

**Work hard for a perfect car life  
Serve you wholeheartedly**

# Air heater

**Technical description, installation,  
Instructions for operation and maintenance.**



## **WARNING**

- 1. When installing, the fixing plate must be sealed with the automobile sheet metal to prevent the exhaust from entering the cab and causing harm to drivers and passengers.**
- 2. Exhaust pipe length shall not be less than 30 cm**
- 3. Exhaust outlet must be fixed in open space**
- 4. Exhaust pipes are not allowed to move in the direction of traffic.**

**Suggestion: After fixing the heater, it is recommended to use sealant to seal the installation gap.**

**D2/D5 Diesel oil 12V  
D2/D5 Diesel oil 24V**

## VI After-sales service

### The following items should be checked in case of failure

- The heater does not start after starting:  
-Shut down and then reboot.
- The heater still does not start, so check:  
-Is there any fuel in the tank?  
-Is the fuse normal?  
-Are the circuits, connections and connectors in good condition?  
-Is the heating air guiding device, combustion-supporting air guiding device or exhaust emission device blocked?
- If the heater fails during start-up or operation, the corresponding safety procedures will be executed according to the type of failure, and the work will be stopped.
- If an abnormal use of the heater may lead to a failure, the following table is the general conditions of use.

Item	Unit	Minimum	Normal	Maximum
Rated voltage	V	21	27	32
Rated current	A	0.06	2	10
Operating noise	dB	35	55	65
Fuel consumption	Litre/hr	0.138	--	0.472
Circulating air volume	cfm	30	--	85

- If all the above are normal, and the heater is still malfunctioning, or other functions are not working, please contact the sales or installation company.



Please note that!  
If the heater is changed by someone else or by parts of unknown origin, the customer will lose the right to ask for warranty.

## I Introduction

### Application field of heater

The air heater is not affected by the engine and is designed to comply with its heating work. It is installed in the following vehicles:

- Various types of cars and their trailers
- Construction machinery
- Agricultural machinery
- Boats, ships and yachts
- RV

### Use of heaters

- Preheat and defrost glass
- Heating and heat preservation for the following areas:  
-Cab or studio, cabin  
-Freight Warehouse  
-Inside the personnel or team carrier  
-RV

In view of the requirements for the functions of heaters, they should not be used in the following situations:

- Continuous heating for a long time:  
-Living room, garage  
-Household boats, etc.
- Heating or drying:  
-Life (human or animal), in the form of direct hot air  
-Articles  
-Blow hot air into the container

### Installation and operation safety instructions

· Installation of heater  
It is necessary to prevent objects around heaters from being overheated or damaged.

- Exhaust Gas Discharge System  
When installing exhaust vents, attention must be paid to preventing exhaust gas from entering the interior of automobiles through ventilation devices, hot air inlets or windows.

- Inlet of combustion-supporting air  
-Air for heater combustion chamber shall not be inhaled from passenger rooms.  
-When installing the air intake, it should be noted that it can not be blocked by objects.

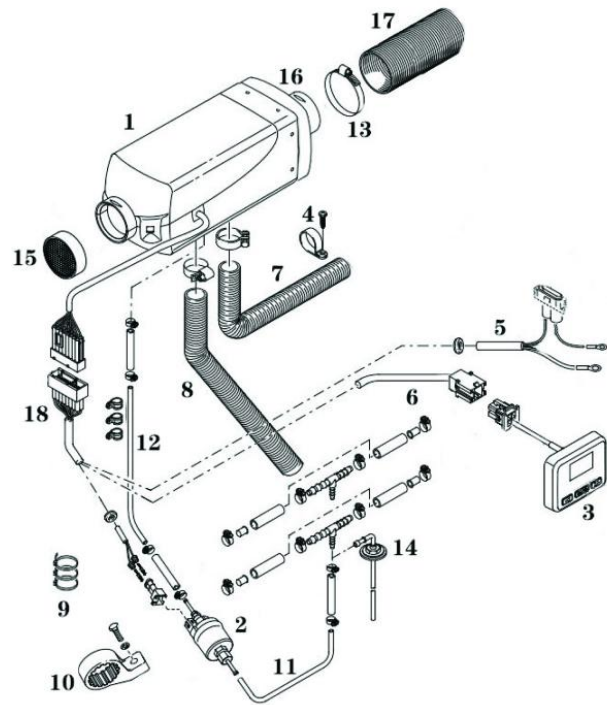
- Heating air inlet  
The heated air supplied must consist of fresh air or circulating air.  
And extracting from a clean area, the intake pipeline must be protected by protective grilles or other appropriate tools.
- Heating air outlet  
Installation of hot air pipes in automobiles should ensure that they are not touched.  
It can cause injury to people or damage to goods.
- Exhaust system  
Attention must be paid to the installation of exhaust pipes. The outlet of exhaust pipes must avoid inflammable and explosive materials and avoid heating or igniting ground combustibles or loaded goods.

### Safety instructions for installation and operation!

- The following measures are not allowed:  
-Change the key components on the heater  
-Use spare parts from other manufacturers without our company's permission  
-Violation of the scope described in this specification during installation or operation
- Only original accessories and components are allowed to be used in installation or maintenance.
- Heaters are not allowed to be used where flammable vapor or dust will form, such as  
Near the following facilities:  
-Fuel Depot  
-Coal Depot  
-Wood bank  
-Granary and similar sites
- The heater must be turned off when refueling.
- If fuel flows out (leaks) from the fuel system of the heating equipment, it should stand.  
That is to return to the service provider for maintenance.
- During the working process of heater, it is not allowed to stop the heater by power off.

## II Product information

Heater Complete sets of equipment and installation components



1. Heater 2. Oil pump 3. Control switch 4. Fixed clamp of exhaust pipe 5. Power cord, positive/negative 6. Control line 7. Exhaust pipe 8. Combustion-supporting air pipe 9. Laying 10. Oil pump bracket 11-12. Oil pipe 13. Outlet pipe throat hoop 14. Oil extractor 15. Inlet grille 16. Outlet hood 17. Outlet duct duct 18. Heater wire harness

## V Circuit

Heater Circuit Arrangement

### Safety instructions

Electrical connection of heater should be realized according to EMC criterion. If improper operation will affect EMC, the following instructions should be followed:

- Caution should be taken not to damage the insulation of the wire. Avoid: scratches, discounts, clamps or heat effects.
- For waterproof plugs, blind plugs are used to seal the unoccupied plug cavity so that dirt and water are not allowed to enter.
- The connection and grounding of electrical appliances must be non-corrosive and firmly realized.



Please note that!

Attention should be paid to electrical wiring of heaters and operating elements.

The following matters:

- and controllers in automobiles, it should be ensured that their functions (such as heating, damp, etc.) are not affected under normal operating conditions.
- When fixing wiring harness, do not fix wiring harness on moving or vibrating parts, so as not to pull or plug off.
- Wire harness positive and negative poles are not allowed to be lengthened without authorization

### A style



Switch fault code

1. Startup failure
2. Abnormal flamesot
3. Voltage anomaly
5. Short Circuit Breaking of Inlet Air Temperature Sensor
6. Oil pump failure
7. Fan failure
8. Ignition plug
9. Ultra-high temperature protection
10. Fault of Ultra-high Temperature Sensor

### B style



### Fault Code Description

Machine fault	Status display	Solution
Undervoltage power source	Panel display E-01	Raise the power supply voltage
Overvoltage power source	Panel display E-02	Reduce the power supply voltage
Ignition plug fault	Panel display E-03	Check whether the ignition plug is open-circuit or short-circuit
Oil pump fault	Panel display E-04	Check whether the oil pump is disconnected or short-circuit
Machine overheat	Panel display E-05	Check the temperature sensor on the shell, or check whether the fan revolution speed is abnormal
Motor fault	Panel display E-06	Check the polarity of the magnet and the position of the Hall sensor.
Disconnection fault	Panel display E-07	Check the connecting plug to the panel, and verify whether the connection of the blue communication line is abnormal
Flame extinguishment	Panel display E-08	Check whether the oil line has any air or whether it is obstructed. Check whether the shell temperature sensor is malfunctioning, or whether the contact of the socket terminal is abnormal.

### C style



### Switch fault code

Fault code type	Fault code	Fault code type	Fault code	Fault code type	Fault code
High Voltage	E001	Short Circuit of Intake Sensor	E004	Fan open circuit	E008
Low Voltage		Intake Sensor Open Circuit		Blockage of fan	
Short circuit of oil pump	E002	Short circuit of ignition plug	E005	Short Circuit of Fan	E010
Oil pump open circuit		Ignition plug open circuit		Ignition failure	
Short Circuit of Shell Sensor	E003	High inlet temperature	E006	High shell temperature	E011
Shell Sensor Open Circuit		Flameout failure		offline	

## IV Fuel filling

### Fuel filling

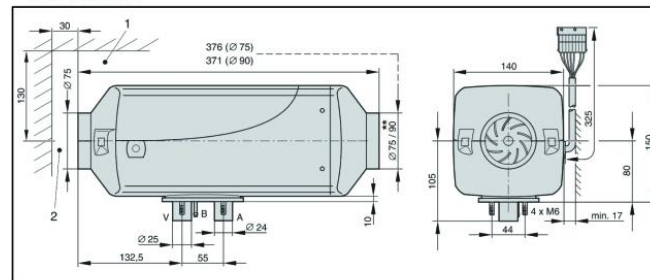
When you install the heater main engine, the fuel circuit and circuit need to use fuel filling function to fill the fuel circuit, otherwise the oil circuit may not lead to start failure.

## II Product information

### Technical parameter

Heater Model	ZB-AIR D5					ZB-AIR D2				
Heating medium	Air					Air				
Calorific grade	rank					rank				
	Super high grade	Top grade	Medium gear	Low grade	Closed	Super high grade	Top grade	Medium gear	Low grade	Closed
Calorific value (W)	5000	3500	2000	900	-	2000	1800	1400	700	-
Medium flux (kg/h)	185	150	110	60	24	130	100	70	50	24
Fuel consumption (liter/hour)	0.64	0.4	0.28	0.11	-	0.35	0.25	0.18	0.1	-
Power Consumption (W)	40	24	13	7	7	24	16	10	7	7
On startup										
Rated voltage	12V/24V					12V/24V				
Lower limit of undervoltage	10.5V/21V					10.5V/21V				
Overtoltage upper limit	16V/32V					16V/32V				
ambient temperature	In operation		When Closed			In operation		When Closed		
heater	-40°C~+40°C		-40°C~+85°C			-40°C~+40°C		-40°C~+85°C		
oil-measuring pump	-40°C~+50°C		-40°C~+125°C			-40°C~+50°C		-40°C~+125°C		
Hot air intake temperature	Maximum+40°C					Maximum+40°C				
weight	≈4.5kg					≈3kg				

### Product size



1. Minimum space for opening lid and removing ignition plug and controller
  2. Minimum installation spacing for suction of heated air
- ※ The above picture shows the product size of ZB-AIR D5. The overall size of ZB-AIR D2 is 340\*115\*115mm.

A = Exhaust Gas  
B = Fuel  
V = Burning air



### III Installation

#### Installation location

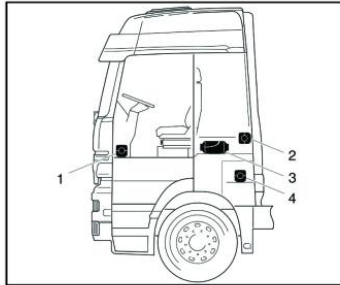
Fix the heater on the vehicle floor or on the outside of the vehicle using four screws on the heater support foot.

When installing heater, attention should be paid to reserving enough space for intake and disassembly of ignition plug and controller (the following is the recommended installation location and method)

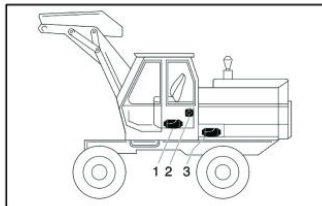
#### Installation position in truck

In the truck, the heater is mainly installed in the cab.

If it cannot be installed in the cab, the heater can also be installed in the toolbox or loading box.



1. The heater is located at the foot of the driver's deputy seat.
2. The heater is located on the rear wall of the cab.
3. The heater is located under the driver's seat.
4. The heater is located in the toolbox.



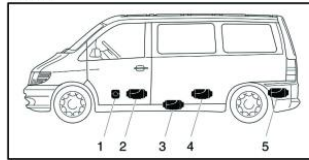
#### Installation Location in Excavator Cab

1. The heater is located in the cabinet of the driver's seat.
2. The heater is located on the rear wall of the cab.
3. The heater is located in the protective box.

#### Installation Location in Car/Large Car

In a car/large car, the heater is mainly installed in the passenger compartment or suitcase of the vehicle.

If it cannot be installed in the passenger compartment or suitcase of the vehicle, the heater can also be fixed on the vehicle to prevent splashing under the bottom of the water.

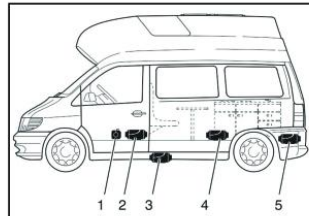


1. The heater is located in front of the driver's deputy seat.
2. The heater is located between the driver's seat and the driver's deputy seat.
3. The heater is located below the bottom.
4. The heater is located under the back seat.
5. The heater is located in the suitcase.

#### Installation position in RV

In the RV, the heater is mainly installed in the room or suitcase.

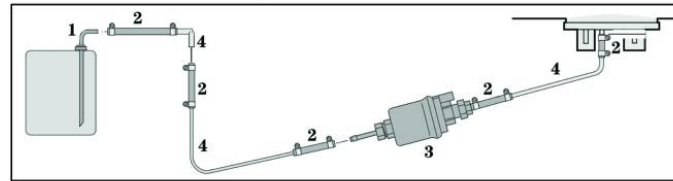
If it cannot be installed in the passenger compartment or suitcase of the vehicle, the heater can also be fixed to the bottom of the vehicle to prevent splashing water.



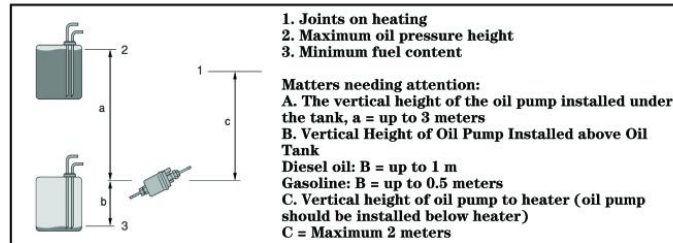
1. The heater is located in front of the driver's deputy seat.
2. The heater is located between the driver's seat and the driver's deputy seat.
3. The heater is located below the bottom.
4. The heater is located in the living room of the RV.
5. The heater is located in the suitcase.

### III Installation

Installation schematic drawings are available in the oil extractor area.



1. Oil extractor 2. Connecting hose 3. Measuring oil pump 4. Oil extractor



1. Joints on heating
2. Maximum oil pressure height
3. Minimum fuel content

Matters needing attention:  
A. The vertical height of the oil pump installed under the tank, a = up to 3 meters  
B. Vertical Height of Oil Pump Installed above Oil Tank

- Diesel oil: B = up to 1 m  
Gasoline: B = up to 0.5 meters  
C. Vertical height of oil pump to heater (oil pump should be installed below heater)  
C = Maximum 2 meters

#### Safety Notice for Laying Oil Pipe

- In order to prevent the tubing from being damaged and/or noisy by vibration, it must be securely fixed.
- When laying oil pipes, we must pay attention to the torsion of vehicles, the movement of engines and so on, so as not to bring long-term adverse effects on their durability.
- Do not lay or fix oil pipes close to the exhaust guiding device of heater or automobile engine. When crossing these pipes, attention should always be paid to maintaining adequate insulation spacing and installing thermal radiation protection board or hose when necessary.
- Install the oil supply equipment. After the heater starts for a period of time, check the connecting parts of each part to see if there is oil leakage.
- Vehicle oil pumps are not allowed to be used for fuel supply

#### Requirements for the use of T-type tees:

- The tee must be installed between the oil pump of the original vehicle and the oil tank of the original vehicle, and must not be connected between the oil pump of the original vehicle and the engine, so as to avoid danger caused by the high-pressure injection heater of the oil pump of the original vehicle. The vehicle with the oil pump installed in the oil tank of the original vehicle can not use the T-tee, and the oil extractor should be used.

#### Matters needing attention in oil pipeline maintenance

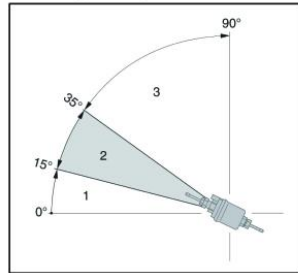
- Before using heater every winter, we should check whether the connecting parts of oil pipeline are loose and whether the connecting hoses and tubing are aging. Check whether there is oil leakage after heater has been running for a period of time and deal with it in time if there is any abnormality.
- When the heater is used for the first time every year, because of long idle time, the tubing may not have fuel, which leads to the failure of normal start-up. It can be restarted to supply fuel to the heater to start normally.

### III Installation

#### Fuel supply

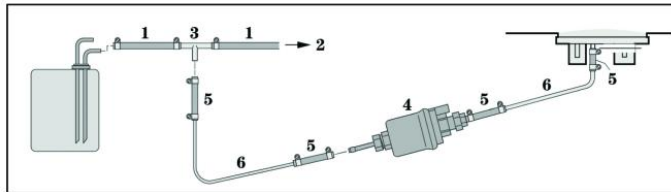
##### Installation Angle of Dose Oil Pump

When installing dose pump, always pay attention to pressure side up finger. Each installation angle is allowed to be greater than 15 degrees, but the installation angle between 15 degrees and 35 degrees is preferred.



1. No installation angle between 0 - 15.
2. Priority is given to the installation angle between 15 - 35.
3. The installation angle between 35 and 90 is allowed to be selected.

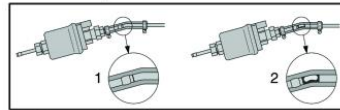
Use T-type tee to get oil from the fuel tank near the oil intake road of automobile engine



1. Oil Pipe of Automobile Fuel Tank
2. Oil Pumps for Automotive Engines
3. T type tee
4. Dose pump
5. Connecting hoses
6. Tubing

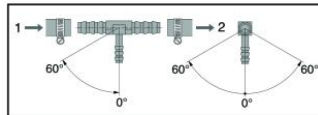
#### Connection of tubing

When connecting the tubing. After the heater nozzle, the pump nozzle, the oil extractor and the T-shaped tee nozzle are inserted into the rubber connection hose, they should form a seamless connection with the oil pipe inserted at the other end to avoid forming bubbles, generating noise and affecting the combustion effect.



1. Connect correctly
2. Connect incorrectly

#### Installation angle of T-type tee



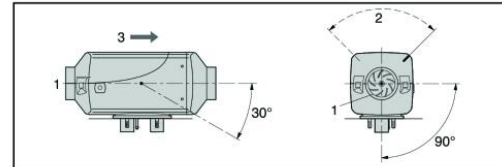
1. From the fuel tank
2. To the engine

### III Installation

#### Permissible installation angle

As shown in the figure, the heater is mainly installed at a normal angle. According to different installation conditions, according to the diagram, heating can be done during installation.

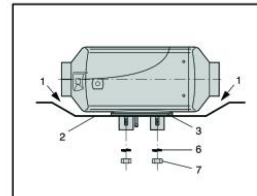
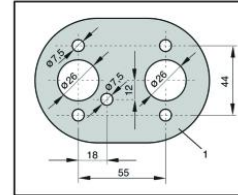
Tilt up to 30 degrees (flow direction down!) Or around its own long axis Rotate up to 90 degrees (exhaust gas casing is placed horizontally, ignition plug pointing upward!)



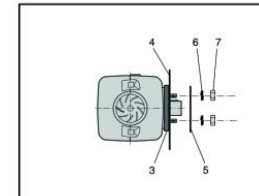
1. Heated air intake
2. Location of ignition plug
3. Flow direction

#### Assembly and Fixing

Perforations for exhaust gas, combustion air and fuel are processed according to the pore diagrams. The placement surface of the supporting foot of the equipment must be smooth.



Fix the heater on the bottom of the vehicle



Fix heater horizontally on vehicle wall

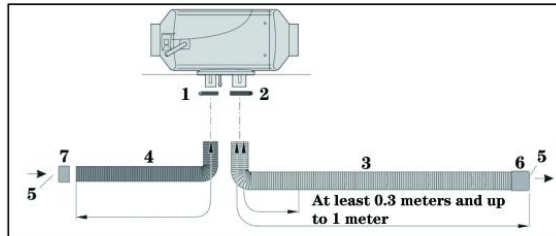
1. Make sure that there is space between the heater and the bottom of the vehicle, and check whether the ventilator wheel is running smoothly.
2. The assembly surface must be smooth.
3. Flange seals must be assembled.
4. Vehicle walls must be level.
5. Reinforced slabs (when needed)
6. Spring leaf
7. Hexagon nut M6

### III Installation

#### Installation of combustion-supporting air conduit and exhaust device

Combustion-supporting air guide device  
Installation assembly contains a flexible combustion air hose with an inner diameter of 25 mm.

According to the installation, the air conduit can be shortened to 30 cm or lengthened to more than 1 m.  
The throat hoop is fixed on the heater through a combustion-supporting air conduit, and the other end is fixed with a tie to prevent shaking and falling off.



- 1-2. throat hoop
- 3. exhaust pipe
- 4. combustion-supporting air pipe
- 5. inlet and outlet
- 6. exhaust pipe jacket
- 7. intake pipe clamp

#### Exhaust

The installation assembly consists of an exhaust pipe with an inner diameter of 24 mm.

According to the installation, the exhaust pipe can be shortened to 30 cm or extended to more than 1 m.  
The throat hoop is fixed on the heater through the combustion-supporting air duct, and the other end is fixed on the car body with a bracket.

**There is a risk of burns and poisoning!**

High temperature and toxic exhaust gases are produced during each combustion.

Therefore, please follow the installation instructions to install the exhaust device.

• During heating operation, it is not allowed to operate in the area where the exhaust guiding device is located.

• When working on the exhaust gas discharge device, the heater should be shut down until all parts are completely cooled, and protective gloves should be worn if necessary.

• No exhaust gas should be inhaled.

#### Safety instructions for combustion-supporting air guide devices!

- The nozzle of the combustion-supporting air pipe must always be unblocked.
- Attention should not be paid to using exhaust gas as combustion-supporting air when installing combustion-supporting air intake port.
- Inhalation of air.
- The intake of combustion-supporting air shall not be directed against the driving wind direction.

#### Safety instructions!

All parts of the exhaust gas discharging device will be very hot during the whole operation from the start of heating operation.

Therefore, please follow the installation instructions to install the exhaust device.

• The exhaust outlet must be placed outside the vehicle.

• The exhaust gas shall not exceed the boundary of the side of the vehicle.

• The exhaust pipe should be inclined downward, and a condensate outlet with a diameter of about 5 mm should be set at the lowest point if necessary.

• It should not affect the function of the components that are vital to the operation of the vehicle (pay attention to maintaining adequate spacing).

• When installing, it should be noted that the exhaust pipe should be spaced enough between the heat sensitive parts. In particular, attention should be paid to fuel pipes (plastic or metal), wires and brake hoses!

• In order to prevent the exhaust pipe from being damaged by vibration, it must be securely fixed (the recommended reference distance is 50 cm).

• When laying exhaust pipes, attention should not be paid to inhaling exhaust gas as combustion-supporting air.

• The outlet of the exhaust pipe shall not be blocked by dirt and snow.

\* The outlet of the exhaust pipe shall not be directed towards the driving direction.

### III Installation

#### Installation and Safety of Heating Air Conduit

#### Heated air conduit

Installation assembly contains a flexible hose with a diameter of 75mm.

#### Safety instructions

• When laying and fixing heated air guide hoses and hot air outlets, care should be taken not to cause injury or damage to people, animals or temperature sensitive materials due to their thermal radiation/contact with them or directly blown by hot air.

• During the whole operation process from the beginning of heating operation, there is high temperature on the hot air duct. Therefore, it is necessary to avoid operating in the area where the hot air duct is located during the whole heating operation. In such cases, the heater should be turned off beforehand and all parts should be completely cooled. Wear protective gloves when necessary.



Be careful!

When installing heated air intake, attention should be paid to not operating under normal conditions. It inhales exhaust gases from vehicle engines and heaters and heats air. It will not seep into dust, salt fog, etc. When heating with circulating air, install the circulating air intake. It should be noted that the derived hot air can not be re-inhaled directly.

Local hot air temperature before shutdown due to overheating

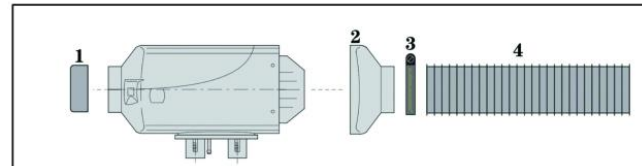
The degree may be as high as 150 degrees C, and the surface temperature may be as high as 90 degrees C. So only allow

Allow us to use the heat-resistant hot air hose released by us to guide the hot air!

When performing a function check, after about 10 minutes of operation, it will be out of the way at a distance.

The average temperature of hot air exhaust measured at the mouth of about 30 cm should not exceed 110 C (air inhalation temperature is about 20 C).

- Heaters and their catheters, etc. are prohibited from covering and heavy pressure, so as not to cause injury to personnel, flammable combustion or damage to heaters.



1.protection grid 2.windshields 3.hose hoop 4.flexible tube



# Catalog

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### Maintenance instructions

· Beyond the heating period, the heater should also be turned on for about 10 minutes a month.

· Before the heating period comes, the heater should be put into trial operation. If there is a long period of smoke, abnormal combustion noise or obvious smell of fuel odor or overheating of electrical/electronic components, the heater must be closed and the fuse removed. Then consult the dealer for inspection.

· Before using heater every winter, we should check whether the connecting parts of oil pipeline are loose and whether the connecting hoses and tubing are aging. Check whether there is oil leakage after heater has been running for a period of time and deal with it in time if there is any abnormality.

· After long-term idleness, the opening of heating air duct, combustion air supply pipe and exhaust gas discharge pipe should be checked and cleaned if necessary.

### service

If you have technical problems, or if your heating equipment fails, please contact the vendor.

### Warranty card

Distributor:		date:	
User name		Contact number	
Heater Model		Installation location	
License Plate Model		Installation time	
Vehicle type		Installer	
Maintenance time		Maintenance project	