

INSTALLATION CHECKLIST & RECOMMENDATIONS

FOR THERMOSIPHON HEATERS



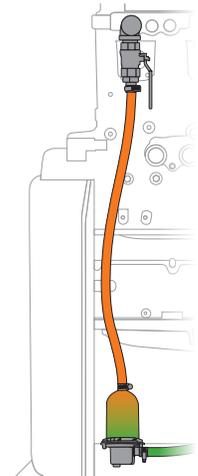
INSTALLING THE HEATING SYSTEM

BEFORE YOU INSTALL

-  Before installing the heater, is the power supply disconnected?
Never install, service or perform maintenance on the heating system with the power supply connected.
-  Has the coolant been drained and flushed?
After the heater is installed, you will need to refill the engine with coolant. Never operate the heater without the presence of coolant.
-  If isolation valves are installed, are they in the closed position?
To make service easier, HOTSTART recommends installing full-flow ball valves to isolate the heating system. After the heater is installed, remember to open the isolation valves. Operating the heater without the presence of coolant will cause overheating and damage the heater.

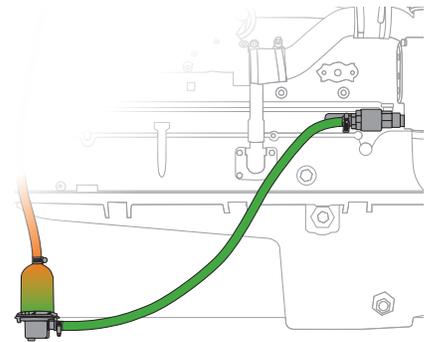
SELECTING THE RETURN AND SUPPLY PORTS

- Is the heater **return** port toward the rear of the engine?
A return port located toward the rear of the engine near the flywheel will ensure that heated coolant will spread evenly throughout the engine's water jacket, improving heating effectiveness.
- Is the heater **return** port as high as possible on the coolant system?
A return port located at the highest possible point on the engine will ensure efficient engine heating.
- Is the heater **return** port away from the engine thermostat?
If the heater return port is located close to the engine thermostat, the engine thermostat may open. Heated coolant will then be routed to the radiator, reducing heating effectiveness.
- Is the heater **supply** port toward the front of the engine?
A heater supply port located toward the front of the engine, near the radiator, will ensure that heated coolant will spread evenly throughout the engine's water jacket.



- Is the heater **supply** port as low as possible on the coolant system?
A heater supply port located at the lowest possible point will ensure there is adequate coolant supplied to the heater.

- Are the heater **return** and **supply** ports located away from each other?
Supply and return ports that are too close together will allow heated coolant to flow through only a small portion of the engine, preventing the entire engine from being heated effectively.



SELECTING HOSE AND FITTING SIZES

- Do you have properly sized fittings?
The following table shows the minimum recommended port size fittings:

TPS	500–2000 watts	3/8 inch NPT
CB/CL/SB/SL	500–3000 watts	1/2 inch NPT
CB/CL/SB/SL	3750–5000 watts	3/4 inch NPT
WL/EE	1500–5000 watts	3/4 inch NPT

- Do you have the largest inside diameter hoses for your installation?
The following table shows the minimum recommended inner diameter hoses:

TPS	500–2000 watts	5/8 inch
CB/CL/SB/SL	500–3000 watts	3/4 inch
CB/CL/SB/SL	3750–5000 watts	1 inch
WL/EE	1500–5000 watts	1 inch

- Do you have adequately rated hoses?
HOTSTART recommends hoses rated for a minimum of 250 °F (121 °C) and 100 psi (690 kPa).

SELECTING THE HEATER MOUNTING POSITION

- Is the heater mounted directly below the heater **return** port?
Positioning the heater directly below the heater return port will ensure efficient coolant flow and prevent unnecessary strain on the thermosiphon heater.

- Is the heater mounted at least 6 inches (15 cm) below the lowest point of the water jacket?
Positioning the heater below the lowest point of the engine's water jacket will ensure adequate coolant supply to the heater and reduce flow restriction along the return hose.

- Is the heater isolated from vibration?
Engine vibration will damage the heater. Ensure the heater is mounted to a vibration-isolated surface. Never mount a heater directly to the engine.

- Will the heater mounting location allow for shortest possible **return** and **supply** hoses?
Before mounting the heater, plan your hose routing. Unnecessarily long hoses may restrict coolant flow.

ROUTING THE HOSES



Does the **return** hose continuously rise to the engine?

Ensure that no point of the return hose is routed higher than the highest coolant level of the engine. Any high points along the return port hose may restrict the flow of coolant, placing unnecessary strain on the thermosiphon heater.



Does the **supply** hose continuously descend to the heater?

Coolant must be able to easily flow downward from the engine to the heater. To promote good flow, eliminate high or low points along the supply hose routing. Any high or low points may restrict the flow of coolant, placing unnecessary strain on the thermosiphon heater.



Are the **return** and **supply** hoses free of dips and bends?

Dips and bends along the hose routing may reduce the efficiency of coolant flow. To eliminate dips and bends, make your hose routing as direct as possible by using the shortest hoses necessary.



Are the **return** and **supply** hoses free of kinks or damage?

Kinked or damaged hoses can restrict or block the flow of coolant, reducing the efficiency of the heating system. Before refilling the system with coolant, inspect the hoses. Replace any damaged or kinked hoses.



If you are using isolation valves, have they been opened?

After the heater and hoses are installed, remember to open the isolation valves. Operating the heater without the presence of coolant can cause overheating and damage the heater.

ADDING COOLANT TO THE ENGINE AND HEATER



Has the coolant been prepared according to the engine manufacturer's recommendations?

Carefully review your engine manufacturer's recommendations before adding coolant to the system. HOTSTART recommends using a 50% deionized or distilled water to 50% low-silicate antifreeze. Note that the antifreeze/water ratio should never exceed 60% antifreeze to 40% water.



Has the coolant been mixed before adding to the engine?

Never add unmixed antifreeze and water separately to an engine. Unmixed antifreeze will damage the heater.



Has the coolant been mixed using deionized or distilled water?

Never mix ordinary tap water with antifreeze. Tap water contains a high amount of impurities and will damage the heater.



Have you checked to ensure coolant is present before operating the heater?

Operating the heater without coolant can cause overheating and damage the heater. If isolation valves are installed, ensure they are opened.

- Has the engine been run to eliminate air from the system?
After the heater is installed and coolant has been added, running the engine long enough to reach its normal operating temperature will eliminate any air remaining in the coolant system.
- After running the engine, have you checked the heating system for leaks?
Swipe each hose connection with a dry towel to find any leaks. If coolant leaks from the hoses or fittings, they may need to be tightened or replaced.
- After shutting the engine off, has the coolant level been topped off as necessary?
Shut the engine off once it has reached its normal operating temperature. After the engine has cooled, check the engine's coolant level. Additional coolant may need to be added.

COMPLETING AND EVALUATING THE INSTALLATION

-  Have you wired the heater to a power source in accordance with local electrical codes?
Before energizing the heater, ensure that the heater is connected to a power source in accordance with national and local electrical codes. Never energize the heater while the engine is running.
-  Have you connected the heater's power source?
It is safe to connect and energize the heater only after coolant has been run through the engine and heating system, air has been eliminated, coolant has been topped off and all potential leaks have been checked.
- While operating, is the **return** hose warm to the touch?
Ensure heated coolant is flowing by placing your hand on the return hose. It should be warm to the touch. If monitoring the temperature, note that the temperature of the coolant returning to the engine should not exceed 180 °F (82 °C).
- Does the heater's thermostat cycle on and off four or fewer times in one hour?
A heater's thermostat that cycles more than four times in one hour may indicate a problem with the heater installation or coolant flow. Review this installation checklist or your heater's installation instructions.

FOR MORE INFORMATION

For additional assistance, view the HOTSTART Engine Heater Installation and Troubleshooting videos at www.hotstart.com/home/resources/videos.