



*Colours may vary*

# Diesel Air Heater – TH-RVH5

## User Manual

[Revision 1.0 May 2020]

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READ THIS MANUAL CAREFULLY BEFORE USE – FAILURE TO DO SO MAY RESULT IN INJURY, PROPERTY DAMAGE AND MAY VOID WARRANTY. • KEEP THIS MANUAL FOR FUTURE REFERENCE. • Products covered by this manual may vary in appearance, assembly, inclusions, specifications, description and packaging.

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# Safety

Safety messages are designed to alert you to possible dangers or hazards that could cause death, injury or equipment or property damage if not understood or followed. Safety messages have the following symbols:



You **WILL** be KILLED or SERIOUSLY INJURED if you do not follow instructions.

It is vital that you read and understand this user manual before using the product, including safety warnings, and any assembly and operating instructions. Keep the manual for future reference.

Safety precautions and recommendations detailed here must be fully understood and followed to reduce the risk of injury, fire, explosion, electrical hazard, and/or property damage.

Safety information presented here is generic in nature – some advice may not be applicable to every product. The term "equipment" refers to the product, be it electrical mains powered, battery powered or combustion engine powered.

- **Before Use** - If you are not familiar with the safe operation/handling of the equipment or are in any way unsure of any aspect of suitability or correct use for your application, you should complete training conducted by a person or organization qualified in safe use and operation of this equipment, including fuel/electrical handling and safety.
- Do NOT operate the equipment in flammable or explosive environments, such as in the presence of flammable liquids, gases or dust. The equipment may create sparks or heat that may ignite flammable substances.
- Keep clear of moving parts.
- Equipment may be a potential source of electric shock or injury if misused.
- Do NOT operate the equipment if it is damaged, malfunctioning or is in an excessively worn state.
- Do NOT allow others to use the equipment unless they have read this manual and are adequately trained.
- Keep packaging away from children - risk of suffocation! Operators must use the equipment correctly. When using the equipment, consider conditions and pay due care to persons and property.

## General Work Area Safety

- Work areas should be clean and well lit.
- Do not operate the equipment if bystanders, animals etc are within operating range of the equipment or the general work area.
- If devices are provided for connecting dust extraction / collection facilities, ensure these are connected and used properly. Dust collection can reduce dust-related hazards.



You **CAN** be KILLED or SERIOUSLY INJURED if you do not follow instructions.

## General Personal Safety

- Wear appropriate protective equipment when operating, servicing, or when in the operating area of the equipment to help protect from eye and ear injury, poisoning, burns, cutting and crush injuries. Protective equipment such as safety goggles, respirators, non-slip safety footwear, hard hat, hearing protection etc should be used for appropriate equipment / conditions. Other people nearby should also wear appropriate personal protective equipment. Do not wear loose clothing or jewellery, which can be caught in moving parts. Keep hair and clothing away from the equipment.
- Stay alert and use common sense when operating the equipment. Do not over-reach. Always maintain secure footing and balance.
- Do not use the equipment if tired or under the influence of drugs, alcohol or medication.
- This equipment is not intended for use by persons with reduced physical, sensory or mental capabilities.

## General Fuel Safety

- Petrol/fuel/gasoline is extremely flammable – keep clear of naked flames or other ignition sources.
- Do not spill fuel. If you spill fuel, wipe it off the equipment immediately – if fuel gets on your clothing, change clothing.
- Do NOT smoke near fuel or when refuelling.
- Always shut off the engine before refuelling.
- Do NOT refuel a hot engine.
- Open the fuel cap carefully to allow any pressure build-up in the tank to release slowly.
- Always refuel in well ventilated areas.
- Always check for fuel leakage. If fuel leakage is found, do not start or run the engine until all leaks are fixed.

## General Carbon-Monoxide Safety

- Using a combustion engine indoors **CAN KILL IN MINUTES**. Engine exhaust contains carbon-monoxide – a poison you cannot smell or see.
- Use combustion engines OUTSIDE only, and far away from windows, doors and vents.



You **CAN** be INJURED if you do not follow instructions or equipment damage may occur.



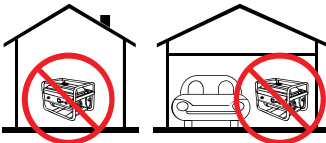
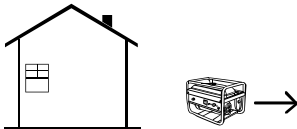
## General Equipment Use and Care

- The equipment is designed for domestic use only.
- Handle the equipment safely and carefully.
- Before use, inspect the equipment for misalignment or binding of moving parts, loose components, damage or any other condition that may affect its operation. If damaged, have the equipment repaired by an authorised service centre or technician before use.
- Prevent unintentional starting of the equipment - ensure equipment and power switches are in the OFF position before connecting or moving equipment. Do not carry equipment with hands or fingers touching any controls. Remove any tools or other items that are not a part of the equipment from it before starting or switching on.
- Do not force the equipment. Use the correct equipment for your application. Equipment will perform better and be safer when used within its design and usage parameters.
- Use the equipment and accessories etc. in accordance with these instructions, considering working conditions and the work to be performed. Using the equipment for operations different from those intended could result in hazardous situations.
- Always keep equipment components (engines, hoses, handles, controls, frames, housings, guards etc) and accessories (cutting tools, nozzles, bits etc) properly maintained. Keep the equipment clean and, where applicable, properly lubricated.
- Store the equipment out of reach of children or untrained persons. To avoid burns or fire hazards, let the equipment cool completely before transporting or storing. Never place or store the equipment near flammable materials, combustible gases or liquids etc.
- The equipment is not weather-proof, and should not be stored in direct sunlight, at high ambient temperatures or locations that are damp or humid.
- Do not clean equipment with solvents, flammable liquids or harsh abrasives.
- For specific equipment safety use and care, see Equipment Safety.

General Electrical Safety	General Electrical Safety	General Service Information
<ul style="list-style-type: none"> <li>Inspect electrical equipment, extension cords, power bars, and electrical fittings for damage or wear before each use. Repair or replace damaged equipment immediately.</li> <li>Ensure all power sources conform to equipment voltage requirements and are disconnected before connecting or disconnecting equipment.</li> <li>When wiring electrically powered equipment, follow all electrical and safety codes.</li> <li>Wherever possible, use a residual current device (RCD).</li> <li>High voltage / high current power lines may be present. Use extreme caution to avoid contact or interference with power lines. Electrical shock can be fatal.</li> </ul>	<ul style="list-style-type: none"> <li>Electrically grounded equipment must have an approved cord and plug and be connected to a grounded electrical outlet.</li> <li>Do NOT bypass the ON/OFF switch and operate equipment by connecting and disconnecting the electrical cord.</li> <li>Do NOT use equipment that has exposed wiring, damaged switches, covers or guards.</li> <li>Do NOT use electrical equipment in wet conditions or in damp locations.</li> <li>Do NOT use electrical cords to lift, move or carry equipment.</li> <li>Do NOT coil or knot electrical cords, and ensure electrical cords are not trip hazards.</li> </ul>	<ul style="list-style-type: none"> <li>The equipment must be serviced or repaired at authorised service centres by qualified personnel only.</li> <li>Replacement parts must be original equipment manufacturer (OEM) to ensure equipment safety is maintained.</li> <li>Do NOT attempt any maintenance or repair work not described in this manual.</li> <li>After use, the equipment and components may still be hot – allow the equipment to cool and disconnect spark plugs and/or electrical power sources and/or batteries from it before adjusting, changing accessories or performing repair or maintenance.</li> <li>Do NOT adjust while the equipment is running.</li> <li>Perform service related activities in suitable conditions, such as a workshop.</li> <li>Replace worn, damaged or missing warning/safety labels immediately.</li> </ul>





















### Diesel Air Heater Safety














- APPLICATIONS.** The air heater is not affected by the engine. It is used for the following vehicles with corresponding power. All kindsof auto and trailers. Construction and machinery. Agricultural machineries. Boat, ship, yacht. Caravans.
- FUNCTION.** Warm-up/Defrost glass. Heat and keep warm driving cabs, cabins, cargo holds, staff carrier interiors, caravans.
- DO NOT USE FOR LONG, CONSTANT HEATING OF:** Living rooms, garages, residential-purpose boats, people, animals and articles of objects.
- Do not install the heater around objects that can easily catch fire or get damaged from high temperatures.
- When installing the exhaust vent, prevent the exhaust from entering the heating space through the ventilator, hot air inlet and a window. Keep the exhaust pipe clear at all times. The exhaust pipe outlet should be kept away from flammable objects. Avoid heating and igniting any flammable objects/substances near the air heater.
- The combustion-supporting air, which is used for the air heater, should never be inhaled. Ensure that the air inlet isn't blocked, and keep the inlet open and clear of any obstacles. If the air inlet is equipped with a filter, keep it clean on a regular basis.
- The heater air is composed of fresh/circulating air, which is inhaled from the clean area of the air heater. The air inlet pipe should be protected with either a safety fence or other suitable tools. Always keep the pipe clear and open.
- To prevent people and objects from being injured/damaged, the hot air pipe should be installed in a place where it could not be accessed easily.
- DO NOT change/modify any internal components of the air heater.
- DO NOT use spare parts from other manufacturers.
- Always follow instructions and guidelines during installation and operation.
- Use only original attachments and spare parts during installation and maintenance.
- DO NOT use the air heater in places where there is flammable vapours or dust such as fuel depots, carbon storehouses, timber storehouses, granaries and diesel/petrol fuel stations.
- Turn OFF the air heater when re-filling it with fuel.
- If there is a fuel leak or discharge, immediately contact an authorised mechanic or professional for repairs.
- While working, do not cut-off the electric power directly to turn OFF the air heater.

 <b>DANGER</b> 		<p><b>GENERAL:</b></p> <ul style="list-style-type: none"> <li>• Do not operate in a hazardous location. Such areas include where there is a risk of explosion of petrol fumes, leaking gas or explosive dusts.</li> <li>• Do not operate in a confined area where exhaust gases or wood/charcoal/gas fumes could reach dangerous concentrations.</li> </ul> <p><b>PRODUCTS FEATURING AN ENGINE</b></p> <ul style="list-style-type: none"> <li>• Follow all warnings in the section titled "GENERAL".</li> <li>• Explosion hazard - never smoke while refuelling.</li> <li>• Take care not to spill fuel. When refuelling the engine, ensure that the engine has been allowed to cool. Prevent spilling of fuel as this may also ignite with a hot engine.</li> <li>• Never refuel while engine is running.</li> </ul> <p><b>GENERATORS</b></p> <ul style="list-style-type: none"> <li>• Follow all warnings in the sections titled "GENERAL" and "PRODUCTS FEATURING AN ENGINE".</li> <li>• The output of this generator is potentially lethal. The generator should not be connected to a fixed electrical installation except by an appropriately licensed person.</li> <li>• Not weatherproof – protect your machine. This machine is not weatherproof and should not be exposed to direct sunlight, high ambient temperature, damp conditions, wet conditions or high humidity conditions.</li> </ul>
<p><b>Using an engine or wood/charcoal/gas fuelled appliance indoors CAN KILL YOU IN MINUTES.</b>  <b>Engine exhaust and wood/charcoal/gas fumes contain carbon monoxide. This is a poison you cannot see or smell.</b></p>		
 <p><b>NEVER</b> use inside a building, home, garage, boat, caravan or tent <b>EVEN IF</b> doors and windows are open.</p>	 <p><b>Only use OUTSIDE</b> and far away from windows, doors, and vents.</p>	
<p><b>Avoid other hazards - READ MANUAL BEFORE USE.</b></p>		

## Safety Symbols

The product may have safety warning labels attached to it, explained below. Understand the symbols on your product and their meanings. If any stickers become unreadable, unattached etc., replace them.

 <p><b>Flammable Material Hazard</b> Flammable liquids, gases or substances etc may present. Avoid ignition sources and open flames. Danger of fire.</p>	 <p><b>Read User Manual</b> Read and fully understand product safety warnings, operation, procedures etc before using the product.</p>	 <p><b>Use Hand Protection</b> Wear appropriate hand protection and take due care as the product or use of the product may present hand hazards.</p>	 <p><b>Carbon-Monoxide Hazard</b> Do not use the product in confined areas or without adequate ventilation. Carbon-monoxide poisoning can be fatal.</p>
 <p><b>Electrocution / Electrical Shock Hazard</b> High voltage or high current electricity may be present or required by the product. Take due care when handling electrical products, cables, plugs and leads. Electrical shock can be fatal.</p>	 <p><b>Toxic Fumes / Dust Hazard</b> Using the product or by-products from use may produce fumes, smoke or particles that could be harmful if inhaled. Wear appropriate breathing protection and have adequate ventilation.</p>	 <p><b>Explosive Material Hazard</b> Combustible liquids, gases or substances etc may be present. Avoid ignition sources and open flames. Danger of explosion.</p>	 <p><b>Cutting / Amputation Hazard</b> The product may have blades, edges or mechanical devices that can cause severe cut injury to fingers, limbs etc. Take due care when handling and using the product.</p>
 <p><b>Crush Hazard</b> The product may have blades, edges or mechanical devices that can cause severe crush injury to fingers, limbs etc. Take due care when handling and using the product.</p>	 <p><b>Single Operator Only</b> The product must be operated by a single person only. More than one person operating the product may introduce additional hazards.</p>	 <p><b>Use Face Protection</b> Wear appropriate full-face protection and take due care as the product or use of the product may present face and eye hazards.</p>	 <p><b>Use Foot Protection</b> Wear appropriate foot protection and take due care as the product or use of the product may present foot hazards.</p>
 <p><b>Use Eye / Ear / Head Protection</b> Wear appropriate eye and / or ear and / or head protection and take due care as the product or use of the product may present eye, hearing and head hazards.</p>	 <p><b>Running Hazard</b> Do not run on or near the product as doing so may present a fall hazard.</p>	 <p><b>Diving Hazard</b> Do not dive into the product as doing so may present a neck / head injury hazard.</p>	 <p><b>Adult Supervision Required</b> Always supervise children and other users of a product to prevent drowning or injury.</p>
 <p><b>Skin Penetration / Puncture Hazard</b> The product may produce pressure, emit liquids or objects that can cause severe injury to fingers, limbs, blood etc. Take due care when handling and using the product.</p>	 <p><b>Hot Surface Hazard</b> Be aware that the product may produce high temperatures and hot surfaces that can cause burn injuries.</p>	 <p><b>Flying Debris Hazard</b> Be aware that the product or use of the product may present hazards produced by flying debris. Wear appropriate clothing and protective devices.</p>	 <p><b>Moving Parts Hazard</b> Be aware that the product contains or uses mechanical devices that move or rotate. Always wait for moving parts to stop fully before handling the product, adjusting, maintenance etc.</p>

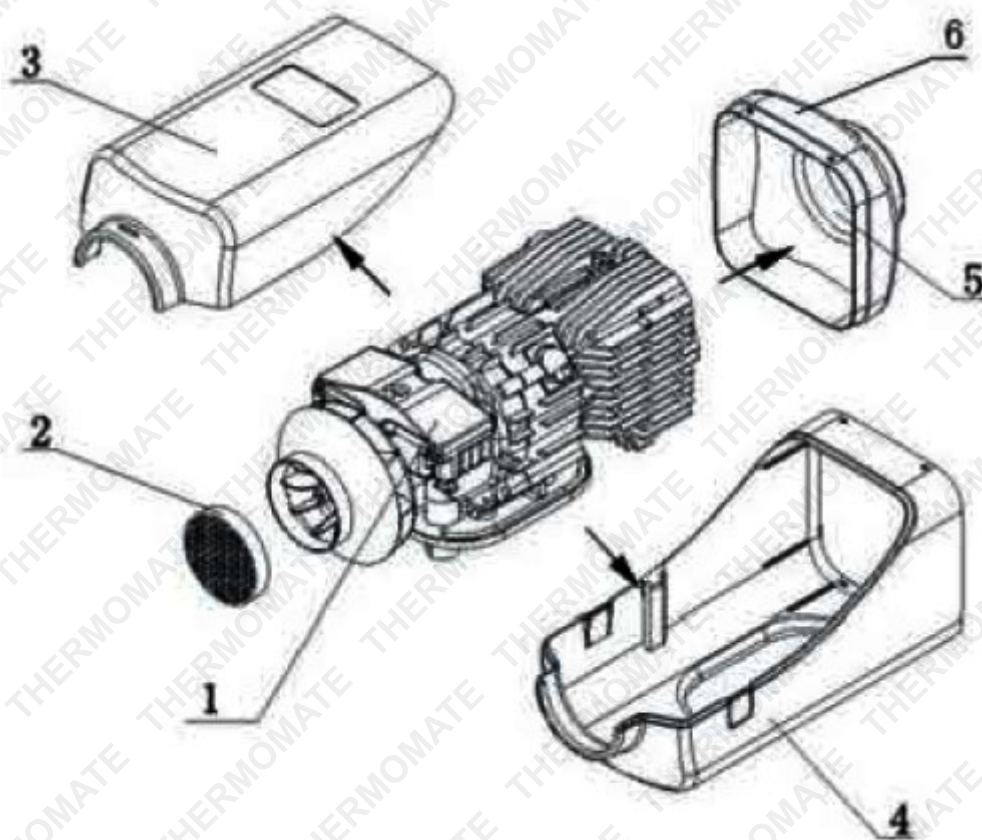
 <p><b>Carbon-Monoxide Hazard</b> Do not use the product in confined areas or without adequate ventilation. Carbon-monoxide poisoning can be fatal.</p>	 <p><b>Pull Hazard</b> Be aware that the product contains or uses mechanical devices that can pull in objects and can cause severe injury to fingers, limbs etc. Take due care when handling and using the product.</p>	 <p><b>Slope / Fall Injury Hazard</b> Be aware that using the product on sloping surfaces or in slippery conditions may present additional dangers from falls and contact with blades, moving parts, hot surfaces etc.</p>	 <p><b>"Slam Dunk" Warning</b> Do NOT attempt "slam dunk" manoeuvres as this may result in severe injury due to falling, product breakage or collapse etc.</p>
 <p><b>Electrocution / Electrical Shock Hazard - Outdoor</b> High voltage or high current electricity may be present or required by the product. Do NOT use in rain, damp or wet conditions. Electrical shock can be fatal.</p>	 <p><b>Electrocution / Electrical Shock Hazard - Disconnect</b> High voltage or high current electricity may be present or required by the product. Always disconnect the product from the electrical supply before handling the product, adjusting, maintenance etc.</p>	 <p><b>Power Line Electrocution Hazard</b> High voltage / high current power lines may be present. Use extreme caution to avoid contact or interference with power lines. Electrical shock can be fatal.</p>	 <p><b>"Kick-Back" Hazard</b> High level of "kick-back" hazard that can cause the machine to suddenly rotate towards operator. Kick-back injury can be fatal.</p>
 <p><b>Winch Operator Position Hazard</b> Do NOT stand between winch and load. Do NOT use winch to move people.</p>	 <p><b>Winch Lift Hazard</b> Do NOT LIFT load vertically. Use machine to PULL only.</p>	 <p><b>Cable Hazard</b> Ensure that load bearing cable is not kinked or knotted.</p>	 <p><b>Winch Cable Hazard</b> Ensure that there is a minimum number of cable coils on winching mechanism.</p>
 <p><b>Winch Hook Hazard</b> Carry hook to load – do NOT throw or run.</p>	 <p><b>Flash / Blinding Hazard</b> Wear appropriate eye protection for welding. Direct exposure to weld arcs may cause permanent eye injury.</p>	 <p><b>Laser Hazard</b> Laser may be in use – do NOT look directly at laser or allow others to.</p>	

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# Parts Identification



No.	Name
1	Main engine
2	Suction hood
3	Upper hood
4	Bottom hood
5	Air outlet
6	Rear hood

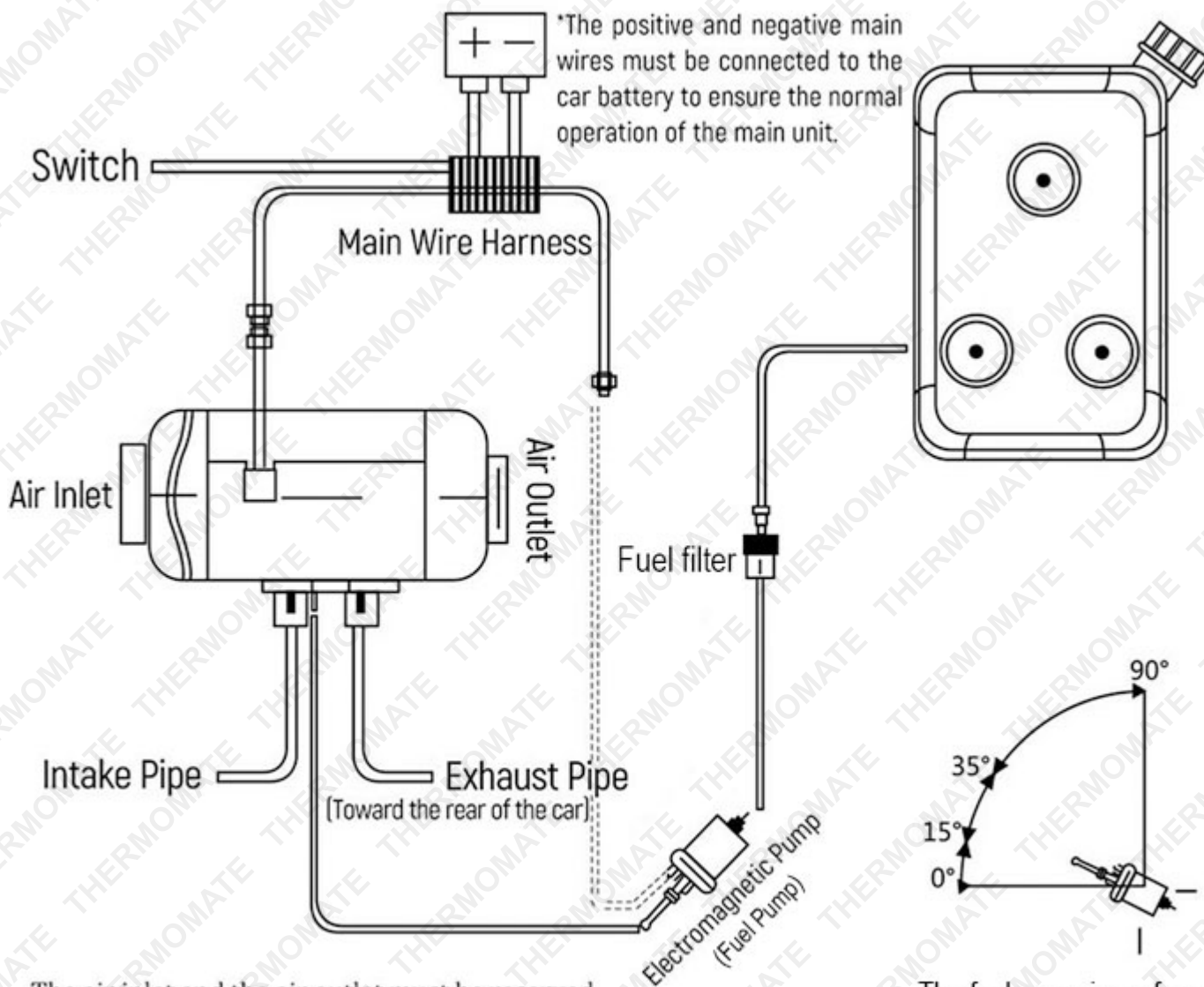


# Installation



**NOTE:** Only special-purpose parts can be used in the installation of the air heater. The following picture is the diagram for installation. The positions and ways of fixing various parts may vary from one automobile model to another, but the general principles must be followed in conformity with the requirements of this section. Otherwise, the air heater may not work normally, or safety problems may occur.

## Installation Diagram

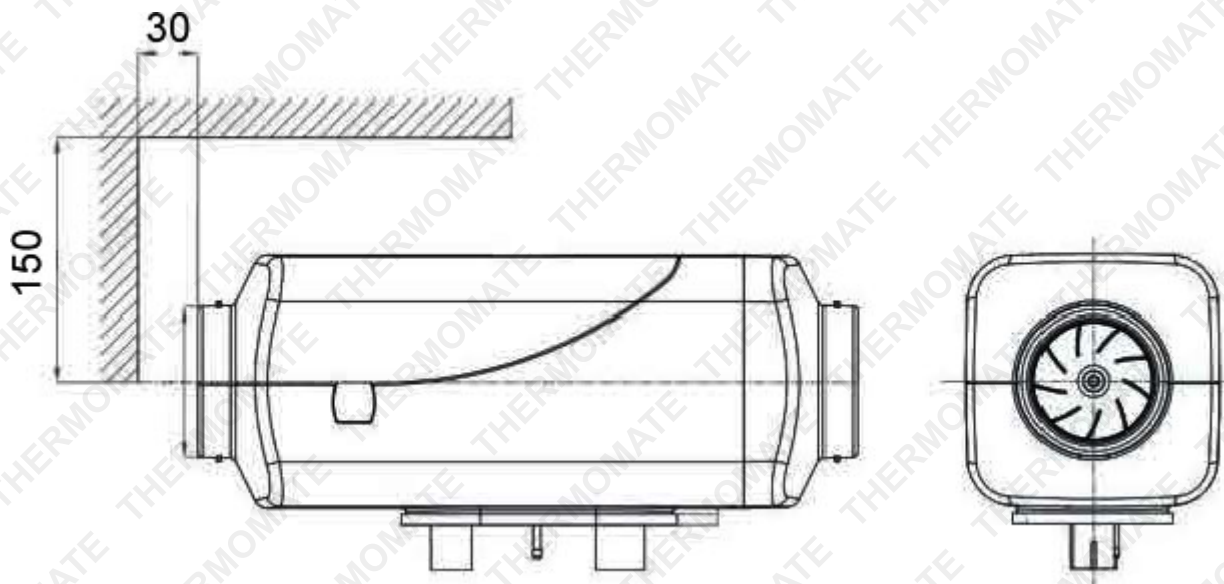


The air inlet and the air outlet must be reserved for a clearance of about 10 cm to ensure that the air inlet and outlet are cooled and unblocked.

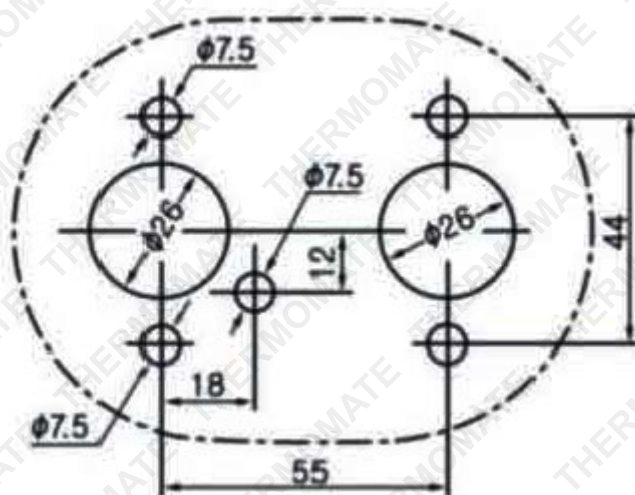
The fuel pump is preferred to be installed between 15°~35°.

## Main Heater Installation

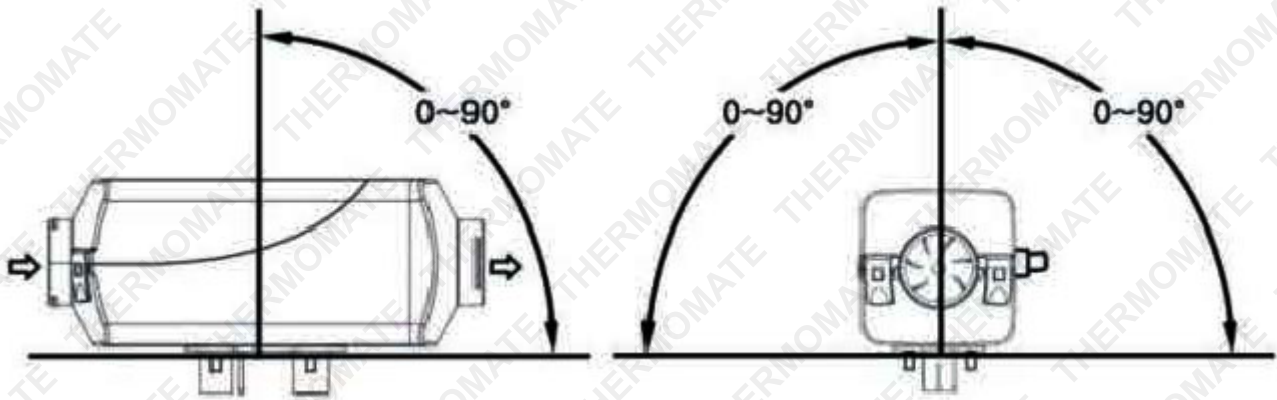
The main heater could be installed both inside and outside of the vehicle. If the heater is installed outside the vehicle, measures must be taken to avoid splashing water onto the heater. Ensure enough space is provided for installation for the convenience of the heating airflow and installation/maintenance of the main heater.



A tight and secure seal is necessary between the main heater and the installation surface on the vehicle. The special gasket supplied by the manufacturer must be inserted in, installation surface must be even, and its parts at the installation bases of the main heater should have unevenness less than 1 mm. After drilling installation holes, evenness must be improved according to this requirement. While installing, rotate the four M6 nuts provided until they are tight and secure. For re-installation of the main heater, a new gasket must be used to replace the old one.



Pay close attention to the inclination angle; it should not exceed the limit, or normal operation will be affected. Direction for installation of the main heater is shown in the following image.



After installation of the main heater, check and make sure that there is no contact or friction between the blade wheel of the fan and other nearby parts to ensure smooth operation.

## Installation of the Air Heating System

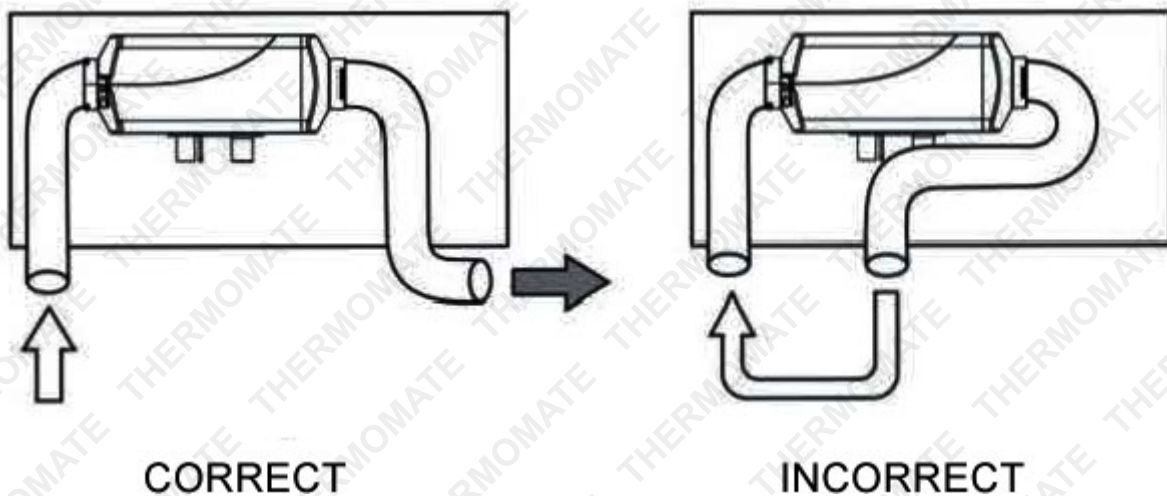
The air heating system of the heater should not be connected to the air channel of the vehicle. Either an independent outer circulation or inner circulation mode can be adopted.

When an external heating air tube is attached to the heater, the tube diameter should not be smaller than 85mm. The material should be capable of resisting high temperatures. The maximum pressure drop between the air inlet side and outlet side of the air heating system should not be higher than 0.15kPa.

The hot air from the heating system should not make contact on parts that are unable to resist high amounts of heat. In passenger vehicles, the hot air vent should not be blocked by passengers. A self-provided protective net can be installed, if necessary.

For a heater that's working in external circulation mode, the position of the air inlet port should ensure that under normal operation, no splashes of water can be sucked into the heater and that no exhaust from the engine can be sucked in.

For a heater working in internal circulation mode, measures should be taken to avoid recycling the supplied hot air back into the air inlet port. If there is no air inlet tube attached in this mode, an air inlet hood with grids must be installed at the air inlet port of the main heater. The inlet air should be drawn from the cold area of the compartment, such as under the seats.

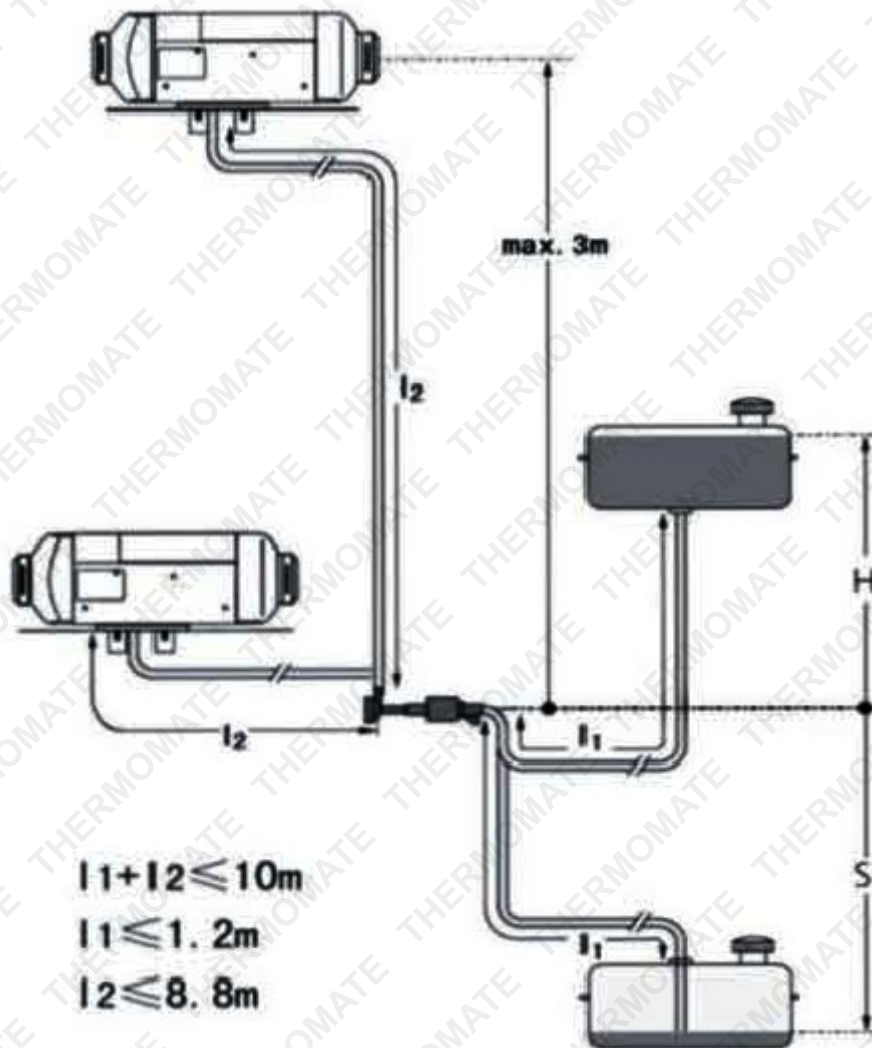




## Installation of the Fuel System

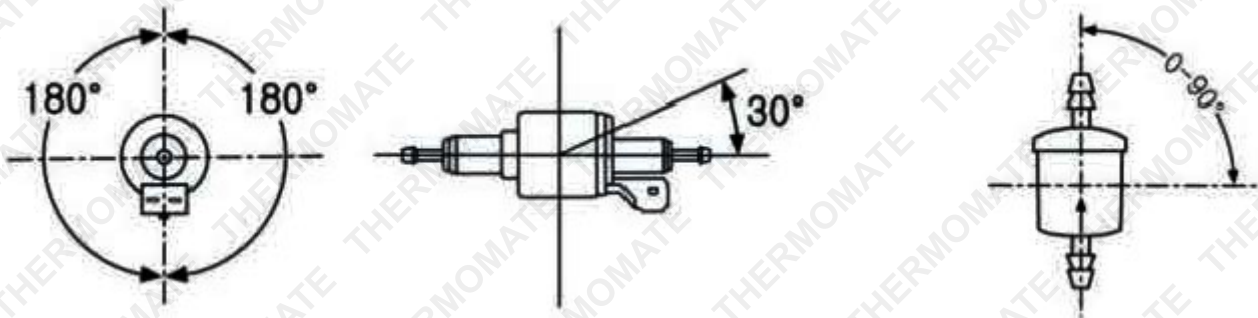
Fuel for the heater can be supplied from the fuel tank of the vehicle or an additional independent fuel tank. DO NOT install the fuel tank in the cab/passenger compartment or any area that can cause fires if an independent fuel tank is used.

The difference of elevation between the heater and fuel pump, and between the fuel pump produces pressure from fuel to the fuel pump. The inner diameter and length of the fuel tube is related to resistance of the fuel route. It is important to consider such factors when installing the heater.



## Fuel Pump Installation

The fuel pump should be installed in places with no residual heat coming from vehicle parts or in places with ample cool ambient air. Its ambient temperature should not exceed 20N. When installing the fuel pump, please use the fuel pump holder supplied with the heater to hold the pump tight. The pump is fixed with a shock-reducing tightening piece.



## Fuel Filter Installation

The fuel filter should be installed before the fuel inlet port. Ensure that the fuel flow is correctly followed. Its position should conform with the image above.

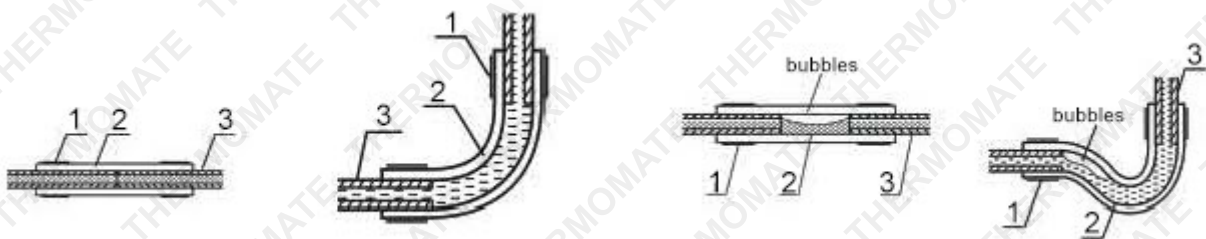
## Fuel Tube Installation

Use only flexible nylon tubes, which has good light resistance and thermal stability. They are supplied with the heater and can be used as the fuel tube. The inner diameter of the tube is 2mm.

The position of the fuel tube should be against any flying debris and should be positioned away from any heat-emitting parts of the vehicle. Protective devices can be installed, if necessary.

The fuel tube from the fuel pump to the main heater could be installed in any directions other than downwards. The fuel tube should be tied to a secure object. The distance between the two ties should be less than 50cm.

The fuel tube fittings supplied with the heater should only be used for connections between the fuel tube and the fuel pump, fuel tube and heater, fuel tube and the sucking tube of the fuel tank and fuel tube. The fuel tube should be secured with clamps for the fuel tube. Remove all air bubbles from the connections.



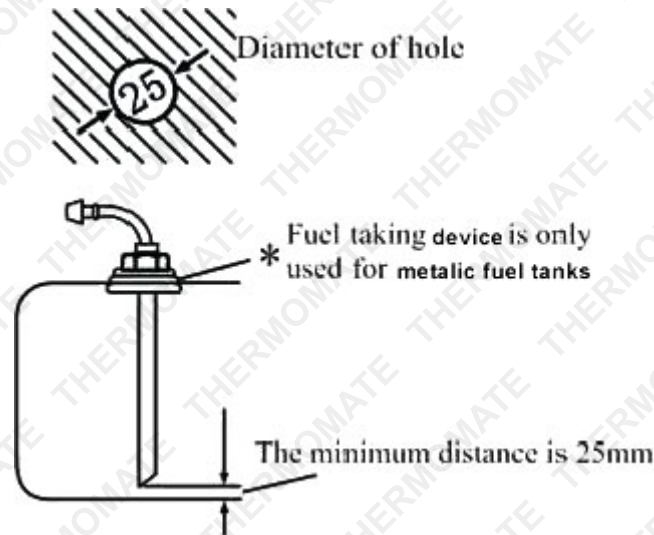
1: Fuel tube clamp

2: Fuel tube fitting

3: Fuel tube

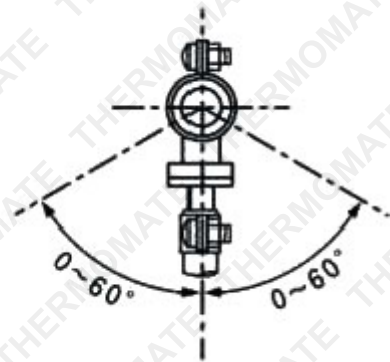
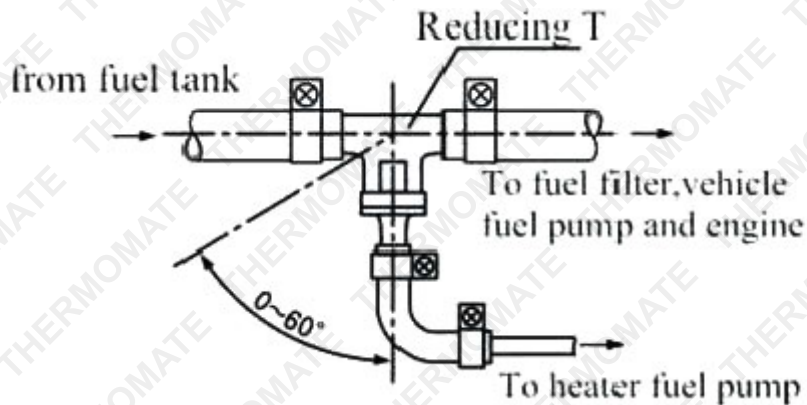
## Fuel-Taking Device Installation

The openings on the fuel tank (or tank cover) for installation should be of appropriate sizes with trimmed brims and with good evenness around the openings. Good sealing is necessary for the base of the fuel-taking tube. The bottom end of the fuel taking tube should be 30 - 40mm from the bottom of the fuel tank to siphon enough fuel and to avoid siphoning in impurities and sediments at the bottom of the fuel tank.



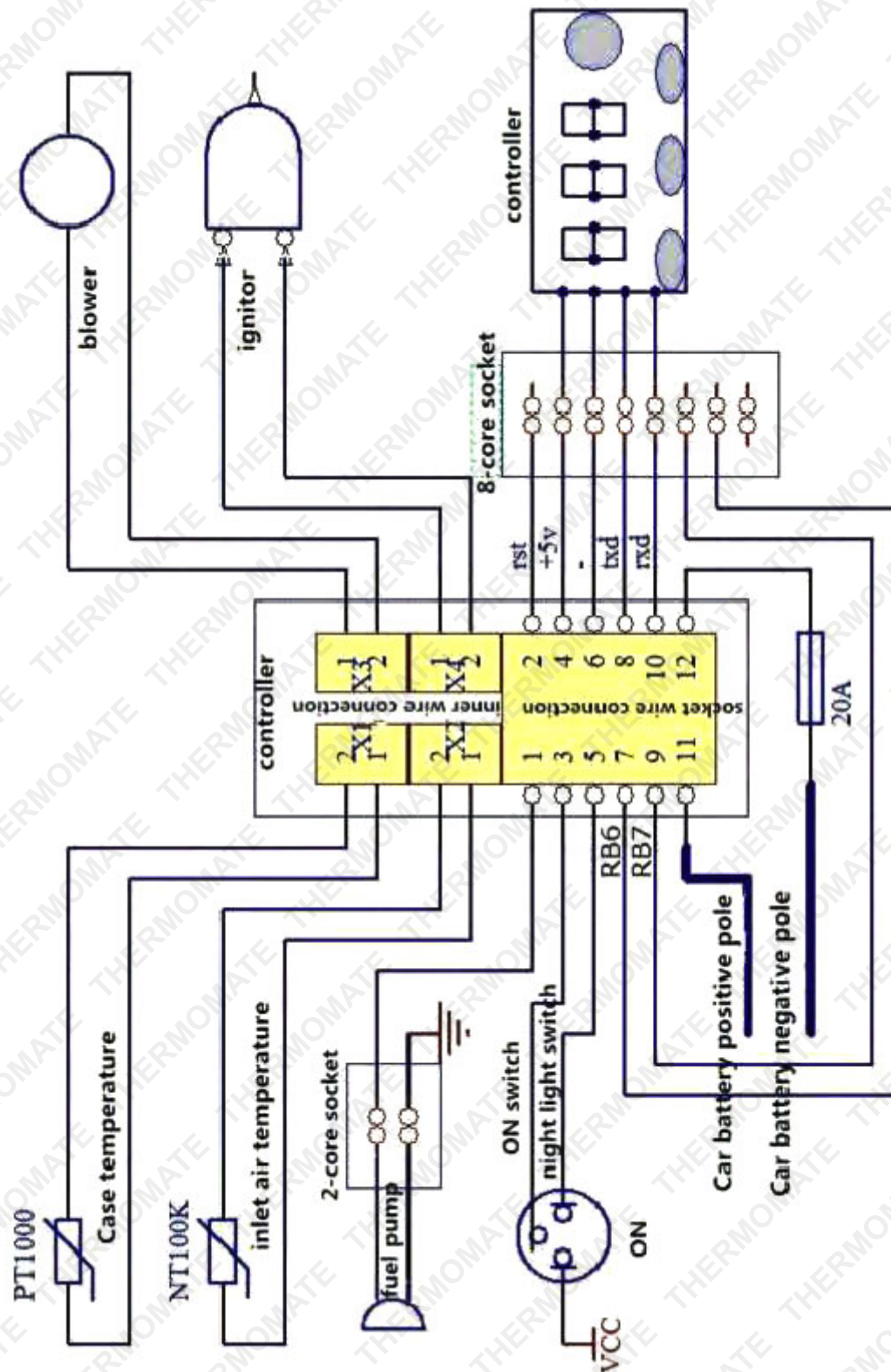
If fuel is taken from the fuel pipe to the engine, the fuel pipe from the fuel tank to the fuel filter should be disconnected and re-connected with the thicker pipes of the reducing T and the thinner pipe of the reducing T should connect the fuel pump of the heater via the fuel tube fitting and tube. The angle of installation must conform with the following image, or normal working capability of the heater will be affected.

After installation, start the vehicle's engine and then turned OFF after about a minute to eliminate any air that is trapped in the fuel siphoning pipe.





## Installation Diagram of Electrical System



## Combustion Air Siphoning Tube and Exhaust Tube Installation

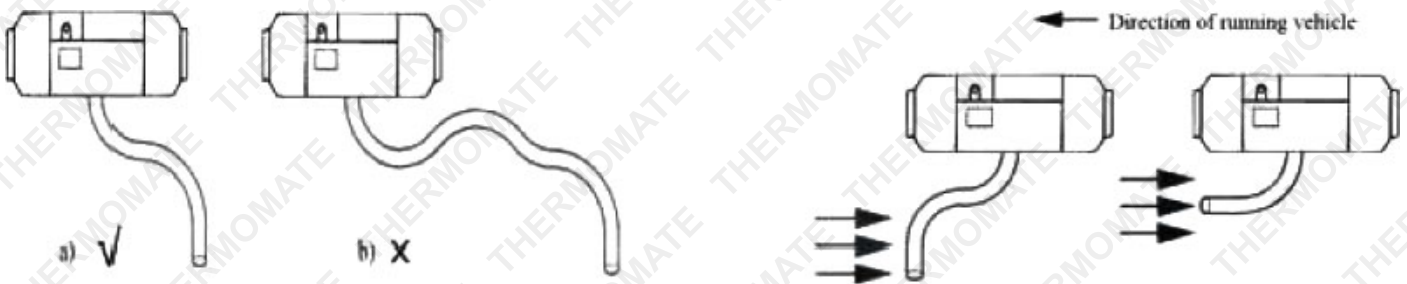
The air for combustion must be siphoned in from fresh air outside of the vehicle. The combustion exhaust must be discharged outside through the exhaust tube. Precautions must be observed to avoid the exhaust from re-entering the vehicle.

The tubes go through the outer wall or holes on the bottom of the vehicle. Precautions must be observed to prevent water from entering. The tubes must be protected and should be able to resist shocks permanently.

Only use the air inlet tube and exhaust tube provided with the heater. The air inlet tube is a corrugated pipe made of an aluminium tube covered with plastic and wrapping paper. The exhaust tube is a corrugated stainless-steel tube. Please identify them and ensure you do not switch them with each other during installation.

To connect them with the heater, please use the supplied clamps to secure them tightly on the combustion air inlet and exhaust tube vent, respectively. The protective hood on the vents of the air inlet tube and exhaust tube must be kept in good condition. Removing them could incur further damages.

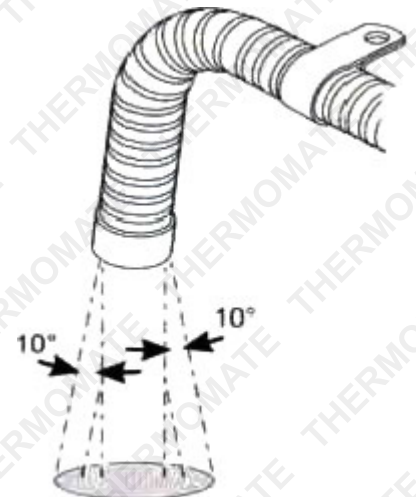
Both the air inlet and exhaust tubes should come out and downwards from the heater, otherwise, drill a 4mm hole at the bottom of the tube to remove any water condensations. If the tube needs to curve, ensure that the curve's radius is bigger than 50mm.



The tube's opening should not be opposite to the direction of the vehicle while running. Also, do not let slurries, rain, snow and/or dirt block the tube's opening.

Install the exhaust tube further away from plastic objects or those with poor heat-resistance. The exhaust tube should be properly affixed. The exhaust vent should face downwards, perpendicular to the road's surface with an angle between 90 to 10°. To ensure that you get the correct angle range, the exhaust tube's clip should be positioned within 150mm from the tube's end.

**WARNING! • Non-compliance with the above instructions could start a fire. •** Install a protective cover on the exhaust tube inside the vehicle to avoid personal injuries.



# Operation

**NOTE:** After installation, turn ON the heater repeatedly a few times to fill-up the fuel tube and to avoid starting failure due to lack of fuel.

## Control Panel



- **ON button:** Start-up. Gently press after connecting to the mains power.
- **OFF button:** Shutdown. Gently press when the heater is running.
- **Rotary Knob:** Adjust temperature and air speed. Temperature will rise when the knob is turned clockwise. The red LEDs beside the knob will also increase. To reduce the temperature, turn the knob in an anti-clockwise direction. The red LEDs will also decrease.

## Manual Oil-Refuelling

Rotate the rotary knob clockwise until all red LEDs are ON. Then, press the OFF button for three or more seconds. At this time, oil will be manually pumped in. Afterwards, press the OFF button for three or more seconds again.

**NOTE:** Fuel pipe should be 1.5 – 2 metres in length. Recommended voltage: 22.5 – 12.8V

## Remote Control

### Button Functions



**Start-Up/Shutdown:** Press and hold for about two seconds to turn ON/OFF the heater.



**Confirm:** View working status.



**Up Button:** Increases oil or temperature.



**Down Button:** Decreases oil or temperature.



## Pairing the Remote Control

1. While the heater is OFF, press the Down Button for a few seconds on the LCD panel. If it shows **HFA**, it has entered the remote control code-matching interface.
2. Press the Power and Confirm buttons on the remote control together. The text “waiting/matching” will appear on the remote control. The remote control and LCD panel should automatically pair-up. After successful matching, the LCD will automatically exit the code interface and display normal working parameters. If code-matching fails, it will not return to normal working parameters. The LCD will automatically exit the code-matching interface if it doesn't receive any remote control pairing code after several seconds.

## Temperature Control

When Temperature Control mode is selected by the remote control, press both Up and Down buttons together to display the temperature when switching to automatic temperature control. Oil volume will also be displayed if the temperature is control manually.

## Working Status Adjustment

The working status of the heater can be adjusted at any time with the remote control:

- **Up button:** Increases the pump oil amount (manual temperature control mode) or raises the setting temperature to increase the heater's output temperature.
- **Down button:** Decreases the pump oil amount (manual temperature control mode) or reduces the setting temperature to decrease the heater's output temperature.

## LCD Panel

### Button Functions



**Settings:** Enter the setting state, adjust setting parameters, and change the working status of the heater.

**Confirm -> OK:** Under the setting state, confirm the current setting value and enter the next parameter setting. View the heater state in the non-setting state.

**▲:** In the setting state, this increases the setting parameters. In the non-setting state, this increases the set working temperature.

**ON/OFF:** Quickly press the button to turn it ON; the status indicator light will turn ON. Press and hold the button for about 2 seconds to turn it OFF; the status indicator light will flash.

**▼:** In the setting state, this decreases the setting parameter. In the non-setting state, this decreases the set working temperature.

## Remote Control Matching

1. In the non-setting state, press the Up button first, then press and hold the Confirm button for 3 seconds or more. Remote control will display 'HFA' upon entering its code matching interface.
2. Press the Confirm button on the remote control to transmit the remote control code, then exit the code interface after code matching is successful; the heater will then enter start-up state. If the code matching fails, the heater will not enter start-up state. It will exit the code matching state after several seconds of inactivity.

## Parameter Settings

Press the Setting button to enter and the status icon corresponding to the display screen will light-up.

1. Time setting  → Up and Down button of adjusting parameters → Press Confirm button to set the hours (24-hour system) and minutes in turn, and press confirm button to enter the next item.

↓
2. Timing switch setting  → It is closed by default, showing no. 1-oF. Press the Up button to start, showing no. 1-on to enter. → Press Confirm button to set the start-up and shutdown time of the first group and the start-up and shutdown time of the second group in turn. After the adjustment, press confirm button to enter the next item.

↓
- Inputting of administrative password  → Press the Up and Down buttons. When the correct value appears, press Confirm button to enter the next digit. After the 4<sup>th</sup> digit is inputted, press Confirm button to enter the next item.

↓
3. Setting of pump oil amount  → Press the Up and Down buttons to modify the minimum pump oil amount to reach the required value, and then press Confirm button. → Modify setting with the Up and Down buttons to meet the requirements of maximum pump oil amount, and then press confirm button to enter the next item.

↓
4. Fan speed setting  → Press the Up and Down buttons to modify the minimum fan speed to reach the required value, and then press Confirm button. → Modify the setting with Up and Down buttons to meet the requirements of maximum fan speed, and then press Confirm button to enter the next item.

↓
5. Operating voltage setting  → **Main board operating voltage can only be selected while the heater is turned OFF.** Press the Up and Down buttons to select the switching work voltage 12V system to be adjusted to display U-12, and 24V system to be adjusted to display U-24 to complete the selection. **Before start-up, check whether the oil pump, motor and ignition plug of the heater are a match with each other to avoid damage.**

↓
6. Selection of speed signal  → Press the Up and Down buttons to set the speed signal. The polarity of the two magnets of the impeller is opposite or only one magnet is selected as 1. The polarity of the two magnets of the impeller is the same. Please select parameter 2. If this parameter is incorrectly selected, the speed difference will be about 1x.

↓
7. Administrative password modification  → After entering, OFF status will be displayed. If there is no need of modification, just press Confirm button to skip the password modification, saving parameters and exiting automatically. Press the Up button and it will display "ON", and then press Confirm button to enter modification status. Input a new, 4-digit password and then press Confirm button to save the password and the adjusted setting parameters, exiting automatically.

**PRECAUTIONS:** After all the parameters are set, you must press Confirm button to exit before saving the setting parameters. If you press the Confirm button to exit, the parameters will not be stored. Please check each new digit of password carefully and save it, through which you can enter to the parameter modification next time.

## Query Heater Status Description

Time display → Ambient temperature display → Setting temperature display (automatic temperature control)/setting pump oil amount display (Manual temperature control)

↑ in non-setting state, press the confirm button to view it cyclically. ← Display of history fault code ← Display of supply voltage



## Re-Filling Fuel in Manual Mode

In the non-setting state, press and hold the Down button first and then press and hold the Confirm button to enter the manual pump interface. When it displays 'H-oF', release the Confirm button first and then release the Down button. Press the Up button to start the manual oil pumping; it will then display 'H-on'. You can hear the oil pump and the oil pump icon will light-up. Press the Down or Setting button to close and exit manual pump mode; the oil pump icon will turn OFF.

## Time Button Description

After the running time is set, press the Confirm button to enter the Time button function setting, which defaults to "oF" OFF state.

1. Press the Up button to start the "ON" state, then press the Confirm button to set the first group about the hours and minutes of start-up time, and then enter the setting of hours and minutes of shutdown time after confirmation.
2. Press the Confirm button to enter the second group. The setting method is the same as above. Set the hours and minutes of start-up time, and then the hours and minutes of shutdown time. A time interval may be set between the two sets of timings. The timing function is only run once.
3. After this time, the current time will be turned OFF. Please turn it ON again and set the time for the next session. The alarm clock icon will light-up after the Time setting and will turn OFF at the end of the session.

## Temperature Control Mode Switching Description











In the non-setting state, press and hold the Up button first and then press the Setting button to display 'P-x.x' (xx represents the pump oil amount), i.e., entering the manual temperature control mode. The pump oil amount is limited to the current setting - the initial pump oil amount.

When you press the 2 button above, XX is displayed. C (xx stands for temperature value), that is, the automatic temperature control mode is entered, and the pump oil amount is controlled to run between the maximum pump oil amount - the initial pump oil amount.

The automatic change of pump oil amount in two modes depends on the change of temperature. The difference between the two modes is that the pump oil amount in automatic mode can reach the maximum value in the parameter setting and when the heater heat is high. The pump oil amount in manual mode is limited to the current setting value and will not reach the maximum value in the parameter setting. The heat is limited to the range of choice, taking into account the usage habits of some old drivers.



# Troubleshooting

Faults	LCD Panel Display	Digital Panel Display	Knob Panel Display	Solution
Insufficient power supply		E-01	1 indicator light	Ensure heater is plugged in correct power source.
Overvoltage		E-02	2 indicator lights	Ensure heater is plugged in correct power source or reduce power supply.
Ignition plug fault		E-03	3 indicator lights	Check if ignition plug is in open-circuit or short-circuit.
Oil pump fault		E-04	4 indicator lights	Check if the oil pump has been disconnected.
Heater is overheating		E-05	5 indicator lights	Check the temperature sensor or if the fan has abnormal rotating speed.
Motor fault		E-06	6 indicator lights	Check the magnet's polarity, the sensor location or if the wirings in the terminal are loose.
Broken connection fault		E-07	7 indicator lights	Check the panel's connecting plug and see whether the blue harness connector is loose or disconnected.
Extinguished heat		E-08	8 indicator lights	Check if the oil circuit is blocked by debris or air.
Sensor fault		E-09	9 indicator lights	Check if the sensor plug is loose, broken or short-circuited.
Ignition failure		E-10	10 indicator lights	Check if the oil circuit is blocked, or if oil transportation is not running smoothly. Oil pump is stuck. Volatilization net is blocked due to oil product problem, and other reasons that can cause two ignition failures.

# Specifications

<b>Power</b>	5kW
<b>Voltage</b>	12V / 24V
<b>Fuel tank</b>	10L
<b>Fuel</b>	Diesel
<b>Noise Level</b>	70db-90db
<b>Fuel consumption (L/hr)</b>	0.21-0.51
<b>Working temperature</b>	(-40°C +20°C)
<b>Diameter of duct</b>	7.6cm
<b>Duct length</b>	120cm
<b>Diameter of vent</b>	2.5cm
<b>Fan speed setting</b>	4000-4500rpm
<b>Max. remote control distance</b>	30m



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- Consult all documentation, packaging and product labelling before use. Note that some products feature documentation available online. It is recommended to print and retain the documentation.
- Before each use, check the product for loose/broken/damaged/missing parts, wear or leaks (if applicable). Never use a product with loose/broken/damaged/missing parts, wear or leaks.
- Products must be inspected and serviced (if applicable) by a qualified technician every 6 months. This is based on average residential use by persons of average size and strength, and on a property of average metropolitan size. Use beyond these recommendations may require more frequent inspections/servicing.
- Ensure that all users of the product have completed a suitable industry recognised training course before being allowed access to the product.
- The product has been supplied by a general merchandise retailer that may not be familiar with your specific application or description of application. Be sure to attain third-party approval from a qualified specialist for your application before use, regardless of any assurances from the retailer or its representatives.
- This product is not intended for use where fail-safe operation is required. As with any product (for example, automobile, computer, toaster), there is the possibility of technical issues that may require the repair or replacement of parts, or the product itself. If the possibility of such failure and the associated time it may take to rectify could in any way inconvenience the user, business or employee, or financially affect the user, business or employee, then the product is not suitable for your requirements. This product is not intended for use where incorrect operation or a failure of any kind, including but not limited to, a condition requiring product return, replacement, parts replacement or service by a technician may cause financial loss, loss of employee time or an inconvenience requiring compensation.
- If this product has been purchased in error when considering the information presented here, contact the retailer directly for details of their returns policy, if required.

