



# Foreman

Ductable Indirect-Fired Oil Heater

**CI500** 500,000 Btu/h / 146.54 kW  
#1 / #2 Diesel

View this manual online at [www.lbwhite.com](http://www.lbwhite.com)

## Attention

This heater has been tested and evaluated by OMNI Test Laboratories in accordance with the requirements of CSA B140.8-1967(R2015) and UL 733-2013 and is listed and approved as a ductable indirect oil-fired forced-air construction heater with application for the temporary heating of buildings under construction, alteration, or repair. CHECK WITH YOUR LOCAL FIRE SAFETY AUTHORITY, YOUR FUEL GAS SUPPLIER, OR THE L.B.WHITE COMPANY IF YOU HAVE QUESTIONS REGARDING APPLICATIONS OR INSTALLATION.

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



## Congratulations!

You have purchased the finest Indirect-fired construction heater available. Your new L.B. White heater incorporates the benefits from the most experienced manufacturer of heating products using state-of-the-art technology.

We, at L.B. White, thank you for your confidence in our products and welcome any suggestions or comments you may have... contact us at 1-800-345-7200, or email us at [customerservice@lbwhite.com](mailto:customerservice@lbwhite.com).

SEE ASSEMBLY  
INSTRUCTIONS  
INSIDE

Please refer to important  
elevation information on  
inside cover.



SCAN THIS  
with your smartphone or  
visit <http://goo.gl/nvneR>  
to view maintenance  
videos for L.B.White heaters.\*

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

**WORLD PROVIDER - INNOVATIVE HEATING SOLUTIONS**

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### **WARNING**

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

If operated at higher elevations the product will not function correctly and may function in an unsafe nature.

Products providing proper operation for alternate elevations may be available.

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

**GENERAL HAZARD WARNING**

Failure to comply with the precautions and instructions provided with this heater, can result in:

- Death
  - Serious bodily injury or burns
  - Property damage or loss from fire or explosion
  - Asphyxiation due to lack of adequate air supply or carbon monoxide poisoning
  - Electrical shock
    - Read this Owner's Manual before installing or using this heater.
    - Only properly-trained service people should repair or install this heater.
    - Save this Owner's Manual for future use and reference.
    - Owner's Manuals and replacement labels are available at no charge.
- For assistance, contact L.B. White at 800-345-7200.

**WARNING**

- Keep all combustible materials away from this heater.
  - Minimum Clearances
  - Outlet: 6 ft. (1.83m)      Sides: 1ft. (0.30m)
  - Top and Rear: 3 ft. (0.91m)
- NEVER use fuels such as gasoline, benzene, paint thinners, or other oil compounds in this heater (RISK OF FIRE OR EXPLOSION).
- NEVER use this heater where flammable vapors may be present.
- NEVER refill the heater's fuel tank while heater is operating or still hot. This heater is EXTREMELY HOT while in operation.
- NEVER block air inlet (rear) or air outlet (front) of heater.
- NEVER move or handle heater while still hot.
- NEVER transport heater with fuel in its tank.
- When used with optional thermostat or if equipped with a thermostat, the heater may start at any time.
- ALWAYS locate heater on a stable and level surface.
- NEVER use any fuel other than #1/#2 diesel in this heater.
- Bulk fuel storage should be a minimum of 25 ft. from heaters, torches, portable generators, or other sources of ignition. All fuel storage should be in accordance with federal, state, or local authorities having jurisdiction.

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

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

**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.

## Specifications

<b>CI500</b>		
Fuel Type	#1 or #2 Diesel	
Maximum Input (Btuh/kWh)	500,000/146.5	
Air Flow (CFM)	3,457	
Pump pressure (PSI/kPa)	150/1034	
Nozzle	2.75 GHP X 60 B	
Fuel Tank Capacity (gal/liter)	42/159	
Firing rate (GPH/LPM)	3.5/0.23	
Motor Characteristics	Ball Bearing, 1.5 H.P./ 1,119 Watts	
Blower Speed (RPM)	1725	
Electrical Supply (Volts/Hz/ Phased)	120/60/1	
Amp Draw	Starting	35
	Continuous Operation (FLA)	14.8
Dimensions (inches/cm) L x W x H	92.5 x 32 x 44.5 / 235 x 81.3 x 113	
Minimum Safe Distances From Nearest Combustible	Top: 3/0.91	Sides: 1/0.30
	Rear: 3/0.91	Blower Outlet: 6/1.83
Materials (Feet/ Meter)	Bulk Fuel Storage Container: 25/7.62	
Net Weight (lbs.)	790	
Shipping Weight (lbs.)	850	
Minimum Ambient Temperature in Which Heater May be Used (°F/°C)	-20/-29	

## General Information

This Owner's Manual includes accessories commonly used on this heater. These accessories must be ordered separately.

When calling for technical service assistance, or for other specific information, **always** have model number, configuration number and serial number available. This information is contained on the dataplate.

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

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

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

## Overview

The heater is equipped with a burner assembly. The assembly includes an electronic igniter, solenoid valves, and burner head with orifice. When the heater is turned ON, the igniter will spark, with gas delivered through the solenoids to the burner orifice. Ignition will occur.

The burner will heat the heat exchanger. After a predetermined time frame has passed, a fan controller will start the main blower motor, and blow cool air over the heat exchanger. The cool air will be preheated by passing over the heat exchanger, with warm, dry air delivered the area to be heated.

Combustion by-products created during the heating process will be transferred up a vent stack directly to the outside, thereby providing only clean, dry air to the heated area.

When the heater is turned OFF, the burner motor is de-energized turning off the fuel pump. The solenoid valves will close cutting off fuel to the burner nozzle. The fan controller will continue to run the main blower motor for a predetermined period of time to allow the heat exchanger to cool down. After this time frame has elapsed, the fan controller will disconnect power to the fan motor, thereby shutting the fan motor down completely.

## Safety Precautions

### **WARNING**

#### **Asphyxiation Hazard**

- Do not use this heater for heating human living quarters, garages, workshops, or other such confined spaces.
- 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.
- Lack of proper ventilation air will lead to improper combustion.
- Improper combustion can lead to carbon monoxide poisoning leading to serious injury or death. Symptoms of carbon monoxide poisoning can include headaches, dizziness and difficulty in breathing.
- Proper ventilation air for combustion must be provided in accordance with OSHA 29 CFR 1926.154, Temporary Heating Devices, ANSI A10.10, Safety Requirements for Temporary and Portable Space Heating Devices, or the Natural Gas and Propane Installation Code, CAN/CSA B149.1 as appropriate.

### **CAUTION**

#### **Fire and Burn Hazard**

- Hot while in operation.
- Do not touch.
- Keep children, clothing, and combustibles away.

## QUALIFICATIONS FOR SERVICING AND INSTALLATION:

1. Do not attempt to install, repair, or service this heater unless you have continuing expert training and knowledge of liquid fuel heaters.

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

To be a qualified liquid fuel heater service person, you must have sufficient training and experience to handle all aspects of indirect fired liquid fuel 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 the heater by reading and complying with the safety instructions, labels, Owner's Manual, etc., that is provided with each heater.

2. All installations and applications of L.B. White heaters must meet all relevant local, state and national codes. Included are electrical and safety codes. Your local fuel supplier, a local licensed electrician, the local fire department or similar government agencies, or your insurance agent can help you determine code requirements.

Refer to the following:

- ANSI/NFPA 70, National Electrical Code.
- ANSI A10.0, 1990 Latest Edition Safety Requirements for Temporary and Portable Space Heating Devices and Equipment Used in Construction Industry.
- CSA standard B139-1962, Installation Code for Oil-Burning Equipment, for recommended installation practice.

3. The area surrounding the heater shall be kept clear and free from combustible materials, gasoline, and other flammable vapors and liquids.
4. We cannot anticipate every use which may be made of our heaters. Check with the local fire safety authority if you have questions about applications.
5. For safety, this heater is equipped with fan and high limit switches. Never operate the heater with any safety device that has been bypassed. Do not operate this heater unless these features are fully functioning.

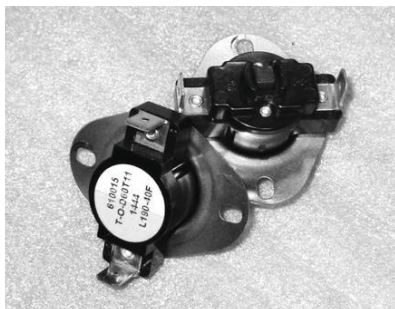
6. Do not locate fuel containers near the blower outlet of the heater.
7. Do not adjust the supply air or fuel for combustion. Doing so will cause improper combustion and operation of the heater.
8. Do not block air intakes or discharge outlets of the heater. Doing so may cause improper combustion or damage to heater components leading to property damage.
9. Check for fuel leaks and proper function upon heater installation, when relocating, and after servicing.
10. This heater should be inspected for proper operation by a qualified service person before each use, not less than once per shift, and at least annually.
11. 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.
12. Read and understand all warnings. Keep this manual for reference. It is your guide to safe and proper operation of this heater.
13. Use only the recommended fuels to avoid risk of fire or explosion. Never use gasoline, naphtha, paint thinners, alcohol, or other highly flammable fuels.
14. Fueling:
  - a. Personnel involved with fueling shall be qualified and thoroughly familiar with the manufacturer's instructions and applicable regulations regarding the safe fueling of heating units.
  - b. Use only the type of fuel specified within the manual.
  - c. All flame shall be extinguished and the heater allowed to cool prior to fueling.
  - d. During fueling, all fuel inlets and fuel-line connections shall be inspected for leaks. Any leaks shall be repaired prior to returning the heater to service.

- e. At no time shall more than one day's supply of heater fuel be stored inside a building in the vicinity of the heater. Bulk fuel storage shall be outside the structure.
  - f. All fuel storage shall be located a minimum of 25 feet (7.62m) from heaters, torches, welding equipment, and similar sources of ignition (exception: the fuel reservoir integral with the heater unit).
  - g. Whenever possible, fuel storage shall be confined to areas where floor penetrations do not permit fuel to drip onto or be ignited by a fire at lower elevation.
  - h. Fuel storage shall be in accordance with the authority having jurisdiction.
  - i. Fuel storage shall not be permitted within 10 ft. (3.05 m) of floor penetrations used for vertical access unless separated from the penetration by full masonry height walls.
15. Use only in areas free of flammable vapors or high dust content.
  16. Locate heater on a stable and level surface while hot or operating. Use a level.
  17. Never start heater if fuel has accumulated in combustion chamber.
  18. Heater may start at any time when used with thermostat.
  19. When heater is stored, it must be in a level position.
  20. Never move, handle, refuel, or service a hot, operating, or plugged-in heater.
  21. Follow all local codes if connecting the heater to an external fuel source.
  22. Heaters used in the vicinity of tarpaulins, canvas, or similar enclosure materials shall be located in safe distance from such materials. The recommended minimum safe distance is 10 ft. (3.05 m). It is further recommended that these enclosure materials be of a fire retardant nature. These enclosure materials shall be securely fastened to prevent them from igniting or from upsetting the heater due to wind action.
  23. Unplug heater when not in use.
  24. When the heater is used in an enclosed or partially enclosed permanent or temporary structure, tests for the presence of carbon monoxide shall be made within one hour after the start of each shift, and at least four hours thereafter. Immediate, more frequent testing may be dictated by job conditions.



## Safety System

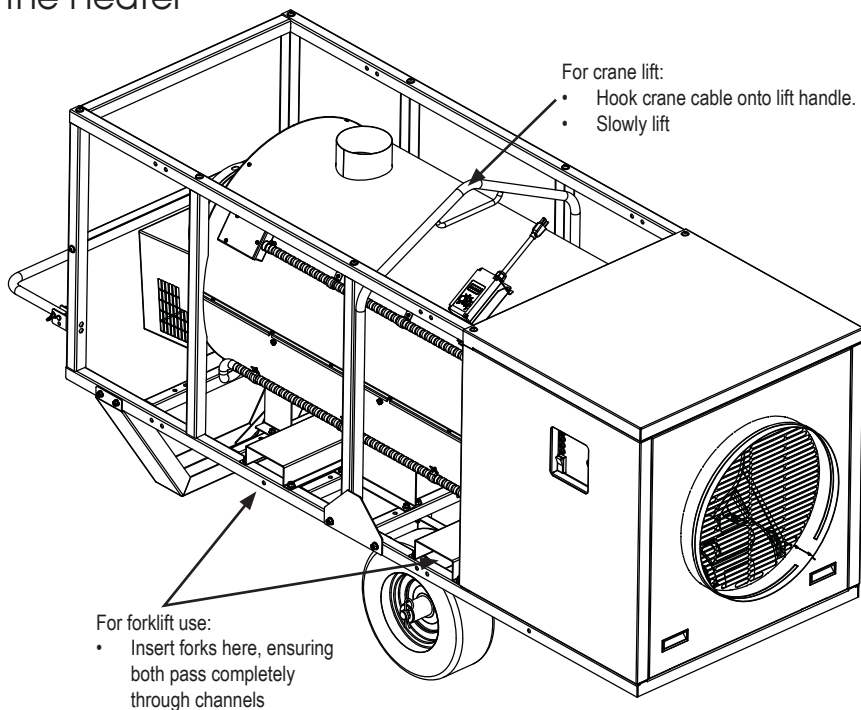
**High Temperature Control:** The heater is equipped with a high temperature switch designed to turn the heater off if the internal temperature reaches an unsafe level.



**CAD Cell:** A light sensitive resistor. Used to sense the presence of light in the heat exchanger, allowing the heater to continue its operation.



## Moving/Transporting the Heater



## General Installation Instructions

### **WARNING**

#### **Fire and Explosion Hazard**

- Before using this heater, please read this USER'S MANUAL very carefully. This USER'S MANUAL has been designed to instruct you as to the proper manner
- In which to maintain, store, and most importantly, how to operate the heater in a safe and efficient manner.
- Never leave the heater unattended while burning!

1. Read all safety precautions and follow L. B. White recommendations when installing this heater. If during installation or relocating of heater, you suspect that a part is damaged or defective, call a qualified service agency for repair or replacement
2. Using a level, make sure the heater is level and properly positioned before use. Observe and obey minimum safe distances of the heater to the nearest combustible materials. Safe distances are given on page 4 of this manual.
3. This heater may be installed either indoors or outdoors. For indoor installations, the heater must be vented to the outside. See installation of inside structure section of this manual.
4. Heaters used in the vicinity of combustible tarpaulins, canvas, plastic, wind barriers, or similar coverings shall be located at least 10 feet/3.05 meters from the coverings. The coverings shall be securely fastened to prevent ignition or upsetting of the heater due to wind action on the covering or other material.
5. Light according to instructions on heater or within owner's manual.
6. The heater must be installed so as not to interfere with or obstruct normal exits, emergency exits, doors and walkways.
7. Railing, fencing or suitable substitute materials must be used to keep the heating equipment from any people using and visiting the structure.
8. The heater shall be located so that rain, ice, or snow drainage from the structure does not affect equipment operation. If the heater is mounted outside, it must be mounted above any pooled or standing water. If the unit is to be located on the ground, a surrounding trench is recommended to drain any rain, ice or snow away from the unit.
9. The ground and surrounding terrain must be cleared of any combustible vegetation and other combustible materials when the heater is utilized outside.
10. Eventually, like all electrical/mechanical devices, the thermostat can fail. Thermostat failure may result in an under-heating condition. The thermostat should be tested to make sure it turns the heater on and off within a temperature differential of  $\pm 3^{\circ}\text{F}$  ( $\pm 1.5^{\circ}\text{C}$ ).
11. 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.
12. Take time to understand how to operate and maintain the heater by using this Owner's Manual.

## Inside Structure

### **⚠ WARNING**

#### Asphyxiation Hazard

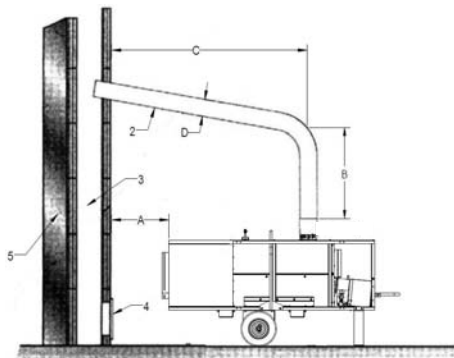
- When installing indoors the heater's exhaust must be vented to the outside.
- Failure to comply can result in asphyxiation due to lack of adequate air supply or carbon monoxide poisoning.
- Carbon monoxide poisoning can lead to serious injury or death.

### **⚠ WARNING**

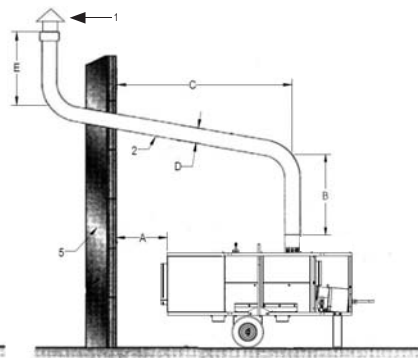
#### Asphyxiation Hazard

- When this heater is connected to a flue pipe, the flue pipe shall terminate in a vertical section at least two feet long and sufficient draft shall be created to assure safe and proper operation of the heater.
- Where back drafts may occur a vent cap should be used on the exit from the flue pipe.
- Horizontal runs of flue pipe should have a rise of 1 in 10 away from the heater.

### IN EXISTING CHIMNEY



### DIRECTLY TO OUTSIDE



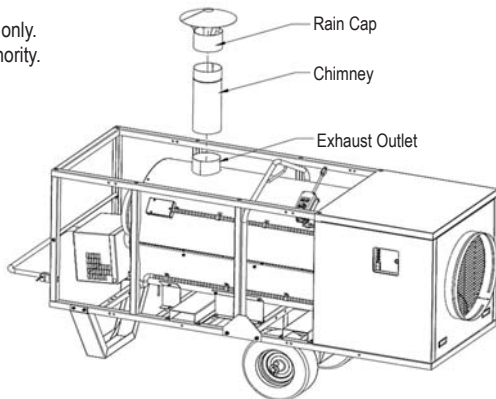
- 1) Anti-wind device, optional accessory
- 2) Horizontal crossing with minimal upside angle pitch of 5°
- 3) Chimney 8 in. x 8 in. of minimal inside measure
- 4) Chimney anti-explosion flap door
- 5) External seating wall

- A. Minimal 3 Ft.
- B. Minimal 3 ft.
- C. Shortest
- D. The same or bigger than the heaters stack outlet diameter.
- E. Minimal 3 ft.

**Note:** The above information is a recommendation only. Have you installation checked by a local authority.

## Outside Structure

To prevent recirculation of flue gas from the exhaust outlet to the heater air inlet, an exhaust stack of 5ft./1.25meter minimum is required to be installed onto the exhaust outlet. To protect against water entry when the heater is installed outdoors, a rain cap is necessary. Optional accessory may be purchased through the L. B. White Co. Rain cap (p#30162) or chimney (p#30161).



## Chimney/Rain Cap Installation

\*Accessory – must be ordered separately

1. Install rain cap onto chimney.
2. Drill 4 (1/8 in.) holes in a crisscross pattern.
3. Secure the rain cap and chimney with screws supplied in kits.
4. Install the chimney/rain cap assembly onto the heater exhaust pipe.
5. Drill 4 (1/8 in.) holes in a crisscross pattern.
6. Secure the chimney/rain cap assembly with screws supplied in kits.

## Duct Installation

\*Accessory – must be ordered separately

This heater may be ducted using the approved L.B. White distribution devices:

-- (2) 12 in./30.48 cm Dia. x 25 ft. / 7.62 m duct kit, L.B. White Part # 30052, duct adapter not required.

-- Locate the duct under suitable wind barrier materials for jobsite requirements.

-- Substitute ductwork material is acceptable but must conform to the following requirements:

1. Duct must have a minimum material temperature of 300°F/149°C
2. Duct length not to exceed 25 ft. /7.62 m per duct.
3. Alternate 12 in. (30.48 cm) x 25 ft (7.62 cm) duct can be used from the following manufacturer's:
  - Artic Helix - Norseman
  - Artic Econorush - Norseman
  - Hitex Series - NTI Global
  - Ventflex Series - NTI Global

### Installation:

1. Extend duct kit to 25 ft./7.62m. length.
2. Attach one end of the duct to one of the heater's discharge outlet. See Fig. 1

FIG. 1



3. Secure duct to heater with clamp as supplied in kit. See Fig. 2.

FIG. 2



4. Straighten ducts and eliminate any kinks

### Note:

- When using the ducting, ensure that bends in ducts are kept to a minimum. A maximum of two 90° bends is allowed.
- Reducing the number of bends will ensure that the warm air exiting the heater flows freely, thereby preventing overheating. If there are excessive bends, the high limit switches may open.

## Adjusting to High Elevation

This heater burner air setting is factory set to operate normally at 0-2,000 ft. above sea level. Allowance for elevation must be taken into consideration when operating above 2000 ft. A 1.84% rate reduction for every 1000 feet above sea level is necessary for the heater to operate safely. For service of re-rating the heater, contact:

Beckett Technical Service  
1-800-645-2876 or  
Email: [techservice@beckettcorp.com](mailto:techservice@beckettcorp.com)

**NOTE:** The firing rate (amount of Btu input) of the burner must be maintained to meet the heating load that the appliance has been sized to meet.

## Thermostat

The optional remote thermostat is a fully enclosed NEMA 4X with a single stage temperature adjustment ( $\pm 3^{\circ}\text{F}/$   $16^{\circ}\text{C}$  degrees). L.B. White part #500-30125.



## Start-Up Instructions

For initial start-up after heater installation, follow steps 1-5. For normal start-up, set the thermostat above room temperature or set thermostat selector switch to the manual position.


1. Follow all ventilation and safety information.
2. Fill tank with fuel.
3. Connect the heater to an approved 20 amp three prong grounded extension cord and properly grounded electrical supply (minimum breaker size must be 20 amp).

### Extension cord wire size requirements

- 6 to 100 ft. – 14 AWG conductors
- 101 to 200 ft. – 12 AWG conductors
- 201 to 300 ft. – 10 AWG conductors

4. Set thermostat to desired room temperature or set thermostat selector switch to the manual position.
5. This heater has a rocker style selector switch located on the side of the heater. This switch allows for either heat mode or ventilate mode (no heat).



6. When the switch is set to heat , three status lights will be activated in sequence as specific circuits are checked by the heater controller. If the heater does not light, and a status light is off, refer to the trouble shooting section of this manual.
7. Do not exceed input rating stamped on nameplate or manufacturer's recommended pump pressure for nozzle used. Make certain that the primary air supply to main burner is open and free of dust, dirt and debris for complete, proper combustion.

### A. Heating Mode Operation

When the selector switch is positioned to heat and the thermostat is calling for heat, a set of green lights will illuminate (power ON and thermostat ON). The burner fan motor will pre purge for 45 seconds. After the burner fan has pre purged, the igniter will spark and ignition will occur. The main blower has a time delay of 30 seconds before operation. The thermostat will cycle the heater ON or OFF based upon temperature setting. The high limit LED will flash during pre/post purge cycle.

**Note:** When the thermostat cycles the heater off or selector switch is switched to OFF, the main fan motor will continue to run for an additional 3 minutes to cool down the heat exchanger.

### B. Vent Mode Operation

When the selector switch is positioned to vent, only the fan motor light will illuminate. The fan motor will start, but the burner motor will not, nor will ignition occur. This feature is used typically when heat is not needed, but air circulation is required. The heater will not cycle on its thermostat setting. To discontinue the ventilation feature, position the switch to midpoint O or heat. If you desire to use the ventilation feature, the fuel source is not needed.

### C. Off O

Position the switch to midpoint O

## Safety Lock-Out

This heater is equipped with the Beckett GeniSys Advanced Burner Control. The GeniSys is used with a suitable cad cell flame sensor to control the oil burner motor, igniter, and oil solenoid valve.

- The GeniSys Burner controller has one ignition trial. If ignition is not achieved, the GeniSys burner control will enter a "soft lock-out" mode.

Soft lockout – the control has shut down for one of the following safety reasons:

- a) The trial for ignition fail.
- b) The cad cell did not detect flame.
- c) Flame is lost during ignition trial.
- d) Burner control will retry ignition in 60 seconds.

## TO RESET THE CONTROL BOX

Push the reset button on the GeniSys controller for 1-second and verify the red light in the reset button shut off.




## DIAGNOSTICS MODE

3 status lights

Light Color	Solid	Flashing
Red	Hard lockout (1)	Soft lockout (2)
Green	Normal operation	Recycle (3)
Yellow	Pump prime mode (4) or reset button held for 15+ seconds	N/A

- (1) Recurrence of a soft lockout- to reset, push and hold the reset button for 15 seconds until the yellow light turns on.
- (2) Ignition failure, cad cell did not detect flame, or flame lost- to reset, push and release the reset button.
- (3) Control has entered a 60 second delay, and will repeat the ignition sequence.
- (4) Purging air out of the fuel line.

The controller will only provide the diagnostics when the selector switch is set to HEAT 

- It is normal for air to be trapped in the fuel line on new installations. The heater may require several trials for ignition before air is finally purged from line and ignition takes place.

## Shut Down Instructions

If the heater is to be shut down for cleaning, maintenance, or repair, follow steps 1-3. Otherwise, simply adjust thermostat to "Off" or "No Heat" or put the HEAT/VENT switch to the OFF position.

1. Turn thermostat dial to lowest temperature setting.
2. Allow heater to perform its post purge cool down mode.
3. Unplug cord from outlet.

DO NOT DISCONNECT THE ELECTRICAL SUPPLY UNTIL THE MAIN FAN MOTOR HAS CYCLED OFF FROM COOLING THE HEAT EXCHANGER

**Note:** During normal operation, if either the thermostat cycles the heater off or the selector switch is put in the OFF position, the main fan motor will continue to operate. This is the cool down post purge of the heat exchanger. The high limit LED will flash during this process. After 3 minutes of post purge, the heater will shut-off.

## Cleaning Instructions

### WARNING

#### Fire, Burn, and Explosion Hazard

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

1. Before cleaning, disconnect electrical supply.
2. The heater should have dirt or dust removed periodically:
  - a. Before each use give the heater a general cleaning using compressed air or a soft brush or dry rag on its case and internal components. At this time, dust off the motor case to prevent the motor from overheating.

- 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 blade assembly. Additionally, make sure the burner air inlet is free of dust accumulation.

### **WARNING**

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

- Do not use a pressure washer, water, or liquid cleaning solution on any gas controls. Use of a pressure washer, water or liquid cleaning solution on the control board components can cause severe personal injury or property damage due to water and or liquids.
- In electrical components and wires causing electrical shock or equipment failure.

Clean all components of the heater with pressurized air, a dry brush, or a dry cloth.

## Maintenance Instructions

### **BEFORE EACH USE:**

- Check the area surrounding the heater to ensure it is clear and free of combustible materials, gasoline, and other flammable vapors and liquids.
- At the installation, ensure the flow of combustion and ventilation air is not obstructed.
- 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.
- Review all heater markings (i.e. wiring diagram, 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 by contacting the L.B. White Co., Inc. Data plate, startup and shut-down instructions and warnings are available at no cost. A nominal charge will be applied for wiring diagrams.
- Check the main fan drive belt. Make sure the belt is not cracked. If so, replace it. Additionally, ensure the belt is not slipping, belt tension is proper and pulleys are properly aligned and not worn.
- Check air gate adjustment.
- Inspect all fuel supply lines for cracks, abrasions, or ruptures. Replace if needed.
- Clean and check the igniter and cad cell annually.
- Test the high limit heat switches to ensure proper function before each use. (see instructions in the service section of this manual)

- Flush the fuel tank after every 50 hours of operation or as needed.
- Replace fuel filter every six months of normal usage.
- Fuel filter lines should be checked and tightened before each use.
- Fan wheel and belt should be clean and check before each use.
- The air passages around the heat exchanger should be check each season for dirt and debris.

### **Storage**

1. Drain all fuel from fuel filters, fuel lines, and pump.
2. Remove drain plug and drain fuel tank. Replace drain plug.
3. If any debris is noted in old fuel, add 1 or 2 quarts of clean fuel to tank, stir, and drain again. This will prevent debris from clogging filters during future use. Install fuel cap and drain plug.
4. Add 2 gallons of recommended fuel to fuel tank. Replace fuel cap.
5. Operate heater for 5 minute (see start up instructions). Shut heater down, let cool completely.
6. Remove drain plug and drain fuel tank. Replace drain plug.
7. Properly dispose of old and dirty fuel.
8. Store heater in a dry location. Make sure storage place is free of dust and corrosive fumes.

Do not store unused fuel over summer months for use during next heating season. Using old fuel could damage heater.



## Service Instructions

### **WARNING**

#### **Burn Hazard**

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

### **WARNING**

#### **Fire and Explosion Hazard**

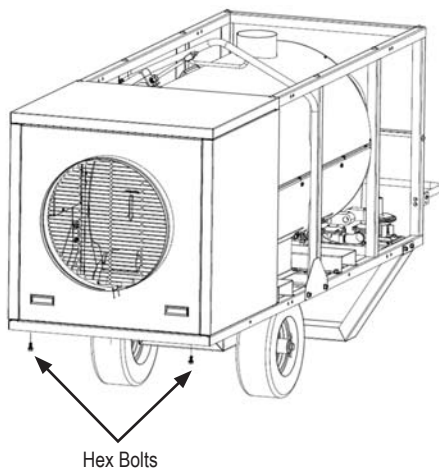
- Do not disassemble or attempt to repair any heater components.
- All component parts must be replaced if defects are found.
- Failure to follow this warning will result in fire or explosions, causing property damage, injury, or death.

1. Disconnect the electrical supply before servicing unless necessary for your service procedure.
2. Clean the heater's nozzle with compressed air or a soft, dry rag. Do not use files, drills, broaches, etc. to clean the orifice hole. Doing so will enlarge the hole, causing combustion or ignition problems. Replace the nozzle if it cannot be cleaned properly.
3. The high limit switches, HEAT/VENT switch, and thermostat can be tested by disconnecting the leads at the component, and jumpering the leads together:
  - Reconnect the electrical supply and open fuel supply valves.
  - If the heater lights, the component is defective and must be replaced.
  - Do not leave the jumper on or operate the heater if the part is defective. Replace the part immediately.
  - An alternate method for checking the components is to perform a continuity check.
4. Open or remove the respective case panel for access to fan related components.
5. For reassembly, reverse the respective service procedure. Ensure gas connections are tightened securely.

6. After servicing, start the heater to ensure proper operation.
7. If any fan keys are lost during service, replacements are easily made by using 3/16 square x 1 in. bar stock. Otherwise order part # 22955.

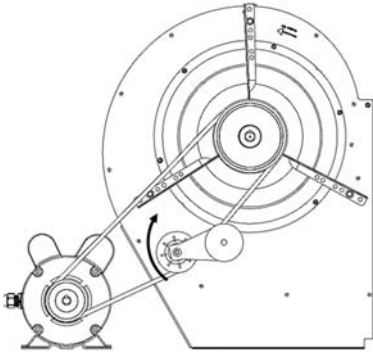
## Drive Components

To get access to the main fan drive components, remove the three hex bolts located under the heater frame.



Remove the rear panel by pulling it out and sliding it down.

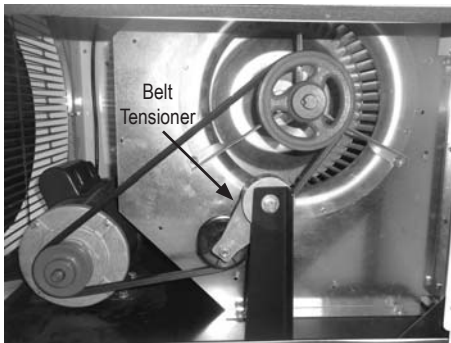
### Belt Replacement



1. Push the belt tensioner clockwise for removal of the belt from pulley.
2. Check the fan and motor pulley grooves for dirt, clean the pulleys if needed.
3. Install new belt.

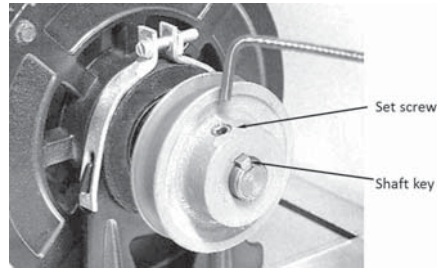
### Belt Tensioner

The belt tensioner automatically applies the proper tension to the belt during operation, thereby eliminating the need for manually tensioning the belt during service.



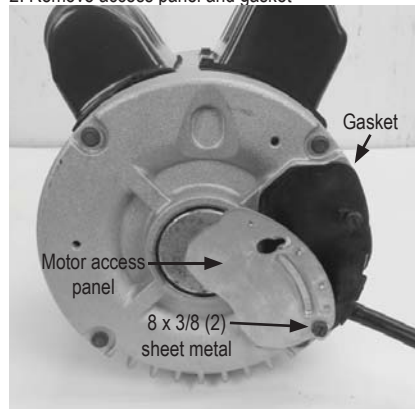
### Fan and Motor Pulleys

1. Remove belt from pulleys. See Belt Replacement.
2. Loosen allen screw on fan and motor pulleys.
3. Remove pulley and key from fan shaft and motor.
4. When installing new pulley, use a straight edge, check motor and fan pulley alignment. Contact must be made at edge of both pulleys.



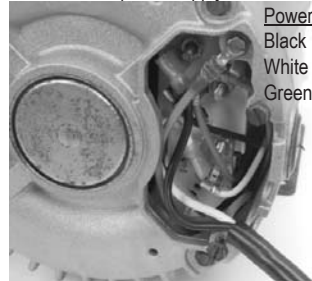
### Fan Motor

1. Loosen electrical supply access panel screws on motor
2. Remove access panel and gasket



3. Disconnect power supply line.

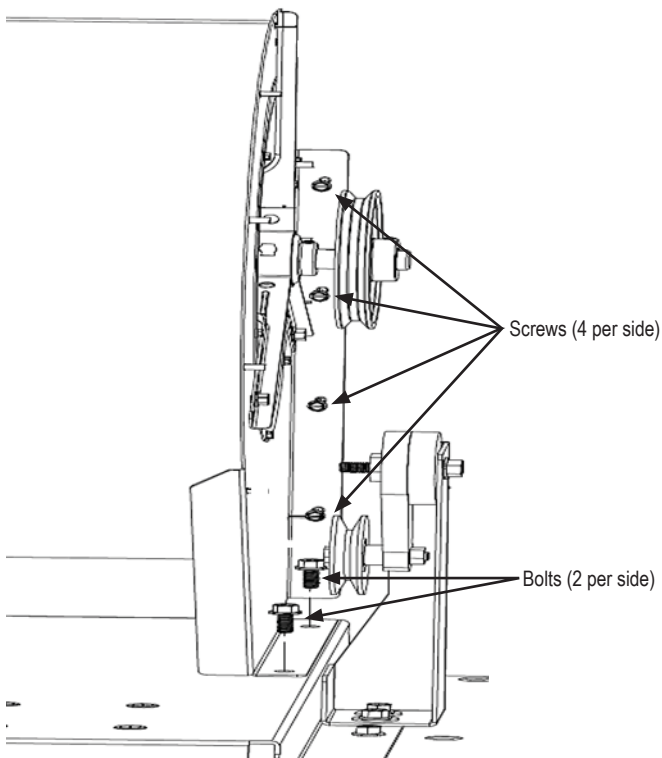
Power Lead	Terminal
Black	2
White	4
Green	Ground



4. Remove the four motor mounting bolts using a 1/2 inch open ended wrench.
  - Ensure motor and fan pulleys are properly aligned when reinstalling.
  - Motor bearings are permanently lubricated.

## Fan Wheel, Shaft, and Bearings

1. Remove fan belt. See "Belt Replacement".
2. Remove fan motor. See "Fan Motor".
3. Locate and remove the four bolts at the base of the fan housing. See below.
4. Locate and remove the eight sheet metal screws. See drawing below.
5. Pull fan wheel housing out.



## Burner Components

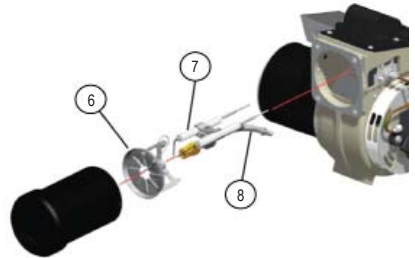
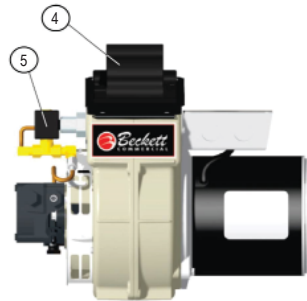
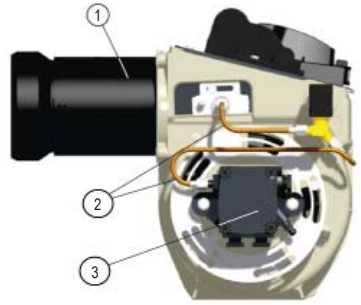
### **⚠ WARNING**

#### **Burn or Fire Hazard**

- Never service heater while it is plugged in.
- Allow the heater to cool before performing service, maintenance, or cleaning.
- Failure to follow this warning will result in burns causing injury.
- Do not attempt to install, repair, or service this heater unless you have continuing expert training and knowledge of liquid fuel heaters



CAD cell flame detection range  
Normal condition = 0 to 1600 ohms



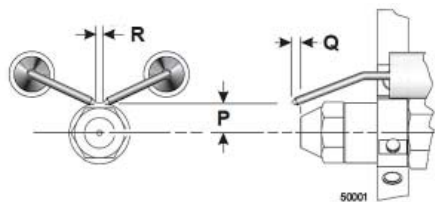
- |                         |                         |
|-------------------------|-------------------------|
| 1. Air tube             | 6. Head assembly        |
| 2. Fuel lines           | 7. Electrode assembly   |
| 3. Fuel pump            | 8. Nozzle line assembly |
| 4. Ignition transformer |                         |
| 5. Oil solenoid valve   |                         |

## WARNING

### Electrode Specifications

- Failure to properly maintain these specifications could cause ignition malfunction, puff-back of hot gases, heavy smoke, asphyxiation, explosion and fire hazard.

Adjust the electrode gap and position in relation to the nozzle to the following specifications.



#### Legend (Figure 5)

- P Nozzle centerline to electrode tip =  $3/16"$
- Q Nozzle face to electrode tip =  $1/4"$
- R Electrode spacing =  $3/16"$  gap

## High Limit Switches

## WARNING

### Fire Hazard

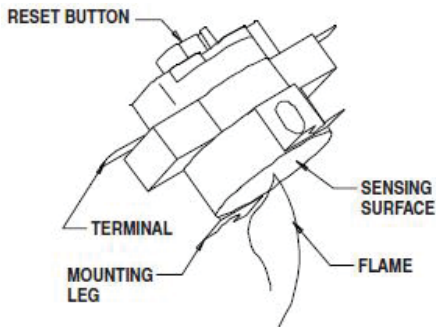
- Do not operate the heater with either of the high limit switches bypassed.
- Operating the heater with a bypassed high limit switch may lead to overheating, possibly resulting in a fire, with subsequent damage to the heater or property damage.

This heater is equipped with two limit switches. One is manual reset; the other is an auto-reset. The switches are located on the side of the heater.



Both high limit switches should be tested a minimum of once per year when the heater is given a thorough cleaning.

1. Remove the high limit switch.
2. Apply a small flame only to the sensing portion on the back of the switch.



Be careful not to melt the plastic housing of the switch when conducting this test.

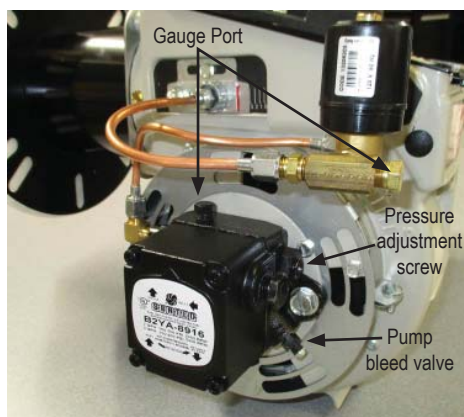
3. Within a minute, you should hear a soft click, indicating the contacts of the switch have opened.
4. **MANUAL RESET SWITCH:** Allow the switch to cool for about a minute before firmly pressing its reset button.  
**AUTO RESET SWITCH:** Allow the switch to cool for about a minute. No need to reset.
5. Check for electrical continuity across the switch terminals to make sure the contacts have closed.

## Pump Pressure Checks

### ATTENTION:

Consult the data plate on the heater or page 4 in this manual for specific pressures to be used.

1. Connect pressure gauge to either gauge port.
2. Start heater
3. Allow motor to reach full speed.
4. Adjust pressure (using flat blade screwdriver).
5. Turn relief valve clockwise to increase pressure.
6. Turn relief valve counter clockwise to decrease pressure.
7. Set pump pressure to correct pressure as indicated on heater nameplate.
8. Stop heater.
9. Remove pressure gauge and plug fuel pump port.



## Troubleshooting Guide

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



#### WARNING

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

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

- Digital Multimeter - for measuring AC voltage and resistance
- High Pressure Gauge - for checking pump pressure against dataplate rating.

#### Before Starting:

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

Components should be replaced only after each step has been completed and replacement is suggested. Refer to the Servicing sections as necessary to obtain information on disassembly and replacement procedures of the component once the problem is identified. Refer to the system operation sequence in this section to gain an understanding as to how the equipment operates during a call for heat. Understanding the sequence of operation of the ignition module and related components is essential as it will relate directly to problem solving provided by the charts.

#### OPERATION SEQUENCE:

- Power cord connected to line voltage.
- Line voltage is sent to:
  - Selector switch terminal 2
  - Main motor relay terminal 2
  - Heater control terminal "L1"
- Selector switch set to heat mode.
  - Power LED activated indicating heater is receiving main power supply.
  - Line voltage sent to thermostat outlet.
- Thermostat calls for heat or Thermostat switch set to manual.
  - Thermostat selector switch sends voltage to terminal "W" of heater control.
  - Thermostat LED activated indicating a call for heat.
  - Line voltage is sent from heater controller "PSO" to manual reset high limit.
  - Line voltage returned to "PSI" on heater control.
  - Line voltage is sent to burner control.
  - Burner motor starts.
  - High limit LED Flashes
- 45 seconds after Burner control receives power.
  - Ignition occurs
- 30 second after ignition occurred, line voltage is sent from "IND" to main motor relay terminal 0.
  - Relay closes, Main motor is energized.
- Main motor LED comes on.
  - Limit/Purge LED stop flashing
- Thermostat opens once heat demand is satisfied.
  - Thermostat LED off
  - Heater control shuts off burner.
  - Main motor continue to receive line voltage (post-purge) for 180 seconds.
  - Limit/Purge LED flashes
- After 180 seconds, heater control de-energized main motor
  - Limit/Purge LED off - Main motor LED off

## Fan Drive Components Troubleshooting

PROBLEMS	CAUSE	SOLUTION
<b>Belt slips</b>	Pulleys worn (Belts bottoming out in grooves)	Replace pulleys
	Oil or grease on belt	Clean pulleys or belt.
<b>Belt Breaks</b>	Improper belt installation Belt pried over pulleys using sharp or pointed tools.	Install new belt properly.
	Improper belt tension	Ensure belt tensioner is positioned properly.
<b>Belt Jumps Sheave Grooves</b>	Drive misaligned	Check and realign
	Dirt entering pulleys	Remove belt, clean the pulleys
<b>Belt Cracking</b>	Dirt or grease on belt or aged belt	Remove dirt or replace belt.
<b>Belt wearing rapidly</b>	Worn pulleys	Replace pulleys
	Dirt in pulleys	Remove dirt



## Heating Mode Troubleshooting

Problem	Solution
Power & Thermostat status LED are ON, trip high limit LED ON	Check manual high limits, reset or replace
Only the power status LED is ON	Thermostat is below set point, adjust thermostat setting or T-stat switch
Power, Thermostat, and Main motor status LED's are ON, main fan not operating	Main fan motor defective, replace motor
	Belt tensioner is loose, adjust tensioner or replace it.
	Broken belt
	Faulty heater controller
	Bad relay

Problem	Solution
Solenoid didn't open	Check for power to solenoid
	Defective solenoid, replace
Solenoid opens, but fuel oil not detected or ignited	Open all manual shut-off valves
	Check pump pressure
	No fuel
Solenoid opens, fuel is detected, but no ignition	Defective pump coupler
	Check ignition transformer springs
	Check igniter gap
Ignition occurs, then goes out	Defective ignition transformer
	Check cad cell for defect or crack
	Check cad cell connection
	Check cad cell location
	Ground fault issue

## Heating Mode Troubleshooting (cont.)

Problem	Solution
Burner motor operated than shut off	Motor overload switch trip
	Auto high limit switch trip
	Defective Main Burner Relay
Burner motor hums	Motor lockup
	Fan wheel binding
	Improper voltage
Burner motor does not come ON	Check burner motor wire connection
	Auto high limit switch trip
	Burner motor overload switch trip
	Defective Main Burner Relay

\* Disconnecting power to burner circuit board controller will not reset burner controller.

## Ventilation Mode Troubleshooting

Problem	Solution
Main motor does not run	Check for power to fan motor
	Bad motor relay
	Bad electrical connections
	Loose belt
Main motor "hums," does not run	Check for binding fan, or defective capacitor



## Heater Component Function

### Bearings

Components used to support the shaft and reduce friction between the pulleys and motor.

### Belt

Friction drive component used for transmission of power from motor to fan shaft. Used in conjunction with motor and fan pulleys.

### Belt Tensioner

A spring loaded device which applies proper tightness to the drive belt, thereby eliminating excess belt wear created by over or under tension.

### Oil Filter

The purpose of the filter is to trap very small particles which may be present in the fuel system. The high degree of filtering is necessary to prevent foreign materials from entering the burner nozzle.

### Fan

Component used in conjunction with the motor and fan housing to move air.

### Cad Cell

A light sensitive resistor. Used to sense the presence of light in the combustion chamber, allowing the heater to continue its operation.

### Heat Exchanger

A sealed chamber used to transfer heat from the burner on one side to cool air on the other side, thereby preheating the cooler air.

### Fuel Pump

Connected to the motor shaft by a coupling, the pump pulls fuel from the tank and forces it to the nozzle under pressure for ignition when the fan motor is in operation.

### Relay

An electrical device, typically incorporating an electromagnet, that is activated by a current or signal in one circuit to open or close another circuit.

### High Limit Switch

Safety device wired into the control system which is used to break an electrical circuit to the burner in the event of overheat situation.

### Igniter

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

### Burner Controller

Electronic circuit board that operates the burner. It will safely shut the heater down if burner flame goes out.

### Ignition Transformer

An electrical component used to take incoming line voltage and increase it to create high voltage that causes spark between the ignitor and earth grounded surface.

### Motor

Electric device used for air movement. Converts electrical energy into mechanical energy.

### Nozzle

A brass metering device use to sprays the fuel under pressure from the pump.

### Pulleys

Grooved friction drive components responsible for transmission of power from motor to fan shaft. Used in conjunction with V-Belt.

### Selector Switch

Electrical device which is used to allow the end user to use the heater in either a heating or ventilation application.

### Oil Solenoid Valve

Houses an electromagnet that when energized, opens and allows fuel passage to the burner nozzle.

### Status Lights

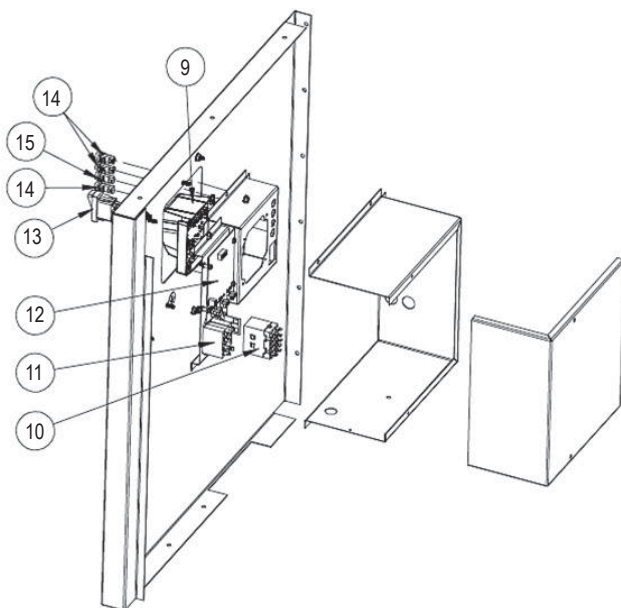
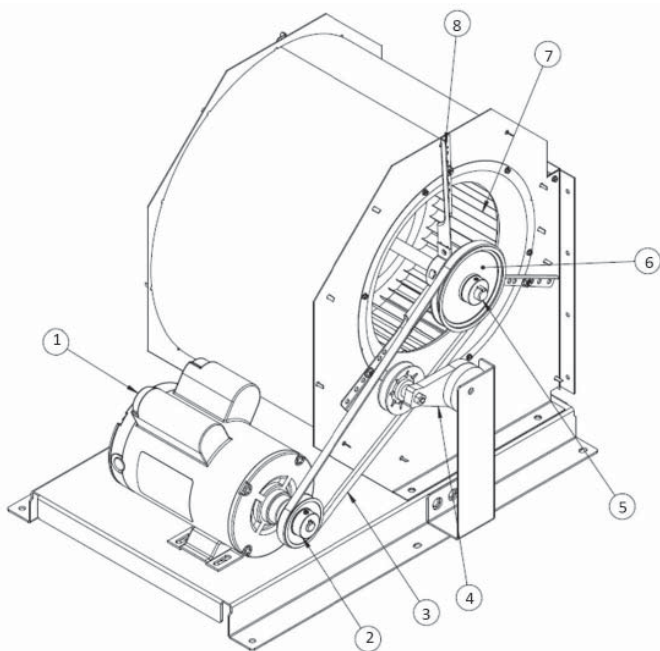
Used to identify if the heater is receiving its power supply and if certain electrical safety components are functioning properly.

### Thermostat

Electrical device used as an automatic "on/off" switch which will respond to changes in temperature.

# Notes

## Service Parts Identification Schematic

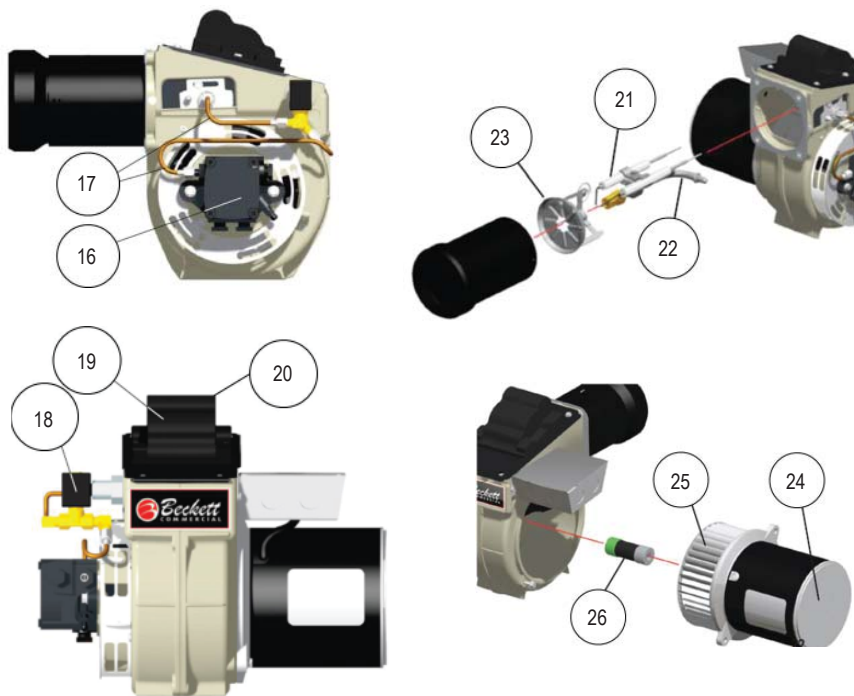


## Parts List - Fan, Drive and Control Box

Item	Description	Part Number
1	Motor, 1.5 HP	573565
2	Pulley, Motor, 2.46 dia. pitch	573569
3	Belt, V type, A48, CI500	573552
4	Tensioner, Belt, Spring, Self-tensioning	25135
5	Shaft, Fan Assembly	573572
6	Pulley, 4.66 dia. pitch	573573
7	Wheel, Fan, 12.625 x 10.5 x 10.5	573581
8	Bearing Mount, CI500	573551
9	Controller, Burner, GeniSys 7575	573649
10	Relay, DPDT, 120VAC Coil	573663
11	Relay, DPST, 100/120V Coil	570221
12	Control, Construction, Foreman 500	573553
13	Switch, Rocker, DPDT, 1/2 HP, 125V-10A	573576
14	LED, Snap-in, Green, 120V, Flush Lens	26393
15	LED, Red, Neon, Snap-In, 120V w/Gasket	573564

\* Accessory - Must be ordered separately.

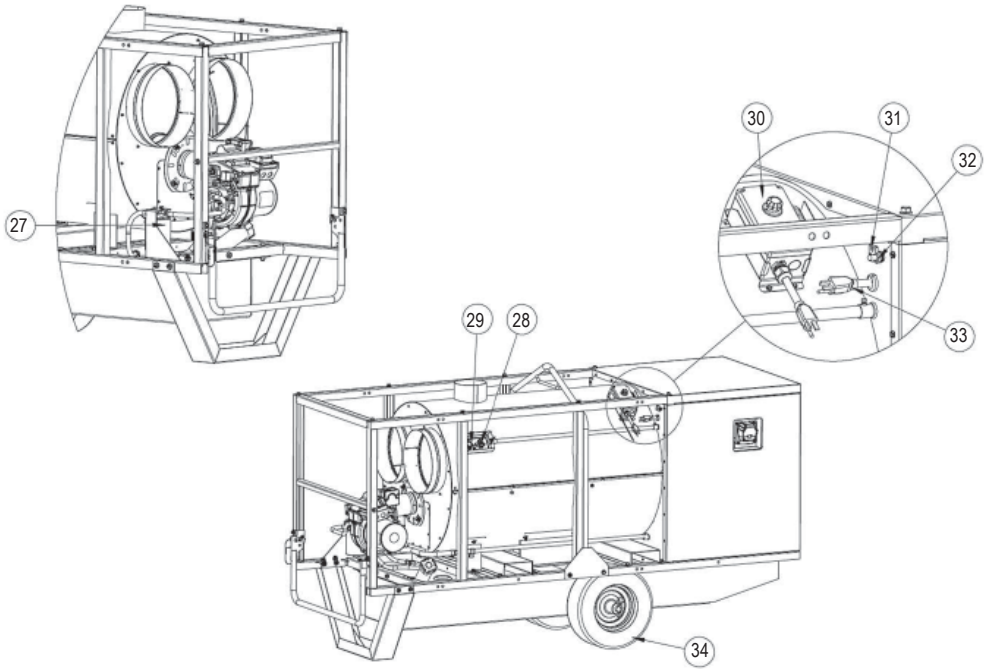
## Parts List - Burner Components



Item	Description	Part Number
16	Fuel Pump	573645
17	Fuel Line	573646
18	Oil Solenoid Valve	573647
19	CAD cell (not shown)	573658
20	Ignition Transformer	573648
21	Spark Plug Igniter	573650
22	Nozzle Line Assembly	573651
23	Head Assembly, CF500 - KK	573652
24	Motor, 1/3 PSC	573653
25	Wheel, 5-19/32" x 2-13/32"	573654
26	Coupling, Pump	573655



## Parts List - Chassis Components



Item	Description	Part Number
27	Filter, fuel	573662
28	Switch, high limit, 225°F	571671
29	Switch, limit, burner, auto reset, 125°F	573660
30	Thermostat w/ 25 FT. cord (optional accessory)	30125
31	Receptacle, NEMA, AC female, snap-in	573570
32	Thermostat toggle switch	571939
33	Cord, power, 14 GA, 20 amp	573568
34	Wheel, 16" DIA.	573581

# Notes

## Notes

# Warranty Policy

## HEATER

L.B. White Co., Inc. warrants that the component parts of its heater are free from defects in material and workmanship, when properly installed, operated, and maintained in accordance with the Installation and Maintenance Instructions, safety guides and labels contained with each unit. If, within 24 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. Registering your product online with L.B.White will automatically qualify a unit and its component parts for warranty consideration. If a product has not been registered with L.B.White, a copy of the bill of sale will be required to establish warranty qualification. If neither is available, the warranty period will be 24 months from date of shipment from L.B. White.

## PARTS

L.B. White Co., Inc. warrants that replacement parts purchased from the company and used on the appropriate L. B. White equipment are free from defects both in material and workmanship for 24 months from the date of purchase by the end user. Warranty is automatic if a component is found defective within 24 months of the date code marked on the part. If the defect occurs more than 24 months later than the date code but within 24 months from the date of purchase by the end user, a copy of a bill of sale will be required to establish warranty qualification.

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

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

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

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

## Service

Contact your local L.B. White dealer for replacement parts and service. You may also call the L.B. White Co., Inc. at 1-800-345-7200, for assistance, or email us at [customerservice@lbwhite.com](mailto:customerservice@lbwhite.com).

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



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