

## The Installation Operation And Specification For Usage and Maintainance



The Air Heater Independent From the Engine

# Introduction

## Contents

Chapter	Title	Contents	Page
1	Introduction	<ul style="list-style-type: none"><li>• Contents ..... 2</li><li>• Concept of this manual ..... 3</li><li>• Special text structure, presentation and picture symbols ..... 4</li><li>• Important information before starting work ..... 5</li><li>• Safety instructions for installation and operation ..... 6</li></ul>	
2	Product information	<ul style="list-style-type: none"><li>• Scope of supply ..... 7</li><li>• Technical data of Air Heater D5.. ..... 9</li><li>• Main dimensions .....10</li></ul>	
3	Installation	<ul style="list-style-type: none"><li>• Installation and location .....11</li><li>• Installation location .....12</li><li>• Possible installation positions.....13</li><li>• Mounting and fastening .....14</li><li>• Heater air system .....15</li><li>• Exhaust system .....16</li><li>• Combustion air system .....17</li><li>• Fuel supply .....18 – 21</li></ul>	
4	Operation and function	<ul style="list-style-type: none"><li>• Operating instructions / important information for operation .....22</li><li>• Description of functions .....23</li><li>• Control and safety devices / EMERGENCY OFF .....24</li></ul>	
5	Troubleshooting Maintenance Service	<ul style="list-style-type: none"><li>• In case of faults, please check the following points .....25</li><li>• Maintenance instructions .....25</li><li>• Specification .....25</li><li>• Electrical Diagram .....26</li><li>• The Interior Structural Illustration .....27</li></ul>	

# 1 Introduction

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## Concept of this manual

This manual aims to support the installation workers installing the heater and to provide the user with all important information about the heater. The manual has been divided into 5 chapters to make it easier to find the corresponding information quickly.

### 1 Introduction

Here you will find important introductory information about installation of the heater and about the structure of the manual.

### 2 Product information

Here you will find information about the scope of supply, the technical data and the dimensions of the heater.

### 3 Installation

Here you will find important information and instructions referring to installation of the heater.

### 4 Operation and function

Here you will find information about the operation and function of the heater.

### 5 Troubleshooting / maintenance / service

This section contains information on possible faults and malfunctions, troubleshooting, maintenance and the service hotline.

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# 1 Introduction

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## Special text structure, presentation and picture symbols



### **Danger!**

This picture symbol with the remark "Danger!" refers to the risk of a fatal danger to life and limb. Under certain circumstances, failure to comply with these instructions can result in severe or life-threatening injuries.



### **Caution!**

This picture symbol with the remark "Caution!" refers to a dangerous situation for a person and / or the product.

Failure to comply with these instructions can result in injuries to people and / or damage to machinery.

### **Please note!**

These remarks contain application recommendations and useful tips for installation of the heater.



### **Caution!**

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

- The heater must only be used and operated for the range of application stated by the manufacturer in compliance with the "Operating instructions" included with every heater.

## Important information before starting work

### **Range of application of the heater**

The Air Heater operating independently of an engine is intended for installation in the following vehicles, depending on its heating output:

- Vehicles of all kinds (max 8 seats)
- Construction machinery
- Agricultural machinery
- Boats, ships and yachts (only diesel heaters)
- Camper vans

### **Please note!**

- The camper heaters are intended for installation in camper vans. Version D3-Camper should be used in situations requiring reduced noise levels.
- The heaters (only diesel heaters, 24 volt) can be installed in vehicles used for the transport of dangerous goods as per ADR.
- The current controller is to be replaced by a special controller when the heater is to be used to heat the freight compartment / cargo (order no. see heater price list or spare parts list).

### **Purpose of the heater**

- Pre-heating, de-misting windows
- Heating and keeping the following warm:
  - Driver and working cabs, Ship's cabins
  - Freight compartments
  - Passenger and crew compartments
  - Camper vans

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
  - 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
  - Blowing hot air into containers

# 1 Introduction

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## • Arrangement of the heater

- 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.
- The heater must not be mounted in the passenger compartment of vehicles in class M<sub>2</sub> and M<sub>3</sub>. But a heater in a hermetically sealed enclosure which otherwise complies with the conditions stated above may be used.
- The factory nameplate or duplicate must be affixed so that it can still be easily read when the heater is installed in the vehicle.
- All appropriate precautions must be taken when arranging the heater to minimise the risk of injuries to persons or damage to other property.

## • Fuel supply

- The fuel intake connection must not be located in the passenger compartment and must be sealed with a properly closing lid to prevent any fuel leaks.
- In heaters for liquid fuel where the heater fuel is separate from the vehicle fuel, the type of fuel and intake connection must be clearly identified.
- A warning sign is to be fixed to the intake connection indicating that the heater must be switched off before refuelling.

## • 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.

## • Fuel tanks

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

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

## • Exhaust system and exhaust pipe layout

The exhaust system as well as the exhaust pipes shall laid out or protected to avoid any danger to the load through heating or ignition. Parts of the exhaust system situated directly below the fuel tank (diesel) shall have a clearance of at least 100 mm or be protected by a thermal shield.

## • Switching on the combustion heater

The combustion heater may only be switched on manually. Automatic switching on via a programmable switch is not permitted.

Combustion heater after-run

After-running of the switched off combustion heater is permitted. In the cases named in the "FL vehicles" paragraph under letters b) and c) the supply of combustion air must be interrupted by suitable means after a maximum after-run period of 40 seconds. Only combustion heaters whose heat exchangers are verifiably not damaged by the reduced after-run period of 40 seconds beyond their usual use period may be used.

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# 1 Introduction

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## Safety instructions for installation and operation



### **Danger!**

#### **Risk of injury, fire and poisoning!**

- The heater must only be started up when the maintenance flap is closed and the outlet hood is mounted in position.
- The maintenance flap must not be opened during operation.
- Disconnect the vehicle battery before commencing any kind of work.
- Before working on the heater, switch the heater off and let all hot parts cool down.
- The heater must not be operated in closed rooms, e.g. in the garage or in a multi-storey car park.
- Adjustable hot air outlets must always be adjusted so that they cannot blow hot air directly at living creatures (people, animals) or objects sensitive to temperature (loose and / or fastened).



### **Caution!**

#### **Safety instructions for installation and operation!**

- The year of initial commissioning must be marked on the nameplate.
- The heat exchanger of air heaters is a component subject to high thermal loads which must be replaced 10 years after initial commissioning of the heater. In addition, the installation date must be entered on the plate "original spare part" enclosed with the heat exchanger must. Then affix the plate next to the nameplate on the heater.
- The heater must only be installed by a JE partner authorised by the manufacturer according to the instructions in this manual and possibly according to special installation recommendations; the same applies to any repairs to be carried out in the case or repairs or guarantee claims.

- The following measures are not allowed:
  - Changes to components relevant to the heater.
  - Nonconformities in installation or operation from the statutory regulations, safety instructions or specifications relevant to safe operation as stated in the installation instructions and operating instructions. This applies in particular to the electrical wiring, fuel supply, combustion air system and exhaust system.
- Only original accessories and original spare parts must be used during installation or repairs.
- When carrying out electric welding on the vehicle, the plus pole cable at the battery should be disconnected and placed at ground to protect the controller.
- The heater must not be operated where there is a risk of an accumulation of flammable vapours or dust, for example close to
  - fuel depot
  - coal depot
  - wood depot
  - grain depots etc.
- The heater must be switched off when refuelling.
- When the heater is mounted in a safety housing etc., the installation compartment of the heater is not a stowage compartment and must be kept clear. In particular fuel canisters, oil cans, spray cans, gas cartridges, fire extinguishers, cleaning rags, items of clothing, paper etc. must not be stored or transported on or next to the heater.
- Defect fuses must only be replaced by fuses with the prescribed rating.
- If fuel leaks from the heater fuel system, arrange for the damage to be repaired immediately by a JE service partner.
- After-running of the heater must not be interrupted prematurely e.g. by pressing the battery disconnecting switch, apart from in the case of an emergency stop.

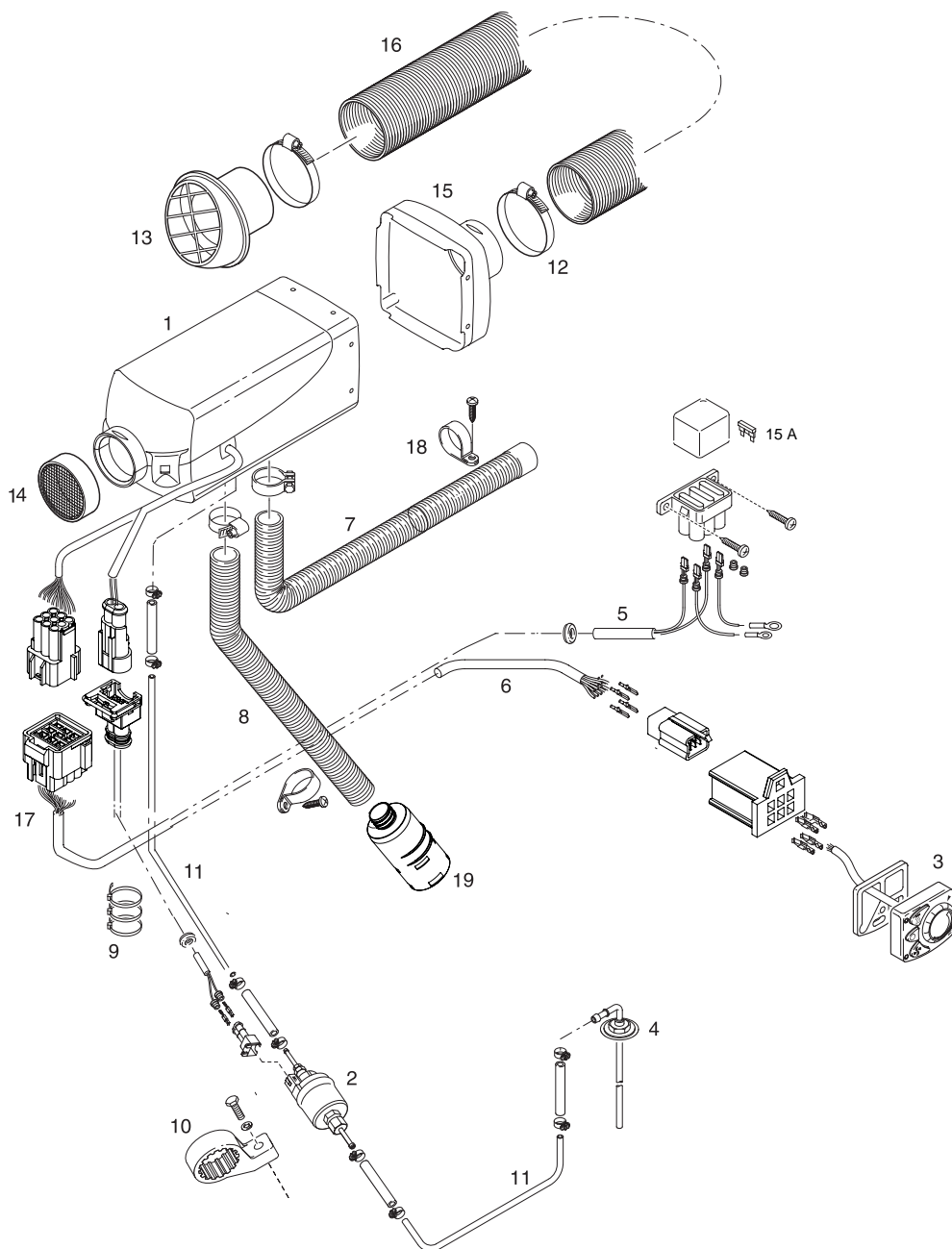
## **Accident prevention**

General accident prevention regulations and the corresponding workshop and operation safety instructions are to be observed.

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## 2 Product information

### Scope of supply of Heater, Installation Kits and Set Instruments



## 2 Product information

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### Scope of supply for heater

#### Pict.-No. Designation

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- |   |             |
|---|-------------|
| 1 | Heater      |
| 2 | Dosing pump |

### Scope of supply for installation kit

#### Pict.-No. Designation

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- |    |                       |
|----|-----------------------|
| 3  | Rotation Switch       |
| 4  | Tank Extractor        |
| 5  | Harness               |
| 6  | Wiring Harness        |
| 7  | Flexible exhaust pipe |
| 8  | Air Intake Pipe       |
| 9  | Cable Tape            |
| 10 | Bracket dosing pump   |
| 11 | Fuel Hose             |
| 12 | Hose Clamp            |
| 13 | Rotational Air Outlet |
| 14 | Grating               |
| 15 | Housing               |
| 16 | Hot Air Duct          |
| 17 | Connector             |
| 18 | Hose Clamp            |
| 19 | Air Intake Silencer   |



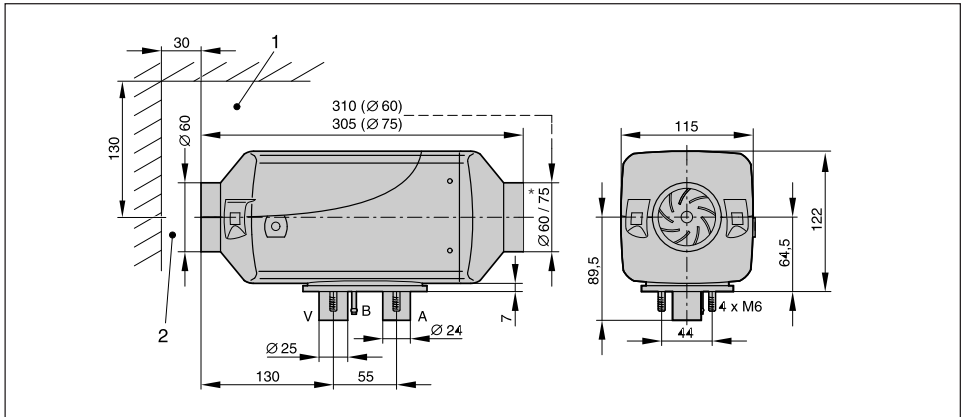
## 2 Product information

### Technical data

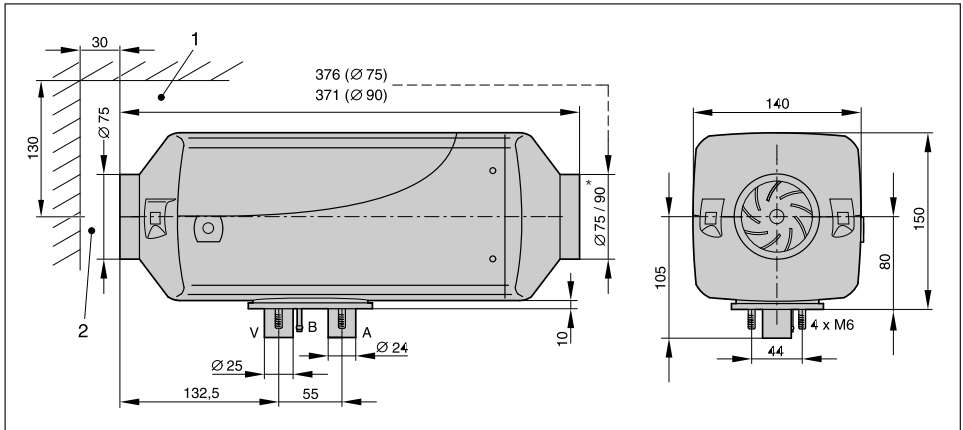
Power (Watt)	2000	3000	5000
Heating medium	Air	Air	Air
Fuel consumption (l/h)	0.28-0.10	0.41-0.11	0.51-0.11
Fuel	Diesel	Diesel	Diesel
Weight	approx. 2.7 kg	approx. 4.5 kg	approx. 4.5 kg
Heater air flow rate without counterpressure (kg/h)	105	185	185
Elektr. power consumption (watt) in operation (12 and 24 volt) at start (12 and 24 volt)	8-34	7-40	7-40
		≤100	
Rated voltage	12 or 24 volt	12 or 24 volt	12 or 24 volt
Main dimensions	310X115x122	376X140x150	376X140x150
Operating range Lower voltage limit:  switches off the heater when the voltage limit is reached.	approx. 10.5 volt resp. 18 volt Undervoltage protection trigger time: 20 seconds		
Upper voltage limit: An uppvoltage protection in the controller switches off the heater when the voltage limit is reached.	approx. 18 volt resp. 28 volt Overvoltage protection trigger time: 20 seconds		
Fuel "Fuel quality" and "Fuel at low temperatures"	Commercially available diesel fuel (DIN EN 590)		
Tolerable ambient temperature	Operation		Not running
	Heater	-40 °C to +70 °C	-40 °C to +85 °C
	Dosing pump	-40 °C to +50 °C	-40 °C to +125 °C
Maximum air intake temperature	+40 °C		
Ventilation mode	possible		

## 2 Product information

### Main dimensions 2000



### Main dimensions 3000/5000



- 1 Minimum installation clearance (space) for opening the lid and for dismantling the glow plug and the controller.
- 2 Minimum installation clearance (space) for intake of heater air.

A = Exhaust  
B = Fuel  
V = Combustion air

## 3 Installation

### Installation and location

The heater is suitable and certified for installation in parts of vehicles used by persons.  
Installation in the cab or passenger compartments of coaches or buses with more than 9 seats is **not** allowed.

When installing in compartments used by persons, the exhaust, combustion air and fuel pipes in these areas must not have any detachable connections and must be routed splash-waterproof in the breakthroughs. For this reason, the heater can be mounted with its foot using the flange seal in the foot to the vehicle floor or to an outer wall of the vehicle.

The electronic control is integrated in the heater which makes wiring during installation much easier.

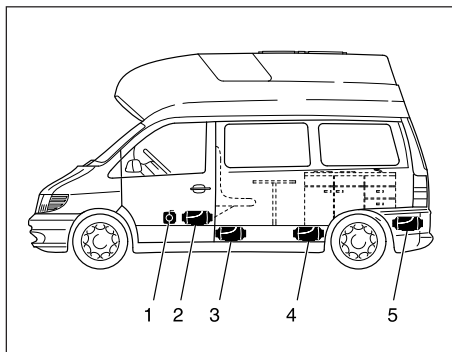
#### Please note!

- 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 page 15 "main dimensions").

### Installation position

#### Installation position in a camper van

In a camper van, the heater is preferably installed in the inner compartment or luggage compartment.  
If it cannot be installed in the inner compartment or luggage compartment, the heater can also be fitted to the vehicle floor from underneath.



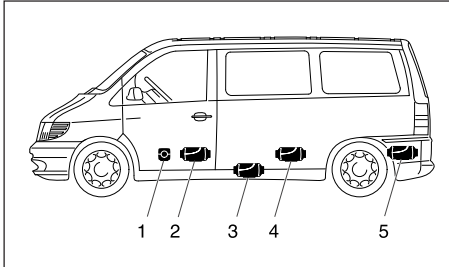
- 1 Heater in front of the passenger seat
- 2 Heater between the driver's seat and the passenger seat
- 3 Heater under the vehicle floor
- 4 Heater under the back seat
- 5 Heater in the boot

## 3 Installation

### Installation

#### Installation in a car or people carrier

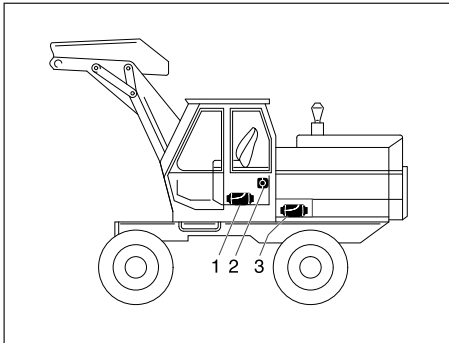
In a car or people carrier, the heater is preferably installed in the passenger compartment or boot. If it is not possible to install the heater in the passenger compartment or boot, the heater can also be mounted under the vehicle floor.



- 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

#### Installation in an excavator cab (only diesel heaters)

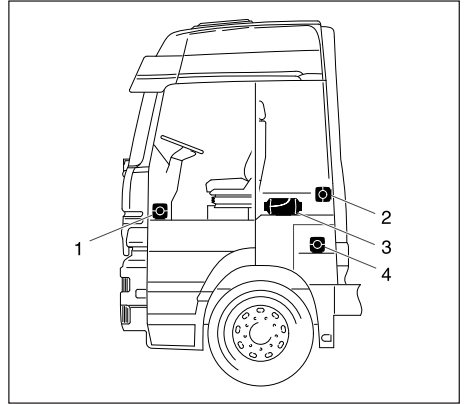
In an excavator, the heater is preferably installed in the cab. If it is not possible to install the heater in the cab, the heater can also be installed in a storage box outside the cab.



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

#### Installation in a truck (only diesel heaters)

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

#### Please 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.
- Other installation information (e.g. for boats and ships) is available from the manufacturer on request.
- Observe the tolerable installation position together with the operating and storage temperatures.

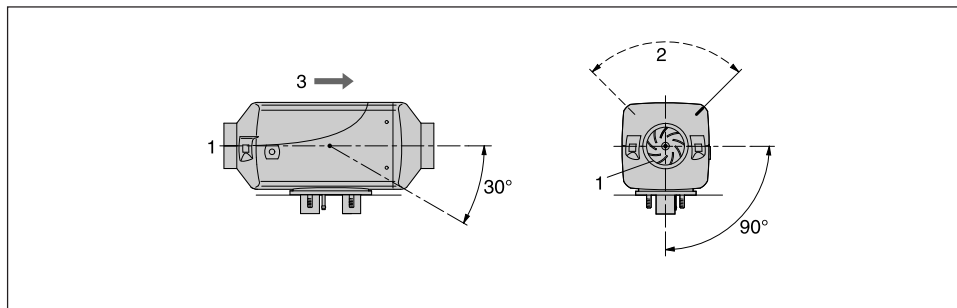
## 3 Installation

### Possible installation positions

The heater is preferably installed in the normal position as shown in the drawing. Depending on the installation conditions, the heater can be tilted by max. 30° (flow direction to the bottom) or turned by max. 90° 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° in all directions because of a slanting position of the vehicle or boat, without any impaired functions.

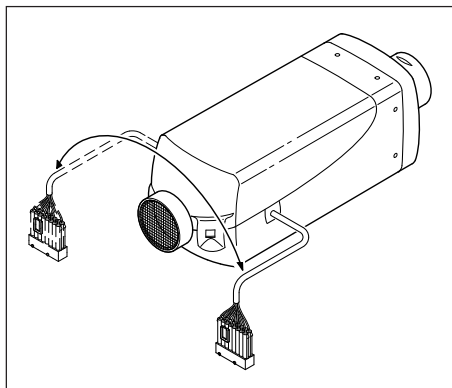
### Normal position horizontal (exhaust connection downwards) with tolerable swivel range



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

### 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 the jacket shell and insert the cable harness bush and the bungs in the corresponding recesses in the lower jacket shell.



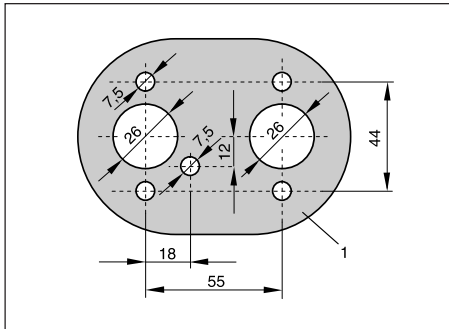
### 3 Installation

#### 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. An appropriate tool can be purchased from the manufacturer for drilling the breakthroughs and also smoothing the support surface. The hole  $\varnothing 10.5$  mm for the cable harness "dosing pump" is not included in the picture drawing and must be drilled after installation.

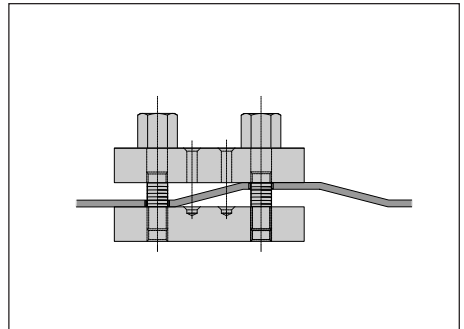
If the sheet metal of the support surface is thinner than 1.5 mm, an additional reinforcement plate will have to be fitted.

#### Picture hole

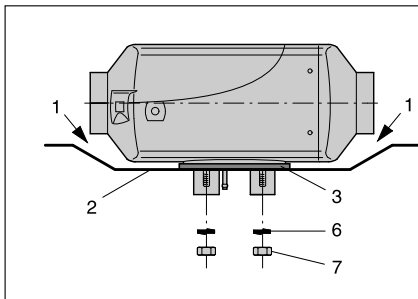


1 Contour of the bearing surface

#### Special tool

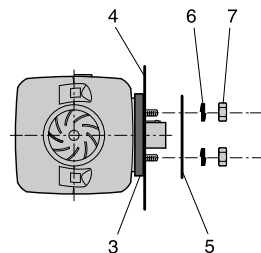


#### Fastening the unit on the vehicle floor



- 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



- 4 The vehicle wall must be flat and smooth.
- 5 Reinforcement plate (if required, see above)
- 6 Spring washer
- 7 Hexagon nut M6 (torque  $5^{+1}$  Nm)

### 3 Installation

#### Heater air system

The universal installation kit includes a flexible pipe, an outflow and a safety grid for the heater air system. The flexible pipe is not included in the installation kits for the camper heaters. It has to be ordered separately. The order number is stated in the Accessories Catalogue.



#### **Danger!**

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

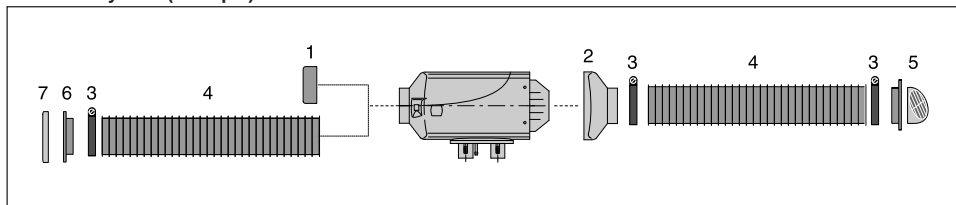
- The hoses of the heater air system and the hot air outlet are to be routed and fastened in such a way that they pose no temperature risk to people, animals or materials sensitive to temperature from radiation / contact or blowing directly. If necessary, a cover is to be fitted to the heater air system or hot air outlet.
- The outflow hood must be fitted on the hot air outflow side.
- A safety grid 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 all parts have cooled down completely.  
If necessary, wear safety gloves.



#### **Caution!**

- The heater air intake openings 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. 30 cm 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.

#### Heater air system (example)



- 1 Safety grid
- 2 Outflow hood
- 3 Hose clip
- 4 Flexible hose

- 5 Rotating outflow
- 6 Connection fitting
- 7 Safety grid

## 3 Installation

### Exhaust system

#### Mounting the exhaust system

The universal installation kit includes a flexible exhaust pipe, inner Ø 24 mm, 1000 mm long and an exhaust silencer. The flexible exhaust pipe can be shortened to 20 cm or lengthened to max. 2 m, depending on the installation conditions.

Fasten the exhaust silencer to a suitable position in the vehicle.

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.



#### Caution!

##### Safety instructions!

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. Ø 5 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 50 cm) 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.
- Always fasten the exhaust silencer to the vehicle.



#### Danger!

##### 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.

- 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.

#### Please note!

- Comply with the regulations and safety instructions for this chapter on page 4 – 7.
- 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 (see diagram page 23).



### 3 Installation

#### Combustion air system

##### Mounting the combustion air system

The universal installation kit includes a flexible combustion air hose, inner Ø 25 mm, 100 mm long. If necessary the flexible combustion air hose can be shortened by 20 cm or lengthened by max. 2 m depending on the installation conditions. Fasten the combustion air hose to the heater with a pipe clip and at suitable points with hose clips or cable ties.

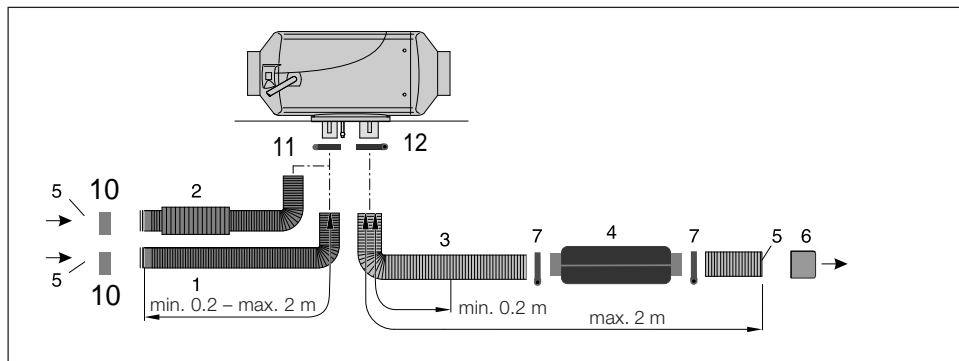
The installation kit for camper heaters includes a combustion air intake silencer with a flexible connection hose (inner diameter 25 mm). Fasten the flexible connection hose to the heater with a pipe clip and fasten the combustion air intake silencer with hose clips or cable ties at suitable points.



#### Caution!

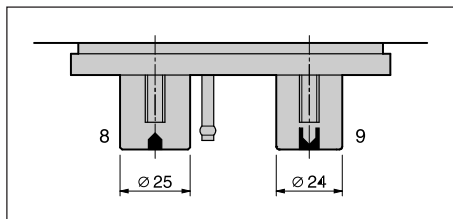
##### Safety instructions for the combustion air system!

- The combustion air opening must be free at all times.
- Position the combustion air intake to be sure that exhaust fumes cannot be sucked in with the combustion air.
- Do not arrange the combustion air intake to pointing against the wind blast.
- The combustion air intake must not get clogged with dirt and snow.
- Install the combustion air intake system sloping slightly downwards. If necessary, make a drain hole approx. Ø 5 mm at the lowest point to drain off condensation.



- 1 Combustion air hose, di = 25 mm
- 2 Combustion air silencer,
  - included in scope of supply for *AIRTRONIC* camper heaters
  - optional (**not** included in scope of supply for *AIRTRONIC* and *AIRTRONIC M* heaters)
- 3 Exhaust pipe, de = 24 mm
- 4 Exhaust silencer
- 5 Intake / outlet opening – protect from wind, snow, dirt and water.
- 6 End sleeve, combustion air
- 7 End sleeve, exhaust
- 8 Combustion air connection
- 9 Exhaust connection

- 10 Combustion Air End Housing
- 11 Hose Clamp
- 12 Hose Clamp



## 3 Installation

### Fuel supply

#### Mounting the dosing pump, routing the fuel pipes and mounting the fuel tank

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 comply can result in malfunctions.



#### **Danger!**

#### **Risk of fire, explosion, poisoning and injuries!**

Caution when handling fuel.

- Switch off the vehicle engine and heater before refuelling and before working on the fuel supply.
- No naked lights when handling fuel.
- Do not smoke.
- Do not inhale fuel vapours.
- Avoid any contact with the skin.

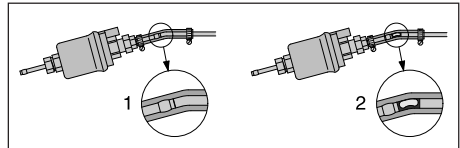


#### **Caution!**

#### **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 safely to avoid any damage and / or noise production from vibrations (recommended clearance of approx. 50 cm).
- 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. When the systems cross, always ensure there is a sufficient heat clearance. If necessary, install heat deflection plates.
- 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

#### **Safety instructions for 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.

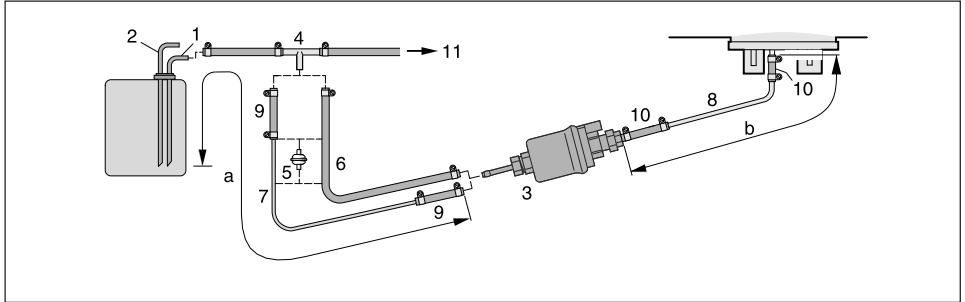
#### **Please note!**

Comply with the regulations and safety instructions for this chapter on page 4 – 7.

### 3 Installation

#### Fuel supply

Fuel feed point with T-piece from the fuel supply line from the tank fitting to the vehicle engine



- 1 Fuel feed pipe from tank connection
- 2 Dosing pump
- 3 Fuel pipe, 5 x 1.25 (di = Ø 2 mm)
- 4 Fuel hose, 3.5 x 4.5
- 5 Fuel hose, 4.5
- 6 Fuel filter – only necessary for contaminated fuel.
- 7 Fuel pipe, 4 x 1.25 (di = Ø 1.5 mm)

#### Possible pipe lengths

##### Intake side

a = max. 5 m

M

a = max. 2 m

##### Pressure side

##### Diesel heaters

- For suction pipe di = Ø 2 mm, b = max. 6 m
- For suction pipe di = Ø 5 mm, b = max. 10 m

##### Petrol heater

- b = max. 4 m



#### Caution!

#### Safety instructions for the fuel supply!

- The fuel must not be conveyed by gravity or overpressure in the fuel tank.
- Withdrawal of fuel after the vehicle's fuel pump is not allowed.
- When the pressure in the fuel pipe is more than 0.2 bar to max. 4.0 bar, use a pressure reducer (order no. 22 1000 20 08 00) or separate tank connection.
- When the pressure in the fuel pipe is more than 4.0 bar or there is a non-return valve in the return pipe (in the tank), a separate tank connection must be used.
- When using a T-piece in a plastic pipe, always use support sleeves in the plastic. Connect the T-piece and the plastic pipe with corresponding fuel hoses and secure with hose clips.

### 3 Installation

#### Fuel supply

##### Installation position of the dosing pump

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

##### 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 0.03 bar in tank cap):  
 $b = \text{max. } 400 \text{ mm}$

Pressure height of the dosing pump to the heater:  
 $c = \text{max. } 2000 \text{ mm}$

#### Please note!

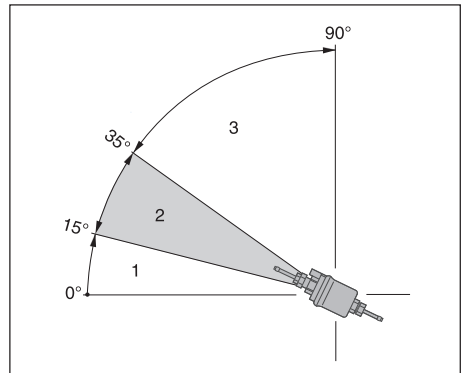
Check tank venting.



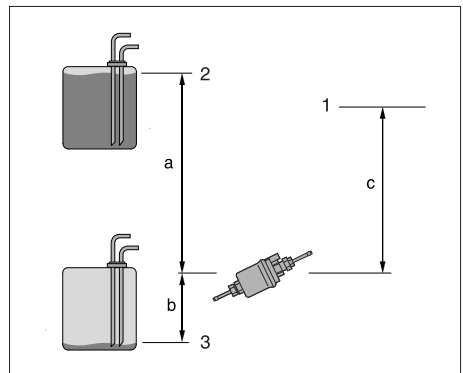
#### Caution!

##### Safety instructions for installing the dosing pump

- Always mount the dosing pipe with the pressure side rising upwards – minimum incline  $15^\circ$ .
- Protect the dosing pump and filter from intolerable heat, do not mount near to the silencers and exhaust pipes.



- 1 Installation position between  $0^\circ$  and  $15^\circ$  is not allowed.
- 2 Preferred installation position in range  $15^\circ$  to  $35^\circ$ .
- 3 Installation position in range  $35^\circ$  to  $90^\circ$  is allowed.



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

## 3 Installation

### Fuel supply

#### Fuel quality for petrol heaters

The heater runs smoothly on standard commercial quality petrol in accordance with DIN EN 228, which you use to run your vehicle engine.

#### Fuel quality for diesel heaters

- The heater runs smoothly on standard commercial quality diesel in accordance with DIN EN 590, which you use to run your vehicle engine.
- In special cases (above 0 °C), the heater can also run on fuel oil EL or paraffin.
- Refineries and fuel service stations automatically adjust the fuel to normal winter temperatures (winter diesel). This means that difficulties are only to be expected for extreme drops in temperature, as also apply to the vehicle engine. Please also refer to the vehicle manual.
- If the heater is run from a separate tank, please comply with the following rules:  
For temperatures above 0 °C, any kind of diesel fuel as per DIN EN 590 can be used.
- If no special diesel fuel is available for low temperatures, then paraffin or petrol should be mixed with the fuel according to the following table:

Temperature	Winterdiesel	Addition
0 °C to -25 °C	100 %	–
-25 °C to -40 °C	50 %*	50 % paraffin or petrol

\* or 100 % special cold diesel fuel (Arctic diesel)

#### Please note!

- Mixtures with used oil are **not** allowed!
- After refuelling with winter or cold diesel or the listed blends, the fuel pipes and the dosing pump must be filled with the new fuel by letting the heater run for 15 mins.!

#### Please note!

- When using 100 % biodiesel, the heater should be operated twice a year with diesel fuel (in the middle and at the end of a heating period) in order to burn off any possible biodiesel residues deposited.  
To do so, let the vehicle tank run almost empty and fill with diesel fuel without adding any biodiesel.  
While running on this tank filling, switch the heater on 2 to 3 times for 30 minutes at a time at the highest temperature setting.
- When operating with diesel / biodiesel mixtures of up to 50 % biodiesel, intermediate operation with pure diesel fuel is not necessary.

## 4 Operation and function

### Description of functions

#### Switching on

When the heater is switched on, the control lamp in the control element lights up.  
The glow plug is switched on and the fan starts at low speed.

#### Please note!

If there is still 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.

#### Starting AIRHEATER 5

After approx. 60 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 90 seconds.

After another 120 seconds, the heater has reached the "POWER" stage (maximum fuel quantity, maximum fan speed).

#### Temperature selection with the control element

Select the required passenger compartment temperature with the knob. The temperature setting can be between +10 °C and +30 °C depending on the size of the room being heated and the prevailing outside temperature. The required setting of the knob is an empirical value.



#### Control in the heating mode

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

If the temperature is higher than the temperature selected on the control element, the heater starts to regulate its output. There are 4 control stages so that the outflow of heat produced by the heater can be adjusted finely to the heating requirements. Fan speed and fuel quantity correspond to the particular control stage.

If the set temperature is still exceeded in the smallest control stage, the heater goes to the "AUS" stage with the fan running on for approx. 4 minutes to cool off. Then the fan continues at minimum speed (circulation mode) or is switched off (fresh air mode) until the heater is started again.

#### Ventilating mode

In the ventilating mode, first the changeover switch "heating / venting" has to be activated and then the heater is switched on.

#### Switching off

When the heater is switched off, the control lamp goes off and the fuel supply is switched off.

The fan runs on for approx. 4 minutes to cool down. While the fan is running on, the glow plug is switched on for approx. 40 seconds to clean.

Special case:

If no fuel has been supplied or if the heater is in the "AUS" stage until it is switched off, the heater is stopped without any after running.

## 1. Charging fuel manually

Before using the heater for the first time, please use this function to completely exhaust the air from the tubing.

Under non-set state, please push the “▼” button firstly and hold it, then push “OK” button to enter the state of pump fuel manually. When H-oF displayed, release the OK button firstly, then release “▼” button. Push “▲” button to start pumping fuel manually, display H-on, and the sound of pumping can be heard. In the mean time, the fuel pump lamp is lighting. Push “▼” button, or Setting button can stop it. Quit pumping status, the light goes to off.

## 2. Function of button

“Set” → Enter setting state to adjust and set the parameter, and change the working conditions.

“OK” → Under setting state, confirm current setting data, and enter next parameter setting. Under non-set status, review the current setting.

“▲” → Under setting state, upper the setting parameter; under non-set state, upper setting working temperature.

“ON/OFF” → Push ON/OFF button shortly, status light normally on. Push button for 2 seconds to switch off the heater. Status light flicker.


“▼” → Under setting state, lower the setting parameter; under non-set state, lower the setting working temperature.


## 3. Remote code-match(Selectable)

Under standby state, when the display shows ambient temperature, push the Up button more than 3 seconds to enter the remote code-match status. When HFA- shows on the screen, push “ON” button on the remoter to transmit remote code. After the code matched successfully, quit the code-match interface. The heater is switch on. If the code cannot be matched, the heater will not be switched on. Over the time limit, no code matched, quit the status automatically.

**Remark: after all settings, push OK to quit. Otherwise, the setting will not be saved.**

## 4. Parameter setting (Push “Set” button to enter setting panel, and the corresponding icon is lighted)

Time Setting  → Push “UP” and “DOWN” button to adjust parameters → Push “OK” button to set the hours and minutes → Push “OK” button and go to the next item.

Set time to turn on and turn off  → Default off, display 1-oF. After push the “UP” button to start, display 1-on and enter setting state → Push “OK” button to set the first group of power on/off time and the second group of power on/off time in turn → Push the “OK” button to enter the next item.

## 5. Inquire status

Ambient temperature → Working temperature → Setting temperature (temperature controlled

automatically) / Setting fuel flow rate (controlled manually) → Voltage Historical → the past error code → Ambient temperature (Under non-set state, push "OK" button to check the settings and for loop view)

## **6. The Description of Timer**

After the run time is set up, push "OK" button to set time to turn on and turn off the heater. The default is "oF" state. And Push "UP" button to start "on" state. Push "OK" button to set the hours and minutes of the first group of power on time, after confirm that, then set the hours and minutes of the first group of power off time. Push the "OK" button to set the second group of power on/off time, the setting method is the same as above. The interval between two groups of timing can be left, or you can only set one group time to turn on/off.

The timing function is only run once. After this time, the current timer is turned off. The next time it is used, please turn it on again and set the time. If there is a timer setting, the alarm icon will light and disappear after the timer expires.

## **7. Temperature control methods**

The switch has two temperature control modes: temperature manual control mode and temperature automatic control mode.

### **(1) Temperature manual control mode**

Under non-set state, keep pushing UP button, meanwhile, push setting button. When it displays P-xx (xx:fuel flow rater) it means entering the temperature manual control mode. And the outlet temperature is controlled by adjusting the fuel flow rater. You can select the fuel flow rater from 1.6Hz to 5.5Hz. Use the "▲" and "▼" buttons to adjust the fuel flow rater. Each push represents  $\pm 0.1\text{Hz}$ . The selected fuel value will be saved after power off or shut down. In this mode, the outlet air temperature is not affected by the ambient temperature, and it gives out heat at a constant temperature.

### **(2) Temperature automatic control mode**

Under non-set state, keep pushing UP button, meanwhile, push setting button. When it displays  $\times\times^{\circ}\text{C}$  (xx:temperature), that means the temperature automatic control mode. The operator can arbitrarily set the temperature between  $8^{\circ}\text{C}$  ~  $35^{\circ}\text{C}$  by using the "▲" and "▼" buttons. Under temperature automatic control mode, the controller automatically adjusts the operating power of the heater by determining the temperature value relationship between the set temperature value and the current ambient temperature value.

When the current ambient temperature  $<$  the set temperature value  $2^{\circ}\text{C}$ , the heater automatically works at maximum power









When the current ambient temperature  $>$  the set temperature value  $2^{\circ}\text{C}$ , the heater automatically works at minimum power

**After switch the state, the corresponding lamp will light. After few second without operation, the display will switch off automatically.**



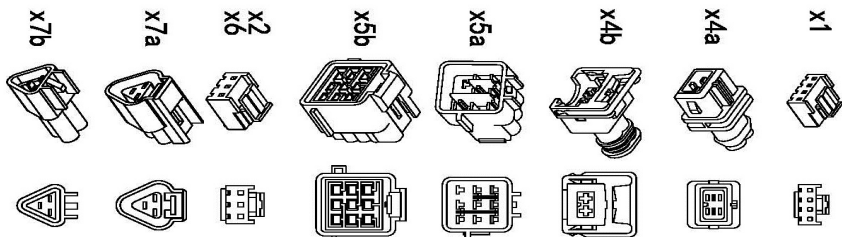
## 5 Troubleshooting / Maintenance / Service

### Error code

Error	Icon display on the	Number display on the screen	Problem shooting
Under voltage		E - 01	Increase voltage
Over voltage		E - 02	Decrease voltage
Glowplug fault		E - 03	Check connection of glowplug, open or short
Fuel pump fault		E - 04	Check connection of fuel pump, open or short
Heater over heat		E - 05	Check temperature sensor on the cover, or the blower rotate speed
Fan Motor fault		E - 06	Check the polarity of the magnetic pole and the location of Hall sensor and fan motor
Disconnection		E - 07	Check connection to the panel, the connection of blue communication line is not ok
Flame off		E - 08	Check fuel line to see if there is air inside or blocked. Check the temperature sensor on the cover, or the connection of connector

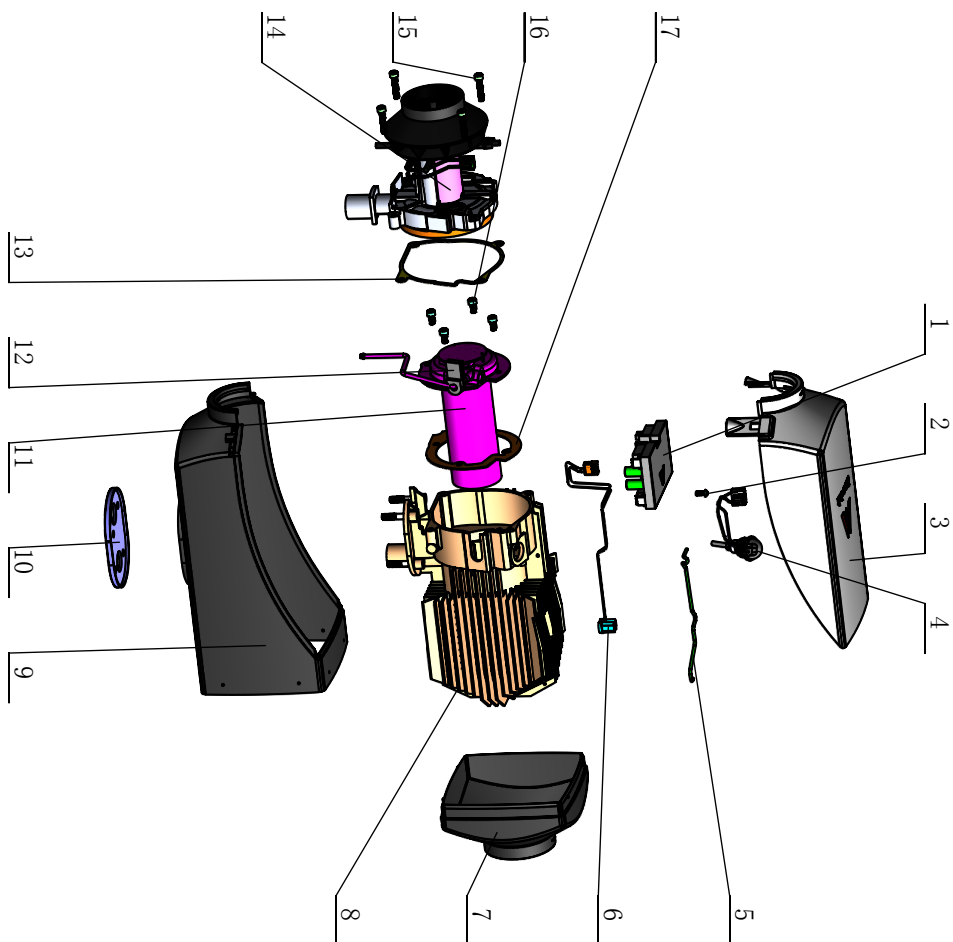
The description in the form above is for digital panel and LCD panel, both of them can be controlled by remote. The content are the same with the form .

For the rotate panel, the problem shooting are the same, but the error shows by the times of the lights or the numbers of the lighting lights. (the Indicator light display mode depends on the number of lighting lights)



## 5 Troubleshooting / Maintenance / Service

### The Heater Interior illustration



Nr	Parts	Qty
1	ECU	1
2	Bolt M4*10	1
3	Upper Housing	1
4	Glow Plug	1
5	Sensor Clip	1
6	Temp Sensor	1
7	Air Intake Hood	1
8	Heat Exchanger	1
9	Lower Housing	1
10	Rubber Gasket	1
11	Burner	1
12	Fuel Gasket	1
13	Fan Motor Gasket	1
14	Fan Motor Assembly	1
15	Bolt M5*25	4
16	Bolt M5*10	4
17	Burner Gasket	1