Preface

Thank you for choosing 2KW air parking heater.

This instruction book describes the structures, working principles, installation and operation of the air-heating parking heater. For correct use of the heater, please read this instruction book carefully before installation and use. The instruction book shall be saved in a convenient place for later reference.

Attention:

- This instruction book is subject to revision without notice, but the instruction book is in conformity to the purchased product.
- Our effort is to explain all questions the users may have through this instruction book. If you have any doubts or find anything incorrect in this instruction book, please contact our company directly.
- At first unpacking, please check the heater and its accessories against the packing list. Please contact the dealer immediately if any problem is found.
- If any trouble arises during application, please contact the Department of Marketing of our company or other customer service stations authorized by this company. We shall do our best to provide service to you.

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Note：

Comply with the operational manual for installation and use to ensure that the heaters can work for a long time.

Version No.:20121204

1 Introduction

The main equipment of Model FJH-2/ □ air parking heater (hereinafter referred to as the heater) is a small fuel furnace controlled by a single-chip micro- processor. Its furnace body (the heat exchanger) is located in the hood-shape case, which serves as independent air passage. Cold air is sucked into the air passage by the heat supplying fan and blown out when it becomes hot, so as to form another heating system that is independent to the original heating system of the vehicles. In such a way, heat can be supplied by the heater to driver's cab and passengers' compartment no matter the engine is working or not working. The schematic diagram is shown in Fig. 1.

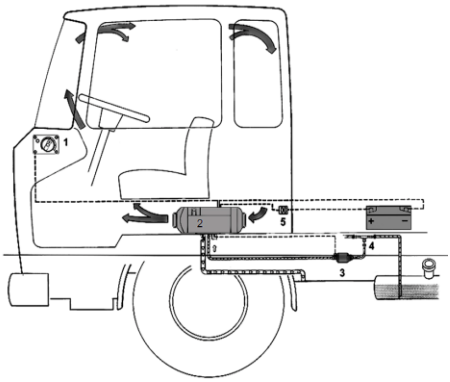


Fig. 1

1-Control switch 2- Heater

3- Fuel pump 4- Reducing T 5- Fuse box

The heater is fully automatically controlled. It features in compact structure, easy installation, energy-saving, environmental protection, safety and reliability, easy maintenance, etc.

2 Main Technical Specifications

Please refer to Table 1 for main technical specifications.

Table 1

Heat Power (W)	2000	
Fuel	Gasoline	Diesel
Rated Voltage	12V/24V	12V/24V
Fuel Consumption	0.14~0.27	0.12~0.24
Rated Power Consumption (W)	14~29	
Working (Environment) Temperature	-40℃~+20℃	
Weight of Main Heater (kg)	2.6	
Dimensions (mm)	323×120×121	
Mobile phone control（Optional）	No limitation	
Remote control（Optional）	Without obstacles≤800m	

3 Structures and Working Principles

The structures of the main heater are shown in Fig. 2

3.1 Heater

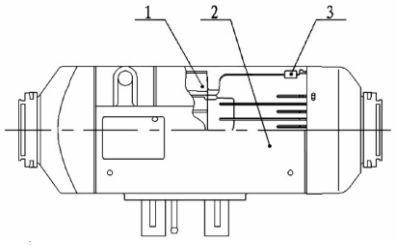


Fig. 2

1-Heater; 2-Hood-shape case;
3-Insulating mat

Fig.3 is the diagram for structure of the heater.

Heat exchanger 1 is the combustion furnace body, made of die-casting aluminum, with radiating fins around and at the rear end. Combustion pipe 3 is installed in the inner cavity. The front of the combustion pipe insert the combustor 4, Fuel comes to the combustor core through the fuel pipe 13 and is ignited by the glow plug 14 after atomization. The flame enters the gap between the inner walls of the furnace body through the rear-end guide pipe of the combustion pipe,The exhaust is discharged through exhaust pipe vent 15.

The fresh air for supporting combustion of the furnace comes from the supporting air inlet port 12 and is sent to the combustion pipe by the combustion supporting air blades 6 of the fan motor.

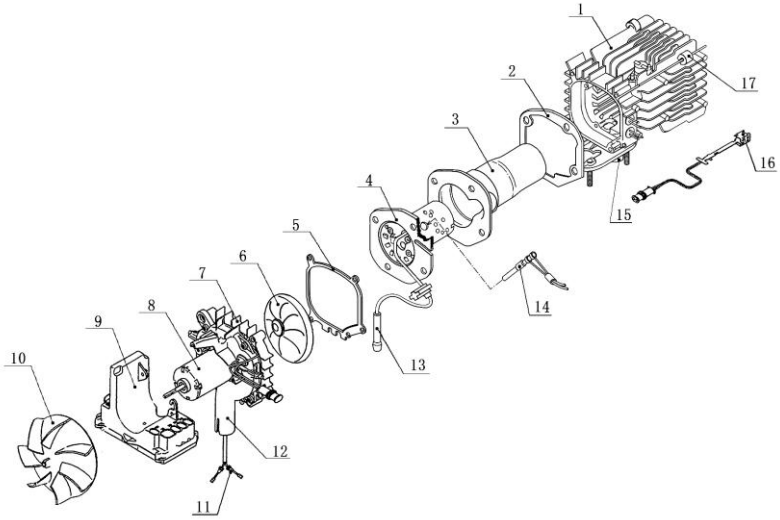


Fig. 3

1- Heat exchanger 2-Gasket 3- Combustion pipe 4-Combustor 5- Gasket
6- Combustion supporting fan blades 7-Bracket for fan motor 8- Fan motor
9-Controller 10- Blade wheel of heating fan 11-Fuel pump leading wire
12- Insulating mat 13- Fuel pipe 14-Glow plug 15- Exhaust pipe vent
16- Overheat sensor 17-Insulating mat

3.2 Hood-Shape Case

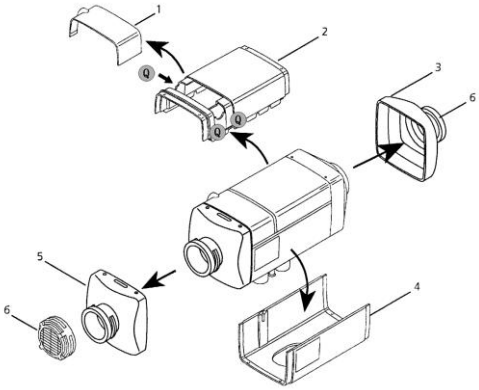


Fig. 4

1-Junction box cover 2-Top hood-shape cover 3-Hot air outlet;
4-Bottom hood-shape cover 5-Air inlet of heater 6-Air inlet/exhaust hood

The structure of the hood-shape case is shown in Fig. 4. It consists of the top cover 2 (The junction box cover 1 can be fixed on its window), bottom cover 4, air inlet hood 6, air inlet of heater 5 and hot air outlet 3. They form an air heating passage. Blade wheel of heating fan (Fig.3-10) on the fan motor (the same fan for supporting combustion) sucks in cold air from the air inlet. The air is heated by the heat exchanger and sent out from the hot air outlet.

3.3 Controller

The controller (Fig. 3-9) is at the front of the heaer and the back of the blade wheel of heating fan.This controller main including collect the circuit and exam the temperature circuit of the signal of a single-chip microprocessor、drive circuit、frequency、rotational speed、voltage.Have the function of heating process automation 、 system surveillance automation、breakdown handling automation.

3.3.1 Control of Working Procedures

Adjustment and control on operational status are performed during the whole working cycle (start-operation-stop) of heater in terms of the rotation speed of fan motor, the frequencies of fuel pump, on-off of glow plug, to given time sequence and in consideration of the preset value and measured value of the temperature of the temperature control point, rotation speed of fan motor feedback signal、frequency of fuel pump, surface temperature of the heat exchanger and other random parameters.

3.3.2 Locking Due to Troubles

When the heater can not be ignited normally, or can not sustain normal combustion after ignition, or broken circuit or short-circuit occurs to the glow plug, fan motor, fuel pump, or various sensors and components, or in case of overheating of heat exchanger, five times of termination of combustion, twice of unsuccessful ignition or abnormal power voltage, the heater will turn off and enter into locked status for protection.

3.3.3 Display of Troubles

For convenience of maintenance and repair, troubles of the heater can be displayed by the indicators (green LED) of the control switch.

In trouble status, indicator flashes at different frequencies. During the period between two fast flashes, there will be a few times of 1.3Hz slow flashes. The times of slow flashes represent the types of troubles, as shown in Table 2.

Table 2

Times of flashes of LED	Cause of trouble
1	Failure of second start
2	Termination of the third time of combustion
3	Power voltage out of specified range
4	The temperature of the glow plug goes up slowly
6	Broken circuit or short-circuit of temperature sensor
7	Broken circuit or short-circuit of fuel pump
8	Broken circuit, short-circuit, or rotation clogging of fan motor
9	Broken circuit or short-circuit of glow plug
10	Overheated
11	Broken circuit or short-circuit of overheating sensor
12	Broken circuit or short-circuit of control switch

3.3.4 Circuit Interfaces

The following circuit interfaces can be found on the controller case: socket X1 for fan motor, socket X2 for glow plug, socket X3 for overheating sensor, socket X4 for the leads to fuel pump and socket X7 for the main wire bundle. Please refer to Fig. 5 for their locations.

The connection parts are designed with such structures that wrong connection is made impossible.

3.4 Sensors and Safety Protection

3.4.1 Overheating Sensor

The overheating sensor(Fig.3-16) is installed on the back outer wall of

the heat exchanger. If the temperature here becomes higher than 182℃, the fuel pump circuit will be cut off by the controller and supply of fuel is stopped and then the heater is turned off for purpose of overheating protection.

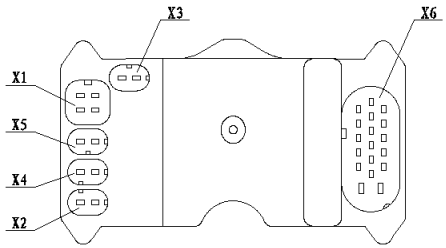


Fig. 5

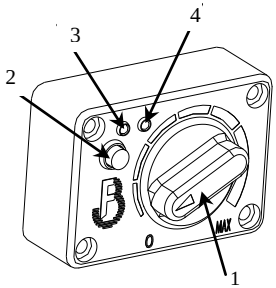


Fig. 6

1-Control Knob 2-Mode-transformation button
3-Mode indicating light 4-Working indicating light

3.4.2 Temperature Sensor

The temperature sensor is installed on the air inlet of heater，it measures the air temperature at the air inlet.

The working status and output power of the combustion furnace is regulated by the controller based on the measured temperature.

3.5 Control Switches

The control switch is shown in Fig. 6. Its control knob is used for the following operations: turning on or off of the heater and eliminating locking of the heater due to trouble interrupt and converting from constant temperature working mode to constant power working mode through the mode conversion button.

Constant temperature mode: when the indicating light turns red. Use the control knob to set the control temperature of the heated area(adjustable continuously from 5℃to 35℃).

Constant power mode:When the indicating light turns green,then use the control knob adjust the power.(adjustable continuously between 1KW and 2KW).

Constant lighting of the indicator (green) on the control switch indicates normal operation of the heater. Flashing of the indicator indicates trouble status of the heater (see Section 3.3.3 for details).

3.6 Power Supply

The power supply to the heater is a common power source for the engine of the vehicle, but with an independent safety device. When the power

voltage is lower than the specified lower limit for 18 seconds continuously or higher than the specified higher limit for 5 seconds continuously, trouble display will occur to the heater and the heater will be turned off automatically with trouble display.

3.7 Fuel Supply

The fuel for the heater can be from the fuel tank or from another independent fuel tank. A special-purpose fuel pump is used for transmission of fuel and regulation of supply quantity of fuel.

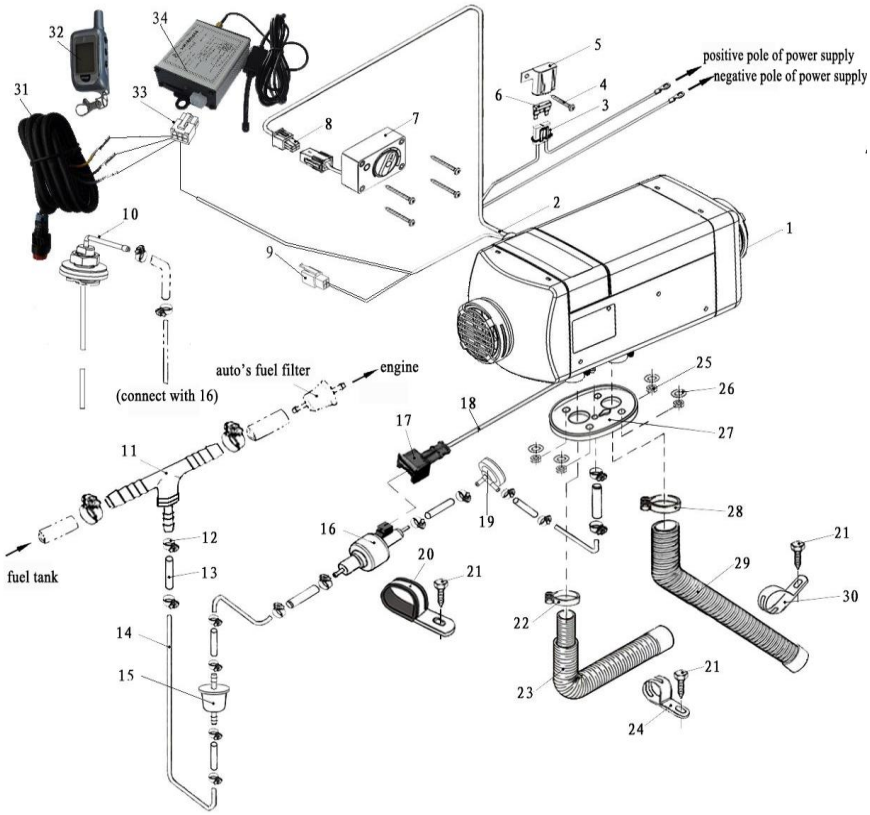


Fig. 7

1-Heater 2-Main wire bundle 3-Fuse holder 4-Self tapping screw 5-Fuse box cover 6-Fuse 7-Control switch 8-Connector X9 for control switch 9-Trouble diagnosis connector 10-Fuel suction pipe 11-Reducing T 12-Fuel pipe clamp 13-Fuel pip joint 14-Fuel pipe 15-Fuel filter 16-Fuel pump 17-Fuel pump connector 18-Fuel pump leading wire 19-Damper 20-Fuel pump clamp 21-Self drilling tapping screw 22-Air inlet pipe clamp 23-Air inlet pipe 24-Air inlet pipe fixing clamp 25-Nut M6 26-Washer 27-Gasket 28-Exhuat pipe clamp 29-Exhaust pipe 30-Exhaust pipe fixing clamp 31-Manual button 32-Remote controller 33-Plug of remote control receiver or GSM receiver 34-Remote control receiver or GSM receiver

4 Installation

Only special-purpose parts can be used for installation of the heater. Fig. 7 is the diagram for installation. The positions and ways of fixing of various parts may vary from one automobile model to another, but the general principles must be followed in conformity with the requirements of this chapter. Otherwise the heater may not work normally or safety problems may occur.

4.1 Requirements for Installation and Places of Application of the Heater

4.1.1 It is not allowed to use the heater in locations with inflammable or explosive substances such as flammable gas or flammable dust.

4.1.2 It is not allowed to use the heater in closed space (such as garage or maintenance workshop without air ventilation) to avoid danger of poisoning due to exhaust from burning.

Attention: Under either of the above circumstances, it is not allowed to use the heater even at the timer stand-by state or wireless remote control state.

4.1.3 It is not allowed to install and use the heater in bedrooms.

4.1.4 If the heater is installed in special-purpose vehicles (such as vehicles for dangerous goods), special rules must be followed in installing the heater.

4.1.5 Never place fuel tank, compression tank, fire extinguisher, clothes, paper, etc. near the heater or opposite to the hot air vent.

4.2 Installation of the Main Heater

4.2.1The main heater can be installed inside the vehicle or outside the vehicle. But when it is installed outside the vehicle a shield which can be prevent the damage(splash of stones)of external force(supplied by retailers).The heater can’t be soaked in the water or in the rain for a long time(heater should be shut off).The heater should be operated after it is completely dried if the heater is corroded by rain and water.

4.2.2 For convenience of heating air flow and installation, maintenance of the main heater, enough space must be provided for installation. Please refer to the scope of double dot line for the space for installation, as shown in Fig. 8.

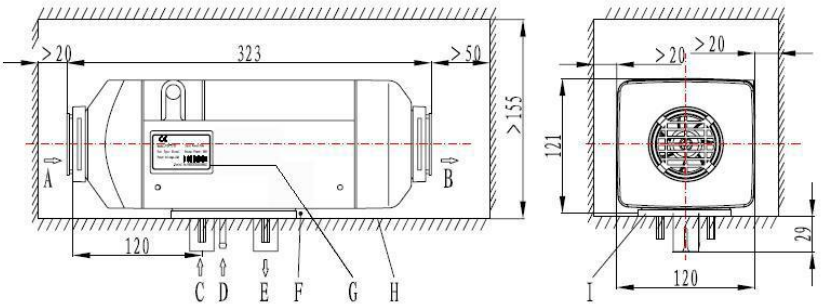


Fig. 8

A-Inlet of heating air B-Outlet of heated air C-Inlet of combustion air
D- Fuel inlet E-Exhaust outlet F- Non-interference area
G-Information label H-Installation surface I-Gasket

Please make sure that there is not any foreign matter in the gap between the bottom surface of the main heater and the installation surface of the vehicle (Fig. 8-F).

4.2.3 Good sealing is necessary between the main heater and the installation surface on the vehicle. A special gasket (as shown in Fig. 8) supplied by the manufacturer must inserted in between during installation. The installation surface must be even enough. Its parts at the installation bases of the main heater shall have unevenness of less than 1mm. After drilling installation holes, evenness must be improved according to this requirement. At installation, please rotate the four M6 nuts, provided by the manufacturer, tight. The torque for tightening shall be 6Nm+1Nm.

Please refer to Fig. 9 for positions of installation holes.

4.2.4If the sickness of the installation panel<1.5mm a mounting plate may need(Fig.10).

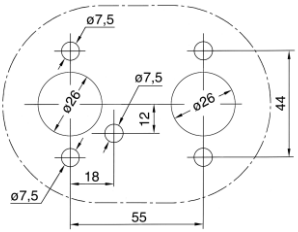


Fig.9

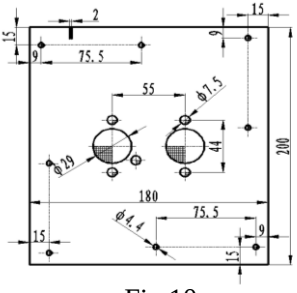


Fig.10

Attention: For re-installation of the heater ,a new gasket must be used to replace the old one.

4.2.5Direction for installation of the heater is shown in Fig. 11. Attention must be paid to that the inclination angle shall not exceed the limit, or normal operation will be affected.

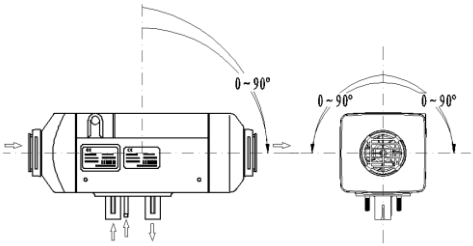


Fig.11

4.2.6 After installation of the main heater, please check and make sure that there is not any contact or friction between the blade wheel of fan and other nearby parts to avoid unsmooth operation

4.2.7 After installation, remember the information of the lable on the heater. It is the important proof of maintenance in the future.

4.3 Installation of Air Heating System

4.3.1The independent outer circulation or inner circulation mode of heater can be recommended.If the air heating system of the heater have to be connected with the air duct of the vehicle,in order to ensure the air duct unobstructed the connection way should be analysed by the professionals.

4.3.2 When an external heating air pipe is attached to the heater, the pipe diameter shall not be smaller than 60mm. Its material shall be capable to resist temperature of 130℃.

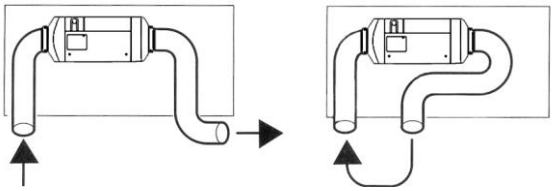
4.3.3 The maximum pressure drop between the air inlet side and air outlet side of the air heating system shall not be greater than 0.15kPa.

4.3.4 The hot air from the heating system shall not erupt onto such parts that are unable to resist heat. In case of passenger vehicles, measures shall be taken to avoid blocking of the hot air vent by passengers. A self-provided protective net can be installed if necessary.

4.3.5 For heater working in external circulation mode, the position of air inlet port shall be proper to guaranteed that under normal operation no splash of water can enter. No water can be sucked into the heater and no

exhaust from the engine can be sucked in.

4.3.6 For heater working in internal circulation, measures shall be taken to avoid re-entering of the supplied hot air into the air inlet port (as shown in Fig. 12). If no air inlet pipe is attached in this mode, an air inlet hood with grids (Fig. 4-6) must be installed at the air inlet port of the main heater. The inlet air shall be drawn from the cold area of the compartment, such as under the seats or berths.



a) Correct b) Wrong

Fig. 12

4.3.7The optional air duct fittings

Users can choose the air duct fittings according to the situation.Please refer to Fig.13.

No.	Name	Specification
A	Grill	Φ60
B	Diameter changes joint	Φ90/60
		Φ56/60
C	Elbow	Φ60
D	Clamp	Φ50～70
E	Ducting	Φ60/Φ64
F	Connecting	Φ60
G	Reducing T	Φ60

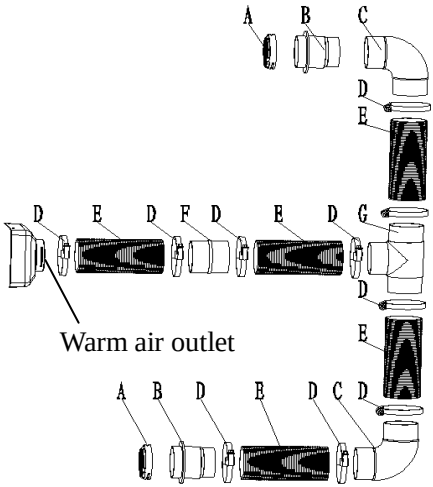


Fig. 13

4.4 Installation of Fuel Supply System

The fuel supply system for the heater is as shown in Fig. 14.

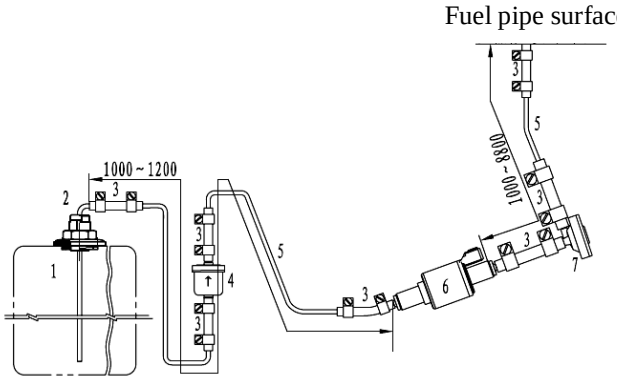


Fig.14

1.Fuel tank 2.Fuel extractor 3.Fuel pipe connector 4.Filter 5.Fuel pipe 6.Fuel pump 7.Damper

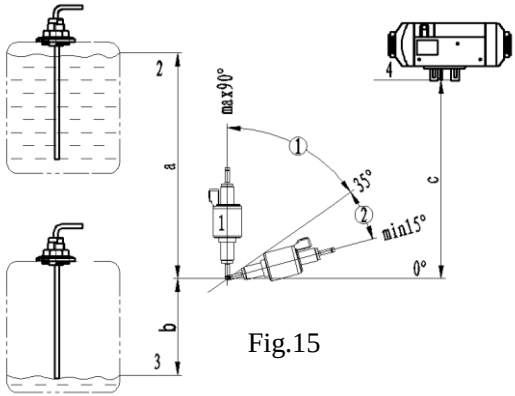
4.4.1 The fuel pump shall be fixed in automobile with a fuel pump clamp with protective rubber cover. The outlet of the fuel pump shall tilt upwards. The tilt angle can be selected from the range of 15°～35° (as shown in Fig. 15). When conditions permit, the fuel pipe between the fuel pump and the heater shall go up gradually.

4.4.2Damper installation should be according to the practical situation.If the packing list doesn't include the damper then it is should not be used temporarily.

4.4.3 Difference in elevation between the level of fuel and the fuel pump as well as the difference in elevation between the fuel pump and the fuel inlet of the heater can produce pressure (or suction) in the fuel pipeline(See Fig.15).So, these dimensions shall conform to the requirements as follows:

a≤3m b≤0.5m (Avoid of negative pressure may be produced in sealed fuel tank. In such case, b≤0.15m) c≤2m.

Note:please check the vent on the fuel tank when doing installation.



1-Fuel pump
2-Max.fuel level
3-Min.fuel level
4-Fuel inlet level

①Allowable installation angle
②Optimum installation angle

Fig.15

4.4.4 Installation of Fuel Filter

A fuel filter shall be installed before the fuel inlet port. Please make sure that the fuel flow is correctly followed. Its position shall be in conformity with Fig. 16.

Fuel filter should be changed after 2 years,fuel pipe and clamps should also be changed.

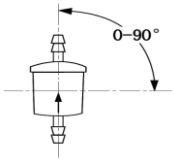


Fig.16

4.4.5 Installation of Fuel Pipe

4.4.5.1 Only the flexible nylon pipe, which has good light-resistance and thermal stability, supplied with the heater can be used as the fuel pipe. The inner diameter of the pipe is Φ2mm.

4.4.5.2 The place for installation of fuel pipe shall be resistant against flying stones and shall be away from any heat emitting parts of the vehicle. Protective device can be installed if necessary.

4.4.5.3 The fuel pipe from the fuel pump to the main heater shall be in any directions other than downward direction. The fuel pipe shall be tied in some proper location to make it fixed. The distance between two ties shall be less than 50cm.

4.4.5.4 The fuel pipe fittings supplied with the heater shall be used for

connections between fuel pipe and fuel pump, fuel pipe and heater, fuel pipe and sucking pipe of fuel tank and fuel pipe and reducing T. The fuel pipe shall ties with fuel pipe clamps. Bubbles shall be eliminated from the connecting places (Fig. 17).

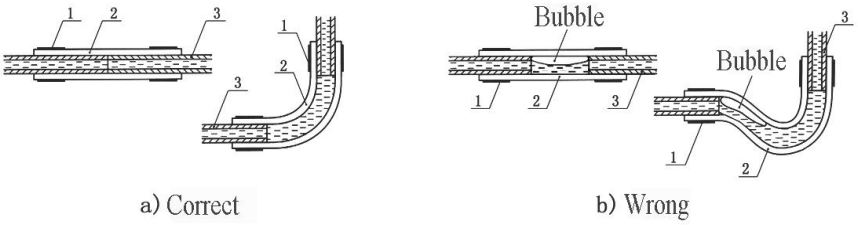


Fig. 17

1-Fuel pipe clamp; 2-Fuel pipe fitting; 3-Fuel pipe

4.4.6 Installation of Fuel Sucking Device

4.4.6.1 When fuel is sucked from the vehicle fuel tank or from an independent fuel tank, a sucking pipe shall be used. Attention shall be paid to that the openings on the fuel tank (or tank cover) for installation shall be appropriate in size, with trimmed brim and with good evenness around the opening. Good sealing is necessary for the base of the fuel sucking pipe. The bottom end of the fuel sucking pipe shall be 30mm-40mm from the bottom of fuel tank to suck enough fuel and at the same time to avoid sucking in impurities sediment on the bottom of fuel tank. (Fig. 18)

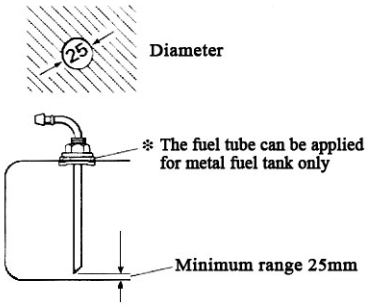


Fig. 18

4.4.6.2 If fuel is sucked from the fuel pipe to the engine, the fuel pipe from the fuel tank to the fuel filter shall be disconnected and re-connected with the thicker pipes of the reducing T and the thinner pipe of the reducing T

shall connect the fuel pump of the heater via oil pipe fitting and fuel pipe. The angle for installation must in conformity with Fig. 19, or normal work of the heater will be affected.

After installation, the vehicle engine shall be started and then turned off after one minute's work to eliminate air trapped in the fuel sucking pipe.

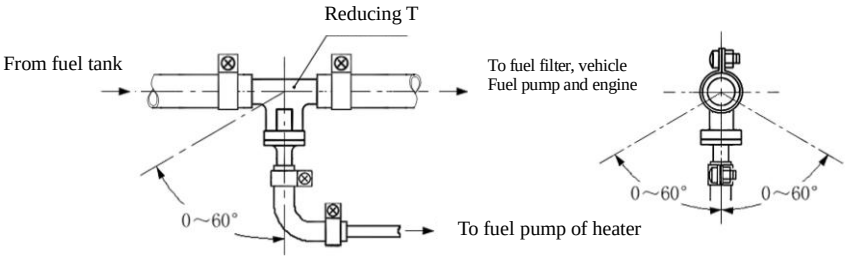


Fig. 19

4.5 Installation of Electrical System

4.5.1 The wiring diagram for the heater is shown in Fig. 20. The wires of the main heater for connection to outside circuits have been made into wire bundles. They can be laid according to the positions of various components and shall be fixed in some proper locations. The distance between two fixing points shall not exceed 30cm. Attention: Any exposed wire bundle out of the vehicle body or out of the wiring groove must be protected by corrugated pipe.

4.5.2 Connection of the main wire bundle with the heater: Use a blunt tool to pry the places marked "ⓠ" gently to remove the junction box cover (Fig. 4-1). Connect the 18-wire connector X6 of the wire bundle to the controller socket. The wire bundle can come out from either the right side or the left side of the heater. Then replace the junction box cover. Make sure to have good sealing between the junction box cover and upper cover and between the junction cover box and the wire bundle sealing mat to avoid any thermal malfunction due to leak of air from the hood-shape case.

4.5.3 Insert sheet fuse into fuse holder F and replace the upper cover tightly. Use screws to fix it in a proper location in the vehicle.

4.5.4 Connect the 2.5mm^2 red wire and the 2.5 brown wire in the wire bundle to the hole terminals with springs and therefore connect to the "+" and "-" terminals of the vehicle battery.

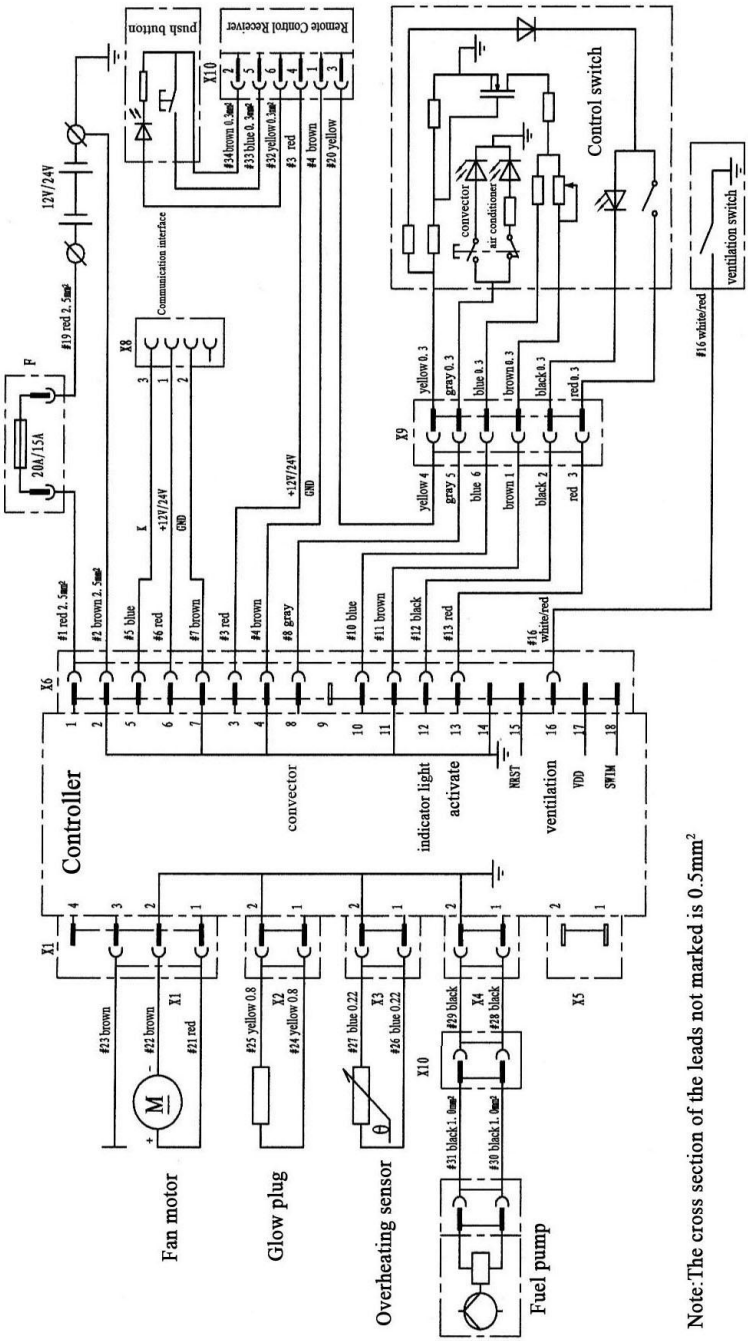

Controller
Fan motor
Glow plug
Overheating sensor
Fuel pump
convector
indicator light
activate
ventilation
Control switch
Remote Control Receiver
push button
Communication interface
convector
air conditioner
ventilation switch
12V/24V
20A/15A
Note:The cross section of the leads not marked is 0.5mm²

Fig.20

4.5.5 Straighten the fuel pump leads (two 0.6mm^2 black wires) with their protective pipes, which is made a coil inside the combustion supporting air inlet port, and put them through the opening on the wall of the air inlet pipe. Insert the terminals at the end of the wires with pressed springs into the socket of the fuel pump connector and therefore connect to the fuel pump.

4.5.6 Use four self-tapping screws to fix the control switch in a position for convenient operation and the arrangement shall make easy observation on the indicator on the case, so as to identify the working conditions (operation/stop) of the heater easily. The terminals on the leads from the control switch according to the sequence shown in Fig.21,shall be inserted into the pin seat and connect with self-locking mechanism to connector X9 on the main wire bundle.

4.5.7 The surplus wires in the wire bundle at the moment are wires for fault diagnosis、information adjustment and function expansion. They shall be kept in good condition. Their ends shall be wrapped with electrician's insulating tape to avoid short-circuit or earthing.

Fig. 21

4.6 Installation of Combustion Supporting Air Sucking Pipe and Exhaust Discharge Pipe

4.6.1 The combustion supporting air must be sucked in from external fresh air outside the vehicle. The exhaust from combustion must be discharged into the air through exhaust pipe. Measures must be taken to avoid the exhaust from re-entering the vehicle.

The pipes go through the outer wall or holes on the bottom of vehicle. Measures must be taken to prevent entering of splash water. The pipes must be protected and can resist shock permanently.

4.6.2 Only the air inlet pipe and exhaust pipe provided with the heater can be

used. The air inlet pipe is a corrugated pipe made of a aluminum pipe that it's surface is covered by plastic and paper; The exhaust pipe is corrugated stainless steel pipe. Please identify them and do not make mistake at installation. To connect them with the heater, please use the supplied clamps to fix them tightly on the combustion supporting air inlet and exhaust pipe vent respectively. The protective hood on the vents of the air inlet pipe and exhaust pipe must be kept in good condition. Do not damage them or remove them.

4.6.3 Both the air inlet pipe and exhaust pipe shall come outwards and downwards from the heater (Fig. 22), otherwise a Φ4mm hole shall be prepared at the bottom of the pipe for discharge of condensation water. If the pipe need curve, the radius cannot be smaller than 50mm.Also, the sum of all curve angles for each pipe shall not exceed 270 °.

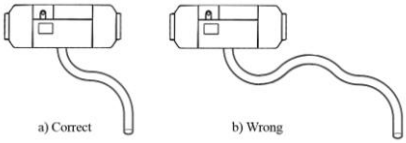


Fig. 22

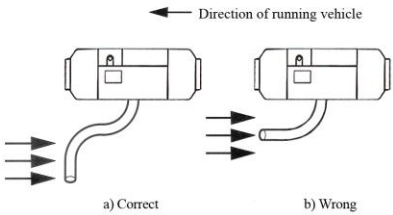


Fig. 23

4.6.4 The openings of the pipes shall not be opposite to the direction of the running vehicle. (Fig. 23)

4.6.5 Arrangement of the pipes shall protect the pipe openings from blocking by slurry, rain and snow or other dirt. (Fig. 24)

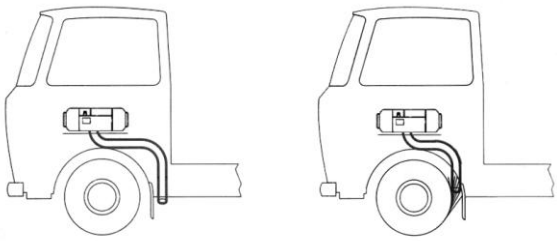


Fig. 24

4.6.6 When the heat is working, the exhaust pipe is at high temperature. In

installation, make sure to install it in far distance from plastic parts or other objects with poor thermal resistance of the vehicle body. The exhaust pipe shall be properly fixed. The exhaust vent shall be downwards, perpendicular to road surface with an angle of 90 °±10 °. To ensure such an angle, the fixing clamp for the exhaust pipe shall be within 150mm from the pipe end. (Fig. 25)

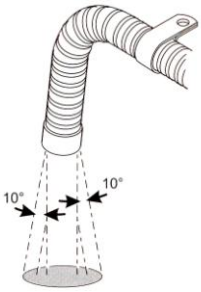


Fig.25

Warning:Violation against the above requirements may cause fire.

4.6.7 If the section of the exhaust pipe inside the vehicle may be touched by passenger, a protective cover has to be installed to prevent human contact and scald.

5 Methods of Operation

5.1 The heater control with two ways

(1) Use the control switch.

(2) Control with extended function, use the remote controller or GSM mobile phone controller.

5.2 Use the control switch

5.2.1 Turn the control knob clockwise and the power is on the controller and the work indicator (green LED) comes to light. At this moment, the heater comes to the start stage. The controller will run heating program according to the temperature control target set by the control knob. In the start stage, the time delay from switch-on to fuel supply to the fuel pump is 45 seconds.

5.2.2 After the combustor is ignited, if you want to regulate the heating temperature or the heater power, you can turn the control knob according to the arc mark around the control switch.

5.2.2.1 When the mode indicating light turns red,the heater is in constant temperature mode.If you want to adjust the heating temperature,press the curve sign on the control switch,turn the control knob,press the mode-transformation button,mode indicating light turns green,then the heater will convert to the constant power mode.

5.2.2.2 When the mode indicating light turns green,the heater is in constant power mode.If you want to adjust the power, press the curve sign on the control switch,turn the control knob,press the mode-transformation

button,mode incating light turns red,the heater will convert to the constant temperature mode.

5.2.3 The user can install a ventilation switch oneself ,if you want the heater work for air circulation only under normal temperature without any heating, you can close the ventilation switch. The wind capacity can be continuously regulated with the control knob.

5.2.4 If you want to turn off the heater manually, turn the knob anticlockwise to position "0", 3 seconds after, the work indicator goes out. If the fuel pump is at work before the heater is turned off, the pump will shut down immediately. But the fan will continue to run for 180 seconds.

5.2.5Use any other way shut off the heater (cut off the power) directly is not allowable.

5.3 Remot control instruction (Optional device)

5.3.1Remote controller (See Fig.26)

Fig.26

Display Symbol

①Signal intensity：

②Heating symbol：

③Successfully set symbol：

④Heating 15 minutes：15

⑤Heating 30 minutes：30

⑥Heating 45 minutes：45

⑦The rest heating time：XX(minute):XX(second)

⑧Key lock：

⑨The rest power of the battery：

⑩The end of heating：


Fig.27

5.3.2 Manual button（See Fig.27）

5.3.2.1 The indication light of manual button goes out when the heater is in the standby status.

At this time,press the manual button,heater will work and the indication light of manual button will be lights up.The default heating time is 45 minutes of starting by manual button.

5.3.2.2 The indication light of manual button lights up when the heater is in the heating status.At this time press the manual button or the heating 45 minutes is finished,the heater will stop heating and the indication light of manual button will be went out.

5.3.3Remote control receiver(See Fig.28)

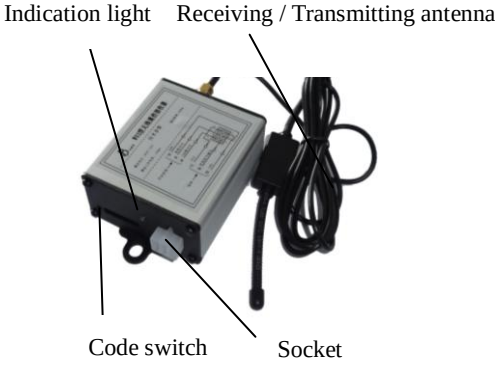


Fig.28

5.3.4 Instruction for installation

According to the diagram of the wireless remote control receiver connect the wiring of remote control receiver、manual button and install (tight) the receive/transmitting antenna before use.

5.3.5 Instruction for operation

5.3.5.1 Light up and go out of the screen

5.3.5.1.1 Screen and all the symbols light up after the battery is installed , then the remote controller enters the standby state(Screen goes out and none of the symbols are displayed after 2 seconds).

5.3.5.1.2 In all processes ,the remote controller will enter the key lock state automatically if no operation within 10 seconds .Key lock symbol occurs and the screen goes out.

5.3.5.1.3 Unlocking method: When the screen goes out, hold down the stop key for 3 seconds ,it will be unlocked. Then the screen lights up and the symbol of the key lock disappeared.

5.3.5.1.4 In the heating state, the heating symbol、rest of heating time、whole heating time and screen state(lock or unlock) occurs on the

screen .Press any key,the screen will be lighted up (key lock symbol will be displayed).

5.3.5.2 The autocode function of remote controller and wireless remote control receiver

5.3.5.2.1 Press the encoding button of the wireless remote control receiver, the indication light will turn red and the remote controller will enter into the encoding state.

5.3.5.2.2 In the encoding process of wireless remote control receiver ,encode the four different remote controllers by pressing each four different keys(in the unlocked status)of the remote controllers .Heating symbols(15mins 、30mins 、45mins) will all light at the same time if the encoding operation is correct. All the heating symbols will go out after 1 seconds and indication light turns green if encoding set up successfully.

5.3.5.3 The starting of parking heater

5.3.5.3.1 In standby and unlocking status,press the key of“heating 15 minutes”,then the screen is lighted up and the indication light flashes one time.If the Heating 15 minutes symbol is lighted up,the operation is finished.The time of heating 15 minutes is displayed on the screen and the heater enters into the heating status.If the heating 15 minutes symbol is not lighted up,the operation failure.Please re-press the key of heating 15 minutes.

5.3.5.3.2 In standby and unlocking status,press the key of“heating 30 minutes”,then the screen is lighted up and the indication light flashes one time.If the Heating 30 minutes symbol is lighted up,the operation is finished.The time of heating 30 minutes is displayed on the screen and the heater enters into the heating status.If the heating 30 minutes symbol is not lighted up,the operation failure.Please re-press the key of heating 30 minutes.

5.3.5.3.3 In standby and unlocking status,press the key of“heating 45 minutes”,then the screen is lighted up and the indication light flashes one time.If the Heating 45 minutes symbol is lighted up,the operation is finished.The time of heating 45 minutes is displayed on the screen and the heater enters into the heating status.If the heating 45 minutes symbol is not lighted up,the operation failure.Please re-press the key of heating 45 minutes.

5.3.5.4 The shutdown of parking heater

5.3.5.4.1 In the heating status,the remaining heating time is gradually decreased by the heating process.The heater will stop heating when the remaining heating time is cleared to zero or press the stop key in the unlocking status.when the stop operation is set,the screen will be lighted up

and heating symbol will be went out.The heating process will be stop after the end of heating symbol occurs and the buzzer rings two times.

5.3.5.4.2 In the heating end of unlocking status,press stop key,the remote controller will return to the standby and locking status immediately.

5.3.5.4.3 In the heating end of locking status, the remote controller will return to the standby and locking status after 60 seconds.

5.3.5.5 Heating key operation in the heating status

5.3.5.5.1 In the heating of unlocking status,press the key of heating 15 minutes,the screen is lighted up and the heating 15 minutes symbol is displayed.The remaining heating time can't be accumulated,the cutdown from 15 minutes to begin again.

5.3.5.5.2 In the heating of unlocking status,press the key of heating 30 minutes,the screen is lighted up and the heating 30 minutes symbol is displayed.The remaining heating time can't be accumulated,the cutdown from 30 minutes to begin again.

5.3.5.5.3 In the heating of unlocking status,press the key of heating 45 minutes,the screen is lighted up and the heating 45 minutes symbol is displayed.The remaining heating time can't be accumulated,the cutdown from 45 minutes to begin again.

5.4 GSM remote control instruction(Optional device, Initial password:2530666).

GSM remote controller is an extended function device of parking heaters which can be started and stopped through voice and SMS by phones or cellphones.

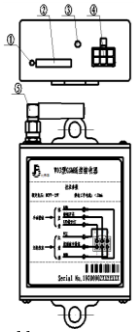
5.4.1 GSM remote controller as shown Fig.29.

5.4.2 SIM card should be put into GSM remote controller before use.Refer to Fig.20 (Heater manual instruction),fix controller and manual button in a proper position.

5.4.3 Heating process can be cancelled by pressing manual button.Same as 5.3.2

5.4.4 Voice Control

Dial the SIM card phone number of GSM remote controller by phone or cellphone. According to voice prompt,operate each step.



1-SIM card button
2-SIM card socket
3-Indicatin light(red and green colours);
4-Socekt；5-GSM antenna

Fig.29

If your cellphone had binded with controller,you can operate directly without password(Cellphone binding method see 5.4.7.1).

If not,you have to input the right password after voice “Please input the password and press #”.You will hear “Password is wrong,please input again” if wrong password used.Your phone will be hung up automatically after second wrong password.

In the heating mode you can hear voice prompt: “The heater is heating” ,**xx** minutes have been heated”, “XX minutes have been left”, “Press 0 to stop heating”, “Press 8 for language change”.

In the non-heating mode you can hear voice prompt: “Press 1 to heat 15 minutes”,“Press 2 to heat 30 minutes”,“Press 3 to heat 45 minutes”, “Press 8 for language change”, “Press 9 to change the password”.You can hear “The heater starts heating process for 15 minutes”by pressing 1 key. “The heater starts heating process for 30 minutes”by pressing 2 key. “The heater starts heating process for 45 minutes” by pressing 3 key.

5.4.5 Password Setting

5.4.5.1 In the non-heating mode change password by pressing 9.

5.4.5.2 According to prompting input 7 numbers as your new password after hearing “Please input the new password and press #” .Input new password again after hearing “Please input the new password again and press #” .If two passwords are consistent you will hear voice: “The password is changed,new password：XXXXXXX” .If not,voice prompt “Wrong password,please re-enter the password” .After setting up successfully controller will return previous mode automatically.

5.4.5.3 Hold down manual button for 3s green indication light flashes 3 times,new password will be canclled automatically,system restore initial password: “2530666”.

5.4.6 Language Conversion

5.4.6.1 In the heating or non-heating mode change languages by pressing 8 key.

5.4.6.2 In the Chinese voice status you can hear “Press 2 change to English,press 3 change to English, press 0 to return”, in the English voice status you can hear “Press 1 change to Chiness,press 3 change to Russian, press 0 to return”, in the Russian voice status you can hear “Press 1 change to Chinese,press 2 change to English, press 0 to return” .After

setting up successfully you will hear “Language changed successfully” in language which has been converted.

5.4.7 SMS Control Method （Use phone number 139333444411 as an example）

5.4.7.1 SMS Binding.

One GSM controller can be binded with only 2 cellphones, send message to GSM controller：*2530666**13933344411#

You will receive the message from controller: “13933344411 is commanded successfully” or “Command is full,command unsuccessfully”(When you want to bind the third cellphone).

5.4.7.2 SMS cancel the bindings.

Send message to GSM controller：*2530666*#13933344411#

If your cellphone had been binded with GSM controller you will receive the message from controller: “ Relieved the command of 13933344411 successfully”.If not,you will receive the message: “No command cellphone”.

5.4.7.3 SMS cancel all the bindings.

Send message to GSM controller：*2530666*##

If your two cellphones had both been binded with GSM controller you will receive the message from controller: “All the commands are relieved successfully ”.If not,you will receive the message:“No command cellphone”.

5.4.7.4 SMS set heating time（Only this time effective）.

5.4.7.4.1 If you want to start the heater in **hh** hours and **mm** minutes and heat **xx** times.

Setting time:**hh** hours and mm minutes shouldn’t less than 1 hour.Heating time:**xx** should between 15-45 and can’t more than 45 minutes.

Binding cellphone send message to GSM controller：*__hhmm__*__xx__# or *2530666*__hhmm__*__xx__#

Non-binding cellphone send message to GSM controller：*2530666*__hhmm__*__xx__#

Eg**:**Heat 30 minutes in 2 hours and 15 minutes later:

Binding cellphone send message to GSM controller: *0215*30# or *2530666*0215*30#

Non-binding cellphone send message to GSM controller: *2530666*0215*30#

5.6.7.4.2 System default heating time are 45 minutes.

Eg**:**Heat 45 minutes in 2 hours and 15 minutes later:

Binding cellphone send message to GSM controller：*0215# or *2530666*0215#

Non-binding cellphone send message to GSM controller：*2530666*0215#

5.4.7.4.3. GSM controller reply SMS.

GSM will reply the SMS“The heater setting time successfully! The heater will turn on after hh hours and mm minutes and heat for xx minutes”after right operation.Both the red indication light of GSM controller and manual button light will flash continuously.

When heater starting at the setting GSM controller will reply SMS: “The heater has started, estimated heating time are xx minutes”.

5.4.7.5 SMS start the heater immediately（Only this time effective）.

5.4.7.5.1 Setting time:**xx** minutes.

Heating time:**xx** should between 15-45 and can’t more than 45 minutes.

Binding cellphone send message to GSM controller：*01***xx**# or *2530666*01***xx**#

Non-binding cellphone send message to GSM controller：*2530666*01***xx**#

Eg**:**Heat 30 minutes immediately:

Binding cellphone send message to GSM controller: *01*30# or *2530666*01*30#

Non-binding cellphone send message to GSM controller: *2530666*01*30#

5.4.7.5.2 Heat 45 minutes immediately(System default heating time).

Binding cellphone send message to GSM controller：*01#or*2530666*01#

Non-binding cellphone send message to GSM controller：*2530666*01#

5.4.7.5.3 GSM controller reply SMS.

GSM will reply the SMS “The heater has started, estimated heating time are **xx** minutes”.If the heater has been heating you will receive SMS “The heater is heating now, **xx** minutes have been heated, **xx** minut es are left”.

5.4.7.6.SMS Cancel time setting.

Binding cellphone send message to GSM controller: *0000# or *2530666*0000#

Non-binding cellphone send message to GSM controller: *2530666*0000#

GSM will reply the SMS “Time heating has been canceled”.

5.4.7.7.SMS shut off the heater immediately.

Binding cellphone send message to GSM controller: *02# or *2530666*02#

Non-binding cellphone send message to GSM controller: *2530666*02#

If the heater is heating now GSM controller will reply SMS “The heater has stopped and heated **xx** minutes”.

If the heater has stopped heating GSM controller will reply SMS “The heater has turned off”.

5.4.7.8 Failure SMS notice.

If incorrect format SMS has been sent(must start with*and end with#),GSM controller will reply: “Failure command, please reply *88# if you would like to get more help information”

If you reply message:*88# you will get:
“*2530666**13933344411#；*2530666*#13933344411#；*2530666*##；*2530666*hhmm*xx#；*2530666*01#；*2530666*02#”(This messages just remind users the right message formats).

6 Treatment of Usual Troubles

6.1 During use, the heater may become unable to start normally or die out after start. Such troubles may lead to locking state. In such case, you can turn the control knob anticlockwise to position “0” and turn off the heater and keep it in such state for at least 5 seconds. Then, restart the heater.

6.2 Circuit troubles may be caused by different reasons, such as corrosion of connectors, poor contact of connectors, wrong connection of wires, corrosion of wires or fuse, corrosion of battery poles, etc. Users need to check and prevent such troubles and offer good maintenance.

6.3 The reasons for the troubles to the heater can be indicated by the green LED on the control switch (see Section 3.3.3 for details). When the following troubles occur, users can take measures to solve:

(a)Failure to turn on the heater and the LED, the reason is open0circuit of fuse or wrong connection of wires.

(b)The heater runs idly and no start process occurs after the heater is powered on, this indicates that the temperature of air inlet (or the ambient temperature around the external temperature sensor) is higher than the set heating temperature, or called hot start. In such case, you need to turn the control switch knob clockwise to have a higher set temperature.

(c)When the LED flashes once, it indicates failure of second start. You should check if the fuel pipe is clogged or there is not enough fuel in the fuel tank.

(d)When the LED flashes for three times, it indicates that the power voltage is out of the allowable range. If the voltage is low, please charge the battery.

(e)When the LED flashes for ten times, it indicates an overheating trouble. Check shall be performed to find any clogging at the hot air outlet and any obvious leak of air flow through the hood-shape case.

6.4 If the LED flashes for the number of times that are not mentioned above, the reasons for the troubles are complicated. Users are not capable for their solution. The problems shall be checked and solved by the service stations authorized by the manufacturer.

7 Precautions

7.1 After the heater is installed, it shall be turned on repeatedly for a few times so as to remove air trapped in the fuel supply system thoroughly and fill the fuel route with fuel only.

7.2 Trial operation is necessary for the heater before it is put into normal use. At trial operation, you have to check leakage from all connections and all safety issues. If discharge of dense smoke is observed or irregular

combustion noise or fuel smell is sensed, the heater must be turned off. Please take out the fuse, making the heater unable to operate. The heater can only be put into use after it is tested by qualified professionals.

7.3 Before each heating season, check shall be performed by qualified professionals for maintenance works, details as follows:

(a)Check air inlet and air outlet to find any pollution or foreign matters.

(b) Clean the external of the heater.

(c)Check if there is any corrosion or loose connection for electric contacts.

(d)Check to find any clogging and damage to the air inlet pipe and exhaust pipe.

(e)Check to find any leakage on the fuel pipe.

7.4 If the heater will not work for a long time, you'd better run it once every four weeks and let it run for 10 minutes at least to prevent malfunction of mechanical parts.

7.5 The air inlet port and air outlet vent of the heater must be kept clean and unblocked to provide smooth route for air flow, so as to prevent overheating.

7.6 If fuel is replaced with low-temperature fuel, run the heater for at least 15 minutes to fill new fuel into the fuel pipe and fuel pump.

7.7 When fill fuel for the heater, you have to turn off the power first. To do this, just turn the control switch anticlockwise to position "0".

7.8 The heat exchanger of the heater can not work for longer than 10 years. When it has worked for ten years, it must be replaced with a qualified one. The replace work must be performed by the heater manufacturer or its authorized agent. At this time, the overheating sensor shall be replaced too.

7.9 The exhaust pipe of the heater for discharge of waste gas after combustion, if arranged in an area with passengers, shall be replaced with qualified one when it has worked for 10 years.

7.10 If electric welding is performed to the vehicle, please detach the positive wire of power supply of the heater from the battery and connect it to earth to protect the controller from any damage.

7.11 The ambient temperature shall be in the range of -40℃~85℃ for

transport and storage of the heater to avoid any damage to its electronic elements and components.

7.12 Only authorized customer service stations are allowed to provide repair and installation for the heater. It is prohibited to make repair by yourself or use non-manufacturer's parts or components so as to avoid danger.

7.13 The manufacturer shall not be held responsible for any damage to the heater if the heater is opened without authorization or such damage is caused due to installation or operation with violation against the regulations.