



Owner's Manual and Instructions

SENTINEL® Agricultural Building Radiant Tube Heaters



MODELS	OUTPUT (Btuh)	FUEL
AT 125	125,000	Propane Vapor Withdrawal or Natural Gas
AT 150	150,000	



SCAN THIS QR
CODE



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
QR Reader for iPhone.

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...contact us toll free at (800) 345-7200, or email us at customerservice@lbwhite.com.

ATTENTION ALL USERS

This heater has been tested and evaluated by L.B.White Co., Inc. as a direct gas fired radiant tube heater with intended use for the heating of poultry confinement buildings. If you are considering using this product for any application other than its intended use, then please contact your fuel gas supplier, or the L.B. White Co., Inc.

150-30269 REV.A



World Provider - Innovative Heating Solutions

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

 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 heater.
- Only properly-trained service people should repair or install 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 800-345-7200.

 WARNING

- Proper gas supply pressure must be provided to the inlet of the heater.
- Refer to rating 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, building damage or loss of livestock.
- 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 to humans and livestock.

 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.

FOR YOUR SAFETY

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

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

Improper installation, adjustment, alteration, service or maintenance can cause property damage, injury or death. Read the installation, operating and maintenance instructions thoroughly before installing or servicing this equipment.

 WARNING

Fire and Explosion Hazard

- Keep solid combustibles a safe distance away from the heater.
- Solid combustibles include wood or 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 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 loss of life.



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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 6 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.

Tube Heater Specifications

SPECIFICATIONS		Model	
		AT 125	AT150
Tube Length (ft.)		60	40 or 60
Maximum Input per Hour (BTUH)		125,000	150,000
Fuel Consumption per Hour (Max.)	L.P. GAS (lbs.)	5.80	6.96
	NAT. GAS (cu. ft.)	125	150
Inlet Gas Supply Pressure Acceptable at the Inlet of the Heater for Purpose of Input Adjustment	MAX.	13.5 in. W.C., L.P. and Natural Gas	
	MIN.	11.0 in. W.C., L.P. Gas 7.0 in. W.C., Natural Gas	
BurnerManifold Pressure		10.0 in. W.C., L.P. Gas 4.0 in. W.C., Natural Gas	
Ventilation Air Required to Support Combustion		140 CFM	
Motor Characteristics		Ball Bearing 1/30 H.P., 3020 RPM, CW Rotation	
Electrical Supply (Volts/Hz/Phase)		115/60/1	
Amp Draw (Starting Amps Include Igniter)	STARTING	1.16	
	CONTINUOUS OPERATION	1.02	
Minimum Safe Distances of Heater From Nearest Combustible Materials (See Fig. 1 on page 5)	TOP	1 ft.	
	SIDES	6 ft.	
	DISCHARGE END	6 ft.	
	BELOW RADIANT TUBES	6 ft.	
Temperature Sensor Location (See Fig. 2 on page 5)		12-18 in. Above Litter and Approx. 15 Ft. Down from Burner Box	

FIG. 1

SAFE CLEARANCES FROM COMBUSTIBLES

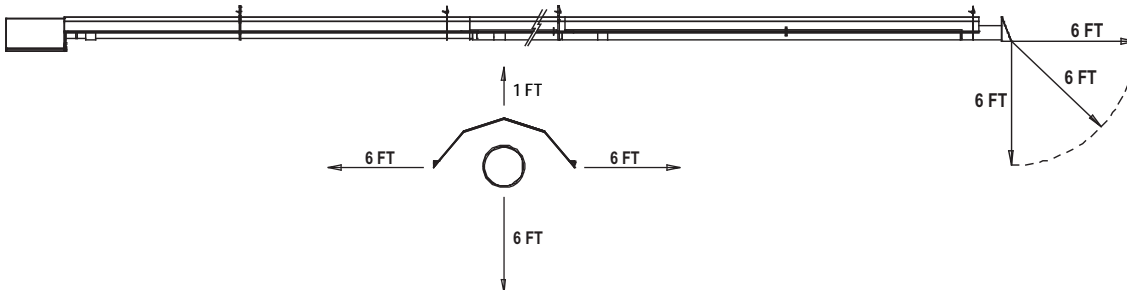
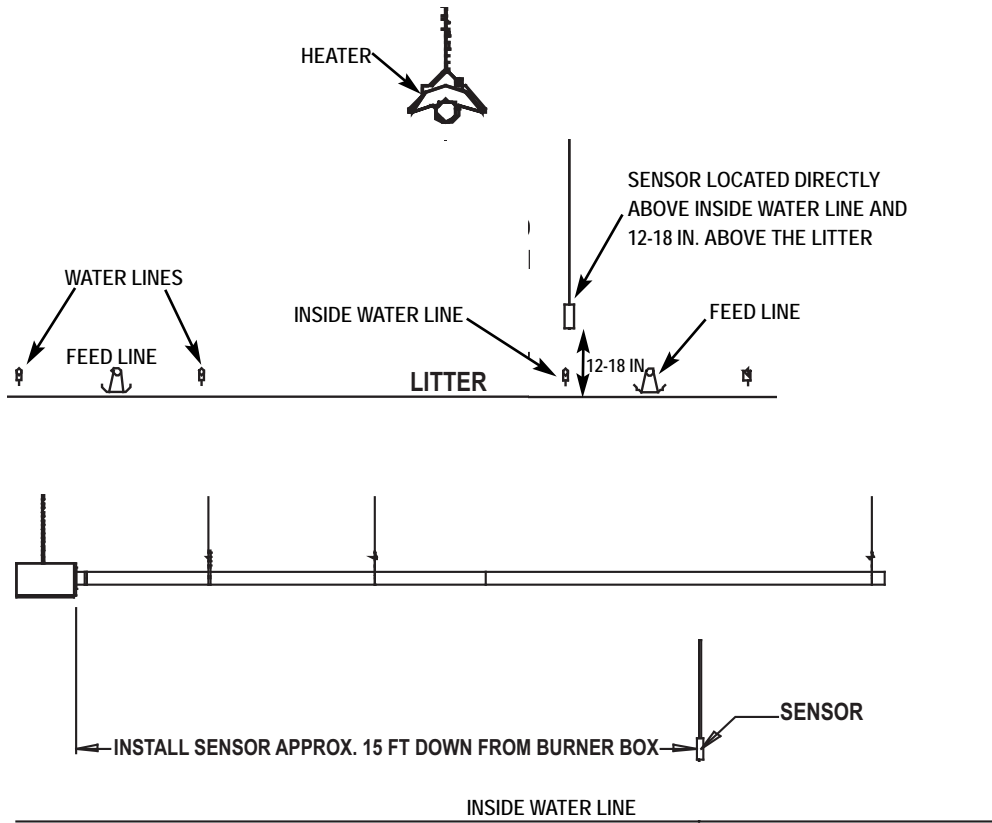


FIG. 2
TEMPERATURE SENSOR LOCATION



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 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 L.B. White Company to determine combustion air ventilation requirements of the heater.
- Lack of proper ventilation air will 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 ventilation affecting livestock can be disease, lower feed conversion, or death.

FUEL GAS ODOR

Propane gas and natural gas has man-made odorant 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 (LP) gas tank or cylinder fuel supply valves, or the main fuel supply valve 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.
- Natural gas is lighter than air and can collect around rafters or ceilings.
- 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 heater 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 this fuel gas.**
- Learn to recognize the odor of propane gas or natural gas. Local propane gas dealers 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 has a distinctive odor. Learn to recognize this odor. (Reference "Fuel Gas Odor" and "Odor Fading" sections above.)
- 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.
- 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 gas or fuel system.
- 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 service and installation of this equipment are as follows:

- a. To be a qualified gas heater service person, you must have sufficient training and experience to handle all aspects of gas-fired heater installation, service and repair. This includes the task of installation, troubleshooting, replacement of defective parts and testing of the heater. You must be able to place the heater into a continuing safe and normal operating 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 and tank 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. Do not move, handle, or service heater while in operation or connected to a power or fuel supply.
 4. 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 its 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.

5. 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.
6. The heater is designed to operate only with its access door closed and latched. Do not operate the heater with its burner box access door open.
7. 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.
8. 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 hose assembly shall be that specified by the manufacturer. See parts list.
9. Check for gas leaks and proper function upon heater installation and before building repopulation.
10. This heater should be inspected for proper operation by a qualified service person at least annually.
11. Always turn off the gas supply to the heater when not in use.
12. 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.
13. 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.
14. Use only approved gas hose or approved flexible connectors which are rated for use with propane or natural gas.

Installation Instructions

GENERAL

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.

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

3. Inlet Air Requirements:

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 Drawing Inlet Air From Attic- Overhead and Side Wall Heaters

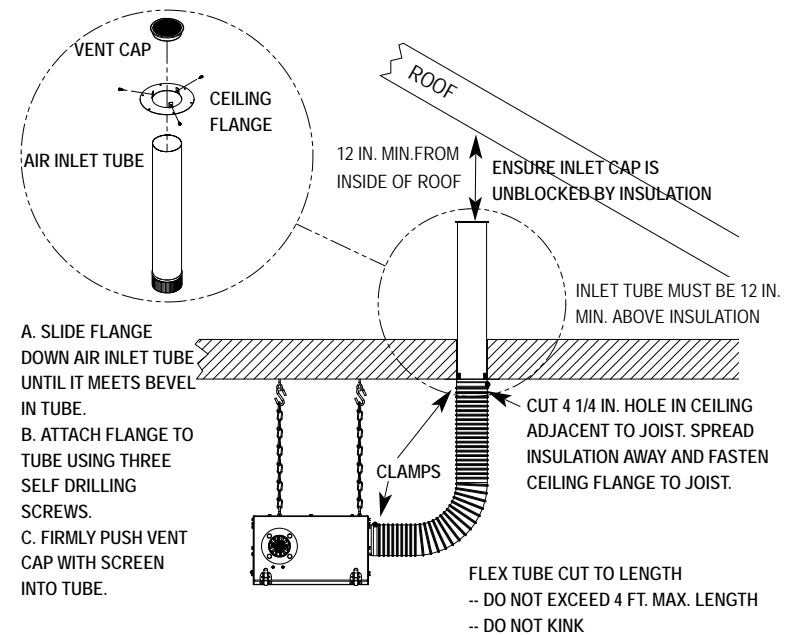
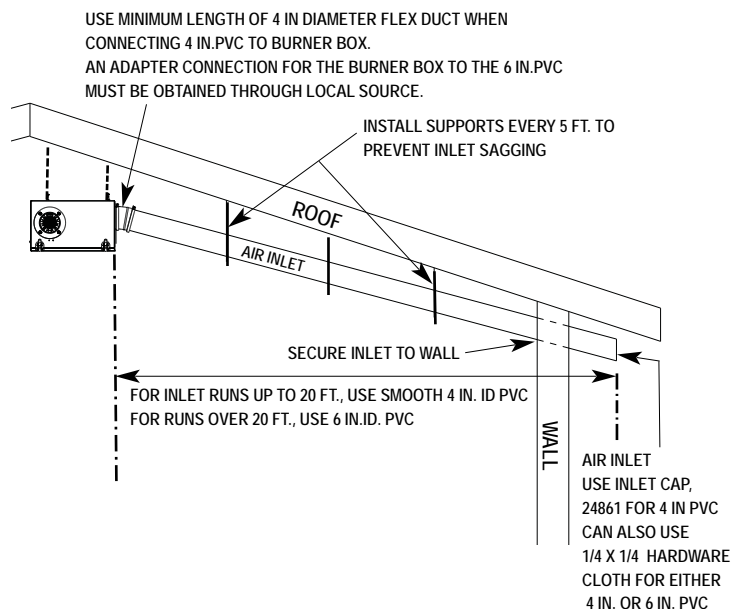


FIG. 4 Drawing Inlet Air Through Side Walls - Overhead Heaters



5. Heater installation must take into consideration proper hanging height to allow for clearance of catching machines, litter spreaders, and any other equipment used.
6. Ensure the heater installation does not interfere with water, gas, or electrical lines.

7. Position the gas hose to prevent any contact with the tubes, heat selectors, and burner box.
8. 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.
9. 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.
 - Regulator 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.
10. Always use pipe joint compound that is resistant to liquefied petroleum gas and natural gas.
11. Check all connections for gas leaks using approved gas leak detectors. Gas leak testing is performed as follows:
 - 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.
12. 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.
13. 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.
14. Install the proper 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.
15. Light according to instructions on heater or within Owner's Manual.
16. 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 at any time.
17. 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.
18. 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.
19. 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.
20. 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.



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 connections with approved gas leak detectors.

1. 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.
2. Hang the burner box. See Fig. 5. Maintain clearances to combustibles as shown in Fig. 1.
3. From the burner box chain, measure the distances shown in Fig. 6. **Aligning to the center of the burner box discharge**, hang chains at these points, using open eye hooks.

FIG. 5

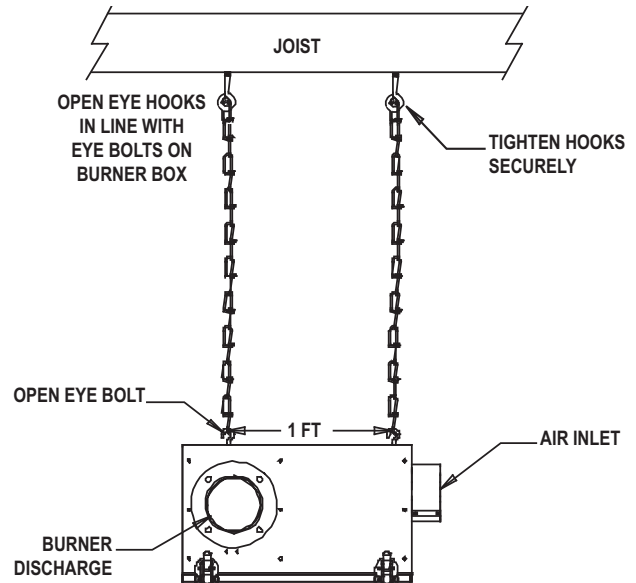
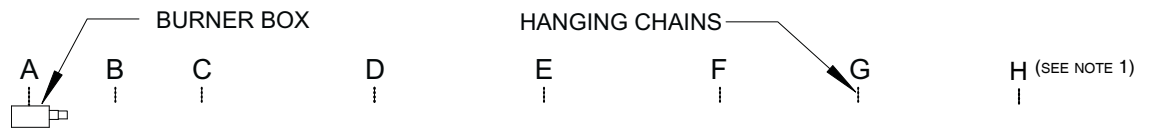


FIG. 6



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)	G - H (FT) <small>see Note 1</small>
4 FOOT	60 FT	4	4	12	8	12	8	8
5 FOOT	60 FT	5	5	10	10	10	5	10
10 FOOT	60 FT	5 *	5	10	10	10	5 *	10

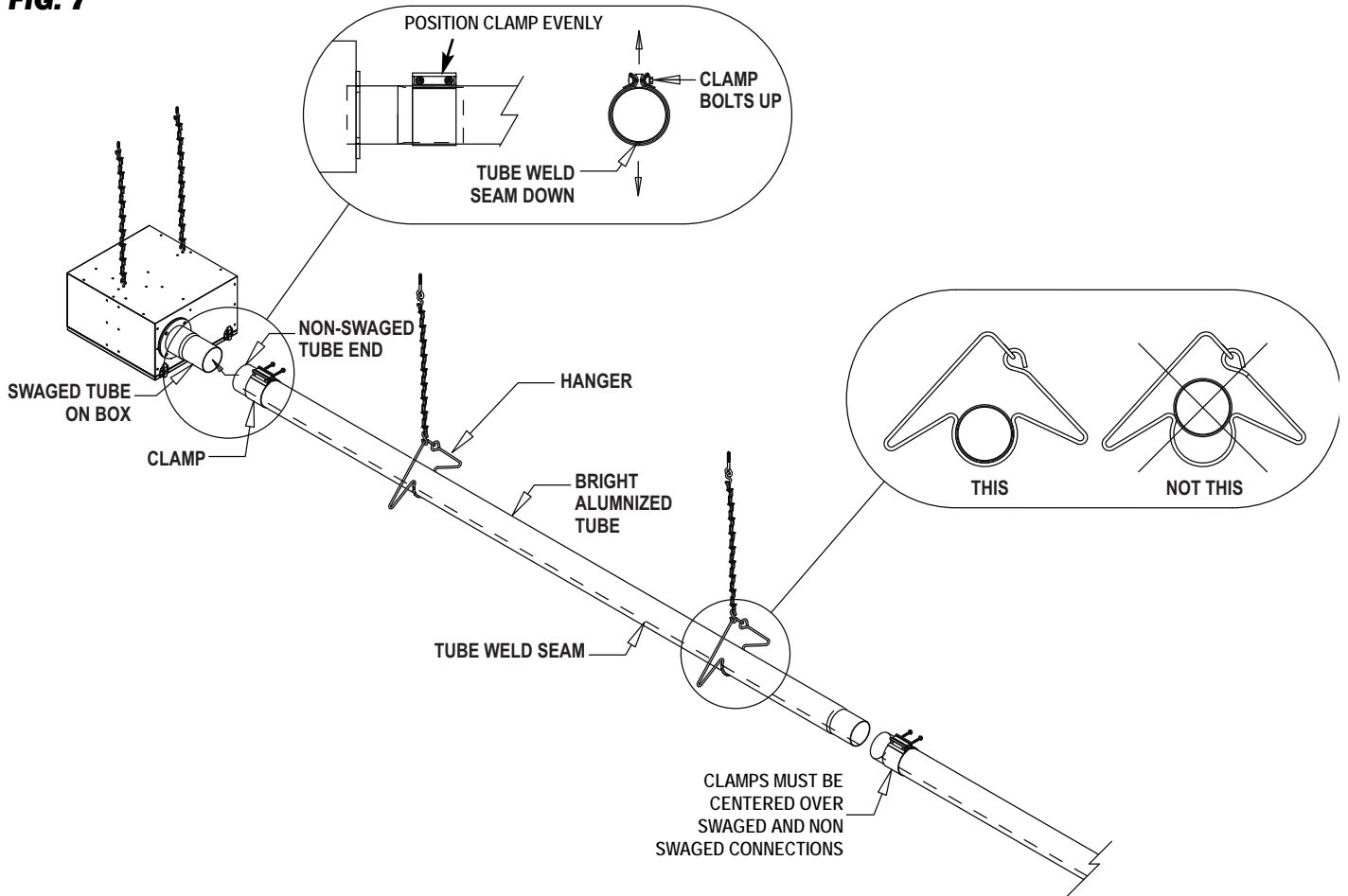
* A SUPPORT MUST BE CREATED BETWEEN THE TRUSSES
 (1) DISTANCE G - H FOR 60 FT. TUBE HEATERS ONLY

HANGING THE TUBES

Refer to Fig. 7 and the following instructions:

1. Slide a tube clamp over the non-swaged end of the 10 ft. aluminized tube (AT125/60 and AT150/60) or stainless steel tube (AT150/40).
2. Install the tube over the swaged discharge tube on the burner box.
 - a. Tube weld seam must be down.
 - b. Non-swaged end of tube must be completely pushed over swaged end of adjoining tube.
 - c. Clamp must be centered over tube connection.
 - d. Clamp bolts must be up.
 - e. Clamp bolts must be tight.
 - Tighten both bolts firmly.
 - Tighten both bolts to 35 ft.-lbs.
 - Finish tightening bolts to 65 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.

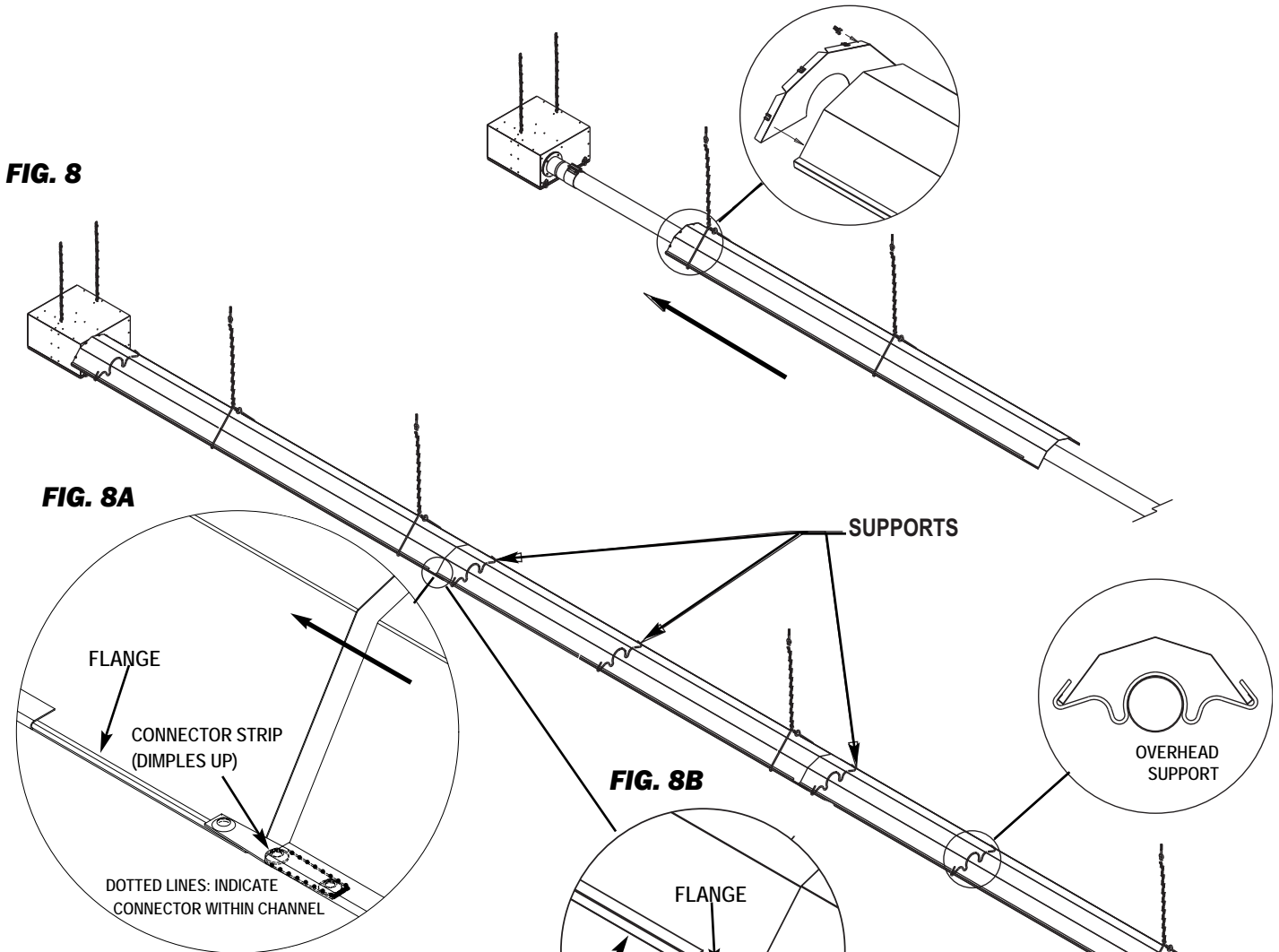
FIG. 7



INSTALLING REFLECTORS & SUPPORTS

Your tube heater may be supplied with either of two designs of reflectors. Refer to Fig. 8 and the following instructions.

1. **Overhead heaters:** Attach end cap to non-notched end of a reflector. Use 4 U-clips.
2. Slide the reflector through the hangers until end cap is up against burner box.
3. **Reflectors using connection strips:** See Fig. 8A.
Standard reflectors (have 90° formed channels): See Fig. 8B.
4. Complete this process for all remaining reflectors.
5. **Overhead heaters:** Attach remaining end cap to last reflector with U-clips.
6. 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.

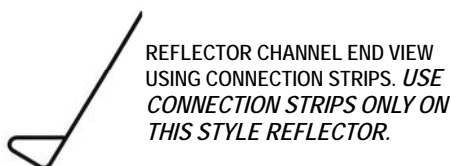


REFLECTOR USING CONNECTION STRIPS:
Insert a connection strip halfway into the folded channel at both sides of a reflector, at the end without flanges.

Slide this end of the reflector through the hanger and push it firmly into the folded channels of the reflector at the burner box.

The unflanged end of the reflector will overlap the flanged end of the adjacent reflector.

STANDARD REFLECTOR:
Overlap the reflectors 2 to 3 inches
Non-flanged ends overlap flanged ends.



AIR TURBULATION STRIPS & VENT HOOD

Assemble the strips and insert into last tube. Edge of strip is flush with end of tube. See Fig. 9. Refer to Fig.10 for installation of vent.

FIG. 9

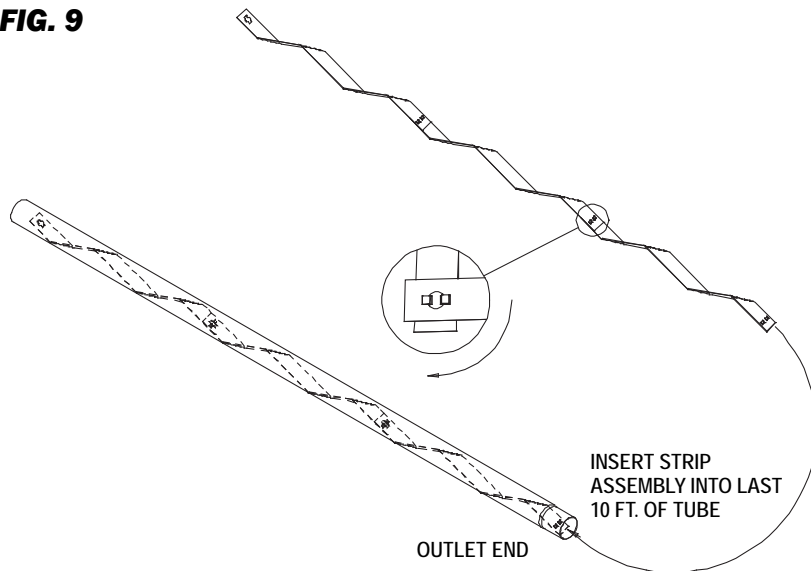
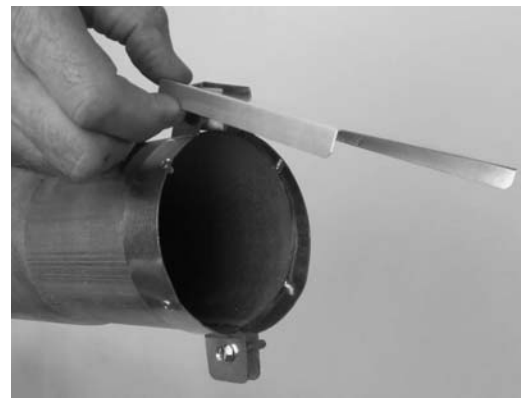


FIG. 10

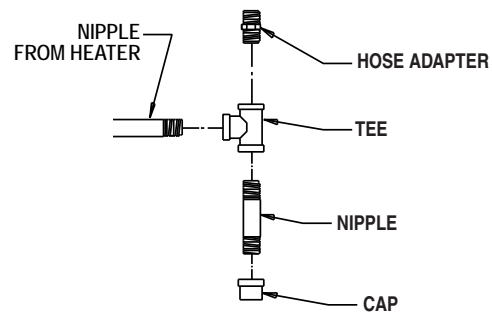


- FORM THE VENT'S STRAP AROUND END OF LAST TUBE.
- STRAP STOPS ARE PUSHED FIRMLY AGAINST EDGE OF TUBE.
- TIGHTEN THE STRAP SCREW SECURELY.
- FLAPPER MUST LIFT AND DROP FREELY.

SEDIMENT TRAP ASSEMBLY

Assemble the tee, nipple, and cap to the nipple at the gas inlet of heater. See Fig. 11. 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.**

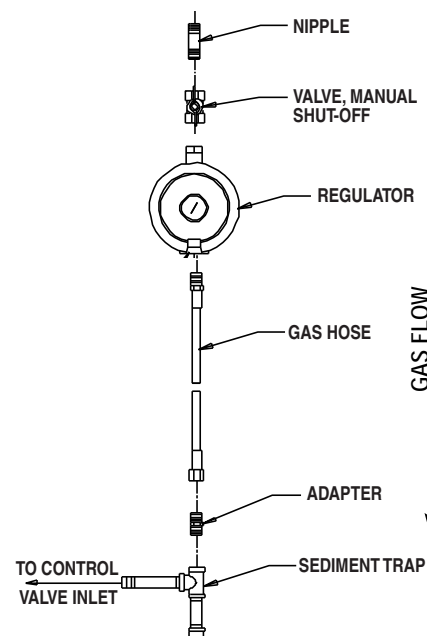
FIG. 11



MANUAL SHUT-OFF VALVE, HOSE & REGULATOR ASSEMBLY

1. Assemble the components together. See Fig. 12. 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. 12



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.

When connecting a thermostat or building controller to the burner box, route the wiring through the watertight connector near the power cord after removing the connector's plug. See Fig.13 If the connector does not completely seal around the wiring after tightening, apply silicone at the wire entry of the connector.

All interconnecting thermostat wiring must be at least 18 gauge to prevent voltage drop. Ensure the terminal marked W on the ignition control receives 24 VAC from the thermostat or building controller.

FIG. 13



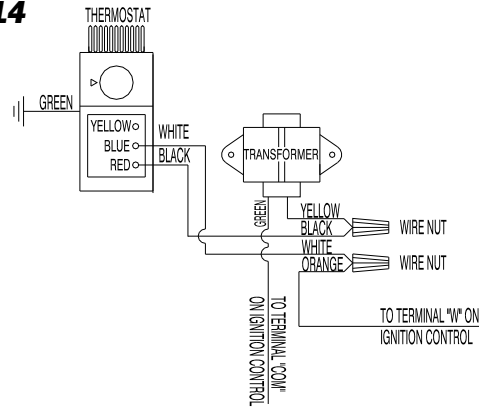
A. Connecting series tap thermostat kit.

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

B. Wiring Single Stage Thermostat (See Fig.14)

- Remove wire nut at yellow and orange wire.
- Connect wiring of thermostat as shown or refer to electrical diagram on heater

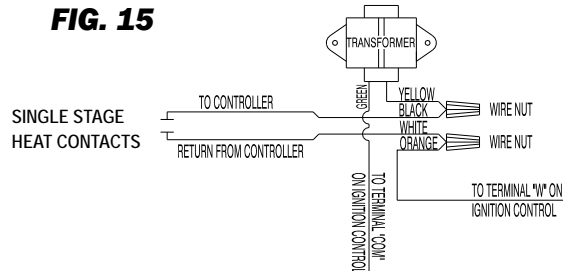
FIG. 14



C. Building Controller Connections (See Fig.15)

- Remove wire nut from yellow and orange wires.
- Connect controller contacts as shown.

FIG. 15



Start-Up Instructions

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

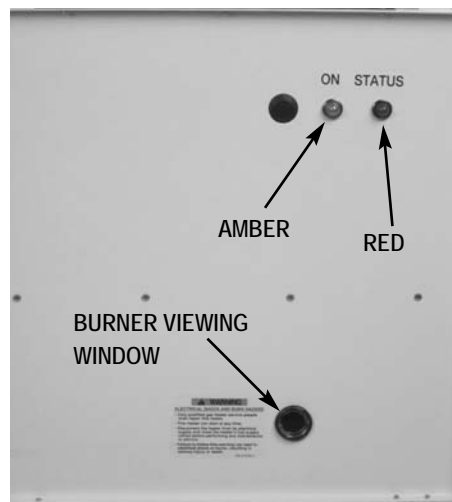
1. Open all manual fuel supply valves and check for gas leaks using approved leak detectors. The gas control valve has a manual shut-off feature incorporated into the valve assembly. Ensure the indicator on the valve is turned to the ON position. See Fig. 16.

FIG. 16



2. Connect the electrical cord to an approved electrical outlet.
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. A red LED (light emitting diode) is on the burner box cover. A constant on red indicates that the heater is functioning correctly. Any flash pattern 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.
5. The burner box has either one amber LED. One amber light indicates single stage heating capability. See Fig. 17.

FIG. 17



6. On a call for heat, the red status LED will come on. The motor will start up and run for five (5) seconds. 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.
 - The amber light will come on, indicating full heat output.
7. 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.

1. Before cleaning, close fuel supply valve to heater and disconnect electrical supply. Allow heater to cool.
2. The heater should have dirt or dust removed periodically:
 - a. After each flock or between building repopulation, 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.

 **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.

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 on the zone control panel 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 suitable for continued use.
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. 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.
6. If any warning or instruction labels, dataplates, etc. become lost or hard to read, replace them immediately. Do not operate the heater until you have all instructions and can read and understand them.
7. Check overall condition of heater for cracked or damaged components, loose screws or bolts, nicked or cut electrical leads, etc. Replace any suspect components.
8. Check all hose and tubing assemblies for cracks, abrasions or ruptures. Replace any hoses that are suspect.
9. Ensure reflector supports and hangers are secure, reflectors do not sag, and are properly located.
10. Check all gasketing on burner box and fan housing discharge. Ensure all is in good condition. Replace any gasket material if suspect.
11. At least once a year, check the air inlet assembly. Ensure the air inlet assembly and its duct are free of blockages.

Service Instructions

GENERAL

 **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.
6. After servicing, light the heater to ensure proper operation and check for gas leaks.

The igniter serves the dual purpose of igniting the fuel and sensing flame. The tip of this components is exposed to a harsh environment consisting of high temperatures and combustion products. Periodic servicing is required for optimum performance of ignition and flame sense.

A. REPLACEMENT

1. Remove igniter mounting screws. See Fig. 18.
2. Remove ignition cable from igniter. See Fig. 19.

FIG. 18

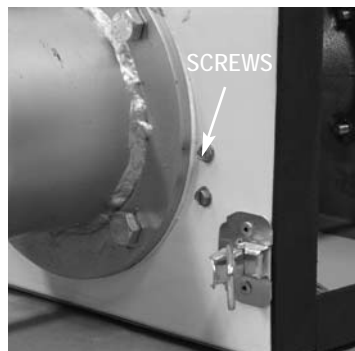
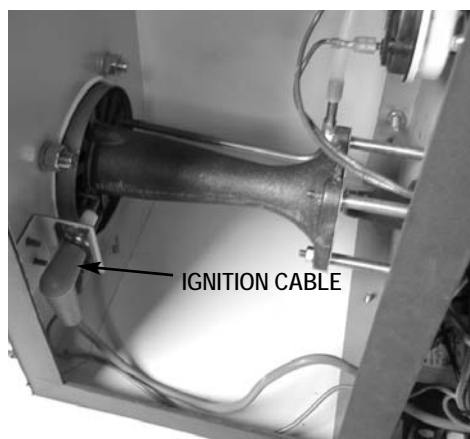


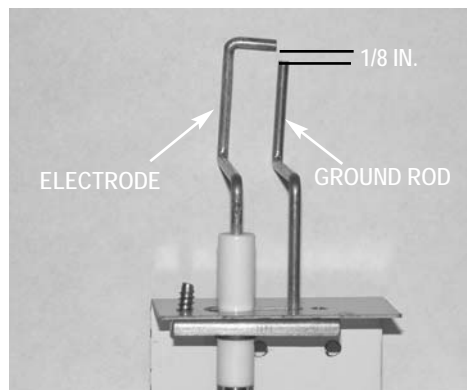
FIG. 19



B. MAINTENANCE

1. Remove igniter from burner box. Ensure the gap is 1/8 in. See Fig. 20.
2. Clean the electrode and ground rod using emery cloth.

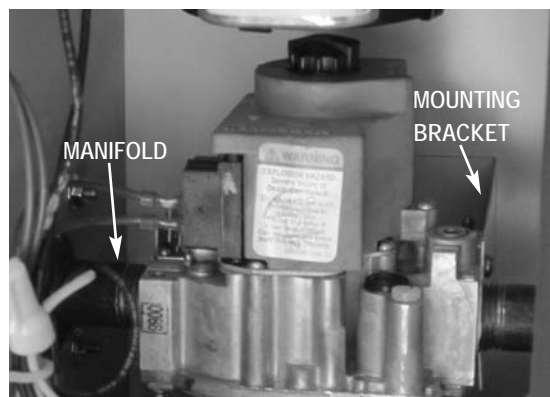
FIG. 20



GAS CONTROL VALVE

1. Brush or blow off any dust in area of the gas control valve.
2. Disconnect the gas hose and remove all piping from from gas control inlet.
3. Remove the manifold from the control valve's outlet. See Fig. 21.
4. Remove the screws holding the valve's mounting bracket to the burner box top.
5. Pull the control from the box, and remove its mounting bracket.

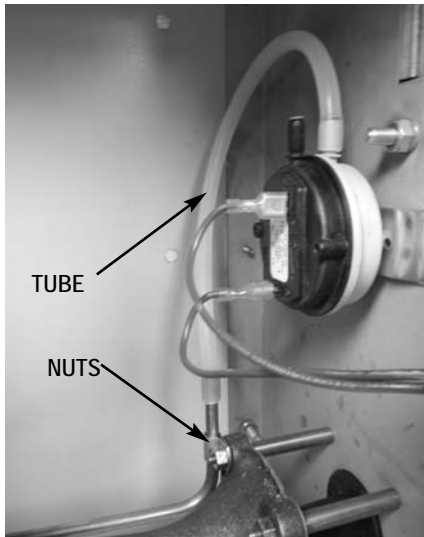
FIG. 21



BURNER ORIFICE

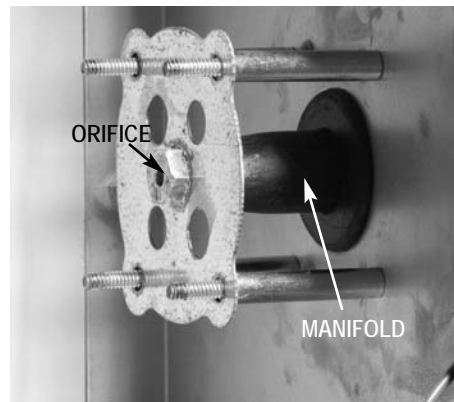
1. Remove the igniter
2. Remove the clear flexible tube from the pressure switch. Fig.22.
3. Remove the four nuts from the burner mounting studs and remove burner. See Fig. 22.

FIG. 22



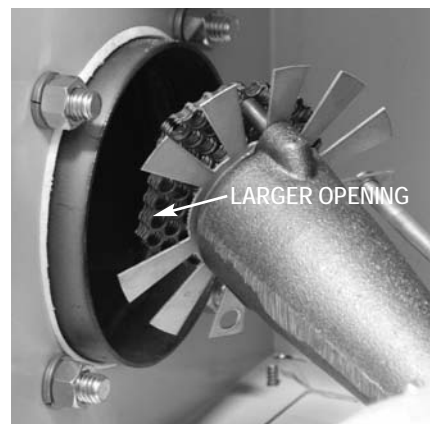
4. Securely hold the burner manifold in place while removing the orifice from the manifold. See Fig. 23. Inspect the orifice and clean out any dirt. Replace it if necessary.

FIG. 23



5. When reinstalling the burner, ensure larger opening between burner vanes is directed to the access door of the burner box. See Fig. 24.

FIG. 24



MOTOR AND FAN ASSEMBLY

1. Remove all fan housing mounting nuts. See Fig. 25.
2. Reposition the fan and motor assembly as necessary to remove it from the burner box. See Fig.26. The fan/motor/housing is available only as an assembly.

FIG. 25

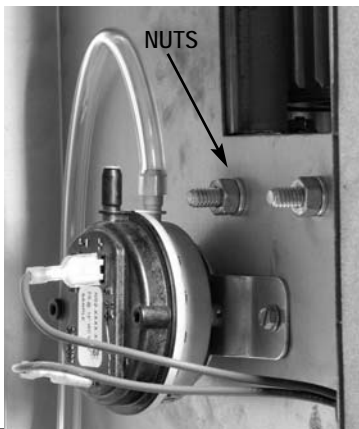
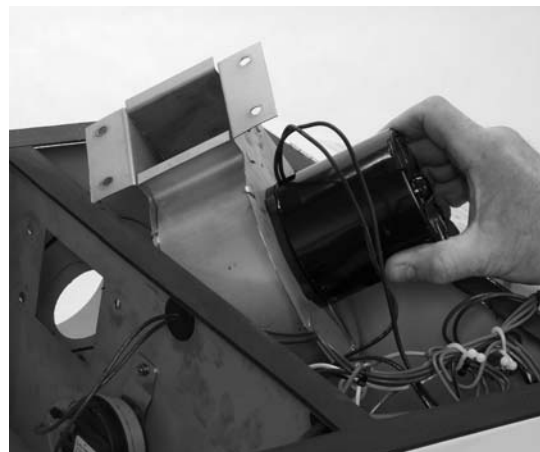


FIG. 26



AIR DIFFERENTIAL PRESSURE SWITCH, TUBING & PRESSURE ORIFICES

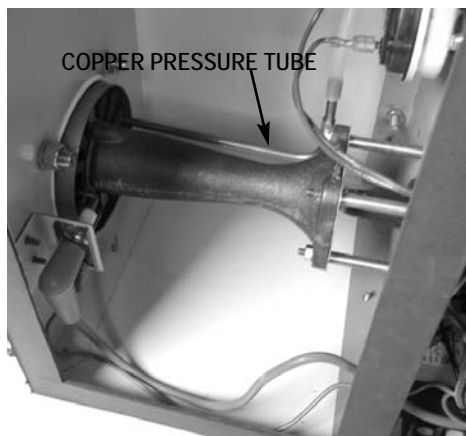
For proper heater operation:

- The copper pressure tube at the burner vane must be straight. See Fig.27.
- Ensure the clear flexible tube is free of dust and securely connected to the fitting at the burner and to the fitting at the differential pressure switch. See Figs. 28.
- The air differential pressure orifices should be free of blockages. If cleaning is required use pressurised air:

Orifices on pressure switch (See Fig.28)

- Remove respective orifice from switch.
- Hold up to light, if blocked clean the orifice.
- Ensure orifices are securely pushed backed into proper location on switch.

FIG. 27

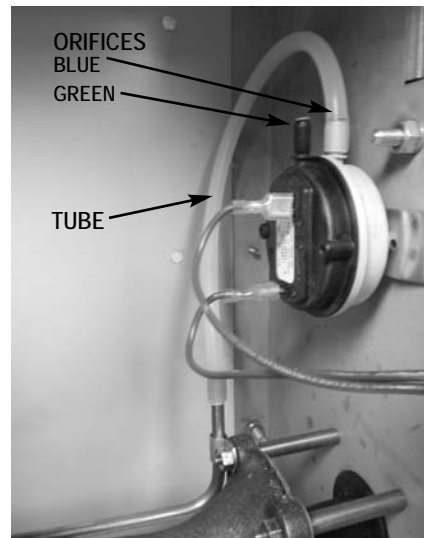


The air pressure switch contacts must be open during a call for heat and then close after the fan motor starts. If the contacts of the switch are stuck closed before a call for heat, or do not close, there will not be spark nor opening of the gas control valve.

Servicing the differential air pressure switch:

- The differential pressure switch is non-adjustable. If the switch does not make the circuit after inspection of tubes and orifices, it must be replaced.
- Do not jumper the switch. Doing so will cause lock-out of the heater's ignition control.

FIG. 28



IGNITION CONTROL

The control sends and receives voltages to operate or verify operation of components. Refer to the following and Fig. 29 to understand the ignition control's terminal designators if doing voltage checks on the control.

- L1:** 115 VAC to control from power supply.
- IND:** 115 VAC 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:** Microamperage from control to ignitor/flame sensor for proving burner flame.
- 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.

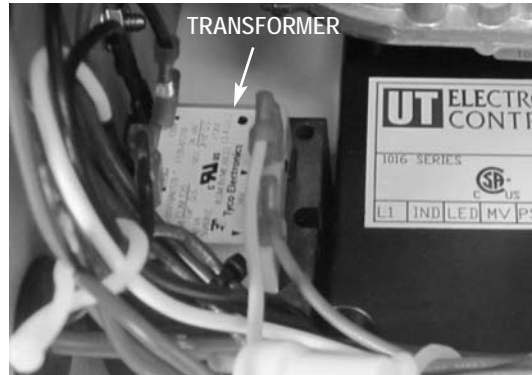
FIG. 29



TRANSFORMER

The transformer reduces 115 VAC to 24 VAC for operation of the the ignition control. Without 24 VAC from the transformer, the red diagnostic light will not be on and the ignition control will not function.

FIG. 30



Gas Pressure Checks

- The following is a typical procedure to be followed in checking gas pressures for single or two stage gas control valves
- 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.

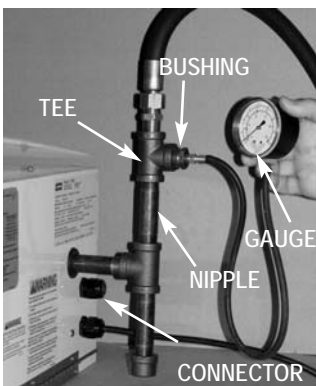
MATERIALS REQUIRED

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	1/2 in. x 3 in. nipple
1	1/2 in. tee
1	Bushing, 1/2 in.x 1/8 in.

A. Preparation

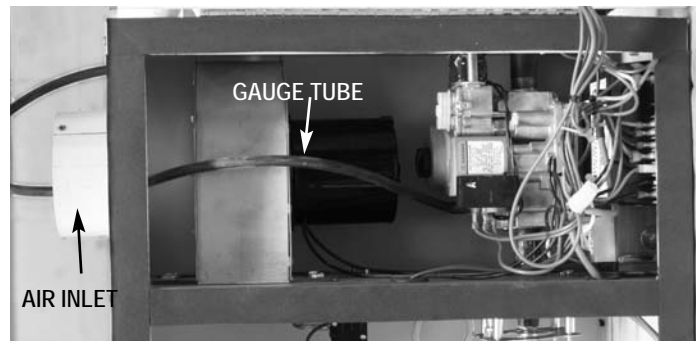
1. Disconnect the heater from the electrical supply and close the fuel supply valve to the heater inlet.
2. Remove the hose and hose adapter from the sediment trap.
3. Install the nipple,tee, bushing, and a pressure gauge as shown in Fig. 31. Install hose and hose adapter.

FIG. 31



4. Open the burner box access panel.
5. Remove the plug from the connector near the power cord and route the gauge tubing through the connector. See Fig. 31. Keep the connector's plug.

FIG. 32



6. If connector is occupied by thermostat wiring, remove the air inlet tube from the burner box and route gauge tubing through burner box air inlet to gas control valve. See Fig. 32.
7. Remove the pressure tap plug from the outlet of gas control valve. Securely connect a pressure gauge. See Fig.33.
8. Close and latch the burner box. Open the fuel supply valves to the heater, reconnect the heater's electrical supply, and start the heater.

C. Reading Pressures

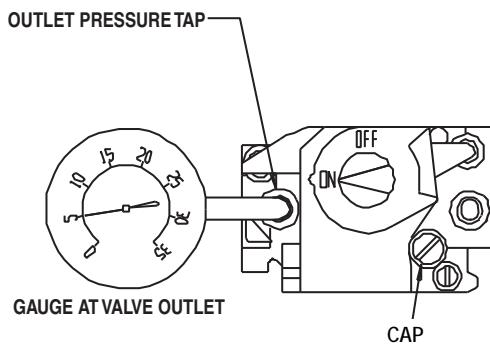
1. With the heater operating, the pressure gauges should read the pressures specified on the dataplate.
2. Do the readings at the inlet and outlet pressure gauges agree with that specified on the dataplate? If so, then no further checking or adjustment is required. Proceed to section D.

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. Set the thermostat to its highest setting. The single amber light on the burner box panel will come on, and gas control will open. If manifold gas pressure is different than the dataplate, remove the cap on the gas control as shown in Fig. 33. Turn the pressure adjusting screw beneath this cap clockwise to increase pressure or counter clockwise to decrease pressure, while the heater is in operation..

D. 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. Install cap on gas control valve. 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.

FIG. 33



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 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 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. 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 tables below to identify what page to refer to when troubleshooting any problems.

Problems	Page
L.E.D. is steady on. No flash pattern.....	24
L.E.D. light is not on.	24
L.E.D. diagnostic light is flashing:	
A. One Time.....	25
B. Two Times.....	25
C. Three Times.....	26
D. Four Times.....	26
E. Five Times.....	26

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.

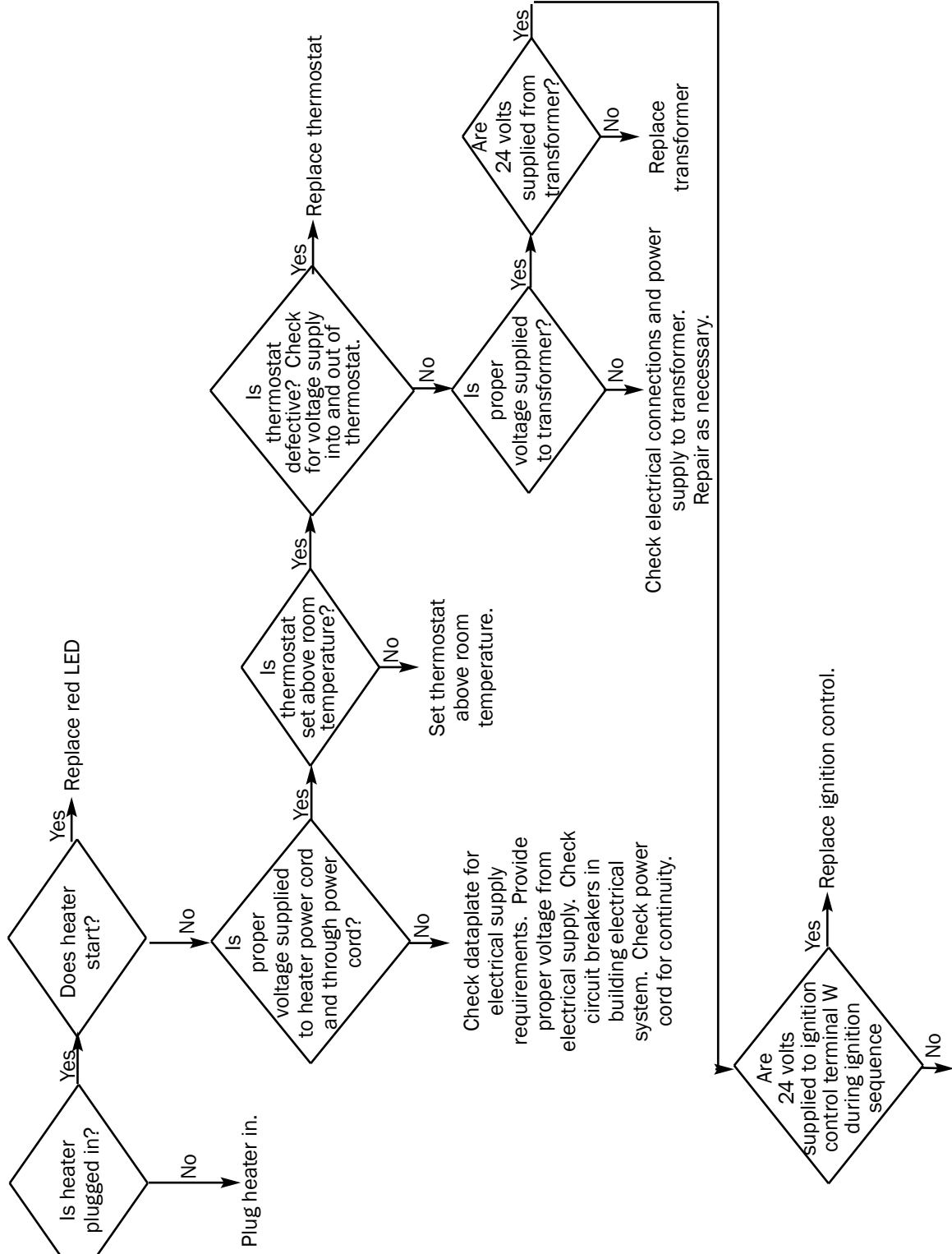
DIRECT IGNITION OPERATION SEQUENCE:

- Line voltage is sent to ignition control and to transformer.
- Transformer reduces line voltage to 24 volts which is sent to thermostat.
- The thermostat calls for heat.
- The thermostat sends 24 volts to ignition control terminal W..
- Red light is illuminated.
- 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 from terminal PS1.
- Ignition control sends line voltage to motor from terminal IND.
- Fan motor starts.
- Air pressure switch contacts close and 24 volts are returned to the ignition control module at terminal PS2.
- Ignition control module sends high voltage to the igniter electrode.
- Igniter sparks.
- Ignition control module sends 24 volts to the gas control valve from terminal MV.
 - Gas control valve opens.
- Ignition occurs.
 - Igniter continues to spark until flame proving occurs.
 - Ignition spark is cut off.
 - Gas valve stays open.
 - Second stage (if applicable) of gas control opens based upon thermostat.
- Room warms to desired temperature.
 - Thermostat is satisfied.
 - Heater shuts down.
- Process starts again on a call for heat.

Red LED Constant On → Normal Operation

Problem

Red LED not on during a call for heat.



Poor electrical connection or broken wire present. Repair or replace.
 Voltage drop from thermostat to terminal W on ignition control.
 Incorrect wire size from thermostat to terminal W on ignition control.

Red LED Flashing

One Time

Differential air pressure switch contacts are closed before fan motor starts.

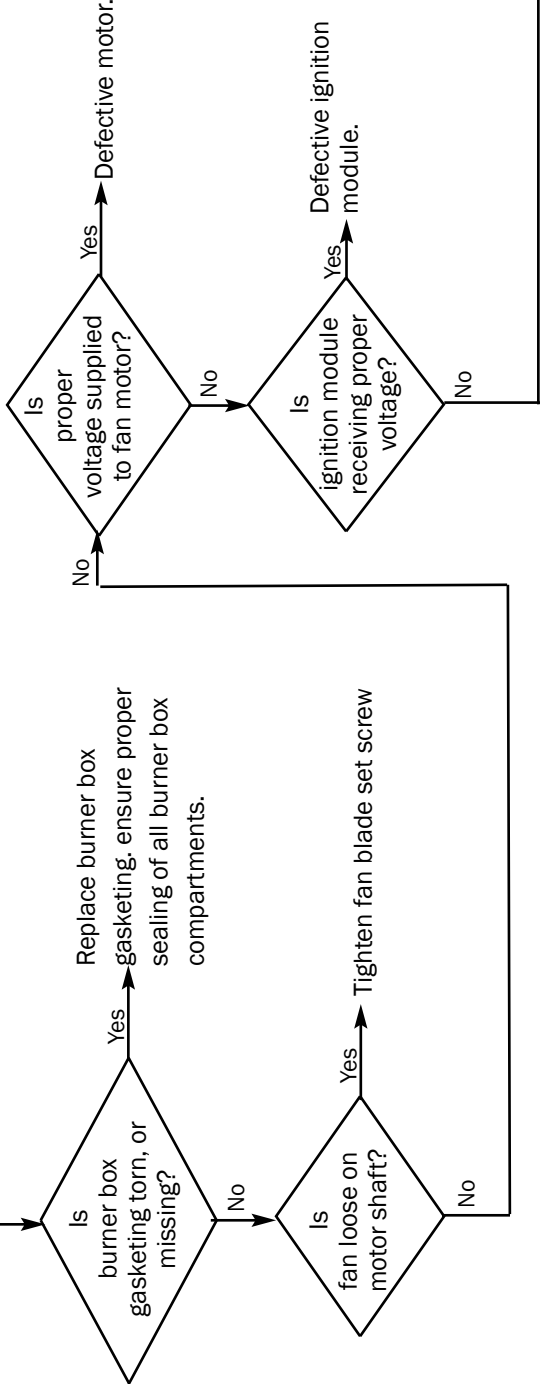
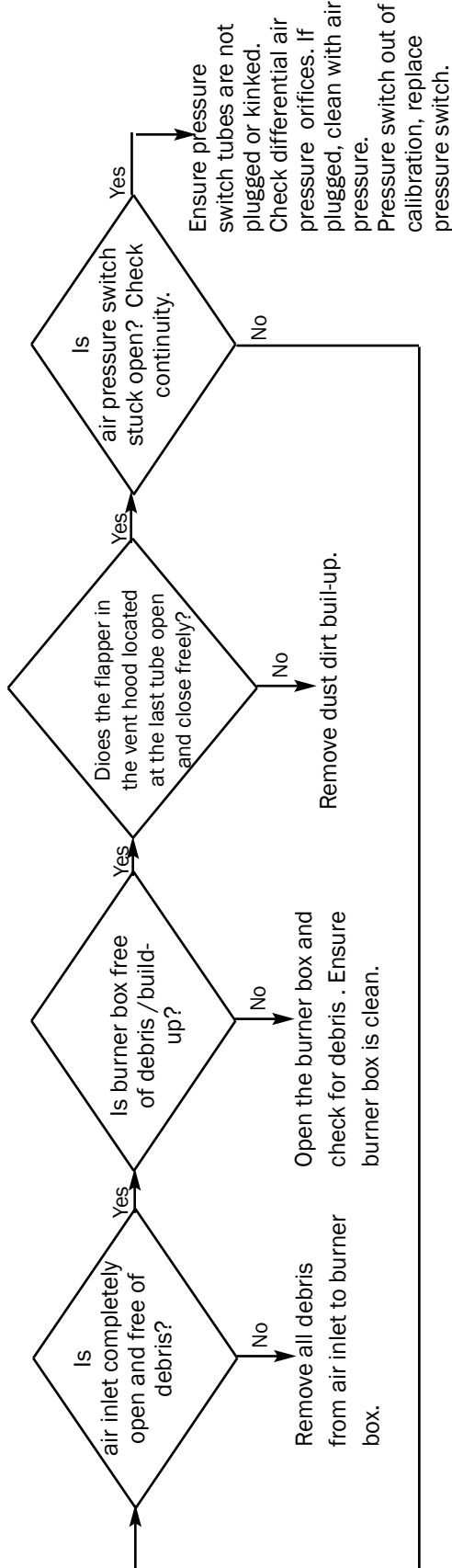
Is pressure switch stuck closed? Check continuity.

Yes → Replace air-proving switch

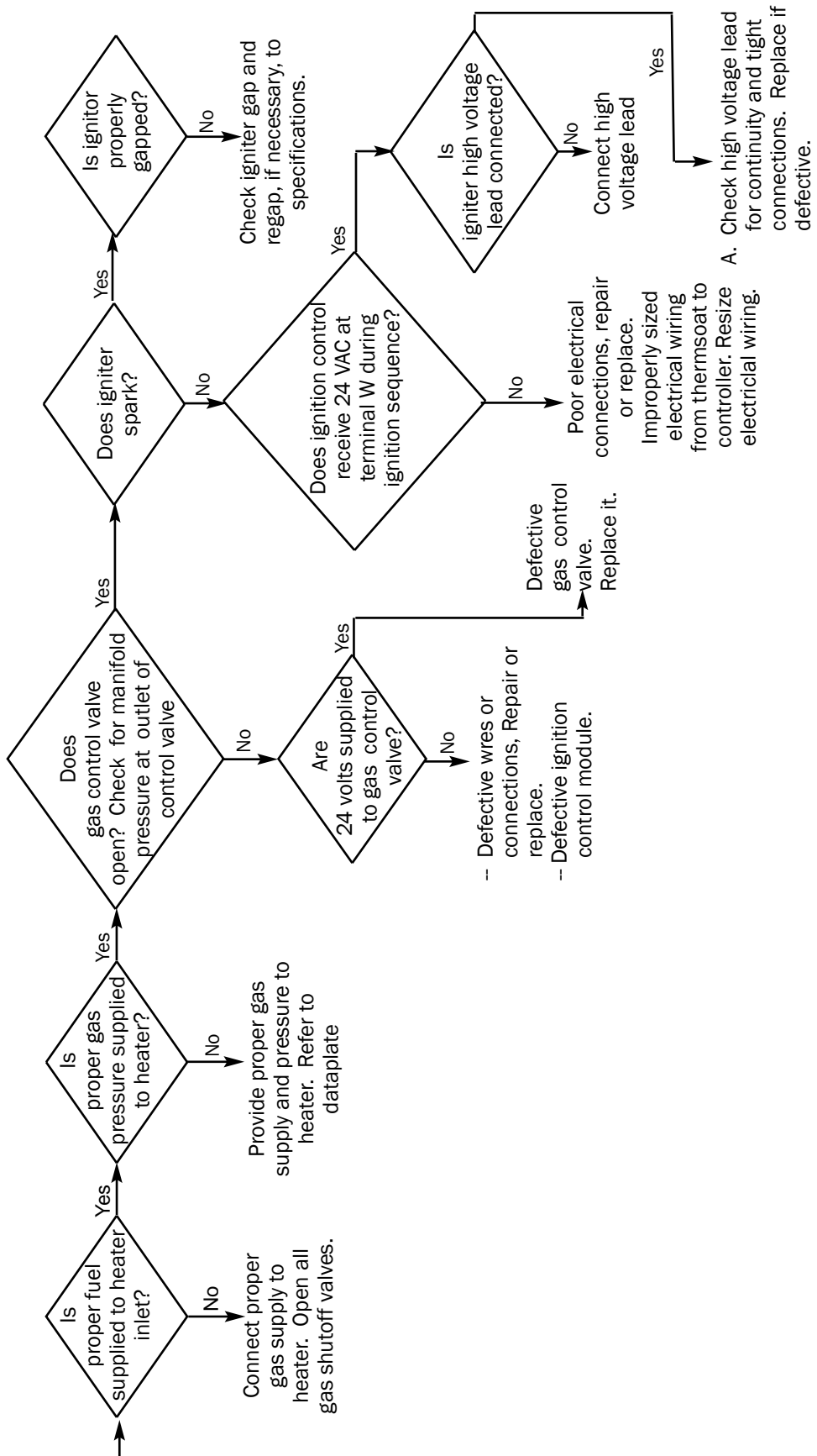
No → Defective wire or loose connection to air pressure switch. Repair as needed

Two Times

Differential air pressure switch contacts have not closed. Indicates no air proving in fan section of heater



Three Times
Ignition failure.
The control
module is in
safety lockout.



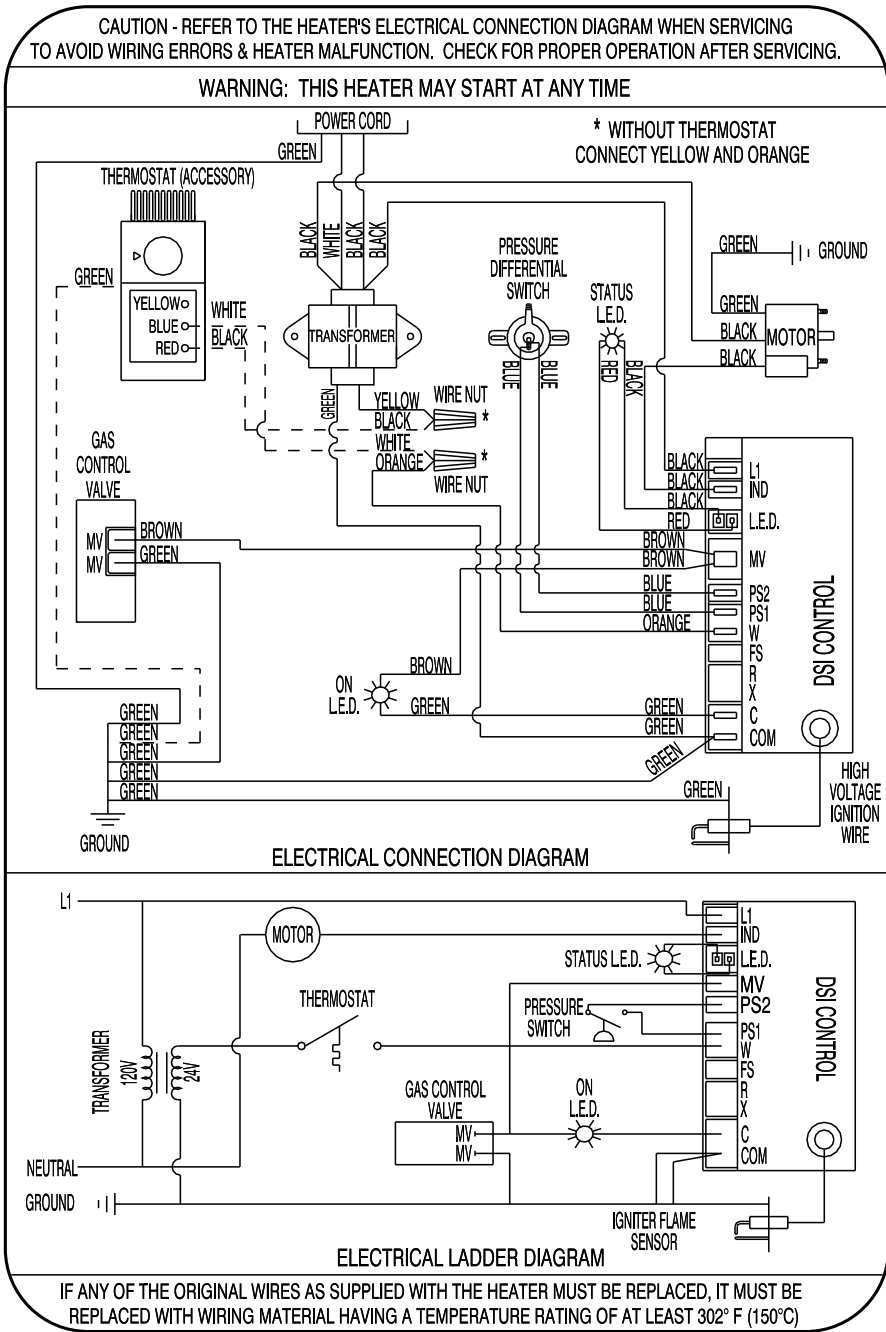
Four Times
Lockout from
too many
flame losses.

Flame sense related problems. Check for cracked or dirty flame sensor, improperly positioned sensor, or poor flame sense ground.

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, too small wire gauge.)

Electrical Connection and Ladder Diagram



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.

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

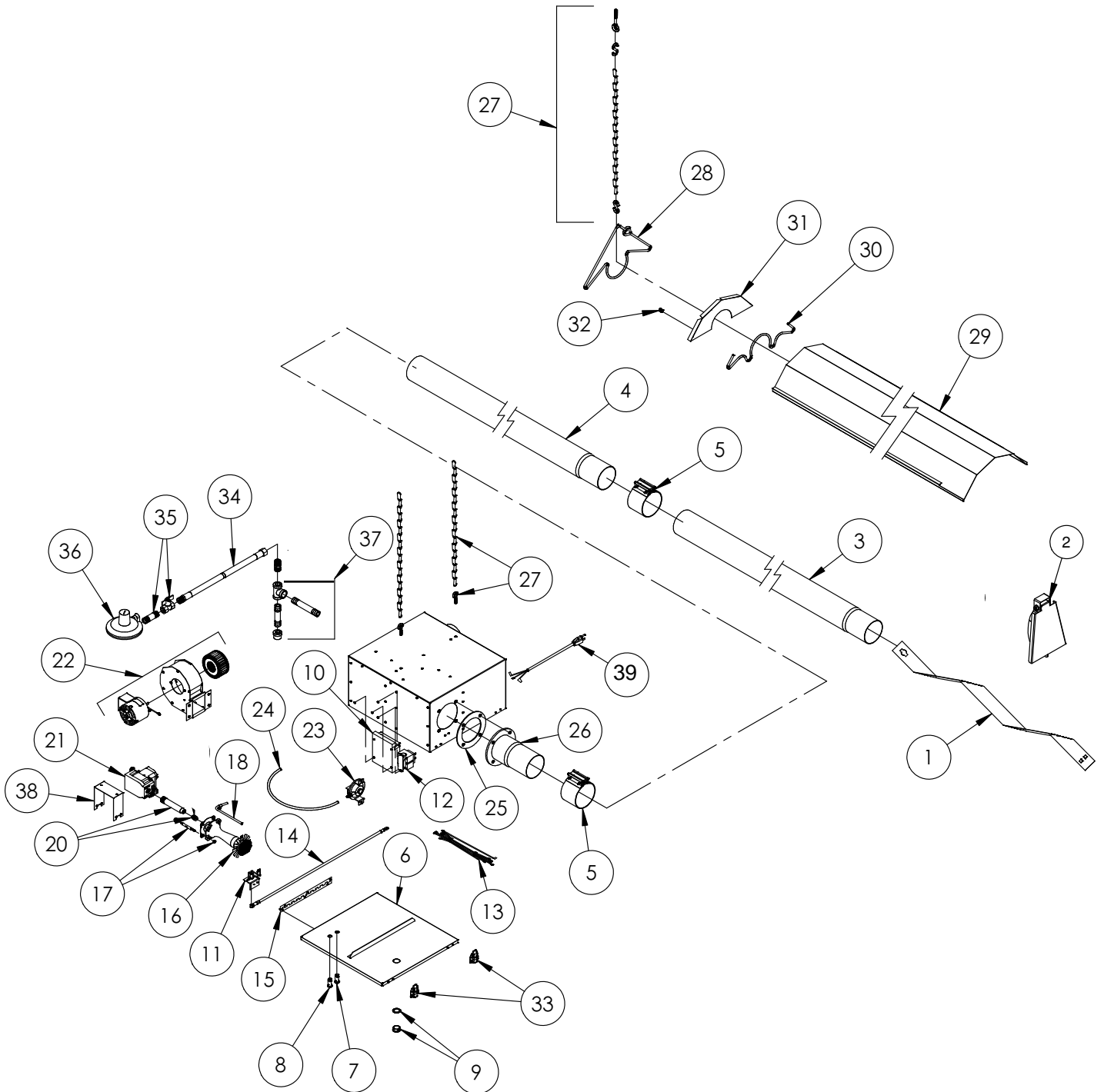
A component which responds to a change in temperature. This component is available for single stage or two stage heating. The two stage thermostat incorporates two independent control circuits which interconnect to the heater's two stage gas control valve, thereby providing low or high heat depending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

Parts Identification

PARTS SCHEMATIC



PARTS LIST

Item	Description	AT125/60	AT150/40	AT150/60
1	Air turbulation strip		572892	
2	Vent w/clamp		572886	
3	Tube, uncoated, 4 in. x 10 ft. w/clamp		573011	
4	Tube, aluminized, 4 in. x 10 ft. w/clamp (AT125 and AT150, 60 ft)	573010	--	573010
	stainless steel, 4 in. x 10 ft. w/clamp (AT150, 40 ft.)	--	573387	--
5	Clamp, tube	573009	573413	573009
6	Cover, burner box, w/hinges & LEDs		26804	
7	Amber LED		572813	
8	Red LED		571333	
9	Window, plug w/o-ring		570002	
10	Ignition control		25865	
11	Igniter w /bracket		24972	
12	Transformer		570630	
13	Wire harness		572848	
14	Ignition cable		572847	
15	Hinge		82784	
16	Burner assembly LP	572338	572649	573411
	NG	573412	572346	573411
17	Burner mounting hardware		573172	
18	Copper pressure tube with fittings		572889	
20	Manifold with orifice, LP	573410	*	*
	NG	573409	*	*
21	Gas control valve LP		522076	
	NG		522078	
22	Motor, fan housing, and fan wheel assembly		24961	
23	Switch, differential air pressure w/ orifice		26809	
24	Tube, pressure switch		572883	
25	Ceramic gasket		573006	
26	Tube, swaged, 8 in. w/ flange, (includes gasket and mounting hardware)		573005	
27	Chain with S hooks and open eye lag screws		572854	
28	Hanger		573004	
29	Reflector		572895	
30	Support, reflector		573001	
31	End cap, reflector, w/U-clips		572869	
32	U-Clip		572867	
33	Latch		572867	
34	Hose, w / adapter, rigid x swivel		20713	
35	Shut off valve with nipple		03399	
36	Regulator, second stage, LP		06553	
	NG		24414	
37	Sediment trap		00815	
38	Bracket, gas control valve		573000	
39	Power Cord		26129	

NOTE: Gasket for fan housing discharge is part # 24850
 Complete gasket kit for burner box is part # 26746

* Contact L.B.White Co.

Warranty Policy

HEATER

L.B. White Co., Inc. 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 Co., Inc. will at its option, repair or replace the defective part or heater, with a new part or heater, F.O.B., Onalaska, Wisconsin, USA.

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 Co., Inc. 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/product-registration>. Please have the serial number(s) and model(s) handy for the products you are registering.

Replacement Parts and Service

Contact your local L.B. White dealer for replacement parts and service. You may also call the L.B. White Co., Inc. at (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.