



# ***Hot Surface Ignition***

***Agricultural Animal Confinement Building Heaters***

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## ***Installation and Service Guide***



***Quality heaters you can count on.***

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150-21516

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The purpose of this Service Guide is to provide detailed instructions and information for the installation, maintenance, troubleshooting and repair of L.B. White hot surface ignition agricultural heaters. By consulting specific sections within the guide, you will become acquainted with components and operation of the equipment as well as proper procedures to use during trouble analysis and repair. Parts illustrations and information for all L.B. White hot surface ignition heaters is included. Illustrations in the various sections may not necessarily depict the actual heater model and are intended for reference only.

It is very important when using the guide to pay particular attention to any Warning or Caution statements printed throughout the guide, identifying areas where care must be exercised.

This Service Guide covers the majority of problems which may arise. However, as with any product, certain problems may be encountered which have not been covered. If such problems arise, please call Technical Service at 1-800-345-7200 from 7:00 a.m. to 5:00 p.m. Central Standard Time to address these problem areas.

It is L.B. White's policy to continually upgrade our service network, therefore, new ideas and comments are welcomed for incorporation into this guide.

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### GENERAL HAZARD WARNING

- Failure to comply with the precautions and instructions provided within this guide, 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 Service Guide before installing or servicing this heater.
- Only properly-trained service people should repair or install L.B. White heaters.
- Replacement labels are available at no charge. For assistance, contact L.B. White at 1-800-345-7200.



### WARNING

- Proper gas supply pressure must be provided to the inlet of the heater.
- Refer to dataplate for proper gas supply pressure.
- Gas pressure in excess of the maximum inlet pressure specified at the heater inlet can cause fires or explosions.
- Fires or explosions can lead to serious injury, death, building damage or loss of livestock.
- Gas pressure below the minimum inlet pressure specified at the heater inlet may cause improper combustion.
- Improper combustion can lead to asphyxiation or carbon monoxide poisoning and therefore serious injury or death to humans and livestock.



### WARNING

#### Fire and Explosion Hazard

- Not for home or recreational vehicle use.
- Installation of this heater in a home or recreational vehicle may result in a fire or explosion.
- Fire or explosions can cause property damage or loss of life.

#### FOR YOUR SAFETY

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

#### FOR YOUR SAFETY

If you smell gas:

- Open windows.
- Don't touch electrical switches.
- Extinguish any open flame.
- Immediately call your gas supplier.



### WARNING

#### Fire and Explosion Hazard

- Keep solid combustibles a safe distance away from the heater.
- Solid combustibles include wood or paper products, feathers, straw, and dust.
- Do not use the heater in spaces which contain or may contain volatile or airborne combustibles.
- Volatile or airborne combustibles include gasoline, solvents, paint thinner, dust particles or unknown chemicals.
- Failure to follow these instructions may result in a fire or explosion.
- Fire or explosions can lead to property damage, personal injury or loss of life.

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## Basic Unit Description and Application

Hot surface ignition agricultural building heaters are direct-fired, non-vented heaters used in the heating of animal confinement buildings (examples: swine, chicken, and turkey). These heaters utilize a system that ignites the gas by surface temperature of the igniter rather than by direct spark or pilot flame. All models include a microprocessor based control module. This module controls the operation of the heater and also monitors the safety devices. The module incorporates diagnostics to aid in troubleshooting and repair of the heater.

As a non-vented heater, adequate ventilation must be provided to ensure fresh air for combustion and removal of combustion by-products from the building.

This style of heater is offered in a wide range of input ratings, some with variable heat control, to help manage heating needs efficiently.

All heaters referred to in this guide may be mounted inside the building at appropriate locations to help provide proper warm air flow in the room being heated. Models beginning with the letters "AW" may also be mounted outside, using the appropriate outdoor kit.

## Key Markings; Purpose and Location

Markings constitute safety related information such as the dataplate, start-up/shut-down instructions, warnings, etc. that are applied on the heater to allow the qualified service person or end user to operate the heater in a safe manner.

Familiarize yourself with the location and content of all markings. Location may vary depending on model. If any markings are damaged or unreadable, replace the markings immediately. Contact the L.B. White Company.

### A. Dataplate

#### *Purpose:*

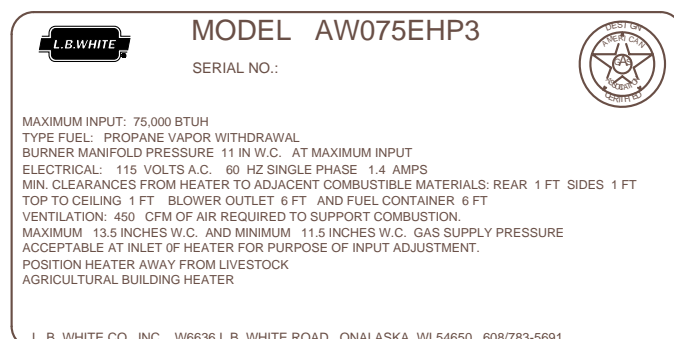
Used for identification of model number, and configuration number and also critical information such as safe clearances to combustibles, burner manifold pressure, maximum and minimum allowable inlet pressures, etc.

#### *Typical Location:*

Interior of burner end access panel or fan motor access panel.

#### *Part No.:*

Varies with design sequence and model number. Contact L.B. White Co.



### B. Start Up and Shut Down Procedures

#### *Purpose:*

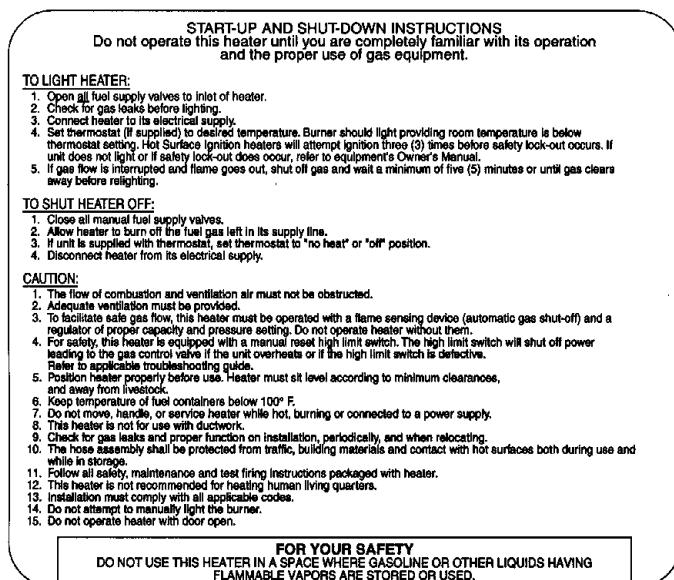
Provides the basic information to safely start up and shut down the heater and also provides cautionary information relative to various safety aspects of installation and application.

#### *Typical Location:*

Next to dataplate.

#### *Part No.:*

150-21304



## Heater Specifications

			Model						
SPECIFICATIONS	AW060		AW100		AW250		AW325		
	L.P. Gas	Natural Gas	L.P. Gas	Natural Gas	L.P. Gas	Natural Gas	L.P. Gas	Natural Gas	
Maximum Input (BTUH)	60,000		100,000		250,000		325,000		
Minimum Input (BTUH)	30,000		50,000		160,000		200,000		
Ventilation Air Required to Support Combustion	240 CFM		400 CFM		1,050 CFM		1,700 CFM		
Inlet Gas Supply Pressure Acceptable at the Inlet of the Heater for Purpose of Input Adjustment	MAX. 13.5 in. W.C.								
	MIN.	11 in. W.C.	7 in. W.C.	11 in. W.C.	7 in. W.C.	11 in. W.C.	7 in. W.C.	11 in. W.C.	7 in. W.C.
Burner Manifold Pressure	10 in. W.C.	4 in. W.C.	10 in. W.C.	4 in. W.C.	10 in. W.C.	4 in. W.C.	8 in. W.C.	3.5 in. W.C.	
Fuel Consumption Per Hour	MAX.	2.78 lbs.	60 cu. ft.	4.63 lbs.	100 cu. ft.	11.58 lbs.	250 cu. ft.	15.05 lbs.	325 cu. ft.
	MIN.	1.39 lbs.	30 cu. ft.	2.32 lbs.	50 cu. ft.	7.41 lbs.	160 cu. ft.	9.26 lbs.	200 cu. ft.
Ball Bearing									
Motor Characteristics	1/15 H.P. 1700 RPM		1/8 H.P. 1100 RPM		1/3 H.P. 1100 RPM		1/2 H.P. 1100 RPM		
Electrical Supply (Volts/Hz/Phase)	115/60/1						220/60/1		
Amp Draw (Starting Amps Includes Igniter)	STARTING	7.0	7.5		11.8		10.5		
	CONTINUOUS OPERATION	1.1	1.4		4.5		3.5		
Dimensions (Inches) L x W x H	21 1/4 x 14 1/4 x 18		29 1/2 x 14 1/4 x 18		30 3/4 x 18 1/4 x 28 1/4		36 x 22 x 30		
Minimum Safe Distances From Nearest Combustible Materials	TOP				1 ft.				
	SIDES				1 ft.				
	BACK				1 ft.				
	BLOWER OUTLET				6 ft.				
	GAS SUPPLY				L.P. Gas Supply – 6 ft. (1.83 m) Natural Gas Supply – N/A				
Net Weight (lbs.)	52		65		116		150		
Shipping Weight (lbs.)	57		70		126		160		





## Heater Specifications

	Model								
SPECIFICATIONS	AB200		AW075		AW215		AW230		
	L.P. Gas	Natural Gas	L.P. Gas	Natural Gas	L.P. Gas	Natural Gas	L.P. Gas	Natural Gas	
Maximum Input (BTUH)	200,000		75,000		215,000		230,000		
Minimum Input (BTUH)	N/A		45,000		N/A		100,000		
Ventilation Air Required to Support Combustion	875 CFM		450 CFM		850 CFM		960 CFM		
Inlet Gas Supply Pressure Acceptable at the Inlet of the Heater for Purpose of Input Adjustment	MAX. 13.5 in. W.C.								
	MIN.	11.5 in. W.C.	7 in. W.C.	11.5 in. W.C.	7 in. W.C.	11.5 in. W.C.	7 in. W.C.	11 in. W.C.	7 in. W.C.
Burner Manifold Pressure	11 in. W.C.	4 in. W.C.	11 in. W.C.	4.5 in. W.C.	11 in. W.C.	4 in. W.C.	10 in. W.C.	4 in. W.C.	
Fuel Consumption Per Hour	MAX.	9.26 lbs.	200 cu. ft.	3.47 lbs.	75 cu. ft.	9.95 lbs.	215 cu. ft.	10.65 lbs.	230 cu. ft.
	MIN.	N/A	N/A	2.10 lbs.	45 cu. ft.	N/A	N/A	4.63 lbs.	100 cu. ft.
Ball Bearing									
Motor Characteristics	1/4 H.P. 1100 RPM		1/8 H.P. 1100 RPM		1/4 H.P. 1100 RPM		1/3 H.P. 1075 RPM		
Electrical Supply (Volts/Hz/Phase)	115/60/1								
Amp Draw (Starting Amps Includes Igniter)	STARTING	7.0	7.5		7.0		8.8		
	CONTINUOUS OPERATION	2.2	1.4		2.2		4.3		
Dimensions (Inches) L x W x H	21 1/4 x 14 1/4 x 18		29 1/2 x 14 1/4 x 18		30 3/4 x 18 1/4 x 28 1/4		36 x 22 x 30		
Minimum Safe Distances From Nearest Combustible Materials	TOP	1 ft.							
	SIDES	1 ft.							
	BACK	1 ft.							
	BLOWER OUTLET	6 ft.							
	GAS SUPPLY	L.P. Gas Supply — 6 ft. (1.83 m) Natural Gas Supply — N/A							
Net Weight (lbs.)	109		60		126		116		
Shipping Weight (lbs.)	125		66		135		126		

## Safety Precautions

### **WARNING** **Asphyxiation Hazard**

- Do not use this heater for heating human living quarters.
- Do not use in unventilated areas.
- The flow of combustion and ventilation air must not be obstructed.
- Proper ventilation air must be provided to support the combustion air requirements of the heater being used.
- Refer to the specification section of this guide, the heater's Owner's Manual, heater dataplate, or contact the L.B. White Company to determine combustion air ventilation requirements of the heater.
- Lack of proper ventilation air will lead to 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

LP gas and natural gas have man-made odorants added specifically for detection of fuel gas leaks.

If a gas leak occurs, you should be able to smell the fuel gas.

**THAT'S YOUR SIGNAL TO GO INTO IMMEDIATE ACTION!**

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

## ODOR FADING -- NO ODOR DETECTED

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

## ATTENTION -- CRITICAL POINTS TO REMEMBER!

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



## Safety Precautions

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

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

- a. To be a qualified gas heater service person, you must have sufficient training and experience to handle all aspects of gas-fired heater installation, service and repair. This includes the task of installation, troubleshooting, replacement of defective parts and testing of the heater. You must be able to place the heater into a continuing safe and normal operating condition. You must completely familiarize yourself with each model heater by reading and complying with the safety instructions, labels, Owner's Manual, etc., that is provided with each heater.
  - b. To be a qualified gas installation person, you must have sufficient training and experience to handle all aspects of installing, repairing and altering gas lines, including selecting and installing the proper equipment, and selecting proper pipe and tank size to be used. This must be done in accordance with all local, state and national codes as well as the manufacturer's requirements.
2. All installations and applications of L.B. White heaters must meet all relevant local, state and national codes. Included are L.P. gas, natural gas, electrical, and safety codes. Your local fuel gas supplier, a local licensed electrician, the local fire department or similar government agencies, or your insurance agent can help you determine code requirements.
    - a. For U.S.A. installations and applications:
      - ANSI/NFPA 58, latest edition, Standard for Storage and Handling of Liquefied Petroleum Gas and/or
      - ANSI Z223.1/NFPA 54, National Fuel Gas Code
      - ANSI/NFPA 70, National Electrical Code.
    - b. For Canadian Installations and Applications:
      - CAN1-B149.1 or CAN1-B149.2 Installation Codes
      - CSA C22.1 Part 1 Standard Canadian Electrical Code. CSA C22.2 No. 3, Electrical Features of Fuel-Burning Equipment.
  3. Do not move, handle, or service heater while in operation or connected to a power or fuel supply.
  4. Observe and obey all instructional warnings pertaining to cleaning procedures which are located on the heater.
  5. For safety, this heater is equipped with a manual reset high-limit switch and an air proving switch. Never operate this heater with any safety device that has been bypassed. Do not operate this heater unless all of these features are fully functioning.
  6. Do not operate the heater with its door open or panel removed.
  7. Do not locate fuel gas containers or fuel supply hoses anywhere near the blower outlet of the heater.
  8. Do not block air intakes or discharge outlets of the heater. Doing so may cause improper combustion or damage to heater components leading to property damage or animal loss.
  9. The hose assembly shall be visually inspected on an annual basis. If it is evident there is excessive abrasion or wear, or if the hose is cut, it must be replaced prior to the heater being put into operation. The hose assembly shall be protected from animals, building materials, and contact with hot surfaces during use. The hose assembly shall be that specified by the manufacturer. See parts list.
  10. Check for gas leaks and proper function upon heater installation, before building repopulation or when relocating.
  11. This heater should be inspected for proper operation by a qualified service person before building repopulation and at least annually.
  12. Inform the customer to always turn off the gas supply to the heater if the heater is not going to be used in the heating of livestock.
  13. This heater is equipped with a three-prong (grounding) plug for your protection against shock hazard and must be plugged directly into a properly grounded three-prong receptacle. Failure to use a properly grounded receptacle can result in electrical shock, personal injury, or death.
  14. Hot surface ignition 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

## Safety Precautions

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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. Non-hanging heater installations that do not use an approved gas hose assembly must conform to local gas code requirements. In absence of local codes, follow ANSI/NFPA58, Standard for Storage and Handling of Liquefied Petroleum Gas.



### **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 heater. If during the installation or relocating of heater, you suspect that a part is damaged or defective, call a qualified service agency for repair or replacement.
2. For heaters intended for outdoor installation, the heater is to be installed at least 18 inches above the ground or to a height that would prevent snow blockage of heater's air inlet.
3. Certain heater models may be used either indoor only or indoors and outdoors. When the heater is mounted outdoors, use only the ductwork supplied in the outdoor mounting kit. Refer to the heater's dataplate or contact L.B. White to determine mounting type.
4. Insure that all accessories that ship within the heater have been removed from inside of heater and installed. This pertains to air diverters, hose, regulators, etc.
5. A qualified service agency must check for proper operating gas pressure upon installation of the heater.
6. L.B. White heaters can be configured for use with either L.P. gas vapor withdrawal or natural gas. Consult the dataplate, located on interior of the burner end or motor end access door, for the gas configuration of the specific heater. Do not use the heater in an L.P. gas liquid withdrawal system or application. If you are in doubt, contact the L.B. White Co., Inc.
7. 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.
8. Take time to explain to your customer how to operate and maintain the heater by using this Service Guide. Make sure your customer knows how to shut off the gas supply to the building and also to the individual heater. In the event of an emergency, have your customer contact you or the fuel gas supplier if you have any questions.
9. Any defects found in performing any of the service or maintenance procedures must be eliminated and defective parts replaced immediately. The heater must be retested by properly qualified service personnel before placing the heater back into use.
10. Do not exceed input rating stamped on the dataplate of the heater. Do not exceed the burner manifold pressure stated on the dataplate. Do not use an orifice size different than specified for the specific input rating of this heater, fuel type, configuration and altitude.

## Pipe Sizing

### GENERAL INFORMATION

Pipe sizing is critical to the proper operation of any gas heating system. However, piping is dependent on several factors:

1. Total gas load expressed in BTUH.
2. The gas pressure to be supplied through the piping system. This pressure may be expressed in pounds of pressure per square inch (psi) or inches of water column (W.C.).
3. Distance that the gas must travel to feed the heater furthest from the regulator.

This section provides a basic explanation of how to size piping for the heaters through the use of pipe sizing tables and a **typical** example. In all cases with this example, we will be using only pounds of pressure, expressed as 5 psi and not inches of water column.

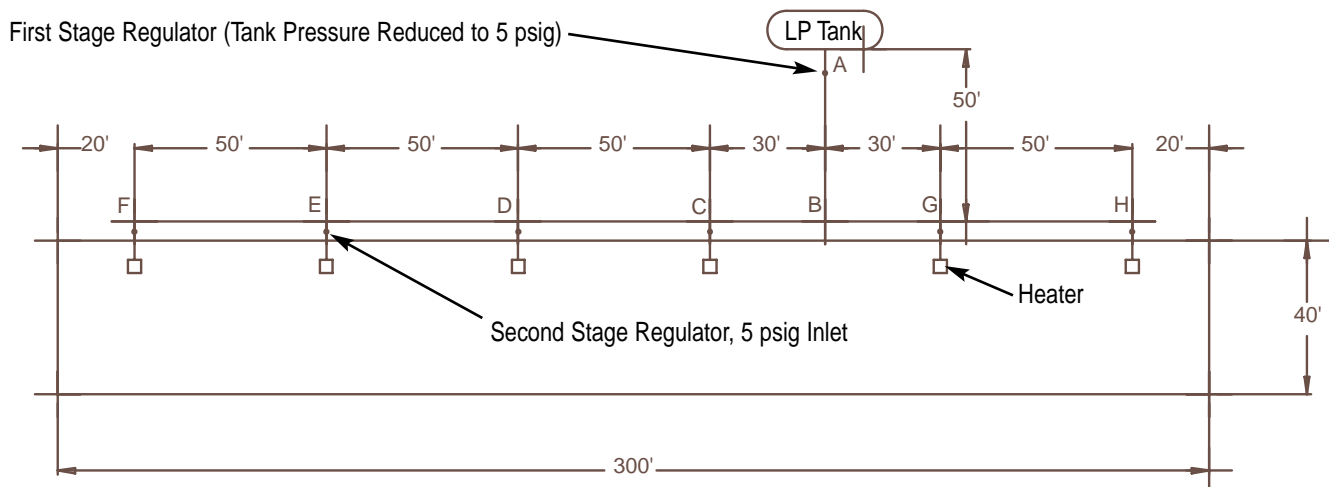
- a. Black iron pipe only was used in this example as it is less expensive per foot than copper tubing and, therefore, more commonly used. However, the same selection process using copper tubing may be done if so desired. Refer to appropriate pipe sizing tables for copper tubing. All pipe diameters given are measured in inner diameter (I.D.). Piping planning and installation must be done by an experienced, qualified LP gas installation agency.
- b. The minimum pipe size normally used in many situations is 1/2 in. nominal.

- c. The information in the pipe sizing tables was obtained from Engineered Control International, Inc., L.P. Gas Serviceman's Manual L545.
- d. Do not attempt gas supply line selection or installation unless you are properly trained and qualified.
- e. All gas supply lines must be leak checked after installation and when pressurized to provide a safe installation. Use only certified, approved leak detectors.
- f. This is one example showing how to size piping for a building. Installation layouts differ as do the pressures being supplied to piping, whether you are using for LP gas or natural gas and the material (pipe or copper tubing) being used.

### INSTRUCTIONS

- a. Determine total gas demand for entire system, by adding up BTUH input from heater dataplates and adding demand for any other gas-fired appliances and any future heaters.
- b. Measure the length of piping required from outlet of first-stage regulator to the appliance furthest away. No other length is necessary to do the sizing. In this example the distance from first-stage regulator to appliance furthest away is 230 ft.
- c. Make a sketch of the piping system and installation. See Fig. 1.

Fig. 1





### EXAMPLE

(Refer to Fig 2)

**IMPORTANT:** If exact length is not on chart, use next longer length. Select the size of pipe that shows at least as much capacity as needed for each piping section.

- Section A to B of pipe must supply the complete gas load of 1,500,000 BTUH for the entire building. Looking at the 5 PSIG sizing chart, the size of pipe used in conveying gas would need to be sized at 1 inch diameter pipe. Note that even though furthest distance from first stage regulator to appliance is 230 ft., we use the 250 ft. length.
- Section B to C must supply the load of 1,000,000 BTUH. Select 3/4 inch pipe for Section B to C.
- Section C to D must supply a load of 750,000 BTUH. Select 3/4 inch pipe for Section C to D.
- Section D to E must supply a load of 500,000 BTUH. Select 1/2 inch pipe.
- Sections E to F must supply 250,000 BTUH. Select 1/2 inch pipe.
- Sections B to C must supply 500,000 BTUH. Use 1/2 inch pipe.
- The final section, G to H, needs only 250,000 BTUH for gas usage. This section would use 1/2 inch pipe.

Fig. 2

### EXAMPLE

Perform pipe sizing for building.  
Total heat load is 1,500,000 BTUH.  
Quantity 6 - 250,000 BTUH heaters.  
Building is 300 ft. long x 40 ft. wide.

Section	BTUH Gas Load	LP Gas Pipe Size @ 5 PSIG
A - B	1,500,000	1 in.
B - C	1,000,000	3/4 in.
C - D	750,000	3/4 in.
D - E	500,000	1/2 in.
E - F	250,000	1/2 in.
B - G	500,000	1/2 in.
G - H	250,000	1/2 in.

### First Stage Pipe Sizing

5 PSIG Inlet with a 1 PSIG Pressure Drop

Maximum capacity of pipe or tubing, in thousands of BTU/hr. of LP Gas

**IMPORTANT:** If exact length is not on chart, use next longer length. Select the size of pipe that shows at least as much capacity as needed for each piping section.

Pipe Size (In Inches)	Length of Pipe or Tubing (In Feet)*									
	10	20	30	40	50	60	70	80	90	100
1/2	2946	2025	1626	1392	1233	1118	1028	957	897	848
3/4	6161	4234	3400	2910	2579	2337	2150	2000	1877	1773
1	11605	7976	6405	5482	4859	4402	4050	3768	3535	3339
1/2	125	150	175	200	225	250	275	300	350	400
3/4	751	681	626	583	547	516	490	468	430	400
1	1571	1424	1310	1218	1143	1080	1026	978	900	837
1	2956	2682	2467	2295	2153	2034	1932	1843	1696	1577

\* Total length of piping from outlet of first stage regulator to inlet of second stage regulator (or to inlet of second stage regulator furthest away).

## Tank Sizing

### ATTENTION

- The following is supplied for informational purposes only.
- Consult your LP gas supplier for specific requirements.

A tank is propane storage container ranging in size from 150 gallons to 10,000 gallons or larger. For agricultural heating applications, the tank sizes typically used are either 500 gallons or 1,000 gallons with 1,000 gallons being the most common. The size and quantity of tanks will vary and is dependent on the total heating load at the site.

In determining tank size and quantity, several factors apply:

- Total heat load of the building
  - To determine total load, add up the heat input (expressed in BTUH) for all gas-fired heaters,

pressure washers, water heaters, etc., that will be drawing vapor from the tanks.

— The heat input rating is located on the dataplate.

- The coldest outside air temperature at night that the tank(s) will be exposed to.
- Percentage of propane remaining in the tank prior to refill. Your fuel gas supplier will inform you at what level a refill will normally occur.

### IMPORTANT

- Minimum vaporization of propane from liquid to vapor occurs when temperatures are coldest and liquid level of propane in the tank is lowest.
- Size the quantity of tanks for the lowest temperature you can expect in your area.

Refer to the following table to identify the heat output of tanks at various temperatures and levels of fullness.

Tank Size (Gallons)	Outside Temps.	Percentage of Liquid Propane Remaining Prior to Refill							
		(Heat Input Expressed in BTUH)							
	° F.	80%	70%	60%	50%	40%	30%	20%	10%
500	0	532,800	488,400	444,000	400,000	355,000	311,000	266,000	200,000
	-5	399,600	366,300	333,000	300,000	262,500	233,250	199,500	150,000
	-10	266,400	244,200	222,000	200,000	177,500	155,500	133,000	100,000
	-15	132,200	122,100	111,000	100,000	88,750	77,750	66,500	50,000
1,000	0	949,000	870,100	791,000	712,000	633,000	553,000	474,000	356,000
	-5	711,900	652,575	593,250	534,000	474,750	414,750	355,500	267,000
	-10	474,600	435,050	395,500	356,000	316,500	276,500	237,000	178,000
	-15	237,300	217,525	197,750	178,000	158,250	138,250	118,500	89,000

NOTE: For above table, multiply the results obtained by one of the following factors if nighttime temperatures will not reach 0° F.:

Temperature	Multiplier
+5° F.	1.25
+10° F.	1.50
+15° F.	1.75
+20° F.	2.00

### EXAMPLE

- Select 1,000 gallon tank.
- Total heat load is 1,500,000 BTUH (6-AW250 Heaters).
- Coldest nighttime temperature is -10° F.
- Tanks to be refilled by LP gas supplier when liquid propane level is 30%.

D. To determine the total number of tanks required:

$$\frac{\text{Total Heat Load of Building}}{\text{Heat Output of 1,000 Gallon Tank}}$$

or

$$\frac{1,500,000 \text{ BTUH/Building}}{276,500 \text{ BTUH/Tanks}} = 5.4 \text{ Tanks (6 Tanks)}$$

### NOTE:

Always round up fractions or decimals. See example. (Example: 5.4 tanks = 6 tanks). This will give you some extra capacity especially in cold weather, in the event your LP gas supplier cannot refill your tanks immediately.

- A. In the 1,000 gallon tank sizing chart, locate -10° F. outside temperature.
- B. Locate the column which identifies 30% of propane remaining in the tank prior to refill.
- C. The intersection of these two variables identifies the heat input, in BTUH, that one 1,000 gallon tank can supply (see shaded area in table - 276,500 BTUH).



**Tank Location and Installation****ATTENTION**

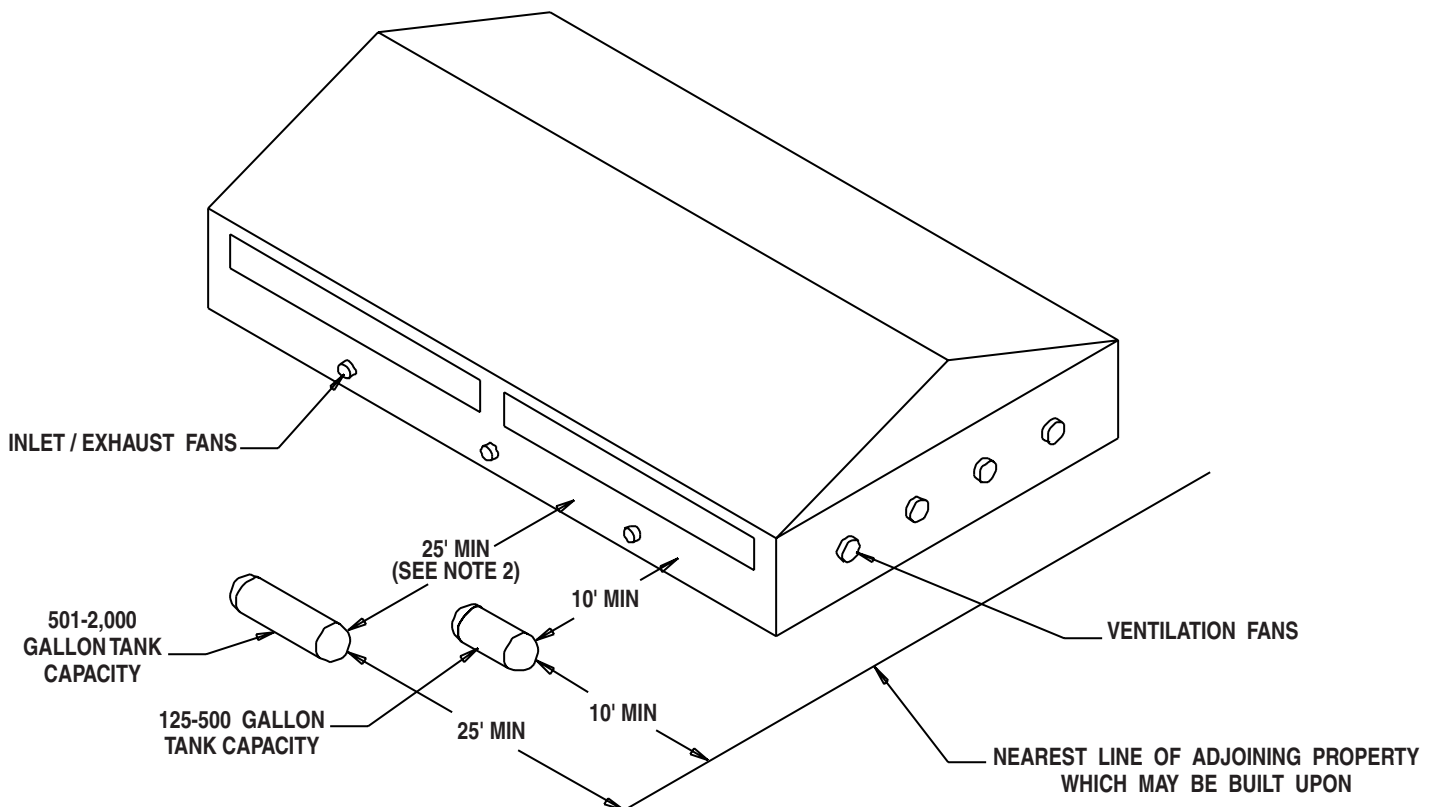
- The following is supplied for informational purposes only.
- Tank installation shall only be accomplished by a qualified LP gas installation person.
- State and local codes must be observed at all times.
- In absence of state and local codes, follow ANSI/NFPA58 Standard for Storage and Handling of Liquefied Petroleum Gases.

Once the proper size of the LP gas supply tank(s) has been determined, attention must now be given to the most convenient, yet safe, location of the tanks on the customer's property.

Tanks should be placed in a location pleasing to the customer that does not conflict with state or local regulations or NFPA 58 (Storage and Handling of Liquefied Petroleum Gases).

Generally, LP gas tanks should be placed in an accessible location for filling, supported by concrete of appropriate size and reinforcement, and located away from vehicular traffic. Where the tank may be subjected to abrasive action or physical damage due to vehicular traffic or other causes, it must be placed not less than two feet below grade, or otherwise protected against such physical damage.

Regardless of its size, attention must be paid to the tank distance from building openings, external sources of ignition, intakes to any outdoor mounted heaters, or mechanical ventilation systems. Refer to NFPA58 and the following illustration for the minimum distances that the LP gas tanks must be placed from the building or other objects.



**NOTE: 1. REGARDLESS OF SIZE, ALL TANKS FILLED ON SITE MUST BE LOCATED AT LEAST 10 FEET FROM NEAREST SOURCE OF IGNITION (FANS, HEATERS, ETC.)**

**2. THIS DISTANCE MAY BE REDUCED TO NO LESS THAN 10' FOR A SINGLE CONTAINER OF 1200 GALLON CAPACITY OR LESS, PROVIDED THAT THE CONTAINER IS AT LEAST 25' FROM ANY OTHER L.P. GAS CONTAINER OF MORE THAN 125 GALLON CAPACITY.**

**3. DISTANCE FROM TANK TO BUILDING FOR TANKS OF 2,001-30,000 GALLON CAPACITY IS 50 FEET.**

## LP Gas Tank Manifolding

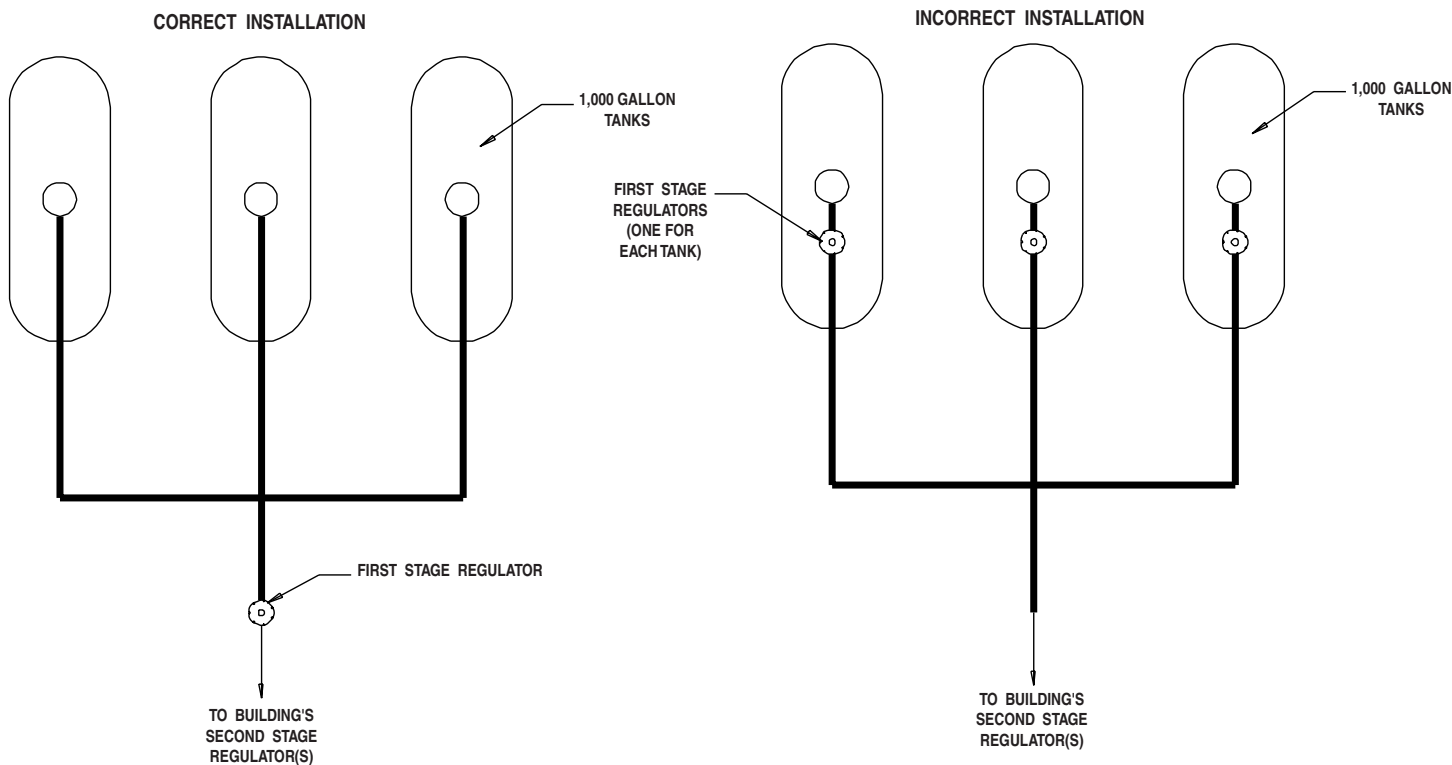
### ATTENTION

- The following is supplied for informational purposes only.
- Tank manifolding shall only be accomplished by a qualified LP gas installation person.
- Local and state codes must be observed at all times.
- In absence of state and local codes, follow ANSI/NFPA58 Standard for Storage and Handling of Liquefied Petroleum Gases.

It has been a long-standing industry practice to manifold two or more LP gas storage tanks together in order to increase gas system vaporization capacity.

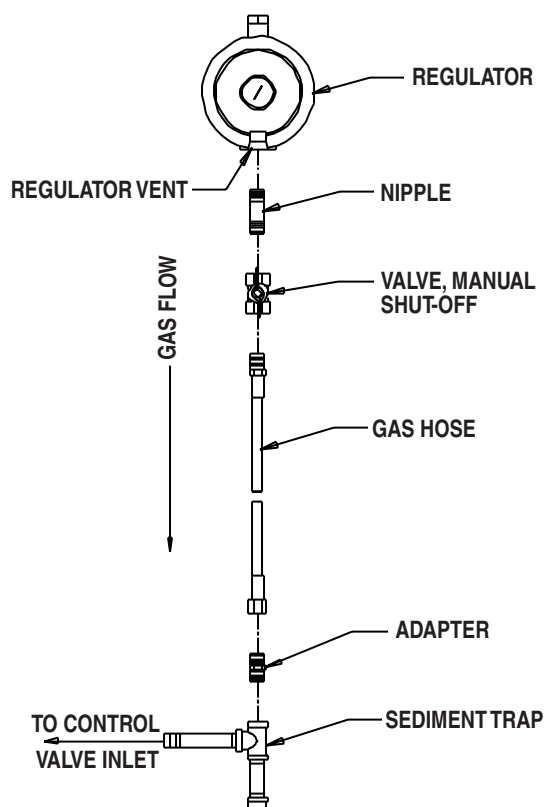
However, when tanks are manifolded together, never use a first-stage regulator at each tank. If this is done, the total required capacity for the installation may not be obtained. It is almost impossible to set all regulators at the identical pressure. Therefore, the regulator delivering the highest outlet pressure will backpressure the other regulators, in turn keeping them from operating. In effect, only one tank would be supplying gas to the building. In this situation, especially on large capacity installations, ignition failures would occur due to poor gas volume and pressure.

To eliminate this problem, run high pressure piping from the LP gas tanks into a common line, then install one first-stage regulator that can handle the required capacity of the installation. Refer to the following illustrations.



## Manual Shut-Off Valve, Hose and Regulator Assembly

1. Always use approved pipe thread compound suitable for use with L.P. gas or natural gas 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.**
5. The heater must have proper gas regulator installed 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 dataplate at all times. Contact the L.B. White Co., Inc. if you have any questions.
6. The heater's gas regulator (with pressure relief valve) should be installed outside of building. Any regulators inside the buildings must be properly vented to the outside. Local, state and national codes always apply to regulator installation. Natural gas regulators with vent limiting device may be mounted indoors without venting to outdoors.
7. All gas pressure regulators must be installed in strict accordance with the manufacturer's safety instructions. These instructions accompany each regulator.
8. Any heater connected to a piping system must have an accessible, approved manual shut off valve installed within six feet (6 ft.) of the appliance it serves. The manual shut-off valve can be installed before the regulator, under the eave of the building, or after the regulator inside the building.

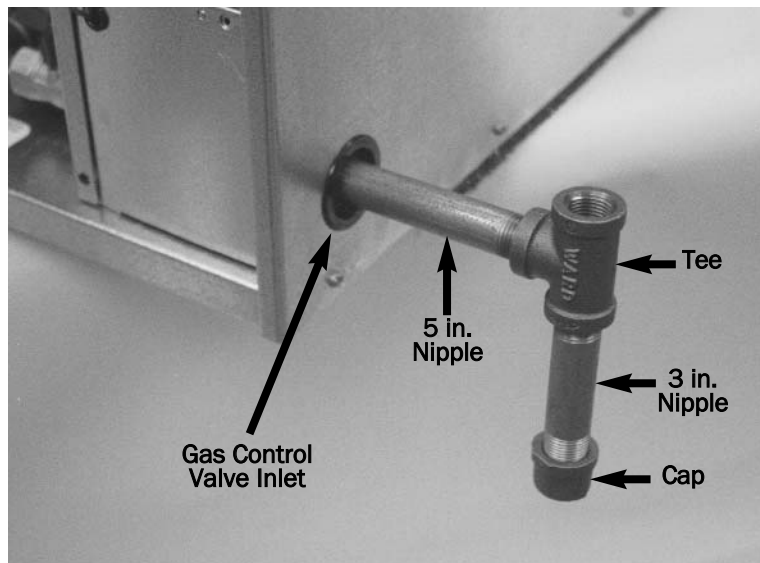


## Sediment Trap

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Assemble the tee, nipples and cap together and tighten securely. The sediment trap assembly must always be mounted in a vertical position. Make sure pipe thread compound that is resistant to both L.P. gas and natural gas is used in making all connections. **Check all connections for gas leaks using approved gas leak detectors.**

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 a 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.





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## Electrical Requirements

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### ATTENTION

- The following is supplied for informational purposes only.
  - All electrical wiring shall be accomplished by a qualified electrician.
  - Local and state codes must be observed at all times.
  - In absence of local or state codes, follow ANSI/NFPA70 National Electrical Code.
- 

Strict attention must be given to the following areas before connecting the heater to its electrical supply.

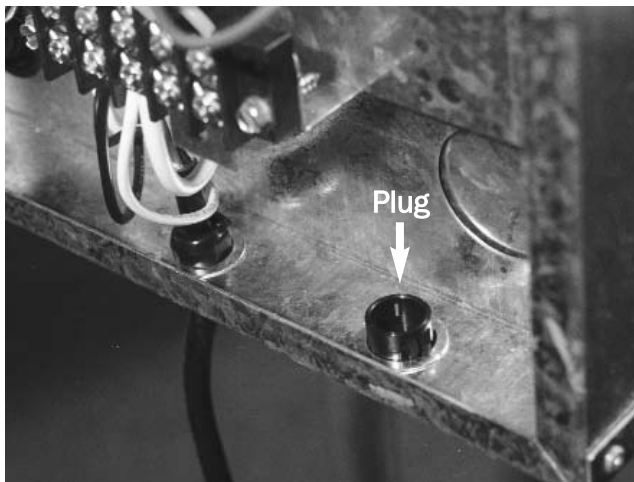
- A properly installed three-wire electrical supply consisting of separate hot, neutral, and ground leads shall be connected to each electrical outlet that supplies each heater.
- Proper voltage must be supplied to each heater:
  - Proper voltage is 115 V.A.C.
    - +10% (127 volts maximum)
    - 15% (98 volts minimum)
  - Undervoltage may cause:
    - \* Low motor speed
    - \* Igniter not reaching temperature
    - \* Lack of ignition
  - Overvoltage may cause:
    - \* Accelerated igniter failure
    - \* Motor thermal overload tripping
- Contact a qualified electrician to determine proper wire gauge for installation according to code.

## Thermostat Kit

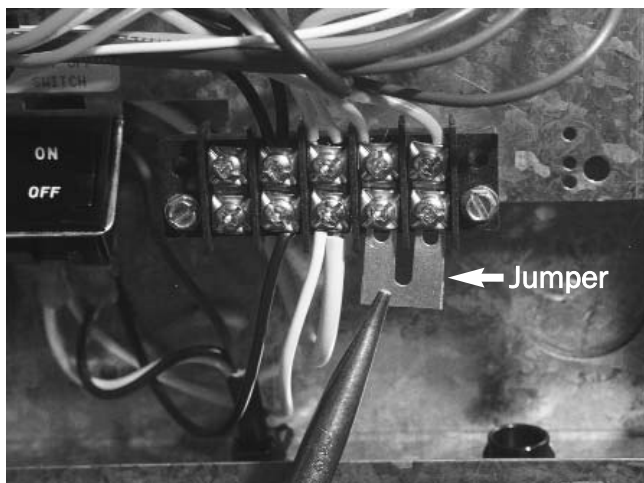
Refer to instructions below when connecting a thermostat to units with a Master Control Panel. Follow the instructions on page 2.6-2 to install the thermostat kit with a Guardian style control panel.

### Master Control Panel

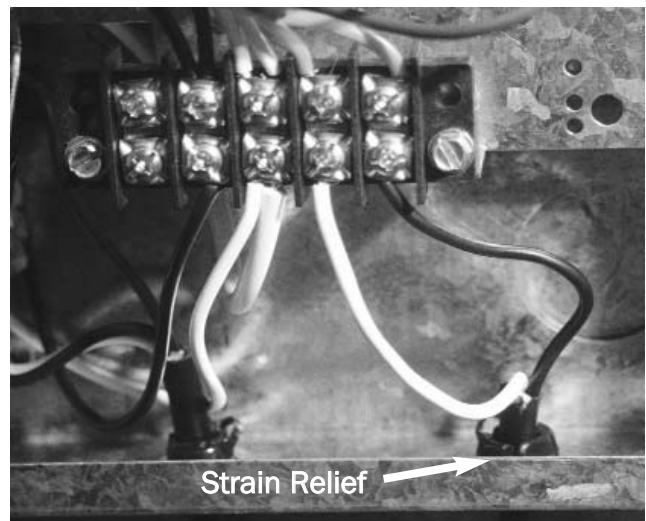
1. Disconnect heater from electrical supply and shut off gas to inlet of heater.
2. Open the Master Control Panel on the heater and remove the plastic hole plug located in the bottom of the panel.



3. Loosen the screws on the terminal strip that hold the jumper in place. Remove the jumper.



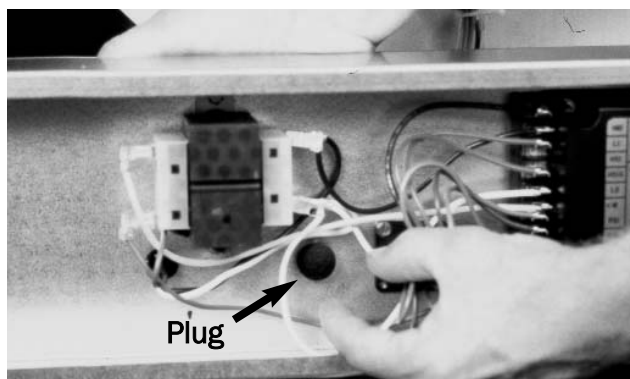
4. Using a wire cutter, cut off the 3/16 in. insulated terminal and the 1/4 in. uninsulated terminal on the black and white leads of the thermostat cord set. Strip back the leads 1/4 in. to expose the stranded conductors.
5. Run this end of the cord up through the hole in bottom of panel from which you removed the plastic hole plug. Using a pliers or other suitable tool, secure the cord in place within the hole with the small strain relief that is included with the cord. Install this strain relief to prevent abrasion and possible cutting of the cord's insulation against the edge of the hole.
6. Connect the exposed conductors of the black and white leads of the thermostat cord to the terminals previously occupied by the jumper.



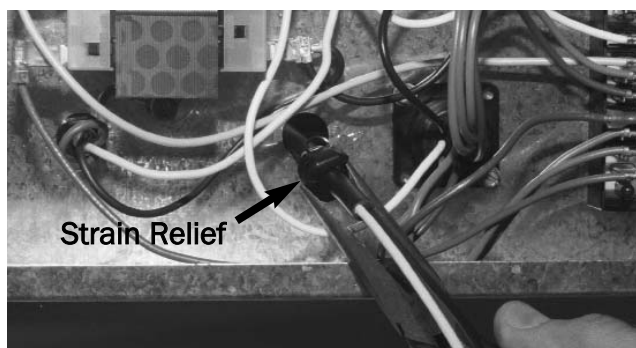
7. Reconnect heater to electrical supply. Open gas valves to inlet of heater. Turn up the thermostat and test for proper operation. The heater will start. Set the thermostat to desired temperature after testing. Close and latch the control panel door.

### Guardian Style Control Panel

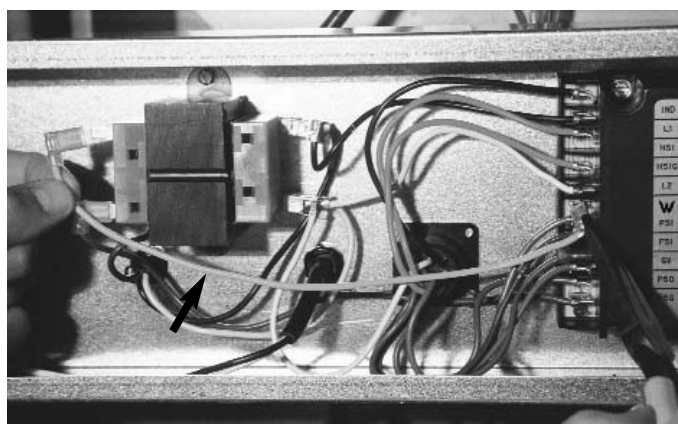
1. Disconnect the heater from its electrical supply and shut off gas to the inlet of heater.
2. Open the control panel mounted on the motor end of the heater. You will need a standard head screwdriver, or other tool, to turn the screw latch 90 degrees counterclockwise.
3. Remove plastic hole plug located on the back or bottom of the control panel.



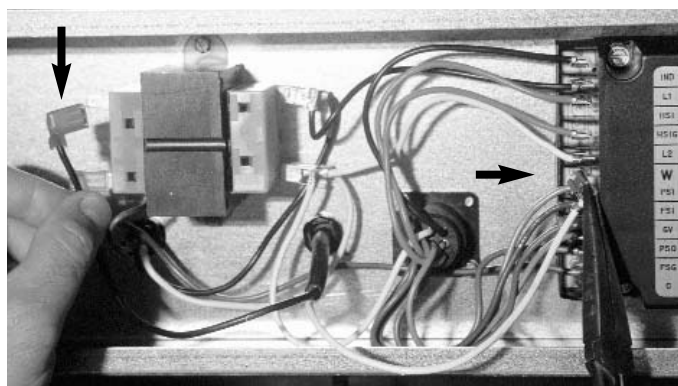
4. Route the lead end of the thermostat cord through the hole near the base of the heater that the power cord is routed through or up through the bottom of the heater nearest the control panel.
5. Route the lead end of the thermostat cord through the hole in the back or bottom of the control panel.
6. Using a pliers or other suitable tool, secure the thermostat cord in place within the hole with the small plastic strain relief supplied with the thermostat kit. Make sure you install this strain relief to prevent abrasion and, therefore, cutting the thermostat cord against the sheet metal edge of the hole.



7. Locate the yellow wire which runs from the 24 v. output on transformer to terminal "W" on the hot surface ignition control board. Remove this wire.



8. Connect the black lead of thermostat cord with the 3/16 in. female insulated terminal to 3/16 in. terminal on the 24 v. output side of the transformer.

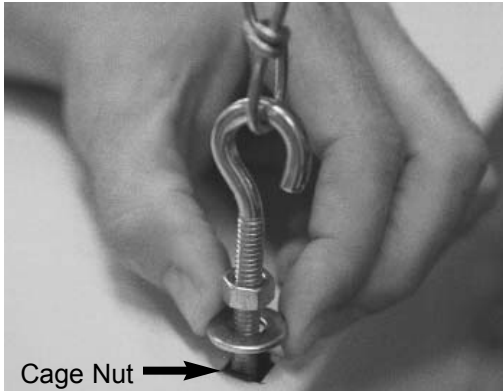


9. Connect the white lead of thermostat cord with 1/4 in. uninsulated female terminal to terminal marked "W" on the hot surface ignition control board.

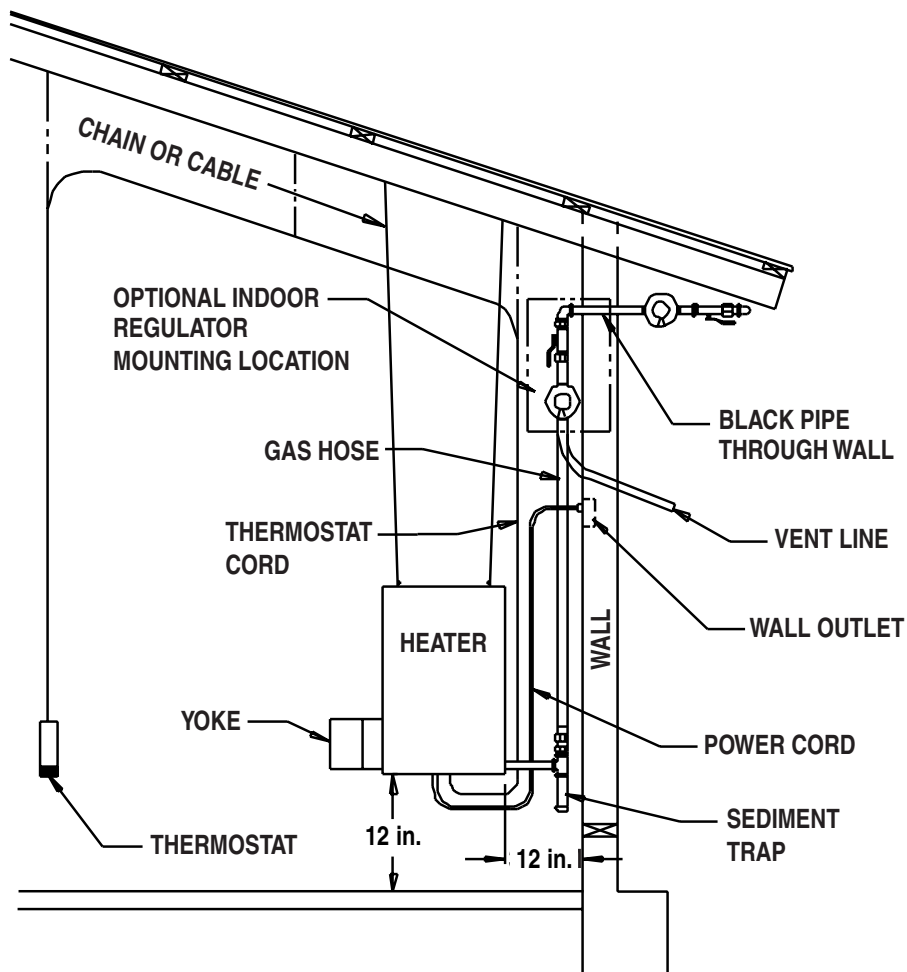
10. Reconnect heater to electrical supply. Open gas valves to inlet of heater. Turn up the thermostat and test for proper operation. The heater will start. Turn thermostat to desired temperature after testing. Close and latch the control panel door.

## Hanging Instructions

1. Assemble according to the illustration and tighten all eyebolts securely.



2. Make sure the heater is properly positioned before use and is hung level. Observe and obey all minimum safe distances of the heater to the nearest combustible materials. Minimum safe distances are given on the heater dataplate.
3. See figure for **typical** indoor installation. In any animal confinement building, consideration must be given to making sure the heater is located away from the livestock so that livestock cannot knock the heater, tear it loose from its mounting, or damage the heater, its power supply cord, or its gas supply line in any way. Make sure you observe and obey minimum clearance distances to combustible materials as stated in the specification section of this owner's manual and on the heater itself.

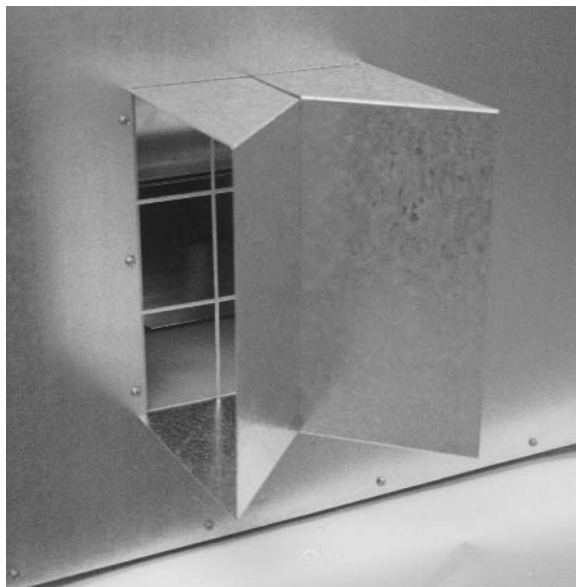
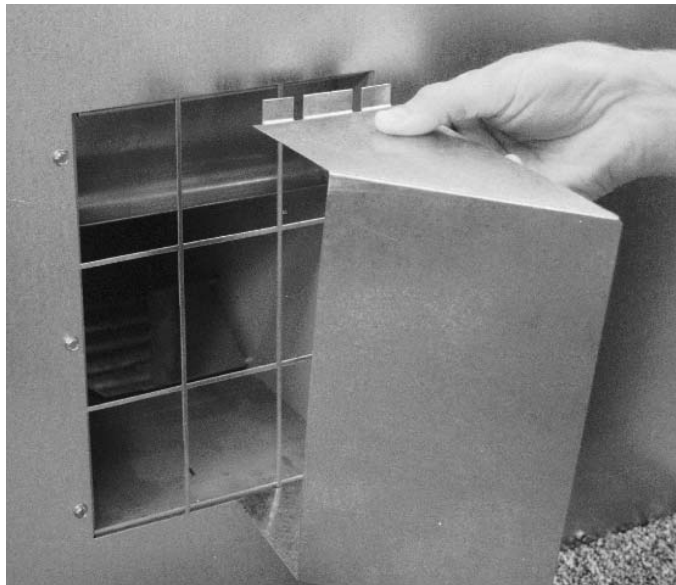




**Air Diverters**

The air diverters allow the hot discharge air to be blown out either in two 45 degree paths or in one direction only. Either way promotes good air movement and circulation.

1. Install the air diverter as follows. This is a typical procedure for all heaters. Appearance of the outlet on heater may vary from model to model.
  - a. The air diverter's notched tabs on each half will pop into the blower outlet between the inside of the case assembly and the blower housing outlet.
  - b. The air diverter halves are installed so the notches in the tabs are up against the formed guard of the blower outlet.
  - c. Tighten blower outlet screws.



**Diverters Pointed Both Left and Right**



**Diverters Pointed in One Direction**

## Outdoor Mounting

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When installing a heater for outdoor mounting, you must always use the appropriate outdoor mounting kit which has been specifically designed by L.B. White Co., Inc. for the respective heater being installed. All outdoor mounting kits are listed in Section 10, Kits and Accessories.

In addition to following the installation instructions provided with the kit, attention must also be given to these areas:

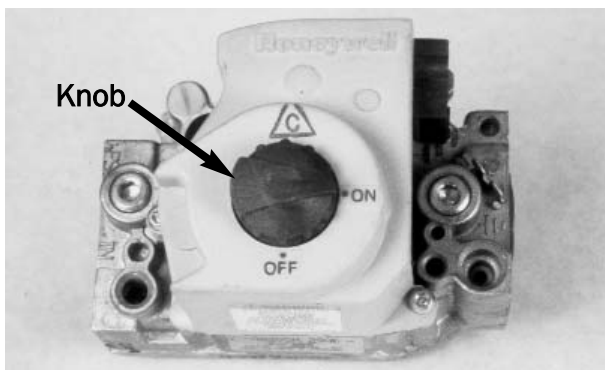
- The heater and its associated ducting must be mounted so it will not interfere with electrical raceways or waterlines.
- The heater and ducting must sit level when installed so the dampers open and close properly.
- To prevent water entry into the case; remove the cage nuts from the case top and install the hole plugs (provided with the kit) into each hole. A sloped top accessory kit is also available for heater models AW230 and AW250 to facilitate water runoff (Kit Part #500-20257.)
- The heater should be installed at least 18 inches above the ground or to height that would prevent snow blockage at the heater's air inlets.
- Clearances from nearest combustibile materials must always be maintained. (See heater dataplate or specification section within this guide.)
- When mounted outside, the heater will be pulling in fresh outdoor air for combustion. Therefore, during periods of cold temperatures, the outlet air temperature of the heater will also drop. Unless building ventilation is properly managed, increased fuel gas use may occur on outdoor mounted heaters.

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**Start-Up and Shut-Down****Start-Up Instructions**

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

1. Open all manual fuel supply valves and check for gas leaks using approved leak detectors. The gas control valve on the heater has a manual shut-off feature incorporated into the valve assembly. The control valve may be located within an enclosure. If necessary, remove the metal cover and make sure the indicator on the control valve's knob is turned to the "on" position. Reinstall the metal cover.



2. Connect the electrical cord to an approved electrical outlet.
3. Set the thermostat (if supplied) to desired room temperature.
4. This heater includes a hot surface ignition (HSI) control module for purposes of controlling the timing of the ignition process of the heater as well as monitoring of the safety functions. The HSI module is contained within the control enclosure. On the HSI module is a red light emitting diode (LED). This LED indicates the status of the heater. The LED is visible external of the control enclosure through the plastic

eye. A constant light from the LED is an indicator that the heater is functioning correctly. Any flash pattern by the LED is indicative that there is a problem in the operation of the heater. Refer to the troubleshooting decal on the access panel at the fan motor end of the heater for assistance in troubleshooting. Only qualified and properly trained personnel shall service or repair the heater.

5. On a call for heat, the motor will start up and run for five (5) seconds and then stop. This pre-purge is a safety feature and a normal operational characteristic prior to ignition taking place. After the motor has stopped, the igniter will heat up (approximately 17 seconds). After igniter warm up time has been achieved, the motor will start again and shortly thereafter ignition will occur.

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**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.

6. The current design HSI control module (part #120-09298) will make up to three trials for ignition. Each trial for ignition will take approximately 20 seconds. A 15 minute "wait period" will then begin after the second trial for ignition has taken place. After the 15 minute time span has elapsed, the third and final trial for ignition will take place. If ignition is not achieved at this final trial, the system will lock out, and a "three flash" pattern will be indicated by the LED.

The earlier design ignition control module (part #120-08117) will make 3 trials for ignition in approximately one minute. If ignition is not achieved after the third trial, the ignition control will lock out immediately. A three-time flash pattern will be given.

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**Shut-Down Instructions**

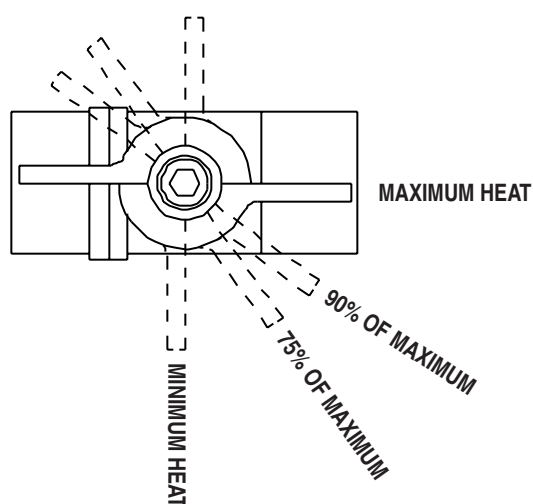
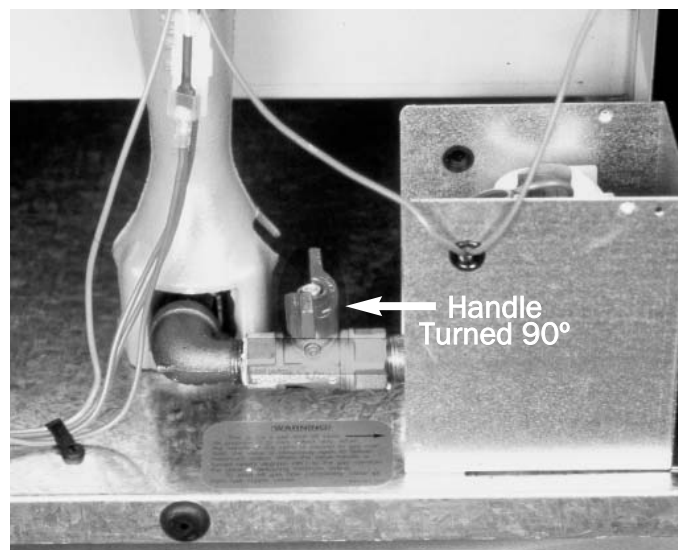
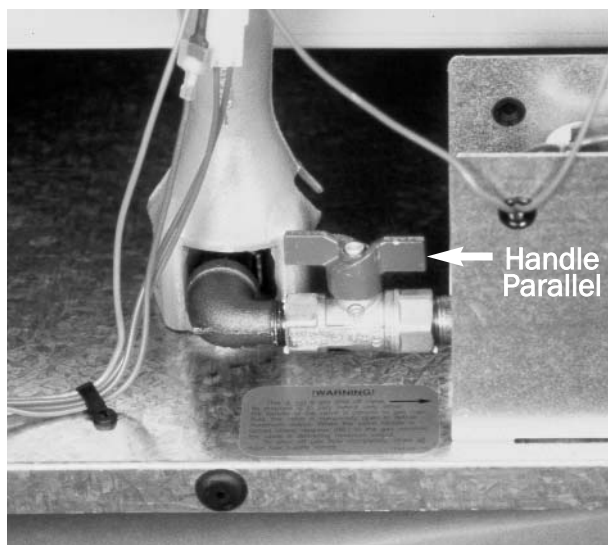
If the heater is to be shut down for cleaning, maintenance or repair, follow steps 1 - 5. Otherwise, simply turn thermostat to "off" or "no heat" for standard shut down.

1. Close all manual fuel supply valves.

2. With the heater lit, allow heater to burn off remaining 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 heater from the electrical supply.

## Variable Heat Output

1. Some models of propane (LP) gas or natural gas heaters have a throttle valve for varying heat output located between the gas control valve and gas manifold assemblies. **THIS IS NOT A MANUAL GAS SHUT OFF VALVE.**
2. The throttle valve can be adjusted to deliver either minimum heat or maximum heat. When the throttle
3. valve handle is parallel to the gas flow, the valve is completely open to deliver maximum heat output.
3. The throttle valve may be adjusted to minimum heat output by turning the handle 90° to gas flow or any position between maximum and minimum settings.





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### **Periodic Inspection**

1. **The area surrounding the heater shall be kept clear and free from combustible materials, gasoline, and other flammable vapors and liquids.**
2. 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.
3. 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.
4. 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.
5. Check all wiring associated terminals and electrical components within the heater for corrosion, frayed or cut insulation, tight connections, etc. Repair or replace as necessary.
6. Review all heater markings (i.e. wiring diagrams, warnings, start-up, shut-down, troubleshooting, etc.) at the time of maintenance for legibility. Make sure none are cut, torn, or otherwise damaged. Any damaged markings must be replaced immediately. Contact the L.B. White Co. for replacement markings. Dataplates, start-up and shut-down instructions and warnings are available at no cost. A nominal charge will be applied for wiring diagrams, and troubleshooting markings.

## Cleaning Instructions

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### **WARNING**

#### **Fire, Burn, and Explosion Hazard**

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

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



### READ THIS ENTIRE SECTION BEFORE BEGINNING TO TROUBLESHOOT PROBLEMS.



#### WARNING

##### Electrical Shock and Burn Hazard

- Do not attempt to service or repair this heater unless you are a properly trained and qualified gas heater service person.
- 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 in this section provide systematic procedures for isolating heater problems. Refer to the Component Testing section of this Service Guide for general instructions on performing voltage and continuity checks as well as evaluation of specific components as indicated by these charts. Refer to the appropriate wiring diagram for assistance in performing voltage and continuity checks. Refer to the Service section for gas pressure checks and adjustments as indicated by the flow charts.

### 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 voltage and resistance.
- **Microamp Diagnostic Kit** - (L. B. White Part No. 500-08507) When used with a standard digital multimeter, this kit allows testing of the flame sensor on direct sense systems.
- **Low Pressure Gauge** - (L.B. White Part No. 550-00764) for checking inlet and manifold pressures of the gas control valve against dataplate rating.

### INITIAL PREPARATION

- Visually inspect heater for apparent damage.
- Check all hoses for abrasion and wear. Replace any that are suspect.
- Make sure heater is properly installed and meets minimum clearances to nearest combustible materials. (Refer to dataplate on heater.)
- Check all wiring for loose connections and worn insulation.

### IGNITION AND SAFETY CONTROL Part 120-08117 and 120-09298

Refer to the system operation sequence in this section to gain an understanding as to how the heater operates. 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.

The troubleshooting flow charts pertain to both part numbers 120-08117 and 120-09298 ignition control modules, unless indicated.

Problems	Module Part No.		Page
	120-08117	120-09298	
L.E.D. Diagnostic light <u>not</u> on during a call for heat	X	X	5.1-3
L.E.D. diagnostic light flashing:			
A. Rapid Flash	N/A	X	5.1-4
B. Long Flash (2 seconds on - 2 seconds off)	N/A	X	5.1-4
C. One Time	X	X	5.1-4
D. Two Times	X	X	5.1-5
E. Three Times	X	X	5.1-6
F. Four Times	X	X	5.1-7
G. Five Times	N/A	X	5.1-7
H. Six Times	N/A	X	5.1-7

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

## Troubleshooting Guide

### HOT SURFACE IGNITION OPERATION SEQUENCE:

- Line Voltage is Sent to Transformer
- 24 V.A.C. is sent from Transformer to the Thermostat
- A call for Heat Occurs
- 24 V.A.C. is sent from Thermostat to Ignition Control Module
- Red Light on Ignition Module Begins to Glow
- Ignition Control Module Performs an Internal Safe Start Check
  - Internal Components are Tested
  - Voltage is sent to Flame Sensor from Control Module to Start Flame Proving Process
  - Air Flow Circuit is Checked
- Ignition Control Module Begins Safety Lockout Timing
- Ignition Control Module Starts Fan Motor for Prepurge
  - Air Flow Switch is Checked for Proper Operation
  - Module Stops the Fan Motor
- Ignition Control Module Powers the Igniter
- Ignition Control Module Restarts the Fan Motor (after igniter warm-up)
  - Air Flow Switch Closes
  - Gas Control Valve Opens
- Ignition Occurs
  - Igniter stays "Powered-up" for 6 seconds after Ignition
  - Flame Proving occurs (in 6 seconds)
  - Igniter Shuts Off
  - Gas Valve Stays Open
- Room Warms to Desired Temperature
  - Thermostat is Satisfied
  - Heater Shuts Down
- Process Starts Again on Call for Heat

### MULTIPLE IGNITION TRIAL SEQUENCE (PART #120-09298):

- First Trial for Ignition Takes Approximately 30 Seconds
- Two More Trials for Ignition will Occur
  - Second Trial Follows Immediately if First Trial Fails
  - Module Starts a 15 Minute "Wait" Period to Allow Ignition Interruption to Pass
  - Third and Final Trial Occurs After 15 Minute Wait Period
- If Ignition Control Module Does Not Prove Flame After Third Trial, the Module Goes into Safety Lockout (3 Flash Pattern)
  - Igniter Shuts Down
  - Fan Motor Stops
  - Gas Valve Closes
- To Manually Reset the Ignition System
  - Unplug the Heater and Plug it back in
    - OR
  - On heaters so equipped, turn power supply switch to "Off" and then to "On" OR
  - Turn Thermostat to "Off" or "No Heat" and Then Back to Above Room Temperature

## ATTENTION

### Part# 120-08117 Multiple Ignition Trial Sequence:

This module will attempt three trials for ignition in approximately one minute. System lockout occurs immediately after the third (final) trial for ignition. There is not a 15 minute waiting period between second and third ignition trials.

A troubleshooting data marking is also located on the heater for convenience.

### Purpose:

Provides a readily accessible, abbreviated guide to analyzing and correcting system problems as identified by the red light on the control module.

### Typical Location:

Exterior or interior of burner access panel or fan and motor access panel.

### Part No.:

150-09982

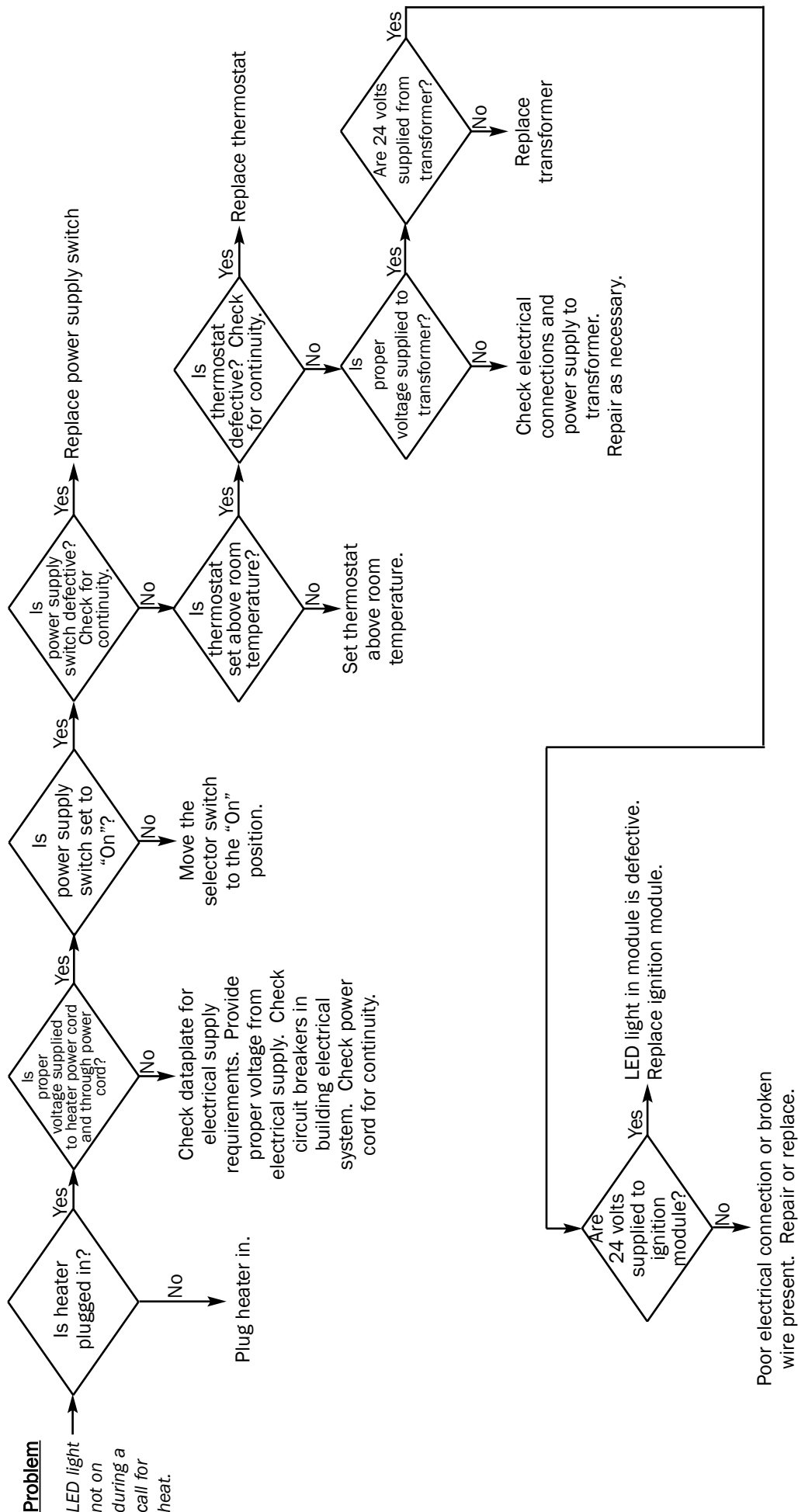
TROUBLESHOOTING DATA HOT SURFACE IGNITION HEATERS		
SELF-DIAGNOSTIC "SYSTEM II" OPERATION		
• LED light will be on constantly during normal operation. • LED light will flash if a problem occurs. Refer to "Troubleshooting Data" below. • The flash pattern will continue, separated by a pause, until the problem is identified and corrected.		
PROBLEMS	CAUSES	REMEDIES
1. LED light constant on	• Normal Operation	• No Problem
2. LED light is not on during call for heating. Fan does not run, heater does not light.	• No voltage to heater from thermostat.  • 24 volts not supplied from transformer to thermostat.	• 1. Verify thermostat is set above room temperature. If it is, see Remedy #2. 2. Jumper thermostat to determine if defective. If defective, replace.  • Verify 24 volts from transformer with a voltage tester. If transformer is not supplying 24 volts to the thermostat, a. Verify main power supply voltage to transformer. (See data label for proper voltage.) b. If main power supply voltage is supplied to transformer, replace transformer.
3. LED Light Flashing: Rapid Flash One Long Flash (2 seconds on, 2 seconds off)	• If 24 volts supplied to HSI board, and LED light is not functioning.  • Main power supply voltage not being supplied to heater. (See data label for proper voltage.)	• Replace HSI board.  • Verify main power supply voltage to the power cord. If main power supply voltage is not being supplied to the heater, check the power cord, the outlet that the heater is plugged into, and the circuit breakers supplying power to the outlets. Repair as needed.
One Time	• Reverse polarity at power outlet.	• Have qualified electrician correct wiring at power outlet.
Two Times (Last of "air proving" in fan and motor section of unit.)	• Heater is in 15 minute wait period between ignition trials. Heater has attempted two ignition trials. A third attempt will be made 15 minutes after the second attempt. If ignition is not achieved, heater will lock out on three time flash pattern.  • Air flow switch paddle, paddle arm or flapper is stuck in closed position. • Air flow switch contacts stuck, closed or shorted. • Air flow switch paddle or flapper stuck to blower housing with debris. • Air flow switch does not close or is defective. • Fan wheel is binding or dirty. • Bad motor or capacitor. • Bad motor entry (if applicable). • No fuel.	• See "three time" flash pattern and remedies for same.  • Verify paddle, paddle arm or flapper is binding in the closed position and then repair or replace. • Verify switch contacts are stuck closed. If so, replace switch. • Free paddle or flapper and clean debris. • Adjust or replace switch. • Clean, repair or replace. • Replace motor or capacitor. • Replace motor entry. • 1. Fill tank if empty. 2. Turn on valve for gas supply to building. 3. Verify gas valve and/or gas cock is in ON lockout position. • Verify the igniter gloves and is not disconnected, unplugged or broken. • Determine cause of limit switch opening and repair, then reset the limit switch. If tripped or replaced, if defective. • Disconnect flame sensor wire from FSI terminal on HSI control board and connect a microamp meter between the flame sensor wire and FSI terminal. Microamp reading should be no less than .50 and for optimum flame sensing, 1.4 to 1.6 of the tip of the flame sensor should be in the flame. Replace, clean or recalibrate as necessary. • Connect gas pressure gauge to outlet pressure tap on gas valve. Turn unit on. Audible click should be heard when valve opens. Check the pressure out of control valve. If no pressure out of valve, check wiring to valve. If wiring is good, verify adequate fuel supply to inlet pressure tap of valve and replace the valve, if necessary. • If HSI board does not reset, then replace the board. • Have qualified electrician check power source.
Four Times	• Broken or disconnected igniter. • High limit switch is tripped or is defective. • Defective, improperly positioned, dirty or disconnected flame sensor.  • Bad valve or wires connected to valve.	
Five Times	• Internal board fault. • Power quality: -line noise -line sags • Rapid on/off cycling of heater due to defective, improperly positioned, or cracked ceramic on flame sensor.	• Clean, reposition, or replace flame sensor.
Six Times	• Low microamp output from flame sensor. Flame sensor is dirty, weak, defective, or improperly positioned.	• Clean, reposition, or replace flame sensor.



# PROBLEMS



LED constant on → Normal operation.



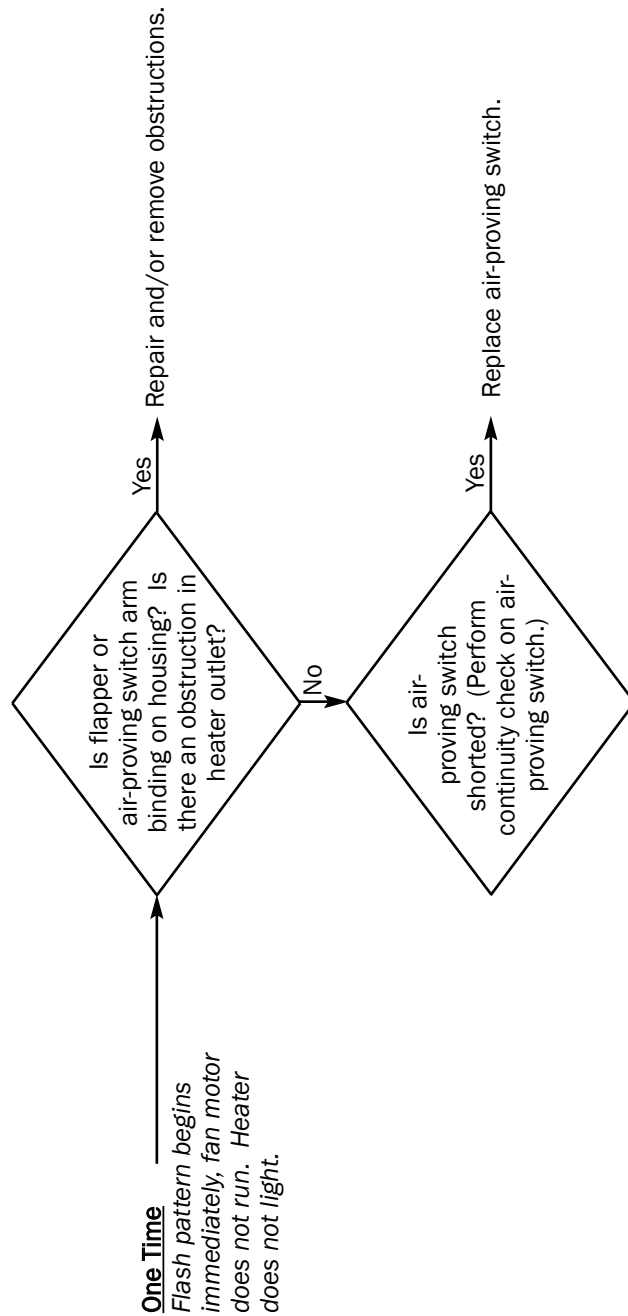
## Problem

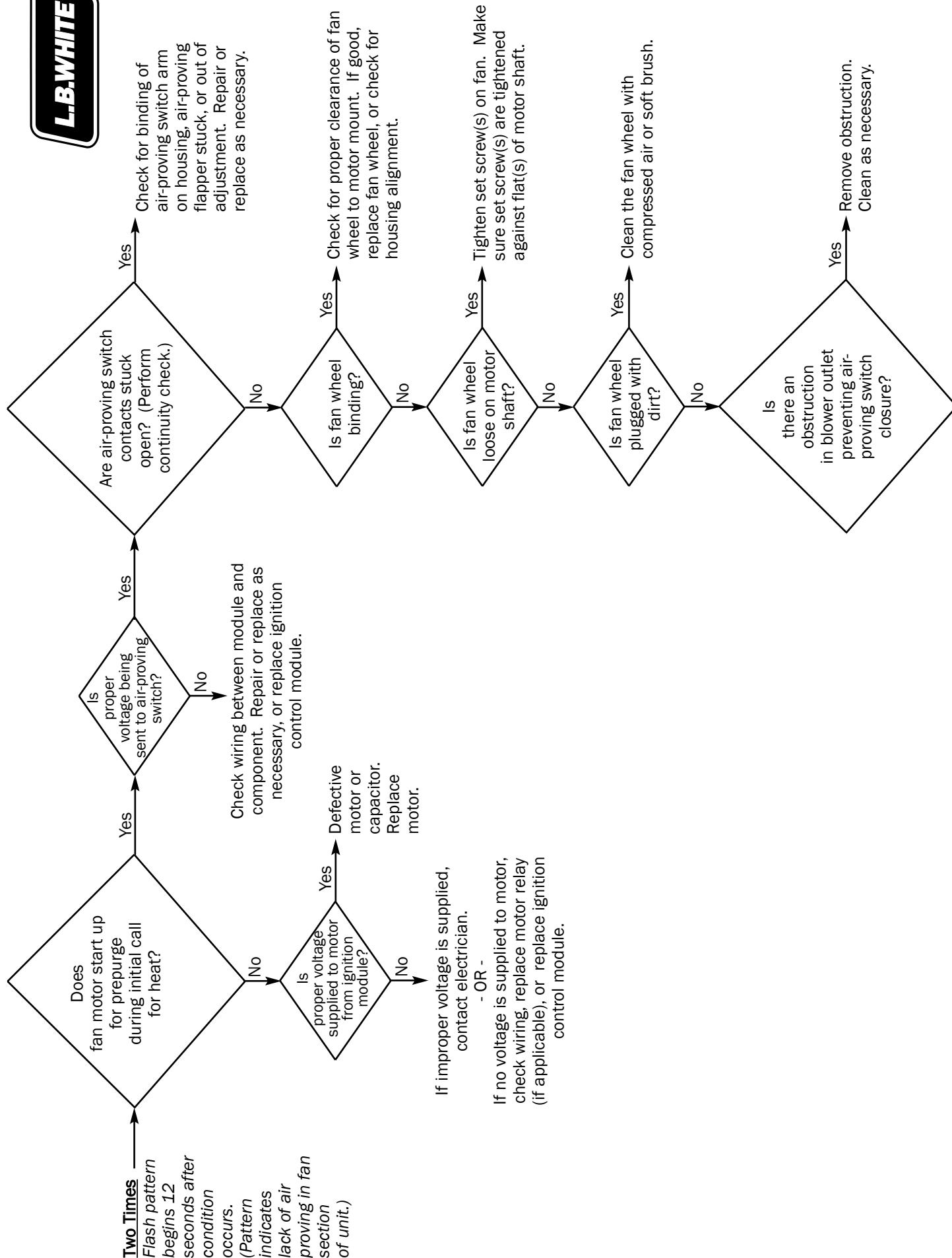
### LED Flashing

**Rapid Flash** → Reverse polarity. Have electrician check neutral and hot wire connections that outlet heater is connected to.

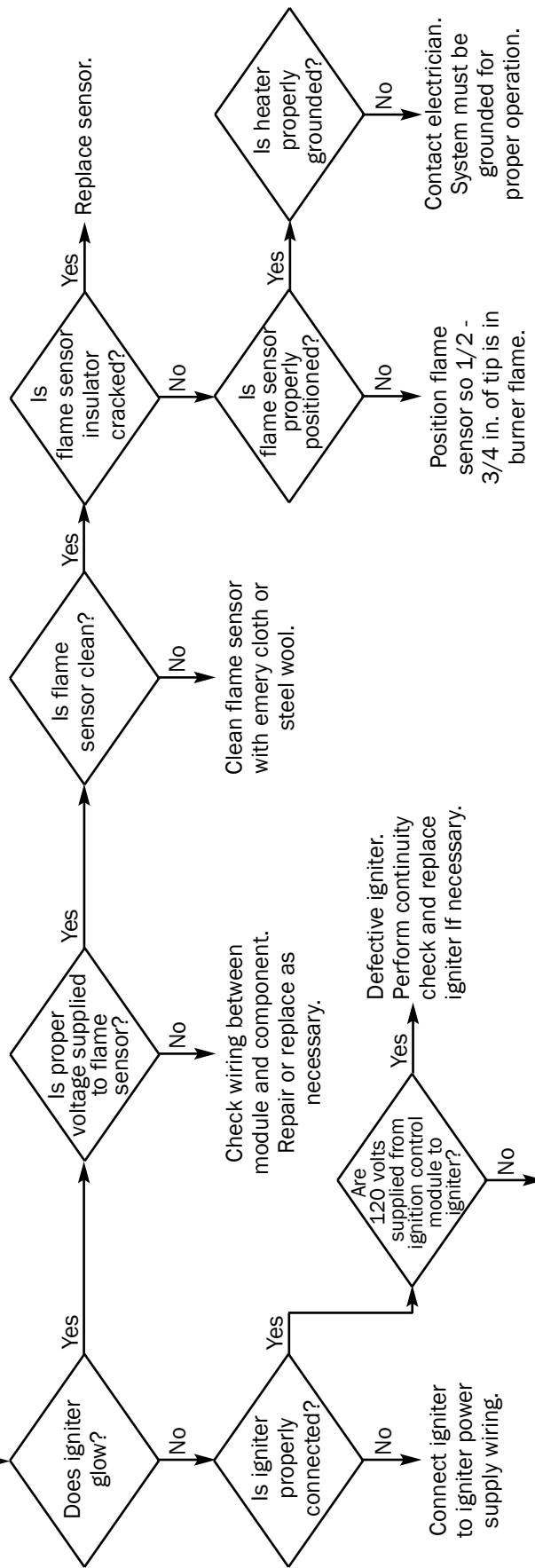
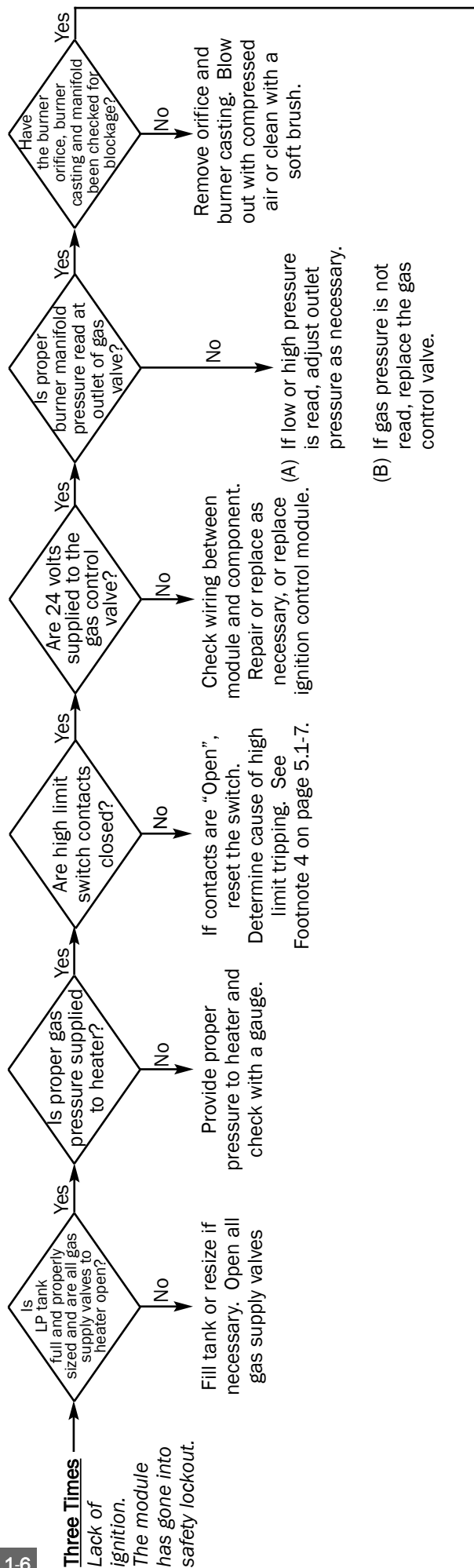
**Long Flash** → Heater has attempted two ignition trials. Heater is in a 15 minute wait period before attempting its third (final) trial for ignition. If ignition is not achieved after the third trial, the heater will lock out and the ignition control module will present the three time flash pattern. Either recycle the heater or wait for heater to attempt third ignition trial.

**Two seconds on, two seconds off repetitively for 15 minutes.**





**Three Times**  
Lack of  
ignition.  
The module  
has gone into  
safety lockout.



Check wiring between module and component. Repair or replace as necessary or replace control module.





**Four Times** —————→ If HSI board does not reset, then replace the board. (Internal board fault.)  
If HSI board resets, then have qualified electrician check power source for power quality problems. (Frequency, line noise, line spikes, loose connections, too small wire gauge.)

**Five Times** —————→ See flame sensor related problems in  
*Rapid On/Off cycling of the burner.* three time flash pattern.

**Six Times** —————→ Low microamp output from flame sensor. With a six time flash pattern, the heater will continue to operate as normal. This flash pattern means that flame sense is low and that flame failure or improper operation can occur at any time. See flame sensor related problems in three time flash pattern.

- (1) With any electrical problem, all wiring should be checked for good connections and proper voltage and repaired if a problem is found.
- (2) **IMPORTANT:** Remember, the ignition control board sends and receives voltages throughout the entire operation sequence. The ignition control board terminals should also be checked for delivering proper voltages, in addition to the individual components as indicated by the respective flash pattern, to make sure the board itself is working properly.
- (3) In order to verify the diagnosis of the flashing LED or to reset the unit and retry ignition, disconnect the unit from power and then reconnect to power or if your heater uses a thermostat, turn down thermostat below room temperature and then turn thermostat above room temperature. When testing is completed, reset thermostat to desired temperature.
- (4) The high-limit switch will open or "trip" for a variety of reasons, such as high gas pressure, low voltage, excessive dust and dirt build-up within the heater, dirty fan assembly, fan is not tightened onto motor shaft, and obstructions in air inlets or discharge outlet of heater.



## Voltage Checks

### GENERAL

#### Equipment required:

Digital Volt/Ohm Meter

#### Explanation:

All electrical components within the heater may be tested to determine if voltage is being supplied to, or sent through the component. Familiarizing yourself on how to check voltage is critical since it will help you determine if a component is working properly, plus, it will shorten the amount of time used should troubleshooting equipment problems occur.

#### Attention

The ignition control module will not operate without 24 V.A.C. supplied from the transformer.

Before we look at basic procedures in checking voltages at individual parts, it is good to know which components within the control system work on a particular voltage. Since the ignition control module sends and receives voltages throughout the heater we will review the terminal designation on both past and present designs of control modules. Refer to the following illustrations for comparison of ignition controls and positioning of designators, which in turn will identify the voltage that each individual component receives.

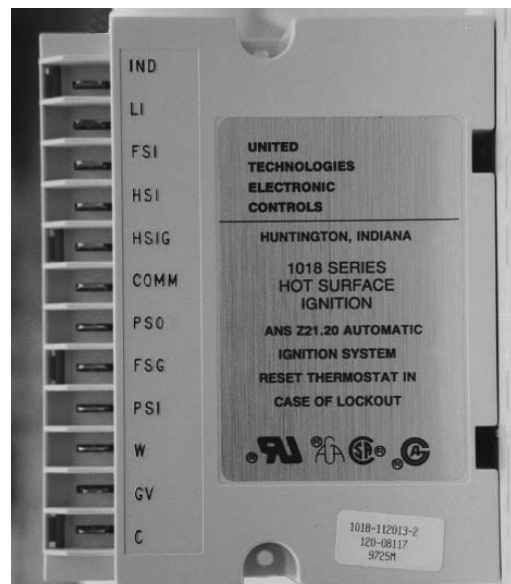
#### Self-Diagnostic Control Module Terminal Designators and Voltages (Part #120-09298 and 120-08117)

<b>IND</b>	120 V.A.C. from module to motor
<b>L1</b>	120 V.A.C. power supply voltage to module
<b>HSI</b>	120 V.A.C. from module to igniter
<b>HSIG</b>	Neutral return for igniter
<b>L2</b>	Neutral of igniter (part #120-09298)
<b>COMM</b>	Neutral of igniter (part #120-08117)
<b>W</b>	24 V.A.C. to module from transformer
<b>PSI</b>	24 V.A.C. from module to air proving switch
<b>FSI</b>	100 V.A.C. from module to flame sensor (black module) 24 V.A.C. from module to flame sensor (white module)
<b>GV</b>	24 V.A.C. from module to high limit and then to gas control valve
<b>PSO</b>	24 V.A.C. from air proving switch back to module
<b>FSG</b>	Flame sensor ground
<b>C</b>	Control module ground

Part #120-09298



Part #120-08117



### Control Module Terminal Designators and Voltages (Part #120-08027)

IGN	120 V.A.C. from module to igniter
L	120 V.A.C. power supply to module
GND	Control module ground
FP	24 V.A.C. from module to flame sensor
TH	24 V.A.C. from transformer through air proving switch, to high limit switch, and finally to control module
TR	Neutral return for transformer
MV	Neutral return for control valve
MV	24 V.A.C. to gas control valve

### ATTENTION

The control module has three diagnostic light patterns:

- No Light: Normal operation.
- Steady On Light: Fault is internal to module. Replace module.
- Flashing Light: Problem is within other heater components or wiring. Refer to wiring diagram for Model 284/285 heaters within Section 7 for assistance in determining failure.

### Control Module Part #120-08027





## Voltage Checks

### Equipment required:

Digital Volt/Ohm Meter

### Procedure

Testing for voltage at any of the components is a relatively easy procedure. The following illustrates how to check voltage at some of the components used in the heater.

Be aware on the heater's electrical control system that black and red color coded wires will carry high voltage (either 120 V.A.C. or 220 V.A.C.). All other wires will carry low voltage (24 V.A.C.). Use extreme care to prevent electrical shock.



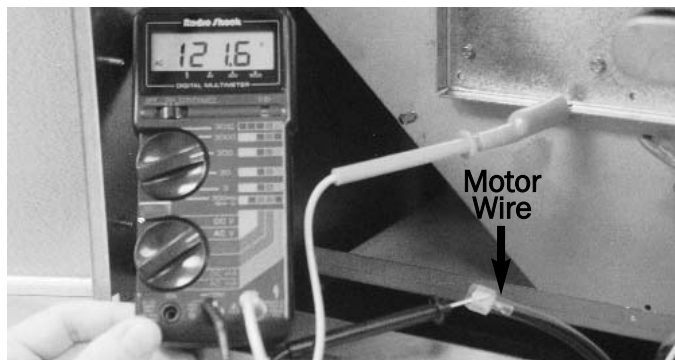
#### Warning Electrical Shock Hazard

- Troubleshooting may require the heater to be connected to its electrical supply.
- Do not directly touch exposed terminal connections when checking voltage. Use only the insulated probes of the voltage tester.
- Failure to follow this warning may result in electrical shock leading to personal injury.

First, set the function selector switch of the tester to "AC" (alternating current). Check for voltage at either the ignition module or the individual component. To test, place one of your tester probes at the "hot" power supply terminal of the component being tested and the other probe to a grounded portion of the heater's cabinet. (Normally, a sheet metal screw on the cabinet will serve this purpose.) Or, place your probes across the terminals of component being tested. The following are some examples showing both procedures:

#### Checking for voltage supply to motor from module.

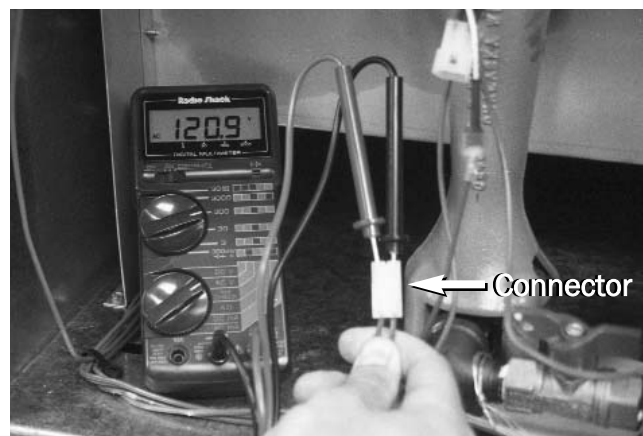
Apply a tester probe to the end of the black motor wire and the other probe to ground. When the module is energized,



you will see approximately 120 volts readout on the meter display. This verifies the module is supplying voltage and the wiring between the module and the motor is in good condition.

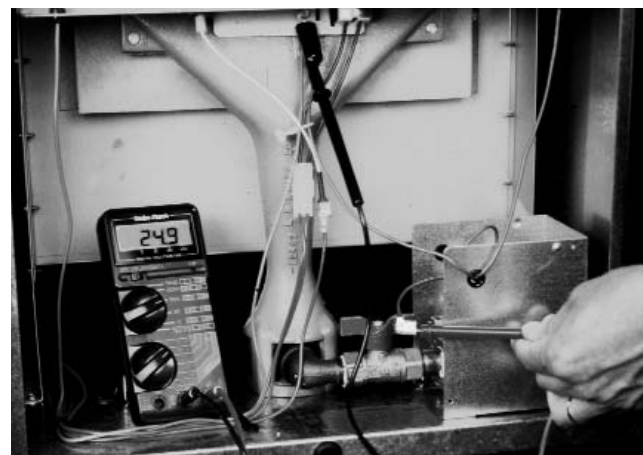
#### Checking for voltage supply to igniter from module.

Apply the probes to the female terminals in the plastic connector at the end of the red igniter wires. The board will send voltage to the igniter once the motor stops after prepurge. Voltage (120 V.A.C. approximately) will appear for 17 seconds, thereby proving both control module and igniter wires are working properly.



#### Checking for voltage supply to gas control valve from the high-limit switch.

Apply one probe to female terminal at end of brown gas control valve wire and the other to ground. You will see 24 volts appear, proving both the module, high-limit switch, and their respective wires are in order.



# Component Testing

## Continuity Checks



### Continuity Checks

#### Equipment required:

Digital Volt/Ohm Meter

#### Explanation:

In a continuity test, you simply want to determine whether or not an electrical pathway exists through a component. For these tests, it is important that the probes of the multimeter make good contact with the part being tested. They should touch bare metal or wire, not insulation, paint, or dirt. Alligator clips make firmer contact than needle probes, use them where possible.

The components which exhibit good continuity within the electrical circuit also provide a resistance to the flow of electricity. The resistance is measured in ohms and will be displayed on the meter. You do not need to remove the components to check for continuity. Also, manipulate wires to see if they are loose to help uncover poor connections or other electrical interruptions. The following illustrates how to check for continuity for some of the components used in the heater.

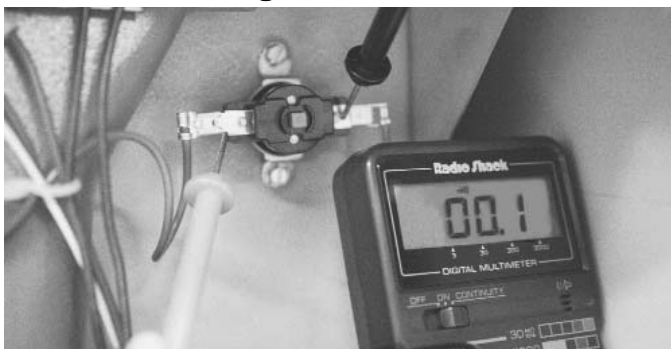
#### Attention

Make sure that the heater is disconnected from its electrical source before conducting this procedure. Failure to do so will result in damage to your meter.

#### Procedure

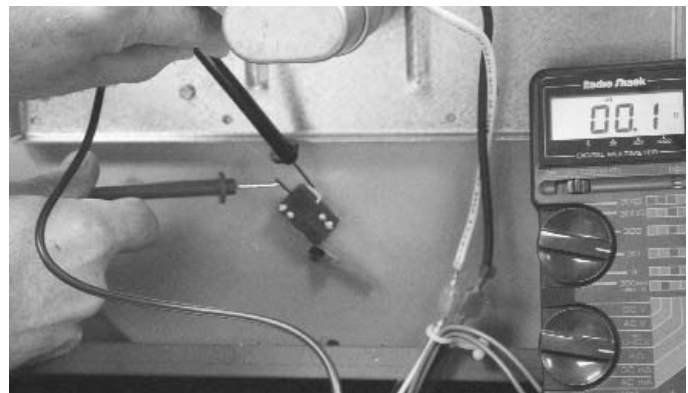
First, set your meter to the continuity scale (if provided) or the ohm(s) scale. Place the tester probes on the terminals of the component being tested. If your meter has an audible continuity feature you will hear a “ringing” sound in addition to seeing a read out in ohms. Examples of checking for continuity on several components are shown.

#### High Limit Switch



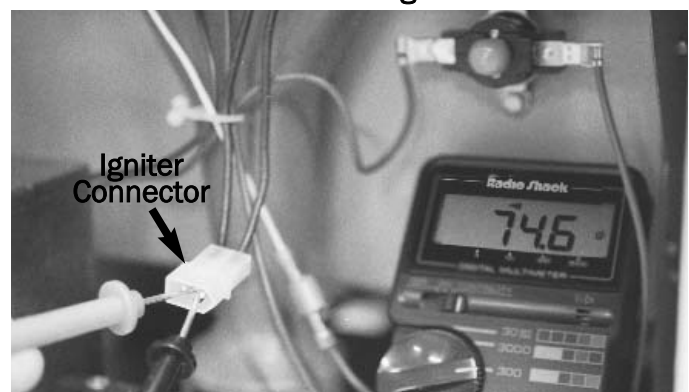
Typically, components which show an open circuit and are not in proper working order will exhibit an “overload” readout on the display of the multimeter. These components should be replaced. However, some components such as an air proving switch have a set of normally open contacts. To verify proper operation, the switch arm needs to be pushed so the contacts are engaged. At this point an ohm reading should appear.

#### Air-Proving Switch



Some components, such as an igniter, have a much larger amount of resistance to the flow of electricity. The ohm read out will be much greater on the igniter than on some other components such as an air-proving switch or high-limit switch. Continuity through the igniter indicates that it is good.

#### Hot Surface Igniter



To check for proper thermostat operation, connect the testing probe to the end of the thermostat cord set leads that normally connect to the heater. When the thermostat contacts are open, the meter will show an open circuit. When the thermostat is adjusted to call for heat, the contacts should close and you will see an ohm readout

---

**Continuity Checks**

appear on the tester indicating that there is a completely closed electrical circuit through the cordset and thermostat.

**Thermostat****Attention**

- Many thermostats can be wired to open or close on an increase in temperature.
- Make sure the thermostat is wired properly so the contacts close when the thermostat is set to a point above room temperature and open when the temperature is achieved. This will allow the heater to cycle accordingly.
- Refer to the heater wiring diagram or the wiring diagram applied to the inside of the thermostat cover for proper hook-up.

# Component Testing

## Flame Sensor Tests



### Equipment Required:

Volt / Ohm Meter with a DC Scale

### Signal Transducer:

Part Number 120-08507

### EXPLANATION:

The flame sensor is responsible for monitoring burner flame presence. It is used in conjunction with the ignition module.

Here is how it works. Flame sensing is the ability of a flame to conduct current when current is supplied to the flame sensor (from the module) and the flame sensor is immersed in the burner flame. The alternating current received at the flame sensor passes through the flame to the nearest grounded surface, which is at the burner. At this point the alternating current has been rectified or converted to direct current. A green wire connected at the burner receives this direct current and returns it back to the ignition module thereby proving the presence of flame. The system control allows the burner to operate as long as it receives this signal from the flame sensor.

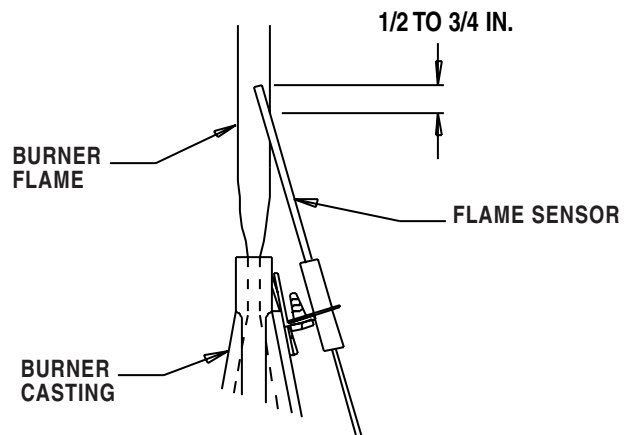
### Checking for Flame Sense:

With heater on check to make sure the black control module (part number 120-09298) is sending approximately 100 V.A.C. from terminal "FSI" through the flame sensor wire to the flame sensor. (For units with the white control module, part number 120-08117, the flame sensor receives approximately 24 V.A.C. from terminal FSI.) This can be accomplished by disconnecting the flame sensor from its power supply wire (from module) and performing the following:

- Shut the heater off.
- Set your multimeter to A.C. Connect one probe to the exposed terminal at the end of the wire from terminal FSI and the other probe to ground (sheet metal screw or cabinet).
- Turn the heater on. As soon as there is a call for heat, the control module will start sending approximately 100 V.A.C. (or 24 V.A.C.) to the sensor depending on control module. If you do not see this voltage appear, shut the heater off and check the wire for continuity. If

the wire is good, the control module is defective and must be replaced. However, if the control module is sending necessary voltage to the sensor, then reconnect the sensor to its wire and recycle the heater. If flame sense failure occurs, then proceed to check these problem areas:

- A. Extremely low gas pressure
- B. Dirty flame sensor element. (Rub sensor element briskly with steel wool or emery cloth.)
- C. Cracked insulator base on sensor
- D. Poor electrical connection
- E. Flame sensor tip touching metal
- F. Flame sensor tip not in burner flame. (See below for proper positioning.)



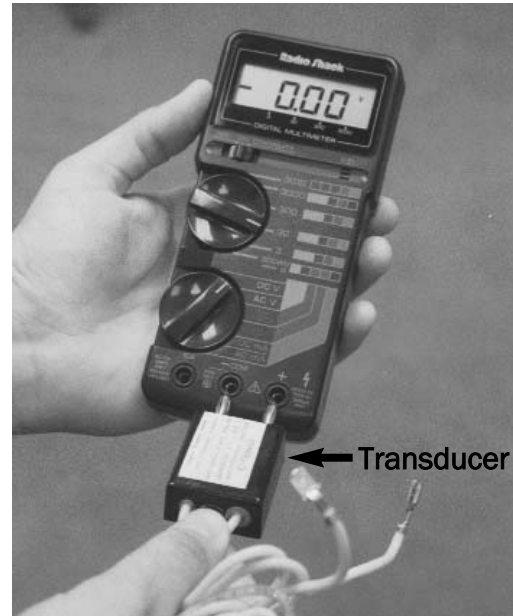
Any of the preceding conditions allow flame current to be "blocked" with subsequent extinguishing of the burner flame. Therefore, make sure these conditions do not exist before replacing the sensor.

If these areas have been checked, one final procedure is to check for proper flame sense current. This procedure requires the use of a signal transducer used in conjunction with a digital meter.

**Flame Sensor Tests****Signal Transducer:**

The signal transducer allows current measurements to be read from the D.C. voltage scale using the conversion 1 D.C. volt equals 1 D.C. microamp. The tester allows flame sense current measurements down to .01 MA (microamp).

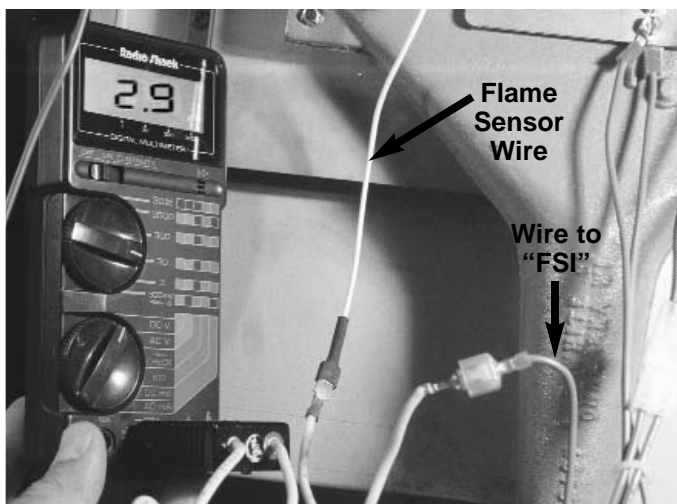
The transducer is designed to plug directly into a meter as shown. If your meter does not have a connector jack, simply apply the meter probes directly to the transducer's pins. Observe proper polarity. Failure to do so results in negative values being read.

**Testing Procedures:**

*Conduct this test with both access doors closed. Failure to follow this instruction will create disruption of proper sensing, with possible extinguishing of burner flame.*

**A. Initial Preparation**

1. Disconnect the heater from its electrical supply.
2. Set function selector switch on meter to D.C. voltage position.

**B. Test Kit Installation**

1. Disconnect flame sensor wire from terminal FSI on the ignition control module.
2. Connect the male terminal from the transducer to the female terminal of the flame sensor wire. Connect the female terminal of the transducer to the male terminal at terminal FSI on the control module.
3. Reconnect heater to electrical supply.

**C. Flame Sensor Check**

1. Start the heater and allow the ignition sequence to proceed until flame is firmly established. Crack open the burner access door slightly to allow just enough of a view. Make sure the flame sensor tip is at midpoint in the burner flame and is not touching any metal on the heater.
2. Note the reading on the meter. A slight fluctuation is normal. Readings will be anywhere from .50 MA (minimum) to 4.5 MA (maximum).
3. If the reading drops below .50 MA, the ignition module will eventually allow burner flame to be extinguished.
  - Shut off gas supply and disconnect heater from its electrical supply.
  - Allow heater to COOL.
  - Replace the flame sensor and retest.

# Component Testing

## High Limit Switch Tests

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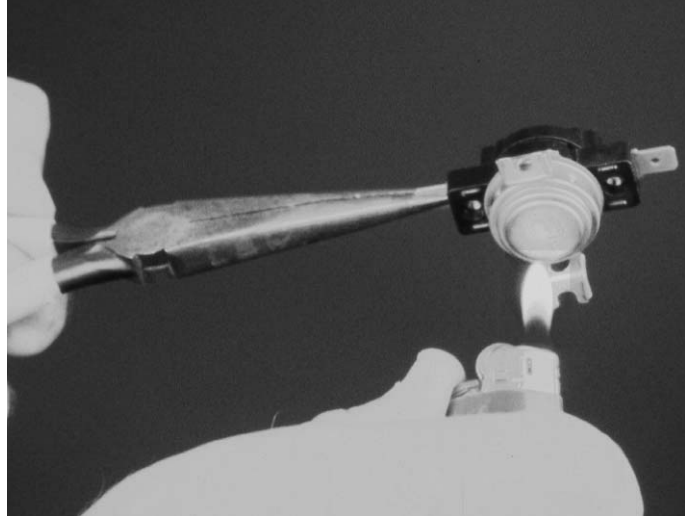
### Method of Test:

Disconnect the heater from its electrical supply before conducting this test.

Remove the switch from its location. Hold the switch by one of its legs with a pliers and apply a small flame only to the sensing portion on the back side of the switch. Be careful not to melt the plastic housing of the switch when conducting this test. Within 1 minute, you should hear a “pop” coming from the switch which indicates the electrical contacts have opened.

Let the switch cool down for about 10 - 20 seconds before firmly pressing the reset button on the switch. Check for continuity across the terminals of the switch to make sure the contacts are closed.

Reinstall the switch into the heater and reconnect heater to its electrical supply.



---

### ATTENTION

Model AB200 heaters incorporate a high limit switch with a sensing capillary. To test this switch, run a small flame back and forth along a 6 inch section of the capillary. Within 1 minute the electrical contacts of the switch should open. You may leave the switch in its mounted position to perform the test.

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# Wiring Diagrams

## Electrical Connection and Ladder Diagram

The wiring diagrams on the following pages are provided to give the qualified service person information on the interconnection and sequence of operation of the electrical components of various models of L. B. White hot-surface ignition heaters.

On more current models, typical location is the interior of the fan and motor access panel. Earlier models will have the diagram on the burner end panel, or within the "Master Control" panel.

Although the wiring diagrams appear to be the same, be aware there are differences in the color coding of the component interconnecting wiring. Also, the ignition control module of specific models may have different wiring designators.

To be sure of what diagram to use, always obtain the heater's model number and design sequence. This information is identified on the heater's dataplate. For earlier design heaters, the design sequence will be shown as the 6th digit of the model number. For heaters manufactured more recently, the dataplate will identify a configuration number. The design sequence is the first digit of the configuration number. Match this information to the models and designs given at the top of each of the following pages within this section.

The part number of the wiring diagram varies with model number and design sequence. Contact L.B. White Co., Inc.



### CAUTION




Refer to the heater's electrical connection diagram when servicing to avoid wiring errors and heater malfunction. Check for proper operation after servicing.

### ATTENTION

If any of the original wire as supplied with the heater must be replaced, it must be replaced with wiring material having a temperature rating of at least 302° F. (150° C.)

## Dataplate Comparison




### Without Configuration Number

**MODEL** AW075EHP3  
SERIAL NO.:  
**Design Sequence**

MAXIMUM INPUT: 75,000 BTUH  
TYPE FUEL: PROPANE VAPOR WITHDRAWAL  
BURNER MANIFOLD PRESSURE 11 IN W.C. AT MAXIMUM INPUT  
ELECTRICAL: 115 VOLTS A.C. 60 HZ SINGLE PHASE 1.4 AMPS  
MIN. CLEARANCES FROM HEATER TO ADJACENT COMBUSTIBLE MATERIALS: REAR 1 FT SIDES 1 FT  
TOP TO CEILING 1 FT BLOWER OUTLET 6 FT AND FUEL CONTAINER 6 FT  
VENTILATION: 450 CFM OF AIR REQUIRED TO SUPPORT COMBUSTION.  
MAXIMUM 13.5 INCHES W.C. AND MINIMUM 11.5 INCHES W.C. GAS SUPPLY PRESSURE  
ACCEPTABLE AT INLET OF HEATER FOR PURPOSE OF INPUT ADJUSTMENT.  
POSITION HEATER AWAY FROM LIVESTOCK  
AGRICULTURAL BUILDING HEATER

L. B. WHITE CO., INC. W6636 L.B. WHITE ROAD ONALASKA, WI 54650 608/783-5691

### With Configuration Number

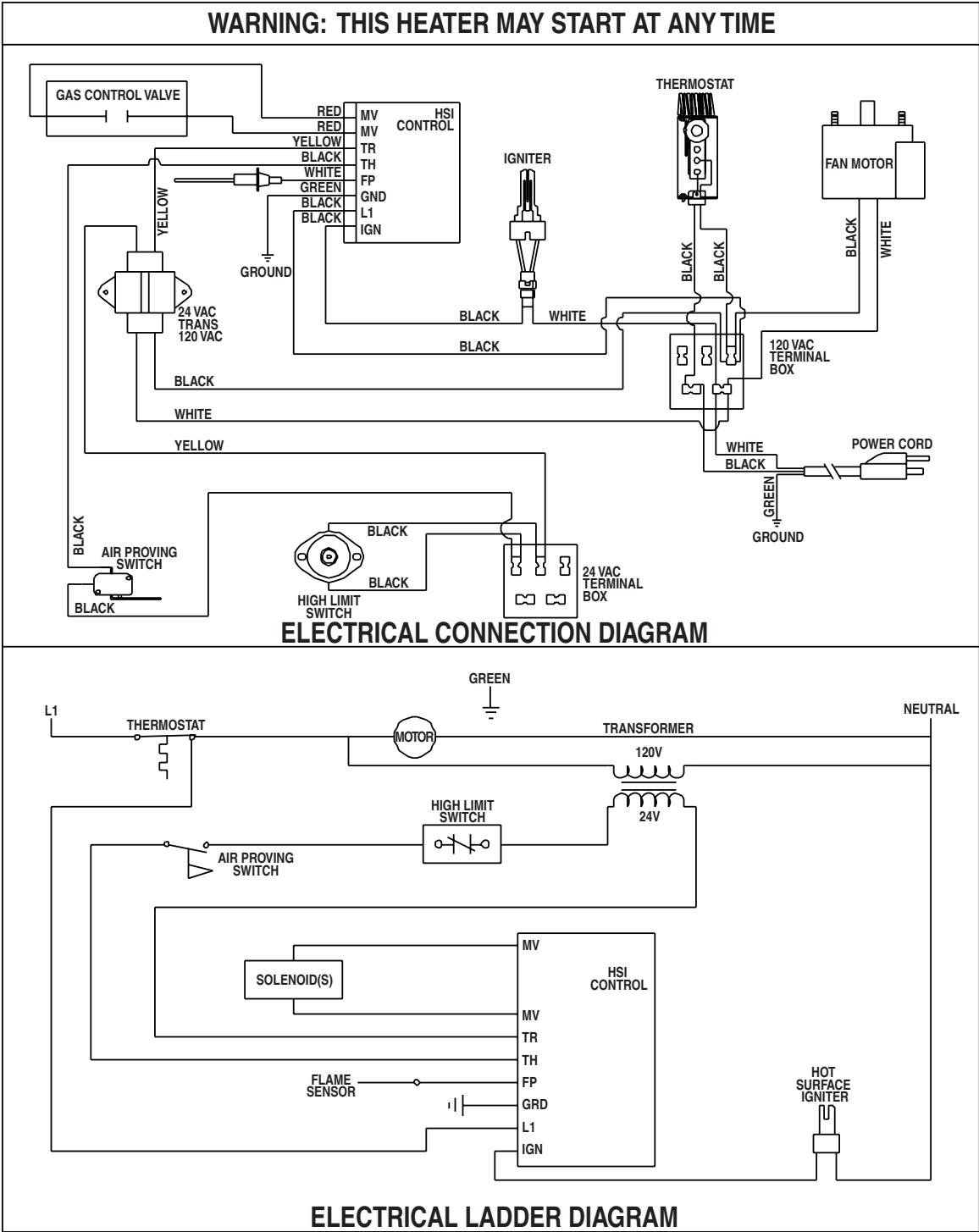
**MODEL** AW060  
CONFIGURATION NO. AHPD210000  
SERIAL NO.:  
**Design Sequence**

MAXIMUM INPUT: 60,000 BTUH  
TYPE FUEL: PROPANE VAPOR WITHDRAWAL  
BURNER MANIFOLD PRESSURE 10.0 IN W.C. AT MAXIMUM INPUT  
ELECTRICAL: 115 VOLTS A.C. 60 HZ SINGLE PHASE 1.5 AMPS  
MIN. CLEARANCES FROM HEATER TO ADJACENT COMBUSTIBLE MATERIALS: REAR 1 FT SIDES 1 FT  
TOP TO CEILING 1 FT BLOWER OUTLET 6 FT AND FUEL CONTAINER 6 FT  
VENTILATION: 240 CFM OF AIR REQUIRED TO SUPPORT COMBUSTION.  
MAXIMUM 13.5 INCHES W.C. AND MINIMUM 11.5 INCHES W.C. GAS SUPPLY PRESSURE  
ACCEPTABLE AT INLET OF HEATER FOR PURPOSE OF INPUT ADJUSTMENT.  
POSITION HEATER AWAY FROM LIVESTOCK  
AGRICULTURAL BUILDING HEATER

L. B. WHITE CO., INC. W6636 L.B. WHITE ROAD ONALASKA, WI 54650 608/783-5691

Wiring Diagrams

Used on:	Model	Design Sequence
	284	A
	285	A







# Electrical Connection and Ladder Diagram

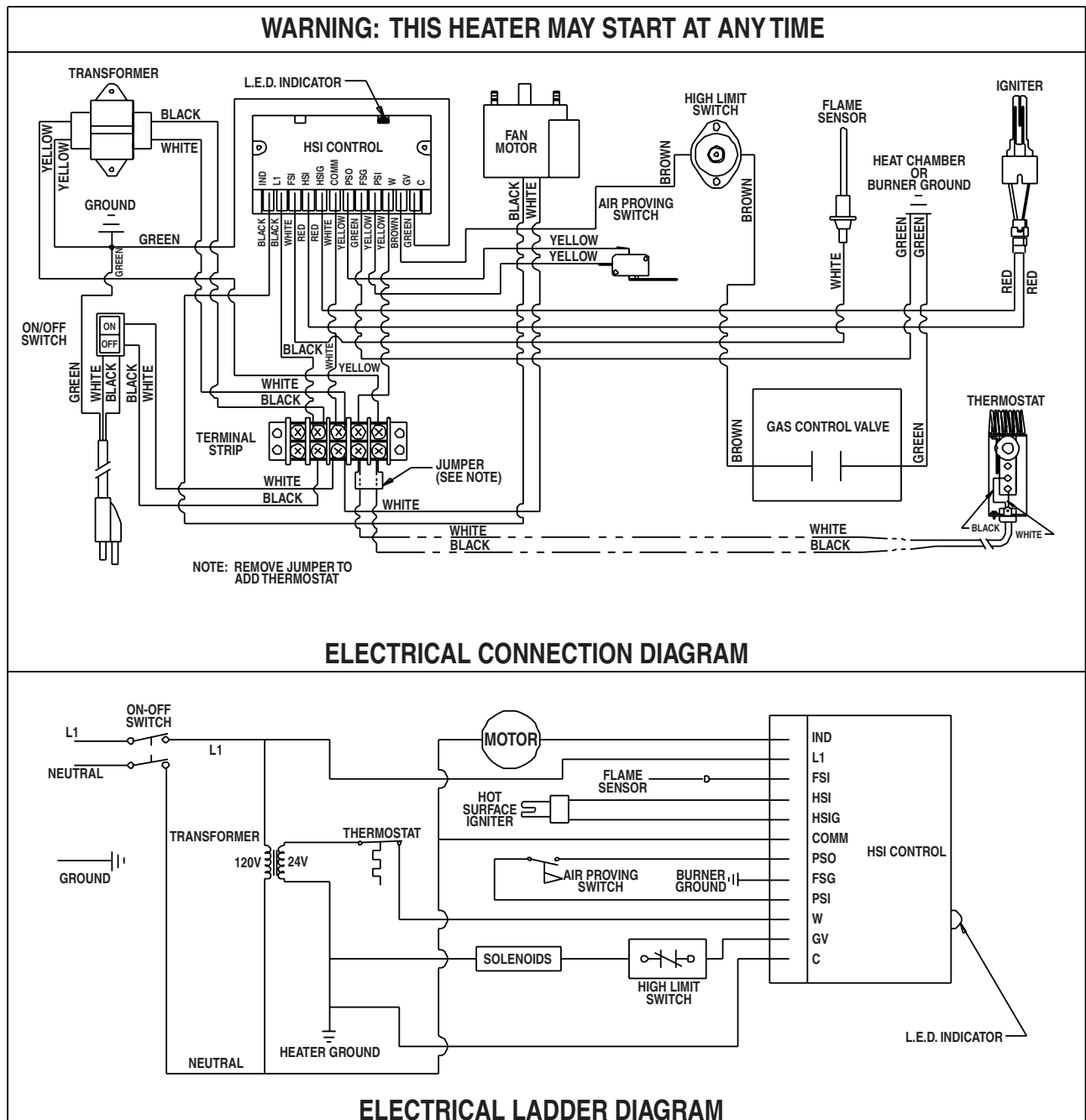
## Wiring Diagrams

Used on:

Model  
AW075  
AB200  
AW215  
AW230

Design Sequence

B, C and D  
B  
B  
C and D



# Electrical Connection and Ladder Diagram

## Wiring Diagrams



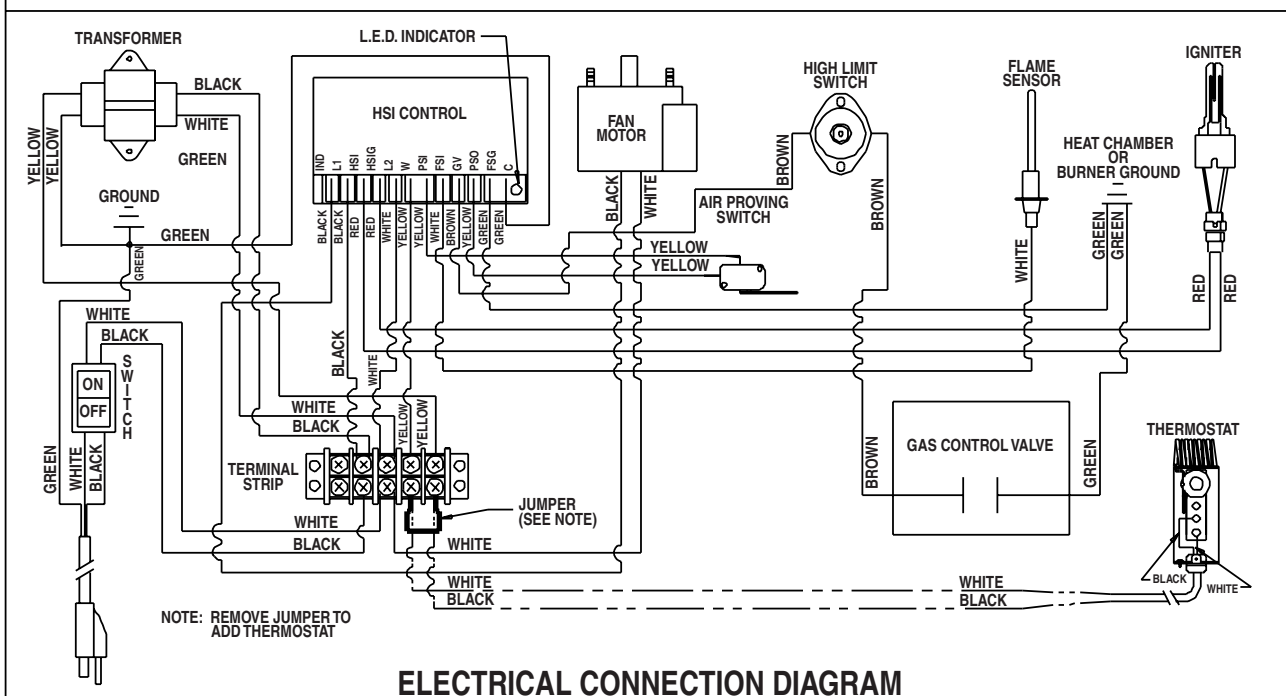
Used on:

Model  
AW075  
AB200  
AW215  
AW230

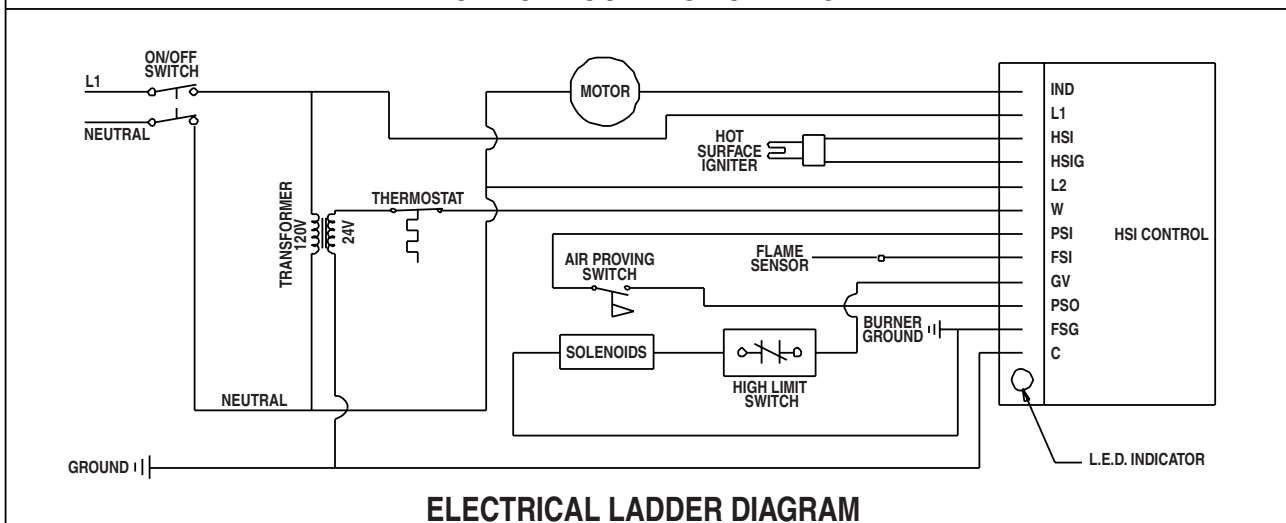
Design Sequence

E  
C  
C  
E and F

**WARNING: THIS HEATER MAY START AT ANY TIME**



**ELECTRICAL CONNECTION DIAGRAM**



**ELECTRICAL LADDER DIAGRAM**



**Used on:**

Model

AW060

AW100

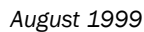
## AW250

## Design Sequence

A

A

A



# Electrical Connection and Ladder Diagram

## Wiring Diagrams



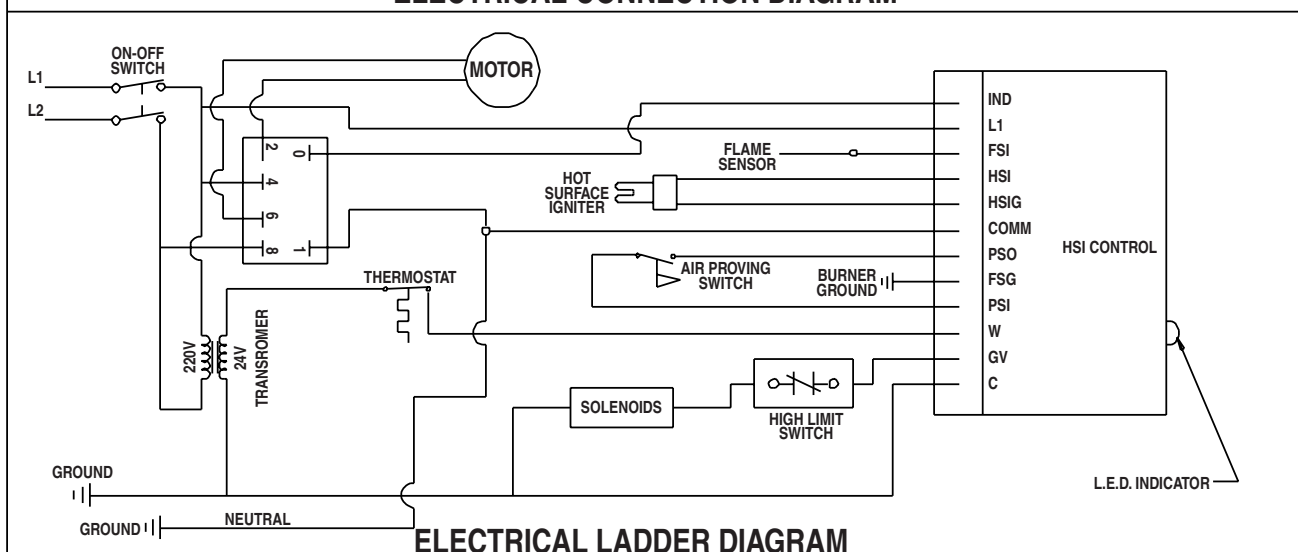
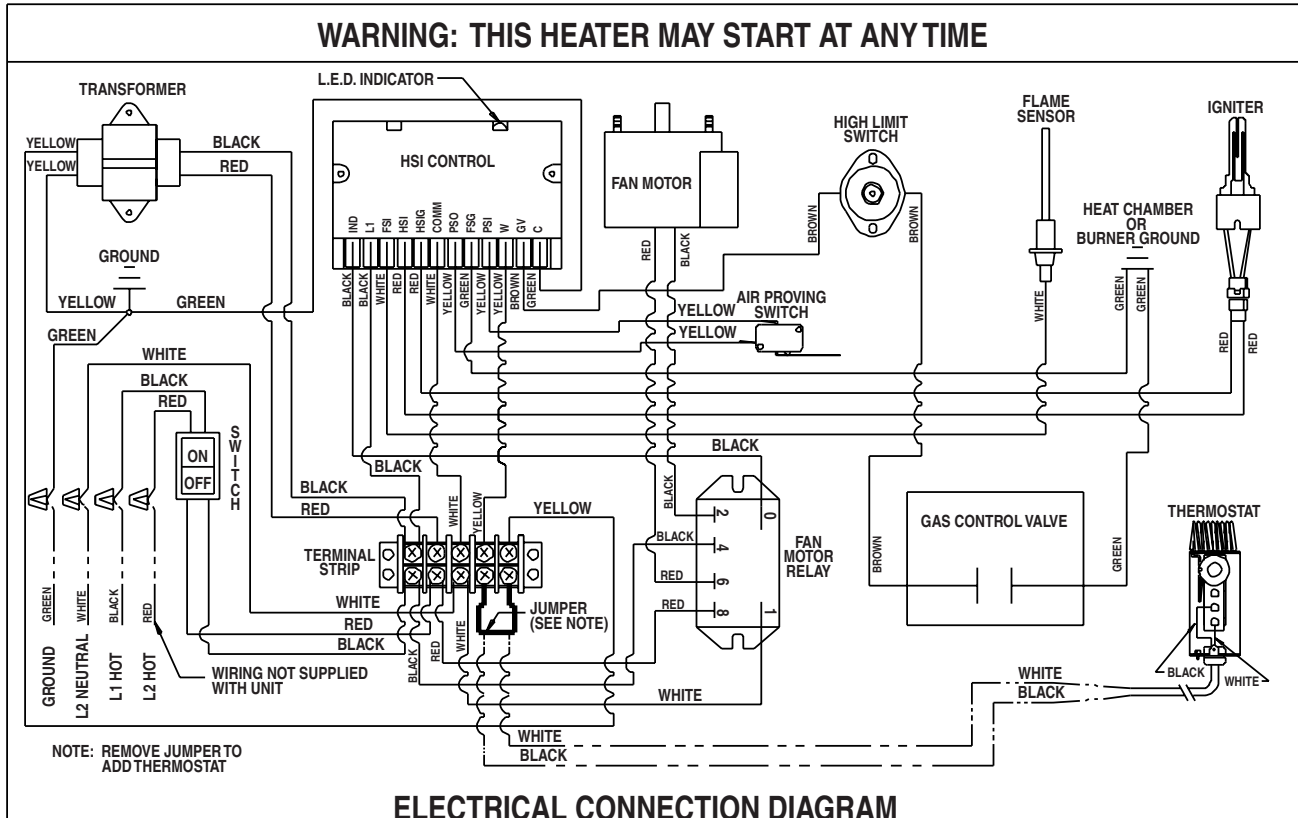
Used on:

Model  
AW325

Design Sequence

A

**WARNING: THIS HEATER MAY START AT ANY TIME**





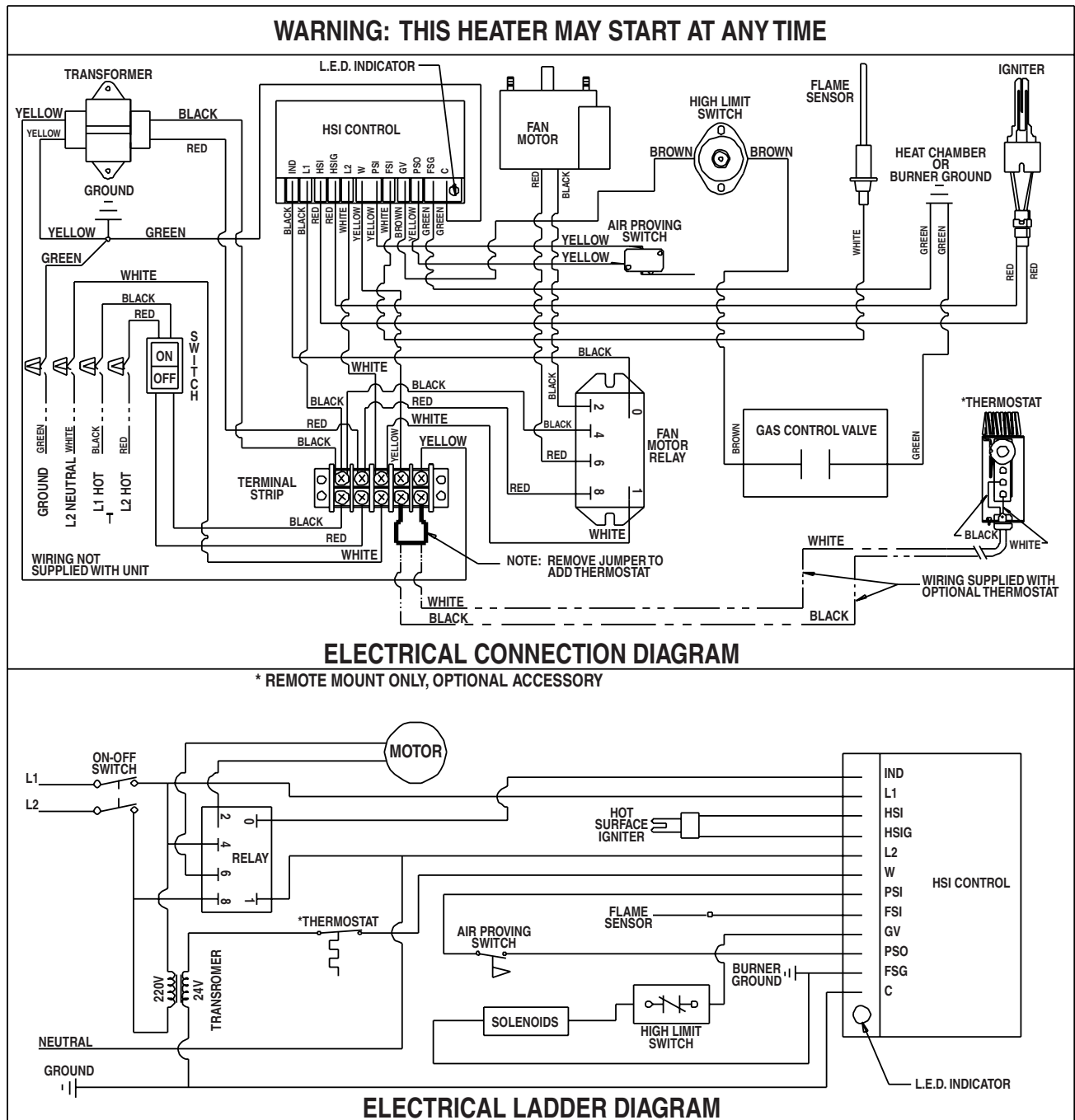
# Electrical Connection and Ladder Diagram

## Wiring Diagrams

Used on:

Model  
AW325

Design Sequence  
B





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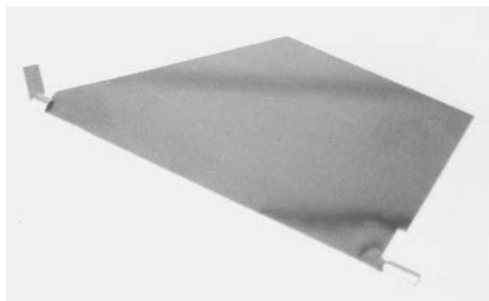
**Component Identification and Function**

All components must work together for proper heater operation. However, as with anything electrical or mechanical, problems may arise which will require you to

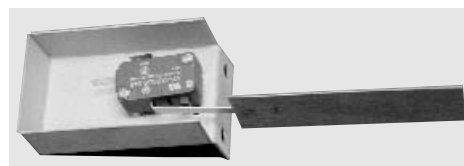
determine what malfunction has occurred. Before you start troubleshooting, it's a good idea to understand the components in their appearance and purpose.

**Main Operational Components****A. Air Proving  
Flapper**

A stainless steel flapper (sail) located in the blower outlet that upon an increase in air pressure generated by the fan and motor, lifts and pivots upward and engages the air proving switch arm, thereby closing the switch contacts, establishing that the motor is up to full speed and sufficient airflow is present.

**B. Air Proving  
Switch**

Safety device that proves that proper motor speed and airflow is being achieved before the gas control valve is opened. Some air proving switches incorporate a paddle welded onto its arm, whereas others work in conjunction with a flapper (sail). Their purpose is the same.

**C. Burner**

A device designed for the burning of gas or a gas/air mixture in the combustion zone.

**D. Fan Housing**

An assembly composed of the motor, fan wheel and housing for purposes of pulling air through the heater and discharging heated air into the room.



## Component Identification and Function

### E. Fan Wheel

Used in conjunction with the motor and fan housing to pull hot air from the heater and blow it into the room for heating purposes.



### F. Flame Sensor

Also known as a flame rod or flame probe, this device works in conjunction with the ignition module in proving that burner flame has been established.



### G. Gas Control Valve

A device which consists of a low pressure regulator and electrical solenoids which are used for the control of gas flow to the burner assembly. A feature of the control is a built in gas shut off which is used to isolate the heater from its gas supply when servicing.



### H. Gas Hose

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



### I. Heat Chamber

Metal "fire box" which is used to support the burner and fan assemblies while at the same time providing an area where combustion of gas occurs.



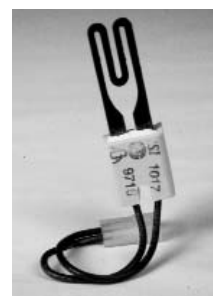


## Component Identification and Function

**J. High Limit Switch** A manually resettable temperature activated switch. Its purpose is as a safety device wired into the control system to sense when an overheat condition occurs, either at the heat chamber or blower outlet. The switch "opens" the electrical circuit to the gas control thereby shutting off gas flow. The switch has a button located in its center that will need to be pushed in to reset the contacts if the contacts open due to an overheat condition.



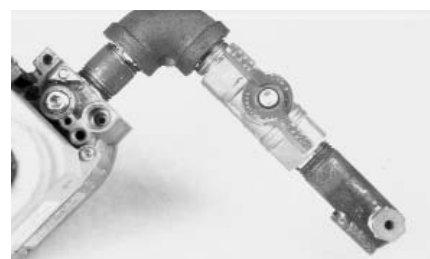
**K. Hot Surface Igniter** Electrical ignition device used on automatic ignition control systems. Ignites gas by surface temperature rather than by spark or flame.



**L. Ignition Control Module** Controls the ignition sequence and operation of the heater as well as monitoring the safety devices. A major service feature is the board's ability to diagnose component and flame failure by means of a diagnostic light located within the module. This light will provide a specific flash pattern repetitively, depending on the type of component failure that has occurred.



**M. Manifold** Series of nipples or elbows that convey the gas from the outlet of the gas control valve to the burner orifice.



**N. Motor** An electrically powered device, located in the air housing, in conjunction with the fan wheel to circulate air in the confinement area.



## Component Identification and Function

### O. Motor Relay

Used on heaters with motors rated at 220 VAC. This device is wired between the ignition module and the motor and will feed voltage to the motor upon receipt of voltage from the ignition module.



### P. On/Off Switch

Simple electrical device used to supply and disconnect incoming line voltage at the electrical control panel of the heater.



### Q. Orifice

Metering device which is drilled to a specific diameter to allow a volume of gas to be fed through the burner at the stated manifold pressure (see dataplate) to achieve proper heat output.



### R. Regulator

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



### S. Thermostat

Electrical control which is basically used as an "on/off" switch that responds to changes in room temperature.



### T. Transformer

This device is responsible for reducing a higher incoming voltage (normally 120 V.A.C.) to a lower outgoing voltage. The lower voltage (24 V.A.C.) is essential to operate the ignition control module.



## Ignition Control Module Change-Out

Following this procedure will eliminate the risk of errors in reconnecting the module which can lead to heater malfunction.

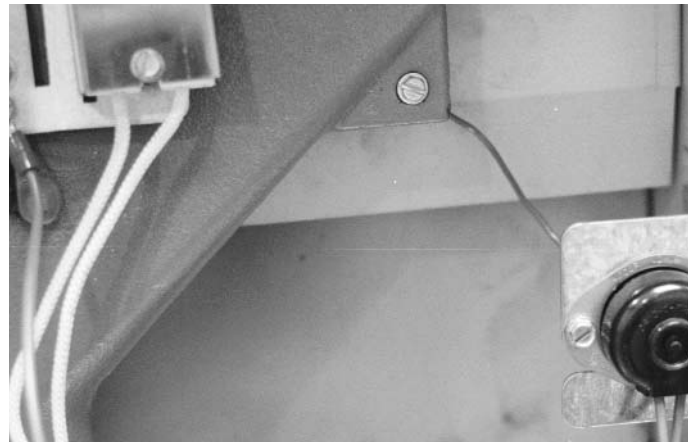
1. Close all fuel supply valves to the heater and disconnect the heater from its electrical supply.
2. Open the control box door (if applicable).

### ATTENTION

Do not immediately begin to disconnect the electrical leads from the control module unless you are familiar with the control module's wiring designators and associated color code of wiring.

3. Position the replacement module near the module in the control box.
4. Transfer the electrical leads one at a time from one module to the other by matching up the wiring designators until all leads are reconnected to the proper designator on the replacement module.

5. Remove the mounting screws that secure the module to the control box.
6. Mount the replacement module in the control box using these screws and tighten securely.
7. Reconnect the heater to its electrical supply and open the fuel supply valves to the heater.
8. Start the heater and check for proper operation.



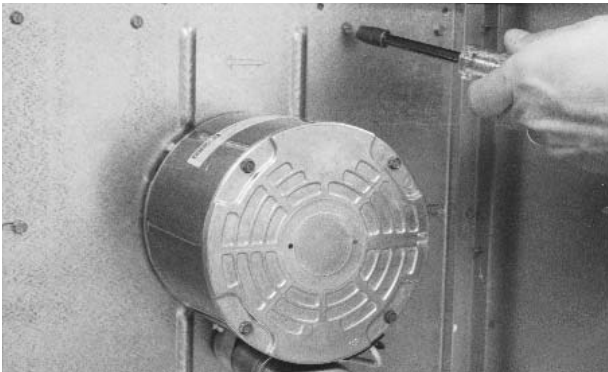
# Servicing Instructions

## Fan and Motor



### Cleaning the Fan:

1. Shut off the gas supply to the heater and disconnect the heater from its electrical supply.
2. Open or remove the access panel on the end of heater opposite burner.
3. Disconnect the motor leads.
4. Remove the screws that secure the motor mount plate to the fan housing.
5. Lift and pull the motor and fan assembly from housing.
6. Clean the fan wheel using a soft brush, rag, or compressed air, paying particular attention to individual fan blades to remove dirt build up.

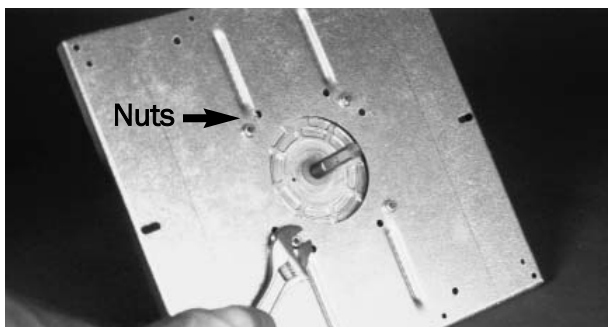


### Motor and Fan Replacement:

1. Follow steps 1 - 5 above.
2. Loosen the set screw(s) on the fan wheel.
3. Pull the fan wheel from the motor shaft. Use a wheel puller, if necessary. All L.B. White fan wheels incorporate a wheel puller groove on the fan hub to assist in fan removal.



4. Remove the nuts that hold the mounting plate to the motor.



5. To reinstall motor and wheel, reverse these procedures.

### IMPORTANT

- Make sure that the fan does not rub on the inlet ring of the fan housing.
- Make sure set screw(s) of fan are on flats of motor shaft when tightening.
- Fan wheel to motor mount plate spacing must be at proper clearance before tightening fan to shaft. Refer to the following table and illustration.

Model	Clearance
AW060/AW100	1/4 in.
AB200/AW075/AW215 AW230/AW250/AW325	1/8 in.



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**Air-Proving Flapper (Sail)**

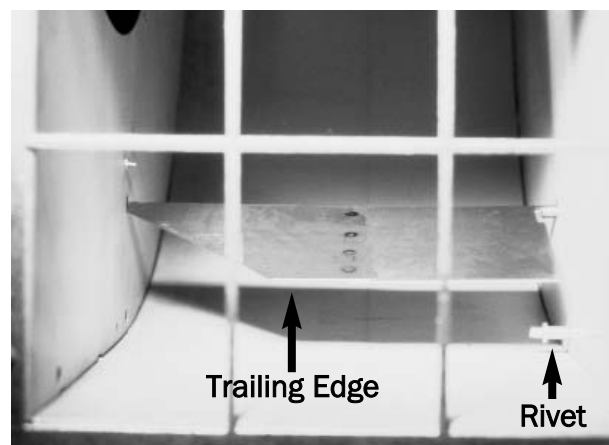
The flapper is located in the blower outlet. As discussed in Section 9.1, Component Identification and Function, its purpose is to assist the air-flow switch in establishing proper air pressure and, therefore, fan speed is achieved before the

gas valve opens. However, over a period of time, the flapper may accumulate deposits of dust or dirt affecting its ability to pivot, thereby creating system failures. It then will be necessary to check this mechanism for operation.

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**Cleaning/Adjusting Procedure:**

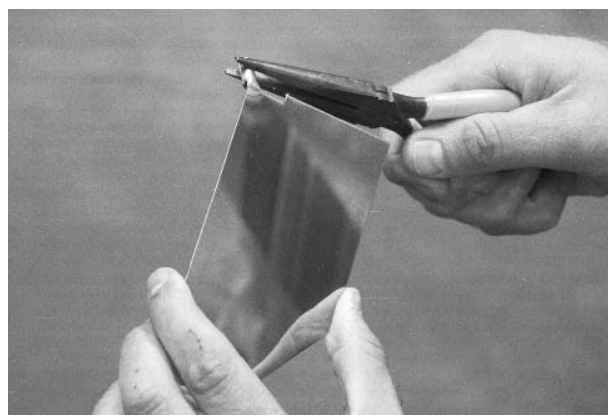
1. Disconnect the electrical supply and shut off gas to the heater.
2. Make sure the sail moves up and down freely. Check for debris, burrs or housing alignment that would cause the pivot points of the flapper to bind. Clean with a soft brush or compressed air if necessary.
3. The arm of the flapper should engage the arm of the switch when the trailing edge of the flapper body is lifted approximately 1 1/4 in. to 1 3/8 in. off the housing bottom or rivet (if supplied). At this distance you should hear an audible click which are the contacts closing within the switch.
4. If the switch contacts do not close within this distance, then manually push in the switch arm to make sure the switch is not defective. If a "click" is heard, normally the switch is good and the sail arm then needs to be adjusted. (If in doubt, check for continuity.)
5. Using a needle nose pliers, gently bend up the arm of the flapper (**NOT THE SWITCH ARM**) in increments until the sail arm engages the switch arm, closing the contacts of the switch when the sail body trailing edge is 1 in. up off of housing bottom or rivet.



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**Replacing the Flapper:**

If the flapper ever needs replacement, you will need to remove the fan and motor assembly from the housing. (See Section 6.2) You can now pull up on the main body of the flapper, thereby popping it from its mounting holes. To replace the flapper, bend the pivot point (opposite air-flow switch) down just enough so it allows the flapper to mount in the support holes. Once installed, push down with enough force nearest this pivot point to realign the pivot and the flapper body. Test the flapper to make sure that its arm engages the air-flow switch arm properly and that the contacts of the switch close within the prescribed distance.



# Servicing Instructions

## Air-Proving Switch



### For Heaters With Flapper:

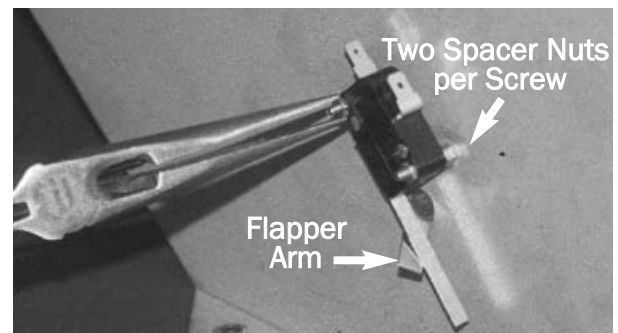
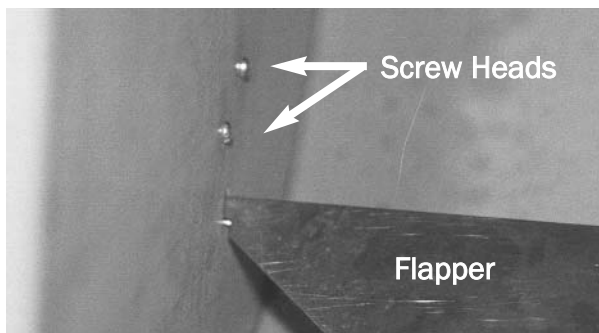
1. Shut off gas supply and disconnect heater from electrical source.
2. Disconnect air-proving switch leads.
3. Some models may have the air-proving switch mounting nuts located on the inside of the fan housing. Remove the motor and fan assembly from the housing. Remove the nuts and pull the switch and screws from the housing.
4. The replacement switch will ship with appropriate quantity of nuts and two screws. Mount the

replacement switch so each mounting screw head is located **inside** the fan housing with threads exposed to the switch side of the housing.

Make sure on reassembly that two nuts per screw are used as spacers between the switch and housing side panel. These nuts are tightened securely against the housing side panel. Slide the switch onto the screws and secure the switch in place using the two remaining nuts.

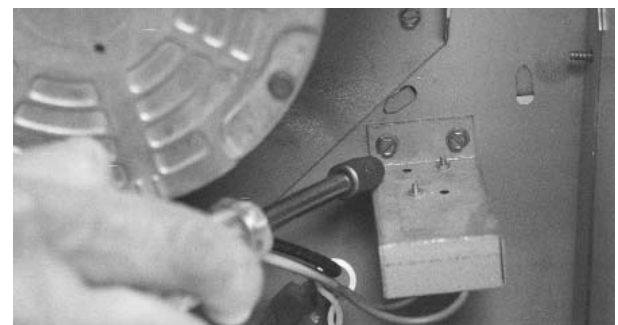
#### NOTE:

When replacing the switch, make sure the arm of the switch is located above the flapper arm.



### For Heaters with Air-Proving Switch and Paddle:

1. Shut off gas supply to heater and disconnect heater from its power source.
2. Open case access panel on fan motor end of heater.
3. Remove two (2) sheet metal screws holding the air-proving switch with bracket to blower housing. Remove the assembly by turning switch assembly 90° so the paddle on the switch arm can be pulled through oblong hole on side of fan housing.
4. Disconnect the leads from the air-proving switch.
5. The replacement switch will be mounted to its bracket.
6. To install switch with bracket, reverse above procedure.



#### IMPORTANT

Make sure you don't bend the switch arm when installing the replacement switch. Bending the switch arm may create ignition problems later.

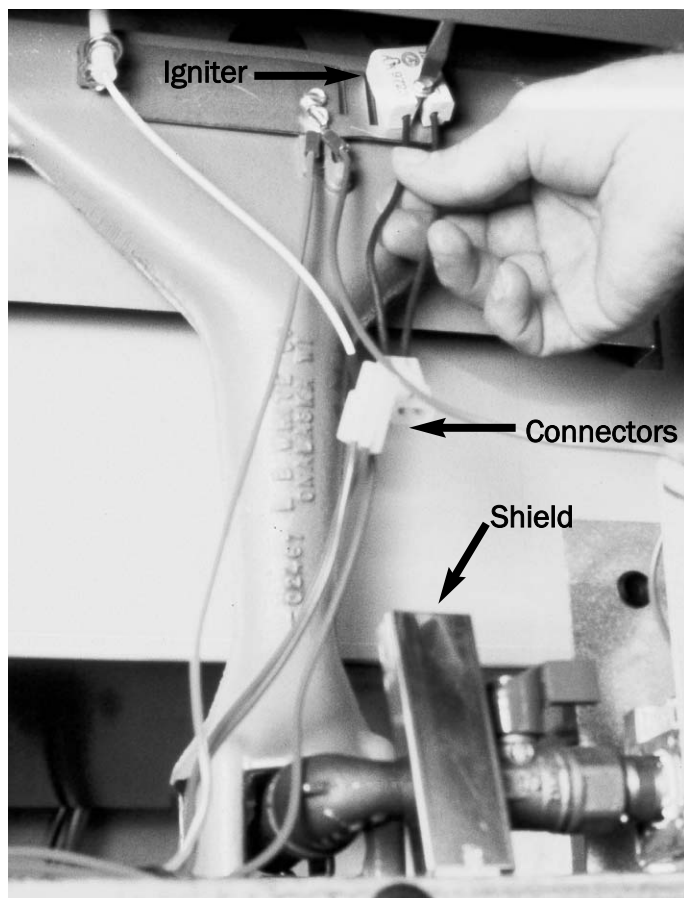
**Hot Surface Igniter Replacement**

**MAKE SURE THE IGNITER AND THE BURNER ARE COOL TO TOUCH BEFORE REPLACING IGNITER.**

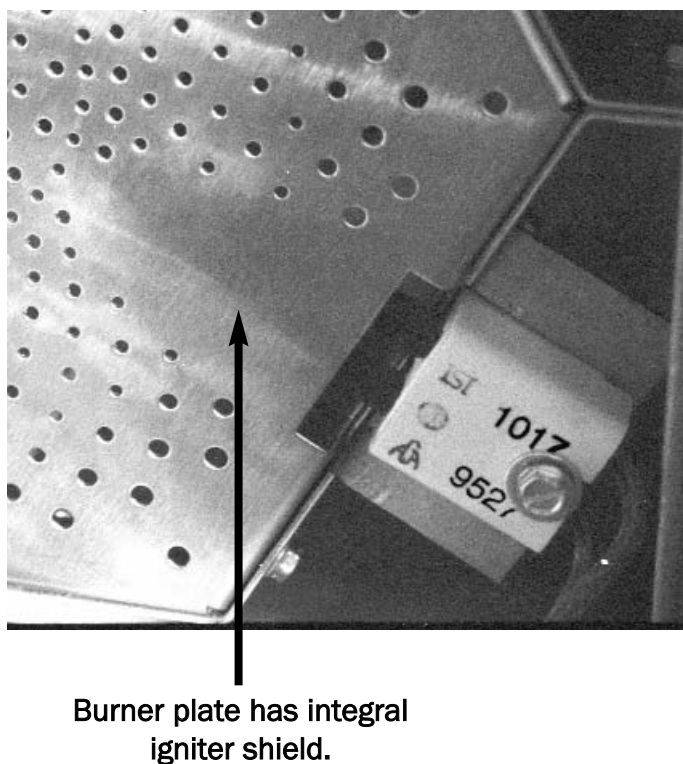
**Procedure:**

1. Shut off the gas supply to the heater and disconnect the heater from its power supply.
2. Open the burner end access panel.
3. Regardless of burner design, disconnect male and female connectors located at the end of igniter leads and loosen the screw securing the igniter shield (if applicable) and igniter to mounting bracket.
4. Remove the igniter and the igniter shield (if applicable) from its mounting bracket.
5. Connect the replacement igniter to its power supply wiring.
6. Slide the igniter and igniter shield down over the mounting screw so the mounting slots of these components straddle the screw.
7. Tighten the screw snugly. **DO NOT OVERTIGHTEN.** Overtightening can cause cracks in base of igniter, possibly leading to future igniter failure.

**Heaters with Cast Burner**



**Heater with Burner Plate**



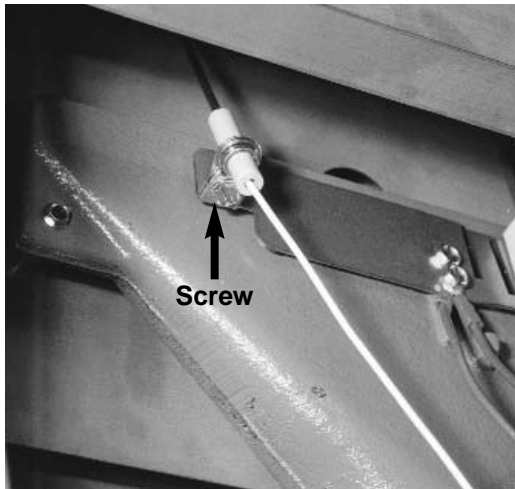
Burner plate has integral  
igniter shield.

# Servicing Instructions

## Replacement of Sensor

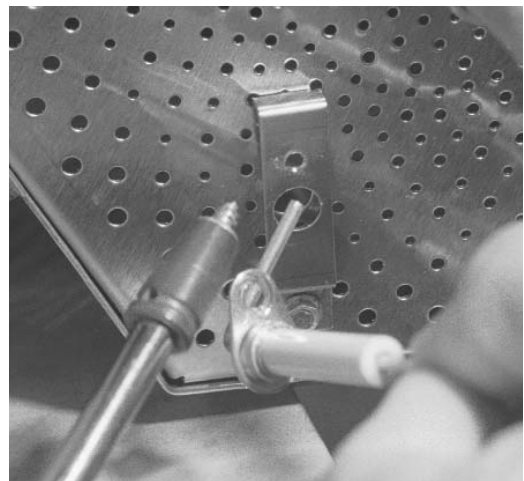


1. On units with cast burners, the sensor is located near the igniter mounted on the same metal bracket as the igniter. Units with a burner plate have the sensor mounted on a small support bracket.



2. Use the proper nut driver or screwdriver to remove the sensor's mounting nut or screw (depending on model).
3. Disconnect the sensor from the supply wiring.

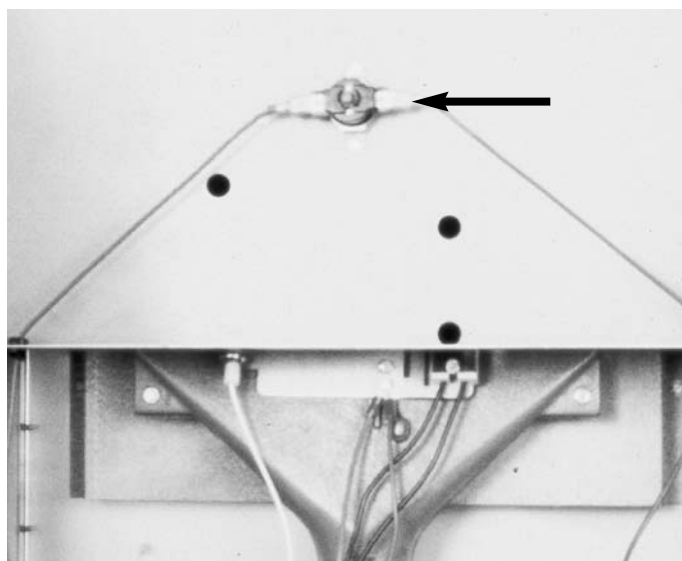
4. Replace with new sensor. For units with cast burner, the sensor tip must be properly positioned within the burner flame. Normally 1/2 in. is sufficient. On units with a burner plate, the sensor is pre-formed and will be self-located when remounted back onto the support bracket. The clearance of the sensor rod to burner plate on the burner flame side of the plate must be 1/8 in.



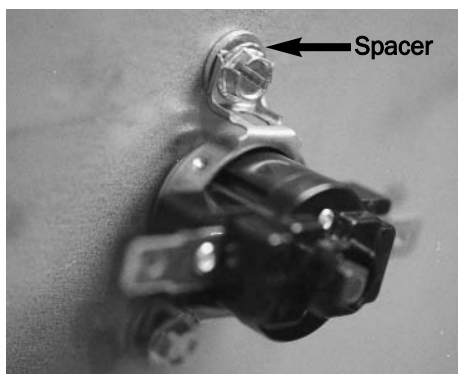


## High-Limit Switch Replacement

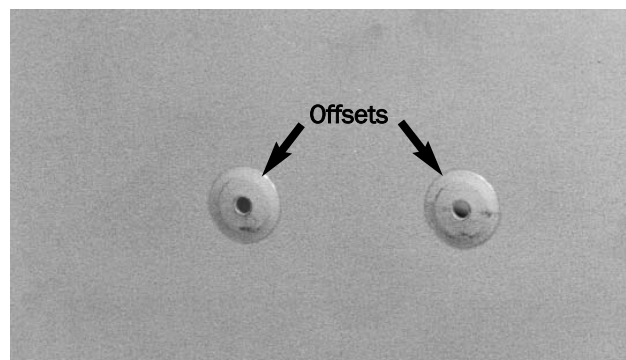
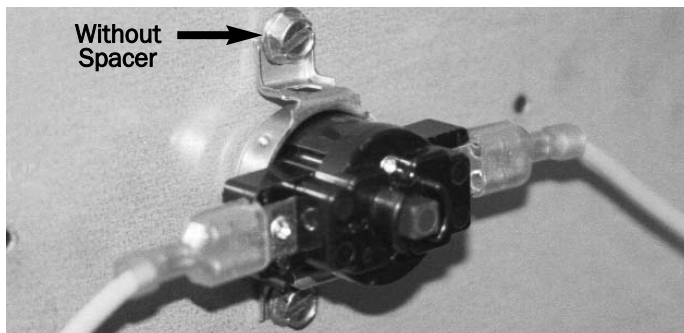
Very little actual servicing of the high-limit switch is required. However, it is good to know the location of the switch when working on the heater. Typically, the switch is located on the heat chamber face or at another similar location at the burner end of the heater. Some models may have the switch located on the housing at the motor end of the heater, or on a bracket near the burner.



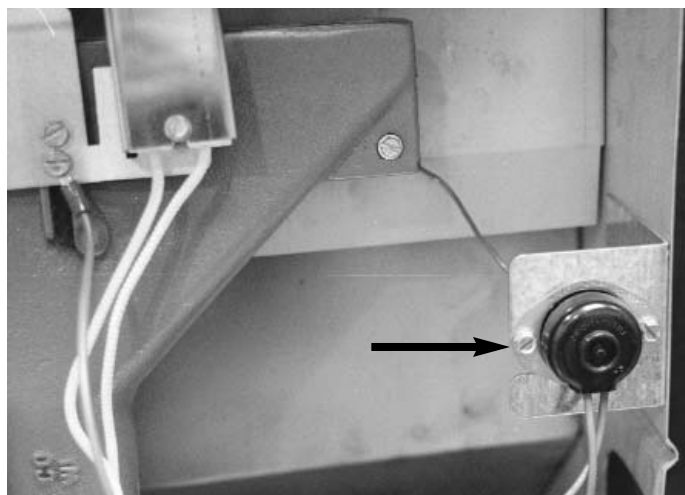
Depending upon model, and design sequence, some heaters used a spacer between the legs of the high limit switch and the heat chamber. These allowed the switch to open at the proper temperature. If your heater is so equipped, insure the spacers are reinstalled prior to mounting the switch. Spacer thickness may vary with model and design. Refer to appropriate parts list for part number.



Other heater designs may have the switch mounted without spacers directly to the flat of the heat chamber face or to formed offsets which act as spacers. Familiarize yourself with switch mounting characteristics.



Specifically relating to the AB200 heater, the high limit consists of capillary and switch mounted to a bracket near the burner. If switch replacement is necessary you will need to route the capillary behind the burner, and then across the heat chamber face, allowing 12 inches of capillary to be in contact with the heat chamber. The capillary is held in position by tabs that are formed from the heat chamber. Insure you have also installed the spacer clips on the capillary to prevent premature high limit tripping.



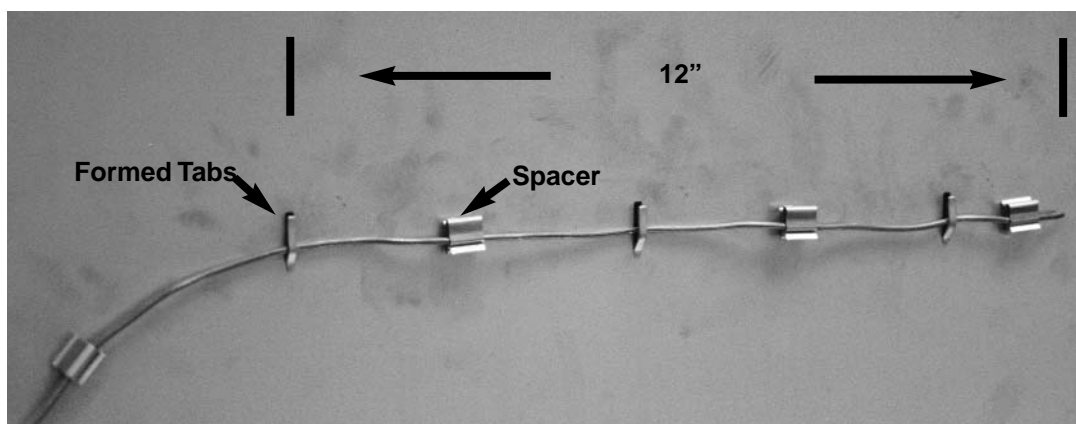
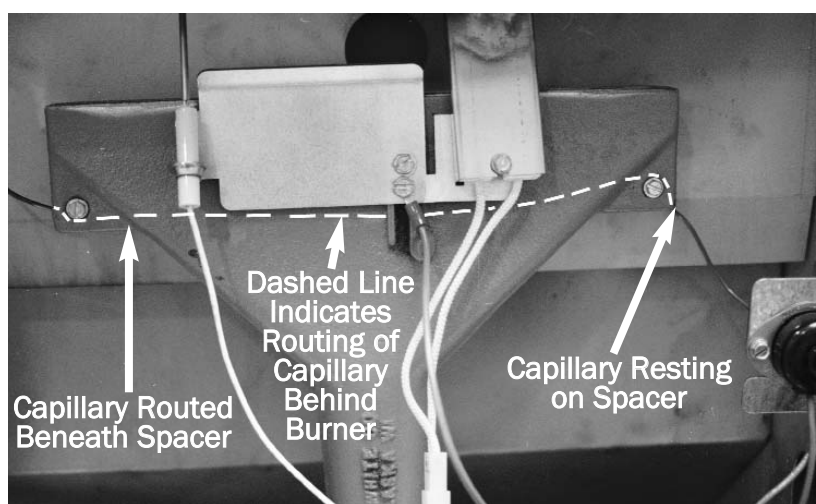
# Servicing Instructions

## High-Limit Switch Replacement



### ATTENTION

- Four spacer clips are required per switch (spacer part #130-09051).
- Install and position the spacers as illustrated.
- Do not kink the capillary tube, or pinch it between the formed tabs and the heat chamber by using unnecessary force. Capillary damage with subsequent switch failure will occur.



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**Burner and Burner Orifice**

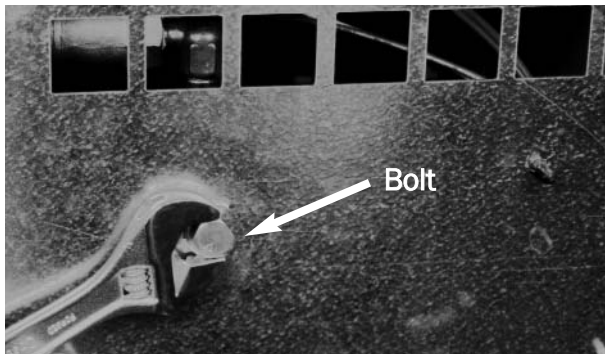
Over a period of time, the burner and orifice may start to become blocked if proper cleaning is not conducted. This can create poor burning of the fuel gas, resulting in nuisance

heater problems. This section covers heaters with cast burners and burner plates. If cleaning is necessary, refer to the following instructions:

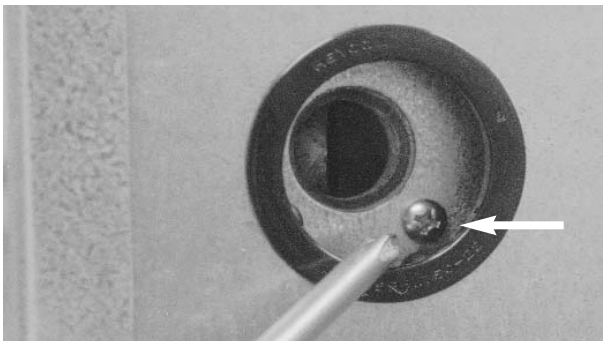
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**Heaters with Cast Burners:**

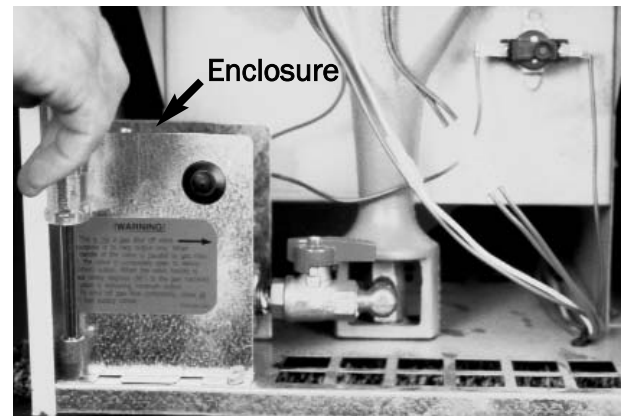
1. Shut off the gas supply to the heater and disconnect the heater's electrical supply. Allow heater to cool.
2. Remove the hose and sediment trap from the inlet of the gas control valve.
3. Remove the retaining bolt located on the underside of the heater. This bolt holds the burner into a fixed position.



4. Open the burner end access panel.
5. Remove the protective cover from over the control valve (if applicable).
6. The gas control valve with manifold can now be readied for removal from the heater. This procedure varies slightly depending on model and age of the heater. Some models allow the valve to be removed from its metal enclosure by removing two screws that can be accessed at the control valve inlet.

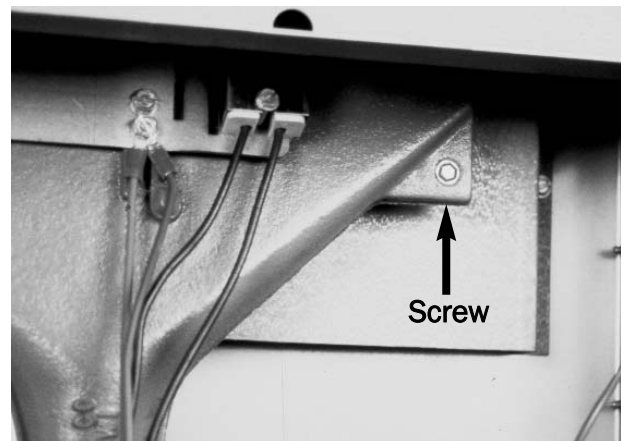


Other models may require removal of the valve enclosure mounting screws to allow removal of the enclosure, with valve and manifold assembly, from the heater.



Specific models such as AW060 and AW100 models may have a "tab and slot" configuration on the back side of the valve mounting bracket that assists in holding the valve enclosure to the base. Pull the valve enclosure assembly forward to release the tab of the enclosure from the slot in the base.

7. Remove the two screws and spacers located at the right and left hand top of the burner casting (if applicable).

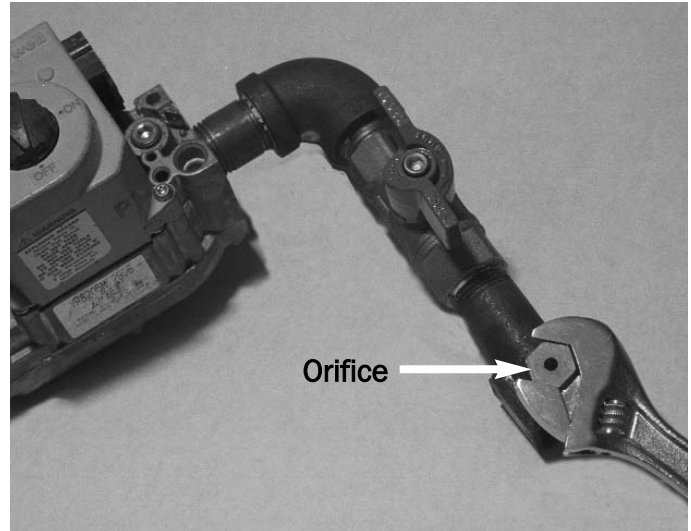


# Servicing Instructions

## Burner and Burner Orifice



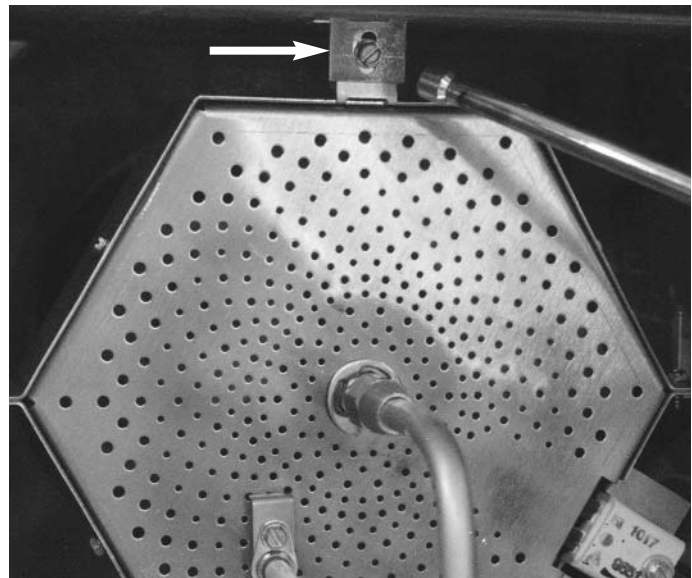
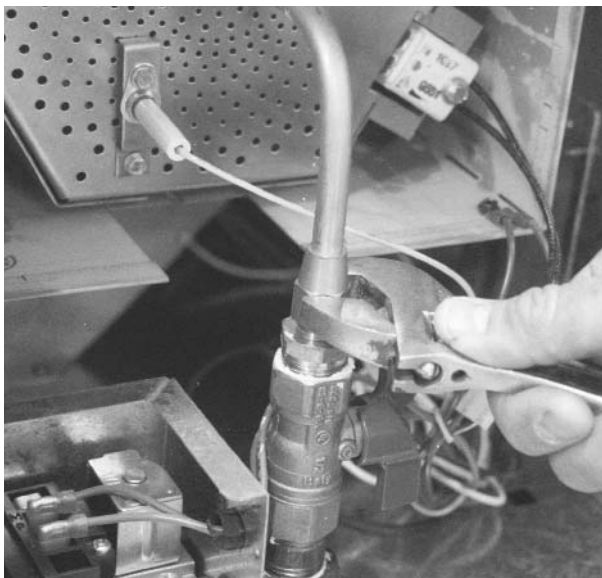
8. Disconnect the wires from the gas control valve, burner casting ground wires, igniter, and flame sensor wires.
9. Remove the burner and valve/manifold assembly from the heater. Some larger models may require you to pivot the valve and manifold assembly to remove the orifice from beneath the burner.
10. Hold the burner casting up to a light. If it appears plugged, then use compressed air to try and remove the blockage. If this is not successful, straighten a wire coat hanger and push it down through the slot at the top of the casting, moving it around vigorously to dislodge any blockages. **Be careful not to damage the igniter.** Blow out again with compressed air.
11. Check the orifice for external build up of dust. Brush or blow off as necessary. If it still appears plugged, remove and inspect the burner orifice. Blow out the orifice hole with compressed air until the hole is open. Also, inspect the manifold area into which the orifice was threaded to make sure there aren't any blockages. If necessary, remove that portion of the manifold and clean it also.



12. Reassemble all components. Use pipe thread compound on threaded connections.
13. Restart the heater. Check for proper burner flame characteristics and for gas leaks.

## Heaters with Burner Plates:

1. Shut off the gas supply to the heater and disconnect the heater's electrical supply. Allow heater to cool.
2. To remove the burner plate, loosen the compression fitting at the throttle valve outlet.
3. Remove **only** the screw in the 12 o'clock position above the orifice and simply lift the burner plate from its position to view the burner orifice on the opposite side of the burner plate.



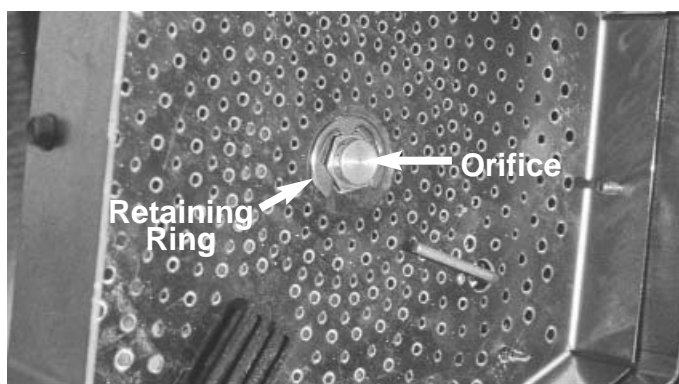
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**Burner and Burner Orifice**

4. Check the orifice for blockages at all twelve holes. Blow out or brush off as necessary. Also, blow or brush off the burner plate. If the orifice holes cannot be freed of blockages, then replace the orifice. Do not attempt to poke any instruments into the holes.
5. To remove the orifice, pry off either of the retaining rings holding the orifice in place. The replacement orifice ships with both bowed and flat retaining rings.

The flat retaining ring holds the orifice on the flame side of the burner plate. The bowed retaining ring holds the orifice in place on the gas inlet side of the orifice.

6. Reassemble all components.
7. Restart the heater. Check for proper burner flame characteristics and for gas leaks.



# Servicing Instructions



## Removing Control Box Assembly on Guardian Style Heaters

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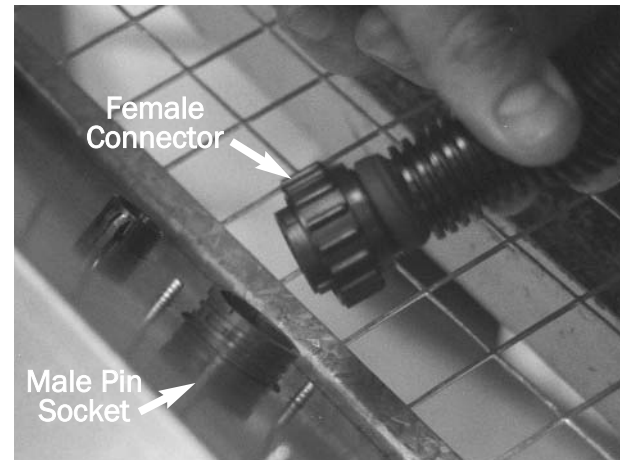
The heater incorporates a unique service feature which is a removable control box assembly. The control box is connected to the heater's electrical components by means of 9-pin female/male connector harnesses. Simply removing several screws and disconnecting the harnesses allows the service person to remove the entire control box. This is a major benefit if the control panel is ever damaged and needs to be completely replaced, or if bio-security is in effect at a site and the ignition module replacement must be made by a non-qualified individual who is employed by the site.

1. Shut off gas supply to heater and disconnect the heater from its electrical supply.
2. Remove the top two sheet metal screws on each side of the control box.



3. Loosen the bottom screw on each side of the control box.
4. Pivot the control box forward, exposing the wire harness connector socket. Turn the wire harness

connector with 9 female pins socket (located on back of box) counter-clockwise.



5. Remove the bottom screws from each side of the control box.
6. To assemble, reverse above procedure.

---

### ATTENTION

- The wire harness connector sockets are “keyed” so that they connect together in only one manner.
  - Make sure the socket heads are not cross threaded.
  - Turn the locking collar on the female socket until it locks into place.
  - Failure to properly connect the male and female wire harnesses will create poor electrical connections possibly resulting in heater failures.
-

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**Leak and Gas Pressure Checks**

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**Equipment Required:**

- Certified Leak Detectors
- 1 - 3/16 Hex Head Allen Key
- 2 - Low Pressure Gauge Kits,  
Part Number 550-00764

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**ATTENTION**

This procedure is to be done once a year prior to the heating season, any time the appliance is moved from one location to the other, or after servicing the heater.

**WARNING****Fire and Explosion Hazard**

- Do not disassemble the gas control valve.
- Do not attempt to replace any components on 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 to humans and livestock, and building damage.

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**ATTENTION**

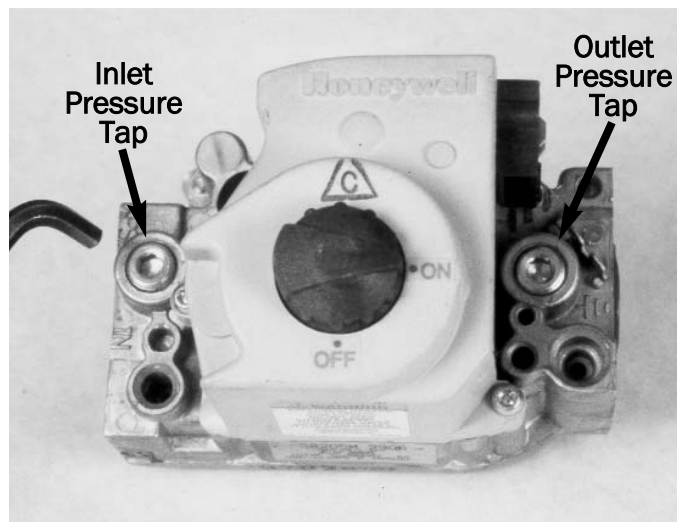
- The following explains a typical procedure to be followed in checking gas pressures on control valves.
- The gas pressures will vary depending upon heater model and fuel type.
- Consult the dataplate or the heater specification on pages 4 and 5 in this guide for specific pressures to be used in conjunction 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. Make sure all threaded connections to the inlet of the control valve are tightened securely. Obtain two pressure gauges capable of reading up to 35 in. W.C.
2. Disconnect the heater from the electrical supply and close the fuel supply valve to the heater inlet.
3. Open or remove the burner access panel, if applicable. Remove the protective cover from over the control valve.
4. Brush or blow off any dust and dirt on or in the vicinity of the gas control valve.

**B. Gauge Installation**

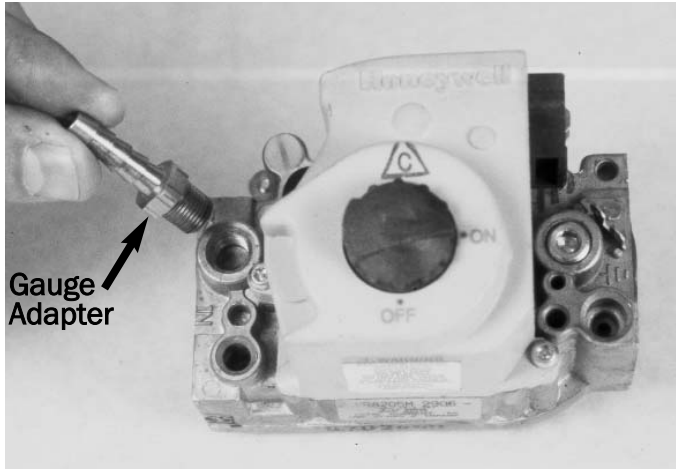
1. Locate the inlet and outlet pressure taps.



2. Using a 3/16 in. allen key, remove the taps at the inlet and outlet of the control valve and install a threaded gauge adapter and a low pressure gauge at these points. Since some heaters used control valves from different manufacturers, the location of the pressure taps may vary slightly.

# Servicing Instructions

## Leak and Gas Pressure Checks



Valve shown is outside of heater for clarity of view.

### C. Leak Check

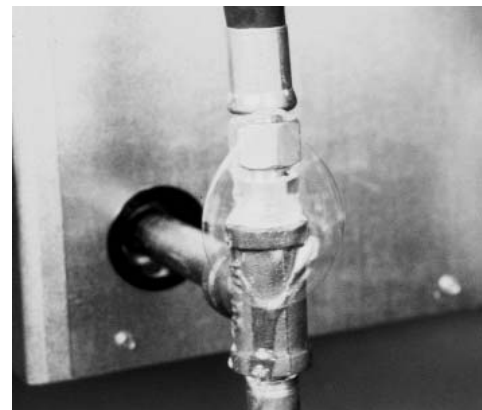
#### **WARNING**

##### 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.

1. Check all connections for gas leaks using approved gas leak detectors. Gas leak testing is performed as follows:

- a. 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.
- b. Tighten the gas connections as necessary to stop the leak.
- c. After all connections are checked and any leaks are stopped, start the heater so the main burner ignites.
- d. Stand clear while the main burner ignites to prevent injury caused from hidden leaks that could cause flashback.
- e. 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.
- f. If a leak is detected, disconnect the heater from its electrical supply and close the fuel supply valve to the heater.



- g. Check the components involved for cleanliness in the thread areas and proper application of pipe compound.
- h. 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.

### D. Reading Pressures

1. With the heater operating, the pressure gauges should read the pressures specified on the dataplate, or in the specification section of this guide.



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**Leak and Gas Pressure Checks**

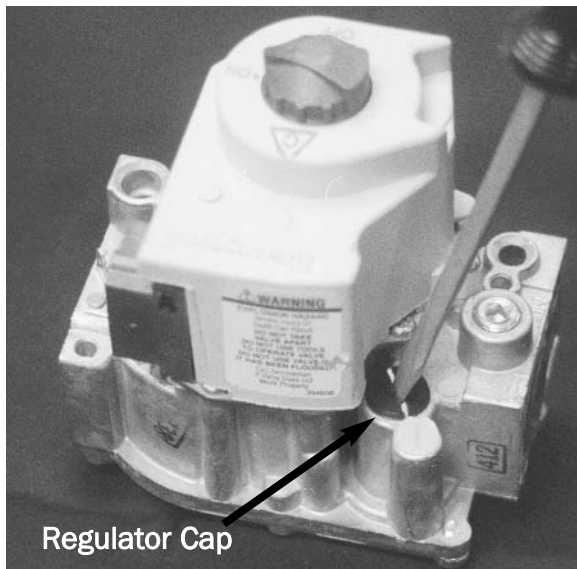
2. Do the readings at the inlet and outlet pressure gauges agree with that specified on the dataplate? If so, then no further checking or adjustment is required. Proceed to Section F.
3. If the inlet pressures do not agree with that specified on the dataplate, then the building system regulator controlling gas pressure to the heaters requires adjustment.
4. If the inlet pressures are correct but the burner manifold pressure does not agree with that specified on the dataplate, then the gas control valve's internal pressure regulator requires adjustment. Proceed to Section E.

**E. Burner Manifold Pressure Adjustment**

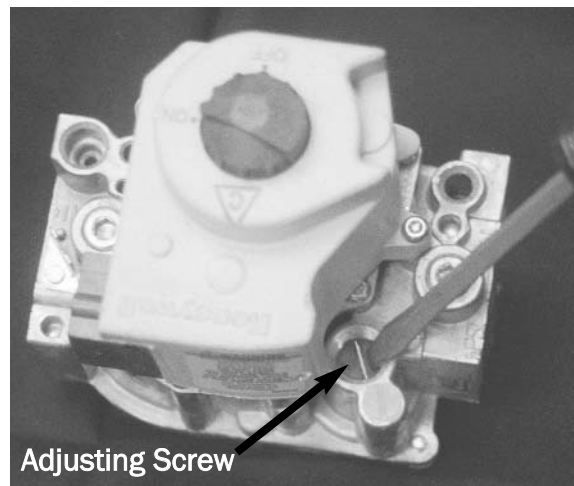
Refer to the following instructions, after proper inlet pressure has been established.

1. Light the heater. Once the heater has lit, observe at the manifold (outlet) pressure gauge. Burner manifold pressure must be the same pressure as given on the dataplate.
2. If the manifold pressure does not correspond to the manifold pressure given on the dataplate, the outlet pressure must be adjusted at the valve by following these instructions. (This procedure must be accomplished with the burner on.)
  - a. Remove the regulator cap on the control valve to expose the output pressure adjusting screw.

(Valve shown outside of heater for clarity of viewing.)



- b. Using a standard screwdriver, turn the plastic adjusting screw until the gauge reads proper manifold pressure. Clockwise increases outlet pressure. Counterclockwise will decrease pressure.



- c. Reinstall regulator cap on valve.

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**NOTE:**

Procedures for adjusting outlet pressure on control valves used on earlier models are the same. However, the internal regulator on the valve is at a slightly different location.

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3. Shut off the gas supply and disconnect the electrical supply to the heater.
4. Remove gauges and adapters and reinstall the pressure tap plugs, tightening both securely.
5. Open the fuel supply valves and reconnect heater to electrical supply. Test heater for proper operation.

**F. Completion**

1. Once inlet and burner manifold pressures have been confirmed and/or properly set, close the fuel supply valve to the heater and allow the heater to burn off any as remaining in the gas supply line.
2. Disconnect the heater from its electrical supply.
3. Remove the gauges and connecting hoses.
4. Reinstall the pressure tap plugs and tighten securely. Check for gas leaks to insure the tap screws have seated properly.





## Parts Identification Guide



The parts identification guides on the following pages have been designed to give a quick reference to component parts used on hot surface ignition agricultural building heaters. The guides identify components not only used on current production, but also on equipment that is of earlier design. To use the guides properly, you should know the model numbers of the heater and its design sequence. This information is identified on the dataplate. For earlier heaters, the design sequence will be shown as the 6th digit of the model number. For heaters manufactured more recently, the dataplate will identify a configuration number. The design sequence is the first digit of the configuration number.

In many cases you will find components are common between different designs of the model number. Parts lists and schematics are shown on the following pages for the respective heaters.


The parts guides also identify part numbers for the most commonly requested components, wires, and hardware items used on the heaters. If a wire, nut, or screw, etc. is not identified, please contact the L. B. White Co. for parts ordering information.

## Dataplate Comparison

### Without Configuration Number

**MODEL AW075EHP3**



SERIAL NO.:

**Design Sequence**


MAXIMUM INPUT: 75,000 BTUH  
TYPE FUEL: PROPANE VAPOR WITHDRAWAL  
BURNER MANIFOLD PRESSURE 11 IN W.C. AT MAXIMUM INPUT  
ELECTRICAL: 115 VOLTS A.C. 60 HZ SINGLE PHASE 1.4 AMPS  
MIN. CLEARANCES FROM HEATER TO ADJACENT COMBUSTIBLE MATERIALS: REAR 1 FT SIDES 1 FT  
TOP TO CEILING 1 FT BLOWER OUTLET 6 FT AND FUEL CONTAINER 6 FT  
VENTILATION: 450 CFM OF AIR REQUIRED TO SUPPORT COMBUSTION.  
MAXIMUM 13.5 INCHES W.C. AND MINIMUM 11.5 INCHES W.C. GAS SUPPLY PRESSURE  
ACCEPTABLE AT INLET OF HEATER FOR PURPOSE OF INPUT ADJUSTMENT.  
POSITION HEATER AWAY FROM LIVESTOCK  
AGRICULTURAL BUILDING HEATER

L. B. WHITE CO., INC. W6636 L.B. WHITE ROAD ONALASKA, WI 54650 608/783-5691

### With Configuration Number

**MODEL AW060**

CONFIGURATION NO. **AHPD210000**  
SERIAL NO.:

**Design Sequence**

MAXIMUM INPUT: 60,000 BTUH  
TYPE FUEL: PROPANE VAPOR WITHDRAWAL  
BURNER MANIFOLD PRESSURE 10.0 IN W.C. AT MAXIMUM INPUT  
ELECTRICAL: 115 VOLTS A.C. 60 HZ SINGLE PHASE 1.5 AMPS  
MIN. CLEARANCES FROM HEATER TO ADJACENT COMBUSTIBLE MATERIALS: REAR 1 FT SIDES 1 FT  
TOP TO CEILING 1 FT BLOWER OUTLET 6 FT AND FUEL CONTAINER 6 FT  
VENTILATION: 240 CFM OF AIR REQUIRED TO SUPPORT COMBUSTION.  
MAXIMUM 13.5 INCHES W.C. AND MINIMUM 11.5 INCHES W.C. GAS SUPPLY PRESSURE  
ACCEPTABLE AT INLET OF HEATER FOR PURPOSE OF INPUT ADJUSTMENT.  
POSITION HEATER AWAY FROM LIVESTOCK  
AGRICULTURAL BUILDING HEATER

L. B. WHITE CO., INC. W6636 L.B. WHITE ROAD ONALASKA, WI 54650 608/783-5691

# Service Parts, Kits and Accessories



## Parts Identification Guide

### Model 284/285

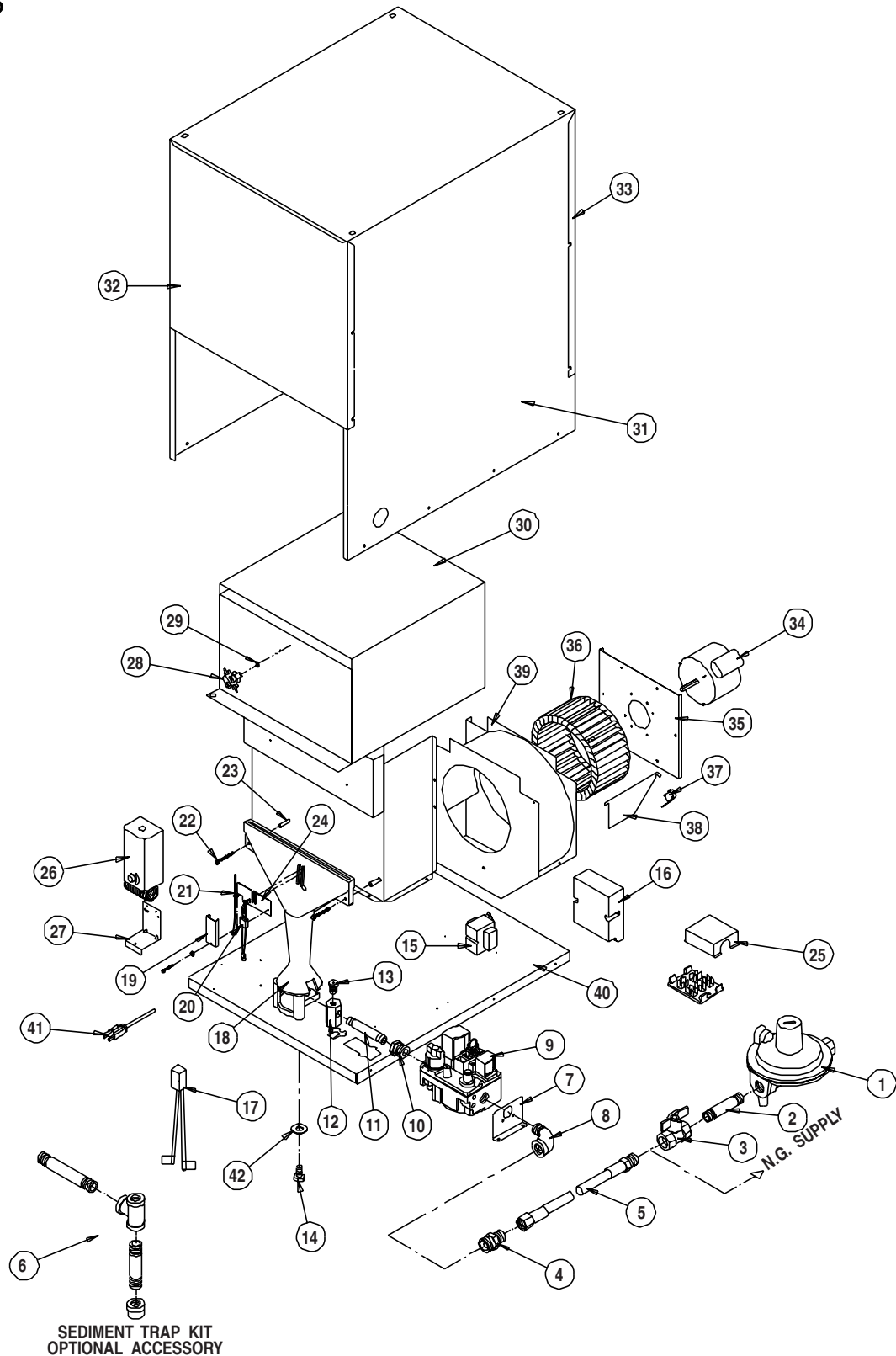
Item	Description	Design Sequence	Part Number
		A	
1	Regulator, LP Gas, 2nd Stage, Vent over Side	X	550-06665
	Regulator, LP Gas, 2nd Stage, Vent over Outlet	X	550-06553
	Regulator, Natural Gas	X	500-07087
2	Nipple, 1/2 x 3 1/2 (LP Gas)	X	130-07148
3	Valve, Manual Shut-Off	X	130-05548
4	Adapter, Hose, 1/2 NPT x 1/2 NPS	X	310-02894
5	Hose, 1/2 in. x 10 ft. with Adapters	X	550-20704
6	Kit, Sediment Trap	X	500-00815
7	Elbow	X	130-01359
8	Bracket	X	220-06412
9	Valve, Gas Control (LP Gas)	X	500-09336
	Valve, Gas Control (Natural Gas)	X	500-09337
10	Bushing	X	130-01519
11	Nipple	X	130-03114
12	Holder, Orifice	X	310-02690
13	Orifice, Burner (LP Gas)	X	310-02691
	Orifice, Burner (Natural Gas)	X	310-02735
14	Bolt	X	130-02692
15	Transformer	X	120-06979
16	Control, Hot Surface Ignition	X	550-08027
17	Harness, Igniter Wire	X	120-06068
18	Burner	X	320-03453
19	Shield, Igniter	X	240-09167
20	Igniter, Kit	(2)	500-09755
21	Sensor, Flame	X	120-06165
22	Screw, Burner	X	130-02688
23	Spacer, Burner	X	130-02687
24	Bracket, Igniter	X	220-07110
25	Board, Terminal and Cover (120 Volt or 24 Volt)	X	500-02686
26	Thermostat with Bracket	X	500-05568
27	Bracket	X	220-05493
28	Switch, High Limit	X	120-05566
29	Spacer, High Limit	X	130-02725
30	Chamber, Heat	X	420-02667
31	Case, Assembly (1)	X	500-02673
32	Case, Panel, Burner End (1)	X	271-07333
33	Case, Panel, Motor End	X	271007332
34	Motor	X	550-06008
35	Mount, Motor	X	220-03764
36	Fan, Wheel	X	130-02684
37	Switch, Air Proving	X	500-02680
38	Flapper	X	240-02441
39	Housing, Fan, with Flapper and Air Proving Switch	X	500-05570
40	Base	X	220-05577
41	Cord, Power	X	120-03438
42	Washer	X	130-01589

- (1) Specify model and fuel type when ordering.
- (2) For replacing igniter, order conversion kit 500-09755.  
Igniter Part No. 500-09201 may be ordered separately after conversion.

WIRE SELECTION TABLE			
DESCRIPTION	COLOR	LENGTH	PART NO.
Wire, Ignition Control to Gas Control Valve	Red	5 in.	120-06166
Wire, Air Proving Switch to Terminal Board	Black	42 1/2 in.	430-06980
Wire, High Limit Switch	Black	25 1/4 in.	430-03105
Wire, Thermostat to Terminal Board	Black	25 1/4 in.	430-02723

FASTENER SELECTION TABLE		
DESCRIPTION	APPLICATION	PART NO.
Screw	Case Assembly	130-07288

**Model 284/285**



# Service Parts, Kits and Accessories



## Parts Identification Guide

### Model AB200

Item	Description	Design Sequence			Part Number
		A	B	C	
1	Regulator, LP Gas, 2nd Stage, Vent over Side	X	X	X	550-06665
	Regulator, LP Gas, 2nd Stage, Vent over Outlet	X	X	X	550-06553
	Regulator, Natural Gas	X	X	X	500-07087
2	Nipple, 1/2 x 3 1/2 (LP Gas)	X	X	X	130-07148
3	Valve, Manual Shut-Off	X	X	X	130-05548
4	Adapter, 1/2 NPT x 1/2 NPS	X	X	X	310-02894
5	Hose, 1/2 in. x 10 ft. with Adapters	X	X	X	550-20704
6	Kit, Sediment Trap	X	X	X	500-00815
7	Valve, Gas Control, LP Gas	X	X	N/A	500-09336
	Valve, Gas Control, LP Gas	N/A	N/A	X	120-09368
	Valve, Gas Control, Natural Gas	X	X	N/A	410-09320
	Valve, Gas Control, Natural Gas	N/A	N/A	X	120-09428
8	Base	(1)	X	X	225-08224
9	Manifold w/Bracket	X	X	X	420-07826
10	Spacer	X	X	X	130-07905
11	Orifice, Burner, LP Gas	X	X	X	310-02691
	Orifice, Burner, Natural Gas	X	N/A	N/A	310-02735
	Orifice, Burner, Natural Gas	N/A	X	X	310-08057
12	Cover, Gas Control Valve	N/A	N/A	X	225-09514
13	Bracket, Gas Control	N/A	N/A	X	225-09513
14	Shield, Igniter	X	X	N/A	240-08001
	Shield, Igniter	N/A	N/A	X	240-09167
15	Igniter	X	X	N/A	500-09755
	Igniter	N/A	N/A	X	550-09201
16	Sensor, Flame	X	X	X	120-08270
17	Bracket, Igniter and Sensor	X	N/A	N/A	260-07110
	Bracket, Igniter and Sensor	N/A	X	X	260-08233
18	Burner	X	X	X	320-03453
19	Spacer, Burner	X	X	X	130-02687
20	Bracket, Ignition Control Mounting (not illustrated)	(1)	N/A	N/A	220-07867
21	Switch, High Limit	X	X	X	120-08269
22	Chamber, Heat	(1)	N/A	N/A	400-07763
	Chamber, Heat	N/A	X	X	400-08289
23	Case, Assembly w/Doors and Latches and Control Box (2)	(1)	N/A	N/A	400-07857
	Case, Assembly w/Doors and Latches and Control Box (2)	N/A	X	X	500-08238
24	Cover, Control Panel w/Hinge	N/A	X	N/A	500-08236
	Cover, Control Panel w/o Hinge	N/A	N/A	X	225-09456
25	Control, Ignition	X	X	N/A	120-08117
	Control, Ignition	N/A	N/A	X	120-09298
26	Cord, Power	X	X	X	120-08284
27	Transformer	X	N/A	N/A	400-07901
	Transformer	N/A	X	X	120-08260
28	Switch, On/Off	N/A	X	X	120-08240
29	Strip, Terminal	N/A	X	X	120-08253
30	O-Ring	N/A	X	X	130-08347
31	Plug Window	N/A	X	X	130-08255
32	Panel, Ignition Control Mounting	N/A	X	X	225-08221
33	Motor	X	X	X	550-08277
34	Mount, Motor	X	X	X	220-03764
35	Switch, Air Proving	X	X	X	500-02680
36	Flapper	X	X	X	240-02441
37	Fan, Wheel	X	X	X	130-02684
38	Housing, Assembly w/Air Flow Switch and Sail	N/A	X	X	500-08324
39	Spacer, High Limit	X	X	X	130-09051

N/A Not Applicable

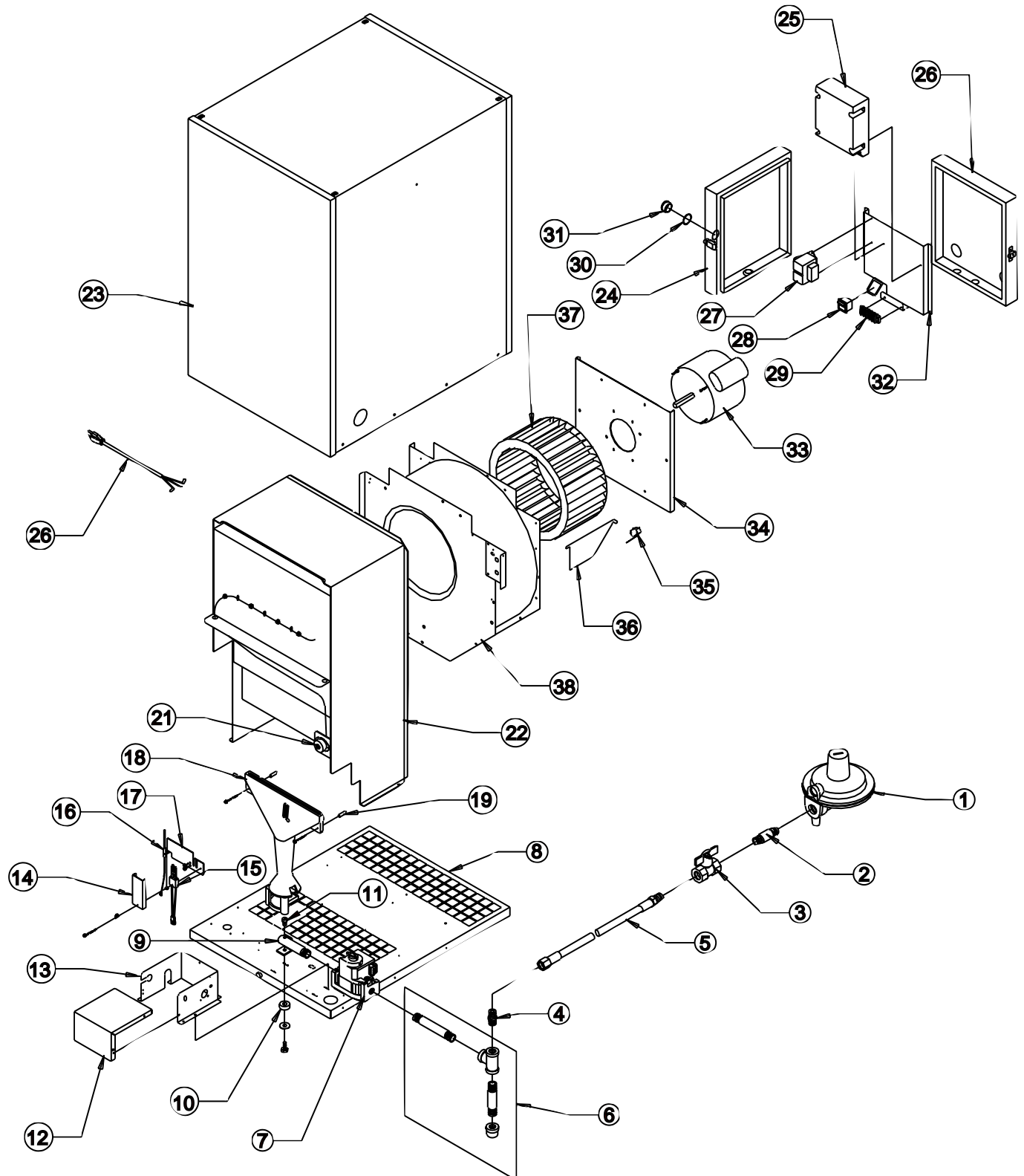
(1) No longer available.

(2) Specify model number fuel type when ordering.

WIRE SELECTION TABLE			
DESCRIPTION	COLOR	LENGTH	PART NO.
Wire, Harness Control			
Module to Igniter	Red	34 in.	120-08286

FASTENER SELECTION TABLE		
DESCRIPTION	APPLICATION	PART NO.
Bolt, 3/8 - 16 x 3/4	Burner Mounting	130-02692
Screw, 1 1/2 in.	Burner Mounting	130-02688

**Model AB200**



## Parts Identification Guide

### Guardian AW060 / AW100

Item	Description	Design Sequence		Part Number
		A		
1	Regulator, LP Gas, 2nd Stage, Vent over Side	X		550-06665
	Regulator, LP Gas, 2nd Stage, Vent over Outlet	X		550-06553
	Regulator, Natural Gas (not illustrated)	X		500-07087
2	Nipple, 1/2 x 3 1/2	X		130-07148
3	Valve, Manual Shut-Off	X		130-05548
4	Adapter, 1/2 NPT x 1/2 NPS	X		310-02894
5	Hose, 1/2 in. x 10 ft. w/Adapter	X		550-20704
6	Kit, Sediment Trap	X		500-00815
7	Valve, Gas Control, LP Gas	X		120-09368
	Valve, Gas Control, Natural Gas	X		120-09428
8	Bushing, Pipe	X		130-07859
9	Nipple, Close	X		130-01142
10	Valve, Throttle, LP Gas, 60,000 Btu	X		410-09649
	Valve, Throttle, Natural Gas, 60,000 Btu	X		410-09721
	Valve, Throttle, LP Gas, 100,000 Btu	X		410-09661
	Valve, Throttle, Natural Gas, 100,000 Btu	X		410-09722
11	Base, 60,000 Btu	X		225-09437
	Base, 100,000 Btu	X		225-09530
12	Cover, Gas Control Valve	X		225-09443
13	Bracket, Gas Control Valve	X		225-09444
14	Ell, Street	X		130-09621
15	Nipple	X		130-03071
16	Holder, Orifice	X		310-02690
17	Orifice, Burner, LP Gas, 60,000 Btu	X		310-09630
	Orifice, Burner, Natural Gas, 60,000 Btu	X		310-09631
	Orifice, Burner, LP Gas, 100,000 Btu	X		310-09633
	Orifice, Burner, Natural Gas, 100,000 Btu	X		310-09634
18	Shield, Igniter	X		240-09167
19	Igniter	X		550-09201
20	Flame, Sensor	X		120-09626
21	Bracket, Igniter and Sensor	X		260-09932
22	Burner	X		320-09933
23	Switch, High Limit	X		120-03933
24	Spacer	X		130-02687
25	Chamber, Heat, 60,000 Btu	X		400-09652
	Chamber, Heat, 100,000 Btu	X		400-09664
26	Case Assembly w/Doors and Latches, 60,000 Btu (2)	X		400-09655
	Case Assembly w/Doors and Latches, 100,000 Btu (2)	X		400-09667
27	Cover, Control Panel w/Gasket and Latch	X		400-09975
28	Control, Ignition	X		120-09298
29	Transformer	X		120-09615
30	Harness Connector, 9 pin, Female	X		120-20277
31	Harness Connector, 9 pin Male (control box)	X		120-09616
32	Control Box Bottom	X		271-09438
33	Plug, Window	X		130-08255
34	O-Ring	X		130-08347
35	Cord, Power, 5 ft.	X		120-09663
36	Motor, 1/8 HP, 60,000 Btu	X		550-09837
	Motor, 1/8 HP, 100,000 Btu	X		550-08178
37	Mount, Motor, 60,000 Btu	X		220-05490
	Mount, Motor, 100,000 Btu	X		220-09528
38	Fan, Wheel, 60,000 Btu	X		130-02808
	Fan, Wheel, 100,000 Btu	X		130-03531
39	Switch, Air Proving w/Bracket, 60,000 Btu	X		400-09839
	Switch, Air Proving w/Bracket, 100,000 Btu	X		400-09840
40	Housing, Fan, w/Air Flow Switch and Bracket, 60,000 Btu	X		550-20989
	Housing, Fan, w/Air Flow Switch and Bracket, 100,000 Btu	X		550-20990

(1) Complete control box assembly for all models, including wires, transformer, ignition control and power cord is part number 400-09658.

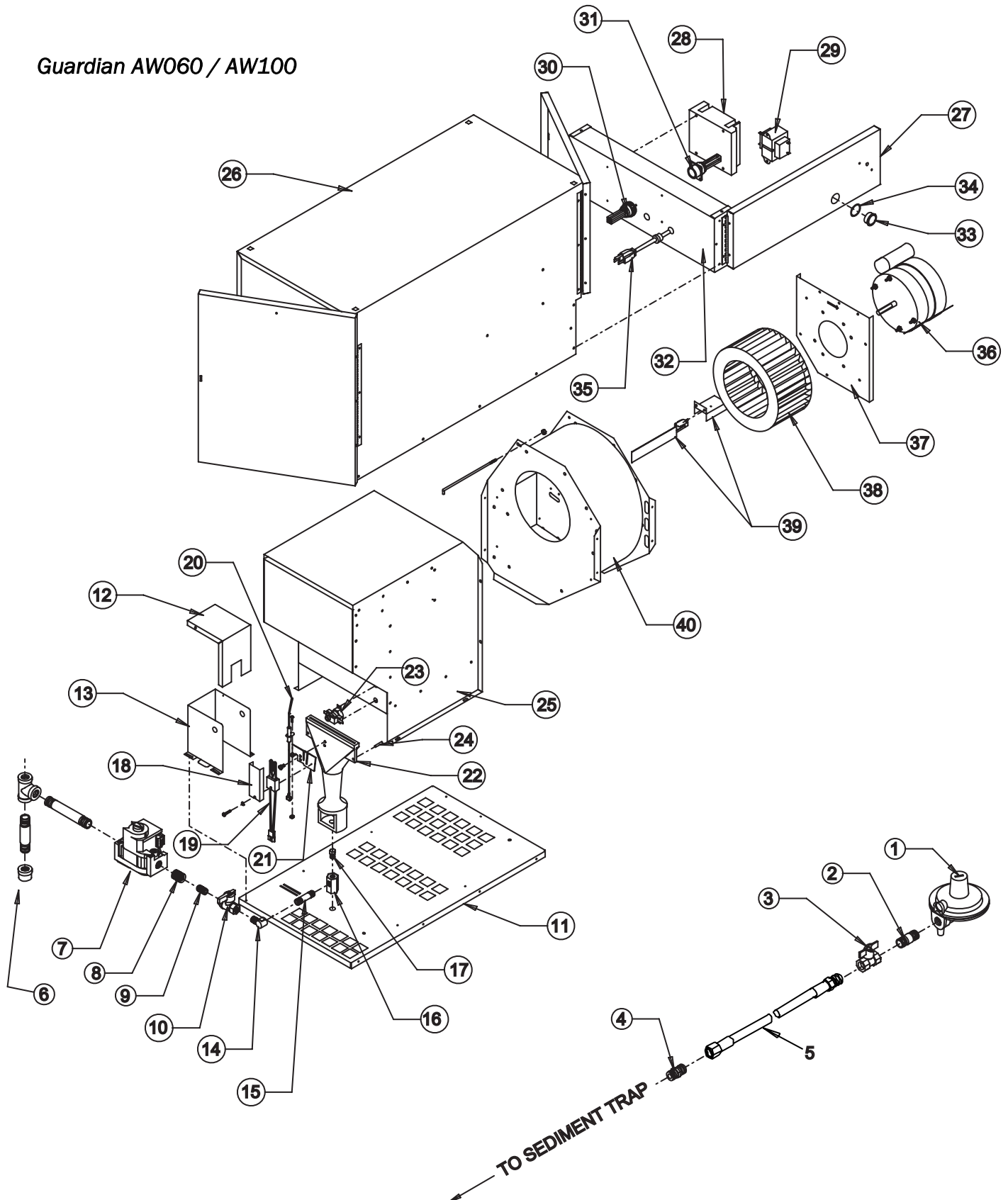
(2) Specify model number and fuel type when ordering.

FASTENER SELECTION TABLE		
DESCRIPTION	APPLICATION	PART NO.
Bolt, 3/8 - 16 x 3/4	Burner Mounting	130-02692
Screw, 1 1/2 in.	Burner Mounting	130-02688



**Parts Identification Guide**

Guardian AW060 / AW100



## Parts Identification Guide

### Model AW075

Item	Description	Design Sequence					Part Number
		A	B	C	D	E	
1	Regulator, LP Gas, 2nd Stage, Vent over Side	X	X	X	X	X	550-06665
	Regulator, LP Gas, 2nd Stage, Vent over Outlet	X	X	X	X	X	550-06553
	Regulator, Natural Gas (not illustrated)	X	X	X	X	X	550-07087
2	Nipple, 1/2 x 3 1/2	X	X	X	X	X	130-07148
3	Valve, Manual Shut-Off	X	X	X	X	X	130-05548
4	Adapter, Hose, 1/2 NPT x 1/2 NPS	X	X	X	X	X	310-02894
5	Hose, 1/2 in. x 10 ft. w/Adapter	X	X	X	X	X	550-20704
6	Kit, Sediment Trap	X	X	X	X	X	500-00815
7	Base	X	X	X	X	X	225-08348
8	Cover, Gas Control Valve	X	X	X	X	X	225-08351
9	Bracket, Gas Control Valve	X	X	X	X	X	225-08350
10	Valve, Gas Control, LP Gas	X	X	X	X	X	410-09321
	Valve, Gas Control, Natural Gas	X	X	X	X	X	410-09320
11	Ell, 1/2 in.	X	X	X	X	X	130-01359
12	Nipple, 1/2 x 1/2 in.	X	X	X	X	X	130-02420
13	Valve, Throttle, LP Gas	X	X	X	X	X	410-08359
	Valve, Throttle, Natural Gas	X	X	X	X	X	410-08360
14	Adapter	X	X	X	X	X	130-08361
15	Sleeve, Compression	X	X	X	X	X	130-03879
16	Nut, Compression	X	X	X	X	X	130-05772
17	Tube, Tinned	X	X	X	X	X	410-08673
18	Sensor, Flame	X	X	X	X	X	120-08366
19	Bracket, Flame Sensor	X	X	X	X	X	240-09174
20	Ring, Retaining, Bowed	X	X	X	X	X	130-08460
21	Ring, Retaining, Flat	X	X	X	X	X	130-08459
22	Orifice, Burner, LP Gas	X	X	X	X	X	310-08357
	Orifice, Burner, Natural Gas	X	X	X	X	X	310-08358
23	Igniter	(1)	(1)	N/A	N/A	N/A	500-09755
	Igniter	N/A	N/A	X	X	X	500-09201
24	Burner, Plate Assembly w/Orifice	X	X	X	X	X	400-09215
24	Chamber, Heat	X	X	X	X	X	220-08670
25	Chase, Wire	X	X	X	X	X	225-08294
26	Chamber, Heat	X	X	X	X	X	220-08670
27	Case Assembly, with Doors and Latches (2)	X	X	X	X	X	500-08494
28	Cover, Control Panel	X	X	N/A	N/A	N/A	271-08230
	Cover, Control Panel	N/A	N/A	X	X	X	271-09456
29	Box, Control Panel	X	X	X	X	X	500-08237
30	Control, Ignition	X	X	X	N/A	N/A	120-08117
	Control, Ignition	N/A	N/A	N/A	X	X	120-09298
31	Transformer	X	X	X	X	X	120-08260
32	Switch, On/Off	X	X	X	X	X	120-08240
33	Strip, Terminal	X	X	X	X	X	120-08253
34	O-Ring	X	X	X	X	X	130-08347
35	Plug, Window	X	X	X	X	X	130-08255
36	Motor, 1/8 HP	X	X	X	X	X	550-08178
37	Mount, Motor	X	X	X	X	X	220-08146
38	Fan, Wheel	X	X	X	X	X	130-08177
39	Bracket, Blower Housing	X	X	X	X	X	220-08415
40	Switch, Air Proving	X	X	X	X	X	500-02680
41	Flapper	X	X	X	X	X	240-08898
42	Switch, High Limit	X	N/A	N/A	N/A	N/A	120-03933
	Switch, High Limit	N/A	X	X	X	X	120-05566
43	Cover, High Limit	X	X	X	X	X	220-08480
44	Housing, Fan w/Sail	X	X	X	X	X	500-08905
45	Cord, Power	X	X	X	X	X	120-08284
46	Panel, Stand-Off	N/A	X	X	X	X	225-08221

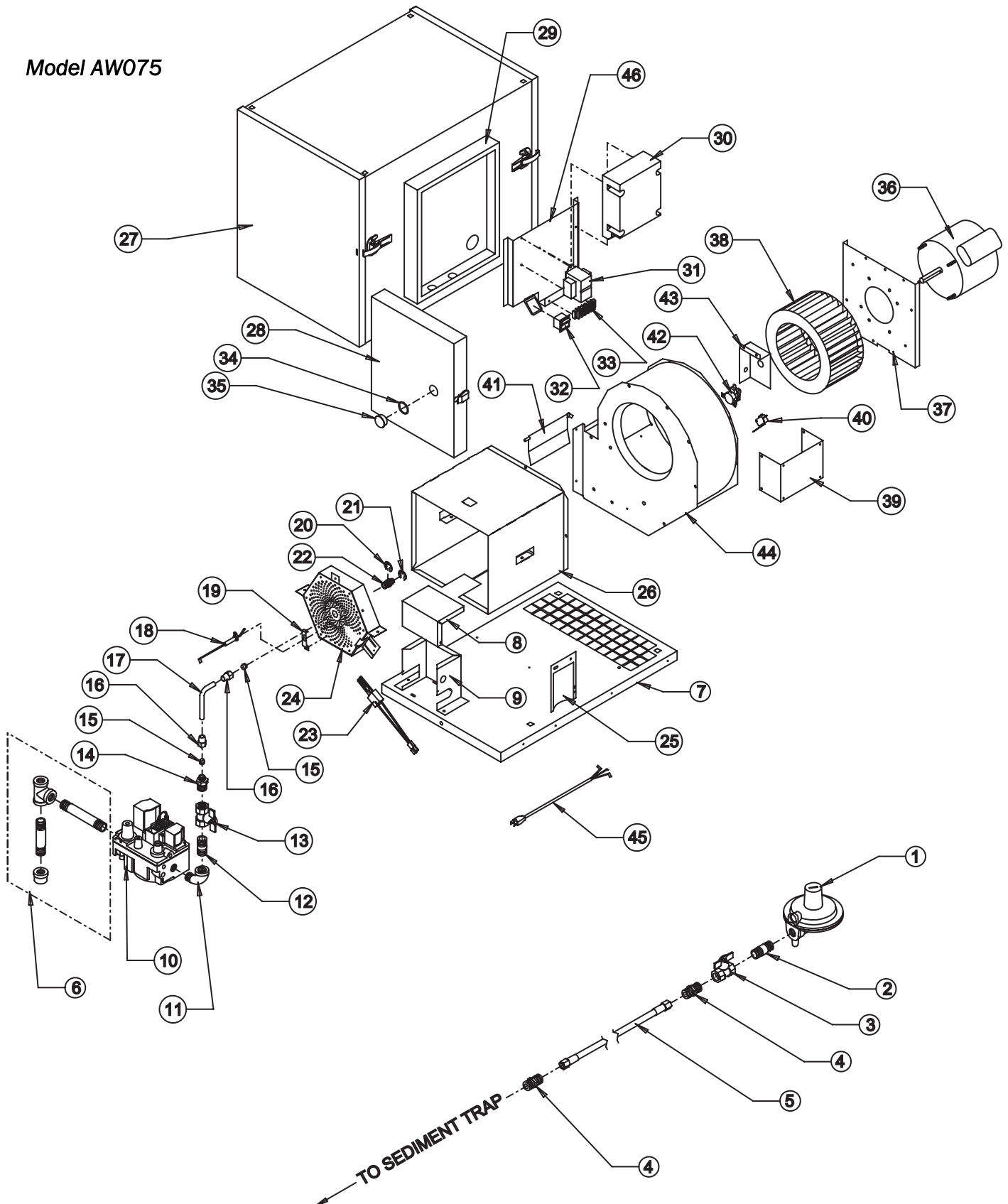
(1) For replacing igniter, order conversion kit 500-09755. Igniter Part No. 500-09201 may be ordered separately after conversion.

(2) Specify model number and fuel type when ordering.

WIRE SELECTION TABLE			
DESCRIPTION	COLOR	LENGTH	PART NO.
Wire, Harness, Control Module to Igniter	Red	34 in.	120-08286

**Parts Identification Guide**

**Model AW075**



## Parts Identification Guide

### Model AW215

Item	Description	Design Sequence		Part Number
		B	C	
1	Regulator, LP Gas, 2nd Stage, Vent over Side	X	X	550-06665
	Regulator, LP Gas, 2nd Stage, Vent over Outlet	X	X	550-06553
	Regulator, Natural Gas, 2nd Stage	X	X	500-07087
2	Nipple, LP Gas, 1/2 x 3 1/2	X	X	130-07148
3	Valve, Manual Shut-Off	X	X	130-05548
4	Adapter, Hose, 1/2 NPT x 1/2 NPS	X	X	310-02894
5	Hose, 1/2 in. x 10 ft. w/Adapters	X	X	550-20704
6	Kit, Sediment Trap	X	X	500-00815
7	Valve, Gas Control, LP Gas	X	N/A	500-09336
	Valve, Gas Control, LP Gas	N/A	X	120-09368
	Valve, Gas Control, Natural Gas	X	N/A	500-09337
	Valve, Gas Control, Natural Gas	N/A	X	120-09428
8	Base	X	X	225-08213
9	Cover, Gas Control	X	N/A	225-08326
	Cover, Gas Control	N/A	X	225-09287
10	Bracket, Gas Control	X	N/A	225-08325
	Bracket, Gas Control	N/A	X	225-09506
11	Manifold	X	X	130-07825
12	Orifice, Burner, LP Gas	X	X	310-07717
	Orifice, Burner, Natural Gas	X	X	310-07816
13	Shield, Igniter	X	X	240-08001
14	Igniter Kit	+	+	500-09755
15	Sensor, Flame w/Lead	X	X	120-08273
16	Bracket, Igniter and Sensor	X	X	260-08233
17	Burner	X	X	320-03453
18	Spacer	X	X	130-02687
19	Chamber, Heat	X	X	400-07668
20	Switch, High Limit	X	X	120-05566
21	Case Assembly w/Doors (2)	X	X	500-08244
22	Cover, Control Panel	(1)	N/A	500-08236
	Cover, Control Panel	N/A	X	225-09456
23	Control, Ignition	X	N/A	120-08117
	Control, Ignition	N/A	X	120-09298
24	Transformer	X	X	120-08260
25	Switch, On/Off	X	X	120-08240
26	Strip, Terminal	X	X	120-08253
27	O-Ring	X	X	130-08347
28	Plug, Window	X	X	130-08255
29	Panel, Stand-Off	X	X	225-08221
30	Box, Control Panel	X	X	500-08237
31	Motor	X	X	550-08277
32	Mount, Motor	X	X	220-06892
33	Switch, Air Proving	X	X	500-02680
34	Flapper	X	X	240-02441
35	Fan, Wheel	X	X	130-02684
36	Housing w/Sail and Air Proving Switch	X	X	500-08324
37	Cord, Power	X	X	120-08284

(1) No longer available.

(2) Specify model number and fuel type when ordering.

+ For replacing igniter, order conversion Kit 550-09755.  
Igniter Part No. 550-09201 may be ordered separately after conversion.

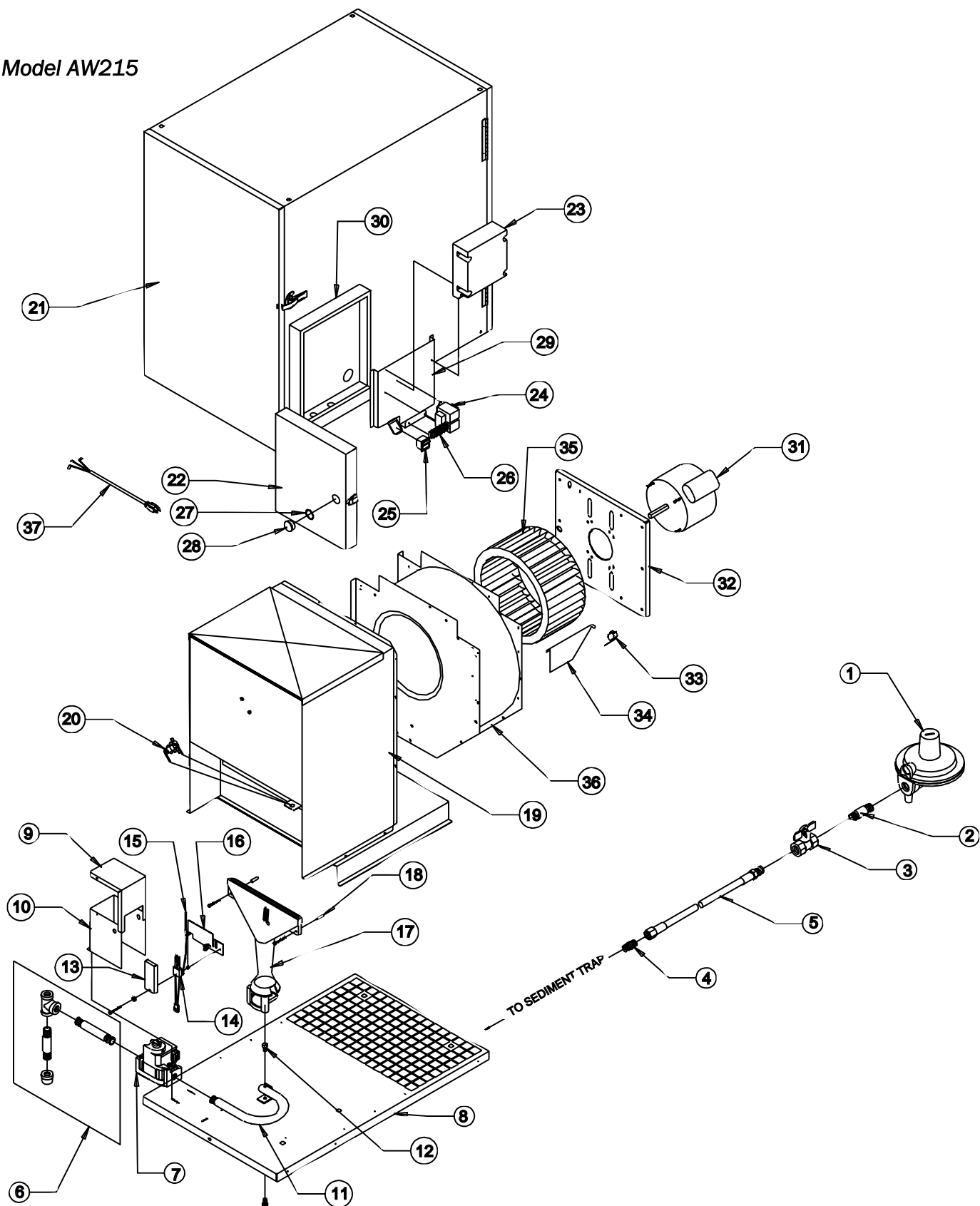
#### FASTENER SELECTION TABLE

DESCRIPTION	APPLICATION	PART NO.
Bolt, 3/8 - 16 x 3/4	Burner Mounting	130-02692
Screw	Burner Mounting	130-02688

#### WIRE SELECTION TABLE

DESCRIPTION	COLOR	LENGTH	PART NO.
Wire, Harness, Control Module to Igniter	Red	34 in.	120-08286

**Model AW215**



# Service Parts, Kits and Accessories



## Parts Identification Guide

### Model AW230

Item	Description	Design Sequence				Part Number
		C	D	E	F	
1	Regulator, LP Gas, 2nd Stage, Vent Over Side	X	X	X	X	550-06665
	Regulator, LP Gas, 2nd Stage, Vent Over Outlet	X	X	X	X	550-06553
	Regulator, Natural Gas, 2nd Stage	X	X	X	X	500-07087
2	Nipple, 1/2 x 3 1/2 (LP Gas)	X	X	X	X	130-07148
3	Valve, Manual Shut-Off	X	X	X	X	130-05548
4	Adapters, 1/2 NPT x 1/2 NPS	X	X	X	X	310-02894
5	Hose, 1/2 in. x 10 ft. with Adapters	X	X	X	X	550-20704
6	Kit, Sediment Trap	X	X	X	X	500-00815
7	Valve, Gas Control, LP Gas	X	X	N/A	N/A	500-09336
	Valve, Gas Control, Natural Gas	X	X	N/A	N/A	500-09337
	Valve, Gas Control, LP Gas	N/A	N/A	X	X	120-09368
	Valve, Gas Control, Natural Gas	N/A	N/A	X	X	120-09428
8	Base	X	N/A	N/A	N/A	225-08631
	Base	N/A	X	X	X	225-09285
9	Cover, Gas Control	X	N/A	N/A	N/A	225-08513
	Cover, Gas Control	N/A	X	X	X	225-09287
10	Bracket, Gas Control Valve	X	N/A	N/A	N/A	225-08512
	Bracket, Gas Control Valve	N/A	X	X	N/A	225-09286
	Bracket, Gas Control Valve	N/A	N/A	N/A	X	225-09506
11	Nipple, 1/2 x 1 1/2	X	X	X	X	130-02420
12	Elbow	N/A	X	X	X	130-01426
13	Nipple, Close	N/A	X	X	X	130-01305
14	Valve, Throttle, LP Gas	X	X	X	N/A	410-08704
	Valve, Throttle, LP Gas	N/A	N/A	N/A	X	410-09604
	Valve, Throttle, Natural Gas	X	X	X	N/A	410-08519
	Valve, Throttle, Natural Gas	N/A	N/A	N/A	X	410-09606
15	Manifold	N/A	X	X	X	420-09291
	Manifold, Single Piece, U-Shaped (not illustrated)	X	N/A	N/A	N/A	130-09019
16	Orifice, Burner, LP Gas	X	X	X	N/A	310-08705
	Orifice, Burner, LP Gas	N/A	N/A	N/A	X	310-09603
	Orifice, Burner, Natural Gas	X	X	X	N/A	310-08706
	Orifice, Burner, Natural Gas	N/A	N/A	N/A	X	310-09605
17	Shield, Igniter	X	X	X	N/A	240-08001
	Shield, Igniter	N/A	N/A	N/A	X	240-09167
18	Igniter	(1)	(1)	(1)	N/A	500-09755
	Igniter	N/A	N/A	N/A	X	550-09201
19	Sensor, Flame	X	X	X	X	120-08270
20	Bracket, Igniter and Sensor	X	X	X	X	260-09202
21	Burner	X	X	X	X	320-03453
22	Switch, High Limit	X	X	X	X	120-05566
23	Spacer	X	X	X	X	130-02687
24	Chamber, Heat	X	X	X	X	400-08700
25	Case, Assembly w/Doors (3)	X	N/A	N/A	N/A	400-08701
	Case Assembly w/Doors (3)	N/A	X	X	X	400-09301
26	Cover, Control Panel	(2)	(2)	N/A	N/A	500-08236
	Cover, Control Panel	N/A	N/A	X	X	225-09456
27	Box, Control	X	X	X	X	500-08237
28	Panel, Stand-Off	X	X	X	X	225-08221
29	Control, Ignition	X	X	N/A	N/A	120-08117
	Control, Ignition	N/A	N/A	X	X	120-09298
30	Transformer	X	X	X	X	120-08260
31	Switch, On/Off	X	X	X	X	120-08240
32	Strip, Terminal	X	X	X	X	120-08253
33	O-Ring	X	X	X	X	130-08347
34	Plug, Window	X	X	X	X	130-08255
35	Motor, 1/3 H.P.	X	X	X	X	550-08710
36	Mount, Motor	X	X	X	X	225-08647
37	Fan, Wheel	X	X	X	X	130-02684
38	Switch, Air Proving	X	X	X	X	500-02680
39	Housing, Fan w/Sail and Air Proving Switch	X	X	X	X	500-08799
40	Flapper	X	X	X	X	240-02441
41	Cord, Power, 10 ft.	X	X	X	X	120-08284

(1) For replacing igniter, order conversion kit 500-09755. Igniter Part No. 550-09201 may be ordered separately after conversion.

(2) No longer available.

(3) Specify model and fuel type when ordering.

#### FASTENER SELECTION TABLE

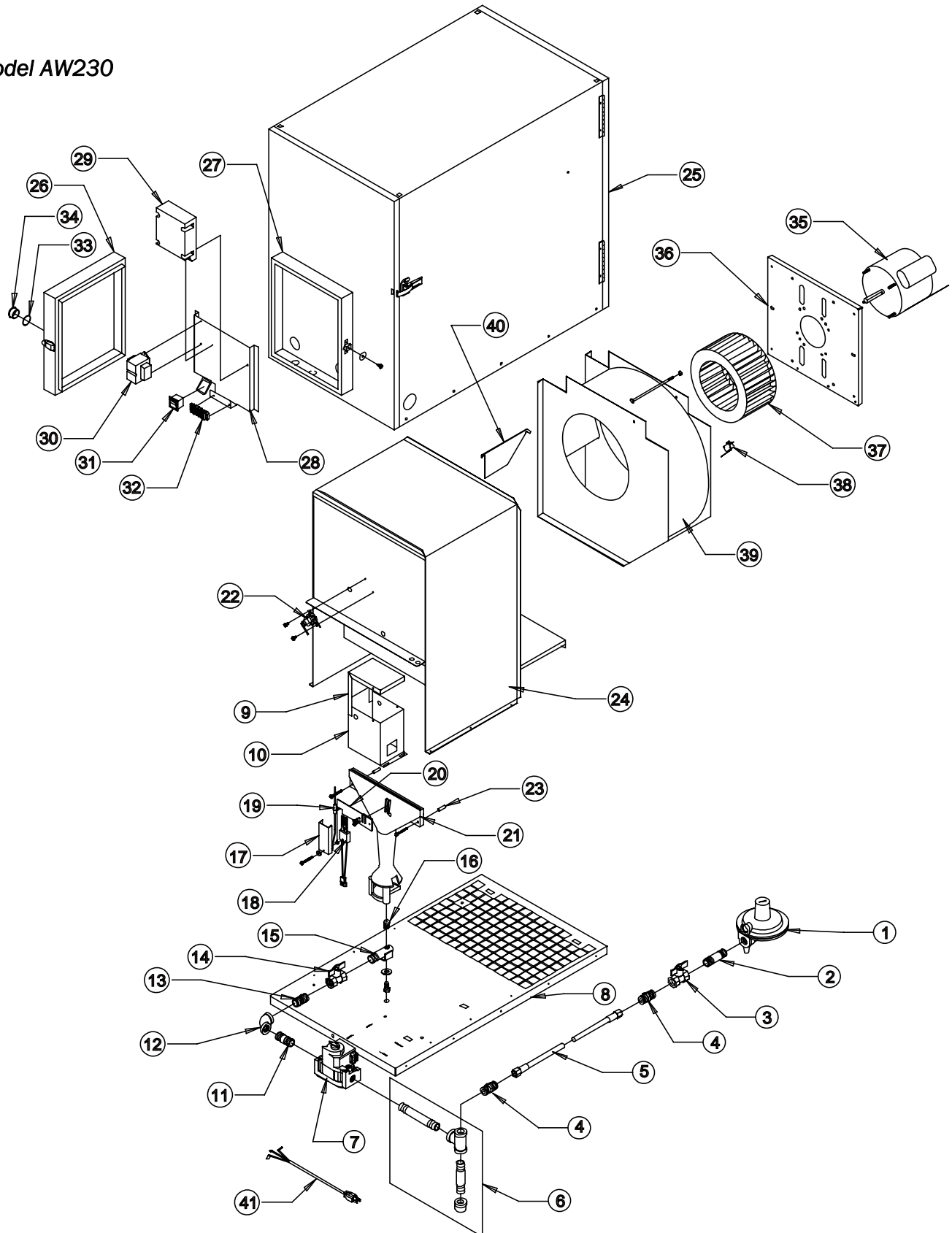
DESCRIPTION	APPLICATION	PART NO.
Bolt, 3/8 - 16 x 3/4	Burner Mounting	130-02692
Screw	Burner Mounting	130-02688

#### WIRE SELECTION TABLE

DESCRIPTION	COLOR	LENGTH	PART NO.
Wire, Harness, Control Module to Igniter	Red	34 in.	120-08286

**Parts Identification Guide**

**Model AW230**



## Parts Identification Guide

### Guardian AW250

Item	Description	Design Sequence		Part Number
		A		
1	Regulator, LP Gas, 2nd Stage, Vent Over Outlet	X		550-06553
	Regulator, LP Gas, 2nd Stage, Vent Over Side			550-06665
	Regulator, Natural Gas	X		500-07487
2	Nipple, 3 1/2 in.	X		130-07148
3	Valve, Manual Shut Off	X		130-05548
4	Adapter, Hose, 1/2 NPT x 1/2 NPS	X		310-02894
5	Hose, 1/2 in. ID x 10 ft. with Adapters	X		550-20704
6	Kit, Sediment Trap	X		500-00815
7	Base	X		225-20136
8	Cover, Gas Control Valve	X		225-09287
9	Bracket, Gas Control Valve	X		225-09506
10	Valve, Gas Control: LP Gas	X		120-09368
	Valve, Gas Control: Natural Gas	X		120-09428
11	Nipple, 1/2 in. x 1 1/2 in.	X		130-02420
12	Valve, Throttle: LP Gas	X		410-20143
	Valve, Throttle: Natural Gas	X		410-20144
13	El, Street	X		130-01359
14	Manifold	X		420-09291
15	Orifice, Burner: LP Gas	X		310-20141
	Orifice, Burner: Natural Gas	X		310-20142
16	Igniter	X		120-09201
17	Shield, Igniter	X		240-09167
18	Sensor, Flame	X		120-20139
19	Bracket, Igniter	X		260-09202
20	Burner	X		320-03453
21	Spacer	X		130-02687
22	Switch, High Limit	X		120-05566
23	Chamber, Heat	X		400-20024
24	Case, Assembly with Doors and Latches	X		225-20149
25	Harness, 9 wire, 9 male pin	X		120-09616
26	Control, Ignition	X		120-09298
27	Transformer, 120/24 v.	X		120-09615
28	Plug, Window	X		130-08255
29	O-Ring	X		130-08347
30	Cover, Control Box	X		400-20134
31	Cord, Power, 10 ft.	X		120-20133
32	Harness, 9 wire, 9 female pin	X		120-20140
33	Motor, 1/3 HP, Ball Bearing	X		550-08710
34	Mount, Motor	X		225-08647
35	Wheel, Fan	X		130-09050
36	Switch, Air Proving	X		500-02680
37	Flapper	X		240-09076
38	Housing, Fan, with Flapper, Air Proving Switch and Motor Mount	X		500-20250

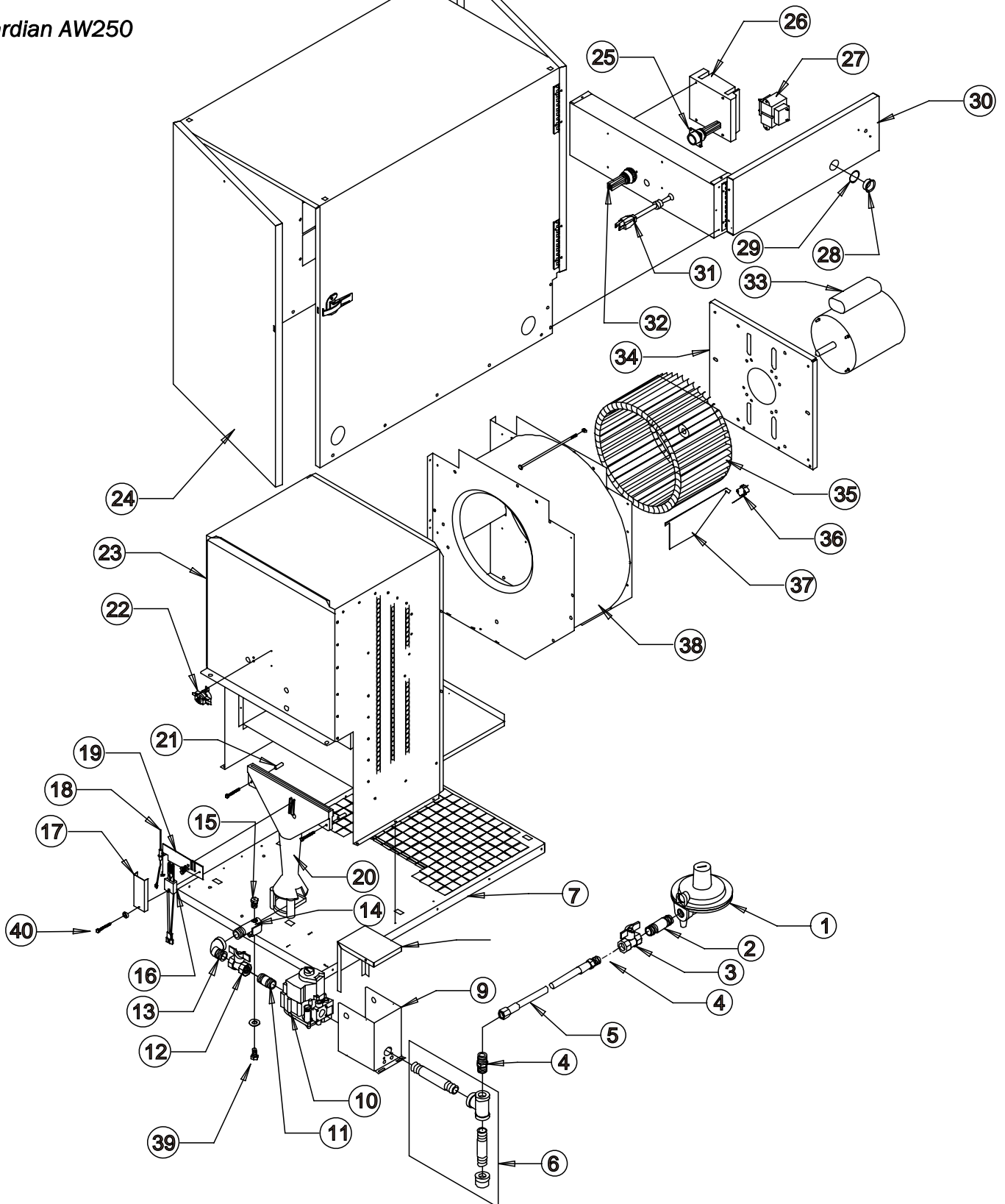
- (1) Complete control box assembly, including wires, transformer, ignition control and power cord is part number 400-20135.
- (2) For fixed rate heater, replace items 11, 12 and 13 with a 1/2 in. elbow, part #130-01426 and a nipple, 1/2 in. x 3 1/2 in., part #130-07148.
- (3) Specify model number and fuel type when ordering.

FASTENER SELECTION TABLE		
DESCRIPTION	APPLICATION	PART NO.
Bolt, 3/8 - 16 x 3/4	Burner Mounting	130-02692
Screw, 1 1/2 in.	Burner Mounting	130-02688



**Parts Identification Guide**

*Guardian AW250*



## Parts Identification Guide

### Model AW325

Item	Description	Design Sequence		Part Number
		A	B	
1	Regulator, LP Gas, 2nd Stage Vent Over Side	X	X	550-06665
	Regulator, LP Gas, 2nd Stage Vent Over Outlet	X	X	550-06553
	Regulator, Natural Gas, 2nd Stage	X	X	500-07087
2	Nipple, 1/2 x 3 1/2	X	X	130-07148
3	Valve, Manual Shut Off	X	X	130-05548
4	Adapter, 1/2 NPT x 1/2 NPS	X	X	310-02894
5	Hose, 1/2 in. x 10 ft. with Adapters	X	X	550-20704
6	Kit, Sediment Trap	X	X	500-00815
7	Valve, Gas Control, LP Gas	X	N/A	410-09635
	Valve, Gas Control, Natural Gas	X	N/A	400-08998
	Valve, Gas Control, LP Gas	N/A	X	120-09429
	Valve, Gas Control, Natural Gas	N/A	X	120-09430
8	Nipple	X	N/A	130-07148
	Nipple	N/A	X	130-08899
9	Valve, Throttle, LP Gas	X	N/A	410-08927
	Valve, Throttle, Natural Gas	X	N/A	410-08520
	Valve, Throttle, LP Gas	N/A	X	410-09692
	Valve, Throttle, Natural Gas	N/A	X	410-09695
10	Cover, Gas Control	X	N/A	225-08513
	Cover, Gas Control	N/A	X	225-09287
11	Bracket, Gas Control	X	N/A	225-08512
	Bracket, Gas Control	N/A	X	225-09506
12	Base	X	N/A	225-08644
	Base	N/A	X	225-09674
13	Manifold	X	X	130-09019
14	Orifice, Burner, LP Gas	X	N/A	310-08928
	Orifice, Burner, Natural Gas	X	N/A	310-08694
	Orifice, Burner, LP Gas	N/A	X	310-09694
	Orifice, Burner, Natural Gas	N/A	X	310-09691
15	Shield, Igniter	X	X	240-09167
16	Igniter	X	X	550-09201
17	Sensor, Flame	X	X	120-08270
18	Bracket, Igniter and Sensor	X	X	260-09202
19	Burner	X	X	320-03453
20	Spacer	X	X	130-02687
21	Chamber, Heat	X	X	400-08682
22	Switch, High Limit	X	X	120-05566
23	Case Assembly (2)	X	X	400-08688
24	Cover, Control Panel	(1)	N/A	500-08236
	Cover, Control Panel	N/A	X	500-09546
25	Control, Ignition	X	N/A	225-08117
	Control, Ignition	N/A	X	120-09298
26	Transformer	X	X	120-08684
27	Relay, Motor	X	X	120-08685
28	Switch, On/Off	X	X	120-08240
29	Strip, Terminal	X	X	120-08253
30	O-Ring	X	X	130-08347
31	Plug, Window	X	X	130-08255
32	Panel, Standoff	X	X	225-08221
33	Box, Control Panel	X	X	500-08237
34	Motor, 1/2 HP, 220 V.	X	X	120-08635
35	Mount, Motor	X	X	225-08647
36	Switch, Air Proving	X	X	500-02680
37	Flapper	X	X	240-08658
38	Fan, Wheel	X	X	130-08636
39	Housing, Assembly Fan with Sail and Air Proving Switch	X	X	500-08798

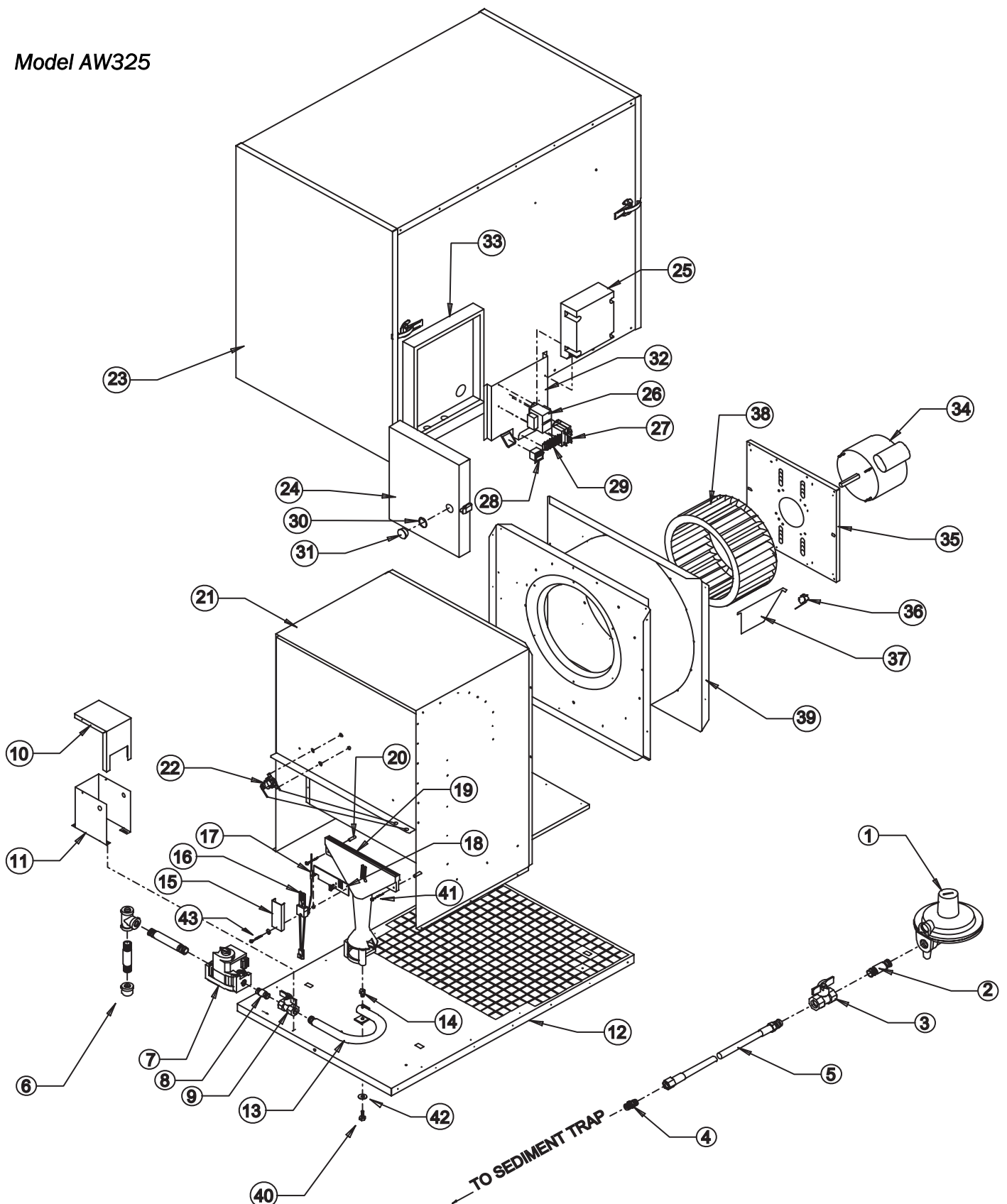
(1) No longer available.

(2) Specify model number and fuel type when ordering.

WIRE SELECTION TABLE			
DESCRIPTION	COLOR	LENGTH	PART NO.
Wire, Harness, Control Module to Igniter	Red	29 in.	120-08287

FASTENER SELECTION TABLE		
DESCRIPTION	APPLICATION	PART NO.
Bolt, 3/8 - 16 x 3/4	Burner Mounting	130-02692
Screw	Burner Mounting	130-02688

Model AW325



# Service Parts, Kits and Accessories



## Kits and Accessories

This section provides part numbers for many of the more commonly requested kits and accessories used on hot-surface ignition heaters.

### GAS CONVERSION KITS

PART NUMBER	PROPANE TO NATURAL GAS	
	MODEL NUMBER	DESIGN(S)
500-08570	AB200	A, B
500-09539	AB200	C
500-20118	AW060	A
500-08598	AW075	All
500-20116	AW100	A
500-08595	AW215	B
500-09540	AW215	C
500-09324	AW230	C, D
500-09541	AW230	E, F
500-20258	AW250	A
500-09833	AW325	A
500-20114	AW325	B
	NATURAL GAS TO PROPANE	
	MODEL NUMBER	DESIGN(S)
500-08594	AB200	A, B
500-09542	AB200	C
500-20119	AW060	A
500-08599	AW075	All
500-20117	AW100	A
500-08596	AW215	B
500-09543	AW215	C
500-09325	AW230	C, D
500-09544	AW230	E, F
500-20259	AW250	A
500-09834	AW325	A
500-20115	AW325	B



### TEST KITS

PART NUMBER	DESCRIPTION
550-00764	Low Gas Pressure Test Kit
120-08507	Transducer Test Kit for Testing Flame Sense

### MISCELLANEOUS ACCESSORIES

PART NUMBER	DESCRIPTION	MODEL
500-07802	Indoor Chain Hanging Kit	All
500-20257	Sloped Top for Outdoor Mount	AW230; AW250

### AIR DIVERTERS

DESCRIPTION	MODELS	PART NUMBER
Two Piece (Snap-In)	AB200, AW215	500-07434
	AW075, AW100	550-08607
	AW230	550-09111
	AW325	550-09177
	AW250	550-20048
	AW060	550-20111
T-Duct (105° Duct)	AW250	500-20100
Flush Mount Diffuser	AW250	500-20095

### OUTDOOR MOUNTING KITS

MODEL	PART NUMBER
AW060	500-09810
AW100	500-09811
AW230	500-09102
AW250	500-20094
AW325	500-09103

### THERMOSTATS

DESCRIPTION	PART NUMBER
Remote Thermostat - Penn Stainless Steel (Less Wiring)	500-06537
Remote Thermostat - Penn Stainless Steel w/20' Series Tap Cord	500-00831
Remote Thermostat - Nema 4X w/20' Series Tap Cord	500-09454
Remote Thermostat - Nema 4X Meets NEC Article 547 (Less Wiring)	500-09381
Remote thermostat - Penn Stainless Steel w/25' Cord (Wired to Control Panel)	500-20177
Remote Thermostat - Nema 4X w/25' Cord (Wired to Control Panel)	500-20176





# Warranty Guidelines

## Equipment and Parts

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### EQUIPMENT

L.B. White Co., Inc. warrants that the component parts of its heater are free from defects in material and workmanship, when properly installed, operated, and maintained in accordance with the Installation and Maintenance Instructions, safety guides and labels contained with each unit. If, **within 12 months from the date of purchase by the end user**, any component is found to be defective, L.B. White Co., Inc. will at its option, repair or replace the defective part

or heater, with a new part or heater, F.O.B., Onalaska, Wisconsin.

A warranty card on file at L.B. White will automatically qualify a unit and its component parts for warranty consideration. If a warranty card is not on file, 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.

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### PARTS

L.B. White Co., Inc. warrants that replacement parts purchased from the company and used on the appropriate L.B. White heaters 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 heater, and in any event L.B. White's liability in connection with the heater, 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.

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### REPLACEMENT PARTS AND SERVICE

Contact your local L.B. White dealer for replacement parts and service or call the L.B. White Co., Inc. at 1-800-345-7200 for assistance. Be sure that you have your

heater model number and configuration number when calling.

## Warranty Returns

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### Warranty Returns

To complement L.B. White's warranty, the following has been written to simplify the warranty return policy. Our goal is to process warranty returns and issue the appropriate credit to you as promptly as possible. Your cooperation in following the procedures listed below will help us achieve our goal.

#### 1. Units and Sub-Assemblies

A. Defective units and sub-assemblies may be returned to L.B. White by authorized L. B. White service dealers by obtaining factory approval and a Return Authorization Number prior to any return shipment. The following information must be supplied when requesting a Return Authorization Number:

1. Complete heater model and serial number
2. Customer's name and address
3. Date sold
4. Date installed
5. Date failed
6. Probable cause of equipment failure

B. The Return Authorization Number must be shown on all transmitting paperwork and marked on the outside of the merchandise return carton. A warranty card on file at L.B. White will automatically qualify the unit, sub-assembly, or component for a 12-month warranty from date of purchase if the material being returned is found defective. Items must be returned freight PREPAID.

#### 2. Parts

Authorized L.B. White service dealers can return defective service parts, qualified for warranty under the L.B. White Warranty Policy, as follows:

- A. By using L.B. White Material Return Tags. Prior factory approval is not required in this case. A Material Return Tag must be filled out completely and attached to each defective part being returned. Material Return Tags are available from L. B. White upon request.
- B. By using the Return Authorization Number procedure described in A. above.

All items must be returned freight PREPAID. Out of warranty parts require factory approval and a Return Authorization Number prior to being returned.

#### 3. Credit

Credit will be issued if inspection indicates:

- A. The item is defective
- B. The item is within the warranty period
- C. Failure is due to normal use

L.B. White is not responsible for the labor cost of removal of a defective product or part, or damages due to removal, or expenses incurred in shipping the product or part to or from L.B. White's plant, or the installation of the repaired or replaced product or part.

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## Return of New Items for Credit

#### 1. Factory Approval

Factory approval and a Return Authorization Number must be obtained **before** any new product or part is returned to L. B. White or credit may not be issued.

#### 2. Freight

**All items returned for credit must be shipped freight prepaid.**

#### 3. Restocking Charge

A 15% restocking charge will apply provided the item is new and in unused condition. Additional charges will be made if reconditioning or new packaging is required.

#### 4. Item Shipped Incorrectly

If the item was shipped in error, L.B. White will authorize shipping freight collect and rescind the 15% restocking charge if Step 1 above is followed.

#### 5. Materials Return Tag

All parts returned to L.B. White must be accompanied by a Materials Return Tag with the Return Authorization Number. A separate tag is required for each part.

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## Shipping Damage

#### 1. Parcel Post

All Parcel Post claims for damages or shortages must be made to L.B. White within 20 days of date of shipment.

#### 2. Truck or United Parcel Service

Damage claims should be made by the customer directly to the carrier or UPS.