

INSTALLATION INSTRUCTIONS

AIRTRONIC S2 COMMERCIAL

AIRTRONIC M2 COMMERCIAL / AIRTRONIC M2 RECREATIONAL



The technical description and installation instructions are valid for the following engine-independent air heaters:

Air heaters for diesel fuel

	Order No.
Airtronic S2, D2L, 12 V	25.2721.05.0000
Airtronic S2, D2L, 24 V	25.2726.05.0000
Airtronic M2, D4L, 12 V	25.2720.05.0000
Airtronic M2, D4L, 24 V	25.2729.05.0000
Airtronic M2, D4R, 12 V	25.2746.05.0000

Air heaters for petrol

	Order No.
Airtronic M2, B4L, 12 V	20.1987.05.0000

3 Installation

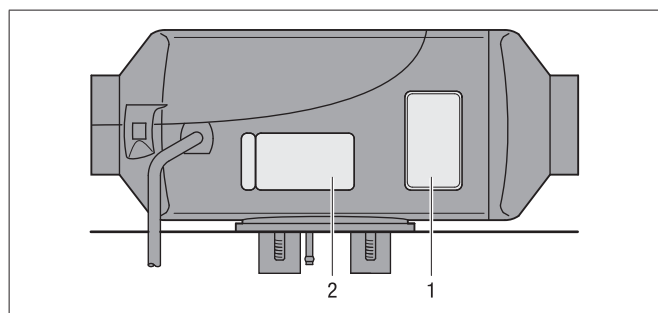
3.1 Nameplate

The nameplate and the 2nd nameplate (duplicate) are fixed to the side of the bottom jacket shell.

The 2nd nameplate (duplicate) is attached to the bottom jacket shell, and can be pulled off; if necessary it can be stuck onto an easily visible place on the heater or in the area of the heater.

i Note

Note and follow the regulations and safety instructions for this chapter on page 6.



- 1 Original nameplate
- 2 2nd nameplate (duplicate)

3.2 Installation and mounting position

The heater is suitable and approved for installation in vehicle interiors used by people.

The heater is fixed by its heater flange and the mounted flange seal directly onto the floor of the vehicle or onto a suitable place on the rear panel of the vehicle.

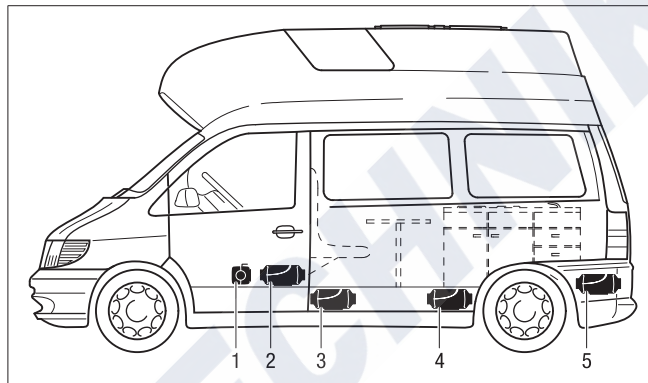
i Note

- Detachable connections of exhaust, combustion air and fuel lines are not permissible for installation in the vehicle interior.
- The flange seal must be mounted on the heater, to seal the openings for the exhaust, combustion air and fuel lines.
- Installation in the driver's cab or passenger compartment of coaches or buses with more than 9 seats (8 seats + driver's seat) is not allowed.
- When installing the heater, always ensure that there is sufficient clearance left for intake of the hot air and for dismantling the glow plug and control box (on page 15 "Main dimensions").
- Note and follow the regulations and safety instructions for this chapter from page 6.

3.3 Installation in a camper van

In a camper van the heater is preferably installed in the vehicle interior (passenger compartment) or in the boot.

If it is not possible to install the heater in the passenger compartment or boot, the heater can also be mounted, protected from splashing water, on the underside of the vehicle floor.

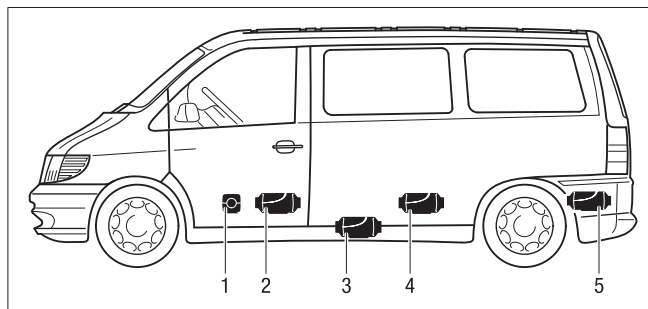


- 1 Heater in front of the passenger seat
- 2 Heater between the driver's seat and the passenger seat
- 3 Heater under the vehicle floor
- 4 Heater in living space
- 5 Heater in the boot

3.4 Installation in a car or people carrier

In a car / people carrier, the heater is preferably installed in the vehicle interior (passenger compartment) or in the boot.

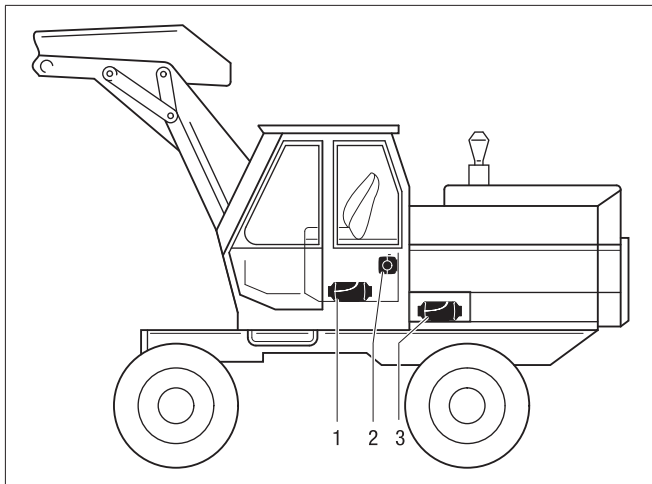
If it is not possible to install the heater in the passenger compartment or boot, the heater can also be mounted, protected from splashing water, on the underside of the vehicle floor.



- 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

3.5 Installation in an excavator cab (only diesel heaters)

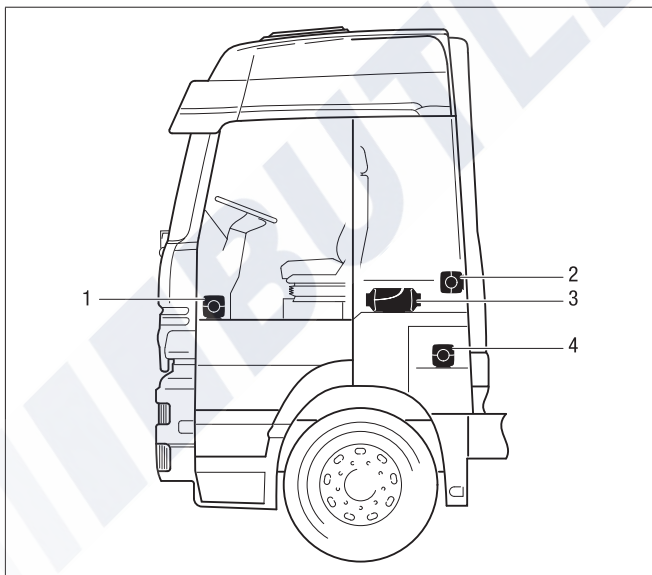
In an excavator, the heater is preferably installed in the cab. If it is not possible to install the heater in the cab, the heater can also be installed in a storage box outside the cab.



- 1 Heater in the seat box
- 2 Heater on the cab rear wall
- 3 Heater in the safety housing

3.6 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

i Note

- The installation suggestions made in the installation instructions are examples. Other installation locations are possible if they comply with the installation requirements stated in these installation instructions.
- Further installation information (e.g. for boats and ships) is available from the manufacturer on request.
- Note and observe the allowable installation positions together with the operating and storage temperatures.

3.7 Permissible installation positions

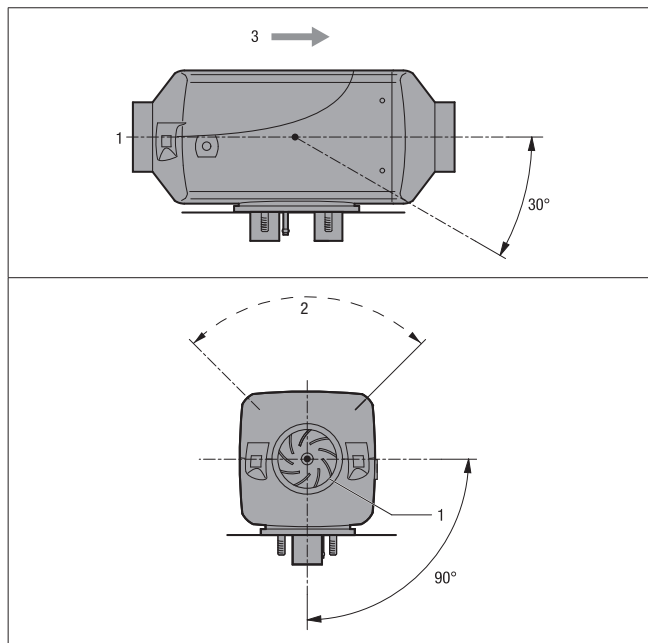
The heater should be preferably installed in the normal position – as shown in the drawing.

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!), as shown in the drawing.

i Note

In heating mode, the standard or maximum installation positions shown can differ by up to +15° in all directions, due to tilted vehicle or boat positions, without impairing the heater's function.

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

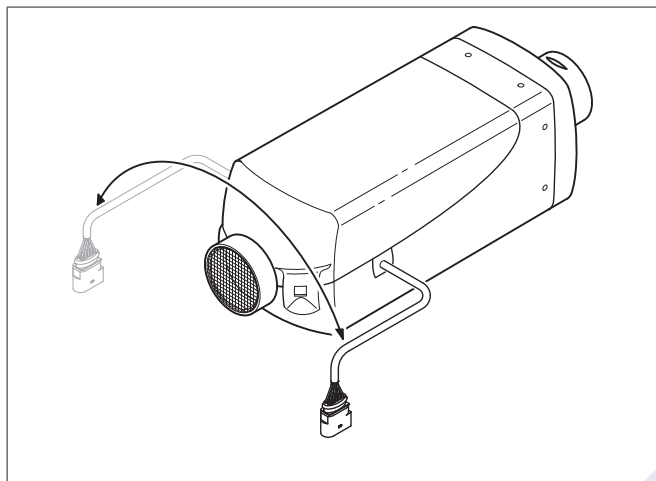


- 1 Hot air intake opening (impeller)
- 2 Position of the glow plug
- 3 Direction of flow

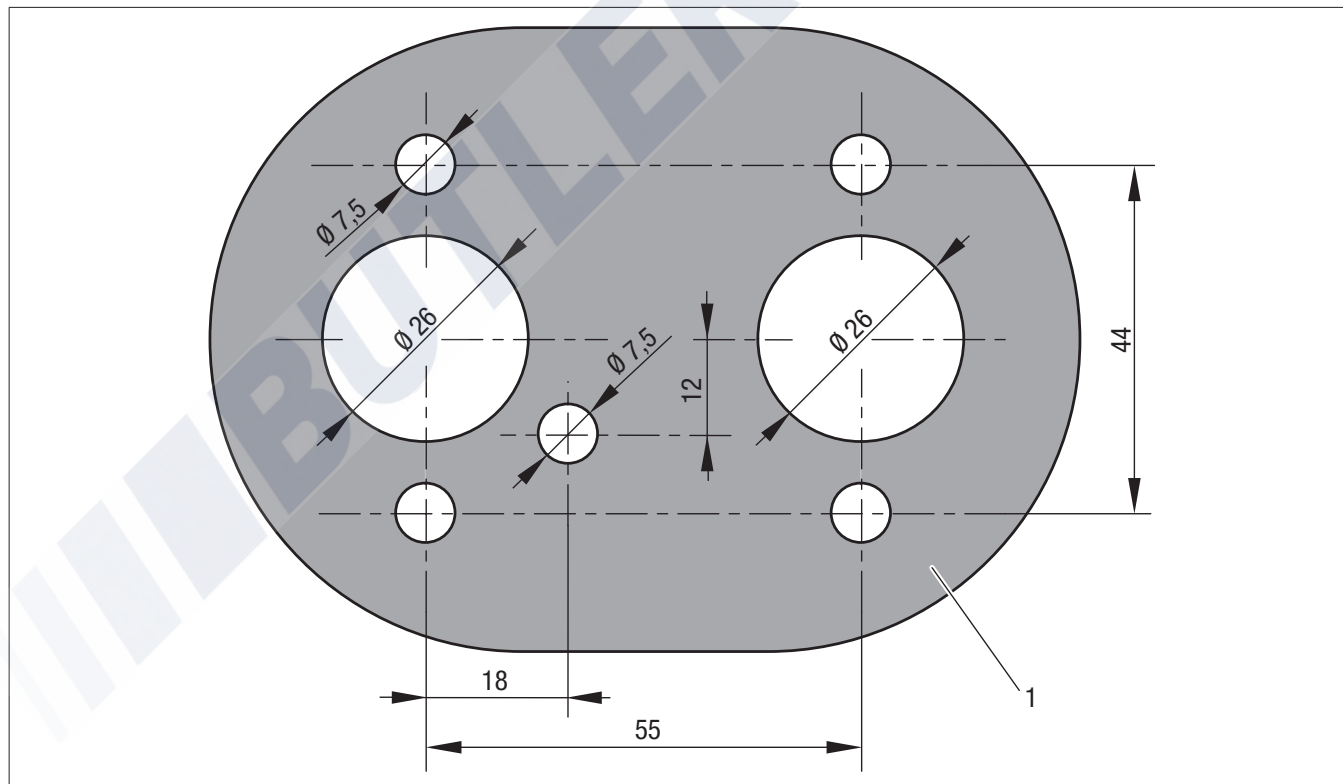
3.9 Cable harness connection, optionally right or left-hand

If necessary, the cable harness connection can be changed over to the opposite side of the heater. To do this, the control box must be removed and the bottom semi-circular cable harness cover unclipped.

Then re-install the control box, put on the jacket shell, at the same time inserting the cable harness grommet and the blanking plugs in the corresponding recesses in the bottom jacket shell.



Drilling hole pattern



1 Contour of the support surface

i Note

The hole pattern is used as a drilling template (printout 1:1).

3.10 Installation and fixing

Make the through-holes for exhaust, combustion air and fuel to match the drilling hole pattern.

The support surface for the heater base must be flat.

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

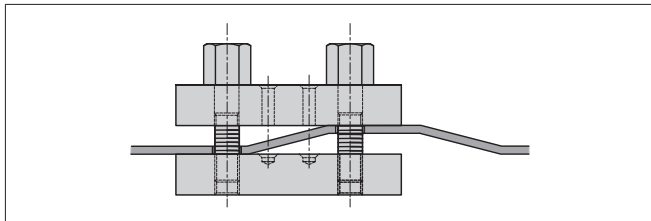
The \varnothing 10.5 mm hole for the “metering pump” cables is not included in the drilling hole pattern and must be drilled depending on the installation.

If the sheet metal of the support surface is <1.5 mm thick, an additional reinforcement must be installed.

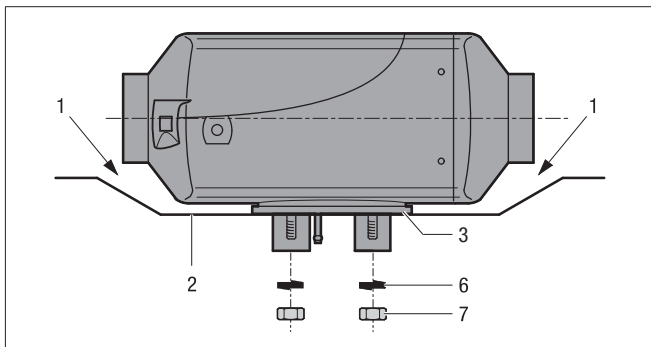
Order No. – reinforcement plate 20 1577 89 00 03

Order No. – special tool 99 1201 46 53 29

Special tool

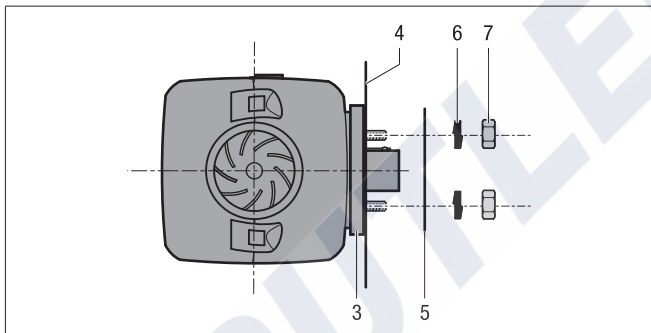


Mounting the heater on the vehicle floor



- 1 There must be sufficient clearance between the heater and the vehicle floor – also check that the impeller runs freely.
- 2 The mounting surface must be flat.
- 3 The flange seal must be fitted.

Fasten the heater horizontally to the vehicle wall



- 4 The vehicle wall must be flat.
- 5 Reinforcement plate (if required, for Order No. see above)
- 6 Spring lock washer
- 7 M6 hexagon nut (tightening torque 5+1 Nm)

3.11 Hot air system

The scope of supply of the universal installation kit does not include any air system parts. These must be ordered separately.

Order No. see product information.

Danger!

Risk of burning and injuries!

- The hot air system hoses and the hot air outlet are to be laid and fastened in such a way that they do not pose a risk to people, animals or materials sensitive to temperature due to radiation / contact or direct blowing. If necessary, a cover is to be fitted over the hot air ducting and / or the hot air outlet.
- The outlet hood must be fitted on the hot air outflow side.
- If no air hoses are fitted, a safety grille must be fitted to the hot air intake side and outflow side, to prevent injuries from the heater fan or burns from the heat exchanger.
- High temperatures occur in the hot air system while the heater is running and immediately afterwards. This is why it is important to avoid working in the vicinity of the hot air system while the heater is running. In such cases, switch off the heater beforehand and wait until all parts have completely cooled down. If necessary, wear safety gloves.

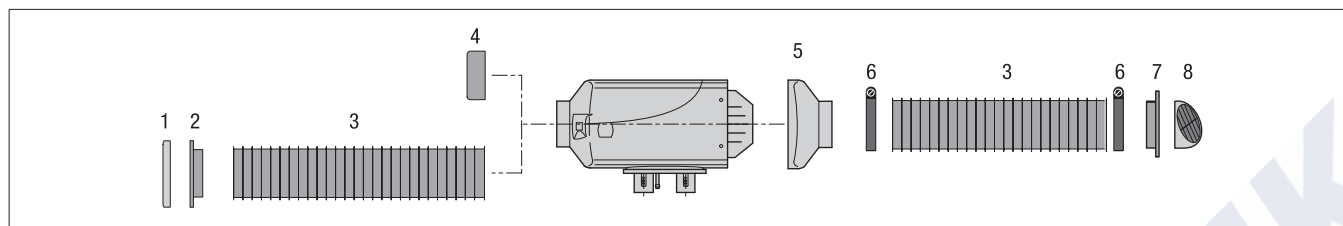
Note

- It is not permitted to mount a connector on the Airtronic M2 D4R.
- Assembling the Airtronic M2 D4R it is mandatory to mount a flexible heating air hose length of min. 2 m at the hot air outlet.
- Note and follow the regulations and safety instructions for this chapter from page 6.
- When connecting parts which conduct air (air system parts), observe the heater code number given in "Using universal installation kits" on page 9.

Warning

- The hot 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 hot air to be contaminated with dust, salt spray, etc.
- For circulating air mode, position the circulating air intake in such a way that the outflowing hot air cannot be directly sucked in again.
- In the event of a fault due to overheating, local heating air temperatures up to max. 150 °C can occur directly before the shutdown on faults.
- If the driver and/or passengers could come into contact with the heater or parts carrying heating air, suitable protection against contact must be attached in these places.

Hot air system (example)



- 1 Safety grille
- 2 Connection sockets, intake side
- 3 Flexible pipe
- 4 Safety grille

- 5 Connection sockets, discharge side
- 6 Hose clip
- 7 Connection socket
- 8 Air outlet, rotatable

i Note

- Note and follow the regulations and safety instructions for this chapter from page 6.
- When connecting air system parts, note the heater rating, on page 9.
- For important notes on the air system, the heater ratings and the ratings for air system parts, please refer to the "Product Information" document.

i Note

- In case of critical installation conditions, we recommend securing the flexible tubing with an additional hose clip at the pipe connection socket.
- Plastic sheathed hot air hoses with wire inlay must be fixed onto the pipe connection socket with a hose clip.
- Tightening torque for hose clip = 3 Nm.

3.12 Mounting the air outlets and pipe connection sockets

Cutting out the opening for the connection sockets

Use a keyhole saw to cut out an opening for the connection socket at the planned place of installation (vehicle floor or wall).

Pipe connection socket \varnothing 60 mm – keyhole saw \varnothing 68 mm

Pipe connection socket \varnothing 75 mm – keyhole saw \varnothing 92 mm

Pipe connection socket \varnothing 90 mm – keyhole saw \varnothing 92 mm

Fixing the pipe connection socket

Insert the pipe connection socket in the drillhole. Mark and drill three fixing holes \varnothing 2 mm.

Use 3 self-tapping screws DIN 7981 3.9×13 to fix the connection sockets.

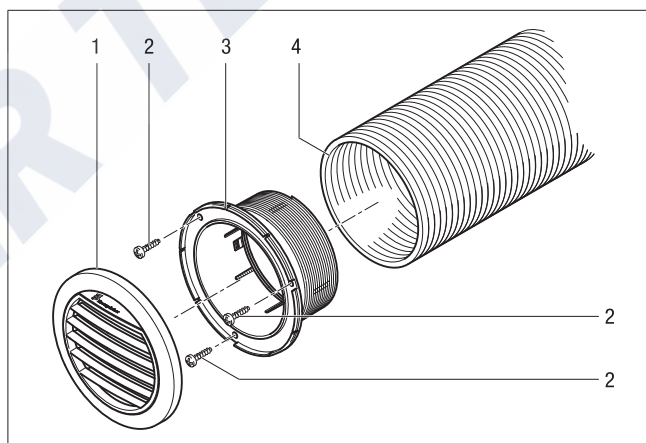
Fix air outlet onto the pipe connection socket

Clip the corresponding air outlet onto the pipe connection socket.

Installing flexible tubing on the pipe connection socket

Turn or latch the flexible tubing onto the thread of the pipe connection socket.

It is not necessary to use a hose clip to fix the tubing onto the pipe connection socket.



- 1 Outflow
- 2 Self-tapping screw
- 3 Connection socket
- 4 Flexible pipe

3.13 Installing the air blocking element

⚠ Caution
Risk of overheating!

Blocking the hot air can cause overheating of the heater; the heater is switched off by the protection against overheating.

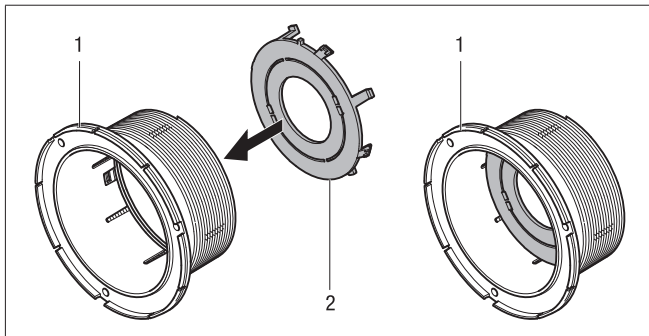
- The air blocking element may only be used in multi-duct air systems.

The air blocking element is clipped into the pipe connection socket, discharge side. This reduces the cross-section of the pipe connection socket and reduces the quantity of air flow.

The air blocking element consists of two rings; the inner ring can be broken out.

1 ring = low air blocking / 2 rings = high air blocking

The air blocking element is available in sizes \varnothing 75 mm and \varnothing 90 mm (Order No. see product information).



- 1 Connection sockets, discharge side
2 Air blocking element

3.14 Exhaust system

Installing the exhaust system

The universal installation kit includes

- a flexible exhaust pipe, inside- \varnothing 24 mm, L = 900 mm,
- a flexible exhaust pipe, inside- \varnothing 24 mm, L = 300 mm, with end piece
- 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.

Lay the flexible exhaust pipe from the heater to the exhaust silencer and fasten with pipe clips (tightening torque: 6 ± 1 Nm).

Use a pipe clip (tightening torque 6 ± 1 Nm) to fix a short exhaust end pipe (with end sleeve) to the exhaust silencer.

Warning!

Safety instructions for the exhaust system!

The whole exhaust system gets very hot while the heater is running and immediately afterwards.

This is why the exhaust system must always be routed as described in these installation instructions.

- The exhaust pipe must end in the open air.
- Lay the exhaust system so
 - that outflowing exhaust gases cannot be drawn into the fresh air intake of the vehicle or heater.
 - that outflowing exhaust gases cannot be drawn in as combustion air.
- The exhaust outlet mouth must end at a minimum height of 20 cm above the floor. Particular caution is required during installation in areas where readily flammable materials could exist in the area of the exhaust outlet mouth during heater operation, e.g. in forestry machines above dry grass, leaves or similar.

- The exhaust pipe and exhaust outlet mouth may not protrude beyond the limits of the vehicle.
- Lay the exhaust pipe sloping slightly downwards.
- Important functional parts of the vehicle may not be impaired (maintain sufficient clearance).
- Mount the exhaust pipe with sufficient clearance to heat-sensitive parts. Pay particular attention to fuel pipes (made of plastic or metal), electrical cables and brake hoses etc.!
- Exhaust pipes must be safely fixed (recommended clearance of 50 cm) to avoid damage from vibrations.
- The mouth of the exhaust pipe must not become clogged with dirt and snow.
- Do not point the mouth of the exhaust pipe in the direction of travel.
- Always fix 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 always be routed as described in these installation instructions.

- Do not perform any work on the exhaust system while the heater is working.
- Before working on the exhaust system, switch off the heater first and wait until all the parts have completely cooled down, wear safety gloves if necessary.
- Do not inhale exhaust fumes.

Note

Note and follow the regulations and safety instructions for this chapter from page 6.

- The exhaust pipe end should be much shorter than the flexible exhaust pipe from the heater to the exhaust silencer.
- Small arrows indicating the flow direction are cast into the connection sockets to differentiate between the combustion air and exhaust air connection socket at the heater (see sketch on page 22).
- To avoid contact corrosion, the clips for fixing the exhaust pipe must be made of stainless steel. Please refer to the product information for the Order No. of the stainless steel fixing clips.

3.15 Combustion air system

3.15.1 Mounting the combustion air system

The universal installation kit includes a flexible combustion air hose, inside \varnothing 25 mm, 1000 mm long.

The flexible combustion air hose can be shortened to 20 cm or lengthened to max. 2 m, depending on the installation conditions.

- Fasten the combustion air intake silencer to the heater with a pipe clip (tightening torque $3^{+0.5}$ Nm) and at suitable points with hose clips or cable ties.
- After installing the hose, push on an end sleeve.
- Use a pipe clip (tightening torque $3+0.5$ Nm) to fix the flexible connection hose to the heater and use hose clips or cable ties to fix the combustion air intake silencer in suitable positions.
- After installing the hose, push on an end sleeve.

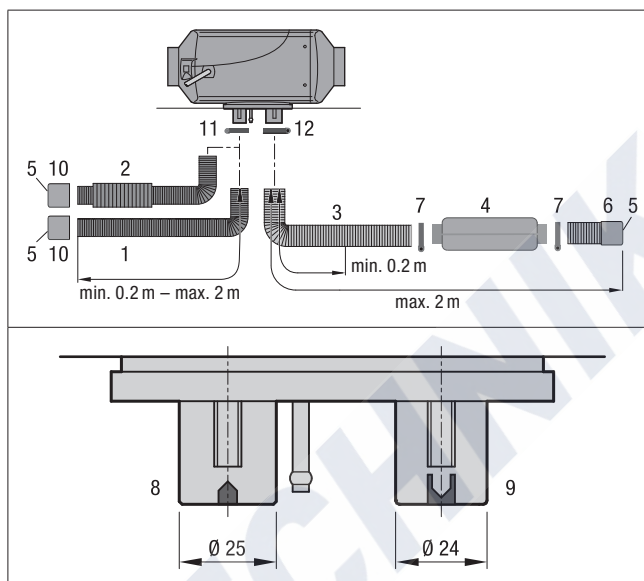
Note

- Instead of the combustion air hose, a combustion air intake silencer can be installed for Airtronic S2 and Airtronic M2 heaters to reduce noise. For Order No. please refer to product information.
- Note and follow the regulations and safety instructions for this chapter from page 6.

Warning!

Safety instructions for the combustion air system

- Lay the combustion air inlet so
 - that exhaust gases cannot be drawn in as combustion air.
 - that fuel fumes that may occur cannot be drawn into the fresh air intake of the vehicle or heater.
 - The combustion air opening must remain free at all times.
-
- Do not direct the combustion air intake against the vehicle's airstream.
 - The combustion air inlet must not become clogged with dirt and snow.
 - Lay the combustion air system sloping slightly downwards. If necessary, make a drain hole of approx. \varnothing 5 mm at the lowest point to drain off condensation.
 - If necessary, use fastening clips or cable ties to fix the flexible combustion air hose to the vehicle in suitable places.



- 1 Combustion air hose, di = 25 mm
- 2 Combustion air intake silencer
- 3 Exhaust pipe, di = 24 mm
- 4 Exhaust silencer
- 5 Inlet and outlet opening – protect from wind, snow, dirt and water
- 6 End sleeve, exhaust gas
- 7 Hose clip
- 8 Combustion air connection socket
- 9 Exhaust connection socket
- 10 End sleeve, combustion air
- 11 Hose clip
- 12 Exhaust pipe clip

3.16 Fuel supply

Installing the metering pump, laying the fuel pipes and installing the fuel connection.

The following safety instructions must always be observed when installing the metering pump, laying the fuel lines and installing the fuel tank.

Deviations from the instructions stated here are not allowed. Failure to comply can result in malfunctions.

Danger!

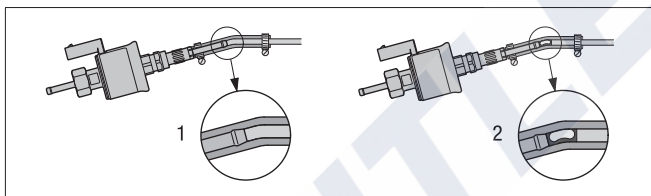
Risk of fire, explosion, poisoning and injury!

Caution when handling fuel.

- Switch off the vehicle engine and the heater before refuelling and before working on the fuel supply.
- Avoid naked flames when handling fuel.
- Do not smoke.
- Do not inhale petrol fumes.
- Avoid any contact with the skin.

 **Caution!**
Safety instructions for laying the fuel lines!

- Use a sharp knife only to trim the fuel hoses and pipes. Interfaces must not be crushed (pressed in) and must be free of burrs.
- Wherever possible, lay the fuel lines from the metering pump to the heater with a continuous rise.
- Fuel lines must be securely fixed to avoid damage and / or noise due to vibrations (recommended guideline value: clearance of around 50 cm).
- Fuel lines must be protected against mechanical damage.
- Lay the fuel lines so that any twisting of the vehicle, engine movements, etc. do not have a disadvantageous effect on their durability.
- Secure all hose connections in the fuel supply with hose clips (tightening torque $1^{+0.2}$ Nm).
- Parts carrying fuel must be protected from interfering heat.
- Never route or fasten the fuel lines directly along the heater or vehicle exhaust system. In case of crossing, always pay attention to sufficient thermal spacing; if necessary attach heat deflection plates or attach a protective hose (Order No. protective hose, see product information).
- Dripping or evaporating fuel must never be allowed to collect on hot parts or ignite on electric equipment.
- When connecting fuel lines with a fuel hose, always install the fuel lines with a butt joint to prevent any bubbles from forming.



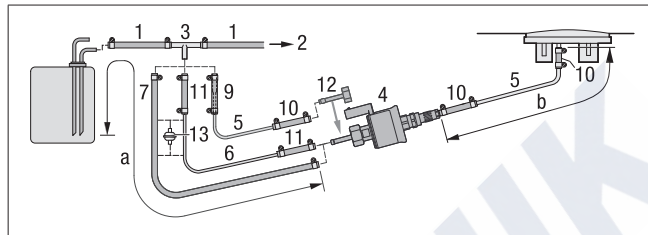
- 1 Correct laying of the fuel lines
- 2 Incorrect laying of fuel lines – bubbles form

Safety instructions for fuel lines and fuel tanks in buses and coaches

- In buses and coaches, fuel lines 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 immediate danger if a fire occurs.

 **Note**

- Note and follow the regulations and safety instructions for this chapter from page 6.
- For noise reasons, do not rigidly fix fuel pipes to components that transfer structural-borne sound.
To reduce noise, a sponge rubber hose can be pushed over the fuel pipes.

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

- 1 Fuel return line, vehicle tank
- 2 To the vehicle engine, mechanical fuel or injection pump
- 3 T-piece, 8-4-6
- 4 Metering pump
- 5 Fuel pipe, 4 x 1 (di = Ø 2 mm)
- 6 Fuel pipe, 6 x 2 (di = Ø 2 mm)
- 7 Fuel hose, 5 x 3 (di = Ø 5 mm)
- 9 Adapter Ø 4.5 / 3.5
- 10 Fuel hose, 3.5 x 3 (di = Ø 3.5 mm), approx. 50 mm long
- 11 Fuel hose, 5 x 3 (di = Ø 5 mm), approx. 50 mm long
- 12 Connection socket $d_a = \text{Ø } 4$ mm
- 13 Fuel filter – only required for contaminated fuel.

Permissible line lengths

Intake side

Airtronic S2 a = max. 5 m

Airtronic M2 a = max. 2 m

Pressure side

Diesel heaters

For intake line di = Ø 2 mm, b = max. 6 m

For intake line di = Ø 5 mm, b = max. 10 m

Petrol heater

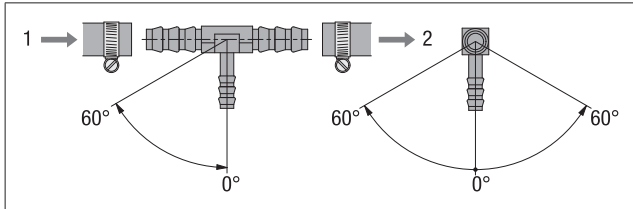
b = max. 4 m

 **Note**

- Insert T-piece 3 into the fuel return line upstream of the fuel pump.
- Item 5 is included in the universal installation kit.
- Item 6, 7 and 13 must be ordered separately. For Order No. please refer to product information.

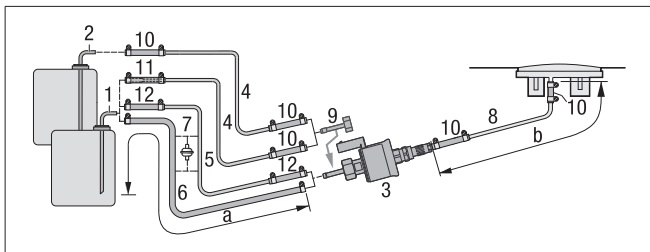
Installation position of the T-piece

When installing a T-piece, comply with the installation positions shown in the sketch.



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

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 Metering pump
- 4 Fuel pipe, 4 x 1 (di = Ø 2 mm)
- 7 Fuel filter – only required for contaminated fuel.
- 9 Connection fitting, da = Ø 4 mm
- 10 Fuel hose, 3.5 x 3 (di = Ø 3.5 mm), approx. 50 mm long

Permissible line lengths

Intake side

- Airtronic S2 a = max. 5 m
 Airtronic M2 a = max. 2 m

Pressure side

Diesel heaters

- For intake line di = Ø 2 mm, b = max. 6 m
 For intake line di = Ø 5 mm, b = max. 10 m

Petrol heater

- b = max. 4 m

Note

- Item 2, 4, 8, 9 and connection parts are included in the "Tank connection" upgrade kit, Order No. 22 1000 20 13 00
- Item 6 and 7 must be ordered separately, refer to product information for the order No.
- When installing tank connection maintain a minimum distance of 50 ± 2 mm from the end of the riser to the bottom of the tank.
- Contact the vehicle manufacturer before installing the tank connection in a metal tank.

⚠ Caution

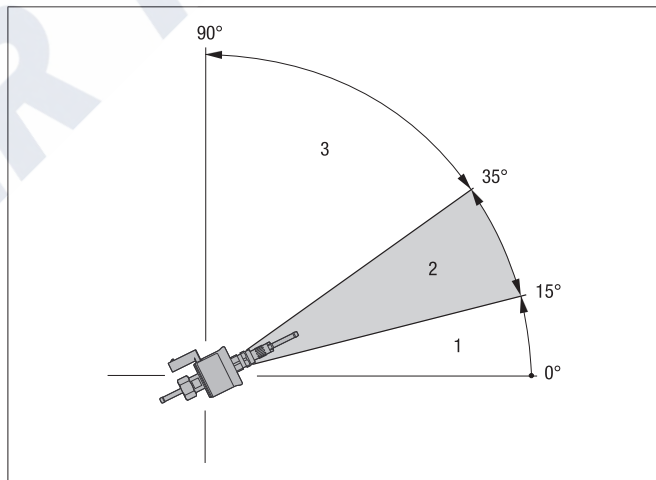
Safety instructions for laying the fuel lines!

- The fuel must not be discharged by means of gravity or overpressure in the fuel container.
- It is not permitted to extract fuel downstream of the vehicle's own fuel pump.
- If the pressure in the fuel line is higher than 0.2 bar up to max. 4.0 bar, use a pressure reducer (Order No. 22 1000 20 08 00) or a separate tank connection.
- If the pressure in the fuel line is above 4.0 bar or if there is a non-return valve in the return line (in the tank), a separate tank connection must be used.
- If using a T-piece in a plastic pipe, always insert support sleeves in the plastic pipe. Connect the T-piece and the plastic pipe with the relevant fuel hoses and secure with hose clips.

Installation position of the metering pump

Always install the metering pump with the delivery side rising upwards.

Any mounting position over 15° is allowed, although a mounting position between 15° and 35° is preferable.



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

Allowable suction and pressure head of the metering pump

Pressure head from vehicle tank to metering pump:

a = max. 3000 mm

Suction head in pressure-less vehicle tank:

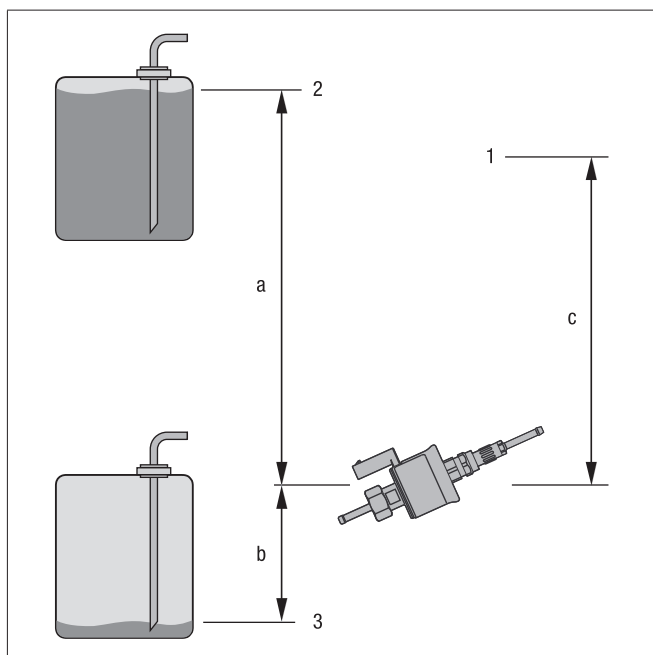
b = max. 1000 mm for diesel
 b = max. 500 mm for petrol

Suction head in a vehicle tank in which negative pressure occurs during extraction (valve with 0.03 bar in the tank cap):

b = max. 400 mm

Pressure head from the metering pump to the heater:

c = max. 2000 mm



- 1 Connection at the heater
- 2 Max. fuel level
- 3 Min. fuel level

⚠ Caution!

Safety instructions for installing the metering pump

- Always install the metering pump with the delivery side rising upwards – minimum angle 15°.
- Protect the metering pump and filter from impermissible heating, do not install near to silencers and exhaust pipes.

⚠ Caution!

Safety instruction for fuel supply

It is not permitted to operate the heater with unapproved fuel / fuel blends or to add used oil.

Non-compliance can lead to personal injuries and also to a malfunction or damage to the heater.

Only use fuel approved by the manufacturer or vehicle manufacturer.

3.17 Fuel quality for petrol heaters

The heater runs problem-free on standard commercial quality fuel, which you use to run your vehicle engine. Commercially available, maximum blending of ethanol to DIN 51600 and EN 228.

3.18 Fuel quality for diesel heaters

The heater runs on standard commercial grade diesel fuel to EN 590 with max. 30 % biodiesel content (FAME). In case of storage periods longer than 30 days it is advisable to use FAME-free products, as ageing effects can have a negative effect on the fuel, especially regarding its flow properties and filterability.

During the winter months the diesel fuel is adapted to the low temperatures of 0 °C to –20 °C. This means that problems can only arise if extreme drops in temperature occur – as is the case for the vehicle engine too – please refer to the vehicle manufacturer's instructions.

3.19 Heating oil operation with additional tank

In special cases and at outside temperatures above 0 °C the heater can also be run on EL heating oil according to DIN 51603 (from an additional tank).

If the heater is run from a separate tank, please comply with the following rules:

- at outside temperatures above 0 °C: use diesel fuel to EN 590 or EL heating oil to DIN 51603;
- at outside temperatures of 0 °C to –20 °C: use winter diesel fuel to EN 590;
- at outside temperatures of –20 °C to –40 °C: use Arctic diesel or polar diesel.

i Note

- It is **not** permitted to add used oil!
- Following operation with winter or cold diesel, the fuel lines and the metering pump must be filled with the standard diesel fuel after letting the heater run for 15 minutes!
- Heaters B 4 E and B 5 E are **not** approved for operation with biodiesel to DIN 14214.

BUTLER TECHNİK

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