

Electric Blue Motors



BLUE HEAT - CAR HEATING SYSTEM

Operation and Installation Manual



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Introduction

NOTE: It is important that you read this manual before installing or operating any of these components.

Thank you for purchasing Electric Blue Motors' **BLUE HEAT**, we hope you enjoy the comfort and feel of a warm cabin just as you would in a gas-powered vehicle. This manual covers operating and installation information for the Electric Blue Motors' **BLUE HEAT**.

1.2: Packing List

Please verify that all items on the Packing List are in the box. Any shortages should be reported immediately. Your **BLUE HEAT** heating system should include the following items:

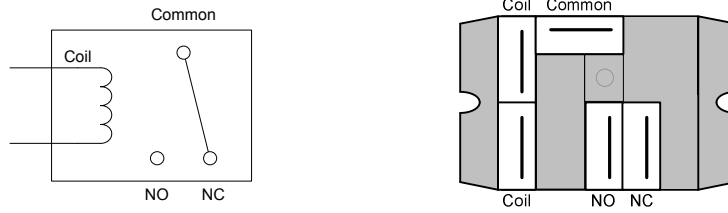
- Electric Blue heating element
- 12V Circulating Pump
- System on/off relay
- Bag of hose clamps (6x)
- Mounting Bracket
- Operation/Installation Manual

1.3: Component Description

1.3.1- Electric **BLUE HEAT** heating element – This unit is thermostatically controlled to heat up the passing coolant between 135-175°F. The nominal power consumption is rated at 1500W. The heating element runs off of **120V AC @60Hz ONLY!**

1.3.2- 12V Circulating Pump – Adds for more efficient heat distribution throughout the system. This motor runs off of **12V DC**.

1.3.3- System on/off Relay – The Relay has one pole normally closed (NC) the other normally open (NO). The figure below shows the electrical schematic for the relay.



1.3.4- Hose Clamps – This kit contains six (6) hose clamps to secure each side of the rubber tubing. If additional hose clamps are needed you may request them upon purchase or purchase more at your local hardware store or car parts store.

1.3.5- Mounting Bracket – This bracket is provided in the kit to help secure the heating system to a nearby wall or frame in the engine bay.

1.3.6- Coolant Reservoir – (NOT INCLUDED) It is essential to include a reservoir within your flow system. A reservoir allows for expansion and contraction, and makes it much easier to add coolant to the system when needed (DO NOT USE WATER – COOLANT ONLY).

1.3.7- Blue Flash Inverter – (NOT INCLUDED) It is HIGHLY recommended that you use the **BLUE FLASH INVERTER** as your AC power source. Most of the inverters on the market will not be able maintain the proper voltage as your traction battery pack depletes from fully charged to empty. The Blue Flash Inverter was designed specifically for EV applications to allow for the current consumption by components like the **BLUE HEAT** and **COOL BLUE AIR CONDITIONING SYSTEM**.



*It is important that you **USE ANTIFREEZE** within the system, **DO NOT** use water.*

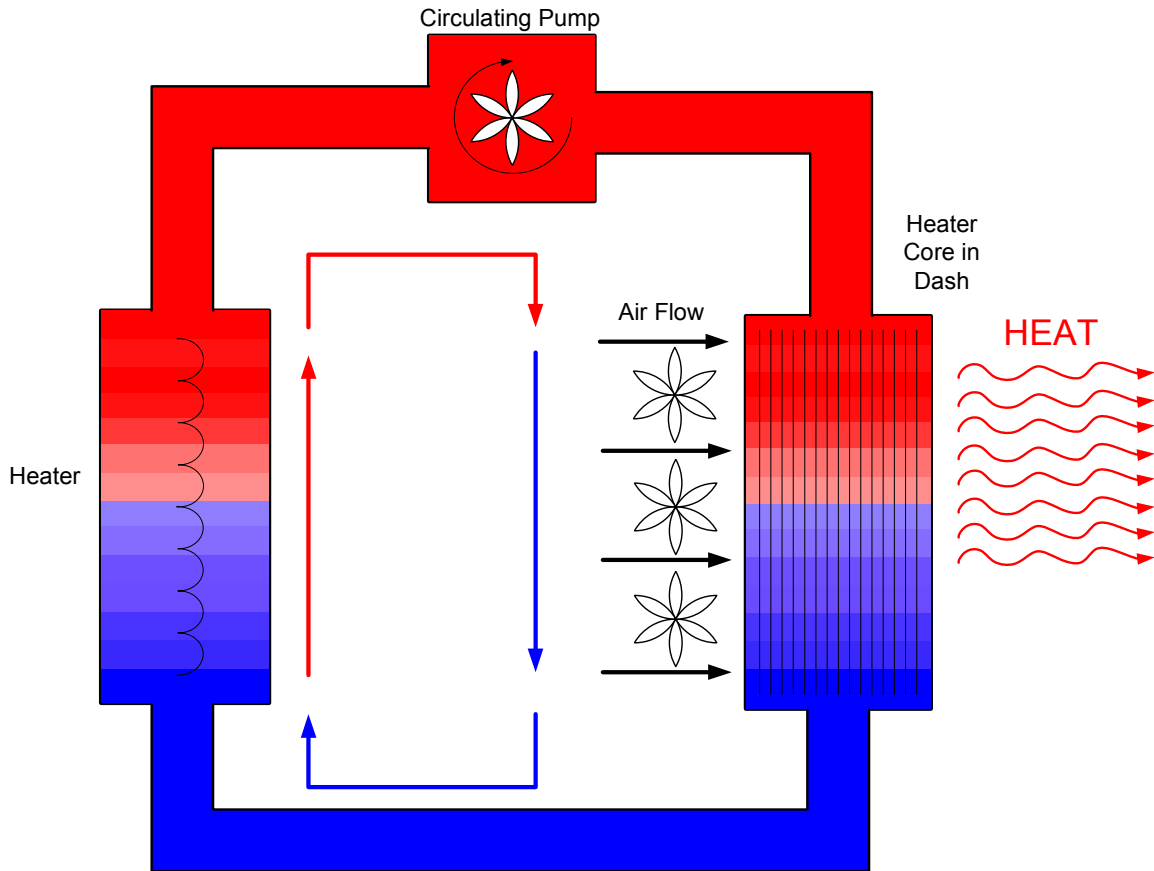


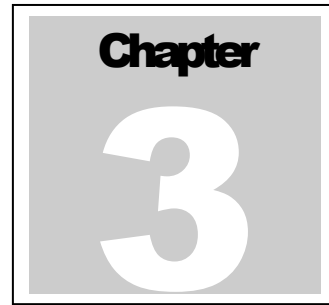
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Principle of Operation

In a gas-engine powered vehicle, the heat comes as a byproduct from the engine, it heats antifreeze which is circulated by a pump running off the belt system of the engine. After converting a car to electric you lose not only your source of heat, but the pump to circulate the flow of coolant. The coolant normally would travel through the engine (heating up the liquid) and then travels through a heat exchanger in your dash where fans blow past it to vent the heat through your cabin (cooling the liquid) – this process is then repeated as the coolant circulates again through the system.

Using the **BLUE HEAT** system provides the heating source and the pump to give you functionality of the dashboard heating controls. When **BLUE HEAT** is used in conjunction with the **COOL BLUE AIR CONDITIONING** system, complete functionality of both the heating and cooling controls are re-established back to as if the car was running off an engine. Switching to a direct electrical equivalent for the components involved proves to be much more efficient as the mechanical energy losses are eliminated from the system.





Important things to Consider before Installation



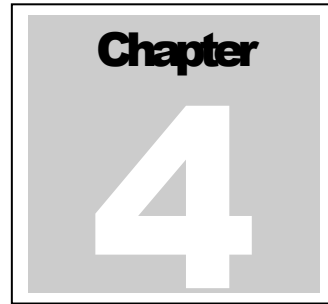
NOTE: *It is important that you use antifreeze within the system, do not use water. Water will freeze at a low temperature and could break components in the system, and at a high temperature will boil and could pressurize the system.*

It is important to understand and have all the components needed to complete this installation before you attempt to install the **BLUE HEAT** system. You will need to go to your local car parts store and buy the correct length hoses for you car. You may also need to purchase a few more hose clamps. If you do not have a reservoir to use you can purchase one from a car parts store. Below is a complete list of items that you will need to complete the installation.

- **BLUE HEAT** kit
 - Electric Blue heating element
 - 12V Circulating Pump
 - System on/off Relay
 - Hose Clamps
 - Mounting Bracket
- **BLUE FLASH** or alternative 120V AC Power Source
- Reservoir 1 Pint (≈ 0.5 L) minimum
- 0.5 Gallon (≈ 2 Liters) of antifreeze
- High Temperature Tubing
- Switch (12V 5A minimum) for dash
- 22 AWG Wire (size varies on installation due to component placement)
- 18 AWG Wire (size varies on installation due to component placement)
- General Automotive Tool Set (Ratchet/Socket Set, Screwdrivers, Wire Stripper, Butt Splices, Crimper, Gloves)



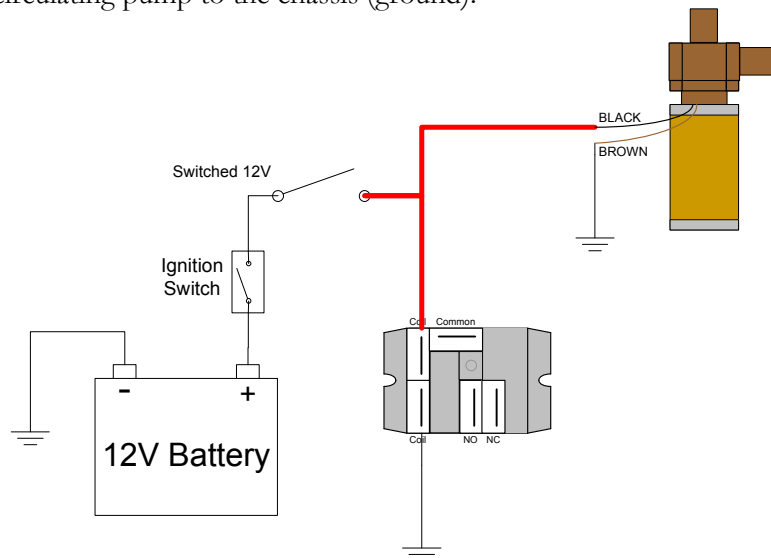
ALWAYS USE HIGH CAUTION WHEN WORKING ON AN ELECTRIC VEHICLE. ALWAYS DISABLE THE CIRCUIT BREAKER WHEN THE ENGINE BAY IS OPEN (THIS WILL HELP MINIMIZE RISK OF SHOCK). ALWAYS TAKE NOTE WHERE THE HIGH VOLTAGE LINES ARE.



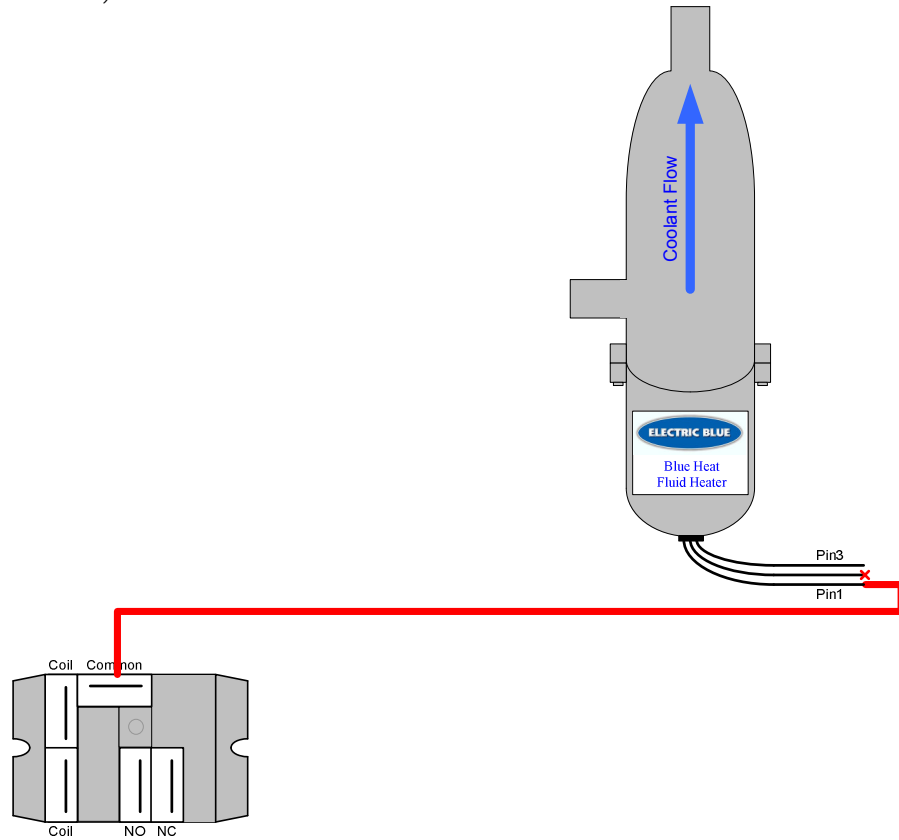
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Chapter 4 – Installation

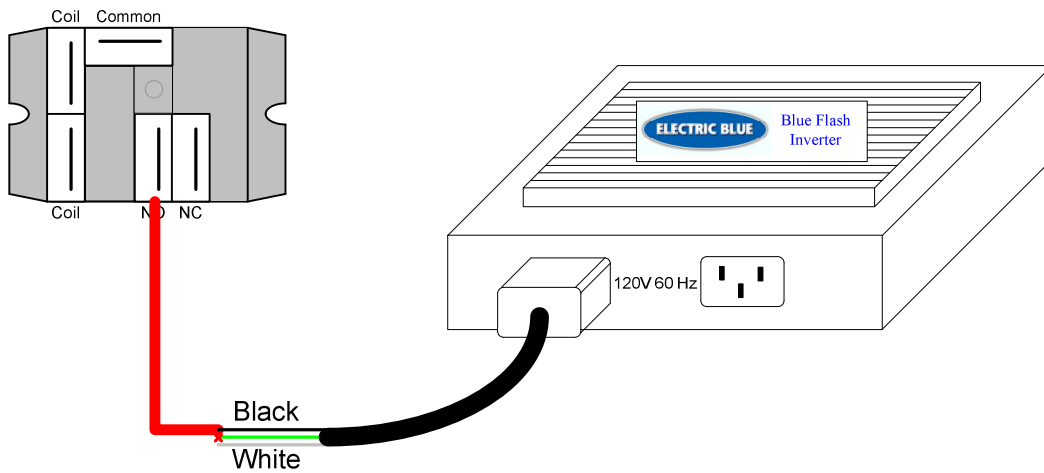
- Turn off circuit breaker to the high voltage system.
- Mount all flow system components under the hood, make sure all hose connections have hose clamps. Try to find a location away from any electrical connections, in case of a coolant leak.
 - Couple the circulation pump and the heating element (follow the installation diagram in Appendix A). Make sure that the flow of coolant travels in the desired direction of the arrows on both components.
 - Attach the reservoir to the heating element
 - Attach tubing from the circulating pump to one of the heat lines in the firewall. In most cars it should not matter what direction the coolant flows.
 - Attach tubing from the reservoir to the last heat line in the fire wall
- This now completes the flow system for the coolant, the next steps focus on wiring up the electrical side of the **BLUE HEAT** system.
- Mount the system on/off relay, for better reliability the relay should be mounted on a flat surface (usually the firewall). Wire one side of the coil to the chassis of the car (ground).
- Mount switch in the cabin near driver's reach. Wire switched 12V (from the ignition switch) to one end and wire the other end to one side of the coil on the relay and the **BLACK** wire on the circulating pump. Wire the brown wire of the circulating pump to the chassis (ground).



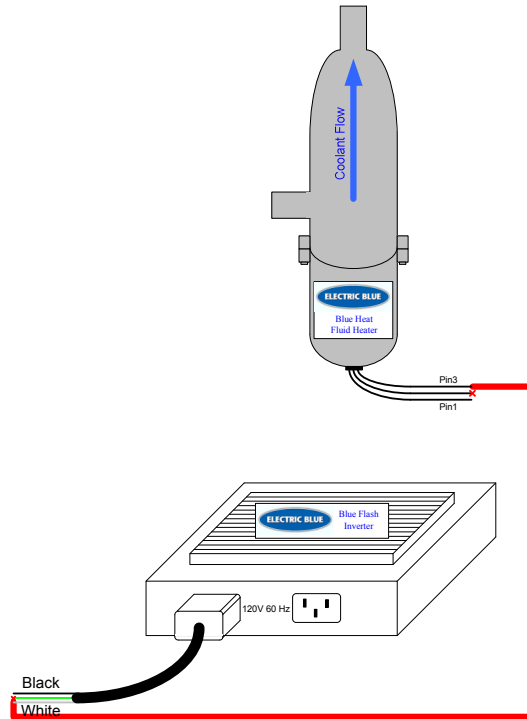
- Wire pin1 of the heating element power cable to the common connection to the relay (the outside wires of the cable are the 120V AC lines and the center is the ground line).



- Wire the normally open connection to **BLACK** 120V AC line on the **BLUE FLASH** inverter output.



- The other outside wire (pin3) should be connected to the **WHITE** 120V AC line on the **BLUE FLASH** unit.



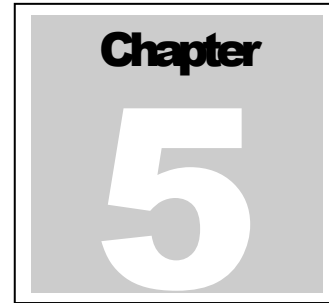
- Pin2 on the heating element and the green wire on the **BLUE FLASH** unit do not have to be wired.
- You have now completed the wiring for the **BLUE HEAT** system. Now, slowly fill up the reservoir up with coolant. Check for leaks in the system.
- Unplug the power plug from the heating element to the **BLUE FLASH** inverter and flip the switch to turn on the heating system. The motor should turn ON and the relay should “click” on (although power will not be connected at this time). The coolant should start to circulate through the system, you may need to add more coolant.
- Check for coolant circulation in the reservoir.
- Now turn **OFF** the switch and plug in the heating element to the **BLUE FLASH** inverter.
- Flip the switch ON and monitor the system as it heats up. **CAREFULLY** put you hand near the heater to test that the coolant is heating up. **DO NOT** touch the heating element, it will get extremely **HOT**.



CAUTION – HOT !!!



- You now can sit in your car and use your dashboard heating system! It will take about 2-5mins to heat up the coolant to the maximum temperature.



Chapter 5 – Warranty and Repair

The **BLUE HEAT** is backed by a 1 year warranty. If it breaks within a year of purchase, just send it back and we'll fix it for free! This warranty does not cover misuse of device. Direct all warranty and repair requests/inquiries to the Electric Blue Motors Customer Service Department. **BEFORE RETURNING ANY PRODUCT(S) TO ELECTRIC BLUE MOTORS, PLEASE OBTAIN AN AUTHORIZED RETURN NUMBER FROM ELECTRIC BLUE MOTORS CUSTOMER SERVICE DEPARTMENT (IN ORDER TO AVOID PROCESSING DELAYS).**

