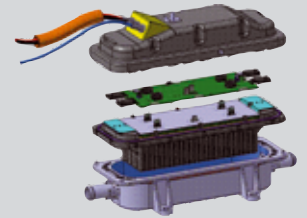# HV COOLANT HEATER TECHNICAL SALES NOTES

High voltage PTC heater that uses an external %heat demand to produce a user specified heat power from 0 to 6kW. The heater does not automatically maintain water temperature in the coolant circuit, it responds to user demand.

Heater is used to replace heat source (IC engine) for HVAC heater matrix when used on electric vehicle or to provide heat source when in electric mode on a hybrid vehicle.

Eberspächer (UK) Ltd
Tel: 01425 480151
www.eberspacher.com

DRIVING THE MOBILITY OF TOMORROW

Eberspächer

HV COOLANT HEATER
TECHNICAL SALES NOTES

1. High voltage PTC heater that uses an external %heat demand to produce a user specified heat power from 0 to 6kW. The heater does not automatically maintain water temperature in the coolant circuit, it responds to user demand.

2. Heater is used to replace heat source (IC engine) for HVAC heater matrix when used on electric vehicle or to provide heat source when in electric mode on a hybrid vehicle.

3. Heater construction – See Figure below.

4. 7 wires to the heater

    a. HV+ (250-450VDC), typ 350V DC.

    b. HV-.

    c. Interlock - In.

    d. Interlock - Out.

    e. 12V+ (9-16V range), typ 13.2V DC.

    f. 0v (from low voltage 12V supply).

    g. PWM heat demand signal 12V; active low (5k internal pull up resistor), 40-300Hz.

    Heater is supplied with bare cables grouped as a-d and e-g; single ended cable screens.

5. Interlock (passive) is used to sense if the connector is disconnected so high voltage is not available at the connector for safety. The interlock is a simple continuity loop.

6. HV supply to heater needs fusing, recommendation is 40A.

7. No water pump is supplied as part of the heater but can be required if required; inlet/outlet of heater is dia 20mm. 5-30L/min is required (see Ancillary Option A).

8. Either end of heater can be used as the inlet.

9. Any orientation for the heater, avoid mounting at top of water circuit as air lock likely. Heater will run and control itself even in the absence of water.

10. IP69 allows any location chassis mounting.

11. This is the standard V7.5 heater; there are no options on it. There are other heaters options that can use CAN or LIN connectivity but are not standard and expensive to develop for customer so unlikely to be available unless volume production.

12. Automotive pedigree, the specification details the comprehensive suite of tests that have been carried out on the heater that are typical of large OEM supply.

13. Safety (for example it conforms to ISO 6469 regarding harness colouring), a PTC style heater is inherently safer than a resistive element such that a heater can be run with no water in it for hours/days and it will regulate itself both as a function of the PTC element where self heating reduces power demand and also on board temperature sensing on the internal control pcb limits power and eventually turns heater off where as a resistive element potential carries on at full power.

14. On board electronic control allows comprehensive suite of fault detection including watchdog function on micro controller, over current and short circuit detection. If current >30A for more 80ms or >20A for 3-5 seconds then automatic power reduction.

15. Limited fault diagnostics, it is possible to monitor current when first switched on to identify the check function on the heater. If PWM is forced to 0 by the heater then heater is faulty and requires replacing.

16. Heater has 4 separate heater banks, 3kW, 1.5kW, 750W and PWM switched 0-750W. Selection of heater % demand activates combination of heater banks to achieve value required.

17. Regulation, the external heat demand enables the vehicle to limit the power demand of the heater so for instance if the battery is getting low it is possible to limit the power draw where as the typical competitive heaters are either on or off.

18. The heater can also be used for the HV dissipation of the vehicle HV circuit, i.e. turning heater on once HV has been switched off on the vehicle allows the heater to 'drain' the HV from the electrical circuit of the vehicle so allows safe working on the vehicle.

19. To reduce start up current the heater output increases at a rate of 260ms per % demand, so 26 seconds to achieve full output.

ANCILLARY OPTIONS

- Water pump: A 12V DC water pump (P/N 25 2526 25 00 00) is available rated at 720l/hour which is matched to work with the controller (option B). Other pumps in 12 and 24V DC are available on request.

- Controller: The heater typically uses a PWM signal generated by the customer's body controller. A separate controller (P/N 291L4501540) is available which generates the PWM signal from a customer 'on/off' switch on the dashboard and controls the heater to maintain the water temperature at 85°C. The controller can also control the heater to a low level PWM (25 or 50%) via a user signal if power consumption control is required, in this case the 85°C may not be maintained (dependent on the ambient temperature and heat load requirements). The controller works with input voltage 9-32V and will power the 12V water pump (Option A).

TOP COVER

PCB WITH SWITCHING

DIE CAST WITH PTC STONES

PLASTIC HOUSING FOR COOLANT