Owner's Manual — FireBird HD308 Central Hydronic Heater

Installation, Operation & Service Instructions

Read and Save These Instructions

Designed and built for the rigors of the restoration industry, the Phoenix FireBird HD308 is the safest, most efficient, flexible, and durable heat system made. The FireBird HD308 uses superior design to maximize heating capacity and minimize your fuel cost, while its innovative safety features and system flexibility create revenue opportunities unavailable to competing units.

The Phoenix FireBird HD308

- **308,000 BTU Capacity**
- **Atmospherically-Vented**
- **Stainless Steel and Aluminum Construction**
- **Diesel Powered**
- **Heavy Duty 1 HP Glycol Pump**
- **120 Gallon Fuel Tank Capacity**

Phoenix FireBird HD308
PN 4031010

⚠WARNING

This appliance is equipped with a Blocked-Flue shutoff device. If any part of the flue-gas passageway in the combustion chamber, exhaust pipe or rain cap should become blocked or adversely restricted, a pressure sensing switch (Fig.24 pg.10) will break the electrical control circuit and not allow the burner to run. There is a "Manual Reset" button on this switch that will have to be reset before re-firing can occur. If the burner fails to start after resetting once, call a qualified service technician to clean the flue passageways and/or replace the switch. Cleaning instructions can be found in Section (6.1 G) of the Maintenance section of this manual.

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Specifications subject to change without notice.

Table of Contents **Page**

Serial No. _____

Purchase Date _____

Dealer's Name _____

1. Specifications

Part No.	**4031010**
Fuel Input	308,000 BTU/hr
Fuel Options	Diesel
Run Time at Full Load	50 Hours
Efficiency	85%
Heat Transfer Fluid	Propylene Glycol
Pump	1 HP
Lifting Hook	1
Operating Temp Range	-30°F to 140°F
Fluid Temperature Range	100°F to 200°F
Fuel Tank Capacity	120 Gallons
Fuel Consumption at Full Load	2.4 Gallons
Hydronic Flow Rate	30GPM/1.89 liters per sec
Hydronic Connections	1" ISO 7241 Series B Couplings
Dimensions	72"L x 31"W x 48"H - inches 1829L x 787W x 1219H - millimeters (Cabinet with Fuel Tank)
Weight	800 lbs. / 363 kg (Empty Fuel Tank) 1700 lbs. / 771 kg (Full Fuel Tank)

2. System Description & Features

1: FireBird HD308, Pump End

2: FireBird HD308, Burner End

2.1 Description

- The HD308 is a fuel burning appliance, designed to heat fluid "on demand" and provide pumped circulation of the fluid for use in various portable hydronic applications.
- The HD308 provides a central source of hot "heat transfer fluid" (HTF) for use with dependent heat exchangers such as:
  - Fan coils for heating and drying of structures.
  - Multi-circuit line heat exchange hose or tubing for ground thawing, concrete curing, snow melting and slab heating.
  - Custom hydronic heat exchange accessories and applications.
- The HD308 oil-fired is designed to burn #1 or #2 light diesel fuel or heating oil.
- Pumping and combustion control are achieved with electrical components. The FireBird HD308 requires a 120 volt, 20 amp, 3-wire grounding circuit.
- The HD308 is designed for consistently-efficient outdoor operation.

2.2 Features

- All exposed components are made of non-corrosive materials such as stainless steel, brass or aluminum.
- The "HTF" circuit includes an open, atmospherically-vented expansion tank, which effectively eliminates the system from pressure vessel classification.
- The control system includes a sequence of status indicator lights which provide a quick function check and trouble-shooting aid for the operator.
- The combustion chamber/heat exchanger is completely fabricated from stainless steel and is not susceptible to corrosion. Temperature turn-down for prolonged periods of operation (such as for concrete curing) will not harm the chamber.
- For security and environmental protection, all valves, controls, burner, pump, filters, "HTF"tank filler and fuel tank filler are either secured behind lockable access doors or are self-lockable.
- An electric "Pre-heater" ensures continued clean lighting and combustion of diesel/light oil, even in the coldest of climatic conditions.
- Temperature gauges, pressure gauge, system status indicator lights, "HTF" tank level gauge and fuel tank level gauge are visible to the operator even when the system is securely locked down.
- The CSA/UL approved burner, comes with a permanently installed pressure gauge to simplify adjustment of fuel pressure when setting up the burner.
- Door handles and hose connection couplers for the external HTF circuit are recessed so as not to create "snag-points" when moving, shipping or delivering the unit.

3. Safety

⚠CAUTION

3.1 General Safety Guidelines:
CAUTION! This is a fuel burning appliance.

- Some surfaces will become **EXTREMELY HOT!**
- When using the fuel oil **the chance of FIRE or EXPLOSION always exists!** Always follow safe-operating practices and comply with local fire and fuel handling codes.
- Before attempting to setup or operate this equipment, it is imperative that the operator reads and understands all the information in this manual.
- Untrained people should not attempt to operate this equipment until they receive proper instruction.
- Maintain instructional and safety labels. Replace damaged labels.
- Observe all posted warnings and cautions.
- Always wear suitable protective clothing and accessories such as safety glasses, leather gloves, certified work boots and hard hat when working with or operating this equipment.
- Keep children, pets and all untrained bystanders clear from the heater and accessories.

3.2 Safety Devices and Clearances

- All safety devices must be in place and functioning properly when the equipment is in operation.
- All hydronic heater panels and doors must be kept closed when the system is operating.
- The flue-gas exhaust pipe and rain-cap requires a minimum of 6" (152 mm) clearance, from any type of combustible material.
- Clearance from any obstructive objects must be maintained to a minimum of 36" (914 mm) from both ends of the Hydronic Heater.
- Do not allow anything to obstruct the "combustion air intake".

3.3 Heat Transfer Fluid

Precautions and measures to follow when working with "heat transfer fluid" (Inhibited aqueous propylene glycol).

- Ventilation - Good general ventilation should be sufficient for most conditions.
- Respiratory protection - No respiratory protection should be needed.
- Skin protection - For brief contact, no precautions other than clean body-covering clothing should be needed.
- Use impervious gloves when prolonged or frequently repeated contact should occur.
- Eye protection - Use safety glasses.

First aid measures.

- Eyes - Flush eyes with plenty of water.
- Skin - Wash off in flowing water or shower.
- Ingestion - Induce vomiting if large amounts are ingested. Consult medical personnel.
- Inhalation - Remove to fresh air if effects occur. Consult a physician.
- Note to physician - No specific antidote. Supportive care. Treatment based on judgement of the physician in response to reactions of the patient.

4 Specifications

4.1 Construction Specifications

- The HD308 includes an aluminum "enviro-containment" base, with fork-lift pockets.
- The exterior enclosure panels are made of stainless steel.
- The framework for the enclosure and the base are built of structural aluminum. A top center hoisting hook is included.
- Primary access for operation and service is provided for through hinged, lockable doors at the two ends of the enclosure.
- Both side panels and both roof panels are fastener-attached for potential removal.
- Then combustion chamber/heat exchange section is fabricated from stainless steel.
- Access for cleaning the chamber is from the burner end with minimal disassembly required. The procedure consists of removing the burner and inside chamber section.
- Temperature turn-down and condensing within the chamber can not harm the chamber.
- The exhaust flue for the burner exits through the roof of the enclosure. The exposed roof flashing is made from aluminum. The rain cap and flue pipe are made of stainless steel.

4.2 Dimensions and Capacities

Length of Cabinet	inches (millimeters)	72 (1829)
Width of Cabinet	inches (millimeters)	22 (559)
Width of Fuel Tank	inches (millimeters)	31 (787)
Height of Cabinet	inches (millimeters)	48 (1219)
Height of Top of Rain Cap	inches (millimeters)	58 (1473)
Heat Transfer Fluid Capacity	US gallons (liters)	20 (76)
Fuel Tank Capacity	US gallons (liters)	116 (439)
Weight without Fuel Tank	pounds (kilograms)	600 (272)
Weight with Fuel Tank Empty	pounds (kilograms)	800 (363)
Weight with Fuel Tank Full	pounds (kilograms)	1700 (771)

4.3 Oil Burner and Fuel Specifications (Fig. 3)

- The "oil burner" is a pressure-atomization type with direct spark ignition.
- #1 or #2 light heating oil or diesel fuel may be used.
- A gauge is connected to a pressure-tap port on the fuel pump of the burner to aid in setting the burner and monitoring performance (Fig. 26).
- A fuel filter is mounted inside the enclosure (Fig.4).
- Supply and return fuel lines are equipped with quick couplers for ease of connection to a fuel tank.

Burner Specifications		
Operational Mode		single stage
Electrical Characteristics	V/A/Hz/Ph	120/2.0/60/1
Nozzle		1.65-60ºB
Fuel Pump Pressure: factory setting	PSI (kilopascals)	180 (1241)
Turbulator Head: factory setting	#	3.0
Air Gate: factory setting	#	4.2
Fuel Input Rate: factory setting	USGPH (liters/hr)	2.2 (8.3)
Heat Input: based on 140,00 Btu per USG	Btu/H (Watts)	308,000 (90,244)
Heat Output @ 80% net efficiency	Btu/H (Watts)	246,400 (72,195)

3: Oil/Diesel Burner

4: Fuel Filter & Valve

4.4 Circulation Pump (Fig. 6)

- The HTF circulation pump is a stainless steel, direct drive centrifugal type.
- The pump is located inside the enclosure at the opposite end of the burner and can be accessed through a hinged lockable door (Fig. 1).
- A panel-mounted pressure gauge is connected to the output side of the HTF pump by means of a 1/8" ID hydraulic hose and fittings (Fig. 25).

HTF Pump Specifications		
Motor Horsepower	HP (Watts)	1.0 (746)
Voltage	Volts	120/240
Full Load Amp Rating	Amps	12.3/6.2
System Design Flow Rate	USGPM (liters/sec)	30 (1.89)
System Design Operating Pressure	PSI (kilopascals)	35 (241

6: Fluid circulation Pump

4.5 Electrical Requirements for Complete System

Supply Voltage	Volts	120
Circuit Amperage	Amps	20
Hertz	HZ	60
Phase	PH	single
Control Circuit Voltage	Volts	120
Power Inlet - NEMA Twistlock		L520P

7: Power Inlet Plug

4.6 Gauges and Indicator Lights

- A cluster of gauges and status-indicator lights are located inside the UL approved control panel. This panel is located behind the burner access door near the top (Fig. 2). These gauges and lights are visible from the exterior through plexi-glass windows in the access door and the control panel door.
- A digital gauge (Fig. 14) monitors each of the following:
  - HTF supply temperature.
  - HTF return temperature.
- A digital hours meter (Fig. 14) logs system run-time.
- A series of 6, LED indicator lights (Fig. 15) illuminate in sequence as each of the following scenarios is proven:
  - #1 - 120 volt control power is present - clear lens.
  - #2 - HTF level is adequate in reservoir - green lens.
  - #3 - Flow switch has proven adequate flow of HTF in the system - green lens.
  - #4 - High limit control has not interrupted the circuit - green lens.
  - #5 - High pressure switch has not interrupted the circuit - green lens.
  - #6 - Aquastat is calling for heat - green lens.

8: Control Panel, Outer

9: Control Panel, Inner

4.7 Controls and Electrical

- The UL approved electrical box, located inside the enclosure, above the burner, houses specific electrical components, besides the lights and gauges, and serves as a junction box for cords going to and from remote electrical components (Fig. 8 & Fig. 9).
- The following components are part of and are located in the UL approved box:
  - Main power disconnect (Fig. 11).
  - Pump ON/OFF switch (Fig. 12).
  - Burner circuit ON/OFF switch (Fig. 13).
  - Main system breaker (Fig. 16).
  - Pump circuit breaker (Fig. 16).
  - Burner circuit breaker (Fig. 16).
  - Power disconnect switch (Fig. 17).
  - Temperature gauge transformers 6VDC (Fig. 18).
  - LED lights - 120 volt (Fig. 15).
  - Hours meter - 120 volt (Fig. 14).
  - Terminal blocks (Fig. 20).
  - Contactors (Fig. 19).
  - Electronic operating controller (Fig. 10).
- The following items are remotely connected to cords that exit from the control panel: (see chart below for details of these components)
  - Main power male inlet-plug (twist lock) (Fig. 7).
  - Low water cut-off switch (mounted on HTF reservoir) (Fig. 21).
  - Flow switch (mounted in HTF plumbing circuit) (Fig. 22).
  - High limit switch (mounted in HTF plumbing circuit) (Fig. 23).
  - High pressure switch (Fig. 24).
  - Diesel fuel pre-heater (Fig. 5).
  - HTF circulating pump (Fig. 6). (see pump chart above for details)
  - Burner (Fig. 3). (see burner chart above for details)

	Volts Rating	Amps Rating	NEMA	Approvals
Control Panel and Contents	125VAC	20	4X	UL
Inlet Plug	125VAC	20A-1HP	L5-20P	UL/CSA
Lo-water Cutoff	120VAC	5.8 FLA	N/A	UL/CSA
Hi-limit Switch	120VAC	8.0 FLA	N/A	UL/CSA
Flow Switch	120VAC	7.4	N/A	UL/CSA/CE
High Pressure Switch	120VAC	300VA	N/A	UL/CSA
Fuel Heater	120VAC	0.77	N/A	UL

3.8 Control, Switch & Gauge Identification

- Mounted on Control Panel

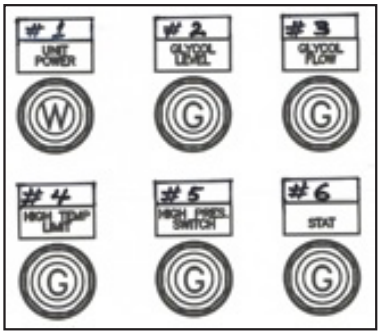
10: Operator, Digital

11: Main Power Switch Knob

12: Pump Switch

13: Burner Switch

14: Temperature Gauges & Hour Meter



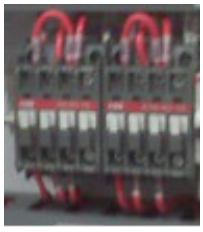
15: LED Indicator Lights

- Mounted Behind Control Panel

16: Circuit Breakers

17: Main Power Switch Body

18: Transformers for Digital Temp. Gauges



19: Contactors

20: Terminal Blocks

- Mounted Remotely on Plumbing Circuit

21: Low Water Cutoff

22: Flow Switch

23: High Temp Limit Switch

24: High Pressure Switch

- Pump and Burner Pressure Gauges

25: Pump Pressure Gauge (PSI)

26: Fuel Oil Pressure Gauge (PSI)

5. Setup

5.1 Positioning Equipment on the Job

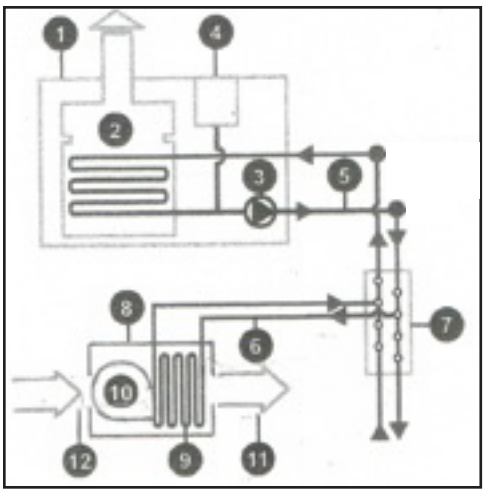
Before choosing the location to place the central hydronic heater on a job site, several factors should be considered.

- If possible, the HD308 should be placed at a central position that will minimize and equalize the lengths of hoses. This helps to ensure maximized and equalized HTF flow.
- Convenient access to a suitable electrical connection, if site power is to be used. 120V, 1PH, 60Hz, 20A, 3-wire grounding is required.
- Convenient access to bulk truck re-fueling.
- Do not locate in the path of job site traffic.
- Avoid locations that will expose the HD308 to intense dust or other sources of air contamination. Clean flowing air is essential to maintain clean combustion.
- Observe all requirements listed in the “Instructions for Installation” document provided with this unit.

5.2 Hose and Accessory Connections

In order to make use of the heated fluid, it is necessary to lay out a circuit of hoses to; distribute the hot fluid, transfer it’s heat to another medium and return the cooled fluid to the HD308 for re-heating (Fig. 27).

- Primary 1” hoses are used from the HD308 quick-connect couplings (Fig. 28) to feed a manifold for either multiple fancoils in air heating situations (Fig. 30) or multiple 5/8” hose circuits for ground thawing, concrete curing, slab heating or snow melting (Fig. 31).
- Use only “approved hose” as supplied by ThermaStor. Otherwise, compatibility issues may arise.
- Hoses are pre-charged with the recommended mixture of water and propylene glycol and are equipped with hydraulic-style quick couplers. Every hose has a male connector on one end and a female connector on the other end; therefore any hose can be used for either the supply side or the return side of the hose circuit.
- Route hoses to achieve minimum chance of damage from traffic of any kind and at the same time minimize the overall circuit length.
- Provide protection from “Kinking” of hoses that would restrict flow.
- When connecting Quick couplers, ensure that the connections are “fully engaged” and snapped into place or flow will not take place through the coupler connection.
- For longer term, building heating projects it is advised to insulate all hose sections located outdoors, between the FireBird HD308 and the exterior building wall. Special “insulating wraps” are available for this purpose.

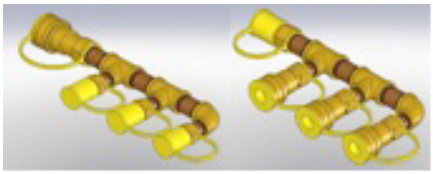


27: Layout for Fluid Distribution

1. Central Hydronic Heating Unit
2. Burner& Heat Exchanger
3. Circulating Pump
4. Reservoir for Expansion & Filling
5. Primary Fluid Hoses, 1”
6. Secondary Fluid Hoses, 3/4” or 1”
7. Manifold for Multiple Connections
8. Fancoil Heat Exchanger
9. Heat Transfer Coil
10. Air Moving Fan
11. Heated Supply Air
12. Intake Air

28: Hoses Connected to HD308 Unit

29: Fancoil Connected to HD308 Unit



30: Manifolds for Fancoils - Supply & Return

5.3 Charging the Fluid System

32: HTF Level Gauge & Vented Filler Cap

33: HTF Circuit Valves, Y-strainer & High Temp. Limit

- The FireBird HD308, all hose and all accessories are shipped pre-charged with the “approved blend” of heat transfer fluid (HTF). The required fluid is a 50% blend of Inhibited propylene glycol and de-mineralized neutral PH (#7)water. This provides freeze protection to -29°F (-34°C). The HTF provided with a new system and accessories is marketed as DowFrost. Use of any other product that cannot be proven to be equal in all respects will void warranty of the system.
- Check the HTF level gauge (Fig. 32). The reservoir should be 1/4 to 1/2 full when the system is cold. Add approved fluid, if necessary, at the vented filler cap (Fig. 32).
- Connect all primary hoses from the FireBird HD308 to the distribution manifold.
- Place all fancoils in the desired locations and route all the hoses to them OR lay out all hose grid circuits for ground thaw or concrete curing.
- Connect hoses from the manifold to ONE fancoil ONLY.
- Open 2 HTF circuit valves (Fig. 33).Turn ON the circulating pump switch (Fig. 12) and let the fluid circulate until all the air is eliminated from the first branch circuit. Air has been purged when steady pressure of 30 to 35 PSI is observed at the glycol pressure gauge (Fig. 25).

- Connect each fancoil or thaw/cure loop, in turn, one at a time, in the same manner as above. When all are connected and the pressure gauge maintains steady pressure, the system is charged and ready for use.
- Check the HTF level again and top up if necessary 1/4 to 1/2 full).

5.4 Oil Burner Installation and Setup (Fig. 3)

- Specific burner settings for the FireBird HD308 are as follows.

Fuel Pump Pressure: factory setting	PSI (kilopascals)	180 (1241)
Turbulator Head: factory setting	#	3.0
Air Gate: factory setting	#	4.2
Fuel Input Rate: factory setting	USGPH (liters/Hr)	2.2 (8.3)
Heat Input: based on 140,000 Btu per USG	Btu/H (Watts)	308,000 (90,244)
Heat Output: @ 80% net efficiency	Btu/H (Watts)	246,400 (72,195)

6. Operation

6.1 Startup

- Make sure the FireBird HD308 is connected to a correct, stable power source (120V, 20A, 60Hz, 3-wire grounding) and proper gauge chords are used (12 gauge minimum).
- Verify adequate and correct fuel supply for the burner (#1 or #2 light oil or diesel). Open all valves in the fuel-supply lines.
- Make sure at least one circuit of HTF hose is connected to the FireBird HD308 to provide adequate circulation to trigger the flow switch (see hose and accessory connections section).
- At the control panel (Fig. 8), remove 2 thumb screws to open and expose the inner panel (Fig. 9), turn ON the three breakers located behind the light panel (Fig. 16). Close and refasten the panel.
- Turn ON the main power switch (Fig. 11). The white unit power light (Fig. 15) will come on, as well as the two digital temperature gauges and hour meter (Fig. 14).
- Turn ON the pump switch (Fig. 12) and check the pump pressure gauge (Fig. 25). Steady pressure around (30 to 35 PSI), indicates that no air remains in the fluid circuit.
- Once a stable pump pressure is achieved, turn ON the burner switch (Fig. 13). The following sequence should now occur: Observe the LED light cluster (Fig. 15).
    - The glycol level light will turn on (indicating that there is a sufficient amount of HTF in the system).
    - The glycol flow light will turn on (indicating that there is enough flow for the system to operate).
    - The high temp limit light will turn on. (This indicates that the high limit safety switch has not broken the circuit).
    - The high pressure switch light will turn on. (This indicates that the blocked flue high pressure safety switch has not broken the circuit).
    - A few seconds later, the stat light will come on and the burner fan will purge the combustion chamber for a few seconds.
    - The burner should light following the pre-purge. If air is still present in the fuel lines, the burner may not light and lock out. It might be necessary to push the red reset button on the burner module 2 or 3 times until fuel reaches the burner head and ignition takes place.
- Make sure the operator (Fig. 10) is set at the desired temperature. DO NOT operate at temperatures above 200°F, or damage to inline controls and certain accessory components can result. To adjust setpoint on this control just use the up and down key. There is no need to go into the menu of the control to perform this function. The control simultaneously displays setpoint temperature and actual supply fluid temperature.
- Once the setpoint temperature has been reached, the burner will cycle off and on as needed.

5.2 Shutdown

- Turn OFF the burner switch (Fig. 13). The burner will no longer recycle but the circulation pump will continue to run.
- It is recommended that the fluid be allowed to continue circulating until it has cooled down to 100°F (38°C) or lower.
- Turn OFF the pump switch (Fig. 12). If any fancoils and hoses have been placed at a higher elevation than the FireBird HD308, the primary hoses should be immediately disconnected from the FireBird HD308 (Fig. 28). This will prevent fluid from draining back and overflowing at the HTF reservoir vent (Fig. 32).
- Turn OFF the main power switch (Fig. 11).
- Turn OFF fuel supply valves.
- If the system is to be de-commissioned, it is now safe to disconnect the power supply, and all HTF circulation hoses, manifolds and accessories.

6. Maintenance

6.1 Service Instructions and Checks

⚠CAUTION

"CAUTION: Label all wires prior to disconnection when servicing controls. Wiring errors can cause improper and dangerous operation. Verify proper operation after burner adjustment and servicing

A. To achieve and ensure clean combustion from the burner, a "flue-gas analyzer" and "smoke spot tester" must be used to verify clean combustion. Perform the following checks while the burner is firing. Must be performed by a trained service technician ONLY. These checks should be performed, every time, when putting the system into operation on a new project and a minimum of once yearly.

a. Before starting the burner, determine that the combustion head is set at 3.0 and the correct nozzle is in place (Delavan 1.65-60ºB).

b. Fire the burner and ensure that the oil pressure is at 180 PSI. Adjust if necessary.

c. Regulation of combustion air flow is made by adjustment of the manual AIR ADJUSTMENT PLATE. Initial suggested setting is (4.2).

d. Final position of the air adjustment plate must be set based on instrument readings of not greater than 13.0% CO2 and a smoke spot reading of zero. Final readings must be taken with all service-access doors closed.

B. After placing this unit in operation, the ignition system safety shutoff device must be tested. Must be performed by a trained service technician ONLY. Refer to the Riello manual, 40-F10 for burner component identification and further instructions. This check should be performed, every time, when putting the system into operation on a new project or a minimum of once yearly.

a. Shut OFF the "burner circuit" power switch.

b. Remove the primary control box from the burner and place a small piece of dark tape over the light-sensing, cad-cell eye that senses the presence of flame in the combustion chamber. Put the primary control back in place.

c. Turn the power switch back ON and initiate burner lighting procedure. After the short pre-purge cycle, the burner should light but go out in 5 seconds and lock out. If the burner does not lock out with the cad-cell eye covered, the primary control should be replaced.

d. To put the unit back in standard operating mode, turn OFF the burner circuit power switch, remove the tape-cover from the burner's primary control box, re-insert the control and turn ON the "burner circuit" power switch.

C. Examine the flue gas exhaust pipe and rain cap to be sure they are solidly attached and free from any type of obstruction. Clean if necessary.

a. This check should be performed, every time, when putting the system into operation on a new project or a minimum of once yearly.

D. After placing this unit in operation, the low water safety shutoff device must be tested. Must be performed by a trained service technician ONLY. The low water cutoff switch is located in plain view at the same end of the FireBird HD308 as the circulating pump and is identified with a label.

a. Push the test switch on the outside of the control. This will simulate a "low water" condition and open the burner circuit to prevent burner initiation.

b. By pushing the reset switch, the control will restore function to the burner circuit as long as there is fluid touching the probe. The electronic probe is a "self cleaning" type and should not require service.

c. This control should be tested every time, when putting the system into operation on a new project or a minimum of once yearly.

E. After placing this unit in operation, the high temperature limit safety shutoff device must be tested. Must be performed by a trained service technician ONLY. The high temperature limit switch is located in plain view at the same end of the FireBird HD308 as the circulating pump and is identified with a label.

a. With the burner firing, set the digital operating control to a temperature value that is at least 5°F higher than the setpoint of the high temperature limit switch.

b. When the fluid temperature reaches the level of the high limit setpoint, it should shut down the burner.

c. The high limit will need to be manually re-set, by pushing the red re-set button to return to the operating mode. Adjust the operator back down to the lower setting.

d. This control should be tested every time, when putting the system into operation on a new project or a minimum of once yearly.

F. After placing this unit in operation, the high pressure safety shutoff (blocked-flue) device must be tested. Must be performed by a trained service technician ONLY. The high pressure cutoff switch is located just below and to the left of the burner and is identified with a label.

a. Remove the chimney rain cap.

b. With the burner firing, cover the chimney flue pipe so it is blocked off completely. This should cause the pressure switch contacts to open and shut down the burner.

c. Remove the cover from the pipe and replace the rain cap. The burner should not try to re-light since the switch must be manually re-set.

d. By pushing the reset button (located under the electrical box cover of the pressure switch), the control will reset and the burner should light again.

e. This control should be tested every time, when putting the system into operation on a new project or a minimum of once yearly.

G. Procedure for cleaning flue gas passageways. This procedure should be performed in the event of blockage in the flue gas passage due to soot or any other obstruction that may occur. Improper burner settings or maintenance could cause soot accumulation in the combustion chamber. The following steps should be taken to clean out the chamber flue gas passageway. Must be performed by a trained service technician ONLY.

a. Shut off and disconnect external electrical power supply.

b. Drain the heat transfer fluid from the system.

c. Exterior cabinet side panels and the cabinet door & framing members, at the burner end of the cabinet, should be removed, to facilitate access to the combustion chamber. The control panel should be loosened from its mounting frame. These are all bolt-on components.

d. Once access to the chamber has been gained, disconnect the burner electrical supply line and fuel supply line and remove the burner. Two bolts will need to be removed that hold the burner to its mounting flange.

e. Disconnect the flue gas vent pipe by removing screws. Remove the pipe and rain cap assembly and clean its interior thoroughly.

f. The two hoses are connected to 1" fittings that protrude through the front flange plate disk of the combustion chamber. These hoses will need to be disconnected by loosening the hose clamps and pulling the hose off the insert barbs.

g. Remove 8 bolts that hold the chamber flange plate disk to the main chamber body.

h. The inner section of the combustion chamber can now be pulled straight out of the main chamber body. All flue gas contact surfaces are now exposed and can be easily cleaned with vacuum cleaner, brushes or other cleaning utensils.

i. To re-assemble the unit, replace components in reverse order to which they were removed.

j. Reconnect fuel and power supply to the unit and when re-starting the system perform all safety and service checks as outlined above.

H. The FireBird HD308 will produce condensate while operating, at any time that the circulating fluid is cooler than approximately 130°F (54°C). A clear poly-tube is connected to a fitting in the bottom of the chamber at front and is routed to the outside of the cabinet to carry condensate away. This tube should be inspected and cleaned, if necessary, when putting the system into operation on every new project or a minimum of once yearly.

I. On a daily basis, the area around this system must continue to be kept clear and free from combustible materials, gasoline and all other flammable vapors and liquids.

J. At the circulation pump end of the FireBird HD308 cabinet, louvers are stamped into the access door to provide intake air for combustion and ventilation. Check on a daily basis to ensure that nothing is allowed to obstruct this free-flow of air.

K. Check heat transfer fluid level daily. Maintain between ¼ and ¾ level during normal operation. If excessive fluid loss occurs check all hoses and connections for leaks. Top-up only with approved HTF. (see section 4.3 for details).

L. Verify that all gauges are maintaining within their desired operating ranges with respect to setpoint.

M. Check fuel tank level daily and order fuel as required.

N. Make sure that all access doors and panels are kept closed and locked while the system is in use.

O. If fluid-flow should become reduced, as indicated by the flow light going out and burner not starting, isolate and clean the Y-strainer. To clean the Y-strainer (Fig. 33): The ball valve immediately to the left of the Y-strainer must be closed and the quick-coupler connection immediately to the right (on the outside of the cabinet) must be disconnected. This will isolate the Y-strainer. The cap on the Y-branch can now be removed so the cylindrical screen can also be removed. Clean the screen with compressed air or a small wire brush. Put the screen back in place and re-engage the cap, quick coupler connection and valve.

For further service assistance

Call the manufacturer toll free at: 1-800-533-7533

OR

Call to speak to an hydronic service specialist direct at: 1-306-921-5227

6.2 Maintenance Frequency Chart

MAINTENANCE TASKS	Daily	Start of Every Project	Start of Heating Season	As Necessary
User Performed Tasks:				
Check pressure & temperature gauges for "Normal Function Levels" during operation	√	√	√	√
Check Aquastat for "Correct Setpoint" during operation	√	√	√	√
Check LED lights for "Correct Function" during operation	√	√	√	√
Check Fuel Gauge and order a delivery if necessary	√	√	√	√
Check HTF Level Gauge and add HTF if necessary	√	√	√	√
If HTF loss is excessive, Check all Hoses & accessories for Leaks and Repair				√
Replace Diesel Fuel Filter			√	√
Clean Y-strainer Screen		√	√	√
Examine all hoses and replace or repair any that are cracked or in any way damaged		√	√	√
Lubricate all quick couplers with light oil			√	√
Thoroughly Clean the system inside and out			√	√
Examine The Flue gas exhaust pipe and Rain cap. Clean as needed		√	√	√
Check condensate drainage tube and clean if necessary		√	√	√
Make certain that no flammable materials are anywhere near the heating unit	√	√	√	√
Make certain that nothing is allowed to obstruct the combustion air intake louvers	√	√	√	√
To be Performed by Trained Service Technician				
Perform a Flue Gas Analysis test (using instruments) to confirm clean combustion		√	√	√
Replace Diesel Burner Nozzle			√	√
Test Ignition Safety Shutoff device on burner		√	√	√
Test Low Water Cut-off Safety switch		√	√	
Test High Temperature Limit switch		√	√	
Test High Pressure Limit (blocked flue) switch		√	√	
Check flue gas passageways for soot or any type of blockage and clean if necessary			√	√

7. Troubleshooting

7.1 Fault Determination

The FireBird HD308 is equipped with a group of LED "indicator lights". The purpose of these lights is to aid in determining where the fault lies if the heating unit should fail to function properly. The following sequence explains the function each light represents and what to look for if that function fails:

If all switches have been turned ON and the system has been operating but has now FAILED, the status of these 6 lights will help to isolate the problem.

All Lights OFF indicates.

A. NO power through the main power switch. Check the following:

   a. Is main power switch (Fig.11) still turned on?

   b. Are the circuit breakers (Fig. 16) still turned on?

   c. Verify external power supply (120V) to inlet plug (Fig. 7).

#1 Unit Power Light is ON indicates.

A. Power is present through main switch. The 2 digital temperature gauges should be ON. If not, use a multi-meter to check the following:

   a. The 2 transformers (Fig. 18) should show 120VAC in and 6VDC out. If power goes in but not out, replace transformer.

   b. If there is 6VDC at the digital gauge but it does not illuminate, replace the temp. gauge.

B. There is no power going through the low water cutoff (LWCO) switch (Fig. 21).

   a. Check fluid level in reservoir. Should be at least ¼ level. Add if necessary.

   b. Check, with a multi-meter, for 120V in and out of LWCO switch. If fluid is adequate and there is power in but not out, replace the LWCO switch.

#2 Glycol Level Light, (plus #1) are ON indicates.

A. LWCO switch (Fig. 21) is sensing sufficient glycol in the reservoir and power is going through the switch.

B. There is no power going through the glycol flow switch (Fig. 22). Check the following:

a. Is the pump (Fig. 6) still running? If not; Check for 120 volts to the pump. If power is present but the pump isn't running, replace the pump.

b. Are all glycol circuit valves still open?

c. Are at least 1 fancoil or 2 ground thaw loops still hooked up?

d. Check Y-strainer (Fig. 33) and clean if necessary.

e. Check all hoses for kinks or other restrictions.

f. Check that all quick couplers are fully engaged and have snapped into position.

g. Check, with a multi-meter, for 120V in and out of glycol flow switch (Fig. 22). If there is power in but not out, replace the flow switch.

#3 Glycol Flow Light, (plus #1 & #2) are ON indicates.

A. Glycol flow switch (Fig. 22) is sensing sufficient flow and power is going through the switch.

B. There is no power going through the high temperature limit switch (Fig. 23).

a. Check the setpoints on the high temperature limit switch (Fig. 23) and digital operator (Fig. 10). If these 2 set points are too close to the same, the high limit temperature setting may have been reached and the switch will be locked out. It will be necessary to push the manual reset button on the front of the high temperature limit switch and check the setpoints of both the high limit switch (maximum 210ºF) and the digital operator (maximum 10ºF lower than the high limit).

b. With the high limit re-set and actual fluid temperature well below the setpoint of both controls, check, with a multi-meter, for 120V in and out of the high temperature limit switch (Fig. 23). If there is power in but not out, replace the limit switch.

#4 High Temp. Limit Light, (plus #1, #2 & #3) are ON indicates.

A. Actual supply fluid temperature has not reached the high temperature limit setpoint and power is going through the switch.

B. There is no power going through the NC contacts of the high pressure switch (Fig. 24). Blockage may have occurred in the flue gas passage way.

a. Check the chimney pipe and rain cap for blockage.

b. Check the air tube connection to the pressure switch and clean if necessary.

c. Clean the flue gas passages in the combustion chamber (see Maintenance Section 6.1 G for instructions)

d. Push the manual reset button on the pressure switch and the circuit should be restored. If not replace the switch.

#5 High Pressure Switch Light, (plus #1, #2, #3 & #4) are ON indicates.

A. Pressure in the combustion chamber and flue pipe has not risen above the high limit cutoff point. power is going through the NC contacts of the high pressure switch (Fig. 24). Indicates no blockage in any of the flue gas passages.

B. There is no power going through the digital operator switch contacts (Fig. 10).

a. The actual supply fluid temperature may have risen high enough that the Operator has cycled off. A call-for-heat will be re-established once the Supply fluid temperature has dropped to 5ºF below setpoint.

b. If the actual supply fluid temperature is well below the setpoint of the operator (at least 10ºF lower), check, with a multi-meter, for 120V in and out of the operator. If there is power in but not out, replace the operator and it's sensor.

#6 Stat Light, (plus #1, #2, #3, #4 & #5) are ON indicates.

A. The digital operator (Fig. 10) is calling for heat. The burner should be engaged.

B. If the burner is not functioning, a fault lies within the burner.

7.2 Burner Internal Faults

Diesel/Light Oil Burner

Below is a list of scenarios and possible causes for burner failure.

A. The burner goes through the prepurge period normally. The flame ignites, but the burner goes to lockout within five seconds.

a. The phase/neutral lines are reversed. Correct polarity is critical.

b. The wiring to ground is absent or ineffective.

c. The electric eye, light-sensing switch is dirty or defective. Try cleaning the eye. If it still fails, replace it.

B. The burner goes to lockout after the prepurge period because the flame does not ignite.

a. No fuel in tank or lines.

b. Air has not been fully bled from the fuel lines.

c. The fuel filter is dirty. Replace filter.

d. Nozzle is plugged. Replace nozzle.

e. The spark is irregular or not present. Re-align electrodes.

C. The burner does not start when the thermostat calls for heat.

a. Loose wire connection at terminals L or N.

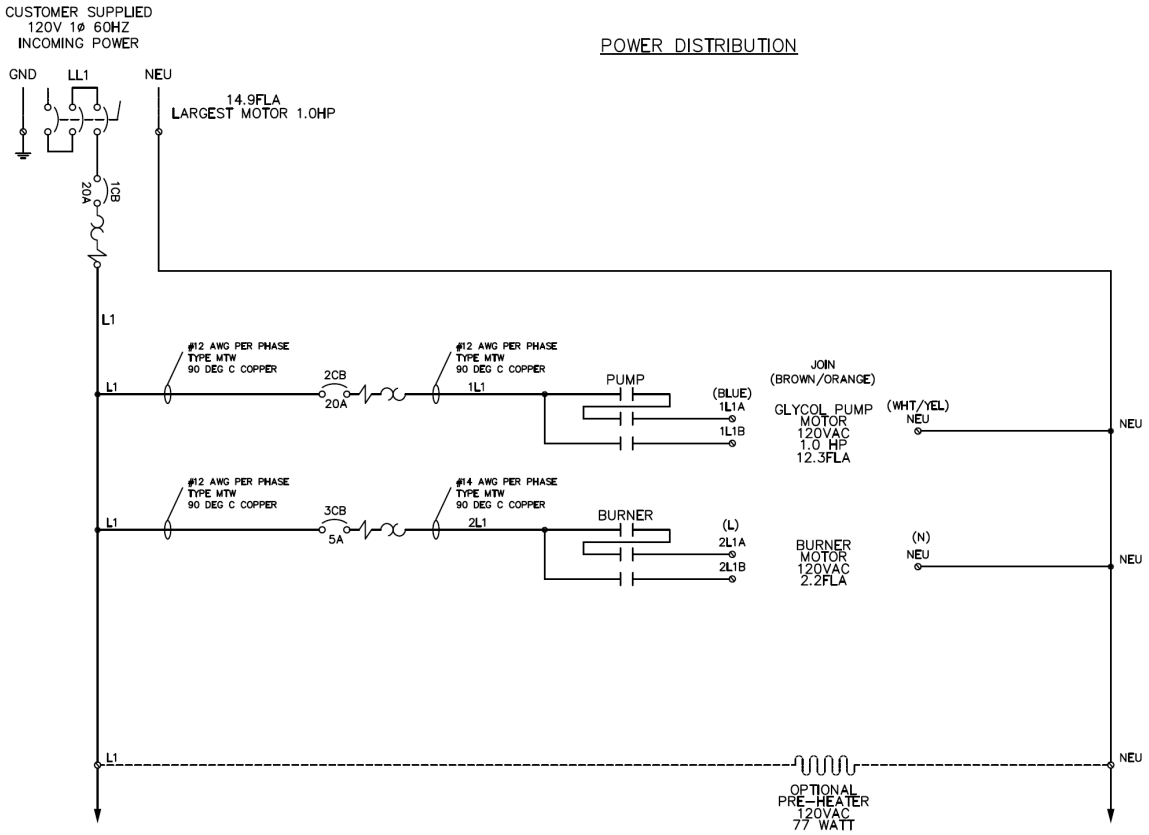
b. Terminals on the control module are bent or loose.

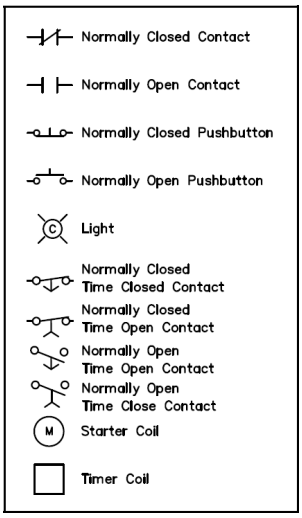
c. The motor is defective.

d. The capacitor is defective.

e. The control box is defective.

7.3 Electrical Schematics





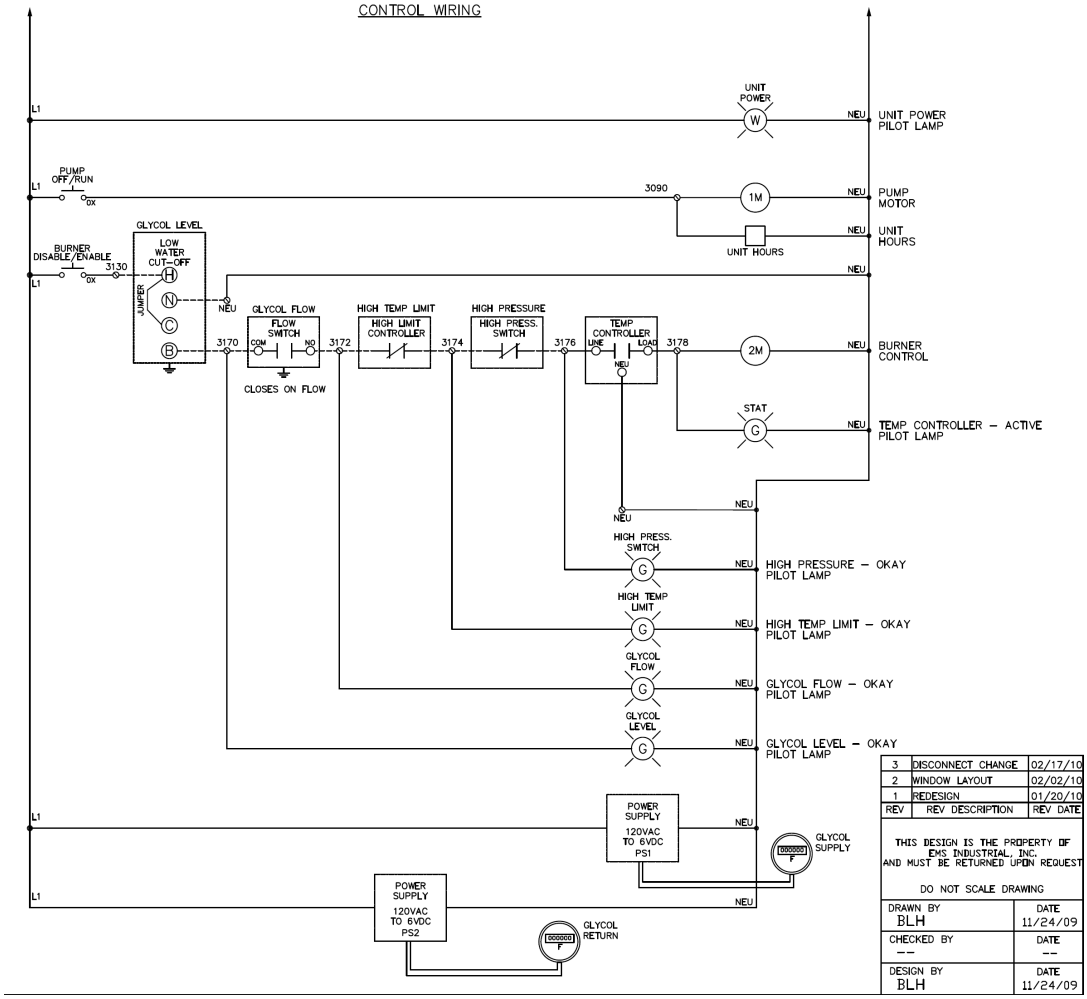
NOTE:

- * CUSTOMER FURNISHED SAFETY DISCONNECT REQUIRED IF MAIN DISCONNECT IS NOT IN SIGHT OF EQUIPMENT
- □ POWER LUG ON THE COMPONENT
- ○ TERMINAL IN REMOTE JUNCTION/DEVICE BOX
- ⊘ TERMINAL IN MAIN ENCLOSURE TERMINAL
- ---- DASHED LINES INDICATE FIELD WIRING AND/OR CUSTOMER SUPPLIED COMPONENTS

WIRE COLOR CODE	
120 VAC CONTROL	RED
AC NEUTRAL (GROUNDED)	WHITE
DC CONTROL	BLUE
OVDC (GROUNDED)	BLUE W/WHITE TRACER OR WHITE W/BLUE TRACER
FOREIGN VOLTAGE	YELLOW
POWER WIRING	BLACK
GROUND	GREEN OR GREEN W/YELLOW TRACER

FIELD WIRING TO BE COPPER WITH 75°C INSULATION

CONTROL WIRING



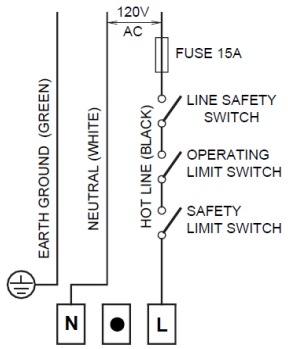
REV	REV DESCRIPTION	REV DATE
3	DISCONNECT CHANGE	02/17/10
2	WINDOW LAYOUT	02/02/10
1	REDESIGN	01/20/10

DO NOT SCALE DRAWING

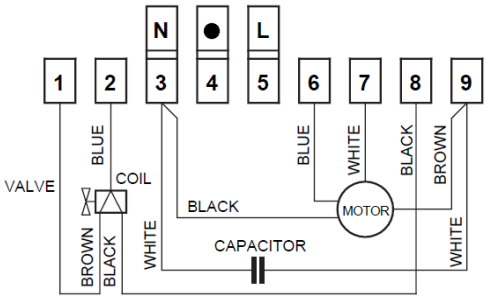
DRAWN BY: BLH	DATE: 11/24/09
CHECKED BY: --	DATE: --
DESIGN BY: BLH	DATE: 11/24/09

Burner Wiring:

Line Voltage:



Sub-base Wiring:



REMOTE SENSING OF SAFETY LOCKOUT: The SAFETY SWITCH in the 530SE CONTROL BOX is equipped with a contact allowing remote sensing of burner lockout. The electrical connection is made at terminal 4 (●) on the SUB-BASE. Should lockout occur the 530SE CONTROL BOX will supply a power source of 120Vac to the connection terminal. The maximum allowable current draw on this terminal (4) is 1 Amp.

WARNING: If a neutral or ground lead is attached to this terminal, the CONTROL BOX on the burner will be damaged should lockout occur.

8. Service Parts

Item	Description	Part No.
1	HTF Pump	4030271
2	Low HTF Cutoff	4030276
3	Flow Switch	4030277
4	High Temp Limit Switch	4030275
5	High Pressure Switch	4030663
6	Pump Pressure Gauge	4030305
7	Fuel Pressure Gauge	4030304
8	Burner Nozzle	4030551
9	Burner Assembly	4030272
10	Igniter	4030302

5 Options and Accessories

4029790	Phoenix TX 80 Fan Coil
4030700	Manifold Kit (2 ea.)
4030153	3/4” x 50’ Hose
4030417	3/4” x 25’ Hose
4030418	3/4” x 15’ Hose
4030154	1” x 50’ Hose
4029876	Ductable Filter Box Kit
4021799	16” x 16” x 2” Merv-8 Filter
4028363	16” x 25’ Heavy Duty Flex Duct
4024936	14” x 250’ Lay Flat Duct
4029423	Glycol

Phoenix FireBird HD308 Limited Warranty

FireBird HD308 Limited Warranty

Warrantor:

Therma-Stor LLC
4201 Lien Rd.
Madison, WI 53704
Telephone: 1-800-533-7533

Who Is Covered: This warranty extends only to the original end-user of the Phoenix FireBird HD308 and may not be assigned or transferred.

One Year Warranty: Therma-Stor LLC warrants that, for one (1) year the Phoenix FireBird HD308 will operate free from any defects in materials and workmanship, or Therma-Stor LLC will, at its option, repair or replace the defective part(s), free of any charge.

End-User Responsibilities: Warranty service must be performed by a Servicer authorized by Therma-Stor LLC. If the end-user is unable to locate or obtain warranty service from an authorized Servicer, the end-user should call Therma-Stor LLC at the above number and ask for the Therma-Stor Service Department., which will then arrange for covered warranty service. Warranty service will be performed during normal working hours.

The end-user must present proof of purchase (lease) upon request, by use of the warranty card or other reasonable and reliable means. The end-user is responsible for normal care. This warranty does not cover any defect, malfunction, etc. resulting from misuse, abuse, lack of normal care, corrosion, freezing, tampering, modification, unauthorized or improper repair or installation, accident, acts of nature or any other cause beyond Therma-Stor LLC' reasonable control.

Limitations and Exclusions: If any Phoenix FireBird HD308 part is repaired or replaced, the new part shall be warranted for only the remainder of the original warranty period applicable thereto (but all warranty periods will be extended by the period of time, if any, that the Phoenix FireBird HD308 Desiccant Dehumidifier is out of service while awaiting covered warranty service).

UPON THE EXPIRATION OF THE WRITTEN WARRANTY APPLICABLE TO THE PHOENIX FIREBIRD HD308 OR ANY PART THEREOF, ALL OTHER WARRANTIES IMPLIED BY LAW, INCLUDING MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, SHALL ALSO EXPIRE. ALL WARRANTIES MADE BY THERMA-STOR LLC ARE SET FORTH HEREIN, AND NO CLAIM MAY BE MADE AGAINST THERMA-STOR LLC BASED ON ANY ORAL WARRANTY. IN NO EVENT SHALL THERMA-STOR LLC, IN CONNECTION WITH THE SALE, INSTALLATION, USE, REPAIR OR REPLACEMENT OF ANY PHOENIX FIREBIRD HD308 OR PART THEREOF BE LIABLE UNDER ANY LEGAL THEORY FOR ANY SPECIAL, INDIRECT OR CONSEQUENTIAL DAMAGES INCLUDING WITHOUT LIMITATION WATER DAMAGE (THE END-USER SHOULD TAKE PRECAUTIONS AGAINST SAME), LOST PROFITS, DELAY, OR LOSS OF USE OR DAMAGE TO ANY REAL OR PERSONAL PROPERTY.

Some states do not allow limitations on how long an implied warranty lasts, and some do not allow the exclusion or limitation of incidental or consequential damages, so one or both of these limitation may not apply to you.

Legal Rights: This warranty gives you specific legal rights, and you may also have other rights which vary from state to state.