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## Preface

Thank you for choosing air parking heater.

This instruction book describes the structures, working principles, installation and operation of the 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 our company. We shall do our best to provide service to you.

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

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## **1.Introduction**

### **Application scope**

This air heater is not affected by the engine, for in compliance with its heating power under the premise of installation in the following vehicles:

Various properties of the car (at most 9 people) and its trailer.

Building and machinery

Agriculture working machinery.

Boats, steamer and yacht (Limited to diesel heaters) .

Motor homes.

### **Heater purpose**

Preheating and defrosting the glass.

Heating and keeping the following warm:

Driver and working cabs.

Freight compartments.

Passenger and crew compartments.

Motor homes.

On account of its functional purpose, the heater is not permitted for the following applications:

Long-term continuous operation, e.g. for preheating and heating of:

Residential rooms and garages.

Work huts, weekend homes and hunting huts.

Houseboats, etc.

Heating or drying

Living creatures (people or animals) by blowing hot air directly at the subject

Objects.

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Blowing hot air into containers.

## **Safety instructions for application and proper purpose!**

### **Instructions for installation**

Parts of the structure and other components near the heater must be protected from excess heat exposure and possible contamination from fuel or oil

The heater must not pose a fire hazard even when it overheats. This requirement is deemed to be fulfilled when adequate clearance to all parts is observed during installation, sufficient ventilation is provided and fire-proof materials or heat plates are used.

All appropriate precautions must be taken when arranging the heater to minimize the risk of injuries to persons or damage to other property.

### **Exhaust system**

The exhaust outlet must be arranged so as to prevent any penetration of exhaust fumes into the vehicle interior through the ventilation system, warm air intakes or open windows.

### **Combustion air intake**

The air for the heater combustion chamber must not be sucked in from the passenger compartment of the vehicle.

The air intake must be arranged or protected in such a way that it cannot be blocked by other objects.

### **Heater air intake**

The heater air supply must consist of fresh air or circulated air and be sucked in from a clean area not contaminated by exhaust fumes of the drive machine, the combustion heater or any other source in the vehicle.

The intake pipe must be protected by a grid or other suitable means.

### **Hot air outlet**

The hot air pipes within the vehicle must be arranged or protected in such a way that there is no risk of injury or damage if they are touched.

The air outlet must be arranged or protected in such a way that it cannot be blocked by any objects.

### Installation kit

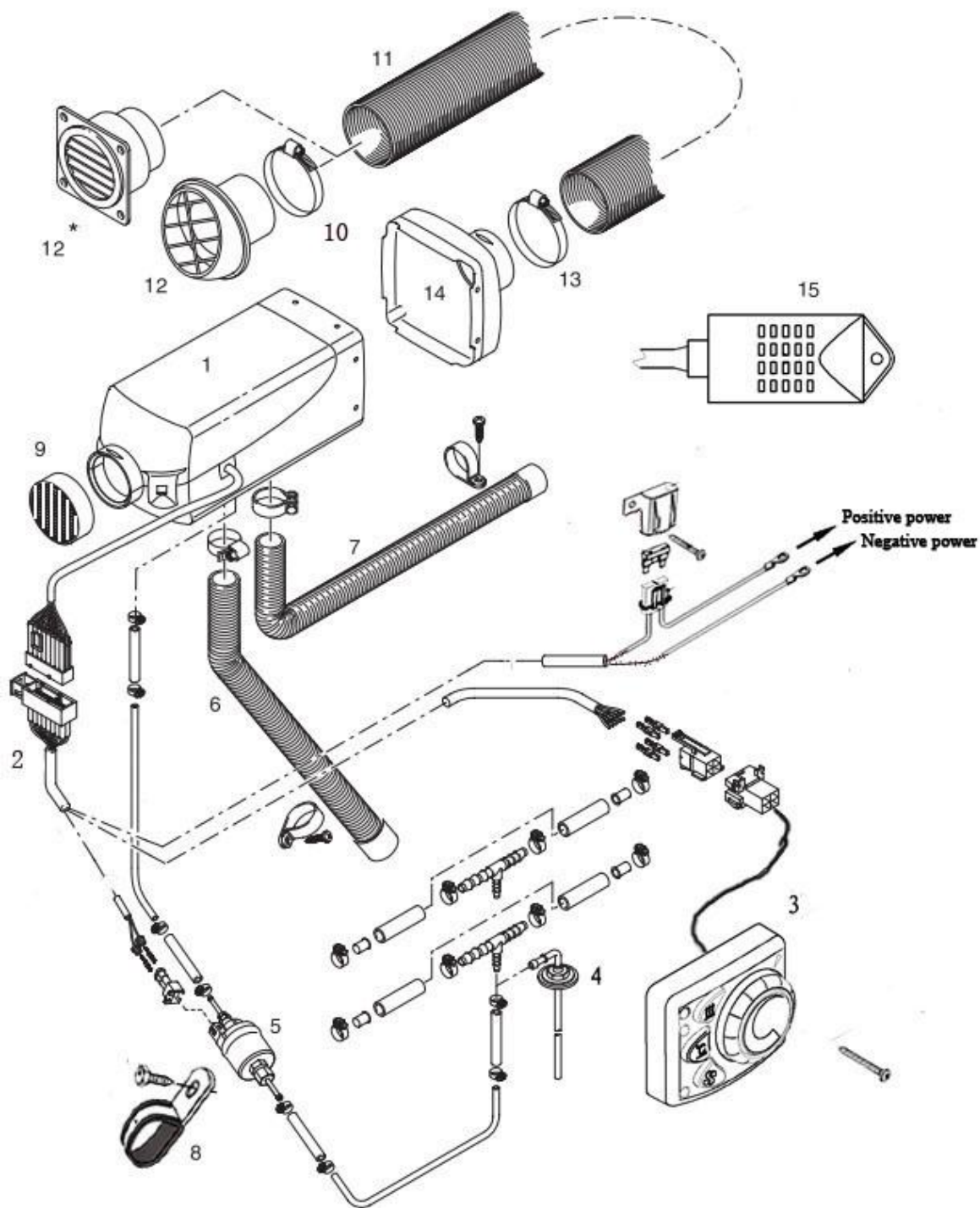


Fig.1

- 1.Heater 2.Cable harness 3.Control switch 4.Fuel suction pipe 5.Fuel pump 6.Air inlet

pipe 7.Exhaust pipe 8.Fuel pump clip 9.Grid 10. Clip 11.Ducting 12.Air outlet  
13.Clip 14.Hood 15.Outer temperature sensor(optional)

12 only for 2.2 KW air parking heater.

12\*only for 3KW and 4KW air parking heater.

## Technical specification

Table 1

Heater Model	FJH-2.2/□C	
Heater grade	Min	Max
Heating value (w)	850	2200
Fuel consumption (l/h)	0.1	0.28
Run time consumption power	7w	20w
Run time consumption power	≤100 w	
Weight	About 2.7Kg	

Table 2

Heater Model	FJH-3/□C	
Heater grade	Min	Max
Heating value (w)	900	3000
Fuel consumption (l/h)	0.11	0.38
Run time consumption power	8w	24w
Run time consumption power	≤100 w	
Weight	About 4.5Kg	

Table 3

Heater Model	FJH-4/1Q	
Heater grade	Min	Max
Heating value (w)	1300	4000
Fuel consumption (l/h)	0.18	0.54
Run time consumption power	8w	40w
Run time consumption power	$\leq 100$ w	
Weight	About 4.5Kg	

Table 4

Heater Model	FJH-4/□C	
Heater grade	Min	Max
Heating value (w)	900	4000
Fuel consumption (l/h)	0.11	0.51
Run time consumption power	8w	40w
Run time consumption power	$\leq 100$ w	
Weight	About 4.5Kg	





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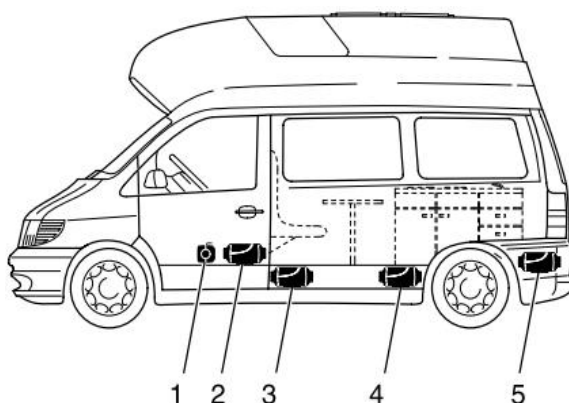
foot to the vehicle floor or to an outer wall of the vehicle.

Note

When installing the heater, always make sure there is sufficient clearance left for intake of the heater air and for dismantling the glow plug and controller (See Main dimensions 2)

**Installation position in a motor home**

In a motor home, the heater is preferably installed in the inner compartment or luggage compartment. If it is not possible to install the heater in the passenger compartment or boot, the heater can also be mounted and protected against splashing water under the vehicle floor.

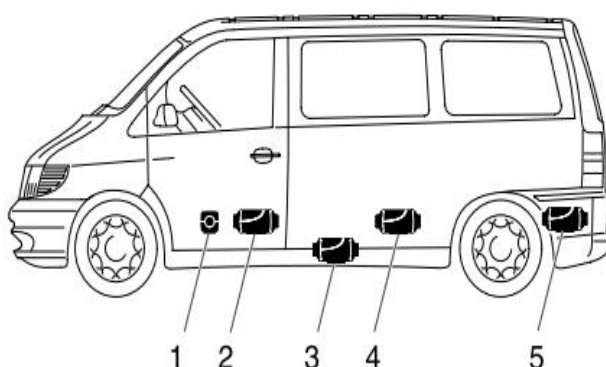


- 1 Heater in front of the passenger seat
- 2 Heater between the driver's seat and the passenger seat
- 3 Heater under the vehicle floor
- 4 Heater under the back seat
- 5 Heater in the boot

Fig.4

**Installation in a car or people carrier**

In a car or people carrier, the heater is preferably installed in the passenger compartment or boot. If it is not possible to install the heater in the passenger compartment or boot, the heater can also be mounted and protected against splashing water under the vehicle floor.

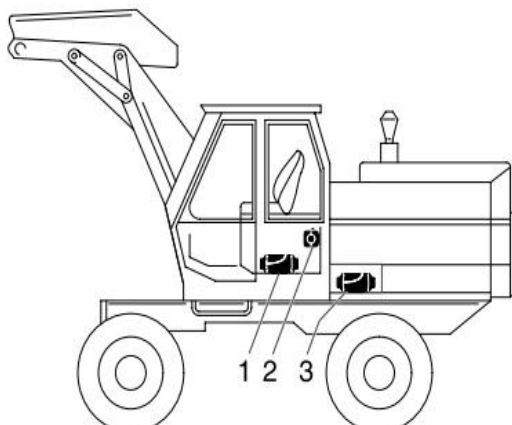


- 1 Heater in front of the passenger seat
- 2 Heater between the driver's seat and the passenger seat
- 3 Heater under the vehicle floor
- 4 Heater under the back seat
- 5 Heater in the boot

Fig.5

## Installation in an excavator cab

In an excavator, the heater is preferably installed in the cab. If it is not possible to install the heater in the cab, the heater can also be installed in a storage box outside the cab.

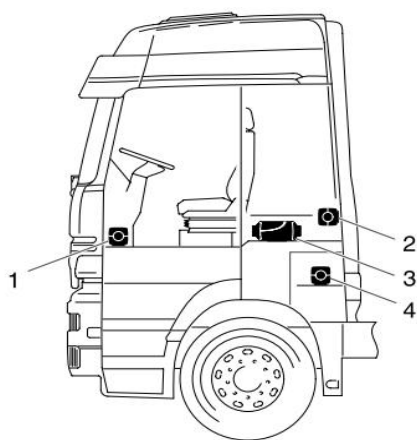


- 1 Heater in the seat box
- 2 Heater on the cab rear wall
- 3 Heater in a protective case

Fig.6

## Installation in a truck

In a truck, the heater is preferably installed inside the driver's cab. If it is not possible to install the heater inside the driver's cab, it can also be mounted in the tool box or in a storage box.



- 1 Heater in the passenger's foot room
- 2 Heater on the cab rear wall
- 3 Heater under the bed
- 4 Heater in the tool box

Fig.7

## Note

The installation suggestions made in the installation instructions are just examples. Other installation locations are possible as long as they correspond to the installation requirements stated in these instructions.

## Possible installation positions

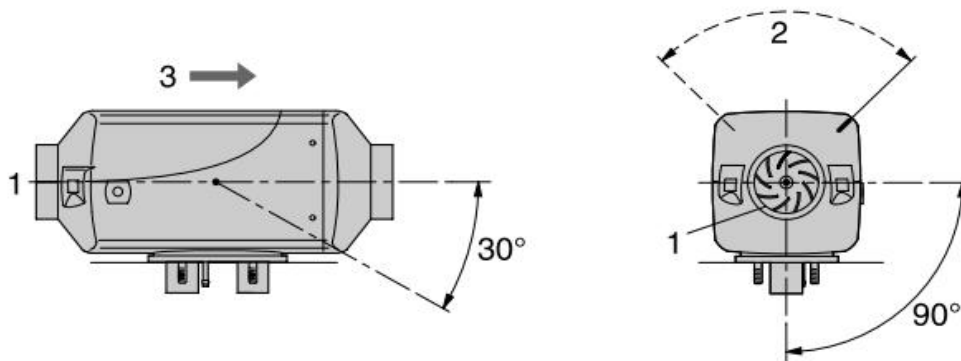
The heater is preferably installing in the normal position as shown in the drawing Fig.8

Depending on the installation conditions, the heater can be tilted by max. 30° (flow direction to the

bottom) or turned by max.  $90^\circ$  around its own longitudinal axis (exhaust connection horizontal, glow plug points upwards!)

In the heating mode, the heater can deviate from the shown normal or maximum installation positions by up to  $+15^\circ$  in all directions because of a slanting position of the vehicle or boat, without impaired functions.

Normal position horizontal (exhaust connection downwards) with tolerable swivel range



- 1 Heater air intake opening (fan wheel)
- 2 Position of the glow plug
- 3 Direction of flow

Fig.8

Cable harness connection, right or left

If necessary, the cable harness connection can be changed over to the other side of the heater. To do so, the controller has to be removed and the lower semi-circular cable harness cover unclipped. The cable harness can then be rerouted in the controller, then mount the controller again, position in the jacket shell and insert the cable harness bush and the bungs in the corresponding recesses in the lower jacket shell.

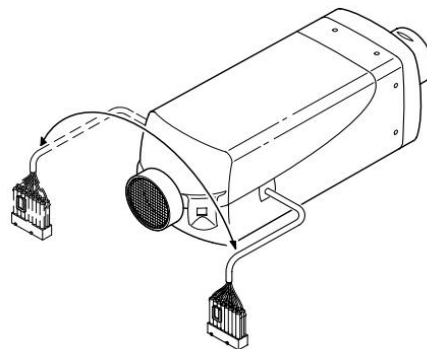
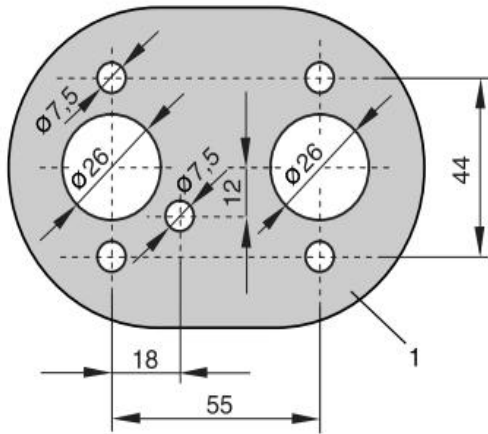


Fig.9

## Mounting and fastening

Make the necessary breakthroughs for exhaust, combustion air and fuel as shown in the hole diagram. The support surface for the heater foot must be flat. The hole  $\Phi 10.5\text{mm}$  for the cable harness “dosing pump” is not included in the picture drawing and must be drilled after installation.



Contour of the bearing surface

Fig.10

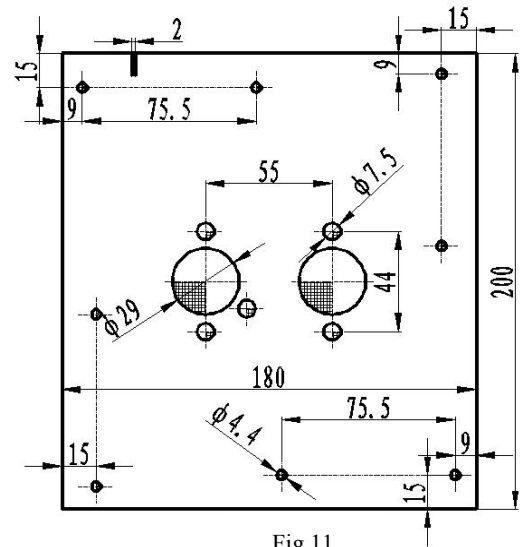


Fig.11

If the sheet metal of the support surface is thinner than 1.5mm, an additional reinforcement plate will have to be fitted. (Fig.11)

### Fastening the heater on the vehicle floor

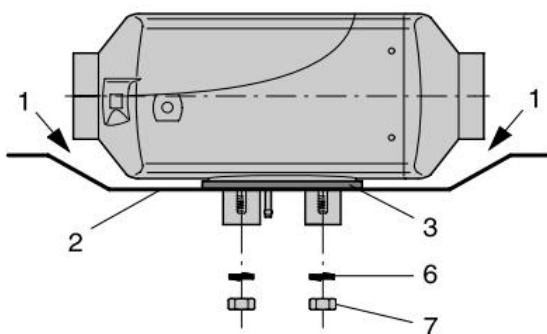


Fig.12

- 1 There must be sufficient clearance between the heater and the vehicle floor-also check that the fan wheel runs freely
- 2 The mounting surface must be flat and smooth
- 3 The flange seal must be mounted

### Fastening the heater horizontally to the vehicle wall

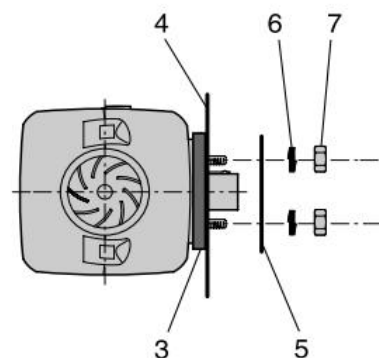


Fig.13

- 4 The vehicle wall must be flat and smooth
- 5 Reinforcement plate (if required, see above)
- 6 Spring washer
- 7 Hexagon nut M6

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## **Heater air system**

### **Risk of burning and injuries**

The hose of the heater air system and the hot air outlet are to be routed and fastening in such a way that they pose no temperature risk to people. Animals or materials sensitive to temperature from radiation/contact or blowing directly. If necessary, a cover is to be fitted to the heater air system or hot air outlet.

The outflow hood must be fitted on the hot air outflow side.

A safety guard must be fitted to the heater air intake side and outflow side if no air hoses are mounted to prevent any injuries from the heater air fan or burns from the heat exchanger.

High temperatures occur in the heater air system during and after the heater has been working. This is why it is important to avoid working in the vicinity of the heater air system while the heater is working. In such cases, switch the heater off beforehand and wait until parts have cooled down completely. If necessary, wear safety gloves.

### **Note**

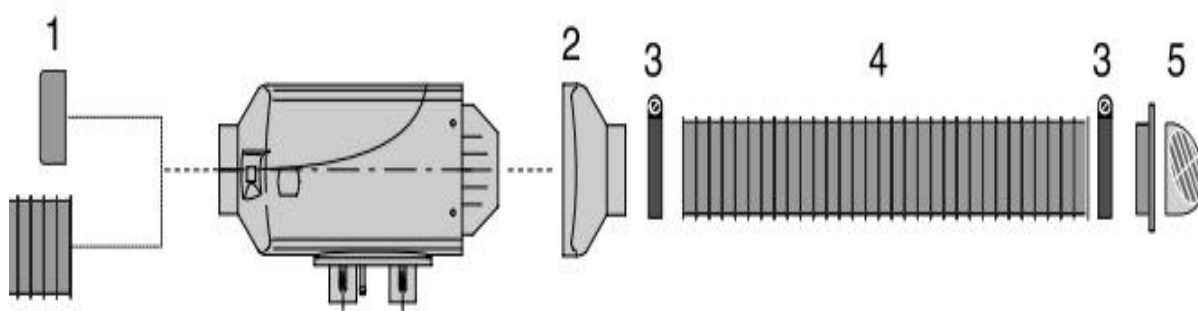
The heater air intake opening must be arranged in such a way that under normal circumstances, it is not possible for exhaust from the vehicle engine and heater to be sucked into the system or for the heating air to be contaminated with dust, salt spray, etc.

For circulating air, position the circulating air intake in such a way that the outflowing hot air cannot be directly sucked in again.

In the event of possible overheating, it is possible for local hot air temperatures of up to max. 150 °C or surface temperatures of up to max. 90 °C to occur immediately before the defect shutdown. Therefore only temperature-resistant hot air hoses approved by us must be used for the heater air system.

When checking the functions, the mean outflow temperature measured after the heater has been running about 10 minutes at approx. 30cm from the outlet should not exceed 110 °C (at an intake temperature of approx. 20 °C).

If there is a risk of the driver and passengers touching the heater when the vehicle is being driven normally, a contact protection device must be fitted.



1 Safety grid 2 Outflow hood 3 hose clip 4 Flexible hose 5 Rotating outflow

Fig.14

### The 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	Φ90
		Φ60
B	Diameter changes joint	Φ90/60
		Φ56/60
C	Elbow	Φ60/90°
D	Clamp	Φ50~70
E	Ducting	Φ60/φ64
F	Connector	Φ60-Φ60
G	Reducing T	Φ60

Table 5

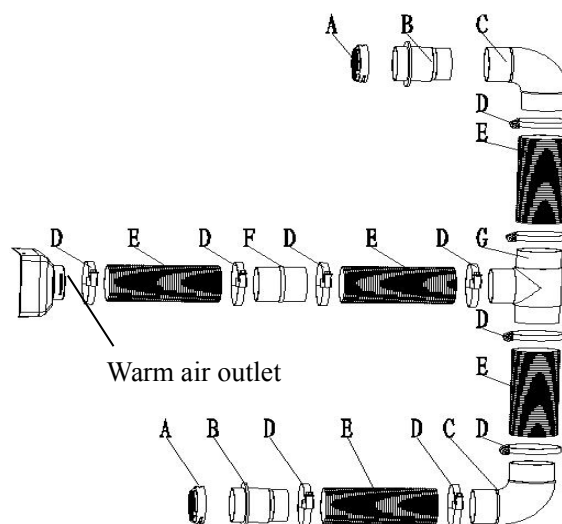


Fig. 15

### Exhaust system

The flexible exhaust pipe can be shortened to 20cm or lengthened to max. 2m depending on the installation conditions.

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Fasten the exhaust silencer (if have) to a suitable position in the vehicle. Cut flexible pipe off a long part and a short part.

Route the flexible exhaust pipe from the heater to the exhaust silencer and fasten with pipe clips. Use a pipe clip to fix a short exhaust pipe end (with end sleeve) to the exhaust silencer.

### **Note**

The whole exhaust system gets very hot during and immediately after the heater has been working. This is the reason why the exhaust system must be installed according to these instructions.

The exhaust outlet must end in the open air.

The exhaust pipe must not protrude beyond the lateral limits of the vehicle.

Install the exhaust pipe sloping slightly downwards. If necessary, make a drain hole approx.  $\Phi 5\text{mm}$  at the lowest point to drain off condensation.

Important functional parts of the vehicle must not be impaired (keep sufficient clearance).

Mount the exhaust pipe with sufficient clearance to heat-sensitive parts. Pay particular attention to fuel pipes (plastic or metal), electrical cables and brake hoses etc.

Exhaust pipes must be fastened safely (recommended clearance of 50cm) to avoid damage from vibrations.

Route the exhaust system so that the emitted fumes are not sucked in with the combustion air.

The mouth of the exhaust pipe must not get clogged by dirt and snow.

The mouth of the exhaust pipe must not point in the direction of travel.

### **Risk of injuries and burns!**

Every type of combustion produces high temperatures and toxic exhaust fumes. This is the reason why the exhaust system must be installed according to these instructions.

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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 and wait until all parts have cooled down completely, wear safety gloves if necessary.

Do not inhale exhaust fumes.

### Note

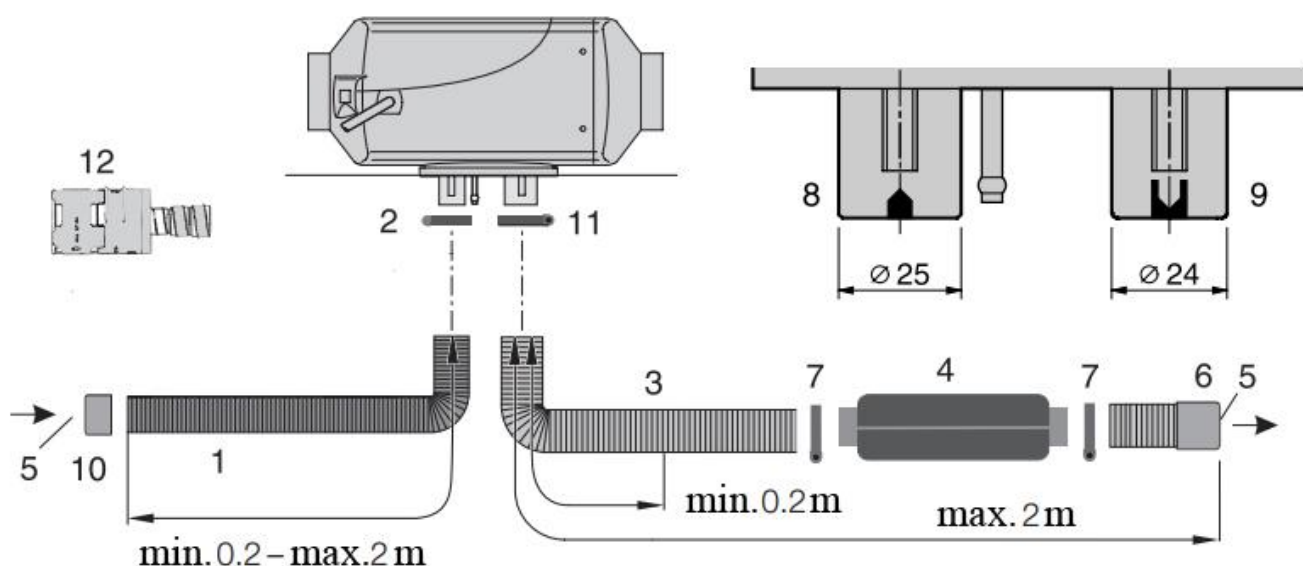
If a silencer is fitted, the exhaust end pipe must be much shorter than the flexible exhaust pipe between the heater and the exhaust silencer.

Small arrows indicating the direction of flow have been cast into the fittings to differentiate between the combustion air and the exhaust fittings at the heater.

### Combustion air system

The universal installation kit includes a flexible combustion air hose, inner  $\Phi 25$ mm, 600mm long. If necessary the flexible combustion air hose can be shortened by 20 cm or lengthened by max. 2m depending on the installation conditions. Fasten the combustion air hose to the heater clips or cable ties.

In order to meet the dust environment, an optional air filter is a good choice. A length of air filter can be cut in order to meet different thickness of air inlet pipes.





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1Combustion air hose,di=25mm	7Clip
2Hose clip	8Combustion air connection
3Exhaust pipe,di=24mm	9Exhaust connection
4Exhaust silencer(optional part)	10End sleeve,combustion air
5Intake/outlet opening-protect from wind,snow,dirt and water.	11Hose clip
6End sleeve,combustion air	12Air filter(optional part)

Fig.16

## **Fuel supply**

The following safety instructions must be observed when mounting the dosing pump,routing the fuel pipes and mounting the fuel tank.

Deviations from the instructions stated here are not allowed.

Failure to company can result in malfunctions.

### **Danger!**

Risk of fire,explosion,poisoning and injuries!

Switch off the vehicle engine and heater before refueling and before working on the fuel supply.

No naked lights when handling fuel.

Do not smoke.

Do not inhale fuel vapours.

### **Note**

Safety instructions for routing the fuel pipes

Only use a sharp knife to cut off fuel hoses and pipes,interfaces must not be crushed and must be free of burrs.

The fuel pipe from the dosing pump to the heater should be routed at a continuous rise.

Fuel pipes must be fastened safety to avoid any damage and/or noise production from vibrations(recommended clearance of approx.50cm).

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Fuel pipes must be protected from any mechanical damage.

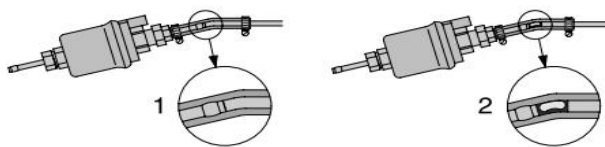
Route the fuel pipes so that any distortion of the vehicle, engine movements etc. cannot have any lasting effect on the service life.

Parts carrying fuel must be protected from interfering heat.

Never route or fasten the fuel pipes to the heater or vehicle exhaust system. At crossings, always ensure adequate heat clearance, if necessary attach heat deflection plates protective hose.

Dripping or evaporating fuel must never be allowed to collect on hot parts or ignite on electric systems.

When connecting fuel pipes with a fuel hose, always mount the fuel pipes in a butt joint to prevent any bubbles from forming.



1 Correct connection

2 Incorrect connection-bubble formation Fig.17

## Safety instructions for fuel pipes and fuel tanks in buses and coaches

In buses and coaches, fuel pipes and fuel tanks in buses and coaches

In buses and coaches, fuel pipes and fuel tanks must not be routed through the passenger compartment or driver's cab.

Fuel tanks in buses and coaches must be positioned in such a way that the exits are not in direct danger from a possible fire.

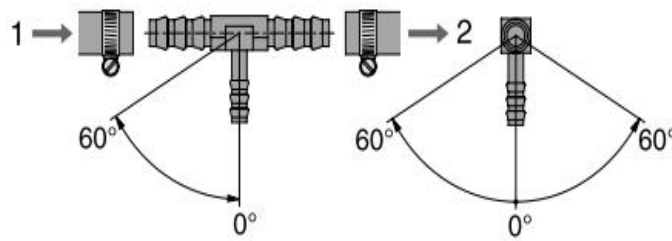
### **Note**

For noise reasons, do not rigidly fit fuel pipes onto structural sound transferring components.

A sponge rubber hose can be pushed over the fuel tubes for noise reduction.

## **Installation position of the T-piece**

Use the installation positions shown in the diagram 18 when inserting a T-pipe



1 Direction of flow from the fuel tank  
2 Direction of flow to the vehicle engine

Fig.18

## Fuel supply

Fuel suction pipe install in the vehicle tank or independent fuel tank(optional)

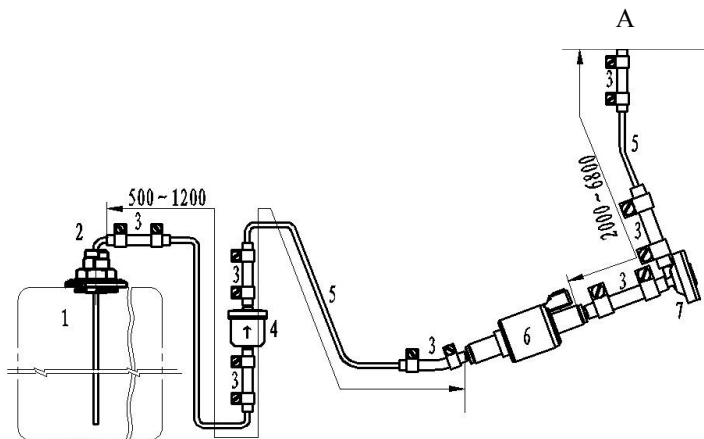


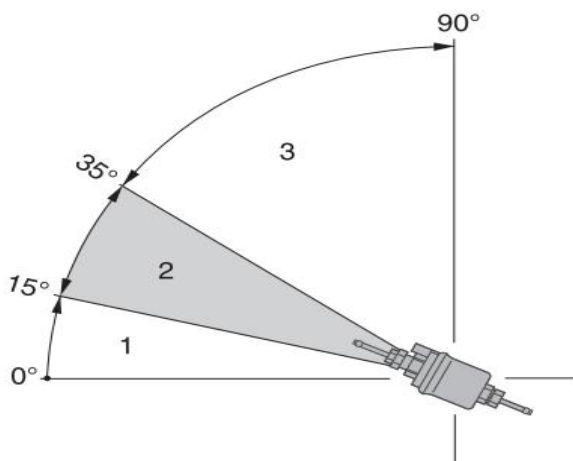
Fig.14

1.Fuel tank 2.Fuel extractor 3.Fuel pipe connector  
4. Fuel pipe 5. Filter 6.Fuel pump 7.Damper 8F

A- Fuel pipe surface

## Installation position of the fuel pump

Always mount the dosing pump with the pressure side rising upwards. Every installation position over 15° is allowed, although an installation position between 15° and 35° is preferable.



1 Installation position between 0° and 15° is not allowed.

2 Preferred installation position in range 15° and 35°

3 Installation position in range 35° and 90° is allowed.

Fig.20

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## Damper installation

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

### Installation of Fuel Filter(only diesel)

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. 21

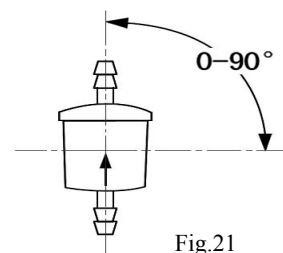


Fig.21

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

## Note

### Safety instructions for installing the fuel pump

Always mount the dosing pipe with the pressure side rising upwards - minimum incline 15°

Protect the dosing pump and filter from intolerable heat, do not mount near to the silencer and exhaust pipes.

### Fuel criterion

Gasoline should meet the criterion DIN EN 228

Diesel should meet the criterion DIN EN 590

## Note

The fuel brand should be used to meet the requirements of low temperature in winter and biofuels is not allowed.

## Fuel supply

## Note

After refueling with winter or cold diesel, the fuel pipes and the metering pump must be filled with the new by letting the heater run for 15 min.

Possible suction and pressure height of the dosing pump

Pressure height from vehicle tank to dosing pump:

$a = \text{max. } 3000\text{mm}$

Intake height in pressure-less vehicle tank:

$b = \text{max. } 1000\text{mm}$  for diesel

$b = \text{max. } 500\text{mm}$  for petrol

Intake height in vehicle tanks with withdrawal by negative pressure (valve with 0.03bar in tank cap)

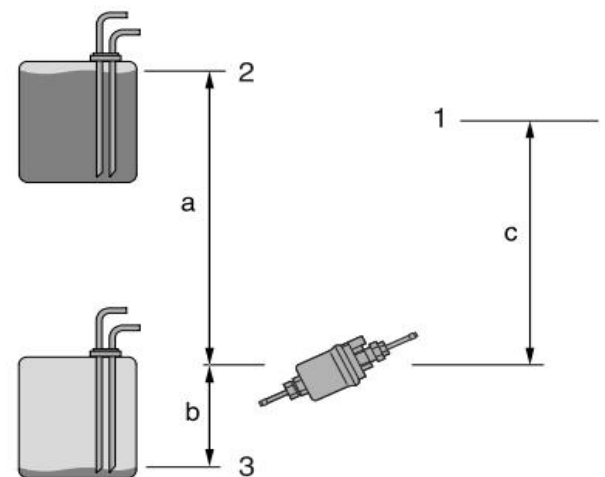
$b = \text{max. } 400\text{mm}$

Pressure height of the fuel pump to the heater:

$c = \text{max. } 2000\text{mm}$

**Note**

Check tank venting



1 Connection to heater  
2 Max. fuel level  
3 Min. fuel level

Fig.22

### Installation of Fuel Sucking Device

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 size  $\phi 25 \pm 0.2$ , 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.23).

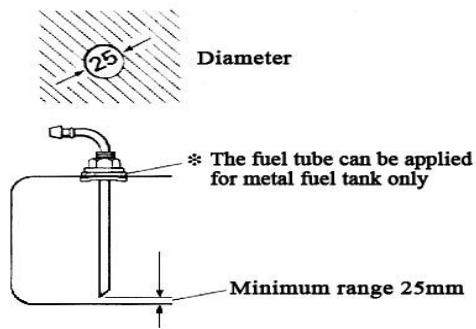
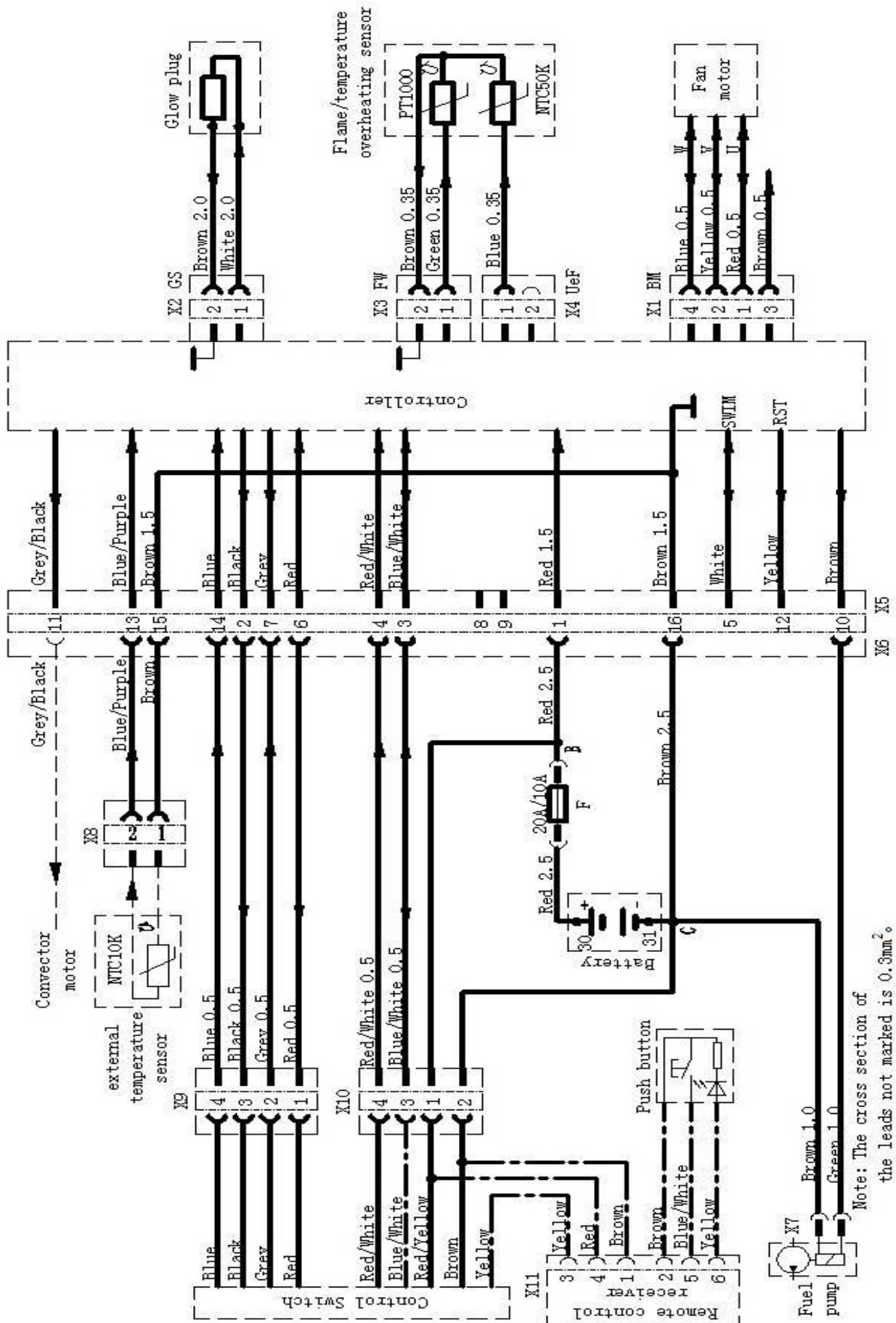


Fig. 23

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. Must ensure fuel extraction without any pressure and extract the fuel smoothly when the car is stopping. The angle for installation must in conformity with Fig.18, 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.

# Circuit diagram



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## **Installation for control switch**

Remove the adjustment knob and show the screw hole, install the adjustment knob after fixing control switch with screw.

## **External temperature sensor(optional)**

We can realize the function of the designated area temperature control. The default sensor is external temperature sensor after installing external temperature sensor.

## **Heater wiring**

### **Note**

Safety instructions for wiring the heater

The heater is to be connected up electrically according to the EMC directives. EMC can be affected if the heater is not connected up correctly. For this reason comply with the following instructions:

Ensure that the insulation of electrical cables is not damaged. Avoid: chafing, kinking, jamming or exposure to heat.

In waterproof connections, seal any connector chambers not in use with filler plugs to ensure they are dirt-proof and water-proof.

Electrical connections and ground connections must be free of corrosion and firmly connected.

Lubricate connections and ground connections outside the heater interior with contact grease.

### **Note**

Comply with the following when wiring the heater and the control element:

Electrical leads, switchgear and controllers must be arranged in the vehicle so that they can function perfectly under normal operating conditions (e.g. heat exposure, moisture etc.).

The following cable cross sections are to be used between the battery and heater. This ensure that



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the max.tolerate voltage loss in the cables dose not exceed 0.5V for 12V or 1V or 24V rated voltage.

Cable cross sections for a cable length of(plus cable+minus cable):

$\leq 5m = \text{cable cross section } 4\text{mm}^2$

$< 5m \leq 8m = \text{cable cross section } 6\text{mm}^2$

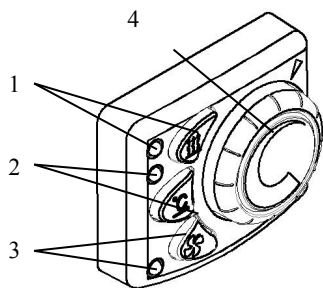
If the plus cable is to be connected to the fuse box(e.g.terminal30),the vehicle cable from the battery to the fuse box must be included in rating the overall cable length and possibly re-dimensioned if necessary.

Insulate unused cable ends.

### Operation and function

There are four methods to starting heater

Digital control switch (Optional device)



- 1 Heating(constant power)indication light
  - 2 Air conditioner(constant temperature) indication light
  - 3 Ventilation indicating light
  - 4 Control Knob
- Fig.26

Digital control switch (Optional device)

Display set temperature

Set heat starting time

Set heat time

Display fault information



Fig.27

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Eliminate fault code

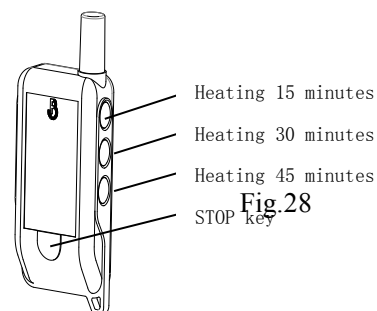
Digital display power level

Remote controller (extended function)

Remote control the heater, Without obstacles  $\leq 800\text{m}$

Power on and power off heater immediately, three times

can be set: 15mins, 30mins and 45mins.



GSM remote controller(extended function)

Function device of parking heaters

which can be started and stopped

through calling or sending message

to the number of SIM card in the GSM

remote controller by phones or cellphones.

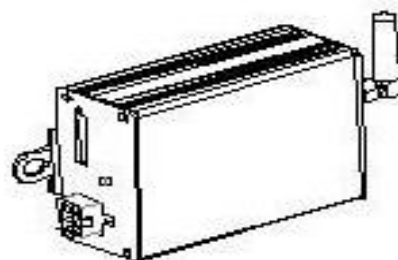


Fig.29

Control ways include voice and short message.

It can start and power off heater immediately.

No limits.

### **Operation of control switch.**

Heating(constant power)mode

Press air conditioner(constant temperature) mode button then the heating(constant power)indication light turns yellow, use the control knob adjust heater power.(adjustable continuously between 1KW and 2KW).

Air conditioner(constant temperature) mode

Press Air conditioner(constant temperature) mode button then Air conditioner(constant temperature) indication light turns red,use the control knob to set the control temperature of the heated

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area(adjustable continuously from 5°C to 35°C).

Ventilation mode

Heater only circulating air without heating. Fan speed can be adjusted by control knob.

Heating(or air conditioner ) working mode

Corresponding lights turn on by pressing heating(or air conditioner) button then glow plug switched on and the fan starts at a low speed.

### **Note**

If there is too much residual heat in the heat exchanger from when the heater was last used, firstly only the fan starts up(cold blowing).

Once the residual heat has been cleared, the heater starts.

After approx. 65 seconds the fuel supply starts and the fuel/air mixture in the combustion chamber ignites. Once the combined sensor(flame sensor) has detected the flame, the glow plug is switched off after 60 seconds. The heater is now in standard operation.

Convert working mode

Convert to the work mode by press the unlighted corresponding light.

Operation of running heater

Adjust the heating power and air temperature by rotating the switch.

During heating (constant power) mode, the room temperature or the temperature of the sucked in heating air is constantly measured.

During air temperature(constant temperature) mode, if the temperature is higher than the temperature selected on the control element, the heater starts to intermittent condition.

### **Intermittent condition.**

The fan runs on for approx. 3 minutes to cool down then restart again.

### **Switching off**

Press the button which the corresponding indicator light is on.

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Indicator light extinguished and fuel pump stop working after switching off the heater.

The fan running and cooling down continuously about 3 minutes in the switch off process.

### Control and safety devices

If the heater does not ignite within 90 seconds after starting the fuel pump, the start is repeated. If the heater still does not ignite after another 90 seconds of pumping fuel, the heater is switched off, i.e. the fuel supply is off and the fan runs on for approx. 3 minutes.

If the flame goes off by itself during operation, the heater is restarted. If the heater does not ignite within 90 seconds after the fuel pump has started or ignites and goes off again within 15 minutes, the heater is switched off, i.e. the fuel supply is off and the fan runs on for approx. 3 minutes. This status can be remedied by briefly switching off and on again. Do not repeat the switching off/on routine more than twice.

In the case of overheating, the combined sensor (flame sensor/overheating sensor) triggers, the fuel supply is interrupted and the heater switched off. Once the cause of the overheating has been switching off and on again.

If the lower or upper voltage limit is reached, the heater is switched off after 20 seconds.

The heater does not start up when the glow plug is defect or when the electric lead to the dosing pump is interrupted.

If the combined sensor (flame sensor/overheating sensor) is defect or the electric lead interrupted, the heater starts up and is then switched off again during the start phase.

The speed of the fan motor is monitored continuously. If the fan motor does not start up or if the speed deviates by more than 10%, the heater is switched off after 30 seconds.

When the heater is switched off, the glow plug is switched on for 40 seconds (after-glowing) while the fan runs on to clean off any combustion residues.

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## **Emergency shutdown**

If an emergency shutdown is necessary during operation, proceed as follows:

Switch the heater off with the control or

Pull the fuse out of

Disconnect the heater from the battery

### **Note**

Do not switch the heater off and on again more than twice.

## **Treatment of Usual Troubles**

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 and looseness of battery poles, etc. Users need to check and prevent such troubles and offer good maintenance.

The reasons for the troubles to the heater can be indicated by the green LED on the control switch. In trouble status, indicator light will flash circularly, each circulation include 2 seconds extinguishing and a few 0.5 seconds times of slow flashes appear alternately. During the period between two long extinguishing, the times of slow flashes represent the types of troubles.

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 press the button which is lighting on then work indicator goes out. Turn off the heater and keep it in such state for at least 5 seconds. Then restart the heater.

When the following troubles occur, users can take measures to solve:

Failure to turn on the heater and the indicator light is not illuminating, the reason is open circuit of fuse or wrong connection of wires.

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.

When the LED flashes once, troubleshooting can be solved by the methods list in table 6.

Table 6

Times of flashes of LED	Troubleshooting methods
1	a Check whether the fuel pipe is blocked or whether the fuel in the tank is sufficient. b Check whether the exhaust pipe is blocked. c Check whether fuel mass is appropriate.
2	a Ditto b Ditto c Ditto d Replace the fuel pump
3	a Abnormal voltage,if the voltage is very low, then battery should be charged.
4	a Use ventilation mode cooling if temperature overhigh. b Or replace controller.
6	a Replace controller
7	a Check whether fuel pump lead connection is reliable. b Replace fuel pump.c Replace controller.
8	a Check whether the fan wheel have any scrape. b Replace fan motor assembly.c Replace controller.
9	a Clean the carbon deposition of glow plug. b Replace glow plug.c Replace controller.
10	a Whether air inlet and outlet are blocked. b Whether junction box cover tightly. c Whether inlet air and exhaust air short circuit.
11	a Check overheat sensor (normal temperature resistance is about 1k $\Omega$ ). b Replace overheat sensor.
12	a Check control switch connection. b Replace control switch.
13	a Need to clean up the carbon deposition and maintenance work.

## Precautions

After the heater is installed, in order to remove air trapped in the fuel supply system thoroughly and fill the fuel route with fuel only we Specially designed for oil pump function alone:In the Ventilation mode, short connection external temperature sensor 2 times continuously,then the fuel pump (4hz) stop pump fuel after the third time.Only effective when each power on.

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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.

Some smell maybe occurs in the first time using heater within a short time which is a common phenomenon and does not mean heater not working properly.

### **Seasonal maintenance**

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

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

Clean the external of the heater.

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

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

Check to find any leakage on the fuel pipe.

### **Not working for a long time**

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.

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.

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.

### **Service life**

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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.

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.

### **Others need attention**

The ambient temperature shall be in the range of  $-40^{\circ}\text{C} \sim 85^{\circ}\text{C}$  for transport and storage of the heater to avoid any damage to its

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.

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.

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"

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.



Packing list				
No.	Name	Specification	QTY	Order No.
1	Parking heater	FJH-2.2/1C ( )	1	4A200212C11
		FJH-2.2/2C ( )		4A200224C11
		FJH-3.0/1C ( )		4A200312C11
		FJH-3.0/2C ( )		4A200324C11
		FJH-4.0/1C ( )		4A200412C11
		FJH-4.0/1Q ( )		4A200412Q11
		FJH-4.0/2C ( )		4A200424C11
2	Main wiring harness	12V ( )	1	12031000100
		24V ( )		12031000200
3	Fuel pump	12V ( )	1	33000003100
		12V with damper ( )		33000007600
		24V ( )		33000003200
4	Filter	Only diesel	1	33000000400
5	Fuel pipe(from pump to heater)	$\phi 4/\phi 2$ L=6800	1	12060004200
6	Fuel pipe(from pump to fuel tank)	$\phi 5/\phi 2$ L=1200	1	31010602300
7	Control switch		1	31010700400
8	Protective gasket(control switch)		1	12040600900
9	Air inlet pipe	$\phi 29/\phi 25*600$	1	31010202700
10	Exhaust pipe	$\phi 24*700$ ( )	1	31010602500
		$\phi 24*1000$ ( )		31010202800
11	Gasket	81×110×6	1	12040600100
12	Reducing T	10-6-10	1	12020015700
13	Reducing T	12-6-12	1	12020015800
14	Fuel pump clip	$\phi 32$	1	12010007100
15	Exhaust pipe clip	24-28	1	12010004400
16	Air inlet pipe fixing clip		2	29010003700
17	Exhaust pipe fixing clip		2	29010002300
18	Fuel pipe connector	$\phi 3.5/\phi 9.5$ L=50	2	12060003900

19	Fuel pipe connector	φ4.1/φ10.5 L=50	4	12060003800
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Packing list (continue)				
No.	Name	Specification	QTY	Order No.
20	Fuel pipe clip	φ8/φ10 (9)	4	12010004300
21	Fuel pipe clip	φ9/φ11 (10)	8	12010004200
22	Fuel pipe clip	φ12/φ14	2	12010004600
23	Gasket	φ6/φ18	4	12010006500
24	Nut	M6	4	12050003400
25	Self drilling tapping screw	ST5.5×25	4	12050003100
26	Self drilling tapping screw	ST5.5×30	1	12050003000
27	Self tapping screw	4×16	1	12050002700
28	Self tapping screw	3×20	1	12050002500
29	Cable ties	4×200	10	21990000000
30	Fuel suction pipe	XYG-II φ5*600	1	31000000500
31	Clip	φ50~φ70 ( )	2	12010005100
		φ80~φ100 ( )		12010005800
32	Grill	φ60 ( )	1	12020601100
		φ90 ( )		12020701000