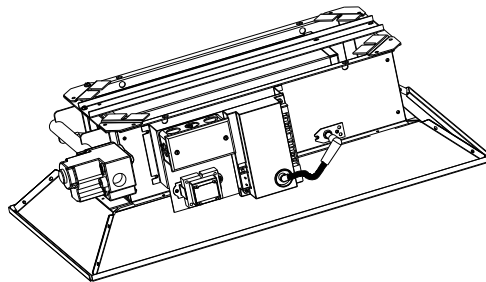


INSTALLATION AND OPERATION INSTRUCTIONS

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

INFRARED RADIANT CERAMIC HEATER

STARGLO SG SERIES



! 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 heater.

In locations used for the storage of combustible materials, signs must be posted to specify the maximum permissible stacking height to maintain the required clearances from the heater to the combustibles. Signs must either be posted adjacent to the heater thermostats or in the absence of such thermostats, in a conspicuous location.

! WARNING NOT FOR RESIDENTIAL USE.

This heater is not approved in any residential application. This includes (but is not limited to) the home, living quarters, attached garages, etc. Installation in residential indoor spaces may result in property damage, asphyxiation, and serious injury or death.

! IMPORTANT: SAVE THIS MANUAL FOR FUTURE REFERENCE.

SUNSTAR HEATING PRODUCTS, INC.

⚠ CAUTION

WHAT TO DO IF YOU SMELL GAS:

- ! DO NOT try to light any appliance. Extinguish any open flame. Open windows.
- ! 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.

⚠ WARNING

- ◆ Installation and service must be performed by a qualified installer, service agency or the gas supplier.
- ◆ If the information in these instructions is not followed exactly, a fire or explosion may result causing property damage, personal injury or death.
- ◆ DO NOT store or use gasoline or other flammable vapors and liquids in the vicinity of this or any other appliance.

⚠ 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.

TABLE OF CONTENTS

| <i>SECTION</i> | <i>DESCRIPTION</i> | <i>PAGE</i> | <i>SECTION</i> | <i>DESCRIPTION</i> | <i>PAGE</i> |
|----------------|---|-------------|----------------|--|-------------|
| 1) | Safety | 2 | 11) | Ventilation | 13 |
| 2) | Installer Responsibility | 2 | 12) | Lighting and Shutdown Instructions | 14 |
| 3) | General Information | 2 | 13) | Sequence of Operation | 15 |
| 4) | Minimum Clearances To Combustibles | 4 | 14) | Cleaning and Annual Maintenance | 15 |
| 5) | SG Series Specifications | 6 | 15) | Burner Operation/Troubleshooting | 16 |
| 6) | SG Series Dimensions | 7 | 16) | Optional Parabolic Reflector Extension | 18 |
| 7) | Hanging | 7 | 17) | Optional Protective Reverb Screen | 18 |
| 8) | Gas Connections and Regulation | 7 | 18) | Replacing Parts | 18 |
| 9) | Instructions for Pressure Test Gauge Connection | 9 | 19) | Installation Data | 18 |
| 10) | Electrical Connections | 11 | 20) | Replacement Parts Guide | 19 |
| | | | 21) | Warnings Card | 20 |

This heater complies with Z83.19 (current standard) and CSA 2.35. 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) SAFETY

This heater is a self-contained infrared radiant ceramic 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) INSTALLER RESPONSIBILITY

The installer is responsible for the following:

- The heater installation, 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 87lbs.
- Supply the owner with a copy of these Installation and Operation Instructions.
- 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.

3) GENERAL INFORMATION

This heater is a self-contained infrared radiant ceramic 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**.

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

«Installation à l'intérieur seulement. Ne pas installer dans un logement.»

WARNING



NOT FOR RESIDENTIAL USE

Installation of an infrared heater system in residential indoor spaces, attached garages, living quarters, solariums, RV's, mobile homes, etc. may result in property damage, asphyxiation, fire, serious injury or death.

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 (PROPANE 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 a PROPANE container or propane cylinder without directions from your propane company. PROPANE containers (propane cylinders) must not be stored indoors or in the vicinity of any gas-burning appliance.
- Building owner and occupants 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.
- 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.
- Installation and repair should be done by a licensed contractor qualified in the installation and service of gas heating equipment. The heater should be inspected before use and at least annually by a qualified service person. More frequent cleaning may be required as necessary. It is imperative that the control compartment, air passageways and burner of the heater be kept clean.

INSTALLATION REQUIREMENTS

Installation of this heater must conform with local building codes or, in the absence of local codes, with the National Fuel Gas Code, ANSI Z223.1/NFPA 54, or the Natural Gas and Propane Installation Code, CSA B149.1. In Canada, the installation must conform to current CSA B149.1 (The Natural Gas and Propane Installation Code) in the absence of local codes. 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 (The 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 Heating Products, Inc.** will not recognize the warranty for any use other than space heating.

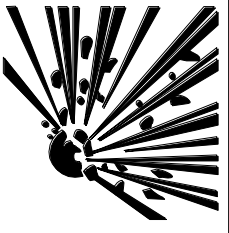
This heater is for Indoor Installation only and can be used in Unvented mode. The term Unvented actually means Indirect Vented. While the products of combustion are expelled into the building, national codes require 4 CFM/1000 BTU of heater input ventilation in the building to dilute these products of 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.

⚠ 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.

4) MINIMUM CLEARANCES TO COMBUSTIBLES

| ⚠ WARNING | | |
|---|---|--|
|  |  | <p>FIRE AND EXPLOSION HAZARD</p> <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> |

| ⚠ WARNING | | |
|---|---|---|
|  |  | <p>FIRE AND EXPLOSION HAZARD</p> <p>Always maintain minimum clearances and post signs where needed. Signs should state the hazards for the particular application and be legible to the building occupants. Consult the factory or a factory representative for additional information on signage compliance.</p> <p>Failure to do so may result in fire and/or explosion, property damage, serious injury or death.</p> |

For maximum safety the building must be evaluated for hazards before installing the heater system. Examples include, but are not limited to:

- Gas and electrical lines
- Combustible and explosive materials
- Chemical storage areas
- Areas of high chemical fume concentrations
- Provisions for accessibility to the heater
- Adequate clearances around the openings
- Combustion and ventilating air supply
- Vehicles parking areas
- Vehicles with lifts or cranes
- Storage areas with stacked materials
- Lights
- Sprinkler heads
- Overhead doors and tracks
- Dirty, contaminated environment

A critical safety factor to consider before installation is the clearances to combustible materials. Clearance to combustibles is defined as the minimum distance you must have between the infrared surface, or reflector, and the combustible item. Considerations must also be made for moving objects around the infrared heater. The following is a partial list of items to maintain clearances from:

Combustible Items Include:

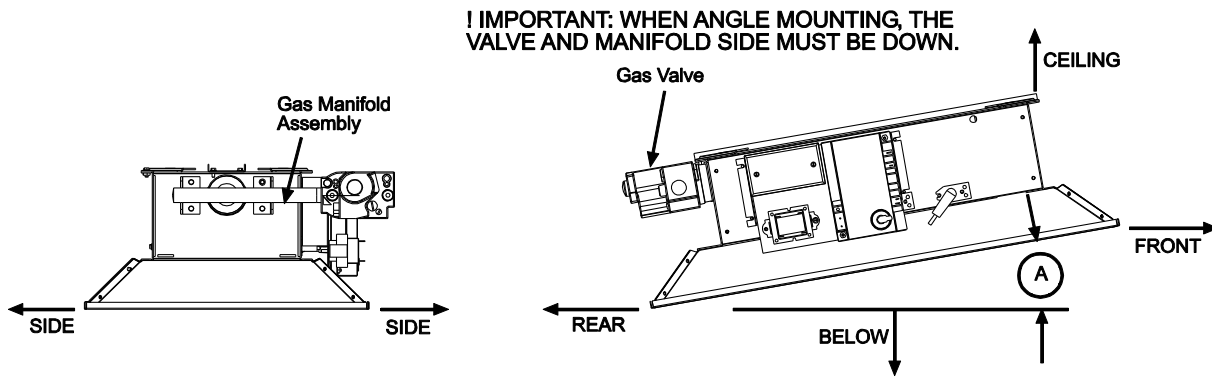
- Wood
- Paper
- Fabric
- Chemicals
- Wall or roof insulation

Moving Objects Include:

- Overhead doors
- Vehicles on lifts
- Cranes
- Hoists
- Car wash equipment

When installing the infra-red heater system, the minimum clearances to combustibles must be maintained. These distances are shown in Chart below and on the heater. If you are unsure of the potential hazards, consult your local fire marshal, fire insurance carrier or other qualified authorities on the installation of gas fired infra-red heaters for approval of the proposed installation. Install the warnings card supplied with each heater and complete the blank spaces using the clearances from combustibles table below. See Section 21 for a printed copy of the warnings card.

Minimum clearances shall be measured from the outer surfaces as shown below:



| MINIMUM CLEARANCES TO COMBUSTIBLES | | | | | | | | | | |
|------------------------------------|----------------------|---------|----------------------|-----------------------|----------------------|-----------------------|----------------------|-----------------------|------|---|
| MODEL | Mounted Horizontally | | | | Mounted at 35° Angle | | | | | Angle Mounting (degree) 0° min 35° max |
| | SIDES | CEILING | BELOW | | BELOW | | FRONT | | REAR | |
| | | | w/Standard Reflector | w/Reflector Extension | w/Standard Reflector | w/Reflector Extension | w/Standard Reflector | w/Reflector Extension | | |
| SG3 and SG4 | 31" | 37" | 73" | 101" | 73" | 101" | 37" | 51" | 31" | |
| SG6 and SG8 | 49" | 49" | 99" | 138" | 99" | 138" | 49" | 69" | 37" | |
| SG10 and SG12 | 49" | 65" | 129" | 181" | 129" | 181" | 61" | 85" | 49" | |
| SG13,SG14 and SG15 | 61" | 65" | 137" | 191" | 137" | 191" | 65" | 91" | 49" | |

NOTE: The clearance to combustible materials noted above must be maintained at all times and the same clearance distances must be adhered to from any other materials that may be damaged by temperatures 90F above the ambient temperature. It is the installer's responsibility to ensure that building materials with a low heat tolerance (such as plastic, vinyl siding, canvas, tri-ply etc.) which may degrade at lower temperatures are protected to prevent degradation. Clearances to combustibles are posted on the reflector near the control end of the heater.

⚠ WARNING INSTALLER

In locations used for storage of combustible materials where they may be stacked below the heater, NFPA 54 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. It is important to provide warnings to alert individuals of potential hazards and safety actions. Posted signs should state the hazards for the particular application and be legible to building occupants.

⚠ WARNING Fire sprinkler heads must be located at an appropriate distance from the heater. This distance may exceed the published clearance to combustibles. Certain applications will require the use of high temperature sprinkler heads or relocation of the heaters.

Sprinkler systems containing propylene glycol or other flammable substances are not to be used in conjunction with this heater without careful consideration for and avoidance of potential fire or explosion hazards. For further information consult NFPA 13. Always observe applicable state and local codes.

5) SG SERIES SPECIFICATIONS

| COMPLETE MODEL & SUFFIXES | BTU/HR INPUT | NUMBER OF BURNERS | ORIFICE SIZE* | | SHIPPING WEIGHT | MINIMUM MOUNTING HEIGHTS (FEET) |
|------------------------------|--------------|----------------------|--------------------|--------------------|-----------------|---------------------------------------|
| | | | <i>Natural Gas</i> | <i>Propane Gas</i> | | |
| SG3-N5C, N5D | 33,000 | 1 | 3/32" | n/a | 30 lbs. | 12 |
| SG4-N5C, N5D | 40,000 | 1 | #38 | n/a | 30 lbs. | 12 |
| SG6-N5C, N5D | 65,000 | 2 | 3/32" | n/a | 35 lbs. | 13 |
| SG8-N5C, N5D | 80,000 | 2 | #38 | n/a | 35 lbs. | 14 |
| SG10-N5C, N5D | 100,000 | 3 | #41 | n/a | 48 lbs. | 15 |
| SG12-N5C, N5D | 120,000 | 3 | #38 | n/a | 48 lbs. | 16 |
| SG14-N5C, N5D | 140,000 | 4 | #41 | n/a | 58 lbs. | 17 |
| SG15-N5C, N5D | 155,000 | 4 | #38 | n/a | 58 lbs. | 18 |
| SG3-L5C, L5D | 32,000 | 1 | n/a | #52 | 30 lbs. | 12 |
| SG6-L5C, L5D | 65,000 | 2 | n/a | #52 | 35 lbs. | 13 |
| SG10-L5C, L5D | 100,000 | 3 | n/a | #52 | 48 lbs. | 15 |
| SG13-L5C, L5D | 140,000 | 4 | n/a | #52 | 58 lbs. | 17 |

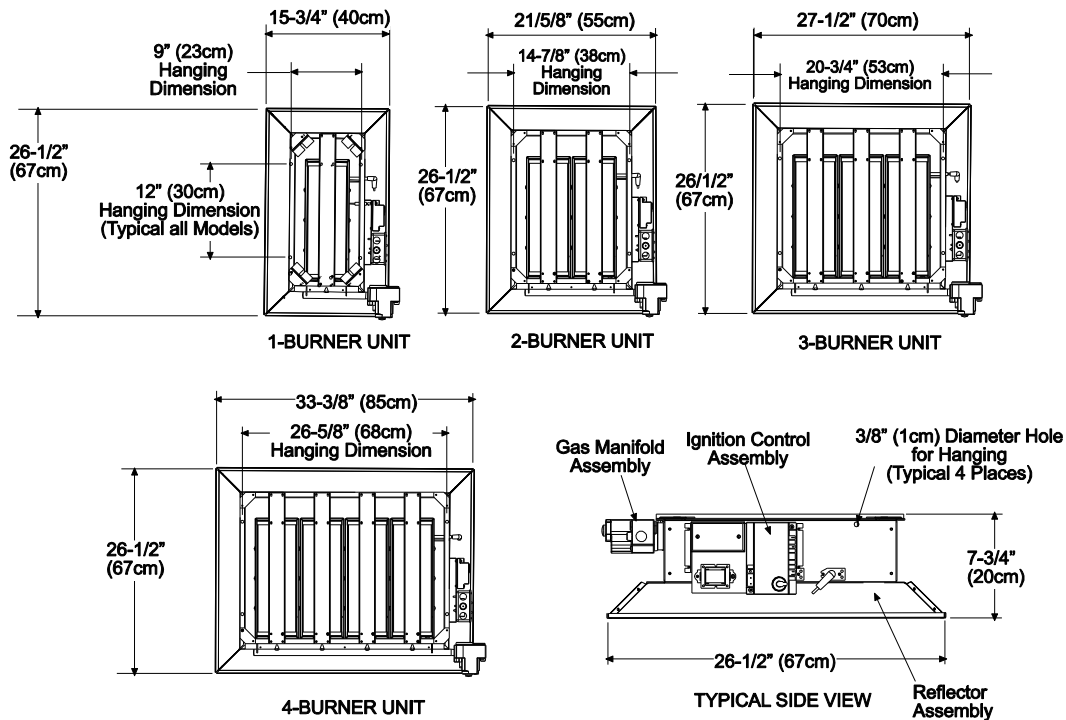
| MODEL SUFFIXES: | |
|----------------------------|--|
| Gas Type: | Ignition System: |
| N = Natural L = Propane | 5 = Direct Spark (115 Volt / 0.40 Amp / 60 Hz) |

| GAS-PIPE CONNECTION: |
|-------------------------|
| 1/2" NPT (Female) |


* One Orifice Per Burner

***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.

6) SG SERIES DIMENSIONS

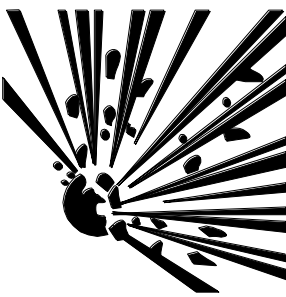


7) HANGING

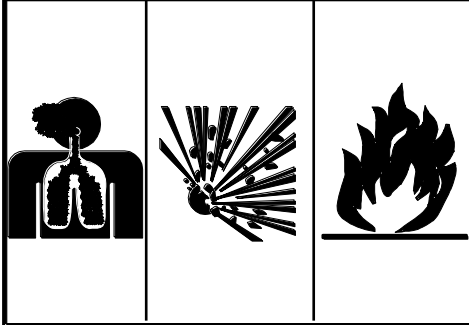
| ⚠ WARNING | |
|---|---|
|  | <p>SUSPENSION HAZARD</p> <p>Always suspend from a permanent part of the building structure that can support the total force and weight of the heater.</p> <p>Never use the heater to support a ladder or other access equipment.</p> <p>Improper suspension of the infrared heater may result in collapse and being crushed.</p> <p>Failure to do so may result in death, serious injury or property damage.</p> |

The heater can be mounted with the reflector horizontal or angled up to 35° from horizontal. When the heater is to be angle mounted, make sure the gas manifold assembly is on the lower side of the heater. Coil chains (No. 2 or larger) or rigid supports may be used to mount the heater, which must be suspended from a permanent structure with adequate load capacity. The gas manifold assembly tube must be level, and for angled mounting, it must be at the LOWER end of the heater. All "S" hooks and eyebolts must be manually crimped closed by the installer.

8) GAS CONNECTIONS AND REGULATION

| ⚠ WARNING | |
|---|--|
|  | <p>FIRE AND EXPLOSION HAZARD</p> <p>An approved connector, suitable for the environment of equipment usage, is required. Visible or excessive swaying, flexing and vibration of the gas connections must be avoided to prevent failure. Neither the gas pipe nor the connector shall be placed in the "flue discharge area". In no case shall the gas supply support the weight of the heater.</p> <p>Failure to do so may result in death, serious injury or property damage.</p> |

⚠ WARNING



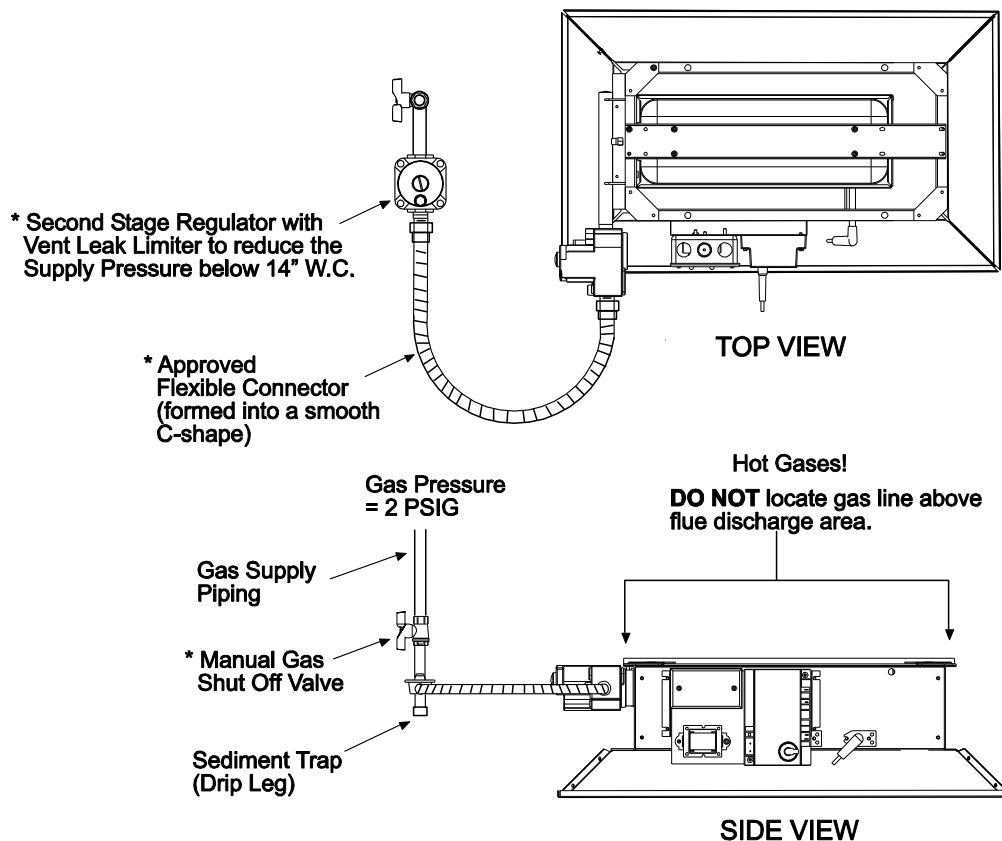
FIRE AND EXPLOSION HAZARD

Tighten the flexible gas hose and components securely.

Improperly connected gas lines may result in fire, explosion, poisonous fumes, toxic gases, asphyxiation or death. Connect gas lines in accordance to national, state, provincial and local codes.

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

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.
2. All gas supply lines must be located in accordance with the required clearances to combustibles below the heater as listed on the nameplate of the heater.
3. Pipe joint compounds must be resistant to the action of liquefied petroleum gases.
4. Where local codes do not prohibit, a CSA or U.L. approved flexible connector (minimum 5/8" I.D.) is recommended between the rigid piping and the heater. A union and an approved shut-off valve should be installed before the control valve inlet. The shut-off valve should be installed within 6 feet of the union.



* Available as Accessories

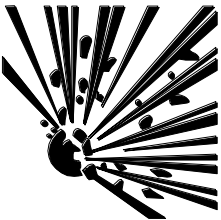
TYPICAL GAS CONNECTIONS

5. This appliance is equipped with a snap-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 use a line regulator as indicated in the following illustration, or a line regulator which corresponds to the supply pressure.
6. If a second stage regulator is used and gas seeps through it, 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.
7. 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. Turn the gas pressure on and check for leaks. To check for leaks, apply a soapsuds solution to all connections and joints or check by one of the methods listed in Appendix D of the National Fuel Gas Code, ANSI Z223.1-(latest edition).

Certified connections are recommended to be installed as shown, in one plane, and without sharp bends, kinks or twists. The gas take off from the supply line must be parallel to the burner gas inlet connection.

If the maximum supply pressure is less than 1/2 psig, a second stage regulator is not required.

⚠ WARNING



Testing for gas leaks with an open flame or other sources of ignition may lead to a fire or explosion and cause serious injury or death. Test in accordance with NFPA or local codes.

9) INSTRUCTIONS FOR PRESSURE TEST GAUGE CONNECTION

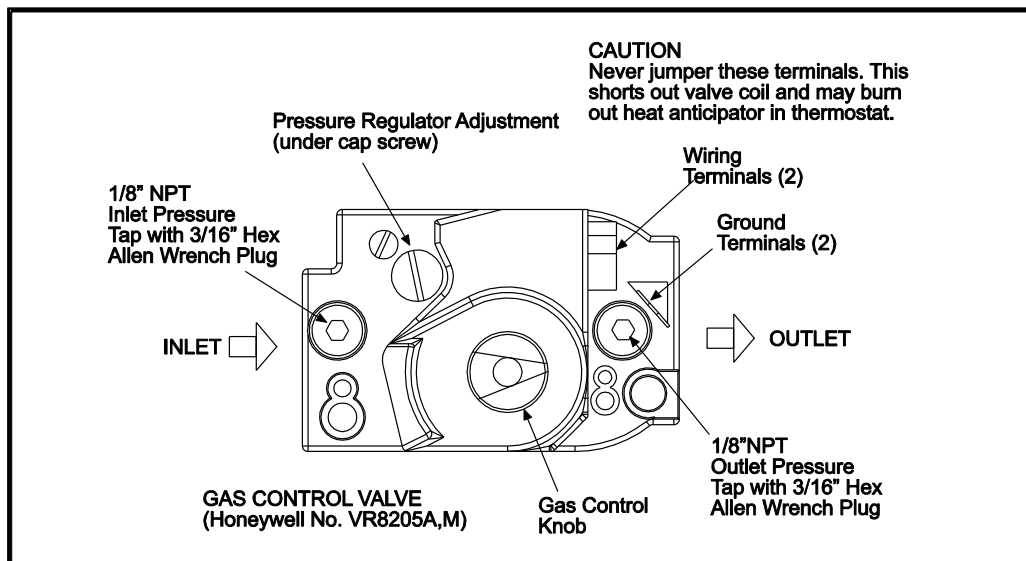
SUPPLY PRESSURE

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

OUTLET GAS PRESSURE CHECK AND ADJUSTMENTS (HONEYWELL 1-STAGE GAS VALVES)

1. Turn the gas valve to the "OFF" position. Remove the 1/8" plug from the combination gas valve at the outlet pressure tap and connect a 1/8" N.P.T. nipple to the tapped hole. Connect gauge to nipple. Turn on the gas supply.

Model Suffix 5C



2. With the main burner operating, check the burner manifold pressure using a water manometer. Gauges that measure pressure in pounds per square inch are not accurate enough to measure or set the manifold pressure. Use a water manometer or a gauge calibrated in inches of water column. All measurements **MUST BE** made when this heater and all other gas burning equipment that is connected to the gas supply system are operating at maximum capacity.
3. The combination gas valve is factory set and should not require adjustment. If full rate adjustment is required, remove the cover screw. Using a small screwdriver, turn the adjustment screw clockwise ⤴ to increase or counterclockwise ⤵ to decrease the gas pressure to the burner. Replace the cover screw.

OUTLET GAS PRESSURE CHECK AND ADJUSTMENTS (WHITE-RODGERS 1 STAGE) 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 is 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 prior to connecting manometer hoses.
2. Turn the outlet pressure boss test screw (3/32" Hex allen wrench plug) 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 figure below). If regulator needs to be adjusted, see instructions below.

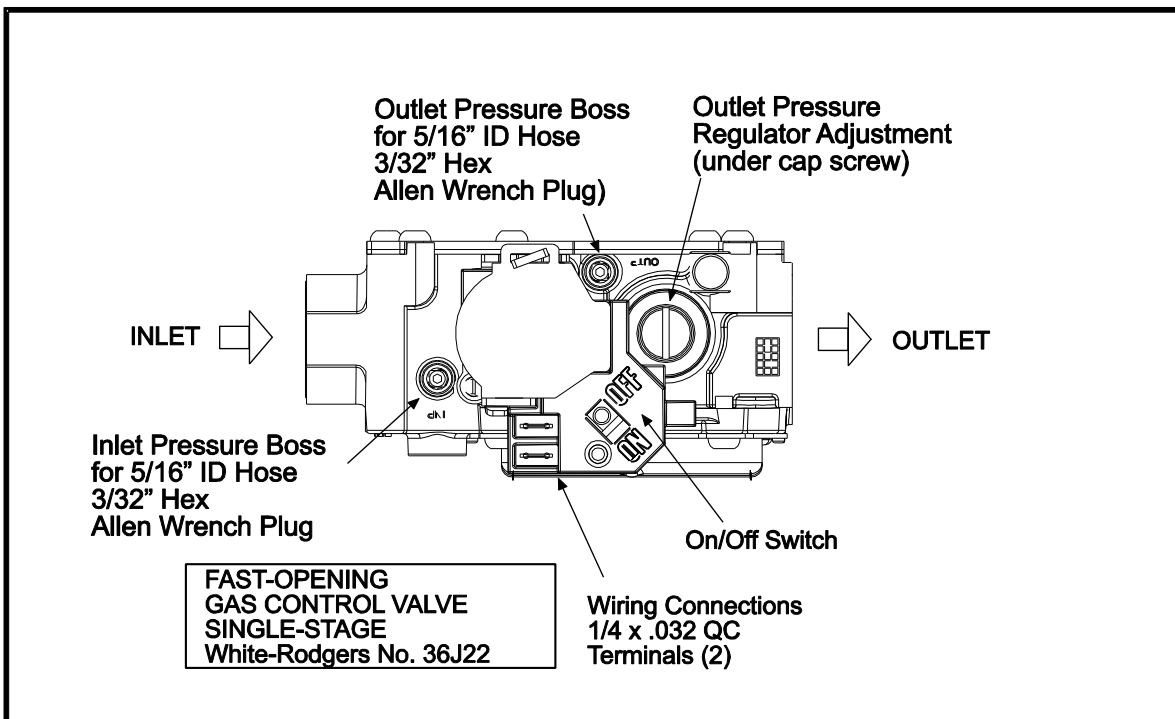
To Adjust Regulator (1-stage gas valves):

1. Turn on power and energize the main gas valve. Remove regulator cover screw (see figure 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.

Model Suffix 5D

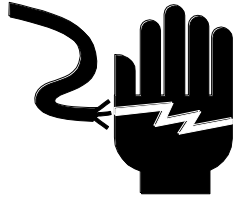


| GAS PRESSURE TABLE | | | | |
|---------------------------------|----------|-------------------|-----------------|----------|
| HEATER MODEL | GAS TYPE | MANIFOLD PRESSURE | SUPPLY PRESSURE | |
| | | | *Minimum | Maximum |
| SG (3, 4, 6, 8, 10, 12, 14, 15) | Natural | 6" W.C. | 7" W.C. | 14" W.C. |
| SG (3, 6, 10, 13) | Propane | 10" W.C. | 11" W.C. | 14" W.C. |

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

10) ELECTRICAL CONNECTIONS

⚠ WARNING



ELECTRIC SHOCK HAZARD

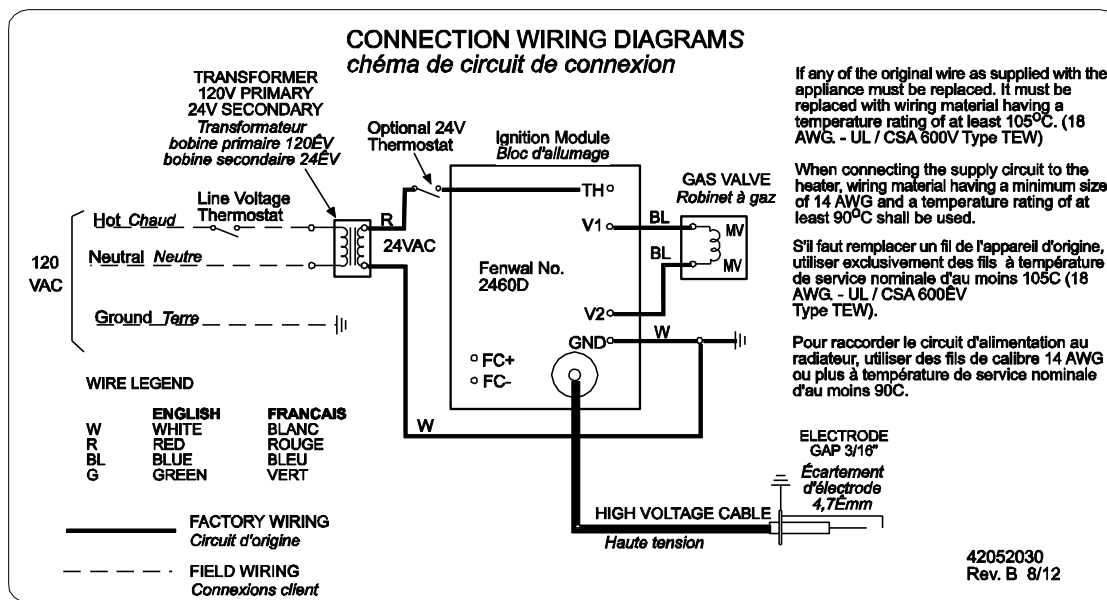
Disconnect electrical power and gas supply before servicing.

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

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

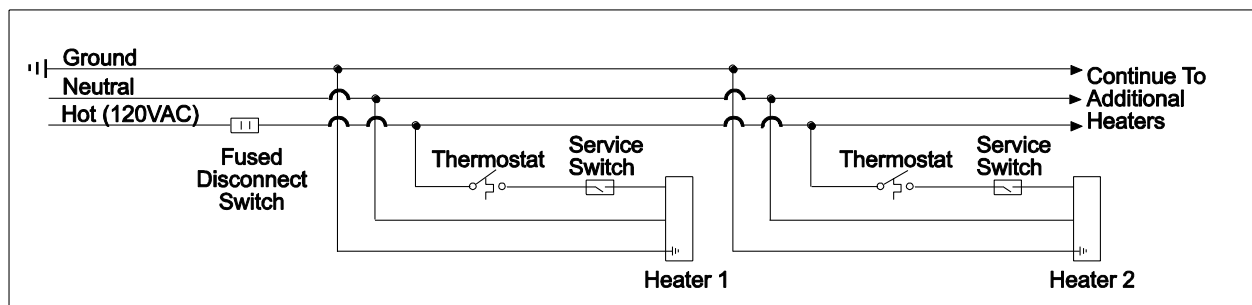
1. All electric wiring shall conform to the latest edition of the National Electrical code (ANSI/NFPA No. 70), or the code legally authorized in the locality where the installation is made.
2. The unit must be electrically grounded in accordance with the National Electrical code (ANSI/NFPA No. 70- latest 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 below 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.

CONNECTION WIRING DIAGRAM – Direct Spark Ignition

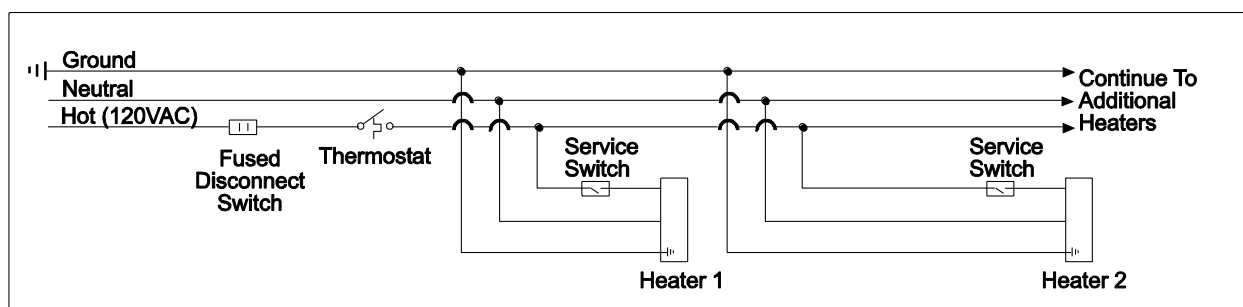


FIELD CONNECTION AND THERMOSTAT WIRING DIAGRAMS

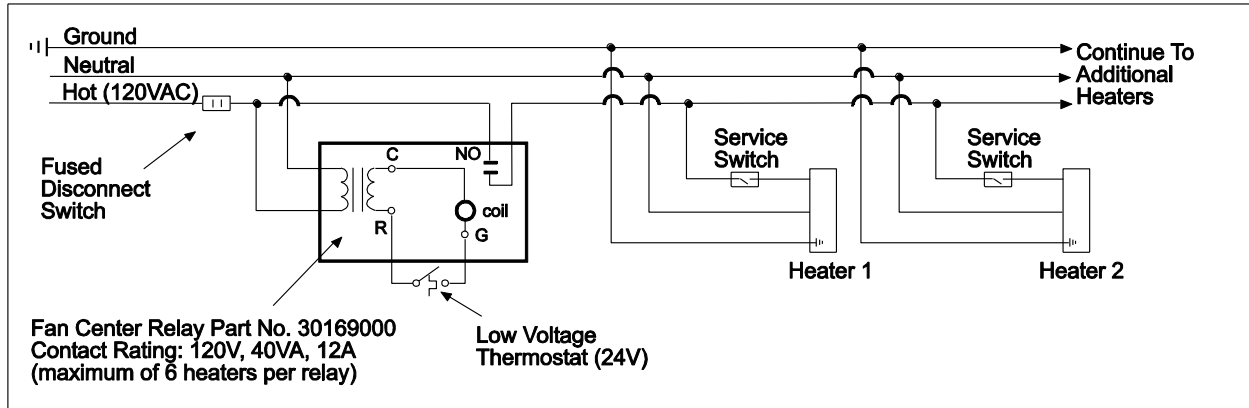
A. LINE VOLTAGE (120V) THERMOSTAT CONNECTIONS – SINGLE HEATER PER THERMOSTAT



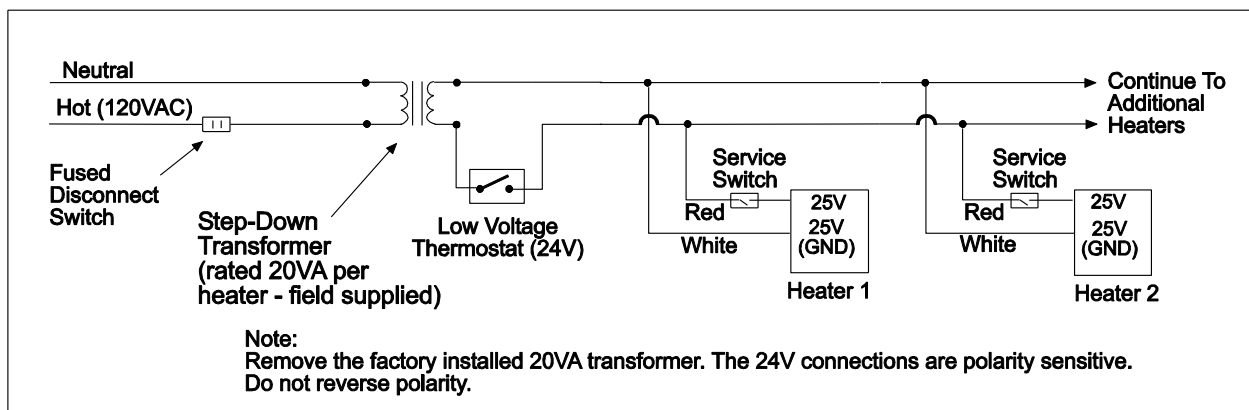
B. LINE VOLTAGE (120V) THERMOSTAT CONNECTIONS – MULTIPLE HEATERS PER THERMOSTAT



C. LOW VOLTAGE (24V) THERMOSTAT CONNECTIONS - MULTIPLE HEATERS PER THERMOSTAT - (POWER SUPPLIED FROM FAN CENTER RELAY)

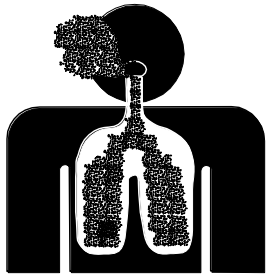


D. LOW VOLTAGE (24V) THERMOSTAT CONNECTIONS - MULTIPLE HEATERS PER THERMOSTAT - (POWER SUPPLIED FROM STEP-DOWN TRANSFORMER)



11) VENTILATION

⚠ WARNING



CARBON MONOXIDE HAZARD

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

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

Where unvented infrared heaters are used, natural or mechanical means shall be provided to supply and exhaust at least 4 cfm per 1000 Btu per hr input of installed heaters.

Exhaust openings for removing flue products shall be above the level of the heaters.

This heater requires ventilation in the building to dilute the products of combustion and provide fresh air for efficient combustion. Power ventilation is recommended and the minimum vent flow required is as follows:



| | | | |
|-----|---------|------------|---------|
| SG3 | 140 cfm | SG10 | 400 cfm |
| SG4 | 160 cfm | SG12 | 480 cfm |
| SG6 | 280 cfm | SG13, SG14 | 560 cfm |
| SG8 | 320 cfm | SG15 | 640 cfm |

If gravity ventilation is used, the required square feet of inlet and outlet vent area (depending on height and temperature difference) is as follows:

| | | | |
|-----|----------|------------|----------|
| SG3 | 0.49 s/f | SG10 | 1.48 s/f |
| SG4 | 0.57 s/f | SG12 | 1.72 s/f |
| SG6 | 0.98 s/f | SG13, SG14 | 1.97 s/f |
| SG8 | 0.98 s/f | SG15 | 2.30 s/f |

The General Ventilation Rules outlined in ASHRAE GUIDE AND DATA BOOK should be observed when locating vents. Exhaust vents must be located at the highest point above and in the vicinity of the heaters and the inlet vents must be located below the level of the heaters. Inlet openings in the building should be well distributed high in the sidewalls and should direct incoming air upward to dilute products of combustion while preventing drafts at lower levels. Inlets are typically 1 to 3 sq. ft. Local codes may require that mechanical exhaust systems be interlocked with thermostats to function simultaneously.

12) LIGHTING AND SHUTDOWN INSTRUCTIONS

| ⚠ WARNING | | |
|--|--|---|
| ELECTRIC SHOCK AND FIRE HAZARD | | |
|  |  | <p>Disconnect power to heater before servicing.</p> <p>Do not operate unit if repairs are necessary. Do not operate unit showing any signs of burner malfunction. Call a professional for assistance.</p> <p>Failure to do so may result in death, serious injury or property damage.</p> |

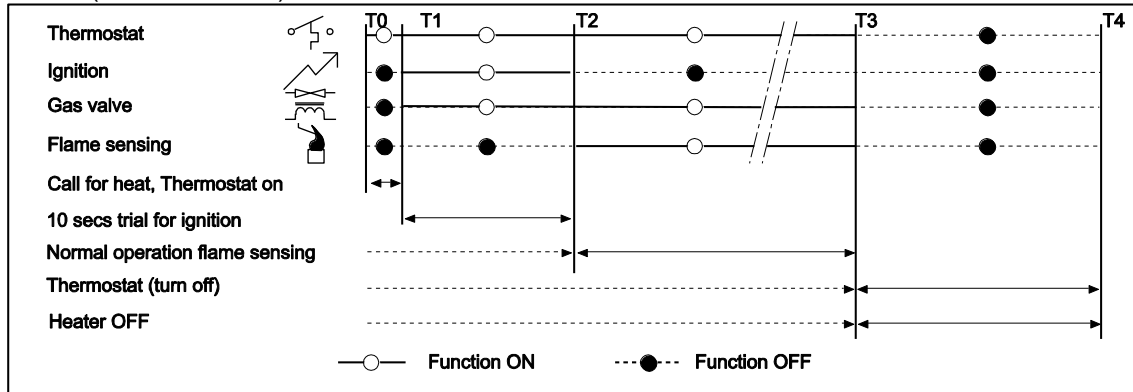
DIRECT SPARK IGNITION SYSTEM (Ignition Suffix "5")

1. Turn on the gas supply.
2. Set the thermostat to call for heat.
3. Ignition should occur immediately.
4. If the burner fails to light, or flame is not detected during the first trial for ignition (a period of approximately **10 seconds**) the gas valve is de-energized and the control goes through an interpurge delay of approximately **15 seconds** before another ignition attempt. The control will attempt two additional ignition trials before going to lockout, and the valve will be de-energized immediately.
5. If the heater does not light, shut off the gas completely for **5 minutes** before attempting to relight.
6. **CAUTION:** The heater must be grounded. Poor grounding will give nuisance lockouts, particularly during momentary power interruptions.
7. To shut down the heater, turn off the gas and the electrical supply.

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

13) SEQUENCE OF OPERATION

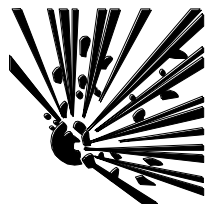
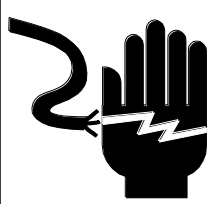
The chart below shows the sequence of operation for the normal operating cycle of the heater when connected to a permanent 120V power supply and the heater is turned on and off by a remote 120V thermostat. (See Section 10)



If the flame is not sensed during sequence T2 then the burner will automatically begin re-ignition sequence T1. The ignition sequence will be repeated three times with a 15 second inter-purge. If the flame is not reestablished the heater will go to lockout.

14) CLEANING AND ANNUAL MAINTENANCE

⚠ WARNING



ELECTRIC SHOCK & EXPLOSION HAZARD

Disconnect electrical power and gas supply before servicing.

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

⚠ CAUTION



EQUIPMENT FAILURE HAZARD

Do not blow out heating elements with high pressure air.

Failure to do so may result in property damage.

This heater consists of multiple individual atmospheric burners. Due to the variation in tile porosity, there could be color variations between the burners. This is natural and should not be a cause for concern during the initial startup.

This heater must be cleaned and serviced at least once before the start of each heating season or at any time the infrared emitter shows signs of collecting any foreign material on its surface or in the ports, or when anything obstructs the venturi or the screen. Maximum heating efficiency and clean combustion will be maintained by keeping the emitter and burner clean. To clean the heater, follow these instructions: 1. Turn off all electrical and gas supply to the heater. 2. Clean the reflector. 3. Remove the main burner orifice and clean it thoroughly. 4. Check the venturi opening to be sure it is clean. If there is any evidence of dirt accumulation in the venturi, remove it.

15) BURNER OPERATION/TROUBLESHOOTING

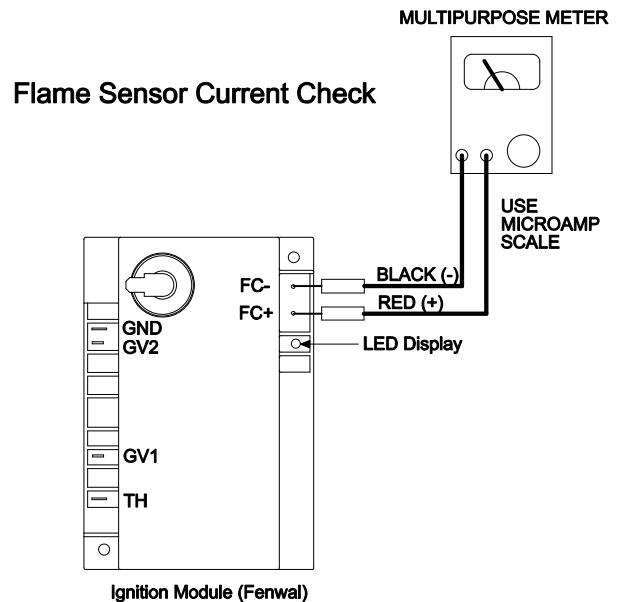
A) IGNITION MODULE DIAGNOSTICS

The LED located on the ignition module (see Figure) will flash ON for ¼ second, then OFF for ¼ second during a fault condition. The pause between fault codes is 3 seconds.

| LED Indication | Error Mode |
|----------------|--------------------------|
| Steady On | Internal Control Failure |
| 2 Flashes | Flame Sense Fault |
| 3 Flashes | Ignition Lockout |

B) FLAME SENSOR TESTING

The flame current is the current that passes through the flame from the sensor to the ground. The minimum flame current necessary to keep the system from lockout is 0.7 microamps. To measure the flame current, connect an analog DC microammeter to the FC- and FC+ terminals per diagram. The meter should read 0.7 μ A or higher when the burner is running full on. If the meter reads below zero, the meter leads are reversed. Disconnect power and reconnect the meter leads for proper polarity.

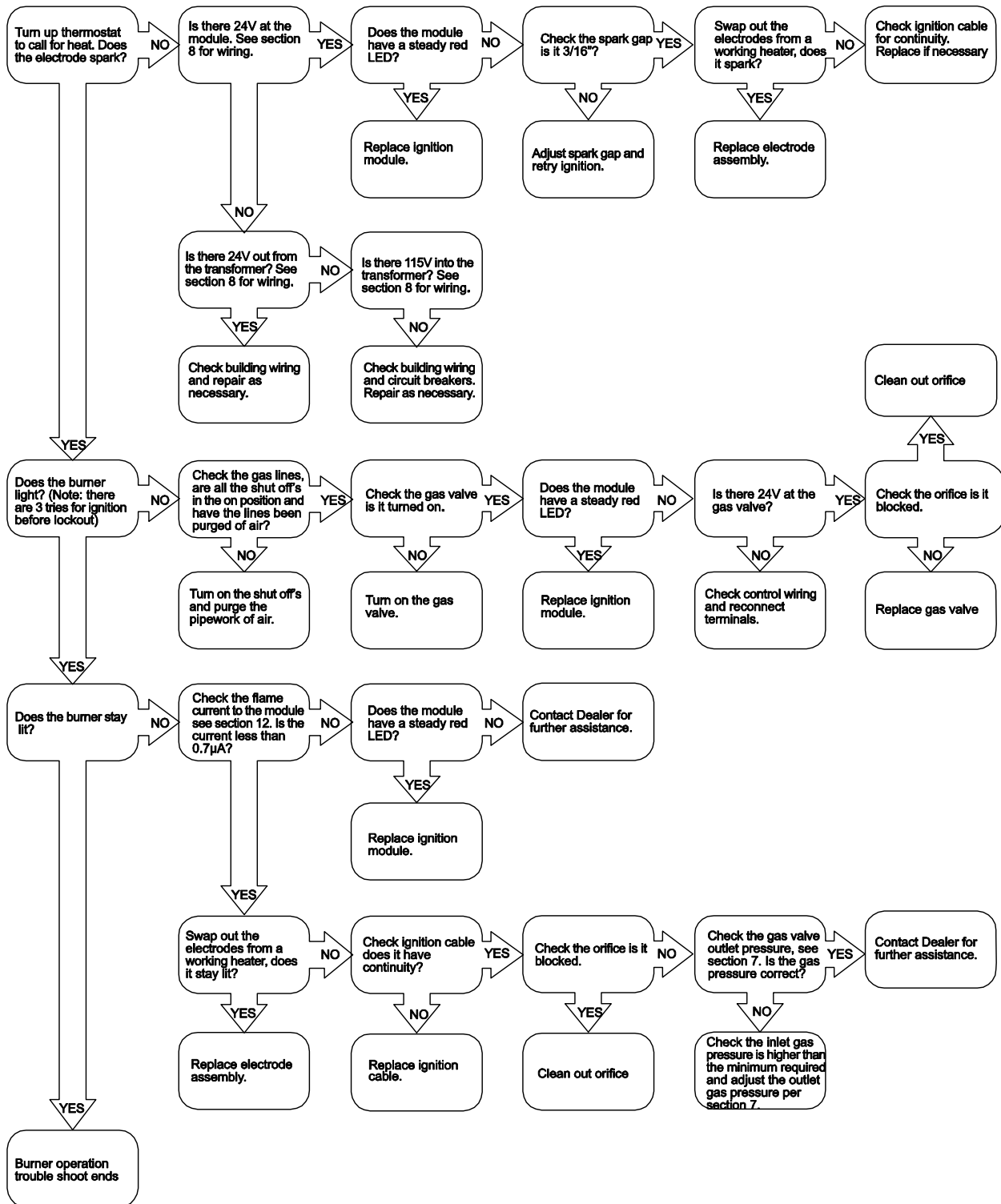


C) TROUBLESHOOTING CHART

| TROUBLE | POSSIBLE CAUSE | SOLUTIONS |
|--|---|---|
| <i>Heater is not glowing red...</i> | <ul style="list-style-type: none"> □ The supply gas pressure is too low. □ Improper size of gas piping. □ The orifice is clogged. □ Incorrect orifice size. | <ul style="list-style-type: none"> □ Check the manifold gas pressure and adjust if necessary. □ If you are not sure of the performance, use the NFPA 54 gas pipe sizing table. □ Clean the orifice. □ See the instructions for correct orifice size and replace if necessary. |
| <i>Heater will not attain the desired temperature...</i> | <ul style="list-style-type: none"> ♦ There is insufficient heat in the building for heat loss (i.e., not enough heaters). □ The thermostat sensing bulb is incorrectly placed. □ The thermostat is out of calibration. | <ul style="list-style-type: none"> □ Conduct heat loss and add heaters or other source of heat as necessary. □ Reposition as necessary for proper operation. NOTE: The sensing bulb should be shielded from direct radiation to prevent short cycling of the heater. □ Recalibrate (if possible) or replace. |
| <i>Flames flaring up, outside of emitter surface...</i> | <ul style="list-style-type: none"> □ The gas pressure is too high. □ Incorrect orifice size. □ Incorrect type of gas supplied to the heater. □ Not enough combustion air. | <ul style="list-style-type: none"> □ Check the manifold gas pressure and adjust if necessary. □ See instructions for correct orifice size and replace if necessary. □ Check the nameplate to identify the correct type of gas the heater is equipped to operate. □ Clean the emitter with compressed air. |

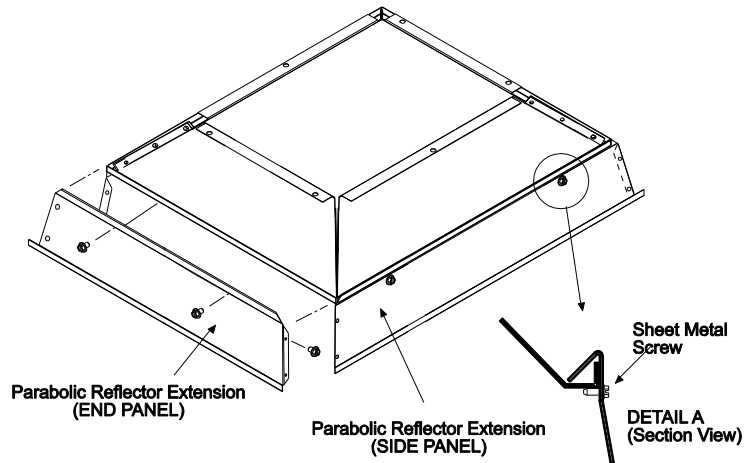
C) TROUBLESHOOTING CHART

(Continued)



16) OPTIONAL PARABOLIC REFLECTOR EXTENSION ASSEMBLY

The heater is completely factory assembled and requires no field assembly. If the optional parabolic reflector extension is utilized, locate and identify the end panels and side panels as shown in the following diagram. Attach the side panels as shown. Attach the end panels so that the end flanges of the end panels overlap the side panels. Attach the side panels and end panels together with the screws provided in the kit. Attach the remaining screws as shown in Detail A. This is to ensure that the Parabolic Reflector Extension is securely attached to the reflector. The clearances to combustibles (shown on the clearance label that is secured to the reflector on the control end of the heater and in Section 4 of these instructions) must be closely observed. *Please order the Parabolic Reflector Extension Kit using the Part Numbers below:*



| Model No. | Parabolic Reflector Extension Kit Number |
|------------------|--|
| SG3, SG4 | #43822010 |
| SG6, SG8 | #43822020 |
| SG10, SG12 | #43822030 |
| SG13, SG14, SG15 | #43822040 |

17) OPTIONAL PROTECTIVE REVERB SCREEN

The optional protective Reverb Screen acts as a safety net in the unlikely event that the ceramic tile assembly is broken by an outside force. In addition, it increases the overall emissivity of the radiating surface with a blackbody radiation effect. It is recommended in high-traffic areas as well as where improved radiant output is desired. *Please order the Protective Reverb Screen using the Part Numbers listed to the right:*

| Model No. | Reverb Screen Kit Number |
|------------------|--------------------------|
| SG3, SG4 | #43876010 |
| SG6, SG8 | #43876020 |
| SG10, SG12 | #43876030 |
| SG13, SG14, SG15 | #43876040 |

18) REPLACING PARTS

At all times when parts are being replaced, ensure that both the gas and electrical supplies are disconnected. Various parts are available from the factory for replacement by a licensed service person. Refer to the exploded parts guide in Section 20 for all replacement parts.

19) INSTALLATION DATA

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

Heater Serial Number: _____

Heater Model: **SG** _____

N = Natural Gas
L = Propane Gas

20) REPLACEMENT PARTS GUIDE

| ITEM# | PART # | DESCRIPTION |
|-------|----------|---|
| 1 | 30755040 | Valve-WR 36J22-232-propane gas @ 10" WC |
| 2 | 30755030 | Valve-WR 36J22-2xx-natural gas @ 6" WC |
| 3 | 30279000 | Transformer AT120B1051 |
| 4 | 30632030 | Spark Module, Fenwal #35-605950-015 |
| 5 | 30295020 | Electrode PSE-GF9 |
| 6 | 30567070 | Ignition Cable 7" |
| 7 | 43856029 | Burner Assembly Kit (Ignition Unit) |
| 8 | | |
| 9 | 43862010 | Manifold for SG3, SG4 |
| 10 | 43862020 | Manifold for SG6, SG8 |
| 11 | 43862030 | Manifold for SG10, SG12 |
| 12 | 43862040 | Manifold for SG13, SG14, SG15 |
| 13 | 43847010 | Reflector for SG3, SG4 |
| 14 | 43847020 | Reflector for SG6, SG8 |
| 15 | 43847030 | Reflector for SG10, SG12 |
| 16 | 43847040 | Reflector for SG13, SG14, SG15 |
| 17 | 43908010 | Frame Assembly (1 Burner Unit) |
| 18 | 4390802 | Frame Assembly (2 Burner Unit) |

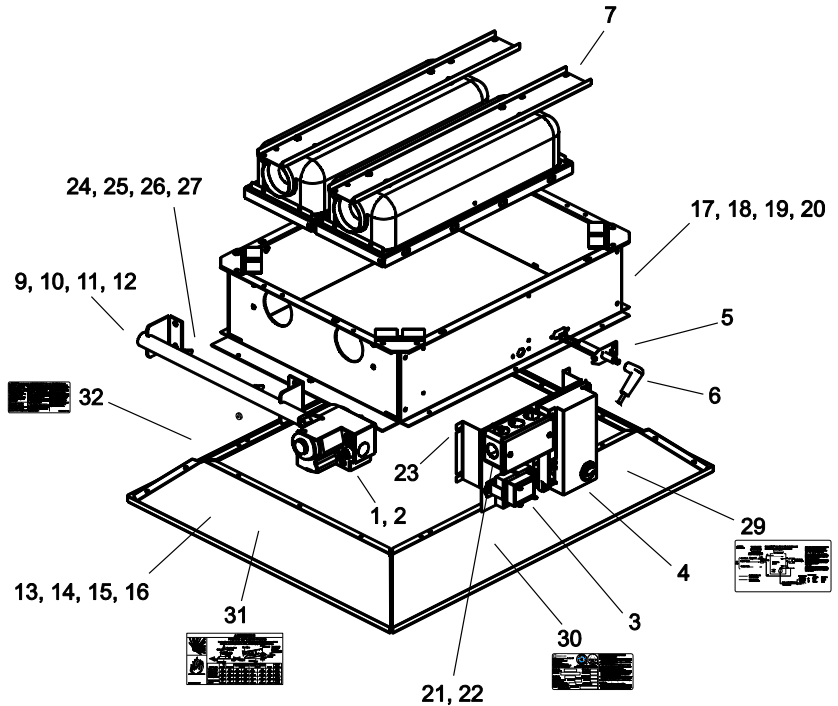
| ITEM# | PART # | DESCRIPTION |
|-------|----------|--|
| 19 | 43908030 | Frame Assembly (3 Burner Unit) |
| 20 | 43908040 | Frame Assembly (4 Burner Unit) |
| 21 | 03548000 | Junction Box, 2 x 4 x 1½ |
| 22 | 03606000 | Cover Plate |
| 23 | 43849000 | Ignition Control Bracket |
| 24 | 43872380 | Orifice #38 for SG4, SG8, SG12, SG15 - Natural Gas |
| 25 | 43872410 | Orifice #41 for SG10, SG14 - Natural Gas |
| 26 | 43872980 | Orifice 3/32" for SG3, SG6 - Natural Gas |
| 27 | 43872520 | Orifice #52 for SG3, SG6, SG10, SG13- Propane Gas |
| 28 | 43219020 | Installation and Operation Manual (Not Shown) |
| 29 | 42052030 | Label - Connection Wire Diagram |
| 30 | 42849020 | Label - Nameplate |
| 31 | 43247030 | Label - Clearances to Combustibles |
| 32 | 42875000 | Label - General Warnings |
| | | |
| | | |
| | | |
| | | |

IMPORTANT:

- Please order by Part Number, not by Item Number.
- Refer to complete Model Number when ordering.
- All replacement parts available when ordering.

Screws, nuts and washers are standard hardware items and can be purchased at any local hardware store.

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



21) WARNINGS CARD

This card is furnished with each heater. Additional copies may be ordered under part no. 43344980.

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



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

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

WARNING



FIRE HAZARD

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

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

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

Maintain Clearances to Combustibles to Prevent the Risk of Fire.

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

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

IF YOU SMELL GAS: _____

FOR YOUR SAFETY

! DO NOT try to light any appliance.

! DO NOT touch any electrical switch; **DO NOT** use any telephone in your building.

! IMMEDIATELY call your gas supplier from a neighbor's telephone. Follow the gas supplier's instructions.

If you cannot reach your gas supplier, call the fire department.

Installation Code and Annual Inspections:

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

SUNSTAR HEATING PRODUCTS, INC.

43344980
June 2014



LIMITED WARRANTY: SunStar Heating Products, Inc., the manufacturer, warrants to the original owner of any SunStar infrared gas heater that said heater will be free from defects in material or workmanship under normal use and service. The heater(s) shall be installed, used and maintained strictly in accordance with the manufacturer's instructions. The manufacturer's sole obligation under this warranty shall be limited to furnishing replacement parts, F.O.B. Charlotte, NC, for 12 months from the date of installation, or 18 months from the date of shipment by the manufacturer, whichever period shall expire first. Labor charges for removal of defective parts and the installation of the replacement parts are not included. This warranty applies only within the USA and Canada.

WARNING: Manufacturer's warranty shall not apply: (a) to damage to the heater when used in an atmosphere containing halogenated hydrocarbons or other corrosive chemicals. Some compounds in the air can be ingested into the equipment and can cause an accelerated rate of corrosion of some of the parts of the heating components. The use of such chemical compounds in or near the operating environment of the heater should be avoided where a longer heater life is desirable; (b) to any heater or components which have been repaired or replaced with other than factory parts, modified in any way, misused or damaged, or which have been used contrary to the manufacturer's written instructions. Replacement parts are available through SunStar distributors.

LIMITATION OF WARRANTY: THERE ARE NO WARRANTIES, EXPRESS OR IMPLIED, WHICH EXTEND BEYOND THE DESCRIPTION ON THE FACE HEREOF. WITHOUT LIMITING THE FOREGOING, THE MANUFACTURER EXPRESSLY EXCLUDES ANY AND ALL IMPLIED WARRANTIES, INCLUDING NOT LIMITED TO ANY IMPLIED WARRANTY OF FITNESS FOR PARTICULAR PURPOSES AND ANY IMPLIED WARRANTY OF MERCHANTABILITY FOR ITS PRODUCTS.

If any provision of this warranty is found to be void, unenforceable or unconscionable, then the same is hereby severed and the remainder of this warranty is hereby saved and shall remain in force.

EXCLUSIVE REMEDY: The sole and exclusive remedy under this warranty is the replacement of the defective parts or heaters as hereinabove specified. THE MANUFACTURER DOES HEREBY EXPRESSLY EXCLUDE ANY AND ALL LIABILITY FOR INCIDENTAL AND CONSEQUENTIAL DAMAGES UNDER THIS OR ANY OTHER WARRANTY. Without intending to limit the aforesaid exclusion, THE MANUFACTURER DOES HEREBY EXCLUDE ANY LIABILITY UNDER THIS OR ANY OTHER WARRANTY FOR INJURIES AND COMMERCIAL LOSS TO PROPERTY THAT RESULT FROM THE OPERATION, PROPER OR IMPROPER, OF ITS PRODUCTS.

The manufacturer will not be responsible for labor charges incurred for removal or installation of emitters. Any transportation charges involved in the return or repair are excluded.

ADDITIONAL TERMS: Manufacturer assumes no liability for delay in performing its obligations under the aforesaid warranty. Manufacturer assumes no liability for failure in performing its obligations there under if failure results directly or indirectly from any cause beyond its control, including but not limited to acts of God, acts of Government, floods, fires, shortages of materials, strikes and other labor difficulties or delays or failures of transportation facilities.

THIS IS A NON-RESIDENTIAL PRODUCT. Installation and service shall be by a Licensed Contractor and in accordance with National and Local Codes.

When presenting warranty claims, proof of date of purchase must be submitted.

No Representative is authorized to assume for the manufacturer any liability except as set forth above.

In case of claim under this warranty, contact: **SunStar Heating Products, Inc.**