



Owner's Manual and Instructions

Oval 80 v.2 Sentinel v.2 Radiant Tube Heaters

AR80 (1)	80,000 Btuh
*AT 100	100,000 Btuh
*AT 125	125,000 Btuh
*AT 150	150,000 Btuh

Propane Vapor Withdrawal
or Natural Gas

(1) Listed under U.S. Patent #: 9,303,880

View this manual online at www.lbwhite.com

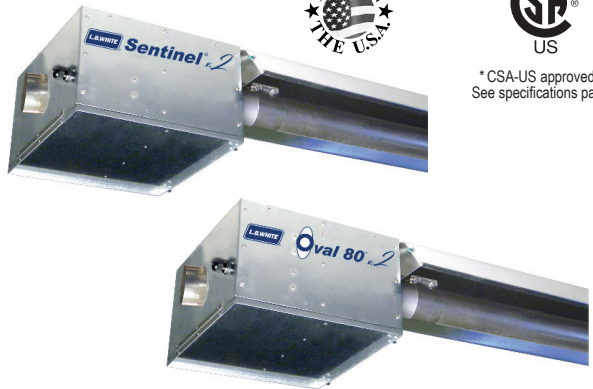
Attention

The Oval 80 heater has been designed, tested, and evaluated by the L. B. White Company as a radiant tube heater according to the requirements of standard IAS U.S. Requirements 8-94. Specific Sentinel radiant tube heaters have been tested and evaluated by the CSA Group in accordance with the requirements of standard IAS U.S. Requirements 8-94 and are listed and approved by the CSA Group as a direct gas-fired radiant tube heaters. All heaters are designed specifically for the intended use of heating poultry confinement buildings. **CHECK WITH YOUR LOCAL FIRE SAFETY AUTHORITY, YOUR LOCAL FUEL GAS SUPPLIER, OR THE L.B. WHITE COMPANY IF YOU HAVE QUESTIONS REGARDING APPLICATIONS.**

www.lbwhite.com



* CSA-US approved.
See specifications page.



Congratulations!

You have purchased the finest radiant tube heater available for the heating of poultry confinement buildings.

Your new L.B. White radiant heater incorporates the benefits from the most experienced manufacturer of heating products using state-of-the-art technology.

We, at L.B. White, thank you for your confidence in our products and welcome any suggestions or comments you may have...call us toll free at (800) 345-7200.

SEE ASSEMBLY
INSTRUCTIONS
INSIDE

Please refer to important
elevation information on
inside cover.



SCAN THIS

with your smartphone or
visit <http://goo.gl/yyKxJo> to
view maintenance videos
for L.B. White heaters.

* Requires an app like QR Droid
for Android or for iPhone

WORLD PROVIDER - INNOVATIVE HEATING SOLUTIONS

411 Mason Street, Onalaska, WI 54650 • 800-345-7200 • 608-783-5691 • 608-783-6115 (fax) • www.lbwhite.com

TABLE OF CONTENTS

Heater Specifications.....	4
General Information.....	5
Safe Clearance From Combustibles.....	5
Temperature Sensor Location	5
Safety Precautions	6
Inlet Air Requirements	9
General Installation Instructions	10
Initial Set-Up	12
Hanging the Tubes	12
Installing Reflectors & Supports	14
Air Turbulation Strips & Vent.....	15
Sediment Trap Assembly	15
Manual Shut Off Valve, Hose & Regulator Assembly	15
Heater Controls	16
Connecting Series Tap Thermostat	16
Start-Up Instructions	16
Shut-Down Instructions	17
Cleaning Instructions	17
Maintenance Instructions.....	18
General Service Instructions	18
Igniter	19
Motor and Fan	20
Air Differential Pressure, Tubing & Pressure Orifices	20
Air Differential Pressure Switch.....	21
Gas Control Valve	22
Transformer.....	22
Ignition Control.....	23
Gas Pressure Checks	23
Troubleshooting Information	25
Electrical Connection and Ladder Diagram	29
Heater Component Function	30
Service Parts Identification	
Service Parts Identification Schematic - Tube/Reflector	32
Tube/Reflector Parts List.....	33
Service Parts Identification Schematic - Burner Box.....	34
Burner Box Parts List	35
Warranty Policy.....	36
Replacement Parts and Service	36

WARNING

Standard products are manufactured to operate at optimum efficiency at elevations between 0 and 2000 ft. above sea level.

If operated at higher elevations the product will not function correctly and may function in an unsafe nature. Products providing proper operation for alternate elevations may be available.

If you require a high elevation product, did not specify when ordering, and/or the box this unit came in does not have an alternate altitude designation sticker please contact technical support.

**GENERAL HAZARD WARNING**

- FAILURE TO COMPLY WITH THE PRECAUTIONS AND INSTRUCTIONS PROVIDED WITH THIS HEATER CAN RESULT IN:
 - DEATH
 - SERIOUS BODILY INJURY OR BURNS
 - PROPERTY DAMAGE OR LOSS FROM FIRE OR EXPLOSION
 - ASPHYXIATION DUE TO LACK OF ADEQUATE AIR SUPPLY OR CARBON MONOXIDE POISONING
 - ELECTRICAL SHOCK
- READ THIS OWNER'S MANUAL BEFORE INSTALLING OR USING THIS PRODUCT.
- ONLY PERSONS WHO CAN READ, UNDERSTAND, AND FOLLOW THE INSTRUCTIONS SHOULD USE OR SERVICE THIS HEATER.
- SAVE THIS OWNER'S MANUAL FOR FUTURE USE AND REFERENCE.
- OWNER'S MANUALS AND REPLACEMENT LABELS ARE AVAILABLE AT NO CHARGE. SEE WEBSITE, OR FOR ASSISTANCE, CONTACT L.B. WHITE AT 1-800-345-7200.

**WARNING**

- PROPER GAS SUPPLY PRESSURE MUST BE PROVIDED TO THE INLET OF THE HEATER.
- REFER TO DATA PLATE FOR PROPER GAS SUPPLY PRESSURE.
- GAS PRESSURE IN EXCESS OF THE MAXIMUM INLET PRESSURE SPECIFIED AT THE HEATER INLET CAN CAUSE FIRES OR EXPLOSIONS.
- FIRES OR EXPLOSIONS CAN LEAD TO SERIOUS INJURY, DEATH, OR BUILDING DAMAGE.
- GAS PRESSURE BELOW THE MINIMUM INLET PRESSURE SPECIFIED AT THE HEATER INLET MAY CAUSE IMPROPER COMBUSTION.
- IMPROPER COMBUSTION CAN LEAD TO ASPHYXIATION OR CARBON MONOXIDE POISONING AND THEREFORE SERIOUS INJURY OR DEATH.

**WARNING
FIRE AND EXPLOSION HAZARD**

- NOT FOR HOME OR RECREATIONAL VEHICLE USE.
- INSTALLATION OF THIS HEATER IN A HOME OR RECREATIONAL VEHICLE MAY RESULT IN A FIRE OR EXPLOSION.
- FIRE OR EXPLOSIONS CAN CAUSE PROPERTY DAMAGE OR LOSS OF LIFE.

**WARNING
FIRE, BURN, INHALATION, AND
EXPLOSION HAZARD**

- KEEP SOLID COMBUSTIBLES A SAFE DISTANCE AWAY FROM THE HEATER.
- SOLID COMBUSTIBLES INCLUDE WOOD, PAPER PRODUCTS, FEATHERS, STRAW AND DUST.
- DO NOT USE THE HEATER IN SPACES WHICH CONTAIN OR MAY CONTAIN VOLATILE OR AIRBORNE COMBUSTIBLES.
- VOLATILE OR AIRBORNE COMBUSTIBLES INCLUDE PIT GASES, GASOLINE, SOLVENTS, PAINT THINNER, DUST PARTICLES OR UNKNOWN CHEMICALS.
- FAILURE TO FOLLOW THESE INSTRUCTIONS MAY RESULT IN A FIRE OR EXPLOSION.
- FIRE OR EXPLOSIONS CAN LEAD TO PROPERTY DAMAGE, PERSONAL INJURY OR DEATH.

FOR YOUR SAFETY

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

FOR YOUR SAFETY

If you smell gas:

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

**WARNING**

Cancer and reproductive harm.
See www.P65Warnings.ca.gov.

Specifications

		AR080	AT100	AT125		AT150		
Available Tube Lengths (ft.)		20	30	40	40	50	50	
Maximum Input per Hour BTU/H		80,000	100,000		125,000		150,000	
Fuel Consumption per Hour (Max.)	LPG (lbs.)		3.7	4.6		5.8		7.1
	NG (ft.3)		80	100		125		150
Gas supply pressure acceptable for the purpose of input adjustment (in.W.C.)	MAX.	LPG	13.5					
		NG						
	MIN.	LPG	11.0					
		NG	7.0					
Burner manifold pressure (in.W.C.)	LPG		10.0					
	NG		4.0					
Ventilation air required to support combustion	140 CFM							
Motor characteristics	1/30 H.P., 3020 RPM, CW Rotation							
Electrical supply (Volts/Hz/Phase)	115/60/1							
Amp draw	Starting		1.16					
	Continuous Operation		1.02					
Minimum safe distances of heater from nearest combustible materials (ft.) See Fig. 1 on page 5.	Top		1					
	Sides		2.5	6				
	Discharge End		6					
	Below radiant tubes		5	6				
Temperature sensor location	See Fig. 2 on page 5 of the owner's manual							
CSA-US Approval		-		✓				

General Information

This owner's manual includes all options and accessories commonly used on or with this heater. However, depending on the configuration purchased, some options and accessories may not be included.

When calling for technical service assistance, or for other specific information, always have the model number and serial number available.

This manual will instruct you in the operation and care of your radiant heater. Have your qualified installer review this manual with you so that you fully understand the heater and how it functions.

The gas supply line installation, and the repair, installation and servicing of the heater requires continuing

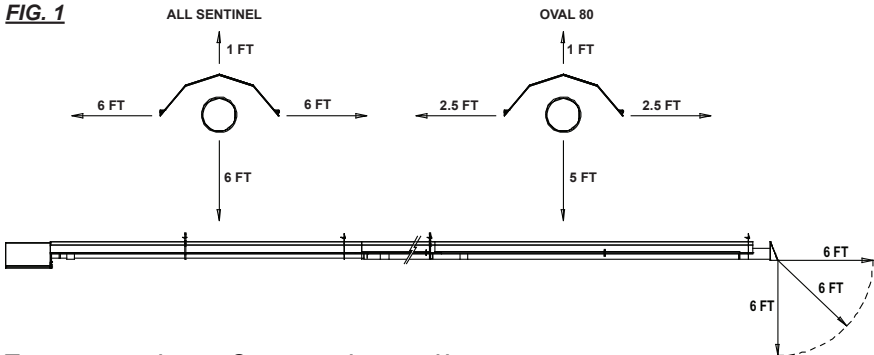
expert training and knowledge of gas heaters and should not be attempted by anyone who is not so qualified. See page 7 for definition of the necessary qualifications.

Contact your local L. B. White distributor or the L.B. White Co., Inc. for assistance, or if you have any questions about the use of the heater or its application.

The L.B. White Co., Inc. has a policy of continuous product improvement. It reserves the right to change specifications and design without notice.

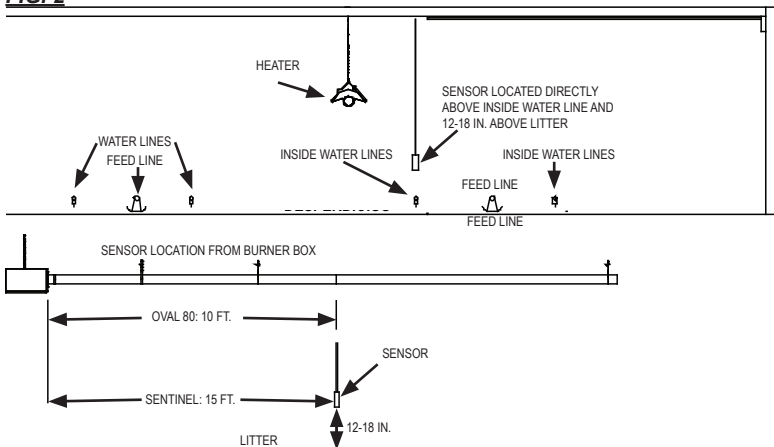
Safe Clearance from Combustibles

FIG. 1



Temperature Sensor Location

FIG. 2



Safety Precautions

WARNING

Asphyxiation Hazard

- Do not use this radiant heater for heating human living quarters.
- Do not use in unventilated areas.
- The flow of combustion and ventilation air must not be obstructed.
- Proper ventilation air must be provided to support the combustion air requirements of the heater being used.
- Refer to the specification section of the Owner's Manual, heater's dataplate, or contact the LB White Company to determine combustion air ventilation requirements of the heater.
- Lack of proper ventilation air will lead to improper combustion.
- Improper combustion can lead to carbon monoxide poisoning in humans leading to serious injury or death. Symptoms of carbon monoxide poisoning can include headaches, dizziness and difficulty in breathing.
- Symptoms of improper combustion affecting livestock can be disease, lower feed conversion, or death.

Fuel Gas Odor

Propane gas and natural gas have man-made odorants added specifically for detection of fuel gas leaks. If a gas leak occurs, you should be able to smell the fuel gas.

THAT'S YOUR SIGNAL TO GO INTO IMMEDIATE ACTION!

- Do not take any action that could ignite the fuel gas. Do not operate any electrical switches. Do not pull any power supply or extension cords. Do not light matches or any other source of flame. Do not use your telephone.
- Get everyone out of the building and away from the area immediately.
- Close all propane gas tank or cylinder fuel supply valves, or the main fuel supply valve located at the meter if you use natural gas.
- Propane gas is heavier than air and may settle in low areas. When you have reason to suspect a propane leak, keep out of all low areas.
- Use your neighbor's phone and call your fuel gas supplier and your fire department. Do not re-enter the building or area.
- Stay out of the building and away from the area until declared safe by the firefighters and your fuel gas supplier.
- **FINALLY**, let the fuel gas service person and the firefighters check for escaped gas. Have them air out the building and area before you return. Properly trained service people must repair the leak, check for further leakages, and then relight the appliance for you.

Odor Fading - No Odor Detected

- Some people cannot smell well. Some people cannot smell the odor of the man-made chemical added to propane or natural gas. You must determine if you can smell the odorant in these fuel gases.
- Learn to recognize the odor of propane gas and natural gas. Local propane gas dealers and your local natural gas supplier (utility) will be more than happy to give you a "scratch and sniff" pamphlet. Use it to become familiar with the fuel gas odor.
- Smoking can decrease your ability to smell. Being around an odor for a period of time can affect your sensitivity to that particular odor. Odors present in animal confinement buildings can mask fuel gas odor.
- The odorant in propane gas and natural gas is colorless and the intensity of its odor can fade under some circumstances.
- If there is an underground leak, the movement of gas through the soil can filter the odorant.
- Propane gas odor may differ in intensity at different levels. Since propane gas is heavier than air, there may be more odor at lower levels.
- Always be sensitive to the slightest gas odor. If you continue to detect any gas odor, no matter how small, treat it as a serious leak. Immediately go into action as discussed previously.

Attention - Critical Points to Remember!

- Propane gas and natural gas have a distinctive odor. Learn to recognize these odors. (Reference "Fuel Gas Odor" and "Odor Fading" sections above.
 - If you have not been properly trained in repair and service of propane gas and natural gas fueled heaters, then do not attempt to light the heater, perform service or repairs, or make any adjustments to the heater on a propane (LP) gas or natural gas fuel system.
 - Even if you are not properly trained in the service and repair of radiant heaters, ALWAYS be consciously aware of the odors of propane gas and natural gas.
 - A periodic "sniff test" around the heater or at the heater's joints; i.e. hose, connections, etc., is a good safety practice under any conditions. If you smell even a small amount of gas, CONTACT YOUR FUEL GAS SUPPLIER IMMEDIATELY. DO NOT WAIT!
1. Do not attempt to install, repair or service this heater or the gas supply line unless you have continuing expert training and knowledge of gas heaters.

QUALIFICATIONS FOR SERVICING AND INSTALLATION:

- a. To be a qualified gas heater service person, you must have been trained in gas-fired heater servicing, repair and also have sufficient experience to allow you to troubleshoot, replace defective parts, and test heaters in order to get them into a continuing safe and normal operation condition. You must completely familiarize yourself with each model heater by reading and complying with the safety instructions, labels, owner's manual, etc. that is provided with each heater.
 - b. To be a qualified gas installation person, you must have sufficient training and experience to handle all aspects of installing, repairing and altering gas lines, including selecting and installing the proper equipment, and selecting proper pipe size to be used. This must be done in accordance with all local, state and national codes as well as the manufacturer's requirements.
2. All installations and applications of L.B. White heaters must meet all relevant local, state and national codes. Included are L.P. gas, electrical, and safety codes. Your local fuel gas supplier, a local licensed electrician, the local fire department or similar government agencies, or your insurance agent can help you determine code requirements.
 - ANSI/NFPA 58, latest edition, Standard for Storage and Handling of Liquefied Petroleum Gas and/or
 - ANSI Z223.1/NFPA 54, National Fuel Gas Code
 - ANSI/NFPA 70, National Electrical Code.
 3. For indoor installation only in agricultural poultry confinement buildings. Not for use in residential dwellings.
 4. Do not move, handle, or service heater while in operation or connected to a power or fuel supply.
 5. This heater may be installed in areas subject to washdown. This heater may only be washed on the external components. See Cleaning Instructions. Do not wash the interior of the burner box or the tubes. Use only compressed air, soft brush or dry cloth to clean the interior of the heater and it's components. After external washdown, do not operate this heater until it is completely dry. In any event, do not operate the heater for at least one hour after external washdown.
 6. For safety, this heater is equipped with an differential air pressure switch. Never operate this heater if this safety device has been bypassed. Do not operate this heater unless this feature is fully functioning.
 7. The heater is designed to operate only with its burner access door closed and latched. Do not operate the heater with its burner box access door open.
 8. Do not block air intakes or discharge outlets of the heater. Doing so may cause improper combustion or damage to heater components leading to property damage or animal loss.

9. The hose assembly shall be visually inspected on an annual basis. If it is evident there is excessive abrasion or wear, or if the hose is cut, it must be replaced prior to the heater being put into operation. The hose assembly shall be protected from animals, and contact with hot surfaces during use. The replacement hose assembly shall be that specified by the manufacturer. See parts list.
10. Check for gas leaks and proper function upon heater installation and before building repopulation.
11. This heater should be inspected for proper operation by a qualified service person at least annually.
12. Always turn off the gas supply to the heater when not in use.
13. This heater is equipped with a three-prong (grounding) plug for your protection against shock hazard and must be plugged directly into a properly grounded three-prong receptacle. Failure to use a properly grounded receptacle can result in electrical shock, personal injury, or death.
14. Direct ignition heaters will make up to three trials for ignition. If ignition is not achieved, the control system will lock out the gas control valve. If gas is smelled after system lock out has occurred, immediately close all fuel supply valves. Do not relight until you are sure that all gas that may have accumulated has cleared away. In any event, do not relight for at least 5 minutes.
15. Use only approved gas hose or approved flexible connectors which are rated for use with propane or natural gas.

Inlet Air Requirements

⚠ WARNING **Combustion Hazard**

- Provide a properly located and sized fresh air inlet for the heater.
 - Refer to Inlet Air Requirements instructions.
- Failure to provide a fresh air inlet can lead to:
 - Sooting causing building damage
 - High carbon monoxide levels, causing serious injury or death to livestock and humans.
 - Overheating of the first 10 ft. tube, causing fires leading to building damage and injury to livestock and humans.
 - Higher temperature differences over the length of the tubes, causing problems in temperature control and bird performance

This heater requires clean, fresh air from a normal, atmospheric pressure environment for proper operation and combustion. Contact L.B.White Company if you have any questions regarding the installation of this heater.

Inlet air may be drawn from the attic or through side walls under a protective eve. See Figs. 3 and 4.

- All inlet air seams and joints must be sealed
- Do not use any filters on the air inlet system
- **The air inlet system must be kept as straight as possible. No more than 1 - 90° bend is allowed.**
- Contact L.B.White Co. if you have any questions regarding the installation of the heater.

Inlet air for combustion **MUST NOT** be drawn from:

- Inside the confinement room.
- An attic or location where negative pressure (vacuum) affects the air draw of the heater's fan. Examples include, but are not limited to:
 - a. Houses with attic soffit vent area smaller than ridge cap vent area
 - b. Heater air inlet located within 20 ft. of building ventilation fans
 - c. Locations where wind and/or the elements can create a negative pressure.

FIG. 3

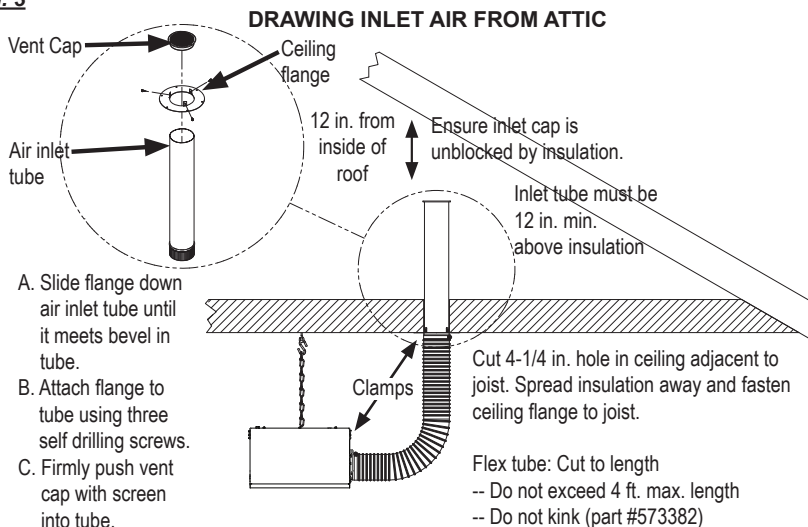
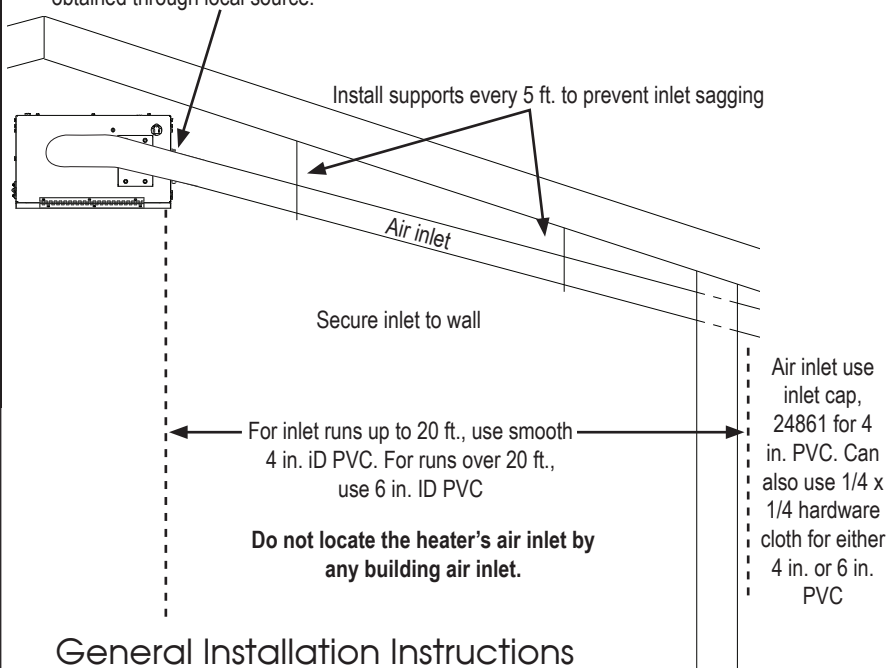



FIG. 4**DRAWING INLET AIR THROUGH SIDEWALLS**

Use minimum length of 4 in. diameter flex duct when connecting 4 in. PVC to burner box. An adapter connection for the burner box to the 6 in. PVC must be obtained through local source.

**General Installation Instructions**


1. Read all safety precautions and follow L.B. White recommendations when installing this heater. If during the installation of the heater, you suspect that a part is damaged or defective, call a qualified service agency for repair or replacement.
2. A qualified service agency must check the heater upon installation and periodically. This shall consist of the following:
 - Start up and shut down of the heaters to test for proper operation.
 - Leak check all gas pipe joints and gas hose connections.
 - Gas pressure checks.
 - Ensuring the heater is properly positioned away from combustible materials.
3. Heater installation must take into consideration proper hanging height to allow for clearance of catching machines, litter spreaders, and any other equipment used.
4. Ensure the heater installation does not interfere with water, gas, or electrical lines.
5. Position the gas hose to prevent any contact with the tubes, heat reflectors, and burner box.
6. Ensure that all accessories that ship with the heater have been removed from shipping containers and installed. This pertains to gas hose, regulators, supports, hangers, etc.
7. This heater requires a regulated gas supply to its gas inlet :
 - The regulator must be the proper design for the application.
 - The regulator must control the inlet pressure to the heater within the range specified on the dataplate.

- Regulators mounted outside must be protected from adverse weather conditions.
 - Regulators with pressure relief valves should be installed outside the building.
 - Regulators installed inside should be vented outside.
 - Local state and national codes apply to regulator installation. Refer to NFPA 54, National Fuel Gas Code, and NFPA 58, Standard for Storage and Handling of Liquefied Petroleum Gas.
8. Always use pipe joint compound that is resistant to liquefied petroleum gas and natural gas.
9. Check all connections for gas leaks using approved gas leak detectors. Gas leak testing is performed as follows:
-  WARNING**

Fire and Explosion Hazard

 - Do not use open flame (matches, torches, candles, etc.) in checking for gas leaks.
 - Use only approved leak detectors.
 - Failure to follow this warning can lead to fires or explosions.
 - Fires or explosions can lead to property damage, injury or death.
- 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.
 - 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
 - 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. Install a sediment trap at the gas valve inlet to prevent foreign materials (pipe compound, pipe chips and scale) from entering the gas valve. Debris blown into the gas valve may cause that valve to malfunction resulting in a serious gas leak that could result in a possible fire or explosion causing loss of products, building or even life. A properly installed sediment trap will keep foreign materials from entering the gas valve and protect the safe functioning of that important safety component.
11. Any heater connected to a piping system must have an accessible, approved manual shut off valve installed within six feet (6 ft.) of the heater it serves.
12. Install the proper size of gas supply line to assure proper functioning of the heaters. Consult your fuel gas supplier, or the L.B. White Co., Inc. for proper line sizing and installation.
13. Light according to instructions on heater or within Owner's Manual.
14. The heater is designed for L.P. vapor withdrawal or natural gas only. Do not use this heater in a propane liquid withdrawal system. Do not permit propane in liquid form to enter the heater.
15. The corrosive atmosphere present in animal confinement buildings can cause component failure or heater malfunction. The heater should be periodically inspected and cleaned in accordance with the Maintenance and Cleaning Instructions in this manual. Make sure that livestock is protected by a back up alarm system that limits high and low temperatures and also activates appropriate alarms.
16. Take time to understand how to operate and maintain the heater using the owner's manual. Make sure you know how to shut off the gas supply to the building and to the heater. Contact your gas supplier if you have any questions.
17. Any defects found in performing any of the service procedures must be eliminated and defective parts replaced immediately. Retest the heater before placing it back into service.

18. Do not exceed input rating stamped on the dataplate of the heater. Do not exceed the burner manifold pressure stated on the dataplate. Do not use an orifice size different than specified for the specific input rating of this heater, fuel type configuration and altitude.

FIG. 6 SENTINEL


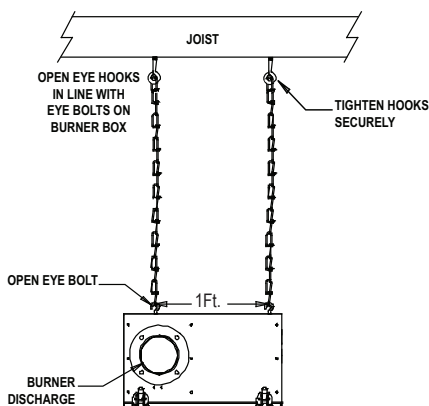

HANGING CHAIN DISTANCES

TRUSS CENTERS	HEATER LENGTH	A - B (FT)	B - C (FT)	C - D (FT)	D - E (FT)	E - F (FT)	F - G (FT)
4 FOOT	30 FOOT	4	4	12	8		
	40 FOOT	4	4	12	8	12	
	50 FOOT	4	4	12	8	12	8
5 FOOT	30 FOOT	5	5	10	10		
	40 FOOT	5	5	10	10	5	
	50 FOOT	5	5	10	10	10	5
10 FOOT	30 FOOT	5 *	5	10	10		
	40 FOOT	5 *	5	10	10	5 *	
	50 FOOT	5 *	5	10	10	10	5 *

* A SUPPORT MUST BE CREATED BETWEEN THE TRUSSES

Initial Setup

- Plan the installation. Determine location for the heater to optimize its heat pattern, keeping in mind cooler regions in the house (end walls, and curtains) and clearances to combustibles.
- Hang the burner box. See Fig. 5. Maintain clearances to combustibles as shown in Fig. 1.
- From the burner box chain, measure the distances shown in Fig. 6 or 7 depending on if a Sentinel or Oval 80 heater is being installed. **Aligning to the center of the burner box discharge**, hang chains at these points, using open eye hooks.

FIG. 5

FIG. 7 OVAL 80


HANGING CHAIN DISTANCES

TRUSS CENTERS	HEATER LENGTH	A - B (FT)	B - C (FT)	C - D (FT)	D - E (FT)
4 FOOT	20 FOOT	4	4	4	8
5 FOOT	20 FOOT	5	5	5	5
10 FOOT	20 FOOT	5 *	5	5 *	5

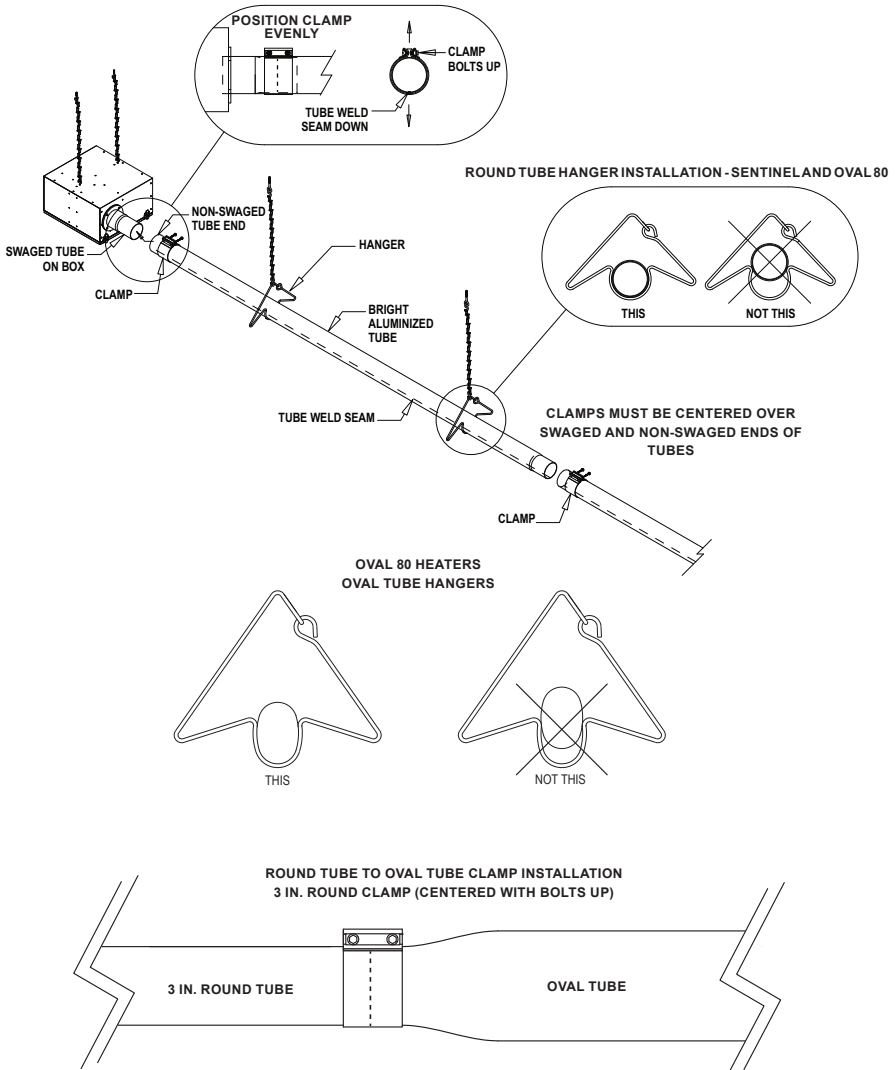
* A SUPPORT MUST BE CREATED BETWEEN THE TRUSS

Hanging the Tubes

Refer to Fig. 8 (on next page) and the following instructions:

- Slide a tube clamp over the non-swaged end of the 10 ft. bright aluminized tube. One aluminized tube per tube kit.
- Install the tube over the swaged discharge tube on the burner box:
 - Tube weld seam must be down.
 - Non-swaged end of tube must be completely pushed over swaged end of adjoining tube.
 - Clamp must be centered over tube connection.
 - Clamp bolts must be up.
 - Clamp bolts must be tight.
 - Tighten both bolts firmly.
 - Tighten both bolts to 35 ft.-lbs.
 - Finish tightening bolts:
 - Sentinel Heaters: Finish tightening bolts to 65 ft. lbs.
 - Oval 80 Heaters: Finish tightening bolts to 44-59 ft. lbs.

3. Slide on hangers and connect to chains.
4. Connect and hang remaining tubes. **Follow the procedures given in Step 2.**
5. The tube assembly should be either hung level, or with a downward slope away from the burner box not exceeding 1 in. for every 10 ft. of tube.

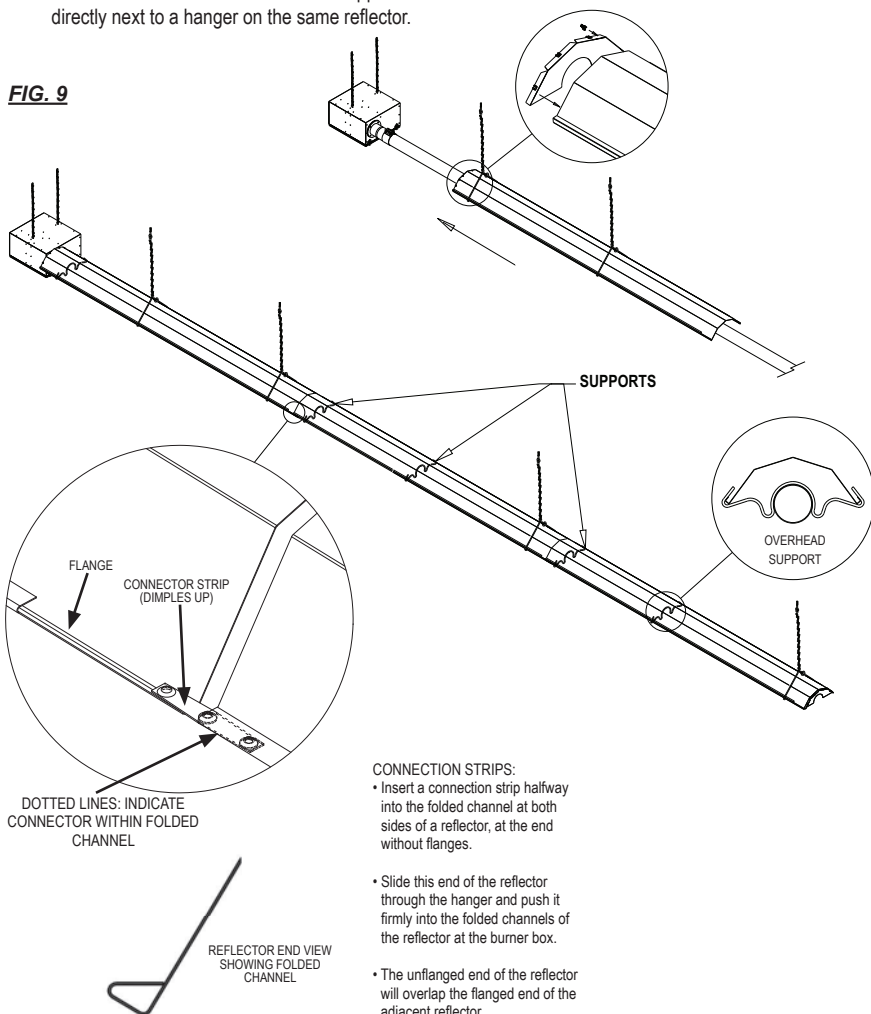
FIG. 8

Installing Reflectors & Supports

Refer to Fig. 9 and the following instructions:

1. Slide the reflector through the hangers until it is about 1 or 2 inches away from the burner box.
2. Attach end cap to end of this reflector. Use 4 U-clips. Push this reflector up to burner box.
3. Sentinel Heaters Only: Install a support at end of reflector nearest burner box and at middle and ends of all reflectors. Do not install a support directly next to a hanger on the same reflector.
4. Connect the reflectors using the dimpled connector strips. See below.
5. Repeat Steps 3 and 4 for remaining reflectors.
6. Attach remaining end cap to last reflector with U-clips.

FIG. 9

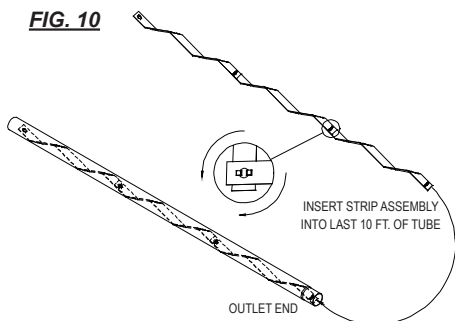


Air Turbulation Strips & Vent

SENTINEL HEATERS: Assemble the strips and insert into last tube, see Fig. 10. Edge of strip is flush with end of tube.

OVAL 80 HEATERS: Both strips are factory installed into the oval tube. At installation, ensure strips are snugly fit into oval tube and do not extend past end of tube.

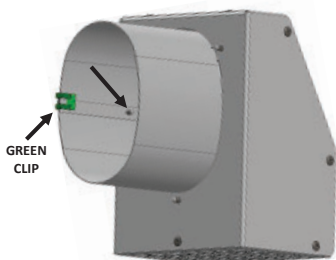
FIG. 10



REGARDLESS OF TUBE DESIGN:

- Ensure the green clip is installed on the exhaust vent. See Fig. 11.
- Insert the exhaust vent to the end of the last tube.
- Push the exhaust vent until the tube is stopped at the rivet.

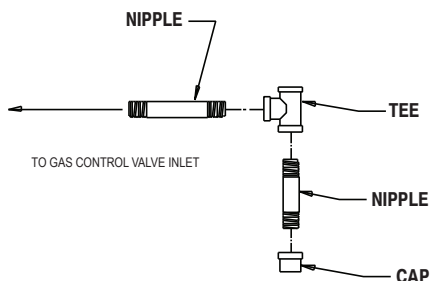
FIG. 11



Sediment Trap Assembly

Assemble the tee, nipple, and cap to the nipple at the gas inlet of the heater. See Fig. 12. Use a wrench to hold the pipe nipple when installing the sediment trap. Tighten securely. The sediment trap assembly must always be mounted in a vertical position. Check all connections for gas leaks using approved gas leak detectors.

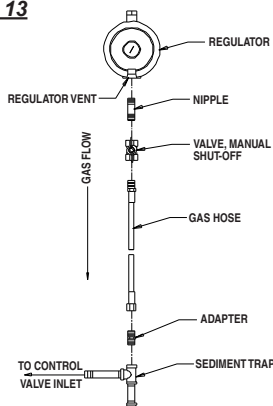
FIG. 12



Manual Shut-off Valve, Hose & Regulator

1. Assemble the components together. See Fig. 13. This view shows general assembly of the components. The regulator must always be mounted so its vent, regardless of location on the regulator, is always pointed downward. Ensure hose is positioned away from the heater.
2. Tighten all connections securely and check for gas leaks

FIG. 13



Heater Controls

Refer to the heater's burner box hinged access panel, or refer to Start-up instructions in this manual to determine if your heater has a single or two stage gas control.

WARNING

Electrical Shock Hazard

- Disconnect the heater's electrical supply before interconnecting the temperature control.
- Failure to disconnect the electrical supply will result in electrical shock.
- Electrical shock will cause severe injury or death.

The tube heater is operated by the building's environmental control system. To accomplish this, the heater must be connected to an electrical outlet controlled by a relay or set of contacts that is closed and opened by the building controller.

A series tap thermostat may be used to operate the tube heater.

Connecting a Series Tap Thermostat

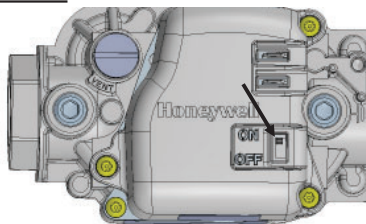
- Connect the power cord of the heater to the female side of the thermostat cord set.
- Plug the male side of the thermostat cord to an approved extension cord or to a wall outlet.

Start-Up Instructions

Follow steps 1 - 6 on initial start-up after heater installation. For normal start-up, set building control thermostat above room temperature. The heater will start.

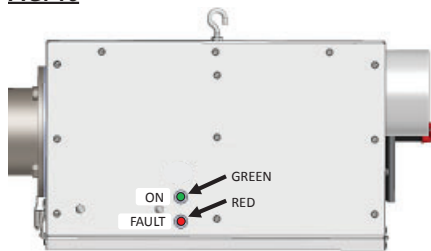
1. Open all manual fuel supply valves and check for gas leaks using approved leak detectors. The gas control valve has a manual shut-off feature incorporated into the valve assembly. Ensure the indicator on the valve is turned to the ON position. See Fig. 14.

FIG. 14



2. Connect the electrical cord to an approved electrical outlet.
3. 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. A red FAULT LED (light emitting diode) is on the burner box. **A flashing red light identifies a problem in the operation of the heater.** Refer to the troubleshooting decal on the interior of the access panel for assistance in troubleshooting.
4. On a call for heat, the ON green light will be lit and the motor will start up and run for five (5) seconds. See Fig. 15.

FIG. 15



5. This pre-purge is a safety feature and a normal operational characteristic prior to ignition taking place. After five (5) seconds, the igniter will spark.
6. The ignition control will make up to three trials for ignition. Each trial for ignition will take approximately ten seconds. If the main burner does not light, the system will lock out, and a three flash pattern will be given by the red LED.

NOTE: It is normal for air to be trapped in the gas hose on new installations. The heater may try more than once for ignition before the air is finally purged from the line and ignition takes place.

Shut-Down Instructions

If the heater is to be shut down for cleaning, maintenance or repair, follow steps 1 - 4. Otherwise, set 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. Turn thermostat to off or no heat position.
4. Disconnect the heater from the electrical supply

Cleaning Instructions



WARNING

Fire, Burn and Explosion Hazard

- This heater contains electrical and mechanical components in the gas management, safety and airflow systems.
- Such components may become inoperative or fail due to dust, dirt, wear, aging, or the corrosive atmosphere of an animal confinement building.
- Periodic cleaning and inspection as well as proper maintenance are essential to avoid serious injury or property damage.



WARNING

This heater may be washed only on its external areas provided:

- The burner box is disconnected from the electrical supply.
- The burner box access panel is closed and securely latched.
- Water spray nozzle shall not discharge within 6 feet of the burner box and its tubes.
- The water pressure does not exceed 45 PSIG for 10 seconds on each side of burner box.
- The burner box is not reconnected to electrical supply for a minimum of 1 hour or until the it is thoroughly dry.

Improper cleaning can cause severe personal injury or property damage due to water and/or cleaning solution:

- In electrical components, connections and wires within the burner box causing electrical shock or component failure.
- On gas control components causing corrosion which can result in gas leaks and fire or explosion from the leak.

Clean internal components of the burner box with a soft, dry brush or cloth, or compressed air.

1. Before cleaning, close the fuel supply valve to the heater and disconnect the electrical supply. Allow heater to cool.
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 pressurized air or a soft brush on its burner box, reflectors, and tubes.
 - b. At least once a year, give the heater a thorough cleaning. At this time, open the burner box and brush or blow off control components, and fan motor assembly. Ensure the burner air inlet venturi ports and the throat of the casting are free of dust accumulation.
 - c. When washing with water, do not spray water into the burner box or the tubes. Observe and obey the Warning within these Cleaning Instructions. This same Warning is supplied on the heater.

Maintenance Instructions

Before Each Use:

1. Check to make sure the heater's surrounding area is kept clear and free from combustible materials, gasoline, and other flammable vapors and liquids.
2. 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.
3. Check all hose and tubing assemblies for cracks, cuts, abrasions or ruptures. Replace any hoses that are suspect.
4. Check all gasketing on burner box and fan housing discharge. Ensure all is in good condition. Replace any gasket material if suspect
5. Ensure reflector supports and hangers are secure, reflectors do not sag, and are properly located.
6. Check overall condition of heater for cracked or damaged components, loose screws or bolts, nicked or cut electrical leads, etc. Replace any suspect components.
7. For safety as well as for optimum performance at the heater, it is necessary to keep the outside of the heater free of dust, dirt or any combustible material. If any operational component shows signs of rust or corrosion, replace the component immediately.
8. Check all warning or instruction labels, dataplates, etc. If any are lost or become hard to read, replace them immediately. Do not operate the heater until you have all instructions and can read and understand them.

Annually:

1. Check the air inlet assembly. Ensure the air inlet assembly and its duct are free of blockages.
2. Have your gas supplier check all gas piping for leaks or restrictions in gas lines. Also, at this time have your gas supplier clean out the sediment trap at the inlet of the burner box of any debris that may have accumulated.

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 suitable for continued use.

General Service Instructions

WARNING Burn Hazard

- Heater surfaces are hot for a period of time after the heater has been shut down.
- Allow the heater to cool before performing service, maintenance, or cleaning.
- Failure to follow this warning will result in burns causing injury.

WARNING Fire and Explosion Hazard

- Do not disassemble or attempt to repair any heater components or gas train components.
- All component parts must be replaced if defects are found.
- Failure to follow this warning will result in fire or explosions, causing property damage, injury, or death.

1. Close the fuel supply valve to the heater and disconnect the heater's electrical supply before servicing unless it is necessary to have the valve open and electrical supply connected for your service procedure.
2. Open the burner box for access to control components. Close and latch after servicing.
3. For reassembly, reverse the respective service procedure. Ensure gas connections are tightened securely.
4. Clean the heater's burner orifice and pressure switch orifices 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 ignition or combustion problems. Replace the orifice if it cannot be cleaned properly.
5. Disconnect appropriate component electrical leads when servicing. **After servicing, light the heater to ensure proper operation and check for gas leaks.**

Igniter

The tip of the igniter is exposed to a harsh environment consisting of high temperatures and combustion products. Periodic servicing is required.

A. REPLACEMENT

1. Remove igniter mounting screws. See Fig. 16.
2. Lift and pivot the igniter until it clears the burner. See Fig. 17 (Sentinel) for example.

DO NOT FORCE OR BEND THE IGNITER DURING IGNITOR REMOVAL. DO NOT FORCE OR BEND THE BURNER VANES (SENTINEL) DURING IGNITER REMOVAL.

FIG. 16

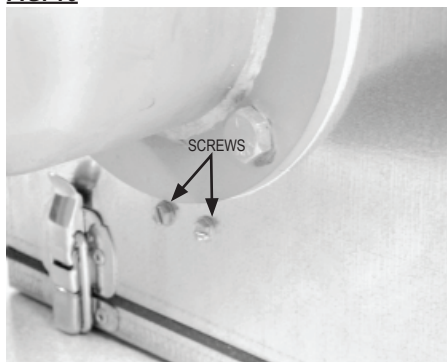
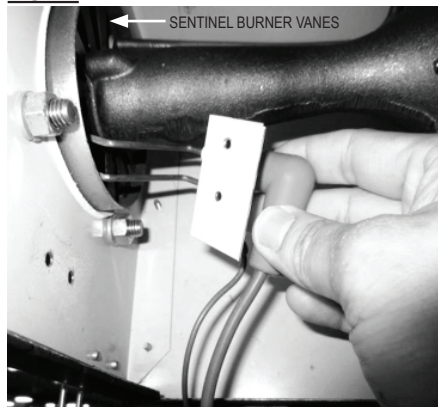


FIG. 17

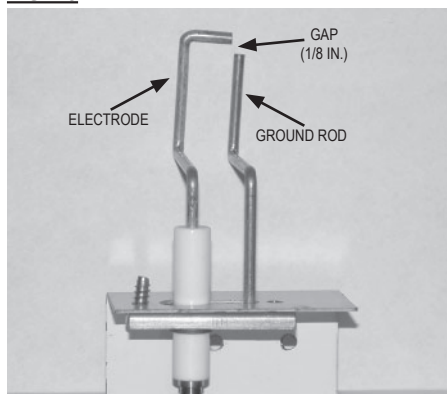


3. Pull the ignition cable's rubber boot from the igniter.

B. MAINTENANCE

1. Ensure the gap is 1/8 in. See Fig. 18.
2. Clean the electrode and ground rod using emery cloth.
3. Ensure the insulative base of the electrode is not cracked.

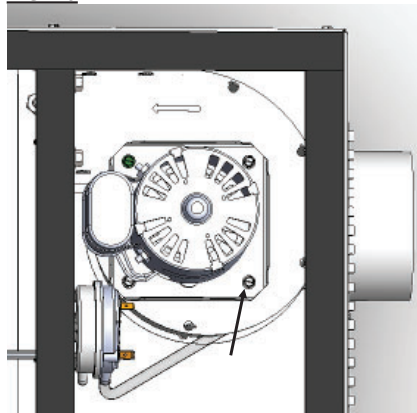
FIG. 18



Motor and Fan Assembly

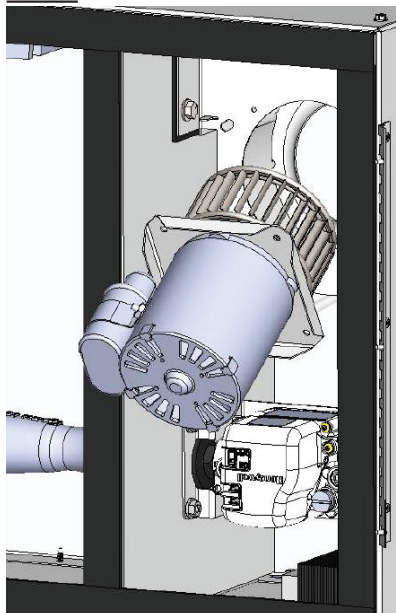
1. Disconnect motor leads.
2. Remove the four (4) motor mounting screws.
See Fig. 19.

FIG. 19



3. Remove motor/fan wheel assembly from fan housing.
See Fig. 20.

FIG. 20

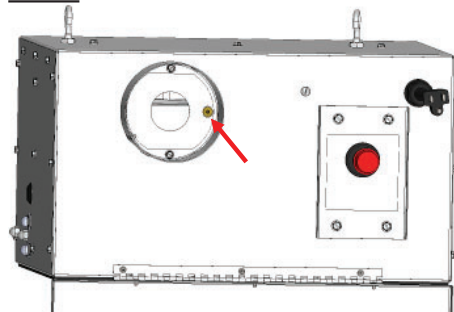


Air Differential Pressure Switch, Tubing and Orifices.

Air inlet plate orifice:

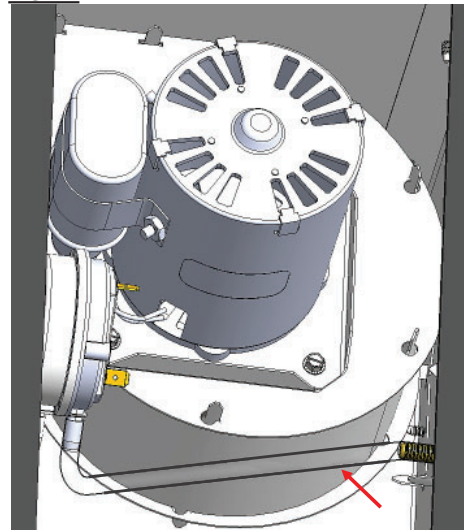
See Fig. 21. Ensure this orifice is free of dust. If the orifice is plugged, remove the two screws that hold the plate to the burner box. Clean using compressed air.

FIG. 21



Pressure switch tube: See Fig. 22. Check for blockage. Clean with compressed air after removing the tube from the switch and the air inlet plate orifice.

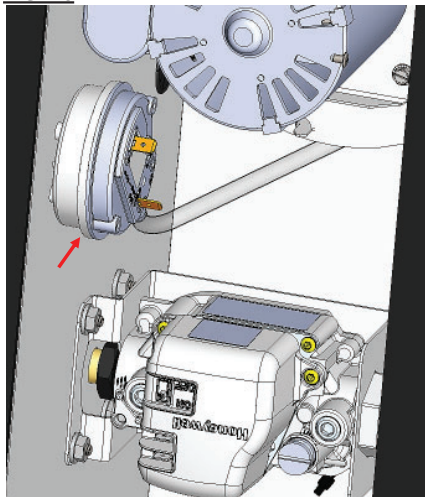
FIG. 22



Air differential switch:

The air differential switch is a normally open, critical safety device. See Fig. 23 for location. Its purpose is to prove to the ignition control that there is a sufficient difference in pressure within the burner box before the ignition control sends power to open the gas control valve.

FIG. 23



Its electrical contacts close based on the difference between pressures between the air inlet and the burner box compartment. If the switch does not close after the fan motor starts, the igniter will not spark nor will the gas control valve open. A rapid flash will occur on the red fault diagnostic light. The ignition control will lock-out for 60 seconds before another trial attempt. After three (3) fail attempts, a 2-time flash pattern will occur. The same will occur if the fan motor does not start on a call for heat.

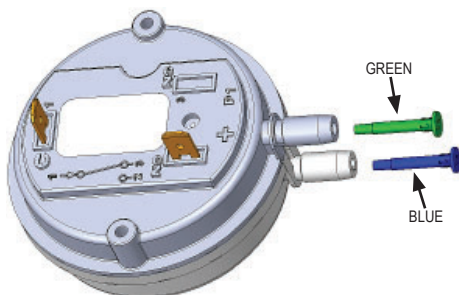
If the switch is already closed from a past ignition trial, and stays closed prior to a call for heat, the fan motor will not start, nor will the igniter spark or the valve open. A rapid flash will occur on the red fault diagnostic light. The ignition control will lock-out for 60 seconds before another trial attempt. After three (3) failed attempts, a 1-flash pattern will occur.

The air differential switch orifices should be free of dirt. If cleaning is needed, use pressurized air. See picture below.

- Remove the respective orifice from the switch.
- Hold up to light. If blocked, clean with air.
- Ensure the orifices are pushed back into the proper location on the switch.
- Green orifice into black stem
- Blue orifice into white stem on switch.

To test the switch:

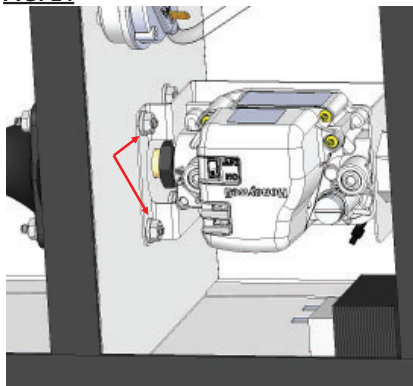
- Disconnect the pressure switch wiring at terminals PSI and PSO of the ignition control.
- Route the wires so both are exterior of the burner box when the burner box' access door is closed and latched.
- Start the heater. As soon as the fan motor starts, connect both air switch leads together.
- If the heater starts and operates normally, verify the following:
 - o Pressure switch wire terminals at the ignition control are tight and in good condition.
 - o No obstructions at air inlet



Gas Control Valve

1. Remove the hose from sediment trap.
2. Remove the two nuts that secure the gas control valve's mounting bracket to the center partition of the burner box. See Fig. 24.

FIG. 24



3. Remove the 4 screws from gas valve door. See Fig. 25.

FIG. 25

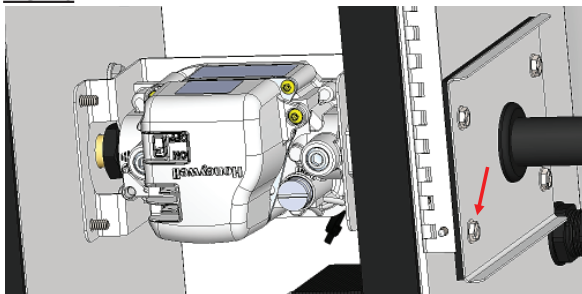
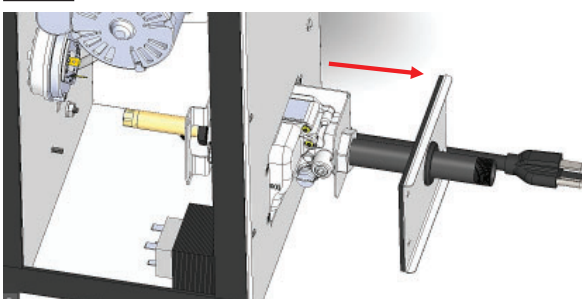


FIG. 26



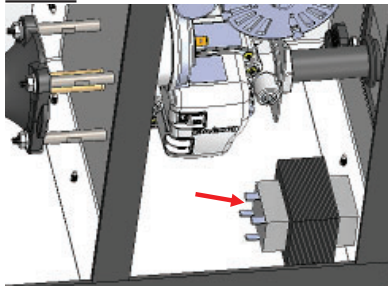
4. Pull valve assembly through the gas valve door opening. See Fig. 26.

Transformer

The transformer (Fig. 27) reduces the main power supply voltage to 24 VAC. The 24 VAC is sent to the ignition controller. Once the ignition controller receives 24 VAC, an ignition cycle begins.

If the transformer is receiving main power voltage, but 24 VAC is absent from its output terminals, the transformer is defective. The heater will not operate, nor will the green LED on the burner box side be on.

FIG. 27



Ignition Control

The ignition control sends and receives voltages to operate or verify operation of components. Refer to the following and Fig. 28 to understand the ignition control's terminal designators if doing voltage checks on the control.

L1: Line voltage to control from power supply.

IND: Line voltage from control to fan motor.

LED: Connection for control's diagnostic light wiring harness.

MV: 24 VAC from control to gas control valve.

PS2: 24 VAC from air pressure switch back to control

PS1: 24 VAC from control to air pressure switch.

W: 24 VAC from transformer to control. (without this voltage the ignition control will not function)

FS: No terminal.

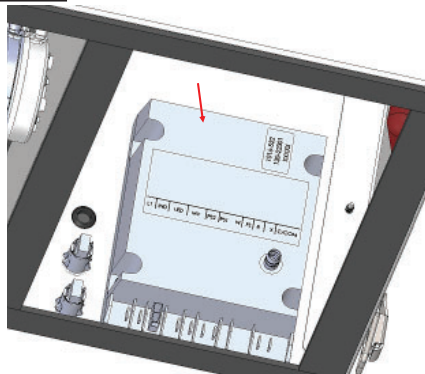
R: No terminal.

X: No terminal.

C/COM: Control and burner ground.

Also refer to "Operation Sequence" within this manual as needed to understand operation of the ignition control during a call for heat.

FIG. 28



Gas Pressure Checks

- The following is a typical procedure to be followed in checking gas pressures.
- Consult the dataplate on the heater or page 4 in this manual for specific pressures. The gas pressures will vary depending upon fuel type.
- Gas pressure measured at the inlet to the gas valve is Inlet Pressure and gas pressure measured at the outlet of the gas valve is Burner Manifold Pressure

MATERIALS REQUIRED

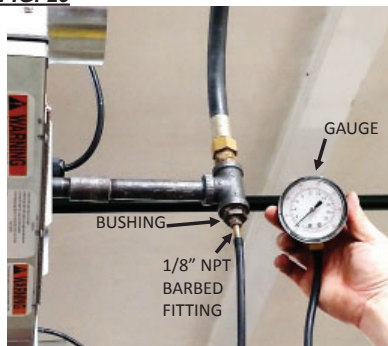
Quantity Description

2	Gas pressure gauges capable of reading up to 35 in. W.C. (may also be ordered from L.B. White, part number 00764)
1	Bushing, 1/2 in.x 1/8 in.
1	1/8 in. barbed fitting
1	3/16 in. allen key

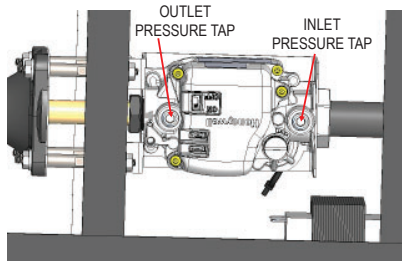
A. Preparation

1. Disconnect the heater from the electrical supply and close the fuel supply valve to the heater inlet.
2. Remove the lower nipple and cap from the sediment trap and install the bushing and 1/8 in. NPT barbed fitting. See Fig. 29.

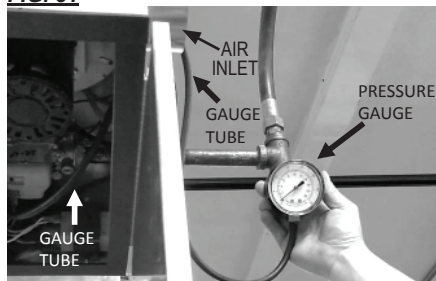
FIG. 29



3. Open the burner box access panel.
4. Remove either the inlet or outlet pressure tap. See Fig. 30.

FIG. 30


5. Remove the air inlet tube from the burner box and route the gauge tube through the air inlet to the gas control valve. See Fig. 31.

FIG. 31


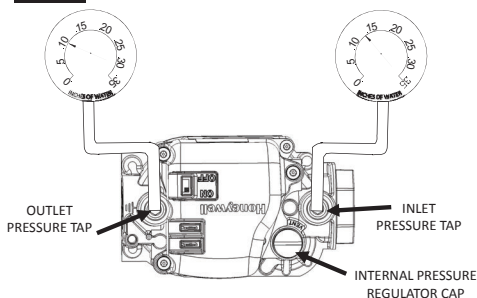
-- Attach pressure barb and hose to either the gas valve inlet or outlet to measure gas pressure. Securely tighten the pressure barb.

6. Close and latch the burner box. Open the fuel supply valves to the heater, reconnect the heater's electrical supply, and start the heater.

B. Reading Pressures

1. With the heater operating, the pressure gauges should read the pressures specified on the dataplate. See Fig. 32.
2. Do the readings at the inlet and outlet pressure gauges agree with that specified on the dataplate? If so, then no further checking or adjustment is required. Proceed to section "C".

3. If the inlet pressures do not agree with that specified on the dataplate, then the regulator controlling gas pressure to the heater requires adjustment.
4. If the inlet pressure is correct but the burner manifold pressure does not agree with that specified on the dataplate, then the pressure regulator internal to the gas control requires adjustment. Refer to the following instructions. The burner box will need to be opened and closed/latched as needed to accurately set the gas control pressures.
5. If manifold gas pressure is different than dataplate, remove the internal pressure regulator cap and adjust the internal pressure regulator clockwise or counter clockwise. See Fig. 32.

FIG. 32


C. Completion

1. Close the fuel supply valve to the heater and allow the heater to burn off any remaining fuel.
2. Disconnect the heater from its electrical supply.
3. Remove the gauges and associated hardware. Install plugs in gas control valve and in connector. Tighten all securely. Close and latch panel. Reconnect air inlet to burner box if necessary.
4. Reconnect hose and adapter to sediment trap. tighten securely.
5. Open fuel supply valve and reconnect electrical supply to heater. Start the heater and check for gas leaks. Set thermostat to desired temperature.

Troubleshooting Information

READ THIS ENTIRE SECTION BEFORE BEGINNING TO TROUBLESHOOT PROBLEMS.

WARNING

- This heater can start at any time.
- Troubleshooting this system may require operating the unit with line voltage present and gas on. Use extreme caution when working on the heater.
- Failure to follow this warning may result in property damage, personal injury or death.

The following troubleshooting guide provides procedures for isolating equipment problems. This guide is intended for use by a **QUALIFIED GAS HEATER SERVICE PERSON. DO NOT ATTEMPT TO SERVICE THESE HEATERS UNLESS YOU HAVE BEEN PROPERLY TRAINED.**

TEST EQUIPMENT REQUIRED

The following pieces of test equipment will be required to troubleshoot this system with minimal time and effort.

- **Digital Multimeter** - for measuring AC voltage and resistance.
- **Low Pressure Gauge** - for checking inlet and outlet pressures at the gas control valve against dataplate rating.
- Visually inspect equipment for apparent damage.
- Check all wiring for loose connections and worn

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 sequence of operation 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. The red LED on the burner box will flash a specific light pattern depending upon the problem which is diagnosed. To effectively use the flow charts, you must first identify what the problem is by the light pattern of the red diagnostic light.

A flashing light indicates a problem.

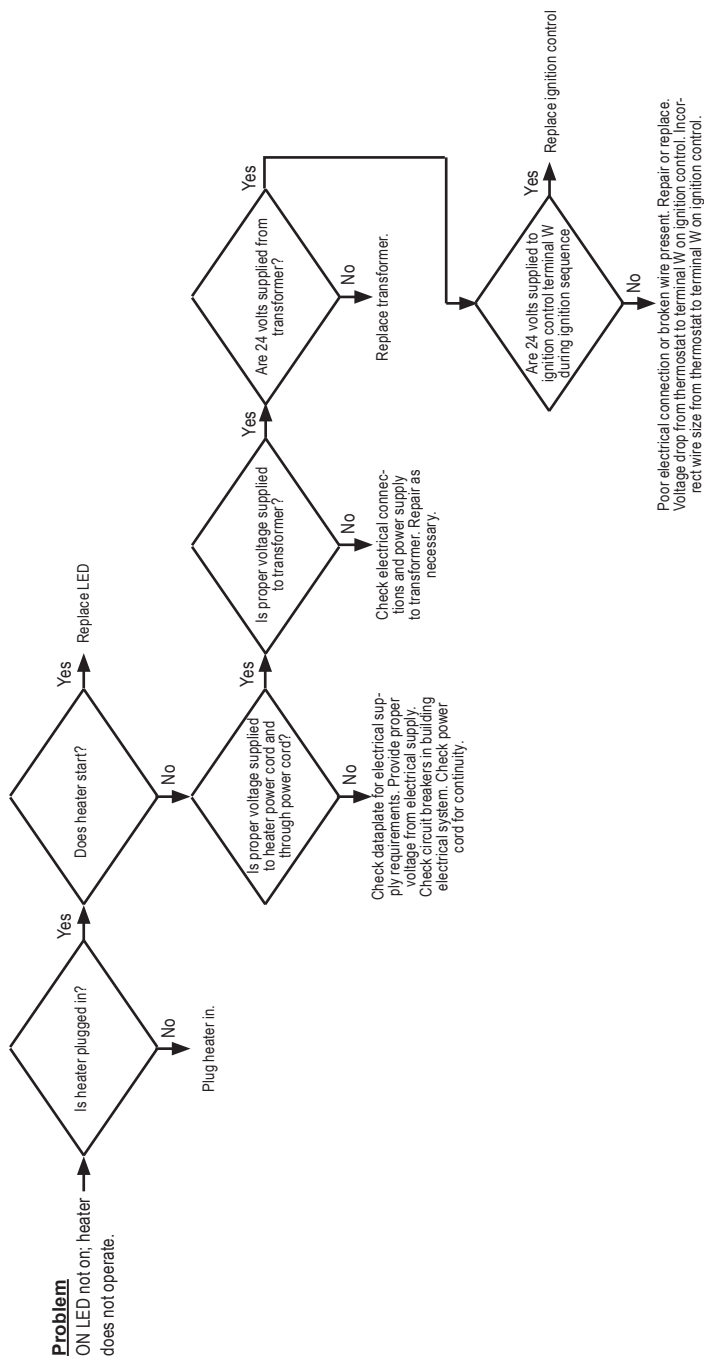
The flash pattern will be followed by a pause and then a repeat of the flash pattern until the problem is corrected. Refer to the tables below to identify what page to refer to when troubleshooting any problems.

Problems	Page
ON L.E.D. light is not ON, heater is not operating...	26
L.E.D. diagnostic light is flashing:	
A. Rapid Flash	27
B. One Time	27
C. Two Times	27
D. Three Times	28
E. Four Times	28
F. Five Times	28

Components should be replaced only after each step has been completed and replacement is suggested in the flow chart. Refer to the Servicing sections as necessary to obtain information on disassembly and replacement procedures of the component once the problem is identified by the flow chart.

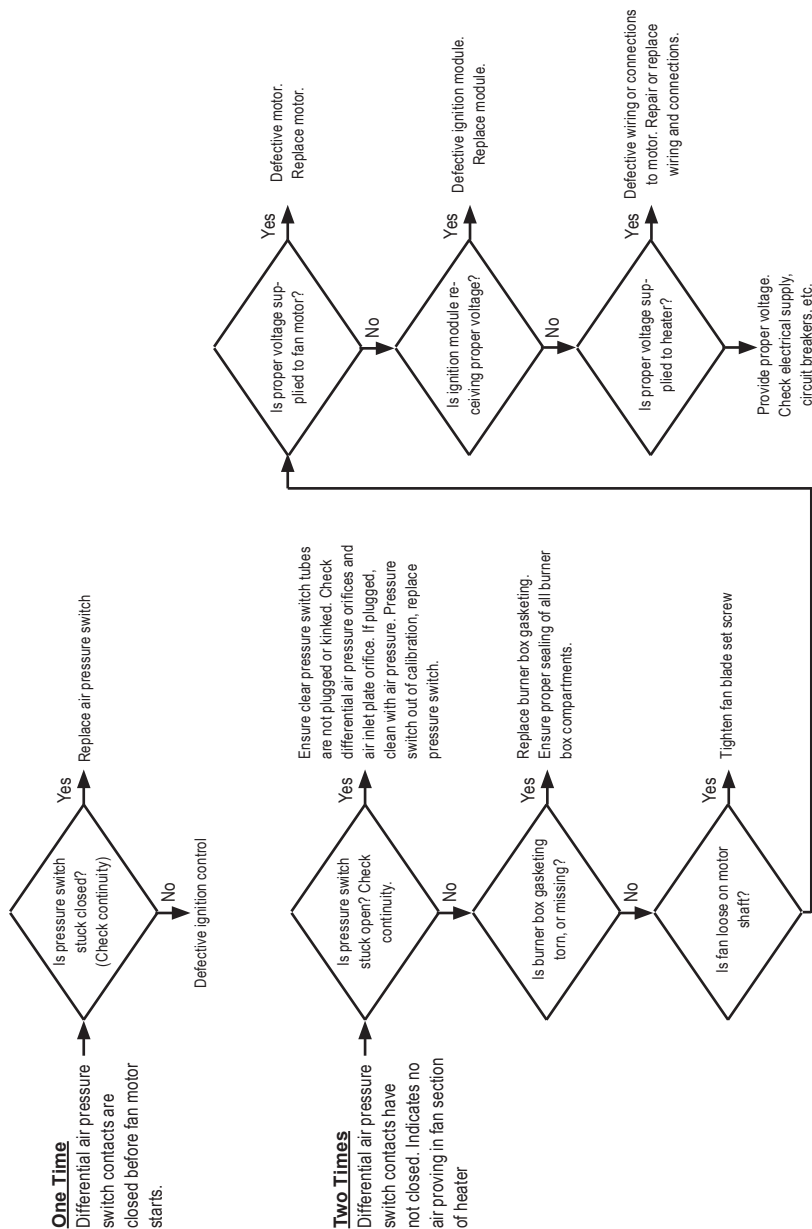
DIRECT IGNITION OPERATION SEQUENCE:

- Line voltage is sent to ignition control and to transformer.
- Transformer reduces line voltage to 24 volts which is sent to ignition control.
- Ignition control module performs self safety check.
- Internal components are tested.
- Air pressure switch circuit is checked.
- Ignition control module begins ignition trial sequence.
- Ignition control module sends 24 volts to air pressure switch.
- Ignition control sends line voltage to motor.
 - Fan motor starts.
 - Green LED is illuminated.
- Air pressure switch contacts close and 24 volts are returned to the ignition control module.
- Ignition control module sends high voltage to the igniter electrode.
 - Igniter sparks.
- Ignition control module sends 24 volts to the gas control valve.
 - Gas control valve opens.
- Ignition occurs.
 - Igniter continues to spark for 4 seconds
 - Ignition spark is cut off.
- Gas valve stays open.
- Building controller shuts heater down.
- Process starts again on a call for heat.



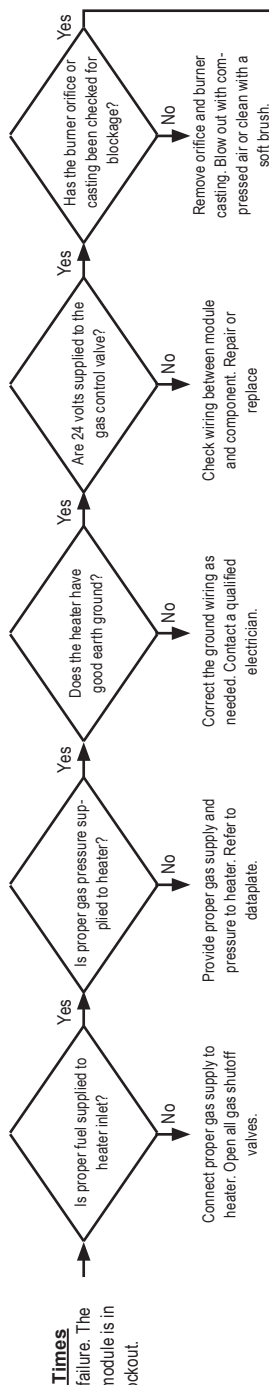
Red LED Flashing

Rapid Flash → Heater is in a 60 seconds soft lock-out. Hard lock will occur after third trial, with either 1 or 2 flash code. The air pressure switch contacts are closed prior to a call for heat or does not close on a call for heat after the motor starts. Refer to Service Instructions for Air Pressure Switch in this manual.

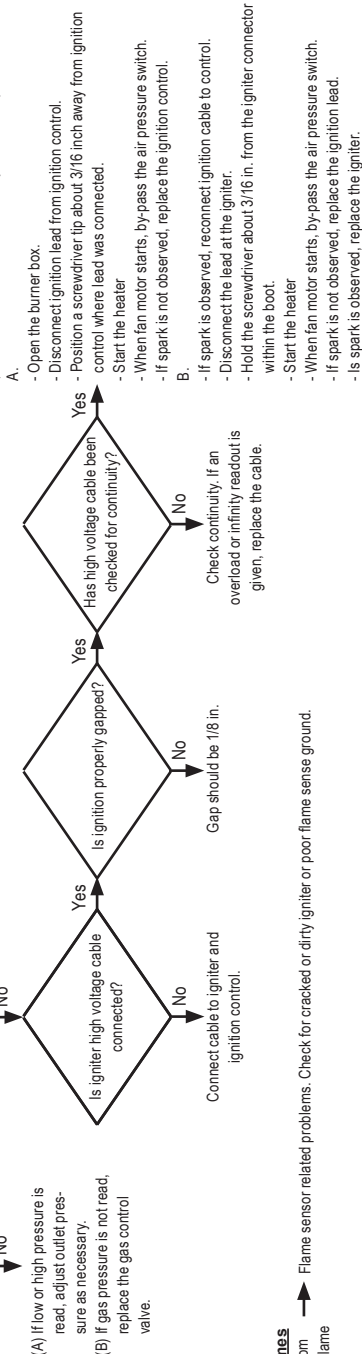


Three Times

Ignition failure. The control module is in safety lockout.

**CLOSE THE GAS SUPPLY WHEN DOING THESE TESTS.**

Determine if ignitor receives high voltage. (Assistance of another person may be required)

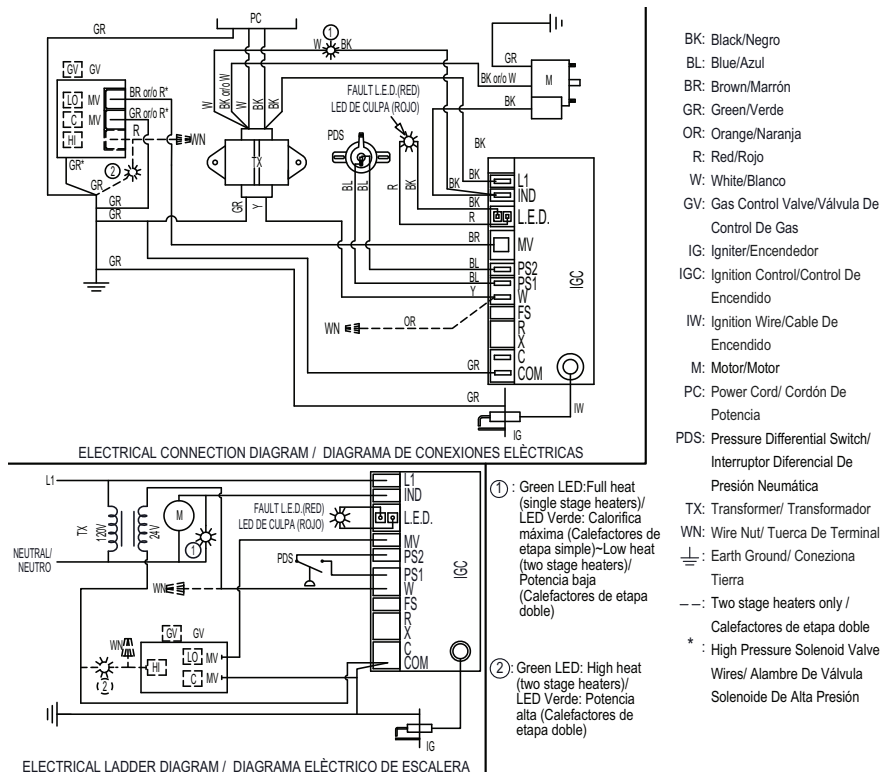
**Four Times**

Lockout from too many flame losses

Five Times

If control module does not reset, then replace it. (Internal board fault).
If module resets, then have qualified electrician check power source for power quality problems. (Frequency, line noise, line spikes, loose connections, improper wire gauge.)

Electrical Connection and Ladder Diagram



IF ANY OF THE ORIGINAL WIRES AS SUPPLIED WITH THE HEATER MUST BE REPLACED, IT MUST BE REPLACED WITH WIRING MATERIAL HAVING A TEMPERATURE RATING OF AT LEAST 302° F (150°C)./SI SE DEBE CAMBIAR CUALQUIER CABLE ORIGINAL PROPORCIONADO CON EL APARATO, SE DEBE CAMBIAR POR UN CABLE CON UNA CLASIFICACION DE TEMPERATURA DE AL MENOS 302° F(150° C)

Heater Component Function

Burner

Cast iron component used to channel gas and provide an area at which the fuel may ignite.

Burner Orifice

Brass metering device used to feed gas to burner at a specific rate.

Burner Tubes

Conducts the heat provided by the ignition of fuel gas at the burner.

Differential Air Pressure Switch

Safety device used to insure that proper positive and vacuum pressures are within the burner box before the gas valve is opened.

Direct Spark Ignition Control Module

Electronic printed circuit board which sends and receives voltages to various controls in an automatic ignition system. An important safety feature of the control board is that it will shut down the entire heater, thereby stopping the flow of fuel gas if burner flame goes out.

Fan Housing

Chamber used for delivering air for efficient air movement.

Fan Wheel

Component used in conjunction with the motor and fan housing. It is used to create pressures within the burner box used in the distribution of burner flame down the burner tubes.

Gas Control Valve

Electrical device consisting of a low pressure regulator and electrical solenoids used for the control of gas flow to the burner assembly. The control is available as single stage or two stage. A feature of the two stage control valve is its ability to modulate from a first stage (minimum) heat position to a second stage (maximum) heat position, if needed, to satisfy the temperature requirements of the building. This results in less temperature variation and potentially lower fuel consumption.

Gas Hose

Flexible connector used to convey gas from supply line in building to heater.

Igniter

Ignition device used on automatic direct spark ignition control systems. Ignites gas by spark.

Motor

Electric device used to force air through burner box to create pressure used in the ignition of the heater.

Reflector

Polished aluminum canopy supported over the burner tubes. Used to gather and reflect the radiant heat provided by the burner tubes back down to ground level.

Regulator

Mechanical device used in L.P. and natural gas distribution systems to reduce a higher inlet pressure to a preset lower pressure. The regulator is responsible to supply a steady outlet pressure to the heater(s) despite changes in inlet pressure, heater demand and weather conditions.

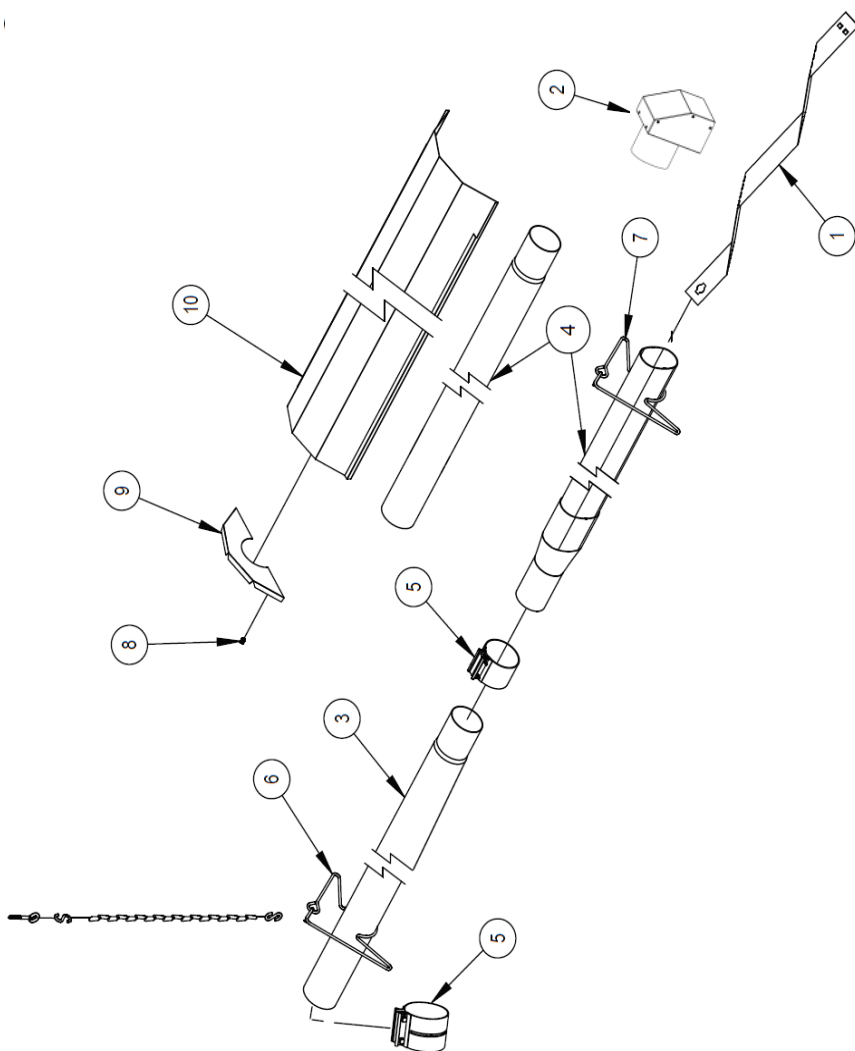
Thermostat

A component which responds to a change in temperature. This component is available for single stage or two stage heating. The two stage thermostat incorporates two independent control circuits which interconnect to the heater's two stage gas control valve, thereby providing low or high heat depending on thermostat setpoint.

Transformer

Electrical control used to accept line power supply primary voltage and reduce it to lower secondary voltage to operate certain control systems.

Service Parts Identification Schematic - Tube/Reflector



Parts List - Tube/Reflector

Item	Description	Part #
1	Air turbulation strip (2 for Oval 80 and 3 for Sentinel)	572892
2	Vent Cap, AT	573970
	Vent Cap, AR	573971
3	Tube, aluminized, 4 in. x 10 ft., with clamp, (All other Sentinel)	573010
	Tube, aluminized, 3 in. x 10 ft., with clamp, Oval 80	572894
4	Tube, uncoated, 4 in. x 10 ft. round w/ clamp, Sentinel	573011
	Tube, oval with clamp, Oval 80	572893
5	Clamp, 4 in., round, Sentinel	573009
	Clamp, 3 in. round, Oval 80	572842
6	Hanger, 4 in. round tube	573004
	Hanger, 3 in. round tube	572852
7	Hanger, oval tube	572870
8	U-clips (4)	572868
9	End cap with 4 u-clips	572869
10	Reflector, with end cap and u-clips	572895

Continued on next page.

This exploded view diagram illustrates the assembly of a washing machine. The central component is the main cabinet (13). Key parts include:

- 5**: A small cylindrical component, likely a filter or cap.
- 12**: The main tub assembly, including the drum and outer casing.
- 14**: A control panel with a digital display and buttons.
- 15**: A long, thin component, possibly a door hinge or latch mechanism.
- 16**: A small bracket or support piece.
- 17**: A long, thin rod or pin.
- 18**: A small cylindrical component, possibly a bearing or bush.
- 19**: A small bracket or support piece.
- 20**: A small rectangular component, possibly a sensor or switch.
- 21**: A long, thin rod or pin.
- 22**: A small cylindrical component, possibly a filter or cap.
- 23**: A small rectangular component, possibly a sensor or switch.
- 24**: A small rectangular component, possibly a sensor or switch.
- 25**: A small rectangular component, possibly a sensor or switch.
- 26**: A small rectangular component, possibly a sensor or switch.
- 27**: A long, thin rod or pin.
- 28**: A long, thin rod or pin.
- 29**: A small rectangular component, possibly a sensor or switch.
- 30**: A small rectangular component, possibly a sensor or switch.

 The diagram shows the spatial relationship between these parts, indicating how they fit together during assembly.

Parts List - Burner Box

Item	Description		Part #
12	Latches and strike		573775
13	Red LED		573769
14	Green LED		573770
15	Wire harness		573681
16	Ignitor with bracket		500-24972
17	Ignition cable		572847
18	Air differential pressure switch		573682
19	Tube, air differential pressure switch		572883
20	Ignition Control		573946
21	Transformer		573697
22	Gasket, burner		573006
24	Gas control valve	LPG	573774
		NG	573773
25	Motor		572860
26	Fan Wheel		572864
27	Power cord with connector		572865
28a	Hose, 6 ft., 1/2 ID. w/adaptor, rigid x swivel, Sentinel		550-20713
28b	Hose, 6ft., 3/8 ID. w/adaptor, rigid x swivel, Oval 80		550-21994
29a	Adapter, 1/2 NPT x 1/2 NPS, Sentinel		500-25873
29b	Adapter, 1/2 NPT x 5/8-18 UNF-2A, Oval 80		573804
30*	Regulator, second stage, propane gas		550-06553
	Regulator, second stage, natural gas		500-24414
31**	Complete gasket kit for burner box		572896

* Accessory sold separately

** Not illustrated

Warranty Policy

HEATER

L.B. White Company, LLC warrants that the component parts of its heater are free from defects in material and workmanship, when properly installed, operated, and maintained in accordance with the Installation and Maintenance Instructions, safety guides and labels contained with each unit. If, within 12 months from the date of purchase by the end user, any component is found to be defective, L.B. White Company, LLC will at its option, repair or replace the defective part or heater, with a new part or heater, F.O.B., Onalaska, Wisconsin. Registering your product online with L.B.White will automatically qualify a unit and its component parts for warranty consideration. If a product has not been registered with L.B.White, a copy of the bill of sale will be required to establish warranty qualification. If neither is available, the warranty period will be 12 months from date of shipment from L.B. White.

PARTS

L.B. White Company, LLC warrants that replacement parts purchased from the company and used on the appropriate L. B. White equipment are free from defects both in material and workmanship for 12 months from the date of purchase by the end user. Warranty is automatic if a component is found defective within 12 months of the date code marked on the part. If the defect occurs more than 12 months later than the date code but within 12 months from the date of purchase by the end user, a copy of a bill of sale will be required to establish warranty qualification.

The warranty set forth above is the exclusive warranty provided by L.B. White, and all other warranties, including any implied warranties or merchantability or fitness for a particular purpose, are expressly disclaimed. In the event any implied warranty is not hereby effectively disclaimed due to operation of law,

such implied warranty is limited in duration to the duration of the applicable warranty stated above. The remedies set forth above are the sole and exclusive remedies available hereunder. L.B. White will not be liable for any incidental or consequential damages directly or indirectly related to the sale, handling or use of the equipment, and in any event L.B. White's liability in connection with the equipment, including for claims based on negligence or strict liability, is limited to the purchase price.

Some states do not allow limitations on how long an implied warranty lasts, so the above limitation may not apply to you. Some states do not allow the exclusion or limitation of incidental or consequential damages, so the above limitation or exclusion may not apply to you. This warranty gives you specific legal rights, and you may also have other rights which vary from state to state.

To register your product and ensure full warranty, go to http://www.lbwhite.com/customer_care_center/product-registration/. Please have the serial number(s) and model(s) handy for the products you are registering.

Service

Contact your local L.B. White dealer for replacement parts and service. You may also call the L.B. White Company, LLC at 1-800-345-7200, for assistance, or email us at customerservice@lbwhite.com.

Be sure that you have your heater model number and configuration number when calling.



WORLD PROVIDER - INNOVATIVE HEATING SOLUTIONS

411 Mason Street, Onalaska, WI 54650

800-345-7200 • 608-783-5691

608-783-6115 (fax)

techsupport@lbwhite.com

www.lbwhite.com

150-131954 REV.B