STOP

DON'T PANIC

READ THE INSTRUCTIONS

DIESELHEAT

DH15, DH22 and DH40 E-Solar

HOT WATER INSTALLATION MANUAL

Version 5

sales@dieselheat.com.au
39 Golden Valley Rd Cygnet 7112

dieselheat

Contents

Installation Guidelines

This installation manual is designed to help you achieve a successful setup of your diesel hot water system. Please read it carefully—many product issues stem from incorrect installation.

Improper installation can lead to reduced performance, system damage, or complete failure. Following the recommended guidelines is essential for optimal operation and longevity.

At Dieselheat, we take pride in supporting our clients through successful installations. If you have any questions after reading this manual, don't hesitate to give us a call—we're here to help.

Eberspacher D5E Technical Manual

This manual contains relevant extracts from the Eberspacher D5E Technical Manual, however it is not the complete manual. For the full manual please refer to the QR code opposite.

Important

The 240v heating element must be installed by a qualified electrician.

The Surecal tank must be earthed.

Always ensure that the thermostats on the 12V and 240V heating elements are wired up to switch off the elements when the tank is fully heated. Refer to wiring diagrams in these instructions.

Never allow the 12V or 240v elements to turn on when there is no water in the tank.

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

Principles of Operation

The E-Solar hydronic hot water heaters operate by storing potable water in the copper Surecal hot water tank and by heating it via a 12V or 240V element. The system can also be boosted via the Eberspacher diesel furnace which heats a coolant loop which circulates inside the tank via finned copper heat transfer pipes. An optional cabin fan heater (air heater) can also be used on the coolant loop.

Diesel Coolant Furnace

The diesel coolant furnace 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 to the Surecal tank via the pump that is supplied with the furnace.

Operating Considerations

- Generally, furnace units are designed to be switched on when needed and turned off when not in use. Extended periods with the furnace 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.
- If you need to get system error codes, need to remove a furnace lock, or need diagnostics, you will require an Easystart Pro controller or Dieselheat thermostat V3.

General Layout and Installation

The E-Solar system is supplied in two main components: the 5kW Power Pack and the Hot Water Calorifier. This modular design provides maximum flexibility for installation across a range of setups.

Both components come pre-plumbed with hose tails, making the connection process straightforward.

Typically, the Power Pack and SureCal tank will be installed close to one another. The kit includes approximately 4 metres of 20mm pipe to interconnect the two units. However, the system also supports installations with greater separation, allowing up to 20 metres of total pipework between components.

The E-Solar system can be configured for either RV or marine applications, with or without integrated air heating. Refer to the diagrams on the following two pages to select the appropriate setup for your needs and to guide correct system installation.

Power Pack Important Installation Considerations

- **Dust Ingestion:** Diesel appliances are sensitive to dust. Carefully consider the location of the air inlet and the system itself to minimise the risk of dust being drawn into the combustion air intake.
- **Exhaust Systems:** Never connect or combine exhausts from different devices. Each unit must have its own separate exhaust system.
- **Fuel Supply:** Keep fuel lines and plumbing as simple as possible to reduce the risk of air leaks. Always use the supplied fuel line—do not substitute with alternative products.
- **Power Isolation:** Avoid installing main power isolation switches on the diesel furnace. Cutting power while the unit is running bypasses the proper shutdown and cooldown sequence, which can lead to damage.
- **Combustion Air Supply:** Ensure there is an adequate supply of combustion air. If the unit is installed in a sealed enclosure, either the door must remain open during operation or an air inlet pathway must be provided. Insufficient air supply can lead to soot build-up and rapid servicing requirements.
- **Service Access:** All diesel furnaces require periodic maintenance. Install the system in a location where the furnace can be easily accessed and removed for servicing.
- **Marine Installations:** When installing in a marine setting, ensure the Power Pack is positioned so the exhaust length does not exceed 2 metres. Refer to the chapter on marine exhausts for more details.
- **Coolant Filler Cap:** The coolant filler cap should be positioned for easy access, allowing for straightforward system refilling.

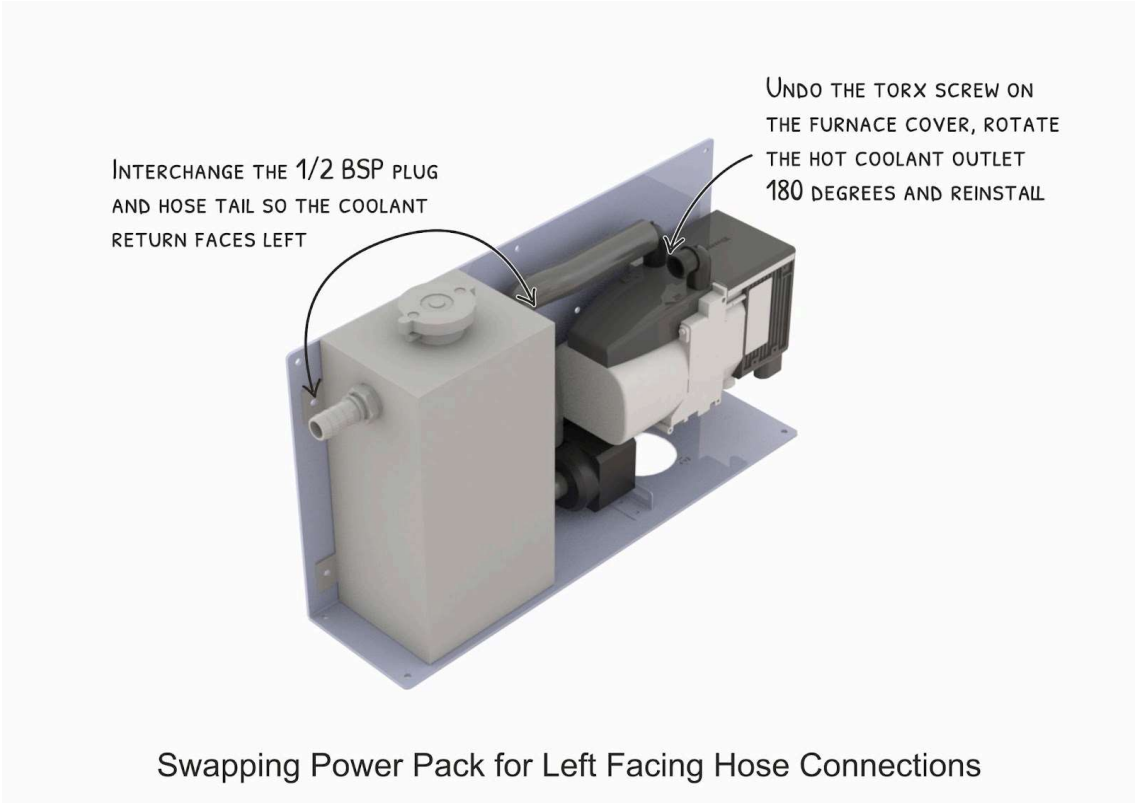
The Power Pack should be the highest point (relative to any air heating heads) if not a separate header tank or coolant booster pump may be required.

Surecal Hot Water Calorifier Installation Considerations

- In most situations, the hot water calorifier is mounted in the same compartment where a typical hot water service would be fitted.
- For RV installation the hot water calorifier is normally under a seat or bed, or in a cupboard.
- For marine installations, the system can be located in the engine room, under a seat in the cabin, or in the engine compartment.

Swapping the Power Pack to Left Facing Connections

The 5kW Power Pack is built with the hose connections facing right. If your installation layout requires them to face left please follow the instructions below.



Swapping Power Pack for Left Facing Hose Connections

Plumbing the Coolant Hoses

The 5kW Power Pack to hot water calorifier plumbing is done with 20mm rubber heater hose. The system is supplied with pre-bent hoses which can be cut to length to allow flexible setup depending on the locations of each component of the system

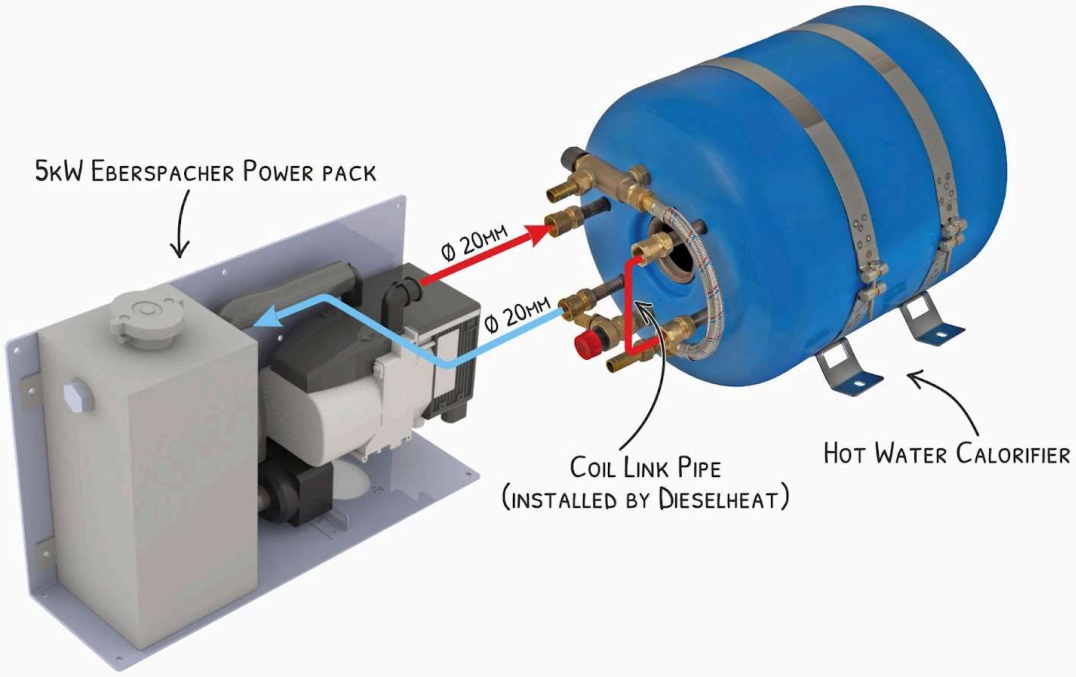
The hot water service to fan heating head plumbing should be done with 16mm ID rubber hoses and secured with hose clamps. Fan head installation kits from Dieselheat contain 2m of the necessary hose and all other hose tails and clamps.

Coolant Circulation Pump

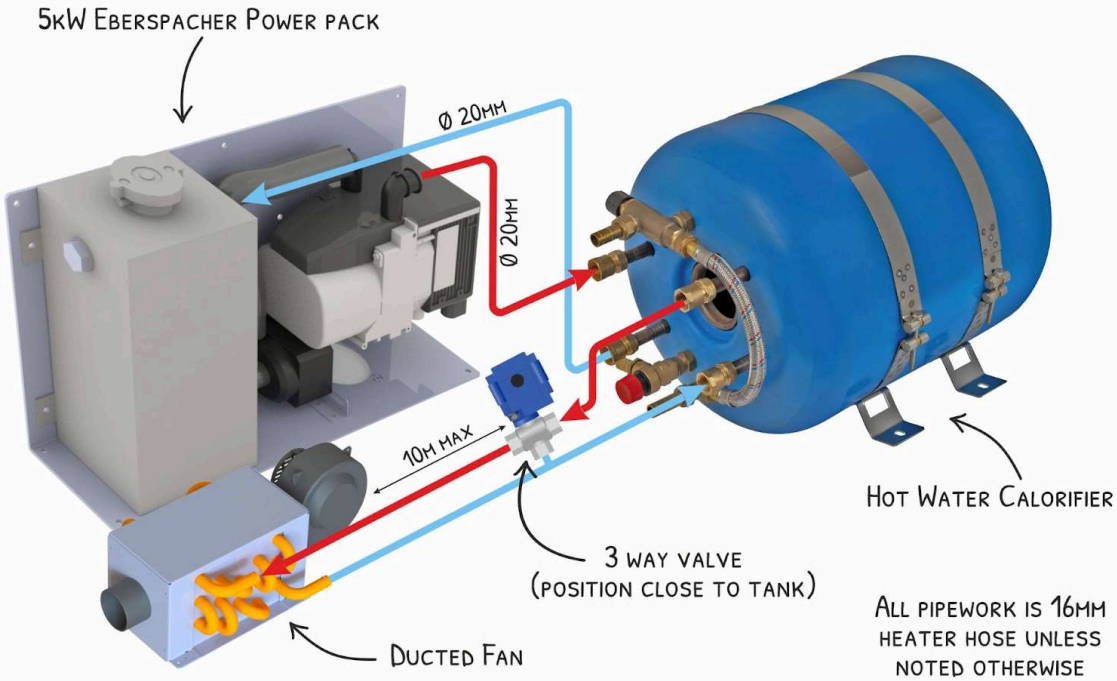
The coolant circulation pump supplied as part of the furnace kit will support systems with up to approximately 20m of coolant pipe.

Larger systems with multiple air heating heads or longer pipe runs, particularly on boats, will require a booster pump.

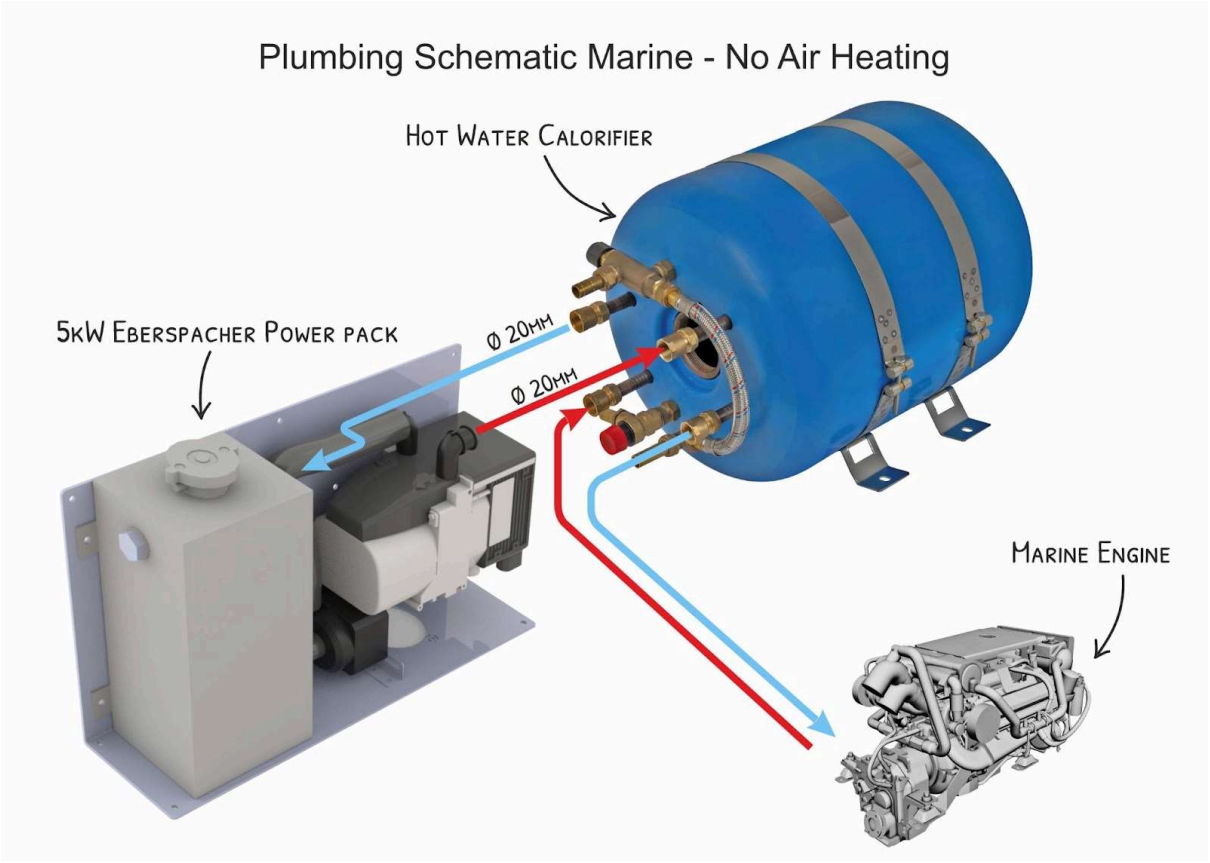
Plumbing Schematic RV and Off Grid - No Air Heating



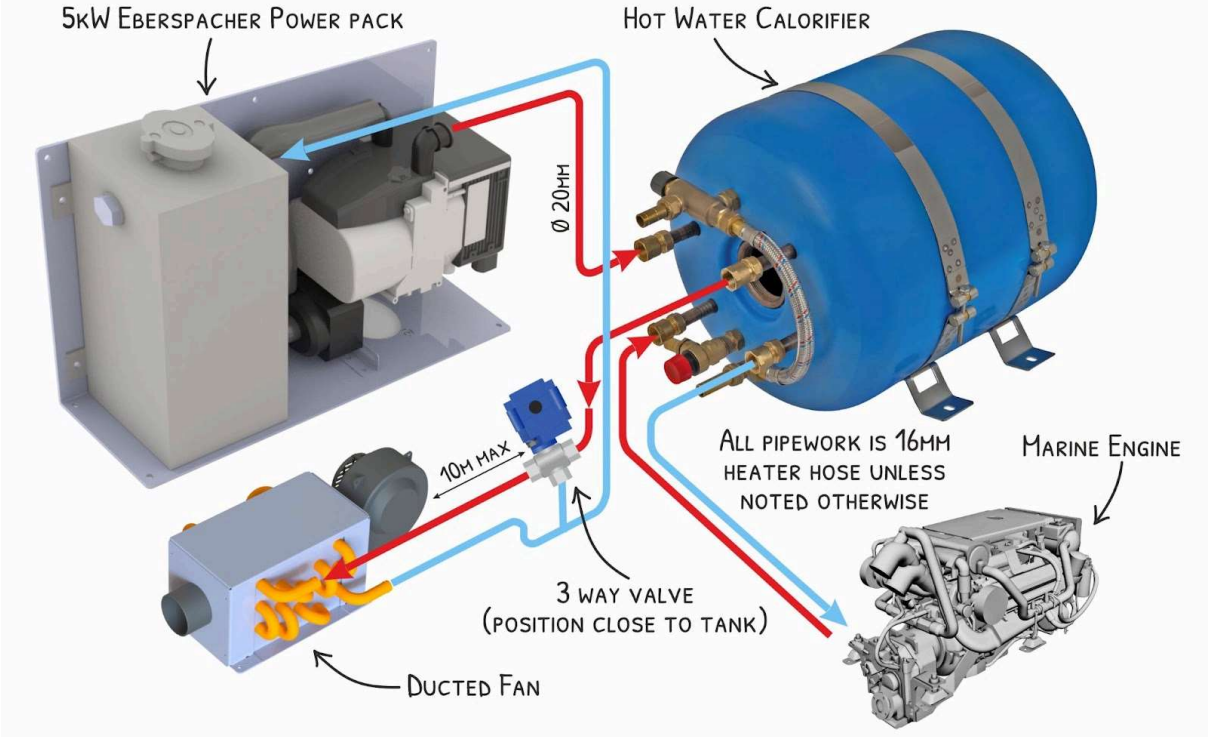
Plumbing Schematic RV and Off Grid - With Air Heating



Plumbing Schematic Marine - No Air Heating



Plumbing Schematic Marine - With Air Heating



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.

Options For e-solar Controls

Systems With Air Heating

Controller	Capability
 Dieselheat Thermostat V3	**This is the recommended setup.** Can Do • Room temp control via auto fan speed control • 3 Speed manual fan control (Kalori or Dieselheat fans) • Eberspacher furnace on/off via start signal • Eberspacher hydronic furnace diagnostics

Systems Without Air Heating

 Eberspacher EasyStart Pro	Can Do • Eberspacher hydronic furnace diagnostics • Furnace on/off via digital communication Cannot Do • Room temperature control
 On/Off switch	The Eberspacher furnace can also be switched on/off with a toggle switch. Can Do • Eberspacher furnace on/off via start signal Cannot Do • Eberspacher hydronic furnace diagnostics • Furnace on/off via digital communication

Controlling The Air Temperature

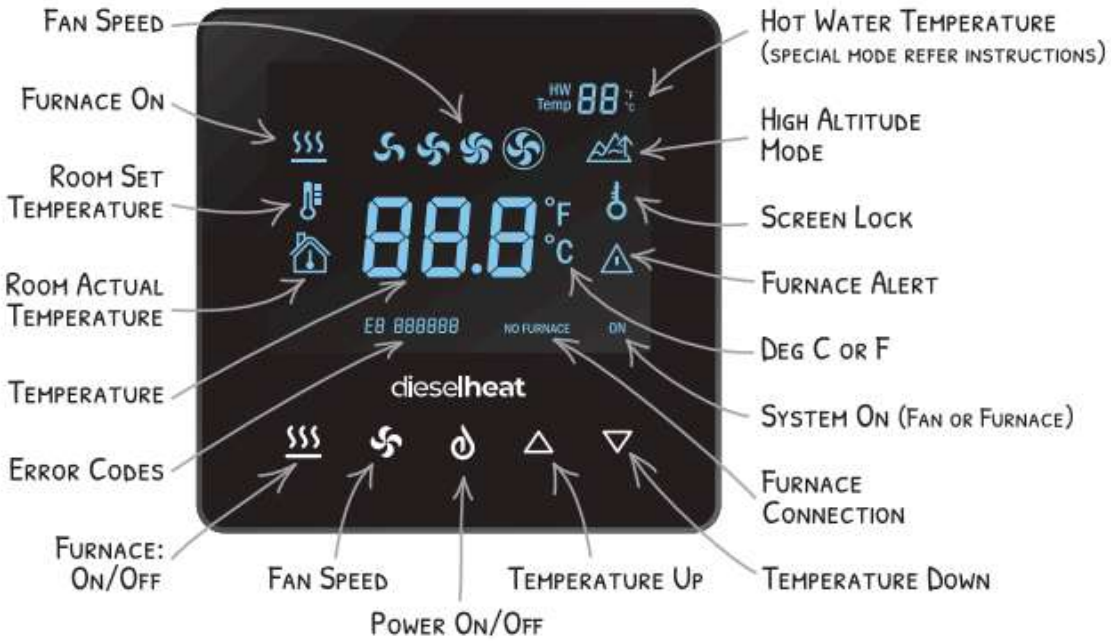
It is recommended to always install either an automatic or manual valve inline with the fan head so that the coolant circulation can be closed off completely when the heater is not needed. This stops the cabin fan heater from acting like a static radiator in a warm climate.

Temperature control can be achieved via 2 methods.

Method 1: Manual Fan Control
All Kalori fans heads have 2 speed fans. These fans can be run on high or low speed, or switched off to manually control the temperature.

Method 2: Thermostat Control
The Dieselheat hydronic thermostat (V3) is designed specifically for hydronic system control. The thermostat provides:

- 3 manual and also automatic fan speed control for Dieselheat ducted fans and also Kalori fans
- an ignition signal for diesel furnace (if not using Eberspacher D5E)
- a signal to open a coolant valve when a fan head fan is on.
- digital CAN control of the Eberapcher D5E furnace including on/off, fault code reading, fault code erasing and activation of high altitude mode.



Air Heating

Dieselheat works with our own and Kalori hydronic air heating heads.

Dieselheat Ducted Fan

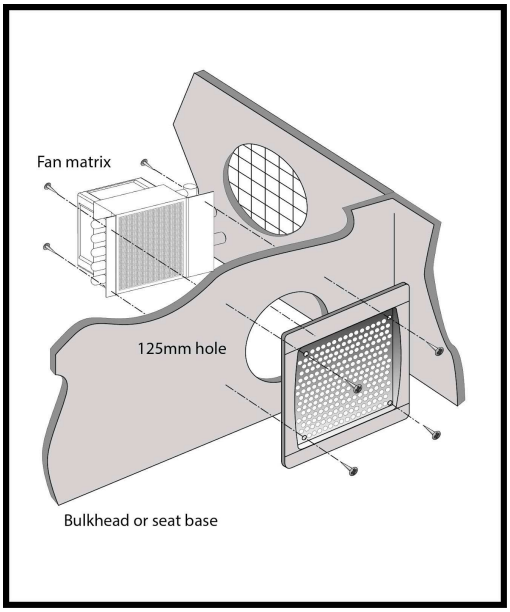
Kalori Fan Heads

Fan Head Installation

- Fan heads should be mounted as close to the area that requires heating as possible.
- Fan heads can be mounted in any orientation.
- Coolant flow direction is only important in Dieselheat fan heads
- Take appropriate precautions to stop external pipe damage when hoses pass through walls or bulkheads.

Piping to Fan Heads

Unless they are very close to the furnace, piping to fan heads is done with insulated PEX piping.
Fan heads use 16mm hose tails, so it is necessary to adapt the 16mm PEX to 16mm rubber heater hose.
Always run the PEX into the compartment with the fan head and then use a short section of the more flexible rubber pipe to make the final connection to the fan head.



Always make sure there is adequate return air ventilation to ensure the fan head works effectively.

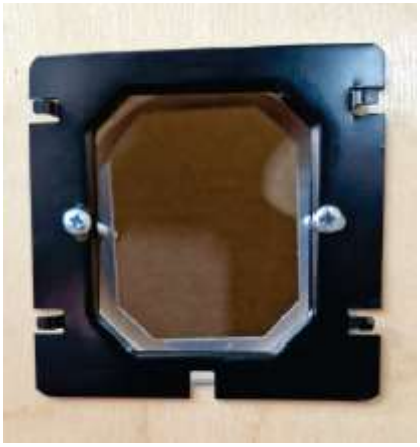
Fan head should have the equivalent of a 90mm open round inlet hole per fan to allow for adequate return air.

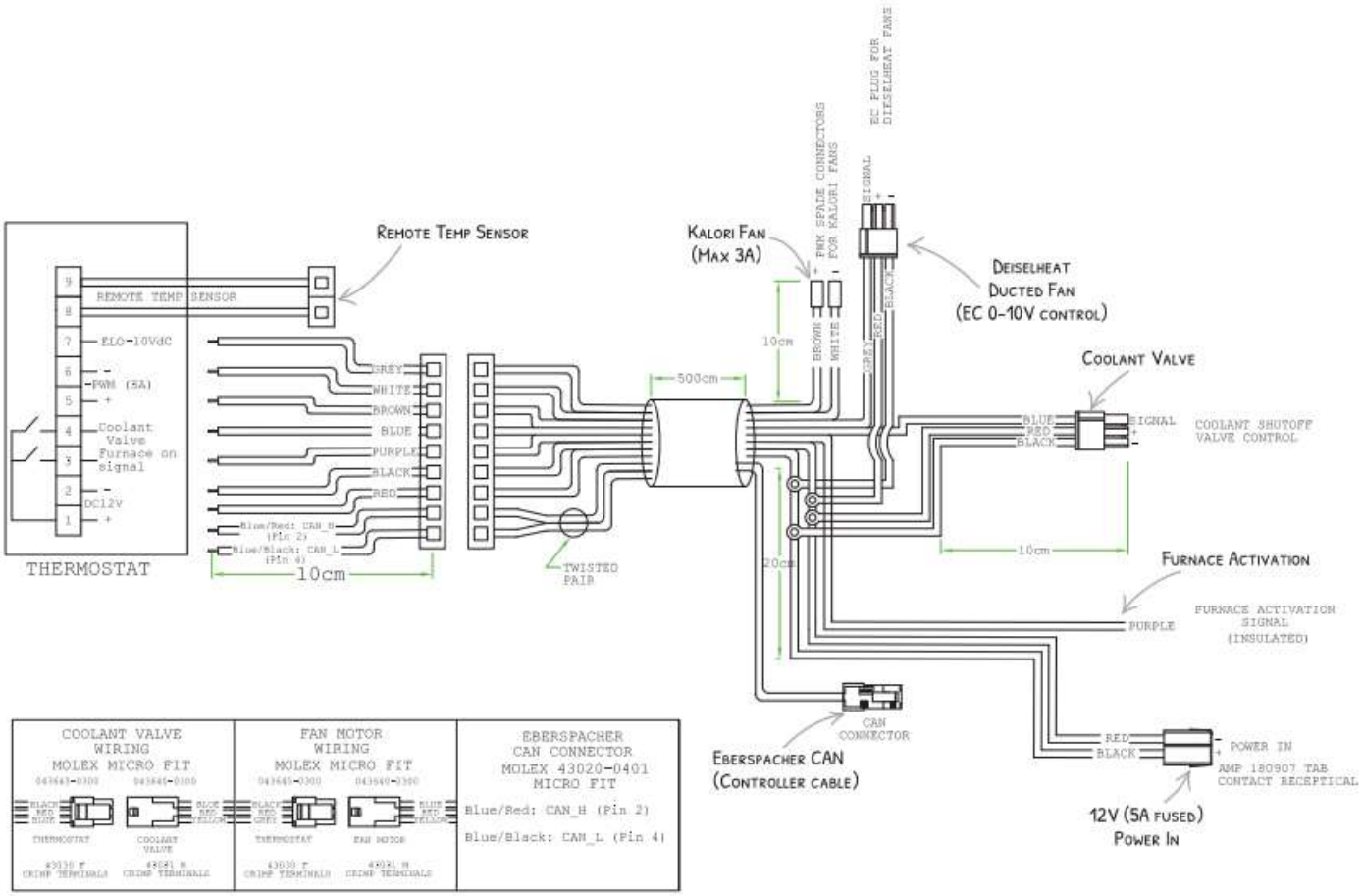
Be aware of punched metal louvres - they often constrict airflow and are not suitable as return air inlets.

90mm return air vent supplied with the Dieselheat ducted fan. This or an equivalent needs to be installed on the cabinet which contains the ducted fan heater.

Dieselheat Hydronic Thermostat V3 Installation

1. Mount the thermostat in a location (around chest height) where the air temperature can be measured as accurately as possible without being affected by direct solar radiation or other source of heating or cooling.
2. To install the thermostat, drill a **75mm** hole in the desired location.
3. Screw the thermostat mounting plate to the backing plate with the 2 supplied screws.
4. Mount the thermostat. Fold up the cable strain bracket and cable tie the loom to it.





Thermostat Setup

The Dieselheat hydronic thermostat allows certain parameters to be adjusted to customise it's performance. In most cases the default parameters will be acceptable. To adjust any of the parameters follow these instructions.

How to Change Parameters:

1. Ensure the thermostat is **turned off**.
2. Press and hold and for **3 seconds** to enter **Parameter Mode**.
3. Use to scroll through available parameters.
4. Adjust settings using and .
5. Changes are saved instantly.
6. Turn the thermostat off to exit **Parameter Mode**.

CODE	PARAMETERS	RANGE	DEFAULT
1	Temp calibration/offset	-9 °C ~+9 °C	0 °C
2	Temperature Display	0 Deg C, 1 Deg F	Deg C
3	CAN Communication	0 Disable, 1 Enable	Enable
4	Fan auto mode P-band range	2, 4, 6, 8, 10	10
5	Fan auto mode I-time range	1 - 60 mins	3 mins
6	Min EC Output for Auto Fan	0 - 10 Vdc	0 Vdc
7	Max EC Output of Auto Fan	0 - 10 Vdc	10 Vdc
8	Low Fan Speed for EC fans on manual mode	0 - 10 Vdc	2 Vdc
9	Medium Fan Speed for EC fans on manual	0 - 10 Vdc	5 Vdc
10	High Fan Speed for EC fans on manual mode	0 - 10 Vdc	10 Vdc
11	Min PWM Output for Auto Fan	0 - 100%	0% (00 stands for 0%)
12	Max PWM Output for Auto Fan	0 - 100%	100% (10 stands for 100%)
13	Low Fan Speed for PWM fans on manual mode	0 - 100%	20%
14	Medium Fan Speed for PWM fans on manual	0 - 100%	50%
15	High Fan Speed for PWM fans on manual	0 - 100%	100%
16	HW Temperature Display*	0 Off, 1 On	Off
17	Batton Backlight	0 Off, 1 On	On

* If Parameter 16 is set to Off the main temperature display is based on the internal sensor or the external sensor if connected. If set to On the main display is always based on the internal sensor and the temperature sensed by the external probe is displayed in the top right of the controller. This allows the actual hot water temperature to be displayed in solar hot water systems.

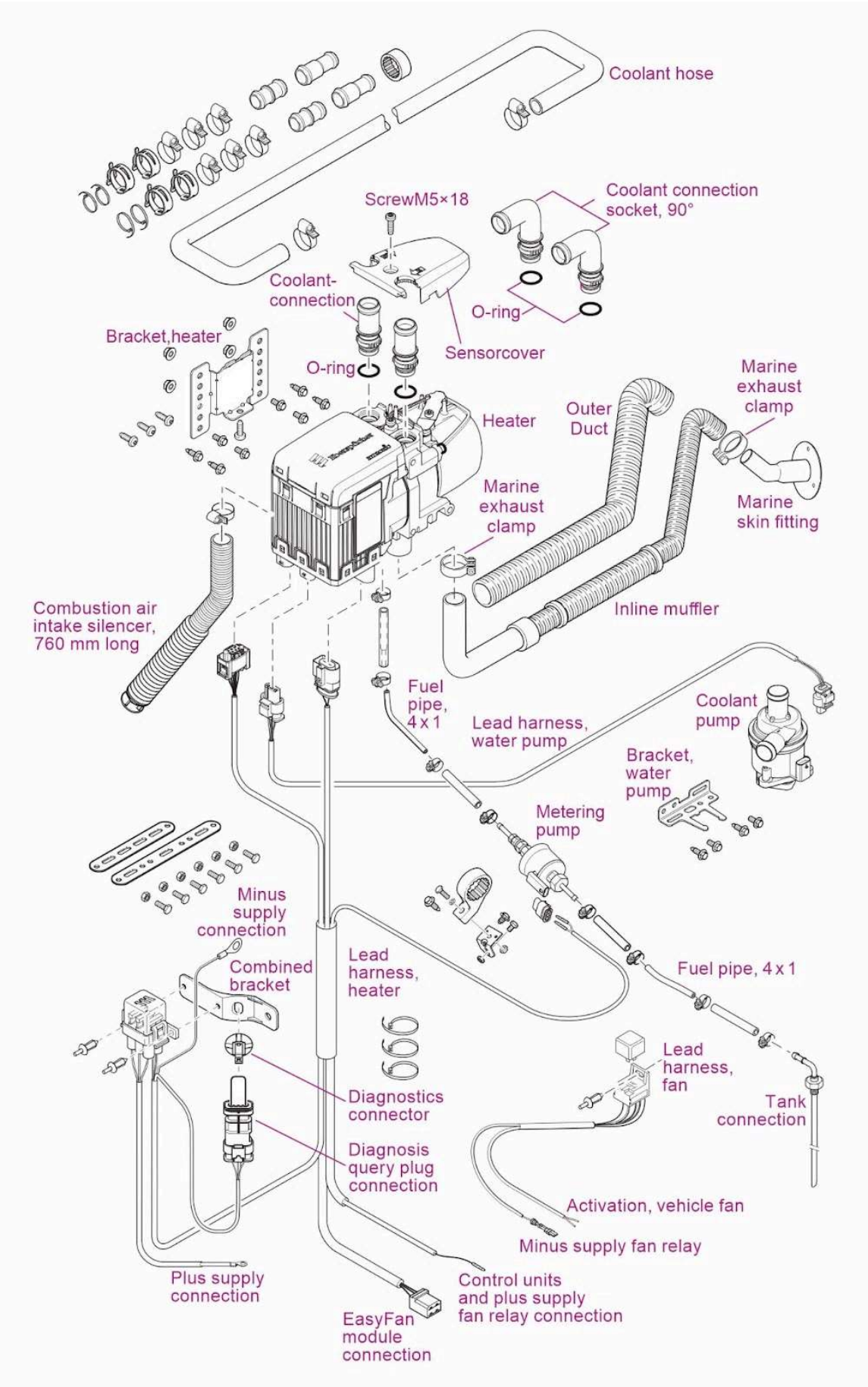
Note: Parameters 2 and 3 adjust the sensitivity of the fan in Auto mode. P sets the speed at which the fan adjusts as the set temp is approached and T sets the time interval at which the controller adjusts the fan.

Displaying Hot Water Temperature

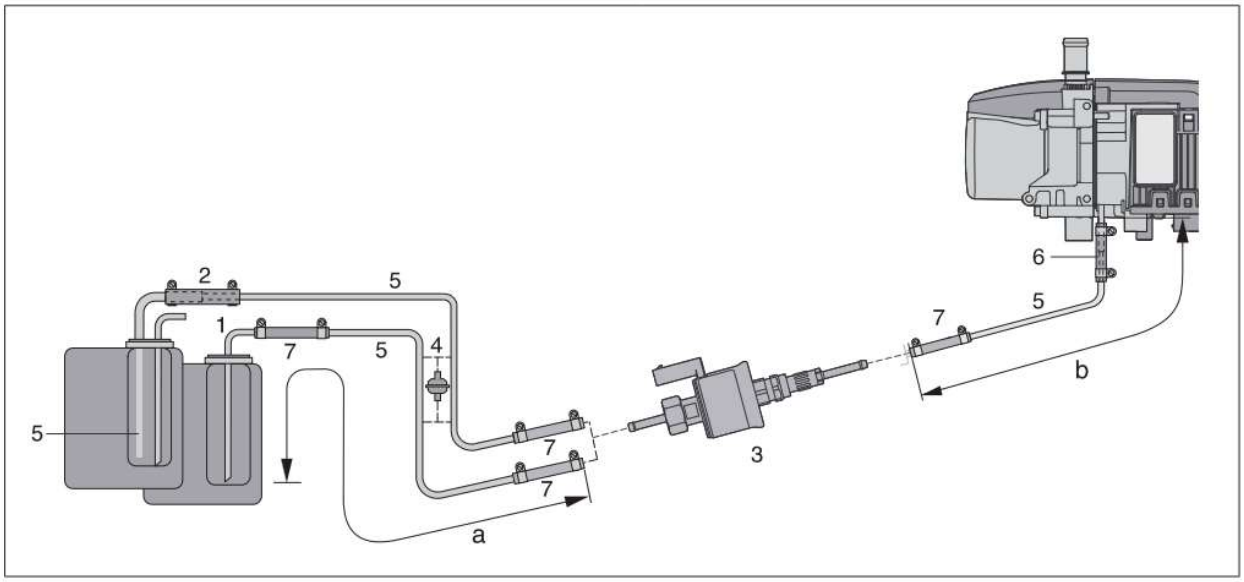
The dieselheat thermostat can be set to read and display the hot water temperature. This is useful to know if you have enough hot water or if you need to start the diesel furnace - particularly on electric solar systems.

Install the remote temperature sensor which is supplied with the thermostat into the hot water tank by squeezing it between the foam cover and the copper hot water outlet pipe. Follow the instructions supplied with the thermostat to set Parameter 16 to 1 (default is 0). In this mode the thermostat will use its internal sensor to sense air temperature for controlling air heating and will display the temperature measured by the external probe in the top right corner of the screen.

Eberspacher D5E Installation



Fuel System



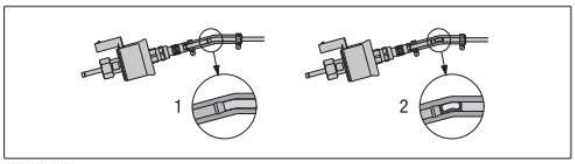
Picture 20

1 Tank connection (di = Ø 2 mm, da = Ø 4 mm) – installed in the vehicle's own tank fitting
2 Adapter (Ø 7.5 / 3.5 mm) – connected to the vehicle's own tank fitting, at a socket Ø 8 mm, used to pass through the intake line (fuel pipe 4 x 1) up to just before the bottom of the tank.
3 Metering pump
4 Fuel filter – only required for contaminated fuel
5 Fuel pipe, 4 x 1 (di Ø 2 mm)
6 Adapter (Ø 4.5 / 3.5 mm)
7 Fuel hose, 3.5 x 3 (di Ø 3.5 mm), approx. 50 mm long

Permissible line lengths: a = max 2m; b = max 6m

Fuel System Installation

- To install the fuel line into the rubber joiners use a small amount of vaseline or silicon grease prior to inserting into the joiner.
- When cutting the fuel line, use a sharp knife or snips, do not allow the end of the line to compress or burr.
- If possible have the fuel line running uphill from the pump to the furnace.
- Protect the fuel line with split corrugated conduit and secure it with cable ties or clamps to avoid mechanical damage or chafing.
- It is especially important to fix the fuel line in the vicinity of the fuel pump or impulses from the pump can cause the fuel lines to rattle.
- When making fuel line connections always push the fuel line all the way into the rubber joiner to ensure a butt joint to prevent bubbles forming.

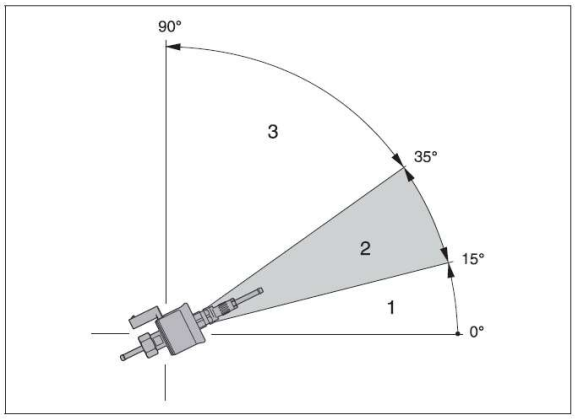


Picture 19

1 correctly laid lines
2 incorrectly laid lines – bubbles form

- Ensure all connections have screw or single use ear clamps installed.
- Ensure the fuel line cannot contact anything hot like the furnace exhaust or a boat exhaust.

Ensure the pump is installed with the correct orientation. The outlet is on the opposite side to the power cable and the pump must be angled upwards by 15-35 deg.



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.

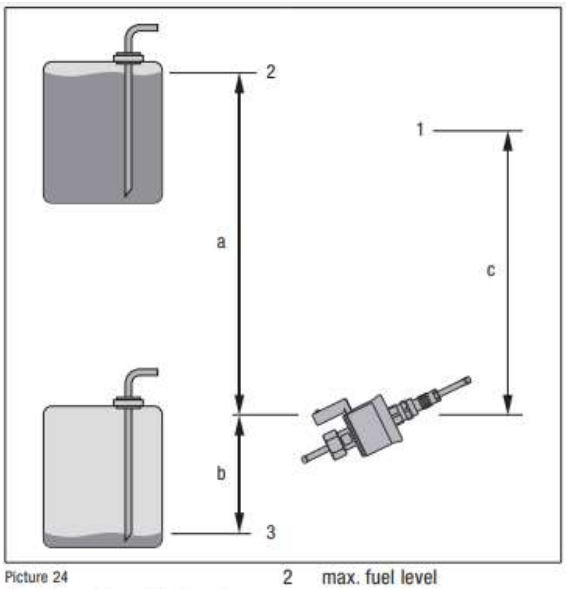
A small inline pre-filter is available as an option to prevent the fuel pump filter clogging if the fuel is dirty.

Fuel Source

The DH E-Solar 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.

Allowable Suction Head



Picture 24

1 Connection at the heater
2 max. fuel level
3 min. fuel level

Pressure head from vehicle tank to metering pump:
a = max. 3000 mm

Suction head in pressure-less vehicle tank:
b = max. 500 mm for petrol
b = max. 1000 mm for diesel

Suction head in a vehicle tank in which negative pressure occurs during extraction (valve with 0.03 bar in the tank cap):
b = max. 150 mm for petrol
b = max. 400 mm for diesel

Pressure head from the metering pump to the heater:
c = max. 2000 mm

Electrical Connection

All wires should be routed in split corrugated conduit and secured via cable ties or clamps to protect them from damage or chafing.

With the exception of the fuel pump cable, do not cut or shorten the loom. Spare cable should be bundled up neatly and tied out of the way.

Pay special attention to wires in the vicinity of the exhaust system and where they connect to the furnace to ensure they cannot be damaged by the hot exhaust.

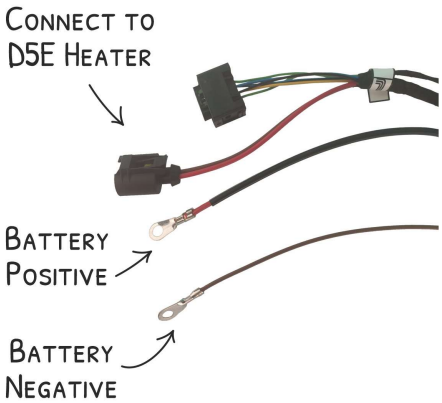
The furnace is switched on and off via a simple switch, the Dieselheat thermostat or the EasyStart Pro controller. The wiring loom for the on/off switch can be extended if necessary.

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. Use 6mm2 cable if extending the loom.

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 cool down sequence prior to stopping, which is triggered by switching the furnace off at its on/off switch or via a controller. For this reason, switches on the main power supply are not recommended.

Main Loom Connections

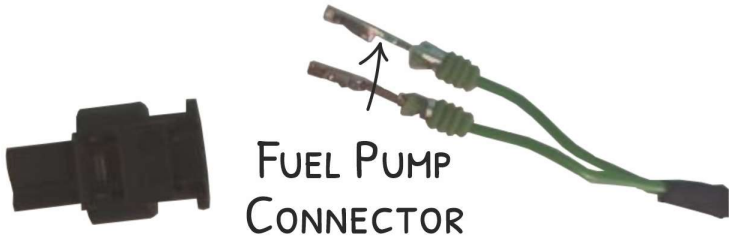


Connect the wires shown below from the loom directly to the battery and heater. Red with black sheath is positive, brown is negative.The fuse box should be in close proximity to the battery.

If you need to extend the power wires use 6mm2 cable for the full run.

Fuel Pump

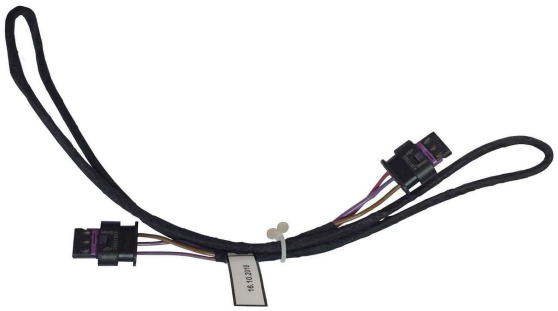
The fuel pump wires are not polarised. The cable bush has a small locking tab to lock the wires in place. Insert the fuel pump wires into the supplied cable plug. (Note that they can only be inserted one way. The side indicated by the arrow below faces the locking tab). Ensure the wires are all the way in (the green rubber should not protrude out the back of the plug). Ensure the plug clips in place on the fuel pump.



Coolant Pump

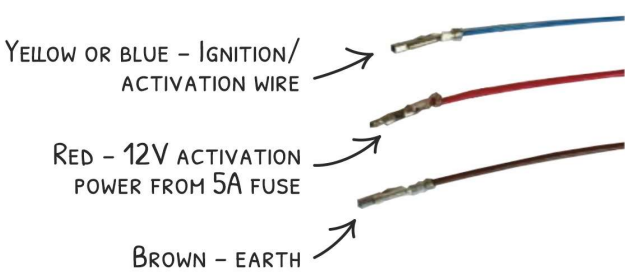
Connect each end of the coolant pump cable to the heater and coolant pump. Note that on pre-assembled systems the coolant pump wire will already be installed.

Do not attempt to run any other auxiliary coolant pumps off the furnace coolant pump power supply.



Manual Control Wires

Note: These wires are removed for kits with the Dieselheat Thermostat V3 or Easystart Pro .

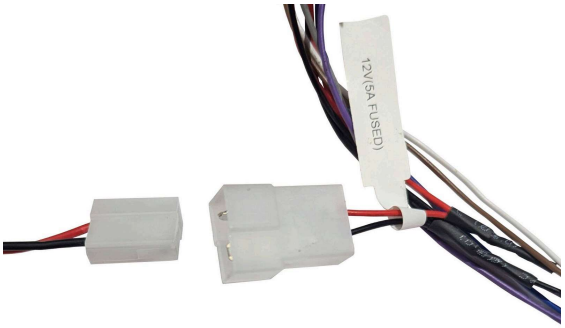


The furnace can work with an ignition/activation wire. Applying 12V to this wire will signal the furnace to turn on. Removing the 12V signals the furnace to shut down. In simple systems, a switch between the red and yellow wire will work to turn the system on or off.

Using the Ebersapcher Fuse Box to Supply Power for the Dieselheat Thermostat.

For Dieselheat thermostats, a power loom for the thermostat is supplied. This loom utilises the spare fuse socket in the Eberspacher loom to supply power to the thermostat and ducted fan.

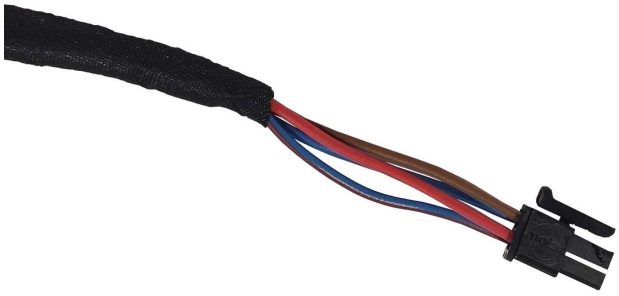
Insert the fuse connector into the spare socket in the Eberspacher loom. A 5A fuse is already supplied. Connect the other end to the thermostat loom.



Surplus Wires to Remove

The loom also includes white/red and brown/black wires which are pre-taped off. These are not used and in most cases will be removed by Dieselheat.

CAN Communication Connector



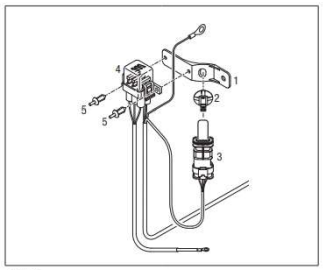
This cable should not be cut or modified.

If not being used do not hide this cable

Plug this into the EasyStart Pro controller or the Dieselheat hydronic thermostat CAN connector.

Diagnostic Port

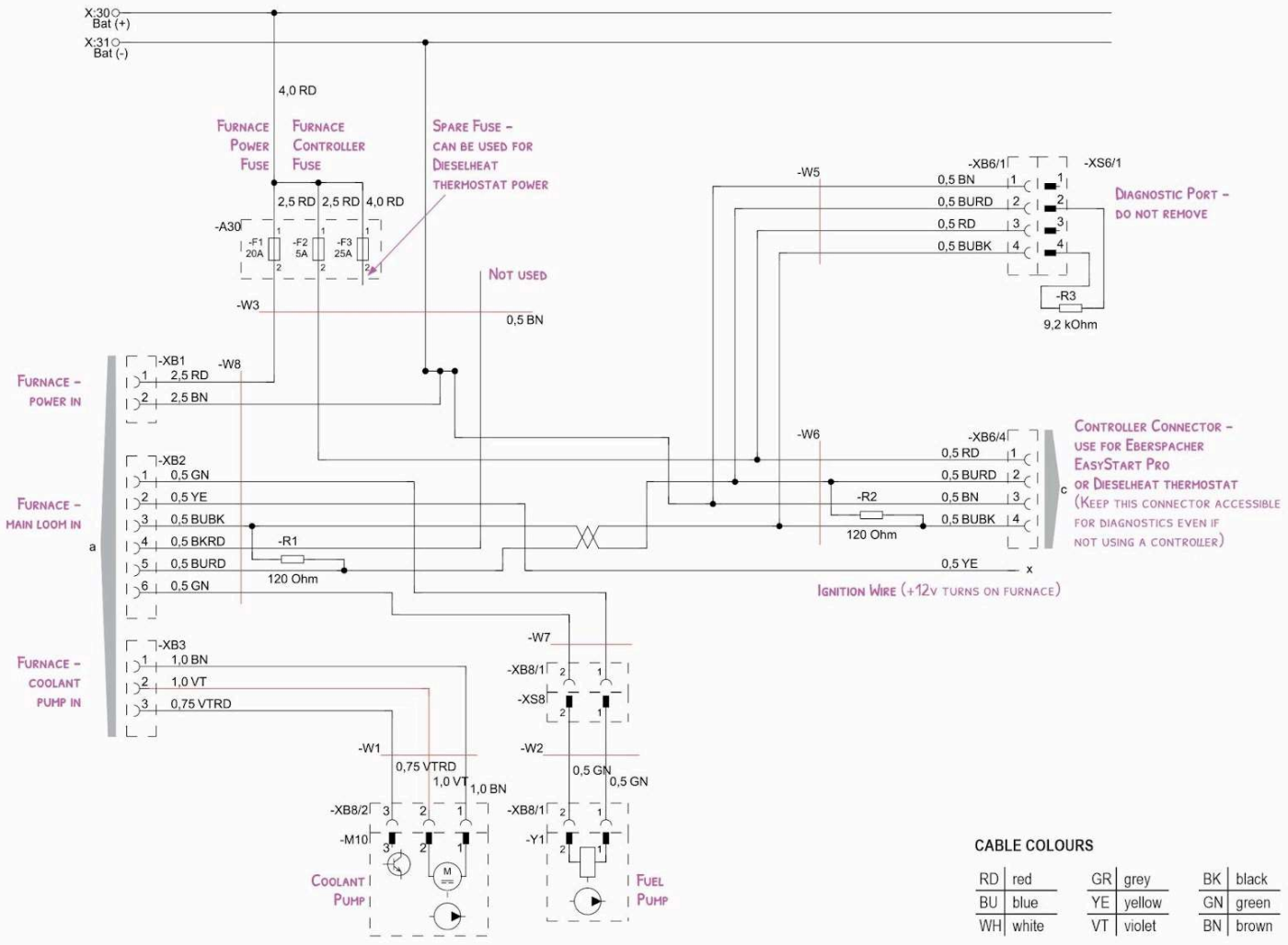
Diagnostic port with end cap. This must be left as is and should be installed in an accessible position next to the fuse box on the supplied mounting tab for future diagnostic purposes (see diagram below).



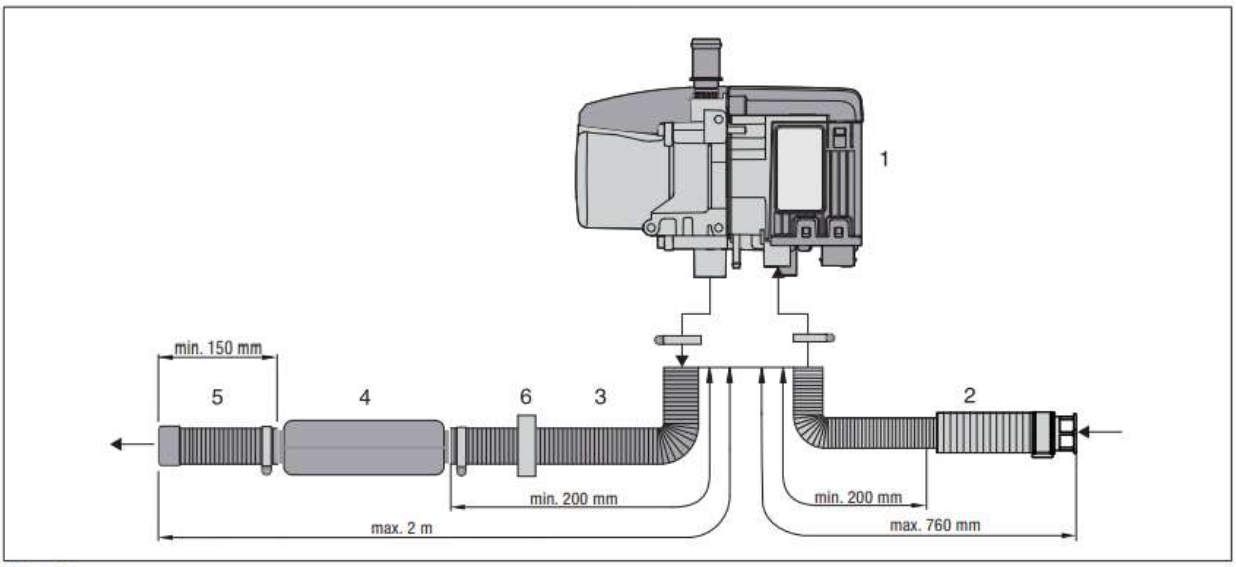
Picture 7

1 Combined bracket
2 Retainer clip
3 Diagnostics connector
4 Fuse bracket
5 Split rivet

D5E CABLE HARNESS DETAILS



Inlet and Exhaust General Arrangement



Picture 18

1 Heater
2 Combustion air intake silencer
3 Flexible exhaust pipe
4 Exhaust silencer
5 Exhaust pipe end with end sleeve
6 Spacer ring

Combustion Air

The DH E-Solar 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 move or 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 traveling.
- After driving in dusty conditions, tap out or clean the inlet pipe prior to starting the unit.

Note: If the DH E-Solar 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.

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 included 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 DH E-Solar, whether your vessel is a sailboat or a motorboat, and the suitable surfaces available.

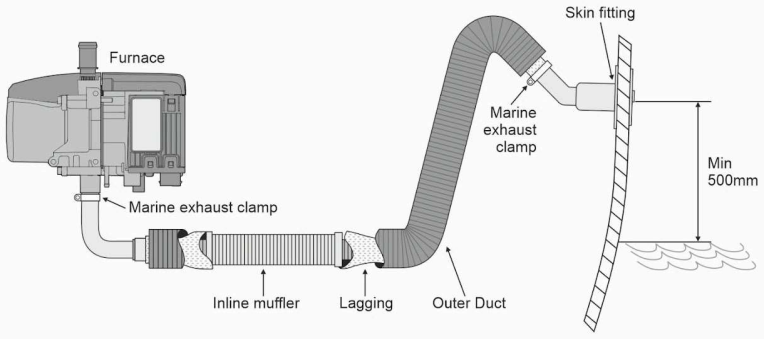
On a sailboat, the preferred location is on the transom or cabin wall, as this is normally the area least likely to be affected by seawater when sailing. On a motorboat, the transom or side of the hull are suitable locations.

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

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

Typical Marine Exhaust Installation



Surecal Calorifier - Hot Water Tank Setup

Tempering Valve - Controlling Water Temperature

When the system has been turned on and has warmed up, the water coming straight from the hot water tank will be approximately 80 degrees.

The tempering valve not only controls the outlet temperature but will increase the usable hot water capacity as it mixes in some cold water to drop the temperature to safe levels.

The supplied tempering valves come pre-set at 50, but can be set at between 40 and 55 degrees by rotating the black knob.

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.

Drain/Pressure Relief Valve

The drain/pressure relief valve serves 2 purposes.

1. As the tank heats the water will expand and so the valve relieves excess pressure by dripping out a small amount of water.
2. In freezing conditions the valve can be manually opened to allow the tank to be drained.

The outlet on the drain/pressure relief valve should always be plumbed into the bilge on a boat or down through the floor and outside in an RV.

Expansion Tanks

Where it is undesirable to allow the drain/pressure relief valve (PRV) to drip as the tank heats - such as in boats an expansion tank can be installed in the hot water side plumbing. This tank allows the water to expand into the tank as it heats.

Note: If an expansion tank is not used, the PRV life will be shortened.

Surecal Immersion Installation and Replacement - All Immersions

Thermostat Information

The immersion heater is supplied with a RTS/RTS PLUS thermostat, approximately factory set to 80°C, with adjustable temperature.
To maintain safety and operation, any replacement thermostat must be of the same type.

Electrical Information

1.This unit should be connected by a suitably qualified electrician in accordance with the latest I.E.E. regulations.
2. Ensure the electrical supply is switched off before making any connection to the unit.
3. The immersion heater must be wired through a double pole isolating switch with contact separation of at least 3mm in both poles.
4. The immersion heater must be wired with a heat resistant flexible cord with a minimum T rating of "T-80" and with a minimum cross-section area of 1.5mm2.
5. Ensure that the terminal screws are not over tightened as this could result in the terminations being broken off.

⚠ **This device must be earthed**

Wiring

1. Earth connection (green & yellow) should be made firmly to the earth post (marked "E") using the terminals attachments provided.
2. The Live Supply (brown) from the mains supply cable to the thermostat terminal marked "L".
3.The neutral connection(blue)from the mains supply to the thermostat terminal marked "N".

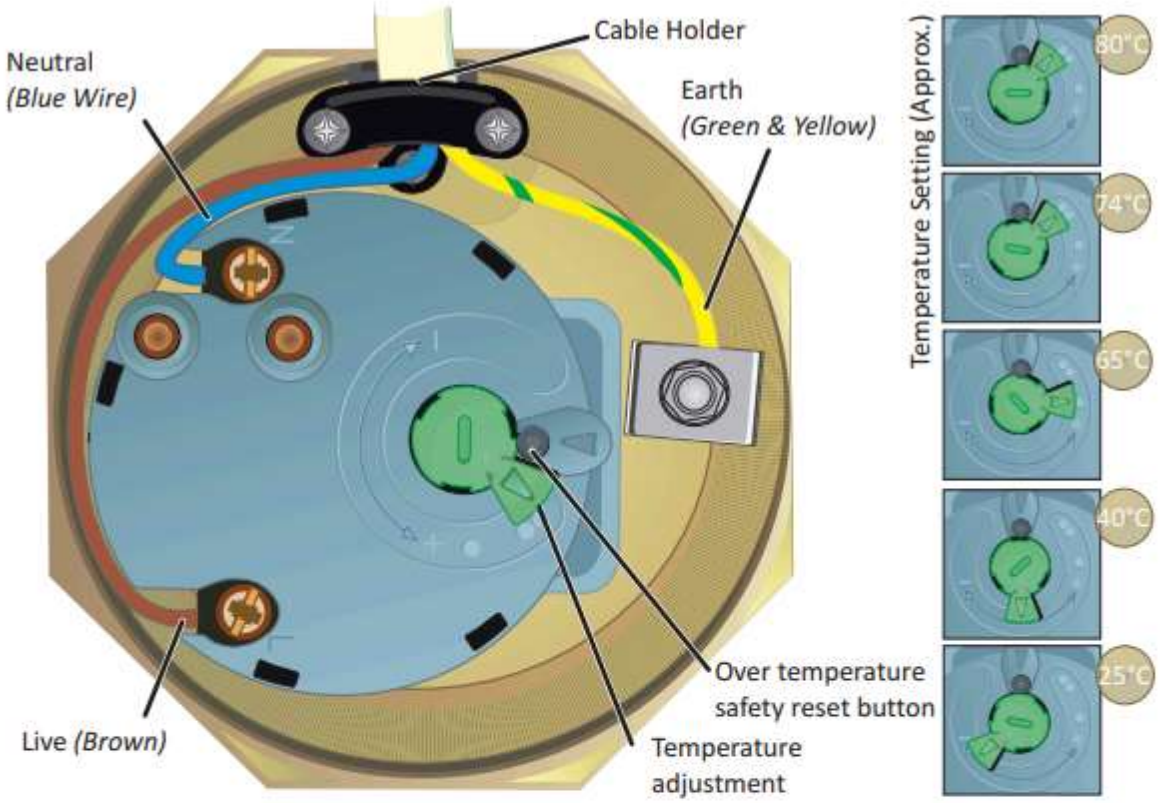
Immersion Replacement Information

1. Check your mains power voltage matches the voltage rating indicated on the label of the plastic terminal cover.
2. The immersion heater screws into a **(2 ¼" BSP)** thread boss.
3. The immersion heater must be fixed to the cylinder using the O ring provided. Please ensure that the unit is not over tightened into the tank boss.
If the heater is switched on when the water level is not fully covering the heating element there may be serious damage incurred to the heater, property or persons.
The appliance is not to be used by children or persons with reduced capabilities, or lack of experience and knowledge, unless they have been given supervision or instruction concerning use of the appliance by a person responsible for their safety.

⚠ **The immersion must not be switched on without water within the calorifier Due to the possibility of buring out the elements and fire.**

⚠ **Do not remove this cover whilst connected to 220-240 volt hook up or generator that is switched on.**

240V Immersion Wiring Diagram and Instructions



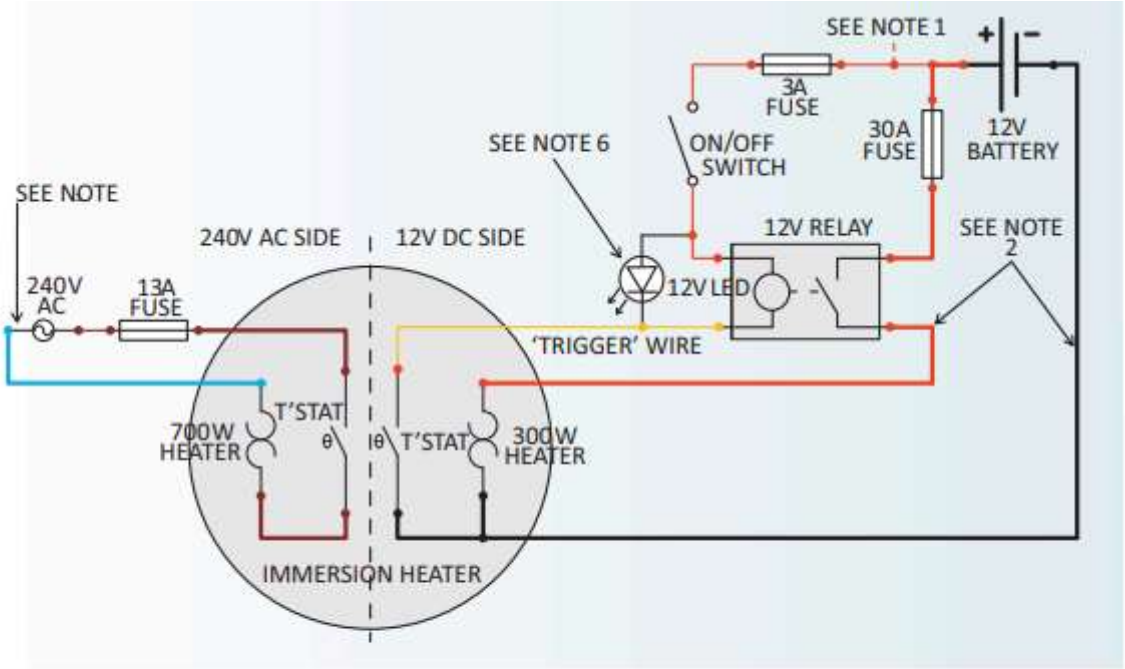
The thermostat has a safety resettable cut out mechanism which prevents excessive temperatures. The unit is able to disconnect both supply conductors (live and neutral) by a single initiating action. In case the normal sensing device fails the over temperature safety device will act to limit the water over temperature.
To reset the thermostat after an intervention of the safety device:

1. Switch off the heater by isolating the power supply
2. Allow the water in the cylinder to cool down sufficiently
3. Remove the cover and press the button on the top of the thermostat.

NB: This cut out is a safety device, if this is found to be operating frequently then we recommend to consult a qualified electrician to investigate the nature of the problem as the thermostat may need to be replaced. It may be helpful to lower the thermostat setting to avoid unnecessary cut offs.

12V/240V Immersion Wiring Diagram and Instructions

As per the wiring diagram below, it is important to install a relay to switch any low voltage element because the thermostat cannot handle the current (Amps) required to drive these thermostats. Connecting a low voltage element directly to the thermostat will destroy it.



NOTES:

1. THIS 12V FEED CAN EITHER BE TAKEN DIRECTLY TO THE BATTERY '+' (AS SHOWN HERE) OR CAN BE TAKEN TO THE VEHICLES ALTERNATOR 'TRIGGER WIRE'. IF POWERED FROM THE ALTERNATOR TRIGGER WIRE, THE HEATER WILL ONLY OPPERATE WHEN THE ENGINE IS RUNNING. IF TAKEN DIRECTLY TO THE BATTERY THEN THE HEATER CAN BE OPPERATED WITH THE ENGINE OFF.

2. ENSURE THE CORRECT GAUGE WIRE IS USED AND DE-RATED ACCORDINGLY. A 300W HEATER AT 12V WILL DRAW ~25A; THEREFORE A 30A FUSE IS REQUIRED. THE WIRING NEEDS TO BE RATED HIGHER THAN THE FUSE RATING ONCE DE-RATED. 11 AWG (4 mm^2) WIRE IS RECOMMENDED.

3. THIS END WOULD BE IN THE FORM OF A NORMAL 3-PIN MAINS PLUG FITTED WITH A 13A FUSE.

4. THE 240V AC THERMOSTAT IS WIRED DIFFERENTLY TO THE 1 2V THERMOSTAT. THIS IS BECAUSE BOTH THERMOSTATS ARE RATED FOR 20A MAX. - AT 240V THE CURRENT REQUIRED FOR THE 700W HEATER IS ~3A; THEREFORE THE THERMOSTAT CAN SAFELY BE WIRED IN SERIES WITH THE HEATER AS SHOWN.- AT 12V THE CURRENT REQUIRED FOR THE 300W HEATER IS ~25A; THERFORE THE THERMOSTAT CANNOT BE WIRED IN SERIES AND A RELAY IS NEEDED AS SHOWN.

5. THE THERMOSTA**MUST BE USED FOR SAFETY** .

6. MAKE SURE A 12V LED/INDICATOR IS USED. THESE HAVE RESISTORS BUILT IN AND DO NOT REQUIRE AN EXTERNAL RESISTOR.

7. WHEN SELECTING THE CORRECT RELAY, A 12V COIL IS NEEDED AND THE CONTACTS MUST HAVE A HIGHER RATING THAN THE FUSE THAT IS PROTECTING IT (GREATER THAN 30A).

12/24V Heating Element Wiring

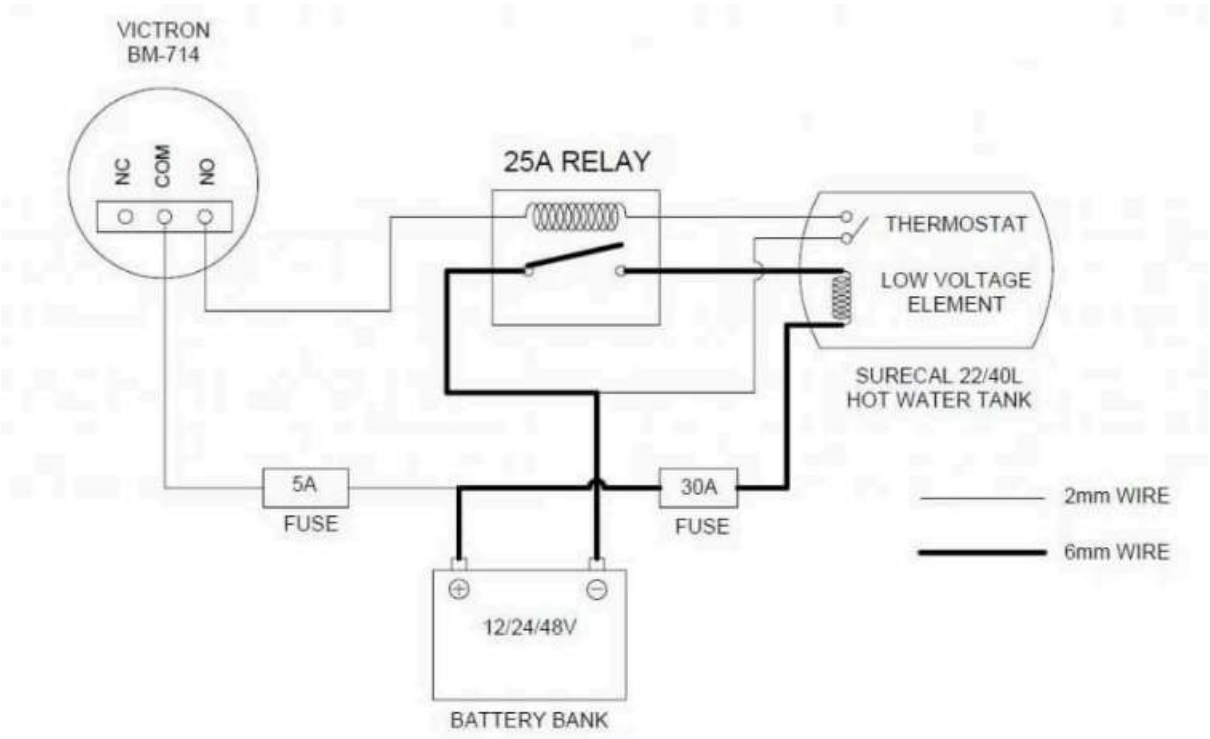
The 12V heating element should be wired to turn on via a 25A relay when

1. The batteries are charged and
2. The tank is below the temperature set on the 12v thermostat included in the 12v/240v element.

This is achieved by using the thermostat supplied in the combined 12V/240V element and a programmable relay in the RV/boat's solar battery system to control a 25A switching relay.

It is suggested to allow the 12v element to turn on when the battery state of charge is between 96% and 100%.

If the RV/boat has a solar charger with programmable relays, use these to control the switching relay. If the controller does not have this feature, use a battery monitor such as the Victron BM-714 which has a programmable relay to perform this function.



Commissioning

Coolant System Filling and Pump Priming

It can be time-consuming and messy to fix bad joints or leaks once the system has been filled with coolant. To avoid this, ensure **all hose connections are tight and secure**, and that **hoses are free of kinks**, **before filling the system.**

The coolant system operates at approximately **5–10 psi**, so careful preparation is essential.

Initial Power-Up

Once the system is fully installed:

1. Insert the fuses into the power line.
2. Power on the furnace.

Coolant Pump Priming

1. Remove the radiator cap on the DH E-Solar Power Pack.

2. Fill the system with pre-mixed coolant to approximately 20 mm below the top of the tank.

   Note: If the system is slightly overfilled, some overflow from the spigot under the cap may occur during first startup. This is normal and will stop once the correct coolant level is reached.

3. With the cap still removed, switch on the furnace.

4. You should hear a quiet whining sound from the coolant pump—this is normal.

5. During this first start-up, air will be purged from the internal pipework, fan heating head, etc. You may see air bubbles rising in the tank as this happens.

6. Check the coolant level after priming. If it has dropped significantly, top it up as needed.

7. Observe the coolant through the filler opening:
   - You should see swirling or turbulence, indicating that coolant is circulating.
   - The pump should be whining softly, not loudly—a sign that it is fully primed and operating correctly.

Once the system is primed and coolant is circulating properly, it is safe to proceed with furnace operation.

Troubleshooting: Coolant Not Circulating

If coolant is not circulating through the system during the priming process, follow the steps below:

1. Check the plumbing
    - Ensure all hoses are correctly connected.
    - Make sure all fan head valves are fully open.

2. Turn on the unit
    - The coolant pump will start automatically.
    - It may surge as it attempts to prime.

3. Wait for the fuel pump to start ticking
    - As soon as you hear the ticking, turn the unit off before the furnace begins its startup cycle.

4. Wait for a full shutdown
    - Allow the unit to shut down completely before proceeding.

5. Repeat the process
    - You may need to repeat the above steps four or five times to fully purge air from the system.
    - Watch the top of the tank for small air bubbles rising through the coolant, indicating air is being expelled.

Signs of Successful Priming

- Small air bubbles appear in the coolant tank.
- The pump tone becomes steady and quieter.
- You can observe swirling or turbulence at the surface of the coolant.

Once these signs are present, the pump is primed and coolant is circulating correctly. You may now proceed with normal operation of the furnace.

Initial Startup

Once the coolant pump is primed, leave the switch on and the furnace will begin its startup attempts. The furnace will not start until the fuel pump and fuel line are fully primed. Priming the fuel line is achieved by repeatedly restarting the system, allowing the pump time to remove air from the fuel line.

The startup process consists of **two start attempts** and usually takes about **6 minutes**. During each attempt:

- The coolant pump runs continuously.

- The combustion fan speeds up and slows down intermittently.
- The fuel pump works to deliver fuel.

After completing both start attempts, the furnace will shut down and enter a waiting state. To initiate another startup process switch off the furnace for 3 seconds and then switch it back on again.

Multiple restarts may be necessary, especially if the fuel line is long.

Note: The Eberspächer furnace will lock out after approximately **8 failed start attempts**. Always double-check the fuel line, pump orientation, and fuel source before starting the furnace. To reset a locked-out furnace, an Easy Start Pro controller or Dieselheat Thermostat (V3) is required.

Post Initial Startup

As the furnace begins heating the coolant, all hoses will start to warm up. Gently move your hands over each hose to check that they are all reaching a similar temperature.

After a few minutes, the DH E-Solar water heater should feel warm to the touch. The hoses connected to and from the cabin fan heater should also be approximately the same temperature as the main hoses.

If everything is warming evenly:

1. Top up the coolant level in the DH E-Solar hot water service until it is about **20 mm below the top** of the tank.
2. Replace the filler cap securely.
3. Allow the system to continue heating for **15 minutes**.
4. Carefully inspect the entire system for any signs of leaks.

The furnace will cycle down, once the coolant reaches approximately **80°C**. At this point:

- All hoses should maintain a similar temperature.
- If a fan head is installed, it should begin blowing hot air.

Important: If water was used during commissioning or testing, be sure to drain the system completely and refill it with the proper coolant.

Congratulations! You have successfully commissioned your DH E-Solar system.

Note: Always turn the furnace off using its own switch. Do not cut power to the furnace at any other point during operation.

Commissioning Troubleshooting

Problem	Things to Check
On initial switch on, furnace does nothing.	• Retrieve and check the fault codes • Check fuel pump connection wires are properly inserted into connector and connector is properly plugged into the pump. • Check coolant pump wires are properly connected. • Check power supply and fuses. • Check furnace is wired directly to batteries. • Check power wiring polarity - red (inside black sleeve is positive, brown is negative).
Furnace tries to start but doesn't start.	• Check fuel pump is orientated correctly. • Check fuel flow in fuel line by shining a torch on the fuel line and looking for bubbles or advancing fuel front. • If installed, check the fuel filter has filled with fuel. • The fuel pump will tick more loudly until filled with fuel. Check fuel pump noise when pump is pumping. • Check all fuel line connectors are tight and air cannot enter the fuel line. • Check battery voltage is above 12.5v. • Check furnace is wired directly to batteries as per install instructions.
Eberspacher Only: Furnace has tried to start multiple times and is now 'dead'.	• The furnace has locked out due to excessive start attempts and will need to be unlocked using an Easy Start Pro or Dieselheat V3 thermostat.
Furnace starts and runs for approx. 1 minute, then shuts down very quickly.	• Check coolant circulation. • Check the fuel line for bubbles.
System works but the air heating fan head is not hot.	• Check all shut off valves. • Review plumbing and use of bypass valves as per the suggested system schematics. • On larger systems (boats), review the use of booster pumps.
System runs but there is no hot water.	• Check the system plumbing and ensure that hot coolant is passing through the plate heat exchanger (remote mounted furnaces only). • Check the thermostatic tempering valve is installed with the 'H' at the top and the 'C' at the bottom.
Fan heads get hot but do not blow hot air.	• Check fans are wired with correct polarity. • Check fan head has adequate return air as per instructions.

Eberspacher D5E Fault Code Listing

TWO YEAR PRODUCT WARRANTY

Dieselheat offers a 2 year warranty on this product. Upon receipt of proof of purchase of a product, Dieselheat will, where possible, provide product support via telephone or email. If Dieselheat determines that the issue necessitates the return of the product for inspection and/or repair, it is your responsibility to uninstall the product and return the product at your cost to Dieselheat. Upon repair of the product, Dieselheat will return the product to you at its cost. It is your responsibility to reinstall the product. See our full warranty terms on our website.