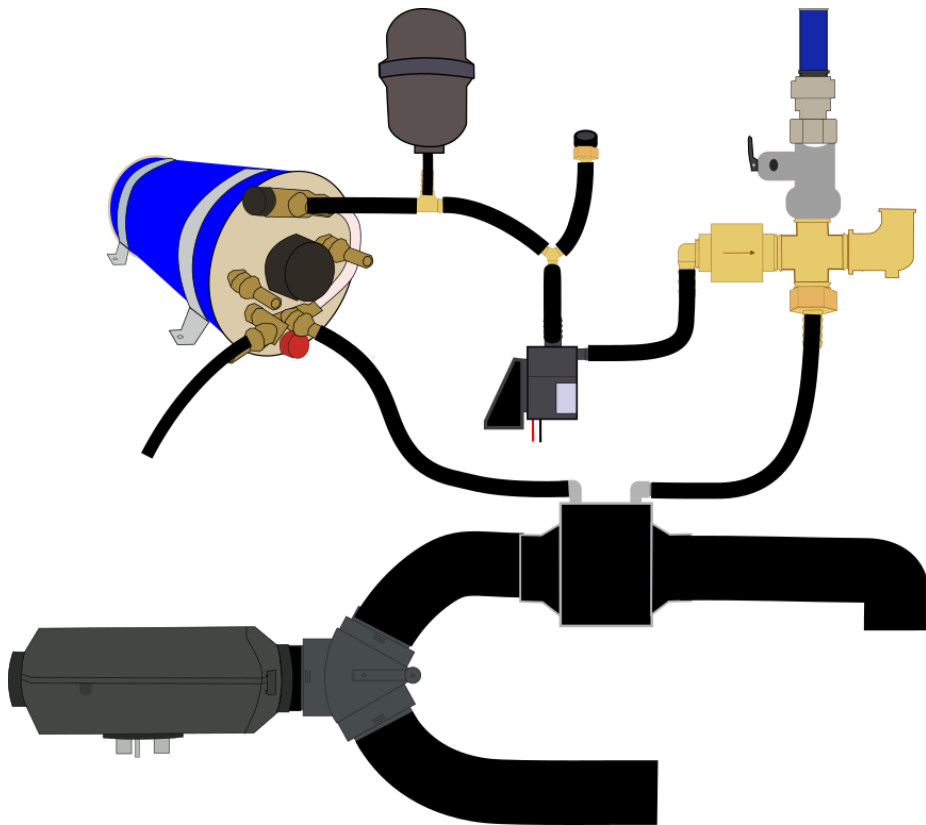




# BOBIL VANS AIR HYBRID CALORIFIER KIT

## 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

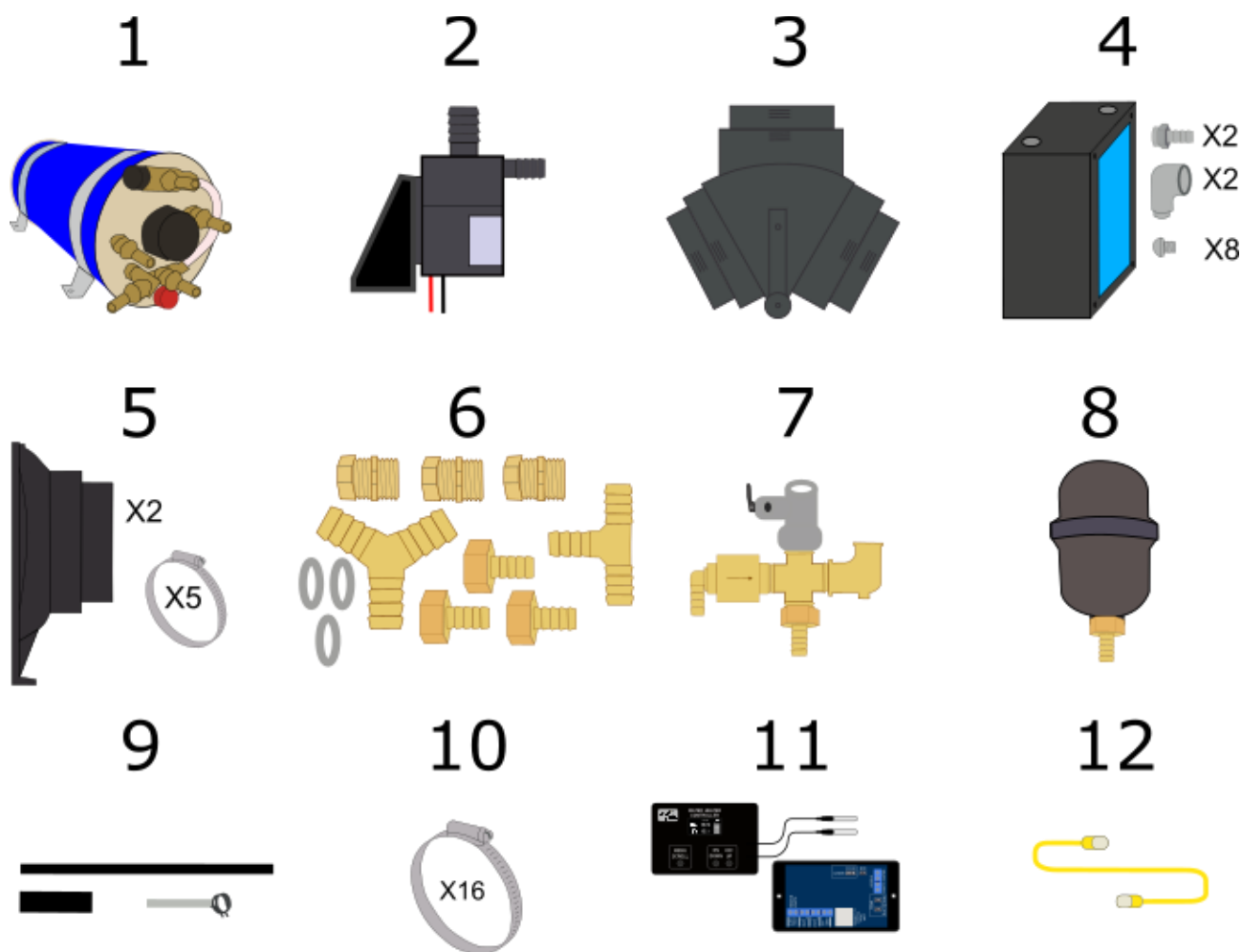
- Ensure secure location where it cannot tip or fall.
- If necessary, verify installation with a qualified electrician or installer.
- Lay cables so they cannot be damaged or be a tripping hazard.
- Do not operate in salty, wet, or damp environments; in the vicinity of corrosive fumes; in the vicinity 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)	7. Central plumbing unit
2. Circulation Pump with bracket	8. Expansion tank and mounting kit
3. Diverter Valve + Flap	9. Hoses
4. Heat Exchanger Assembly	10. Small jubilee clips
5. Ducting Adaptors + Gaskets (x2)	11. Smart controller
6. Brass fittings	12. Cable and accessories bag



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 these codes with your phone camera to watch some installation videos.



Installing in a Van



Intro to the Kit



Smart Controller Features

Whilst these videos are for the regular Air Hybrid, the process is very similar.

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 heat & phillips screwdriver
- Socket set

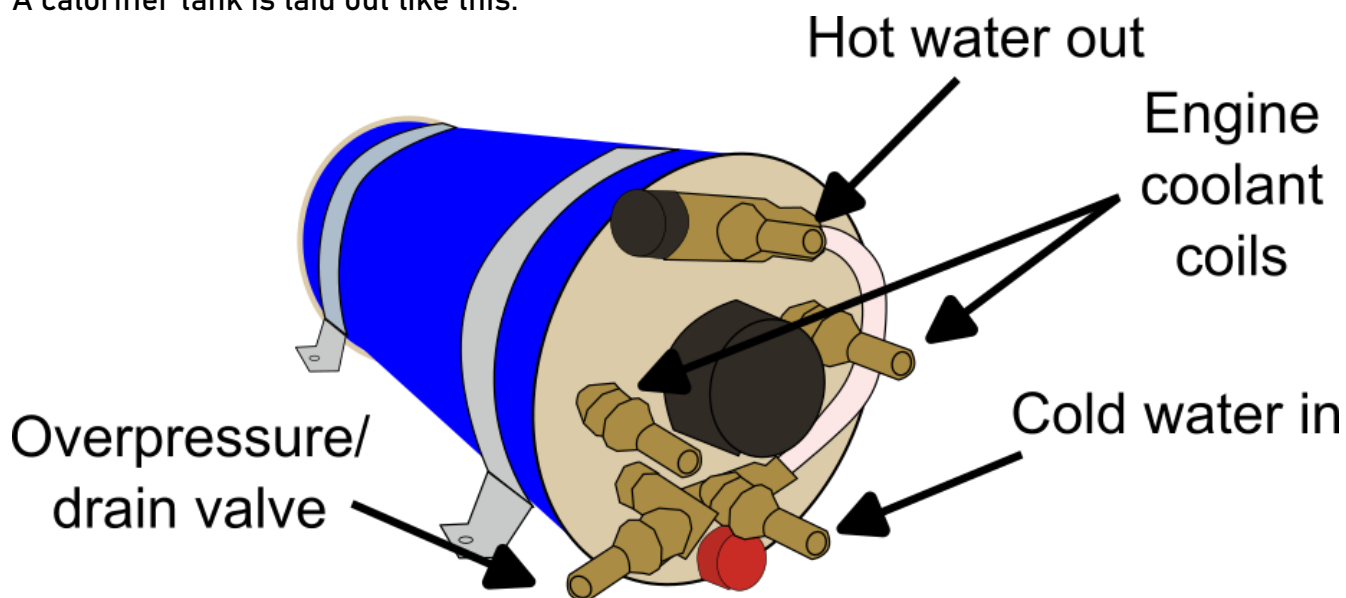
## Thank you for buying our products!

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

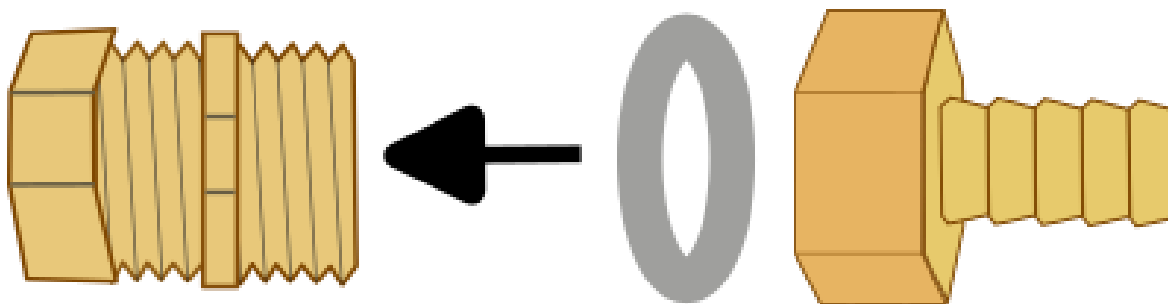
## Installation

A calorifier tank is laid out like this:

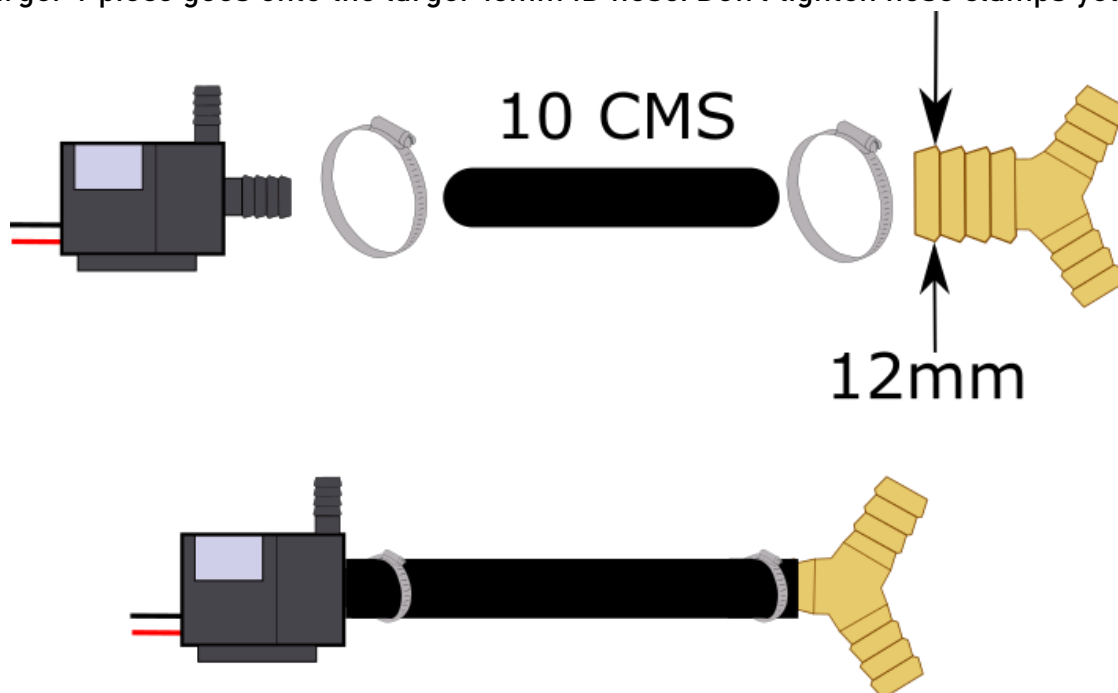


This instruction manual is designed as a guide only, you may have a different approach to assembling the kit according to your system.

1. **TANK CONNECTIONS:** Assemble the compression fittings as shown. These will be attached to the calorifier bars.



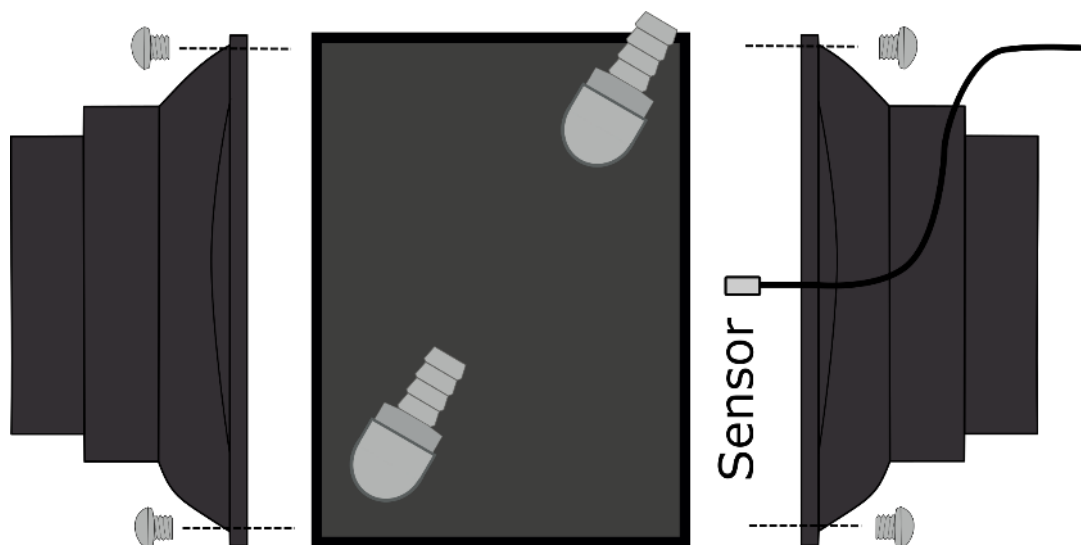
2. **PUMP ASSEMBLY:** Assemble the pump assembly using hose clamps as shown. The larger Y piece goes onto the larger 13mm ID hose. Don't tighten hose clamps yet.



3. **HEAT EXCHANGER ASSEMBLY:** Drill a 4mm hole into one of the adaptors. Pass the temperature sensor through the hole, then assemble the ducting adaptors onto the sides with the temperature sensor inside so it sits in the airstream. (Note that this is a change in technique compared to some of our Youtube videos!)



- Depending on your layout, you may find it more convenient either use the elbow fittings, or the straight fittings.
- You can add the sensor to either side of the exchanger but it should face towards the heater during final assembly.
- The exchanger can be mounted in any orientation, so that the inlets are either on top, on the side, or underneath.



**DIVERTER ASSEMBLY:** Assemble the diverter by clipping together the two halves of the units with the flap in between. Ensure the servo for the diverter flap motor is on the top. The 3 coloured wire connects the servo to the slave board – if required, you can use the included servo extension to lengthen this connection. (see wiring diagram)

**TEMPERATURE SENSOR:** There is no native sensor temperature sensor in the tank of the calorifier, therefore one needs to be added. We would suggest either removing some insulation and attaching the extra temperature sensor directly to the body of the calorifier, or bonding it to one of the metal fittings of the calorifier ports. This sensor then gets plugged into the 'tank' port on the slave board of the smart controller.

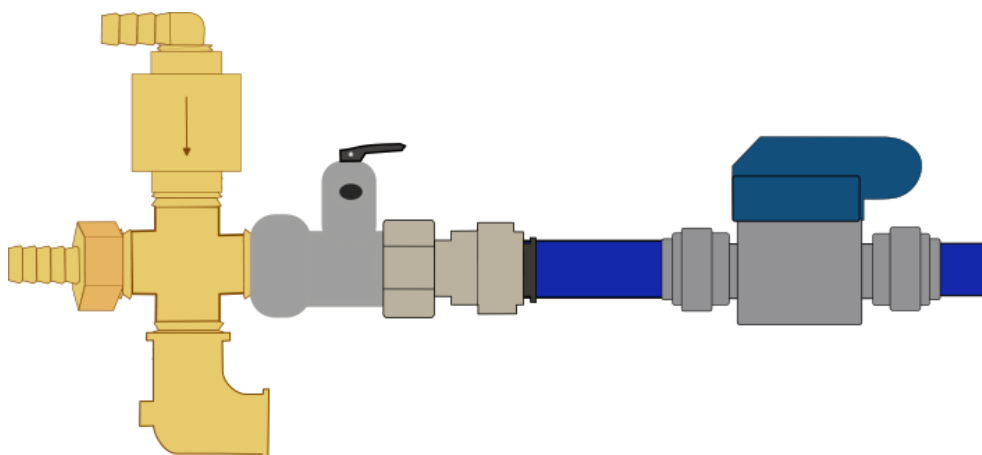




5. **CENTRAL PLUMBING UNIT:** The central plumbing unit will come pre-assembled in the box.

- Plumb the central plumbing unit from your cold feed onto the ½" thread onto the overpressure/drain valve.
- Mount the central plumbing unit by screwing through the brass bracket.
- Drill a 10mm hole through the floor of the van for the drainpipe.
- Attach the clear hose to the overpressure valve with the included clip.

Below is an example of how to plumb it into your cold water feed using 12mm JG push fit. We recommend fitting an isolator valve on the cold water inlet for maintenance (not included)



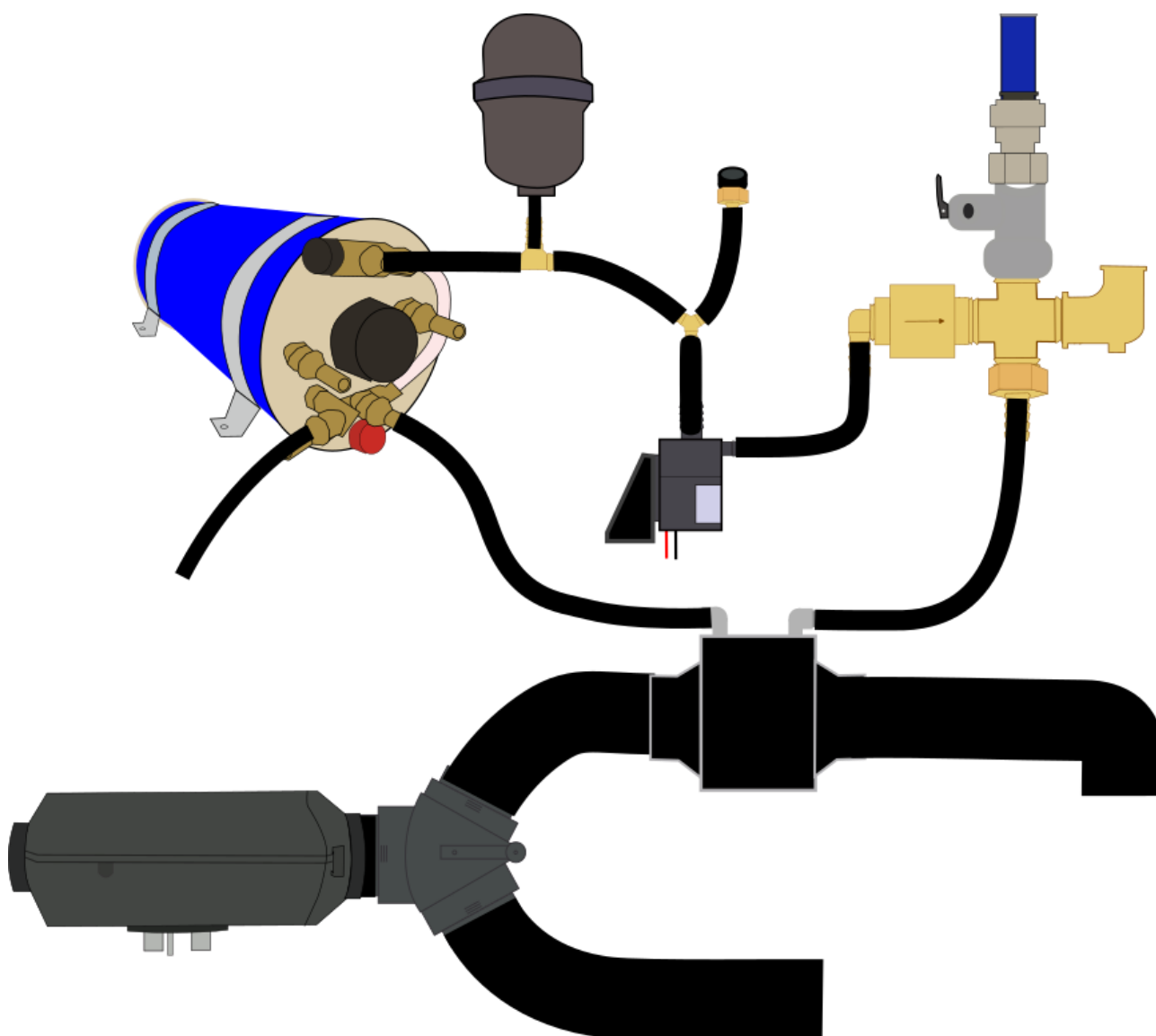
The expansion vessel will need to be set according to your cold water pump pressure, you can use a bike pump or similar for this. It should be set at 5PSI above your pump pressure.

Note that the expansion tanks are sized according to the size of the calorifier tank so you may find that the expansion tank does not look like this one.

The expansion vessel can be mounted using the mounting kit provided. Whilst the diagram shows it coming off the hot tank, it can be attached anywhere in the plumbing loop.

## Final Assembly

- Assemble the heater kit as shown with the remaining hose.
- Ensure that hose clamps are used on every joint.
- If you need more hose, we sell it by the meter on our website.
- The hose connecting the Central Plumbing Unit should enter the exchanger at the opposite side to the where the air enters the exchanger.
- 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.
- Ensure the duct sensor is closest to the diverter.
- The pump should be lower than the water level as it is not self-priming and so that any air from the tank is allowed to escape.

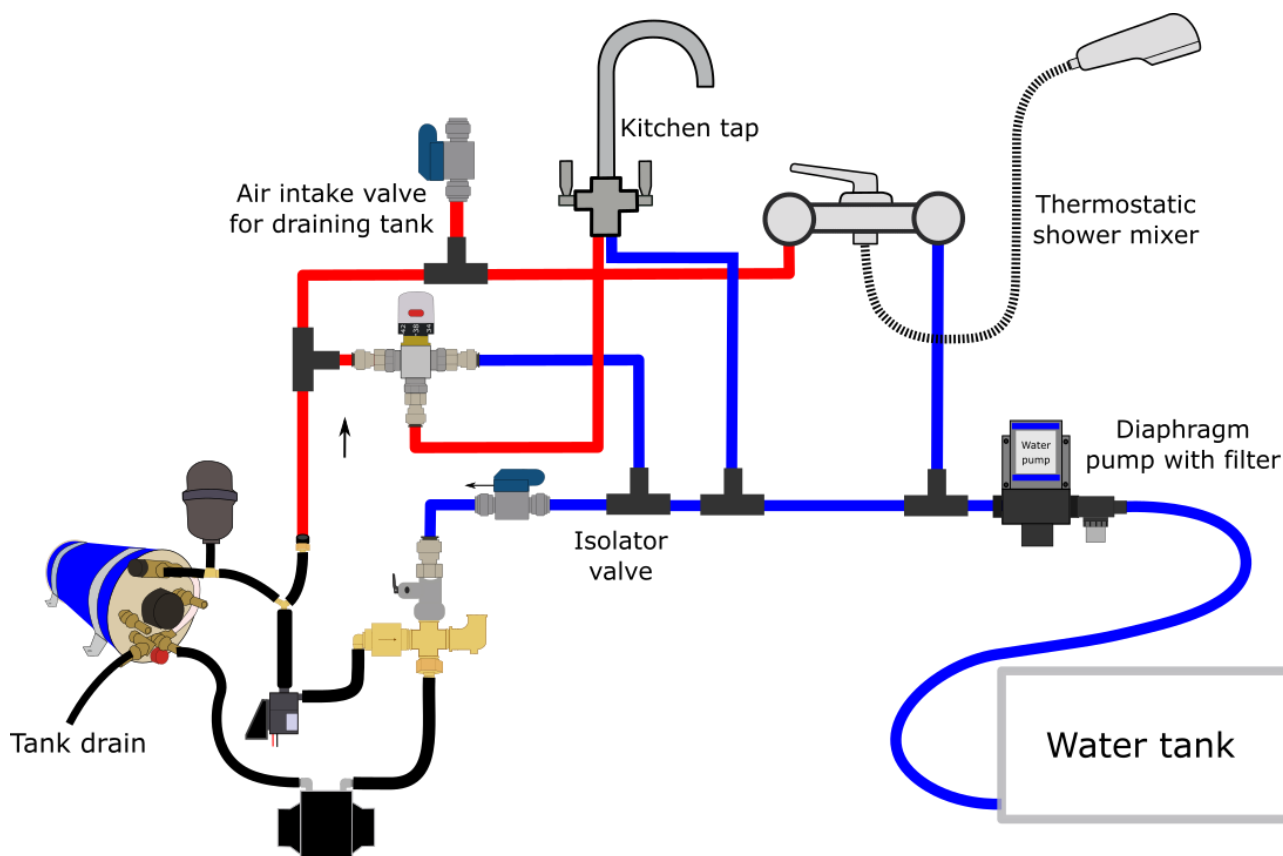


## Thermostatic mixer

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.

Here is 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.

Note the valve on the hot pipe- this is to allow air back into the tank when the system is being drained, as the thermostatic mixers have one way valves built into them. It is not essential but without it you will not be able to drain your tank.



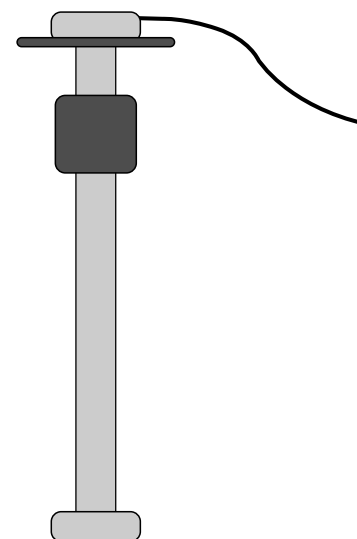
## Water level sensor wiring

If you ordered level sensors, please follow this page to install them.

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

### To fit the fresh level sensor:

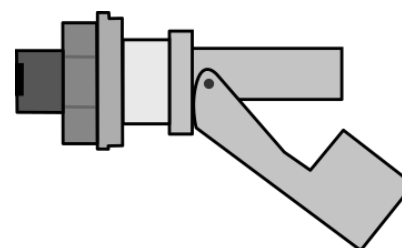
- Drill a 35mm-38mm hole in the top of the tank.
- Drop the sensor in and centre it in the hole.
- Drill a 3.5mm hole underneath one of the holes in the sensor.
- Drive one screw into the hole to form a thread.
- With the sensor in position, drill the other four pilot holes.
- Remove the first screw. Remove any swarf from the sensor and the underside of the hole.
- Replace the sensor and gasket, refitting the first screw.
- Drive the other four screws into the holes to secure the sensor.



*An optional spacer is supplied in case the wall of your tank doesn't allow the sensor to sit correctly.*

### To fit the waste sensor:

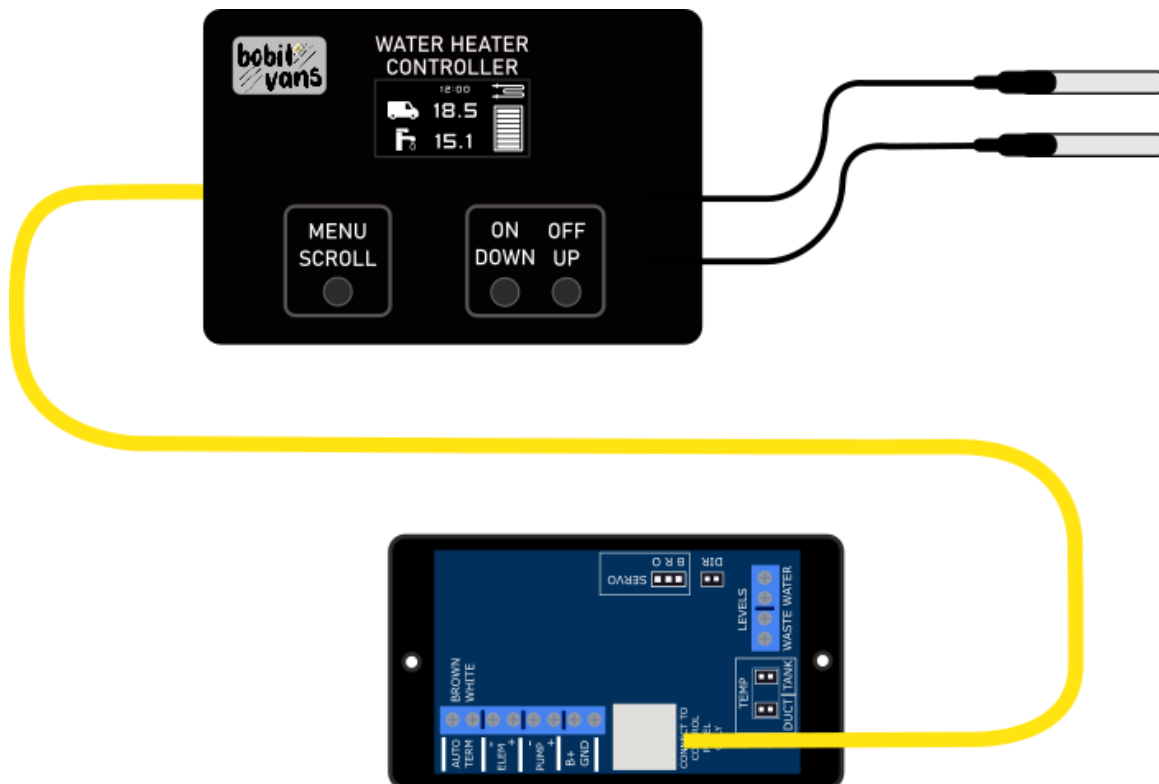
- Drill a 22mm hole in the side of the tank at a level which corresponds to a level of around 80% of the tank volume.
- Once the sensor fits through the hole, tighten the collar on the outside to lock the sensor in place. You should ensure that the sensor is fitted in the orientation shown here.



There is no polarity on the level sensors.

## Controller wiring

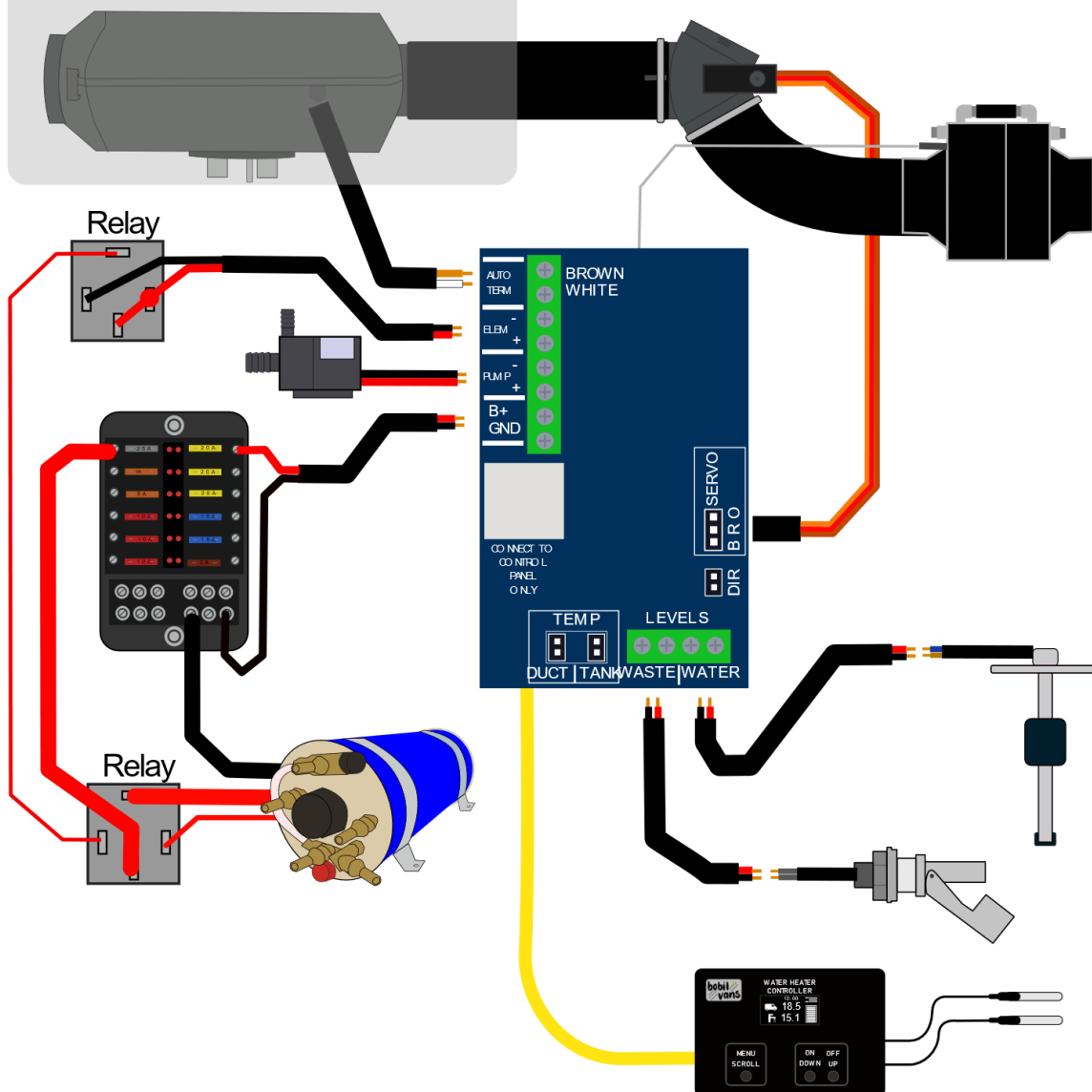
The system is made up of two boxes, one which can be mounted in the living area, and one which is situated near the heater itself. All connections are made from the slave unit except for the air temperature sensors which come from the cabin box.



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.

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.

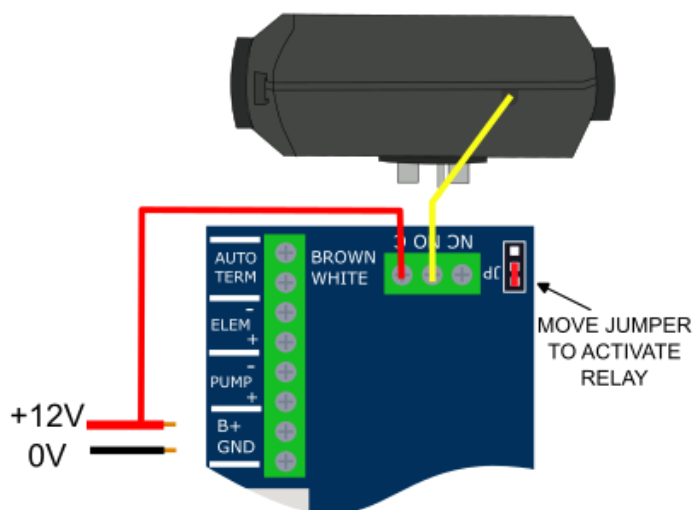
Only connect like this to Autoterm heaters



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.

If your heater has a 'remote start' function which requires a 12v signal, you will need to wire the heater using the relay. Connect the activation voltage to the common pin 'C', and the heater to the normally open pin 'NO'. Please check the wiring diagram of your heater before wiring anything up.



Eberspacher heaters have a yellow wire (called 'S+' or easystart in the documentation, normally pin 4 on the first connector out of the heater), marked 'ge' in the manual.

Some heaters can be made to run on full by interrupting one of the signal lines, if so you can wire these through the 'C' and 'NC' pins.

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.

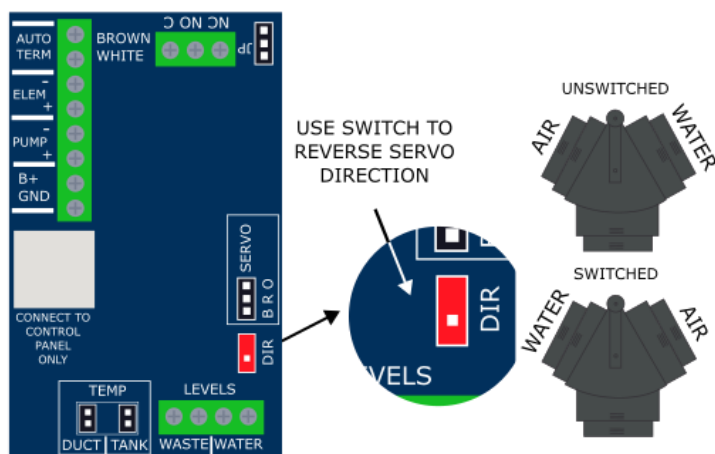
## Wire gauge

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.

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 13.4v 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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