

Defender Puma TDCi Webasto Installation

Introduction

These notes describe the fitting of a Webasto Thermo Top C heater to a UK 2007 Land Rover Defender TDCi 110 XS station wagon. The notes describe my experience of fitting so usual caveats apply. Also I'm happy to admit that there are probably better ways of doing things than the way I've described so if you're doing this yourself then don't follow these notes slavishly! They only apply to the Puma Defender but will however hopefully give you some idea of the process and some of the difficulties.

Acknowledgements go to 'dgardel' from the defender 2 forum www.defender2.net for information about the Webasto one way valve and Entreq www.entreq.de for inspiration about the mounting bracket. Some general notes first.

Thermo Top C - overview

The Webasto Thermo Top C is a 5KW diesel burning (petrol models also available) heater that uses its own separate fuel supply and fuel pump to generate heat independently of the engine. The heater heats up the engine coolant and pumps it round the engine and through the heater matrix using its own built in circulating pump. The unit is controlled either by a simple timer or additionally by either a remote key fob or a gsm telephone unit (so you can 'phone it up'). An electronic circuit board built into the unit controls the start up firing sequence and subsequent close down and also switches on the vehicle fan to blow warm air through the vehicle's heater matrix. Thus in typical use you might set the heater going half an hour say before setting off in the morning, the unit would pump warm coolant round the engine, reducing engine wear on start up and pass warm coolant through the vehicle's heating system which will warm the cabin and defrost the windows.

The Thermo Top C is used in all sorts of installations apart from the one described above. It is also a common heater on yachts, canal boats, motorhomes and as an auxiliary cab heater for artic trucks. As far as I'm aware Land Rover don't offer the Webasto as an option on UK spec Defenders though I believe it is an option on some export models, e.g. Norwegian Defenders. It's worth noting that a number of other Land Rover models, e.g. the Disco 3 (and a number of non-Land Rover diesel cars) have a Webasto heater as a standard fitment where it is used as a supplementary or auxiliary to the vehicle's own heating system. The reason for this is that modern diesel engines can be so efficient that they don't generate sufficient 'waste' heat to cater for all the vehicle's heating needs under adverse conditions. I'm not sure about specific model variants that Land Rover use however there is a variant of the Thermo Top called the Thermo Top Z which doesn't have its own circulating pump, relying instead on the vehicle's own coolant pump. Which brings us to the first issue when considering a Webasto, not all Thermo Tops are the same.....

Buying a Webasto Thermo Top C

For many the thought process goes something like this. You've seen the name Webasto (or Eberspacher who do a similar unit) on either Land Rover forums or in the magazines, thought, nice toasty cab on a winter's morning, done a search on ebay and seen Webastos for around £100 to £150, thought, at that price it's worth a punt and put in a bid. Of course at this stage you've no idea of what you're buying (surely they're all the same/similar?), what other bits you'll need for the

installation (fuel pump, bit of exhaust pipe?) or indeed how much it will end up costing or how difficult it is – well read on....

The first thing is to understand what you're buying. Whilst the base heater/burner units are similar the electronics are not and as well as a standard generic Thermo Top C, Webasto produce specific circuit boards for a number of different cars depending on how the manufacturer wants the heater to operate. This is why one Webasto dealer recounted the story of a telling customer who'd asked him to fit a unit designed for a BMW to his canal boat, that he'd need to have the boat extended by 15 feet to fit the X5 on the front if he was going to stand any chance of getting it to work properly! Joking aside this is quite important as the circuit boards are not available separately (from a Webasto dealer) so if it doesn't work you need to buy the complete burner unit with circuit board and they are around £300.00. Similarly if buying coolant pumps then check the type and the connections as whilst they look similar they're not. In short what you need is a standard Thermo Top C, be very careful/wary about buying something off a specific model of car unless you've seen it working independently of the vehicle in question.

Exhaust hoses and coolant hoses – Stainless steel exhaust hose needed is 22mm and a 22mm silencer. You'll need about 1m (possibly a tad more). The hose and silencers come in different sizes (24mm is also common), so check before you buy. Coolant hose is standard 19mm (3/4inch). I used 2 x Webasto pre-formed hoses (they have a U shape at each end) which were actually 18mm.

The other key part you'll need is a standard Webasto wiring harness and an oval timer switch (Webasto 1533). Whilst it's possible to make a wiring harness up the Webasto harness has all the right connectors, fuses, relays etc so is much easier. Also be aware that the burner unit is not driven by a simple on/off 12v supply, neither is the fuel dosing pump so don't be tempted to make up your own harness unless you're sure you know what you're doing.

The fuel line I used is 2mm plastic fuel line with 5mm reinforced hose rubber connectors. Just a note here, use the proper connecting tube, one lot I got off ebay was non-reinforced standard rubber tube which is useless.

I've included a list of all the parts I used in Appendix A. There are a number of suppliers on ebay including ones from Turkey. It's also worth looking on www.ebay.de as there's much more Webasto kit on there and most suppliers will ship to the UK. Be aware however that, as with all things on ebay, there's a risk. My understanding is that Webasto UK is unlikely to provide any warranty for anything you've bought from Turkey for example. For that reason you might find it better/easier to talk direct to a proper UK Webasto supplier. I've used two who were very helpful, Mellor Auto Electrical www.mellorautoelectrical.co.uk and Selby Boat Centre www.selbyboatcentre.co.uk In both cases I found it more helpful to either talk on the phone/visit than order online.

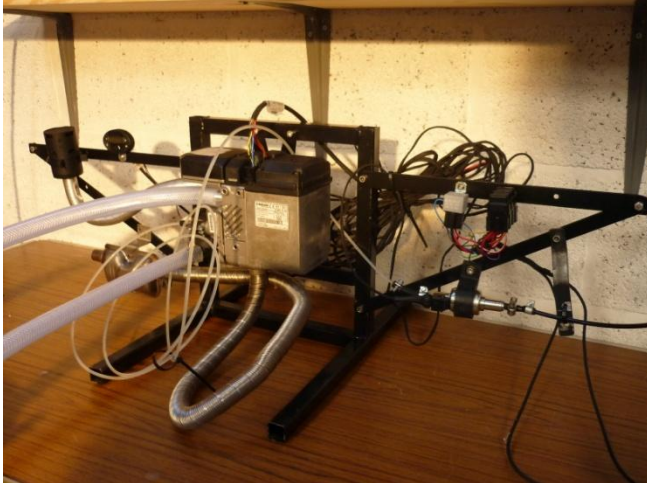
You will no doubt have gathered something about the way I got my parts list together from the above. Hindsight is a wonderful thing and the research was all part of the fun however if I was doing it again I would buy a standard Thermo Top C kit (including all the bits you need to install it) from a UK Webasto dealer (see example pic on the right). The logic



behind this is that I've probably spent a similar amount in bits (including some that should go back on ebay!) to what I would have spent buying a standard kit. I think there's a fair bit of margin on Webasto kit so you should be able to negotiate some discount. Secondly if buying a kit you know that it will work and you'll get a UK warranty if it goes wrong.

Testing prior to Installation

So you've got a nice shiny pile of bits on the lounge carpet (the wife's obviously out!) now you need to connect it all together to test it before even thinking about going near the Land Rover.



I built a test rig for mine which shows all the various components though it's not strictly necessary. Besides the heater/parts you'll need a diesel fuel supply and a charged 12V battery – the Webasto senses if the voltage drops below 10.5V and shuts down. One thing I learnt from testing mine (apart from the fact it didn't work at all to start with due to a faulty circuit board) was that you need

to get airtight connections in the fuel system, hence the need to use proper reinforced rubber hose for the connectors as opposed to any old rubber tube. This is particularly important when you come to install the fuel pickup pipe in the fuel tank for real and connect up to the dosing pump and getting it sorted when you're testing will make sure that there are no frustrations once you've installed everything in the vehicle. It sounds obvious now but most of my initial problems with the burner not firing up properly when testing were due to faults in the fuel connections.

Siting the heater unit.

You only need to open up the bonnet on a Puma to realise that it's fairly well packed in the engine bay and therefore very little room to install the Webasto. On the TD5 Defender there is sufficient room on the passenger side in front of the heater. LHD vehicles have a different layout and I have seen a picture of a Webasto in the engine bay of a LHD Puma. However for UK drivers it's not so easy. If you search through the forums you'll find people siting them in modified cubby boxes and also underneath the car attached to the chassis. Entreq www.entreq.de do a fitting kit but its not cheap and also leaves the unit exposed to road dirt and salt in the UK. I wanted to keep mine out of the weather so decided to mount it under the front wing on the driver's side. Again there are all sorts of downsides to this as it's a very tight fit (just behind the headlamp) and it's on the 'wrong' side of the car from the perspective of connecting up the coolant hoses, resulting in long pipe-work runs. In case you were wondering there isn't sufficient room to mount it on the passenger side under the front wing as the washer bottle is in the way (you



could always design a new washer bottle and mount it somewhere else to create room but my skills didn't extend to that).