



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.

SUNSTAR ECLIPSE INFRARED RADIANT TUBE HEATER

Single and Two Stage Pull Through System (Negative Pressure)

Models: SIR25, SIR35, SIR45 – (N5/L5)
SIR35, SIR45 – (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.

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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.



WARNING:

For installations with mounting heights less than 10 feet, install the heater at the highest possible height for the best radiant energy distribution.



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.

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.

SAFETY REQUIREMENTS

- The heater area must be kept clear and free from combustible materials, gasoline and other flammable vapors and liquids.
- This heater is designed for use with one type of gas (LPG or Natural). Make sure that the type of gas to be supplied to this heater matches that shown on the heater rating plate.
- **DO NOT** install this heater directly onto an LPG container or propane cylinder without directions from your propane company. LPG containers (propane cylinders) must not be stored indoors or in the vicinity of any gas-burning appliance.
- Children and adults should be alerted to the hazards of high surface temperatures and should stay away to avoid burns or clothing ignition.
- Clothing or other flammable materials should not be hung from the heater or placed on or near the heater.
- Young children should be carefully supervised when they are in the same space as the heater.
- **NEVER** attempt to service the heater while it is plugged in, operating or hot. Any guard or other protective device removed for servicing a heater must be replaced prior to operating the heater.



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



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.
- 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 space heating of garages, vestibules and entry ways, workshops, enclosed patios, golf practice ranges and most industrial and commercial applications. **DO NOT** install this heater in residential bedrooms or bathrooms, mobile homes or recreational vehicles.

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.

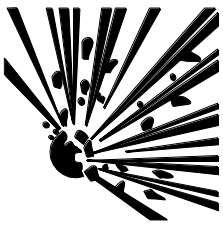
This heater is for Indoor Installation and Covered Patio Installation only and can be used in either Vented or Unvented mode. The term Unvented actually means Indirect Vented. While the products of combustion are expelled into the building, national codes require ventilation in the building to dilute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

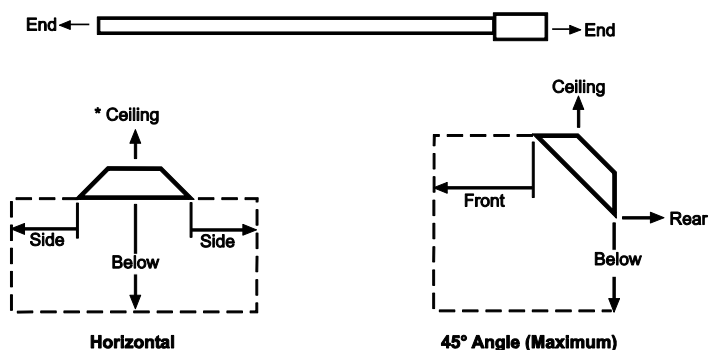
High Altitude:

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.

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>

Minimum clearances to combustibles shall be measured from the outer surfaces as shown in the following diagram. For reduced clearances below the heater, use the Deflector Kit (Part No. 43504010), described in Section 6.1), and maintain the minimum clearances specified in the notes below. Follow the instructions packaged with the kit for installation. Install the warnings card (ordered separately) and complete the blank spaces using the clearances from combustibles table below. See Section 24 for a printed copy of the warnings card.



MINIMUM CLEARANCES TO COMBUSTIBLES						
Model No.	Mounted Horizontally				Angle Mounted at 45°	
	Sides	Ceiling ¹	Below ²	Ends	45° Front	45° Rear
SIR 25	8"	4"	41" *	8"	30"	4"
SIR 35, 45	12"	4"	57" **	8"	40"	4"

* The clearance is 33" with deflector. ** The clearance is 42" with deflector / 30" side clearance with deflector.

¹ The clearance is 12" when installed in an **UNVENTED** configuration in industrial and commercial installations.

² **IN CANADA**, clearances below the heater are:

SIR25: 36" (27" with deflector);

SIR35/45: 48" (36" with deflector)

▲ 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 control 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." Space-Ray 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	Heat Exchanger Length	Total Heater Length	Flue Restrictor Plate I.D. & Part #	Orifice Size				Minimum * Mounting Height	
						Natural Gas		Propane Gas		@ Horizontal	@ 45° Angle
SIR25	25,000	n/a	16'	9'-3"	7/8" 42741120	#42	(0.094)	#52	(0.064)	8'	8'
SIR35	35,000	25,000			1" 42741041	#35	(0.110)	1.75mm	(0.069)	8'	8'
SIR45	45,000	31,500			1-1/8" 42741031	1/8"	(0.125)	5/64"	(0.078)	8'	8'

* 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	Fresh Air Connection	Electrical Supply	Current Rating
Natural or Propane	1/2" MPT (Male)	3"	4" Round	4" Round	120 Volt, 60Hz, 1 Phase	2.6 Amp

Module Electrical Rating:	Ignition System (direct spark):
Fuse : 2 Amp 250V (for 24V Circuit) Input Power Input-Control: 18-30VAC 60 Hz (class 2 transformer) Flame Sensitivity: 0.7 uA (microamps) minimum	30 second pre-purge period 21 second trial for ignition period Single trial for ignition (local sense)

6.0) PACKING LIST

A. Control/Draft Inducer Package

Part Description	QTY
Control Box Assembly	1
Draft Inducer Assembly (with 4" Starting Collar #40504020)	1
Flue Restrictor Plate (refer to 5.0) for I.D. & part number).....	1
15" Plastic Vacuum Air Tube (#03988150).....	1
Control Fastener Kit (#42787000)	1
Containing: 1/4 - 20 Locknuts (#02167010)	6
Tube Flange Gaskets (#4292150)	2
Gas Connector 5/8" OD x 36" (#30302360) US only	1
Installation & Operation Instructions (#43471010)	1

CONTROL/DRAFT INDUCER PACKAGE NUMBERS

1-STAGE CONTROLS		
MODEL NO.	PART NO.	GAS TYPE
SIR25-N5	43501030	NATURAL
SIR25-L5	43501040	PROPANE
SIR35-N5	43501050	NATURAL
SIR35-L5	43501060	PROPANE
SIR45-N5	43501070	NATURAL
SIR45-L5	43501080	PROPANE

2-STAGE CONTROLS		
MODEL NO.	PART NO.	GAS TYPE
SIR35-N7	43501090	NATURAL
SIR35-L7	43501100	PROPANE
SIR45-N7	43501110	NATURAL
SIR45-L7	43501120	PROPANE

B. Body Package Descriptions

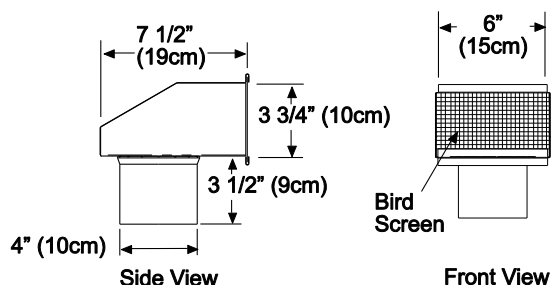
Part Description	QTY
#43468000, 8Ft. Body Package	1
Containing: #43469000, Pre-assembled 8' ALC steel tube assembly with reflectors	1
#42762010, Control End Reflector	1
#42761010, Foot End Reflector	1
#02125130, #10-24x1/2 Screws.....	4
#02189020, #10-16x1/2 Screws.....	2
#02266010, Speed Clips	14
#42769010, Sliding Clamps	4

6.1) ACCESSORY PACKAGES

C. Exhaust Hood Package, Part #42924000

Contains:

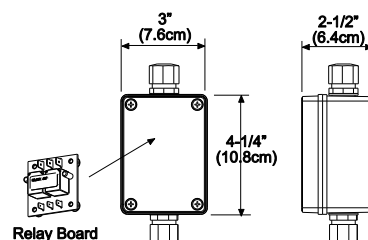
Exhaust Hood Assembly, #42925550.....QTY-1
 #8-18 x 1/2 Self-Drilling Screws, #02189030.....QTY-2



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

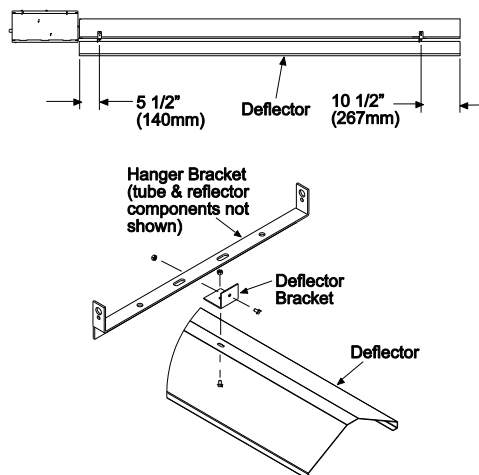
Contains:

Relay Board , #30709058.....QTY-1
 Enclosure, #30709059.....QTY-1
 Cord Connector - 1/2" , #30635040.....QTY-2

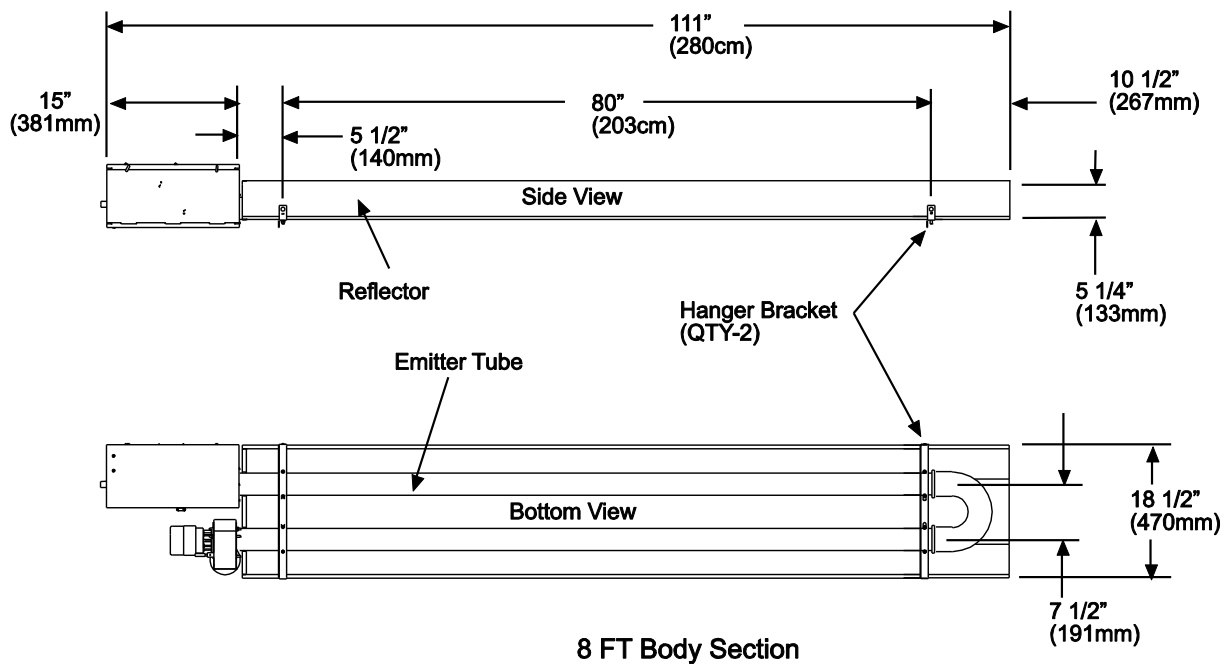
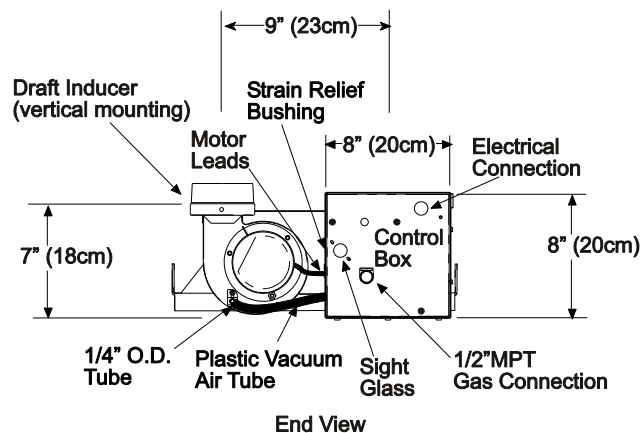


E. Deflector Kit, Part #43504010

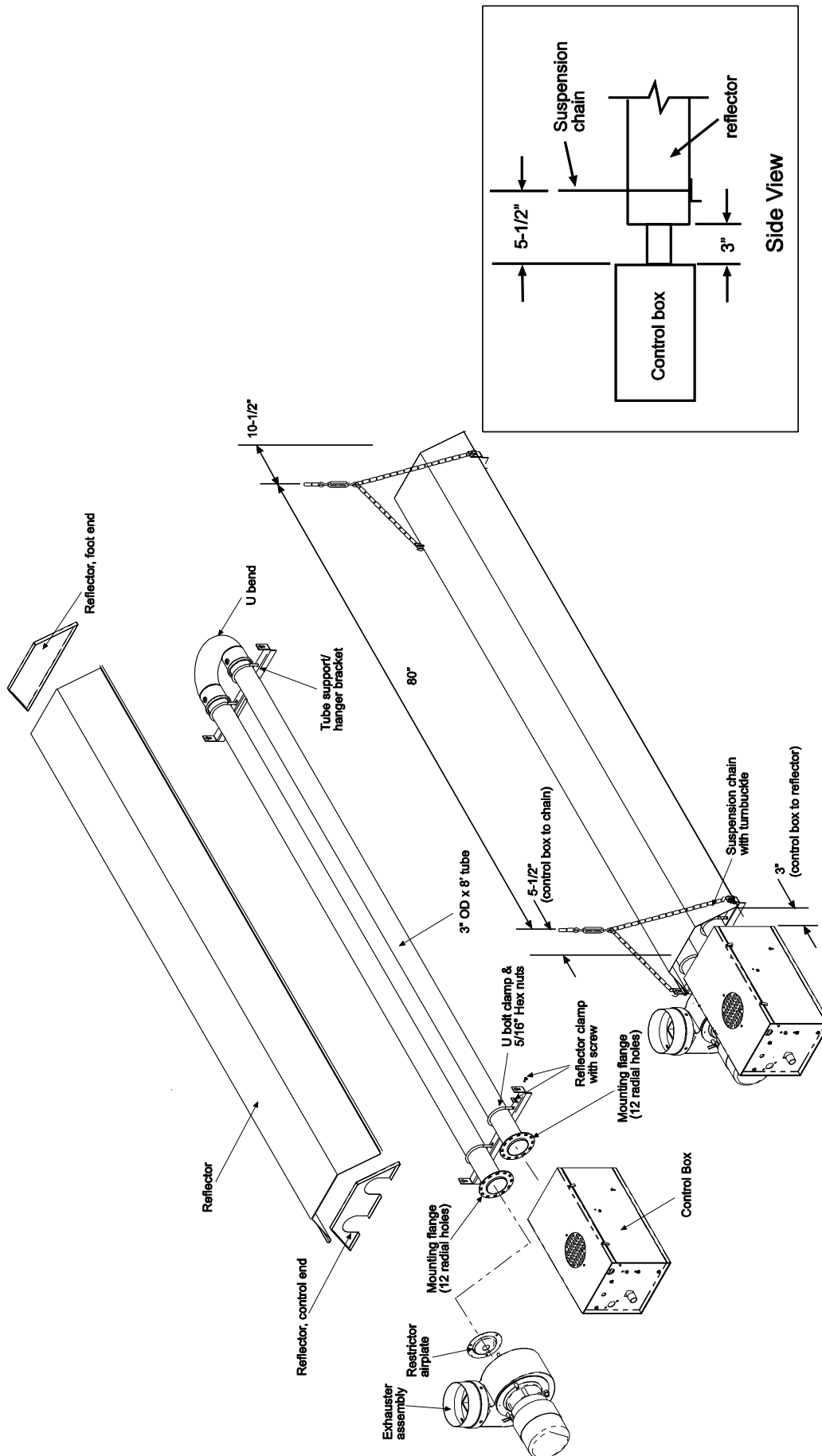
The Deflector Kit is available for use to reduce the clearances to combustibles below the heater. Refer to the **Minimum Clearances to Combustibles Table** in Section 4.0) when using this Deflector Kit. **Heater must be mounted ONLY in the horizontal position when using this kit.**



7.0) DIMENSIONS – SIR SERIES



8.0) HEATER ASSEMBLY OVERVIEW



9.0) TYPICAL SUSPENSION METHODS

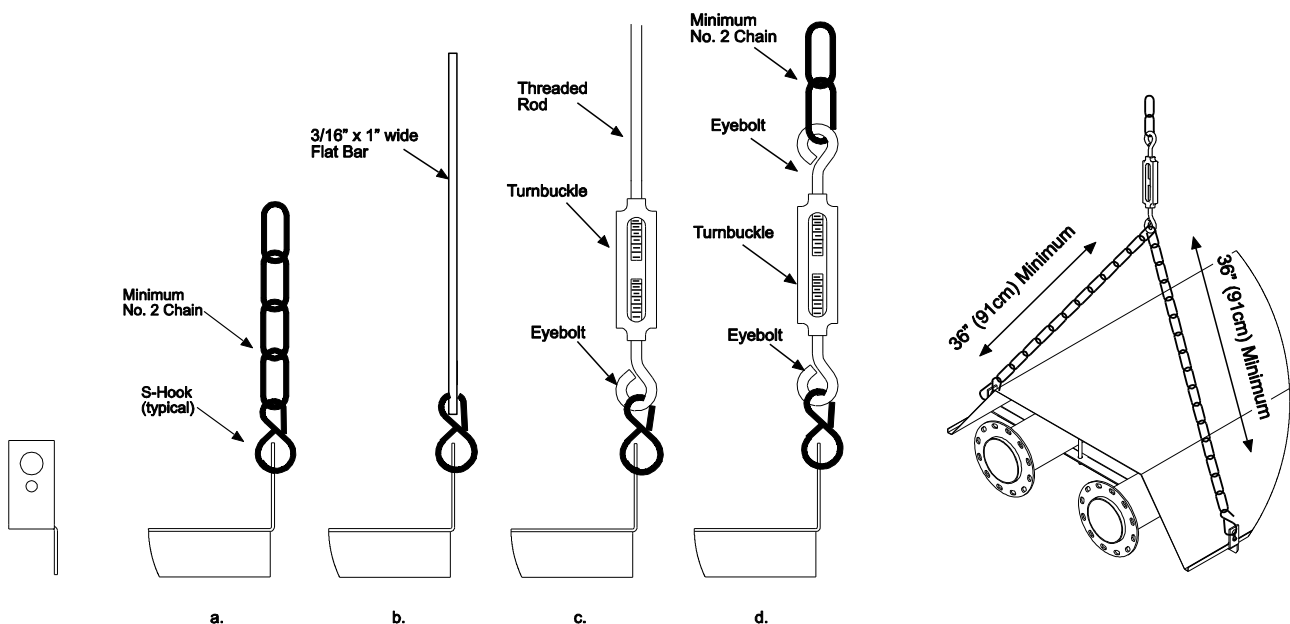
⚠ WARNING	
	<p style="text-align: center;">SUSPENSION HAZARD</p> <p>Burner must be secured to the mounting flange with nuts.</p> <p>All materials used to suspend the heater must have a minimum working load of 115 lbs.</p> <p>All "S" Hooks must be crimped closed.</p> <p>Never use the heater to support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

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 tube sections be suspended using chains with turnbuckles. This will allow slight adjustments after assembly and heater expansion/ contraction during operation.

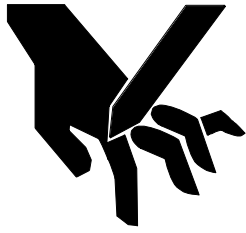
If a "trapeze" method is used for tube support/hanger brackets (shown below), the minimum chain length for the two connecting chains is 36" to minimize any vibration that might be generated by the draft inducer assembly. If these chains must be less than 36", then do not use the trapeze method and, instead,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



10.0) HEATER ASSEMBLY



CAUTION



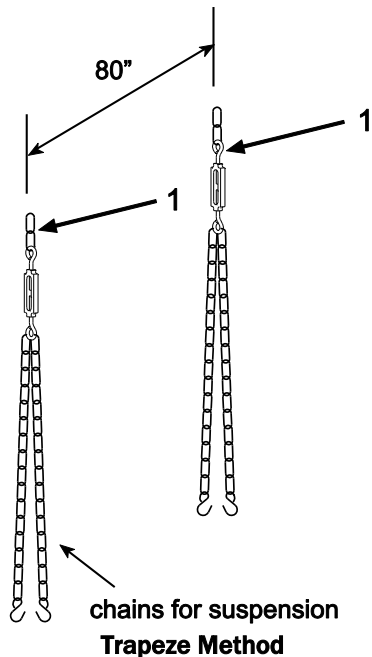
CUT HAZARD

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

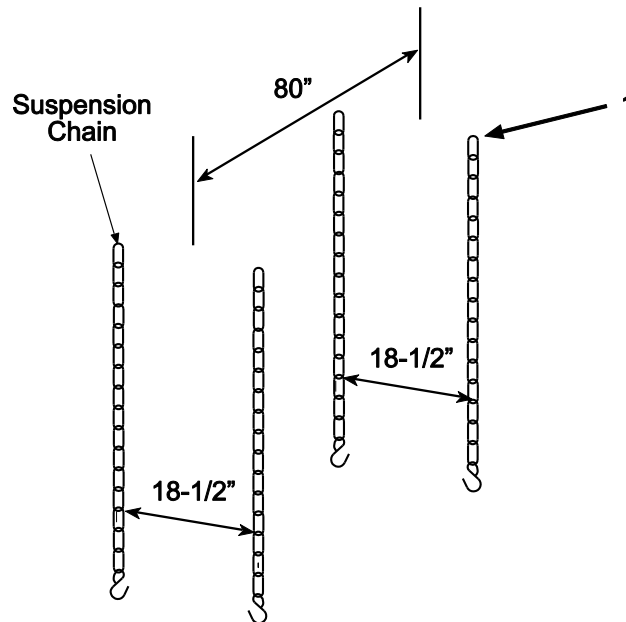
Failure to do so may result in death, serious injury or property damage.

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

1. Install suspension (according to Section 7.0) using proper suspension method (see Section 9.0).

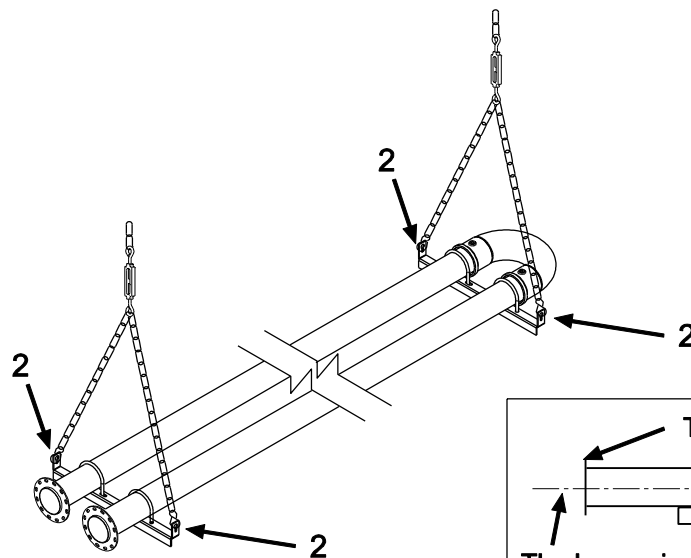
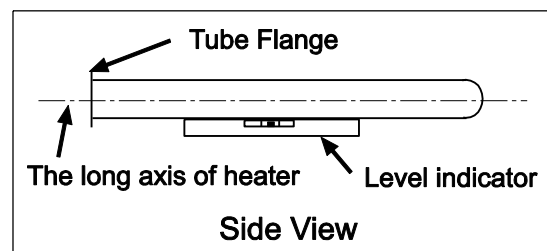


Trapeze Method

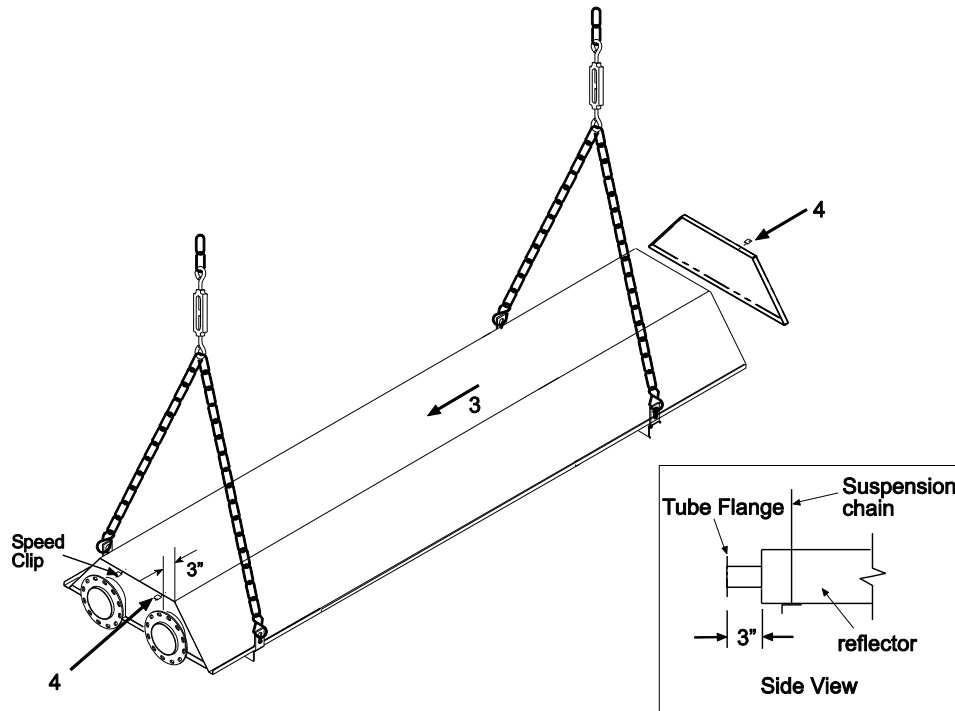


Individual Suspension Method

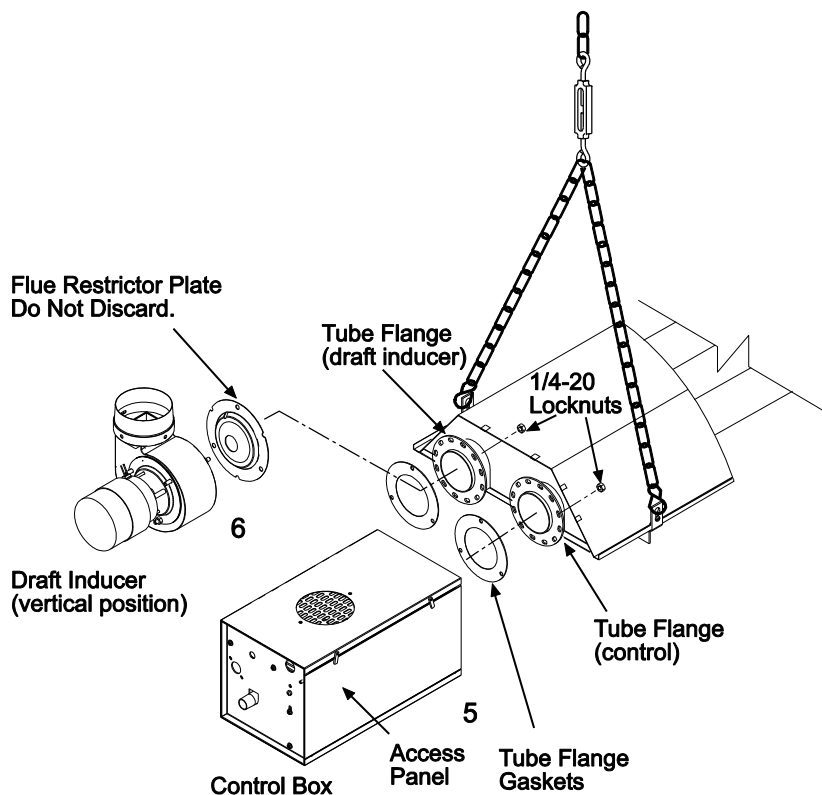
2. Lift the tube section and suspend it into place. When lifting, caution should be used to avoid damaging the assembly. Make sure that the long axis of heater is level.



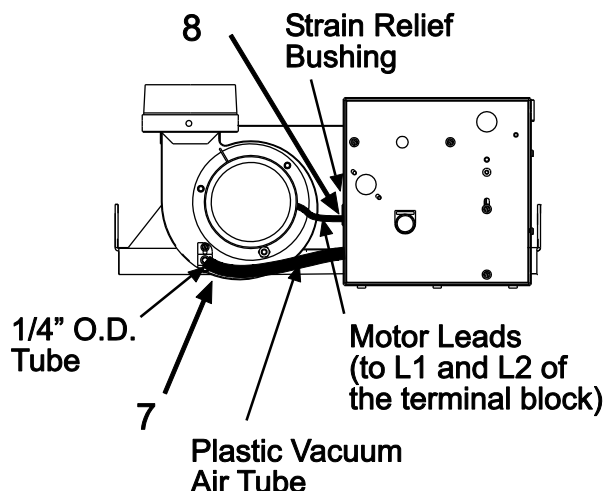
3. Assembly the reflector onto the tube section. Leave 3" space between the tube flange and the reflector for later mounting of control box and draft inducer.
4. Place the flanges of the control end reflector flush with the end of the first reflector. Secure by sliding speed clips onto reflector edges. Evenly space 6 speed clips on sides and top of reflectors to provide a snug fit. Place foot end reflector on the opposite end of the reflector and secure as above.



5. Attach the control box and gaskets to the right-hand control tube flange and secure with (3) 1/4-20 locknuts. The control box must be mounted with the perforated fresh air plate on top, facing the ceiling.
6. Attach the draft inducer assembly and gaskets to the left-hand draft inducer tube flange and secure with (3) 1/4-20 locknuts. A flue restrictor plate is attached to the draft inducer weld studs. **DO NOT DISCARD RESTRICTOR PLATE** and make sure this remains in place while the draft inducer is being attached to the heater body.



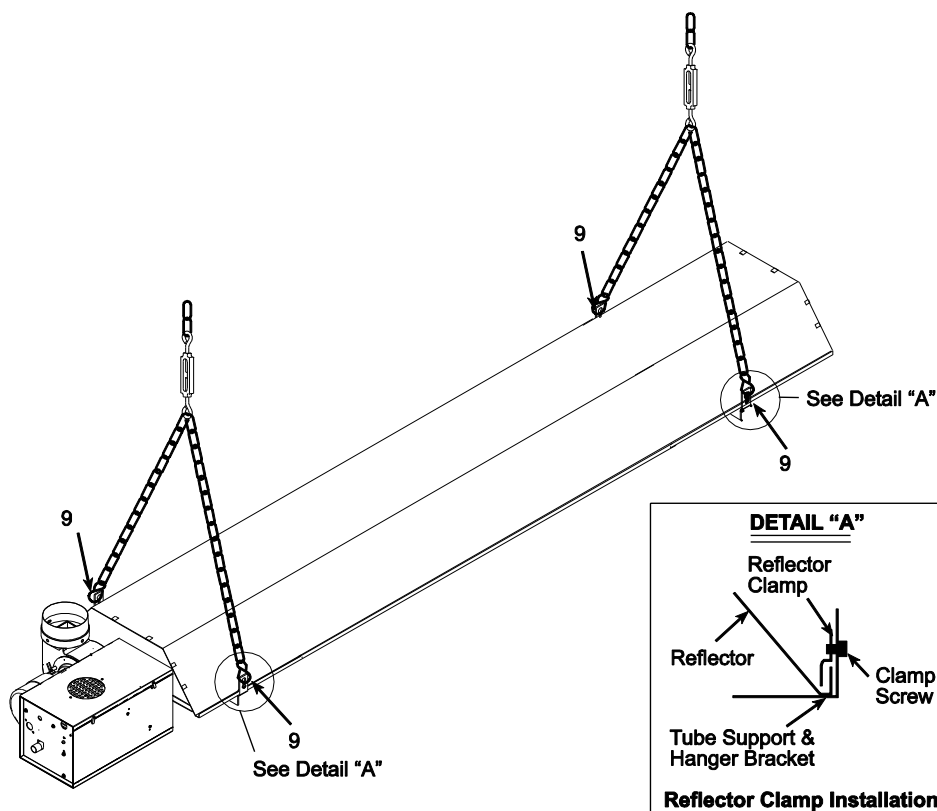
7. Slip the plastic vacuum air tube over the 1/4" O.D. aluminum tube end of the draft inducer and the air switch probe in the control box. The air tube should be shortened to prevent a downward sag which could allow condensation build-up in the tube.
8. Insert motor lead wires through the strain relief bushing of the control box and connect to L1 and L2 of terminal block. Refer also to the wiring diagram in Section 13.0).



9. Mount the sliding reflector clamps (#42769010) per Reflector Clamp Installation (Detail "A") on both tube support/hanger brackets. Make sure the reflector can slide under the clamp during heater operation.

! WARNING

The reflector clamps **MUST** be installed per reflector clamp installation detail which allows the reflector to slide under the clamp during heater operation.

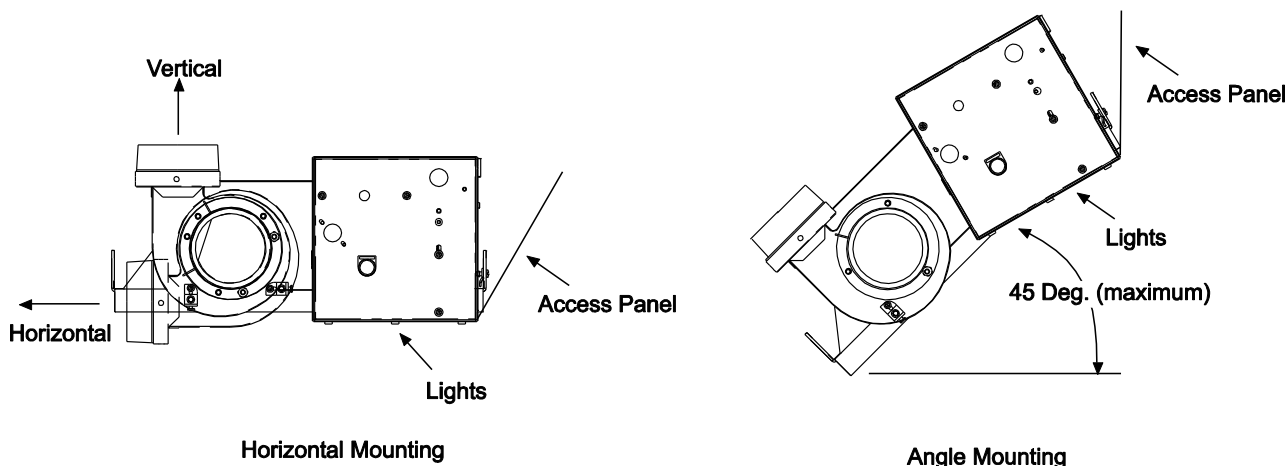


! CAUTION

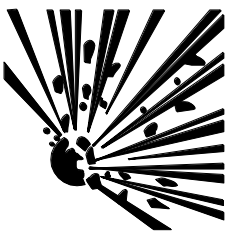
Do not relocate the tube support/hanger bracket at the control box end of the heater. This will increase the weight on the emitter tube and can result in premature tube failure.

ANGLE MOUNTED HEATERS ONLY

10. The heater can be mounted horizontally or up to an angle of 45° maximum from horizontal. When the heater is to be angle mounted adjacent to a sidewall, make sure the draft inducer assembly is on the lower side of the heater so that the control box access panel is easily accessible. Make sure the long axis of heater is level.
11. Multiple draft inducer positions can also be used as shown in the diagrams. This allows for the desired configuration of flue venting.



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

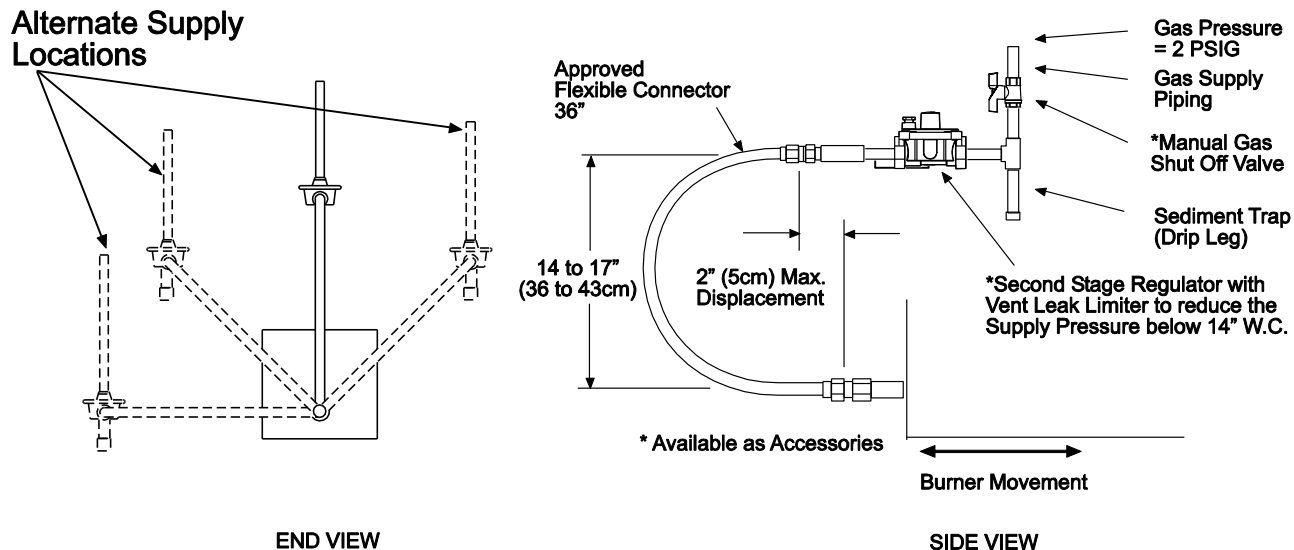
1. Connect to the supply tank or manifold in accordance with the latest edition of National Fuel Gas Code (ANSI Z223.1), and local building codes. Authorities having jurisdiction should be consulted before the installation is made. (In Canada, refer to the latest edition of CSA Standard B149.1, Natural 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 12.0).
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 control 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.

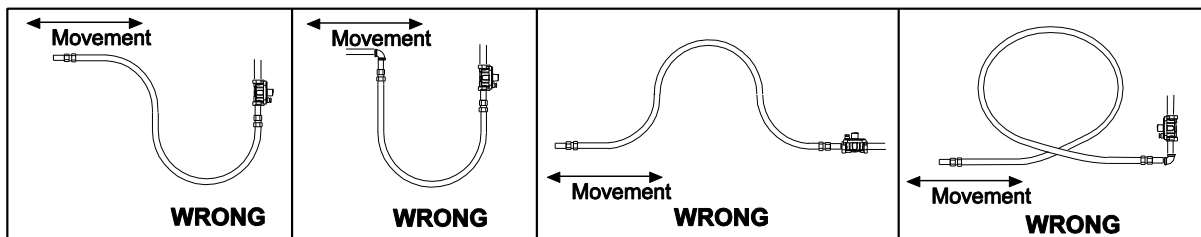
! WARNING

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

KEY DIMENSIONS AND COMPONENTS OF THE GAS CONNECTIONS



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

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 WHITE-RODGERS GAS VALVES

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:

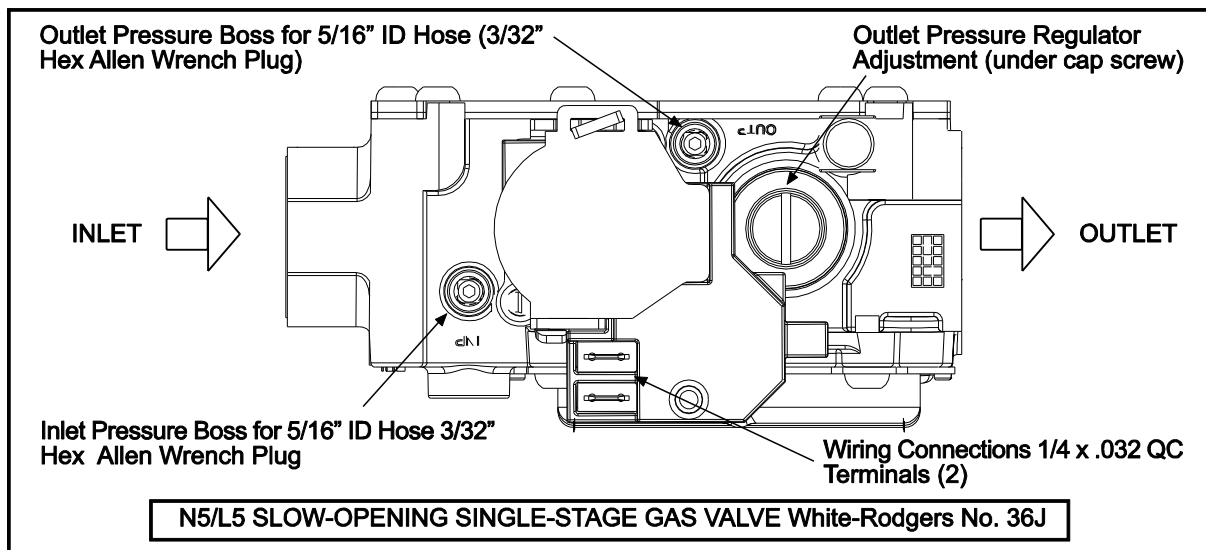
1. Turn off all electrical power to the system to connect manometer hoses.
2. Turn the pressure test screw (3/32" Hex) in the center of the boss **not more than one turn counterclockwise**. Attach a 5/16" hose and manometer over the tapered outlet pressure boss on the valve (see **Figures 1** and **2**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

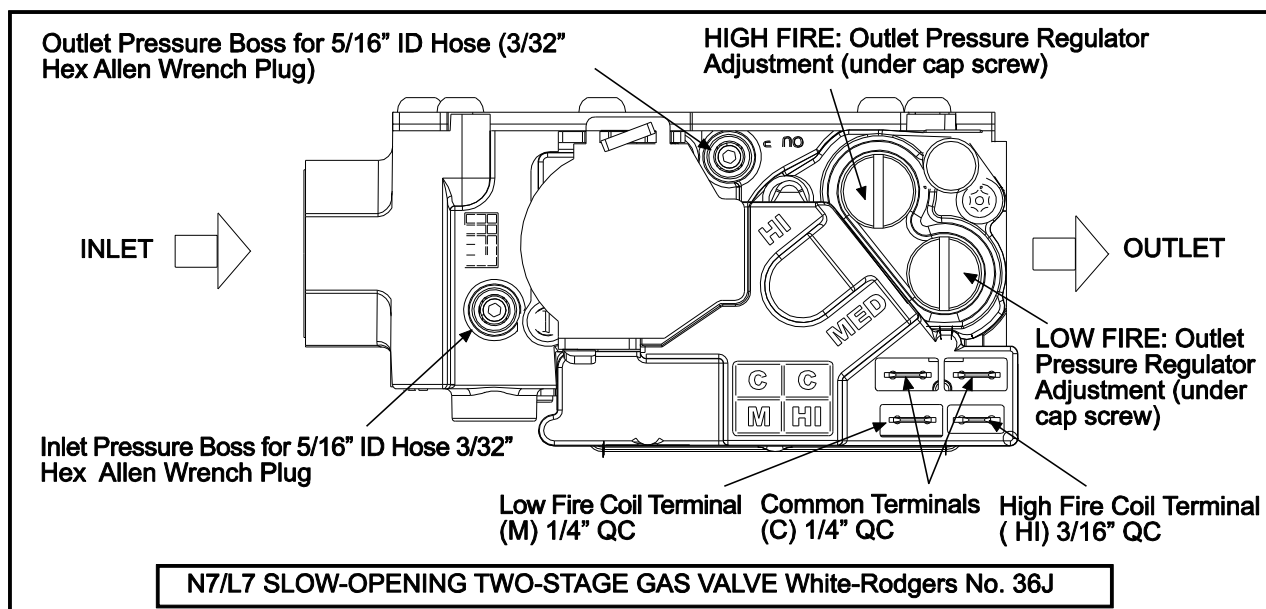


TO ADJUST REGULATOR (two stage gas valves):

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.

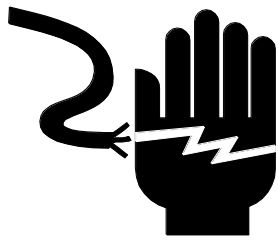


GAS PRESSURE TABLE				
GAS TYPE	MANIFOLD PRESSURE		SUPPLY PRESSURE	Maximum
	High	Low (2-stage only)		
Natural Gas	3.5" W.C.	1.4" W.C.	5" W.C.	14" W.C.
Propane Gas	10.0" W.C.	4.0" W.C.	11" W.C.	14" W.C.

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

13.0) ELECTRICAL CONNECTIONS

⚠ WARNING



ELECTRIC SHOCK HAZARD

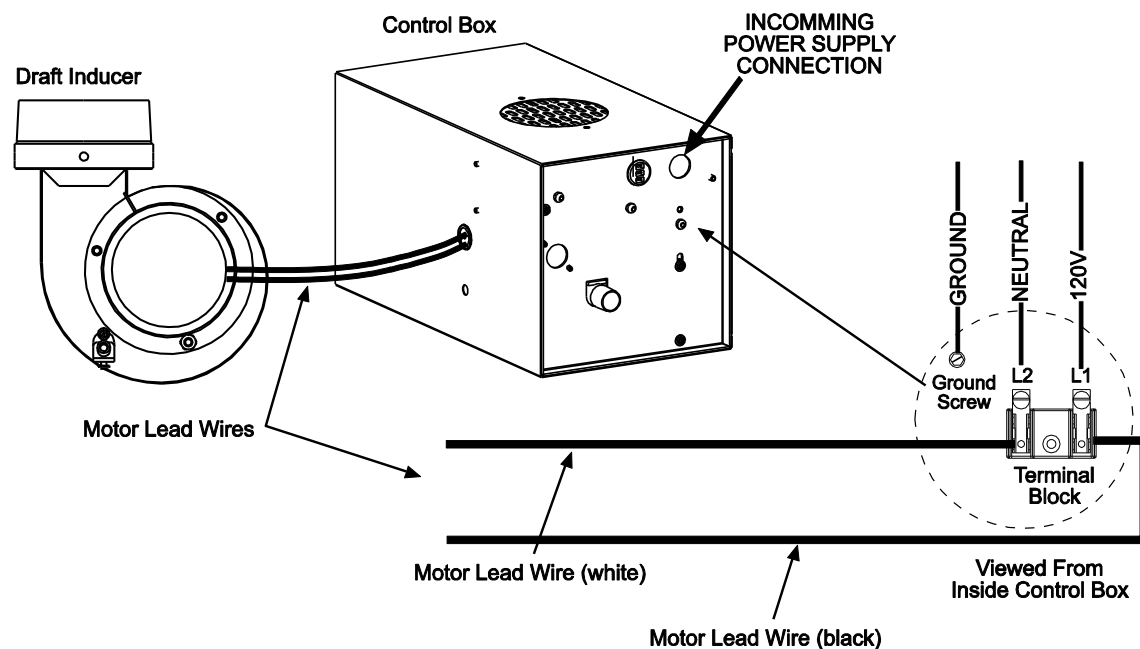
Disconnect electrical power and gas supply before servicing.

This appliance must be connected to a properly grounded electrical source.

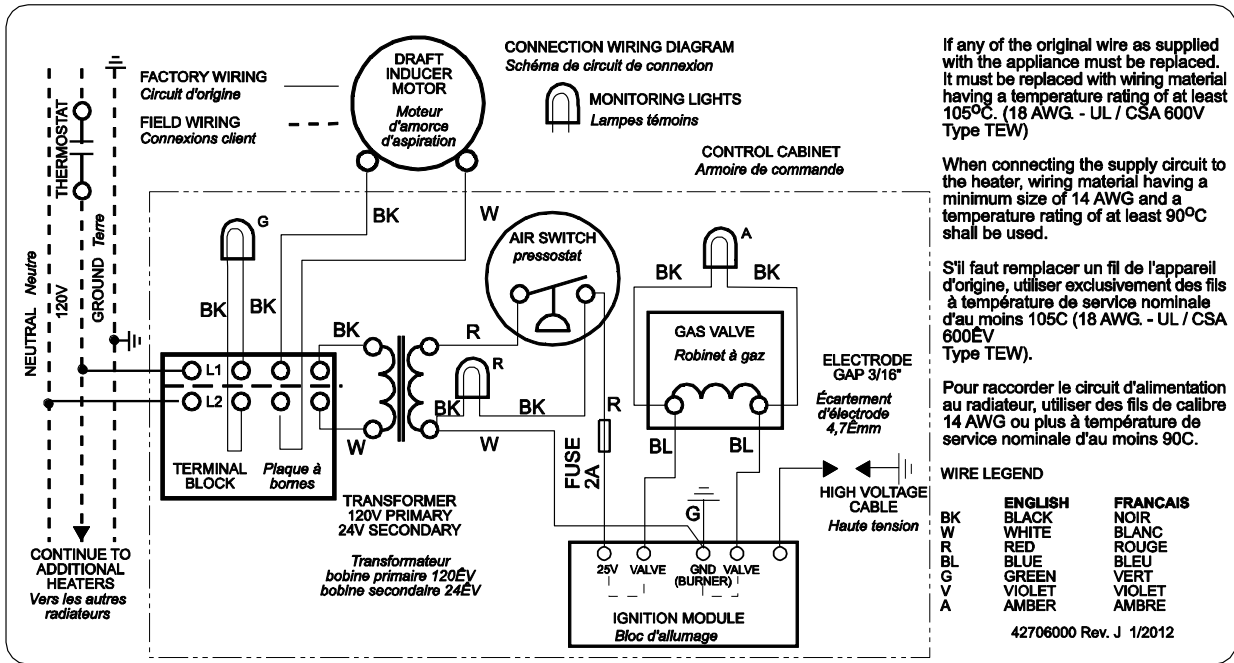
Failure to do so may result in death or serious injury.

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.
2. 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.
3. 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.
4. 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.
5. 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.
6. 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)
7. A replaceable 2-amp fuse (1-1/4" long) is located inside the control box.

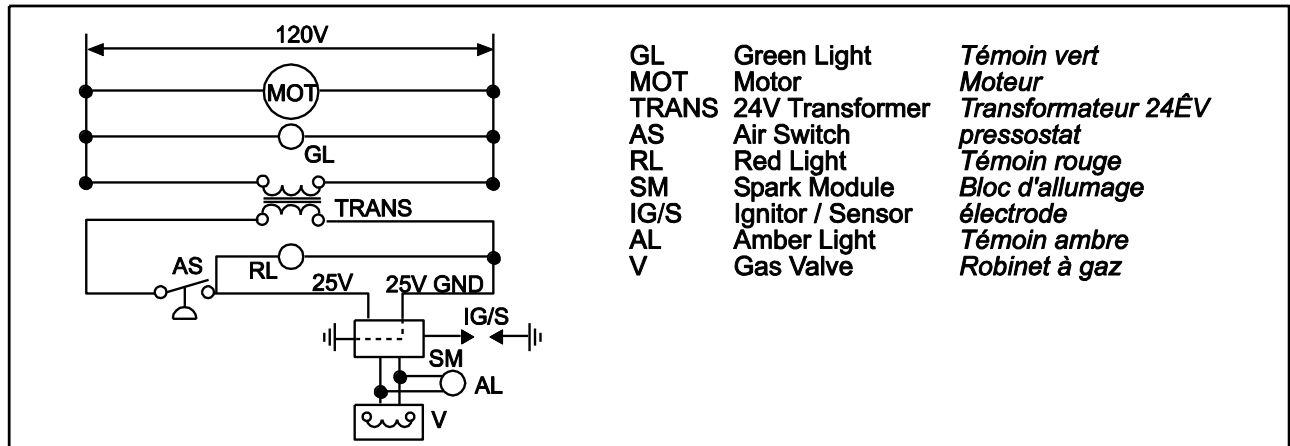
13.1) SINGLE STAGE (N5/L5) – INTERNAL AND THERMOSTAT CONNECTIONS



SINGLE STAGE CONTROLS - INTERNAL CONNECTION WIRING DIAGRAM

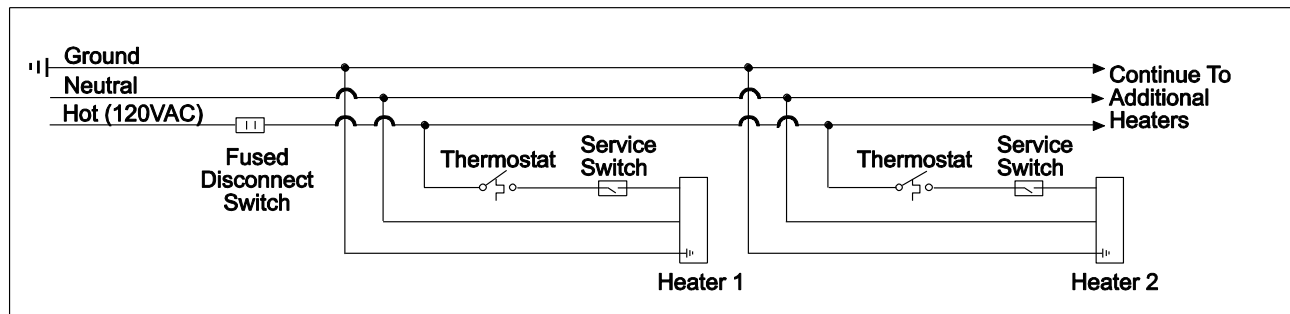


SINGLE STAGE CONTROLS - SCHEMATIC WIRING DIAGRAM

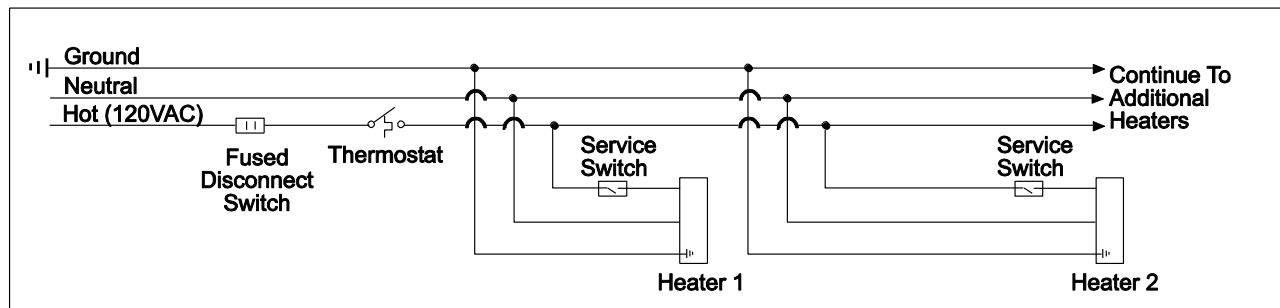


SINGLE STAGE CONTROLS - THERMOSTAT WIRING DIAGRAMS

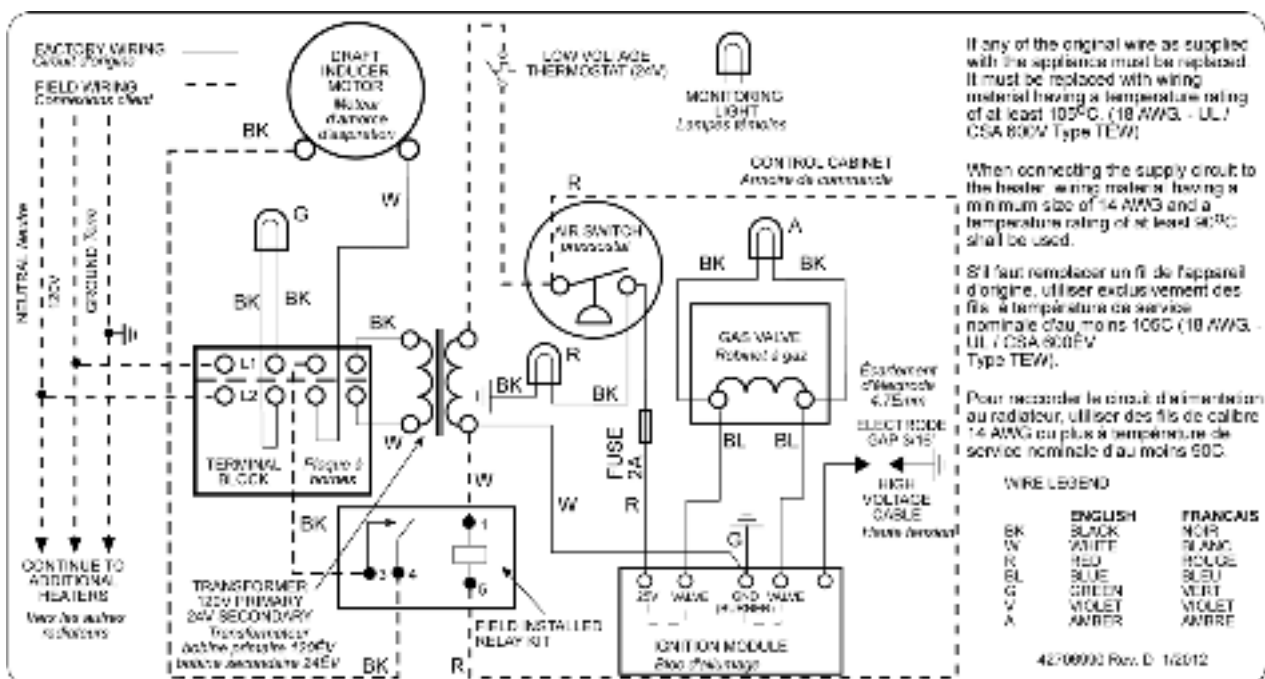
A. LINE VOLTAGE (120V) THERMOSTAT CONNECTIONS – SINGLE HEATER PER THERMOSTAT



B. LINE VOLTAGE (120V) THERMOSTAT CONNECTIONS – MULTIPLE HEATERS PER THERMOSTAT

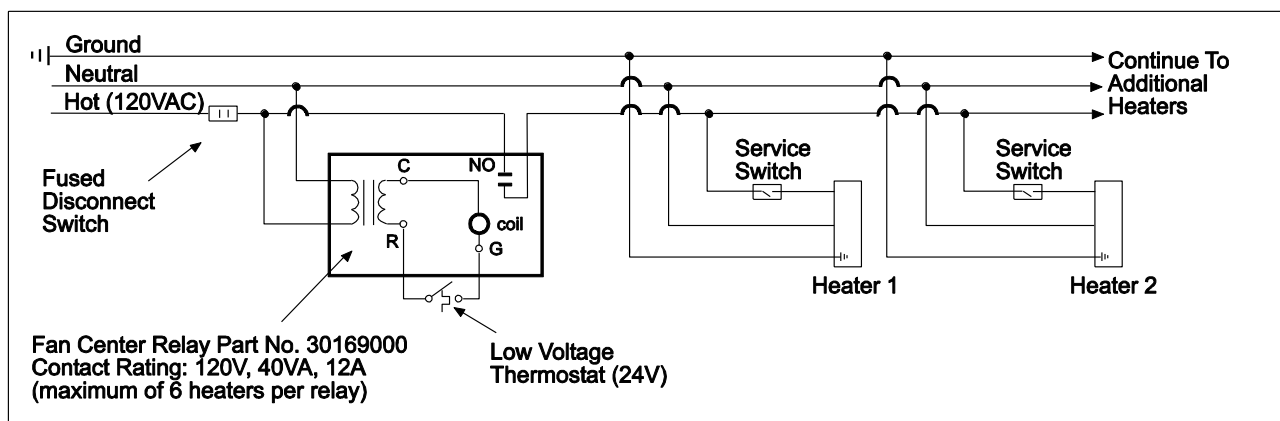


C. LOW VOLTAGE (24V) THERMOSTAT CONNECTIONS – SINGLE HEATER PER THERMOSTAT

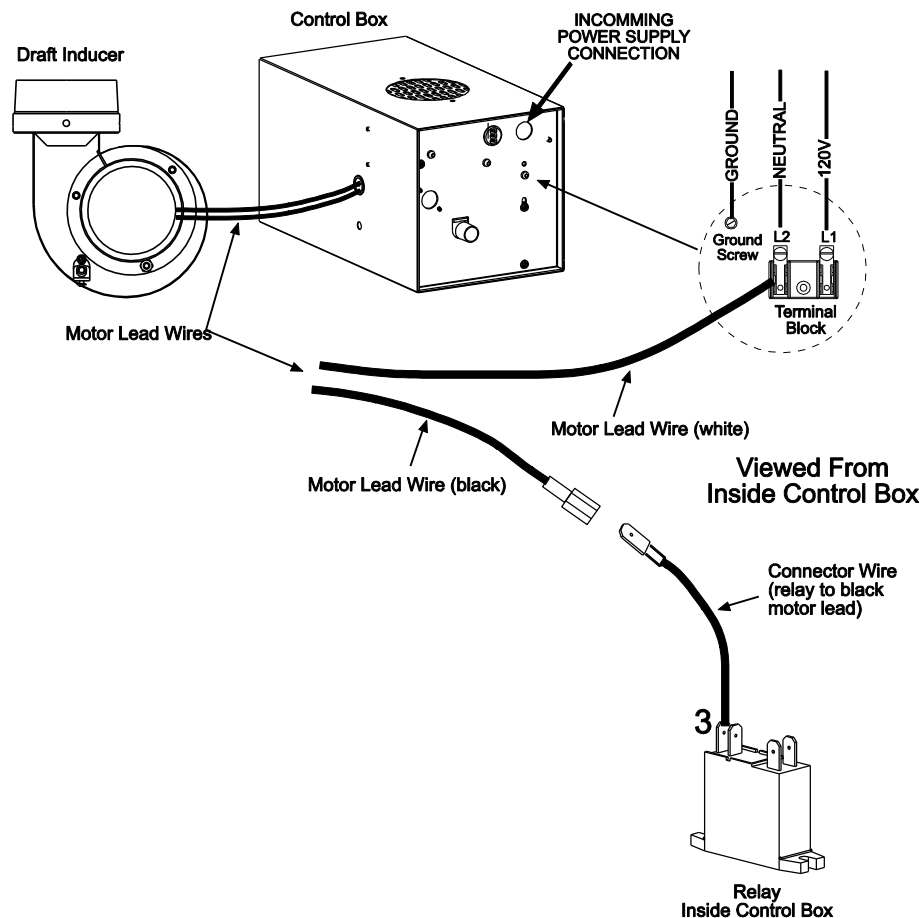


Order 24V Relay Kit (Part No. 43274020) for Low Voltage (24V) thermostat connection.

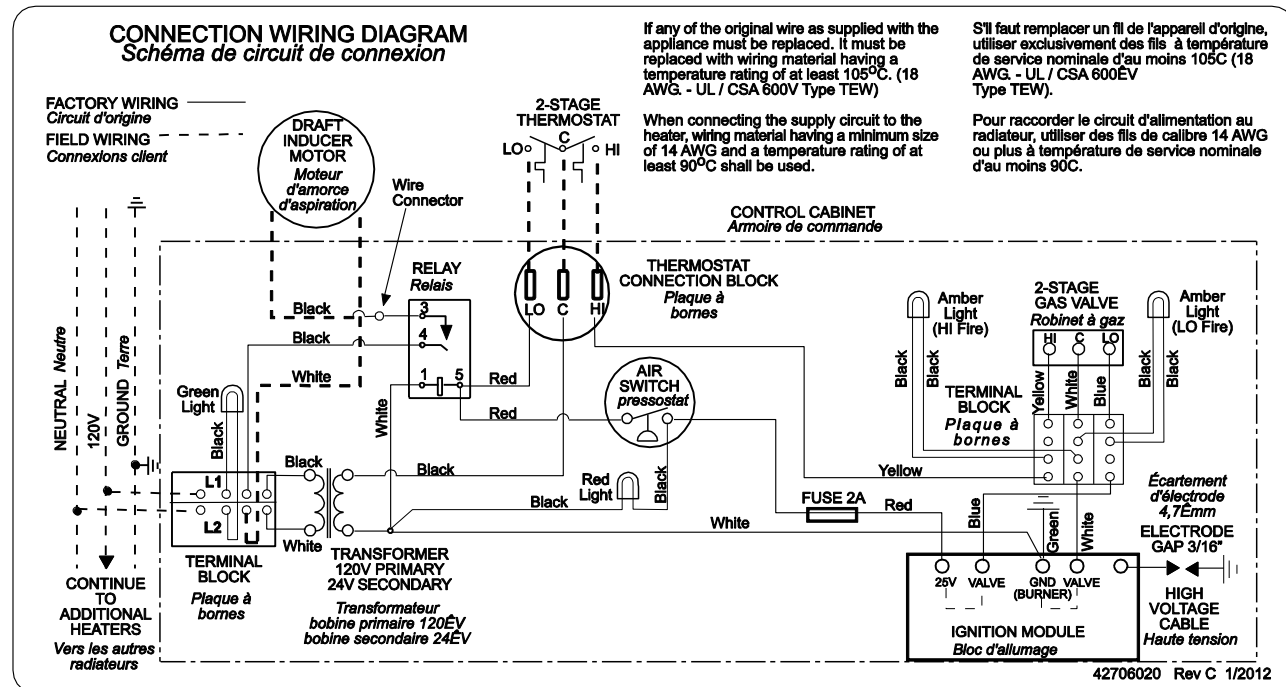
D. LOW VOLTAGE (24V) THERMOSTAT CONNECTIONS – MULTIPLE HEATERS PER THERMOSTAT



13.2) TWO STAGE (N7/L7) – INTERNAL AND THERMOSTAT CONNECTIONS



TWO STAGE CONTROLS - INTERNAL CONNECTION WIRING DIAGRAM

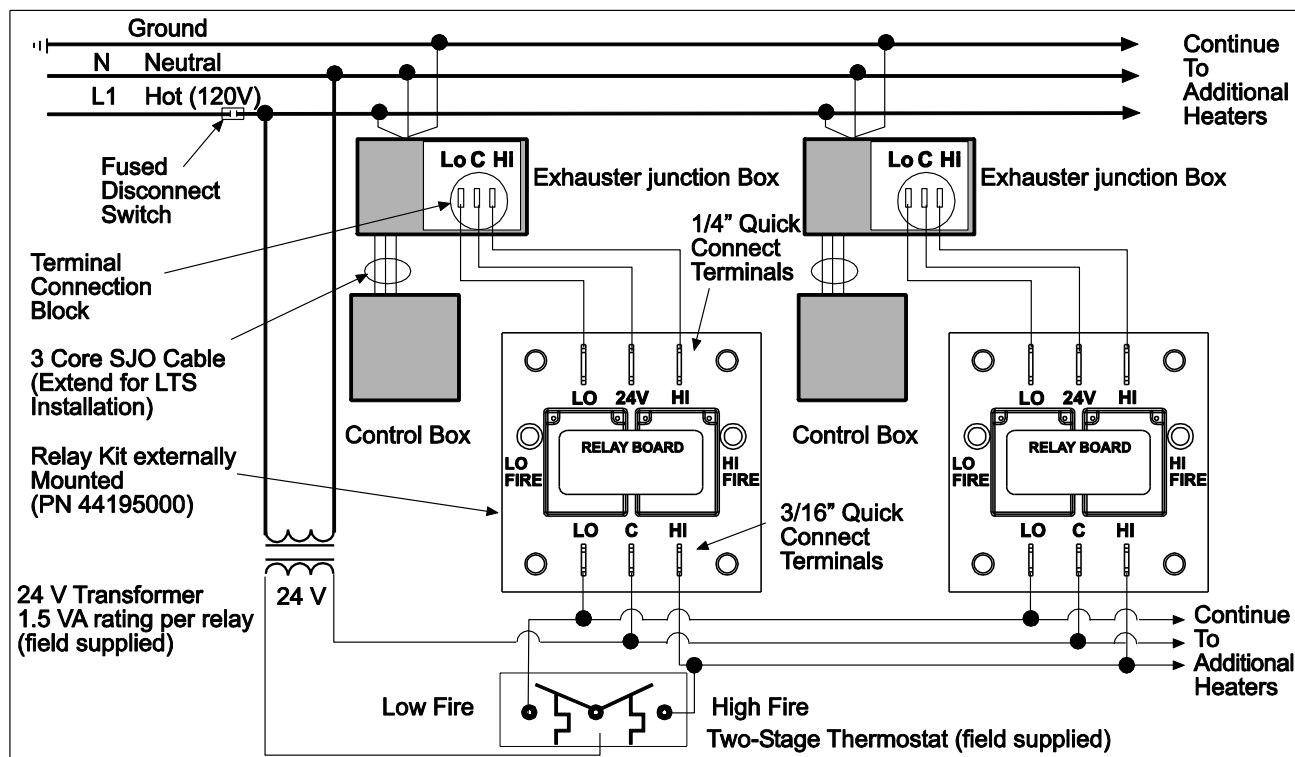


[illegible]

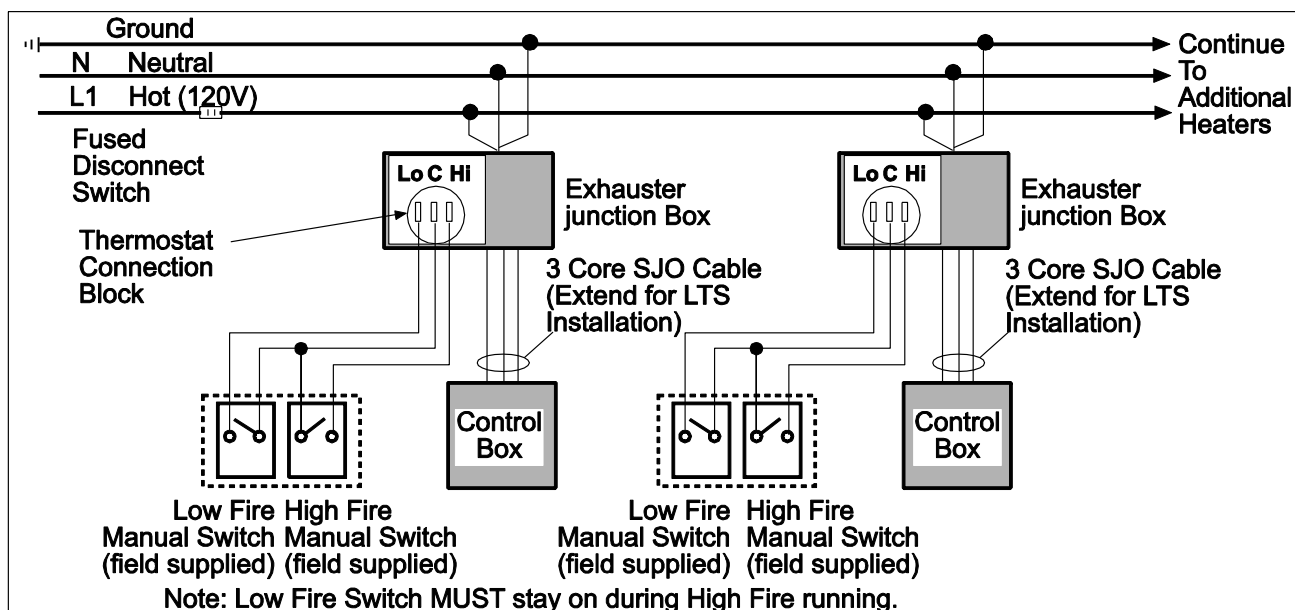
A. LOW VOLTAGE (24V) THERMOSTAT CONNECTIONS – SINGLE HEATER PER THERMOSTAT



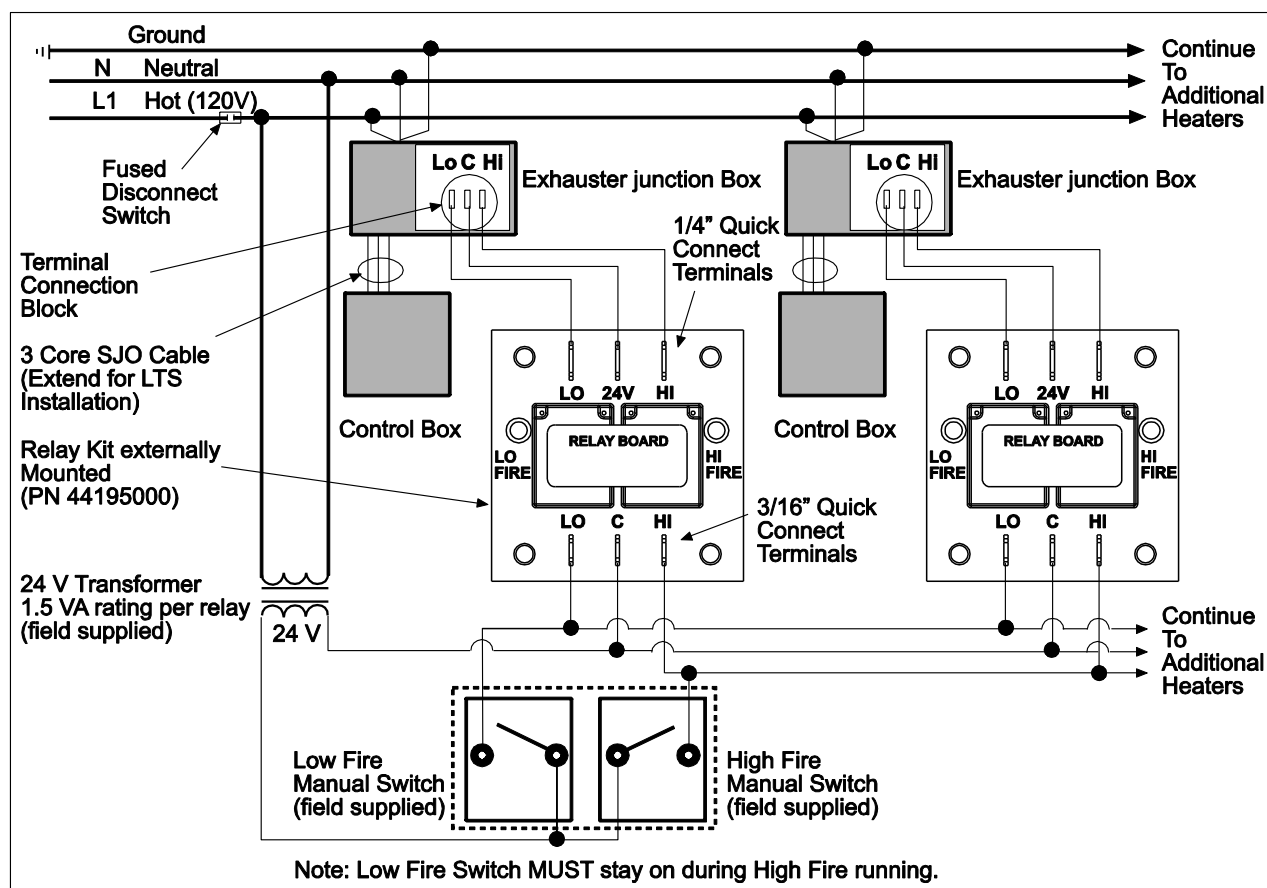
B. LOW VOLTAGE (24V) THERMOSTAT CONNECTIONS – MULTIPLE HEATERS PER THERMOSTAT



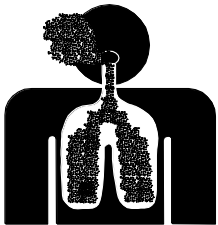
C. MANUAL SWITCH CONNECTIONS – SINGLE HEATER OPERATION PER DUAL MANUAL SWITCH



D. MANUAL SWITCH CONNECTIONS – MULTIPLE HEATERS OPERATION PER DUAL MANUAL SWITCH



14.0) VENTING

⚠ WARNING	
	<p>CARBON MONOXIDE HAZARD</p> <p>Heaters installed in an unvented mode require a minimum ventilation flow of 4 CFM per 1,000 Btu/hr of total installed capacity.</p> <p>In buildings with airborne contamination the heater must be installed with fresh air for combustion.</p> <p>Failure to do so may result in death, serious injury, property damage or illness from Carbon Monoxide poisoning.</p>

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.

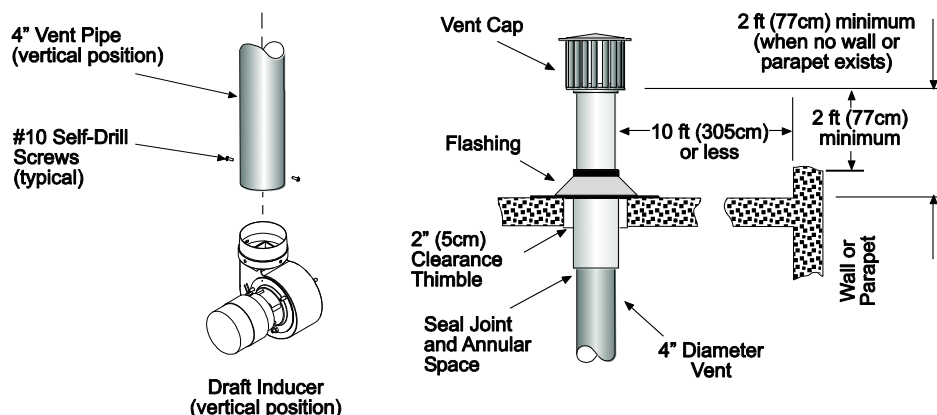
Model	Heat exchanger length ft	Maximum vent length ft. (4" diameter)		Maximum Fresh air intake length ft (4" diameter)
		Vertical Venting	Sidewall Venting	
SIR 25	15	100	75	50
SIR 35	15	100	75	50
SIR 45	15	100	75	50

SINGLE HEATER VENTING (VERTICAL THROUGH THE ROOF)

Note: For residential applications, the heater must not be connected to a separate chimney, but must be installed using the venting system specified below.

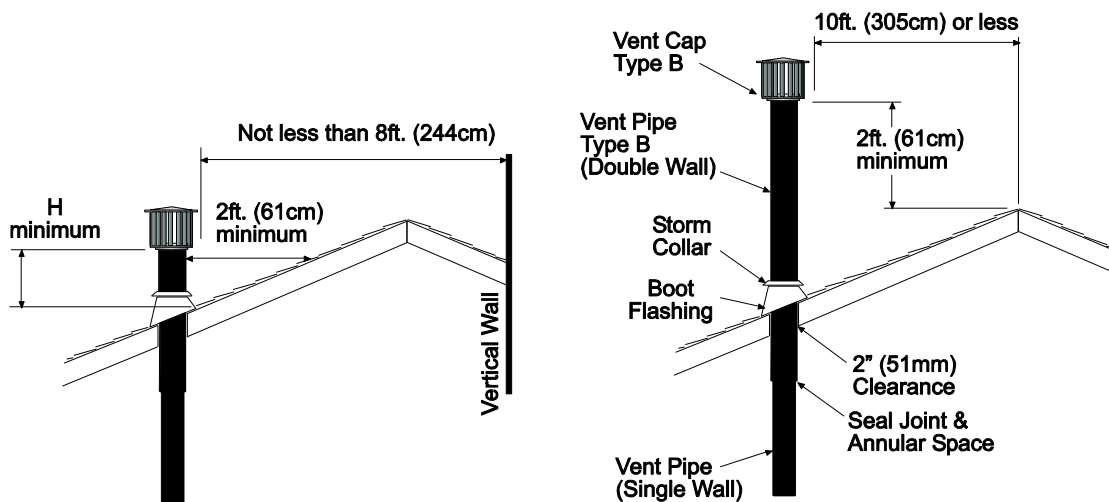
- When venting the heater to outside of building through a roof, use single-wall metal pipe. This is to be constructed of galvanized sheet metal or other approved noncombustible corrosion-resistant material as allowed by state or local codes.
- A vent passing through a combustible roof shall extend through 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.
 - Minimum Equivalent Length = 5 ft. of pipe
 - Maximum Equivalent Length = 75 ft. of pipeUse the following correction factors to obtain the equivalent length:
 - Subtract 15 ft. if the run is horizontal.
 - Subtract 10 ft. for an approved vent cap.
 - Subtract 10 ft. for each elbow beyond 15 ft. from the heater.
 - Subtract 15 ft. for each elbow within 15 ft. of the heater.
- 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. **For Residential Installations:** The seams along the length of the piping and the joints between sections of piping should be sealed to prevent a potential leakage of flue gas into building. Use 100% RTV Silicone Rubber Adhesive sealant suitable for 500 °F. **For Commercial and Industrial Installations:** Use aluminum tape rated for 550°F (3M Company tapes 433 or 363) or RTV silicone sealant.
- Avoid locating elbows in the first 5' of vent pipe whenever possible. Limit to (2) 90° elbows. When vent pipe is in a horizontal run, it must have 1/4 inch per foot rise.
- 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.

9. 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.
10. A venting system shall terminate at least 3 ft. above any forced air inlet located within 10 ft.



VENT TERMINATION (RESIDENTIAL INSTALLATIONS)

- The vent terminal shall terminate above the roof line so that no discharge opening is less than 2 feet (0.6m) horizontally from the roof surface. The lowest discharge opening will be no closer than the minimum height specified in the following table. These minimum heights may be used provided the vent is not less than 8 feet (2.4m) from any vertical wall or similar obstruction.
- All other gas vents shall terminate not less than 2 feet (0.6m) above the highest point where they pass through the roof and at least 2 feet (0.6m) higher than any portion of a building located within 10 feet (3.1m) as shown in the illustration below.



MINIMUM HEIGHT FROM ROOF TO LOWEST DISCHARGE OPENING			
Roof Pitch			H (min)
Flat	to	6/12	1.0 Feet
Over 6/12	to	8/12	1.5 Feet
Over 8/12	to	10/12	2.5 Feet
Over 10/12	to	12/12	4.0 Feet
Over 12/12	to	16/12	6.0 Feet
Over 16/12	to	20/12	7.5 Feet
Over 20/12	to	21/12	8.0 Feet