Owner's Manual and Instructions

Guardian 2.0

Agricultural Animal Confinement Building Brood Heaters

AD060	17.6 kW	Available in Propane Vapor Withdrawal, Butane Propane Vapor Withdrawal, or Natural Gas Configurations
AD100	29.3 kW	
***AD/AW250**	73.3 kW	

* The AW250 model are ONLY available in China.

View this manual online at www.lbwhite.com

Attention

This brood heater has been designed and developed as a direct gas-fired circulating brood heater for the heating of agricultural animal confinement buildings, and is approved for indoor or outdoor mounting. If you are considering using this product for any application other than it's intended use, contact your local agent or the L. B. White Company, LLC in the U.S.A. at 001-608-783-5691.

www.lbwhite.com



Congratulations!

You have purchased the finest agricultural building heater available. Your new L.B. White 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 at 1-(800)-345-7200, or email us at customerservice@lbwhite.com.

NOTICE

The herein installation instructions are the L.B. White Co. LLC suggested recommendations and guidelines for temporary or permanent installation of the L.B. White Co. LLC heaters. Local, state, and electrical and safety code requirements supersede these guidelines.

SEE ASSEMBLY INSTRUCTIONS INSIDE

Please refer to important elevation information on inside cover.

SCAN THIS

with your smartphone or visit http://i.youku.com/lbwhite to view maintenance videos for L.B.White heaters.*

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

WORLD PROVIDER - INNOVATIVE CLIMATE SOLUTIONS

411 Mason Street, Onalaska, WI 54650 • 001-608-783-5691 • 608-783-5691 • 608-783-6115 (fax) • www.lbwhite.com

TABLE OF CONTENTS

Brood Heater Specifications 4
General Information 5
Safety Precautions 5
General Instructions 8
Start-Up & Shut-Down Instructions 13
Cleaning Instructions 14
Maintenance Instructions 14
General Service Instructions 16
Troubleshooting Guide 22
Electrical Connection and Ladder Diagram 28
Schematic and Identification List 30
Warranty Policy 32

⚠ WARNING

Standard products are manufactured to operate at optimum efficiency at elevations between 0 and 610 m 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.

www.lbwhite.com

⚠ GENERAL HAZARD WARNING

- FAILURE TO COMPLY WITH THE PRECAUTIONS AND INSTRUCTIONS PROVIDED WITH THIS BROOD 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 BROOD 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 001-608-783-5691.

⚠ WARNING

- PROPER GAS SUPPLY PRESSURE MUST BE PROVIDED TO THE INLET OF THE BROOD HEATER.
- REFER TO DATA PLATE FOR PROPER GAS SUPPLY PRESSURE.
- GAS PRESSURE IN EXCESS OF THE MAXIMUM INLET PRESSURE SPECIFIED AT THE BROOD 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 BROOD 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 BROOD 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 BROOD HEATER.
- SOLID COMBUSTIBLES INCLUDE WOOD, PAPER PRODUCTS, FEATHERS, STRAW AND DUST.
- DO NOT USE THE BROOD 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.

Specifications

			AD060	AD100	AD/AW250
Maximum Input per hour (kW)			17.6	29.3	73.3
Ventilation Air Required to Support Combustion (m3/hour)			428	692	1,885
Burner Manifold Pressure (kPa/mbar/Inches W.C.)	Propane Gas		2.50/25.5/10.0		
	Natural Gas		1.1/11.2/4.5		
	Butane/Propane Gas		N/A	N/A	2.5/25.5/10.0
Gas Supply Pressure Acceptable at the Inlet of the Heater for purpose of Input Adjustment (kPa/mbar/Inches W.C.)	Propane Gas	Max.	3.40/34.0/13.5		
		Min.	2.74/27.4/11.0		
	Natural Gas	Max.	3.40/34.0/13.5		
		Min.	1.75/17.5/7.0		
	Butane/ Propane Gas	Max.	N/A	N/A	3.40/34.0/13.5
		Min.	N/A	N/A	2.74/27.4/11.0
Motor Characteristics (Watts/ RPM)	Ball Bearing				
	50 HZ.		52/1450	150/1300	186/1150
	60 HZ.		52/1700	94/1100	249/1150
Electrical Supply (Volts/Hz/Phase)			220-240/50/1 or 220-240/60/1		
Amp Draw (Starting Amps Includes Igniter)	Starting		5.0	5.2	7.5
	Continous Operation	50 HZ	0.4	1.2	2.6
		60 HZ	0.9	0.6	2.0
Dimensions L x W x H (cm)			57.15 x 32.39 x 45.72	68.59 x 35.56 x 50.80	77.79 x 45.72 x 71.12
Minimum Safe Distances from nearest Combustible Materials		Top	0.3 m		
		Sides	0.3 m		
		Back	0.3 m		
		Blower Outlet	1.83 m		
		Gas Supply	Propane Gas Supply - 1.83 m Natural Gas Supply - N/A		
Gas Consumption per Hour	Propane Gas (kg)		1.26	2.10	5.26
	Natural Gas (m3)		1.70	2.83	7.08
	Butane/Propane (kg)		N/A	N/A	5.26

NOTE: Butane/propane models are configured to produce full rate output when running on butane fuel. When the heater is operating on propane fuel, the heating rate of the unit will be approximately 11% less than fuel rated output.

www.lbwhite.com

General Information

This Owner's Manual includes all options and accessories commonly used on this brood 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 model number, configuration number and serial number available. This information is contained on the dataplate. The dataplate is located on the interior of either the burner end or motor end door.

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

The gas supply line installation, installation of the brood heater, and repair and servicing of the brood 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.

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

Safety Precautions

WARNING

Asphyxiation Hazard

- Do not use this brood 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 brood heater being used.
- Refer to the specification section of the brood heater's Owner's Manual, brood heater dataplate, or contact the L.B. White Company to determine combustion air ventilation requirements of the brood 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

LPG and natural gas have a 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 LPG tank or cylinder fuel supply valves, or the main fuel supply valve if you use natural gas.
- LPG is heavier than air and may settle in low areas. When you have reason to suspect a leak, keep out of all low areas.
- Natural gas is lighter than air and 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 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 LPG or natural gas. You must determine if you can smell the odorant in these fuel gases.
- Learn to recognize the odor of LPG and natural gas. Local 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 LPG 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.
- LPG odor may differ in intensity at different levels. Since LPG 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!

- LPG 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 LPG and natural gas brood heaters, then do not attempt to light brood heater, perform service or repairs, or make any adjustments to the brood heater on LPG or natural gas fuel systems.
- Even if you are not properly trained in the service and repair of the brood heater, ALWAYS be consciously aware of the odor of LPG and natural gas.
- A periodic "sniff test" around the brood heater or at the brood 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!

Safety Precautions

1. Do not attempt to install, repair, or service this brood heater or the gas supply line unless you have continuing expert training and knowledge of gas brooder heaters.

Qualifications for service and installation of this equipment are as follows:

a. To be a qualified gas brood heater service person, you must have sufficient training and experience to handle all aspects of gas-fired brood heater installation, service and repair. This includes the task of installation, trouble-shooting, replacement of defective parts and testing of the brood heater. You must be able to place the brood heater into a continuing safe and normal operating condition. You must completely familiarize yourself with each model brood heater by reading and complying with the safety instructions, labels, Owner's Manual, etc., that is provided with each brood 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 brood heaters must meet all relevant local,state, and national codes. Included are applicable fuel gas systems, gas installation, electrical, and safety codes. Your local fuel gas supplier , a local licensed electrician, the local fire department or similar governmant agencies, or your insurance agent can help you determine code requirements.

3. Do not move, handle, or service the brood heater while in operation or connected to a power or fuel supply.

4. This brood heater may be installed in areas subject to washdown. This brood heater may only be washed on the external case assembly—see Cleaning Instructions. Do not wash the interior of the brood heater. Use only compressed air, soft brush or dry cloth to clean the interior of the brood heater and it's components. After external washdown, do not operate this brood heater until it is completely dry. In any event, do not operate the brood heater for at least one hour after external washdown.

5. For safety, this brood heater is equipped with a manual reset high-limit switch and an air flow switch. Never operate this heater with any safety device that has been bypassed. Do not operate this brood heater unless all of these features are fully functioning.

6. Do not operate the brood heater with its door(s) open or panel removed.

7. Do not locate fuel gas containers or fuel supply hoses within 6,10 meters of the blower outlet of the brood heater.

8. Do not block air intakes or discharge outlets of the appliance. Doing so may cause improper combustion or damage to brood 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 brood heater being put into operation. The hose assembly shall be protected

from animals, building materials, 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 brood heater installation, before building repopulation or when relocating.

11. This brood heater should be inspected for proper operation by a qualified service person before building repopulation and at least annually.

12. Always turn off the gas supply to the brood heater if the appliance is not going to be used in the heating of livestock.

13. This brood heater is wired for a three-wire electrical system. There is a hot lead, neutral lead and ground lead. The brood heater may or may not incorporate a plug in the power cord to the heater and the plug may or may not incorporate a pin for the ground wire. In any case, the brood heater must be properly connected into a grounded electrical supply using the ground lead in the power cord. Failure to use a properly grounded electrical supply can result in electrical shock, personal injury or death.

14. Hot surface ignition brood heaters will make up to three trials for ignition. If ignition is not achieved after the third trial, 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. In a hanging type installation, rigid pipe or copper tubing coupled directly to the brood heater may cause gas leaks during movement, and therefore must not be used. Use only gas hose assemblies that are rated and approved for LPG and natural gas in a hanging type of installation.

16. Installations not using the gas hose supplied with this brood heater must connect dimensionally using BS1387 Medium Duty Galvanized Steel Tube. (Aluminum piping or tubing shall not be used.) Copper tubing when used for conveying natural gas shall be internally tinned or equivalently treated to resist sulphur.

General Installation Instructions

⚠ WARNING

Fire or Explosion Hazard

Can cause property damage, severe injury or death.

- Disconnect power supply before wiring to prevent electrical shock or equipment damage.
- To avoid dangerous accumulation of fuel gas, turn off gas supply at the appliance service valve before starting installation, and perform gas leak test after completion of installation.
- Do not force the gas control knob. Use only your hand to turn the gas control knob. Never use any tools. If the knob will not operate by hand, the control should be replaced by a qualified service technician. Force or attempted repair may result in fire or explosion.

1. Read all safety precautions and follow L. B. White recommendations when installing this brood heater. If during the installation or relocating of brood heater, you suspect that a part is damaged or defective, call a qualified service agency for repair or replacement.

2. Make sure the brood heater is properly positioned before use and is hung level, using a level. Observe and obey all minimum safe distances of the heater to the nearest combustible materials. Minimum safe distances are given on the brood heater nameplate and on page 4 of this manual.

3. Ensure the brood heater has the proper second stage gas regulator for the application. A regulator must be connected to the gas supply so that gas pressure at the inlet to the gas valve is regulated within the range specified on the brood heater's dataplate at all times. Contact your gas supplier, or the L. B. White Co., Inc. if you have any questions

4. Do not exceed input rating stamped on the dataplate of the brood 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.

5. The brood heater may be installed either indoors or outdoors. When the brood heater is mounted outdoors, use only the ductwork supplied in the outdoor mounting kit.

6. For brood heaters intended for outdoor installation, the heater is to be installed at least 46 cm above

www.lbwhite.com

the ground or to a height that would prevent lockage of heater's air inlet.

7. The brood heater's gas regulator (with pressure relief valve) should be installed outside of building. Any regulators inside the buildings must be properly vented to the outside. Local, state and national codes always apply to regulator installation.

8. All gas pressure regulators must be installed in strict accordance with the manufacturer's safety instructions. These instructions accompany each regulator.

9. Insure that all accessories that ship within the brood heater have been removed from inside of brood heater and installed. This pertains to air diverters, hose, regulators, etc.

10. Make certain that a sediment trap is installed 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 brood heater connected to a piping system must have an accessible, approved manual shut off valve installed within 1.83 meters of the brood heater it serves.

12. 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, personal injury or loss of life.

-- 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.

-- Furthermore tighten the gas connections as necessary to stop the leak.

-- After all connections are checked and any leaks are stopped, turn on the main burner.

-- Stand clear while the main burner ignites to prevent injury caused from hidden leaks that could cause flashback.

-- With the main burner in operation, check all connections, hose connections, fittings and joints as well as the gas control valve inlet and outlet connections with approved gas leak detectors.

-- If a leak is detected, check the components involved for cleanliness in the thread areas and proper application of pipe compound before further tightening.

-- Tighten the gas connection as necessary to stop the leak.

-- If necessary, replace the parts or components involved if the leak cannot be stopped.

-- Ensure all gas leaks have been identified and repaired before proceeding.

13. A qualified service agency must check for proper operating gas pressure upon installation of the brood heater.

14. Light accordance to instructions on the brood heater or within owner's manual.

15. It is extremely important to use the proper size and type of gas supply line to assure proper functioning of the brood heater. Contact your fuel gas supplier for proper line sizing and installation.

16. This brood heater is configured for use with either LPG vapor withdrawal only. Do not use the brood heater in an L.P. gas liquid withdrawal system or application. If you are in doubt, contact the L. B. White Co., Inc.

17. Eventually, like all electrical/mechanical devices, the thermostat can fail. Thermostat failure may result in either an underheating or overheating condition which may damage critical products and/or cause animal injury or death. Critical products and/or animals should be protected by a separate back-up control system that limits high and low temperatures and also activates appropriate alarms.

18. Take time to understand how to operate and maintain the brood heater by using this Owner's Manual. Make sure you know how to shut off the gas supply to the building and also to the individual brood heater. Contact your fuel gas supplier if you have any questions.

19. Any defects found in performing any of the service or maintenance procedures must be eliminated and defective parts replaced immediately. The brood heater must be retested by properly qualified service personnel before placing the brood heater back into use.

Air Diverter Installation Instructions

(Must be ordered separately)

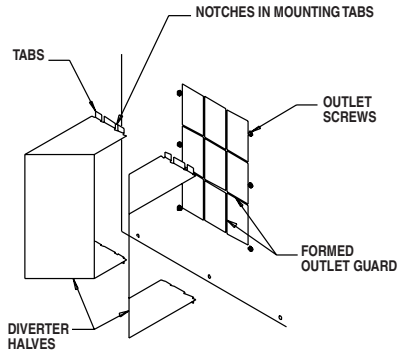
(Appearance of the outlet on heater may vary from model to model.)

1.Air diverters can be installed in the brood heater outlet to provide direction to the heated air as it exits the brood heater. Refer to Fig. 1. Air diverters can be installed to direct the air in either two 45 degree paths or in one 45 degree direction.

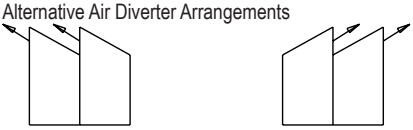
2. The air diverters may require hand forming prior to installation. Make 90 degree bends utilizing the perforations provided. The diverter halves should then have the shape as shown in Fig. 1.

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

FIG. 1



Alternative Air Diverter Arrangements



www.lbwhite.com

Hanging Instructions
(Must be ordered separately)

1. Assemble according to Fig.2 and tighten all eyebolts securely.

2. Be sure brood heater is securely fastened and is hanging level. (Check crosswise and lengthwise using a level.)

3. See Fig. 3 for typical indoor installation. In any animal confinement building, consideration must be given to making sure the brood heater is located away from the livestock so that livestock cannot knock the heater, tear it loose from its mounting, or damage the heater or its gas supply line in any way. Make sure you observe and obey minimum clearance distances to combustible materials as stated in the specification section of this owner's manual and on the brood heater dataplate.

FIG. 2

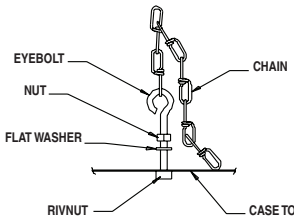
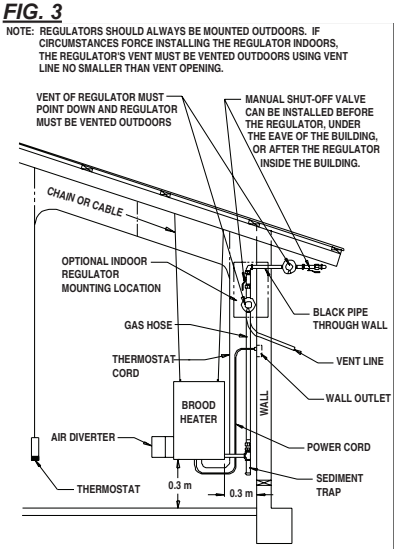


FIG. 3



Thermostat Installation
(Must be ordered separately)

⚠ WARNING

Electrical Shock Hazard

- Disconnect the electrical supply before connecting the thermostat to the brood heater.
- Failure to follow this warning can result in electrical shock, leading to personal injury or death.

To Connect the Direct Wired Thermostat Kit to the Control Box on the Brood Heater:

- The installation and wiring of a thermostat must be done by an electrician or someone properly qualified.

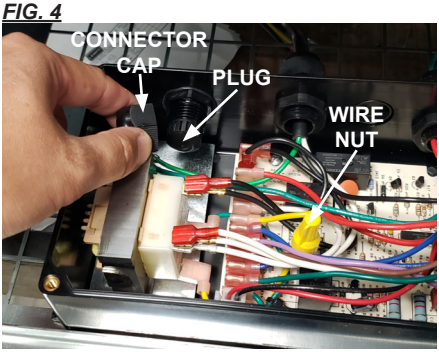
a. Remove the two Phillips head screws securing the control box lid.

b. Remove the control box lid.

c. Remove the wire nut and separate the yellow wires.

d. Remove the liquid tight connector cap and the black plastic plug. See Fig. 4.

FIG. 4

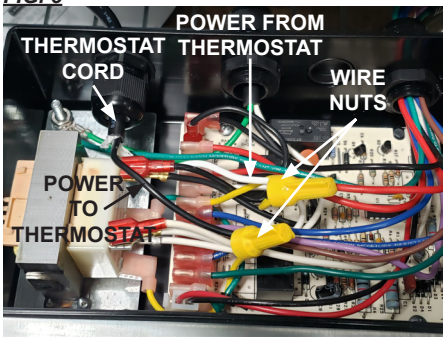


e. Insert the thermostat wires through the liquid tight connector hole and the connector cap.

f. Using the wire nut, connect the black lead of the thermostat to the yellow lead from the transformer (cutting and stripping the thermostat lead may be required.)

g. Using the wire nut, connect the white lead of the thermostat to the yellow lead from the 24VAC of the ignition control board (cutting and stripping the thermostat lead may be required.) See Fig. 5

FIG. 5



h. Tighten the liquid tight cap around the connector body.

i. Install the control box lid and secure it.

j. Start the heater and check for proper operation.

Manual Shut-off Valve, Hose & Regulator Assembly
(Must be ordered separately)

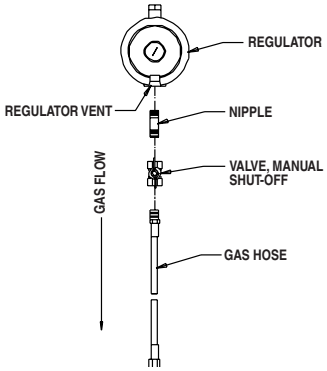
1. Always use approved pipe thread compound suitable for use with LPG on the threaded connections.

2. Assemble the components together according to the figure. This view is to show general assembly of the components only.

3. Tighten all connections securely.

4. **Check all connections for gas leaks using approved gas leak detectors.**

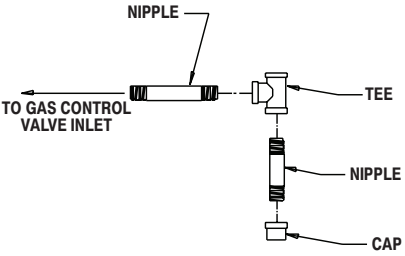
FIG. 6



Sediment Trap Assembly

Assemble the tee, nipples and cap together and tighten securely. The sediment trap assembly must always be mounted in a vertical position. Use pipe thread compound that is resistant to LPG. Check all connections for gas leaks using approved gas leak detectors.

FIG. 7

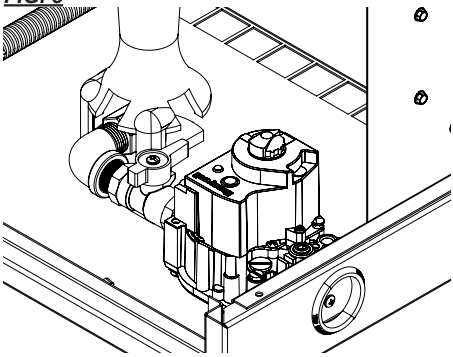


Variable Heat Output

1. Some models have a manual variable rate valve for varying heat output located between the gas control valve and the gas manifold assembly. See Fig. 8. THIS IS NOT A MANUAL GAS SHUT OFF VALVE.

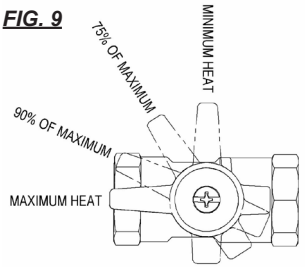
2. The variable rate valve can be adjusted to deliver either minimum heat or maximum heat output. When the variable rate valve handle is parallel to the gas flow, the valve is completely open to deliver maximum heat output. The valve may be adjusted to minimum heat output by turning the handle 90° or to any position between minimum and maximum settings. See Fig. 8.

FIG. 8



www.lbwhite.com

FIG. 9

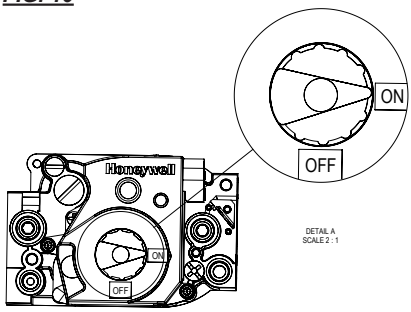


Start-Up Instructions

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

1. Open all manual fuel supply valves and check for gas leaks using approved leak detectors. The gas control valve on the heater has a manual shut-off feature incorporated into the valve assembly. Make sure the indicator on the valve is turned to the ON position. See Fig. 10.

FIG. 10



2. Connect the electrical cord to an approved electrical outlet.

3. Set the thermostat to desired room temperature.

4. This brood heater includes an ignition control module for purposes of controlling the timing of the ignition process of the heater as well as monitoring of the safety functions. The control module is contained within the control enclosure.

On the back side of the brood heater is a red light emitting diode (LED). This LED indicates the status of the heater. During normal operation, the LED will NOT be ON. Any flash pattern by the LED is indicative of a problem in the operation of the heater. Refer to the troubleshooting section of the manual or scan the QR Code for assistance in troubleshooting. Only qualified and properly trained personnel shall service or repair the brood heater.

5. On a call for heat, 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.

AW Models

6. The motor will stop. After the motor has stopped, the igniter will heat up (approximately 15 seconds). After the igniter warm up time has been achieved, the motor will start again and shortly thereafter ignition will occur.

AD models

7. After five seconds pre-purge, the motor will continue to run, and the igniter should spark with ignition occurring.

8. Both models ignition control will make up to three trials for ignition. If ignition does not occur, the ignition control board will “lock out” and a three-flash code will be indicated by the LED.

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

Shut-Down Instructions

If the brood heater is to be shut down for cleaning, maintenance or repair, follow steps 1 - 5. Otherwise, simply turn thermostat to off or no heat for standard shut down.

1. Close all manual fuel supply valves.

2. With the brood heater lit, allow heater to burn off excess fuel in gas supply hose.

3. Turn the indicator on the gas control to off.

4. Turn thermostat to off or no heat position.

5. Disconnect the brood heater from the electrical supply.

Cleaning Instructions

⚠ WARNING

Fire, Burn, and Explosion Hazard

- This brood 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, shut off all gas supply valves and disconnect the electrical supply.

2. The brood heater should have dirt or dust removed periodically:

   a. After each flock or between building repopulation, give the brood heater a general cleaning using compressed air or a soft brush on its interior and exterior. At this time, dust off the motor case to prevent the motor from overheating and shutting the brood heater down.

   b. At least once a year, give the brood heater a thorough cleaning. At this time, remove the fan and motor assembly and brush or blow off the fan wheel, giving attention to the individual fan blades. Make sure the burner air inlet venturi ports and the throat of the casting are free of dust accumulation and the area between the heat chamber top and inside case is also free of dust. Additionally, the flame sensor should be removed and cleaned according to the service instructions within this Owner's Manual.

   c. When washing with water, observe and obey the Warning within these Cleaning Instructions. This same Warning is also supplied on the heater.

⚠ WARNING

This brood heater may be washed only on the external case assembly provided:

A. The brood heater is disconnected from the electrical supply.

B. All access panels are securely closed.

C. Water spray nozzle shall not discharge within 1.83 m. of the brood heater.

D. The water pressure does not exceed 3.1 bar for 10 seconds on each side of brood heater.

E. The brood heater is not reconnected to electrical supply for a minimum of 1 hour or until the heater is thoroughly dry.

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

1. In electrical components, connections and wires causing electrical shock or component failure.

2. On gas control components causing corrosion which can result in gas leaks and fire or explosion from the leak.

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

Maintenance Instructions

BEFORE EACH USE:

- Have your gas supplier check all gas piping annually for leaks or restrictions in gas lines. Also, at this time have your gas supplier clean out the sediment trap of any debris that may have accumulated.
- The brood heater's surrounding area shall be kept clear and free from combustible materials, gasoline, and other flammable vapors and liquids.
- 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.
- Review all brood heater markings (ie. warnings, start-up/shutdown, electrical wiring, diagrams, etc.) for legibility. Ensure that none are cut, torn, or otherwise damaged. Any damaged markings must be replaced immediately by contacting L.B. White Co., LLC. Markings are available at no cost.
- Inspect gas hoses for nicks,cuts, or corroded fittings. Replace the complete gas hose assembly if defects are found.
- Inspect the brood heater's electrical connections. Replace any terminals that are corroded.
- Leak check the brood heater's gas connections according to instructions within this manual before each use.

ANNUALLY:

- Have your gas supplier check all gas piping annually for leaks or restrictions in gas lines. Also, at this time have your gas supplier clean out the sediment trap of any debris that may have accumulated.
- Regulators can wear out and function improperly. Have your gas supplier check the date codes on all regulators installed and check delivery pressures to the appliance to make sure that the regulator is reliable.
- Test the brood heater's high limit switch annually. Refer to instructions within this manual.

Service Instructions

⚠ WARNING
Burn Hazard

- Brood heater surfaces are hot for a period of time after the brood heater has been shut down.
- Allow the brood 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 brood 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 brood heater and disconnect the electrical supply before servicing unless necessary for your service procedure.

2. Open side panels for access to brood heater components.

3. Disconnect the appropriate electrical leads for the component being replaced.

4. The thermostat, and high limit switch can be tested by jumpering the suspect part out of the electrical circuit:

-- Reconnect the electrical supply and open fuel supply valves.

-- If the brood heater lights, the component is defective and must be replaced.

-- Do not operate the brood heater with the component jumpered. Replace the part immediately.

-- An alternate method for checking the components is to perform a continuity check.

5. Do not jumper the air proving switch. If jumpered, the ignition control will not allow heater operation. Test the air proving switch for continuity. If defective, replace the switch

6. For reassembly, reverse the respective service procedure. Ensure gas connections are tightened securely.

7. After servicing, start the brood heater to ensure proper operation. Check for gas leaks with approved leak detectors.

8. Clean the brood heater's orifice with compressed air or a soft, dry rag. Do not use files, drills, broaches, etc. to clean the orifice. Doing so may enlarge the hole, causing combustion or ignition problems. Replace the orifice if it cannot be cleaned properly.

Fan and Motor Wheel Assembly

NOTE: If disconnecting the motor wires from the harness is needed, cut, and remove the heat shrink tube to expose the motor wire connections. Replacement of the heat shrink tubes (574311) after service is necessary to ensure a corrosion free connection.

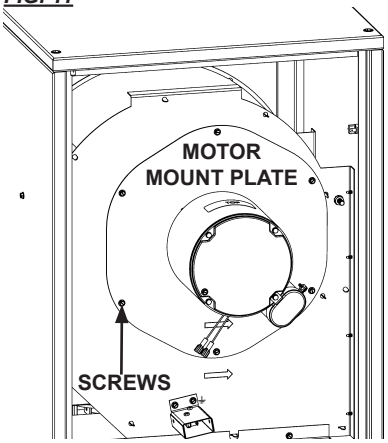
1. Remove the motor mounting plate screws and lift the fan and motor assembly from the housing. See Fig. 11. (AW250 shown)

2. Loosen the square head set screw(s) on the fan wheel.

3. Pull the fan wheel from the motor shaft. Use a wheel puller if necessary.

4. Remove the four (4) nuts securing the motor to the mounting plate.

FIG. 11



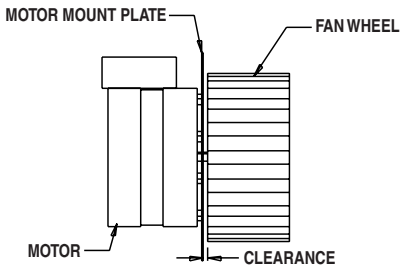
NOTES:

a. Fan wheel to motor mount plate spacing must be adjusted to the clearance specified in Fig. 12 before tightening the fan wheel to the motor shaft.

b. Make sure that set screw(s) of the fan are on the flats of motor shaft when tightening.

www.lbwhite.com

FIG. 12



AD060; 9.53mm AD100; 6.35mm
AD/AW250; 3.18mm

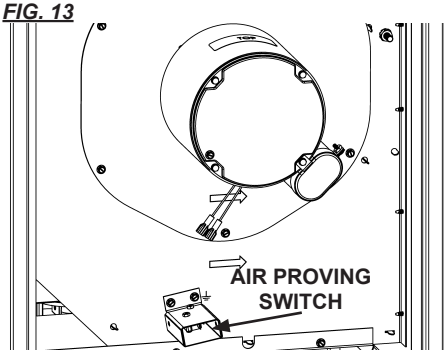
Air Proving Switch

The air proving switch is located on the fan housing at the motor end of the brood heater. It must work properly to allow an ignition cycle. If the air proving switch contacts are closed before the igntion control starts the fan motor, or do not close on a call for heat after the fan motor starts, ignition will not occur . See Fig. 13.

1. Remove the two (2) sheet metal screws holding the switch with bracket to the blower housing.

2. Remove the assembly by turning the switch so the paddle on the switch arm can be pulled through the oblong hole on side of fan housing.

FIG. 13



Manual Reset High Limit Switch

⚠ WARNING
Fire Hazard

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

This brood heater uses a high limit heat switch for the purpose of over heat protection. The high limit switch is located on the heat chamber, see Fig. 14, AW250 shown. It is connected between the ignition control and the gas control valve.

The switch has normally closed contacts. If an overheat condition occurs, the switch contacts will open, thereby opening the circuit to the gas control valve. The high limit switch should be tested a minimum of once per year when the heater is given a thorough cleaning.

1. Remove the switch. Holding the switch by one of its mounting legs, apply a small flame only to the sensing portion on the back of the switch. See Fig. 15. Do not melt the plastic housing of the switch when conducting this test.

2. Within a minute, you should hear a pop coming from the switch, which indicates the contacts of the switch have opened. Check for lack of electrical continuity across the switch terminals to verify contacts have opened.

3. Allow the switch cool down for about a minute before firmly pressing the reset button on the switch.

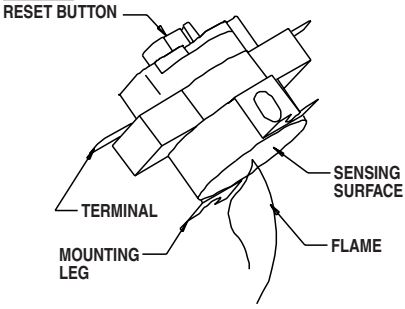
4. Check for electrical continuity across the switch terminals to make sure the contacts have closed.

5. Reinstall the switch back into the brood heater. Reconnect the brood heater to its electrical supply. Start the brood heater and check for proper operation.

FIG. 14



FIG. 15



Igniter & Flame Sensor

See FIG.16a & 16b for igniter type.

1. Generally, the igniter and flame sensor replacement consists of cutting the shrink tubing to expose the connector and removing its mounting screws.

2. Replacement of the heat shrink tubes (574311) after servicing is necessary to ensure a corrosion free connection.

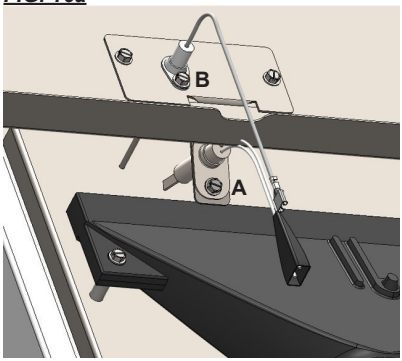
(HSI - AW Models)

- Disconnect the male connector from the female wire harness connector.
- Remove the igniter mounting screw (A). See Fig. 16a.
- Pull igniter away from mounting bracket.

Flame Sensor

- Remove the sensor's screw (B) from its mounting bracket. See Fig. 16a. Clean the rod with a steel wool or emery cloth. Rub briskly to remove build up of dust, dirt, and oxide.
- Check the flame sensor's insulator base for cracks. If cracks are found, replace the sensor.

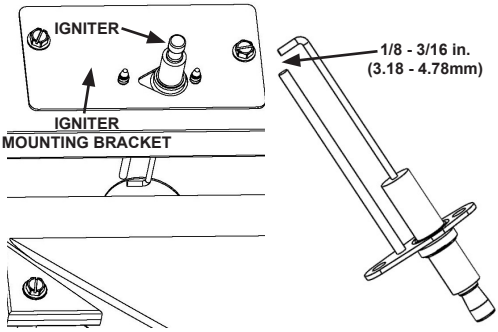
FIG. 16a



(DSI - AD Models)

- The igniter/flame sensor may require cleaning due to accumulations of dust and dirt over a period of time, affecting its ability to ignite fuel gas and sense burner flame. Cleaning will require removing the igniter/sensor.
- If the sparks appear strong but the heater cycles off, take the igniter out and clean the rods with either an emery cloth or a steel wool to remove any buildup.
- If the sparks appear weak or no sparks, remove the igniter and ensure the igniter gap is between 3.18 - 4.78 mm.
- Inspect the igniter's insulator base for cracks. If cracks are found, replace the igniter.

FIG. 16b



www.lbwhite.com

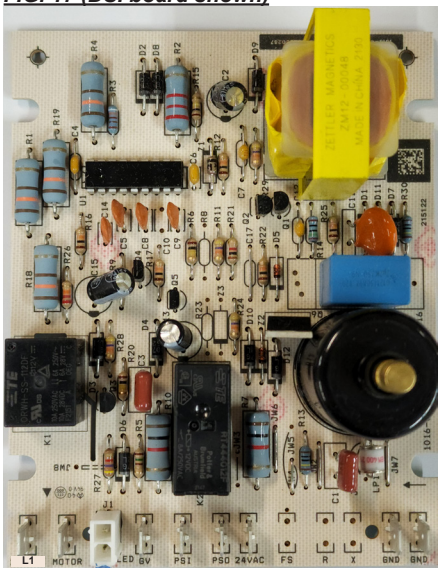
Ignition Control

The control sends and receives voltages to operate or verify operation of components. Refer to the following and Fig. 17 to understand the ignition control's terminal designators if doing voltage checks on the control.

L1: Line voltage to control board
Motor: Line voltage to motor
LED: LED diagnostic light
GV: 24 VAC to high limit and then to gas control valve
PSI: 24 VAC to air proving switch
PSO: 24 VAC return from air proving switch
24VAC: 24 VAC input from transformer
GND: Ground for control board
HSI (AW Model): 220 VAC to hot surface igniter
HSI (AW Model): Neutral return of igniter
FS (AW Model): Micro amperage to flame sensor for proving presence of burner flame

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

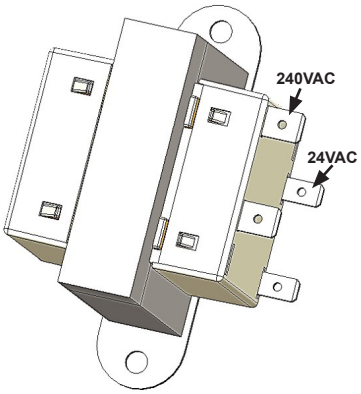
FIG. 17 (DSI board shown)



Transformer

The transformer reduces 220 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. See Fig. 18.

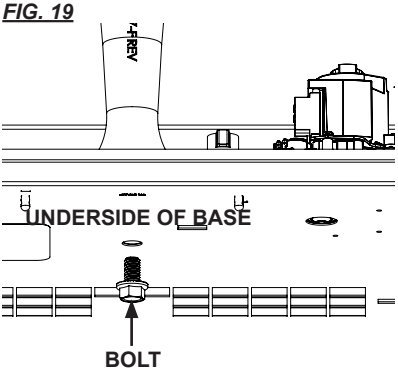
FIG. 18



Gas Control Valve & Burner Orifice

1. Remove the following in the order given:
   -- Gas hose and sediment trap from the inlet of gas the control valve.
   -- Bolt and washers securing the manifold to the burner and base. See Fig. 19.

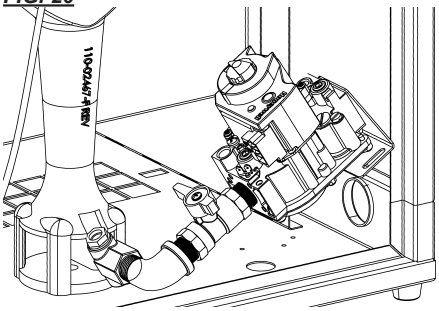
FIG. 19



2. Lift and pivot the gas valve with manifold as needed so burner orifice clears the burner. See Fig. 20.

3. Replace components as needed.

FIG. 20



Gas Pressure Checks

⚠ WARNING

- Do not disassemble the gas control valve.
- Do not attempt to replace any components of the gas control valve.
- The gas control valve must be replaced if any physical damage occurs to the control valve assembly.
- Failure to follow this warning will result in fire or explosions, leading to injury or death, and property damage.

- The following explains a typical procedure to be followed in checking gas pressures.
- The gas pressures will vary depending upon fuel type.
- Consult the dataplate on the heater or page 4 in this manual for specific pressures to be used in conjunction with this procedure.
- 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.

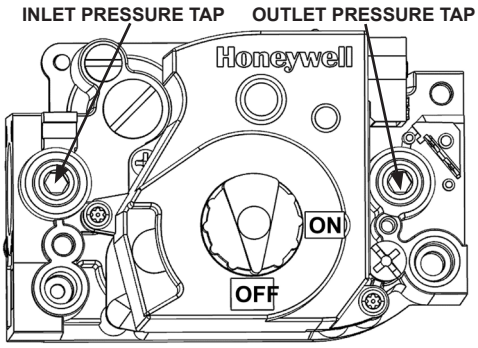
A. Preparation

1. Obtain two pressure gauges capable of reading up to 9 kPa.
2. Disconnect the brood heater from the electrical supply and close the fuel supply valve to the brood heater inlet.
3. Open the burner access panel.
4. Brush or blow off any dust and dirt on or in the vicinity of the gas control valve.

B. Gauge Installation

1. Locate the inlet and outlet pressure taps, see Fig. 21. Remove the pressure tap plug using a 3/16 in. allen key.

FIG. 21



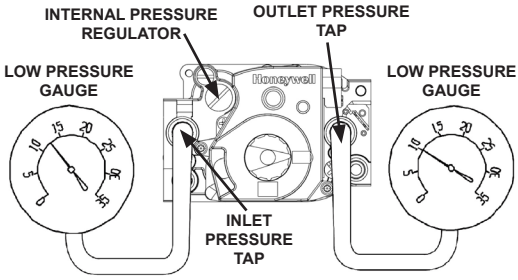
2. Securely connect a pressure gauge to each pressure tap.
3. Open the fuel supply valves to the brood heater and reconnect the brood heater's electrical supply.
4. Start the brood heater

C. Reading Pressures

1. With the brood 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 brood heater requires adjustment.
4. If the inlet pressures are correct and the burner manifold pressure does not agree with that specifed on the dataplate, then the gas control valve's internal pressure regulator requires adjustment. See Fig. 22 for regulator location.

www.lbwhite.com

FIG. 22



EXAMPLE SHOWS PRESSURE FOR PROPANE GAS (In. W.C.) ALWAYS REFER TO PRESSURE ON DATAPLATE.

D. Completion

1. Once the proper inlet and burner manifold pressures have been confirmed and/or properly set, close the fuel supply valve to the heater and allow the brood heater to burn off any gas remaining in the gas supply line.

2. Disconnect the heater from its electrical supply.

3. Remove the gauges and connecting hoses.

4. Install pressure tap plugs and tighten securely. Check for gas leaks.

Troubleshooting Guide

READ THIS ENTIRE SECTION BEFORE BEGINNING TO TROUBLESHOOT PROBLEMS.

⚠ WARNING

Electrical Shock and Burn Hazard

- 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 troubleshooting flow charts on the following pages provide systematic procedures for isolating equipment problems. The charts are intended for use by a QUALIFIED GAS BROOD HEATER SERVICE PERSON. DO NOT SERVICE THESE BROOD 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 and DC voltage and resistance.

- Microamp Diagnostic Kit - (Part No. 08507) When used with a standard digital multimeter, this kit allows testing of the flame sensor on direct ignition systems.

- Low Pressure Gauge - (00764) for checking inlet and outlet pressures of the gas control valve against dataplate rating.

INITIAL PREPARATION

- 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 operation sequence of the ignition module and related components is essential as it will relate directly to problem solving provided by the flow charts. The ignition control module is self-diagnostic. The red light on the module will flash a specific pattern depending upon the problem which is diagnosed. To effectively use the flow charts, you must first identify what the problem is by the flashing pattern of the L.E.D. (light emitting diode) 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**
Diagnostic light is NOT ON during a call for heat 23
Diagnostic light is ON during a call for heat 24
L.E.D. diagnostic light flashing:
A. Rapid Flash (AW Model) 24
B. One Time 24
C. Two Times 25
D. Three Times 26
E. Four Times 27
F. Five Times 27

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

OPERATION SEQUENCE: United Technologies Board

-- Line voltage is sent to transformer.
-- Terminal at transformer branches off line voltage to terminal L1 on ignition control.
-- Transformer reduces line voltage to 24 VAC.
-- If applicable, 24 VAC is sent to the thermostat.
-- Thermostat closes and returns the 24 VAC to the ignition control board terminal 24VAC.
-- (AW model) Ignition control sends flame sense current to the flame sensor rod on terminal FS.
-- Ignition control module performs self-safety check.
-- Air proving circuit is tested.
-- Control sends 24 VAC from terminal PSI to air proving switch.
-- Ignition control module begins ignition trial sequence.
-- Ignition control sends line voltage from terminal MOTOR to the heater motor.
-- Motor starts.
-- Air proving switch closes and 24 VAC is returned to terminal PSO of ignition control.

(AW Models)

-- Motor stops
-- Ignition control module sends line voltage to hot surface igniter
-- Igniter reaches ignition temperature in 17 seconds.
-- Ignition control restarts the motor.

(AD Models)

--Ignition controls powers the igniter and the igniter sparks.

(Both)

-- Ignition control sends 24 VAC from terminal GV to high limit switch.
-- If limit switch contacts are closed, limit sends 24 volts to gas control valve
-- Gas control valve opens
-- Ignition occurs.
-- Flame sense current is passed through burner flame back to ignition control.
-- Igniter stays powered until ignition control proves flame sense
-- Igniter then shuts down.
-- Gas control valve stays open
-- Room warms to desired temperature.
-- Thermostat is satisfied.
-- Brood heater shuts down.
-- Process starts again on a call for heat.

IGNITION TRIAL SEQUENCE:

-- The ignition control board will try three ignition attempts.
-- If ignition control does not prove burner flame after the third trial, the control goes into a safety lockout (3-flash).
-- Gas valve closes.
-- Fan motor stops.
-- To retry for ignition, turn the brood heater OFF and then ON.

AW Models

-- Three ignition trials occur within 90 seconds.

AD Models

-- Three ignition trials occur within 45 seconds.

DIAGNOSTICE LED IS ON DURING A CALL FOR HEAT

-- Either the air proving switch circuit is closed or remains open during a call for HEAT.
-- Ignition control board is in a one minute soft lockout interval.
-- Control will perform two more ignition attempts.
-- If the problem persist after the 3rd attempts, a 1-flash or 2-flash code will be display by the red LED. See page 25 & 26 for flash code.

www.lbwhite.com

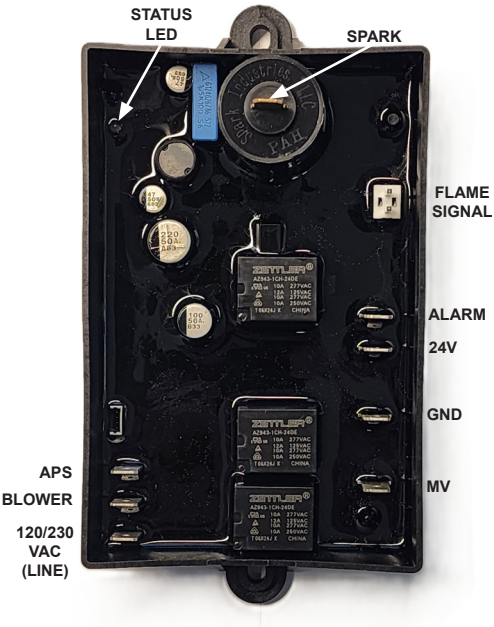
Ignition Control DSI
(Capable Controls Board)

The control sends and receives voltages to operate or verify operation of components. Refer to the following and Fig. 20 to understand the ignition control's terminal designators if doing voltage checks on the control.

120 (LINE): 120V power supply to control board
BLOWER: 120V power supply from control board to motor (or relay).
APS: 24V from air flow switch to control board
GND: Common ground
MV: 24V to high limit
24V: 24V from transformer
ALARM: 24V, LED
FLAME SIGNAL (FV+ FV-): Not Used
SPARK: Ignition transformer, 1/4 in. male tab

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

FIG. 20
Ignition Control

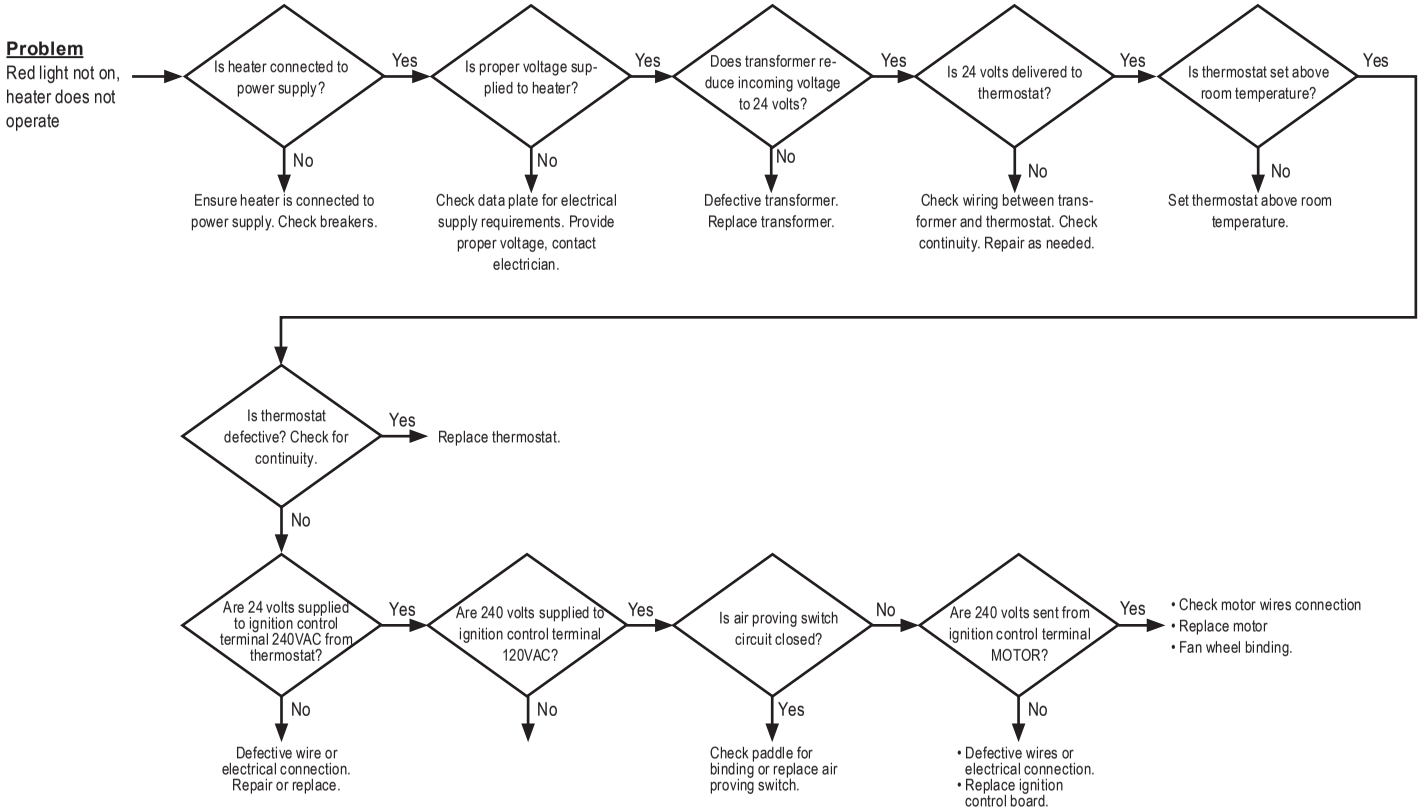


SEQUENCES OF OPERATION:
-- The troubleshooting red LED will not be ON during normal operation.
-- Line voltage is sent to transformer
-- Transformer terminal branches off line voltage to ignition control terminal 120/230VAC (LINE).
-- Transformer reduces line voltage to 24 VAC.
-- If applicable, 24 VAC is sent to the thermostat.
  -- Thermostat closes and returns the 24 VAC to the ignition control terminal 24 VAC.
-- Ignition control module performs self safety check.
  -- Air proving circuit is tested
  -- 24 VAC from transformer is sent to the air proving switch (APS).
-- Ignition control module begins ignition trial sequence.
-- Ignition control sends 120 volts from terminal BLOWER to the heater motor.
-- Motor starts.
-- Air proving switch closes and 24 VAC is sent to terminal APS of ignition control.
-- Ignition control power the igniter and igniter sparks.
-- Ignition control sends 24 VAC from terminal MV to high limit switch.
-- If limit switch contact is closed, limit sends 24 VAC to gas control valve
-- Gas control valve opens
-- Ignition occurs.
-- Flame sense current is passed through burner flame back to ignition control.
-- Igniter stays powered until ignition control proves flame sense
  -- Igniter stop sparking.
  -- Gas control valve stays open
-- Room warms to desired temperature.
  -- Thermostat is satisfied.
  -- Heater shuts down.
-- Process starts again on a call for heat.

The ignition control board will perform 3 ignition trials.
-- If no ignition, the control board goes into a lock-out with a 3-flash code.
-- To retry, turn heater off and on.

Heat/Vent Selector Switch LED:
-- LED ON: Heater is in HEAT mode and will operate normally.
-- LED OFF: Heater is either in the VENT or OFF position, or
-- 24VAC is not present from transformer

Red light not on, heater is calling for heat → Normal operation

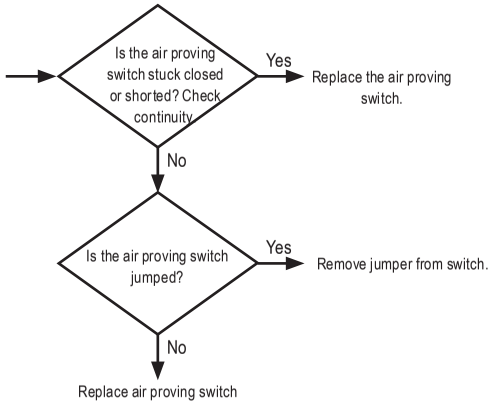


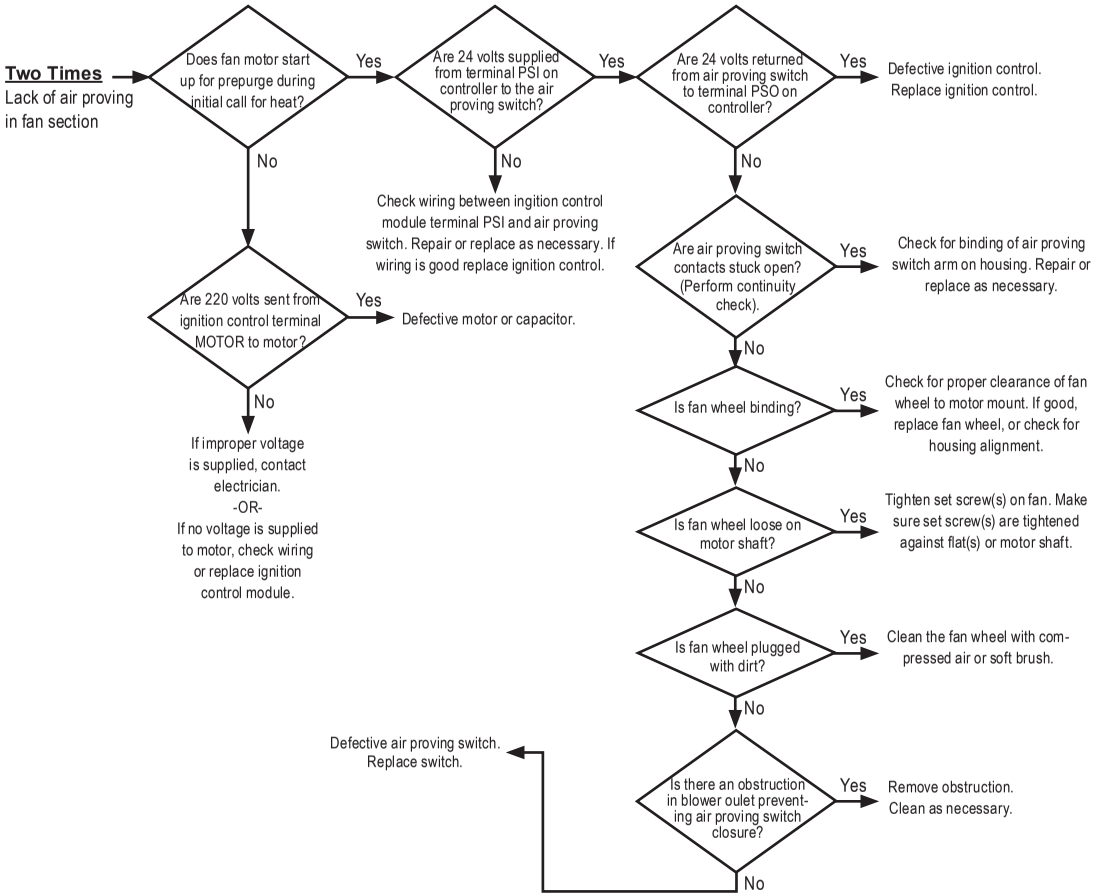
LED FLASHING

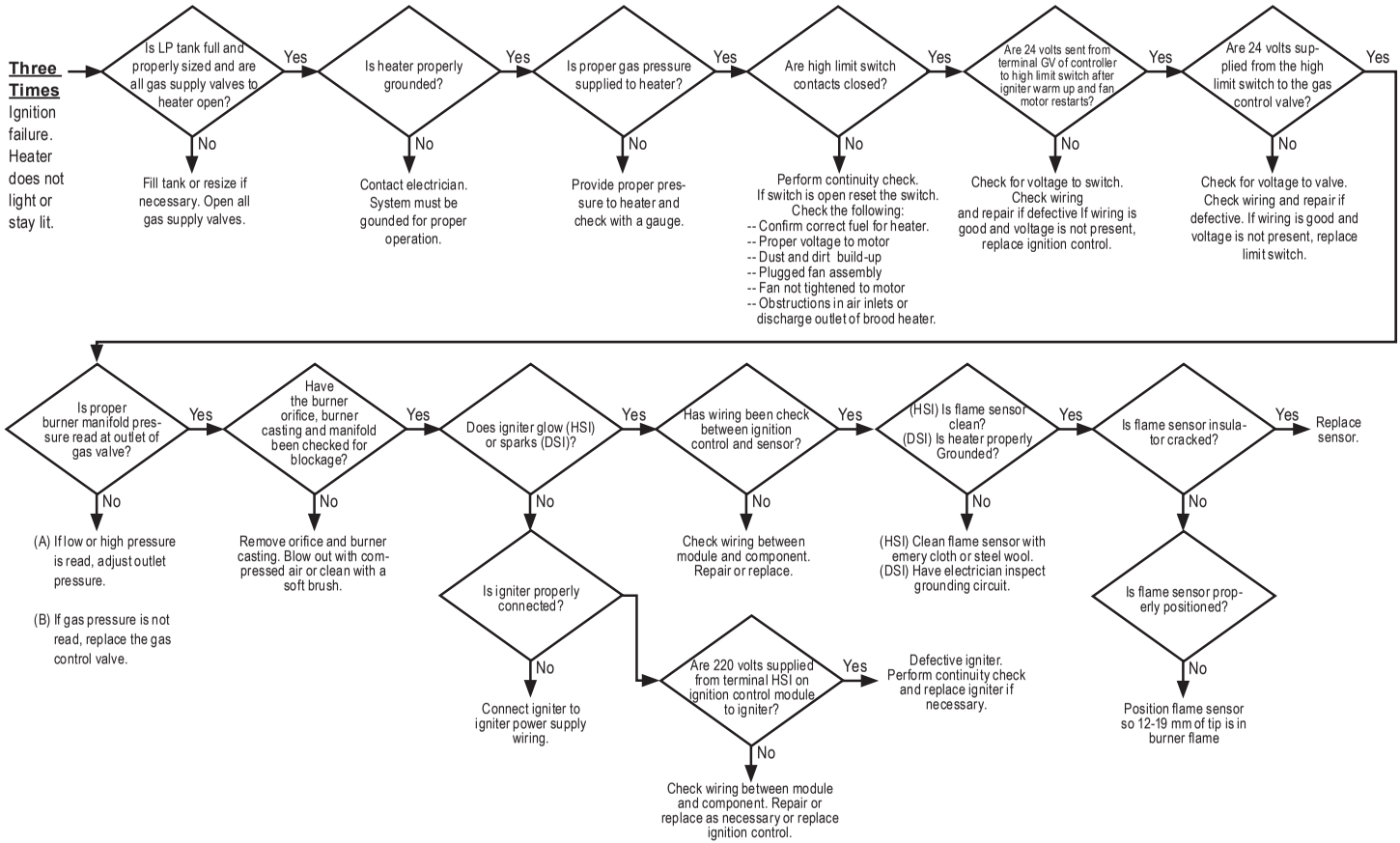
Rapid Flash
(AW Model Only) → Reverse polarity. Have electrician check neutral and hot wire connections that oulet heater is connected to.

LED ON
Heater does not operate → Air proving switch may be either closed or remains open during pre-purg test. Heater will perform 3 attempts with a 1-minute soft lockout interval. After the third attempt, the red diagnostic LED will either flash a 1-flash or 2-flash code.

One Time
Air proving switch contact is closed before a call for heat is established.




Two Times
Lack of air proving in fan section
Does fan motor start up for prepurge during initial call for heat?
Yes
Are 24 volts supplied from terminal PSI on controller to the air proving switch?
Yes
Are 24 volts returned from air proving switch to terminal PSO on controller?
Yes
Defective ignition control. Replace ignition control.
No
Check wiring between ingition control module terminal PSI and air proving switch. Repair or replace as necessary. If wiring is good replace ignition control.
No
Are air proving switch contacts stuck open? (Perform continuity check).
Yes
Check for binding of air proving switch arm on housing. Repair or replace as necessary.
No
Are 220 volts sent from ignition control terminal MOTOR to motor?
Yes
Defective motor or capacitor.
No
If improper voltage is supplied, contact electrician.
-OR-
If no voltage is supplied to motor, check wiring or replace ignition control module.
Is fan wheel binding?
Yes
Check for proper clearance of fan wheel to motor mount. If good, replace fan wheel, or check for housing alignment.
No
Is fan wheel loose on motor shaft?
Yes
Tighten set screw(s) on fan. Make sure set screw(s) are tightened against flat(s) or motor shaft.
No
Is fan wheel plugged with dirt?
Yes
Clean the fan wheel with compressed air or soft brush.
No
Defective air proving switch. Replace switch.
Is there an obstruction in blower oulet preventing air proving switch closure?
Yes
Remove obstruction. Clean as necessary.
No

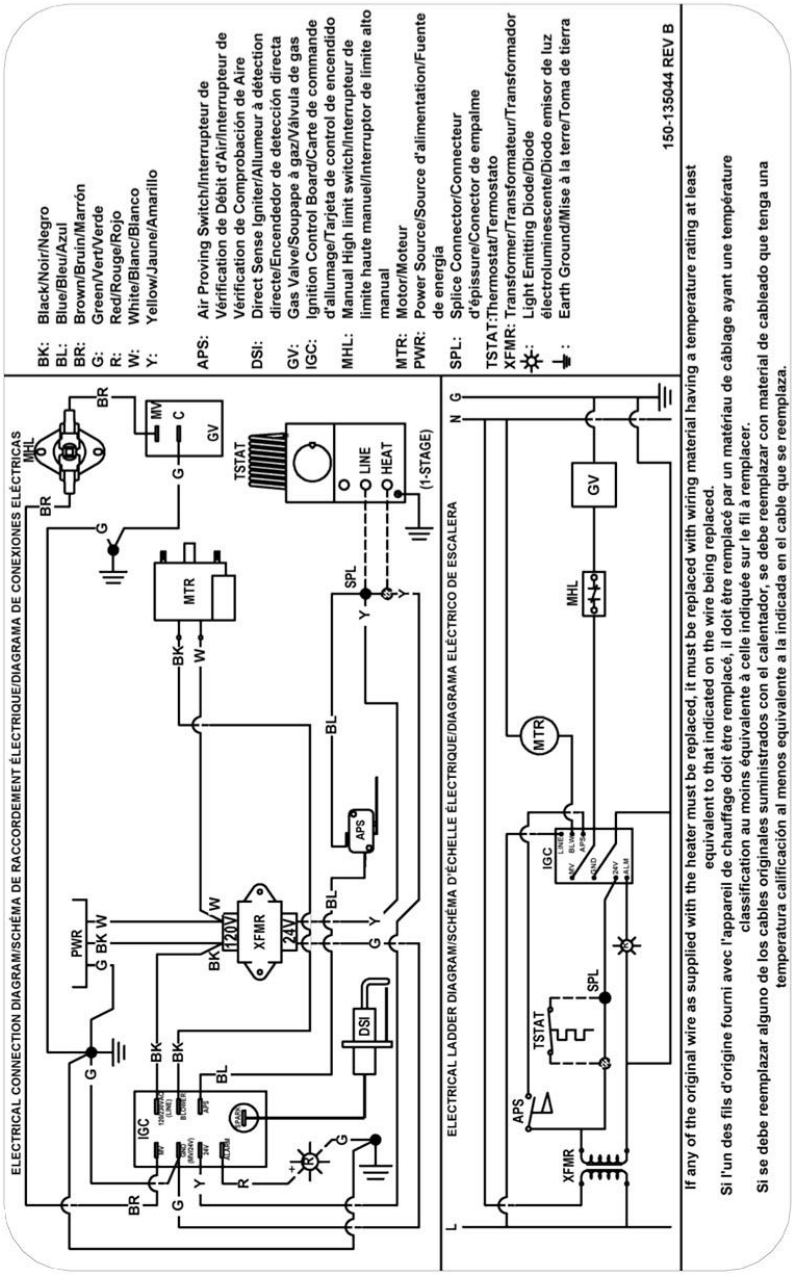

Three Times Ignition failure. Heater does not light or stay lit.
Is LP tank full and properly sized and are all gas supply valves to heater open?
Yes
No
Fill tank or resize if necessary. Open all gas supply valves.
Is heater properly grounded?
Yes
No
Contact electrician. System must be gounded for proper operation.
Is proper gas pressure supplied to heater?
Yes
No
Provide proper pressure to heater and check with a gauge.
Are high limit switch contacts closed?
Yes
No
Perform continuity check. If switch is open reset the switch. Check the following:
-- Confirm correct fuel for heater.
-- Proper voltage to motor
-- Dust and dirt build-up
-- Plugged fan assembly
-- Fan not tightened to motor
-- Obstructions in air inlets or discharge outlet of brood heater.
Are 24 volts sent from terminal GV of controller to high limit switch after igniter warm up and fan motor restarts?
Yes
No
Check for voltage to switch. Check wiring and repair if defective If wiring is good and voltage is not present, replace ignition control.
Are 24 volts supplied from the high limit switch to the gas control valve?
Yes
No
Check for voltage to valve. Check wiring and repair if defective. If wiring is good and voltage is not present, replace limit switch.
Is proper burner manifold pressure read at outlet of gas valve?
Yes
No
(A) If low or high pressure is read, adjust outlet pressure.
(B) If gas pressure is not read, replace the gas control valve.
Have the burner orifice, burner casting and manifold been checked for blockage?
Yes
No
Remove orifice and burner casting. Blow out with compressed air or clean with a soft brush.
Does igniter glow (HSI) or sparks (DSI)?
Yes
No
Is igniter properly connected?
No
Connect igniter to igniter power supply wiring.
Are 220 volts supplied from terminal HSI on ignition control module to igniter?
Yes
Defective igniter. Perform continuity check and replace igniter if necessary.
No
Check wiring between module and component. Repair or replace as necessary or replace ignition control.
Has wiring been check between ignition control and sensor?
Yes
No
Check wiring between module and component. Repair or replace.
(HSI) Is flame sensor clean?
(DSI) Is heater properly Grounded?
Yes
No
(HSI) Clean flame sensor with emery cloth or steel wool.
(DSI) Have electrician inspect grounding circuit.
Is flame sensor insulator cracked?
Yes
Replace sensor.
No
Is flame sensor properly positioned?
No
Position flame sensor so 12-19 mm of tip is in burner flame

Four Times → Poor flame sense. Check all grounded connections. Ensure flame sensor is secure. Clean the sensor rod and check sensor connection.

Five Times → Reset the board. If it does not reset, then replace the board. (Internal board fault.) Have qualified electrician check power source for power quality problems. (Frequency, line noise, or line spikes.)

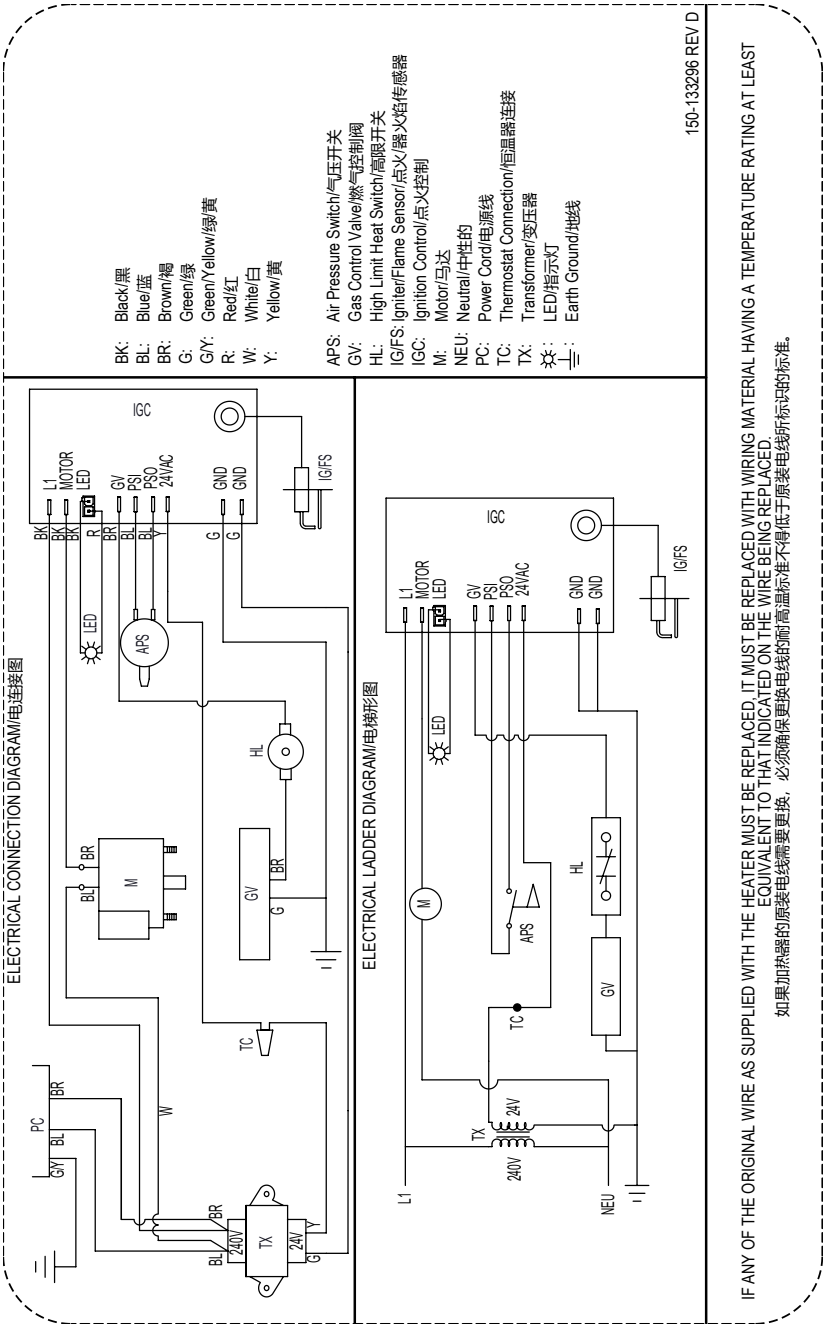
Electrical Connection & Ladder Diagram

AD060 / 100 / 250 Wiring Diagram: (Capable Controls Board)



Electrical Connection & Ladder Diagram

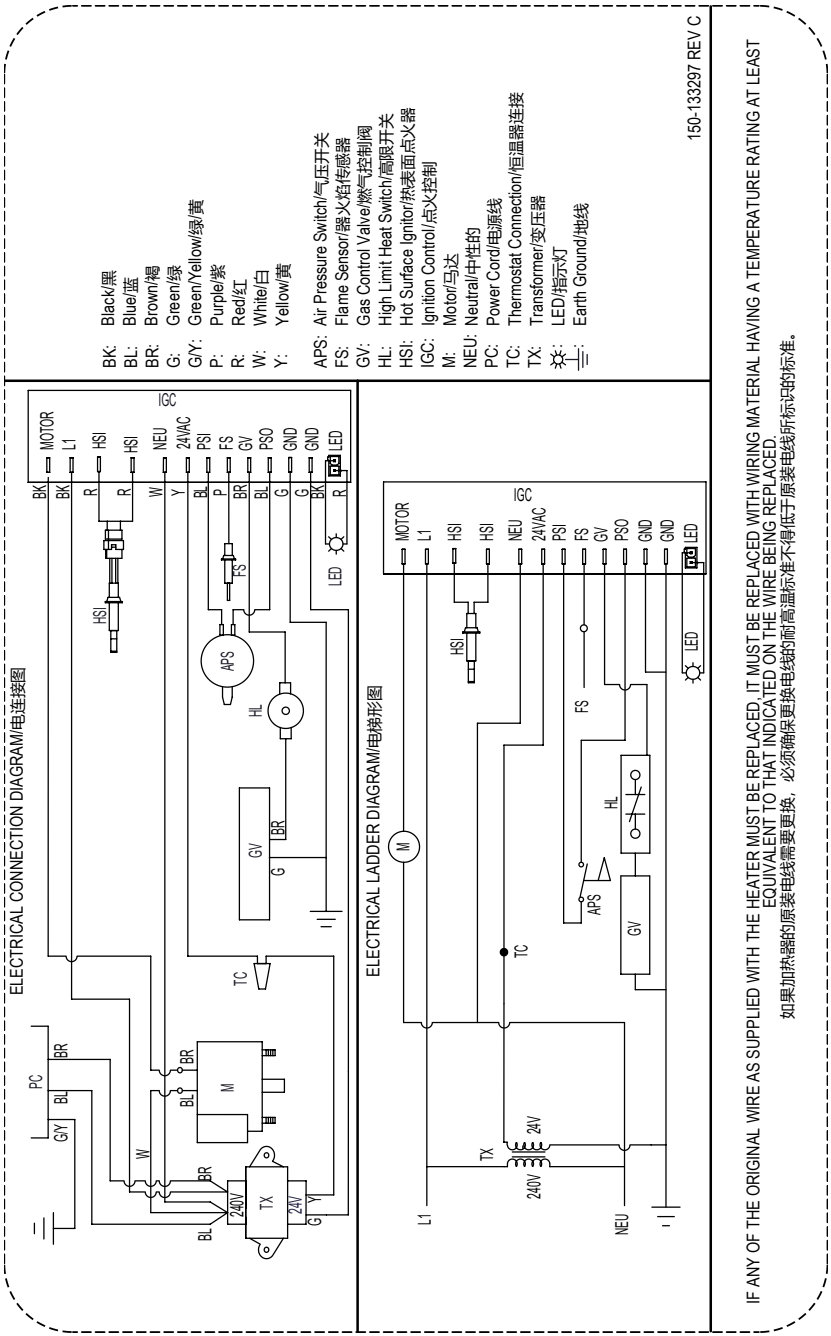
AD060-AD100-AD250 - United Technologies Board



www.lbwhite.com

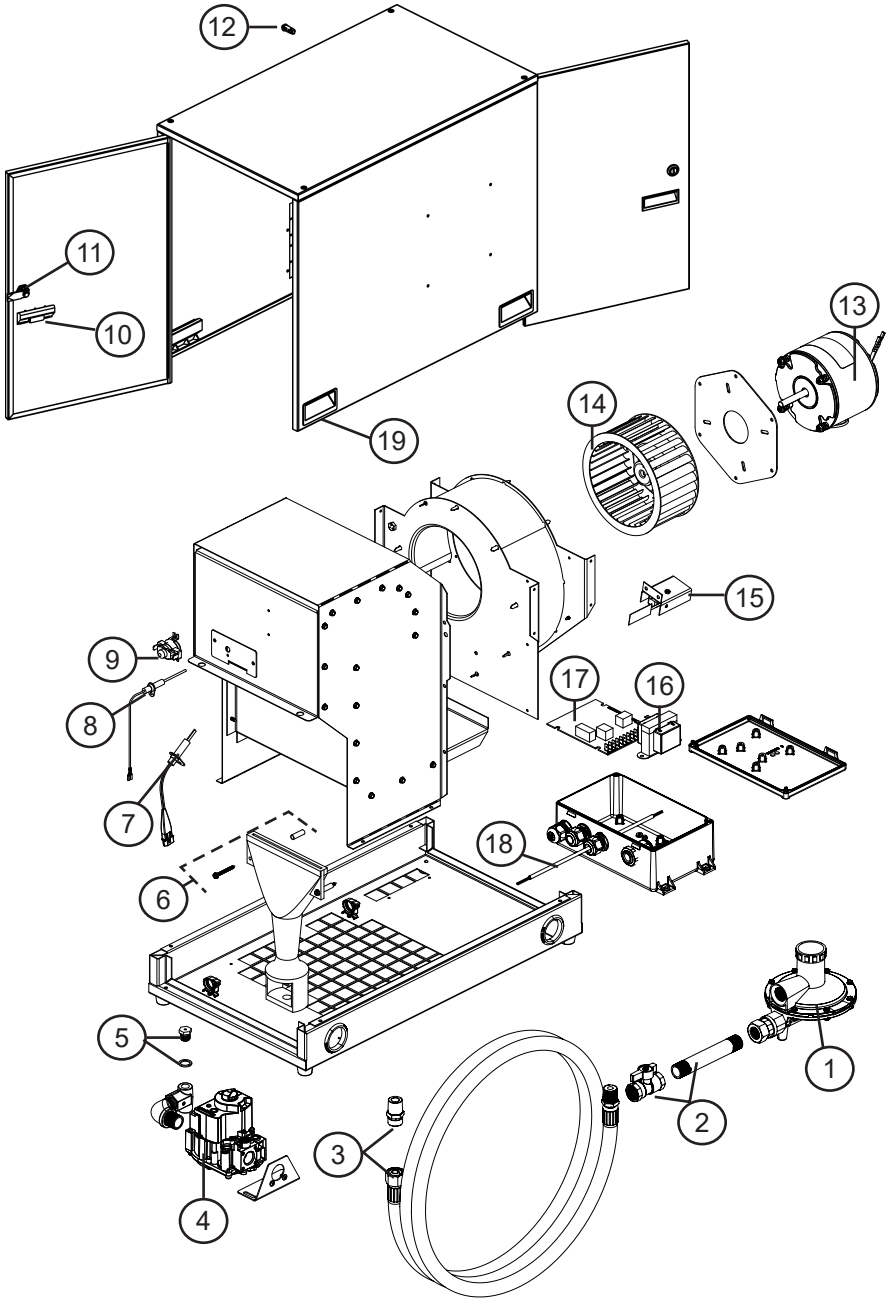
Electrical Connection & Ladder Diagram

AW250



Service Parts Identification Schematic

Guardian 100 HSI model shown



www.lbwhite.com

Parts List

Item	Description		Guardian 60	Guardian 100	Guardian 250
1	*Regulator, LP Gas, vent over side		550-06665		
	*Regulator, LP Gas, vent over outlet		550-06553		
	*Regulator, Natural Gas		500-07087	500-24414	
2	*Valve, Shut-off & Nipple		500-03399		
3	*Hose, Universal, 1/2 in. x 10 ft., with adapters		500-23160		
4	Valve, Gas Control	LP	522076		
		NG	522078		
		Butane-Propane	N/A		572857
5	Orifice, Burner, w/ copper washer	LP	574512	574514	574517
		NG	574513	574516	574303
		Butane-Propane	N/A		574522
6	Burner Mounting Hardware		570211		
7	Igniter	AD	574196		
		AW	N/A		573762
8	Flame Sensor	AW	N/A		574284
	Cable, Igniter (Not Shown)	AD United Technologies	574285		574286
		AD Capable Controls	574753		
9	Switch, High Limit		572501		573099
10	Handle		574124		
11	Latch		574162		
12	LED, Red		571333		
13	Motor	50 Hz	572971	571929	571902
		60 Hz		573549	572334
14	Wheel, Fan	50 Hz	572969	571928	570481
		60 Hz	570230	570304	
15	Switch, Air Proving		574519	574520	574519
16	Transformer		574290		
17	Control board	AD Capable Controls	574678		
		AD United Technologies	574287		
18	Cord, Power		572329		
19	Handle, Case, Front/Back		N/A	N/A	574450

*Optional Accessory

AW - Hot Surface Ignition Model

AD - Direct Spark Ignition Model

Manual Rev./Changes

Date	Rev.	Revision Change	Description
2/14/2024	A	No	Released
5/29/2024	A	No	522076 was 572857, 522078 was 572861

Warranty Policy

HEATER

L.B. White Company, LLC warrants that the component parts of its brood 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 brood 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 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/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 001-608-783-5691 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 CLIMATE SOLUTIONS

411 Mason Street, Onalaska, WI 54650

001-608-783-5691 • 608-783-5691

608-783-6115 (fax)

www.lbwhite.com

150-134162 REV.B

L.B.WHITE 绿博·温特

Guardian 2.0

农用牲畜棚舍育雏取暖器

AD060	17.6 kW	适用于丙烷、丁烷和天然气气型。
AD100	29.3 kW	
***AD/AW250**	73.3 kW	

* AW250 型号仅适用于中国。

本手册可于www.lbwhite.com网站在线查看

所有用户请注意

本育雏取暖器是作为向农用牲畜棚舍供暖的燃气直燃循环育雏取暖器而设计和开发，经批准可安装于室内或室外。倘若您想要把本产品用于并非其预期用途的任何场合，请咨询当地代理或美国L. B. White，后者的电话是001-608-783-5691。

www.lbwhite.com



恭喜!

您购买了时下最好的农用棚舍育雏取暖器。

您的新L.B.White育雏取暖器包含了由最富经验的供暖产品制造商利用最先进的技术，为您带来更大收益。

我们L.B. White公司全体同仁真诚感谢您对本公司产品的信赖，并且欢迎您提出宝贵意见和建议……请拨电话001-608-783-5691或寄电邮至customerservice@lbwhite.com，即可与我们联系。

注意

本安装说明是绿博温特公司（L.B. White Co. LLC）推荐的绿博温特加热器临时或者永久安装建议和指导方针。必须遵守当地电力和安全部门的相关规范要求。

请参见内部装配说明

适用海拔高度信息详见内封面。

扫描本QR码

用您的智能电话或访问http://i.youku.com/lbwhite即可观看L.B.White公司育雏取暖器的维护录像。*

** 须在您的安卓或苹果手机上安装二维码识别应用程序*

全球供应商 - 创新气候解决方案

地址：411 Mason Street, Onalaska, WI USA 54560；美国威斯康星州奥纳拉斯卡市 • 001-608-783-5691 • +1 608 783 5691 • ： +1 608 783 6115 (传真) • www.lbwhite.com

目录

育雏取暖器规格 4
一般信息 5
安全注意事项 5
安装说明 8
启动和停机说明 12
清洁说明 13
保养说明 14
服务说明 15
故障检修指南 21
电连接与梯形图 27
零件示意图和编码表 29
保修原则和更换零件与服务 31

⚠ 警告

标准设备应置于海拔 0 - 610 米处方可实现最大工作效率。

海拔过高将会导致设备无法正常运作，同时伴随一定风险。
公司正考虑推出可用于不同海拔高度的设备。

如果您需要在高海拔地区使用本产品，但在订购时又无法知悉该型号产品所适用的海拔高度，请联系我们寻求技术支持。

www.lbwhite.com

⚠ 通用危害警告

■ 失于遵守随本育雏取暖器提供的注意事项和说明能够导致：
— 死亡
— 严重身体受伤或烧伤
— 由起火或爆炸造成的财产损坏或损失
— 因缺乏足够的空气供应或一氧化碳中毒而窒息
— 触电
■ 安装或使用本产品前请通读本《用户手册》。
■ 本育雏取暖器应只由经过适当培训的维修人员进行修理或安装。
■ 请保存本《用户手册》以备日后使用和参考。
■ 《用户手册》和更换标签可免费提供。请参看网站，或拨+1-608-783-5691与L.B.White公司联系以得到协助。

⚠ 警告

■ 在育雏取暖器的燃气入口处必须提供适当的燃气供应压力。
■ 适当的燃气供应压力请参阅育雏取暖器的参数标牌。
■ 在育雏取暖器入口处高于最大入口压力的燃气压力能够造成起火或爆炸。
■ 起火或爆炸能够导致严重受伤、死亡、棚舍毁损或牲畜损失。
■ 在育雏取暖器入口处低于规定最小入口压力的燃气压力可能造成不当燃烧。
■ 不当燃烧能够导致窒息或一氧化碳中毒，因此可能给人畜带来严重伤害或死亡。

⚠ 警告

起火与爆炸危险

■ 不适合住宅或休闲车使用。
■ 在住宅或休闲车内安装本育雏取暖器可能导致起火或爆炸。
■ 起火或爆炸能够造成财产损失或人身伤亡。

⚠ 警告

起火与爆炸危险

■ 请确定在固体可燃物与育雏取暖器之间保持安全的距离。
■ 固体可燃物包括木头或纸制品、羽毛、秸秆及粉尘。
■ 请勿在包含或可能包含挥发性或空气中可燃物的空间内使用本育雏取暖器。
■ 挥发性或空气中可燃物包括汽油、溶剂、漆料稀释剂、粉尘颗粒或不明化学物质。
■ 失于遵守这些指示可能导致起火或爆炸。
■ 起火或爆炸能够造成财产损失或人身伤亡。

为了您的安全

请勿在本设备或任何其他电器附近存放或使用汽油或其他易燃气体或液体。

为了您的安全

倘若闻到燃气的味道：
1. 打开窗户。
2. 请勿触摸电开关。
3. 熄灭任何明火。
4. 立即打电话给燃气供应商。

育雏取暖器规格

			AD060	AD100	AD/AW250
最大输入/小时 (千瓦)			17.6	29.3	73.3
支持燃烧的必要通风量 (立米/小时)			428	692	1,885
在燃烧器歧管入口处实现输入调节的合格入口燃气供应压力 (千帕/毫巴/英寸水柱)	丙烷		2.50/25.5/10.0		
	天然气		1.1/11.2/4.5		
	丁烷丙烷		N/A		2.50/25.5/10.0
在育雏取暖器入口处实现输入调节的合格入口燃气供应压力 （千帕/毫巴/英寸水柱）	丙烷	最大	3.40/34.0/13.5		
		最小	2.74/27.4/11.0		
	天然气	最大	3.40/34.0/13.5		
		最小	1.75/17.5/7.0		
	丁烷丙烷	最大	3.40/34.0/13.5		
		最小	2.74/27.4/11.0		
电机性(瓦特/转速)	滚珠轴承				
	50 赫兹		52/1450	150/1300	186/1150
	60 赫兹		52/1700	94/1700	249/1150
电源（伏/赫/相）			220-240/50/1 或者 220-240/60/1		
电流 （安）	启动		5.0	5.2	7.5
	连续运行	50 赫兹	0.4	1.2	2.6
		60 赫兹	0.9	0.6	2.0
尺寸 长 x 宽 x 高（厘米）			57.15 x 32.39 x 45.72	68.59 x 35.56 x 50.80	77.79 x 45.72 x 71.12
与邻近可燃材料的最小安全距离 （米）		上面	0.3 m		
		两侧	0.3 m		
		背面	0.3 m		
		鼓风机出口	1.83 m		
		燃气供应	液化气供应- 1.83 天然气 - 不适用		
燃气耗量/小时	丙烷 (公斤)		1.26	2.10	5.26
	天然气 (立方米)		1.70	2.83	7.08
	丁烷-丙烷（公斤）		N/A		5.26

注意：丁烷/丙烷型号配置为在使用丁烷燃料运行时产生全速输出。当加热器使用丙烷燃料运行时，装置的加热速率将比燃料额定输出低约 11%。

www.lbwhite.com

一般信息

本《用户手册》涵盖本育雏取暖器通常使用的全部选项和附件。然而，用户购买的配置可能并未包括某些选项或附件。

在打电话寻求技术服务协助或其他具体信息时，请切记准备好型号、配置号及序号。这些信息都在参数标牌上。参数标牌位于燃烧器端或马达端门的内侧。

本手册将告诉您如何操作和保养您的设备。请让合格安装人员与您一起浏览本手册，从而让您完全理解此育雏取暖器及其工作原理。

燃气供应管线安装、育雏取暖器安装、以及育雏取暖器维修，都需要持续的专家培训和对燃气育雏取暖器的知识，并且不应由非合格人员来尝试进行。必要资格的定义请见第7页。
如需协助，或有关于本设备或其应用的任何疑问，请洽当地的L. B. White产品经销商或美国L. B. White。

美国L.B.White的方针是不断完善其产品，并因此保 留不经通知而更改规格与设计的权利。

安全注意事项

⚠ 警告

窒息危险

- 请勿用本育雏取暖器向人类住所供暖。
- 请勿用于不通风场所。
- 助燃空气和通风的流动不得有任何阻碍。
- 必须提供适当通风，从而可以支持所用育雏取暖器的助燃空气要求。
- 请参阅育雏取暖器的《用户手册》、育雏取暖器的参数铭牌，或者与L.B. White公司联系，确定育雏取暖器的助燃空气通风要求。
- 缺乏适当的通风将导致不当燃烧。
- 不当燃烧能够让人一氧化碳中毒，从而造成严重伤害或死亡。一氧化碳中毒的症状可能包括头痛、头晕或者呼吸困难。
- 不当燃烧影响牲畜的症状可能为疾病、饲料转化率降低或死亡。

燃气气味

液化石油气和天然气含有人造添味剂，目的在于能够探测到燃气泄漏。倘若发生燃气泄漏，您应能够闻到气味。这是您需要立即采取行动的信号！

- 请勿采取任何有可能点燃燃气的行动。请勿操作电开关。请勿拔出任何电源或延长线插头。请勿划着火柴或有任何其他火焰。请勿使用电话。
- 立即通知所有人撤离该棚舍并远离该区域。
- 若使用天然气则关闭天然气倘若使用天然气则关闭天然气表处的总管供气阀门。
- 液化石油气比空气重且可能在低洼区域沉积。如果有理由怀疑泄漏，请远离所有低洼区域。
- 天然气比空气轻，会在房梁或天花板处积累。
- 借用邻居的电话打给燃气供应商和消防队。请勿重新进入该棚舍或区域。
- 留在该棚舍外面并远离该区域，直至消防人员和燃气供应商确认已经安全。
- 最后，让燃气维修人员和消防人员检查有无燃气泄漏。在返回前让他们给该棚舍和区域通风。必须由经过适当培训的维修人员修复该泄漏，确认没有其他泄漏，然后为你重新点燃有关设备。

气味消退 -- 没有闻到气味

- 有些人嗅觉不好。有些人闻不到液化气或天然气中所添加的人造化学物质的气味。您必须确定您能够闻到这些燃气中的添味剂。
- 请学习识别液化气和天然气的气味。当地燃气经销商会很高兴向您提供“刮开后闻闻”纸片。请借此来熟悉燃气的气味。
- 吸烟能够令您的嗅觉减退。长时间闻某种气味也会影响您对该气味的敏感性。
- 液化气和天然气中的添味剂没有颜色，并且其气味强度在某些情况下能够消退。
- 倘若有地下泄漏，燃气在土壤中的流动有可能滤掉添味剂。
- 液化气气味的强度可能随高度变化。因为液化气比空气重，低处的气味可能比较强。
- 请始终对燃气气味保持高度警惕。倘若您不断闻到任何燃气气味，不管多么轻微，都应该作为严重泄漏对待。请立即采取如前所述的行动。

www.lbwhite.com

注意 -- 需要牢记的关键点!

- 液化气和天然气具有独特的气味。学习识别这些气味。（请参阅前面的“燃气气味”和“气味消退”两节。）
- 如果您未曾接受维修液化气和天然气育雏取暖器的适当培训，请勿试图点燃育雏取暖器，进行维修，或者对使用液化气或天然气燃料系统的育雏取暖器做出任何调整。
- 即便您未曾接受维修育雏取暖器的适当培训，请始终对液化气和天然气的气味保持高度警惕。
- 围绕育雏取暖器及在育雏取暖器的连接处（例如软管和接头等等）定期进行“嗅闻测试”，在任何情况下都属于良好的安全实践。倘若闻到哪怕很轻微的气味，立即与燃气供应商联系。切勿拖延!

安全注意事项

1. 除非您有持续的专家培训和对燃气育雏取暖器的知识，请勿试图安装或维修育雏取暖器或燃气供应管线。

下面是维修和安装本设备的资格条件：

a. 要成为合格的燃气育雏取暖器维修人员，来处理燃气育雏取暖器安装与维修的各项任务，包括育雏取暖器的安装、故障检修、问题零件更换及测试等任务。您必须能够让育雏取暖器进入安全正常连续工作状态。您必须通过阅读和遵守每台育雏取暖器随附的安全须知、标签、《用户手册》等资料，完全熟悉每个型号的育雏取暖器。

b. 要成为合格的燃气安装人员，您必须有足够的培训和经验来处理燃气管线安装、修理及更改的各项任务，包括选择和安装适当的设备，以及选择要使用的适当管道和储罐规格。这些工作的完成必须遵守所有当地、省市及国家规范，并且符合制造商的要求。

2. L. B. White 育雏取暖器的全部安装和应用都必须遵守当地、包括适用的燃气系统、燃气安装、电气及安全规范。您当地的燃气供应商、有执照电工、消防队或类似的政府部门、或您的保险代理，将能够帮助您确定规范要求。

3. 请勿移动、搬运或维修在运行中或接有电源或燃料的育雏取暖器。

4. 本育雏取暖器可安装在需要彻底冲洗的区域。本育雏取暖器只可清洗外壳组件—见“清洁说明”。请勿洗涤育雏取暖器的内部。请只使用压缩空气、软刷或干布清洁育雏取暖器内部及其部件。外部冲洗后，在育雏取暖器完全干燥前请勿操作。在任何情况下，外部冲洗后须等至少一个小时，方可再次使用育雏取暖器。

5. 为了安全起见，本育雏取暖器配备了手动重置高限开关和空气流开关。绝对不可绕开任何安全装置地操作本育雏取暖器。除非所有这些装置均功能完全正常，否则请勿操作本育雏取暖器。

6. 倘若育雏取暖器的门开着或面板取下，请勿操作。

7. 请勿把燃气罐或燃料供应软管定位在距离育雏取暖器的鼓风机出口6.10米内。

8. 请勿阻挡育雏取暖器的空气入口或排放出口，否则可能造成不当燃烧或育雏取暖器部件损坏，从而导致财产或牲畜损失。

9. 软管组件须每年一次目视检查。倘若看到过度磨损，或者软管有切口，则在运转育雏取暖器前必须更换该软管。此软管组件在使用中须针对人畜流动、棚舍材料及与高温表面的接触加以保护。该软管组件须由制造商指定。请见零件清单。

10. 在育雏取暖器安装后、牲畜入住棚舍前或搬移时，检查有无燃气泄漏且功能是否正常。

11. 在重新迁入牲畜前且至少每年一次，应由合格维修人员检查育雏取暖器是否工作正常。

12. 倘若育雏取暖器近期内不会用于给牲畜供暖，请关闭燃气供应。

13. 育雏取暖器配备三线电力系统。火线、零线和地线。育雏取暖器的电源线可带或者不带插头，并且插头带有或者没有地线插销。在任何情况下，育雏取暖器必须使用电源线中的地线正确连接至接地电源。未能正确使用接地插座会导致触电、人身伤害或者死亡。

14. 热表面点火育雏取暖器将最多进行三次试点火。倘若在第三次后依然未能点燃，控制系统就会“锁住”燃气控制阀。倘若在系统锁住后闻到燃气气味，立即关闭所有供应阀门。在确定可能集聚的所有燃气都已清除前，请勿重新点火。无论如何，都应等候至少5分钟再重新点火。

15. 就悬挂式安装而言，与育雏取暖器直接连接的刚性管道或铜管可能造成燃气在运动中泄漏，因此绝对不得采用。在悬挂式安装中只可使用经认可用于液化气和天然气的燃气软管组件。

16. 倘若在安装时不采用本育雏取暖器附带的燃气软管，则必须用适当规格的BS1387中等载荷镀锌钢管连接。（切勿使用铝管。）当用于输送天然气时，铜管须内部镀锡或有等效处理以耐硫。

安装说明
通用须知

⚠ 警告

起火或爆炸危险。
能够造成财产损失、严重受伤或死亡。

- 在接线前切断供电以防触电或设备毁损。
- 为了避免燃气的危险积聚，开始安装前在设备检修阀处关断燃气供应，并且在安装完毕后进行燃气泄漏测试。
- 请勿强拧燃气控制旋钮。燃气控制旋钮只可用手转动。绝对不可使用任何工具。倘若该旋钮不能用手操作，则该控制必须由合格维修技师进行更换。强拧或试图修理可能导致起火或爆炸。

1. 在安装本育雏取暖器时请阅读全部安全注意事项并遵循L.B. White公司的建议。倘若在育雏取暖器的安装或搬移过程中，您怀疑有零件受损或有缺陷，请找合格维修单位来修理或更换。

2. 在使用前确定育雏取暖器已经正确定位且水平悬挂。遵守育雏取暖器与最近可燃材料的所有最小安全距离。最小安全距离在育雏取暖器铭牌和本手册第4页上列出。

3. 确定育雏取暖器有对其应用适当的二级燃气调压阀。在燃气供应管线上必须连接一个调压阀，从而确保燃气阀入口处的燃气压力始终维持在育雏取暖器参数标牌上规定的范围内。如有任何疑问，请洽您的燃气供应商美国L. B. White公司。

4. 请勿超出育雏取暖器参数标牌上压印的输入额定值。请勿超出参数标牌上声明的燃烧器歧管压力。请勿使用与本育雏取暖器的具体输入额定值、燃料类型配置及海拔高度所规定的节流孔通径不同的规格。

5. 此育雏取暖器可用于室内或室外。如果要把育雏取暖器安装在室外，请只使用室外安装套件中供应的管道系统。

   AD060, 500-09810
   AD100, 500-09811
   AD/AW250, 500-24097

www.lbwhite.com

6. 在室外安装中，育雏取暖器的安装应在地面以上至少46厘米处或积雪不会阻挡育雏取暖器空气入口的高度。

7. 此机的燃气调压阀（带释压阀）应安装在棚舍外面。棚舍内的任何调压阀必须可向室外适当放空。调压阀安装须始终遵守当地、省市及国家规范。

8. 所有燃气压力调压阀都必须严格按照制造商的安全须知进行安装。每个调压阀都附带有对此的说明。

9. 确定在育雏取暖器内一同运到的全部附件都已取出并安装，这包括空气分流器、软管、调压阀等等。

10. 确定在燃气阀门入口安装一个沉积物捕集器，从而防止异物（管道填塞料、碎屑、鳞片）进入燃气阀门。吹入燃气阀门的碎片或会令阀门失灵，引起严重的燃气泄漏，进而导致可能的起火或爆炸，造成产品、棚舍、甚至生命损失。正确安装的沉积物捕集器将阻止异物进入燃气阀门，从而保障该重要安全部件的安全工作。

11. 与管道系统连接的任何育雏取暖器都必须有一个易于接近的经认可手动截流阀，该阀门的安装位置与所供气的育雏取暖器的距离应在1.83米之内。

12. 使用经认可的泄漏探测器对所有燃气接点进行燃气泄漏检查。燃气泄漏测试应按如下说明完成：

⚠ 警告

起火与爆炸危险

- 请勿使用明火（火柴、火炬、蜡烛等等）来检查燃气泄漏。
- 请只使用经认可的泄漏探测器。
- 失于遵从本警告能够导致起火或爆炸。
- 起火或爆炸能够造成财产损失或人身伤亡。

-- 用经认可的泄漏探测器检查育雏取暖器燃气控制上游的全部管道接点、软管接点、配件及联管件。

-- 万一探测到燃气泄漏，检查有关部件是否洁净，在进一步旋紧前适当施加管道填塞料。

-- 酌情进一步旋紧该燃气接点以停止泄漏。

-- 在全部接点都已检查完毕且任何泄漏都已停止后，启用主燃烧器。

-- 在主燃烧器点火的过程中站远一些，以免因隐蔽泄漏的回火而受伤。

-- 当主燃烧器在工作时，用经认可的泄漏探测器检查全部管道接点、软管接点、配件及联管件，以及燃气控制阀的入口和出口接点。

-- 倘若探测到泄漏，检查有关部件的螺纹区域是否洁净，在进一步旋紧前适当施加管道填塞料。

-- 酌情旋紧该燃气接点以停止泄漏。

-- 倘若泄漏无法停止，酌情更换有关的零部件。

-- 在继续前确认已经发现并修复全部燃气泄漏。

13. 育雏取暖器安装完毕后必须由合格维修单位检查运行燃气压力是否适当。

14. 依照育雏取暖器上或《用户手册》内的说明点火。

15. 为了确保育雏取暖器正常工作，极其重要的一点在于采用适当尺寸与类型的燃气供应管线。请与燃气供应商联系，取得适当的管线尺寸确定和安装。

16. 本育雏取暖器已配置为只使用液化石油气或天然气。请勿将育雏取暖器用于液体抽取系统或应用。如有任何疑虑，请洽美国L. B. White公司。

17. 如同所有机电装置一样，恒温器最终有可能失灵。恒温器故障可能造成供暖不足或过度的情况，因而可能损坏关键产品和（或）造成牲畜伤亡。需要备用控制系统加以保护；该系统需要限制最高和最低温度并发出适当的警报。

18. 请花些时间学习本《用户手册》，从而弄懂如何操作和保养本育雏取暖器。确定您知道如何切断向棚舍及单个育雏取暖器的燃气供应。如有任何疑问，请洽当地燃气供应商。

19. 在进行任何维修程序时发现的任何缺陷都必须消除，并且有问题的零件必须立即更换。育雏取暖器再次投入使用前必须由合格维修人员重新测试。

空气分流器安装说明
(零配件 – 须单独订购)

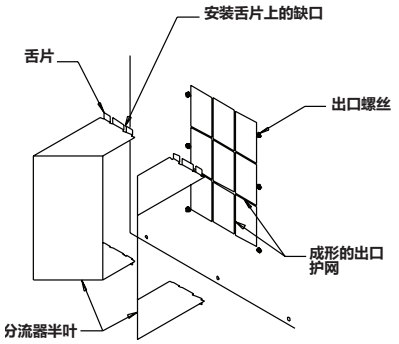
（育雏取暖器出口的外观可能因型号不同而异。）

1.空气分流器可安装在育雏取暖器的出口，从而为育雏取暖器吹出的暖风确定方向。请参阅图1。空气分流器的安装可让暖风有两个45度路径或沿一个45度方向流动。

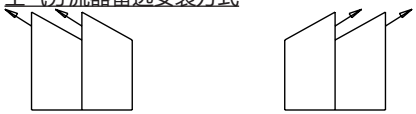
2. 空气分流器在安装前可能需要手工成形。请使用提供的穿孔做出90度弯曲。分流器的两个半叶于是应具有图1中所示的形状。

3. 空气分流器每个半叶上的舌片将弹入到鼓风机出口内在外壳组件内部与鼓风机外壳出口之间。倘若带缺口的舌片无法弹入到鼓风机出口内，松开鼓风机出口螺丝。这将提供插入舌片的空隙。安装后重新旋紧螺丝。

图1



空气分流器备选安装方式



悬挂说明
(零配件 – 须单独订购)

1. 按照图2组装，牢靠上紧全部有眼螺栓。

2. 确定育雏取暖器得到可靠拴系且水平悬挂。（请沿横向和纵向检查。）

3. 图3所示为典型室内安装。在任何牲畜棚舍内都必须考虑周详，确保育雏取暖器远离牲畜，以免牲畜撞到育雏取暖器，令后者松脱其固定，或者以任何方式损坏育雏取暖器或其燃气供应管线。请确定遵守本《用户手册》规格节内和育雏取暖器参数标牌上声明的与可燃材料的最小净空距离要求。

图2

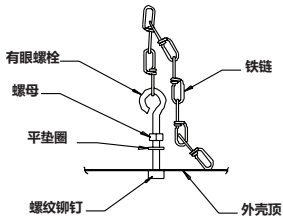
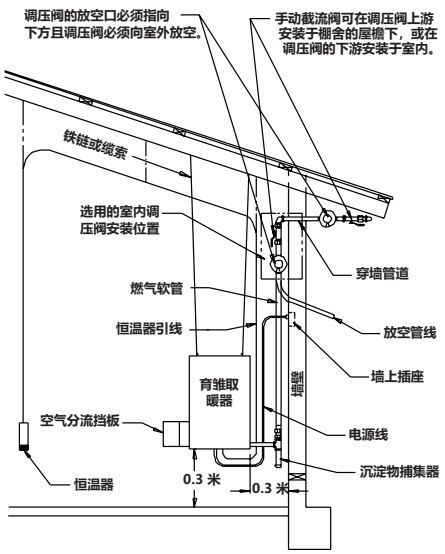


图3

附注：调压阀应总是安装在室外。倘若由于特殊情况而不得不把调压阀安装在室内，调压阀的放空阀必须使用放空管线排放到室外；该管线不得小于放空阀的开口。



www.lbwhite.com

恒温器安装
(零配件 – 须单独订购)

⚠ 警告

触电危险

- 在把恒温器与育雏取暖器连接前请断开电源。
- 失于遵从本警告能够导致触电，从而造成人身伤亡。

将直接连线恒温器套件与育雏取暖器的控制盒连接:

- 恒温器的安装与布线必须由电工或有适当资质的人完成。

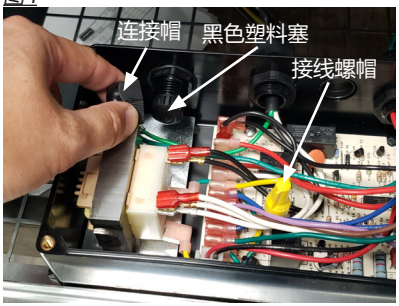
a. 旋开固定点火控制盒外壳的两个十字螺帽。

b. 移开点火控制盒外壳。

c. 旋开接线螺帽，将黄线分开。

d. 移开连接帽和黑色塑料塞，见图4。

图4

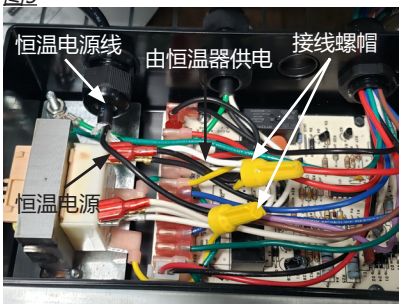


e. 将恒温器的连接线穿过连接孔和连接帽。

f. 使用接线帽，将恒温器的黑线和变压器端的黄线连接（必要时，恒温器的连接线需要剪掉并剥离一段）。

g. 使用接线帽，将恒温器的白线和点火控制盒24VAC端的黄线连接（必要时，恒温器的连接线需要剪掉并剥离一段）。见图5。

图5



h. 将连接帽和连接孔旋紧。

i. 盖上点火控制盒的盖子并固定。

j. 启动加热器并检查是否可以正常运行。

手动截流阀、软管及调压阀件
(零配件 – 须单独订购)

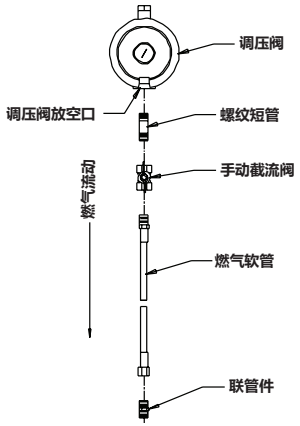
1.在螺纹接点总是使用经认可适合液化气应用的螺纹脂。

2.按照插图组装所有部件。此图只是要显示这些部件的通常组装。

3.牢靠旋紧所有接点。

4. 使用经认可的泄漏探测器对所有燃气接点进行燃气泄漏检查。

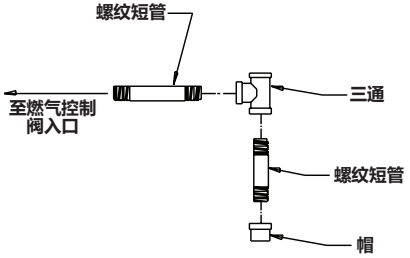
图6



沉积物捕集器组件

将三通、螺纹短管及帽组装并牢靠旋紧。沉积物捕集器组件必须总是垂直安装。请使用耐液化气的螺纹脂。使用经认可的泄漏探测器对所有燃气接点进行燃气泄漏检查。

图7



可变热量输出

1. 有些型号配有手动调节阀，位于电磁阀和燃气歧管之间，用于调节热量输出。见图8。这个调节阀不可用于切断燃气管路。

2. 调节阀可以调节的最大输出量或者最小输出量。当调节阀的手柄和燃气流向平行时，手动阀处于完全打开的状态，此时为最大输出。手柄旋转至90°时，为最小输出，也可以调节至最大和最小输出之间的任意值。见图9。”

图8

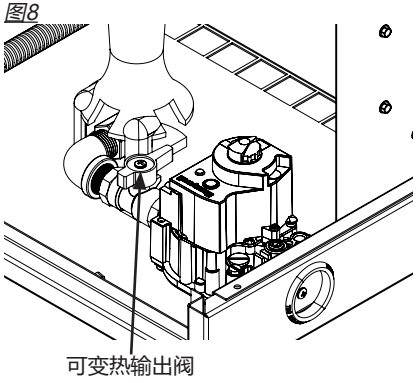
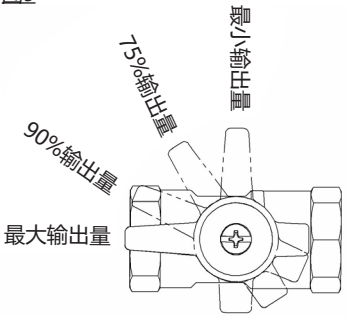


图9

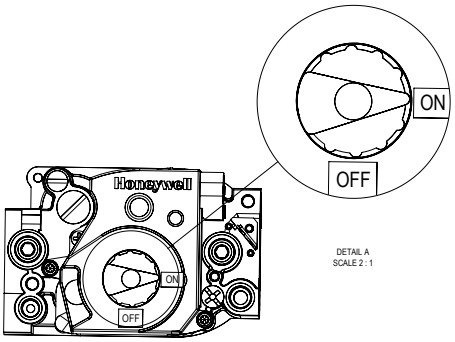


启动说明

在育雏取暖器由合格燃气育雏取暖器维修人员安装完毕后，请采取首次启动的第1至6步。正常启动时只需把恒温器设定在室温之上，育雏取暖器就会启动。

1.打开燃气管路上的所有手动阀并使用检漏器检查是否有燃气泄漏。加热器的电磁阀也有一个手动阀，确保此阀旋转至“ON”的位置。见图10。

图10



2.把电源线连接到经认可的电源插座上。

3. 把恒温器（若已提供）设定在希望的室温上。

4. 这个加热器包含一套点火控制部件，用于控制加热器的点火过程以及检测安全功能。在控制附件中包括此部件。

www.lbwhite.com

加热器的背面有一个红色的LED（发光二极管）指示灯，用于指示加热器的状态。正常运行时，LED灯不会亮起。LED灯只要亮起，就说明加热器的运行存在问题。请参考用户手册的故障指南部分或者扫描二维码寻求帮助。只有合格并经过培训的人员才可以维修保加热器。。

5. 在接到供暖信号时，马达会启动并运转大约5秒，然后停止。此“预吹扫”是一项安全功能和点火前的正常运转特征。在马达停止后，点火器就会变热（大约15秒）。点火器预热时间到后，马达会再次启动，此后很快就会点火。

附注：新安装的燃气软管内夹带有空气是正常现象。育雏取暖器可能需要不止一次试点火，才能把管线内的空气最终清除并实现点火。

AW型号

6. 电机将会停止。电机停止运转后，点火棒开始升温（大约经过15秒钟）。点火棒升温结束后，电机重新启动，并立即开始点火。

AD型号

7. 经过5秒钟的预扫风，电机持续运行，点火器开始启动并产生电火花。

8. 两种型号的点火控制都会尝试三次点火。如果点火未成功，点火控制盒将会 “锁闭”，并出现三次闪烁模式。

注意：新项目完工调试时，燃气管道中会有残留空气。加热器可能需要启动多次来排掉空气，顺利点火。

停机说明

倘若育雏取暖器因为清洁、保养或修理而需要停机，请采取第1到5步；否则只需把恒温器转到关闭或无供暖，即可实现标准停机。

1. 关闭全部手动燃料供应阀门。

2. 在育雏取暖器有火时，让育雏取暖器烧掉燃气供应软管内的多余燃料。

3. 把燃气控制上的指针转到关位置。

4. 把恒温器转到关闭或无供暖位置。

5. 把育雏取暖器与电源断开。

清洁说明

⚠ 警告

起火、烧伤及爆炸危险

- 本育雏取暖器的燃气管理、安全及空气流等系统均包含机电部件。
- 由于粉尘、脏污、磨损、老化，或因牲畜棚舍内的腐蚀性气氛，此等部件可能失灵或出现故障。
- 定期清洁与检查，以及适当的保养，乃是避免严重受伤或财产损失的必要措施。

1. 清洁前请关闭所有燃气供应阀门并断开电源。

2. 育雏取暖器上的脏污或粉尘应定期清除：

   a. 在每群牲畜走后或在棚舍重新迁入牲畜前，用压缩空气或软刷对育雏取暖器内外进行一次全面清洁。此时应清除马达壳上的粉尘，防止过热而导致育雏取暖器停运。

   b. 至少每年一次，对育雏取暖器进行一次彻底清洁。此时应拆下风机与马达总成，用刷子或压缩空气清洁风机叶轮，注意清洁每个风机叶片。确定燃烧器空气入口的文氏管口和铸件喉部均无粉尘积聚，并且热室顶部与机壳内侧之间也没有粉尘。此外还应按照本《用户手册》的维护说明，拆下火焰传感器并加以清洁。

   c. 当用水洗时，务请遵守本清洁说明中的警告。同样的警告也已贴在育雏取暖器上。

⚠ 警告

本育雏取暖器只可清洗外壳组件，并且前提是：

A. 育雏取暖器已经与电源断开。

B. 全部检修面板均已牢靠关闭。

C. 喷水头在喷水时与育雏取暖器的距离不少于1.83米。

D. 育雏取暖器每面冲洗10秒，水压不得超过3.1巴。

E. 育雏取暖器在至少一个小时内或彻底干燥前不与电源重新连接。

对育雏取暖器的不当清洁能够造成严重人员伤害或财产损失，这是由于水和（或）清洗液：

1. 进入电部件、接点及导线内，造成触电或部件故障。

2. 在燃气控制部件上造成腐蚀，从而导致燃气泄漏且由此引起火灾或爆炸。

请用柔软干刷或布或压缩空气清洁育雏取暖器的内部零件。

保养说明

设备使用前：

- 每年一次，请燃气供应商检查全部燃气管线有无泄漏或阻碍，并且清除沉积物捕集器内可能积累的任何异物。
- 育雏取暖器周围须保持空旷，不得有可燃材料、汽油及其他易燃气体和液体。
- 调压阀必须定期检查，确定调压阀放空口未被阻挡。调压阀上的碎片、昆虫、虫巢或冰雪能够阻挡放空口并造成育雏取暖器处压力过高。
- 确认育雏取暖器上所有的标志都是看得清的（警示牌，开始/停止，电路图，图表等）。确保没有被剪、撕裂或者各种损坏。任何损坏的标签都可以立即联系L.B.White公司进行免费更换。
- 检测燃气软管是否有缺口、切割或者被侵蚀。如果发现任何缺陷，更换整个燃气软管。
- 观察育雏取暖器的电子连接处。如果任何接线端有被腐蚀的情况请立即更换。
- 使用设备前，请根据本手册说明，检查设备燃气接点处是否存在燃气泄漏情况。

年检：

- 每年一次，请燃气供应商检查全部燃气管线有无泄漏或阻碍，并且清除沉积物捕集器内可能积累的任何异物。
- 调压阀有可能用坏和失灵。请燃气供应商查看所有已安装调压阀的日期码，并且检查向育雏取暖器输送的压力，从而确保调压阀在可靠工作。
- 每年须对育雏取暖器的高温限制开关进行测试。 请参照本手册说明。

维护说明

警告
烧伤危险
- 在育雏取暖器停运后，育雏取暖器表面在一段时间内继续很热。
- 请等育雏取暖器凉下来，然后再进行维护、保养或清洁。
- 失于遵从本警告将导致烧伤。

警告
起火与爆炸危险
- 请勿分解或企图修理任何育雏取暖器部件或燃气阀组部件.
- 所有零部件，倘若发现有问题，都必须更换。
- 失于遵从本警告将导致起火或爆炸，从而造成财产损失或人身伤亡。

1.除非您的维护程序必须使用燃料和（或）带电，否则在维护前请关闭燃料供应阀门并断开电源。

2. 打开侧面板以接近育雏取暖器部件。

3. 断开要更换部件的电线。

4. 通过将受到怀疑的零件跨接而从电路中排除，能够测试恒温器和高限开关：

-- 重新连接电源并打开燃料供应阀门。

-- 倘若育雏取暖器点火，则该部件有问题且必须更换。

-- 请勿在跨接该部件的情况下操作育雏取暖器。立即更换该零件。

-- 检查部件的一个替代方法是进行导通检查。

5.请勿跨接空气验证开关，否则点火控制将不会允许育雏取暖器运转。请测试空气验证开关的导通，并且更换有问题的开关。

6.重新组装时请反过来执行相应的维护程序。确定旋紧所有燃气接点。

7.维护后请启动育雏取暖器以确定工作正常。使用经认可的泄漏探测器检查有无燃气泄漏。

8.用压缩空气或柔软干布清洁育雏取暖器的节流孔。请勿使用锉刀、钻头、拉刀等清洁节流孔，否则可能加大该孔，造成燃烧或点火问题。更换不能适当清洁的节流孔。

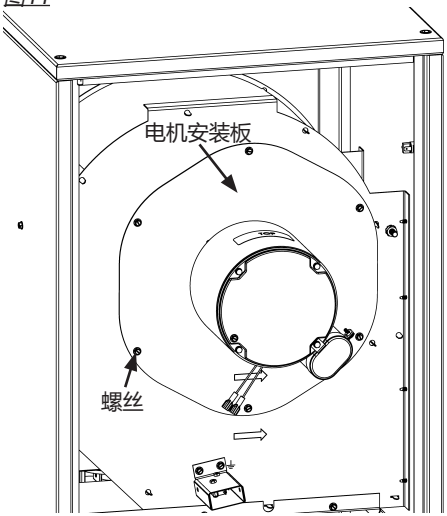
马达与风机叶轮总成

1.松开风机叶轮上的方头定位螺钉。

2.把风机叶轮从马达轴杆上拔下来。如有必要可使用卸轮器。

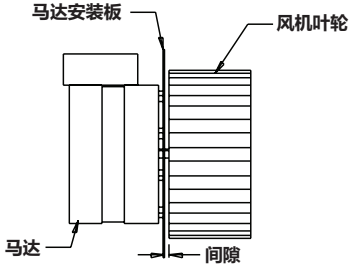
3.取下马达安装板上固定马达的四（4）个螺母。

图11



附注:
a. 在把风机叶轮固定在马达轴杆上之前，必须按照下表中规定的间隙调整风机叶轮与马达安装板的间隔。
b. 确定风机的定位螺钉在旋紧时处于马达轴杆的平面上。

图12



AD060，9.53毫米　AD100, 6.35毫米
AD/AW250, 3.18毫米

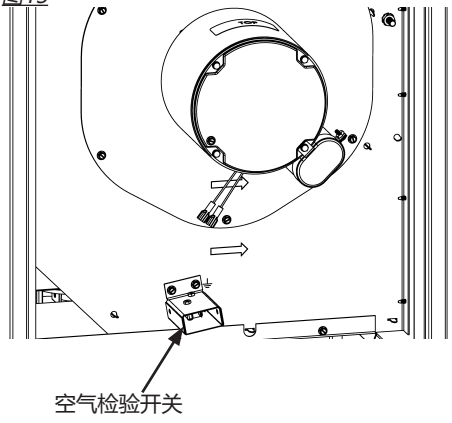
空气检验开关

空气验证开关位于育雏加热器电机端的风扇罩上。 它必须正常工作才能进行点火循环。 如果空气检验开关触点在点火控制器启动风扇电机之前闭合，或者在风扇电机启动后没有在需要加热时闭合，则不会发生点火。 见图 13。

1. 卸下将带支架的开关固定至鼓风机外壳的两 (2) 个金属板螺钉。。

2. 转动开关拆下组件，以便将开关臂上的拨片拉过风扇罩侧面的长方形孔。

图13



手动重置高限开关

⚠ 警告
起火危险

- 请勿在将高限开关旁通的情况下操作育雏取暖器。
- 在将高限开关旁通后操作育雏取暖器可能造成过热，因此可能起火，导致育雏取暖器或棚舍毁坏或牲畜损失。

本育雏取暖器利用一个高限热开关进行过热保护。该限制位于热室上，见图14。它连接在点火控制与燃气控制阀之间。

此开关具有两个常闭触点。倘若发生过热情况，此开关的触点将会分开，从而让燃气控制阀的电路开路。此高限开关应每年在彻底清洁时至少测试一次。

1.拆下此开关。捏住开关的一个安装腿，用一个小火焰对准开关背面的感测部分。见图15。进行这个测试时注意不要烧熔开关的塑料外壳。

2.在一分钟内应该就会听到开关里的爆裂声，这表明开关的触点已经分开。检查开关的两个端子之间是否不导电，以核实触点已经分开。

3.让开关冷却大约一分钟，然后用力按下其上的复位按钮。

4. 检查开关的两个端子之间是否导电，以核实触点已经接合。

5. 把该开关重新安装到育雏取暖器内。重新连接育雏取暖器的电源。启动育雏取暖器并检查是否工作正常。

www.lbwhite.com

图14

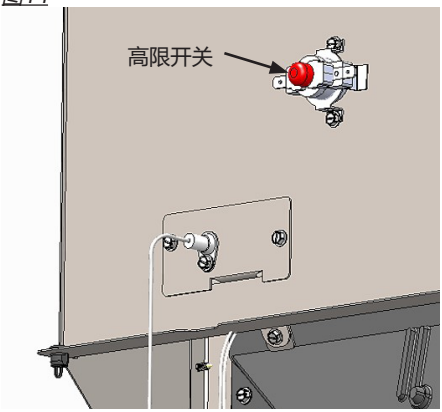
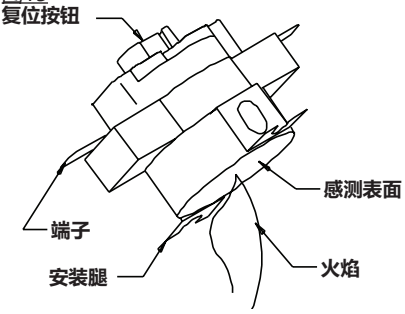


图15



点火器和火焰探针
点火类型见图16a和16b。

1. 点火器和火焰探针的更换，包括切开收缩管，找到连接头并卸掉固定螺丝。

2. 更换结束后，为了防止连接处出现锈蚀，需要更换热收缩管（574311）。

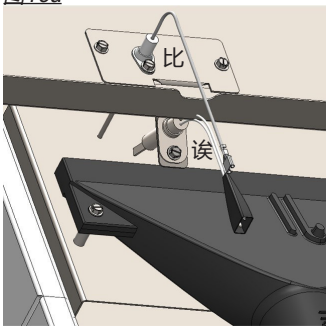
HSI-AW型号
点火棒

- 将线路插头从内孔线路连接口处拔出。
- 卸掉点火棒固定螺丝（A），见图16a。
- 将点火棒从固定支架上取出。

火焰探针

- 从固定支架上卸掉火焰探针的螺丝（B）。见图16a. 使用钢丝球或者砂布清洁探针。快速擦拭，清理掉探针上积累的灰尘、污物和氧化物。
- 检查火焰探针的绝缘体部分是否有裂痕。如果有裂痕，更换探针。

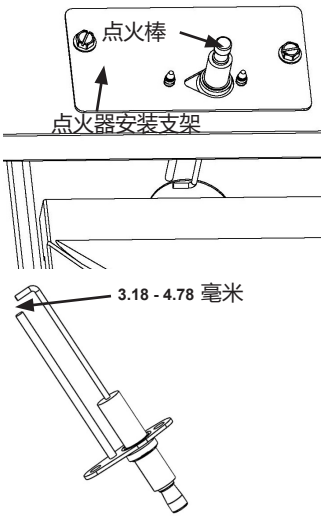
图16a



DSI-AD 型号

- 点火器和火焰探针需要清理长期积累的灰尘和污物，否则会影响点火和探测火焰。需要将点火器和火焰探针移出进行清洁。
- 如果火花强但是加热器运行终止，拿出点火器，使用砂布或者钢丝球清洁表面污物。
- 如果火花弱或者没有电火花，移出点火器，确保点火间隙为3.18-4.78毫米。
- 检查点火器的绝缘底座有无裂痕。如果有裂痕，更换点火器。

图16b



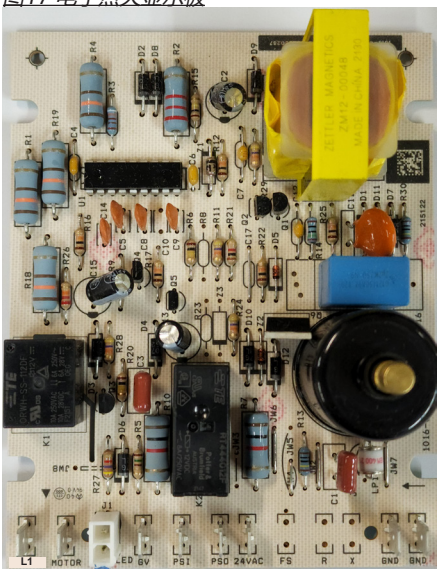
点火控制盒

此控制盒会发送和接收多个电压以操作部件或检验部件的工作。如要对点火控制盒进行电压检查，请参阅下面内容及图17，弄懂其端子标记。

L1：电压至控制盒
MOTOR：电压至电机
HSI（AW 型号：至点火棒的交流220伏
HSI（AW型号）：点火棒的零线
燃烧器火焰出
NEU（AW型号）: 控制中性
LED：LED指示灯
GV：交流24伏经高限开关至电磁阀
PSI：24 VAC 至空气验证开关
PSO：从空气检验开关返回 24 VAC
FS（AW型号）: 输出微安级电流至火焰探针用于检测燃烧器的火焰状态
24VAC：来自变压器的交流24伏
GND：控制盒的地线现

为了弄懂点火控制盒在收到供暖信号时的运作，也请参阅本手册的“动作序列”节。

图17 电子点火显示板

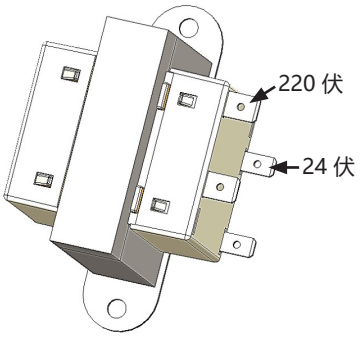


变压器

把交流220伏降至交流24伏，从而向点火控制盒供电。没有来自此变压器的交流24伏，红色诊断指示灯不会发光，点火控制盒也不能工作。

变压器的位置和输出端子参照请见图18。

图18



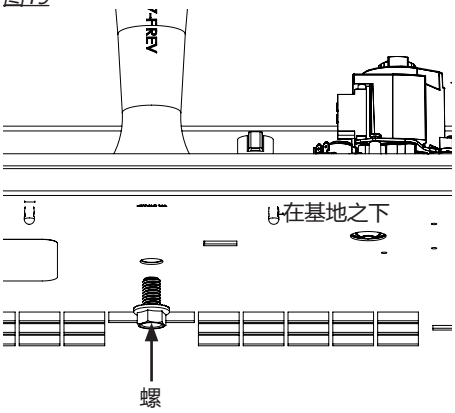
燃气控制阀与燃烧器节流孔

1. 按照列出的顺序拆除下列项目：
   -- 从燃气控制阀的入口拆除燃气软管和沉积物捕集器。
   -- 带垫圈的螺栓将燃气歧管，燃烧器和加热器底座连在一起。见图19。

2.酌情将燃气阀门与歧管提起并转动，让燃烧器节流孔脱离燃烧器。见图19。

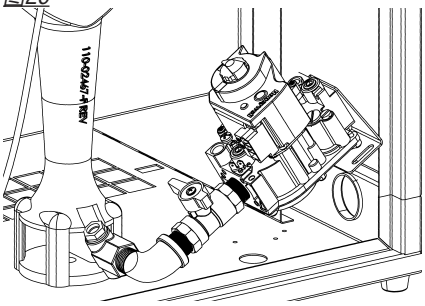
3.酌情更换部件。

图19



www.lbwhite.com

图20



燃气压力检查

⚠ 警告

- 请勿拆解燃气控制阀。
- 请勿试图更换燃气控制阀的任何部件。
- 倘若燃气控制阀总成有任何实际损伤，则必须整个更换该阀。
- 失于遵从本警告将导致起火或爆炸，从而造成财产损失或人身伤亡。

- 下面解释了检查燃气压力的典型程序。
- 取决于燃料类型，燃气压力会有不同。
- 请查看育雏取暖器上的参数标牌或本手册第4页，找到本程序应使用的具体压力数值。
- 在燃气阀门入口处测得的燃气压力为入口压力，在燃气阀门出口处测得的燃气压力为燃烧器歧管压力。

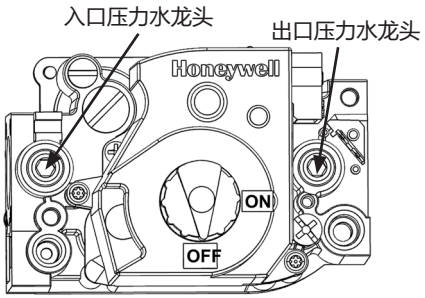
A. 准备

1. 取得两个能够测量至少9千帕的压力表。
2. 把育雏取暖器与电源断开，关闭至育雏取暖器入口的燃料供应阀门。
3. 打开燃烧器检修面板。
4. 用刷子或压缩空气清除燃气控制阀上及附近的任何粉尘与污物。

B. 仪表安装

1. 找到入口压力与出口压力抽头（见图21）。用3/16英寸内六角扳手取下压力抽头塞。

图21



2.在每个压力抽头上可靠连接一个压力表。

3.打开通往育雏取暖器的燃料供应阀门，重新接通育雏取暖器的供电。

4.启动育雏取暖器。

C. 读取压力

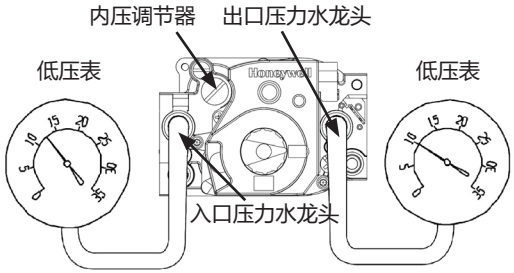
1.在育雏取暖器运转中，这些压力表的读数应与参数标牌上的规定压力相符。

2. 入口和出口压力表的读数是否都与参数标牌上的规定压力相符？如果都符合，则无需进一步检查或调整。请转到第D节。

3. 倘若入口压力与参数标牌上的规定数值不符，则控制向育雏取暖器供气压力的调压阀需要调整。

4. 倘若入口压力正确，但燃烧器歧管压力与参数标牌上的规定数值不符，则燃气控制阀的内部压力调压阀需要调整。调压阀的位置见图21。

图21



示例见丙烷气压(水柱英寸)。 始终参据板上力。

D. 完成

1.一旦适当的入口压力和燃烧器歧管压力得到证实和（或）适当设置，关闭通往暖风机的燃料供应阀门，让育雏取暖器烧完燃气供应管线内剩余的燃气。

2. 把育雏取暖器与电源断开。

3. 拆除这些压力表及连接软管。

4. 装回压力抽头塞并牢靠旋紧。检查有无燃气泄漏。

故障检修指南

开始故障检修前请通读本节。

⚠ 警告

触电与烧伤危险

- 对本系统进行故障检修可能需要对育雏取暖器进行带电通气操作。在育雏取暖器上工作时要极其小心。
- 失于遵从本警告能够造成财产损失和人身伤亡。

后面几页上的故障检修流程图提供了隔离设备问题的系统程序。这些图仅供合格的燃气育雏取暖器维修人员使用。除非您曾经得到适当培训，否则请勿维修这些育雏取暖器。

必要的测试设备

为了用最少的时间和精力来检修本育雏取暖器，您将需要下列测试设备。

- 数字万用表 - 用于测量交流和直流电压及电阻。
- 微安诊断套件- （零件号：08507）当与标准数字万用表合用时，此套件可以测试直接点火系统上的火焰传感器
- 低压压力表（00764）用于按照参数标牌额定值检查燃气控制阀的入口与出口压力。

初始准备

- 目视检查育雏取暖器有无任何明显损伤。
- 检查全部导线有无松动的接头和磨损的绝缘层。

参阅本节中的系统动作序列，弄懂育雏取暖器在收到供暖信号时如何运作。弄懂点火模块和相关部件的动作序列很有必要，因为这直接关系到如何按照流程图解决问题

点火控制模块具有自诊断能力。取决于诊断出来的问题，该模块上的红色指示灯将按照特定模式闪光。为了有效地使用流程图，您必须首先确定LED（发光二极管）诊断指示灯的闪光模式指明了什么问题。倘若该指示灯在闪光，其闪光模式之后会有一个停顿，然后会重复该闪光模式，直至有关问题得到纠正。在检修任何问题时，请从下表中找到要参考的页号。

问题 页
需要加热时，指示灯未亮起.....23
需要加热时，指示灯亮起.....24

LED诊断指示灯在闪光：
A. 闪光灯(AW型号).....24
B. 一度 24
C. 两次 25
D. 三次 26
E. 四次.....27
F. 五次 27

只有在完成了每个步骤且流程图中建议要更换时，才应更换部件。

www.lbwhite.com

直接点火动作序列：

-- 正常运行时，红色LED灯不会亮起。
-- 线电压被发送至变压器
-- 变压器的端子将线电压分流到点火控制盒上的L1端子。
-- 变压器把线电压降至交流24伏。
-- 需要运行时，交流24伏发送至恒温器。
-- 恒温器闭合，交流24伏回到点火控制盒。
-- (AW型号）点火控制盒由FS端子发送火焰感测电流至火焰探针。
-- 点火控制模块执行安全自检。
-- 空气验证电路已测试
-- 控制装置将 24 VAC 从端子 PSI 发送到空气检验开关。
-- 点火控制模块开始进行点火序列。
-- 点火控制盒由MOTOR端子向加热器的电机输出电压。
-- 电机开始运行。
-- 空气验证开关关闭，24 VAC 返回到点火控制端子 PSO。

（AW型号）
--电机停止
--点火控制模块向热表面点火棒输出电压。
--点火棒在17秒内达到点火温度。
--点火控制盒重启电机。

（AD型号）
--点火控制盒向点火器输送电压，点火器产生电火花。

（两种型号）
--点火控制盒由GV端子输送交流24伏至高限开关。
-- 燃气控制阀开启点火。
-- 火焰感测电流穿过燃烧器火焰后返回到点火控制盒。
-- 点火器继续通电，直至点火控制盒证实火焰感测
-- 点火器关闭。
-- 燃气控制阀保持开启。
-- 室内逐渐达到希望的温度。
-- 恒温器条件得到满足。
-- 育雏取暖器关闭。
-- 整个过程会在需要供暖时重新开始。

多次试点火序列：

--点火控制系统将会进行三次点火尝试。
--如果点火三次后，仍未感测到火焰，点火控制系统进入安全锁闭状态（3闪模式）。
--电磁阀关闭。
--电机停止。
--再次启动点火，需要将加热器电源断开，再次接通。

AW型号
--90秒内进行三次点火尝试。

AD型号
--45秒内进行三次点火尝试。

启动加热时，指示灯亮起
--空气压力开关提前闭合了或者加热器启动时还是断开的状态。
--点火控制盒处于1分钟锁定期。
--控制系统还会进行两次点火尝试。
--如果三次尝试以后，问题持续存在，红色指示灯将会出现1次或者2次闪烁。见第24、25页闪烁代码。

DSI 点火控制器
（Capable Controls 控制板）

控制器通过发送和接收电压来操作各部件或验证其运行。如需对控制器进行电压检查，请参阅以下说明及图 20，了解点火控制器的端子标识。

120 (LINE)：火线，控制板 120V 电源
BLOWER：鼓风机，由控制板送至电机（或继电器）的 120V 电源。
APS：由气流开关送至控制板的 24V 电压
GND：公共接地
MV：送至高温限制开关的 24V 电压
24V：来自变压器的 24V 电压
ALARM：报警，24V，LED
FLAME SIGNAL (FV+ FV-)：火焰信号，未使用
SPARK：点火，点火变压器，1/4 英寸公插片

如需了解加热请求期间点火控制器的运行情况，另请参阅本手册中的“运行顺序”。

图22

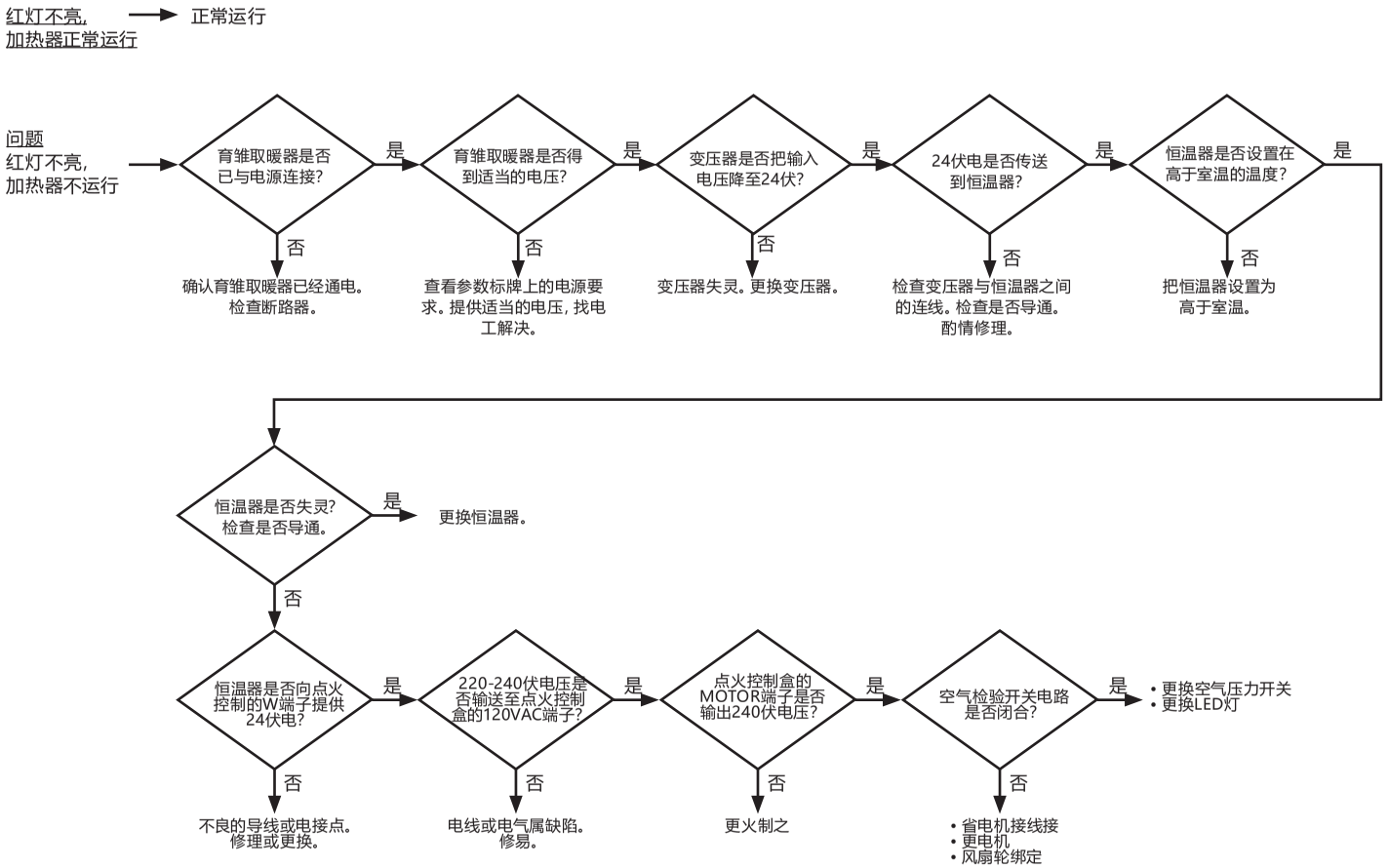


运行顺序：
-- 正常运行期间，故障诊断红色 LED 不亮。
-- 线路电压送至变压器
-- 变压器端子将线路电压分接至点火控制器的 120/230VAC (LINE) 端子。
-- 变压器将线路电压降至 24 VAC。
-- 如适用，24 VAC 送至温控器。
-- 温控器闭合，将 24 VAC 回送至点火控制器的 24 VAC 端子。
-- 点火控制模块执行安全自检。
-- 测试气压验证电路
-- 来自变压器的 24 VAC 送至气压开关 (APS)。
-- 点火控制模块开始点火尝试程序。
-- 点火控制器从 BLOWER 端子向加热器电机发送 120 伏电压。
-- 电机启动。
-- 气压开关闭合，24 VAC 送至点火控制器的 APS 端子。
-- 点火控制器为点火器供电，点火器产生火花。
-- 点火控制器从 MV 端子向高温限制开关发送 24 VAC。
-- 如高温限制开关触点闭合，则由其向燃气控制阀提供 24 VAC
-- 燃气控制阀打开
-- 实现点火。
-- 火焰检测电流经燃烧器火焰传回点火控制器。
-- 点火器保持通电，直至点火控制器确认检测到火焰
-- 点火器停止打火。
-- 燃气控制阀保持打开
-- 室内升温至设定温度。
-- 温控器达到设定温度。
-- 加热器关机。
-- 再次发出加热请求时，重复上述过程。点火

控制板将进行 3 次点火尝试。
-- 如未能点火，控制板将进入锁定状态并显示闪烁 3 次的代码。
-- 如需重试，请先关闭再重新开启加热器。加

热/通风选择开关 LED：
-- LED 亮：加热器处于加热模式，将正常运行。
-- LED 灭：加热器处于通风或关闭位置，或
-- 变压器无 24VAC 输出

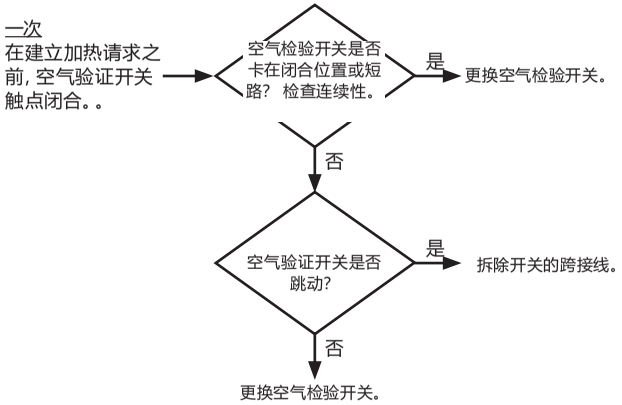
www.lbwhite.com

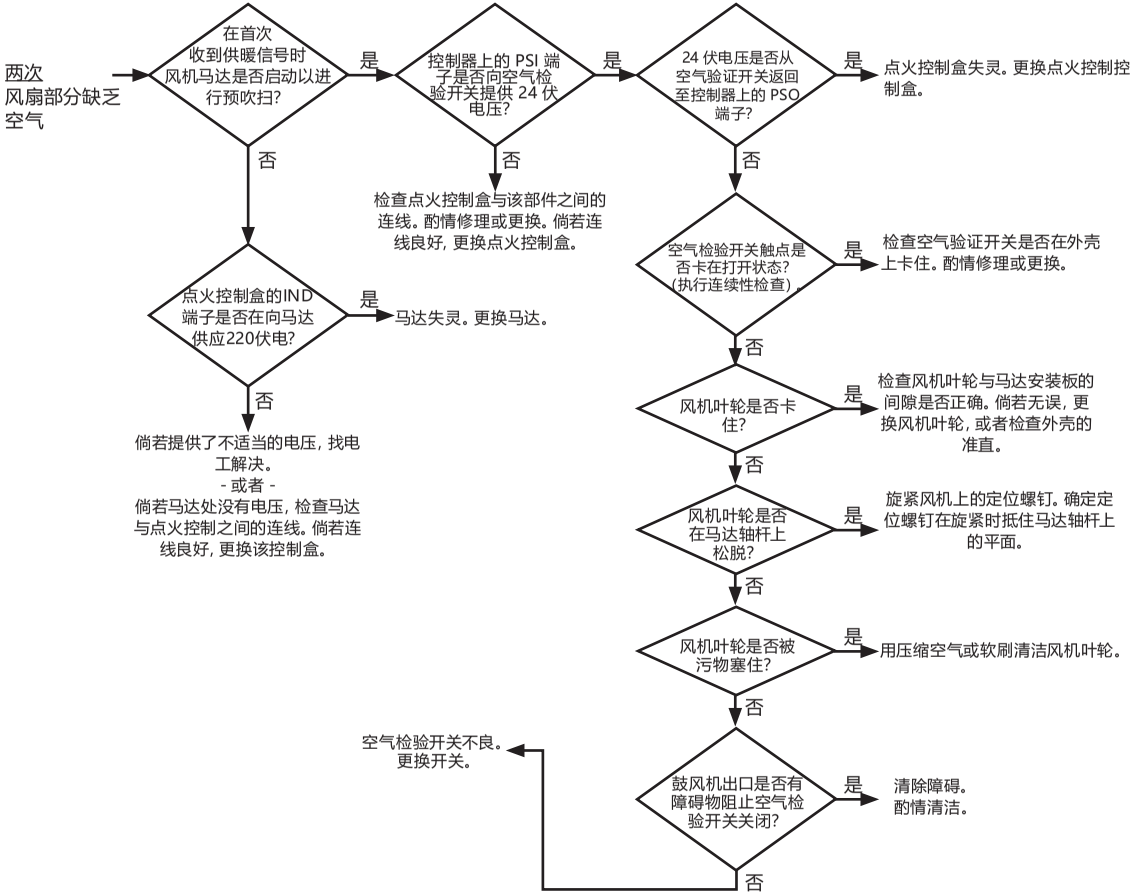

红灯不亮，
加热器正常运行
正常运行
问题
红灯不亮，
加热器不运行
育雏取暖器是否已与电源连接?
是
育雏取暖器是否得到适当的电压?
是
变压器是否把输入电压降至24伏?
是
24伏电是否传送到恒温器?
是
恒温器是否设置在高于室温的温度?
是
否
确认育雏取暖器已经通电。检查断路器。
否
查看参数标牌上的电源要求。提供适当的电压，找电工解决。
否
变压器失灵。更换变压器。
否
检查变压器与恒温器之间的连线。检查是否导通。酌情修理。
否
把恒温器设置为高于室温。
恒温器是否失灵?检查是否导通。
是
更换恒温器。
否
恒温器是否向点火控制的W端子提供24伏电?
是
220-240伏电压是否输送至点火控制盒的120VAC端子?
是
点火控制盒的MOTOR端子是否输出240伏电压?
是
空气检验开关电路是否闭合?
是
• 更换空气压力开关
• 更换LED灯
否
不良的导线或电接点。修理或更换。
否
电线或电气属缺陷。修易。
否
更火制之
否
• 省电机接线接
• 更电机
• 风扇轮绑定

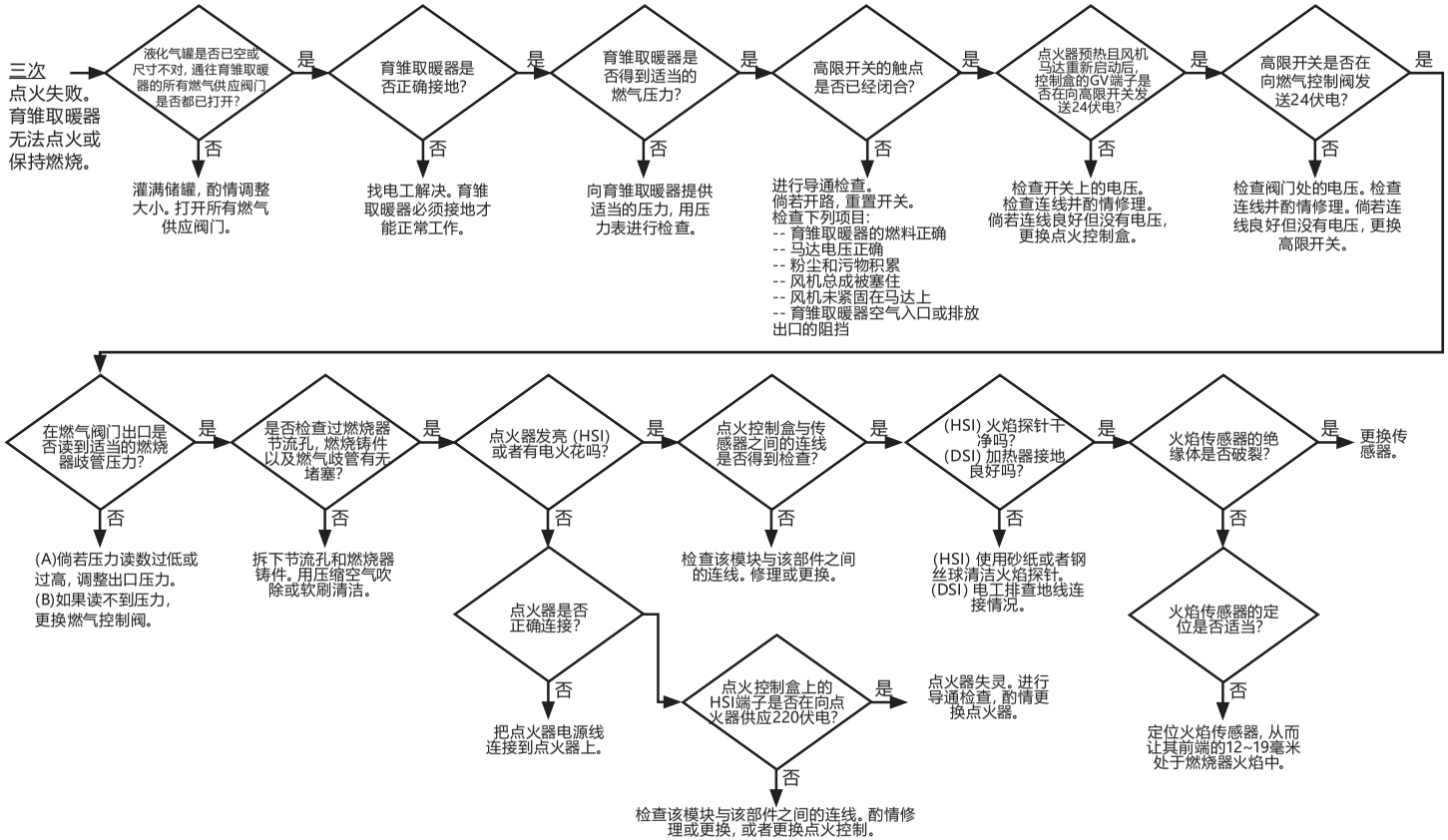
指示灯闪光

快速闪烁 → 调换极性。找电工检查育雏取暖器所用插座的零线与火线连接是否正确。

红灯亮，
加热器不运行 → 空气压力开关提前闭合或者在预扫风阶段保持断开。加热器会进行三次点火尝试，包括1分钟的锁定间隔期。三次尝试之后，加热器的LED指示灯将会出现1次或者2次闪烁模式。




两次
风扇部分缺乏
空气
在首次
收到供暖信号时
风机马达是否启动以进
行预吹扫?
是
否
控制器上的 PSI 端
子是否向空气检
验开关提供 24 伏
电压?
是
否
检查点火控制盒与该部件之间的
连线。酌情修理或更换。倘若连
线良好，更换点火控制盒。
24 伏电压是否从
空气验证开关返回
至控制器上的 PSO
端子?
是
点火控制盒失灵。更换点火控制控
制盒。
否
空气检验开关触点是
否卡在打开状态?
(执行连续性检查)
是
检查空气验证开关是否在外壳
上卡住。酌情修理或更换。
否
风机叶轮是否卡
住?
是
检查风机叶轮与马达安装板的
间隙是否正确。倘若无误，更
换风机叶轮，或者检查外壳的
准直。
否
风机叶轮是否
在马达轴杆上
松脱?
是
旋紧风机上的定位螺钉。确定定
位螺钉在旋紧时抵住马达轴杆上
的平面。
否
风机叶轮是否被
污物塞住?
是
用压缩空气或软刷清洁风机叶轮。
否
鼓风机出口是否有
障碍物阻止空气检
验开关关闭?
是
清除障碍。
酌情清洁。
否
空气检验开关不良。
更换开关。
点火控制盒的IND
端子是否在向马达
供应220伏电?
是
马达失灵。更换马达。
否
倘若提供了不适当的电压，找电
工解决。
- 或者 -
倘若马达处没有电压，检查马达
与点火控制之间的连线。倘若连
线良好，更换该控制盒。

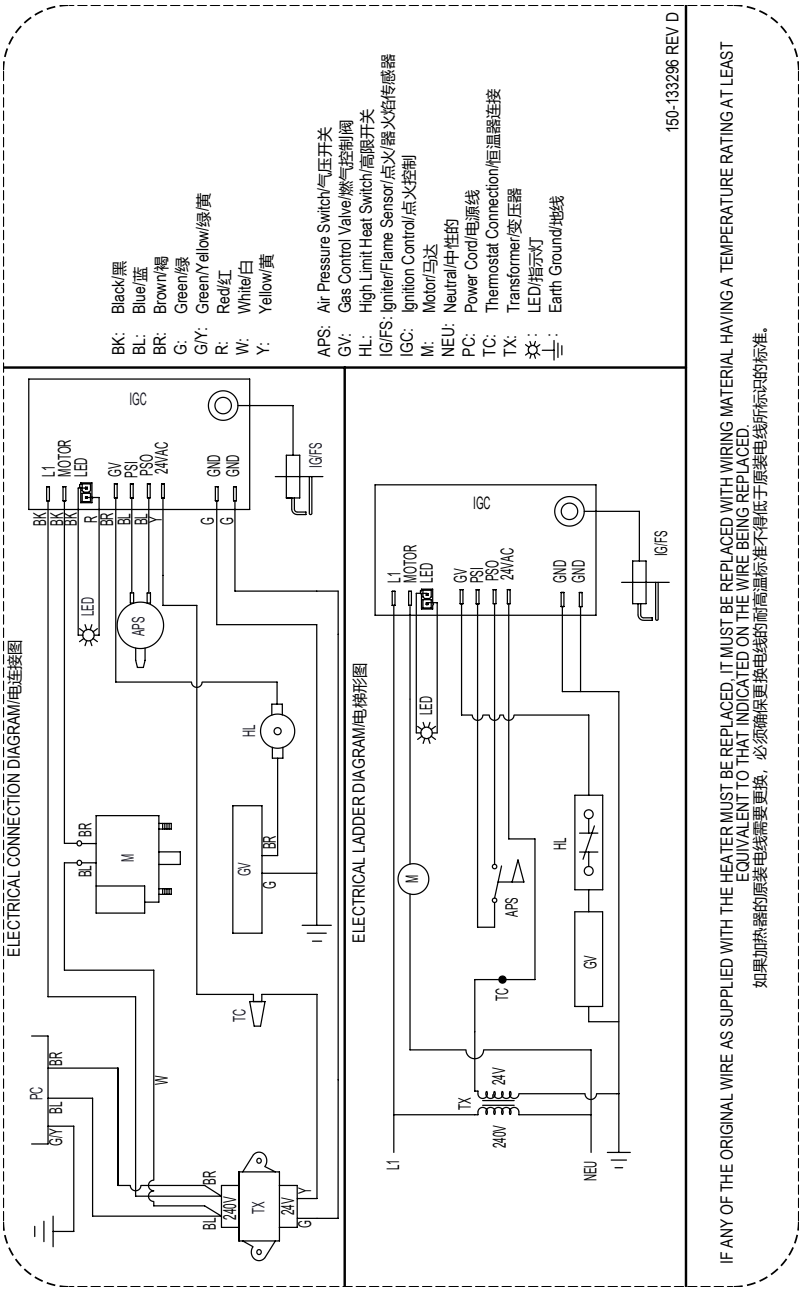

三次点火失败。育雏取暖器无法点火或保持燃烧。
液化气罐是否已空或尺寸不对，通往育雏取暖器的所有燃气供应阀门是否都已打开?
是
否
灌满储罐，酌情调整大小。打开所有燃气供应阀门。
育雏取暖器是否正确接地?
是
否
找电工解决。育雏取暖器必须接地才能正常工作。
育雏取暖器是否得到适当的燃气压力?
是
否
向育雏取暖器提供适当的压力，用压力表进行检查。
高限开关的触点是否已经闭合?
是
否
进行导通检查。
倘若开路，重置开关。
检查下列项目:
-- 育雏取暖器的燃料正确
-- 马达电压正确
-- 粉尘和污物积累
-- 风机总成被塞住
-- 风机未紧固在马达上
-- 育雏取暖器空气入口或排放出口的阻挡
点火器预热且风机马达重新启动后，控制盒的GV端子是否在向高限开关发送24伏电?
是
否
检查开关上的电压。
检查连线并酌情修理。
倘若连线良好但没有电压，更换点火控制盒。
高限开关是否在向燃气控制阀发送24伏电?
是
否
检查阀门处的电压。检查连线并酌情修理。倘若连线良好但没有电压，更换高限开关。
在燃气阀门出口是否读到适当的燃烧器歧管压力?
是
否
(A)倘若压力读数过低或过高，调整出口压力。
(B)如果读不到压力，更换燃气控制阀。
是否检查过燃烧器节流孔，燃烧铸件以及燃气歧管有无堵塞?
是
否
拆下节流孔和燃烧器铸件。用压缩空气吹除或软刷清洁。
点火器发亮 (HSI) 或者有电火花吗?
是
否
点火器是否正确连接?
否
把点火器电源线连接到点火器上。
点火控制盒上的HSI端子是否在向点火器供应220伏电?
是
点火器失灵。进行导通检查，酌情更换点火器。
否
检查该模块与该部件之间的连线。酌情修理或更换，或者更换点火控制。
点火控制盒与传感器之间的连线是否得到检查?
是
否
检查该模块与该部件之间的连线。修理或更换。
(HSI) 火焰探针干净吗?
(DSI) 加热器接地良好吗?
是
否
(HSI) 使用砂纸或者钢丝球清洁火焰探针。
(DSI) 电工排查地线连接情况。
火焰传感器的绝缘体是否破裂?
是
更换传感器。
否
火焰传感器的定位是否适当?
否
定位火焰传感器，从而让其前端的12~19毫米处于燃烧器火焰中。

四次 → 火焰检测不良，检查所有地线连接情况。确保火焰探针固定良好。清洁探针，检查接线情况。

五次 → 重置面板。如果无法重置，更换面板。（面板内部故障），请电工检查电源供应情况。（电频、线路干扰或者浪涌）

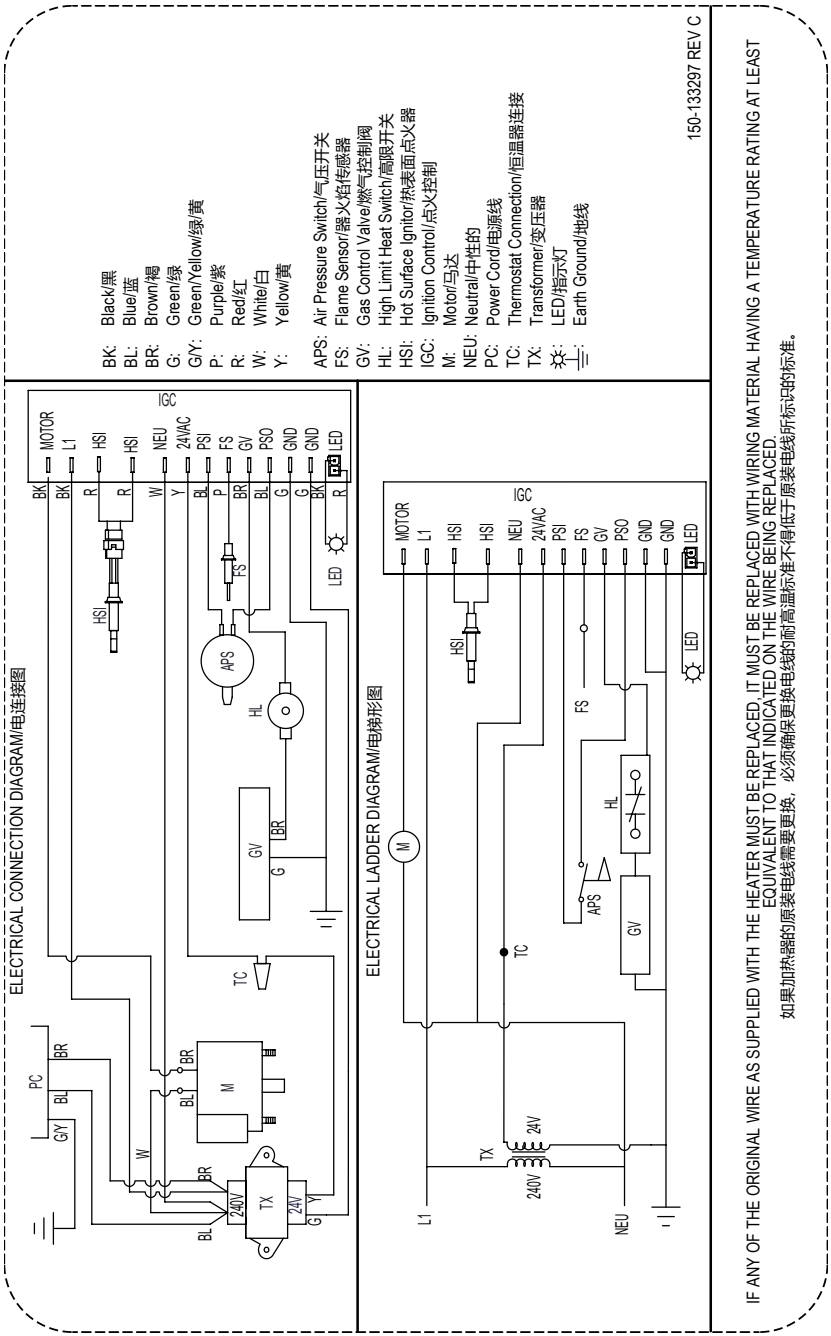
电连接与梯形图

AD060/AD100/AD250 接线图： (Capable Controls 控制板)

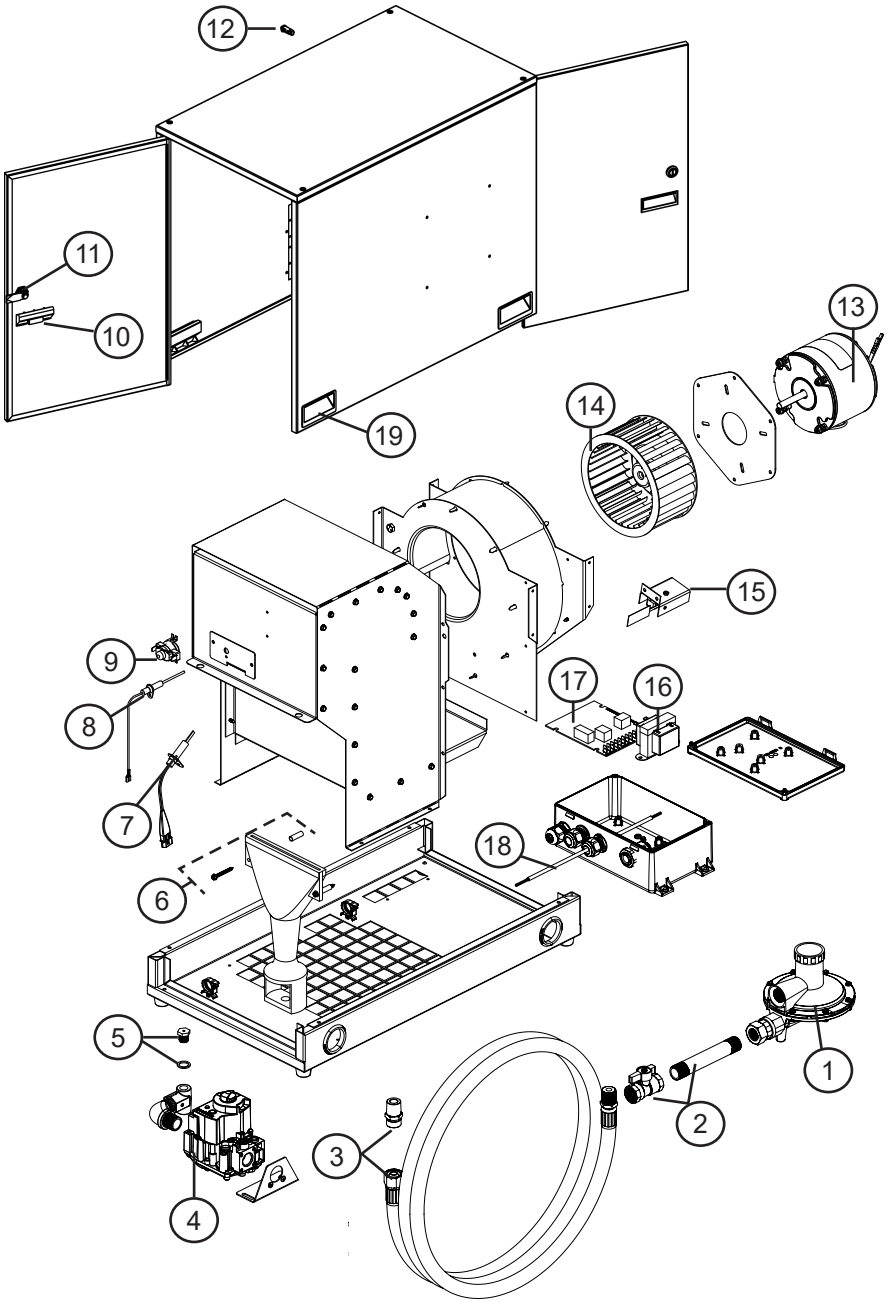


www.lbwhite.com

电连接与梯形图 - AW250



维修零件识别示意图
所示为 Guardian 100 HSI 模型



www.lbwhite.com

零件清单

Item	Description		Guardian 60	Guardian 100	Guardian 250
1	*二级减压阀, 液化气, 侧面放空		550-06665		
	*二级减压阀, 液化气, 出口上放空		550-06553		
	*减压阀, 天然气		500-07087		500-24414
2	*球阀和直管		500-03399		
3	*软管, 通用, 1/2英寸x10英尺, 带转接头		500-23160		
4	燃气控制阀	液化气	522076		
		天然气	522078		
		丁烷丙烷	不适用		572857
5	燃烧器喷嘴	液化气	574512	574514	574517
		天然气	574513	574516	574303
		丁烷丙烷	N/A		574522
6	燃烧器固定五金件		570211		
7	点火棒	AD	574196		
		AW	不适用		573762
8	火焰传感器	AW	不适用		574284
	点火棒线缆 (无图示)	AD United Technologies	574285		574286
		AD Capable Controls	574753		
9	高限开关		572501		573099
10	把手		574124		
11	门闩		574162		
12	红色LED		571333		
13	电机	50 Hz	572971	571929	571902
		60 Hz		573549	572334
14	风轮	50 Hz	572969	571928	570481
		60 Hz	570230	570304	
15	空气检验开关		574519	574520	574519
16	变压器		574290		
17	控制盒	AD Capable Controls	574678		
		AD United Technologies	574287		
		AW	不适用		574288
18	电源线		572329		
19	手柄、外壳、背面和正面		不适用	不适用	574450

*可选配件

AW-热表面点火型号

AD-电火花点火型号

保修原则

设备
美国L.B. White保证其设备的零部件，在依照每台设备包含的安装与保养说明、安全指南及标签而适当安装、操作及保养的情况下，没有材料与工艺缺陷。倘若在自最终用户购买日期起12个月内，任何部件经认定有缺陷，美国L.B. White将依其选择，以美国威斯康星州奥纳拉斯卡FOB的形式用新的零件或设备修理或更换该有缺陷的零件或设备。

在L.B. White网站注册您的产品，就会让相应设备及其零部件自动有资格享受保修考虑。倘若产品未在L.B.White公司网站注册，则需要提供购买凭据副本以确定保修资格。倘若两者皆无，则保修期为自L.B. White公司发货日期起12个月。

零件
美国L.B.White保证，从该公司购买且用于适当之L.B.White公司设备的更换零件，自最终用户购买日期起12个月内没有材料与工艺缺陷。倘若某部件在其上已标记之日期码的12个月内经认定有缺陷，则保修自动有效。倘若缺陷的发生是在日期码的12个月后但在最终用户购买日期的12个月内，则需要提供购买凭据副本以确定保修资格。

前面阐明的保证为美国L.B. White公司的仅有保证；所有其他保证，包括任何默示保证或适销性或特定目的适用性，均明确否认。倘若任何默示保证由于依法行动未于此有效否认，该默示保证的期限为前述保证之时期。前面阐明的补救为据此之唯一且仅有补救。美国L.B. White公司不对与设备的销售、搬运或使用相关的任何附带或间接损害负责；并且在任何情况下，美国L.B. White公司与该设备相关的赔偿责任，包括基于过失或严格责任之索赔的责任，均限制在购买价格。

有些地区不允许限制默示保证的持续时期长度，因此上述限制可能对您不适用。有些地区不允许排除或限制附带或继发损害，因此上述限制或排除可能对您不适用。本保证赋予您特定依法权利，并且您可能有因地区不同而异的其他权利。

如要注册您的产品和确保享受到完整的保修，请访问http://www.lbwhite.com/product-registration网页。请准备好您要注册之产品的序号和型号。

Service

请洽当地的L.B.White产品经销商取得替换零件和服务。您也可拨001-608-783-5691致电美国L.B.White以得到协助，或寄电邮至customerservice@lbwhite.com与我们联系。联系时请确定准备好育雏取暖器的型号和配置编号。

全球供应商 - 创新气候解决方案
411 Mason Street, Onalaska, WI 54650
001-608-783-5691 • 608-783-5691
608-783-6115 (传真)

www.lbwhite.com