EBERSPACHER AND BELIEF MARINE HEATER INSTALLATION SUPPLEMENTARY INSTRUCTIONS

These notes are for Belief and Eberspacher marine air heater installations.

These notes are to be read with the normal RV instructions and take priority over the normal installation manual in areas of duplication.

dieselheat

Contents

Introduction

Congratulations on purchasing a high quality marine diesel heater from Dieselheat. Your kit contains everything you need to complete a professional, quiet, reliable installation.

This is a supplementary manual with marine specific sections which supersede or add to the matching sections in the RV manual. You should read the RV installation manual and then supplement the information contained in it with the extra marine specific information contained in this manual.

Remember - help isn't far away, read the instructions first, but then feel free to call us if you need further help.

Positioning the heater
Generally the location of the heater is driven by the following factors in order of criticality:
1.Physical space - you need a physical space that will fit the heater and exhaust system located as close to the area to be heated as possible.
2. Exhaust - length is limited to 2m and it needs to exit the boat in a position that will minimise the chance of water ingress. The exhaust tends to drive location of the heater.
3. Air Ducting - space to install and route ducting is needed and lengths and complexity should always be kept to a minimum.
4. Fuel/power/control - these are the most flexible so generally are the last consideration.

No heaters like sea spray, moisture of damp areas. Never put the heater in a sail locker, bilge or damp part of a boat.

Always locate the heater in a positon that allows access for servicing.

Carbon Monoxide Risk

A properly installed diesel heater with a marine exhaust presents a very low risk of carbon monoxide poisoning.

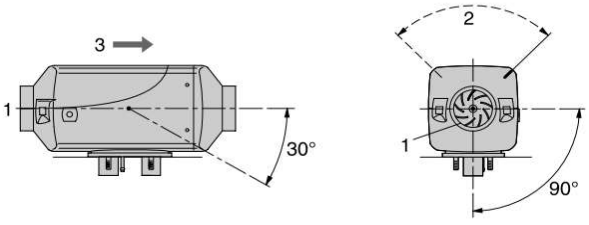
Dieselheat still strongly recommends the use of a CO Monitor in all boats to guard against CO from the engine, cooker and diesel heater should there be a failure in an exhaust or ventilation connection on any appliance.

AS A PRECAUTION ALWAYS INSTALL A CARBON MONOXIDE MONITOR.

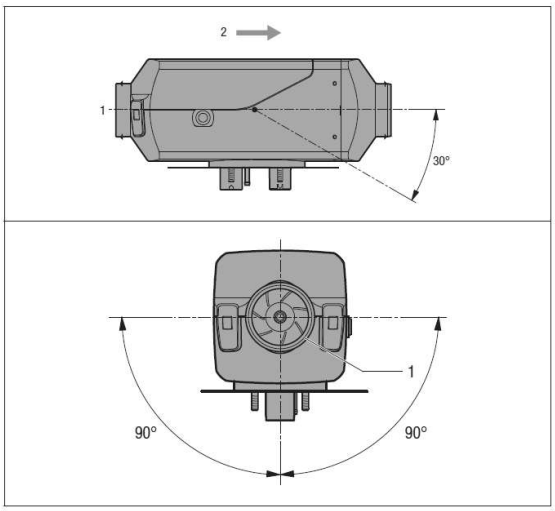
Heater Mounting

Heater Orientation
Don't assume the air heaters have to be in the normal orientation (exhaust down), they can side mount. In boats it often works better to place the heater on it's side as this facilitates getting the exhaust heading in an upwards direction more easily.

Belief 2.2kW or 4kW Orientation Diagram



Eberspacher D2L/D4L AS3 Orientation Diagram



1 Hot air intake opening (impeller)
2 Direction of flow

Note: Heaters not oriented in accordance with the manufacturer's instructions will not work reliably.

Dieselheat marine kits are supplied with stainless steel L shaped mounting brackets. These brackets can be attached to a bulkhead to allow horizontal heater installation or a horizontal surface for vertical heater mounting. It is also possible to fiberglass the L bracket directly to the inside of a boat hull.

Mount your heater mounting plate onto the heater using the 4 x 6mm nuts and washers, make sure that the rubber seal is between the heater and the mounting plate.

Generally for servicing the heater is removed from the bracket and the bracket is left in situ. Always mount the heater on the bracket in a way that allows it to be easily removed.

Exhaust

The metal on the exhaust system reaches temperatures of up to 300degC. Always use a lagged exhaust and ensure that the exhaust is not in contact with any materials which can be damaged/set alight by this heat.

Never use RV/Caravan style exhaust systems in a boat.

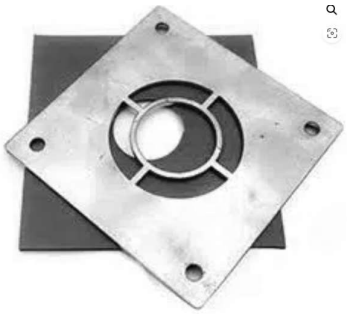
Always use high quality marine stainless steel exhaust system and clamps to ensure no exhaust gasses are vented inside the boat.

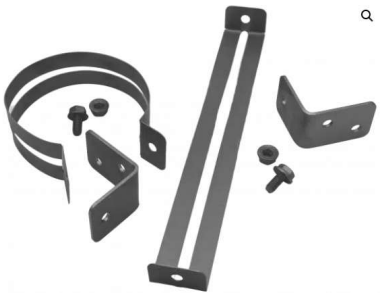
The total maximum length of exhaust is 2m for marine installations.

The Dieselheat marine heater kits include a 2m marine specific lagged exhaust pipe which has a 600mm inline sealed muffler in it. The exhaust is lagged and then wrapped in 60mm high temperature

ducting. It is recommended to leave all the ducting and lagging in place where possible. When passing the exhaust through bulkheads or tight spaces it is permissible to remove the outer ducting if necessary.

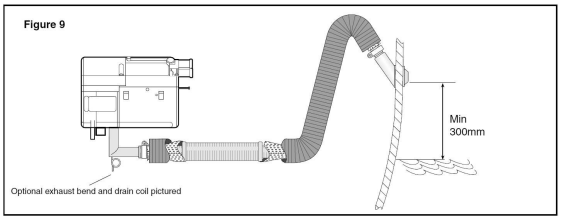
The Dieselheat exhaust floor plate with high temperature silicon seal is useful for neatly routing the exhaust through bulkheads.





The exhaust can be shortened on either side of the muffler by temporarily removing the ducting and lagging, cutting back the exhaust with an angle grinder and then replacing and shortening the lagging/ducting.

Always install the marine exhaust pipe with a gooseneck on the inside of a hull fitting to prevent water washing back into the exhaust system.



The muffler mounting clamps provided in the kit are designed to hold the muffler on the outside of the ducting to allow it to be properly secured.

Installing the hull/deck fitting

The position of the exhaust hull fitting will depend on several factors, where you have located the heater, whether your boat is sail or power, and the suitable surfaces available.

On a sailboat, the preferred location is on the transom, as it is normally the area least likely to be affected by seawater when sailing.

On a motorboat, the transom or side of the hull are suitable locations. However, when locating the hull fitting on the transom of a motorboat, the fitting should be positioned well above the waterline to avoid any following seas covering the fitting when the boat slows suddenly.

If using a closable deck fitting ensure it is located in a position that cannot snare

running rigging and is not a hazard for people walking on the deck.

To avoid potential safety issues the exhaust system must be installed according to these instructions.

- Under no circumstances connect the heater exhaust to an engine exhaust or any other exhaust system.
- The exhaust outlet must vent directly to atmosphere.
- Adequate clearance must be kept around the exhaust system to prevent interference with important functional parts of the boat, e.g. steering or throttle cables.
- Route the flexible exhaust giving clearance and consideration to heat sensitive components such as fuel lines, electrical cables, etc.
- Ensure the support brackets are used to secure the exhaust and avoid damage by vibration.
- Position the hull fitting so that either the heater combustion air or other inlets cannot draw in exhaust fumes.
- Ensure that the position of the hull/deck fitting allows fumes to exit freely and not affect nearby surfaces, e.g. fenders, ropes or moldings.
- To avoid water ingress, the hull fitting should be at least 500mm above the waterline and a suitable bend formed in the exhaust to prevent water collecting in the exhaust.

Use of Condensate Drains

Condensate drains on the exhaust outlet allow any condensation or splashed water that gathers in the exhaust pipe to drain into the bilge.

Generally condensate drains are only needed when the heaters are operated in cold conditions at low power for long periods of time. In this situation the exhaust exit temperature falls below the dew point and condensation can gather in the exhaust.

Our experience is that in Australian conditions condensate drains are generally not needed.

If the heater is ever observed to be gurgling, stops and water is found in the exhaust or it will be operated in very cold conditions we suggest installing a condensate drain.

Combustion Air

Dieselheat marine kits come with combustion air inlet silencers and are set up to draw combustion air from inside the boat.

Locate the combustion air inlet silencer next to the heater secured via cable ties to a bulkhead etc.

Always ensure the combustion air inlet pipe cannot touch the exhaust pipe.

Ensure that the cabinet in which the heater is installed is well ventilated to facilitate combustion air

Fuel System

Fuel Source
The heater can be connected to an auxiliary fuel tank, a day tank or to a connection point on the main fuel system or generator fuel system.

When connecting to main fuel systems it is important to ensure that the fuel take off point is not pressurised (downstream of any feed pumps) and that there are no opportunities for air to enter the fuel lines.

Connection points can include spare ports in the Racor filters, T into the engine fuel line, separate pickup in the fuel tank. The fuel line connector required is 3/16th inch for the diesel heater fuel line.

We do not suggest a tap on the fuel line is necessary as the fuel pump shuts off the fuel when the heater is not operating, however, if desired a shut off tap can be installed.

Locating the Pump
When installing the pump, do not put it in the bilge or other places where it will get excessive salt air/water exposure.

Instructions for Installing the Fuel system

- Only use a sharp blade to cut the plastic/rubber fuel hoses and pipes.
- Ensure all cuts are free from burrs and the fuel lines are not crushed or restricted.
- Fuel lines must be secured every 50cm to avoid noise and/or damage by vibration.
- Fuel lines must be protected from any mechanical damage.
- Avoid running the fuel lines where their condition and longevity may be affected by movement, vibration or heat.
- Do not secure the fuel lines to any exhaust system.
- Do not position any fuel connection where it could leak onto electrical connections or hot surfaces.
- The fuel must not be conveyed by overpressure in the fuel tank.
- Withdrawal of fuel after the boat engine fuel pump is not allowed.

Protecting the Pump
Both Eberspacher and Belief fuel pumps are not stainless steel and have a fairly light zinc anti corrosion coating.

It is recommended to spray the pump with an anti corrosive spray such as lanolin from time to time to protect it from unsightly external surface corrosion.

Air Ducting

Hot Air
Generally speaking Belief 2.2kW and Eberspacher D2L heaters work well with 1 or 2 x 60mm outlets. Beyond this the air

flow is quite low on each outlet. The minimum is 1 x 60mm outlet always open.

Belief 4kW or Ebersapcher D4L heaters will support 3 or 4 x 60mm outlets or 2 90mm outlets. The minimum is 3 x 60mm or 1 x 90mm outlet always open.

Longer and more complex ducting arrangements should be lagged (insulated) where possible to minimise heat loss and to avoid heating up cupboards etc.

When using closeable vents, it is always necessary to have one main airflow pathway which cannot be closed off to avoid the heater overheating. The minimum always open outlet flow path needs to be maintained as noted above.

Closeable vents are good for heating small ancillary spaces (beside the main space to be heated) like forward V berths or bathrooms where shutting the vent does not shut down the heater airflow below the minimum required number of open vents.

To do multi zone heating where larger spaces are to be optionally heated with main heater outlets such as an enclosed cockpit or cabin use flap valve Y junctions. These allow air to be distributed between 1, 2 or both zones without reducing the total airflow below the heaters minimum required.

All heaters have maximum permissible ducting lengths and airflow resistance. It is recommended to check the manufacturer's manual or talk to Dieselheat for specific assistance with larger and more complex ducting arrangements.

Return Air

Return air can be done via a duct or the air can be allowed to migrate back to the heater via cupboards, cabinets and other pathways.

Heaters with a return air duct tend to warm up the space they are installed in due to heat coming off the outlet end of the heater and the ducting.

If the heater is installed into the cabin area (under a seat or in a cupboard etc.) it is not recommended to use a return air duct. It is better to allow the heater to suck air from the space which will keep the space cool. In this case, an adequate return air grille must be installed to allow airflow into the space.

Avoid return air pathways that include the bilge or engine room as these will pick up smell and possibly moisture.

If the heater is installed in the engine room or bilge then a return air duct should be installed to draw air in from the cabin or outside.

Return air ducting is not normally lagged, and needs to be at least the diameter of the heater inlet.

Moisture Control
Allowing some outside air to enter the inlet of the heater will assist with moisture control in the boat as it forces air to be replaced by pumping in fresh outside air.

Outside air can be brought to the heater inlet via ducting, installing the heater in a cabinet with cockpit louvers like a lazarette or by installing it in a cupboard that has both internal and external return / inlet air pathways.

Electrical

Diesel heaters need plenty of power to start so direct connection to batteries is recommended.

In medium to larger boats which have switch boards and proper bus bars which are wired to the battery with heavy duty wiring then connection to the main busbars is acceptable.

Heaters can be damaged by cutting the power when they are operating so it is recommended to connect the heater to an always on bus bar.

If the heater is connected to a bus bar that has isolator switches extreme care needs to be taken to ensure that the heater has always shut down and cooled down before the batteries are isolated.

Do not install main power isolator switches on the heater as this tends to lead to people turning them off at the power not the controller - again damaging them due to circumvention of the cool down cycle.