SunStar®
INFRARED GAS HEATERS

# 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.

## INFRARED RADIANT TUBE HEATER

Single and Two Stage Push Through System (Positive Pressure)

**Models:**

**SPS SERIES:** **(40, 50, 60, 75, 100, 125, 150, 175, 200) N5/L5/N7/L7**

**SPU SERIES:** **(40, 50, 60, 75, 100, 125, 150, 175, 200) 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.**

Scan warranty QR code on the right to register your product.

**!IMPORTANT: SAVE THIS MANUAL FOR FUTURE REFERENCE.**

Manufactured for:
**SUNSTAR HEATING PRODUCTS, INC.**
Post Office Box 36271 (28236) • 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)**

a. Installation of this appliance is to be in accordance with latest edition of CSA B149.1 (Natural Gas and Propane Installation Code).

b. For installation in public garages or aircraft hangars, the minimum clearances from the bottom of the infrared heater to the upper surface of the highest aircraft or vehicle shall be 50 percent greater than the certified minimum clearance, but the clearance shall not be less than 8 feet.

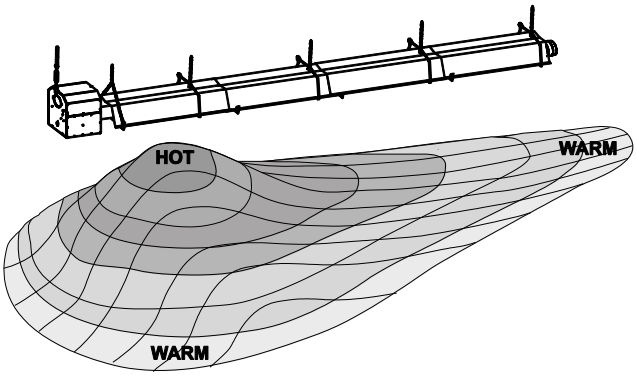
Although these heaters may be used in many applications other than space heating (e.g., process heating), SunStar will not recognize the warranty for any use other than space heating.

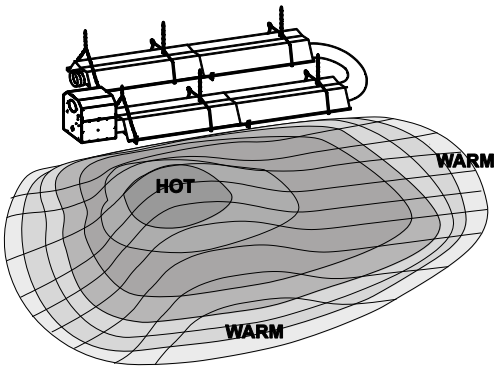
**For indoor installation only. Not for use in residential dwellings.**

This heater is for Indoor Installation and Covered Patio 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.

**SPS Series Only: Since straight tube heaters are always hotter at the control end than at the flue terminal end, always observe the minimum recommended mounting heights shown on the specification sheets** and in Section 5.0) of this manual. Use U-tube configuration instead of straight tubes for spot or area heating (e.g., where a single heater is utilized for space heating).



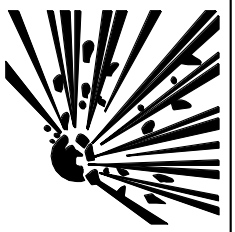




**High Altitude:**
Appliances are supplied as standard for altitudes of 0 to 2,000 feet (0-610 m). High-altitude ratings are obtained by a change in the orifice size. When ordered for high altitude installations, burners are supplied by the factory ready for high altitude installation. Check the nameplate 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**



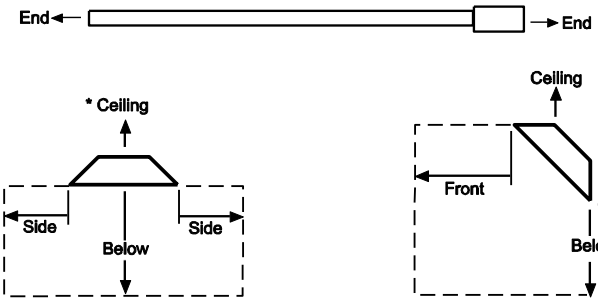
FIRE AND EXPLOSION HAZARD

Combustible material must be located outside the clearance dimensions listed.

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

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 | | | | Angle Mounted at 45° | |
|---|---|---|---|---|---|---|
| | Sides | Ceiling* | Below | Ends | 45° Front | 45° Rear |
| SPS/SPU 40 | 22” | 6” | 52” | 15” | 40” | 12” |
| SPS/SPU 50 | 22” | 6” | 56” | 15” | 48” | 12” |
| SPS/SPU 60 | 22” | 6” | 56” | 15” | 48” | 12” |
| SPS/SPU 75 | 22” | 6” | 60” | 15” | 52” | 12” |
| SPS/SPU 100 | 28” | 6” | 70” ** | 15” | 58” | 12” |
| SPS/SPU 125 | 28” | 6” | 76” ** | 20” | 66” | 12” |
| SPS/SPU 150 | 34” | 6” | 81” ** | 20” | 70” | 12” |
| SPS/SPU 175 | 38” | 6” | 86” ** | 20” | 75” | 12” |
| SPS/SPU 200 | 42” | 6” | 93” ** | 20” | 80” | 12” |

* When used indirect vented, minimum clearance for CEILING must be: 12” for SPS/SPU 50-75 and 18” for SPS/SPU 100-200. If optional corner and u-bend reflectors are not used, the clearance must be 18”.

** Maximum clearance below reduces by 50% once you are 25ft. downstream from the burner box.

**▲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 | | Turbulator Qty. |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Natural Gas | | Propane Gas | | @ Horizontal | @ 45° Angle | |
| SPS/SPU 40 | 40,000 | 25,000 | 44140061 | #32 | (0.116) | #49 | (0.073) | 10 ft. | 9 ft. | 4 |
| SPS/SPU 50 | 50,000 | 30,000 | 4414006H | 3.5mm | (0.138) | #46 | (0.081) | 11 ft. | 10 ft. | 5 |
| SPS/SPU 60 | 60,000 | 37,000 | 4414006H | #26 | (0.147) | #43 | (0.089) | 11 ft. | 10 ft. | 4 |
| SPS/SPU 75 | 75,000 | 50,000 | 44140063 | #21 | (0.159) | 2.5mm | (0.098) | 13 ft. | 12 ft. | 5 |
| SPS/SPU 100 | 100,000 | 65,000 | 44140062 | #12 | (0.189) | #32 | (0.116) | 14 ft. | 13 ft. | 3 |
| SPS/SPU 125 | 125,000 | 80,000 | 44140066 | #4 | (0.209) | #30 | (0.129) | 14 ft. | 13 ft. | 7 |
| SPS/SPU 150 | 150,000 | 100,000 | 44140067 | "A" | (0.234) | #27 | (0.144) | 15 ft. | 14 ft. | 4 |
| SPS/SPU 175 | 175,000 | 110,000 | 44140067 | "E" | (0.250) | #23 | (0.154) | 16 ft. | 15 ft. | 0 |
| SPS/SPU 200 | 200,000 | 125,000 | 44140068 | 6.9mm | (0.272) | 4.1mm | (0.161) | 18 ft. | 16 ft. | 1 |

* MOUNT HEATERS AS HIGH AS POSSIBLE. Minimums are shown as a guideline for human comfort and uniform energy distribution for complete building heating applications. Consult your SunStar 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 16.0) 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)<br>Input Power-Line: 120 VAC (L1, IND contacts only)<br>Flame Sensitivity: 0.7 uA (microamps) minimum | 15 second trial for ignition period<br>15 second pre-purge period<br>60 second inter-purge period<br>30 second post-purge period<br>3 tries for ignition (separate flame sensor). |

## 6.0) PACKING LIST

### A. SPS/SPU Burner Package

**Part Description** **QTY**

Burner Box Assembly (Refer to the following chart for Package Part Numbers) ..... 1
4"ID x 4"Lg Flue Adapter Collar (#30504500) ..... 1
Fastener Kit – Burner Box Attachment/Flue Adapter Collar (#42907040) ..... 1
Containing: #10 x 1/2" Self-Drilling Screws (#02189020) ..... 2
¼ - 20 Locknuts (#02167010) ..... 3
Tube Flange Gasket (#42921000) ..... 1
Turbulator 24" Long (#44152240) *See chart above for required quantities. ..... *
Installation & Operation Instructions ..... 1
Turnbuckle (#43343320) ..... 1
Gas connector 5/8" OD x 36" (#30302360) – US only ..... 1
Screen Assembly 2-5/8" ID x 5-1/2" Long (#44151010) **200M BTU models only** ..... 1
End Reflector Package (#43341000) ..... 1

**BURNER PACKAGE NUMBERS**

| SINGLE STAGE CONTROLS | | |
|---|---|---|
| **MODEL NO.** | **PART NO.** | **GAS TYPE** |
| SPS/SPU 40-N5 | 44150010 | NATURAL |
| SPS/SPU 50-N5 | 44150030 | NATURAL |
| SPS/SPU 60-N5 | 44150330 | NATURAL |
| SPS/SPU 75-N5 | 44150050 | NATURAL |
| SPS/SPU 100-N5 | 44150070 | NATURAL |
| SPS/SPU 125-N5 | 44150090 | NATURAL |
| SPS/SPU 150-N5 | 44150110 | NATURAL |
| SPS/SPU 175-N5 | 44150130 | NATURAL |
| SPS/SPU 200-N5 | 44150150 | NATURAL |
| SPS/SPU 40-L5 | 44150020 | PROPANE |
| SPS/SPU 50-L5 | 44150040 | PROPANE |
| SPS/SPU 60-L5 | 44150340 | PROPANE |
| SPS/SPU 75-L5 | 44150060 | PROPANE |
| SPS/SPU 100-L5 | 44150080 | PROPANE |
| SPS/SPU 125-L5 | 44150100 | PROPANE |
| SPS/SPU 150-L5 | 44150120 | PROPANE |
| SPS/SPU 175-L5 | 44150140 | PROPANE |
| SPS/SPU 200-L5 | 44150160 | PROPANE |

| TWO STAGE CONTROLS | | |
|---|---|---|
| **MODEL NO.** | **PART NO.** | **GAS TYPE** |
| SPS/SPU 40/25-N7 | 44150510 | NATURAL |
| SPS/SPU 50/30-N7 | 44150530 | NATURAL |
| SPS/SPU 60/37-N7 | 44150830 | NATURAL |
| SPS/SPU 75/50-N7 | 44150550 | NATURAL |
| SPS/SPU 100/65-N7 | 44150570 | NATURAL |
| SPS/SPU 125/80-N7 | 44150590 | NATURAL |
| SPS/SPU 150/100-N7 | 44150610 | NATURAL |
| SPS/SPU 175/110-N7 | 44150630 | NATURAL |
| SPS/SPU 200/125-N7 | 44150650 | NATURAL |
| SPS/SPU 40/25-L7 | 44150520 | PROPANE |
| SPS/SPU 50/30-L7 | 44150540 | PROPANE |
| SPS/SPU 60/37-L7 | 44150840 | PROPANE |
| SPS/SPU 75/50-L7 | 44150560 | PROPANE |
| SPS/SPU 100/65-L7 | 44150580 | PROPANE |
| SPS/SPU 125/80-L7 | 44150600 | PROPANE |
| SPS/SPU 150/100-L7 | 44150620 | PROPANE |
| SPS/SPU 175/110-L7 | 44150640 | PROPANE |
| SPS/SPU 200/125-L7 | 44150660 | PROPANE |

## B. SPS 40-200 Body Package Descriptions

*(Package Part Number is indicated on the outside of each corresponding carton.)*

| Systems | | 10Ft. System | 20Ft. System | 30Ft. System | 40Ft. System | 50Ft. System |
|---|---|---|---|---|---|---|
| SPS Body Packages – Aluminized/Hot Rolled or Alumi-Therm/Hot Rolled | | 10 Ft. pkg 44134020 | 20 Ft. pkg 44135000 | 30 Ft. pkg 44136000 | 40 Ft. pkg 44137100 | 50 Ft. pkg 44138100 |
| **Part #** | **Each Body Package Includes:** | **Qty.** | **Qty.** | **Qty.** | **Qty.** | **Qty.** |
| 42912180 | 10 Ft. Tube with 12 Hole Flange (Aluminized) | 1 | 1 | 1 | - | - |
| 42912169 | 10 Ft. Tube with 6 Hole Flange (Alumi-Therm) | - | - | - | 1 | 1 |
| 41932101 | 10 Ft. Tube less Flanges (Hot Rolled) | - | 1 | 2 | 3 | 4 |
| 43319100 | Reflector, 9' 11½" | 1 | 2 | 3 | 4 | 5 |
| 30462980 | Tube Coupling | - | 1 | 2 | 3 | 4 |
| 43318000 | Tube Hanger/Support Bracket, 13" | 1 | 2 | 3 | 4 | 5 |
| 43980010 | Wire Hanger | 1 | 2 | 3 | 4 | 5 |

| Body Fastener Kit (included in body packages) | | 42907280 | 42907190 | 42907200 | 42907210 | 42907220 |
|---|---|---|---|---|---|---|
| 42873000 | U-Bolt | 1 | 2 | 3 | 4 | 5 |
| 02127110 | Hex Nut, 5/16-18 | 3 | 5 | 6 | 8 | 10 |
| 02189020 | HWHSM Screw, #10-16 x ½" TEKS | 4 | 8 | 10 | 14 | 18 |

| Systems | | 60Ft. System | | 70Ft. System | |
|---|---|---|---|---|---|
| SPS Body Packages – Alumi-Therm/Hot Rolled | | 40 Ft. Pkg 44137100 | 20 Ft. Pkg 44135010 | 40 Ft. Pkg. 44137100 | 30 Ft. Pkg 44136040 |
| **Part #** | **Each Body Package Includes:** | **Qty.** | **Qty.** | **Qty.** | **Qty.** |
| 42912169 | 10 Ft. Tube with 6 Hole Flange (Alumi-Therm) | 1 | - | 1 | - |
| 41932101 | 10 Ft. Tube less Flanges (Hot Rolled) | 3 | 2 | 3 | 3 |
| 43319100 | Reflector, 9' 11½" | 4 | 2 | 4 | 3 |
| 30462980 | Tube Coupling | 3 | 2 | 3 | 3 |
| 43318000 | Tube Hanger/Support Bracket, 13" | 4 | 2 | 4 | 3 |
| 43980010 | Wire Hanger | 4 | 2 | 4 | 3 |

| Body Fastener Kit (included in body packages) | | 42907210 | 42907190 |
|---|---|---|---|
| 42873000 | U-Bolt | 4 | 2 |
| 02127110 | Hex Nut, 5/16-18 | 8 | 5 |
| 02189020 | HWHSM Screw, #10-16 x ½" TEKS | 14 | 8 |

| 42907210 | 42907200 |
|---|---|
| 4 | 3 |
| 8 | 6 |
| 14 | 10 |

## C. SPS 40-200 Series Body Package Descriptions – ALC Option (Aluminized Calorized)

*(Package Part Number is indicated on the outside of each corresponding carton.)*

| Systems | | 10Ft. System | 20Ft. System | 30Ft. System | 40Ft. System | 50Ft. System |
|---|---|---|---|---|---|---|
| SPS Body Packages – Aluminized/ Aluminized or Alumi-Therm/ Aluminized | | 10 Ft. pkg 44134020 | 20 Ft. pkg 44135020 | 30 Ft. pkg 44136020 | 40 Ft. pkg 44137090 | 50 Ft. pkg 44138080 |
| Part # | Each Body Package Includes: | Qty. | Qty. | Qty. | Qty. | Qty. |
| 42912180 | 10 Ft. Tube with 12 Hole Flange (Aluminized) | 1 | 1 | 1 | - | - |
| 42912169 | 10 Ft. Tube with 6 Hole Flange (Alumi-Therm) | - | - | - | 1 | 1 |
| 41932100 | 10 Ft. Tube less Flanges (Aluminized) | - | 1 | 2 | 3 | 4 |
| 43319100 | Reflector, 9' 11½" | 1 | 2 | 3 | 4 | 5 |
| 30462980 | Tube Coupling | - | 1 | 2 | 3 | 4 |
| 43318000 | Tube Hanger/Support Bracket, 13" | 1 | 2 | 3 | 4 | 5 |
| 43980010 | Wire Hanger | 1 | 2 | 3 | 4 | 5 |

| Body Fastener Kit (included in body packages) | | 42907280 | 42907190 | 42907200 | 42907210 | 42907220 |
|---|---|---|---|---|---|---|
| 42873000 | U-Bolt | 1 | 2 | 3 | 4 | 5 |
| 02127110 | Hex Nut, 5/16-18 | 3 | 5 | 6 | 8 | 10 |
| 02189020 | HWHSM Screw, #10-16 x ½" TEKS | 4 | 8 | 10 | 14 | 18 |

| Systems | | 60Ft. System | | 70Ft. System | |
|---|---|---|---|---|---|
| SPS Body Packages – Alumi-Therm/ Aluminized | | 40 Ft. Pkg 44137090 | 20 Ft. Pkg 44135030 | 40 Ft. Pkg. 44137090 | 30 Ft. Pkg 44136050 |
| Part # | Each Body Package Includes: | Qty. | Qty. | Qty. | Qty. |
| 42912169 | 10 Ft. Tube with 6 Hole Flange (Alumi-Therm) | 1 | - | 1 | - |
| 41932100 | 10 Ft. Tube less Flanges (Aluminized) | 3 | 2 | 3 | 3 |
| 43319100 | Reflector, 9' 11½" | 4 | 2 | 4 | 3 |
| 30462980 | Tube Coupling | 3 | 2 | 3 | 3 |
| 43318000 | Tube Hanger/Support Bracket, 13" | 4 | 2 | 4 | 3 |
| 43980010 | Wire Hanger | 4 | 2 | 4 | 3 |

| Body Fastener Kit (included in body packages) | | 42907210 | 42907190 |
|---|---|---|---|
| 42873000 | U-Bolt | 4 | 2 |
| 02127110 | Hex Nut, 5/16-18 | 8 | 5 |
| 02189020 | HWHSM Screw, #10-16 x ½" TEKS | 14 | 8 |

| 42907210 | 42907200 |
|---|---|
| 4 | 3 |
| 8 | 6 |
| 14 | 10 |

## D. SPU 40-200 Body Package Descriptions

*(Package Part Number is indicated on the outside of each corresponding carton.)*

| Systems | | 20Ft. System | 30Ft. System | 40Ft. System | 50Ft. System |
|---|---|---|---|---|---|
| SPU Body Packages – Aluminized/Hot Rolled or Alumi-Therm/Hot Rolled | | 20 Ft. pkg 44135000 | 30 Ft. pkg 44136010 | 40 Ft. pkg 44137100 | 50 Ft. pkg 44138110 |
| Part # | Each Body Package Includes: | Qty. | Qty. | Qty. | Qty. |
| 42912180 | 10 Ft. Tube with 12 Hole Flange (Aluminized) | 1 | 1 | - | - |
| 42912169 | 10 Ft. Tube with 6 Hole Flange (Alumi-Therm) | - | - | 1 | 1 |
| 41932101 | 10 Ft. Tube less Flanges (Hot Rolled) | 1 | 1 | 3 | 3 |
| 41932051 | 5 Ft. Tube less Flanges (Hot Rolled) | - | 2 | - | 2 |
| 43319100 | Reflector, 9' 11½" | 2 | 2 | 4 | 4 |
| 43319050 | Reflector, 4' 11½" | - | 2 | - | 2 |
| 30462980 | Tube Coupling | 1 | 3 | 3 | 5 |
| 43318000 | Tube Hanger/Support Bracket, 13" | 2 | 4 | 4 | 6 |
| 43980010 | Wire Hanger | 2 | 4 | 4 | 6 |

| Body Fastener Kit (included in body packages) | | 42907190 | 42907210 | 42907210 | 42907221 |
|---|---|---|---|---|---|
| 42873000 | U-Bolt | 2 | 4 | 4 | 6 |
| 02127110 | Hex Nut, 5/16-18 | 5 | 8 | 8 | 13 |
| 02189020 | HWHSM Screw, #10-16 x ½" TEKS | 8 | 14 | 14 | 24 |

| U-Bend Package | | 43208020 | 43208020 | 43208020 | 43208020 |
|---|---|---|---|---|---|
| 42913020 | U-Bend | 1 | 1 | 1 | 1 |
| 43318500 | 31" Tube Support/Hanger Bracket | 1 | 1 | 1 | 1 |
| 30462980 | Tube Coupling | 1 | 1 | 1 | 1 |
| 02189020 | HWHSM Screw, #10-16 x ½" TEKS | 2 | 2 | 2 | 2 |

| Systems | | 60Ft. System | | 70Ft. System | |
|---|---|---|---|---|---|
| SPU Body Packages – Alumi-Therm/Hot Rolled | | 40 Ft. Pkg 44137100 | 20 Ft. Pkg 44135010 | 40 Ft. Pkg. 44137120 | 30 Ft. Pkg 44136040 |
| Part # | Each Body Package Includes: | Qty. | Qty. | Qty. | Qty. |
| 42912169 | 10 Ft. Tube with 6 Hole Flange (Alumi-Therm) | 1 | - | 1 | - |
| 41932101 | 10 Ft. Tube less Flanges (Hot Rolled) | 3 | 2 | 2 | 3 |
| 41932051 | 5 Ft. Tube less Flanges (Hot Rolled) | - | - | 2 | - |
| 43319100 | Reflector, 9' 11½" | 4 | 2 | 3 | 3 |
| 43319050 | Reflector, 4' 11½" | - | - | 2 | - |
| 30462980 | Tube Coupling | 3 | 2 | 4 | 3 |
| 43318000 | Tube Hanger/Support Bracket, 13" | 4 | 2 | 5 | 3 |
| 43980010 | Wire Hanger | 4 | 2 | 5 | 3 |

| Body Fastener Kit (included in body packages) | | 42907210 | 42907190 | 42907220 | 42907200 |
|---|---|---|---|---|---|
| 42873000 | U-Bolt | 4 | 2 | 5 | 3 |
| 02127110 | Hex Nut, 5/16-18 | 8 | 5 | 10 | 6 |
| 02189020 | HWHSM Screw, #10-16 x ½" TEKS | 14 | 8 | 18 | 10 |

| U-Bend Package | | 43208020 | 43208020 |
|---|---|---|---|
| 42913020 | U-Bend | 1 | 1 |
| 43318500 | 31" Tube Support/Hanger Bracket | 1 | 1 |
| 30462980 | Tube Coupling | 1 | 1 |
| 02189020 | HWHSM Screw, #10-16 x ½" TEKS | 2 | 2 |

## E. SPU 40-200 Series Body Package Descriptions – ALC Option (Aluminized Calorized)

*(Package Part Number is indicated on the outside of each corresponding carton.)*

| Systems | | 20Ft. System | 30Ft. System | 40Ft. System | 50Ft. System |
|---|---|---|---|---|---|
| SPU Body Packages – Aluminized/Aluminized or Alumi-Therm/Aluminized | | 20 Ft. pkg 44135020 | 30 Ft. pkg 44136030 | 40 Ft. pkg 44137090 | 50 Ft. pkg 44138090 |
| Part # | Each Body Package Includes: | Qty. | Qty. | Qty. | Qty. |
| 42912180 | 10 Ft. Tube with 12 Hole Flange (Aluminized) | 1 | 1 | - | - |
| 42912169 | 10 Ft. Tube with 6 Hole Flange (Alumi-Therm) | - | - | 1 | 1 |
| 41932100 | 10 Ft. Tube less Flanges (Aluminized) | 1 | 1 | 3 | 3 |
| 41932050 | 5 Ft. Tube less Flanges (Aluminized) | - | 2 | - | 2 |
| 43319100 | Reflector, 9' 11½" | 2 | 2 | 4 | 4 |
| 43319050 | Reflector, 4' 11½" | - | 2 | - | 2 |
| 30462980 | Tube Coupling | 1 | 3 | 3 | 5 |
| 43318000 | Tube Hanger/Support Bracket, 13" | 2 | 4 | 4 | 6 |
| 43980010 | Wire Hanger | 2 | 4 | 4 | 6 |

| Body Fastener Kit (included in body packages) | | 42907190 | 42907210 | 42907210 | 42907221 |
|---|---|---|---|---|---|
| 42873000 | U-Bolt | 2 | 4 | 4 | 6 |
| 02127110 | Hex Nut, 5/16-18 | 5 | 8 | 8 | 13 |
| 02189020 | HWHSM Screw, #10-16 x ½" TEKS | 8 | 14 | 14 | 24 |

| U-Bend Package | | 43208020 | 43208020 | 43208020 | 43208020 |
|---|---|---|---|---|---|
| 42913020 | U-Bend | 1 | 1 | 1 | 1 |
| 43318500 | 31" Tube Support/Hanger Bracket | 1 | 1 | 1 | 1 |
| 30462980 | Tube Coupling | 1 | 1 | 1 | 1 |
| 02189020 | HWHSM Screw, #10-16 x ½" TEKS | 2 | 2 | 2 | 2 |

| | | 60Ft. System | | 70Ft. System | |
|---|---|---|---|---|---|
| SPU Body Packages – Alumi-Therm/Aluminized | | 40 Ft. Pkg 44137090 | 20 Ft. Pkg 44135030 | 40 Ft. Pkg. 44137110 | 30 Ft. Pkg 44136050 |
| Part # | Each Body Package Includes: | Qty. | Qty. | Qty. | Qty. |
| 42912169 | 10 Ft. Tube with 6 Hole Flange (Alumi-Therm) | 1 | - | 1 | - |
| 41932100 | 10 Ft. Tube less Flanges (Aluminized) | 3 | 2 | 2 | 3 |
| 41932050 | 5 Ft. Tube less Flanges (Aluminized) | - | - | 2 | - |
| 43319100 | Reflector, 9' 11½" | 4 | 2 | 3 | 3 |
| 43319050 | Reflector, 4' 11½" | - | - | 2 | - |
| 30462980 | Tube Coupling | 3 | 2 | 4 | 3 |
| 43318000 | Tube Hanger/Support Bracket, 13" | 4 | 2 | 5 | 3 |
| 43980010 | Wire Hanger | 4 | 2 | 5 | 3 |

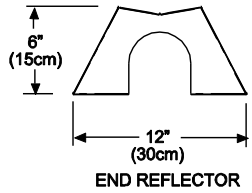
| Body Fastener Kit (included in body packages) | | 42907210 | 42907190 | 42907220 | 42907200 |
|---|---|---|---|---|---|
| 42873000 | U-Bolt | 4 | 2 | 5 | 3 |
| 02127110 | Hex Nut, 5/16-18 | 8 | 5 | 10 | 6 |
| 02189020 | HWHSM Screw, #10-16 x ½" TEKS | 14 | 8 | 18 | 10 |

| U-Bend Package | | 43208020 | 43208020 |
|---|---|---|---|
| 42913020 | U-Bend | 1 | 1 |
| 43318500 | 31" Tube Support/Hanger Bracket | 1 | 1 |
| 30462980 | Tube Coupling | 1 | 1 |
| 02189020 | HWHSM Screw, #10-16 x ½" TEKS | 2 | 2 |

## 6.1) ACCESSORY PACKAGES

**A. <u>End Reflector Accessory Package, Part #43341000</u>**
*(1 pkg. per SPS Series or 2 pkgs. per SPU Series)*

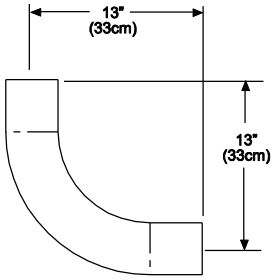
*Contains:*
End Reflector, #43320000.....QTY–2
Speed Clips, #02266010.....QTY–8



END REFLECTOR

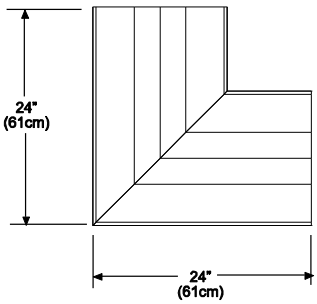
**B. <u>Elbow Accessory Package, Part #43208010</u>**
*(Option for SPS Series Only)*

*Contains:*
Elbow, #43175000.....QTY–1
#10-16 x ½ Self-Drilling Screws, #02189020.....QTY–2
Tube Coupling, #30462980.....QTY–1



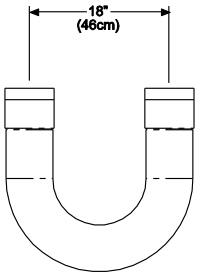

**C. <u>Corner Reflector Accessory Package, Part #43342000</u>**
*(Option for SPS Series Only)*

*Contains:*
Corner Reflector Assembly, #43345000.....QTY–1
Speed Clips, #02266010.....QTY–4




**D. <u>U-Bend Package, Part #43208020</u>**
*(Option for SPU Series Only)*

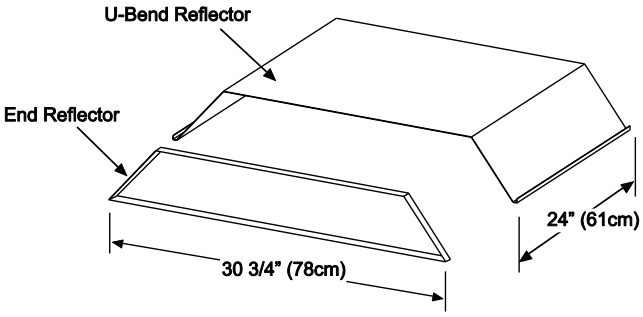
*Contains:*
U-Bend, #42913020.....QTY–1
#10-16 x ½ Self-Drilling Screws, #02189020.....QTY–2
Tube Coupling, #30462980.....QTY–1
31" Tube Support/Hanger Bracket,
#43318500.....QTY–1



## E. U-Bend Reflector Package, Part #43488000

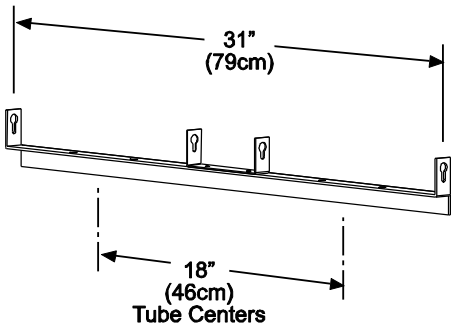
*(Option for SPU Series Only)*

*Contains:*
U-Bend Reflector, #43490000.....QTY–1
U-Bend End Reflector, #43490050.....QTY–1
Speed Clips, #02266010.....QTY–11
#10-16 x ½ Self-Drilling Screws, #02189020.....QTY–4
Installation Form, #43489000.....QTY-1



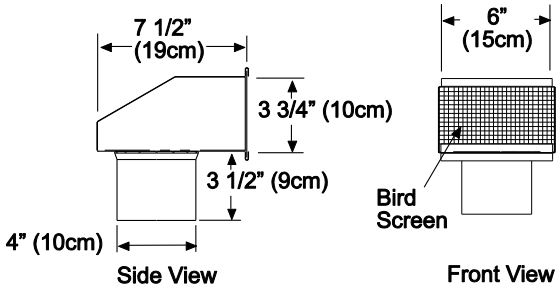

## F. 31" Hanger/Tube Support, Part #43318500

*(Option for Angle Mounting of SPU Series)*



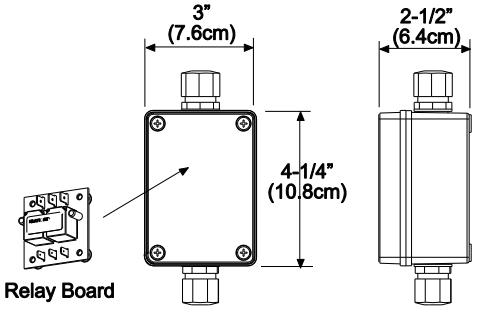

## G. Exhaust Hood Package, Part #42924000

*Contains:*
Exhaust Hood Assembly, #42925540.....QTY–1
#8-18 x ½ Self-Drilling Screws, #02189030.....QTY–2

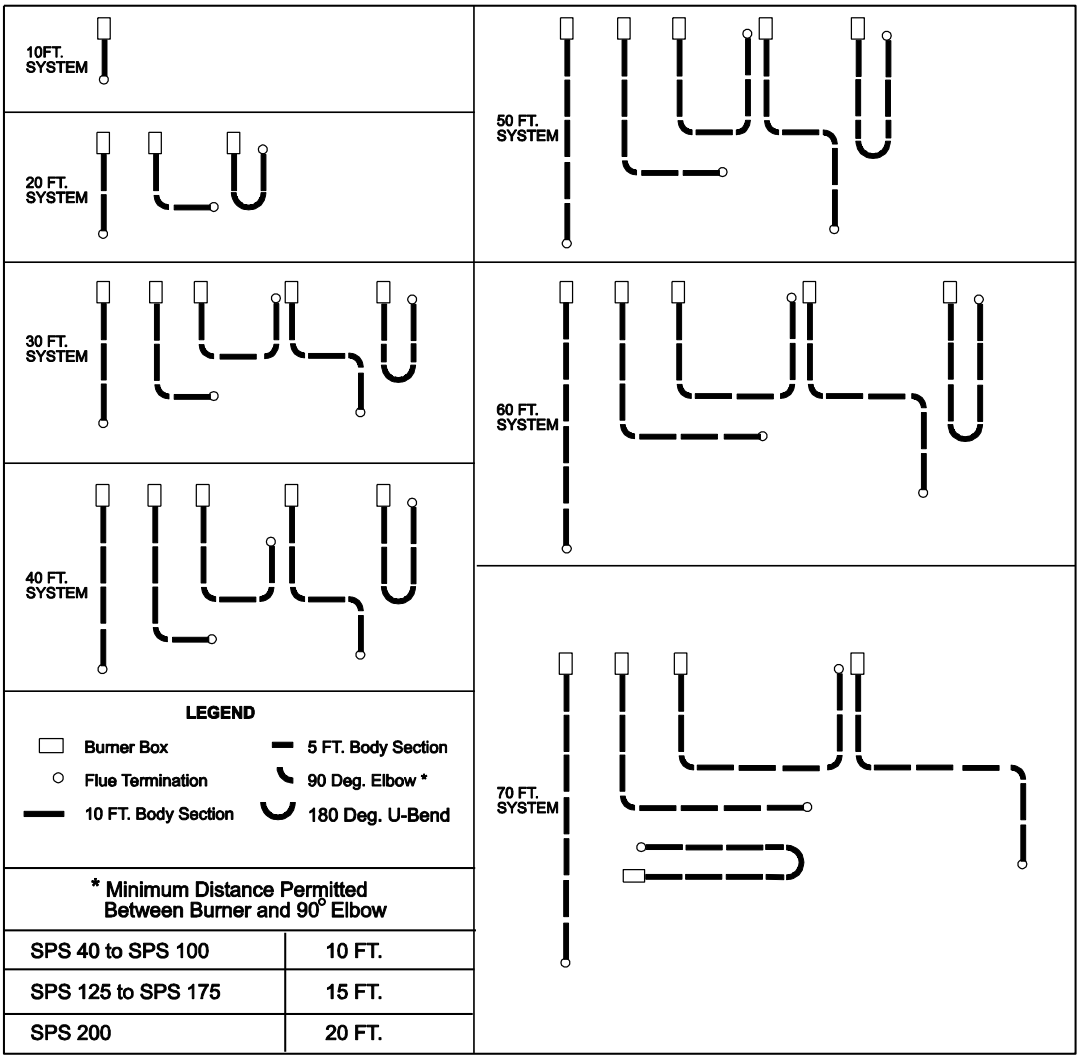



## H. Kit, 2-Stage Relay Board, Part #44195000

*Contains:*
Relay Board , #30709058.....QTY–1
Enclosure, #30709059.....QTY–1
Cord Connector – ½" , #30635040.....QTY–2



# 7.0) TYPICAL LAYOUTS – SPS/SPU SERIES




| * Minimum Distance Permitted Between Burner and 90° Elbow | |
|---|---|
| SPS 40 to SPS 100 | 10 FT. |
| SPS 125 to SPS 175 | 15 FT. |
| SPS 200 | 20 FT. |

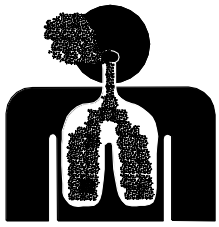
| MODEL | EMITTER LENGTH | | MODEL | BODY LENGTH | |
|---|---|---|---|---|---|
| | Min. | Max. | | Min. | Max. |
| SPS 40 | 10 Ft. | 20 Ft. | SPU 40 | 10 Ft. | 10 Ft. |
| SPS 50 | 20 Ft | 40 Ft. | SPU 50 | 10 Ft. | 20 Ft. |
| SPS 60 | 20 Ft | 40 Ft. | SPU 60 | 10 Ft. | 20 Ft. |
| SPS 75 | 20 Ft. | 40 Ft. | SPU 75 | 10 Ft. | 20 Ft |
| SPS 100 | 30 Ft. | 50 Ft. | SPU 100 | 15 Ft. | 25 Ft. |
| SPS 125 | 30 Ft | 60 Ft. | SPU 125 | 15 Ft. | 30 Ft. |
| SPS 150 | 40 Ft. | 60 Ft. | SPU 150 | 20 Ft. | 30 Ft. |
| SPS 175 | 50 Ft. | 70 Ft. | SPU 175 | 25 Ft. | 35 Ft. |
| SPS 200 | 50 Ft. | 70 Ft. | SPU 200 | 25 Ft. | 35 Ft. |

**NOTES:**

1. In all configurations, the control unit must be connected directly to either a) the 12-radial hole flange of the 10 ft. aluminized steel starting body section (for 10 ft., 20 ft., and 30 ft. systems) or b) the 6-hole flange of the 10 ft. alumi-therm steel starting body section (for 40 ft., 50 ft., 60 ft., and 70 ft. systems).
2. Joining of two 90° elbows directly together to form a "Z" shape IS NOT permitted.
3. SPS / U 175 - 40 ft length available for special applications.
4. 5 Ft. Body Packages may be utilized on any of these heaters to yield heater lengths from 15 ft. to 70 ft.
5. Any configuration of components not shown in the illustrations may be used except as noted in 1 and 2 above.

## 7.1) TYPICAL ASSEMBLY LAYOUT – (SPS SHOWN)

**⚠ WARNING**

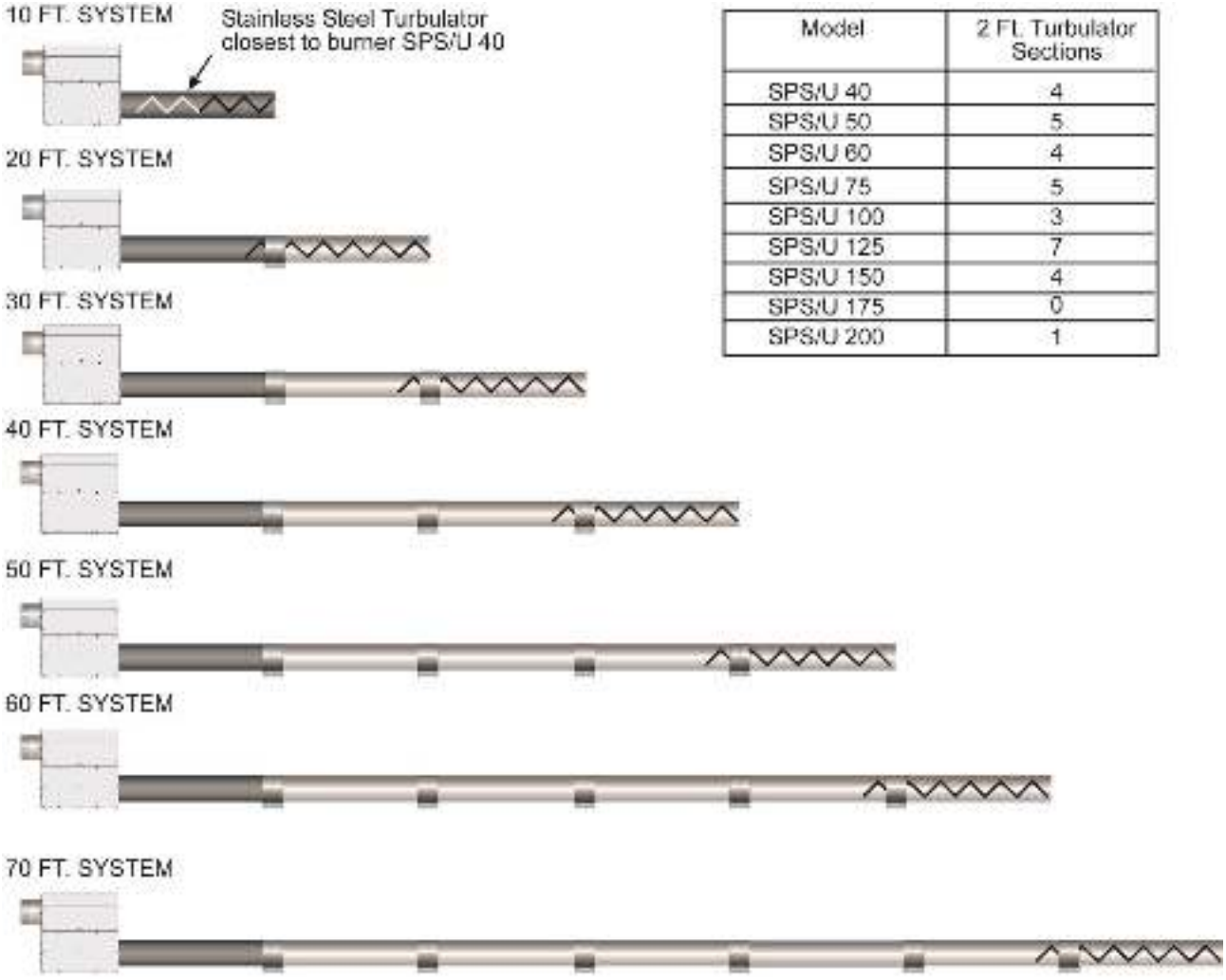


**POISONOUS GAS AND SOOT HAZARD**

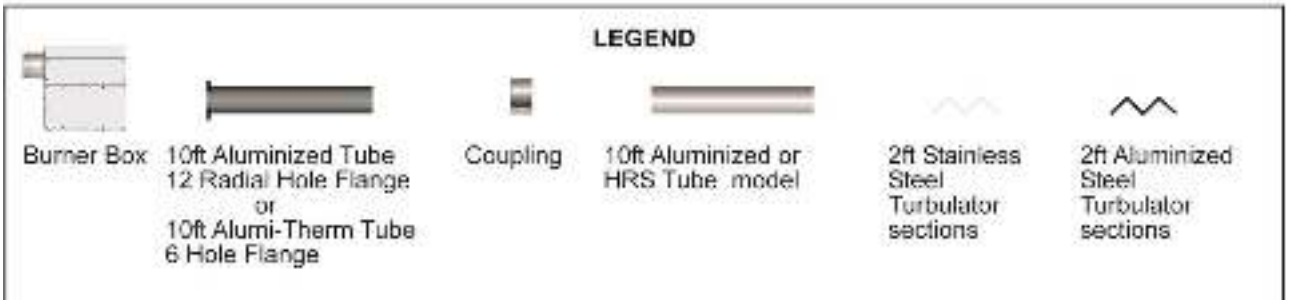
The heater must be assembled with the correct number of turbulator sections and tube length for the rated heat input.

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.

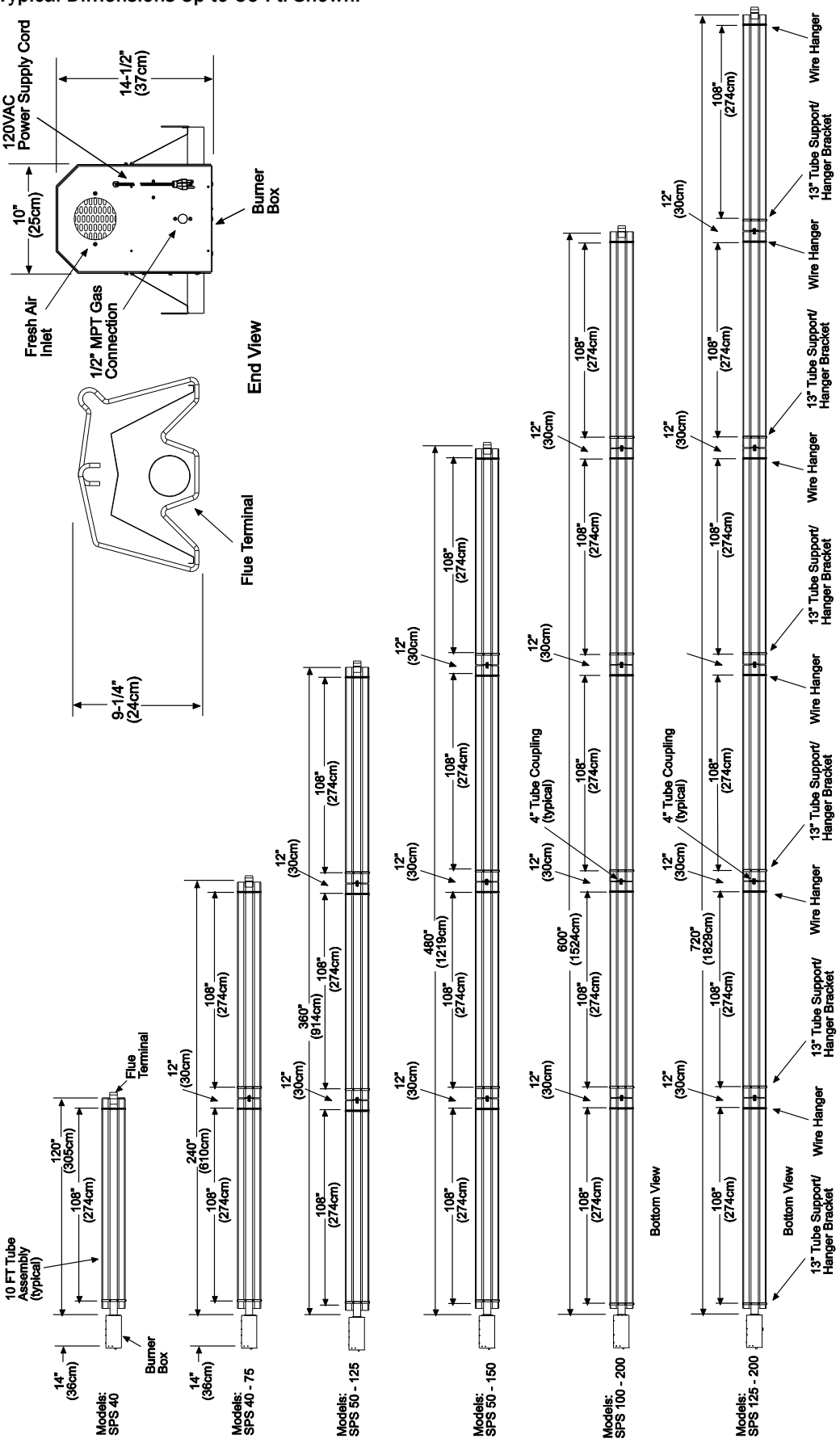



| Model | 2 Ft. Turbulator Sections |
|---|---|
| SPS/U 40 | 4 |
| SPS/U 50 | 5 |
| SPS/U 60 | 4 |
| SPS/U 75 | 5 |
| SPS/U 100 | 3 |
| SPS/U 125 | 7 |
| SPS/U 150 | 4 |
| SPS/U 175 | 0 |
| SPS/U 200 | 1 |



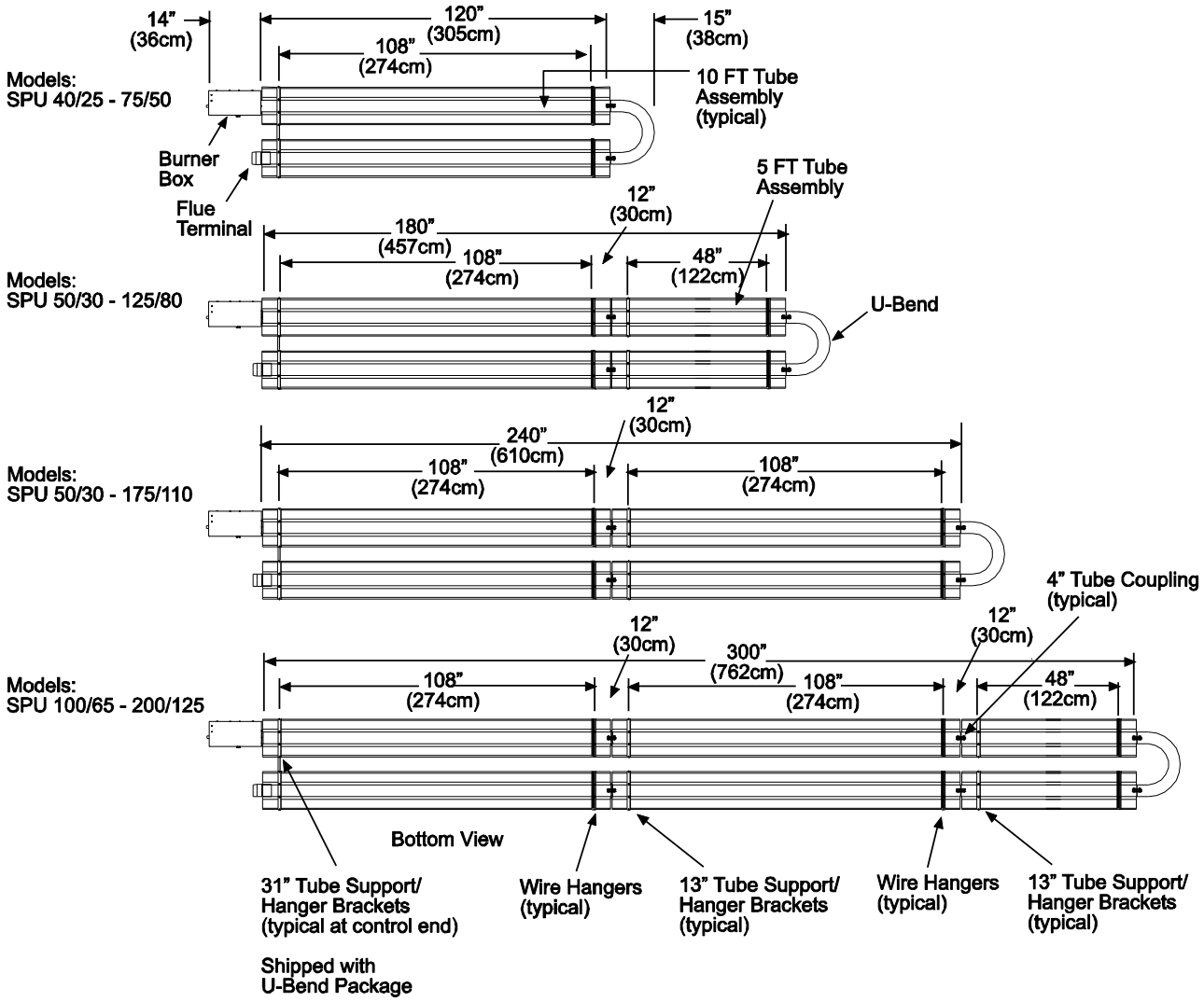
# 8.0) DIMENSIONS – SPS SERIES

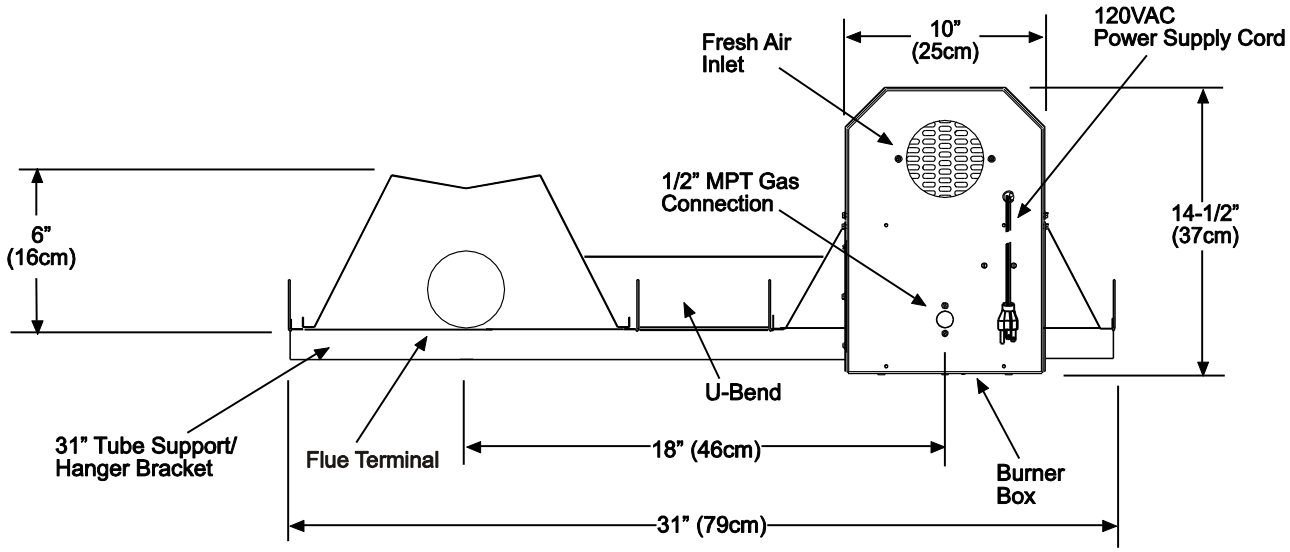
Typical Dimensions Up to 60 Ft. Shown.



## 8.1) DIMENSIONS – SPU SERIES

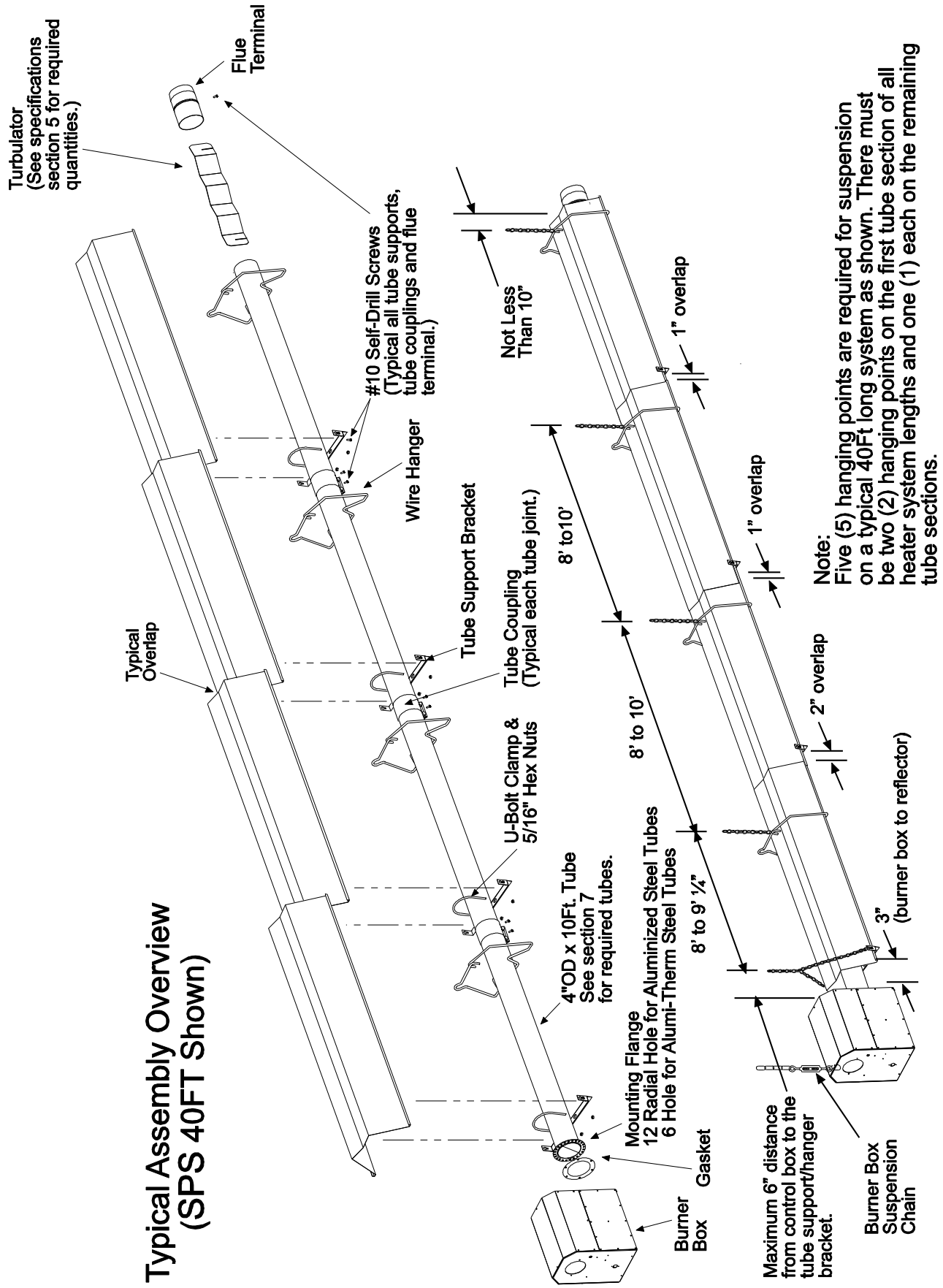
Typical Dimensions Up to 50 Ft. Shown.



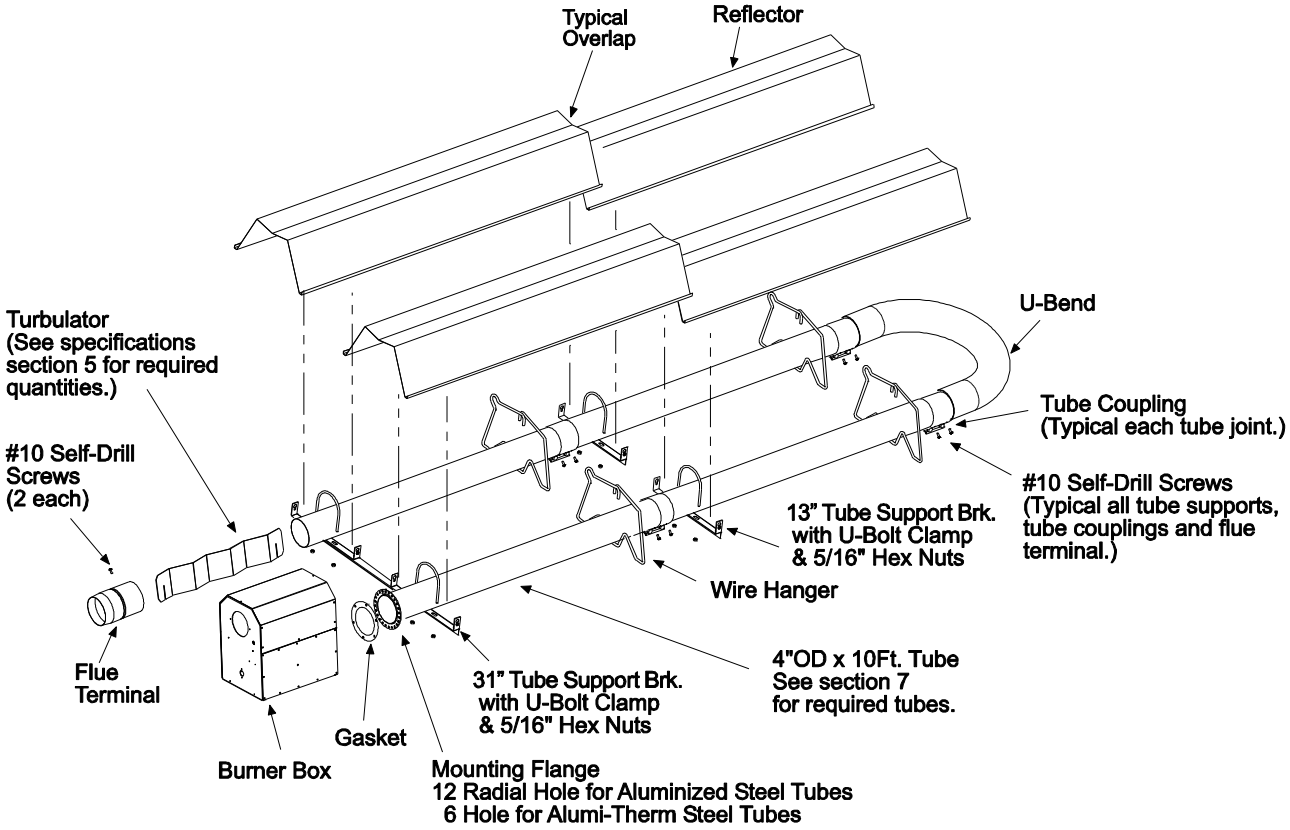



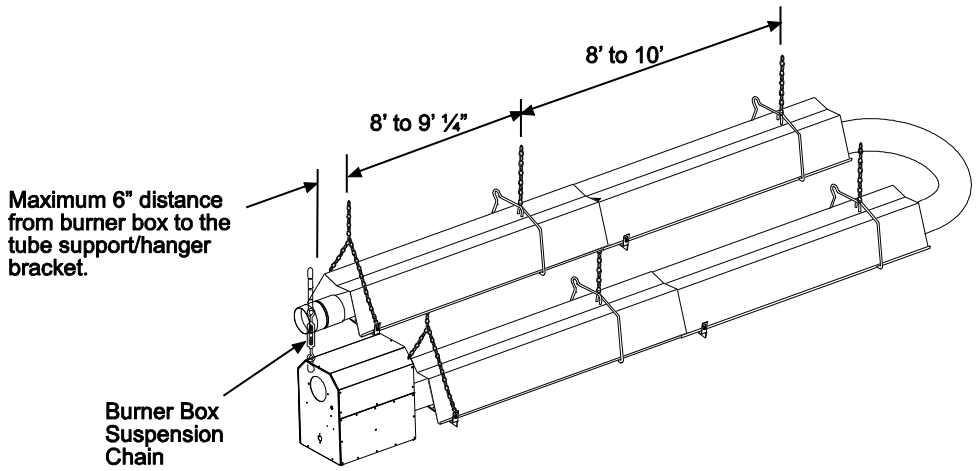

End View

## 8.2) HEATER ASSEMBLY / JOINING OF TUBE SECTIONS



# Typical Assembly Overview
# (SPU 40FT Shown)

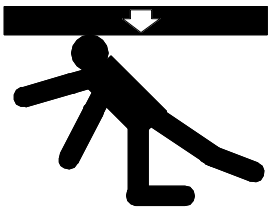



6 hanging points to be used for suspension for a typical 40ft long system. There must be two hanging points on the first tube and one on each of the other tubes

## 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.

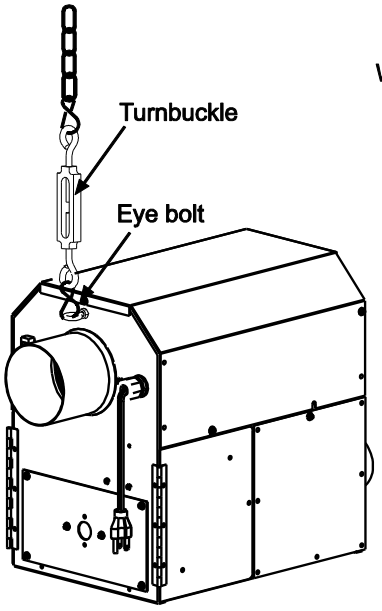
1. Use only noncombustible materials for suspending hangers and brackets.
2. A minimum No. 2 chain with a working load limit of 115 lbs. is required.
3. Turnbuckles can be used with chains to allow leveling of the heater. All "S" hooks and eye bolts must be manually crimped closed by the installer.
4. When using rigid means for heater suspension (rod, flat bar, etc.) provide sufficient lengths or swing joints to compensate for expansion. See Figures b and c.
5. Heaters subject to vibration must be provided with vibration isolating hangers.
6. Heaters must not be supported by gas or electric supply lines and must be suspended from a permanent structure with adequate load capacity.

SunStar recommends that the body sections be suspended using chains with turnbuckles. This will allow slight adjustments after assembly and heater expansion/ contraction during operation.

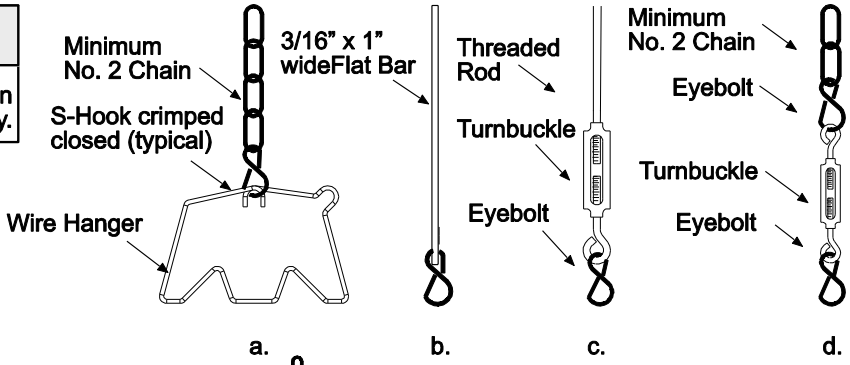
If a "trapeze" method is used for tube support/hanger brackets (shown below), the minimum chain length for the two connecting chains is 36" to minimize any vibration that might be generated by the burner box. If these chains must be less than 36", then do not use the trapeze method and, instead, use individual chains on each tube support/hanger bracket.

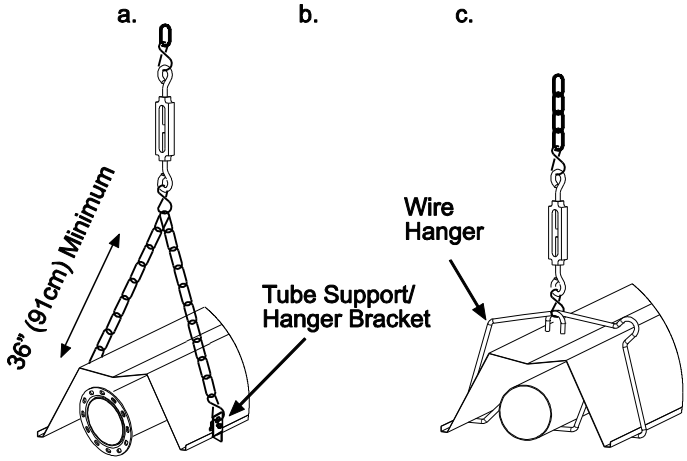
**⚠ CAUTION**

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




Burner Box Suspension



## 9.3) ANGLE MOUNTING OF HEATERS

1. Angle mounting can be accomplished by shortening one length of the chain to achieve the desired angle or using notched section of the wire hanger for angle mounting.

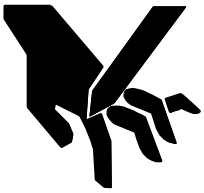
**⚠ CAUTION**

Angle mounting can result in up to 30 % lower radiant output on the floor level and result in lower tube temperatures when compared to horizontal mounting. Angle mounting of straight tubes for spot or area heating (e.g. where a single heater is used for space heating) is not recommended unless you have additional capacity or larger heaters specified/installed. If you are using straight tube heaters, you might have to install two smaller size tube heaters with burners located at opposite ends, to provide more uniform energy distribution and improved comfort level on the floor. Consult your Sunstar Representative if you have any questions prior to the installation concerning particulars of your application.

2. Based on the location of the wire hangers and spacing between the suspension points, it might be necessary to use additional tube support brackets to support the reflector system. Please order additional Tube Hanger Support Bracket (#43318000), U-bolt (#42873000), and 2 pieces of Hex Nut (#02127110) for each 10 ft. length of emitter tube.

## 10.0) ASSEMBLY OF TUBE SECTIONS

**⚠ CAUTION**



CUT HAZARD

Sheet metal parts, particularly reflectors and vent have sharp edges. Always use gloves when handling.

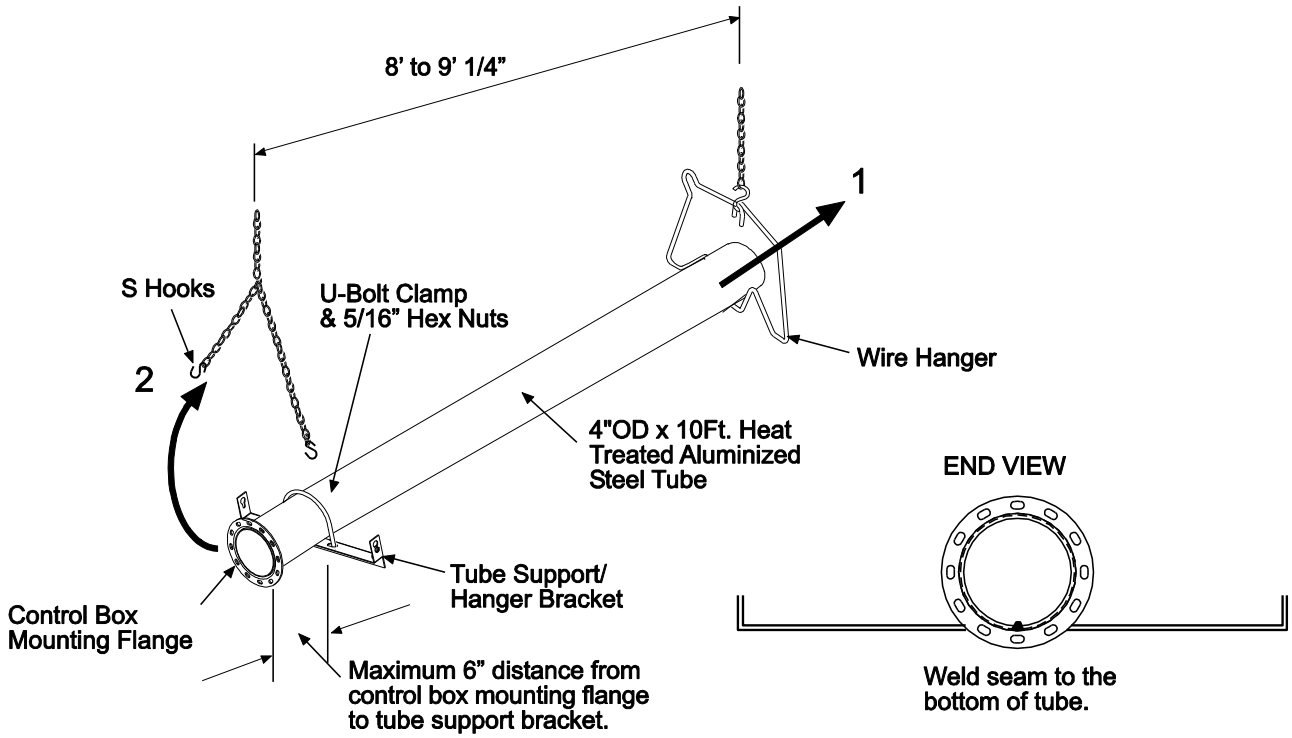
Failure to do so may result in death, serious injury or property damage.

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

1. Before hanging heater sections, first determine the actual layout of the system (see Sections 7.0) & 8.0) for details). 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).
2. Hang each tube section individually. DO NOT attach the heater tube sections together on the ground and attempt to hang the entire system.
3. In all configurations, the burner box must be connected directly to either a) the 12-radial hole flange of the 10 ft. aluminized steel starting body section (for 10 ft., 20 ft., and 30 ft. systems) or b) the 6-hole flange of the 10 ft. alumi-therm steel starting body section (for 40 ft., 50 ft., 60 ft., and 70 ft. systems.
4. Assemble a tube support/hanger bracket 4" from the end of the heat exchanger tube having the mounting flange. Align the tube such that the welded seam is facing down toward the ground.

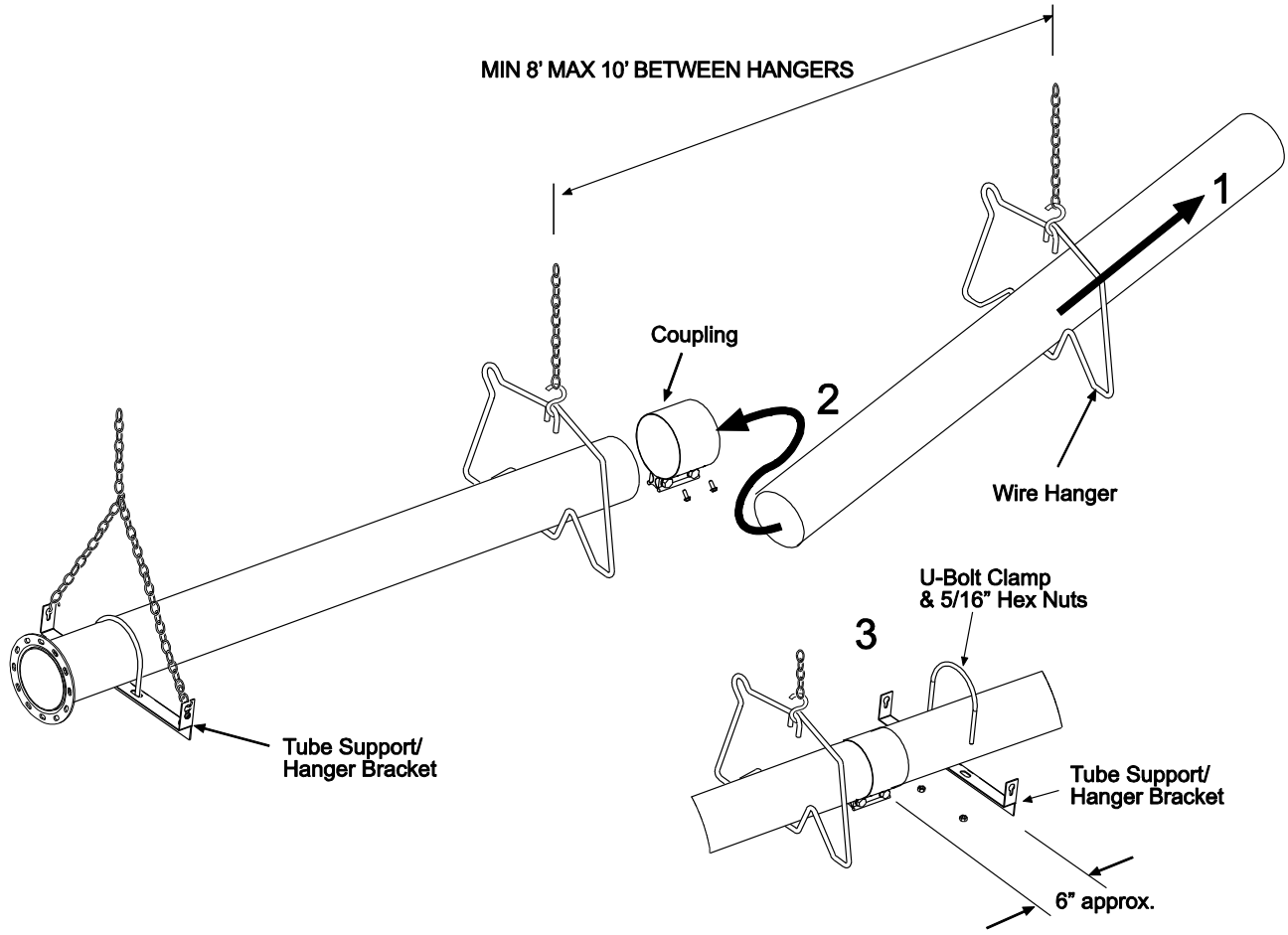
**⚠ CAUTION**

**Failure to assemble the tube with the seam facing down and installing the first tube support/hanger bracket more than 6" from the burner box will VOID the manufacturer' warranty.**




5. Suspend the chain to attach the wire hanger and the tube support bracket. Insert the tube into the wire hanger and then raise the tube support bracket end up to the suspension chain, use "S" hooks to attach the wire hanger and tube support bracket to the chain.

## 10.4) ASSEMBLY OF EXTENSION SECTION



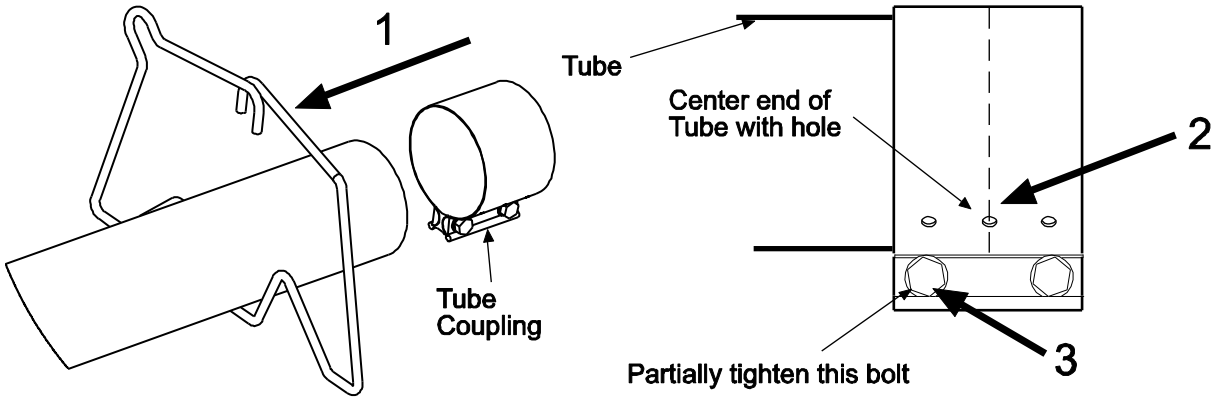
See typical assembly overview (Section 8.0)) for typical complete assembly. Assemble additional extension sections as required for all systems. (See Sections 7.0), and 8.0) for typical layout details.)

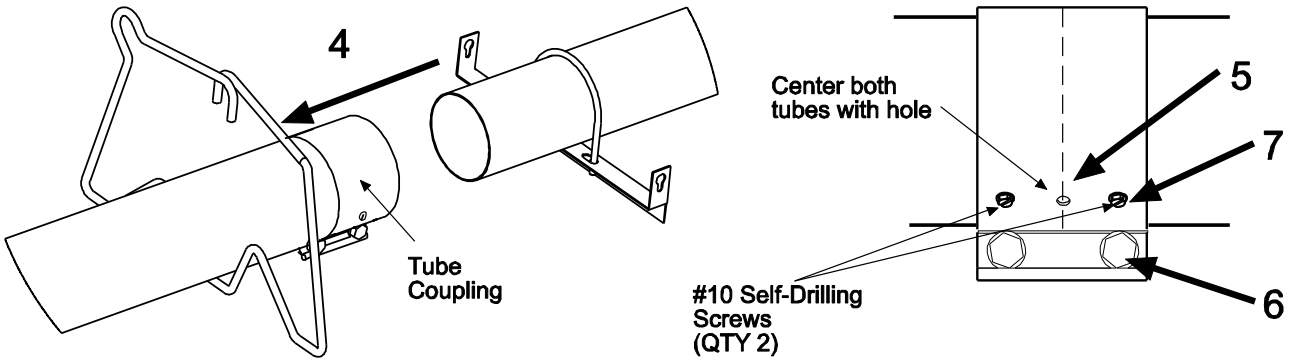
Join the tube sections together and secure with tube couplings as described below:

**⚠ WARNING**

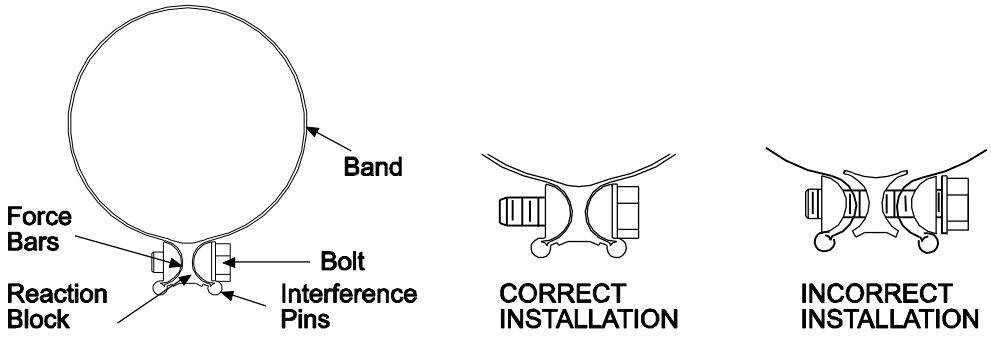
**The following coupling tightening instructions MUST be followed properly to ensure the integrity of the tube connections. Two #10 self-drilling screws MUST be installed at every coupling as shown in the instructions below. Failure to do so may result in serious injury or property damage.**

1. Place the compression coupling over the end of the tube.
2. Use the small hole at the centerline of the coupling to check that the coupling is inserted correctly.
3. Partially tighten the bolt nearest the end of the tube (approximately half closed).



4. Slide the next tube into the coupling.
5. Make sure both tube ends are butted together.
6. Finish tightening both bolts to 40-60 ft.lbs. torque to ensure a complete seal.
7. Use the two Self-drilling screws through the pre-punched holes to secure the tubes in the coupling.



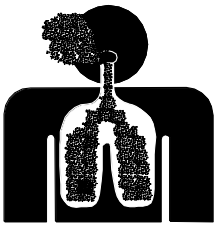

8. Check to ensure that the hardware is completely closed and the band is seated on the reaction block and interference pins as illustrated above.
9. Once all the heater body sections are attached, make sure that the heater system is level. If it is not, slight adjustments can be made using the turnbuckles. (See Section 9.0))

## ⚠ CAUTION

**Important: NEVER reuse a coupling.. Always install a new coupling only and torque as per instructions above and the diagrams below.**

## 10.5) INSERTING TURBULATORS

### ⚠ WARNING



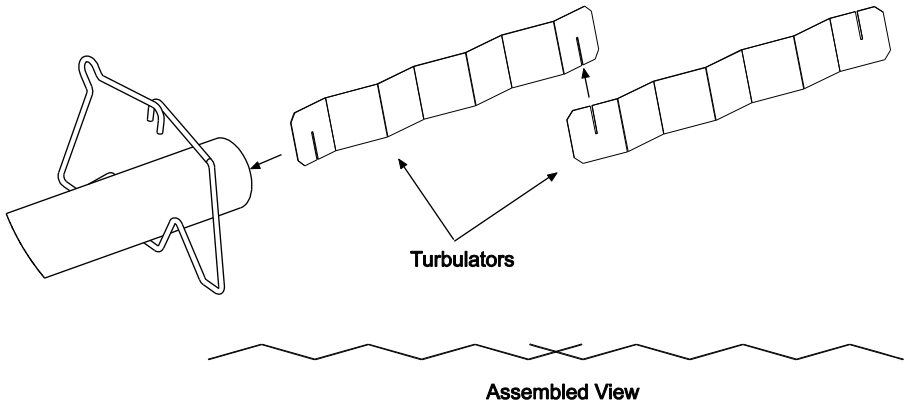
**POISONOUS GAS AND SOOT HAZARD**

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.

1. Assemble the turbulators together by interlocking the slotted end portions. Slide these into the last tube section until they are flush with the tube end. Note: Refer to the table below for quantities of turbulators required for each heater model.




Assembled View

| MODEL | 2 Ft. Turbulator Sections |
|---|---|
| SPS/U 40 | 4 |
| SPS/U 50 | 5 |
| SPS/U 60 | 4 |
| SPS/U 75 | 5 |
| SPS/U 100 | 3 |
| SPS/U 125 | 7 |
| SPS/U 150 | 4 |
| SPS/U 175 | 0 |
| SPS/U 200 | 1 |

**⚠ CAUTION**

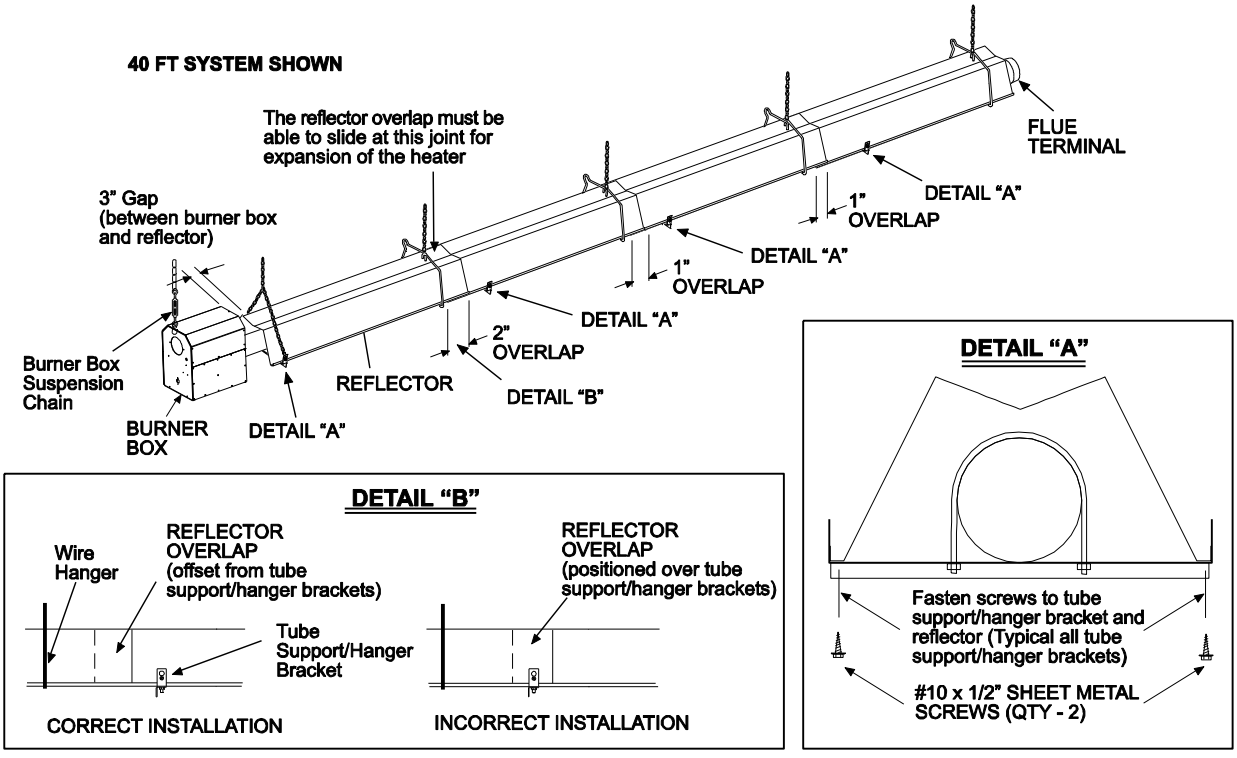
ASSEMBLY HAZARD

The SPS / U 40 has one stainless steel turbulator. This must be installed closest to the burner.

Failure to do so may result in deterioration of the turbulator material and invalidate the warranty.

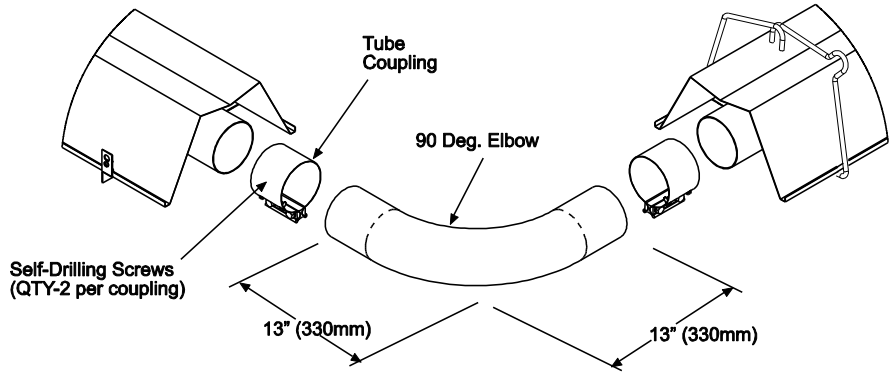
## 10.6) ADDING BODY REFLECTORS

1. Slide the reflectors on the tube support/hanger brackets and through the wire hangers.
2. The tube at the coupling joints must be covered. Slide the reflectors together and provide an overlap of two (2") inches for the first reflector overlap after the control unit. All remaining reflector overlaps will be approximately one (1") inch. This will allow for the natural expansion and contraction of the heater when in operation. **Note: The heaters can expand and contract up to 1-3/4".**
3. Secure the reflectors as shown in Detail "A" using #10 x 1/2" self-drilling sheet metal screws at each tube support/hanger bracket.



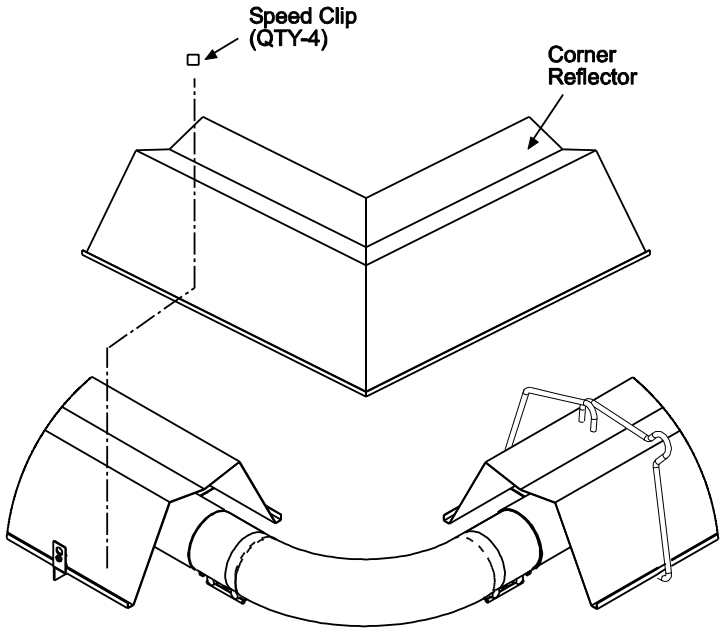
## 11.0) ADDING OPTIONAL 90º ELBOW (SPS ONLY)

1. The optional 90º elbow must be located a minimum of 10 ft. after the burner box.
2. Hang the body sections in a 90º ("L") shaped pattern. Allow spacing for the elbow. The distance from one end of the elbow to the centerline of the opposite leg is 13" as shown.
3. Join the tube ends of the body sections and the elbow together and secure with tube couplings as described in Section **Error! Reference source not found.**.



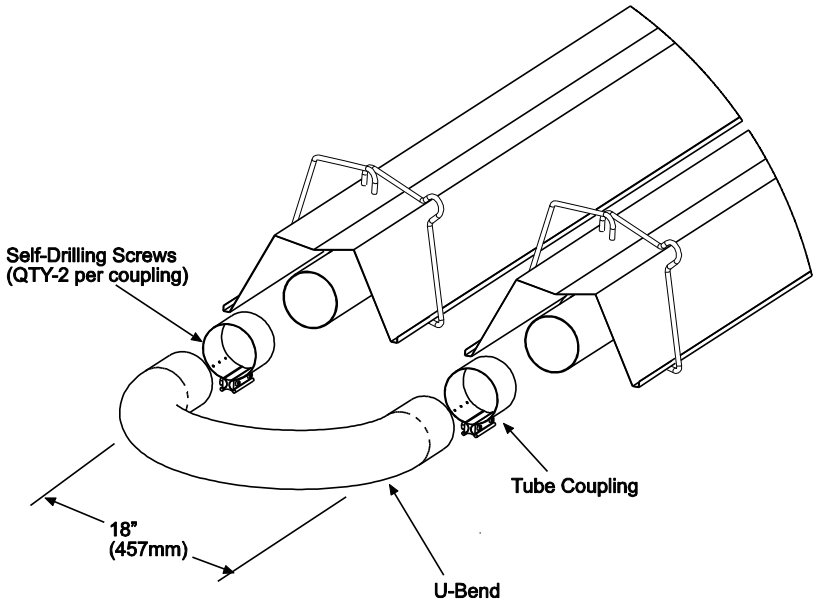

## 11.1) ADDING OPTIONAL CORNER REFLECTOR (SPS ONLY)

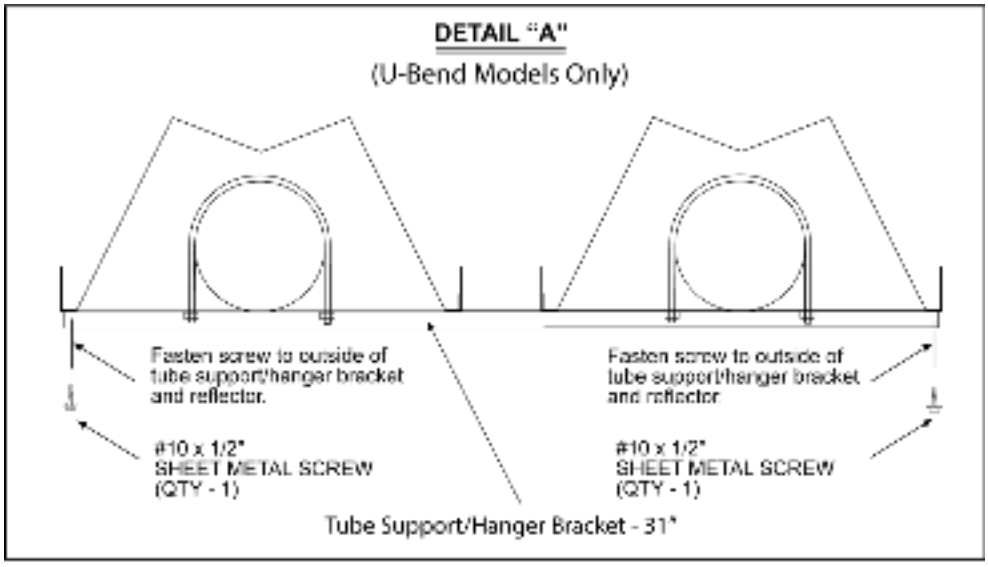
1. Place the corner reflector over the reflectors of both body sections.
2. Secure by sliding speed clips on the reflector edges. One speed clip is required for each side of reflector.
3. The corner reflector can be used only when the long axis of the heater is level and mounted in a horizontal position.



## 11.2) ADDING 180º U-BEND (SPU ONLY)

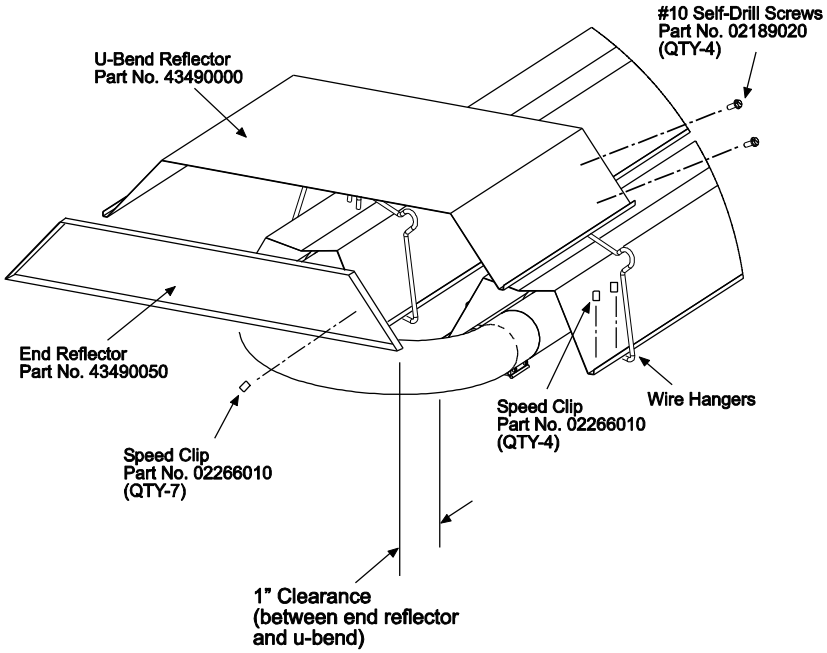
1. Hang body sections parallel with each other. The centerline distance from tube at each body section should be 18" as shown.
2. Join tube ends of body sections and the U-Bend together and secure with tube couplings as described in Section 10.1). Secure the reflectors as shown below in Detail "A" using #10 x ½ (4.8 x 13mm) self-drilling sheet metal screws at each tube support/hanger bracket.



## 11.3) ADDING OPTIONAL U-BEND REFLECTOR (SPU ONLY)

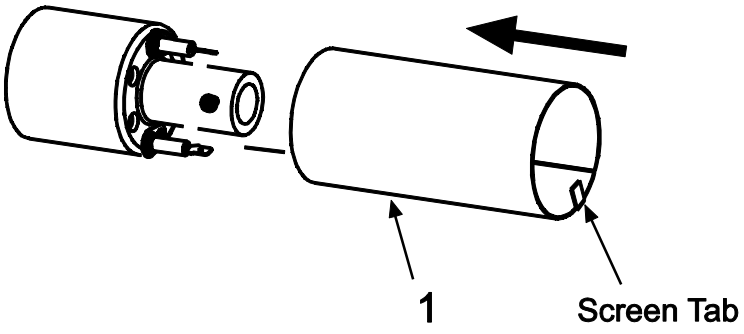
1. Place the **U-Bend Reflector** over the reflectors of each body section with the end resting next to the tube wire hangers as shown.
2. Slide the speed clips on the reflector edges towards the end of the body section reflectors. Two speed clips are required for each side of the **U-Bend Reflector**. Make sure that the speed clips fit tightly over both the **U-Bend Reflector** and the reflector on each body section. Use two self-drilling screws to permanently secure both sides to the reflectors.
3. Place the **End Reflector** flush with the **U-Bend Reflector** as shown. **Note:** Clearance between end of **the U-Bend Reflector** and the **U-Bend** must be a minimum of **1**". Secure by sliding speed clips onto the end reflector edges. Evenly space the speed clips on the sides (two each side) and top (three each) of the reflectors to provide a snug fit.

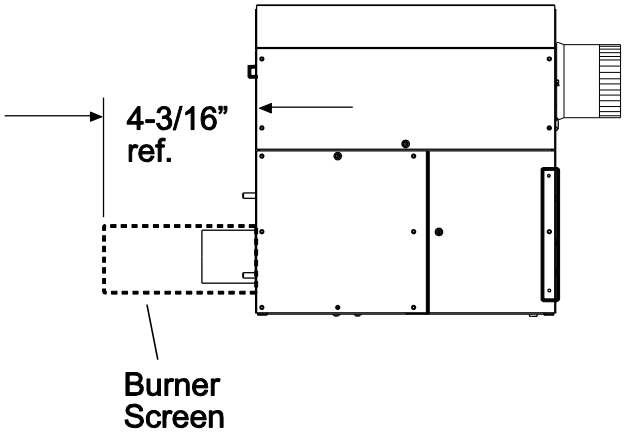



## 12.0) ATTACHING BURNER SCREEN – (200M BTU MODELS ONLY)

A burner screen is assembled with the burner. **If necessary,** the burner screen must be field adjusted as shown below before operation of the heater.

4. Pull burner screen forward from the gas manifold and slide screen over burner until the tab stops against the rear of the burner cup (approximately 4 - 3/16" from the burner box) as shown below.





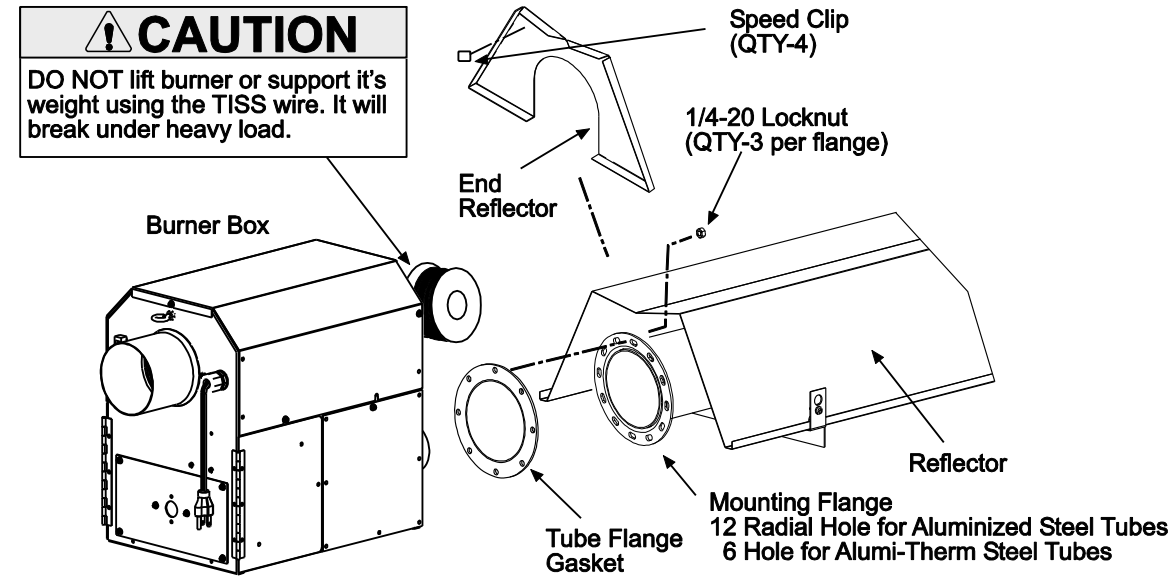

## 12.1) ATTACHING BURNER BOX ASSEMBLY

1. Attach the burner box and gasket to end of tube flange and secure with 1/4-20 locknuts.
2. Assemble the optional end reflector flush with the end of the main body reflector. Secure by sliding speed clips onto the reflector edges. Evenly space the speed clips on the sides (one each side) and top (two required) of the reflectors to provide a snug fit. Leave a 3" space between the end reflector and the burner box assembly.
3. The heater can be mounted **horizontally** or at an angle of up to **45 degrees** maximum from horizontal.

When angle mounting, the **burner** box unit **must** be positioned **upright** as shown below **Failure to install the control box in an UPRIGHT position will VOID the manufacturer's warranty.**

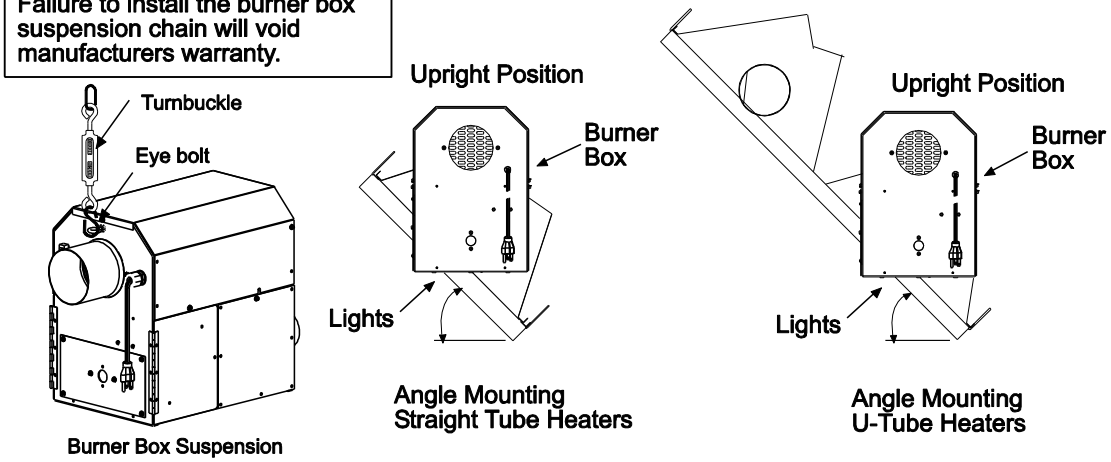
**⚠ CAUTION**

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.**

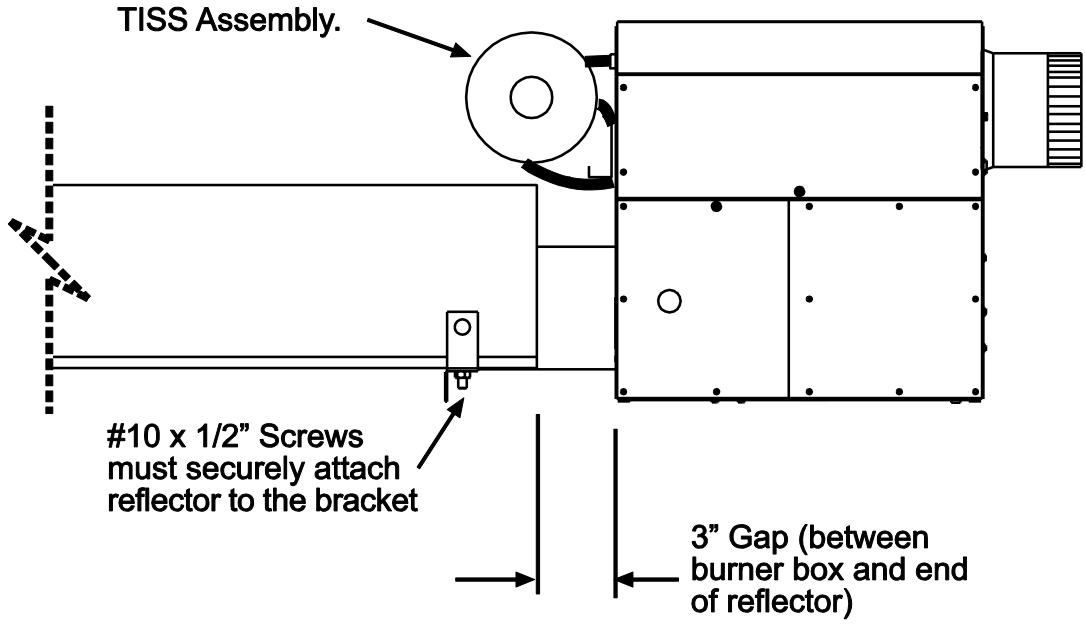
**Failure to install the burner box in an upright position and lights facing the floor will void the manufacturer's warranty.**

## 12.2) CONNECTING THE TISS SYSTEM

**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:**

1. Make sure that the gap between the burner box and end of reflector is 3" and the reflector is securely attached to the reflector support bracket. Make adjustments if necessary.

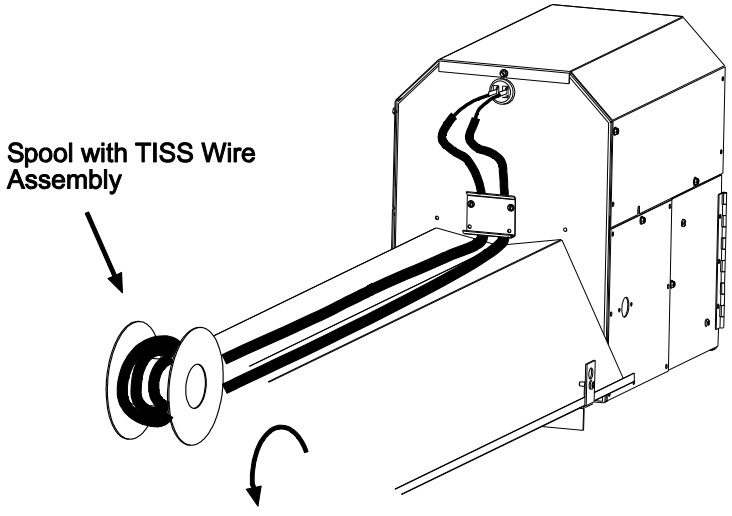



**Step 1**

## ⚠CAUTION

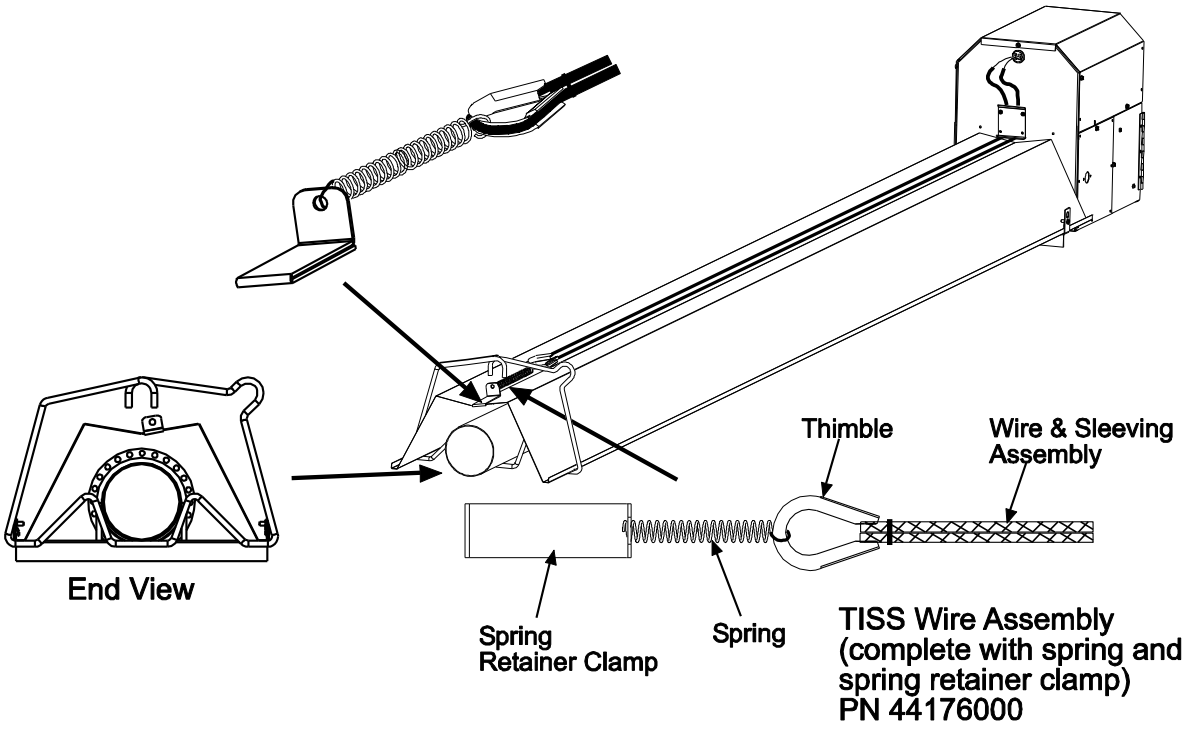
**Failure to maintain 3" gap as shown will result in pre-mature TISS wire failure.**

2. Un-roll the **TISS** wire assembly from the spool. Be careful not to kink the wires.



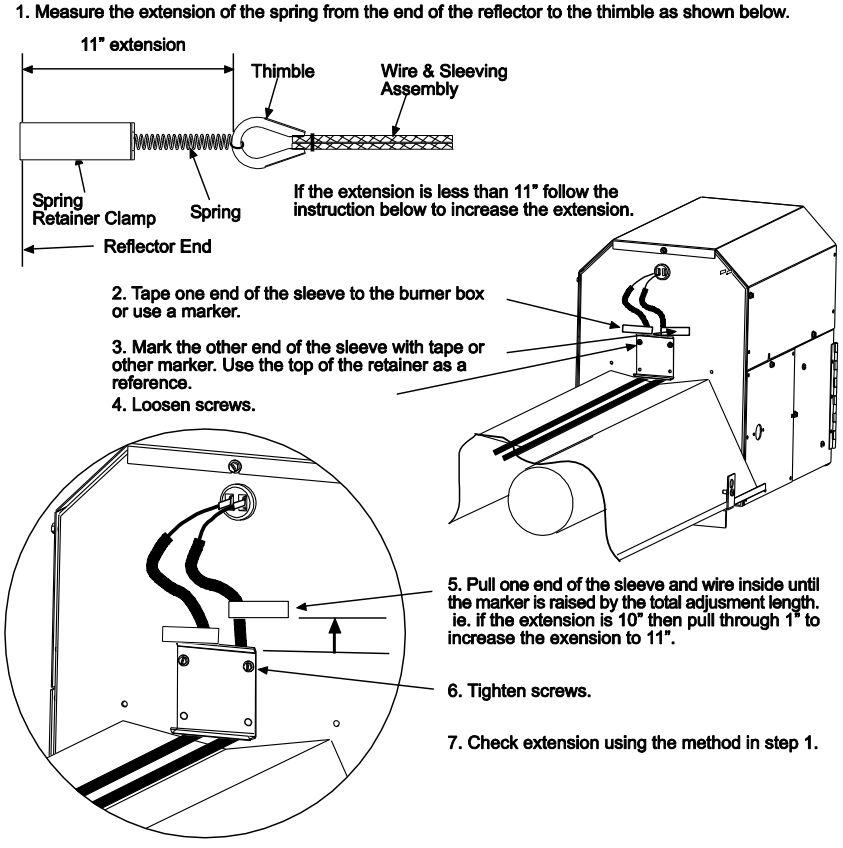

**Step 2**

3. 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

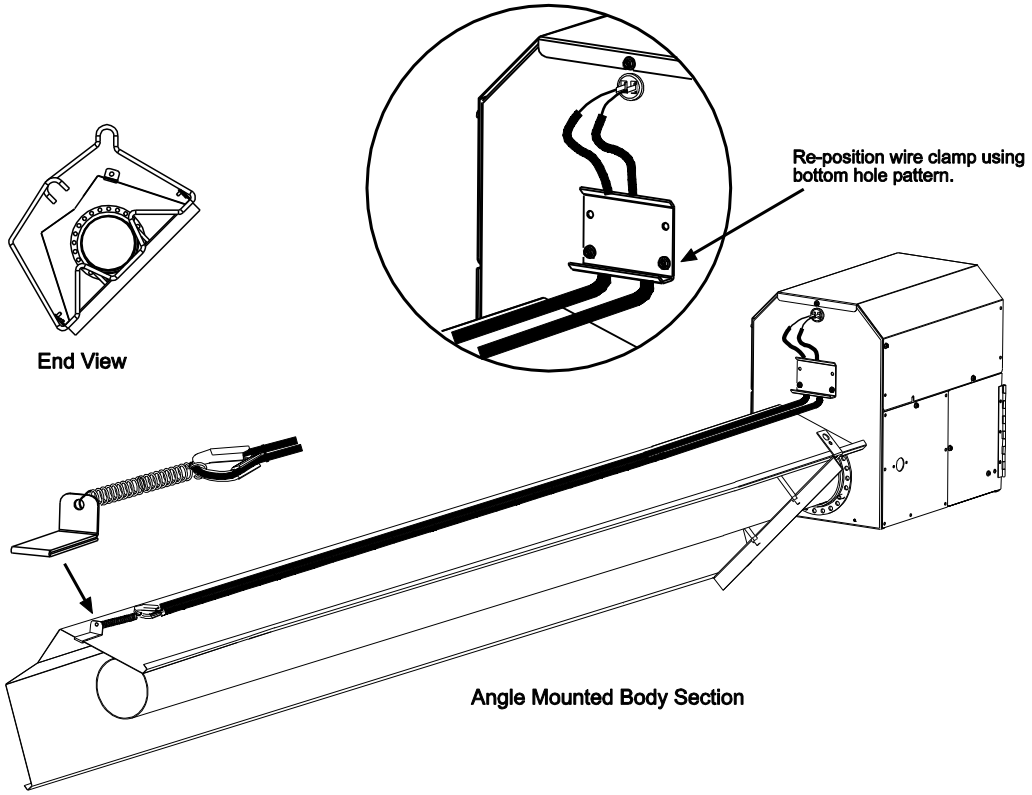
4. After attachment of the **TISS**, check to make sure that there is sufficient tension on the wire. **Follow the diagram below to increase or decrease the tension as necessary.**




## Step 4

## ANGLE MOUNTED HEATERS ONLY

5. If heaters are to be angle mounted, the TISS wire holder clamp must first be re-positioned as shown **using the bottom hole pattern** of the clamp. Follow procedures described earlier for all other adjustments.



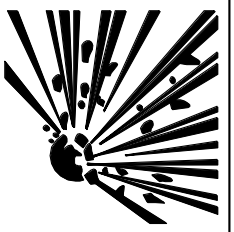

**Step 5**

## ⚠ CAUTION

**Failure to re-position the wire clamp at the bottom hole pattern will shorten the life expectancy of the TISS wire assembly.**

## 13.0) 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.

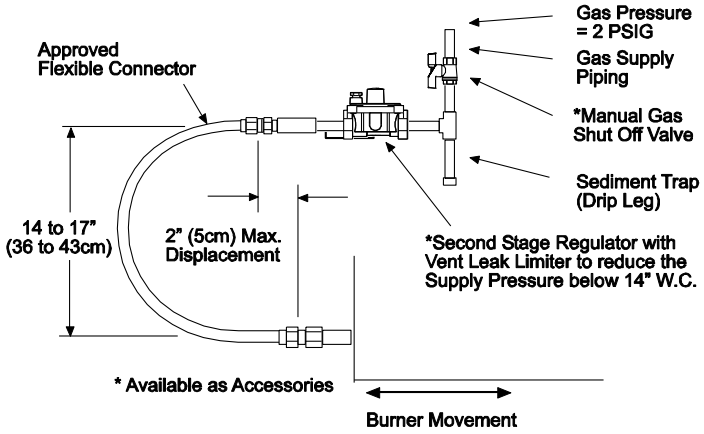
Failure to do so may result in death, serious injury or property damage.

**IMPORTANT BEFORE CONNECTING THE GAS TO THE HEATER**

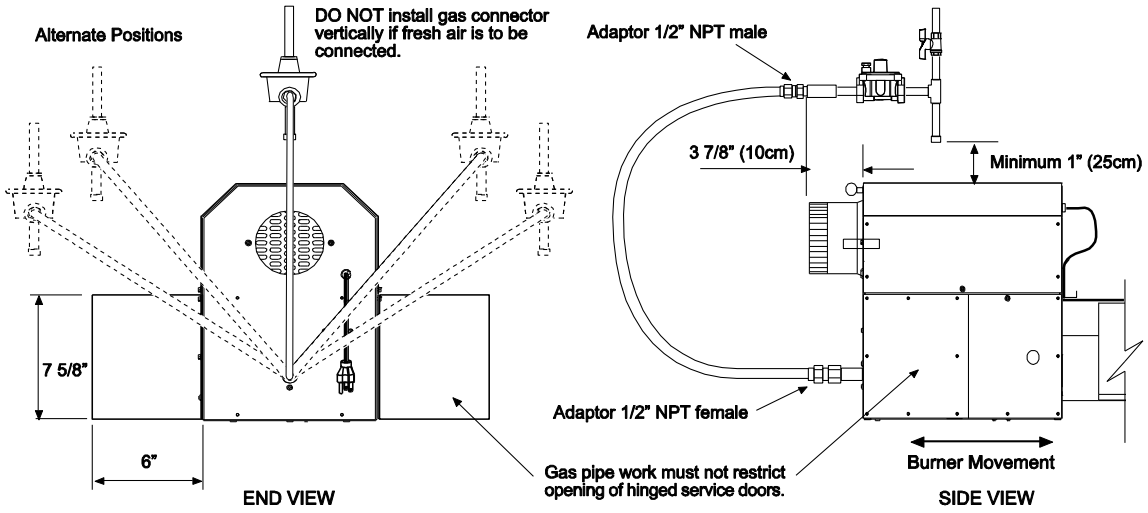
1. Connect to the supply tank or manifold in accordance with the latest edition of National Fuel Gas Code (ANSI Z223.1), and local building codes. Authorities having jurisdiction should be consulted before the installation is made. (In Canada, refer to the latest edition of CSA B149.1, Natural Gas and Propane Installation Code.)
2. Check that the gas fuel on the burner rating plate matches the fuel for the application.
3. 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.
4. 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 14.0).
5. 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.
6. Pipe joint compounds must be resistant to the action of liquefied petroleum gases.
7. 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.
8. 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.
9. 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.
10. 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.
11. 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.**

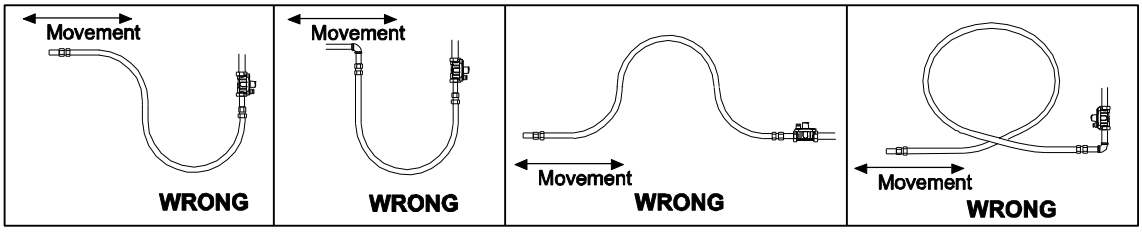
## KEY DIMENSIONS AND COMPONENTS OF THE GAS CONNECTIONS




## 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.**