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**Air heater for petrol *AIRTRONIC* L,
operating independently of the engine**

Heater	Order number
<i>AIRTRONIC</i> L – B5, 12 volt	20 1859 05 00 00

**Air heater for diesel fuel *AIRTRONIC* L,
operating independently of the engine**

Heater	Order number
<i>AIRTRONIC</i> L – D5, 12 volt	25 2361 05 00 00
<i>AIRTRONIC</i> L – D5, 24 volt	25 2362 05 00 00



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

1 Introduction

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1 Introduction

Concept of this manual

This manual aims to support the service company installing the heater and to provide the user with all important information about the heater.
The manual has been divided into 8 chapters to make it easier to find the corresponding information quickly.

1 Introduction

This section contains important introductory information about installing 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 Electrical system

Here you will find information about the electronic system and electronic components of the heater.

6 Troubleshooting / maintenance / service

Here you will find information about possible faults, troubleshooting, servicing / maintenance and the service hotline.

7 Environment

Here you will find information about certification and disposal of the heater together with the EU Declaration of Conformity.

8 Lists

Here you will find the key word list and abbreviations list.

1 Introduction

Special text structure, presentation and picture symbols

This manual uses special text structures and picture symbols to emphasize different contents. Please refer to the examples below for the corresponding meanings and associated actions.

Special structure and presentations

A dot (•) indicates a list which is started by a heading. If an indented dash (–) follows a dot, this list is subordinate to the dot.

Picture symbols



Regulation!

This picture symbol with the remark "Regulation" refers to a statutory regulation. Failure to comply with this regulation results in expiry of the type permit for the heater and preclusion of any guarantee and liability claims on J. Eberspächer GmbH & Co. KG.



Danger!

This picture symbol with the remark "Danger" refers to the risk of fatal danger to life and limb. Under certain circumstances, failure to comply with these instructions can result in severe 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 recommendations for use and useful tips for installation of the 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:

- All types of motor vehicles and their trailers
- Construction machinery
- Agricultural machinery
- Boats, ships and yachts

Please note!

- The heater is approved for installation inside vehicle spaces used by people (max. 9 seats), subject to compliance with the statutory requirements and notes given in the contents of these instructions.
- The AIRTRONIC L – D5 (24 volt) heater is approved for installation in vehicles used for the transport of dangerous goods according to ADR / ADR99.

Intended use of the heater

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

On account of its intended functional use, the heater is not approved for the following applications:

- Long-term continuous operation, e.g. for heating of:
 - Residential rooms
 - Garages
 - Work huts, weekend homes and hunting lodges
 - Houseboats, etc.
- Heating or drying of:
 - Living creatures (people or animals) by blowing hot air directly at them
 - Objects
 - Blowing hot air into containers



Caution!

Safety instructions for the range of application and proper, intended use!

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

1 Introduction

Statutory regulations

The Federal Road Transport Directorate has issued an "EC type approval" and an "EMC type approval" for the heater for installation in motor vehicles and with the following official type approval marks, noted on the heater name plate.

AIRTRONIC EG-e100 0105
EMV-e102 3971



Regulation!

Extract from the EC Directive 2001 / 56 EC Annex VII

• Operating status display

- A clearly visible operating display in the user's field of vision must indicate when the heater is switched on an off.

• Arrangement of the heater

- Parts of the structure and other components near the heater must be protected from excessive heat exposure and possible fuel or oil contamination.
- The heater must not pose a fire hazard even when it overheats.
This requirement is deemed to be fulfilled if adequate clearance is ensured for all parts during installation, sufficient ventilation is provided and fireproof materials or heat shields are used.
- The heater must not be mounted in the passenger compartment of vehicles in class M₂ and M₃.
However, a heater in a hermetically sealed enclosure which also complies with the aforementioned conditions may be used.
- The factory nameplate or duplicate of it 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's combustion chamber must not be sucked in from the vehicle's passenger compartment.
- The air intake must be arranged or protected in such a way that it cannot be blocked by other objects.

• Hot air intake

- The heater's air supply must consist of fresh air or circulated air and must be sucked in from a clean area, which cannot be contaminated by exhaust fumes from the engine, 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.

1 Introduction

Statutory regulations



Regulation!

Installing the heater in a vehicle for the transport of dangerous goods according to ADR / ADR99

- The ADR / ADR99 regulations must also be observed for installation of the heater in vehicles for the transport of dangerous goods. Detailed information about the ADR / ADR99 regulations is given in the information leaflet no. 25 2161 95 15 80 (see also pages 12 and 27).

Please note!

- Compliance with the statutory regulations and safety instructions is prerequisite for guarantee and liability claims. Failure to comply with the statutory regulations and safety instructions and incorrect repairs, even if original spare parts are used, make the guarantee null and void and preclude any liability for J. Eberspächer GmbH & Co. KG.
- Subsequent installation of this heater must be carried out in accordance with these installation instructions.
- The statutory regulations are binding and must also be observed in countries which do not have any special regulations.
- When installing the heater in vehicles not subject to the German Road Traffic Licensing Regulations (StVZO), for example ships, the respective specially valid regulations and installation instructions must be observed.
- Installation of the heater in special vehicles must comply with the regulations applying to such vehicles (e. g. for vehicles for the transport of dangerous goods according to ADR / ADR99).
- Other installation requirements are given in the relevant sections of this manual.

Safety instructions for installation and operation



Danger!

Risk of injury, fire and poisoning!

- The heater must only be started up if the intake and outflow hoods have been fitted.
- 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-story car park.
- Adjustable hot air outlets must always be adjusted so that they cannot blow hot air directly at living creatures (people, animals) or object 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 the initial commissioning of the heater.
In addition, the installation date must be entered on the plate "original spare part" enclosed with the heat exchanger. 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 documentation and any special installation recommendations. The same applies to any necessary repairs or in case of guarantee claims.
- Only the control elements approved by Eberspächer must be used to operate the heater. Use of other control elements can cause malfunctions.



1 Introduction

Safety instructions for installation and operation



Caution!

Safety instructions for installation and operation!

- Repairs by non-authorised third-parties or with not original spare parts are dangerous and therefore not allowed. They result in expiry of the type permit of the heater; consequently, when installed in motor vehicles they can cause expiry of the vehicle operating licence.
- The following measures are not allowed:
 - Changes to components relevant to the heater.
 - Use of third-party components not approved by Eberspächer.
 - Departures from the statutory regulations, safety instructions and / or functional specifications given in these documents with regard to installation or operation. This applies in particular to the electrical wiring, fuel supply, combustion air system and exhaust system.
- Only original accessories and spare parts may be used for 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.
- If the heater is fitted in a safety casing, etc., the heater's installation box must not be used as storage space 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.

- Defective fuses must only be replaced by fuses with the prescribed fuse value.
- If fuel escapes from the heater's fuel system (leak), arrange for immediate repair of the damage by a JE service partner.
- The after-running of the heater must not be prematurely interrupted e.g. by pressing the battery disconnect switch, except for an emergency stop.

Accident prevention

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

2 Product information

Scope of supply for *AIRTRONIC L – B5*

Quantity / Designation	Order no.
1 <i>AIRTRONIC L – B5, 12 V</i>	20 1859 05 00 00

To be ordered separately:

1 Universal installation kit	25 2361 80 00 00
1 Control element*	–

Scope of supply for *AIRTRONIC L – D5*

Quantity / Designation	Order no.
1 <i>AIRTRONIC L – D5, 12 V</i>	25 2361 05 00 00
1 <i>AIRTRONIC L – D5, 24 V</i>	25 2362 05 00 00

To be ordered separately:

1 Universal installation kit	25 2361 80 00 00
1 Control element*	–

* Control elements see price list / accessories catalogue.

Parts list for the picture “Scope of supply” on page 9

Scope of supply for heater

No. in figure Designation

1	Heater
2	Dosing pump

Scope of supply for universal installation kit

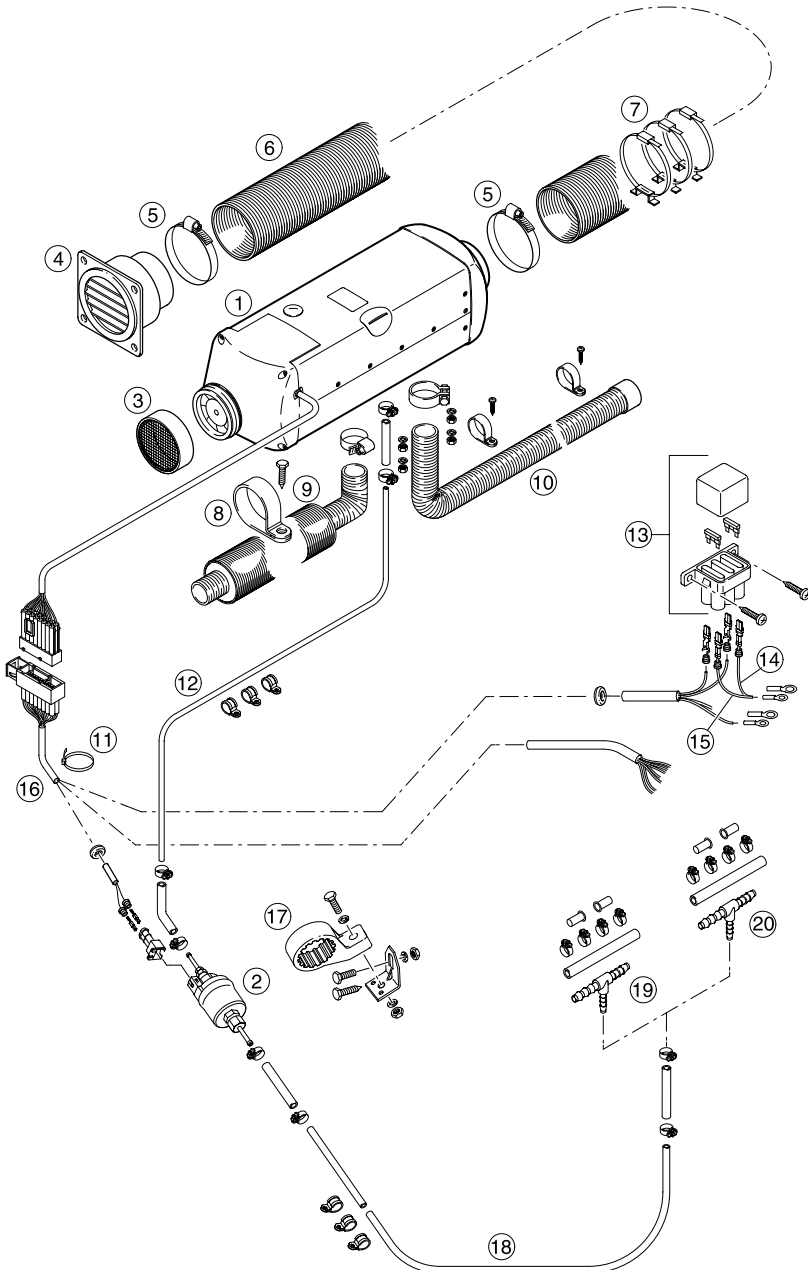
No. in figure Designation

3	Grid, Ø 90 mm
4	Outflow
5	Hose clip, Ø 90 mm – 110 mm (2x)
6	Flexible pipe, Ø 90 mm
7	Support (3x)
8	Pipe clip, Ø 50 mm
9	Intake silencer
10	Flexible exhaust pipe, Ø 24 mm
11	Cable tape 200 (2x 10 pcs)
12	Fuel pipe, 4x1.25, 7.5 m long
13	Fuse-switch
14	Plus cable, 1 ² rt
15	Plus cable, 4 ² rt
16	Wiring harness
17	Bracket dosing pump
18	Fuel pipe, 6x2, 1.5 m long
19	Hose connector 8 / 6 / 8
20	Hose connector 10 / 6 / 10

Please note!

- Parts without a figure no. are small parts and packed in a bag.
- Please consult the additional parts catalogue if any other parts are required for installation.

Scope of supply



2 Product information

Technical data

Heater	AIRTRONIC L – B5				AIRTRONIC L – D5				
Heating medium	Air				Air				
Control of the heat flow	Stage				Stage				
	Power	High	Medium	Low	Power	High	Medium	Low	
Heat flow (watt)	5500	4800	2700	1200	5500	4800	2700	1200	
Heater air flow rate without counterpressure (kg/h)	280	275	180	125	280	275	180	125	
Heater code	10				10				
Fuel consumption (l/h)	0.75	0.65	0.37	0.27	0.66	0.58	0.34	0.15	
Elec. power consumption (watt)									
	in operation	85	80	30	15	85	80	30	15
	while starting	< 250				< 250			
Rated voltage (volt)	12				12 / 24				
Operating range	ca. 10 volt resp. ca. 20 volt Undervoltage protection response time: 20 seconds								
Lower voltage limit: An undervoltage protection installed in the controller switches off the heater at approx. 10 volts or 20 volts respectively.									
Upper voltage limit: An overvoltage protection installed in the controller switches off the heater at approx. 14 volts or 28 volts respectively.									
	ca. 14 volt resp. ca. 28 volt Overvoltage protection response time: 20 seconds								
Fuel	Petrol – standard commercial quality (DIN EN 51600 / DIN EN 228)				Diesel fuel – standard commercial quality (DIN EN 590)				
“Fuel quality” and “fuel at low temperatures” see operating instructions page 24.									
Permissible ambient temperature	Heater	Controller	Dosing pump		Heater	Controller	Dosing pump		
	Operation	–40 °C to +50 °C	–40 °C to +75 °C	–40 °C to +20 °C	–40 °C to +70 °C	–40 °C to +75 °C	–40 °C to +50 °C		
	Storage	–40 °C to +85 °C	–40 °C to +85 °C	–40 °C to +85 °C	–40 °C to +85 °C	–40 °C to +85 °C	–40 °C to +85 °C		
Noise emission – passenger compartment	The maximum sound pressure is < 64 db (A), measured in the “high” stage operating mode, in accordance with the 3rd GSGV and DIN 45 635 – Part 1.								
Maximum air intake temperature	+40 °C								
Interference suppression	Suppression class 5 to DIN 55025								
Weight	ca. 9.3 kg								
Ventilation mode	possible								



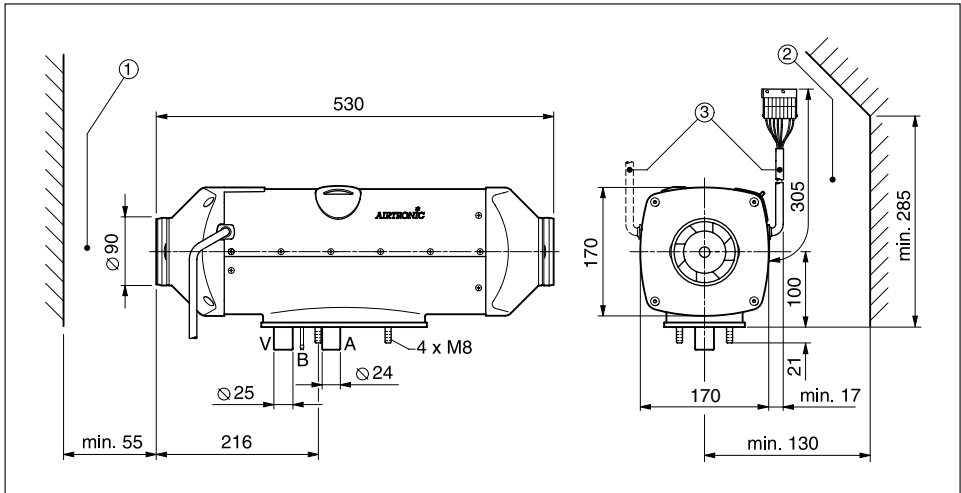
Caution!

Safety instructions for technical data!

Failure to comply with the technical data can

All technical data ±10 %

Main dimensions



- ① Minimum installation space (clearance) required for hot air intake and for dismantling the intake hood.
- ② Minimum installation space (clearance) required for dismantling the glow plugs and controller.
- ③ Wiring harness connection, right or left-hand possible (see "Wiring harness connection, right or left-hand").

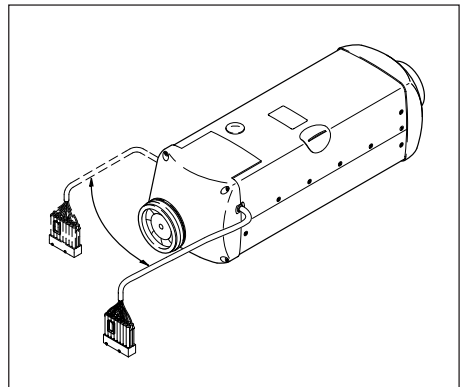
A = Exhaust
B = Fuel
V = Combustion air

Cable harness connection, right or left-hand

If necessary, the cable harness can be changed over to the opposite side of the heater. The controller can be removed after the intake hood has been dismantled.

Unclip the semi-circular cable harness cover on the controller and relay the cable harness. Then fit the semi-circular cable harness cover back onto the controller. Install the controller.

Push the grommet of the cable harness and the dummy grommet in the corresponding holes of the



3 Installation

Installation and mounting position

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

Installation in the driver's 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 laid splash-proof in the penetrations.

For this reason, the heater can be fitted onto the vehicle floor or an outer panel of the vehicle using the flange seal in the heater's base.

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 pages 4 – 7.

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

The heater can be installed in vehicles used for the transport of dangerous goods according to ADR / ADR99.

If installed with the appropriate electrical wiring, the heater fulfills the ADR / ADR99 regulations, see circuit diagrams at the end of this manual.

Detailed information about the ADR / ADR99 regulations is given in the 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 also be observed.

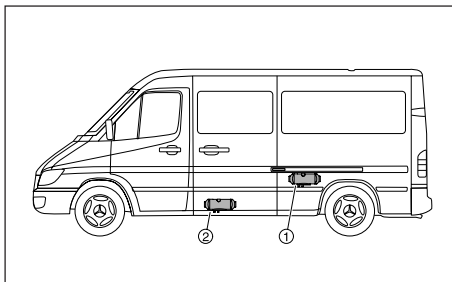
3 Installation



Installation location

Installation location in a delivery truck or van

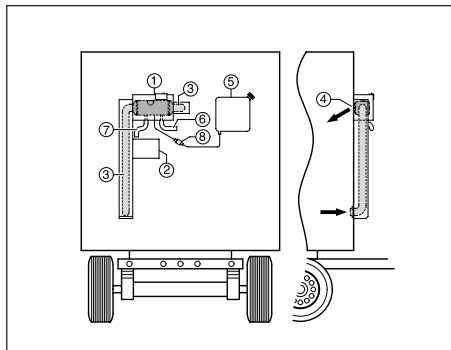
In a delivery truck or van, the heater should preferably be installed in the vehicle interior or cargo area. If it is not possible to install the heater in the vehicle interior or cargo area, the heater can also be fitted under the vehicle floor.



- ① Heater in the vehicle interior or cargo area
- ② Heater fitted under the vehicle floor

Installation location in a trailer

In a trailer, the heater is preferably installed in a box in the upper part of the end panel of the trailer. In this case, for recirculation mode, select hot air intake in the lower part of the trailer and hot air outflow in the lower area.



- ① Heater
- ② Battery
- ③ Flexible pipe for hot air
- ④ Outlet for hot air
- ⑤ Additional fuel tank
- ⑥ Exhaust pipe
- ⑦ Combustion air hose
- ⑧ Fuel dosing pump

Please note!

- The positions suggested in the installation instructions are examples. Other mounting positions 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 permissible mounting positions as well as the operating and storage temperatures.

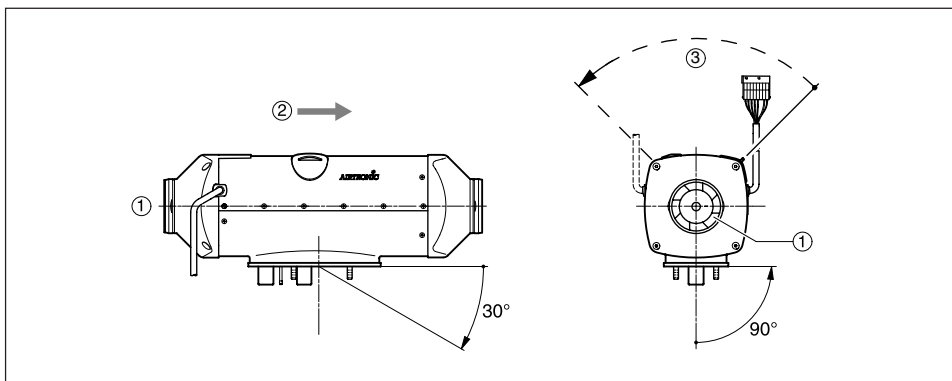
3 Installation

Permitted mounting positions

The heater should preferably be installed in the standard position as shown in the drawing. Depending on the installation conditions, the heater can be tilted by max. 30° (flow direction downwards!) or turned by max. 90° around its own longitudinal axis (exhaust connection horizontal, glow plug points upwards!), as shown in the drawing.

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.

Normal horizontal position (exhaust connection facing downwards) with permissible swivel ranges



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

3 Installation

Installation and fixing

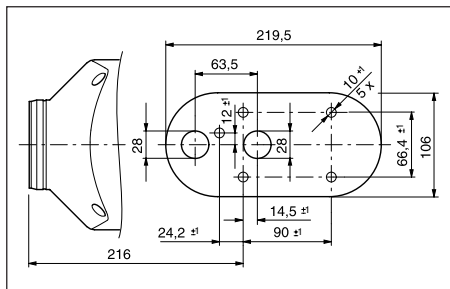
Make the through-holes for exhaust, combustion air and fuel as shown in the drilling hole pattern.

The support surface for the heater base must be flat. 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.

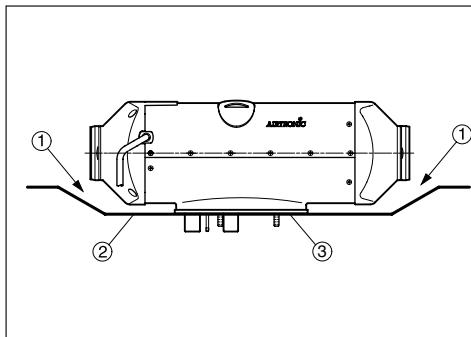
If the sheet metal of the support surface is thinner than 1.5 mm, an additional reinforcing plate will have to be fitted.

Order no: reinforcing plate 25 1729 89 00 03

Drilling hole pattern

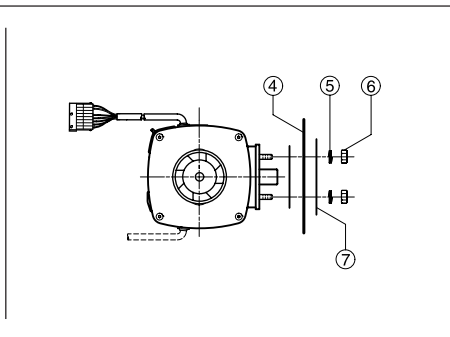


Fixing the heater to the vehicle floor



- ① There must be sufficient clearance between the heater and the vehicle floor – in addition, check that the fan wheel runs freely.
- ② The mounting surface must be flat and smooth.
- ③ The flange seal must be fitted.

Fixing the heater horizontally to the vehicle wall (panel)



- ④ The vehicle wall must be flat and smooth.
- ⑤ Spring washer
- ⑥ 4 x M8 hexagonal nut (tightening torque 11^{+1} Nm)
- ⑦ Reinforcing plate (if needed, Order no. 25 1729 89 00 03)

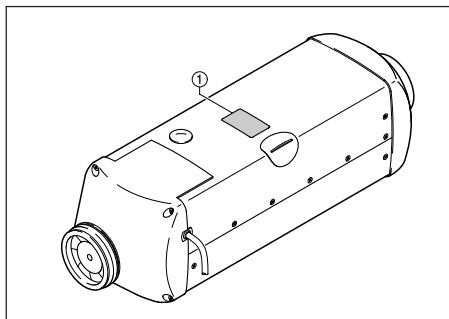
3 Installation

Nameplate

The nameplate is fixed onto the upper jacket shell. A 2nd nameplate (duplicate) is available as an additional part.

Please note!

- Observe the regulations and safety instructions for this chapter given on page 5.
- For further information about the 2nd nameplate (duplicate) see the additional parts catalogue.



① Original nameplate

3 Installation

Hot air system

The universal installation kit includes a 0.5 m long flexible pipe, an outlet, three supports with cable tapes and a safety grid for the hot air system.

For further ducting parts, please refer to the additional parts catalogue.



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 outflow hood must be fitted on the hot air outflow side.
- If no air hoses are fitted, a safety grid 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.

Please note!

- Comply with the regulations and safety instructions for this chapter given on page 4 – 7.
- When connecting parts which conduct air, observe the heater code number given in the technical data (page 10).

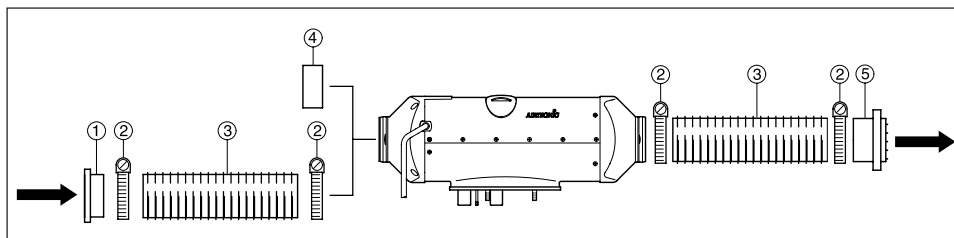


Caution!

Safety instructions!

- The hot air intake openings must be positioned 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 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 safety lock-out.
Therefore only temperature-resistant hot air hoses approved by us must be used for the hot air system!
- When checking the functions, the mean discharge temperature measured approx. 30 cm from the outlet after the heater has been running for about 10 minutes should not exceed 110 °C (with an intake temperature of approx. 20 °C).
- If there is a risk of the driver and passengers touching the heater during normal vehicle operation, a touch guard must be fitted.

Hot air system (example)



- ① Connectors with safety grid
- ③ Hose clip
- ④ Flexible pipe

- ① Safety grid
- ⑤ Outlet

3 Installation

Exhaust system

(For exhaust system diagram see page 19)

Installing the exhaust system

The universal installation kit includes a flexible exhaust pipe, inner Ø 24 mm, 1300 mm long. The flexible exhaust pipe can be shortened to 20 cm or lengthened to max. 2 m, depending on the installation conditions. In addition, an exhaust silencer can be inserted in the exhaust pipe system. In this case, fix the exhaust silencer to the vehicle in a suitable position. Lay the flexible exhaust pipe from the heater to the exhaust silencer and fasten with a pipe clip. Connect an exhaust end pipe with an end sleeve to the exhaust silencer and fix with a pipe clip.



Caution!

Safety instructions!

The whole exhaust system gets very hot while the heater is running and immediately afterwards. This is why the exhaust system must be laid according to these installation 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 with an approx. Ø of 5 mm at the lowest point as a condensation outlet.
- Important functional parts of the vehicle must not be impaired (keep sufficient clearance).
- Install the exhaust pipe with sufficient clearance from heat-sensitive components. 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.
- Lay the exhaust system so that the outflowing exhaust gases are not sucked in as combustion air.
- The mouth of the exhaust pipe must not become clogged with dirt and snow.
- The mouth of the exhaust pipe must not point 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 laid 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, 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.

Please note!

- Comply with the regulations and safety instructions for this chapter given on page 4 – 7.
- The exhaust end pipe should be much shorter than the flexible exhaust pipe from the heater to the exhaust silencer.

3 Installation



Combustion air system

Installing the combustion air system

The universal installation kit includes a combustion air silencer, which must be fitted.

If necessary, the combustion air system can be lengthened up to max. 2 m using a connector and a flexible combustion air hose, internal Ø 25 mm (please refer to the additional parts catalogue for the order no.).

Fix the combustion air silencer to the heater using a pipe clip and use a hose clip to fix at a suitable point.

Please note!

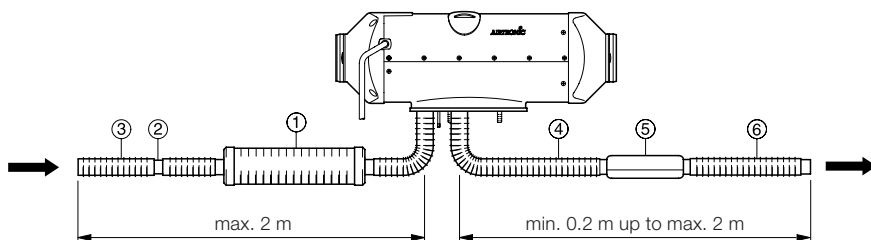
- The combustion air silencer must always be installed.
- Comply with the regulations and safety instructions for this chapter given on page 4 – 7.



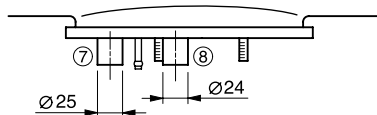
Caution!

Safety instructions for the combustion air system!

- The combustion air opening must be free at all times.
- Lay the combustion air intake to ensure that exhaust fumes cannot be sucked in as combustion air.
- Do not point the combustion air intake against the vehicle's airstream.
- The combustion air intake must not become clogged with dirt and snow.
- Install the combustion air system sloping slightly downwards. If necessary, make a drain hole approx. Ø 5 mm at the lowest point as a condensation outlet.



- ① Combustion air silencer
- ② Connection pipe, optional
- ③ Combustion air silencer, optional
- ④ Flexible exhaust pipe, di = 24 mm
- ⑤ Exhaust silencer, optional
- ⑥ Exhaust end pipe with end sleeve
- ⑦ Combustion air pipe connection
- ⑧ Exhaust connection



3 Installation

Fuel supply

Installing the dosing pump, laying the fuel pipes and installing the fuel tank

The following safety instructions must always be observed when installing the dosing pump, laying the fuel pipes 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 injuries!

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.

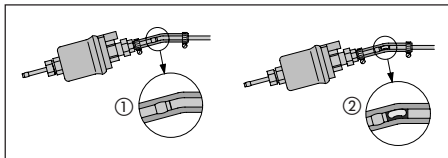


Caution!

Safety instructions for laying the fuel pipes!

- Only use a sharp knife to trim the 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 laid with a continuous rise.
- Fuel pipes must be securely fixed to avoid any damage and / or noise due to vibrations (recommended guideline value: at spacings of approx. 50 cm).
- Fuel pipes must be protected against mechanical damage.
- Lay the fuel pipes so that any distortion or shaking of the vehicle, engine movements, etc. do not have a disadvantageous effect on the service life.

- Parts carrying fuel must be protected from disruptive heat.
- Never lay or fix the fuel pipes immediately next to the heater's exhaust system pipes or along the vehicle's exhaust system. If the systems cross, always ensure there is sufficient heat clearance. If necessary, install heat radiation guards.
- Dripping or evaporating fuel must never be allowed to collect on hot parts or ignite on electric equipment.
- When connecting fuel pipes with a fuel hose, always install the fuel pipes with a butt joint to prevent any bubbles from forming.



① Correct connection

② Pipe laid incorrectly – bubbles form



Caution!

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 immediate danger if a fire occurs.

Please note!

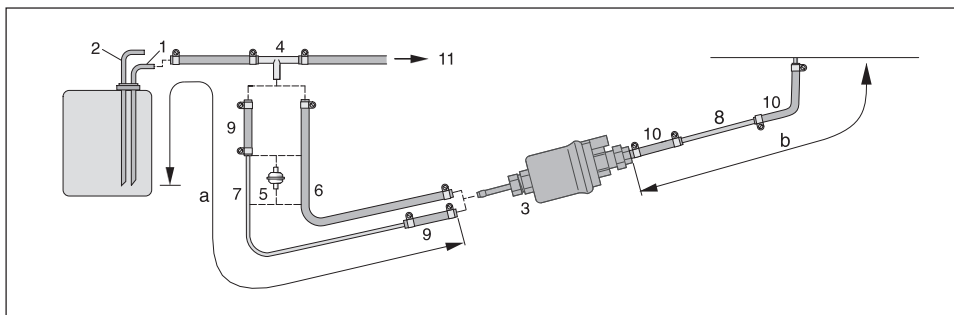
Comply with the regulations and safety instructions for this chapter given on page 4 – 7.

3 Installation



Fuel supply

Fuel extraction using a T-piece from the fuel flow line, from the tank fitting to the vehicle engine



- ① Fuel flow line from the tank connection
- ② Fuel return line from the tank connection
- ③ Dosing pump
- ④ T-piece
- ⑤ Fuel filter – only needed 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), 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

Intake side

a = max. 2 m

Pressure side

b = max. 4 m for petrol

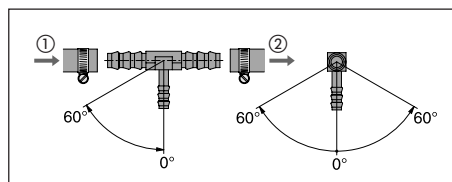
b = max. 6 m for diesel

Please note!

- Insert the T-piece ④ in the fuel flow line upstream of the feed pump.
- Item ⑤ is not included in the scope of supply "installation kit". The order no. is given in the additional parts catalogue.

Installation position of the T-piece

Install any T-piece in the same installation positions shown in the diagram.

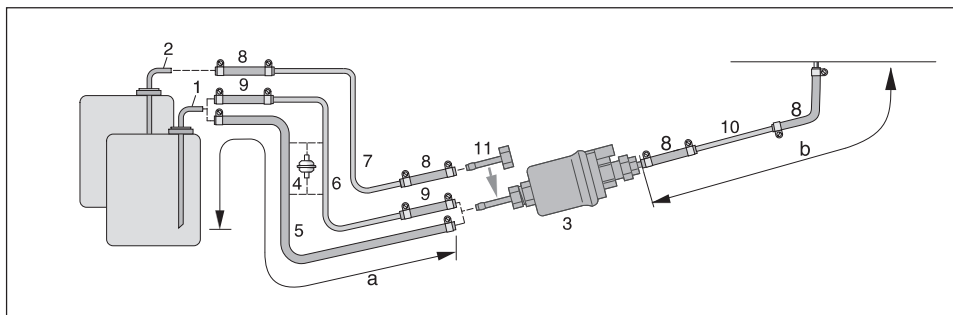


- ① Direction of flow – from the fuel tank
- ② Direction of flow – to the vehicle engine

3 Installation

Fuel supply

Fuel extraction for petrol injection engines and diesel engines



- 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 Pipe connectors, da = Ø 4 mm

Permissible 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 and ⑪ are included in the "tank connection" kit.



Caution!

Safety instructions for the fuel supply!

- 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 pipe is more than 0.2 bar up to max. 2.0 bar, use a pressure reducer (order no. 22 1000 20 09 00) or a separate tank connection.
- If the pressure in the fuel pipe is over 2.0 bar or if there is a non-return valve in the return pipe (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.

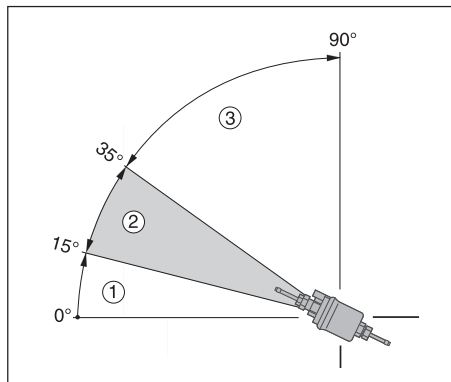
3 Installation

Fuel supply

Mounting position of the dosing pump

Always install the dosing 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 Mounting position between $0^\circ - 15^\circ$ is not allowed.
- ② Preferred mounting position within the range $15^\circ - 35^\circ$.
- ③ Mounting position within the range $35^\circ - 90^\circ$ is allowed.

Permissible suction and delivery head of the dosing pump

Delivery head from vehicle tank to dosing pump:

a = max. 3000 mm

Suction head in pressure-less vehicle tank:

b = max. 500 mm for petrol

b = max. 1000 mm for diesel

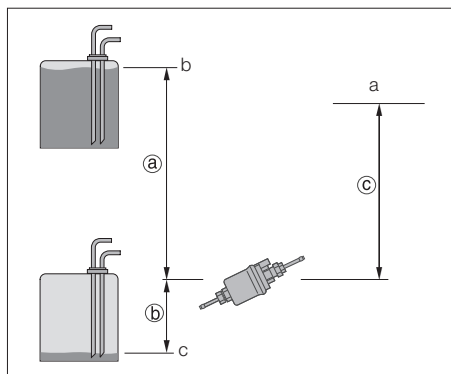
Suction head in a vehicle tank in which negative pressure occurs during extraction (valve with 0.03 bar in the tank cap):

b = max. 150 mm for petrol

b = max. 400 mm for diesel

Delivery head from the dosing pump to the heater:

c = Max. 2000 mm



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

Please note!

Check the fuel tank vent line.



Caution!

Safety instructions for installing the dosing pump!

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

3 Installation

Fuel supply

Fuel quality for petrol heaters

The heater runs problem-free on standard commercial quality fuel in accordance with DIN EN 51600 / DIN EN 228, which you use to run your vehicle engine.

Fuel quality for diesel heaters

The heater runs problem-free on standard commercial quality fuel in accordance with DIN EN 590, which you use to run your vehicle engine.

Fuel for special cases

In special cases the heater can also be run on heating oil (above 0 °C) or kerosene / paraffin oil.

Fuel for low temperatures

Refineries and petrol stations automatically adjust fuel to normal winter temperatures (winter diesel). Therefore, difficulties can only occur if there are extreme drops in temperature, the same as applies 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:

At temperatures above 0 °C, any kind of diesel fuel to DIN EN 590 can be used.

If no special diesel fuel is available for low temperatures, then paraffin oil / kerosene or petrol should be mixed with the fuel according to the following table:

Temperature	Winter diesel	Admixture
0 °C to -25 °C	100 %	---
-25 °C to -40 °C	50 %*	50 % paraffin oil / kerosene or petrol

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

Please note!

- It is not permitted to add used oil!
- 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 minutes!

Operation with biodiesel (PME)

The heater is **not** approved for running on biodiesel according to DIN V 51606.



4 Operation and function

Operating instructions

The heater is operated by a control element.
This control element is absolutely necessary.

Please note!

The control elements (e. g. mini-timer, module timer) are supplied with operating instructions, which the company installing the heater will issue to you.

Important instructions for operation

Safety checks before starting up the heater

After a longer interval between operations (after the summer months) the fuse must be put inserted and / or the heater connected to the battery.

Check that all parts fit securely (tighten screws where necessary).

Carry out a visual check of the fuel system for leaks.

Heating at high altitudes

When using the heater at high altitudes, please note:

- Heating at altitudes up to 1500 m:
 - Unlimited heating possible.
- Heating at altitudes over 1500 m:
 - You can use the heater at this altitude for short periods (e. g. driving through a mountain pass or taking a break in your journey).
 - During longer stays (e. g. winter camping, the fuel supply must be adjusted to the altitude.

Please contact a JE partner.

Initial commissioning

The following points are to be checked by the company installing the heater during initial commissioning.

- After installing the heater, the whole fuel supply system must be carefully vented: please refer to and follow the vehicle manufacturer's instructions.
- During the heater trial run, all fuel connections must be checked for leaks and secure, tight fit.
- If faults occur while the heater is running, use a diagnostics device to determine and correct the cause of the fault.

4 Operation and function

Description of functions

Switching on / starting the heater

When the heater is switched on, the control lamp in the control unit lights up.

The fan starts up in the fan stage "LOW". The glow plug starts with a 3 second delay. After approx.

45 seconds the fuel supply starts and the fuel / air mixture in the combustion chamber ignites.

The fan switches from fan stage "LOW" to fan stage "MEDIUM". The glow plug is switched off after 165 seconds, when a stable flame has formed.

The fan switches from fan stage "MEDIUM" to fan stage "HIGH".

The heater is run at an increased heating capacity of 5.5 kW in order to quickly reach the heater's operating temperature. If the heater's operating temperature has been reached, the heating capacity is reduced to 4.8kW. The length of time for which the heater is run with an increased heating output depends on the ambient temperature.

Control in heating mode

If the intake or ambient temperature set at the control device (10 °C up to 30 °C) has been reached, the heater switches to the "LOW" control level and then continues to run with a low fan motor speed.

If the heat flow at the "LOW" control level of 1.2 kW or 2.0 kW is insufficient, the heater switches to the "MEDIUM" control level. The fan continues to run at a low speed. In most cases the "LOW – MEDIUM – LOW" control at a low speed will cover the heating requirements.

If the heat flow at the "MEDIUM" control level is insufficient, the heater switches back to the "HIGH" control level. This in turn requires the full fan motor speed.

If, in special cases, even less heat flow is required than supplied by the heater at the "LOW" control level, the heater switches to "OFF".

The fan then continues to run for approx. 4 – 5 minutes and, only in recirculation mode, constantly ventilates until it is restarted. The restart takes place at the "MEDIUM" control level at a low fan motor speed.

Ventilation mode

If the heater is set to "Ventilation" at the control element, the fan runs at maximum speed.

Switching off

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

The fan continues to run for approx. 4 – 5 minutes to cool down.



Control and safety devices

- If the heater does not ignite within 90 seconds after the fuel pump is started, the start is repeated. If the heater still does not ignite after another 90 seconds of pumping fuel, a safety lock-out occurs, i. e. the fuel supply is off and the fan continues to run for approx. 4 minutes. After an impermissible number of failed start attempts, the controller is locked.*
- If the flame goes off by itself during operation, the heater is first restarted. If the heater still does not ignite within 90 seconds after the fuel pump has been restarted, or ignites and but goes off again within 15 minutes, a safety lock-out occurs, i. e. the fuel supply is off and the fan continues to run for approx. 4 minutes. The safety lock-out can be cancelled by briefly switching off and on again. Do not repeat the switching off / on routine more than twice.
- In the case of overheating, the combined sensor (flame sensor / overheating sensor) responds, the fuel delivery is interrupted and a safety lock-out occurs. Once the cause of the overheating has been eliminated, the heater can be restarted by switching it off and on again. After an impermissible number of failed start attempts, the controller is locked.*
- If the lower or upper voltage limit is reached, a safety lock-out occurs after 20 seconds.
- The heater will not start if the glow plug or fan motor is interrupted.
- If the combined sensor (flame sensor / overheating sensor) is defective or the electric lead interrupted, the heater starts up and the safety lock-out does not occur until during the start phase.

- The speed of the fan's motor is continuously monitored. If the fan motor does not start up or if the speed deviates by more than 10 %, a safety lock-out occurs after 30 secs.
- When the heater is switched off, the glow plug is switched on for 40 seconds (after glowing) while the fan continues to run in order to clean off any combustion residues.

* The lock can be cancelled and the faults read off:

- using the module timer
- using the radio remote control TP5.

For other controls:

- by connecting the diagnosis unit
- using the customer service program KD2000.

For operation and fault list, please refer to the enclosed operating instructions or the troubleshooting and repair instructions for the heater.

Please note!

Do not repeat the switching off / on routine more than twice.

Forced shut-down during ADR / ADR99 operation

In vehicles for the transport of dangerous goods (e. g. tankers), the heater must be switched off before the truck drives into a danger area (refinery, petrol station, etc.).

Failure to comply results in the heater automatically switching off if:

- The vehicle engine is switched off.
- An additional unit is started up (e. g. auxiliary drive for unloading pump, etc.).
- A vehicle door is opened (ADR99 regulation, only in France).

The fan then continues to run briefly, for max. 40 seconds.

Emergency shutdown – EMERGENCY OFF

If an emergency shutdown – EMERGENCY OFF – is necessary during operation, proceed as follows:

- Switch the heater off at the control or
- remove the fuse or
- disconnect the heater from the battery.

5 Electrical system

Heater wiring



Caution!

Safety instructions for wiring the heater!

The heater is to be connected up electrically according to the EMC Directive.

Improper tampering with the heater can affect the EMC. For this reason, comply with the following instructions:

- Ensure that the insulation of electrical cables is not damaged.
Avoid:
Chafing, kinking, jamming or exposure to heat.
- Seal any connection chambers of waterproof connectors not in use with filler plugs to ensure they are dirt-proof and waterproof.
- Electrical connectors and earth connections must be free of corrosion and securely connected.
- Lubricate connectors and ground connections outside the heater interior with contact protection grease.

Please note!

Comply with the following when wiring the heater and the control element:

- Electrical leads, switch and control gear must be positioned in the vehicle so that they can function perfectly under normal operating conditions without impairment (e. g. due to heat exposure, moisture, etc.)
- The following cable cross-sections are to be used between the battery and heater. This ensures that the max. permissible voltage loss in the cables does not exceed 0.5 V for 12 V or 1 V for 24 V rated voltage.

Cable cross-sections for a cable length
(plus cable + minus cable) of:

- up to 5 m = cable cross-section 4 mm²
- from 5 m up to 8 m = cable cross-section 6 mm²

- If the plus cable is to be connected to the fuse box (e. g. terminal 30), the vehicle's cable from the battery to the fuse box must also be included in the calculation for the total cable length and re-dimensioned if necessary.
- Insulate unused cable ends.

Parts list for the circuit diagrams

The circuit diagrams are printed at the end of this manual.

Parts list for the **AIRTRONIC L** circuit diagrams

- | | |
|-------|--|
| 1.1 | Burner engine |
| 1.2 | Glow plug |
| 1.5 | Overheating and flame sensor |
| | |
| 2.1 | Controller |
| 2.2 | Dosing pump |
| 2.7 | Main fuse
12 volt = 25 A
24 volt = 20 A |
| 2.7.1 | Fuse, actuation (5 A) |
| | |
| 5.1 | Battery |
| 5.2.1 | Battery operating switch
(Operation, e. g. controlled by the ignition lock) d) |
| 5.2.2 | Battery disconnecter
(EMERGENCY OFF function for ADR / ADR99) d) |
| 5.3 | Auxiliary drive (HA+) |
| 5.3.1 | Auxiliary drive switch |
| 5.5 | Generator terminal (D+) |
| | |
| a) | Connection of the control elements and ambient temperature sensor according to the circuit diagrams for the "control elements". <ul style="list-style-type: none">• ge Switch-on signal (– S+)• brws Reference signal sensor• grtt Temperature (setpoint)• blws Diagnosis• br Power supply, minus (terminal 31)• wsrt Switch off burglar alarm (ADR / ADR99 – feedback for timer)• gr Temperature (actual value)• rt Power supply, plus (terminal 30) |
| | |
| b) | Option <ul style="list-style-type: none">• Fresh air fan• Vehicle fan control |
| | |
| c) | ADR / ADR99 dangerous goods transporter in the utility vehicle range (e.g. tanker) |
| | |
| d) | If only one switching element is used for item 5.2.1 and 5.2.2 it must be ensured that on when the "open the battery disconnecter" function is actuated (EMERGENCY OFF function for ADR / ADR99, etc.), the switch always breaks contact immediately (regardless of the heater status) and all the heater circuits are disconnected from the battery. |

Please note!

- Insulate unused cable ends.
- Connectors and bush housings are shown from the



Parts list for the circuit diagrams

The circuit diagrams are printed at the end of this manual.

Parts list for the circuit diagrams for the control elements

- 2.15.1 Temperature sensor (room temperature)
- 2.15.9 Temperature sensor (outside temperature)

- 3.1.9 "Heating / ventilation" selector switch
- 3.1.16 Radio remote control button
- 3.1.17 *AIRTRONIC* mini controller
- 3.1.18 *CALLTRONIC* button
- 3.2.8 Module timer (ADR / ADR99 – potentiometer)
- 3.2.12 Timer, mini – 12 / 24 volt
- 3.2.14 Lighting, mini timer – 12 volt only
- 3.3.6 Radio remote control stationary part TP41i
- 3.3.7 Radio remote control stationary part TP5
- 3.3.8 *CALLTRONIC* remote control
- 3.8.3 Antenna
- 3.9.1 Diagnosis, JE diagnosis

- a) Connection control elements to the *AIRTRONIC*
 - rt Power supply, plus – terminal 30
 - ge Switch-on signal – S+
 - gr Temperature – actual value
 - wsrt Switch off burglar alarm (ADR / ADR99 – feedback for timer)
 - br Power supply, minus – terminal 31
 - blws Diagnosis
 - grrt Temperature – setpoint
 - brws Ground connection for external temperature sensor and temperature setpoint
- b) Terminal 15 – necessary for TP4i connection
- c) Lighting, terminal 58
- d) Connection, diagnosis device
- e) Connection, external temperature sensor
- g) Connection, external heating button
- h) Connection, radio remote control TP4i
- j) Connection, temperature sensor (outdoor temperature)
- l) Connection, "heating / ventilation" selector switch (option). To start: Set the "heating / ventilation" selector switch then switch the *AIRTRONIC* on.
- z) Lighting, terminal 58

Cable colours

- sw = black
- ws = white
- wsrt = white / red
- rt = red
- ge = yellow
- gn = green
- vi = violet
- br = brown
- brws = brown / white
- gr = grey
- grrt = grey / red
- bl = blue
- blws = blue / white
- li = purple

Please note!

- Insulate unused cable ends.
- Connectors and bush housings are shown from the cable entry side.

6 Troubleshooting / maintenance / service

If any faults occur, please check the following items

- If the heater does not start after being switched on:
 - Switch the heater off and on again.
- If the heater still won't start, then check whether:
 - There is fuel in the tank?
 - The fuses are ok?
 - The electrical cables, connections, terminals, are ok?
 - The hot air, combustion air or exhaust systems are blocked?

Troubleshooting

If, after checking these items, the heater is still faulty or another malfunction occurs in your heater, please contact:

- If factory-installed, your contract workshop / garage.
- If subsequently installed, the workshop / garage which installed the heater.

Please note!

Please note that guarantee claims can expire if the heater is modified by a third party or if non-original parts are installed.

Maintenance instructions

- Switch the heater off once a month for about 10 minutes, even outside the heating period.
- Before the heating period starts, a trial run should be carried out for the heater. If thick, persistent smoke develops, unusual burning noises or a clear fuel smell occurs or if electric / electronic parts overheat, the heater must be switched off and put out of service by removing the fuse. In this case, the heater should not be started up again until it has been checked by qualified staff who have been trained on Eberspächer heaters.
- Check the openings of the hot air, combustion air and exhaust systems after lengthy stoppages, clean if necessary!

Service

If you have any technical queries or problems with your parking / cab heater, dial the following service phone number:

Hotline
Phone 0800 / 1234300

Fax hotline
Phone 01805 / 262624



Certification

The high quality of Eberspächer products is the key to our success.

To guarantee this quality, we have organised all work processes in the company for the purposes of quality management (QM).

Nevertheless, we still pursue a large number of activities for continuous improvement of product quality in order to keep pace with our customers' constantly growing requirements.

All the steps necessary for quality assurance are stipulated in international standards.

This quality is to be considered in a comprehensive and total sense.

It affects products, procedures and customer/supplier relations.

Officially approved experts assess the system and the corresponding certification company awards a certificate.

Eberspächer has already qualified for the following standards:

**Quality management in accordance with
DIN EN ISO 9001:2000 and ISO / TS 16949:1999**

**Environmental management system in
accordance with DIN EN ISO 14001:1996**

Disposal

Disposal of materials

Old devices, defective components and packaging materials can all be separated and sorted into pure-grade factions, if necessary, so that all parts can be disposed of in an environment-friendly way or the materials recycled.

Electric motors, controllers and sensors (e. g. temperature sensors) are deemed to be "electronic scrap".

Dismantling the heater

The heater is dismantled according to the repair stages in the current troubleshooting / repair instructions.

Packaging

The heater's packaging can be kept in case it has to be sent back.

EU Declaration of Conformity

We herewith confirm that the following product

Heater type *AIRTRONIC L*

conforms with the essential safety requirements stipulated in the EU Council's Directives for the harmonisation of member states' legal provisions with regard to electromagnetic compatibility (89 / 336 / EEC).

This declaration applies to all heaters manufactured according to the *AIRTRONIC L* production drawings, which are an integral part of this declaration.

The following standards / directives have been used to assess the product with regard to electromagnetic compatibility:

- EN 50081 – 1 Basic form interference emission.
- EN 50082 – 1 Basic form of interference immunity.
- 72 / 245 / EEC – Revision status 95 / 54 / EU interference suppression in motor vehicles.

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List of abbreviations

ADR

European agreement on the international transport of dangerous goods by road.

ADR99

Dangerous goods regulations for France.

EC type approval

Approval awarded by the German Federal Office for Motor Traffic for the production of a heater for installation in motorised vehicles.

EMC Directives

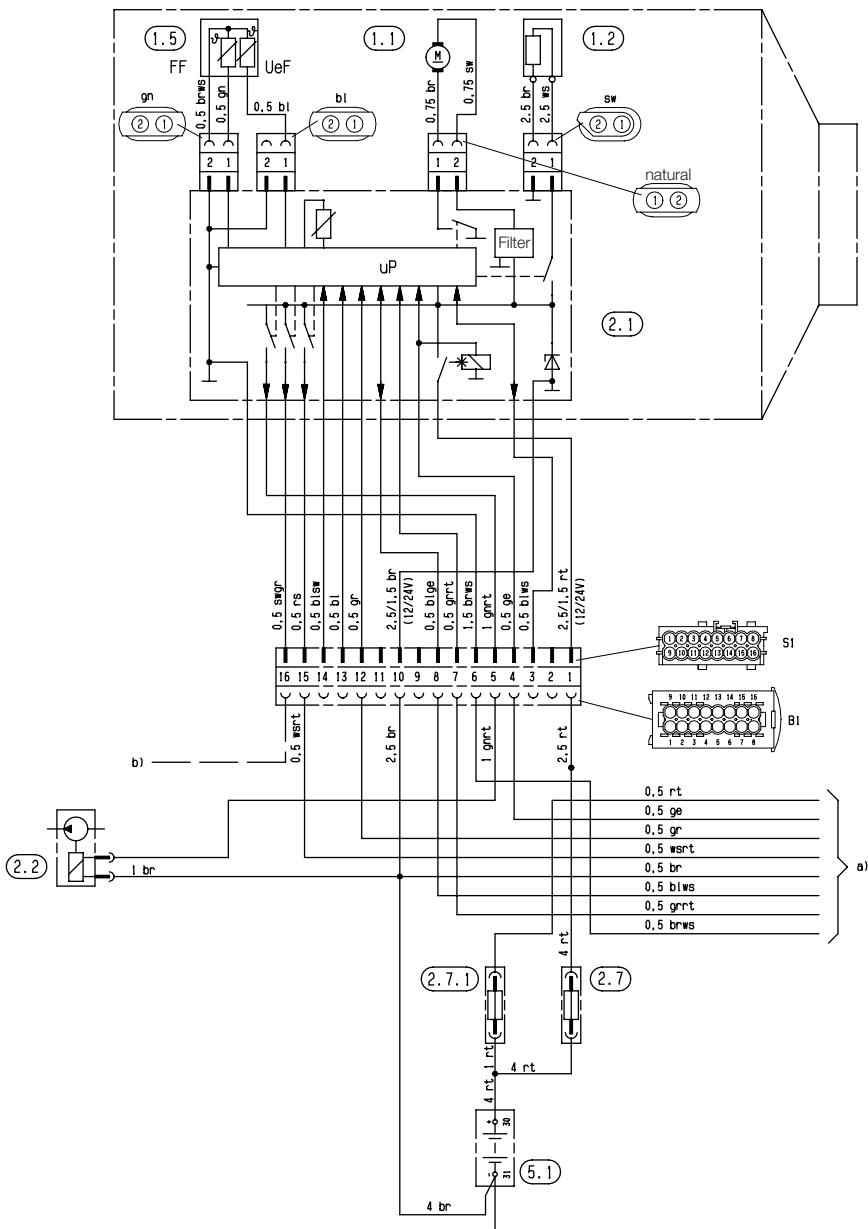
Electromagnetic compatibility.

JE-partner

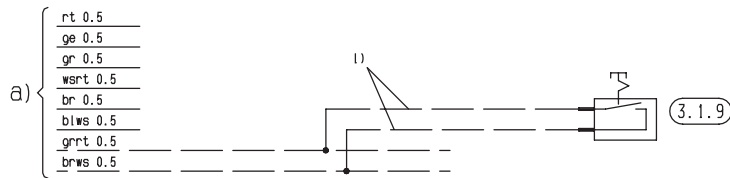
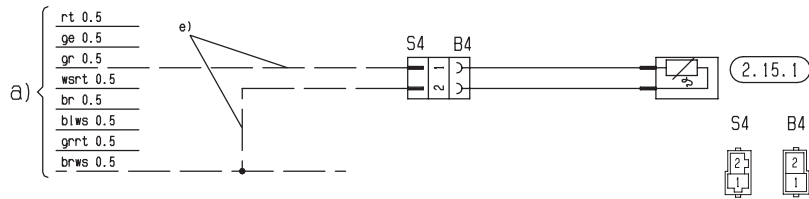
J. Eberspächer partner.

PME

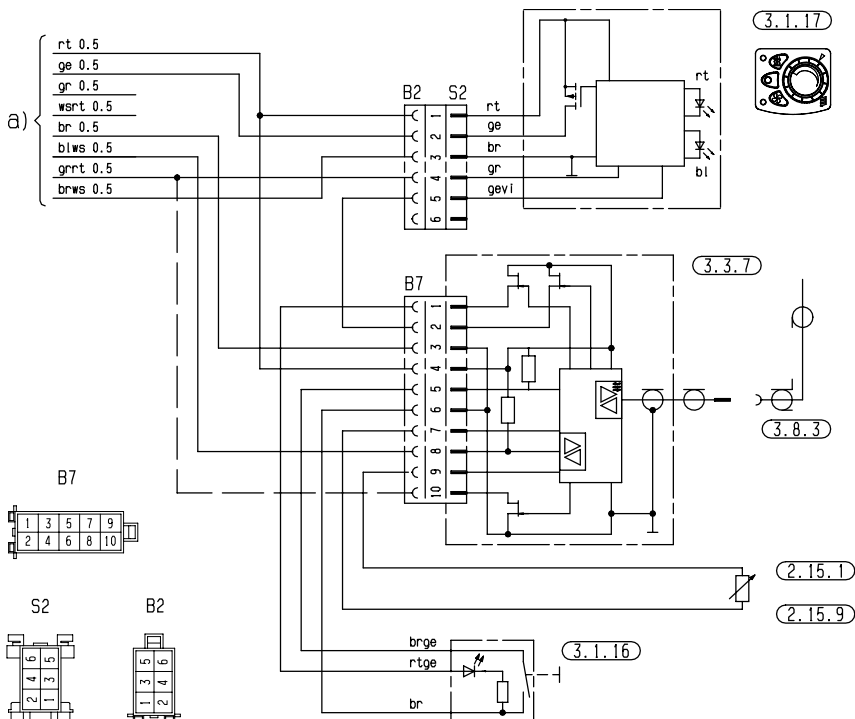
Biodiesel according to DIN V 51606.



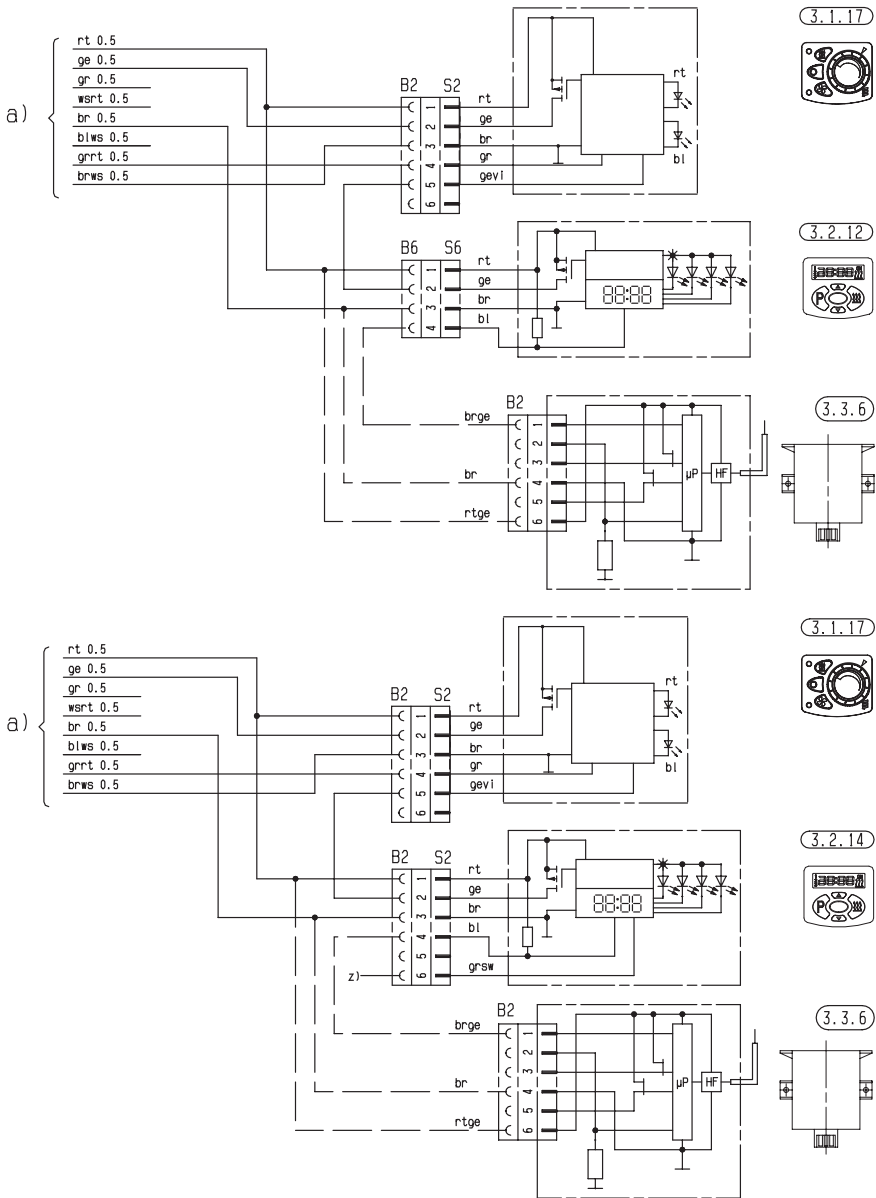
Circuit diagram for control elements



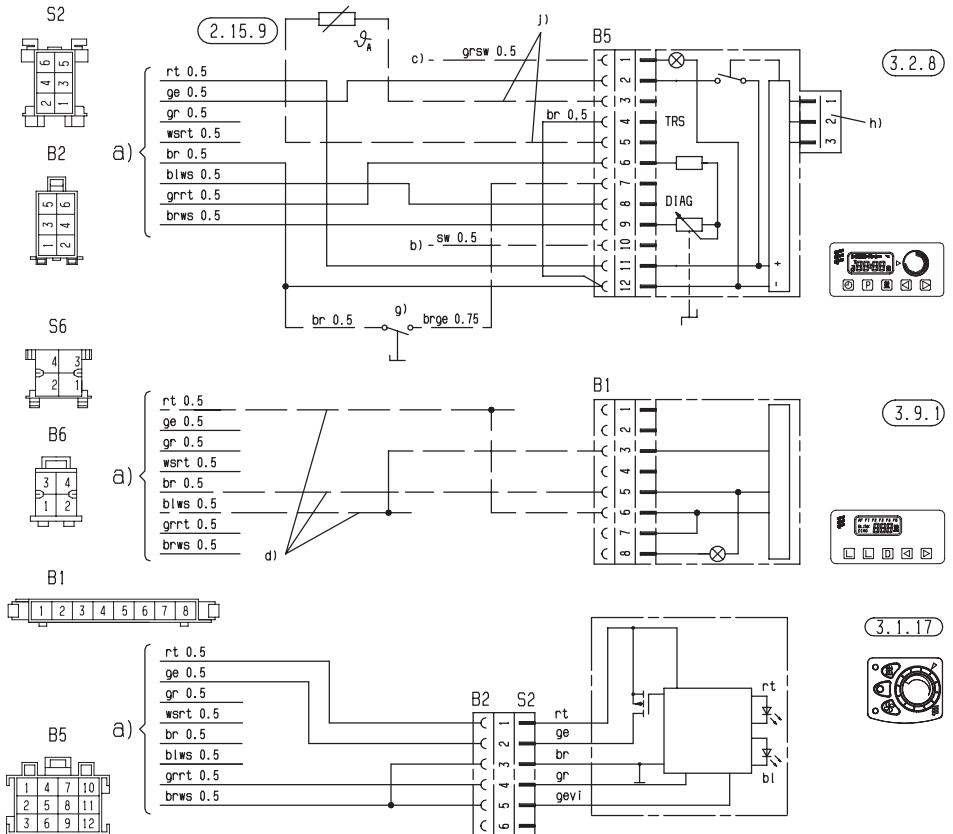
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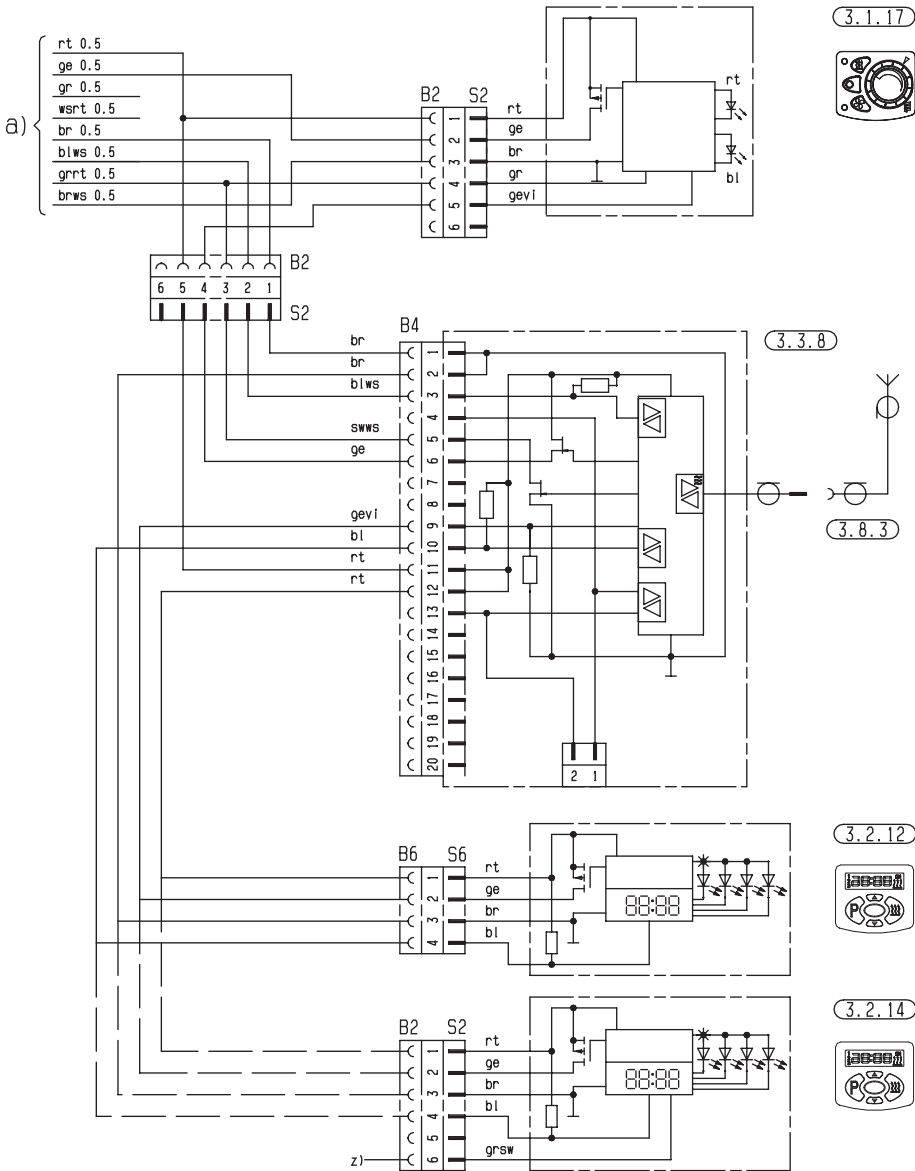
Circuit diagram for control elements



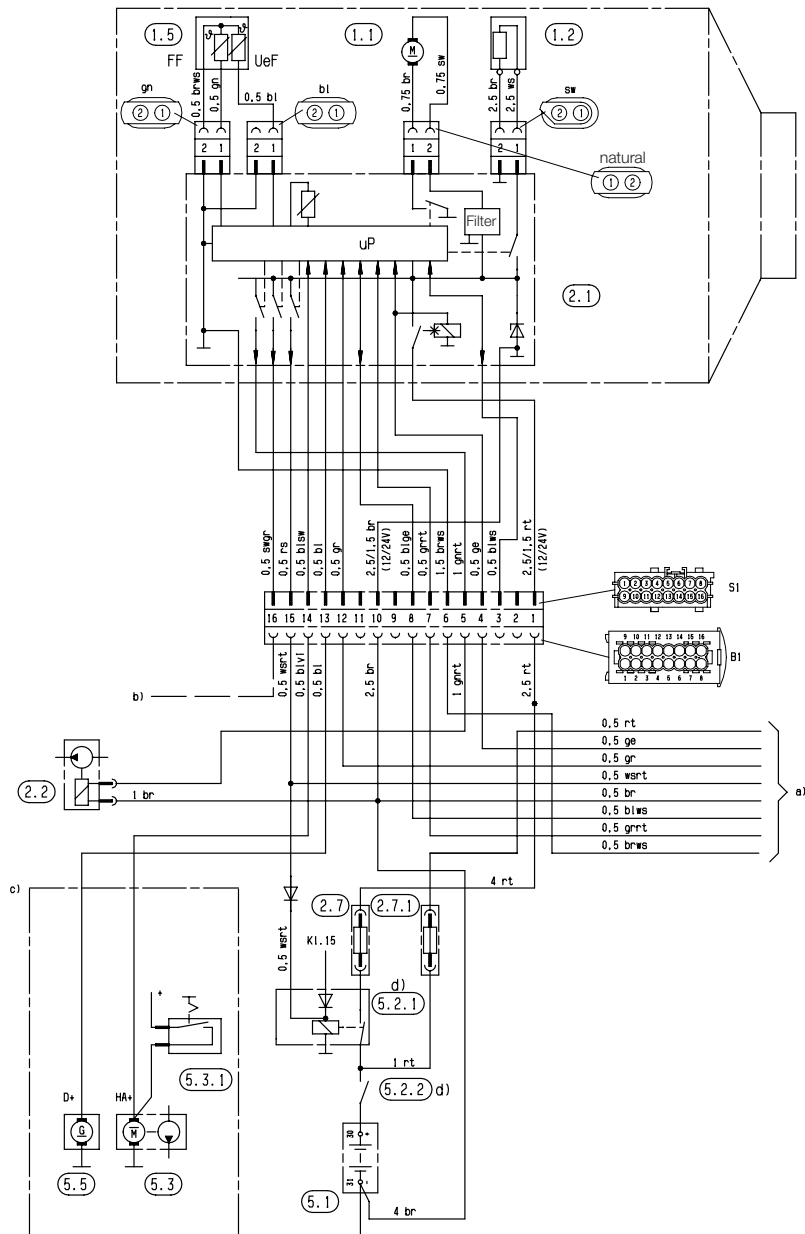
Circuit diagram for control elements



Circuit diagram for control elements



AIRTRONIC L – ADR / ADR 99 circuit diagram



Circuit diagram for ADR / ADR99 control elements

