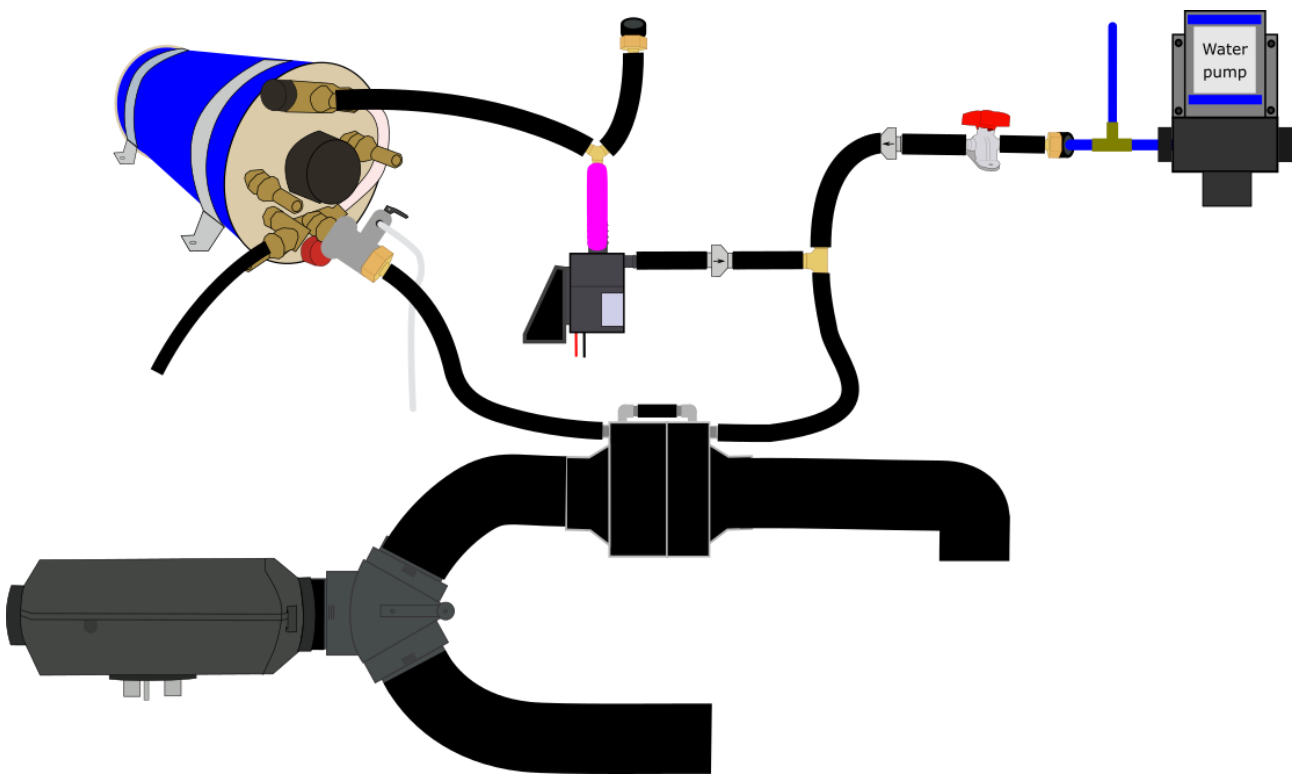


# BOBIL VANS AIR HYBRID CALORIFIER KIT INSTALLATION INSTRUCTIONS





## Important Safety Instructions! Please save these instructions!

This manual contains important safety, installation, and operating instructions for the Bobil Air Hybrid water heater & calorifier kit.

The manufacturer accepts no liability for damage by:

- Incorrect assembly.
- Damage resulting from mechanical influences or excess voltage.
- Modification or tampering with the unit without expressed permission from the manufacturer.
- Used for purposes other than described in this manual.

### General safety

- Firmly secure all cables and hoses.
- In the event of product failure, do not attempt to repair the water heater. Inadequate repairs may cause serious injury.
- Electrical devices are not toys - keep away from children.
- Disconnect the product from the battery and mains power each time before draining, cleaning or maintaining the heater.
- This product is for 12V battery banks and 230V AC circuits only. Make sure your voltage specification is within the input voltage range expressed.
- Do not use the product if physically damaged or with visibly perished hoses.

### Installation

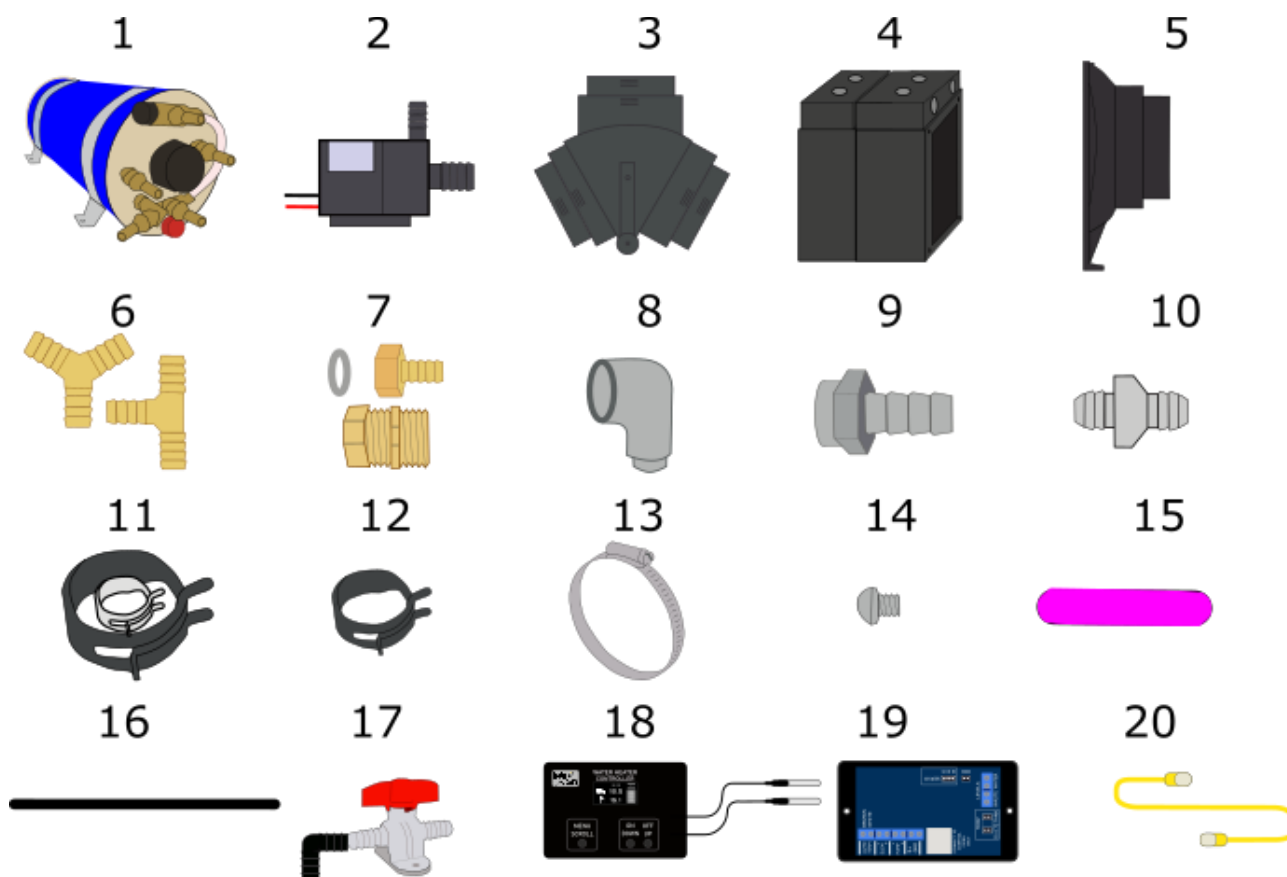
- Ensure secure location where it cannot tip or fall.
- If necessary, verify installation with a qualified electrician or installer.
- Lay cables so they cannot be damaged or be a tripping hazard.
- Do not operate in salty, wet, or damp environments; in the vicinity of corrosive fumes; in the vicinity of combustible material; in areas with risks of explosions.
- Ensure proper cable sizing for currents generated, with appropriate fuses.

Due to the nature of ways the Bobil Hybrid systems can be fitted, we cannot account for all install variations and eventualities in this instruction manual. If you install your system in a way which deviates from these instructions without contacting us beforehand, then we cannot accept fault for any issues that might occur due to incorrect assembly or use, and as such, broken parts would not be covered under warranty.

If you have any questions about your installation, please email us at [info@bobilvans.co.uk](mailto:info@bobilvans.co.uk)

## What comes in the box?

Please unpack all bags and boxes and ensure you have everything before beginning installation.



1. Calorifier (if ordered)	11. Hose Clamps (x2 big black, x1 silver, x1 tiny black)
2. Circulation Pump with bracket	12. Small Hose Clamps (x28)
3. Diverter Valve + Flap	13. Jubilee Clips (x5)
4. Heat Exchanger Assembly	14. Screws (x8)
5. Ducting Adaptors + Gaskets (x2)	15. 10mm ID hose - PINK (10cm)
6. Y and T Splitter	16. 8mm ID hose - BLACK (3m)
7. ½" Barbed fittings & Washers (x4)	17. Drain Valve (x3) & Elbow (x2)
8. 90 Degree Elbow (x4)	18. Master control unit
9. Heat Exchanger Fittings (x6)	19. Slave control unit
10. One Way Valve (x2)	20. Link cable

If you ordered level sensors, these will also arrive inside the smart controller box.

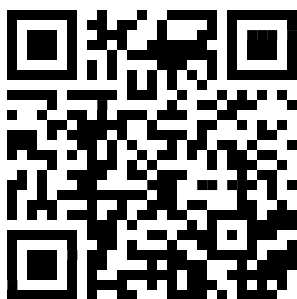


## Preparing your installation area

The tank should be installed in a cupboard or locker which is clean, dry, ventilated, accessible and free of explosive gases or vapour such as those given off by charging batteries. The heat exchangers can be installed remotely from the tank, even under the vehicle. If they are mounted under the vehicle the units should be protected from road debris and hose should be secured where they won't be damaged by being passed through the floor of the van.

Space should be left in front of the heater so the hoses are not kinked and the temperature dial is accessible.

Scan this code with your phone camera to watch an installation video of the Bobil Air Hybrid (a very similar installation), and an overview of how to use the Smart Controller.



Along with the above kit, to install the Bobil Calorifier Kit you will need the following tools:

- Pliers (to fit hose clamps)
- Adjustable Spanner/Spanner Set
- Scissors to cut silicone hose
- Small flat head & Phillips screwdriver
- Socket set

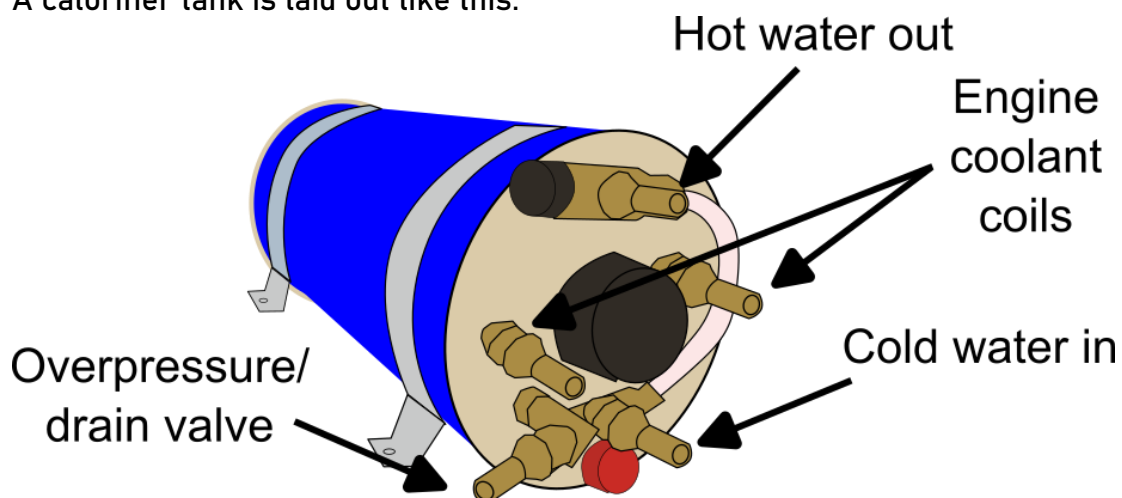
## Thank you for buying our products!

Small businesses like ours only exist because of the support of our customers. We appreciate you purchasing from us, and hope that you have a great experience.

If you have any installation questions or queries then just get in touch, we're here to help. Contact us at [info@bobilvans.co.uk](mailto:info@bobilvans.co.uk) or on the phone at +44 1275 261074

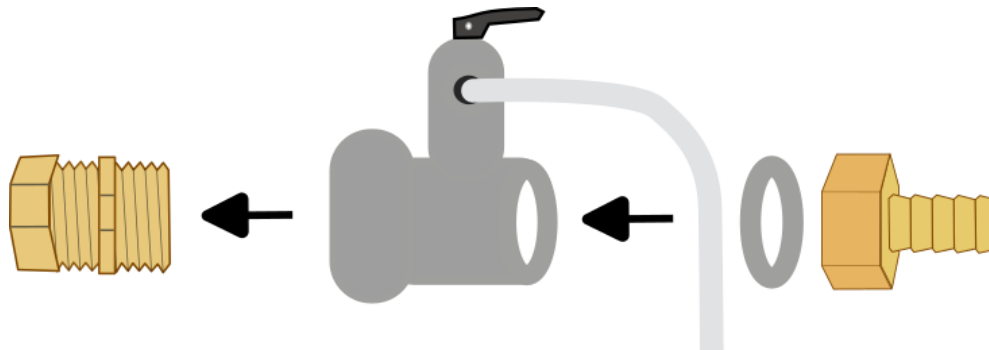
## Installation

A calorifier tank is laid out like this:

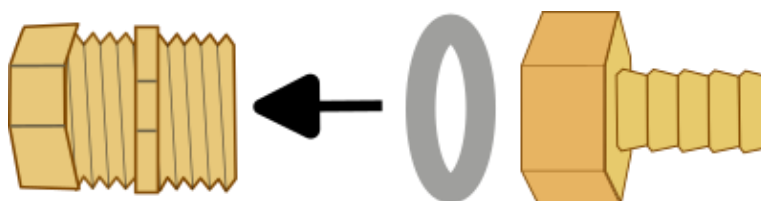


This instruction manual is designed as a guide only, you may have a different approach to assembling the kit according to your system. However, the most important thing is that the overpressure valve is fitted in the system as not fitting this can cause high pressure to build up in the system.

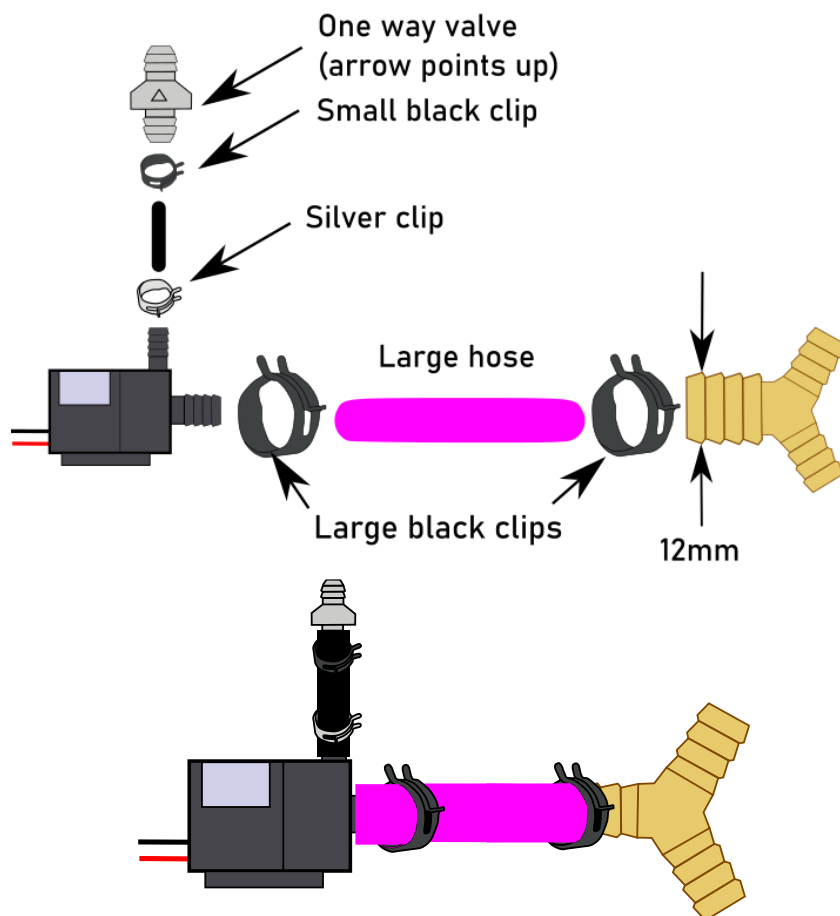
1. **TANK CONNECTIONS:** Assemble the overpressure valve and drain hose as shown, putting the small clip on the PVC to secure it:



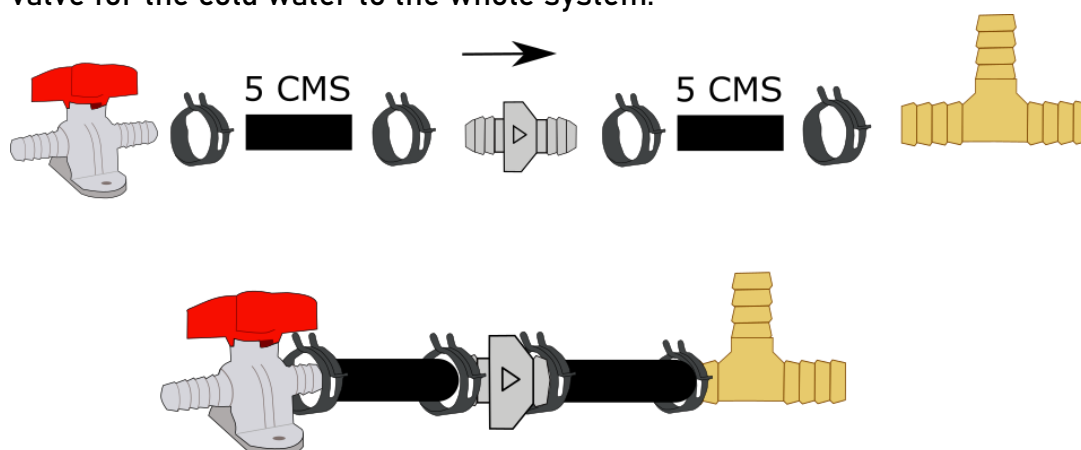
Assemble the remaining compression fittings as shown. These will be attached to the calorifier barbs.



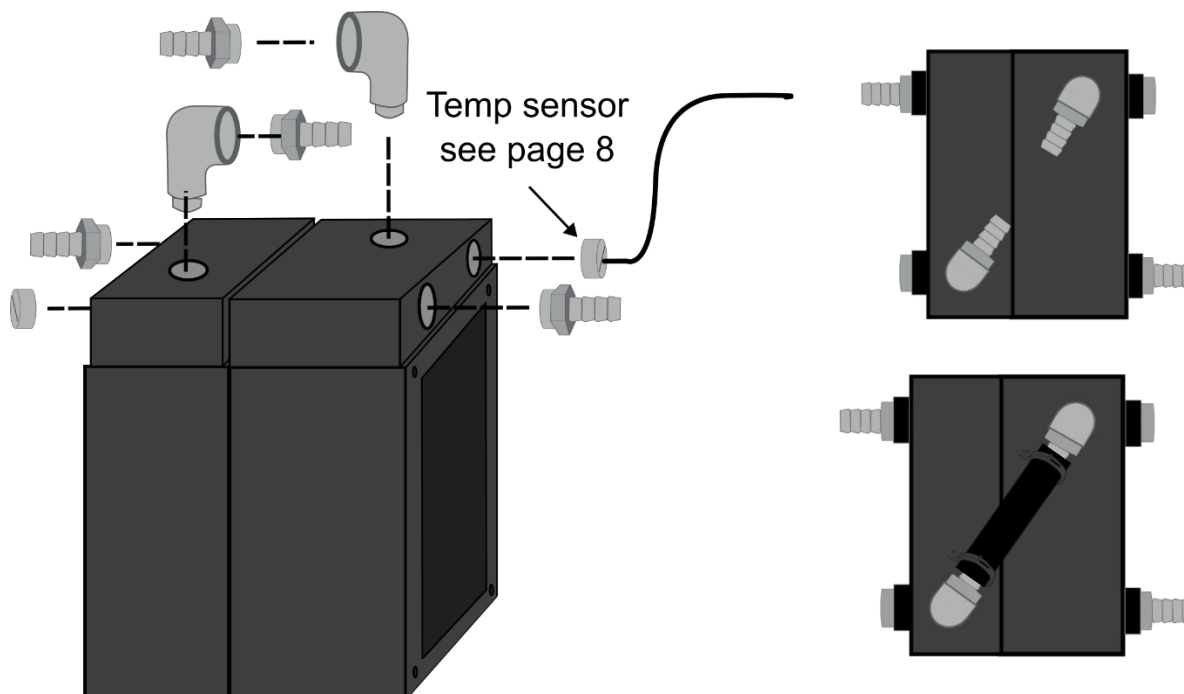
2. **PUMP ASSEMBLY:** Assemble the pump assembly using hose clamps as shown. The larger Y piece goes onto the larger 10mm ID coloured pipe. Note the silver clip on the outlet of the pump.



3. **INLET ISOLATION HOSE:** Cut 2 x 5cm lengths of the 8mm ID silicone hose and assemble this with the T fitting, one-way valve, isolation valve and hose clamps. Ensure the one-way valve points towards the fitting. This creates an isolation valve for the cold water to the whole system.



4. **HEAT EXCHANGER ASSEMBLY:** Remove the 4 red plastic blanking plugs and metal blanking plugs. Assemble heat exchangers as shown, adding the metal blanking plug and temperature sensor into the spare ports on the exchanger. **Do not overtighten the fittings. Hand tighten only.** Add a small piece of the 8mm ID silicone hose with clips to connect the 2 top ports together.

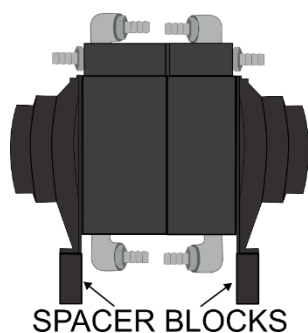
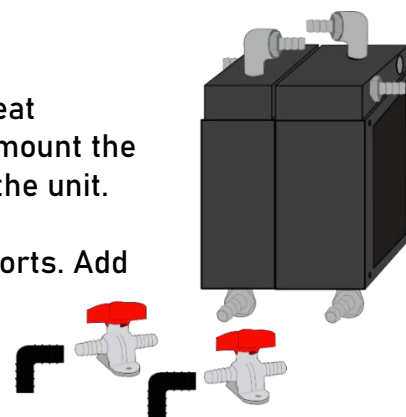


*Optional: If you don't have space above the heat exchanger for the cross pipe, you can use the blanked off outlet and route the pipe around the side of the exchanger.*

4a. **DRAIN KIT (optional):** Install the drain kit.

This is required for use in cold climates when the water in the heat exchanger is likely to freeze. If you do fit the drain kit, you must mount the exchangers on the supplied spacers to allow space underneath the unit.

Screw in the remaining elbows and barbed fittings to the drain ports. Add drain valves and black elbow fittings as shown, at a convenient place to drain the tank. You will then need to add silicone hose and hose clamps (not shown in this image for clarity).

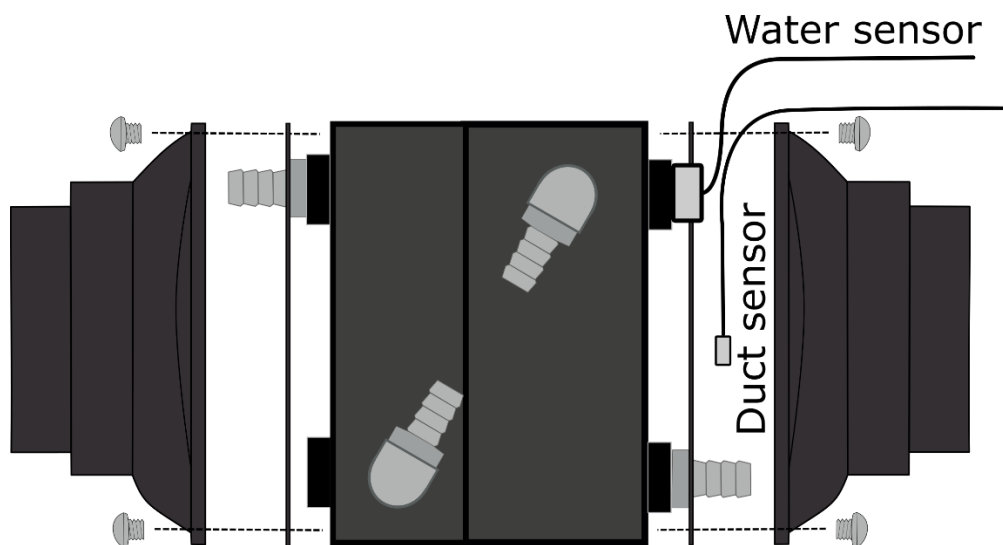
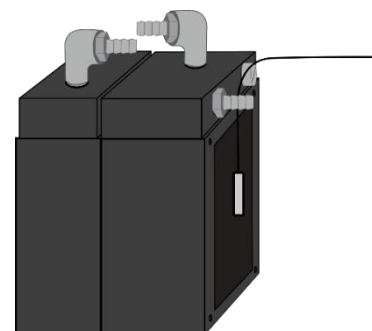


The spacer blocks click into the adaptors and allow a long screw to be fitted down through the block.

The duct temperature sensor gets clamped between the rubber gasket and the plastic adaptor and is positioned as shown.

The water sensor is screwed into a blanked off port on the heat exchanger.

Add the rubber gaskets between the exchanger and the adaptor. Fitting the screws through the adaptor and gasket before fitting to the exchanger makes this task much easier.

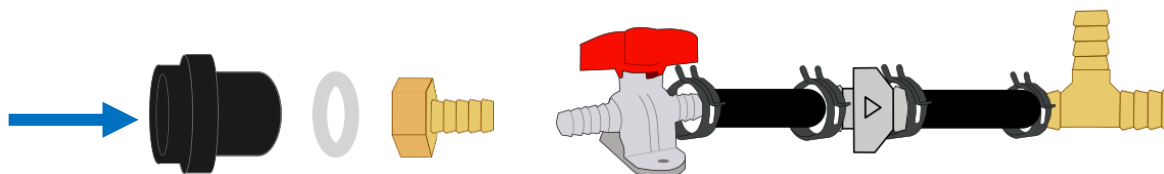


5. Screw your inlet and outlet fittings (not included) onto the remaining two threaded barbed fittings, using the sealing washer for a watertight seal.

- For 12mm plumbing, these should be 12mm straight connectors which are available from our website.
- For 15mm plumbing, we'd recommend John Guest 15mm push fit to 1/2" couplers (Screwfix part number 23662)



These attach onto your inlet isolation hose assembly (from step 3) and pump assembly (from step 2). You can use some of the remaining silicone hose to attach the inlet/outlet barbs to the correct ends.



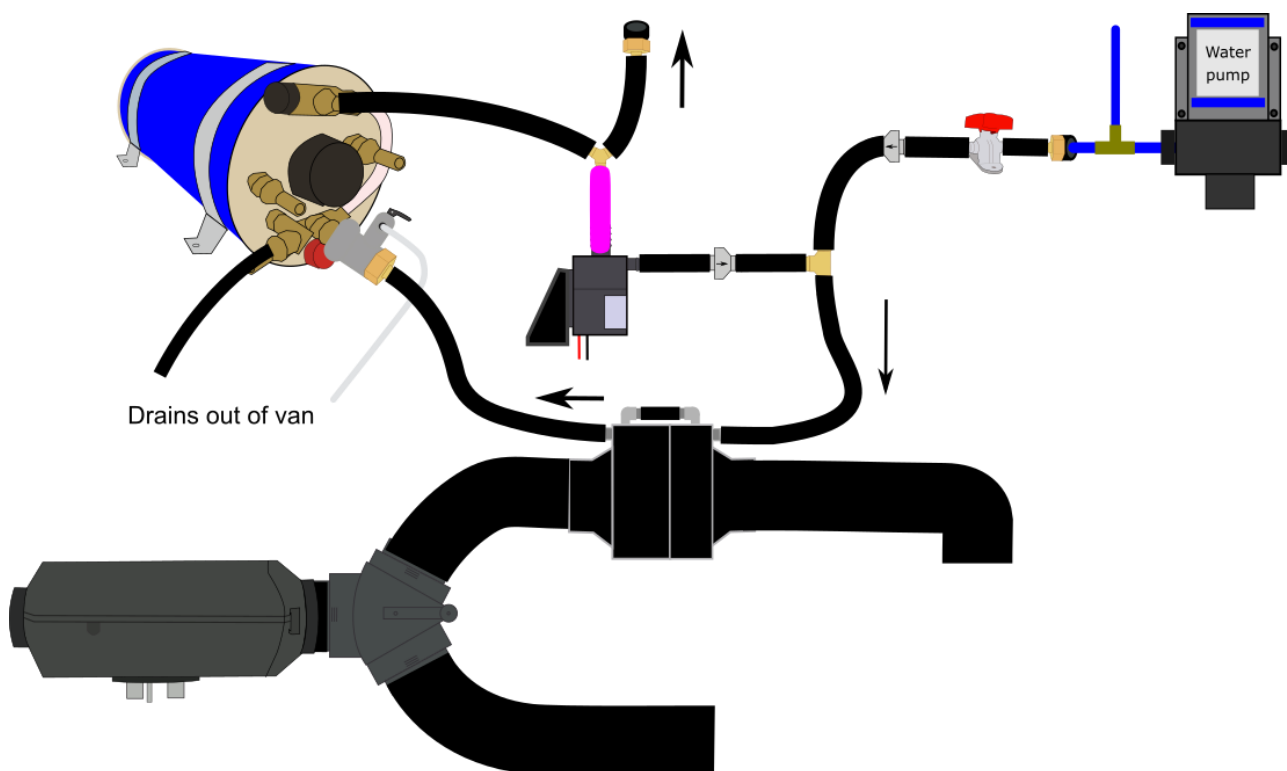
If you have flexible hose you can use a 10mm to (your hose size) straight barbed joiner and disregard the barbed connectors.



## Final Assembly

Assemble the heater kit as shown. Ensure that hose clamps are used on every joint. The ducting should be secured with the supplied jubilee clips, and the ducting exhaust from the heat exchangers can be used to either heat a shower room, garage or vented straight outside through the floor of the van.

Note that a length of silicone hose (0.5 metres) between the water pump and the one-way valve will act as a mini accumulator for diaphragm pumps, saving cost and space.



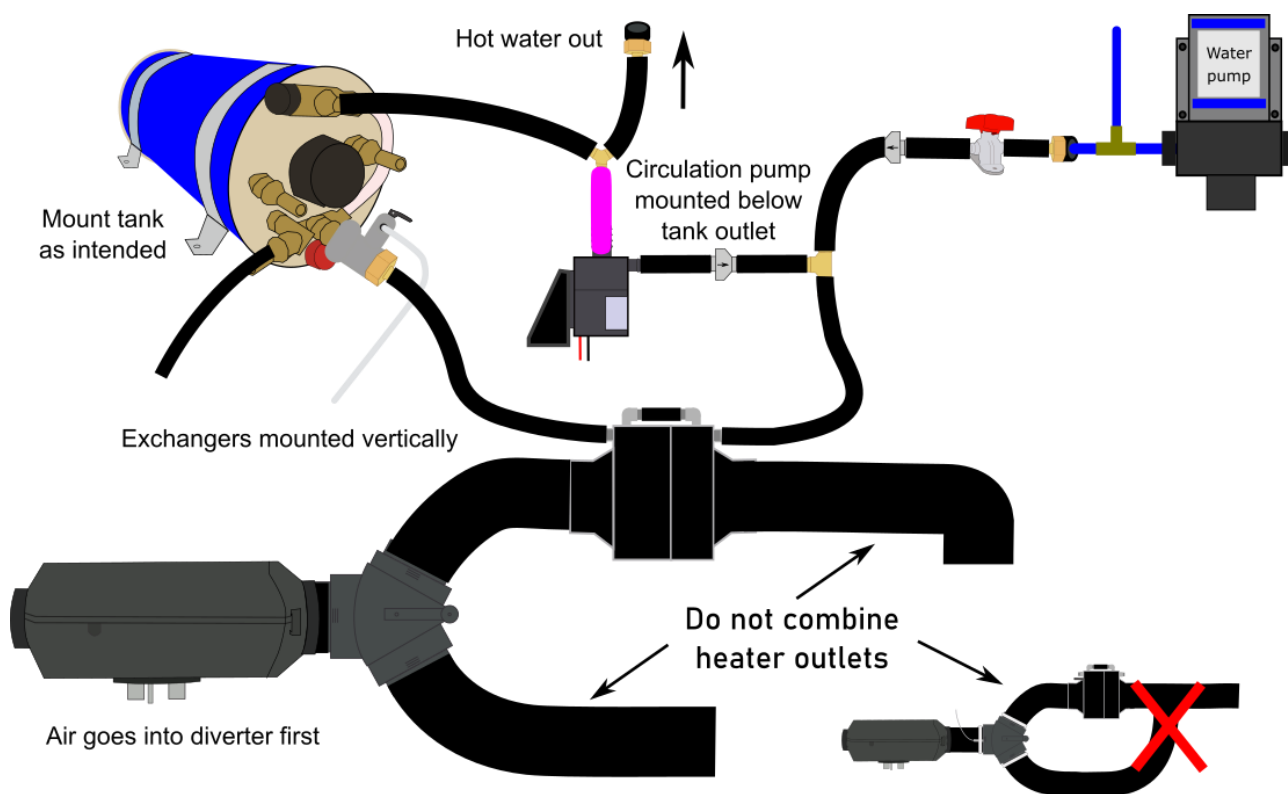
The circulation pump can be screwed to the floor with the included bracket, with the coloured hose facing vertically upwards.

Secure all units using screws. Drill holes in the van floor for the tank drain pipe and the heat exchanger drain pipe. Fit the clear drain pipe to the tank using the supplied 8mm hose clamp to secure the pipe to the fitting.

**The diverter valve MUST be fitted BEFORE the heat exchanger!**



**When installing, please pay attention to the following pointers!**



**Maximum cold water pump pressure for the Hybrid system is 20 psi.**

If your pump is higher pressure than this, please contact us for more information.

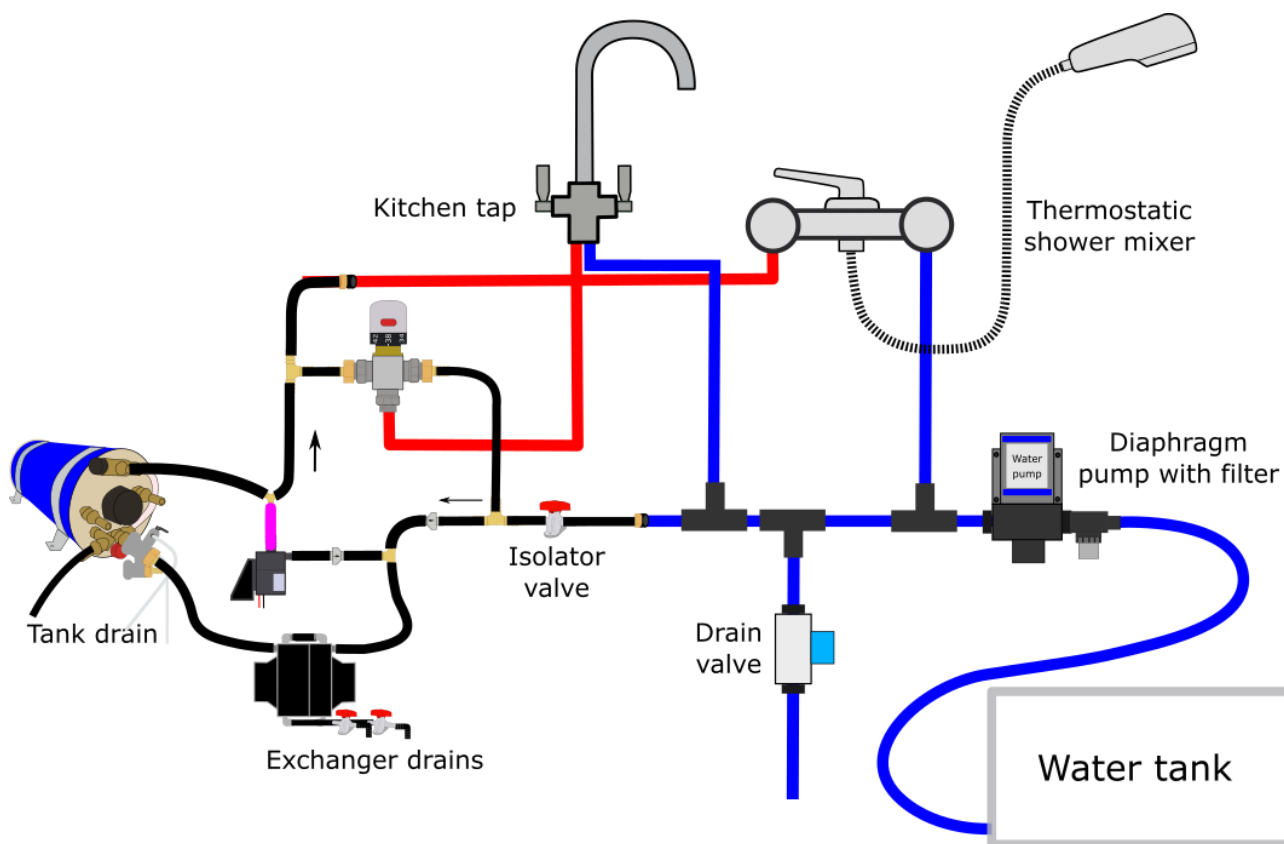
## Thermostatic mixer

Calorifiers can produce water at 85 degrees, so to avoid water coming out of the tap at this scalding temperature they are all fitted with thermostatic mixing valves. We suggest setting the mixing valve to 5 degrees higher than you set the hybrid controller heating temperature to, so if the hybrid controller is set to 60 degrees then set the temperature to around 65 degrees.

On the next page we show a plumbing layout with a second thermostatic mixer, this is advisable because if you use the mixer on the calorifier to control the temperature of water to the tap, it will start to restrict hot water flow to the heat exchanger out of the calorifier when it reaches the set temperature.

# Plumbing Layout

Here is a suggested layout for your van plumbing.



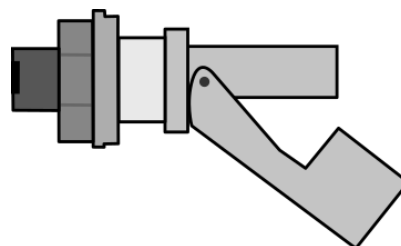


## Water level sensor wiring

Before you start, add crimped spade connectors to the wires for easy connections when the time comes.

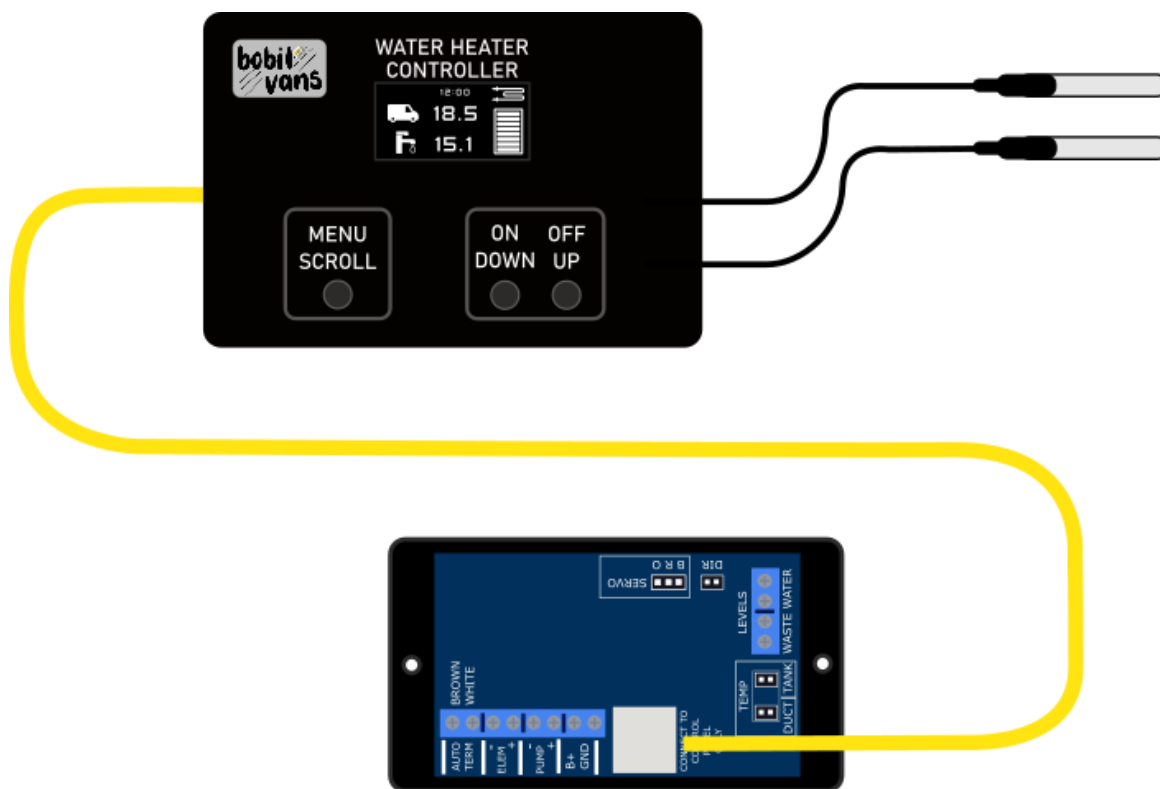
To fit the fresh level sensor, drill a 35mm-38mm hole in the top of the tank. Using the supplied screws and gasket, fit the sensor to the tank using stainless steel bolts on the inside of the tank. If you don't have access to the inside of the tank then you can affix the sensor with the supplied screws- drill 3.5mm holes in the tank, then drive the screws in to form a thread from the outside of the tank.

To fit the waste sensor, drill a 21mm hole in the side of the tank at a level which corresponds to a level of around 80% of the tank volume. This hole should be accurate, so we would recommend using a 20mm spade bit and widening it with a file. Once the sensor fits through the hole, tighten the collar on the outside to lock the sensor in place. You should ensure that the sensor is fitted in the orientation shown here.



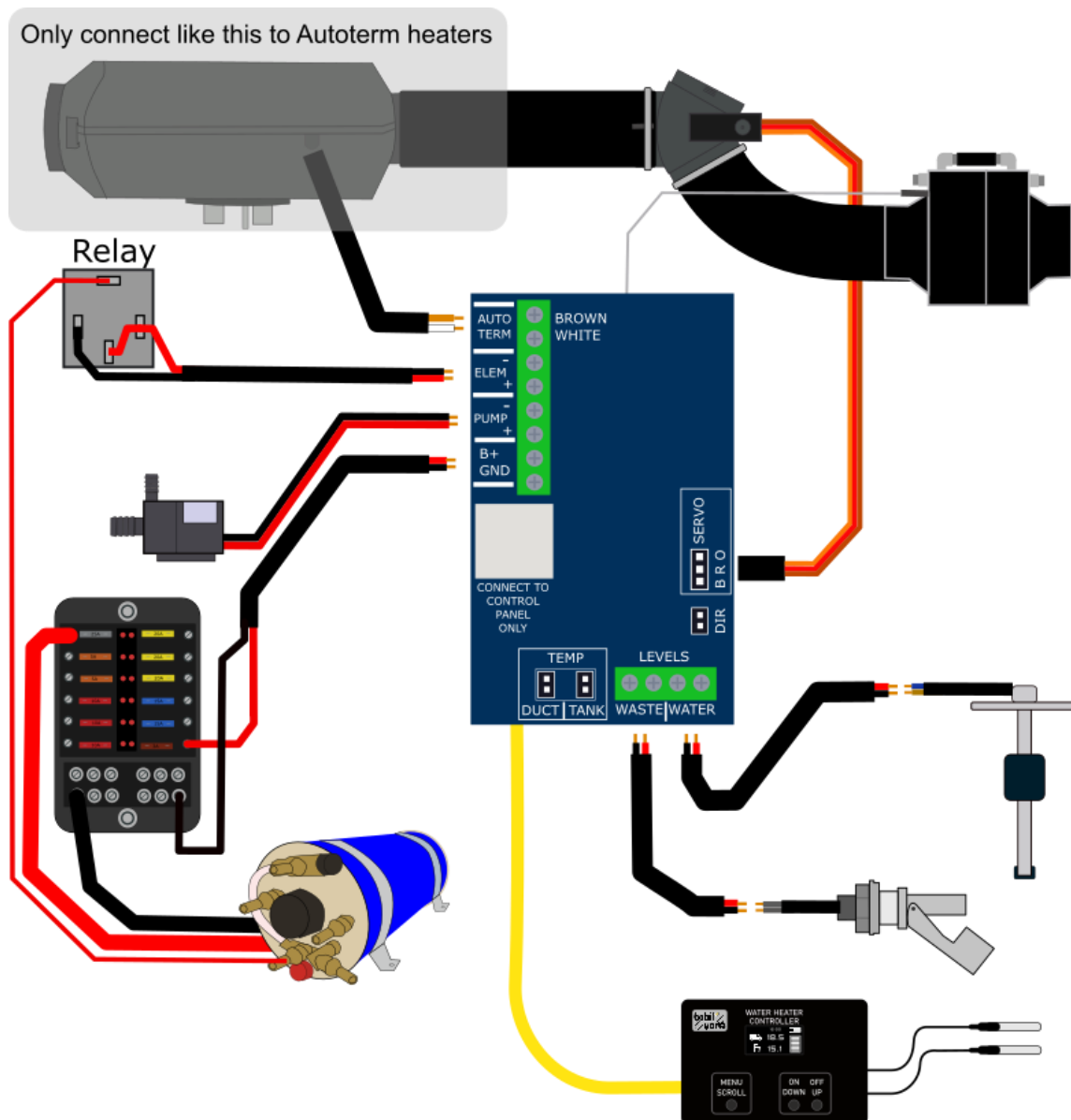
## Controller wiring

The system is made up of two boxes, one which can be mounted in the living area, and one which is situated near the heater itself. All connections are made from the slave unit except for the air temperature sensors which come from the cabin box.



The two sensors from the master controller are for measuring the internal and external temperatures. The internal sensor should be mounted high up in the main living space, away from any direct flow from the heater outlet duct. The external sensor can be mounted anywhere outside the vehicle but must be protected from moisture. We would suggest attaching it to the underside of the van with the provided rubber P-clip.

Wire up the slave controller as shown.

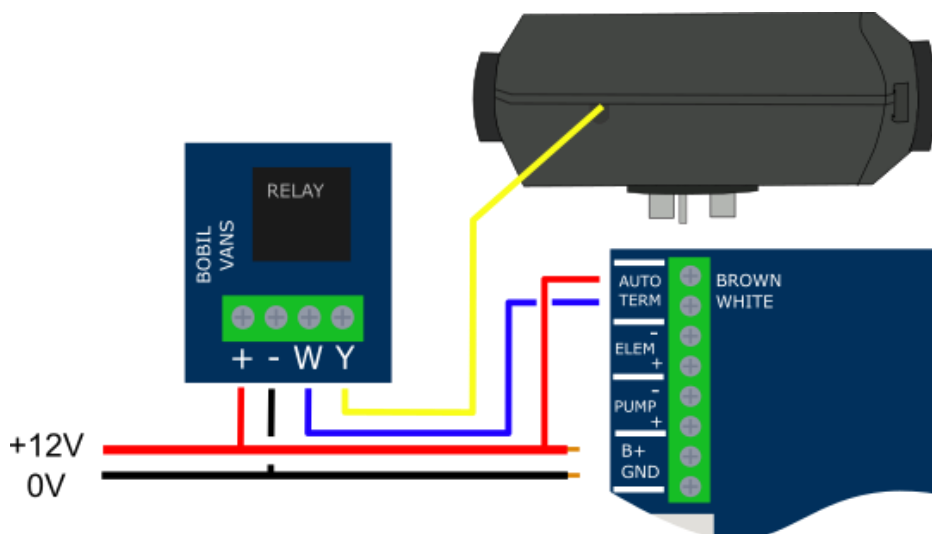


When the connections have been made to the slave board, either drill a hole or remove some of the tabs on the lid of the box to allow the wires to come back through.

There is no polarity on the level sensors.

Do not wire the controller directly to a Chinese heater- it communicates using radio signals. Follow the instructions in the Smart Controller User Guide to pair your heater with the Smart Controller.

If your heater has a 'remote start' function which requires a 12v signal, you will need to use the supplied external board. (This board is only supplied if you have one of these heaters). Eberspacher heaters have a yellow wire (called 'Easystart' or 'S+'), but please check the wiring diagram of your particular heater before wiring anything up.



The controller controls the DC element for "free" hot water when your batteries are full. If you have a tank with a DC element, then when your batteries reach 13.7V, it will switch the DC element on, and switch it off when voltage falls below 12.7V. This function can be turned on or off, but the values cannot be altered.

## Wire gauge

Use this table for suggested wiring sizes for the controller and the 12v element.

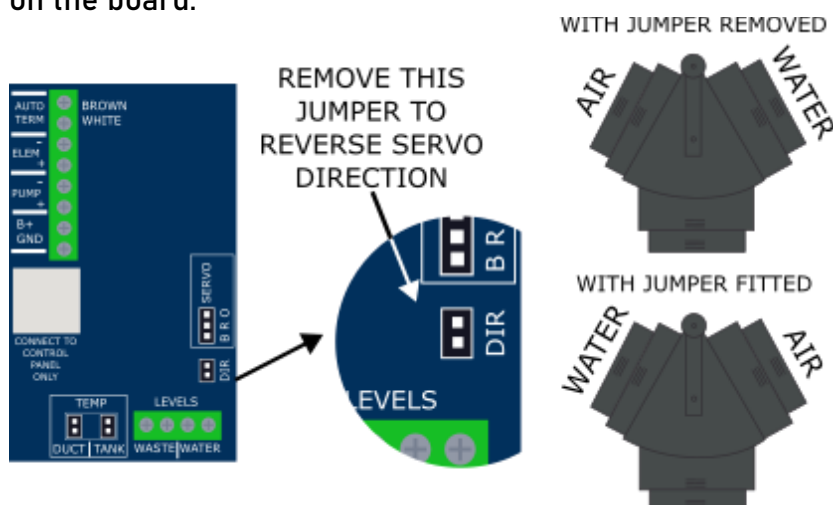
Distance	1-2M	3M	4-6M	7-8M
Element (mm <sup>2</sup> )	2.5mm	6mm	10mm	16mm
Element (AWG)	14 AWG	10 AWG	8 AWG	6 AWG
Controllers (mm <sup>2</sup> )	1mm	1.5mm	2.5mm	2.5mm
Controllers (AWG)	17 AWG	16 AWG	14 AWG	14 AWG

Use a 2A fuse for the controller and a 25A fuse for the element. The AC element (if your tank has one) should be fused at 5A.

Note: 12v only tanks have a brown signal wire. This will need to be connected permanently to 12v for the element to work.

For the connections to the level sensors and the Autoterm, use the thinnest wire you have. We suggest 0.75mm regardless of the distance. The servo is supplied with an extension, if you need longer then extensions are available from our online shop.

Normally the servo will point to the left for water heating and to the right for air heating. However, you can reverse this by removing the 'DIR' jumper which connects the two pins on the board.



## Commissioning the system

To commission your system for the first time, follow these steps.

1. Close all drain valves on the heat exchanger and the tank.
2. Ensure your cold tank has at least 20 litres in it.
3. Open sink hot tap fully.
4. Turn on the cold water pump and open the isolator valve to the hybrid. You should hear water being pumped around the system and filling the tank.
5. You should see water coming out of the hot tap in 1-2 minutes. Close the hot tap and wait for the water pump to stop pumping. Your system is now pressurised.
6. Turn on the controller. Verify that all of the sensors are working correctly.
7. Turn on the water heating routine. Check that the diverter fully closes off the airflow to the van.
8. After 2-3 minutes you should see the water temperature reading on the controller starting to rise. Stop the routine and ensure that the diesel heater switches off.
9. (DC only): Switch on the element option on the controller screen. Raise the voltage of the leisure battery to at least 13.7v and ensure at least 200 watts will be available either from the engine of the vehicle, a mains charger or solar power. The controller should start to count down and switch on the element when it gets to 0. The red light on the front of the tank will come on and you should see the water temperature on the controllers start to rise.
10. (AC/Dual element tank only) Apply AC power and verify that the temperature is increasing with the temperature set on the thermostat.
11. Open the hot tap and enjoy the lovely warm water from your Bobil Hybrid!



## Troubleshooting

The Bobil Air Hybrid should give you many years of service, however if you notice that things aren't quite performing as expected, please do get in touch, we're here to help!

Email us with your questions at [info@bobilvans.co.uk](mailto:info@bobilvans.co.uk)

**We would love to know what you think!**

Please let us know by leaving a review through the link sent through when you made your purchase, or email us at

[info@bobilvans.co.uk!](mailto:info@bobilvans.co.uk)

You can also share photos of your installation on the 'Bobil Water Heater Users', Facebook page, we'd love to see them!

[www.bobilvans.co.uk](http://www.bobilvans.co.uk)

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