

PHP – Technical Bulletin

Bulletin Number: 210203

Subject: Engine Heater Plumbing Guidelines

Issue Date: Feb. 24, 2021

Scope: All Engine Heaters

Complaint:

Heaters are experiencing coolant leaks.

Resolution:

It has been discovered that a prominent reason for coolant leaks is due to repeated overheating of the PHP heater resulting in damage to coolant seals and causing coolant leaks. This bulletin provides additional guidelines for proper plumbing installation of PHP and all engine heaters.

Understand that connecting your heater to the engine makes it an integral part of the engine's cooling system. It is impossible to describe all of the safety and operational considerations in these installation instructions. Therefore, the technician must exercise professional judgment to achieve a safe and quality installation. It is important to try to optimize the coolant flow to get the best heat distribution and heater operation.

Installation Procedure:

- Plan the heater plumbing circuit.
- Install the coolant pump in a protected location close to the heater.
- Install fittings, valves and run hoses as required.
- Bleed the air out of the system (Run engine to help circulate coolant).
- Top up coolant as required.
- Test the heater to ensure proper flow.

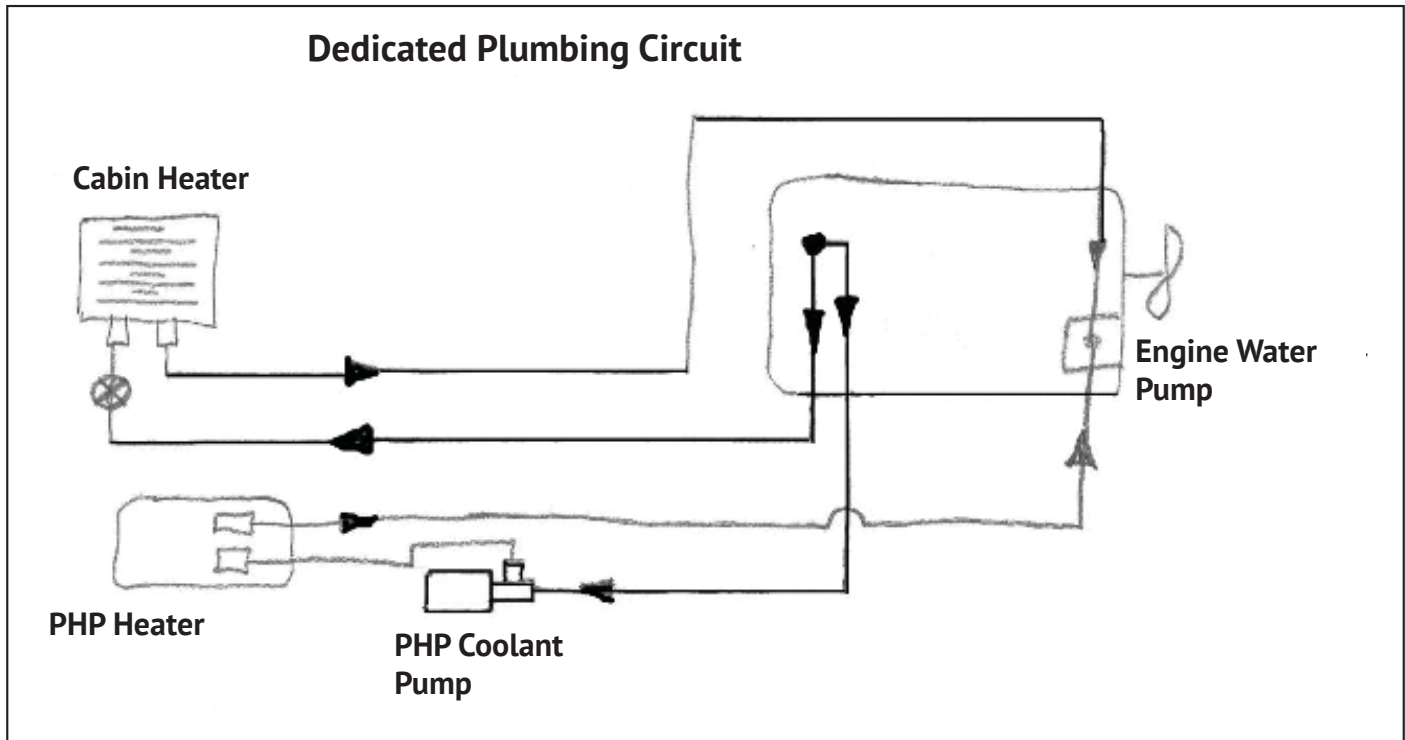
Follow these guidelines and considerations:

- Some plumbing accessories are included with the heater kits (Connectors and molded hoses).
- Use 3/4" hoses to optimize coolant flow.
- Keep the pick up and return points as far apart as possible.
- Take coolant from a high pressure point of the engine (ie. back of block).
- Return coolant to a low pressure point of the engine (ie. engine's water pump).
- Use ball valves to isolate the system when not in use or for heater service.
- Take the coolant from a low point on the engine to minimize air blocks.
- Mount heater and water pump low to allow the purging of air.
- Consider using insulation around the hoses to minimize heat loss.
- A heat exchange can be incorporated into the system. However, ensure that the heater flow can never be completely blocked by a flow control valve.

Dedicated Plumbing Circuit:

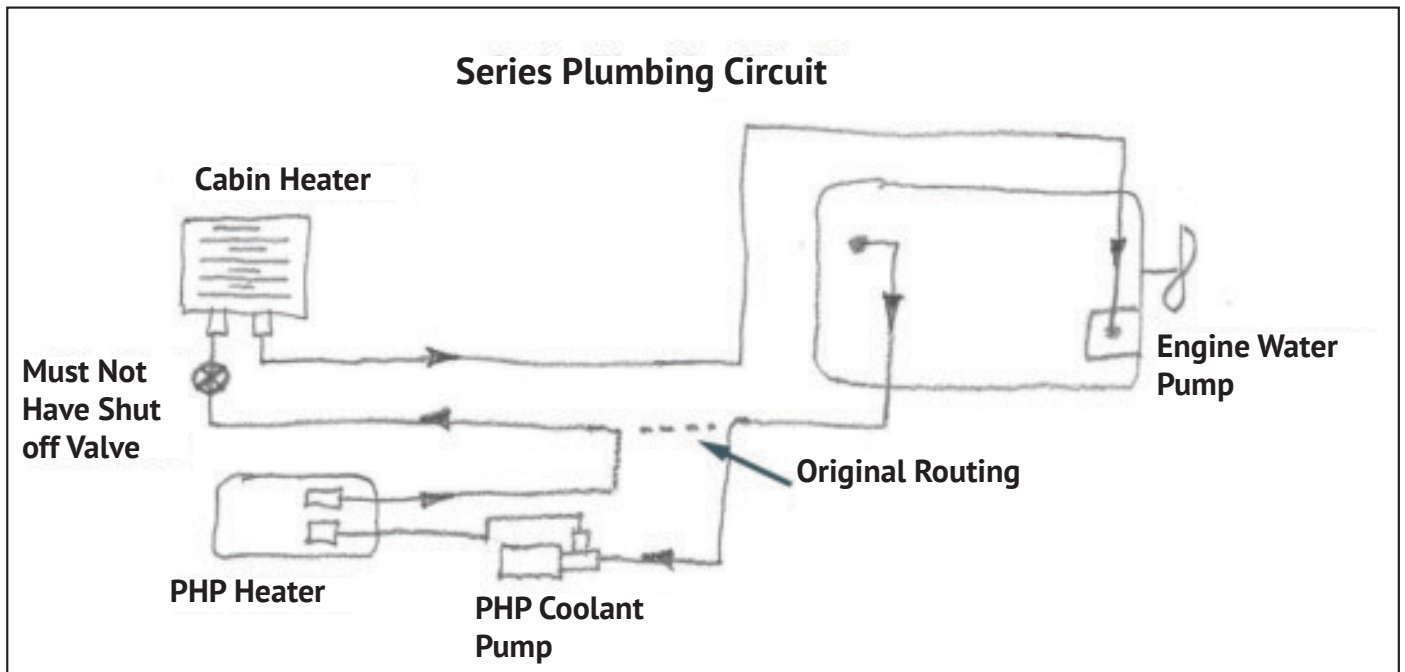
This method provides the safest and most efficient method for engine preheating.

It also allows the heater to easily be isolated for service or being isolated during off season operation.



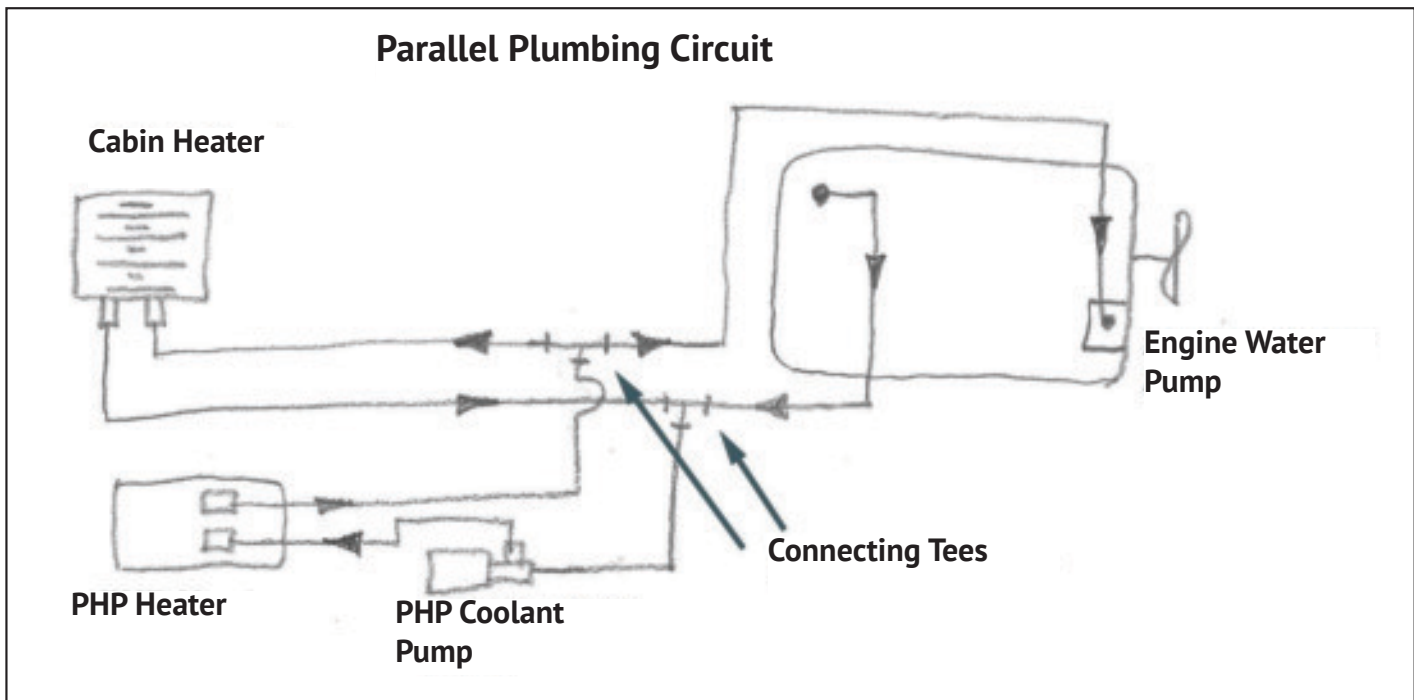
Series Plumbing Circuit:

This method is fast and simple to install, however, it is crucial that the flow control valve in the cabin heater can never be closed during PHP heater operation. This will result in a dangerous overheat condition which could cause a steam explosion and is harmful to the heater components.



Parallel Plumbing Circuit:

This method is also fast and simple to install but its advantage over the Series circuit is that it offers protection against overheat conditions caused by cabin heater controls cutting off coolant flow. The disadvantage of this method however, is that we cannot control coolant flow going through the cabin heater vs. to the engine.



Warnings:

Burn & Explosion Hazards:

- Do not work on the plumbing system when it is hot or under pressure.
- Do not work on the heater or plumbing system when the heater or engine are in operation.
- Always wear safety gloves and appropriate eye protection.
- Provide pressure relief to maximum system operating to 15 PSI (1 bar).
- Never allow the heater to be operated with blocked coolant (ie. flow control valves or frozen coolant)

Caution:

The coolant liquid must contain at least 10% antifreeze for corrosion protection.

Tech Tip:

Ensure adequate flow rate through the heater by comparing the incoming and outgoing coolant temperatures at the heater while the heater is running. Use of a digital thermometer would be helpful but not absolutely necessary. Feel the temperature of the two hoses using your bare hands. Temperature difference should be noticeable but not extreme. If the rise in temperature exceeds 10°C (18°F), coolant flow must be increased by modifying the plumbing.

Corrective Action:

Future manuals will be modified to include more detailed plumbing instructions.