

Air Heater D5LC Installation Manual

Technical description
Installation instructions
Operating instructions
Maintenance instructions

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Engine-independent air heater 5 L for petrol fuel

Heater	Order no.
B 5 L C - 12 Volt	25 1735 05 00 00

Engine-independent air heater 5 L for diesel fuel

Heater	Order no.
D 5 L C - 12 Volt	25 1861 05 00 00
D 5 L C - 24 Volt	25 1862 05 00 00



**Please give this manual to the customer
after installation of the heater.**

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 fitting the heater, ensure there is sufficient space for heater air intake and for removing the glow plug and controller (see page 11, main dimensions).
- The regulations and safety instructions to be observed for this chapter are on page 4 – 7.

Installing the 24 V heater in a vehicle for the transport of dangerous goods as per ADR / ADR 99

The heater may be installed in vehicles used for the transport of dangerous goods as per ADR / ADR99.

Detailed information about the ADR / ADR99 regulations is contained in leaflet no. 25 2161 95 15 80.

Please note!

- For installation of the heater in vehicles for the transport of dangerous goods, the regulations of ADR / ADR99 must be observed.

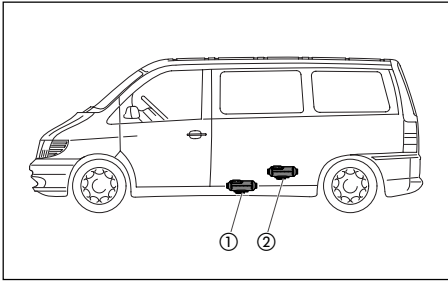


3 Installation

Location

Installation in a car/van

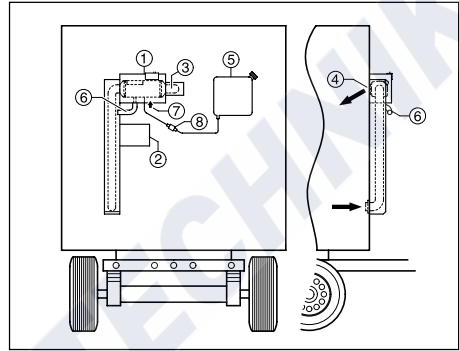
In a van, the heater is preferably installed in the inner compartment or luggage compartment. If it cannot be installed in the inner compartment or luggage compartment, the heater can also be fitted to the vehicle floor from underneath.



- ① Heater in the inner compartment
- ② Heater in the luggage compartment

Installation in a trailer

In a trailer, the heater is preferably installed in a box in the upper part of the front end.



- ① Heater
- ② Battery
- ③ Flexible tube for heating air
- ④ Outflow for heating air
- ⑤ Extra fuel tank
- ⑥ Exhaust pipe
- ⑦ Combustion air
- ⑧ Fuel dosing pump

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.

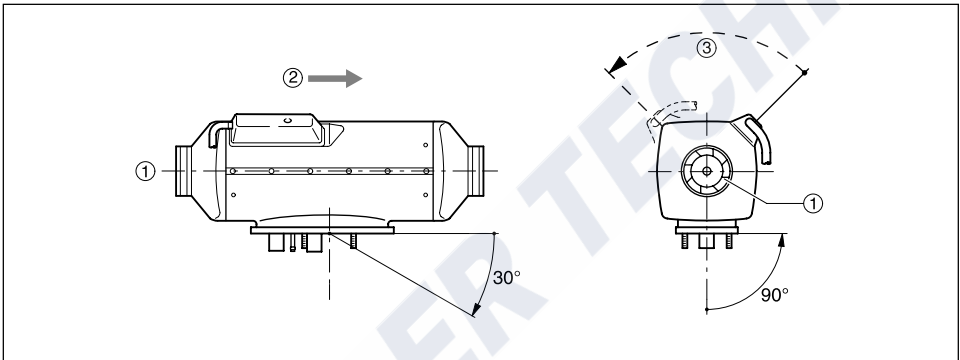
3 Installation

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 (impeller)
- ② Direction of flow
- ③ Position of the glow plug

3 Installation

Mounting and fastening

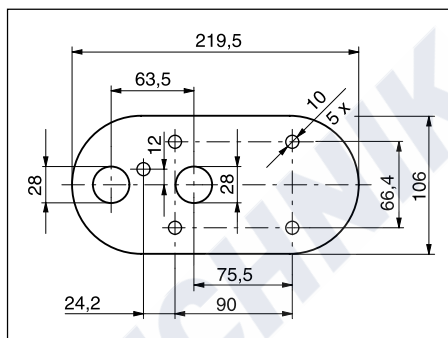
Make the necessary breakthroughs for exhaust, combustion air and fuel as shown in the hole diagram. The support surface for the heater foot must be flat. An appropriate tool can be purchased from the manufacturer for drilling the breakthroughs and also smoothing the support surface.

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.

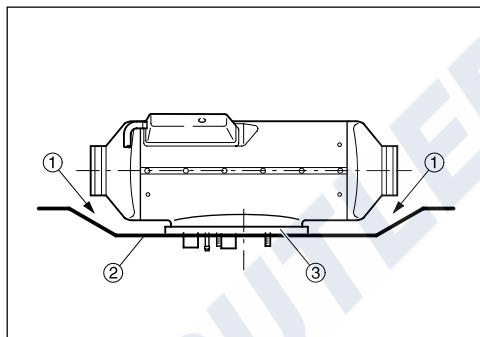
If the sheet metal of the support surface is thinner than 1.5 mm, an additional reinforcement plate will have to be fitted.

Order no: reinforcement plate 25 1729 89 00 03

Picture hole

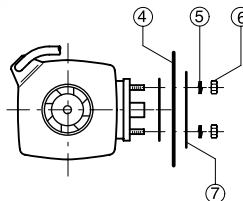


Fastening the unit on the vehicle floor



- 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 Spring washer
- ⑥ Hexagon nut M6 (torque 5⁺¹ Nm)
- ⑦ Reinforcement plate (if required, order no. 25 1729 89 00 03)

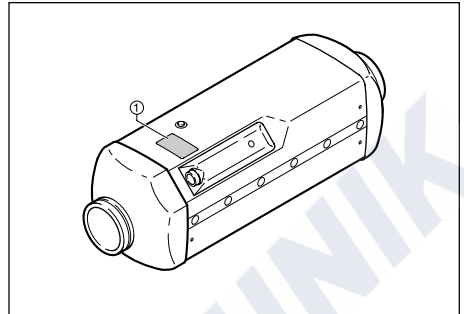
3 Installation

Nameplate

The nameplate is fastened to the upper jacket shell. The second nameplate (duplicate) is included in the scope of supply of the heater and can be adhered as required in an easily visible position on the heater or near to the heater.

Please note!

The regulations and safety instructions to be observed for this chapter are stated on page 5.



① Original nameplate



3 Installation

Heater air system

The scope of supply of the universal kit includes three consoles for the hot air system with cable ties and a safety grid.

For other air conveying parts, see extra parts catalogue.



Danger!

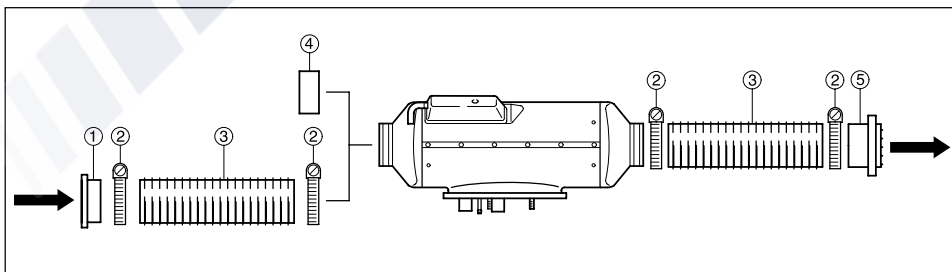
Risk of burning and injuries!

- 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.

Please note!

- The regulations and safety instructions to be observed for this chapter are on page 4 – 7.
- Note the equipment code in the technical data (page 10) when connecting up air-conveying parts.

Heater air system (example)



- ① Connection fitting with safety grid
- ② Hose clip
- ③ Flexible hose

- ④ Safety grid
- ⑤ Outflow



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, increased heater air temperatures or surface temperatures can occur immediately before the defect shutdown.
- 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).

3 Installation

Exhaust system

(Exhaust diagram see page 19)

Mounting the exhaust system

The scope of supply of the universal kit includes a flexible exhaust pipe, inner diameter 24 mm, 1300 mm long. The flexible exhaust pipe can be shortened by 20 cm or lengthened to max. 2 m depending on the installation conditions.

In addition, an exhaust silencer can be inserted in the exhaust system. Fasten the exhaust silencer to the vehicle at a suitable point. Route the flexible exhaust pipe from the heater to the exhaust silencer and fasten with a pipe clip.

Route the flexible exhaust pipe from the heater to the exhaust silencer and fasten with pipe clips.

Connect an exhaust end pipe to the exhaust silencer and fasten with a pipe clip.

After finishing all installation work, place an end sleeve on the exhaust end pipe.



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. \varnothing 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!

- The regulations and safety instructions to be observed for this chapter are 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.



3 Installation

Combustion air system

Mounting the combustion air system

The scope of supply of the heater includes a combustion air silencer which has to be mounted. The combustion air system can be extended up to max. 2 m if required with a connection pipe and a flexible combustion air hose, inner diameter 25 mm. (Order no. see extra parts catalogue).

Fasten the flexible combustion air hose to the heater with a pipe clip and to suitable places in the vehicle with hose clips or cable ties.

After completing all work, push an end sleeve over the flexible combustion air hose.

Please note!

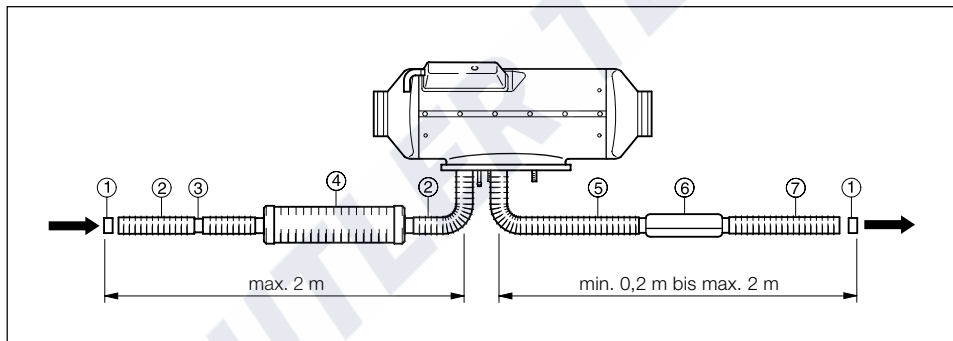
- The regulations and safety instructions to be observed for this chapter are on page 4 – 7.



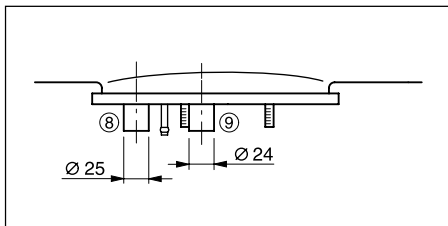
Caution!

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. \varnothing 5 mm at the lowest point to drain off condensation.



- ① End sleeve
- ② Combustion air hose, optional
- ③ Connection pipe, optional
- ④ Combustion air silencer
- ⑤ Flexible exhaust pipe, di = 24 mm
- ⑥ exhaust silencer, optional
- ⑦ exhaust pipe
- ⑧ combustion air connection
- ⑨ exhaust connection



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.

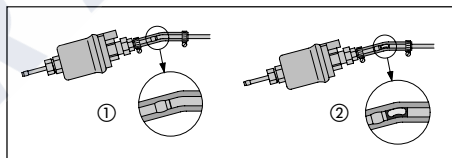
- Switch off the vehicle engine and heater before refuelling and before working on the fuel supply.
- No naked lights when handling fuel.
- Do not smoke.
- Do not inhale petrol fumes.
- Avoid any contact with the skin.

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!

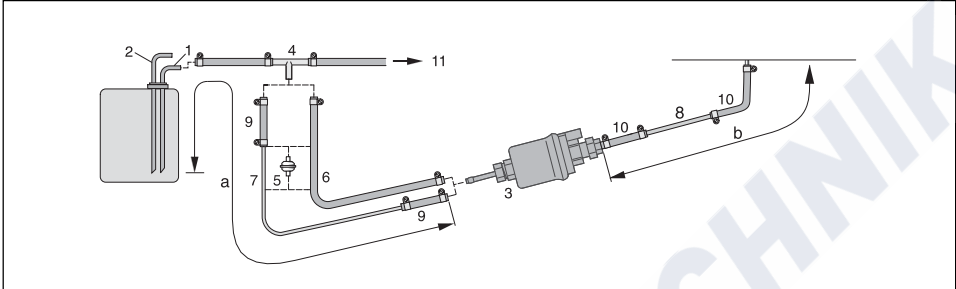
- The regulations and safety instructions to be observed for this chapter are on page 4 – 7.



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 Fuel return pipe to the tank connection
- ③ dosing pump
- ④ T-piece,
- ⑤ fuel filter – only necessary for contaminated fuel
- ⑥ fuel hose, 5 x 3 (di = Ø 5 mm)
- ⑦ fuel pipe, 6 x 2 (di = Ø 2 mm)
- ⑧ fuel pipe, 4 x 1,25 (di = Ø 1,5 mm)
- ⑨ fuel hose, 5 x 3 (di = Ø 5 mm), approx. 50 mm long
- ⑩ fuel hose, 3,5 x 3 (di = Ø 3.5 mm), approx. 50 mm long
- ⑪ to the engine, mechanical fuel or injection pump

Possible pipe lengths

Intake side
a = max. 2 m

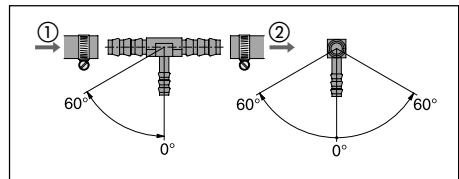
Pressure side
b = max. 4 m for petrol
b = max. 6 m for diesel

Please note!

- Insert T-piece ④ before the fuel pump in the fuel feed pipe.
- Item ⑤ is not included in the scope of supply "installation kit". Order no. see extra parts catalogue.

Installation position of the T-piece

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



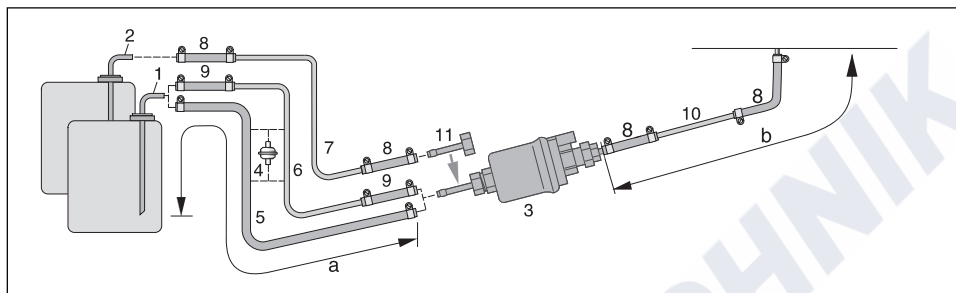
- ① direction of flow from the fuel tank
- ② direction of flow to the vehicle engine

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3 Installation

Fuel supply

Fuel feed point with tank connection – ascending pipe, integrated in the vehicle tank or in the tank fitting



- ① tank connection for metal tank –
di = Ø 2 mm, da = Ø 6 mm
- ② tank connection for tank fitting –
di = Ø mm, da = Ø 4 mm
- ③ dosing pump
- ④ fuel filter – only required for contaminated fuel
- ⑤ fuel hose, 5 x 3 (di = Ø 5 mm)
- ⑥ fuel pipe, 6 x 2 (di = Ø 2 mm)
- ⑦ fuel hose, 4 x 1 (di = Ø 2 mm)
- ⑧ fuel hose, 3,5 x 3 (di = Ø 3.5 mm),
approx. 50 mm long
- ⑨ fuel hose, 5 x 3 (di = Ø 2 mm),
approx. 50 mm long
- ⑩ fuel pipe, 4 x 1,25 (di = Ø 1.5 mm)
- ⑪ connection fitting, da = Ø 4 mm

Possible pipe lengths

Intake side

a = max. 2 m

Pressure side

b = max. 4 m for petrol

b = max. 6 m for diesel

Please note!

Items ② ⑦ ⑪ are included in the "tank connection" kit.



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. 2 bar, use a pressure reducer (order no. 22 1000 20 09 00) or separate tank connection.
- When the pressure in the fuel pipe is more than 2 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.

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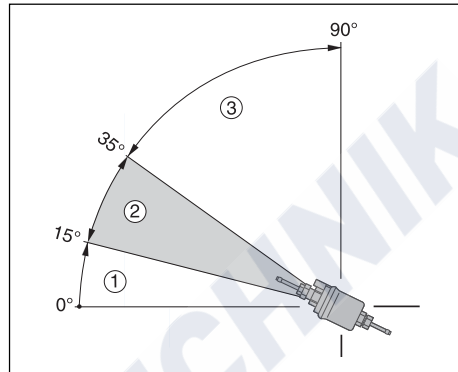


3 Installation

Fuel supply

Installation position of the dosing pump

Always mount the dosing pump with the pressure side rising upwards. Every installation position over 15° 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° to 35°
- ③ installation position in range 35° to 90° is allowed

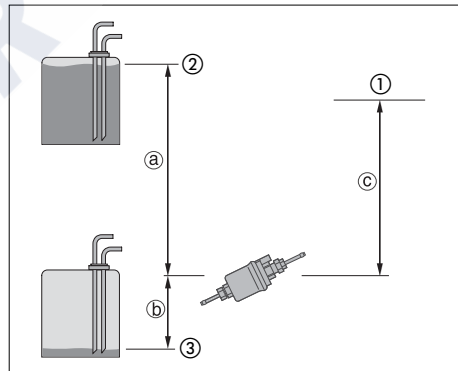
Possible suction and pressure height of the dosing pump

Pressure height from vehicle tank to dosing pump:
a = max. 3000 mm

Intake height in pressure-less vehicle tank:
b = max. 500 mm for petrol
b = max. 1000 mm for diesel

Intake height in vehicle tanks with withdrawal by negative pressure (valve with 0.03 bar in tank cap):
b = max. 150 mm for petrol
b = max. 400 mm for diesel

Pressure height of the dosing pump to the heater:
c = max. 2000 mm



- ① connection to heater
- ② max. fuel level
- ③ min. fuel level

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

3 Installation

Fuel supply

Fuel quality for petrol heaters

The heater can run on commercially available fuel as per DIN EN 228, as used in the vehicle tank.

Fuel quality for diesel heaters

The heater can run on commercially available diesel fuel as per DIN EN 590 as used in the vehicle tank.

Fuel for special cases

In special cases (above 0°C), the heater can also run on fuel oil EL or paraffin.

Fuel for low temperatures

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 bis -25 °C	100 %	---
-25 °C bis -40 °C	50 %*	50 % paraffin or petrol

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

Operation with biodiesel (PME)

The heater is certified for running on biodiesel as per DIN V 51606 in free-flowing state (is reduced at temperatures under 0°C).

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.!