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PARKING AIR HEATER

FOCUS ON PERFORMANCE

ATTENTION

- Information on the devices and accessories included in this manual is provided for reference only actual products are subject to change without prior notice.
- After opening the product's packaging box for the first time, please ensure that the main device and spare parts are included in the packing list.
- Please read this manual carefully; if you have any questions, contact your dealer as soon as possible.

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Packing List

Packing List of All-in-one Heater

NO :	Name	Specification	Unit	Quantity
1	Main Device	12V/24V 8KW	Set	1
2	LCD Control Panel		Piece	1
3	Remote Controller		Piece	1
4	Air Inlet Pipe	ø25mm	Piece	1
5	Exhaust Pipe	ø24mm x 600mm	Piece	1
6	Hot Air Outlet Tubing	ø90mm	Piece	1
7	Air Outlet Grid		Piece	1
8	Air Filter		Piece	1
9	Exhaust Silencer		Piece	1
10	Installation Kit		Set	1
11	Gloves		Pair	1

Note : Please confirm these component counts as soon as you receive the package.



Model: MXR-2Y



Model: MXR-1F

Packing List of Split Heater

NO :	Name	Specification	Unit	Quantity
1	Main Device	12V/24V 8KW	Set	1
2	Wire Harness	3m	Set	1
3	LCD Control Panel	LCD	Piece	1
4	Remote Controller		Piece	1
5	Fuel pump	12V	Piece	1
6	Fuel Filter		Piece	1
7	Fuel Pump Rubber Clip		Piece	1
8	Air Filter		Piece	1
9	Air Inlet Pipe	ø25mm	Piece	1
10	Exhaust Pipe	ø24mm x 600mm	Piece	1
11	Hot Air Outlet Tubing	ø90mm	Piece	1
12	Air Outlet Grid	ø90mm	Piece	1
13	Mounting Plate		Piece	1
14	Fuel Tank	10L	Piece	1
15	Exhaust Silencer		Piece	1
16	Fuel Hose	3.5m	Piece	1
17	Installation Kit		Set	1
18	Oil Extractor		Piece	1
19	Gloves		Pair	1

Note : Please confirm these component counts as soon as you receive the package.

01
INTRODUCTION

1.1 Overview

The main unit of this parking air heater (the "heater") is a small, microprocessor-controlled, fuel-burning furnace. Its heat exchanger is located in a hood-shaped case with a separate air passage. Cold air is sucked into this air passage by the fan, and hot air blown out, forming a heating system independent of the vehicle's original heating system. In this way, a vehicle's cab or passenger compartment can be heated whether or not the engine is running. A schematic diagram is shown in ***Fig. 1***.

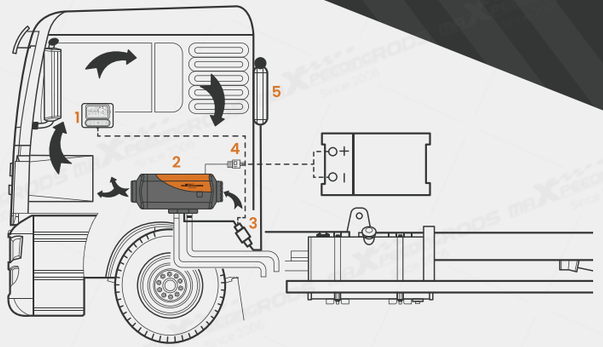


Fig. 1

1.2 Range of Application of the Heater

The air heater operating independently of an engine isintended for installation in the following vehicles, depending on its heating output:

- All types of vehicles (max. 8 seats + driver's seat) and their trailers
- Construction machinery
- Agricultural machinery
- Boats, ships and yachts (only diesel heaters)
- Camper vans

1.3 Purpose of Heater

- Pre-heating, de-misting windows
- Heating and keeping warm the following:
  - All kinds of automobiles and trailers
  - Construction machinery
  - Agricultural machinery
  - Camper vans
  - RVs
  - Boats, ships, yachts



Split Model : MXR-1F



All-in-one Model : MXR-2Y

1.4 Unsuitable Situations and Places

The heater must not be used in the following situations and places:

For constant heating in enclosed spaces (to avoid risk of poisoning), such as:



Residential rooms



Garages



Work huts, weekend homes and hunting huts



Houseboats, etc.

For directly heating and drying (to avoid danger/damage):



Living things (people, animals etc.)



Articles and objects



Blowing hot air into containers

In the presence of flammable vapor or dust :



Fuel depots



Carbon storehouses



Timber storehouses



Granaries and similar places



Diesel/Petrol/Gas stations

02
INSTALLATION NOTES



CAUTION

1. RISK OF FIRE, BURNS, EXPLOSION AND POISONING
   - **TURN OFF** the heater before refuelling.
   - **DO NOT** touch the heater while it is in use to avoid scalding.
   - **DO NOT** use the heater in confined or poorly ventilated areas.
   - **DO NOT** blow hot air directly at people, animals or objects sensitive to temperature.
   - Make sure that the air intake and exhaust ports are clear of any obstruction.
   - Keep children, inflammables and explosives away.
   - Operate the heater only when the installation is completed.
   - Route the exhaust outlet to the outdoors to prevent intake of exhaust fumes and carbon monoxide poisoning.
2. **DO NOT** disconnect the power during operation.
3. **DO NOT** use a cigarette lighter to start the heater.
4. Seal any gaps between the mounting plate and the vehicle's body.
5. To avoid accidents, do not leave the heater unattended for at least 10 minutes after the first start up.
6. **DANGER:** To avoid injury from moving parts, shut off the equipment before removing this cover.

Heater and Component Placement

- The part of any structure or any component near the heater must be protected from excessive heat exposure and possible fuel or oil contamination.
- The heater must not pose a fire hazard even if it overheats. This requirement is considered fulfilled if adequate clearances are allowed for all components during installation, sufficient ventilation is provided and fireproof materials or heat shields are used.
- All appropriate precautions must be taken when positioning the heater in order to minimize the risk of injury to persons or damage to property.

Fuel Supply

- The fuel intake connection must not be located in the passenger compartment, and must be sealed with a properly-closing lid to prevent any leakage of fuel.

Combustion Air Intake

- The air for the heater's combustion chamber must not be sucked in from the vehicle's passenger compartment.
- The air intake must be arranged or protected in such a way that it cannot be blocked by other objects.

Cold Air Intake

- The heater's air supply must consist of fresh air or circulated air and must be sucked in from a clean area which cannot be contaminated by exhaust fumes from the engine, the combustion heater or any other source within the vehicle.
- The intake pipe must be protected using a grill or other suitable equipment.

Exhaust System and Exhaust Pipe Layout

- The exhaust system and exhaust pipes shall be laid out or protected to minimize any danger to the load due to heating or ignition.
- Exhaust system components situated directly below the (diesel) fuel tank shall be protected by a thermal shield, or shall be installed with at least 3.93 inches (100mm) clearance from it.
- The exhaust outlet must be properly situated to prevent any ingress of exhaust fumes into the vehicle interior through the ventilation system, warm air intakes or open windows.

Avoid Overheating and Ignition

- Combustion heaters and their exhaust pipes must be designed, situated, protected and/or covered so that risk of overheating or ignition of the vehicle's load is minimized.

Hot Air Outlet

- The hot air pipes within the vehicle must be arranged or protected such that they do not create risk of injury or damage through being touched.
- The air outlet must be arranged or protected in such a way that it cannot be blocked by objects.

Fuel Tanks

Fuel tanks for supplying the heater shall conform to the following regulations:

- In the event of any leakage, fuel shall drain to the ground without coming into contact with hot parts of the vehicle or its load;
- Fuel tanks containing diesel shall be equipped with an effective flame trap at the filler opening, or with a closure allowing the opening to be kept hermetically sealed.

03
TECHNICAL PARAMETERS

CAUTION

Technical data safety instructions!

Failure to comply with this technical data can result in malfunction.

Please note!

Where no limit values are given, the technical data listed is subject to the tolerances normally applicable to heaters of ±10% for nominal voltage, and at an ambient temperature of 20 °C

Serial No.	Model	MXR-1F	MXR-2Y
1	Fuel	Diesel ONLY	
2	Operating Ambient Temperature	-40°C to + 40°C	
3	Style	Split style	All-in-one Style
4	Heating Capacity	1-8KW	1-8KW
5	Rated Voltage	12V/24V	12V/24V
6	Fuel Consumption	0.15-0.7L/H	0.15-0.7L/H
7	Starting Power Consumption	9-11A	9-11A
8	Operating Power Consumption	1-3A	1-3A
9	Fuel Tank Capacity	10L	5L

04

HEATER STRUCTURE AND WORKING PRINCIPLE

4.1 Working Principle

After the heater is started, the glow plug plug begins to work, the fuel pump starts to supply fuel, and the combustion-supporting fan intakes air from outside. Fuel is burned in the combustion chamber to generate heat, which is taken away by the aluminum heat exchanger. Internal air driven by the heat exchange fan passes through the surface of the heat exchanger to carry the heat to where it is needed. The exhaust gas is discharged through the exhaust pipe.

4.2 Heater Structure

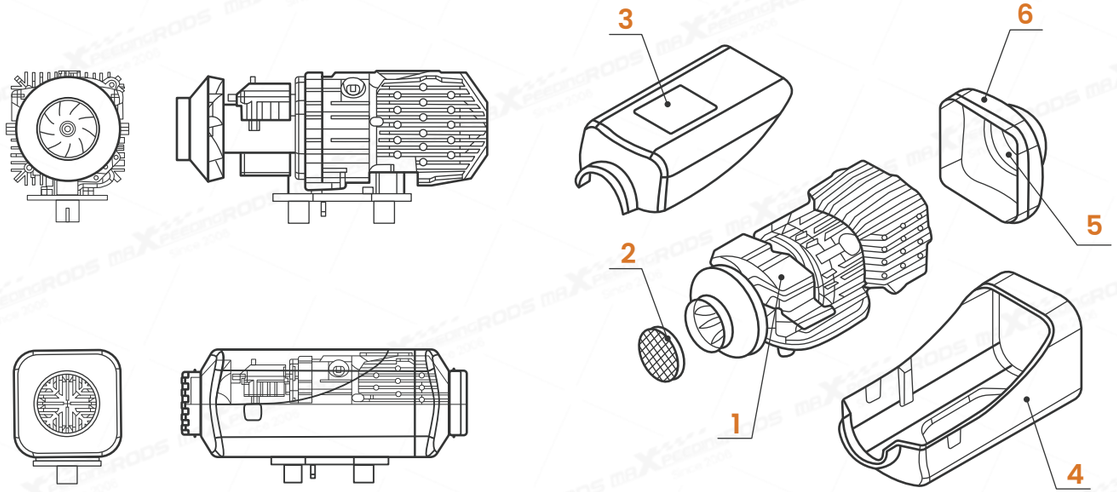


Fig.2

1.Main Engine 2.Suction Hood 3.Upper Hood
4.Bottom Hood 5.Air Outlet 6.Rear Hood {Hood:Case/Shell}

4.3 Internal Structure

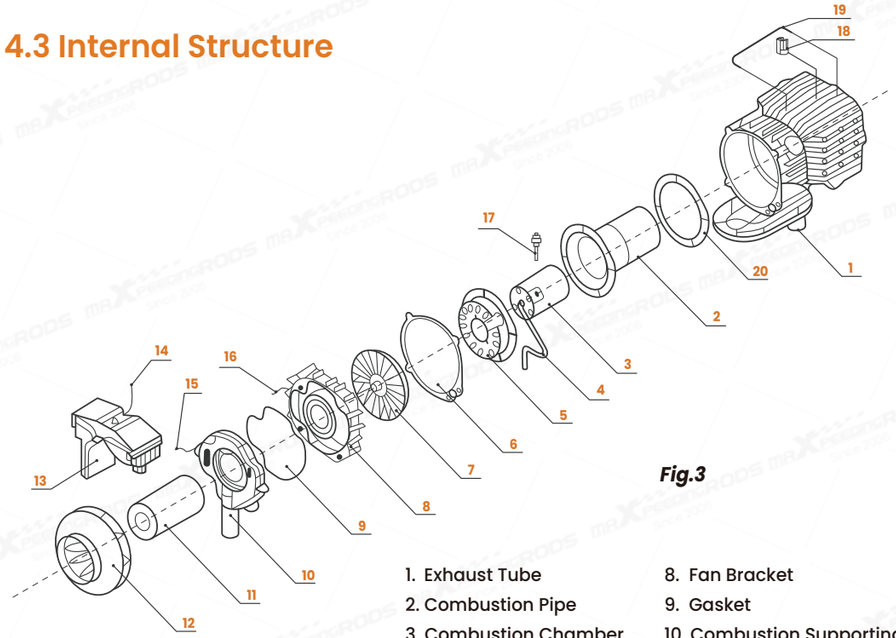


Fig.3

1. Exhaust Tube
2. Combustion Pipe
3. Combustion Chamber
4. Fuel Hose
5. Air Inlet Distributor
6. Gasket
7. Inner Fan Wheel
8. Fan Bracket
9. Gasket
10. Combustion Supporting Air Inlet
11. Fan Motor
12. Outer Fan Wheel
13. Controller Board
14. Fixing Screw
15. Fixing Screw
16. Fixing Screw
17. Ignitor
18. Temperature Sensor
19. Sensor Fixed Bracket
20. Gasket

05
INSTALLATION

5.1 Installation Of Heater Body

5.1.1 Installation Position

The main device can be installed inside or outside of the vehicle. However, when it is installed outside the vehicle, a shield (not included) to prevent damage due to external forces (e.g. stone damage) should be provided. The heater must not be immersed in water or exposed to rain. If the heater suffers corrosion due to rain or other water, immediately cease using it and have all of its components inspected by a qualified technician.

Please note!

MXR-2Y is all-in-one style, which only require connecting to the power supply and exhaust pipe to use, thus omitting the installation steps. We will mainly introduce the installation steps of MXR-1F.

5.1.2 Spacing Requirements

Adequate space for installation and maintenance must be provided. For installation space requirements, please refer to ***Fig.4***. Ensure that there are no potentially interfering objects located in the gap between the bottom surface of the main device and the vehicle mounting surface.

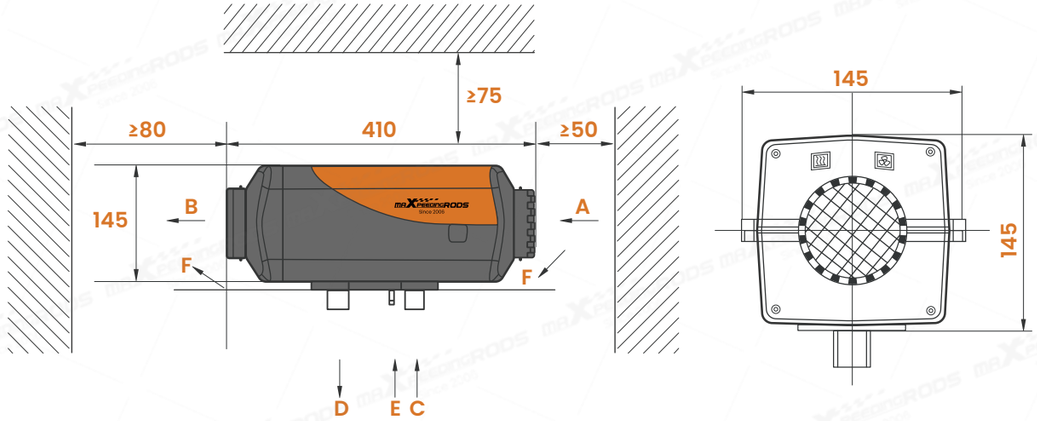


Fig.4

A.Cold Air Inlet B. Hot Air Outlet C. Combustion Air Inlet
D. Exhaust Outlet E. Fuel Inlet F. No-interference Area

5.1.3 Sealing

A good seal between the main device and the vehicle mounting surface is necessary. A flange gasket (as shown in ***Fig. 5***) supplied by the manufacturer, must be installed between the device and the vehicle mounting surface. The installation surface must also be sufficiently flat, with unevenness of less than 1 mm across the base of the main device. After drilling installation holes, please confirm that the evenness meets this requirement, then rotate the four M6 nuts provided by the manufacturer until tightened to a tightening torque of 6Nm+1Nm. The position of installation holes is shown in ***Fig. 6***.

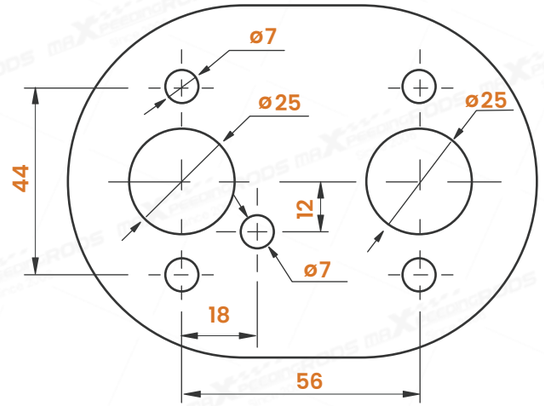


Fig.5

Recommendations: Use of high temperature sealant to seal the installation gap after the heater has been mounted is recommended.

5.1.4 Mounting Plate

A mounting plate is needed if the thickness of the installation panel is < 1.5 mm. The gap between the mounting plate and the car body must also be sealed (as shown in ***Fig. 6***).

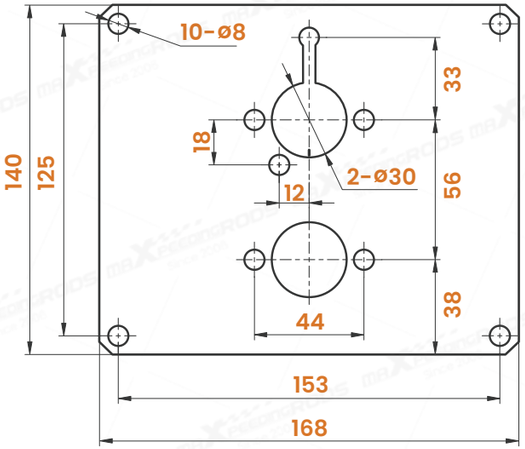


Fig.6

Please note!

The mounting gasket must be replaced with a new gasket when the main device is reinstalled.

5.1.5 Installation Orientation

The installation orientation of the heater body is shown in ***Fig. 7***, it must be noted that the inclination angle of both sides must be exactly 90 degrees, otherwise the normal operation will be affected.

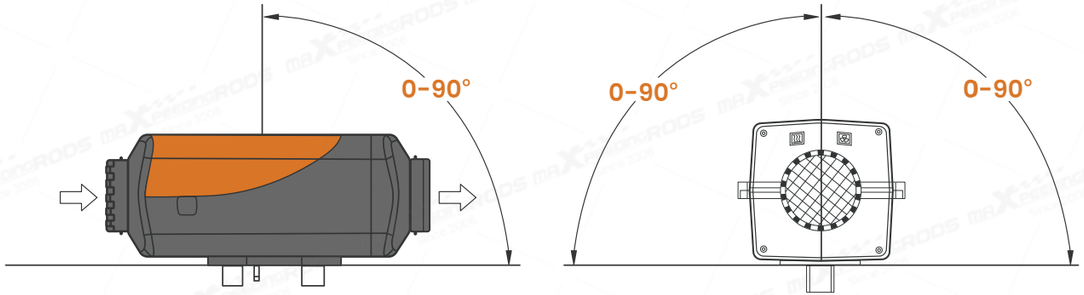


Fig.7

5.1.6 Check the Fan Wheel

After the installation, ensure that there is no contact or friction between the fan wheel and the surrounding components in order to prevent malfunction during operation..

5.2 Air Heating System Installation

5.2.1 Air Circulation Mode

In order to ensure that the air duct is unobstructed, the connection mode should be installed and fixed by professionals, it is suggested that the heater should be installed with independent external circulation or internal circulation.

5.2.2 Temperature Resistance

If an external heating air pipe is attached to the heater, it shall be made of material capable of resisting a temperature of 150 °C.

5.2.3 Cold Air Intake

For a heater operating in internal circulation mode, measures shall be taken to prevent hot air re-entering the air inlet port (as shown in ***Fig. 8***). Inlet air shall be drawn from a cold area of the compartment. If, in this mode, no air inlet pipe is attached, an air inlet hood with a grill must be installed directly onto the main device.



a) √ ***Fig.8*** ***b) ×***

5.3 Installation of Fuel Supply System

5.3.1 Fuel Pump

The fuel pump shall be mounted in a protective rubber clamp to reduce vibration , with its outlet tilting upwards. For the preferred installation position (as shown in ***Fig. 9***). When conditions permit , the fuel pipe between the fuel pump and the heater should run at a gradual upward slope.

5.3.2 Pressure Height of Fuel Pump

The difference in elevation between the level of the fuel itself and the fuel pump, as well as that between the fuel pump and the fuel inlet, can create pressure (or suction) in the fuel pipeline (as shown in ***Fig. 9***). Therefore, these dimensions shall conform to the following requirements: a <= 3m; b <= 0.5m; c <= 2m.

Please note!

1. **This is ONLY applicable for the split heater model (MXR-1F).**
2. **During installation, please check the vent hole on the fuel tank cap.**

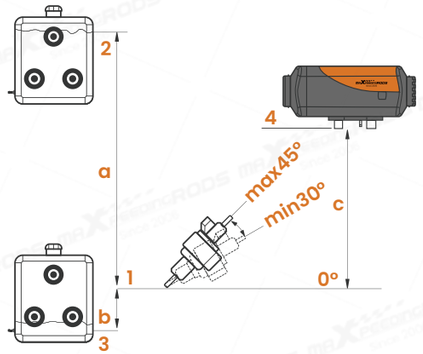


Fig.9

Pressure Height of Fuel Pump

1.Fuel Pump
-Preferred installation position in range 30° to 45°

2.Max. Fuel Level

3.Min. Fuel Level

4.Connection to Heater

Please note!

Please install in accordance with the arrow on the fuel pump. Do NOT install upside down.

5.3.3 Fuel Line

A sharp knife must be used to cut fuel hoses and pipes to length. Their Interfaces must not be crushed and must be free of burrs.

- The fuel pipe from the fuel pump to the heater should be routed to rise continuously.
- Fuel pipes must be fastened safely to avoid damage and/or noise production due to vibrations (with a recommended clearance of approx. 50 cm).
- Fuel pipes must be protected from mechanical damage.
- Hose clips must be used to secure all fuel supply hose connections.
- Components carrying fuel must be protected from heat.
- Never route or fasten the fuel pipes to the heater or vehicle exhaust system. At crossings, always ensure adequate heat clearance.
- Dripping or evaporating fuel must not collect on hot components or be liable to ignition by electrical systems.
- When connecting fuel pipes with a fuel hose, always mount the fuel pipes in a butt joint to prevent the formation of any bubbles.

5.3.4 Installation of Fuel Filter

A fuel filter should be installed in front of the fuel pump's fuel inlet. Ensure that this correctly follows the fuel flow, positioned at an angle of exactly 90°, in conformity with ***Fig.10***, The fuel filter should be replaced every 6 months, as should be the fuel pipe fittings and clamps.

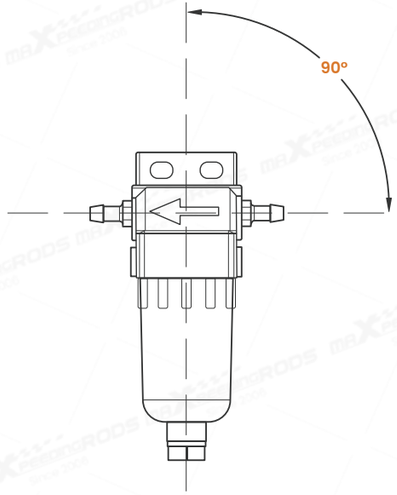


Fig.10

5.4 Wiring Harness Installation

The end of each wire shall be wrapped with electrical insulating tape to prevent short circuit.

5.4.1 Main Harness

The connection diagram for the main wire harness and heater as ***Fig. 11***. The wires of the main device that require connection to external circuits have been gathered into wire bundles, which can be laid to suit the positions of the various components, and fixed in appropriate locations. The distance between two fixing points shall not exceed 300 mm.

Please note!

Any wire bundle exposed outside the vehicle body or outside a wiring duct must be protected with corrugated piping.

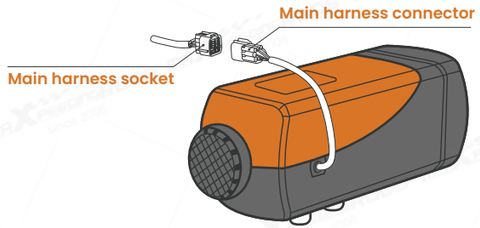


Fig.11

5.4.2 Battery Connection

Connect the red lead on the fuse box to the positive pole of the vehicle battery and the black lead to the negative pole.

5.4.3 Fuel Pump Connection

Connect the fuel pump lead to the fuel pump.

5.4.4 LCD Control Panel

Install the control panel in a position allowing convenient operation, arranging it to make observation of the indicator easy, thus permitting convenient identification of the heater's operating status (e.g. operating/stopped). The terminals of the control panel lead wires shall be inserted into the socket, then connected to the main harness connector using its self-locking mechanism.

5.4.5 Avoid Short-circuit

The end of each wire shall be wrapped with insulating tape to prevent short circuits.

5.5 Installation of Combustion Air System

Please note!

- **Air for combustion must be fresh air drawn in from outside the vehicle; fumes from combustion must be expelled outside the vehicle through the exhaust pipe.**
- **The combustion air intake must remain clear of any obstruction at all times.**
- **The combustion air intake must be installed in a way so that exhaust fumes cannot be drawn in and mixed with the combustion air.**
- **The combustion air intake system should be installed with a slight downward slope.**
- **If pipes pass through the vehicle's outer walls or underside, precautions should be taken to prevent water splash from entering these pipes.**

5.5.1 Installation of Pipes

The air inlet is an aluminum pipe bellows, the exhaust is a stainless steel pipe bellows. These must be installed correctly, and in particular CANNOT BE INTERCHANGED during installation (e.g. the aluminum pipe bellows is only suitable for use as the inlet, and cannot tolerate hot exhaust gasses.) Please use the clamps provided to mount them tightly.

5.5.2 Direction of Pipes

Both the air inlet pipe and exhaust pipe shall exit the heater in an outwards and downwards direction. If either of these pipes must be bent, the sum of the angles of all its curves shall not exceed 270°. Please refer to ***Fig. 12***.

Please note!

The pipes openings shall not face towards the direction of the running vehicle, or be positioned in way that allows blockage by slurry, snow or dirt.

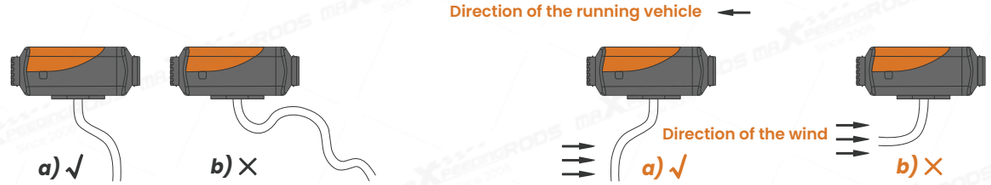


Fig.12

5.5.3 High Temperature

When the heater is running, the surface of the exhaust pipe will reach a high temperature. Ensure that this pipe is installed far away from plastic components or other objects with the poor thermal resistance on the vehicle body. The exhaust pipe shall be properly mounted, with its vent pointed downwards and perpendicular to the road, at an angle of 90°±10° (as shown in ***Fig. 13***). To maintain the correct angle, the exhaust pipe fixing clamp shall be mounted within 150 mm of the pipe end.

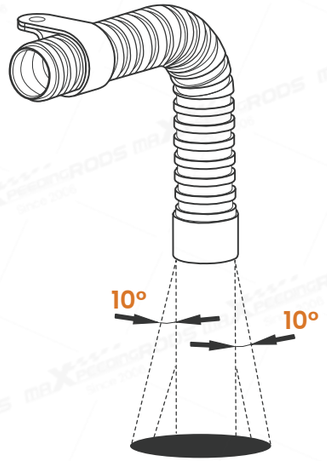


Fig.13

WARNING

Risk of injuries and burns!

All types of combustion produce high temperatures and toxic exhaust fumes; this is the reason the exhaust system must be installed strictly according to these instructions.

- Do not perform any work on the exhaust system while the heater is working.
- Before working on the exhaust system, first switch the heater off, wait until all parts have cooled down completely, and wear safety gloves if necessary.
- Do not inhale the exhaust fumes.
- The manufacture disclaims any liability for consequences resulting from failure to install the device in accordance with the requirements of this manual.

5.6 Inspection Before Use

The heater should be debugged before use. during commissioning, carefully check all connections for leakage and safety, if heavy smoke emission is observed or irregular combustion noise or fuel smell is felt, the heater must be turned off. please remove the fuse so that the heater will not work, the heater must be maintained by qualified professionals before it can be put into use. the details are as follows:

1. Check the air inlet and outlet for contamination and foreign matter.
2. Clean the outside of the heater.
3. Check the electrical contacts for corrosion or loose connections.
4. Check the intake pipe and exhaust pipe for blockage and damage.
5. Check the fuel line for leakage.

06

CONTROL PANEL USAGE

6.1 LCD Control Panel Diagram



Fig.14

1. MODE/SET Key
2. Displayer
3. UP Key
4. DOWN Key
5. ON/OFF Key

6.2 LCD Control Panel Usage

6.2.1 Turn ON/OFF the Heater

Press the "⏻" Key to turn ON/OFF the heater.

6.2.2 Mode Operation

1. **Manual Mode:**

   Manual mode has 8 levels (Level1-8) , “Level 1” is the minimum power level and “Level 8” is Maximum power level, Press "▲"/ "▼" key to adjust the level.

2. **Automatic Mode:**

   Temperature can be adjusted within the range of 8~36 ℃ in automatic mode. the heater automatic adjust the output power by the temperature difference with setting and room. Press "▲"/ "▼" key to adjust the temperature.

6.2.3 Mode Exchange

Press the "✹" Key to change the run mode for the heater.

6.2.4 Remote Control

First, Long press the "▲" key greater than 3s until the screen display "rte" then release the "▲" Key. Second, click any key on the remote controller. When control panel screen back to normal status, it means authorization has succeeded, otherwise repeat above operate again.



Fig.15

WARNING

Chemical Burn Hazard. Keep batteries away from children.

The remote controller contains a lithium coin cell battery. If a new or used lithium coin cell battery is swallowed or enters the body, it can cause severe internal burns and can lead to death in as little as 2 hours. Always completely secure the battery compartment. If the battery compartment does not close securely, stop using the product, remove the batteries, and keep it away from children. If you think batteries might have been swallowed or placed inside any part of the body, seek immediate medical attention.

6.2.5 Time Setting

While Heater is in operation, Long press the "✹" Key greater than 3s until the screen display digital "XX:XX" Only, then clicked "▲" / "▼" key to select set project as ***Fig.16*** :

1. Local Time:

To set the current time, press the "✹" Key to set, and press "▲" /"▼" to switch.

2. Appointment Time:

Set the automatic start time as above.

3. Running Time:

Set the running time as above, the running time set range 0.5 ~ 10 hour , minimum time period 0.5 hour.

4. Timer Switch:

Set the running time as above. timer switch display t-oF, the timer is disable, display t-oN the timer is enable.

6.2.6 Select Language

While Heater is in operation, press "✹" key and "▼" key greater than 3s to change the language of the speaker. The options include u-Ch (Chinese), u-Ru (Russian), u-En (English), or u-oF (mute).

6.2.7 Manual Pump Operation(Pump_oil)

While the heater is in the OFF status, press and hold the "▼" key for more than 7 seconds until the digital display shows "300", and then release the "▼" key. The pump will start pumping fuel at the same time, and the screen will display the remaining time (in seconds) for this program. When the remaining time is less than "0", the pumping program will be completed. Press the "⏻" key to stop the program.

Please note!

When operating the device for the first time, it is recommended to pump fuel using manual pump mode, thereby quickly filling the entire fuel pipeline.



Fig.16

6.3 Fault Code Table

When the heater fails, the corresponding logo will blinking in the displayer ,at the same time the fault code display in the displayer.

The fault cause and solution refer to in the table below:

Fault Code	Cause of Failure	Solutions
E01	Startup Failure	1. Confirm the oil pump is functioning properly; 2. Confirm the fuel pipe is unblocked.
E02	Lack of Fuel	1. Confirm the fuel tank is lack of oil or not.
E03	Over Voltage	1. Confirm the power supply voltage matches heater voltage, normal ranges: 12V (9-16V) or 24V (18-32V); 2. Confirm the power cord is properly installed; 3. Confirm the additional non-compliant power cord is not in use; 4. Confirm the power converter can provide sufficient current; 5. Confirm the power converter output voltage is stable; 6. Confirm the fuse has not deteriorated.
E04/E05	Temperature Sensor Fault	1. Confirm the outlet air temperature sensor connector is loose or not; 2. The temperature sensor is faulty, replace the main board.
E06	Fuel Pump Failure	1. Confirm the pump plug is connected correctly; 2. Confirm the main harness is not short circuited; 3. Confirm the fuel has not run out; 4. Confirm the fuel pipelines are not frozen or blocked; 5. Confirm that the fuel pump is operating normally; 6. Confirm that there is no air trapped in the fuel line causing discontinuous fuel supply; 7. Confirm that the fuel is of adequate quality.

Fault Code	Cause of Failure	Solutions
E07	Fan Motor Failure	1. Confirm the fan wheel is not stuck; 2. Confirm the connector is plugged in securely; 3. Confirm the gap between the wheel magnet and controller's Hall sensor is not excessive; 4. Confirm that the power line is not in a short-circuit or open-circuit state; 5. Confirm that there is no Electric leakage.
E08	Glow Plug Failure	1. Confirm the ignition plug connector is not loose and that wire has not short-circuited to housing; 2. Confirm the ignition plug is not damaged; 3. Appearance of this code immediately after start-up represents a mainboard fault, the mainboard will need to be replaced; 4. Appearance of this code after start-up and about 15 seconds of fan operation represents a glow plug fault; the glow plug will need to be replaced. 5. Appearance of this code about 50 seconds after start-up represents an installation problem; please check the power supply voltage.
E09	Overheat Protection	1.Confirm that the heating air outlet is not blocked; 2.Confirm that the fan is working properly; 3.Confirm that the temperature sensor is operating normally.
E10	Overheat Sensor Fault	1.Confirm the outlet air temperature sensor connector is loose or not; 2.The temperature sensor is faulty, replace the main board.

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Modell : MXR-1F



Modell : MXR-2Y