
		ELECTRIC SHOCK & EXPLOSION HAZARD Disconnect electrical power and gas supply before servicing. Failure to do so may result in death or serious injury.

This heater must be cleaned and serviced annually by a qualified contractor before the start of each heating season and at any time excessive accumulation of dust and dirt is observed. Maximum heating efficiency and clean combustion will be maintained by keeping the heater clean.

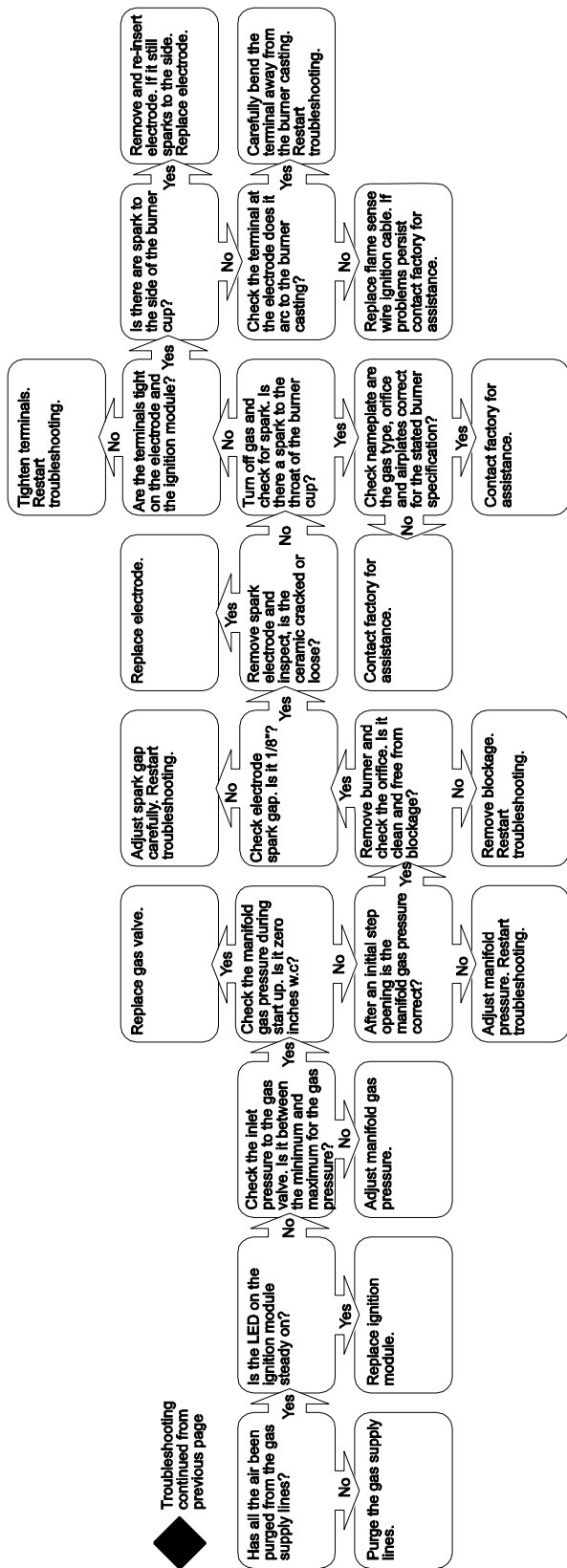
The contractor shall check the following during periodic maintenance.

- A. Clearances to combustibles:** Check that clearances are being maintained. Make sure there are no flammable objects, liquids or vapors near the heater. See also Section 4.0).
- B. Reflectors:** Reflectors should be kept clean, at a minimum blow off the reflectors. (Dirty reflectors will reduce heat output).
- C. Heat exchanger tubes:** Inspect the heat exchanger tubes to make sure they are not cracked, sagging or showing signs of fatigue.
- D. Combustion air intake:** Disconnect combustion air intake from the burner box and inspect internally using a flashlight to make sure no foreign material has collected in the tubes and that there is no obstruction around the air intake openings. Clean any foreign materials. Inspect any joints to make sure they are completely sealed. See also Section 15.0).
- E. Venting System:** Disconnect vent pipe and inspect internally using a flashlight to make sure no foreign material has collected in the pipes. Check the external vent cap and make sure that there is no obstruction around the exhaust openings. Clean any foreign materials. Inspect any joints to make sure they are completely sealed. See also Section 14.0).
- F. Gas lines:** Make sure that the gas lines are not leaking. Check the gas connection to the heater for any signs of damage, fatigue or corrosion. If there are any signs of damage to the gas connection or leaks found in the gas piping, immediately stop using the heater until the gas pipe and connections have been repaired or replaced. Check that the gas lines are not bearing the weight of the heater. See also Section 11.0).
- G. Burner Box:** In order to extend the longevity of the heater, the heat exchanger tube and the burner must be level. Check that the burner box is level; use the turnbuckle on the burner suspension eyebolt to adjust the level of the burner. See also Section 9.0).
- H. Burner sight glass:** Check that the burner sight glass is clean and that the glass is sealed against the housing door. If there any signs of distortion, the sight glass must be replaced. See Section 18.0) for sight glass location.
- I. Blower wheel and housing:** Check that the blower wheel spins freely, blow out any dust or dirt with compressed air. See Section 18.0) for blower location.
- J. Electrode condition:** Visually check that the electrode gap is maintained at 1/8" and that the tips of the flame sensor and spark electrode are free from deposits. Clean off any deposits. Check that the electrode ceramic is free from cracks. See Section 21.2).
- K. Suspension system:** Check that the suspension system is holding the heater level. Make sure that the heater is hanging securely, look for any evidence where the heater may have been hit accidentally and tighten any loose hanging points. Check that S hooks are closed. Check that there is no evidence of wear on the chain at the connection to the heater and at the ceiling.
- L. Tube Integrity Safety System:** Check that the tension of the tube integrity safety system is maintained at 11". Adjust tension if necessary. See Section 0.
- M. Main Burner and Orifice:** Check the Main burner and orifice; remove any dirt or debris including spider webs. See Section 21.2).

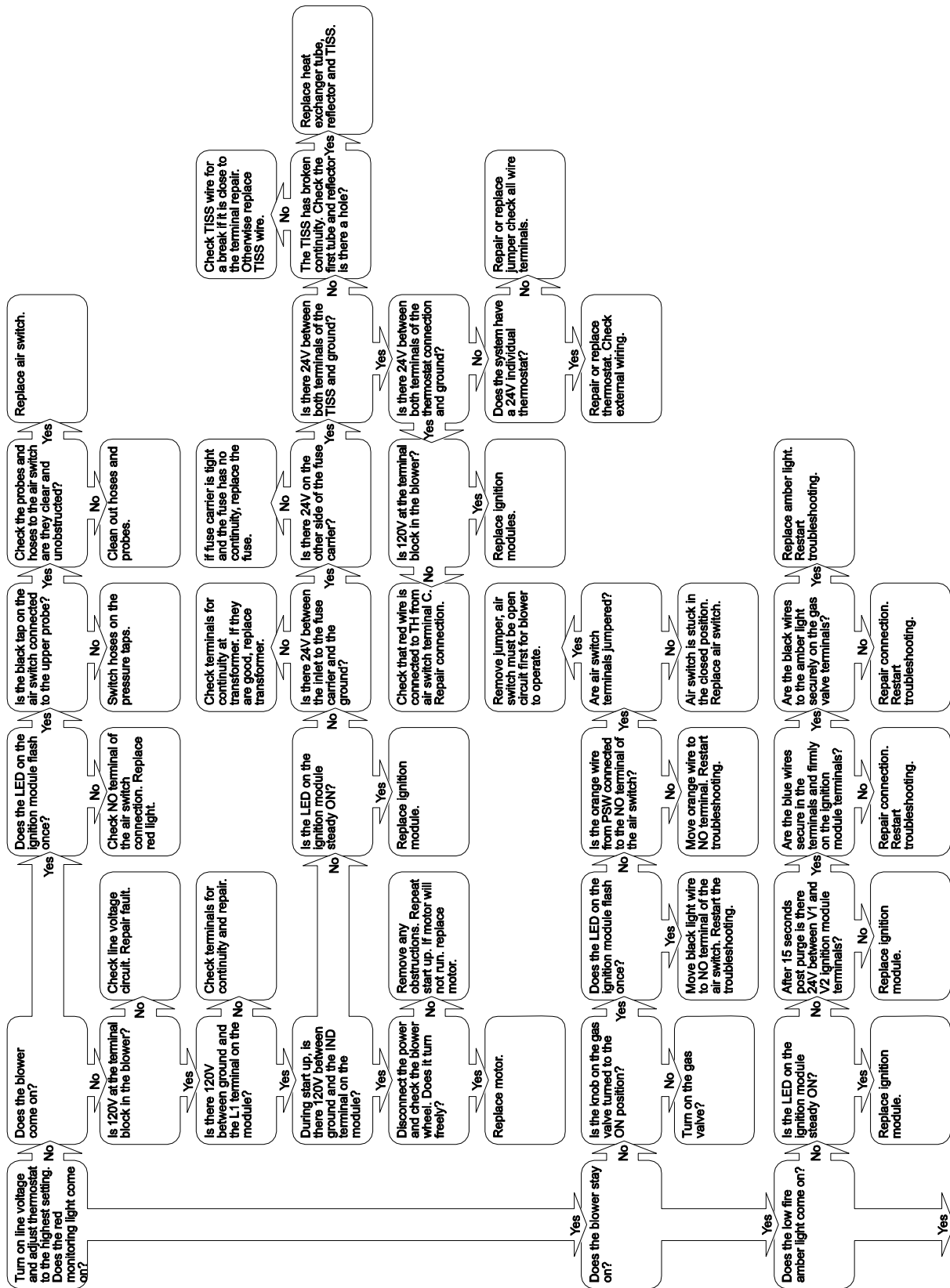
TROUBLESHOOTING GUIDE – SINGLE STAGE (CONTINUED)



TROUBLESHOOTING GUIDE – SINGLE STAGE (CONTINUED)



20.1) TROUBLESHOOTING GUIDE – TWO STAGE (N7/L7)

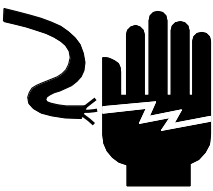
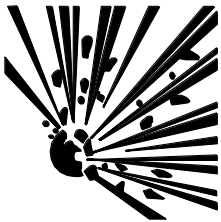


TROUBLESHOOTING GUIDE – TWO STAGE (CONTINUED)



Troubleshooting continued on the next page.

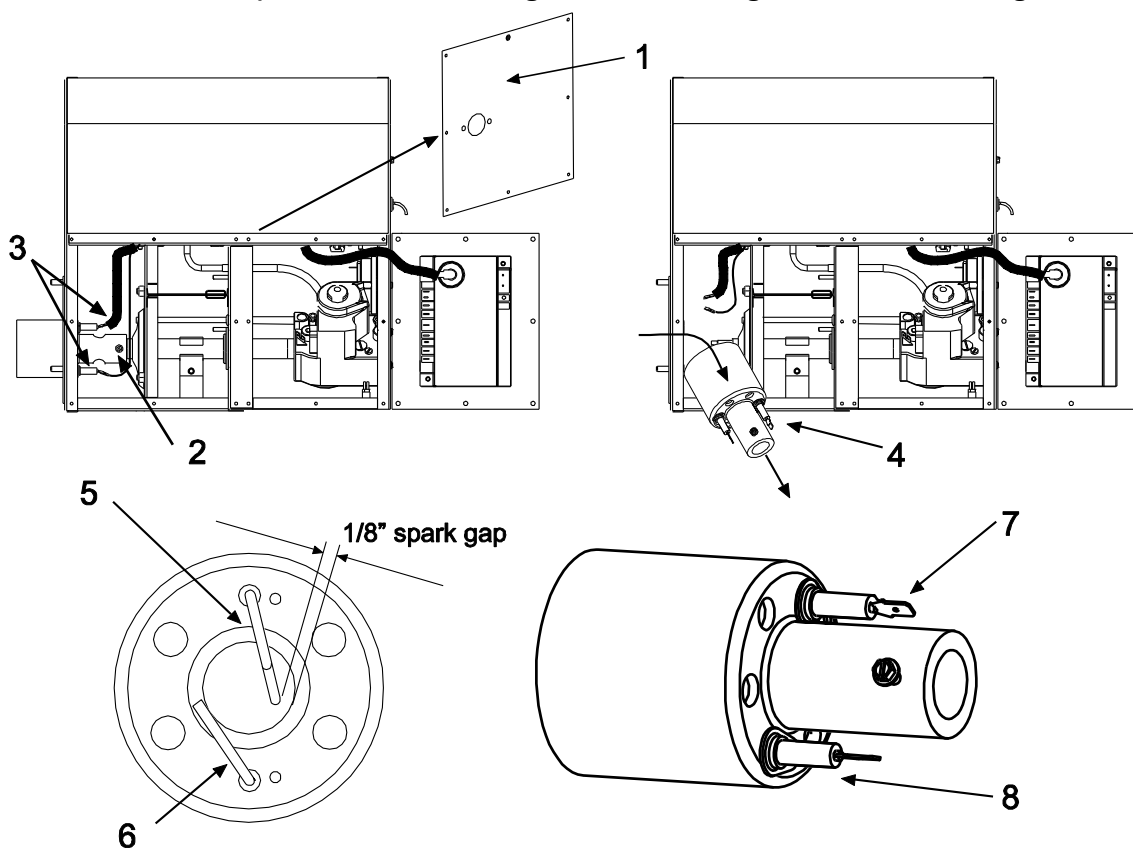
21.0) REPLACING PARTS

⚠ WARNING		
		ELECTRIC SHOCK & EXPLOSION HAZARD Disconnect electrical power and gas supply before servicing. Failure to do so may result in death or serious injury.

Only use genuine Space-Ray replacement parts. Parts are available from the factory for replacement by a licensed person. Refer to the Replacement Parts Guide in Section 23.0) for all replacement parts.

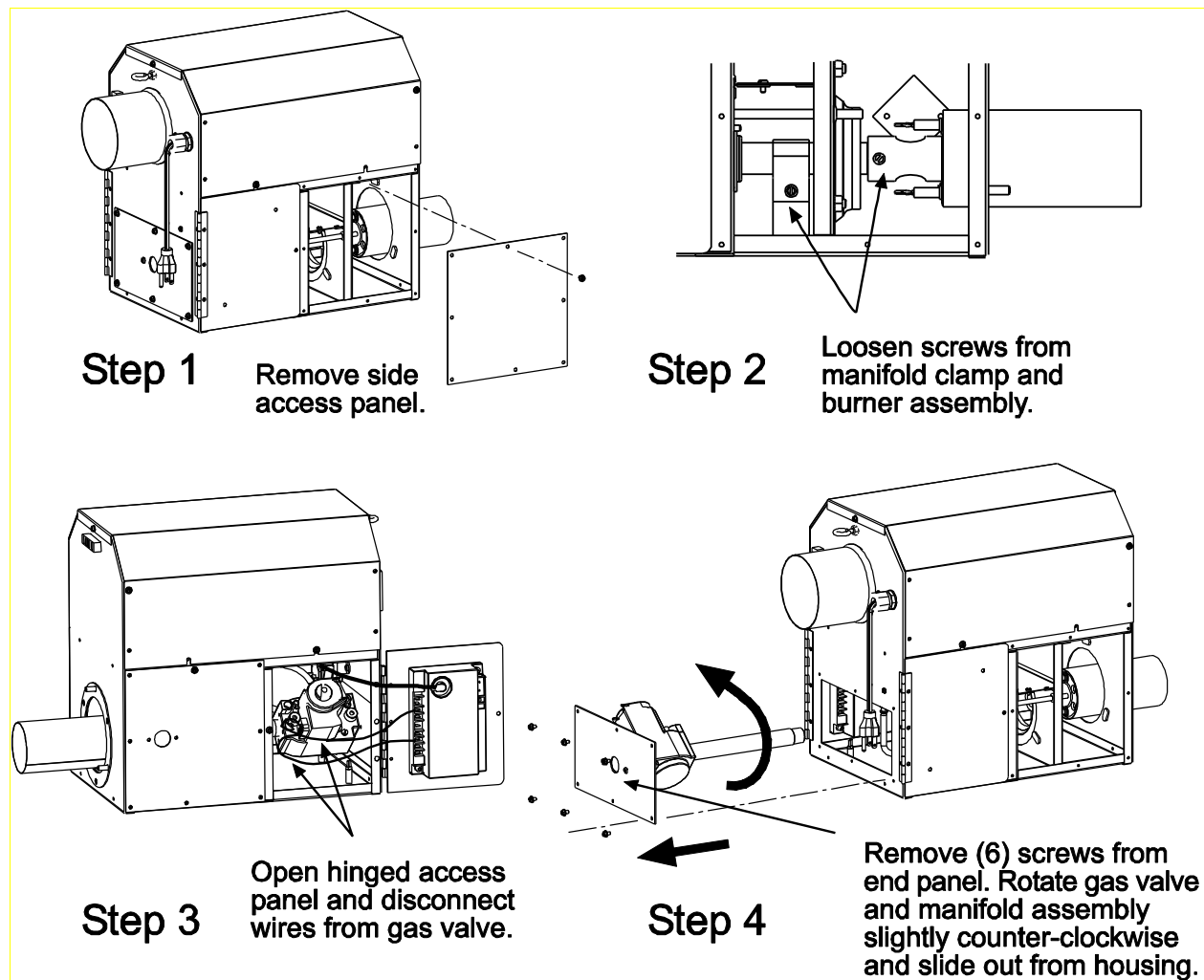
21.2) REMOVAL OF MAIN BURNER AND ELECTRODES

The main burner can be inspected without removing the burner housing from the heat exchanger tube.

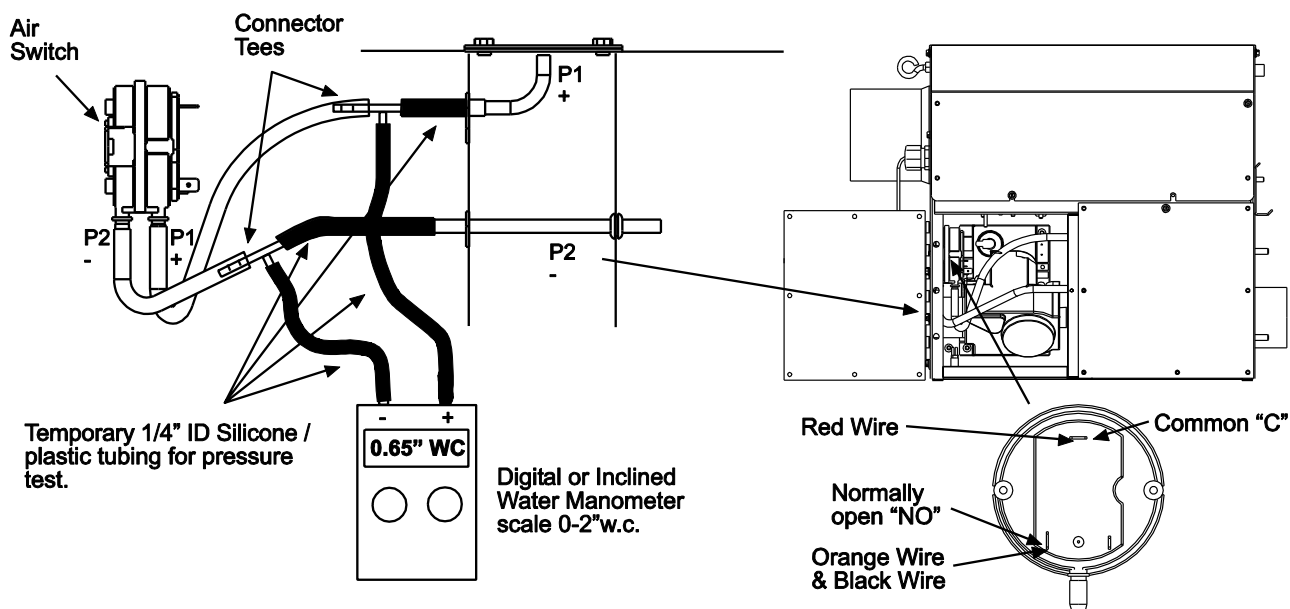


1. Disconnect electrical supply and Remove cover 1.
2. Remove screw securing burner casting to the gas manifold.
3. Disconnect Spark lead and sensing wire.
4. Pull burner forward from the gas manifold and then out through the side of the box as shown.
5. Check that the spark gap is 1/8" between the electrode and the burner casting as shown. Spark electrode should be clean and free from debris.
6. Flame sensor should be clean and free from debris.
7. Check ceramic on the spark electrode, for replacement into the box the spark electrode is the 1/4" terminal which connects to the spark lead.
8. Check ceramic on flame sense electrode, for replacement into the box the flame sense electrode is the 3/16" terminal which connects to the violet wire. (in some models the terminal is 1/4" painted violet)

21.3) REMOVING GAS VALVE AND MANIFOLD ASSEMBLY



21.4) AIR SWITCH PRESSURE CHECK



1. Open hinged access panel.
2. Add tubing to connect the air switch tubing P1 + and P2 - with the connector tees and the probes P1+ and P2+.
3. Connect plastic tubing of a digital or inclined water manometer with a 0-2" scale onto the connector tees.
4. Turn heater on and wait until blower motor is activated.
5. Observe air pressure from manometer. This should be higher than the set point indicated below for correct operation.

Model	Operating Pressure
SPH 40	0.98" W.C. Hot
SPH 50	0.98" W.C. Hot
SPH 60	0.98" W.C. Hot
SPH 75	0.98" W.C. Hot
SPH 80	0.80" W.C. Hot
SPH 100	0.80" W.C. Hot
SPH 125	0.50" W.C. Hot

All pressures are with the heater in operation for at least 15 minutes.

21.5) IGNITION SYSTEM CHECKS

TO CHECK FLAME SENSOR CIRCUIT.

Flame current is the current which passes through the flame from the sensor to ground. The minimum flame current necessary to keep the system from lockout is 0.7 microamps.

- a. Turn off heater at thermostat.
- b. Connect a meter (dc microammeter scale) in series with the ground lead as shown in the diagram. Connect the meter as follows:
 - Connect the black (negative) meter lead to the electronic control FC- terminal.
 - Connect the red (positive) meter lead to the electronic control FC+ terminal.
- c. Restart the system and read the meter. The flame sensor current must be steady and measure at least 0.7 microamps.
- d. If the meter reads less than the minimum or if reading is unsteady:
 - Make sure burner flame is capable of providing a good rectification signal.
 - Make sure fasteners securing igniter/sensor are tightened to assure correct positions. **DO NOT** relocate igniter/sensor.
 - Check for excessive (over 1000°F) temperature at ceramic insulator on flame sensor. Excessive temperature can cause short to ground. **DO NOT** relocate igniter/sensor.
 - Check for cracked ceramic insulator, which can cause short to ground, and replace sensor if necessary.
 - Make sure that electrical connections are clean and tight. Replace damaged wire.
- e. If the meter reads below "0" on the scale, meter leads are reversed. Disconnect power and reconnect meter leads for proper polarity.
- f. Remove microammeter. Return system to normal operation.

IGNITION MODULE DIAGNOSTICS

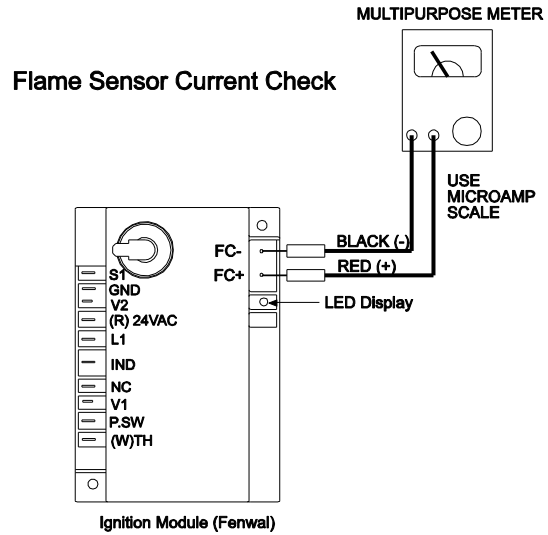
Flame Fault

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 completely removing the flame signal, the combustion blower will power off following the post purge period.

Fault Conditions

Error Mode	LED Indication
Internal Control Failure	Steady On
Air Flow Fault	1 Flash
Gas valve failure (stuck open)	2 Flashes
Ignition Lockout	3 Flashes

The LED located on the ignition module will flash ON for $\frac{1}{4}$ second, then OFF for $\frac{1}{4}$ second during a fault condition. The pause between fault codes is 3 seconds.



22.0) INSTALLATION DATA

Date of Installation: _____ # of Heaters in System: _____

Serial No. _____

Model: **SPH** _____

N = Natural Gas
L = Propane Gas

23.0) REPLACEMENT PARTS GUIDE

BURNER BOX			
Item No.	Part No.	Description	Qty.
Fasteners			
1	02295040	PHTCS #6-32 x 3/8"	3
1a	02266010	Speed Clips (for air inlet plate)	2
2	02261030	HHTCS #8-32 x 3/8" (green coated)	1
3	02242050	PHTCS #8-32 x 3/8"	7
3b	02242070	PHTCS #8-32 x 1/2"	2
4	02123170	RHMS #8-32 x 3/4"	2
5	02167010	Locknut 1/4-20 Keps	8
5a	02309000	Eyebolt 1/4-20 x 2"	1
6	02167040	Locknut #8-32 Keps	7
7	02212020	HWHSMS #8 x 1/2" "B" Point (typical all access panels)	45
8	02132020	Rivet 1/8"	32

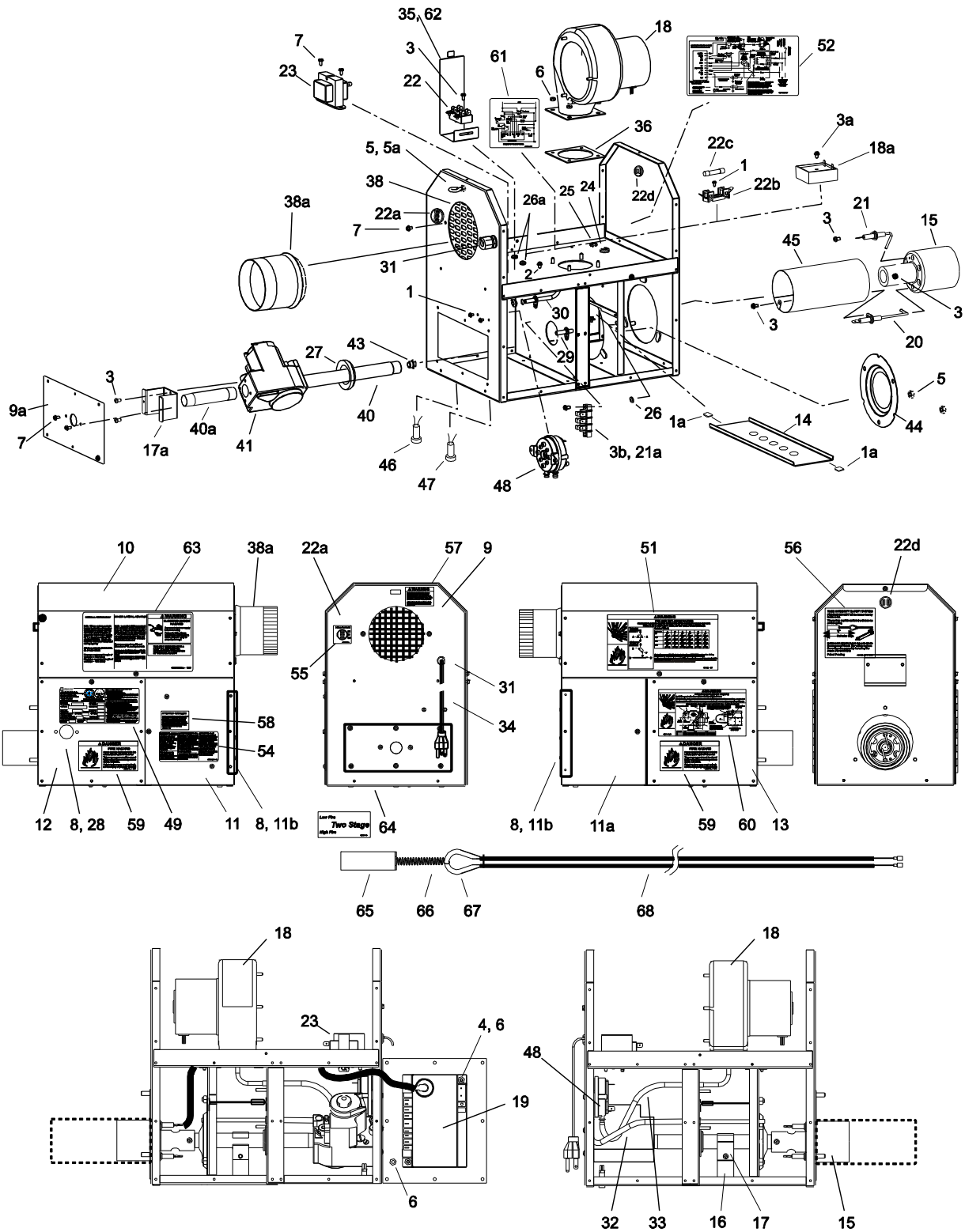
Housing Components			
9	44139050	Housing Assembly (painted)	1
9a	44140119	Valve Holder Plate (painted)	1
10	44140009	Access Panel - Top (painted)	1
11	44140040	Access Panel - Hinged (with module holes)	1
11a	44140041	Access Panel - Hinged	1
11b	02201080	Hinge 1-1/2" x 6"	2
12	44140057	Access Panel - LH burner end -with sight glass (painted)	1
13	44140099	Access Panel - RH burner end (painted)	1
14	4414006x	Combustion Air Plate (see size requirements in Section 5.0)	1

Burner Components			
15	42700500	Burner, Investment Casting - Machined	1
16	44146090	Manifold Support Bracket (painted)	1
17	44146060	Manifold Support Clamp	1
17a	44146058	Manifold Extension Bracket (with set screw)	1
18	30703000	Blower Assembly - Regal Beloit	1
18a	30703050	Blower Assembly - McMillian (alternate)	1
19	30632510	Spark Module - Fenwal-24V #35-615950-197	1
20	30702010	Flame Sensor #PSE-GF24	1
21	30702020	Electrode #PSE-GF25	1
21a	30743000	Terminal Block #EL-3008	1
22	30281000	Terminal Block #EK-204	1
22a	30738030	Terminal Bushing (3 x 1/4" tabs)	1
22b	30713000	Fuse Holder	1
22c	30202000	Fuse 1/4 x 1-1/4" (2 amp)	1
22d	30738020	Terminal Bushing (2 x 1/4" tabs)	1
23	30279000	Transformer 120v-24V 20VA	1
24	02175020	Strain Relief #SR-6P3-4 (ignition cable)	1
25	02175060	Strain Relief #SR-2M-1 (flame sensor wire)	1
26	30514020	Grommet .250ID #739 (air sensing tube)	1
26a	30512020	Split Bushing #2871 (misc. wiring, ignition cable, sensor wire)	2
27	30700040	Grommet, Pipe Sealing 1/2" #63595K34	1
28	30623010	Sight Glass #1295	1
29	42744079	Air Sensing Tube Asm. (straight) 1/4"od	1
30	42744069	Air Sensing Tube Asm. (90 deg bend) 1/4"	1
31	30635050	Cord Connector 1/2" #M4521 (Gray)	1
31a	30635049	Nut 1/2" #8463 (Black)	1
32	03988100	Plastic Vacuum Air Tube 10" (P2- to static pressure point)	1

33	03988100	Plastic Vacuum Air Tube 10" (P1+ to total pressure point)	1
34	43563040	Supply Cord Set (SVT-1 18/3 x 72" long) – includes connector & nut	1
35	42709000	Shield, Terminal Block	1
36	42395010	Gasket, Blower	1
37	03946010	Sealing Strip 1/8" x 3/8" wide (access panels) -not shown-	Ft.
38	42752250	Air Inlet Screen	1
38a	30504040	Starting Collar (combustion air inlet)	1
39	30701240	Ignition Cable - Female (2) 1/4" QC x 24"lg #PSE-GF23 -not shown-	1
40	44145060	Manifold Pipe – 6-1/4"lg	1
40a	03333140	Pipe Nipple – 4"lg	1
41	44010370	Kit, Gas Valve – WR #36J23-203B1 Single Stage (natural gas)	1
41a	44010380	Kit, Gas Valve – WR #36J23-204B1 Single Stage (propane gas)	1
41b	44010390	Kit, Gas Valve – WR #36J58-201B1 Two Stage (natural gas)	1
41c	44010400	Kit, Gas Valve – WR #36J58-202B1 Two Stage (propane gas)	1
43	03259xxx	Main Burner Orifice #7/16-27 (see size requirements in Section5.0)	1
44	42741150	Air Restrictor Plate 2-3/4" (earlier models only)	1
45	44151010	Burner Screen Sub-Assembly (200 BTU units only)	1
46	42398030	Monitoring Light – Amber (gas valve operation) – 2 each for Two Stage	1
47	42398150	Monitoring Light – Red (air switch operation)	1
48	30186250	Air Switch (set point @ .93"WC, RED LABEL) PGR 40, 50, 60 & 75	1
48b	30186230	Air Switch (set point @ .45"WC, ORANGE LABEL) PGR 125	1
48c	30186240	Air Switch (set point @ .75"WC, PINK LABEL) PGR 80 & 100	1

Labels/Manual			
49	42848310	Label, Nameplate – Single Stage	1
49a	42848320	Label, Nameplate – Two Stage	1
50	42013010	Label, Logo (SunStar) (Not Shown)	1
51	43344210	Label, Clearances to Combustibles	1
52	42874020	Label, Wire Connection Diagram – Single Stage	1
52a	42874030	Label, Wire Connection Diagram – Two Stage	1
54	42875000	Label, Warning (installation/configuration/chemical)	1
55	43269010	Label, 24V Thermostat Connection – Single Stage	1
55a	43269060	Label, 24V Thermostat Connection – Two Stage	1
56	43269020	Label, TISS Connection	1
57	43269030	Label, Eyebolt Suspension Warning	1
58	43269040	Label, Gas Valve in "OFF" Position	1
59	43269050	Label, Burner Warning (access panel must remain closed)	2
60	43344110	Label, Flex Gas Connector	1
61	42785020	Label, Ladder Wiring Connection – Single Stage	1
61a	42785010	Label, Ladder Wiring Connection – Two Stage	1
62	42834000	Label, 120V Caution	1
63	42922030	Label, Sidewall Venting	1
64	43269070	Label, Low/High Fire – Two Stage	1
64a	43343130	Installation & Operation Manual (Not Shown)	1

Tube Integrity Safety Switch (TISS) Components			
65	44175000	Retainer clamp	1
66	30519020	Spring	1
67	30736000	Thimble	1
68	44176510	TISS replacement assembly (does not include retainer clamp or spring)	1
69	43269119	Label, TISS Holder Clamp (Not Shown)	1



Note:

- 1) Screws, Nuts and Washers are standard hardware items and can be purchased at any local hardware store.
- 2) Please order by PART NUMBER – not by Item Number.
- 3) Replacement Part Prices are available when ordering.
- 4) Please refer to complete Model Number when ordering.

ALL ILLUSTRATIONS ARE INTENDED TO GIVE THE GENERAL IMPRESSION OF UNITS ONLY. WE RESERVE THE RIGHT TO ALTER ANY SPECIFICATION WITHOUT NOTICE.

24.0) WARNINGS CARD

Copies of this card may be ordered at no charge under part no. 43344980 for installation near the heater.

- Attach this information card adjacent to the thermostat which controls the SunStar heater(s). ○



Read the Installation and Operating Instructions thoroughly before installation, operation or service.

INSTALLER: Write the clearance distance for the highest BTU model in the building in the blank spaces below using permanent ink. The clearances to combustible materials are based on each individual heater model number. Locate the heater model number on the nameplate affixed to the heater. The clearances to combustibles distances can be located adjacent to the nameplate or in the Installation & Operating (I & O) Instructions. I & O's can also be located on www.sunstarheaters.com.

WARNING



FIRE HAZARD

Combustible material must be located outside the clearance distance listed from heater.

Some objects will catch fire or explode when placed close to heater.

Failure to follow these instructions can result in death, injury or property damage.

Maintain Clearances to Combustibles to Prevent the Risk of Fire.

Clearance to combustibles must be maintained at all times in order to prevent the ignition of combustible materials. In locations used for the storage of combustible materials signs must be posted to specify the maximum permissible stacking height to maintain the required clearances from the heater to the combustibles. Signs must either be posted adjacent to the heater's thermostats or in the absence of such thermostats, in a conspicuous location.

Maintain the following clearances:
_____ to the side, _____ above
and _____ below the heater
from combustible materials.

IF YOU SMELL GAS: _____

FOR YOUR SAFETY

! DO NOT try to light any appliance.
! DO NOT touch any electrical switch; **DO NOT** use any telephone in your building.
! IMMEDIATELY call your gas supplier from a neighbor's telephone. Follow the gas supplier's instructions. If you cannot reach your gas supplier, call the fire department.

Installation Code and Annual Inspections:

Installation and Service of SunStar equipment must be performed by a qualified contractor and conform with all requirements set forth in the SunStar Installation and Operating Instructions and any National and Local codes pertaining to the installation, service and operation of the equipment. Annual inspection is recommended prior to the heating season to ensure proper operation of the heating equipment.

SUNSTAR HEATING PRODUCTS, INC.
Post Office Box 36271 (28236) * 1700 Parker Drive (28208) * Charlotte, North Carolina
Phone (704) 372-3486 * Fax (704) 332-5843 www.sunstarheaters.com * email: info@sunstarheaters.com

43344980
August 2021 rev B