

Practical Projects

Hints, tips and money-savers from PBO readers

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Second-hand heating

Tony Sumner saves over £1,500 by converting an Eberspacher D1LC truck heater for his Bavaria

Many sailors want a heater to extend the season or make overnight anchorages more enjoyable. But for my boat a heater kit costs about £1,000 and when fitted it would have cost over £2,200 – very expensive for just a few evenings' use during the year.

However, there is a brisk trade in Eberspacher D1LC ex-truck heaters at boat jumbles and on the internet auction site eBay. I bought mine at the Beaulieu Boat Jumble for £230, and the rest of the parts came from similar sources.

The D1LC produces 1.75kW of heat and is only suitable for a one-outlet system, but this does keep overall costs down and is perfectly adequate unless the outside temperature is below freezing.

Bench check

Although I'd seen the unit running before I bought it, I could not resist the temptation to run it on the bench before cutting holes in my boat. This was quite easy, and worth doing because it brought the exhaust system up to temperature and burnt off the

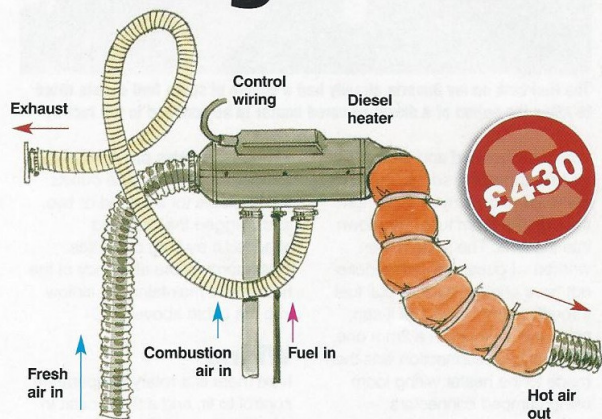
protective oil – causing masses of fumes which would have been very disturbing afloat.

Installation

Installation and operation details can be found in a technical manual downloaded from www.espar.com. The PBO 'reader to reader' forums on ybw.com also had some very helpful tips.

The heater has to be mounted so the exhaust is vented outside the boat but within 6ft 8in (2m) of the heater unit – which means the best place for the heater is normally in a stern locker. My heater is mounted on a stainless steel bracket bolted through a bulkhead.

The skin fitting is in the normal position for Bavaria yachts, adjacent to the water filler cap where it is protected from water and well away from any ventilation inlet. The exhaust pipe is 25mm flexible stainless steel but the skin fitting and exhaust outlet on the heater are, in fact, 24mm diameter. To prevent any leakage the joints were sealed with a thin strip of metal and heavy-duty jubilee clips. The exhaust reaches 150°C, so



The heater is simple: feed air and fuel in and get hot air and exhaust out

should be lagged. I used 10mm wood-burning stove door seal (a tip from ybw.com) which was close wound and attached at either end by jubilee clips. The surface temperature of the insulation is a much safer 80°C. The swan neck shape is to prevent water getting up the exhaust pipe and into the heater. If water is still likely to get in, then add a T-piece drain to a skin fitting.

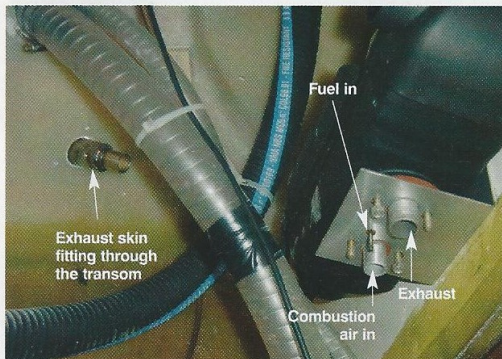
Fuel system

The fuel system should have been easy because Bavaria provides

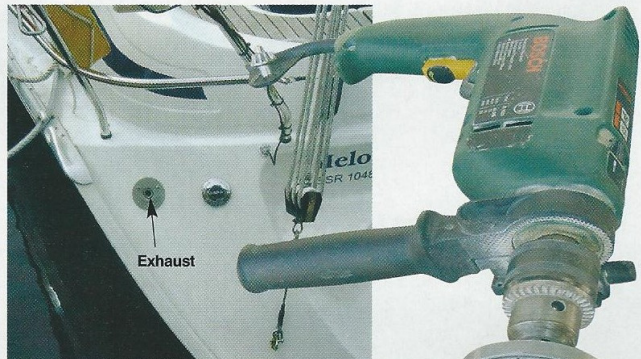
spare tank connections joined together by a short length of pipe.

Unfortunately these are below the top of the tank and as it was full, to prevent condensation, I got diesel everywhere!

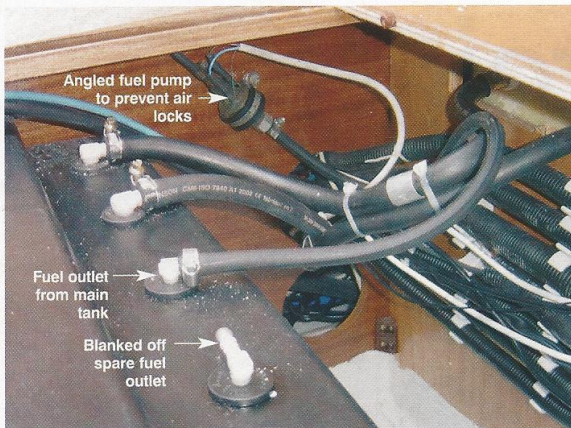
The outlet was connected with 6mm hose, to the pump on the bulkhead. This is angled to prevent air locks and connected to the heater with 2mm fuel hose. I tested the system by using a 12V battery, and flicked one wire on and off to provide 12V pulses to the pump (another tip from ybw.com). The



The heater was mounted on a bracket fixed to the fore-and-aft bulkhead. It just needed all the pipework plumbing in



Exhaust must be clear of through-hull ventilators. Transom was drilled with a trusty hole saw (right)



The fuel tank on my Bavaria already had a couple of spare fuel outlets fitted to allow the option of a diesel-powered heater to be installed in the factory

pump was primed and clicked but no fuel appeared, so I pushed some 2mm bore nylon tube right through the 6mm tube and down into the tank. The system then worked – I guess the pump does not have enough suck to pull fuel through a 6mm pipe, but it can cope with air locks in a 2mm one. The electrical connection was then made to the heater wiring loom using crimped connectors.

Ducting the air

I only wanted to heat the main cabin – the others can have the chill taken off by opening the cabin doors – but the difficulty was finding flexible aluminium tube at a sensible price.

Eventually I found Venture-Flex and paid £13.50 for 10m of 80mm tubing. This would not restrict the airflow and if, at a later date, I wanted to upgrade the heater I wouldn't need to change the pipe.

The pipe was attached by jubilee clips to the heater and fitted easily

through the holes provided in the bulkheads. Various pipe outlets are available for a pound or two, and I lagged the pipe and attached it by long cable ties. This improves the efficiency of the heater and maintains the airflow into the cabin above 70°C.

Wiring

Next there is a rotary temperature control to fit, and a thermostat in the air inlet pipe. The air inlet should really come from the cabin so the heater cuts out when the right temperature is reached, but because the heater uses about 20A to heat the starter glow plug as it turns on and off, it would soon run down the battery. So I have used a short length of the ducting tube to take the inlet air from the cool bottom of the vented lazarette for more consistent running of the heater.

The heater uses a lot of current when starting, and has a low voltage cut-off, so I wired it in to the

domestic battery with two 10m lengths of 16A insulated flexible cable, connected in parallel. This reduces the voltage drop and handles the current easily.

The heater should be connected directly to the battery to avoid inadvertently switching off the heater's main switch. It needs power for a five minute cool-down cycle and ignoring this means an expensive repair.

Fused connections were made with heavy-duty crimps and terminal connectors, and the cables were attached to the main wiring loom with cable ties. This prevents any movement and luckily, in my Bavaria at least, no wiring goes through the bilges.

The remaining question was how and where to fit the control switch. It is designed to be fitted to a thin metal truck dash panel – and I had to go through a 15mm plywood bulkhead – so the shaft was not long enough. Again I got a tip from ybw.com and cut away the bulkhead thickness from the rear.

I used a hole-cutter to cut to the correct depth, and then easily chiselled out the rest of the wood.

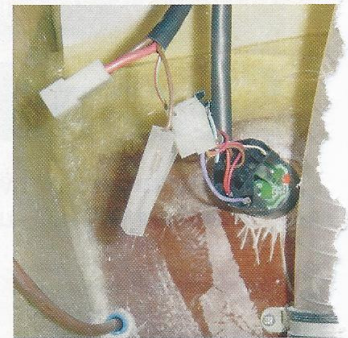
I must admit that I didn't realise the control knob simply pulled off. It has a light inside which is green



The exhaust swan neck is high enough to reduce the chances of sea water getting into the heater

when everything is OK, and flashes red when it is not. I assumed the bulb was in the knob with connections, but in fact the shaft is transparent and the light shines through it to the knob.

The loom connections are fully explained on the espar.com manual.



The back of the bulkhead had to be cut away because the thread on the control knob spindle was too short

Testing

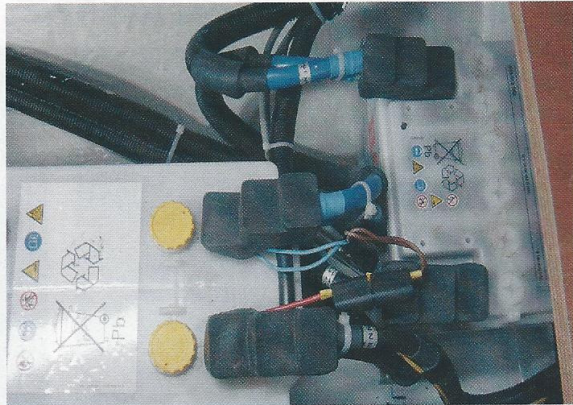
The wiring was re-checked, the fuse installed and the heater control was turned to maximum. After a few seconds the fan could be heard, and then the pump started ticking slowly. The pump and the fan gradually sped up, until it sounded like a small jet engine. I was a bit concerned that it switched off after 20 minutes, but by then the ambient temperature was very high!

Conclusion

The heater has exceeded my expectations, and has allowed many enjoyable evenings at anchor in remote places. The total cost was just over £400 making a minimum saving of £600 over the cost of a new heater kit.



All the bulkheads in my boat had already been cut away in the factory, so the flexible central heating ducting could be threaded through very easily



To reduce voltage drop, the heater was wired directly to the domestic battery with two 16A cables connected in parallel