**Hotstart HE Series Heat Pump Start Up Guide**

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**Project Completion Documentation**

**Project:**

**Customer:**

**Project Start:**

**Project Completion:**

**Project Sub-contractors:**

**Sequence of Operations**

This sequence of operation is for information purposes only. Refer to the operation and maintenance manual for a comprehensive guide. Once the heat pump has been set up, there should be no further action required by the customer related to operational function or changing of any thermostat set points.

The system will automatically shut off in one of two situations:

* Outside air temperature drops to approximately 40 °F (5 °C)
* Supply voltage drops to 197V or exceeds 250V.

In either condition, the engine heater will automatically resume operation based on the control of the dual stage thermostat. As soon as either of those conditions are corrected, the heat pump will resume operation and continue unless the above conditions persist.

There is a three-way rocker style switch on the unit – Bypass, Dual Mode, and Off. The Bypass mode (labelled as EH) should be selected only when the original engine heater(s) operate as the sole heating device. Selecting EH position will prevent the Air Source Heat Pump from operating and therefore no electrical savings will be realized.

The Dual Mode COMP/EH is the down position. This is the normal operating mode.

The OFF position is the middle position and is labelled as OFF. Select this mode for troubleshooting or maintenance. If this is selected, no heat will be applied, and the engine heater and the air source heat pump will not operate.

**NOTE:** If maintenance to either heating system is required, the operator should follow proper lockout/tagout procedures. Start by turning the heat pump rocker switch to OFF, locate the upstream panel, and ensure the breaker supplying power to the air source heat pump and/or block heater is turned off. Follow proper lockout/tagout procedures and only restore power to the unit(s) once maintenance work has been completed. Please call Hotstart Customer service or your Hotstart sales representative for live troubleshooting help.

**Heat Pump – Operation and Maintenance**

The Hotstart HE series heat pump provides energy savings while acting as a redundant heating source for the engine. Coolant supply plumbing from the engine is routed in series through the existing block heater(s) and heat pump. Once installed and set to Dual Mode COMP/EH, the heat pump will act as the primary heating source. Operation of the heat pump is controlled by a dual stage thermostat, ensuring the system operates with redundancy. Should the heat pump ever fail to maintain a minimum temperature of 94 °F (34 °C), the engine heater(s) will engage and raise the coolant temperature until the heat pump can safely maintain the targeted temperature range.

**Operating instructions:**

Heat pump switch should be left in the Dual Mode COMP/EH mode so that the heat pump is the primary heat source and engine heater is set as back-up.

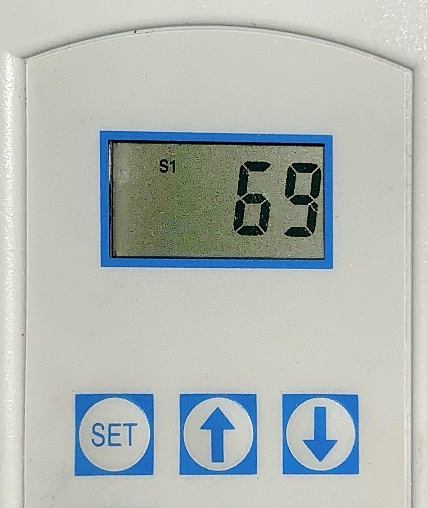
To check heat pump operation, remove front service cover. Locate the electrical enclosure inside of the heat pump and open by lifting the lid up or out. Lid may be secured in the closed position by thumb screws located on each side of the enclosure. Once the lid of the enclosure is open, there will be a circuit board located inside with a green status LED light. The light on the control board should be a steady green indicating normal operation. A flashing green light indicates a fault or failure and troubleshooting may be needed.

In a case of heat pump fault or failure, turn switch to Bypass (EH) position for block heater operation. If there is a fast or slow flash, refer to manual for troubleshooting guide.

Middle position on the switch turns both heaters off. Do not select unless specific maintenance is required. When finished, return the system to Dual Mode COMP/EH mode.

**Thermostat:**

During installation, set the following values in the thermostat controller for heat pump operation. Press the “SET” button to start programming. Use arrow buttons to select values. Press “SET” button to advance through each setting.

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|  |  |
| --- | --- |
| Temperature | Select F or C |
| S1 (Heat Pump Setpoint) | 100 °F/38 °C |
| DIF1 (Differential Temp) | 5 |
| Operation Mode\* | H1 |
| Cooling Delay | D1 (factory default) |
| S2 (Block heater Setpoint) | 95 °F/35 °C |
| DIF2 (Differential Temp) | 5 |
| Operation Mode\* | H2 |
| Cooling Delay | D2 (factory default) |

\* Do not select C1 or C2 for operation mode. HE unit is for heating only.

**Other notes:**

*Refer to Installation Manual for additional installation related topics*

* Heat pump and engine heaters will not operate simultaneously. Only one heating source should operate at a time.
* Heat pump does not have a defrost cycle - it shuts off when air temperature is below 40 °F (5 °C).
* Automatic operation allows for the Hotstart HE Thermostat to sense when the generator is running, preventing heat pump operation.
* Hotstart HE series heat pumps have been designed to use copper piping that allow~~s~~ it to withstand high coolant temperatures when generator runs.
* Do not use gauges on compressor unless absolutely needed.

**MAINTENANCE TIPS**

**Air Filter**

Filter **must** be clean to obtain maximum performance.

Filter should be inspected every month during normal operation. Change filter every 6 months or sooner depending on operating conditions. Do not operate the unit without a filter.

**Fan Motors**

All units have lubricated fan motors and do not require additional lubrication.

**Compressor**

Conduct semi-annual amperage checks to ensure that amp draw is not 10% greater than indicated on unit serial plate. If higher or lower than 10% of recommended draw, check freon levels with gauges.

**Air Coil**

The air coil must be kept clean for maximum performance. Check twice a year during normal operating conditions. If dirty, brush or vacuum clean. Take care not to damage aluminum fins while cleaning. CAUTION: Fin edges are sharp. Coils can also be cleaned with a non-acid coil cleaner.

**Condensate Drain (if installed)**

In areas where airborne bacteria may produce a slimy substance in the drain pan, treat the drain pan chemically with an algaecide approximately every three months to minimize the problem. If no slime is present, inspect semi-annually.

Clean the condensate pan periodically of lint and dirt to ensure indoor air quality. Frequent filter changes may require more frequent condensate pan cleaning. Inspect the drain twice a year to avoid plugging and overflow. Condensate pan tabs can be used.

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| **HEAT PUMP MAINTENANCE LOG** | | | | | | | | | |
| **NEXT MAINTENANCE DATE** | **LOCATION** | **SERIAL**  **NUMBER** | **AIR FILTER CHANGED**  **(Y/N)** | **T-STAT**  **TEMP** | **COILS**  **CLEANED**  **(Y/N)** | **COMP**  **AMPS** | **HOURS**  **RUN** | **SIGNATURE** | **DATE** |
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**HE Series Heat Pump Quick Guide**

**Setup:**

* Refer to Operation Manual for detailed installation procedure. Installation takes roughly 4 hours.
* Verify the existing engine heater operates properly by observing engine temperature and confirming at least one heat cycle (you should see engine temperature rise and fall as the heater cycles on/off).   
  **NOTE:** Do not remove existing engine heater.
* Identify existing engine heater model number (if available) and record under Heat Pump Start up. If existing engine heater(s) are a Hotstart CSM, contact your Hotstart sales rep for wiring options before proceeding with installation.
* Turn power to engine heaters off. Turn power to main panel off and follow lockout/tagout procedures.
* Install new breaker for the Hotstart HE in the service panel (electrical work should be performed by a licensed electrician).
* Move heat pump to desired location.
* Run conduit and power wire from heat pump to power source.
* Disconnect power wires from existing engine heater and run new conduit and power wire from engine heater to Hotstart HE contactor C2 located inside Hotstart HE.
* Install 3/4” NPT to 3/4” hose barbs at Hotstart HE inlet, outlet (top outlet and bottom inlet fittings).
* Install ¾ NPT to 5/8ths barb fitting for Condensate (top outlet and bottom inlet fittings).
* After confirming coolant/engine heater power has been turned off, close engine isolation ball valves (if installed). If no isolation ball valves are installed, the engines coolant will need to be drained.
* Locate engine heater coolant supply hose from engine.
* Remove coolant hose from engine heater inlet and engine.
* Install new silicone heater hose from engine block to Hotstart HE Inlet. Secure hose with hose clamps.
* Install new hose from Hotstart HE outlet to the inlet of the existing engine heater. Secure hose with hose clamps.
* Open isolation valves after new plumbing lines have been installed.
* Verify there are no leaks. If leaks are present, close isolation ball valves and repair leaks.
* Install condensate line (PVC piping) from heat pump to desired drain or drain area.

**Start-up and Commissioning:**

* Turn power to HE system and existing engine heater on.
* Locate the Ranco thermostat located inside of the Hotstart HE system. Set thermostat (see page 6 for settings) and let system run until water jacket is at desired temperature. This process may take up to 2 hours on initial start-up.
* Label according to site requirements.
* Perform Heat Pump Failure test to confirm original block heater operates as required. Test engine heater by setting 3-way rocker switch to up position. Return rocker switch to down position once block heater is confirmed to be operational.

**Hydraulic installation with 2 block heaters:**

* Follow instructions above. Start by removing the inlet lines to both block heaters from the engine to the inlet of the block heaters.
* You will need two TEE fittings with ¾” hose barbs installed on all three openings of the TEE. Small amount of Teflon paste is recommended on all male thread fittings. Brass “Y” fittings can also be used.
* The additional installation parts for 2 block heaters will be 40 feet of silicone hose, 10 ¾” hose barbs and 10 hose clamps. For two block heaters you can expect 2 to 5 hours.
* The TEE fittings should be installed as close as possible to the engine. Hoses from the TEE fitting feeding to block heaters and Hotstart HE should be cut to the same length when possible so that even flow to both block heaters is maintained. You can run a single inlet and outlet silicone heater hose from the Hotstart HE to the TEE fittings.
* The first TEE fitting will be for the inlet feed to the Hotstart HE system.
* Connect both sides of the engine block to both sides of the TEE fitting (The port’s that were previously feeding the block heaters should be used). Secure hoses with hose clamps.
* From the remaining open port run your silicone heater hose to the Hotstart HE port labelled Inlet.
* The second TEE will be for the outlet. Run hose from outlet of HE system to middle fitting of TEE. Then, you will run silicone heater hose to both sides of the engine on the remaining open ports of the TEE, connecting to the block heater inlets. Try to cut hoses connecting from block heater inlet to HE outlet TEE fitting to the same length so that even flow is achieved.
* Install ¾” male by 5/8ths barb at the condensate fitting of the Hotstart HE (middle fitting that is plastic).
* Do not open ball valves until electric installation has been completed. You should then open only the inlet ball valves. Turn on power to the Hotstart HE series heat pump. Once turned on then open the outlet ball valves. Working to push any trapped air out so that you do not have an air lock in the system.
* Place plastic condenser pad under Hotstart HE along with rubber isolation pads to keep moisture off the bottom of the unit.

**Warranty Information**

Date of Warranty Start:

Date of Warranty End:

This letter serves as confirmation of project completion.

Hotstart warrants against defects in the product, (via the manufacturer of the product), and defects in the installation of the product. The warranty includes parts for 1 year.

Operation and maintenance procedures for the product provided at the time of installation. Any issues related to maintaining any product, or accidental damage by the customer are not included in the warranty. Replacement parts are available through Hotstart.

Please contact 813-263-4287 with any issues regarding warranty or ordering of replacement parts.

Thank you,

Patrick Whittlesey

Market Manager – High Efficiency Genset Heaters Americas

[heatpumps@hotstart.com](mailto:heatpumps@hotstart.com)

**HE Series Heat Pump Start Up**

|  |  |
| --- | --- |
| **Customer** |  |
| **Location** |  |
| **Date** |  |

**ENGINE**

|  |  |
| --- | --- |
| **Model** |  |
| **Engine heater watts** |  |
| **Engine heater watts** |  |
| **Voltage** |  |

**HEAT PUMP**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Technician** |  | | | |
| **Heat Pump serial number** |  | | | |
| **Heat pump model number** |  | | | |
| **Voltage** |  | | | |
| **T-stat set points** |  | **S1 100 °F/38 °C Diff 5 °F/-15 °C** |  | **S2 95 °F/35 °C  Diff 5 °F/-15 °C** |
| **Compressor amps** |  | | | |

**ENGINE HEATER**

|  |  |
| --- | --- |
| **Engine heater 1 amps** |  |
| **Engine heater 2 amps** |  |
| **T-stat temp** |  |
| **Hour meter reading** |  |
| **Inlet coolant temp** |  |
| **Outlet coolant temp** |  |
| **Heat pump failure test** |  |
| **Additional notes** |  |

**Installation Pictures:**

**Pre Heat Pump Installation**

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**Pre Heat Pump Installation**

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**Post Heat Pump Installation**

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**Post Heat Pump Installation**

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**Heat Pump Electrical Panel**

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**Existing Engine Heater Name Plate(s)**

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