

# Installation, Operation and Service Instructions

## WARM AIR HEATER



## Series AA250



### 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.

### OWNER

Retain this Manual & ensure available for service. Improper installation, adjustment, alteration, service or maintenance can cause injury, death or property damage. Read the installation, operation and service instructions thoroughly before installing or servicing this equipment

### FOR YOUR SAFETY

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

If you smell gas:

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

### INSTALLER

Provide Manual to Owner upon completion of installation!

Read and thoroughly understand these Instructions before attempting any installation

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**USA:** 315 N Madison Street, Fortville, IN 46040

[www.superiorradiant.com](http://www.superiorradiant.com)

### **CAUTION: FIRE OR EXPLOSION HAZARD**

Maintain clearance to combustible constructions as further specified in this manual. Failure to do so could result in a serious fire hazard. Heaters should not be located in hazardous atmospheres containing flammable vapors or combustible dusts. Signs should be provided in storage areas specifying maximum safe stacking height.

### **CAUTION: MECHANICAL HAZARD**

This equipment expands and contracts with each operating cycle. The gas connection, suspension hardware and the installation itself must safely allow this movement. Failure to do so could result in serious fire or explosion hazard.

### **CAUTION: FIRE OR EXPLOSION HAZARD**

This heater is equipped with an automatic ignition device. Do not attempt to light the burner by hand. Failure to comply could result in a serious fire and personal injury hazard.

### **CAUTION: MECHANICAL HAZARD**

Do not use high pressure (above 1/2 psi) to test the gas supply system with the burners connected. Failure to do so could result in damage to the burner and its control components requiring replacement.

### **CAUTION: SERVICE LIFE RISK**

Do not install equipment in atmospheres containing halogenated hydrocarbons or other corrosive chemicals. Failure to do so may lead to premature equipment failure and invalidation of the warranty.

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## INTRODUCTION

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

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

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

Superior Radiant Products offers more than 20 years of space heating expertise.

The series SRP AA250 is a warm air heater for agricultural installations.

### Important

The manufacturer's instructions, the layout drawing, national and local codes and ordinances, and all applicable standards which apply to gas piping and electrical wiring comprise the basic information needed to complete the installation. These criteria must be thoroughly understood before proceeding.

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

## Installation Codes

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

This heater complies with **ANSI/IAS LC2 and LC2a for U.S., and CAN1-2.20 for Canada**

### General Installation and Gas Codes

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

Not for use in residential dwellings, refer to Rating plate.

### Gas Supply Lines

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

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

### Electrical

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

### Venting

Refer to the National Fuel Gas Code, ANSI Z223.1 (NFPA 54) in the US and CSA B149.1 Installation Code in Canada, as well as all local requirements for general venting guidance.

## GENERAL SPECIFICATIONS

### Heating

Nominal Heat Input	BTU/H	250,000
Partial Heat Input	BTU/H	160,000
Ventilation Air Required	cfm	1000

### Supply Pressure

		Minimum
Natural Gas	In. W.C.	5
Propane	In. W.C.	11

### Burner Manifold Pressure

		Nominal Heat Input	Partial Heat Input
Natural Gas	In. W.C.	4	2
Propane	In. W.C.	10	4.6

### Inlet Connection

1/2" female NPT

### Electric Supply

Alternating current: Voltage 115 V, 60 Hz

Power consumption: 4 Amp

## DIMENSIONAL CHARTS

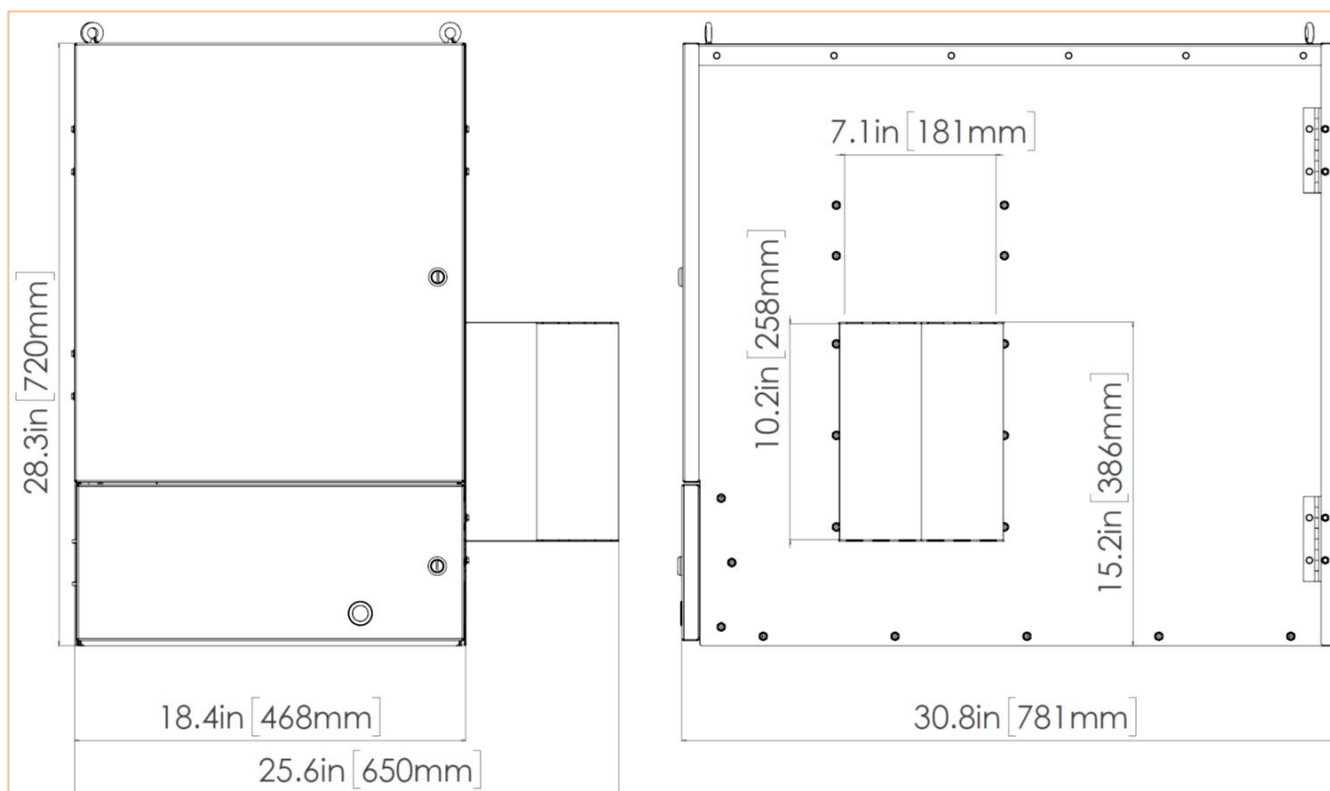


Figure 1 - Overall Dimensional Information

## PARTS OF THE HEATER

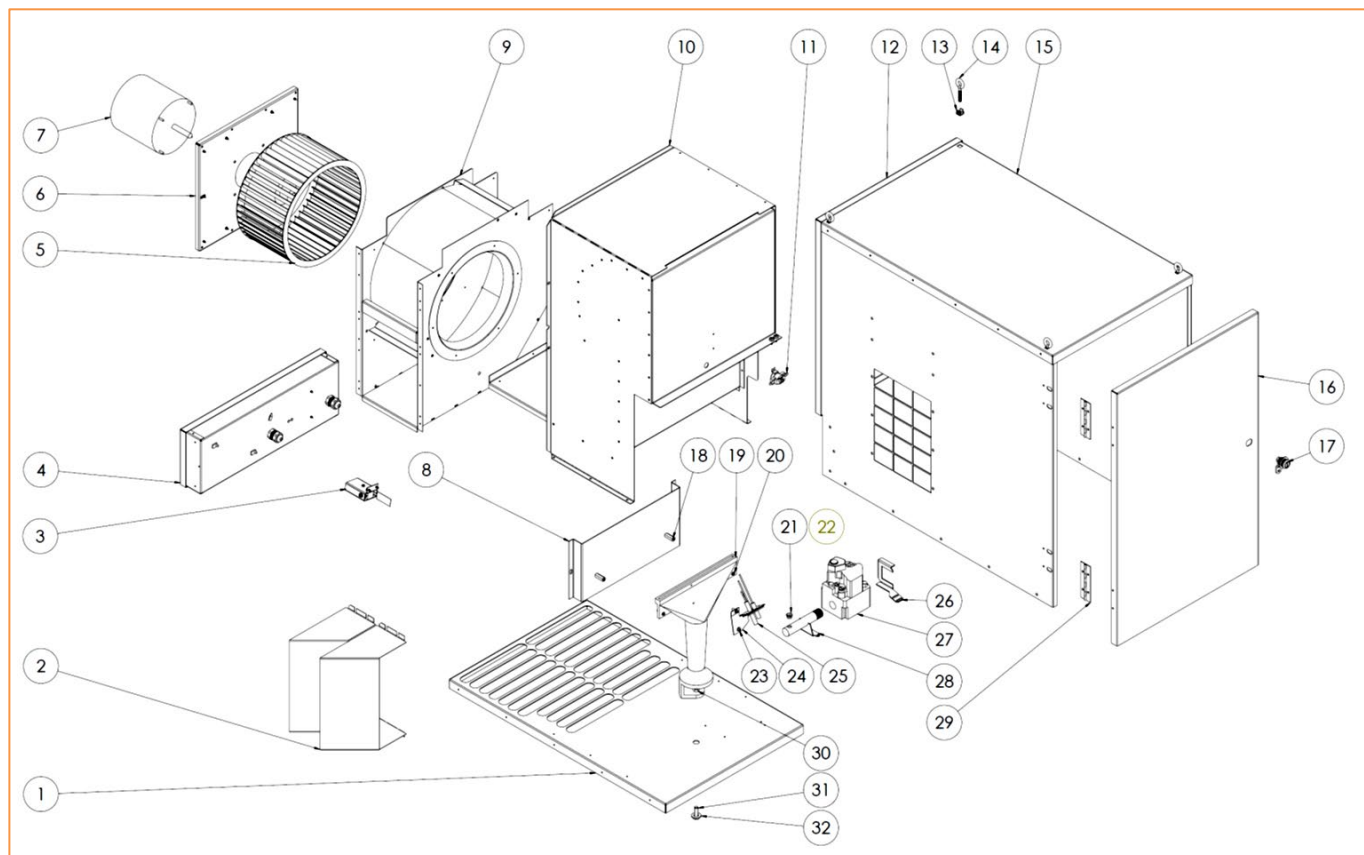
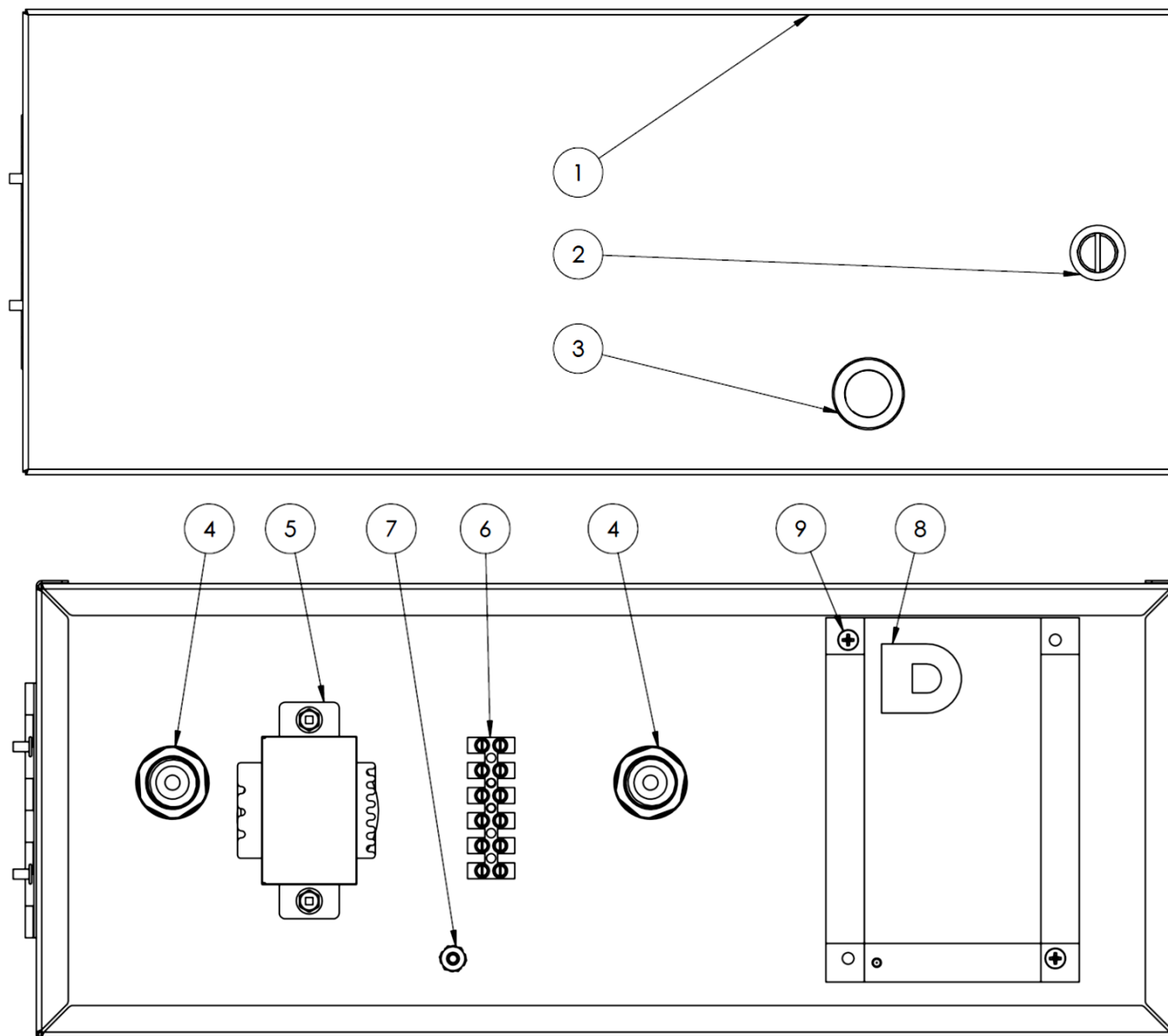


Figure 2 - General Overview

### General Assembly

Refer to Figure 2 for component identification.

No.	Qty	PN	Description	No.	Qty	PN	Description
1	1	BS044	Base	17	3	CH270	Door Latch
2	2	BS051	Vent	18	2	CH277	8-32 x 1" Male-Female Standoff
3	1	BE025	Air Proving Switch	19	1	BG004	Burner
4	1	BS036	Controls Box	20	2	CH119	8-32 x 1" Head Phillips Screw
5	1	BE013	Impeller	21	1	UG040	Orifice (Propane)
6	1	BS025	Motor Interface Plate	22	1	UG028	Orifice (Natural Gas)
7	1	BE012	Motor: 115V/60Hz, 1074 rpm	23	2	CH290	10-32 x 1/4" Head Phillips Screw
8	1	BS029	Burner Mount	24	1	BS045	Igniter Bracket
9	1	BS024	Blower Housing	25	1	VE002	Igniter/Flame Sensor
10	1	BS033	Heat Chamber	26	1	BS043	Valve Bracket
11	1	BE005	High Limit Switch	27	1	CG062	Valve NG W/R 2-Stage
12	1	BS040	Front Door	28	1	BG013	Burner Manifold
13	4	CH273	1/4"-20 Press-In Nut	29	5	CH272	Hinge
14	4	CH274	1/4"-20 Eyebolt	30	1	CH019	Nut, 5/16-18
15	1	BS042	Enclosure	31	1	CH100	Hex Bolt, 5/16-18 x 3/4"
16	1	BS041	Back Door	32	1	CH080	Washer, Flat, 1/2"



**Figure 3 - Controls Box (Closed and Open)**

No.	Qty	PN	Description
1	1	BS035	Lid
2	1	CH270	Door Latch
3	1	CH011	Sight Glass
4	2	CH285	PG13.5 Liquid Tight Fitting
5	1	CE058	TRANSFORMER 120/24V 40VA 50/60 Hz
6	1	VE096	Terminal Strip, 6-port
7	1	CH264	WELD BOLT #10-24 x 1", SS (Ground Lug)
8	1	CE266	CNE Ignition Control Module
9	2	CH268	#8-32 x 1" S/S Screw

## CLEARANCE TO COMBUSTIBLES

Minimum clearances to combustible materials shall be measured from outer surface of the heater as shown in the following table.

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

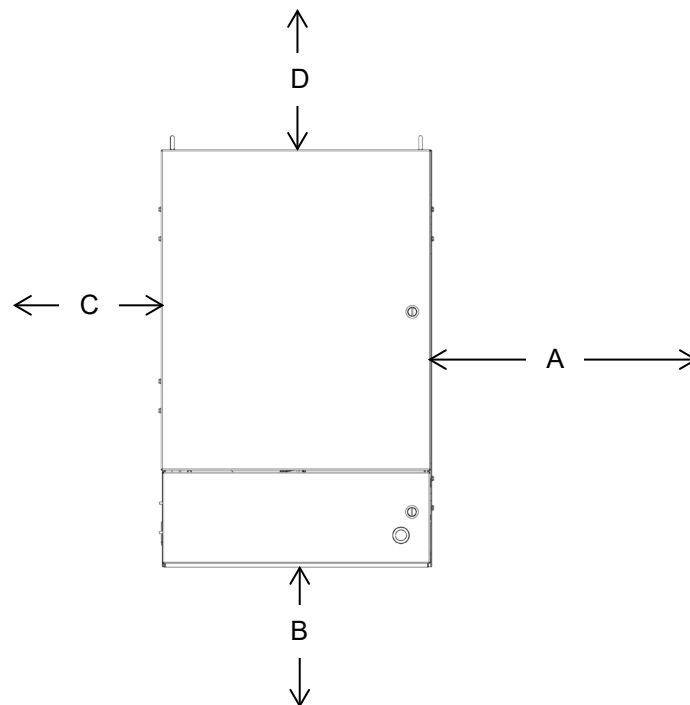
Combustible materials are considered to be wood, compressed paper, plant fibres, plastics, Plexiglas or other materials capable of being ignited and burned. Such materials shall be considered combustible even though flame-proofed, fire-retardant treated or plastered.

The stated clearance to combustibles represents a surface temperature of 90°F (50°C) above room temperature. Building materials with low heat tolerance (i.e. **plastics, vinyl siding, canvas, tri-ply, etc.**) may be subject to degradation at lower temperatures.

**It is the installer's responsibility to ensure that adjacent materials are protected from deterioration.**

Outlet	Below	Side/Front/Rear	Above
A	B	C	D
72" (1850mm)	12" (300mm)	12" (300mm)	12" (300mm)

**Table 2: Minimum clearance to combustible materials**



**Figure 4 - Clearance to Combustible**



## GENERAL INSTALLATION INSTRUCTIONS

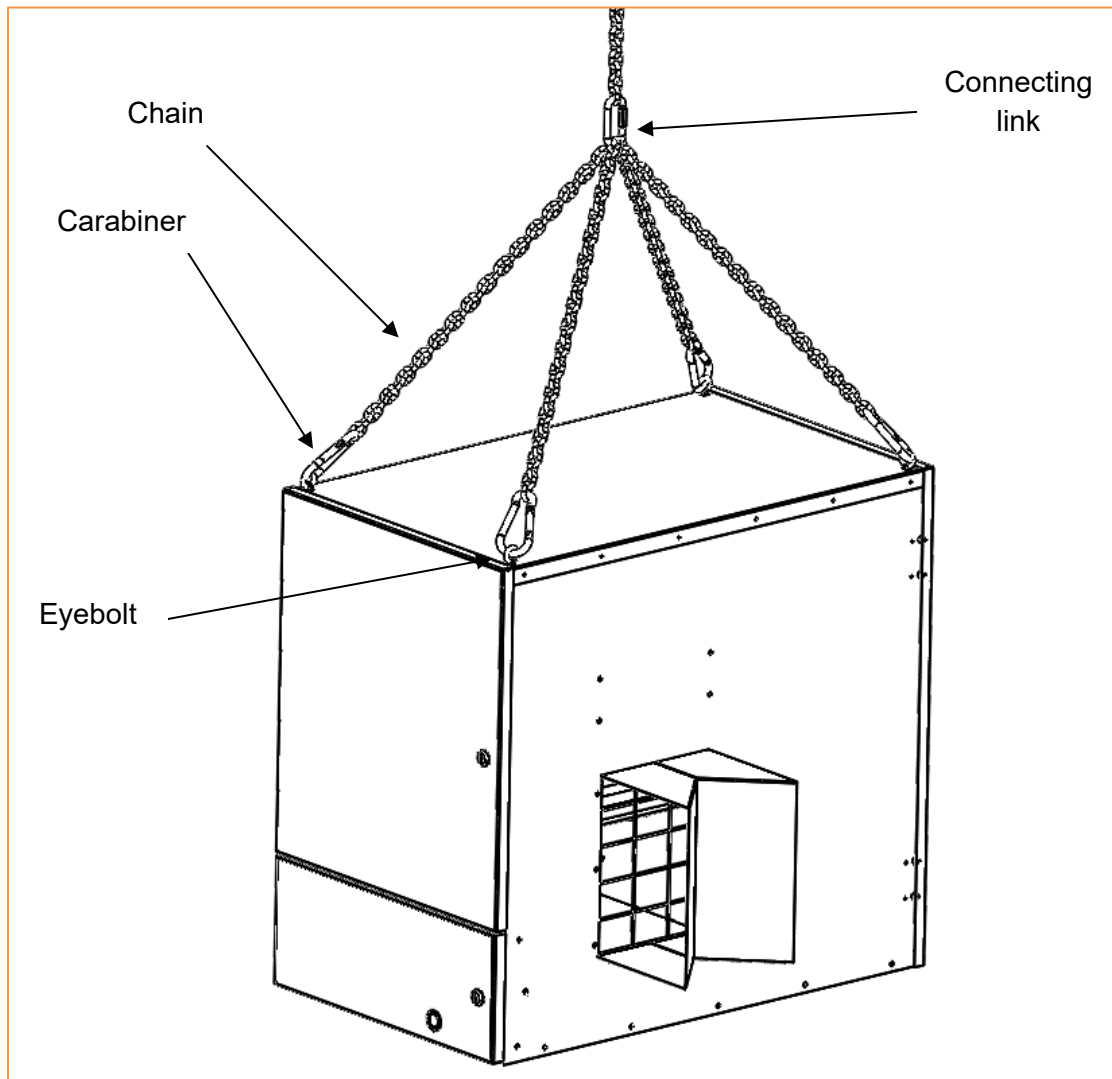
1. Ensure that the heater is level when it is hung or mounted. Obey all clearances to combustibles, listed on the rating plate on the inside of the front door and on page 8 of this manual.
2. If installed outdoors, the heater must be mounted at least 18 inches (500 mm) off the ground or at a height to prevent snow blockage of the heater's air inlet.
3. The heater must be used with the proper gas regulator connected at the gas supply to control the gas pressure at the inlet within the specified range, listed on the rating plate.
4. The heater's gas regulator (with pressure relief valve) should be installed outside of building. Any regulators inside the buildings must be properly vented to the outside. Local, state and national codes always apply to regulator installation.
5. All gas pressure regulators must be installed in strict accordance with the manufacturer's safety instructions. These instructions accompany each regulator.
6. Ensure that all accessories that ship with the heater have been installed. This pertains to air diverters, hose, regulators, etc.
7. A sediment trap must be installed at the gas inlet. See the section on page 15 for detailed instructions.
8. An accessible and approved manual shut off valve must be connected to the piping system within six feet (2 m) of the heater.
9. Check all connections for gas leaks. Gas leak testing is performed as follows:
  - Check all pipe connections, hose connections, fittings and adapters upstream of the gas control with approved gas leak detectors
  - In the event a gas leak is detected, check the components involved for cleanliness and proper application of pipe compound before further tightening.
  - Further tighten the gas connections as necessary to stop the leak
  - After all connections are checked and any leaks are stopped, turn on the main burner
  - Stand clear while the main burner ignites to prevent injury caused from hidden leaks that could cause flashback.
  - With the main burner in operation, check all connections, hose connections, fittings and joints as well as the gas control valve inlet and outlet connections with approved gas leak detectors.
  - If a leak is detected, check the components involved for cleanliness in the thread areas and proper application of pipe compound before further tightening.
  - Tighten the gas connection as necessary to stop the leak
  - If necessary, replace the parts or components involved if the leak cannot be stopped.
  - Ensure all gas leaks have been identified and repaired before proceeding.
10. A qualified service agency must check for proper operating gas pressure upon installation of the heater.
11. Light according to instructions on heater or within owner's manual
12. It is extremely important to use the proper size and type of gas supply line to assure proper functioning of the heater. Contact your fuel gas supplier for proper line sizing and installation.
13. This heater can be configured for use with either propane or natural gas. Consult the rating plate, located on interior of the burner end or motor end door, for the gas configuration of the specific heater.
14. In the case of thermostat failure, a separate back-up control system should be implemented in order to limit high and low temperatures and activate appropriate alarms, in order to protect livestock.
15. Take time to understand how to operate and maintain the heater by using this Owner's Manual. Make sure you know how to shut off the gas supply to the building and also to the individual heater. Contact your fuel gas supplier if you have any questions.
16. Do not exceed the input rating or burner manifold pressure stated on the rating plate. Use only the orifices supplied by the manufacturer and specified for the fuel type configuration.

## INTERIOR AND EXTERIOR MOUNTING

The heater can be mounted indoors, hung on a chain setup or mounted to the wall of the enclosure internally or externally.

### Hanging Instructions

Four (4) eyebolts are supplied with the heater. Fasten them to the retainer nuts on the top of the enclosure. Only use chain rated for lifting and must be attached to all four (4) eyebolts. Assemble eyebolts and chain according to the figure below. Only use chain rated for lifting and must be connected on all four eyebolts. All chain fittings used must have closed ends. Chains may be connected to a singular link or individually attached to the ceiling structure.



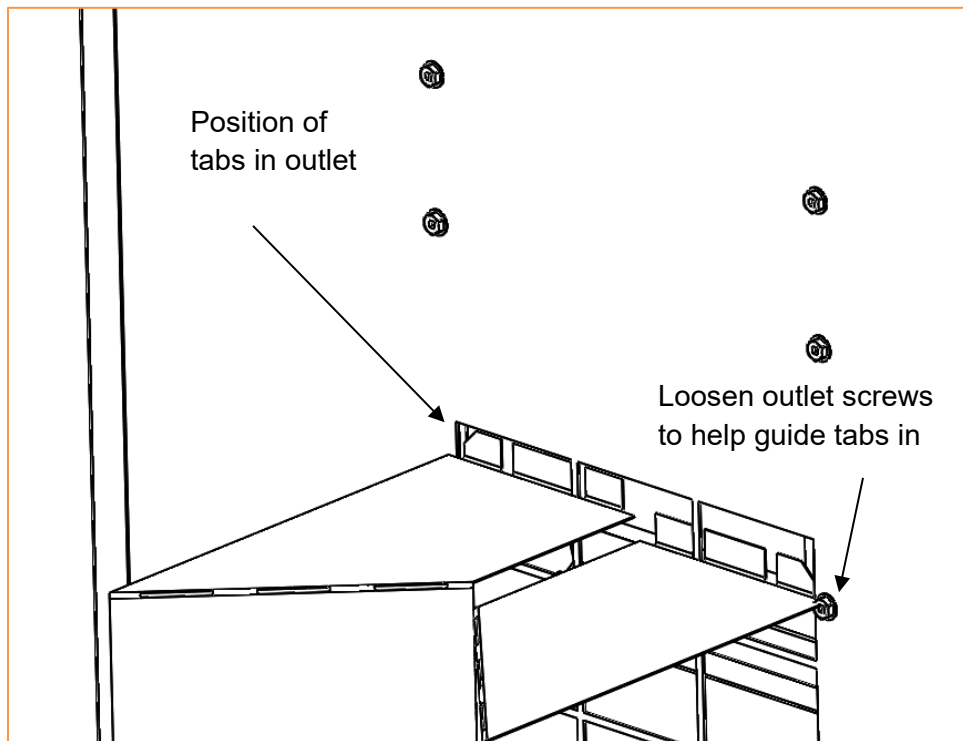
**Figure 5 - Heater mounted with chain setup – four chains to connecting link**

Verify that the heater is securely fastened and is hanging level (crosswise and lengthwise)

## **AIR DIVERTER INSTALLATION**

Air diverters can be installed in the heater outlet to provide direction to the heated air as it exits the heater. Installation options include installing the diverters in such a way as to broadly distribute the air in two 45 degree paths or to focus the air flow in one 45 degree direction.

The tabs on each half will slide into the blower outlet between the inside of the case assembly and the blower housing outlet. If the notched tabs do not slide into the blower outlet, loosen the blower outlet screws. Doing this provides a gap into which you can insert the tabs. Retighten the screws after installation.

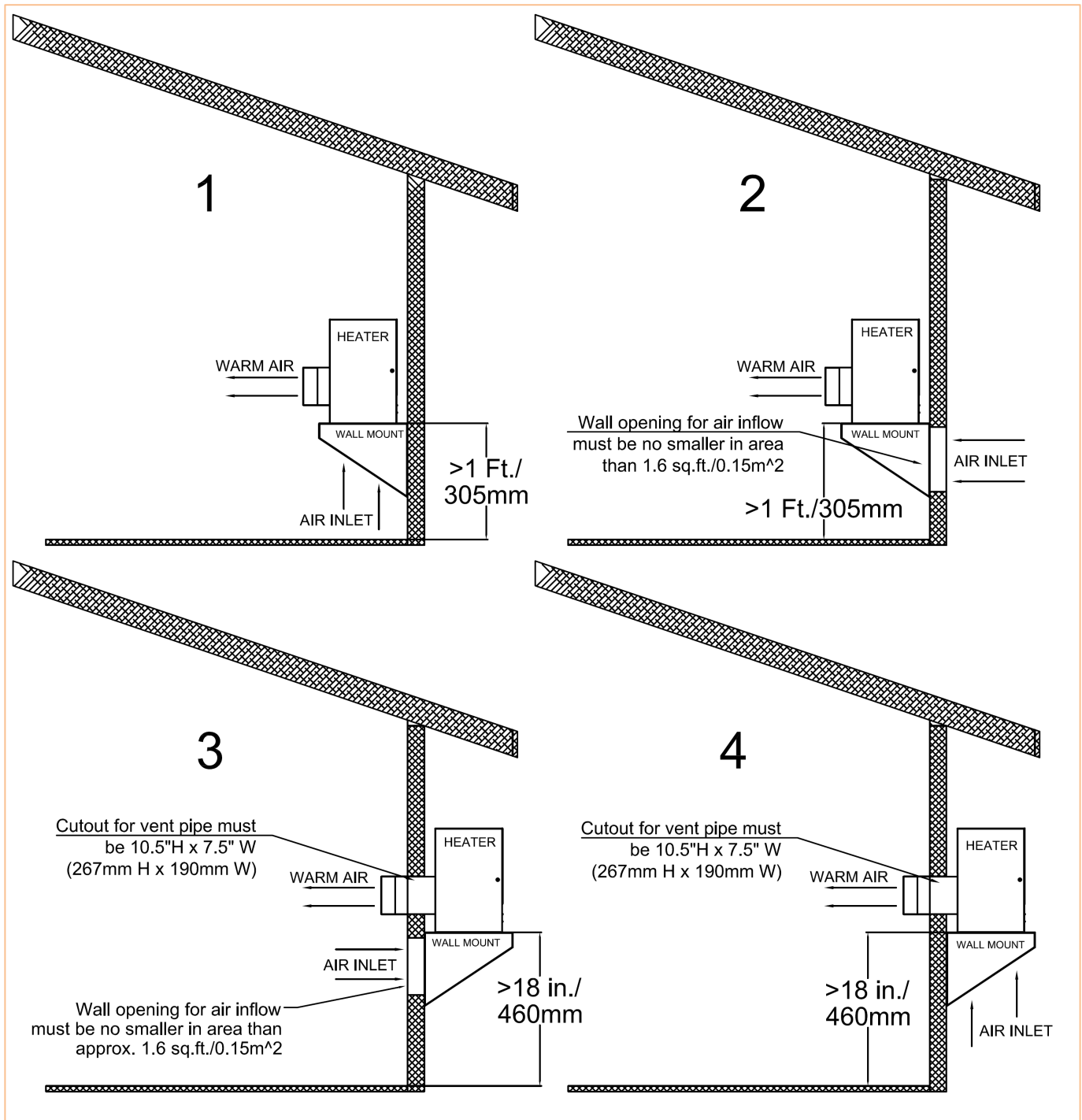


**Figure 6 – Vent installation**

## Wall Mounting

There are four (4) different configurations to mount the heater to the wall:

1. Heater on the inside of the building with airflow coming from inside the building
2. Heater on the inside of the building with airflow coming from outside the building
3. Heater on the outside of the building with airflow coming from inside the building
4. Heater on the outside of the building with airflow coming from outside the building



**Figure 7 - Various wall mounting configurations: Configuration 1 (top left); Configuration 2 (top right); Configuration 3 (bottom left); Configuration 4 (bottom right)**

# LIGHTING AND SHUTDOWN INSTRUCTIONS

## **Start-Up Instructions**

Follow steps 1-6 on initial start-up after heater installation by a qualified gas heater service person. For normal start-up, simply turn thermostat above room temperature. The heater will start.

1. Open all manual fuel supply valves and check for gas leaks using approved leak detectors.
2. Check the heater is receiving 115 VAC from the electrical supply.
3. Set the thermostat to desired room temperature.
4. This heater includes a direct ignition control module for purposes of controlling the timing of the ignition process of the heater as well as monitoring of the safety functions. The module is contained within the control enclosure.  
A red LED light on the module indicates the status of the heater. The LED is visible external of the control enclosure through the sight glass.  
A constant light from the LED is an indicator that the heater is functioning correctly. Any flash pattern is indicative that there is a problem in the operation of the heater. Refer to the troubleshooting decal on the inside of the front door for assistance in troubleshooting. Only qualified and properly trained personnel shall service or repair the heater.
5. On a call for heat, the motor will start up and run for 30 seconds. This pre-purge is a safety feature and normal operational characteristic prior to ignition taking place. After 30 seconds, the igniter should spark with ignition occurring. It is normal for air to be trapped in the gas hose on new installations. The heater may attempt more than one trial for ignition before the air is finally purged from the line and ignition takes place.
6. The ignition control will make up to three trials for ignition. Each trial takes approximately 15 seconds. The first three trials occur within 30 seconds if ignition is not achieved. After three trials, the module will lockout for a period of approximately 1 hour or until reset. (Reset is accomplished by removing power from the module for at least 5 seconds.) After this 1-hour period, the module re-attempts the full ignition sequence.

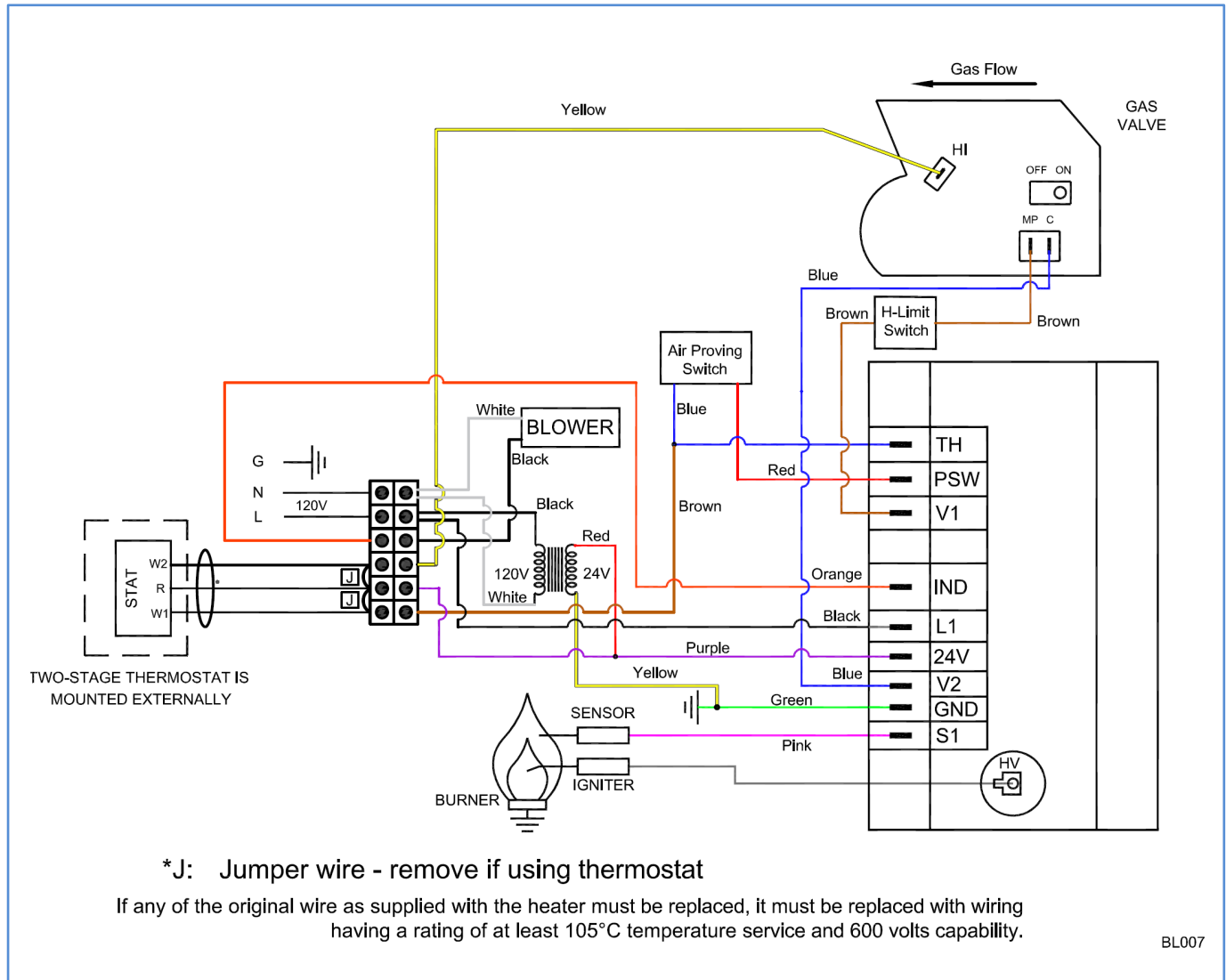
## **Shut-Down Procedure**

To shut down the heater for cleaning, maintenance, or repair, follow steps 1-4. Otherwise, turn the thermostat to OFF or no heat for standard shut down.

1. Close all manual fuel supply valves
2. With the heater lit, allow heater to burn off excess fuel in gas supply hose.
3. Position thermostat to OFF or no heat position.
4. Disconnect heater from the electrical supply.

# ELECTRICAL DIAGRAM

When servicing or troubleshooting the heater, follow the schematic below to connect all leads to their correct terminals. All terminal block leads should be placed exactly as shown.



## WARNING

The heater is shipped from factory equipped with jumpers between R-W1 and R-W2 contacts.

**If energized the heater will start running at full load (high fire).**

If the heater is operated with a two stage thermostat, remove the jumpers.

**Note:** How the two stage thermostat controls the heater:

- When both contacts ( R-W1 and R-W2) are open the heater is off;
- When R-W1 closed and R-W2 open heater operates with partial load (low fire);
- When R-W1 closed and R-W2 closed heater operates with full load (high fire).

## GAS PIPING

- Before connecting gas to the heater, check the supply gas and supply pressure: match the information on the rating plate of the heater.
- The gas meter and service must be sufficiently large to supply gas to the connected building gas load including the heating equipment and any other gas fired equipment. Additionally, the gas distribution piping must be designed according to National standards and Codes of Practice in the destination country. Generally, (low pressure) systems designed with a maximum 1.25 mbar ( $\frac{1}{2}$ " W.C.) total pressure drop meet this requirement.
- Gas supply pipe sizing must be in accordance with the National standards and Codes of Practice in the destination country. Minimum size to be 12.7 mm ( $\frac{1}{2}$ " ) bore.
- Before connecting burners to the gas supply system, verify that high pressure testing of the system has been completed. Failure to do so may expose the burner components to damaging high pressure, requiring replacement of key components.
- Pipe joint compounds must be resistant to the action of liquefied petroleum (LP) gases.

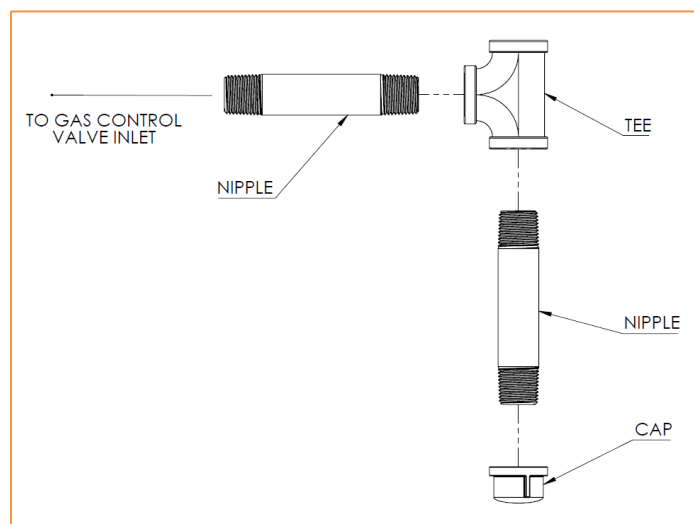
Flexible gas connectors of approved type must be installed without sharp bends, kinks or twists. Failure to install the gas connection in the approved manner will result in a hazardous and potentially deadly situation due to the movement of the heater in the normal course of operation

If possible, the regulator should be mounted outdoors. In the case that it is not possible, then the regulator's vent must be vented outdoors using vent line the same diameter as the vent opening.

In any indoor animal confinement building, consideration must be given to making sure the heater is located away from the livestock so that livestock cannot knock the heater, tear it loose from its mounting, or damage the heater or its gas supply line in any way. Make sure you observe and obey minimum clearance distances to combustible materials as stated in the specification section of this owner's manual and on the heater itself.

Install a manual shut-off valve in the gas piping to each heater. This will allow service of individual heaters without having to shut down the entire gas supply system.

A sediment trap must be installed in the supply line in the lowest spot prior to the heater. The trap length should be at least (3) inches long.



**Figure 15: Sediment Trap**

## VENTING & COMBUSTION AIR

### General Requirements

#### ATTENTION VENTILATION REQUIREMENTS

- BE SURE THE AIR INLET GRILLS, LOUVERS AND DAMPERS ARE INSPECTED REGULARLY AND THAT THEY ARE CLEAR AND FREE OF DUST, DIRT, SNOW, ICE, FROST AND OTHER FOREIGN MATERIAL SO THAT AIR MAY FREELY ENTER INTO THE BUILDING TO PROVIDE ADEQUATE COMBUSTION AND VENTILATING AIR.
  - FOR PROPER AND SAFE OPERATION OF THE HEATER INSTALLATION, THERE SHALL BE PROVIDED A COMBINED INFILTRATION AND NATURAL AND MECHANICAL VENTILATION RATE OF NOT LESS THAN  $\frac{1}{4}$  S.C.F.M. (standard cubic foot per minute) PER BIRD.
- 
- Refer to the National Fuel Gas Code, ANSI Z223.1 (NFPA 54) in the US and CSA B149.1 Installation Code in Canada, as well as all local requirements for general venting guidance.
  - The Nation Fuel Gas Code requires a minimum of 4 CFM per 1000 Btu/hr of heater input for ventilation.

#### FOR YOUR SAFETY

- Exhaust fans must be operating on an appropriate cycle when heating the building to avoid high concentration of carbon monoxide and water vapor.

#### WARNING

- **Carbon Monoxide** is an odorless and poisonous gas. Extended exposure to carbon monoxide may lead to death. Early signs of carbon monoxide poisoning resemble the flu, including headaches, dizziness and/or nausea. If you experience these signs, GET FRESH AIR IMMEDIATELY. Have the heaters serviced as soon as possible and check the ventilation in the house.



## FUEL CONVERSION PROCEDURE

The AA250 heater is equipped to run on either natural gas or propane. From the factory it is set up to run on natural gas, and must be converted to run on propane. The optional Propane Conversion Kit (P/N BK010) has all the required parts:

- Orifice #16, Part # UG040
- Conversion Label, Part # BL022
- Label, LPG Orifice #16, Part # BL023
- Valve Conv. Kit NG-LPG, Part # CG072

1. Follow the **SHUTDOWN PROCEDURE** on page 13
2. Wait until the heater has cooled down before attempting to work on it
3. Remove any piping from the gas valve inlet.
4. Open the back door to access the burner assembly by turning the door latch a quarter turn with a slot screwdriver
5. Unscrew the two machine screws securing the burner manifold to the base, and the two screws of the valve bracket

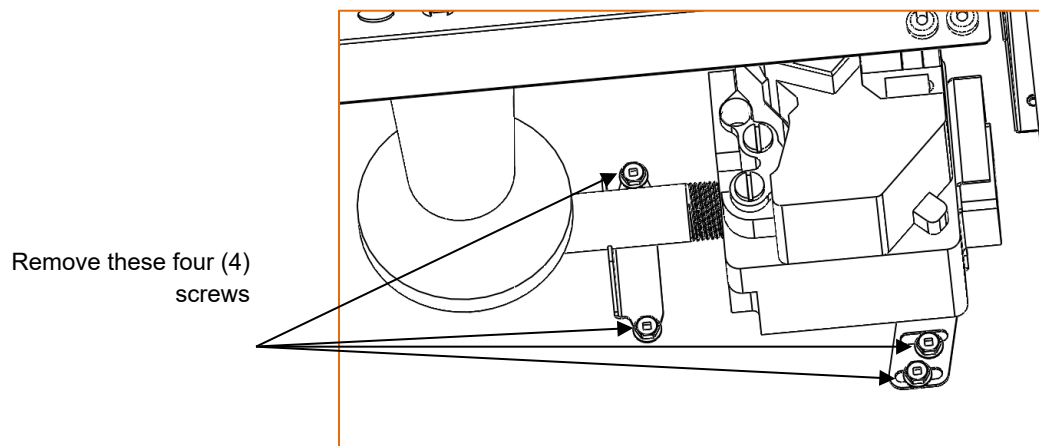


Figure 13

6. Slide the burner manifold and valve out to expose the orifice.
7. Use a 1/2" wrench or socket to remove the orifice from the burner manifold. Inspect the orifice and burner manifold for wear or damage.
8. Clean the threads in the burner manifold with a wire brush or cloth.
9. Install Orifice #16, Part # UG040 in the burner manifold, tighten until hand-tight and an extra quarter-turn
10. Follow the F92-1008 instruction sheet supplied with the Valve Conv. Kit Part # CG072 to modify the gas valve for propane
11. Keep the NG orifice and gas valve springs in the kit bag in the event that you need to convert the heater back to natural gas
12. Re-install the valve and burner manifold to the base, check that it is rigid and secure
13. Place the conversion label next to the rating plate, and fill in the blank spaces with a fine point permanent marker or black pen. Place the LPG orifice label on top of the rating plate covering the natural gas information.
14. Close the back door and install the gas piping
15. Attach the supply line for the propane gas to the pipe fitting
16. Follow the START-UP INSTRUCTIONS on page 13

## MAINTENANCE INSTRUCTIONS

1. Have your gas supplier check all gas piping annually for leaks or restrictions in gas lines. Also, at this time have your gas supplier clean out the sediment trap of any debris that may have accumulated.
2. The heater's surrounding area shall be kept clear and free from combustible materials, gasoline, and other flammable vapors and liquids.
3. Regulators can wear out and function improperly. Have your gas supplier check the date codes on all regulators installed and check delivery pressures to the appliance to make sure that the regulator is reliable.
4. Regulators must be periodically inspected to make sure the regulator vents are not blocked. Debris, insects, insect nests, snow, or ice on a regulator can block vents and cause excess pressure at the appliance.
5. Review all heater markings (i.e. warnings, start-up/shutdown, electrical wiring, diagrams, etc.) for legibility. Ensure that none are cut, torn, or otherwise damaged.
6. Inspect gas hoses for nicks, cuts, or corroded fittings. Replace the complete gas hose assembly if defects are found.
7. Inspect the heater's electrical connections. Replace any terminals that are corroded.

## CLEANING INSTRUCTIONS

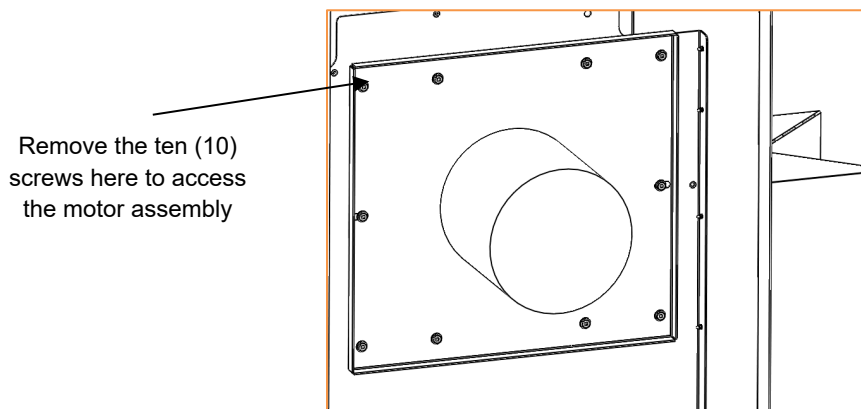
1. Before cleaning, close fuel supply valve to heater and disconnect electrical supply.
2. The heater should have dirt or dust removed periodically:
  - a. After each flock or between building re-population, give the heater a general cleaning using compressed air or a soft brush on its interior and exterior. At this time, dust off the motor case to prevent the motor from over-heating and shutting the heater down.
  - b. At least once a year, give the heater a thorough cleaning. At this time, remove the fan and motor assembly and brush or blow off the fan wheel, giving attention to the individual fan blades. Additionally, make sure the burner air inlet venturi ports and the throat of the casting are free of dust accumulation and the area between the heat chamber top and inside case is also free of dust.
  - c. When washing with water, observe all warnings supplied on the heater.

## SERVICE INSTRUCTIONS

1. Close the fuel supply valve to the heater and disconnect the electrical supply before servicing unless necessary for your service procedure.
2. Clean the heater's orifice with compressed air or a soft, dry rag. Do not use files, drills, broaches, etc. to clean the orifice hole. Doing so will enlarge the hole, causing combustion or ignition problems. Replace the orifice if it cannot be cleaned properly.
3. If the heater is not lighting, one possible cause is a defective high limit switch. It can be tested by:
  - Disconnecting the leads at the component, and jumping the leads together.
  - Reconnect the electrical supply and open fuel supply valves
  - If the heater lights, the component is defective and must be replaced.
  - Do not leave jumper on or operate the heater if the part is defective. Replace the part immediately.
  - An alternative method for checking the components is to perform a continuity check.
4. Test the air proving switch for continuity. If defective, replace the switch.
5. Open the respective case panel for access to burner or fan related components. Open the control box for access to the ignition controller, and transformer.
6. Disconnect the appropriate electrical leads when replacing components.
7. For reassembly, reverse the respective service procedure. Ensure gas connections are tightened securely.
8. After servicing, start the heater to ensure proper operation and check for gas leaks.

## **MOTOR AND FAN ASSEMBLY**

1. Disconnect the motor leads from the terminal block. See ELECTRICAL DIAGRAM (page 19) for reference. Loosen the cable gland on the back of the electrical block and take the motor leads out.
2. Remove ten (10) motor interface plate screws and gently lift the fan and motor assembly from the housing.
3. Loosen the square head set screw on the fan wheel.
4. Pull the fan wheel from the motor shaft. Use a wheel puller if necessary.
5. Remove four (4) nuts securing the motor to the mounting plate
6. Follow instructions in reverse to re-assemble motor. Fan wheel to interface plate clearance must be set to 0.5 inches (13mm). Make sure the set screw of the fan is on the flat of the motor shaft when tightening.

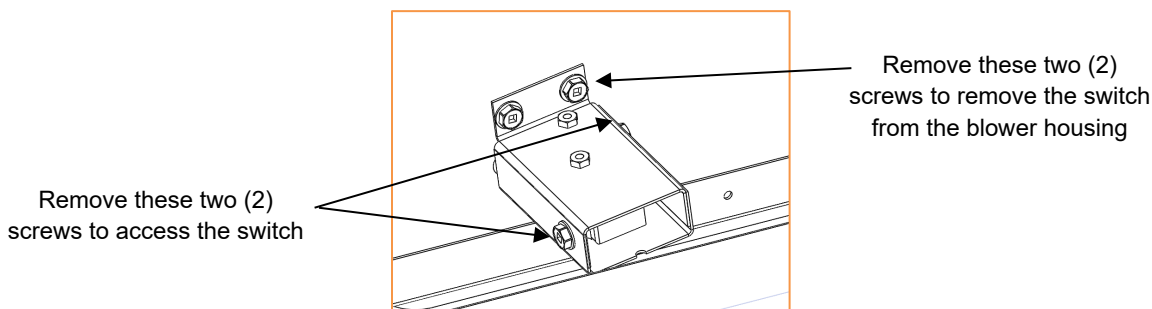


**Figure 8 – Motor assembly**

## **AIR PROVING SWITCH**

If the air proving switch contacts are closed before the ignition control starts the fan motor, or do not close on a call for heat after the fan motor starts, ignition will not occur.

1. Remove the two (2) sheet metal screws holding the switch with bracket to blower housing.
2. Remove the assembly by turning the switch so the paddle on the switch arm on side of fan housing
3. Remove the two (2) screws on either side of the switch housing and remove the bottom half of the switch housing.
4. Inspect the flapper. Ensure that it lifts freely, does not bind, and is free of dust and other debris. If the flapper is binding, its arm will not engage the air proving switch and ignition will not occur.



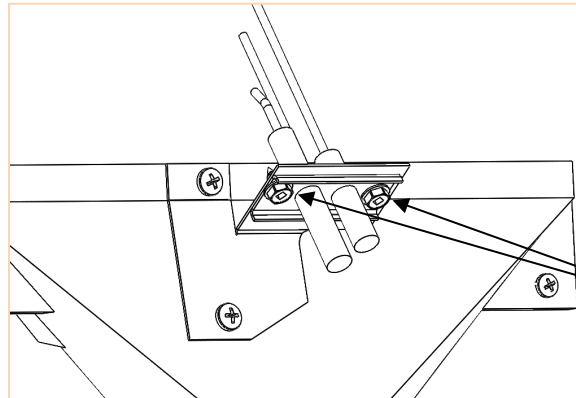
**Figure 9 – Sail switch assembly**

## **IGNITER & FLAME SENSOR ASSEMBLY**

Remove the sensor and igniter from the mounting bracket by unscrewing the two screws on each side. Clean the sensor rod with steel wool or emery cloth. Rub briskly to remove build-up of dust, dirt and oxide. Check the flame sensor's insulator base for cracks. If cracks are found, replace the igniter/sensor assembly.

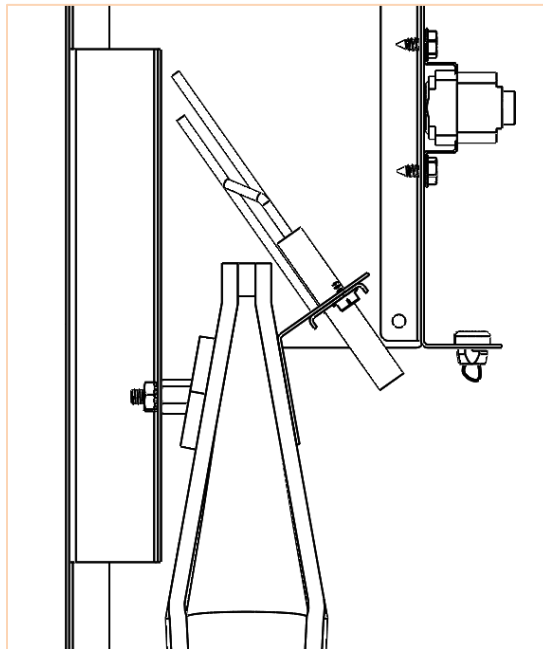
Perform an ohm check at the ignition control terminals to verify the circuit integrity of the igniter. The ohm reading should generally be in the range between 50-55 ohms.

Check the position of the igniter/sensor when it is re-installed on the burner. The igniter should not touch the burner mounting plate but it must still be a ½" (13mm) inside the flame.



Remove these two (2) screws to take off the igniter

**Figure 10 – Igniter assembly**



**Figure 11 – Recommended igniter position**

## **HIGH LIMIT SWITCH**

### **WARNING**

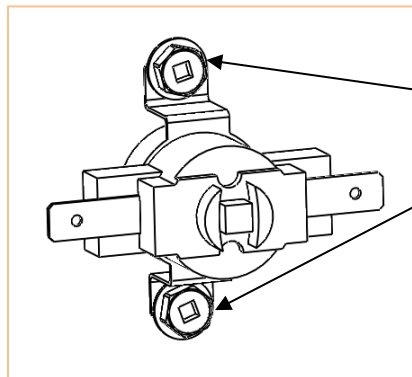
#### **Burn Hazard**

- Do not operate the heater with the high limit switch bypassed
- Operating the heater with the high limit switch bypassed may lead to overheating, possibly resulting in a fire, with subsequent damage to the heater, to the building, or loss of livestock

The heater uses a high limit switch for the purpose of overheat protection. The high limit switch is located on the combustion chamber above the burner, and is connected between the ignition control and the gas control valve.

The switch is normally closed, and will open the switch contacts if an overheat condition occurs. The high limit switch should be tested a minimum of once per year when the heater is given a thorough cleaning.

1. Remove the switch. Apply a small flame only to the sensing portion on the back of the switch. Do not melt the plastic housing of the switch when conducting this test.
2. Within a minute, you should hear a pop coming from the switch, which indicates the contacts of the switch have opened. Check for lack of electrical continuity across the switch terminals to verify contacts have opened.



Remove these two (2) screws  
to access the back of the  
sensor

**Figure 12 – High limit switch**

# TROUBLESHOOTING GUIDE

The troubleshooting flow charts on the following pages provide systematic procedures for isolating equipment problems. The charts are intended for use by a qualified gas heater service person.

**DO NOT SERVICE THESE HEATERS UNLESS YOU HAVE BEEN PROPERLY TRAINED.**

## **TEST EQUIPMENT REQUIRED**

- **Digital Multimeter** – for measuring AC and DC voltage and resistance.
- **Low Pressure Gauge** – for checking inlet and outlet pressures of the gas control valve against rating plate data.

## **INITIAL PREPARATION**

1. Visually inspect equipment for apparent damage.
2. Check all wiring for loose connections and worn insulation.

Refer to the system operation sequence in this section to gain an understanding as to how the equipment operates during a call for heat. Understanding the operation sequence of the ignition module and related components is essential as it will relate directly to problem solving provided by the flow charts.

The ignition control module is self-diagnostic. A solid red light indicates normal operation. The red light on the module will flash a specific pattern if a heater problem is identified, depending upon the problem which is diagnosed.

To effectively use the flow chart, you must first identify what the problem is by the flashing pattern of the red diagnostic light. If the light is flashing, the flash pattern will be followed by a pause and then a repeat of the flash pattern until the problem is corrected.

Refer to the table below to identify the potential problem:

<b>MODULE CODES</b>	
<b>1 Flash</b>	Air Flow Fault
<b>2 Flashes</b>	Flame Sensor Issue
<b>3 Flashes</b>	Ignition Lockout After 3 Tries

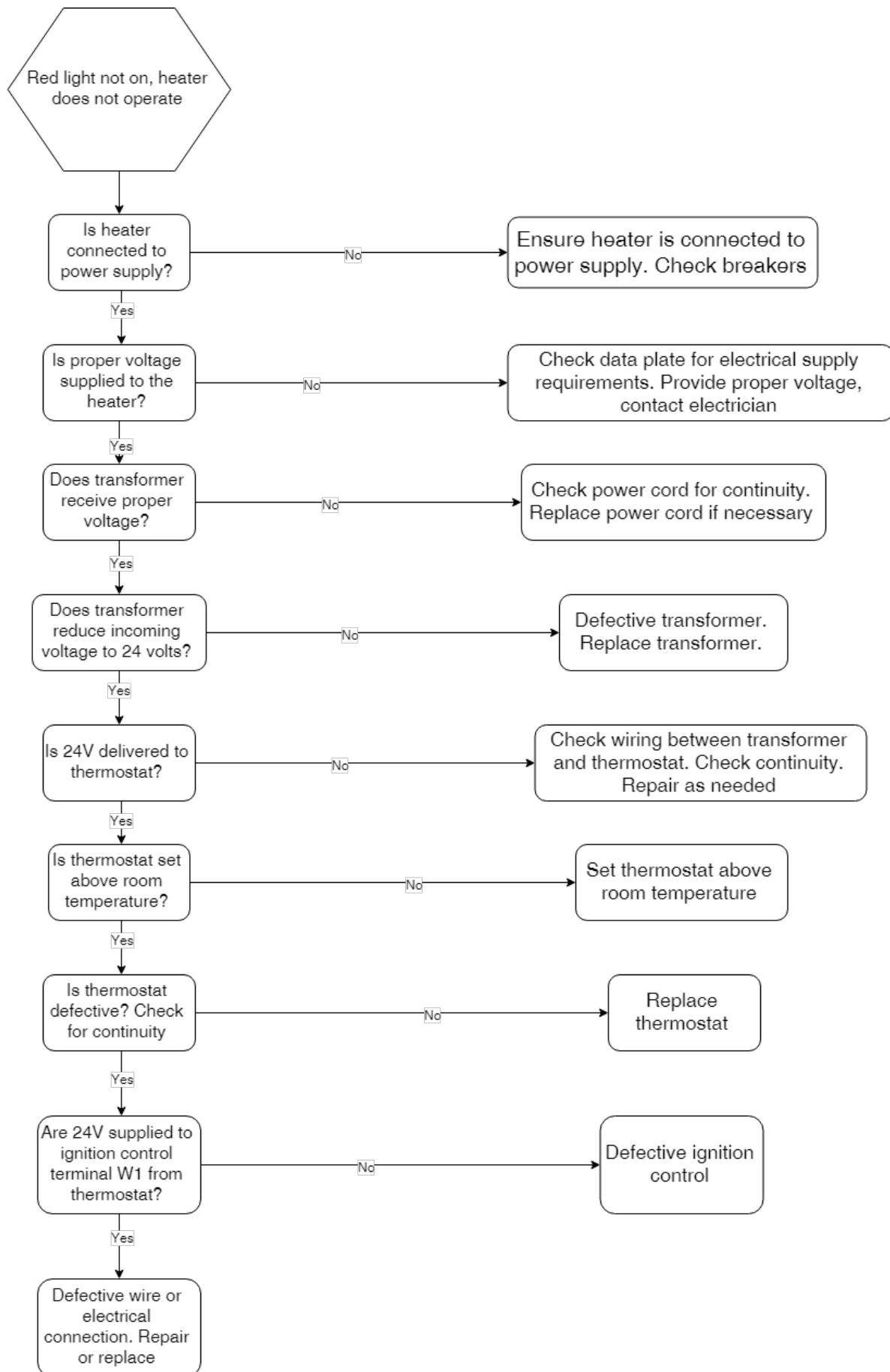
Components should be replaced only after each step has been completed and replacement is suggested in the flow chart.

## **OPERATION SEQUENCE**

- Line voltage is sent to the transformer
- Terminal branches off line voltage to ignition control terminal L1
- Transformer reduces line voltage to 24 VAC
- 24 VAC is sent to thermostat
- When the thermostat calls for heat, Thermostat closes and returns 24V to terminal W1 on ignition control
- Red light on ignition control is illuminated
- Air proving circuit is tested
- Ignition control module begins ignition trial sequence
- Ignition control sends 120V from terminal IND to motor.
- Motor starts
- Air proving switch closes and 24V are returned to terminal TH of ignition control
- The ignition module, after a pre-purge period of approximately 30 seconds, energizes the igniter.

Additionally, the gas valve is energized for this ignition trial period of 15 seconds.

- If a flame is detected, the gas valve remains open, and sparking stops.
- If no flame is detected, the gas valve closes and a 30 sec inter-purge period begins. After the inter-purge, the module repeats the trial for ignition period. If flame is still not established, a third and final inter-purge followed by a final ignition trial cycle begins. After three trials, the module will lockout for a period of approximately 1 hour or until reset. *(Reset is accomplished by removing power from the module for at least 5 seconds.)* After this 1-hour period, the module re-attempts the full ignition sequence.
- When using a 24V thermostat and the heat requirement has been met and the thermostat opens, the burner shuts off but the fan continues to run for approximately 30 seconds. This is referred to as a post purge. This allows the products of combustion to be removed from the heat and increase heat chamber life.
- When using a line voltage thermostat and the heat requirement has been met and the thermostat opens, the burner and fan shut off with no post purge.





## REPLACEMENT PARTS

ITEM	DESCRIPTION	PART NUMBER
1	Fan Motor	BE012
2	Impeller	BE013
3	High Limit Switch	BE005
4	Sail Switch	BE025
5	Burner	BG004
6	Burner manifold	BG013
7	Vent	BS051
8	Transformer 120/24V 40 VA 50/60Hz	CE058
9	Control Module	CE266
10	Valve NG W/R 2-stage	CG062
11	Igniter/Flame Sensor	VE002
12	Ignition Cable	BE010
13	Wire Harness (with ignition cable)	BE034
14	Orifice (Natural Gas)	UG028
15	Orifice (Propane)	UG040

## **SERIES AAE HEATERS WARRANTY**

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

Component	Warranty Period
Burner & Controls	3 Years

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

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

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

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

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