



Eberspächer D3LC Air Heater Installation Manual

Installation instructions

Eberspächer

EN

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Air heater for petrol and diesel fuel, operating independently of the engine

Heater	Order number	Heater	Order number
B 3 L C, 12 V	20 1717 05 00 00	D 3 L C, 12 V	25 1867 05 00 00
		D 3 L C, 24 V	25 1844 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 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.
- Observe the regulations and safety instructions for this chapter, given on page 4 – 7.

Installing the 24 V heater in a vehicle for the transport of dangerous goods as per ADR / ADR99

Heaters (24 volt) are allowed to be installed in vehicles used for the transport of dangerous goods as per ADR / ADR99.

The heater fulfils the regulations of ADR / ADR99 with the corresponding electrical wiring, see circuit diagrams at the end of this manual.

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

Please note!

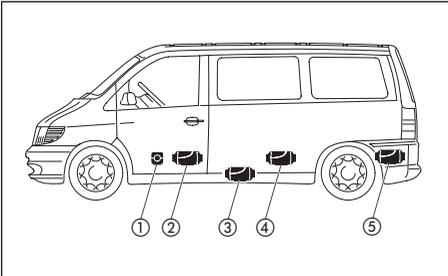
When the heater is to be installed in vehicles for the transport of dangerous goods, the regulations of ADR / ADR99 must be observed.

3 Installation

Installation location

Installation in a car or people carrier

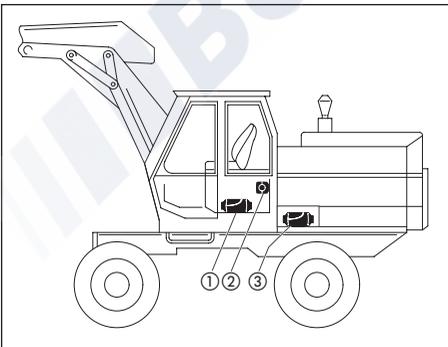
In a car or people carrier, the heater is preferably installed in the passenger compartment or boot. If it is not possible to install the heater in the passenger compartment or boot, the heater can also be mounted under the vehicle floor.



- 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

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 the safety housing

Installation in a truck

In a truck, the heater is preferably installed inside the driver's cab.

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



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

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.



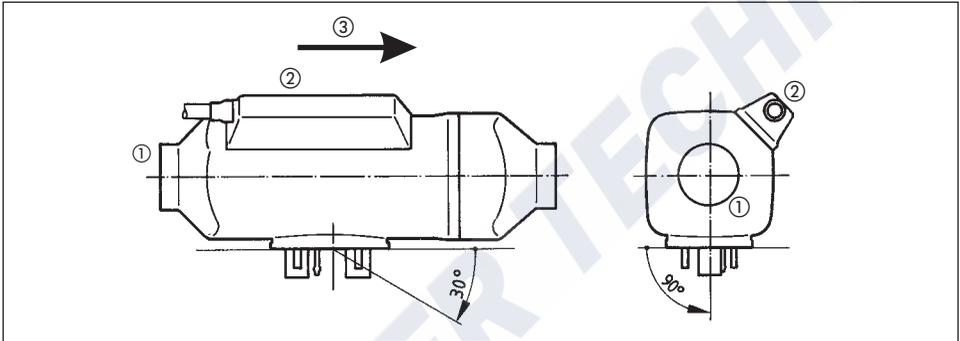
3 Installation

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

3 Installation

Mounting and fastening

Make the through-holes for exhaust, combustion air and fuel as shown in the drilling hole pattern.

The support surface for the heater foot must be flat. An appropriate tool can be purchased from the manufacturer for drilling the through-holes and also smoothing the support surface.

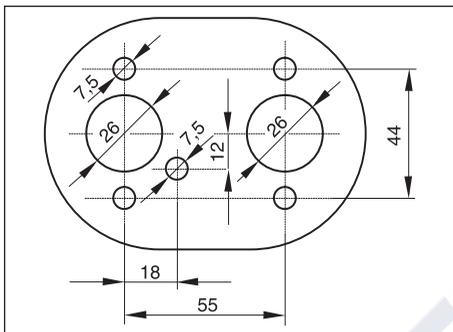
The \varnothing 10.5 mm hole for the "dosing pump" cables is not included in the drilling hole pattern and must be drilled depending on the installation.

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

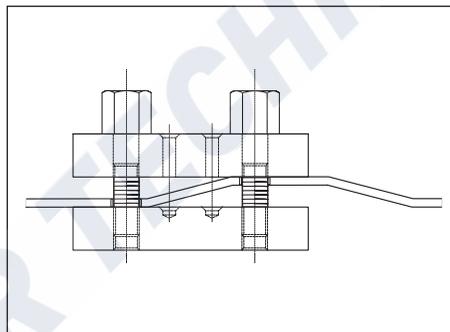
Order no: reinforcement plate 20 1577 89 00 03

Order no: special tool 99 1201 46 53 29

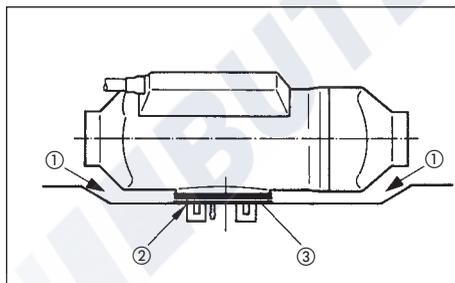
Drilling hole pattern



Special tool

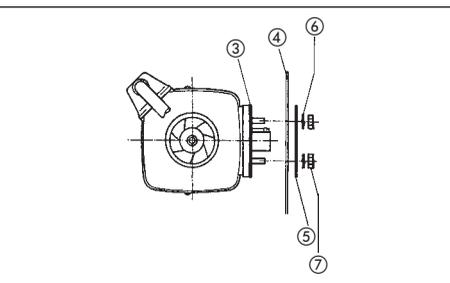


Fastening the unit on the vehicle floor



- 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)



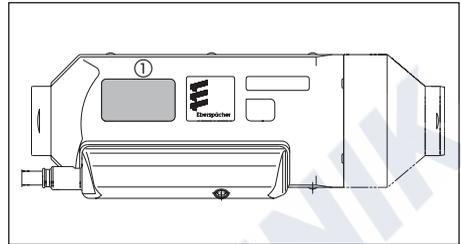
3 Installation

Nameplate

The nameplate is fixed on the upper jacket shell. The 2nd nameplate (duplicate) is included in the heater's scope of supply and, if necessary, can be stuck onto an easily visible place on the heater or in the area of 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 universal installation kit includes a flexible pipe, an outflow and a safety grid for the heater air system.



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.



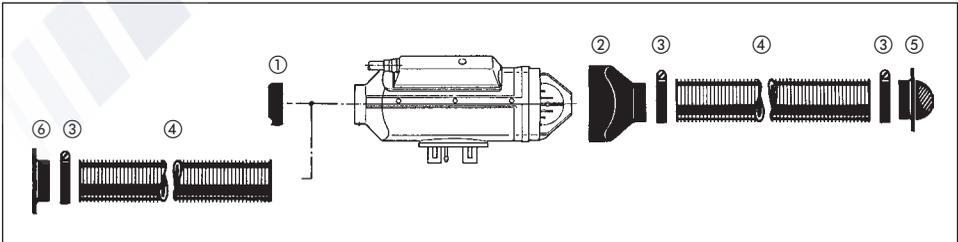
Caution!

- 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. 80 °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.

Please note!

- Comply with the regulations and safety instructions for this chapter given on page 4 – 7.
- When routing the hot air system, comply with the guide numbers of the heater and the air duct parts in the accessories catalogue.

Heater air system (example)



① Safety grid

② Outlet hood, Ø 75 mm / Ø 90 mm

③ Hose clip

④ Flexible hose, Ø 75 mm / Ø 90 mm

⑤ Rotating outflow

⑥ Connection fitting with safety grid



3 Installation

Exhaust system

Mounting the exhaust system

The universal installation kit includes a flexible exhaust pipe, inner \varnothing 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.

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

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

(Exhaust diagram see page 18).



Caution!

Safety instructions!

The whole exhaust system gets very hot during and immediately after the heater has been working.

This is why the exhaust system must be routed according to these installation instructions

- The exhaust pipe 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 be 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 why the exhaust system must be routed according to these installation 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 given on page 4 – 7.

3 Installation

Combustion air system

Mounting the combustion air system

The universal installation kit includes a flexible combustion air intake silencer, inner $\text{\O} 25$ mm. The flexible combustion air intake silencer can be extended with a combustion air hose to max. 2 m depending on the installation conditions.

Fasten the combustion air intake silencer to the heater with a pipe clip and at suitable points with hose clips or cable ties.

After finishing the work, put an end sleeve on the combustion air intake silencer.

Order No. for the combustion air hose: see spare parts catalogue.

Please note!

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

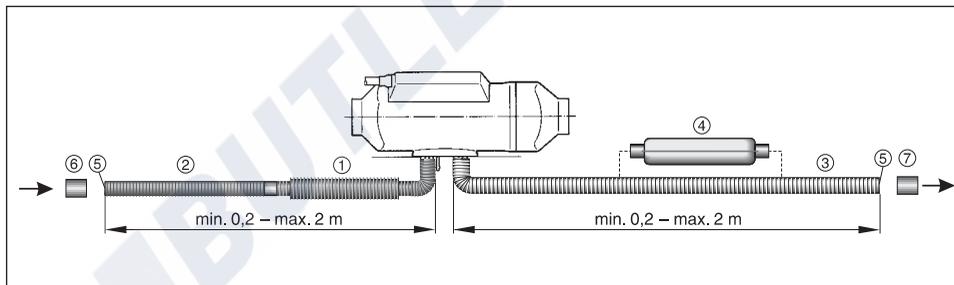


Caution!

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. $\text{\O} 5$ mm at the lowest point to drain off condensation.

Exhaust and combustion air circuit



- ① Combustion air silencer
- ② Combustion air hose, $d_i = 25$ mm, optional
- ③ Flexible exhaust pipe, $d_i = 24$ mm
- ④ Exhaust silencer, optional
- ⑤ Intake / outlet opening – protect from wind, snow, dirt and water
- ⑥ End sleeve for the combustion air silencer or combustion air hose
- ⑦ End sleeve for flexible exhaust pipe



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.

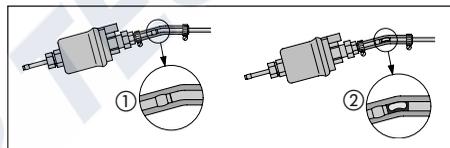


Caution!

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.

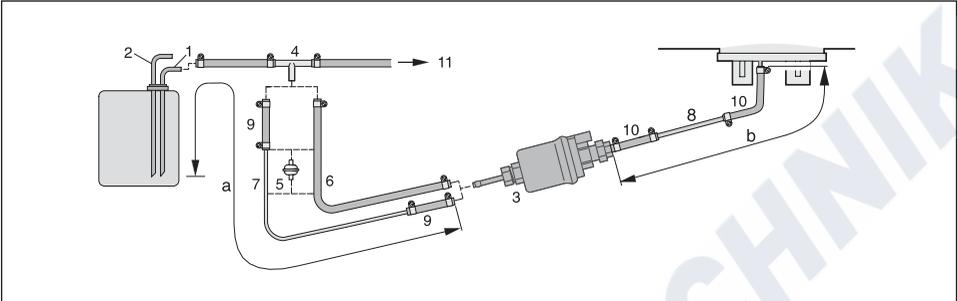
Please note!

Comply with the regulations and safety instructions for this chapter given 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 from tank connection
- ③ Dosing pump
- ④ T-piece, 8-6-8
- ⑤ Fuel filter – only necessary for contaminated fuel.
- ⑥ Fuel hose, 5 x 3 (di = Ø 5 mm), max. 150 mm long
- 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), ca. 50 mm long
- ⑩ Fuel hose, 3.5 x 3 (di = Ø 3.5 mm), ca. 50 mm long
- ⑪ To the engine, mechanical fuel or injection pump.

Permissible pipe lengths for petrol heater

Intake side	Pressure side
a = max. 2 m	b = max. 4 m

Permissible pipe lengths for diesel heater

Intake side	Pressure side
a = max. 5 m	<ul style="list-style-type: none"> • For suction pipe di= Ø 2 mm b = max. 6 m • For suction pipe di= Ø 5 mm b = max. 10 m

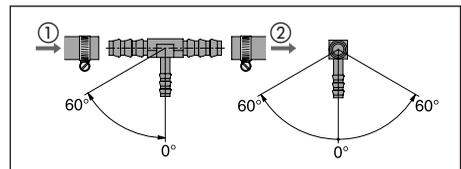
Please note!

Insert the T-piece ④ before the feed pump in the fuel feed pipe.

Item ⑤ is not included in the "installation set", see additional parts catalogue for Order No.

Installation position of the T-piece

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



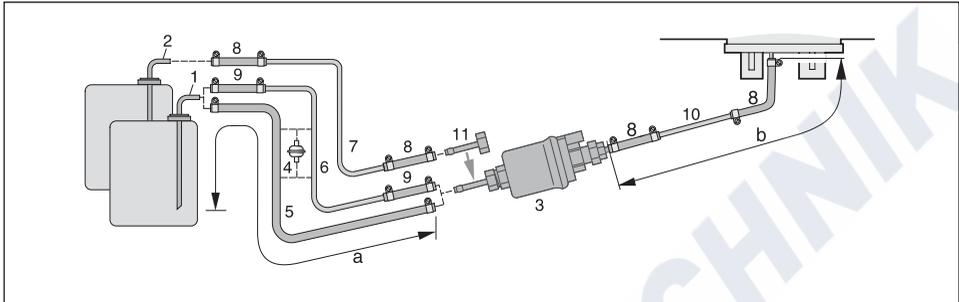
- ① Direction of flow from the fuel tank
- ② Direction of flow to the vehicle engine



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 2 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 pipe, 4 x 1 (di = Ø 2 mm)
- ⑧ Fuel hose, 3,5 x 3 (di = Ø 3.5 mm),
ca. 50 mm long
- ⑨ Fuel hose, 5 x 3 (di = Ø 5 mm), ca. 50 mm long
- ⑩ Fuel pipe, 4 x 1.25 (di = Ø 1.5 mm)
- ⑪ Connection fitting, da = Ø 4 mm

Permissible pipe lengths for petrol heater

Intake side	Pressure side
a = max. 2 m	b = max. 4 m

Permissible pipe lengths for diesel heater

Intake side	Pressure side
a = max. 5 m	<ul style="list-style-type: none"> • For suction pipe di= Ø 2 mm b = max. 6 m • For suction pipe di= Ø 5 mm b = max. 10 m

Please note!

Items ② ⑦ ⑪ are included in the "tank connection" setup kit, see additional parts catalogue for Order No. Item ⑤ is not included in the "installation set", see additional parts catalogue for Order No.



Caution!

Safety instructions for the fuel supply

- The fuel must not be conveyed by gravity or overpressure in the fuel tank.
- Withdrawal of the 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 a 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.

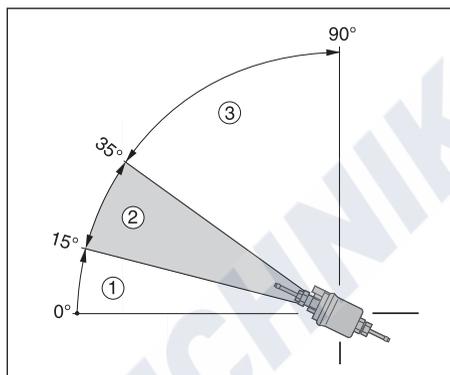
3 Installation

Fuel supply

Installation position of the dosing pump

Always mount the dosing pump with the pressure side rising upwards.

Every installation position over 15° is allowed, although an installation position between 15° and 35° is preferable.



- ① Installation position between 0° – 15° is not allowed.
- ② Preferred installation position in range 15° to 35°.
- ③ Installation position in range 35° to 90° is allowed.

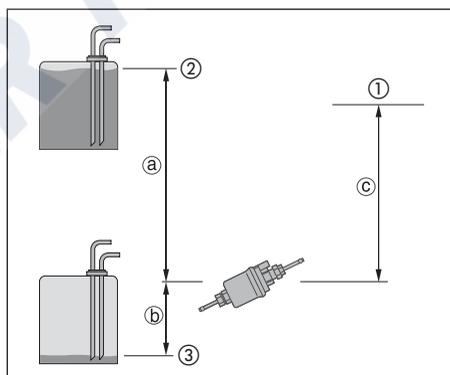
Possible suction and pressure height of the dosing pump

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 pump 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

The heater can easily run on the commercially available fuel you use for your engine.

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	Winter diesel	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)

Operation with bio diesel (PME)

The heater D 3 L C is certified for operation with bio diesel as per DIN V 51606 in flowing state.

Please note!

- The fluidity of bio diesel decreases at temperatures below 0 °C.
- When using 100 % bio diesel, the heater should be operated twice a year with diesel fuel (in the middle and at the end of a heating period) to burn off any possible PME deposits. To do so, let the vehicle tank run almost empty and fill with diesel fuel without adding any bio diesel. 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 / bio diesel mixtures of up to 50 % bio diesel, intermediate operation with pure diesel fuel is not necessary.

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.!