

Revision B  
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# Elston Manufacturing HC Heater Owners Manual

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Revision B – Valid for models beginning with Serial # 2424

## Safety Information

The heater you have purchased was designed, first of all, to be safe. However, since this heater burns propane and uses electricity, safety precautions are necessary for the safe and reliable operation of this product. Throughout this manual, this important safety information will be highlighted in red.

### **Warning: Use Propane Only**

This heater is designed to operate on propane only. Do not attempt to use anything else as fuel since fire or explosion may result.

Use this heater only with regulators and tanks that provide propane vapor at 11 inches of water column.

### **Warning: Do Not Bypass or Substitute Safety Equipment**

Always use the regulator and excess flow valve supplied with the heater or a replacement that complies with Department of Transportation safety regulations.

### **Warning: Exhaust Gases**

It is highly recommended that you use a carbon monoxide detector whenever people are regularly in the space heated by this heater. Although this heater's exhaust is completely isolated from the inside air making it extremely unlikely that any carbon monoxide will enter the inside air, a carbon monoxide detector is a necessary but inexpensive way to add another layer of safety.

### **Warning: Electrical Safety**

Always disconnect power from the heater when performing maintenance or inspection.

**As always, apply common sense. If you're not absolutely sure it's safe then don't do it.**

## Description of Heater

The HC heater you have purchased is a thermostatically controlled propane heater. It is designed to be mounted on the inside of the cab on heavy equipment or inside a small building.

It is a heavy duty forced air heater with electronic ignition. To maximize safety, the combustion air is completely separate from the inside air. The combustion air is drawn from outside, burnt with propane, heat is pulled from it to warm the inside air, and the exhaust exits outside.

### Specifications

Dimensions.....	16 in wide x 11.5 in tall x 8 in deep
Weight.....	27 lbs
Shipping Weight.....	32 lbs
Rating.....	19,000 BTU
Combustion Air Inlet Diameter.....	2 in
Exhaust Outlet.....	1.5 in steel pipe
Hot Air Outlet Diameter.....	6 in
Rated Voltage.....	12 V
Operating Voltage Range (with heater running).....	12-14 V
Average Current Draw.....	3 amps
Fuel Requirement.....	propane (LP gas)
Fuel Consumption.....	0.8 lbs/hr max

## Quick Start Guide

Please read the previous page of important safety information if you haven't already done so.

This guide assumes the heater has already been installed. For installation instruction please go to chapter 5 (page 9).

### For Instructions

**Before Running the Heater for the First Time .....See Below**

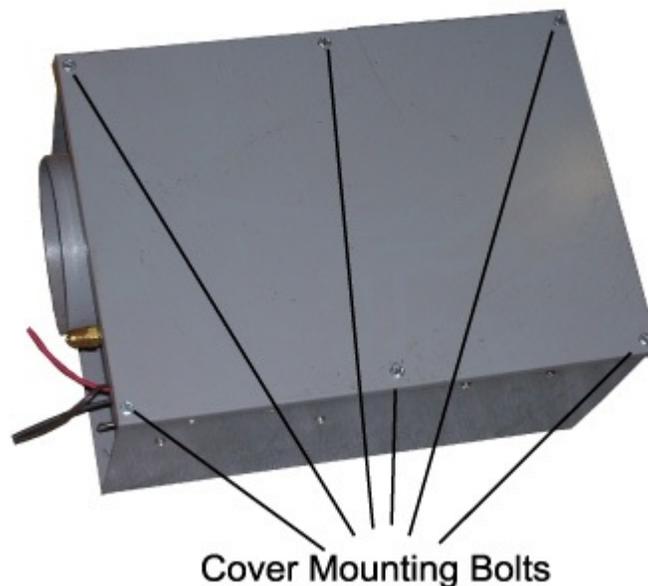
**On Running the Heater for the First Time.....See Page 4**

**On Running the Heater..... See Page 5**

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### Before Running the Heater the First Time

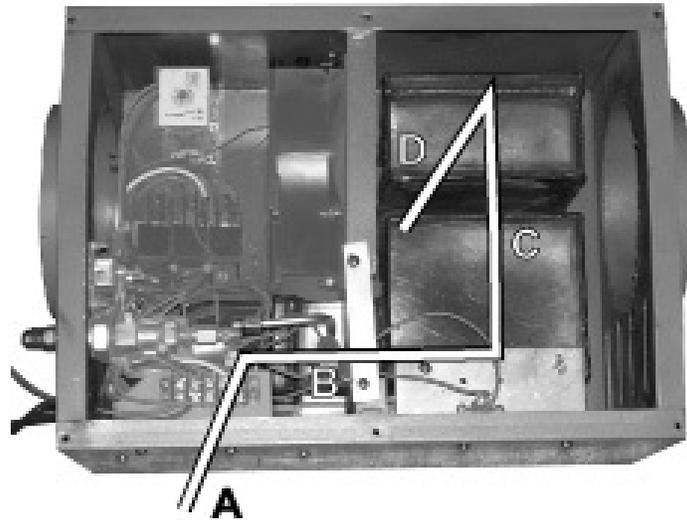
Please take a moment to familiarize yourself with your heater. The cover to the heater is attached with six bolts as shown in Figure 1 below.



**Figure 1: Heater Mounting Bolts**

The combustion air enters in the lower left of the heater (A). It is combined with propane and burnt in the burner (B), travels through the heat exchanger (C), and exits outside (D). The

inside air is blown over the heater exchanger by the fan, where it captures the heat produced by the burning propane. This is illustrated in Figure 2 below.



**Figure 2: How the HC Heater Works**

Near the heater, you will see a thermostat. Please consult the manual that came for the thermostat for instruction on how to operate it.

## **Running the Heater For the First Time or After the Unit Has Been Sitting a Long Time**

Whenever you need to verify that the heater is working properly, please follow the four steps below.

### **1) Check the air inlets and outlets**

Check that the air inlets and outlets are undamaged and unblocked, especially the ones that are outside.

### **2) Check the fuel system**

Check that the propane tank is securely mounted and the gas lines and fittings between the propane tank and the heater are tight and undamaged. Turn on the valve on the propane tank.

### **3) Set the thermostat to the maximum value**

If the temperature is above 80 or 90 degrees, you may not be able to turn the thermostat high enough for the heater to start in the next step. If you wish to continue setting up the heater you will need to chill the thermostat probe.

### **4) Turn on the heater**

The heater will start and, after a few seconds, ignite. The red indicator light near the power switch will turn on until the heater has ignited. You should hear it quietly ignite just after the fan turns on and you will feel the air exiting the heater get warm within a minute. If the heater doesn't ignite after a few minutes (the red indicator light will turn on and stay on), please refer to the troubleshooting guide to help fix the problem.

### **5) Set the thermostat to the desired temperature.**

Your heater is now ready for use.

## Normal Operation

### 1) Check the air inlets and outlets

Check that all the air inlets and outlets are undamaged and unblocked.

### 2) Check propane supply

Check that the propane tank(s) are securely mounted and contains fuel. Check that the fitting connecting the tank to the gas system is tight. Turn on the valve on the propane tank.

### 3) Set the thermostat

Set the thermostat to the desired temperature.

### 4) Turn on the heater

Your heater is now ready for use and will automatically run as necessary to maintain the space at the desired temperature (just like a home furnace.)

### 5) Turning off the heater

If you need to turn the heater for the night or the weekend, turn off the heater using the thermostat. This guarantees that the heater has time to cool down properly.

If you need to turn the heater off for longer than a few days, turn off the heater using the power switch on the side. It is very important that the heater is not running when you shut off the power. If the heater is running, first turn off the heater using the thermostat, wait until the fan was stopped, and then turn off the heater. Turning off the heater with the power switch while it is running is not inherently dangerous, but it will reduce the life of some of the components inside the heater. Once the heater is turned off, close the valve(s) on the propane tank(s).

## Service Instruction

### Every time you walk by the heater (and at least once a week)

- Check the air inlet and the exhaust outlet for damage or obstructions
- Check the exterior gas lines for damage

### Annually before the start of the winter season

- Carefully inspect the propane tank, regulator, and fuel lines. Replace any damaged components and tighten any loose fittings.
- Clean the air inlet and the exhaust outlet. Remove any debris that has collected turning the summer.
- Remove the heater cover. Carefully remove any dust or dirt from the grill and the large fan inside the heater.
- Start up and run the heater for a couple of minutes to check that everything is in working order.
- If you are using a digital thermostat, replace its battery.

### Every three years (or when ignition problems occur)

In addition to the annual maintenance,

- Remove the spark probes and check them for damage and deposits. They should not be darker than a light gray or have an excessively rounded tip. If the spark probes are damaged or excessively rounded, they should be replaced. If the spark probe has deposits then carefully remove them with a damp rag or abrasive plastic pad.



Figure 3: Spark Probe in Excellent Condition

## Troubleshooting

If this guide doesn't fix your problem please contact the company where you purchased the heater. If you are unable to contact them or you need additional help, please contact Elston Manufacturing at 1-800-845-1385.

### Warning

For your safety, the propane should always be turned off when troubleshooting this product. Always keep the power to the heater off when working inside the heater.

### What is wrong with the heater?

- A. Heater fails to ignite and fan does not run.
- B. Fan runs but heater fails to ignite.
- C. Heater usually ignites but sometimes does not.

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### **A** Problem: Heater fails to ignite and fan does not run.

Is the green indicator light on the heater on?

**No.** Check the fuse for the circuit the heater is on. In addition, wait couple of minutes for the circuit breaker inside the heater to reset.

**Yes.** Check that the thermostat is turned on an, if applicable, set to heat. Check that temperature of the thermostat is set high enough that it will turn on the heater. If the thermostat is a digital model, replace the batteries if they are low.

In addition, check the sail switch since if the sail switch is stuck open the fan will not start. Remove the cover to the heater and, with the power to the heater off, use a multimeter to check the resistance of the sail switch. It should read that the switch is open. If the resistance of the switch is low, that the switch is either caught on something or needs to be replaced.

If none of these solve the problem, check that the heater is receiving enough voltage. Remove the cover to the heater and check that the heater is receiving at least 11VDC. If the heater is receiving enough voltage, check the electrical connections in the heater for loose connections and the fan in the heater for obstructions. Also check that the thermostat is properly sending the signal for heat (the white wire is approximately +12VDC).

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## **B** Problem: Fan Runs But Heater Fails to Ignite

Listen carefully. You should hear a faint clicking noise fifteen to thirty seconds after the time the blower starts. If you do, then:

**Rule out general problems.** Carefully check the fuel system, especially that the propane tanks contain fuel. Remove the cover of the heater and check the wiring for damage or loose connections and the components in the heater for obvious damage. Check that the heater is getting at least 12 VDC.

**The small blower may not be working.** With the gas off, check that air is flowing through the combustion chamber and that the small blower is turning. If it is not working, check for loose connections or obstructions or damage to the blower. If you find nothing obvious, remove the blower and test it at 12 VDC to see if it is functioning correctly.

**The spark probe may not be working properly.** Check that the spark probe wire isn't loose or damaged. Check the spark probe. Remove the combustion chamber and the spark probes mounted on it. The metal tip of the spark probe should only be slightly rounded and the spark probe should only have light deposits on the insulator. If the spark probe is damaged or excessively round, it should be replaced. If the spark probes only has deposits, carefully remove them with a damp rag or abrasive plastic pad.

If you don't hear the faint clicking noise then

**The sail switch or high temperature switch may be malfunctioning.** If the sail switch fails to close or the high temperature switch is stuck open the heater will not attempt to ignite. Also loose or damaged wire to either of these items will cause the same problems. Check the wiring to these two items. With the power off to the heater, use a multimeter to check that the resistance of the the high temperature switch is less than 1 ohm. If it is higher, it should be replaced. Also, check if the sail switch closes when the heater runs by disconnecting the wiring to the sail switch and checking if the resistance drops to zero when the fan is running. If the wiring and two switches check out ok, refer to the troubleshooting tips above for this problem.

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## **C** Problem: Heater usually ignites but sometimes does not

Check that the propane tank is not low and gas is getting to the heater.

Is any extra ductwork connected to the exhaust or air inlets or outlets?

**Yes.** The heater should have less than 5 feet connected to the hot air inlet and outlet . Any additional pipe connected to the exhaust should be 1.5-inch or larger pipe less than 2 ft long. Disconnect all ductwork to the heater to see if this corrects the problem.

**No** Carefully check all the inlets and outlets and blower for debris and obstructions. Follow the trouble shooting suggestions for problem B. In addition, use a voltmeter to check if the heater is getting sufficient voltage while it is on. It should be 12 to 13V for the heater to operate reliably. The heater will operate on 11 to 12 V but poor ignition and carbon deposits are a possibility.

## Installation

### Parts Needed for Installation Included with Heater:

- 1 template for mounting holes
- 6 feet self stick rubber seal
- 1 brass fitting

### Additional parts required:

- 6 1/4" bolts 1/2 to 1 inch longer than the thickness of the wall the heater is being mounted on
- 12 flat washers, 6 lock washers and 6 nuts to match the bolts above
- Brackets and clips for attaching fuel and electrical lines

### Tools needed:

- Set of combination wrenches
- Crescent wrench
- #2 phillips screwdriver
- Heavy-duty 1/2 drill
- 5/16 drill bit
- 3" hole saws or jig or saber saw (to cut cold air and exhaust openings)
- Wire cutter
- Wire stripper

### Heater placement:

The heater should be located where it is not in the way of the normal traffic. For the best circulation and the most even heat, there should be plenty of room for the air to enter and leave the heater. In addition, the cold air inlet and the exhaust outlet should be located at least 2 feet from the floor. The heater can be mounted flat against the wall or horizontally on a spot raised well above the floor but wall mounting is preferred for better air circulation.

### Location and Mounting

Tape the drilling template in the desired location for the heater, checking that it is level and flat. Center punch the location of the air inlet and outlet holes and two of the top mounting holes indicated on the template. Remove the template and identify the size of the holes on the wall. If you are cutting the larger holes with a jigsaw or saber saw, use a compass to mark the circles.

Drill all four holes to the size indicated on the template.

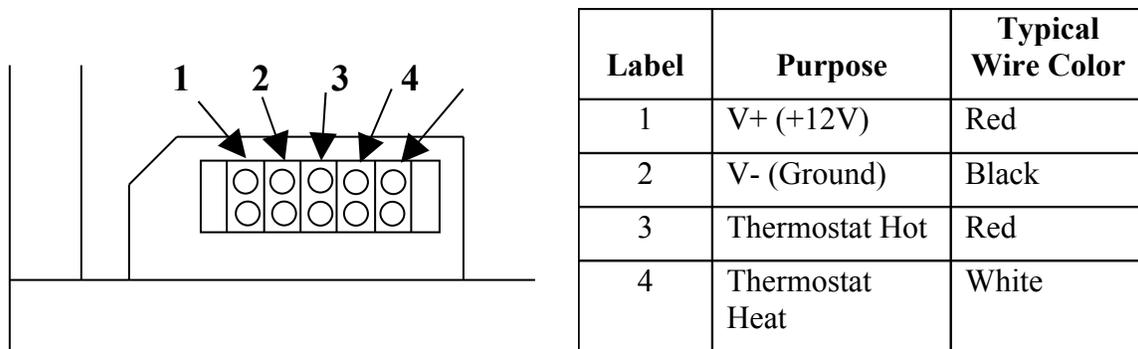
Lift the heater into place and align it with the mounting holes. Once the heater is lined up, slide a 1/4" bolt (with a washer) into the top mounting hole you drilled. If desired, finger tighten the nuts on this bolt to keep the heater from pulling away from the wall. Level the heater and drill the other top-mounting hole. Insert a bolt and its washers into this hole and finger tighten the nut. Drill the remaining mounting holes and insert the remaining bolts. Tighten all six mounting bolts

Attach vents covers with screens to prevent water or debris from entering the cold air inlet or the exhaust outlet.

## Wiring

Mount the thermostat. Select a location where it may be easily accessed and it is away from drafts. If possible, this surface should be insulated for more accurate temperature regulation.

Check that the power to the heater is off. Connect the wires to the terminal block. Two of the terminals are power into the heater and the other two terminals are for the thermostat.



**Figure 1: Illustration of Terminal Block**

**Table 1: Wiring Guide For Terminal Block**

Always use quality electrical connectors, fittings, and wire as clean, secure connections are essential for the proper operation of this heater.

## Fuel System

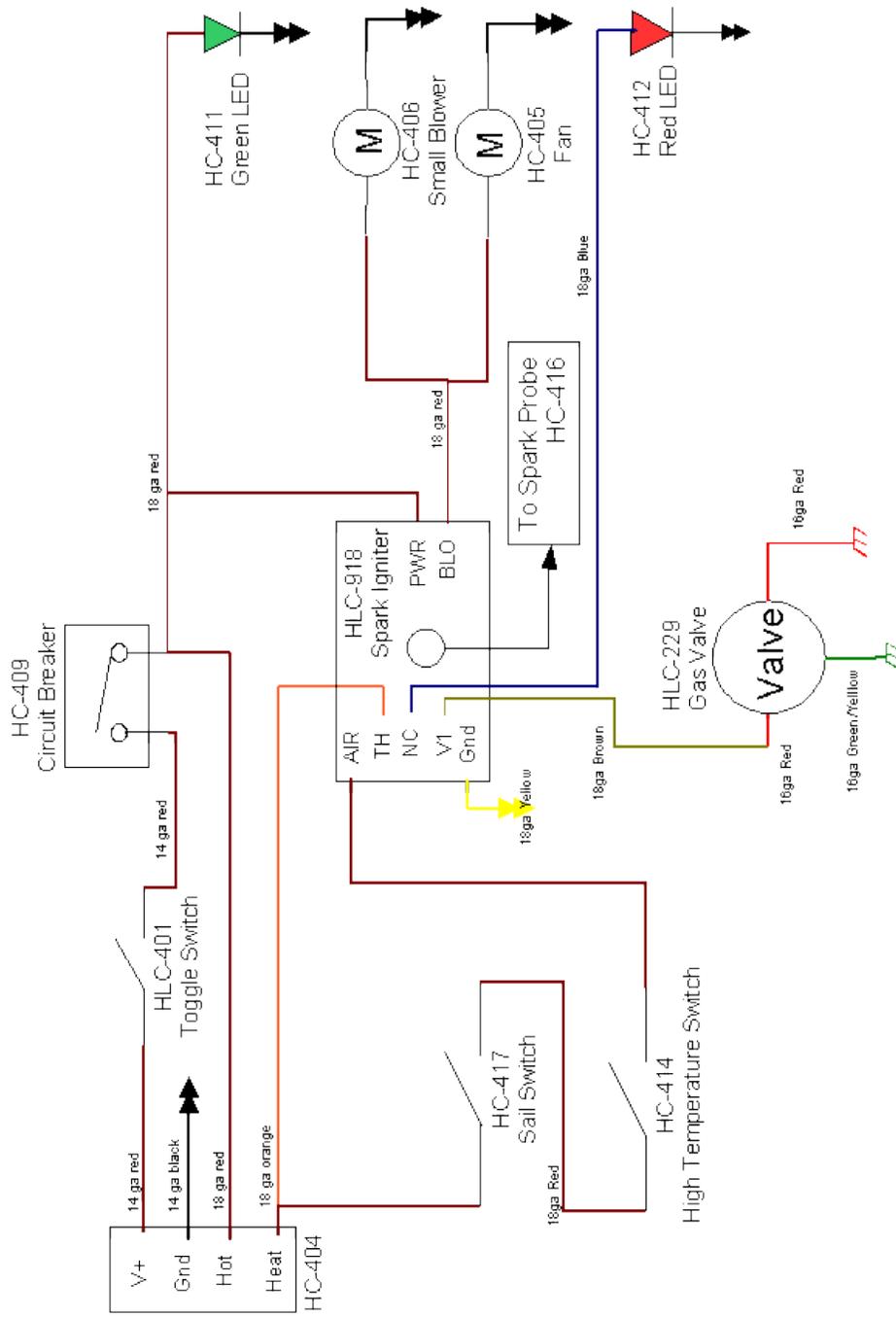
Always follow best practices for installing the fuel system including installing propane tank(s) and the regulator outside of the space to be heated. Do not install the fuel system unless you know best practices for propane fuel systems.

Install the fuel lines between the tank and the heater. Use only quality approved LP gas hoses with properly crimped hose ends and connectors, and proper copper tubing and flare connections and connectors. Be sure that all fuel lines are securely fastened between the tank and the heater.

Pressure check the system for leaks before running propane.

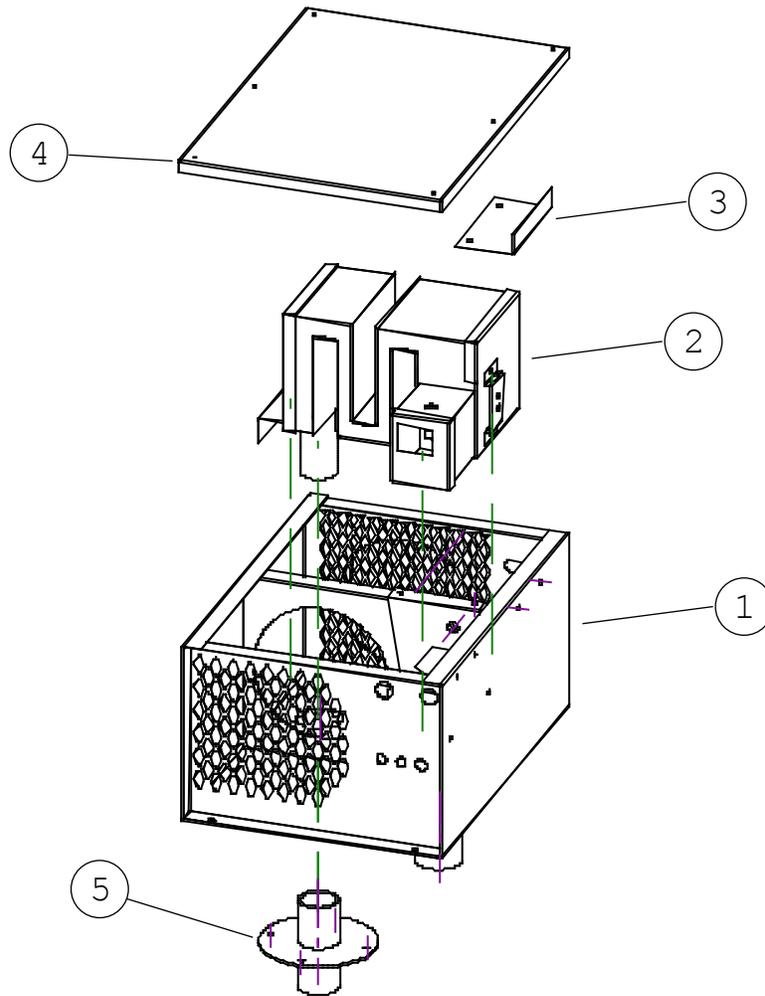
**Final details**

Give the installation one final check to make sure nothing has been forgotten or improperly completed. If everything looks good, the heater is ready to be test fired. For instructions on firing up the heater for the first time please consult the quick start guide.

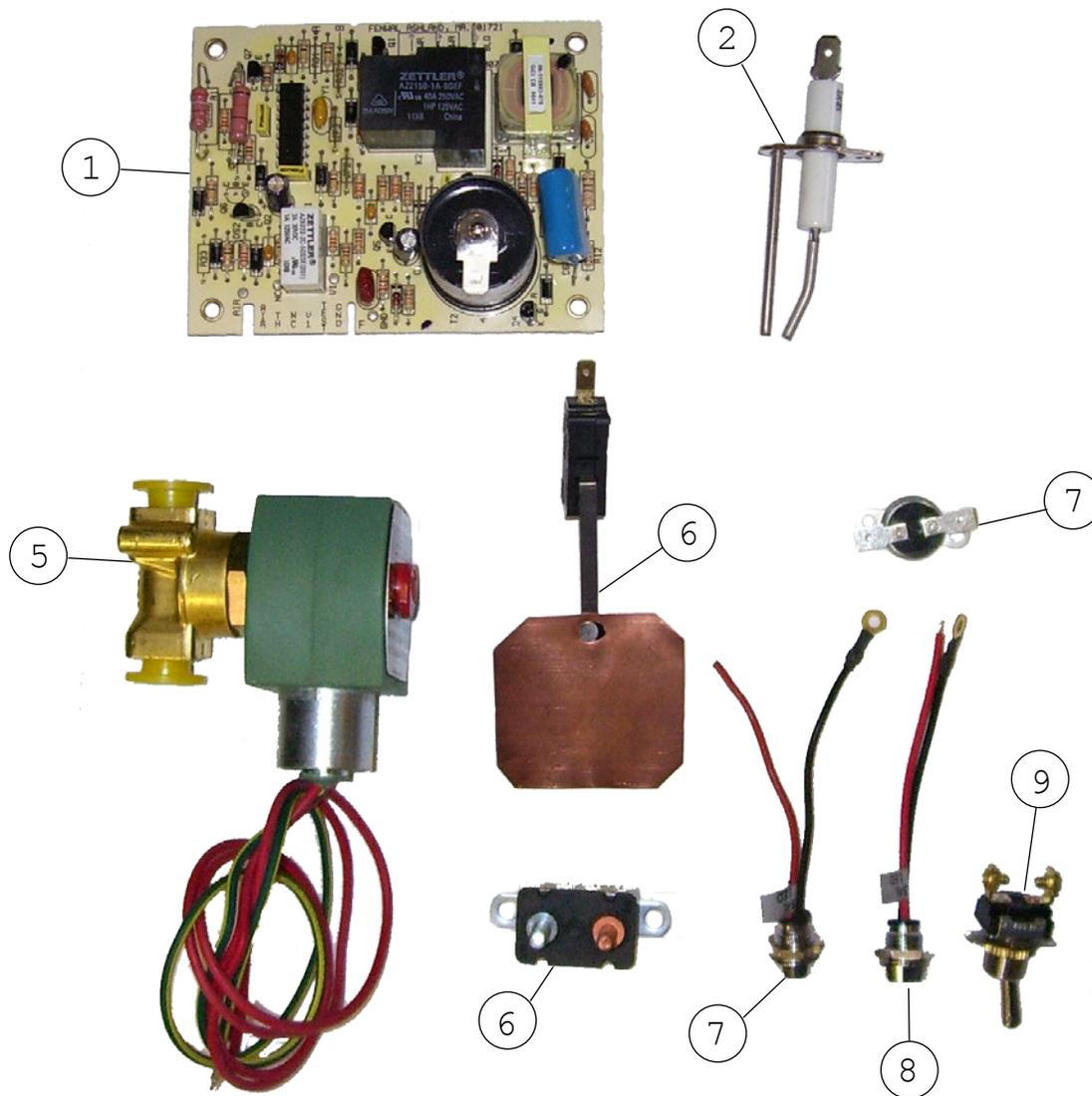


↓ Connected to Chassis Ground

HC Wiring Diagram  
Revision 3  
10/15/2007



Ref #	Name	Part #	Ref #	Description
1	Heater Shell	HC-100	N/A	1/2" #10-24 Machine Screw
2	Combustion Chamber	HC-200	N/A	1/2" #8-32 SS Machine Screw
3	Comb. Chamber Mounting Bracket	HC-109		
4	Heater Cover	HC-101		
5	Exhaust Coupling	HC-110		



Ref #	Name	Part #	Ref #	Name	Part #
1	Ignition Module w/Relay	HLC-918	5	Temperature Limit Switch	HC-414
	Wiring Harness (not shown)	HLC-919	6	6A Circuit Breaker	HC-409
2	Spark Electrode	HC-416	7	Red Indicator Light	HC-412
3	Gas Valve	HLC-229	8	Green Indicatory Light	HC-411
4	Sail Switch	HC-417	9	Toggle Switch	HC-401