

ENGINE COOLING WATER PREHATER

* ZEROSTART*

PTI - Phillips & Temro Industries, Inc. (U.S.)

Operating Principle: The heater operates on the principle of natural gravitation, by which cold coolant is drawn from the bottom of the engine block, heated in the tank, and returned to the top of the engine block.

Installation inspection - Run the engine up to operating temperature and check installation for leaks. Check all pipe fittings and hose connections at the heater as well as at the engine. Run the engine until all air is bled from the cooling system. Let engine cool down and add additional coolant if necessary.

Operation check - The heater case will warm up quickly and become hot to the touch. The outlet hose should be warm and the inlet hose comparatively cool, if the coolant is circulating freely. If the inlet hose gets very warm before entire system is warm, the coolant is not circulating freely due to one or more of the following reasons:

- airlock in hoses due to loops, kinks, excessive lengths, or routing over the top of the engine;
- heater mounted too high;
- heater not mounted with arrow pointing up;
- dirt in cooling system; or
- improper coolant mixture

Leave the heater energized for a period of up to one hour, checking at regular intervals by feeling heater hose at both inlet and outlet. If the heater appears to be operating incorrectly or not at all, consult your vendor for further instructions.

HEATER MAINTENANCE INSTRUCTIONS:

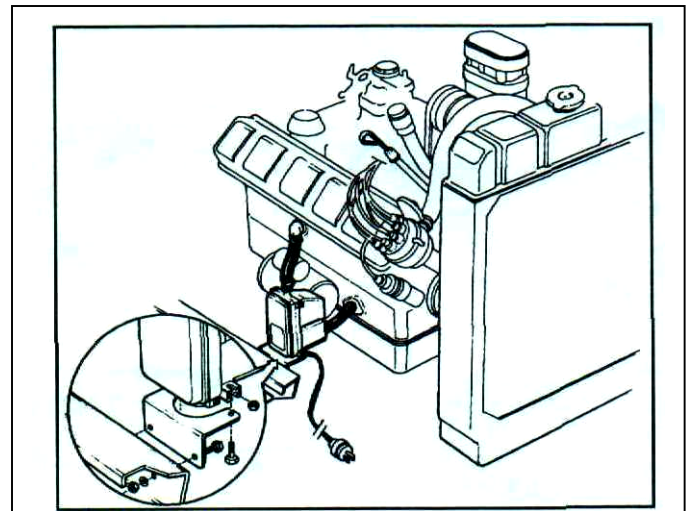
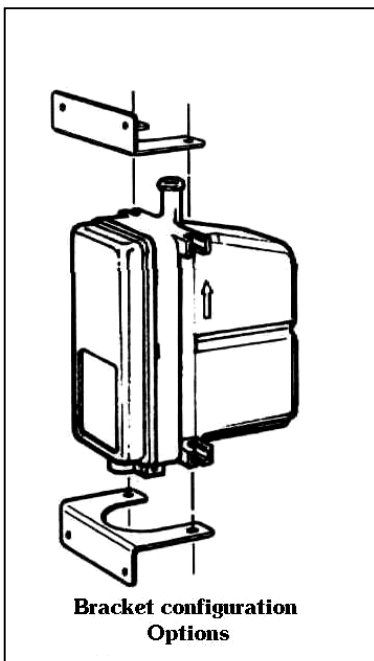
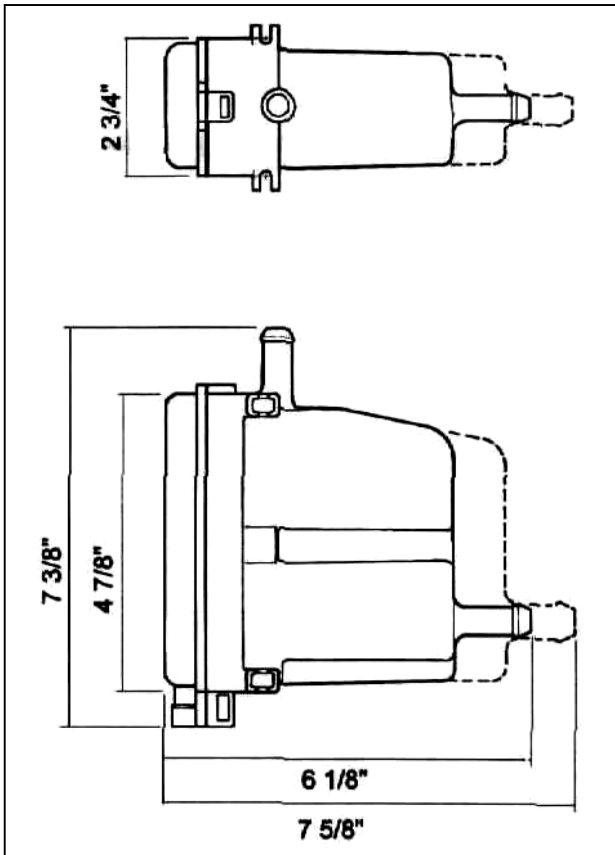
Regular Maintenance - Periodically check all hoses for damage due to aging, elevated temperature (particularly the portion of hose immediately above the heater outlet), over-torqued hose clamps, abrasion, weathering, and engine fluids, Replaced damaged hoses as required. Seasonally check hose clamps torque and adjust accordingly.

Bi -A nnuual Maintenance - Engine manufacturers recommend that the coolant system be flushed and inspected once every two years. As part of this inspection, the heater should be inspected according to the following guidelines to ensure heater life:

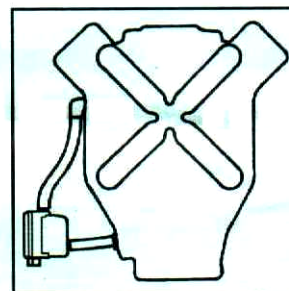
WARNING: TO AVOID ELECTRICAL SHOCK, ENSURE HEATER IS DISCONNECTED FROM POWER SOURCE PRIOR TO PERFORMANCE OF ANY INSPECTION OR MAINTENANCE ON THE HEATER.

1. Disconnect heater from power source.
2. Drain and flush cooling system to remove contaminants. Recycle or dispose of engine coolant properly to prevent environmental contamination. Be sure to re-apply pipe thread sealant on drain plug if it is removed.
3. Remove plastic terminal cap by inserting and twisting a large flat screwdriver in the tab receptacles. Remove the single small screw if applicable. Inspect cord of damage make sure that electrical connections are tight and free from oxide or dirt build-up. **DO NOT REMOVE** electrical connections.
4. Unscrew six torque screws and remove element/flange assembly. Clean the element.
5. Inspect and clean any deposits from the tank interior.
6. Inspect gasket for damage.
7. Replace damaged or worn parts with relevant parts.

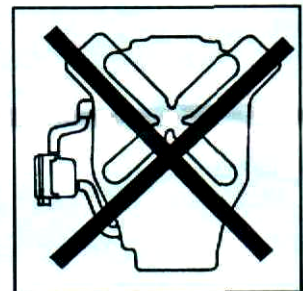
Basic Heater Dimensions



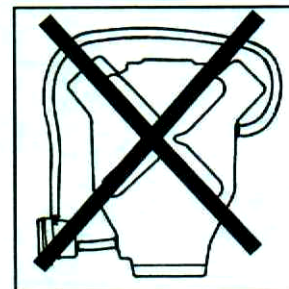
Typical Installation



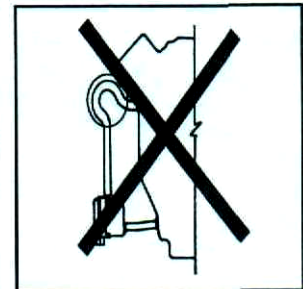
Correct Installation



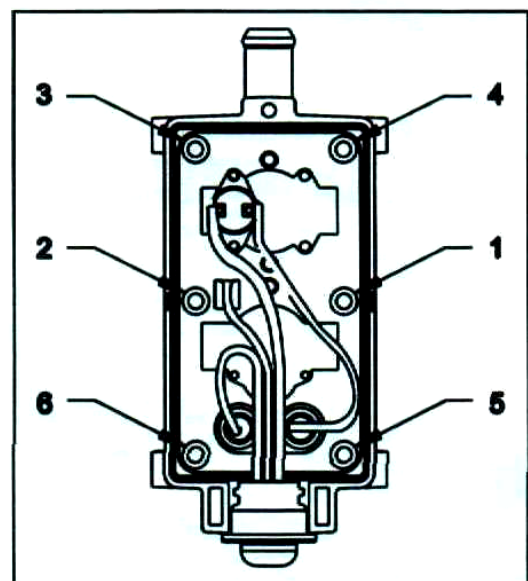
Incorrect: Heater mounted too high



Incorrect: Outlet hose looped over top of the engine



Incorrect: Sharp loop or bend in hose



Fastener - Tightening Pattern

for example:

Type		on °C.	off °C.
330-5028	750W/120V.	38	49
330-5048	1000W/120V	38	49
CL130108-000	3000W/120V	28	38
330-5072	2250W/120V	38	49
331-5002	1000W/240V	38	49
331-5023	2250W/240V	38	49
330-5070	2250W/240V	27	38
WL330 F00-000	3000W/400V	38	49