

# DH Hydronic Series Operation Manual

DH9, DH15 and DH30

Eberspacher and Belief



**RETAIN IN VEHICLE FOR OPERATOR REFERENCE**



WaterMark

All DH Series plate heat exchangers are WaterMark approved for contact with drinking water under WMTS-528:2021, certificate number 23442. All thermostatic mixing valves and brass fittings are WaterMark compliant and certified to AS3500.

**Lifestyle  
Equipment  
& Supplies**

[sales@lifestyleequipment.com.au](mailto:sales@lifestyleequipment.com.au)  
25 Arlington Way, Hatton Vale QLD 4341

**0411 413 469**

[www.lifestyleequipment.com.au](http://www.lifestyleequipment.com.au)



## Contents

<b>Contents</b>	<b>1</b>
<b>Introduction</b>	<b>2</b>
<b>Operating Considerations</b>	<b>2</b>
<b>Typical Coolant Furnace Operation</b>	<b>2</b>
<b>Using a Controller</b>	<b>3</b>
Belief Furnaces	3
Eberspacher Furnaces	3
<b>Restarting After Running Out of Fuel</b>	<b>3</b>
<b>Coolant</b>	<b>4</b>
<b>Coolant Pump Priming</b>	<b>4</b>
<b>Controlling The Air Temperature</b>	<b>5</b>
<b>Tempering Valve - Controlling Water Temperature</b>	<b>5</b>
<b>Simple Troubleshooting</b>	<b>6</b>

## Introduction

DH Hydronic hot water heaters operate by transferring the energy from coolant heated by the diesel furnace to a potable water heat exchanger welded inside the tank and optional fan air heaters.

The systems are assembled with pride in Tasmania and designed to be long lasting and reliable. Please retain this operation manual in your RV/boat for quick reference on how to use and care for your system.

## Operating Considerations

- Generally, units are designed to be switched on when needed and turned off when not in use. Extended periods with the unit left in standby are not recommended.
- Try to start showers when the furnace is running, not in standby, as the furnace restart time can reduce the amount of available hot water.
- When starting from cold, or after a shower, allow time for the system to fully preheat before using it. The system is fully heated when the diesel furnace starts to slow down.
- Never store fuel in clear fuel tanks exposed to sunlight. This will cause fuel degradation or algae growth that can clog the fuel pump.
- Never leave the system in storage with very hard water in it as this can cause damage to the internal 316 stainless steel plate heat exchanger.
- Never run the furnace in a sealed box or with any obstruction to the air inlet or exhaust as this will cause the furnace to soot up almost immediately.

## Typical Coolant Furnace Operation

- Turn on the furnace with the on/off switch.
- After approximately 3 seconds, the coolant circulating pump will come on. The glow pin and fuel pump will then come on and the furnace will start its combustion cycle.
- Once the furnace obtains full combustion, it will continue to produce heat on full power until the coolant temperature reaches 70°C.
- At this temperature, the furnace will cycle down to its lower heat setting, but the circulating pump will continue to circulate coolant around the system.
- When the coolant reaches approximately 80-85°C, the furnace will shut down, but the coolant circulation pump will continue.
- The furnace will not restart until the coolant temperature drops to approximately 68°C. This will happen either by heat dissipation over time, or if the hot water service or cabin fan heater demands heat.

**Only turn the furnace off at its own on/off switch. Do not cut power to the furnace during any stage of its operation.**

## Using a Controller

The systems are supplied with an on/off switch for normal operation. For both Eberspacher and Belief, controller connection plugs are included in the wiring loom and will be generally coiled up near the furnace.

Controllers can be plugged in by removing power from the furnace, plugging in the controller, leaving the on/off switch in the off position and re-connecting the power. Do not use the on/off switch and controller at the same time.

### Belief Furnaces

Belief furnaces include a digital controller which is fiddly to use, so is recommended for diagnostic purposes only. If the furnace is having trouble starting, the digital controller can be plugged in to obtain error codes. Refer to the Belief furnace manual for error codes and how to retrieve them.



### Eberspacher Furnaces

The Eberspacher D5E furnace does not come with an EasyStart Pro Controller by default; this needs to be purchased separately. If the furnace is having trouble starting, the controller can be purchased from Dieselheat and plugged in to obtain error codes or to reset a locked out furnace. Refer to the Easy Start Pro Installation Manual for information on how to access error codes.



## Restarting After Running Out of Fuel

Turn the switch on and the furnace will attempt to start. The furnace will not start until the fuel pump and fuel line have primed.

A furnace start process involves 2 separate start attempts and takes approximately 6 minutes. During each start attempt, the coolant pump runs, the combustion fan revs up and down and the fuel pump attempts to pump fuel.

At the end of a start process (after 2 attempts), the furnace will shut down and wait. A new start process can be triggered by turning the furnace off, removing the fuse, replacing it and turning the furnace on again. This process can take 2-6 start attempts, particularly if the fuel line is long.

**The Eberspacher furnace will lock out after approximately 10 failed start processes. Always double check the fuel source before commencing startup. An EasyStart Pro Controller is required to unlock a locked out furnace. Belief furnaces will not lock out.**

## Coolant

The system must be filled with good quality engine coolant to prevent corrosion of internal components in the furnace. Generally, commonly available coolants that include corrosion inhibitors are acceptable and should be used in accordance with the manufacturer's specifications. Antifreeze is not required unless the system will be operated or stored in freezing conditions.

## Coolant Pump Priming

If the coolant has been drained to allow servicing of the furnace or to repair a leak, etc., follow these instructions to re-prime the coolant pump:

Remove the radiator cap on the hot water service. Fill the system with premixed coolant to approximately 20mm from the top of the tank. If the system is overfilled, some overflow from the overflow spigot under the cap will occur on first startup. This is not an issue and will not continue once the coolant level has dropped.

With the cap removed, switch on the furnace and observe the coolant pump starting. It should give off a quiet whining sound. The system will normally prime immediately and air bubbles will appear in the top of the tank as air is pushed out of the internal pipes, fan heating head, etc. This only happens on the first startup.

Check that the coolant level has not dropped excessively and top up if necessary.

Observe the coolant in the tank through the filler and you should see some swirling and turbulence. The pump should be whining softly, not loudly. This indicates the pump is primed and coolant is circulating and it is safe to allow the furnace to start.

If the coolant is not circulating in the system as noted above, follow the procedure in the DH Series Installation Manual for extended priming instructions.

## Controlling The Air Temperature

Temperature control can be achieved via 3 methods depending on how your system has been set up.

The first method is via an inline valve with the coolant return line from the fan head. Partially closing the valve will restrict the coolant circulation and reduce the heat given off by the fan head. The VA200 fan head has the valve built in, while other fan heads can have a ball valve installed behind them.



The second method is via an electrical thermostat that will turn off the fan in the fan head when the preset temperature is reached. This is an optional addition to the system and needs to be wired up with the fan heads at time of installation.

The third method involves installing an optional PWM DC motor controller, which can be installed inline with the fan head to infinitely vary fan RPM and therefore heat output.

## Tempering Valve - Controlling Water Temperature



The supplied tempering valves come preset at 50, but can be set at between 40 and 50 degrees by removing the yellow cap and rotating the brass bolt beneath it.

**The system will always be shipped with the tempering valve installed.**

**Never operate the system without the tempering valve or with a defective tempering valve as the outlet water temperature can be as hot as 80 degrees.**

## Simple Troubleshooting

Problem	Things to Check	Solutions
On initial switch on, furnace does nothing.	<ul style="list-style-type: none"> <li>Check fuel pump connection wires are properly inserted into connector and connector is properly plugged into the fuel pump.</li> <li>Check coolant pump wires are properly connected.</li> <li>Check power supply fuses.</li> <li>Check battery voltage is above 12.5 volts.</li> <li>Check furnace is wired directly to batteries and there are no poor connections.</li> </ul>	<ul style="list-style-type: none"> <li>For Eberspacher D5E, check for furnace lockout and error codes (this requires EasyStart Pro Controller).</li> <li>For Belief, connect supplied controller and download error codes.</li> </ul>
Furnace tries to start but doesn't start.**	<ul style="list-style-type: none"> <li>Check fuel level in tank.</li> <li>Check fuel filter has fuel in it. If it doesn't, look for low fuel or blockages.</li> <li>Check fuel flow in fuel line by shining a torch on the fuel line and looking for bubbles or advancing fuel front when fuel pump is ticking. If fuel has bubbles, look for air leak in fuel line.</li> <li>On the Eberspacher D5E, the pump will tick until filled with fuel. Check fuel pump noise when pump is pumping. If pump can be heard, check fuel source and air leaks in fuel line.</li> <li>Check battery voltage is above 12.5v.</li> </ul>	<ul style="list-style-type: none"> <li>Refill fuel and follow instructions for Restarting After Running Out Of Fuel.</li> <li>Check all fuel line connectors are tight and air cannot enter the fuel line.</li> <li>Plug into power to ensure battery voltage is high enough.</li> <li>Measure the voltage at the furnace whilst it is trying to start, and check that it is not dropping significantly below the battery voltage (which indicates a power wiring issue).</li> </ul>
Furnace starts but smokes or smells after initial startup.	<ul style="list-style-type: none"> <li>Smell and smoke at startup is normal but should clear within 1 minute.</li> <li>Check for partially or completely blocked combustion air inlet or exhaust.</li> <li>Check for condensation or water in the exhaust system.</li> <li>If your fuel tank has quick disconnect fittings, check that the fittings are properly connected so adequate fuel can flow.</li> </ul>	<ul style="list-style-type: none"> <li>If condensation is gathering in the exhaust on RVs, drill 2mm holes at low point. For marine use, install a drainage lock.</li> <li>Open any obstructed combustion air or exhaust pipes and run the furnace on high to clear any accumulated soot.</li> <li>Contact Dieselheat to arrange servicing of the furnace.</li> </ul>

\*\*The Eberspacher D5E furnace will lock out after approximately 10 failed start attempts. Always try to find the issue prior to restarting the furnace to avoid locking it out.

Problem	Things to Check	Solutions
Furnace has tried to start multiple times and is now 'dead'. (Eberspacher only)	<ul style="list-style-type: none"> <li>The furnace has locked out due to excessive start attempts.</li> </ul>	<ul style="list-style-type: none"> <li>Furnace will need to be unlocked using an EasyStart Pro Controller.</li> </ul>
Furnace starts and runs for approx. 1 minute then shuts down very quickly.	<ul style="list-style-type: none"> <li>Check coolant level.</li> <li>Check coolant circulation and ensure pump is primed and nothing is obstructing the coolant flow.</li> </ul>	<ul style="list-style-type: none"> <li>Open any closed valves, or remove anything obstructing the coolant flow.</li> <li>Follow instructions for priming the coolant pump.</li> </ul>
System works but the air heating fan head is not hot.	<ul style="list-style-type: none"> <li>Check all shutoff valves are in correct positions.</li> <li>Check coolant circulation.</li> <li>Check air return on fan head is adequate.</li> </ul>	<ul style="list-style-type: none"> <li>Open any incorrectly closed valves.</li> <li>Ensure coolant pump is properly primed.</li> <li>•</li> </ul>
The shower runs cold too quickly.	<ul style="list-style-type: none"> <li>Check system is properly preheated before starting shower.</li> <li>Check furnace is not in standby mode before starting shower.</li> <li>Check shower head flow rate is not outside of the recommended range.</li> </ul>	<ul style="list-style-type: none"> <li>Allow more time for the system to preheat/reheat.</li> <li>From a cold start, do not allow the furnace to fully shut down before starting shower.</li> <li>Trigger the furnace to restart by running some hot water prior to getting into the shower, then shut off the water and wait for furnace to be running prior to entering shower.</li> <li>Change to a lower flow rate shower head.</li> </ul>



[sales@lifestyleequipment.com.au](mailto:sales@lifestyleequipment.com.au)  
25 Arlington Way, Hatton Vale QLD 4341

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