

# STOP DON'T PANIC

## READ THE INSTRUCTIONS

**DIESELHEAT DH15/DH30 HYDRONIC  
HOT WATER INSTALLATION MANUAL  
BELIEF OR EBERSPACHER FURNACE**



0418 130 971  
sales@dieselheat.com.au  
39 Golden Valley road  
Cygnet 7112 - TAS



---

<b>Introduction - Principles of Operation</b>	<b>2</b>
Diesel Coolant Furnace	2
Important Design Considerations	2
Operating Considerations	3
Component Location	3
Diesel Coolant Furnace Location Options	4
Hot Water Service Tank Locations	4
Hot Water Service Tank Mounting	5
<b>Set Up The Tank</b>	<b>6</b>
<b>Coolant Circulation Setup</b>	<b>6</b>
<b>Plumbing the Coolant Hoses</b>	<b>10</b>
<b>Coolant Circulation Pump</b>	<b>10</b>
<b>Coolant</b>	<b>10</b>
<b>Fan Heater Installation</b>	<b>11</b>
<b>Controlling The Air Temperature</b>	<b>12</b>
<b>Tempering Valve - Controlling Water Temperature</b>	<b>13</b>
<b>Watermark Approval</b>	<b>13</b>
<b>Fuel System</b>	<b>14</b>
Eberspacher Fuel System	14
Belief Fuel System	14
Fuel Source	15
<b>Electrical Connection</b>	<b>15</b>
<b>RV Exhaust</b>	<b>16</b>
<b>Marine Exhaust</b>	<b>17</b>
<b>Combustion Air</b>	<b>18</b>
<b>Commissioning</b>	<b>19</b>
Coolant Pump Priming	19
Initial Startup	20
Post Initial Startup	20
Coolant Furnace Operation	21
<b>Commissioning Troubleshooting</b>	<b>22</b>

## Installation Guidelines

Dieselheat is providing this installation manual to help make sure your installation is successful. Please read this guide carefully as many product issues can result from improperly performed installations. We can't take responsibility for performance loss, product damage or failure that has resulted from poor installation practices or a failure to follow recommended guidelines.

We pride ourselves on our clients' successful installation and use of their new diesel hot water system. If you have any further questions after reading this manual, please give us a call.

This manual contains all the information required to set up the DH15 or DH30 with Eberspacher or Belief furnace for both Marine or RV.

## Introduction - Principles of Operation

DH15/DH30 hydronic hot water heaters operate by transferring the energy from coolant heated by the diesel furnace to heat exchangers. The primary heat exchanger is the domestic water plate heat exchanger installed inside the DH15/DH30 tank. An additional, optional cabin fan heater (air heater) can also be used.

The full system consists of the diesel coolant furnace and the DH15/DH30 hot water service tank, as well as an optional cabin fan heater.

### Diesel Coolant Furnace

The diesel coolant furnace is the heart of the system. It is the component that burns the diesel/air mixture to generate heat. The heat is transferred to the coolant, which passes through the water jacket surrounding the furnace.

Hot coolant is circulated via the pump that is supplied with the furnace.

### Important Design Considerations

- No diesel appliances like ingesting dust. Consider air inlet locations and system location to minimise or prevent dust being sucked into the combustion inlet.
- Never combine exhausts, i.e. join exhausts from different devices.
- Keep fuel supplies and fuel plumbing as simple as possible to minimise the chance of air leaks. Always use the provided fuel line; never use a substitute.
- Always place furnace units where they can be easily accessed for service or removal.
- Avoid main power isolation switches - these will allow a user to cut power to a unit whilst it is running, bypassing the proper shut down /cool down process. This will damage the unit.
- Ensure adequate supply of combustion air. If installing the unit in

a sealed box, the door must be open for the unit to run, or alternatively an air inlet pathway must be provided. Operating the unit with inadequate inlet air will cause sooting up and almost immediate need for service.

- For marine installations, when deciding where to locate the furnace, always take into account that the maximum allowable length of the exhaust is 2m.

### 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.
- Never store fuel in clear fuel tanks exposed to sunlight. This will cause fuel degradation or algae growth that can clog the fuel pump.
- 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.

### Special Notes

**Do not connect power to the furnace until the installation is 100% complete.**

**If you need to get system error codes, need to remove a furnace lock, or need diagnostics, you will require a controller.**

**Never start the furnace without coolant in the system.**

### Component Location

The DH15/DH30 KIT is designed to have the tank and furnace mounted together and this is how it is shipped by default.

The furnace can also be located up to 4m from the hot water service tank, and as the furnace is IP rated it can be installed under the floor of a vehicle. However, we always suggest splash and stone protection be installed to protect it.

When remote-mounting the furnace, the connecting hoses can be covered in insulation tubing if the vehicle/boat is in an ultra-cold climate, but this is not necessary in most Australian conditions.

### External/Remote mounting:

- Increases the volume of coolant in the system, which is beneficial.
- Facilitates installation in tight spaces.
- Enables the furnace to be installed in a location that allows for better noise management.
- For marine installations, enables the furnace to be moved to a location where the exhaust is easier to install.

### When remote-mounting the furnace:

- Take appropriate precautions to stop external hose damage where hoses pass through walls or bulkheads.
- If the hoses need to be routed around corners or bends and there is a possibility of kinking, fit elbows into the hose.

- Always provide mechanical protection from stones, etc.
- Always protect from excess dust ingress.

## Diesel Coolant Furnace Location Options

### Caravan/RV

- On the side of the hot water service tank (default) - this gives the most compact install with the components close together.
- Externally in a box (which must be ventilated when the furnace is running).
- Under the chassis on a vehicle. This is a good option because it means there will be no fuel line or exhaust connections in the vehicle, and noise will be reduced in the vehicle.

### Marine

- On the side of the hot water service tank (default) - this gives the most compact install with the components close together.
- Separated from the tank in the engine room.
- Separated from the tank in a locker/lazarette, which can facilitate easier installation of the marine exhaust system.

**Note: The diesel furnace should be installed below the top of the hot water service tank to ensure it fills with coolant.**

**Note: The coolant circulating pump must be level with the tank connection point or below it.**

**Note: All diesel furnaces require servicing from time to time, so the furnace should always be installed in a location where it can be easily removed.**

## Hot Water Service Tank Locations

In most situations, the hot water service tank is mounted in the same compartment where a typical hot water service would be fitted.

For marine installations, the hot water service tank can be located in the engine room, under a seat in the cabin, or in the engine compartment.

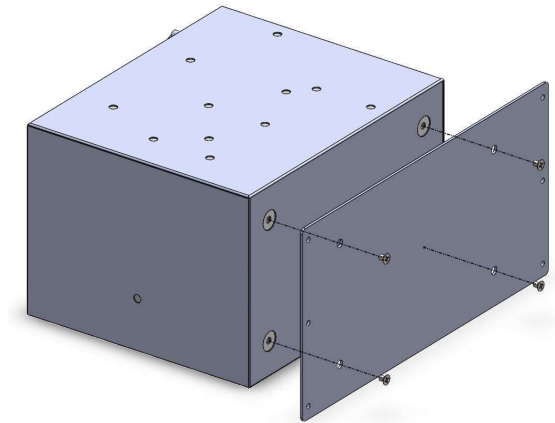
**Ideally, the hot water service tank should be the highest point in the system, although this is not always possible.**

## Hot Water Service Tank Mounting Requirements:

- The tank must be mounted vertically with filler cap on top.
- Filler cap should be easily accessible to fill the system and periodically check coolant level.
- The tank must be supported from underneath (do not hang off a wall by the mounting plate).

### Hot Water Service Tank Mounting

- The supplied mounting plate can be fixed to the back or the base of the hot water service tank.
- Install the plate with the 4 supplied countersunk screws.
- Note that the mounting plate is asymmetrical; the longer side is designed to go under/behind the plumbing.

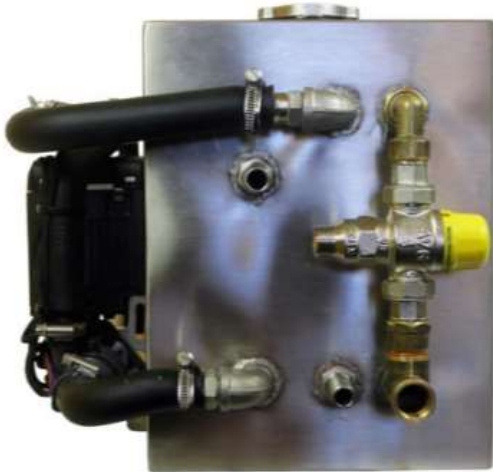


**Note: Due to manufacturing tolerances in the location of the threaded attachment points on the tanks, it may be necessary to ease (enlarge) the holes for the mounting plate screws slightly when the mounting plate is installed.**

**Note: The threaded inserts on the tanks are 10mm deep - forcing a screw past this depth may result in damage to the inner tank.**

## Set Up The Tank

The tank is shipped with the tempering valve installed and these connections are pressure tested prior to shipping.

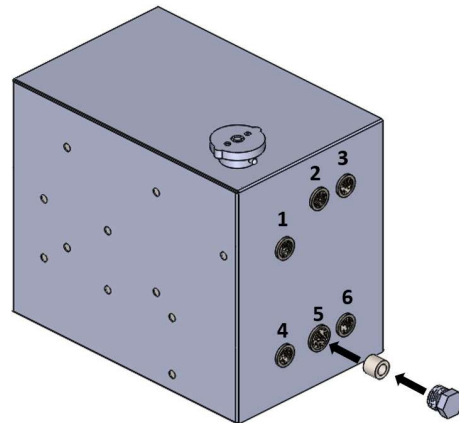


We do not recommend moving or adjusting the tempering valve as the connections require special sealant and tightening.

All connections for coolant on the tank need to be sealed with either thread tape or Loxeal 58-11 to ensure there are no coolant leaks.

## Coolant Circulation Setup

The system contains a coolant bypass hole inside the  $\frac{3}{4}$  connector (Position 4) on the tank. This hole allows coolant to exit the plate heat exchanger and return to the tank without the need for external plumbing.



This hole can be blocked by inserting a bypass hole blocking ring into the  $\frac{3}{4}$  fitting prior to installing a hose tail.



**It is important to configure the tank properly to ensure good performance. Use the following scenarios to configure your tank.**

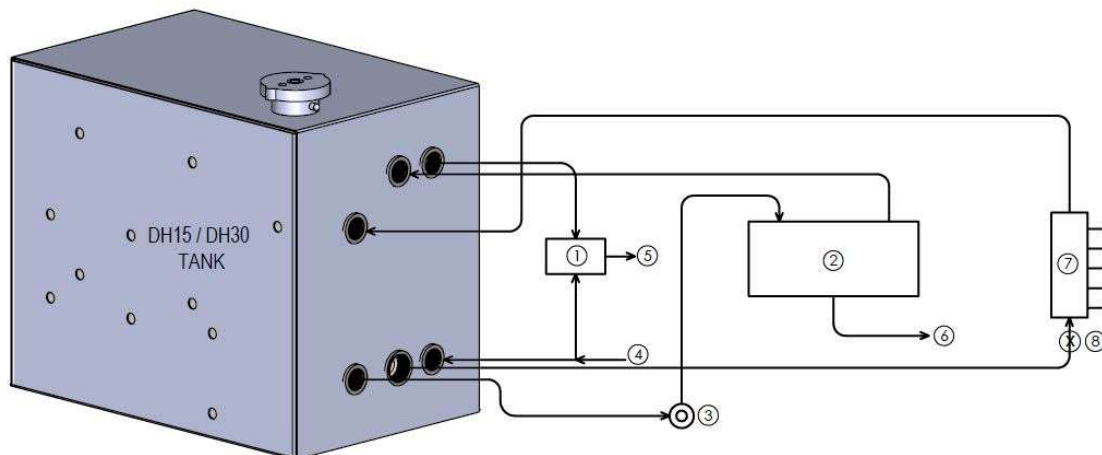
### Hot water only installations.

For hot water only installations, connectors 1 and 5 should be blocked with the supplied plugs. However, the bypass hole blocking ring should not be installed.

### Installations with 1 fan head located at or below 0.5m above the top of the coolant tank.

For installations with only 1 fan head located within 1.5m of the tank at or below 0.5m above the top of the tank, ports 1 and 5 should have hose tails installed and the fan head should connect to those hose tails. The bypass hole blocking ring should not be installed. Coolant will flow to the fan head, but if the fan head circuit is turned off, coolant will bypass via the internal bypass hole.

DH15/DH30 SCHEMATIC SETUP:  
FAN HEAD < 0.5m ABOVE TANK - INTERNAL BYPASS



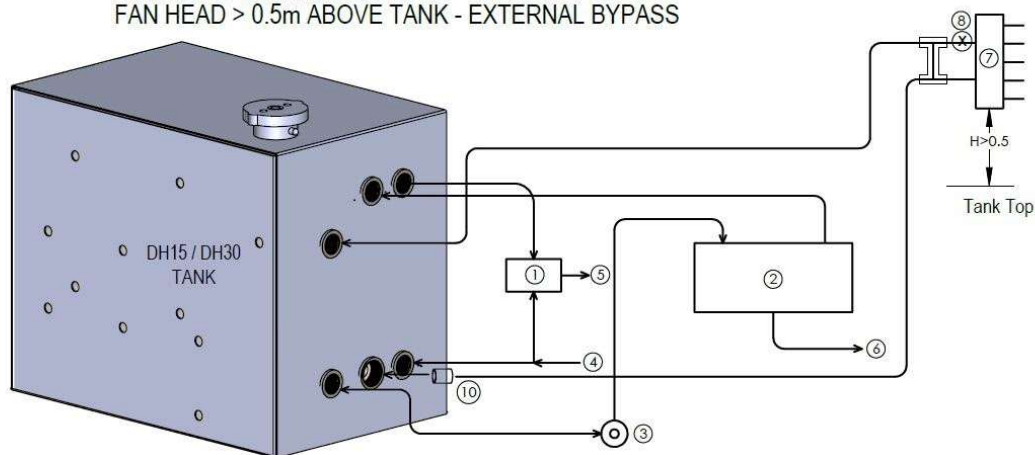
1. MIXING VALVE
2. HYDRONIC FURNACE
3. COOLANT PUMP
4. COLD WATER SUPPLY
5. HOT WATER OUTLET
6. EXHAUST
7. OPTIONAL FAN HEATING HEAD
8. OPTIONAL SHUTOFF VALVE



**Installations with multiple fan heads, fan heads located up to 1m above the level of the tank or where the fan head is more than 1.5m from the tank.**

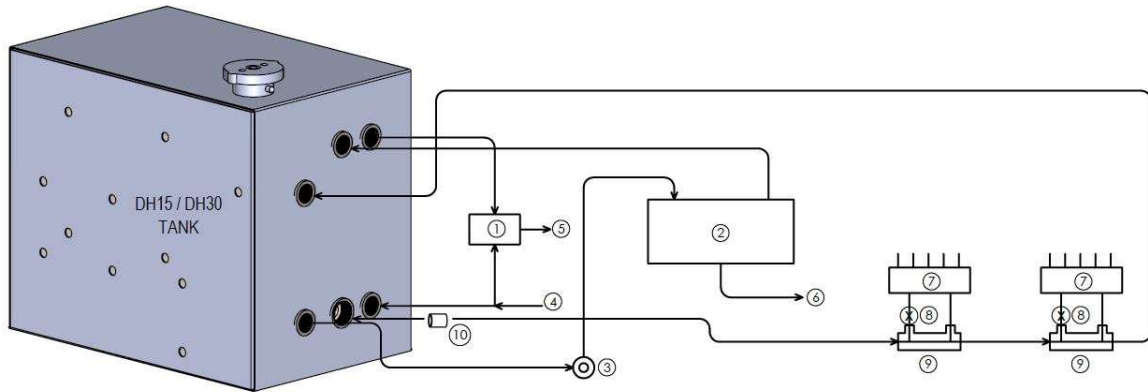
For these installations, ports 1 and 5 should have hose tails installed and **the bypass hole blocking ring must be installed**. This prevents coolant passing back into the tank and significantly increases the available pump pressure to drive circulation of the coolant.

DH15/DH30 SCHEMATIC SETUP:  
FAN HEAD > 0.5m ABOVE TANK - EXTERNAL BYPASS



1. MIXING VALVE
2. HYDRONIC FURNACE
3. COOLANT PUMP
4. COLD WATER SUPPLY
5. HOT WATER OUTLET
6. EXHAUST
7. OPTIONAL FAN HEATING HEAD
8. OPTIONAL SHUTOFF VALVE
9. EXTERNAL BYPASS VALVE
10. BYPASS HOLE BLOCKING RING

DH15/DH30 SCHEMATIC SETUP:  
MULTIPLE FAN HEADS



1. MIXING VALVE
2. HYDRONIC FURNACE
3. COOLANT PUMP
4. COLD WATER SUPPLY
5. HOT WATER OUTLET
6. EXHAUST
7. OPTIONAL FAN HEATING HEAD
8. OPTIONAL SHUTOFF VALVE
9. EXTERNAL BYPASS VALVE
10. BYPASS HOLE BLOCKING RING



In this scenario, bypass valves must be installed on each fan head so that if the coolant is shut off in any one fan head, coolant circulation is not stopped in the whole system.

It is important to install the bypass valve behind the fan head at approximately the same level as the fan head so coolant flow through the fan head is adequate.

Bypass assemblies with valves are also available for when the bypass valve cannot be installed at the same level as the fan heating head. In this case, closing down the valve will ensure that enough coolant flows through the fan head for it to work effectively.



**Note: In most cases, your tank will be shipped to you properly configured. If you are unsure of how to configure your tank or have doubts, please consult with Dieselheat.**

## Plumbing the Coolant Hoses

The hot water service to fan heating head plumbing should be done with 16mm ID rubber hoses and secured with hose clamps. Fan head installation kits from Dieselheat contain 2m of the necessary hose and all other hose tails and clamps.

If remote-mounting the furnace, the furnace to hot water service tank plumbing should be done with rubber or silicone hoses of 18-20mm ID and secured with quality hose clamps. The hose and clamps provided in the diesel furnace kits are designed for this purpose and should be utilised whenever possible.

## Coolant Circulation Pump

The coolant circulation pump supplied as part of the furnace kit will support systems with up to approximately 20m of coolant pipe.

Larger systems, particularly on boats, will require a booster pump. This can be powered and switched via a relay that can be attached to the Eberspacher D5E wiring loom, or manually in the case of a Belief furnace.

## Coolant

The system must be filled with good quality engine coolant to prevent corrosion of the furnace's internal components.

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.

It is acceptable to initially leak test the system using water during the installation and testing phase, as long as the water is immediately removed and replaced with coolant after testing.

**Note: Never leave a system that was filled with water for testing sitting empty, as residual moisture and air will immediately trigger internal corrosion.**

## Fan Heater Installation

The hoses connecting the cabin fan heater are connected directly to the DH15/DH30 tank ports. The cabin fan heaters should be plumbed with 16mm hose for short runs (less than 2m) or 16mm insulated PEX for longer runs.

To mount the cabin heater:

- Remove the front face of the heater and measure the outlet surface area. Cut the appropriate hole in the board.
- Sandwich the kickboard between the face and the main heater housing.
- If the kickboard is thicker than 10mm, longer screws may be required.
- The cabin heater can be mounted vertically or horizontally.

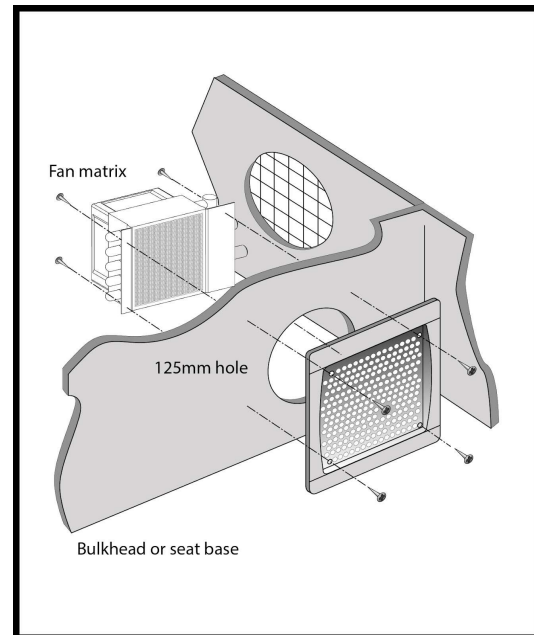
The hose barb on the bottom of the cabin fan heater is always the coolant inlet from the furnace.

If the components are located in separate compartments, drill two suitable sized holes through the flooring or walls to let the heater hose through. Take appropriate precautions to stop external hose damage when hoses pass through walls or bulkheads.

If the hoses need to be routed around corners or bends and there is a possibility of kinking, fit elbows into the hose.

Non-ducted units feature very low power consumption fans that give their maximum performance when air can flow with minimal

restriction. Fan heads should be mounted as close to the area that requires heating as possible. The areas where the fan heads are located must be well ventilated with good return air flow or the fan head performance will be significantly reduced.



## Controlling The Air Temperature

Temperature control can be achieved via 3 methods.

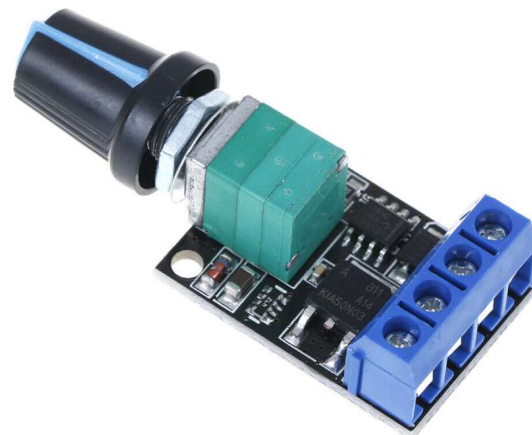
The first method is via an inline valve with the coolant return line from the fan head. Partially closing the valve will restrict the coolant circulation and reduce the heat given off by the fan head. The VA200 fan head has the valve built in, while other fan heads can have a ball valve installed behind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

It is recommended to always install a valve inline with the fan head so that during hotter months the coolant circulation can be closed off completely. This stops the cabin fan heater from acting like a static radiator in a warm climate.

The second method is via an electrical thermostat that will turn off the fan in the fan head when the preset room 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 a PWM DC motor controller, which can be installed inline with the fan head to infinitely vary fan RPM and therefore heat output.

**Note: All fan head wiring and control is independent of the diesel furnace wiring and control.**



## Tempering Valve - Controlling Water Temperature

When the system has been turned on and has warmed up, the water coming straight from the DH15/DH30 hot water service will be approximately 70-75 degrees.

The tempering valve not only controls the outlet temperature but will increase the usable hot water capacity. The volume of coolant at 70-75 degrees is directly related to how much hot water is available at 45-50 degrees.



The supplied tempering valves come pre-set 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.**

## Watermark Approval

As per the note below, the DH15/DH30 uses a watermark approved plate heat exchanger and watermark approved fittings.



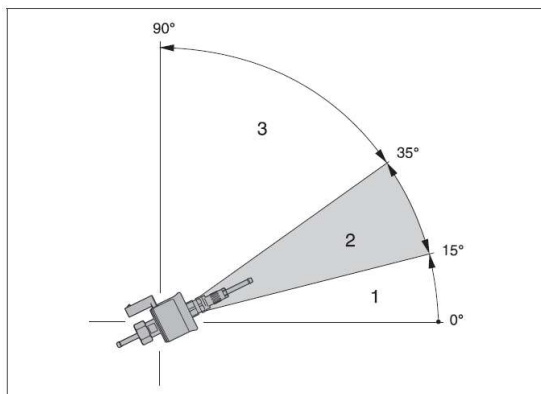
## Fuel System

**Note: The Eberspacher fuel pump needs to be orientated differently from the Belief fuel pump. Please follow the instructions below to ensure your pump is installed the correct way.**

### Eberspacher Fuel System

Follow the Eberspacher H5E HS3 technical manual for fuel system installation.

Ensure the pump is installed with the correct orientation. The outlet is on the opposite side to the power cable.



Picture 23

- 1 Installation position between 0° – 15° is not allowed
- 2 Preferred installation position within the range 15° – 35°
- 3 Installation position within the range 35° to 90° is allowed

It is advisable to install the pump as close as possible to the fuel source so it pushes the fuel instead of sucking it.

The Eberspacher fuel pump is very quiet so noise does not need to be a major consideration when selecting a location.

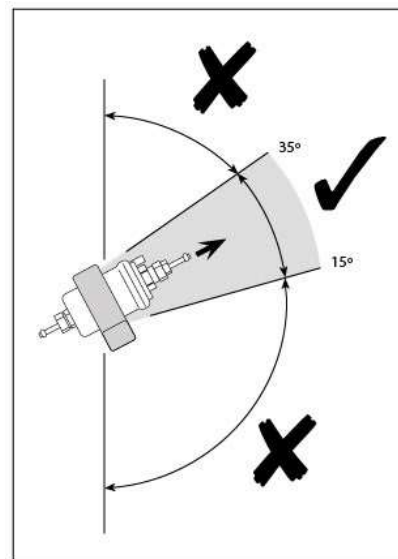
**Note: The pump contains a small filter behind the nut on the inlet side. A small inline pre-filter is provided to prevent the**

**fuel pump filter clogging if the fuel is dirty.**

### Belief Fuel System

Follow the Belief furnace technical manual for fuel system installation.

Ensure the pump is installed with the correct orientation. The outlet is on the same side as the power cable.



Belief fuel pumps make a ticking sound, so it is recommended to install the pump in a location that provides some sound insulation.

The Belief pump is shipped without the fuel line accumulator that is shown in some diagrams.

## Fuel Source

The DH15/DH30 can be connected to an auxiliary fuel tank, to a day tank or to a connection point on the main fuel system or generator fuel system.

When connecting to main fuel systems in boats or motorhomes, it is important to ensure that the fuel take off point is not pressurised (downstream of any feed pumps) and that there are no opportunities for air to enter the fuel lines.

### Instructions for Installing the Fuel System:

- Only use a sharp blade to cut the plastic/rubber fuel hoses and pipes.
- Ensure all cuts are free from burrs and the fuel lines are not crushed or restricted.
- Fuel lines must be secured every 50cm to avoid noise and/or damage from vibration.
- Fuel lines must be protected from any mechanical damage.
- Avoid running the fuel lines where their condition and longevity may be affected by movement, vibration or heat.
- Do not secure the fuel lines to any exhaust system.
- Do not position any fuel connection where it could leak onto electrical connections or hot surfaces.
- The fuel must not be conveyed by gravity or overpressure in the fuel tank.
- Withdrawal of fuel downstream of any engine fuel pump is not allowed.

## Electrical Connection

Follow the diesel furnace technical manual for electrical system installation.

For Eberspacher D5E, see also the Dieselheat D5E Supplemental Wiring Instructions included with this kit for a wiring quick reference.

The furnace is switched on and off via a simple switch. The wiring loom for the on/off switch can be extended if necessary.

The furnace requires 12V and uses approximately 8A to start. The operating current is approximately 2-4A once the starting sequence has completed.

The furnace should be connected directly to the house batteries using 6mm<sup>2</sup> cable.

If connecting via an isolation switch or switchboard (not recommended), it is important that the switchboard has ample power supply from the batteries to prevent voltage drop making the unit hard to start. Small caravan-style fuse boxes are not recommended for this reason. Only commercial quality marine switchboards with DC bus bars should be used.

**Note: Except in an emergency, never switch the diesel furnace off at the main power supply. The furnace must go through a cooldown sequence prior to stopping, which is triggered by switching the furnace off at its on/off switch.**



## RV Exhaust

The exhaust system on an RV consists of 2 lengths of exhaust and a muffler. The exhaust should be installed in a manner that ensures it cannot dislodge or come into contact with any electrical wiring, water pipes, etc., as it is hot enough to melt plastics.

The exhaust should have a length of pipe before the muffler and generally at least 30cm of pipe after the muffler, as this helps to manage noise. If possible, install all of the exhaust pipe provided to reduce noise.

The exhaust pipe should be horizontal or have a slight downward slope to prevent condensation being trapped in the pipe.

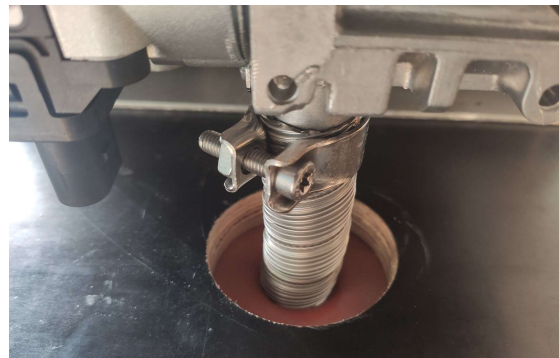
**If the exhaust pipe has a valley or low spot, drill a 3mm hole at the lowest point to allow condensation to drain.**



If the exhaust is passing through a timber floor, we strongly recommend using the optional silicon plate, to make sure the exhaust cannot touch the timber, and to ensure there is a water/dust tight seal around the exhaust.



View of exhaust floor plate from below



View of exhaust floor plate from above

## Marine Exhaust

**Always use high-quality marine stainless steel exhaust systems and clamps to ensure no exhaust gasses are vented inside the boat.**

The total maximum length of the marine exhaust is 2m. Always install the exhaust with a gooseneck on the inside of a hull fitting to prevent water washing back into the exhaust system.

**Note: The exhaust system reaches temperatures of up to 300°C. Always lag the exhaust and ensure that the exhaust is not in contact with any materials that could be damaged or set alight by this heat.**

### Installing the hull/deck fitting

The position of the exhaust hull fitting will depend on several factors, including where you have located the DH15/DH30, whether your vessel is a sailboat or a motorboat, and the suitable surfaces available.

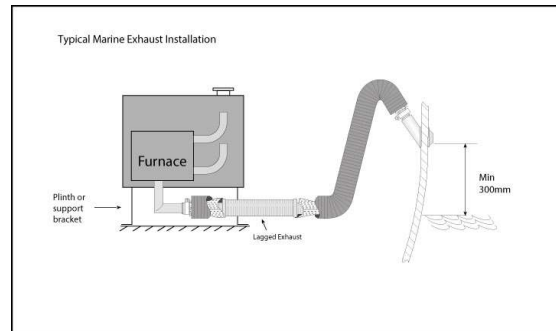
On a sailboat, the preferred location is on the transom or cabin wall, as this is normally the area least likely to be affected by seawater when sailing. On a motorboat, the transom or side of the hull are suitable locations.

The hull fitting should be positioned as high as possible and a minimum of 300mm above the waterline to avoid water ingress.

If using a closable deck fitting, ensure it is located in a position where it cannot snare

running rigging and where it is not a hazard for people walking on the deck.

To avoid potential safety issues, the exhaust system must be installed according to the following instructions:



- Under no circumstances connect the heater exhaust to an engine exhaust or any other exhaust system.
- The exhaust outlet must vent directly to the atmosphere.
- Adequate clearance must be maintained around the exhaust system to prevent interference with important functional parts of the boat, such as steering or throttle cables.
- Route the flexible exhaust giving clearance and consideration to heat sensitive components such as fuel lines and electrical cables.
- Ensure the support brackets are used to secure the exhaust in order to avoid damage from vibration.
- Position the hull fitting so that other inlets (hatches, windows) cannot draw in exhaust fumes.
- Ensure the hull/deck fitting is positioned to allow fumes to exit freely so as not to affect nearby surfaces, such as fenders, ropes or mouldings.
- The exhaust must not be routed through the living area.

## Combustion Air

The DH15/DH30 ships with the furnace combustion air inlet pipe and combustion silencer pre-installed.

For marine applications or instances in RVs where the furnace is installed inside a locker or cupboard, it is acceptable to install the combustion air inlet inside the engine room or locker.

For vehicles that will be operating in dusty conditions, it is not recommended to install the combustion air inlet outside the vehicle. If it is necessary to do this, use the following strategy:

- Keep the air inlet up high and behind some part of the vehicle like a crossmember or water tank.
- Make sure the exhaust points backwards and down.
- Consider covering the exhaust with an exhaust end cap when not in use in dusty conditions. This can prevent air circulating through the unit whilst travelling.
- After driving in dusty conditions, tap out or clean the inlet pipe prior to starting the unit.



**Note: If the DH15/DH30 is installed in a sealed box or compartment, always ensure the box is opened before use. Operating the furnace in a sealed box will result in inadequate combustion air and will result in immediate sooting up of the furnace.**

## Commissioning

It is a time consuming and messy operation to rectify any bad joints or leaks after the system is filled with coolant. The coolant system operates at approximately 5-10psi, so check that all hose connections are secure and all hoses are kink free before filling the system with coolant.

When the system is 100% installed, insert the fuses in the power line and power up the furnace.

### Coolant Pump Priming

Remove the radiator cap on the DH15/DH30 hot water service. Fill the system with pre-mixed coolant to approximately 20mm from the top of the tank. The DH15 holds around 15L and the DH30 holds approximately 30L plus any additional coolant to fill fan heating heads and pipes.

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 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.

### Extended Air Bleeding/Priming

If the coolant is not circulating in the system as noted above, follow this procedure:

Recheck that all the plumbing is correctly installed and turn on all fan head valves.

Turn the unit on.

The coolant pump will start. It will often surge as it tries to prime. Wait until the fuel pump starts to tick, then turn the unit off before the furnace tries to start.

Wait for the unit to turn off completely.

Repeat.

You may need to repeat the above steps 4 or 5 times to push all of the air out of the system. Look at the top of the tank and you will see small air bubbles coming through the liquid.

The pump will change tone and you will see the coolant swirling on the surface once priming has been achieved.

## Initial Startup

Once the coolant pump is primed, leave 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 quite a few start attempts, particularly if the fuel line is long.

**Note: The Ebersapcher furnace will lock out after approximately 10 failed start processes. Always double check the fuel line, pump orientation and fuel source before commencing startup. An Easy Start Pro controller is required to unlock a locked out furnace. Belief furnaces will not lock out.**

## Post Initial Startup

As the furnace begins to heat the coolant, all the hoses will start to get warm. Move

your hands over all the hoses to check they are all of a similar temperature.

After a few minutes, the DH15/DH30 water heater should be warm to the touch. The hoses to and from the cabin fan heater should be a similar temperature to the main hoses.

If these hoses are still at ambient temperature, it is likely that there is an air lock in the loop or the pump is not primed properly. Check the shut off valves or the system design to determine why the coolant is not circulating properly.

If everything is getting warm, top the coolant level up in the DH15/DH30 hot water service until it is approximately 20mm from the top of the tank and replace the filler cap. Allow the system to fully heat for 15 minutes. Recheck the whole system for leaks.

Depending on the ambient temperature, the furnace will cycle down after about 8 minutes as the coolant reaches 70°C. All hoses should be at a similar temperature and, if installed, the fan head should blow hot air.

If water has been used for commissioning/testing, drain the system down and replace the water with coolant.

Congratulations! You have now successfully commissioned your DH15/DH30 system.

### 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. This will take approximately 8 minutes, depending on the ambient temperature.
- 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 DH15/DH30 hot water service or cabin fan heater demands heat.

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

## Commissioning Troubleshooting

Problem	Things to Check
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 pump.</li> <li>● Check coolant pump wires are properly connected.</li> <li>● Check power supply and fuses.</li> <li>● Check furnace is wired directly to batteries.</li> <li>● Check power wiring polarity - red (inside black sleeve is positive, brown is negative).</li> </ul>
Furnace tries to start but doesn't start.	<ul style="list-style-type: none"> <li>● Check fuel pump is orientated correctly.</li> <li>● Check fuel flow in fuel line by shining a torch on the fuel line and looking for bubbles or advancing fuel front.</li> <li>● If installed, check the fuel filter has filled with fuel.</li> <li>● The fuel pump will tick more loudly until filled with fuel. Check fuel pump noise when pump is pumping.</li> <li>● Check all fuel line connectors are tight and air cannot enter the fuel line.</li> <li>● Check battery voltage is above 12.5v.</li> <li>● Check furnace is wired directly to batteries as per install instructions.</li> </ul>
Eberspacher Only: Furnace has tried to start multiple times and is now 'dead'.	<ul style="list-style-type: none"> <li>● The furnace has locked out due to excessive start attempts and will need to be unlocked using an Easy Start 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 circulation.</li> </ul>
System works but the air heating fan head is not hot.	<ul style="list-style-type: none"> <li>● Check all shut off valves.</li> <li>● Review plumbing and use of bypass valves as per the suggested system schematics.</li> <li>● On larger systems (boats), review the use of booster pumps.</li> </ul>
System runs but there is no hot water.	<ul style="list-style-type: none"> <li>● Check the system plumbing and ensure that hot coolant is passing through the plate heat exchanger (remote mounted furnaces only).</li> <li>● Check the thermostatic tempering valve is installed with the 'H' at the top and the 'C' at the bottom.</li> </ul>

<p>System heats up but fan heads do not get hot.</p>	<ul style="list-style-type: none"><li>● Check fan head shut off valves are open.</li><li>● If using a valved bypass valve, ensure the bypass valve is partially closed.</li><li>● If using a valveless bypass valve, check the bypass valve is on the same level as the fan head.</li><li>● Check tank plumbing and bypass arrangements are in accordance with diagrams in these instructions.</li></ul>
<p>Fan heads get hot but do not blow hot air.</p>	<ul style="list-style-type: none"><li>● Check fans are wired with correct polarity.</li><li>● Check fan head has adequate return air as per instructions.</li></ul>