



WALRUS 5000C

DIESEL COOLANT HEATER INSTRUCTION MANUAL

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PREFACE

Thank you for purchasing the WALRUS 5000C coolant heater. This instruction book describes the structures, working principles, installation and operation of the WALRUS 5000C. For correct use of the heater, please read this instruction book carefully before installation and operation. The instruction book should be saved in a convenient place for later reference. This instruction book is subject to revision without notice, but will conform to the purchased product. This manual

aims to answer all questions the user may have about the product, however, if you have any doubts or find anything incorrect in this manual, please contact us directly. Check the heater for any damage when unpacking and contact the dealer immediately if any damage is found. If any troubles arise during application, please contact General Components or the company who sold it to you. We shall do our best to provide service to you.

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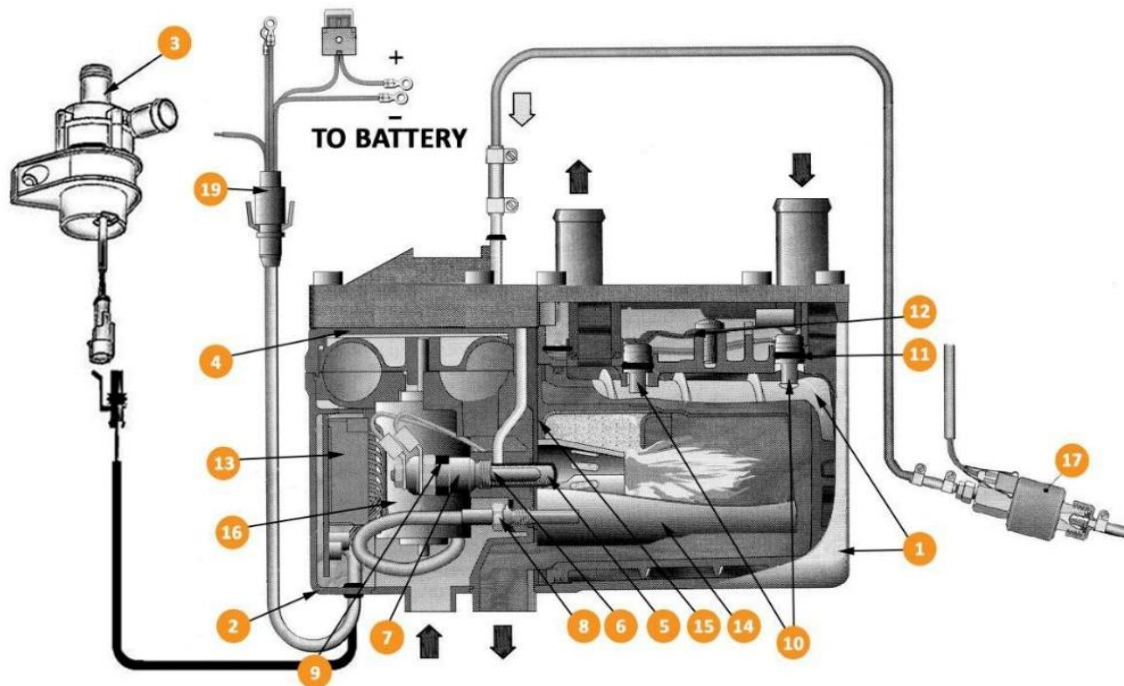
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INTRODUCTION

WALRUS 5000C is a 5kW modulating diesel fired water heater, which is suitable for providing hot water for heating purposes via radiators or matrix heaters and also domestic hot water via a calorifier. The WALRUS 5000C is fully automatic in operation featuring low energy glow pin ignition and microprocessor control for full temperature regulation. It has low servicing costs due to modular construction and its simple wiring means

simple, 2 wire system thermostats can be added into the installation. It can be applied to various heating purposes, whether its hot water heating for easier living or engine pre-heating and demisting. For both vehicle and marine markets, WALRUS 5000C is a great way to efficiently meet your heating needs. This kit includes everything necessary for installation excluding plumbing to the radiators and calorifiers.

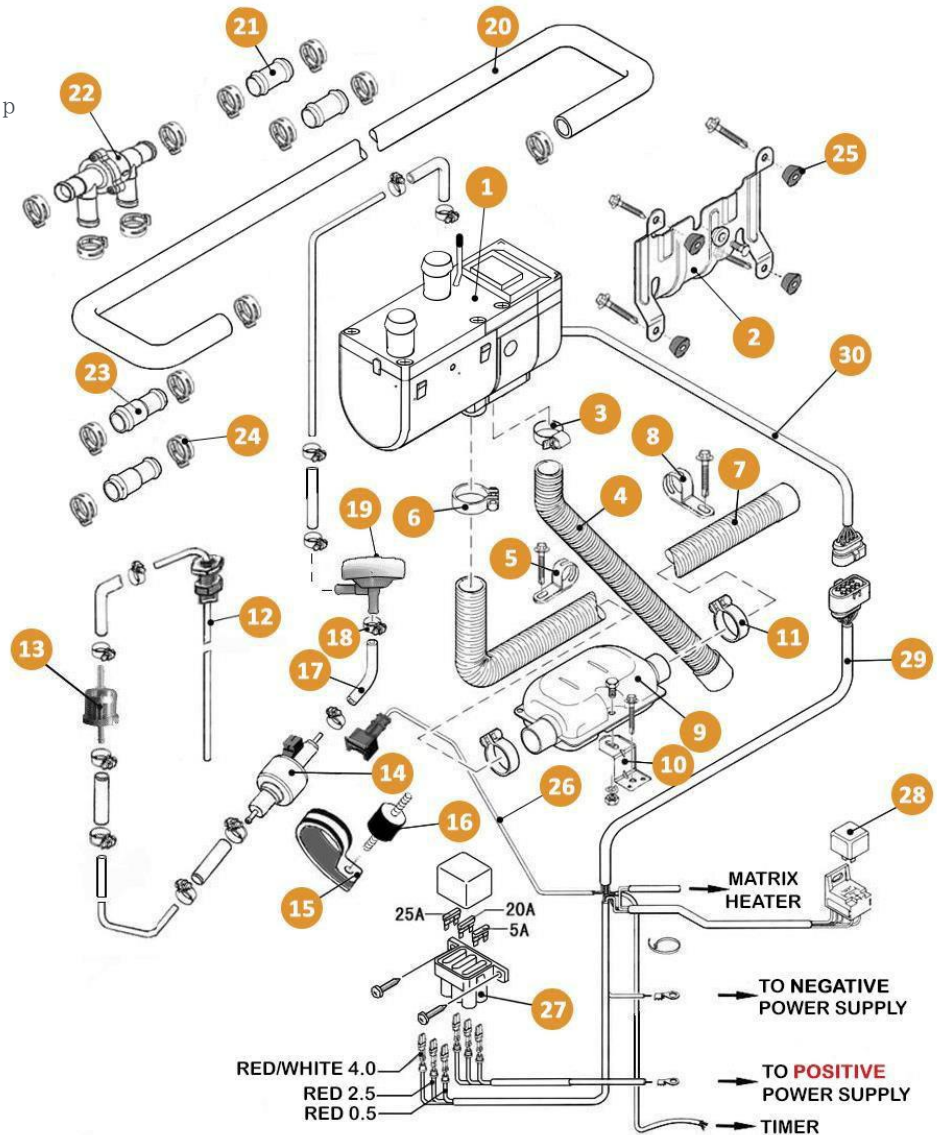
STRUCTURE



- | | |
|-------------------------------------|-----------------------------|
| 1. Heat Exchanger Assembly | 11. Temp sensor 'O' Rings |
| 2. Base Cover | 12. Leaf Spring |
| 3. External Water Pump | 13. E.C.U. |
| 4. Fan Cover | 14. Combustion Chamber |
| 5. Glow Pin Lining | 15. Combustion Chamber Seal |
| 6. Glow Pin | 16. Air Motor |
| 7. Glow Pin Housing | 17. Fuel Pump |
| 8. Flame Sensor | 18. Timer Control |
| 9. Holder | 19. Main Wiring Harness |
| 10. Temperature and Overheat Sensor | |

EXPLODED PARTS DIAGRAM

1. Heater Cover
2. Heater Mounting Bracket
3. Combustion Air Intake Clamp
4. 22mm Combustion Air Intake
5. Combustion Air Fixing 'P' Clip
6. Exhaust Clamp
7. 24mm Exhaust - 1M (*)
8. Exhaust 'P' Clip
9. 24mm Exhaust Silencer*
10. Exhaust Mounting Bracket
11. Exhaust Silencer Clamp*
12. Fuel Standpipe
13. Inline Fuel Filter
14. Fuel Pump
15. Fuel Pump Bracket
16. Anti-Vibration Mount
17. Rubber Fuel Connector
18. Fuel Line Connector Clamp
19. Fuel Damper (Optional)
20. Rubber Coolant Pipe
21. Coolant Pipe Connectors
22. Bypass Valve (**)
23. Reducing Pipe Connectors
24. Coolant Pipe Clamps
25. Coolant Pipe Clamps
26. Fuel Pump Power Loom
27. Fuse Holder
28. Matrix Heater Relay
29. Main Wiring Harness
30. Heater body Loom and Plug



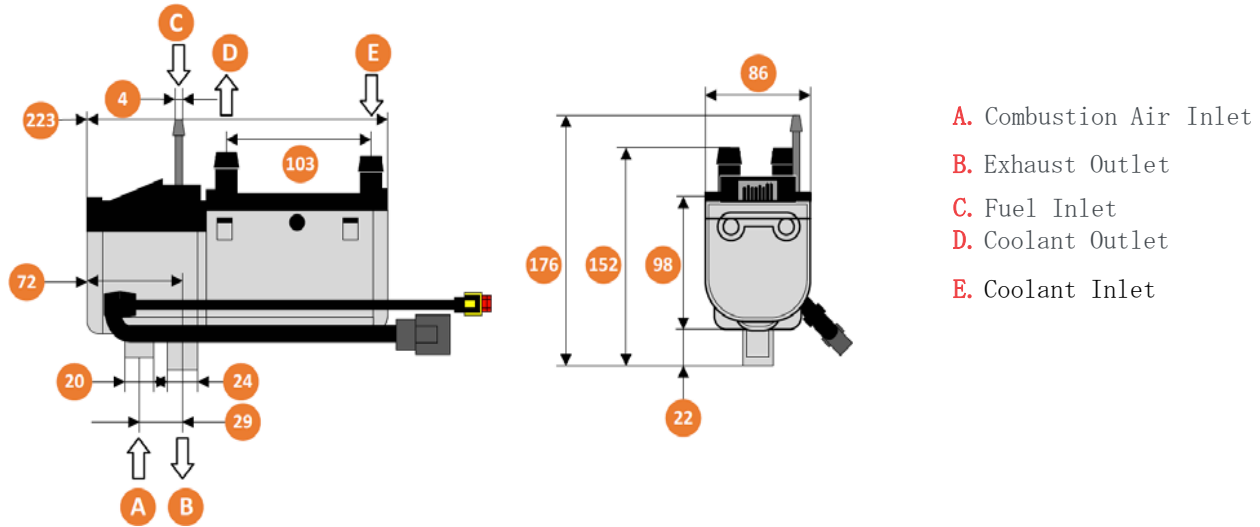
*Combined 2.3m stainless steel exhaust and silencer for marine applications

**Only supplied in vehicle applications

Do not install the heater anywhere near flammable sources, including the fuel tank, in closed spaces without ventilation or exposed in

the proximity of people without a proper heat shield.

DIMENSIONS, mm

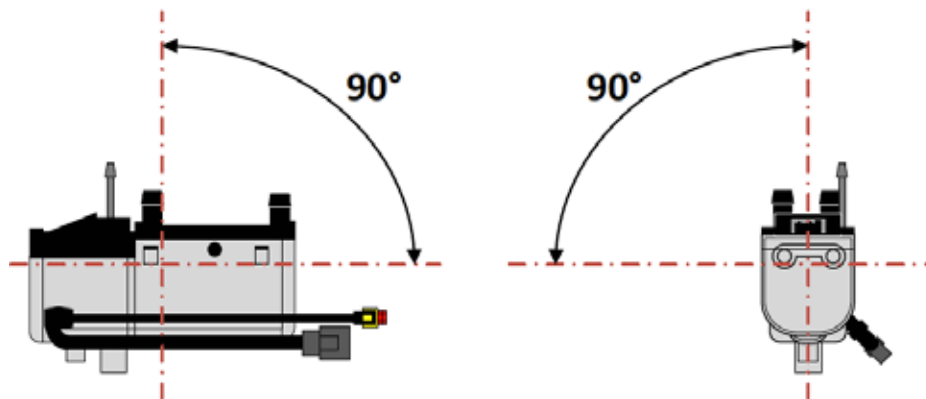


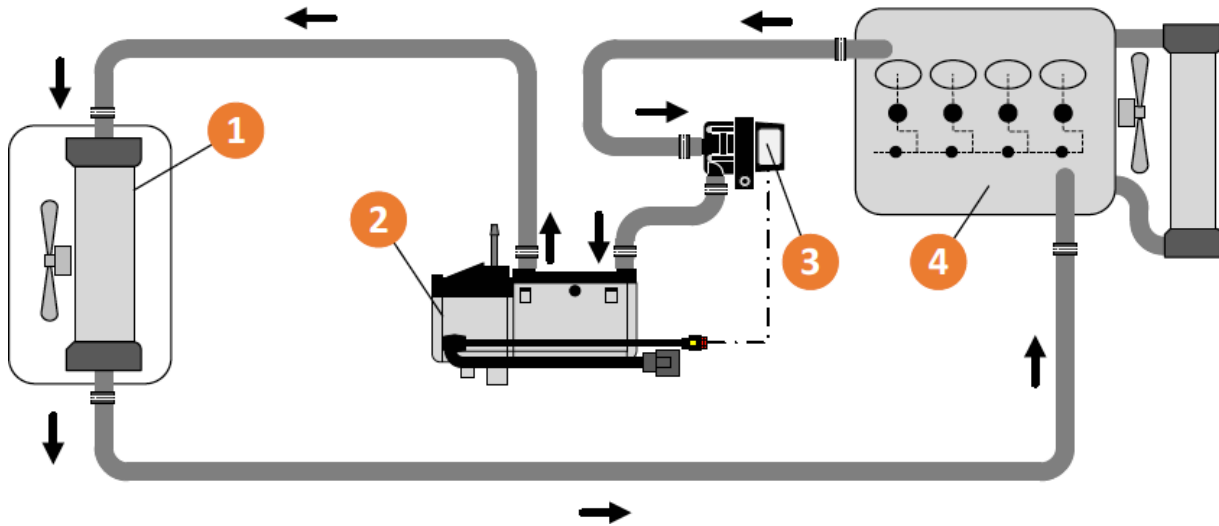
The heater should ideally be installed in the engine room, but with ease of access for removal and servicing of the unit.

The main heater body is mounted onto a suitable surface with a bracket. Ensure it is

lined up with all relevant holes in the correct position. Once it is in place the unit can be mounted to the bracket with the M6X10 bolt supplied in the kit.

ALLOWABLE MOUNTING ANGLE

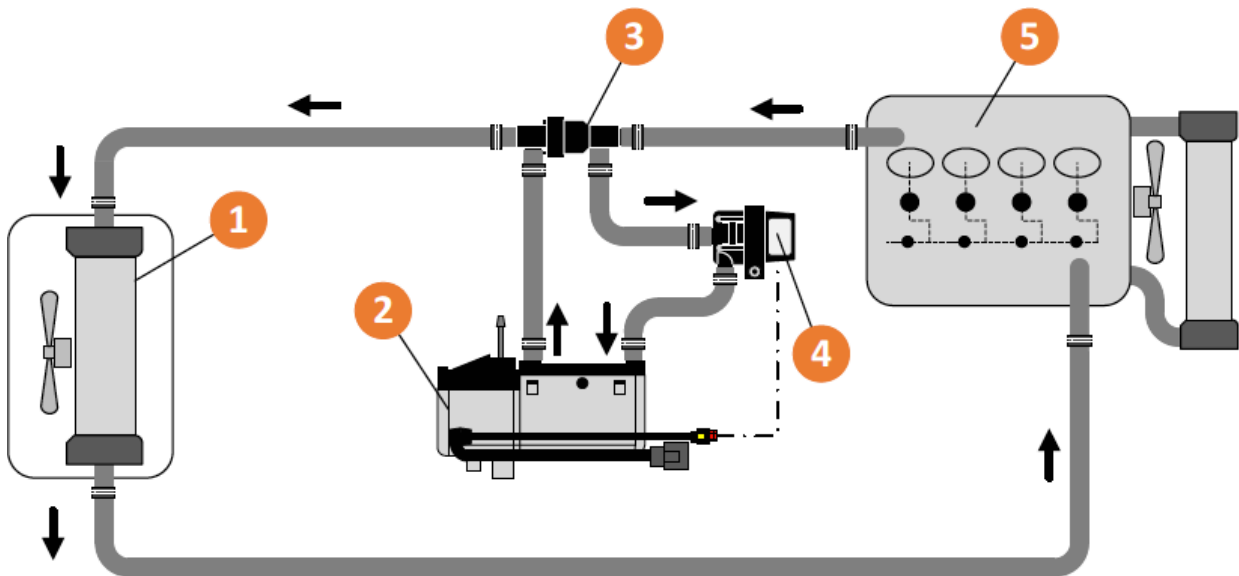




1. Matrix Heater 2. The Heater 3. External Water Pump 4. Engine

The figure above shows the installation of the coolant circulation system in a marine application, not using a bypass valve. Figure

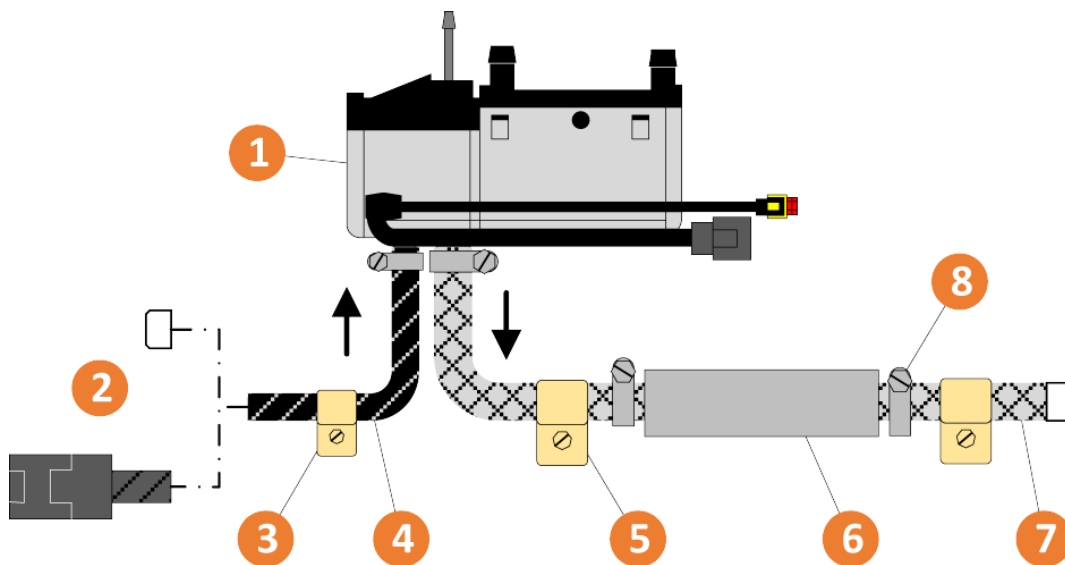
below shows the way to install the system in a vehicle, using the bypass valve.



1. Matrix Heater 2. The Heater 3. Bypass Valve 4. External Water Pump 5. Engine

To bleed the system, simply loosen the outlet hose from the heater and begin the system. Any excess air should immediately circulate out of the system and the hose can be re-tightened.

During installation, any existing coolant in the system should be flushed out with clean water and then re-filled with new coolant. Ensure you use the right coolant specified for your vehicle.



- | | |
|-------------------------------|------------------------------|
| 1. Heater | 5. Exhaust P-Clip |
| 2. P-Clip | 6. Exhaust Silencer |
| 3. Air Silencer or End Cap | 7. 24mm Exhaust with End Cap |
| 4. 20mm Combustion Air Intake | 8. Exhaust Clamps (*) |

Figure above shows the installation of the air intake and exhaust. Make sure you only use the appropriate pipes provided and use the clamps to secure them in position.

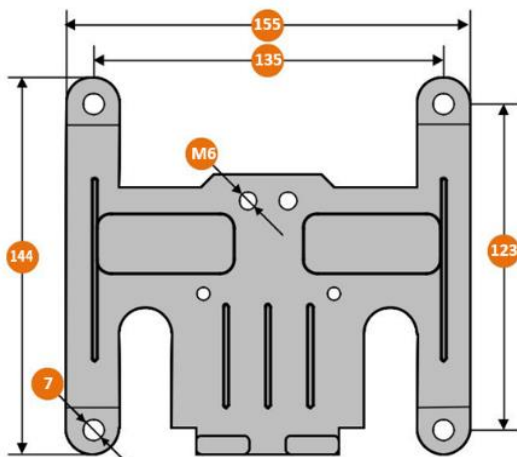
The air inlet pipe is used to bring in combustion supporting air into the furnace of the heater from outside of the vehicle and in the opposite direction of travel to ensure that the air is clean and doesn't clog up the pipe with dirt and dust.

(*) Not necessary when the silencer is

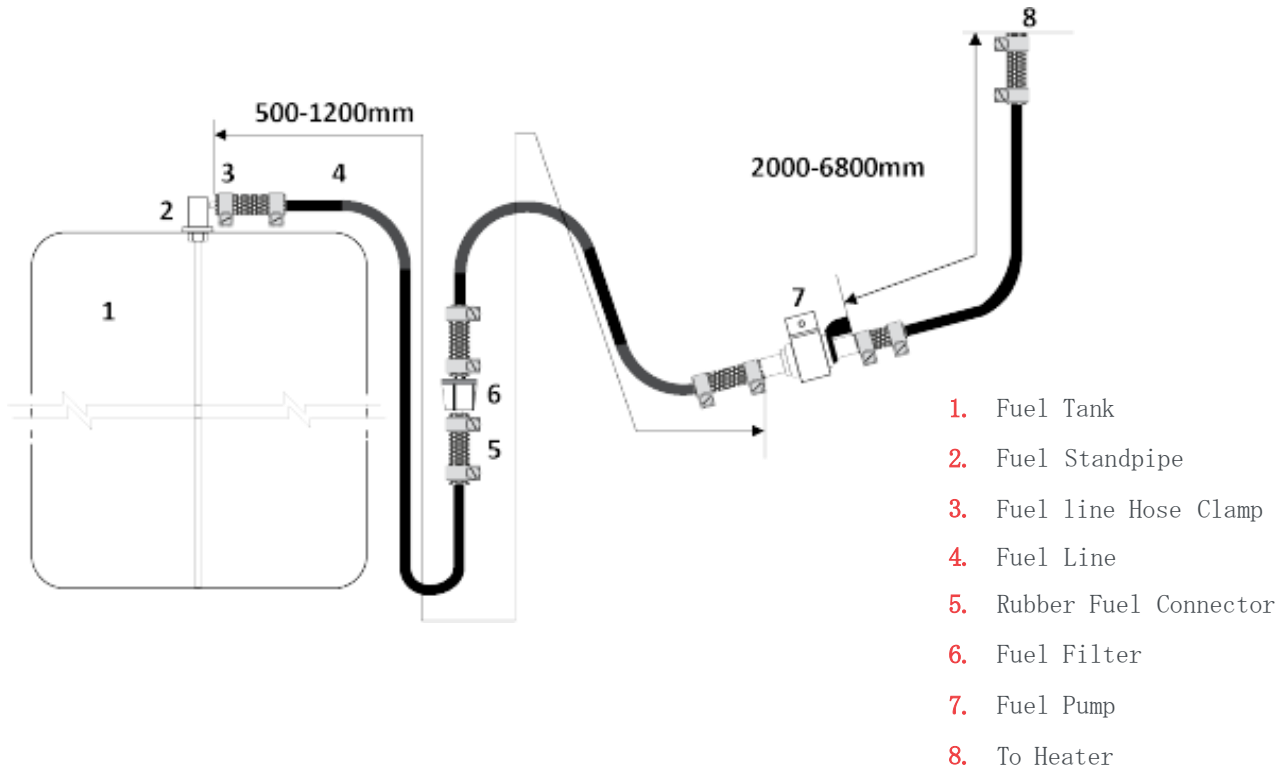
built into the exhaust as part of a marine application for example.

Make sure that the exhaust and any other parts that become hot during the operation of the heater are away from anything damaged by a high heat like wires or plastics.

Also, please ensure that the exhaust does not exit in such a way that the fumes are re-circulated by the air inlet pipe or can be inhaled by anyone.



The mounting bracket is supplied in the installation kit, along with a 100mm M6 hex bolt, used to secure the heater in place to the bracket using one of the two M6 taps, located near the center of the bracket.



FUEL PUMP ANGLE & SUCTION HEIGHT

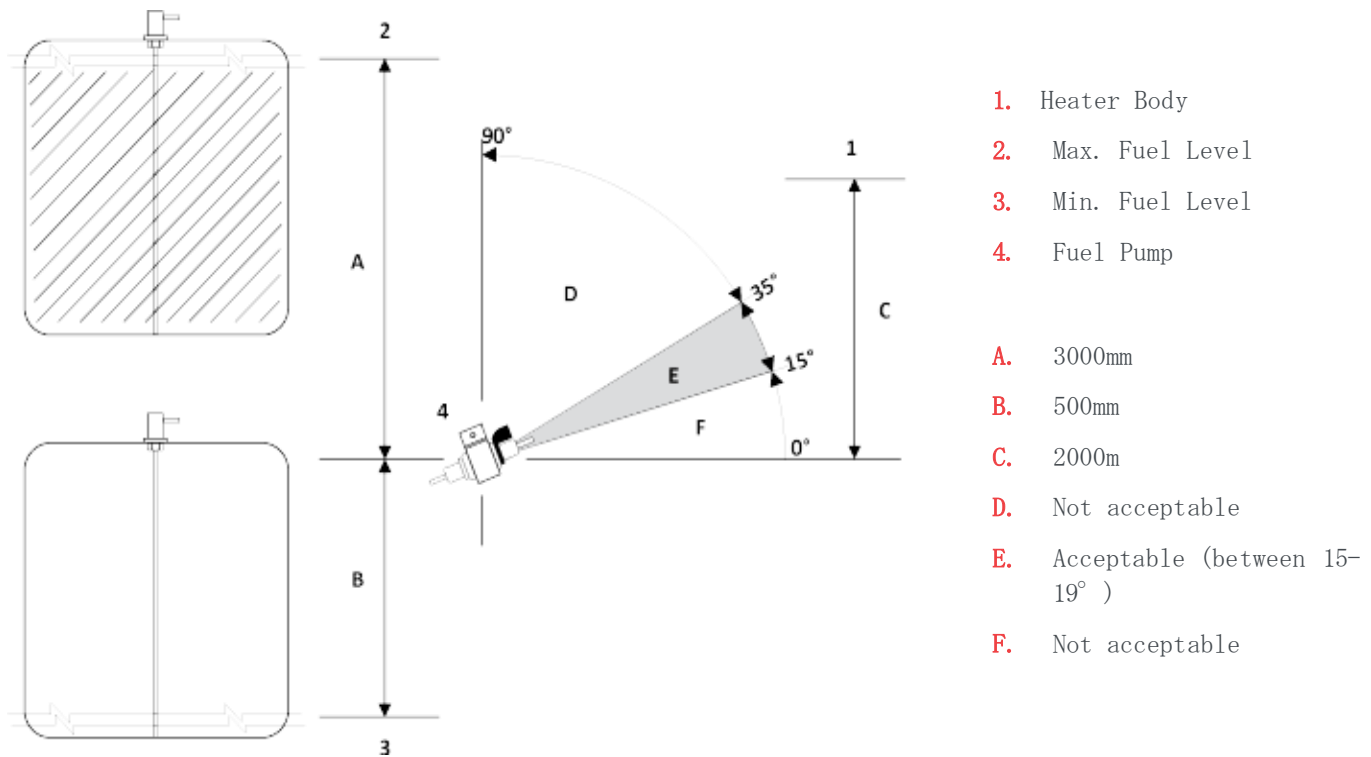
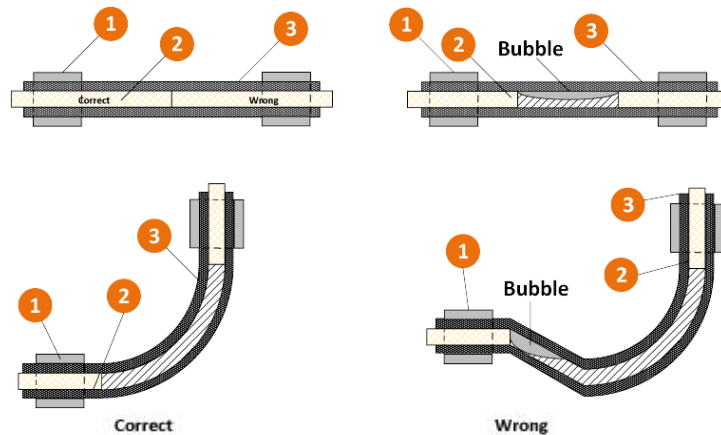


Figure shows the ideal way to mount the fuel pump. The fuel pump's outlet should tilt upward at an angle between 15°-35° (as shown above).

FUEL LINE CONNECTIONS



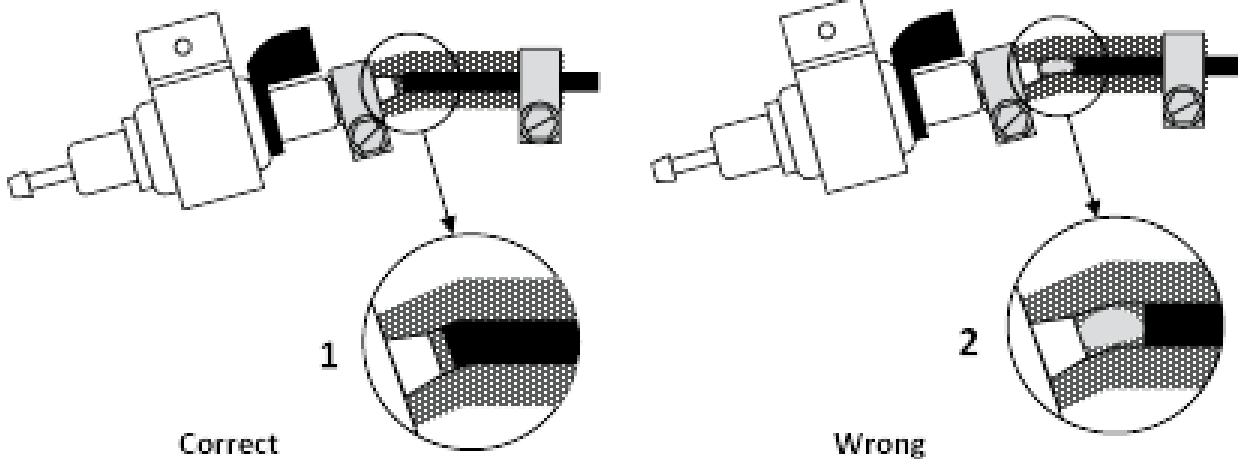
1. Fuel Connector Clamp 2. Fuel Pipe 3. Rubber Fuel Connector

Figures on this page show the correct way to connect fuel lines to prevent the build-up of air bubbles: Ensuring they are flush and minimizing bends.

When the fuel is being sucked from the vehicle tank, or an independent tank, a fuel standpipe is required. Make sure all the openings

are appropriate for the installation and a tight seal is maintained for the base of the standpipe (see pages 10-11).

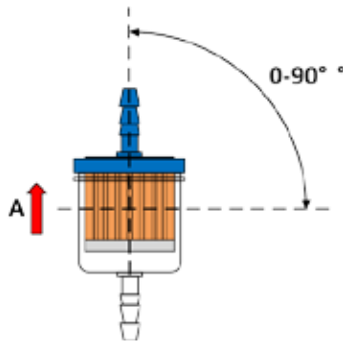
The bottom of the suction pipe should be about 30-40mm from the bottom of the fuel tank, to avoid sucking impurities or sediment from the bottom.



Only use the fuel line provided, ensure the pipe is placed away from any possible debris and avoid any sagging in the line. Make sure the

fuel line does not flow downward toward the fuel pump. This will prevent correct fuel flow and produce air bubbles in the line.

The fuel filter, fuel pipe and clamps should all be replaced after approximately 2 years of use.



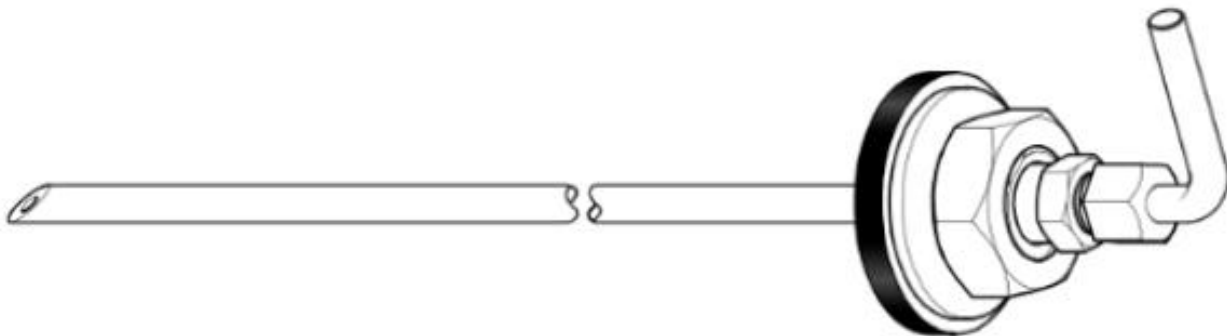
This figure shows the allowable, installations angle of the fuel filter, as well as the direction of fuel flow (arrow A). The filter should be fitted between the vehicles tank and the fuel pump.

FUEL Pick-up Tubes

A Fuel pick-up tube will need to be installed in the vehicle's fuel tank or an independent fuel tank depending on what the installation calls for. Sealant is not required

to fit the pick-up tubes.

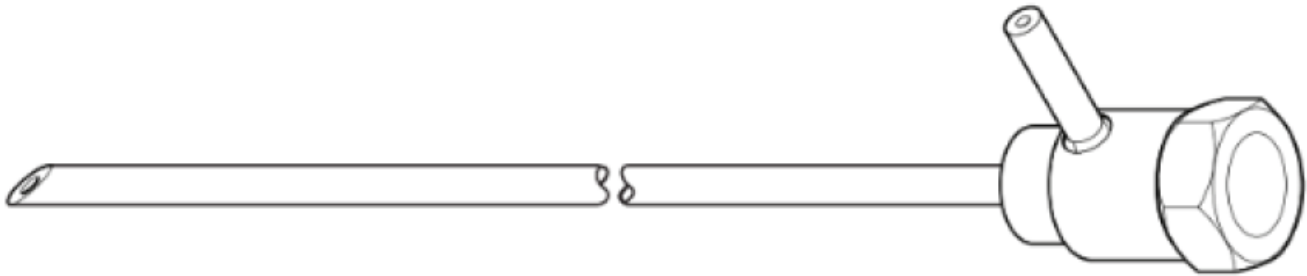
Depending on the pick-up tube provided in the kit, you will need to install the pick-up tube in one of two ways.



Usually supplied in Marine kits and supplied bent, this standpipe is installed like so:

- Drill a hole in the top of the vehicle's fuel tank $\Phi 22 \pm 0.2\text{mm}$ in size. Ensure it is smooth and clean of burrs
- Remove the top nut and washers and bend the standpipe straight
- Straighten the standpipe and cut it down to size if necessary

- Fit the standpipe by tilting it into position into the newly drilled hole

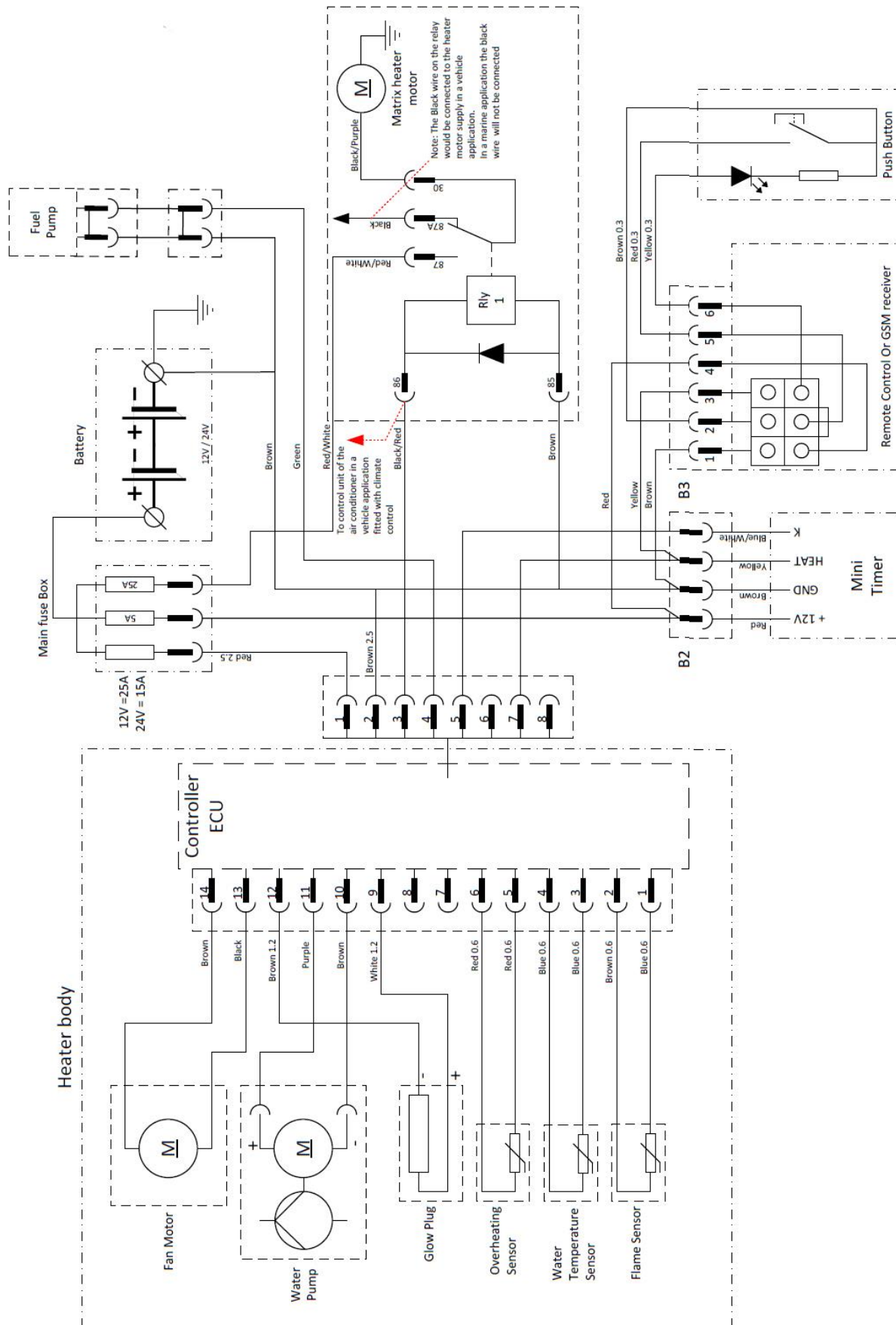


Supplied mainly in vehicle kits, this standpipe is installed like so:

- If possible, remove the sender unit from the vehicles fuel tank, this will make it easier to attach the nut securely back onto the standpipe
- Drill a $\Phi 6 \pm 0.2\text{mm}$ hole into the sender unit
- Remove the nut from the standpipe and feed it through the hole ensuring the rubber 'o' ring remains on the standpipe 'head' side
- Replace the nut on the standpipe to secure it safely to the sender unit.
- Replace the sender unit into the fuel tank.

The bottom of the fuel standpipe should be 30-40mm from the bottom of the fuel tank to allow enough suction of fuel and at the same time not allow impurities and sediment to be drawn up the standpipe.

WIRING DIAGRAM



CONNECTIONS

The connections on the main wiring harness have all been pre-fitted so that only simple connections to the corresponding plugs need to be made.

The main connections on the heater are to the main wiring harness, and to the water pump. The connections on the wiring harness are for the timer control, to the fuel pump, and to the remote control (if one is installed, otherwise it can be left unplugged), and to the main heater itself. The remaining wires are installed as follows:

Attach the positive line (4mm² red) to the positive terminal of the vehicle's battery and the negative (2.5mm² brown) to the negative terminal.

The black wire (4mm²) of the matrix heater's relay should be connected to the vehicle's fuse box, and the black/ purple wire (4mm²) should be connected to the positive terminal of the matrix heater.

All electrical components of the heater should join to the main wiring harness according to the corresponding connections. The only plug that can be left unattached is the remote control port (red, brown, and yellow) as it is an optional extra.

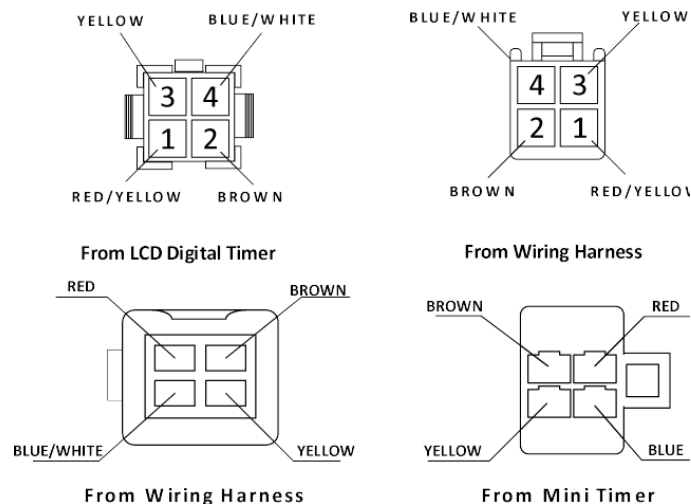
Note: All terminals should be connected, even if not in use to prevent short circuiting.

And when fitting the electrics, make sure any exposed wiring outside of the vehicle are well protected from damage or heat.

TIMER CONNECTIONS

All connections should be prepared for you in your kit. However, if changes need to be made, or terminals have become disconnected, use the

following diagrams to ensure the timer plugs are wired correctly.

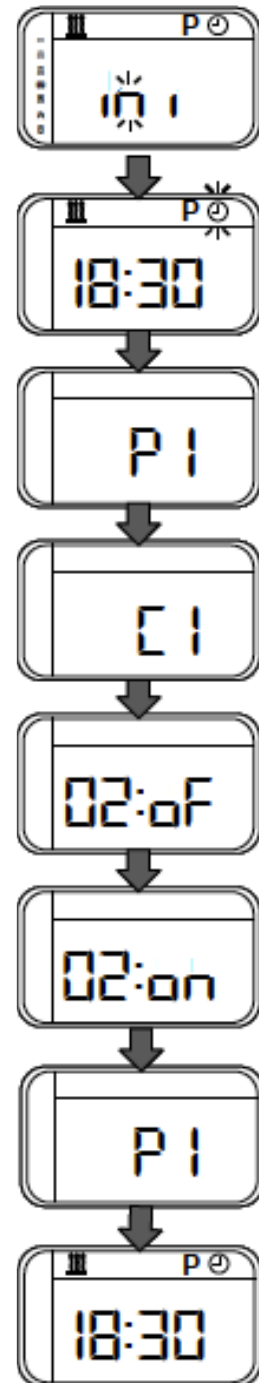


OPERATING INSTRUCTIONS

CHANGING LANGUAGE

The language should be set to English. However, if it isn't or the control has been reset to default settings it will revert to Chinese. Please follow these steps to convert the language to English.

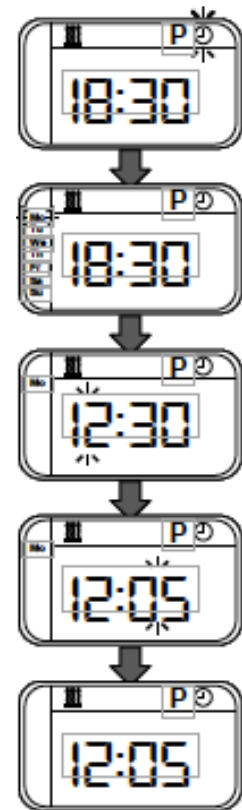
1. Turn on the control with the power button. Wait for the symbols to stop flashing, then press the power button again.
2. Navigate to the clock face symbol at the top of the control by using the arrow keys. When it is flashing press both arrow keys simultaneously.
3. P1 now appears.
4. Press ok and C1 will appear.
5. Keep pressing ok slowly until '02:oF' appears.
6. Press any of the arrow keys until the screen reads '02:on'.
7. Keep pressing ok until back to the P1 menu screen.
8. Press power button to return. The language will now be set to English.



PRE-SETTING HEATING TIMES

The digital control can be used as a 7-Day timer, and is able to be preset to switch on up to three times a day.

1. Navigate to the 'P' symbol, and press OK.
2. Using the arrow keys select the number 1 (flashing) at the top of the screen, and press OK - Number 1 is the first heating time.
3. Using the arrow keys, select 'ON', as this will allow the heater to switch on after the presetting is finished. Press OK to confirm.
4. Select the length of time you want the heater to run for by using the arrow keys.
5. L800 represents 800 minutes. Run time can be selected from 50-990. Press OK to confirm.
6. Select the hour you wish the heater to start at by using the arrow keys and then pressing OK to confirm.



MAINTENANCE

Once the heater is installed, it should ideally be turned on a few times to remove any air trapped in the fuel lines. Also ensure there is no leaks from the lines and that all electric terminals fit securely together.

INSPECTION CHECKLIST

- Check the air inlet and outlet for any pollution or foreign matters
- Clean the externals of the heater
- Check for corrosion or loose connections of the circuits
- Check the combustion air inlet and exhaust pipe for damage and clogs
- Check the fuel line for leaks

To ensure a long life of the heater it is advised that you run it for at least 10 minutes every month to prevent malfunction of mechanical parts.

After 10 years the heat exchanger, overheat

sensor and exhaust should be replaced by a professional.

If any welding is being attempted on the vehicle, please remove the positive power supply wire and earth it to protect the controller from any damage.

ADDITIONAL PRECAUTIONS

1. A trial run is useful before continual use of the heater to ensure all parts are working correctly. If lasting dense smoke occurs, irregular combustion noise, lingering fuel smell, or overheating happens, the heater should be switched off and allowed to cool. The fuse should also be removed, rendering the heater unusable. The installation should then be looked over, paying close attention to any loose connections of electrics, or pipework. A voltage check may be required, as well as checking fuel levels.
2. If the heater has not been allowed to cool down before restarting, don't be alarmed when ignition does not occur straight away. The heater will go into a self-check mode, and will only start when the internal temperature has cooled to appropriate levels.
3. If any problems persist, the heater and installation should be looked at by a trained professional.
4. Note: Once switched off, the water pump and air motor will continue to run. This is the cool down cycle, and is necessary to prevent damage to internal parts.
5. Be sure to turn the heater off before filling up the fuel tank.
6. The heaters should ideally be run for 10 minutes every month to prevent the fuel pump, or any moving parts from blocking.
7. The manufacturer will not be held responsible for any damage to the heater caused by anything that violates these instructions.

TROUBLESHOOTING

Fault codes will be displayed on the timer. Press the P key in the heating mode. The fault code will be displayed as XEXX, where X is the breakdown number and XX is the fault code (see next page). Use the arrow keys to view the breakdown information.

To eliminate the failure information; hold down the P key and press the heating button. The information will now be cleared. Press the heating button again to display the current time.

Treatment of usual troubles If the heater is switched on but does not work correctly, the following methods can be used for treatment.

- Turn off and then restart the heater. Do not restart the heater more than twice if the same problem persists.
- Ensure that the heater has cooled completely before attempting a restart, paying close attention if the coolant temperature has exceeded 70° C.
- Check the fuses
- Ensure that there is sufficient coolant in the system before starting-up, and never start the heater if the coolant has frozen.

Protected Circuit	Rated current of fuse DC12V	Rated current of fuse DC24V
Warm air blower motor circuit	25A	25A
Main circuit of heater	20A	15A
Operation circuit of heater	5A	5A

Fault Code	Description	Troubleshooting
10	Voltage too high <15 (12V) >29 (24V)	A) Check Voltage at the battery B) Check Voltage at the heater
11	Voltage too low <10.2 (12V) >20.5 (24V)	A) Check Voltage at the battery B) Check Voltage at the heater C) Charge Battery
13	Second Start Failure	A) Check coolant level - If necessary, refill once cooled and re-start heater B) Check whether the water pump is working
12	Software overheating	A) Check coolant level - If necessary, refill once cooled, and re-start heater
14	Overheating	B) Check whether the water pump is working
15	Overheat lock (10-time starting failure)	
17	Overheating hardware	
20	Glow pin broken circuit	
21	Glow pin short circuit	A) Clean the glow plug of any carbon build-up B) Change glow pin C) Change controller
30	Fan rotation speed is too high	A) Change controller
31	Broken circuit in the air motor	A) Check that the fan wheel is not rubbing B) Change the air motor
32	Short circuit in the air motor	C) Change controller
33	Fan rotation speed is too low	A) Check if the voltage of the heater is too low B) Check if the fan wheel is rubbing C) Change Controller
38	Matrix heater broken circuit	A) Check matrix heater motor
39	Matrix heater short circuit	
41	Water pump broken circuit	A) Check the water pipe for kinks and blockages
42	Water pump short circuit	B) Replace water pump
47	Fuel pump short circuit	A) Ensure the fuel pump lead is correctly installed
48	Fuel Pump broken circuit	B) Change fuel pump C) Change controller

Fault Code	Description	Troubleshooting
50	Starting Lock (see 13)	A) See 13
51	Temperature of the flame sensor is too high	A) Wait for flame sensor to cool and re-start B) Change flame sensor (normal temperature resistance $>1\Omega$)
52	Flame out three times (See 13)	A) See 13
60	Temperature sensor broken circuit	A) Check temperature sensor (normal temperature resistance is about 10Ω)
61	Temperature sensor short circuit	B) Change temperature sensor
64	Flame sensor broken circuit	A) Check flame sensor (normal temperature resistance is about 0.8Ω)
65	Flame sensor short circuited	B) Change flame sensor
71	Overheat sensor broken circuit	A) Check overheat sensor
72	Overheat sensor short circuit	B) Change overheat sensor C) Change controller
99	Invalid fault information	A) Change controller
D3	Maintenance Reminder	A) Clean carbon build-up inside the heater