

**Documentation
for installation***

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Engine-independent air heaters AIRTRONIC D2 for diesel fuel

	Order No.		Order No.
AIRTRONIC D2 – 12 volt	25 2069 05 00 00	AIRTRONIC D2 – 24 volt	25 2070 05 00 00
AIRTRONIC D2 – 12 volt As a complete package	25 2115 05 00 00	AIRTRONIC D2 – 24 volt As a complete package	25 2116 05 00 00



Please note!

The AIRTRONIC D2 / D4 / D4S - 24 volt is suitable and certified for installation in vehicles used to transport dangerous substances according to the regulations in accordance with GGVS / TRS 003 / ADR / ADR 99 (detailed information is contained in an information sheet with print no. 25 2069 95 13 50). A special control unit should be used for heating the cargo compartment / cargo – see page 8.

*** Please hand this technical description / mounting instruction
to the customer after installation of the AIRTRONIC.**

Subject to change

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Area of use of the AIRTRONIC

Taking into consideration their heating capacity, the stationary and auxiliary heaters 'AIRTRONIC' are intended for installation and use in all types of motor vehicles and their trailers, in construction machines, machines used in agriculture, in boats, ships and yachts for the purpose of preheating, clearing of window panes, heating and keeping warm of driver's or working cabs, cargo compartments, ship's cabins, passenger or crew transport spaces, engine motors and aggregates.

The AIRTRONIC is suitable for and permitted to be installed in vehicle spaces used by passengers.

However, it is not permitted to be installed in the driver's cab or passenger compartment of coaches with more than 9 seats.

The 'statutory regulations', 'safety instructions' and 'important instructions' relevant to the installation and printed below in these mounting instructions, and which govern the equipment selection, area of use, installation and operation of the AIRTRONIC must be taken into consideration.

Based on its functional purpose, the AIRTRONIC is not permitted to be used for other areas of use apart from those listed, in particular not for a long-term continuous operation, e.g. to preheat and heat living spaces, garages, working huts, week-end homes, hunting lodges, houseboats or similar as well as not to heat up or to dry objects or living beings (man or beast) by directly blowing hot air onto them and / or blowing hot air into appropriate receptacles.

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Statutory regulations concerning the installation of the AIRTRONIC

- For installation in motor vehicles subject to the Regulations authorizing the Use of Vehicles for Road Traffic (StVZO), the air heater has been approved by the German Federal Office for Motor Traffic in keeping with the 'General Design Certification' (AGB) and the official test symbol is marked on the type plate of the heater.

AIRTRONIC D2  S 318
AIRTRONIC D4 / D4S  S 323

- The mounting requirements associated with the General Design Certification (AGB) and further statutory regulations have been printed in the corresponding sections of these mounting instructions.
- When the air heater is installed in special vehicles, the regulations governing such vehicles must be taken into account (e.g. GGVS / TRS 003 / ADR / ADR 99 for vehicles used to transport dangerous substances).
- The year in which the air heater was operated for the first time must be permanently recorded on the type plate. To this end, 3 different years have been printed on the corresponding field of the type plate. The valid year is to be identified by removing (detaching) those two years which are not applicable.
- Subsequent installation of the heater must be carried out in conformity with these mounting instructions and must be examined and certified in writing by an officially approved vehicle specialist or inspector or employee (Number 4 of Annex VIII b to the StVZO) in conformity with § 19 Section 3 StVZO. The effectiveness of the design certification (ABG) for the heater is dependent on this.
At the discretion of the vehicle owner, the certificate can be issued as follows:
 - As separate 'Certificate of Approval' which must always be kept in the vehicle. A blank form for this 'Certificate of Approval' is attached at the end of the **operating instructions** for the heater. Neutral certificates of approval available to the motor vehicle specialist are also permissible. In both cases, the vehicle manufacturer, vehicle model and vehicle identification number must be entered.
 - As entry in the vehicle registration document (assessing authority) and in the vehicle identification card (licencing authority.)
- For vehicles not subject to the StVZO (e.g. ships), it is necessary to observe the specific regulations and mounting instructions applicable to the given vehicle; these may differ regionally.
- The heater may only be installed or repaired - in case of the heater being handed in for repair or guarantee reasons - by a specialist workshop approved by the manufacturer (service partner) in keeping with these mounting instructions and possible special installation recommendations.
- The information sticker '**Switch off heater before refuelling**' supplied with the heater must be attached in a suitable position on the vehicle (close to the fuel filler neck).

- In conformity with StVZO, the heat exchanger must be replaced by an original replacement heat exchanger by the manufacturer or an authorised service partner 10 years after the heater was used for the first time. The vehicle owner / operator of the heater is responsible for this exchange to be carried out. A plate with the installation date of the replacement heat exchanger and the word 'original spare part' must be mounted on the heater (the plate is supplied with the replacement heat exchanger - the date needs to be entered).



Safety instructions concerning the installation and repair of the AIRTRONIC

Danger of burns and injury!

Before commencing any work on the AIRTRONIC, disconnect the vehicle battery.
The AIRTRONIC may only be started up if the top shell and the exhaust hood have been mounted in accordance with the regulations and if the air duct on the suction side has been carried out in accordance with the regulations.
During operation, the top shell may not be opened and hot parts not be touched.

ATTENTION!

Important instructions for the installation and repair of the AIRTRONIC

When mounting or repairing the heater, only original accessories and original spare parts may be used. Changes to the AIRTRONIC or to components relevant to the heating, the use of outside parts not approved by Eberspächer as well as an installation or operation differing from the statutory, safety and / or function relevant specifications contained in the mounting instructions and in the operating instructions are not permissible: this applies in particular to the electric wiring (circuit diagrams), the fuel supply, the combustion air and exhaust gas duct.

Only the control elements provided and / or approved by us, either on their own or in a given combination, may be used to operate the AIRTRONIC. The use of other control elements may lead to malfunctions of the heater / heating operation.

Non-compliance with the statutory, safety and / or function relevant specifications leads to the lapse of the General Design Certification (ABG) of the AIRTRONIC and to the exclusion of guarantee and liability on the part of the company J. Eberspächer GmbH & Co.

Please note!

Further 'Safety instructions concerning the installation and repair of the AIRTRONIC' as well as 'Important instructions concerning the installation' have been printed directly in the corresponding sections of these mounting instructions.

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Scope of supply

Quantity / Designation	Order No.
1 <i>AIRTRONIC</i> D2 – 12 volt	25 2069 05 00 00
To be additionally ordered:	
1 Universal mounting kit	25 2069 80 00 00
or	
1 <i>AIRTRONIC</i> D2 – 12 volt As a complete package*	25 2115 05 00 00
1 <i>AIRTRONIC</i> D2 – 24 volt	25 2070 05 00 00
To be additionally ordered:	
1 Universal mounting kit	25 2069 80 00 00
or	
1 <i>AIRTRONIC</i> D2 – 24 volt As a complete package*	25 2116 05 00 00
1 <i>AIRTRONIC</i> D4 – 12 volt	25 2113 05 00 00
To be additionally ordered:	
1 Universal mounting kit	25 2113 80 00 00
1 <i>AIRTRONIC</i> D4 – 24 volt	25 2114 05 00 00
To be additionally ordered:	
1 Universal mounting kit	25 2113 80 00 00
1 <i>AIRTRONIC</i> D4S – 12 volt	25 2144 05 00 00
To be additionally ordered:	
1 Universal mounting kit	25 2144 80 00 00
1 <i>AIRTRONIC</i> D4S – 24 volt	25 2145 05 00 00
To be additionally ordered:	
1 Universal mounting kit	25 2144 80 00 00

* The complete package consists of:
1 *AIRTRONIC* D2
1 Universal mounting kit

Optional accessories

1 Temperature sensor, external with line tract, 2 m long	25 1774 89 03 00
1 Line tract, 4 m long for the temperature sensor, external	25 1688 89 09 00
1 Tank connection, di=Ø 2 mm	25 1226 89 50 00

For further accessories, please refer to the accessories catalogue.

Control elements, optional

Quantity / Designation	Order No.
1 Mini controller <i>AIRTRONIC</i> 12 / 24 volt The mini controller can be used on its own or in combination with the mini-clock.	22 1000 32 07 00
1 Mini-clock – 12 / 24 volt The mini-clock can be combined with the TP4i radio remote control. For 'control' and 'ventilating', also install the mini controller <i>AIRTRONIC</i> .	22 1000 31 31 00
1 Module clock – 12 / 24 volt with temperature preselection The module clock can be used on its own or in combination with the TP4i radio remote control. For 'ventilating', also install change-over switch 'heating / ventilating'.	22 1000 30 38 00
1 Mounting parts 'module clock' only required when installing with panel.	25 1482 70 01 00
1 Change-over switch 12 / 24 volt Can only be used in combination with the module clock.	22 1000 31 89 00
1 Remote radio control TP5 The bi-directional remote radio control TP5 can be used on its own for remote control of the heating in the vehicle.	22 1000 32 01 00
1 Radio remote control TP4i 12 / 24 volt The radio remote control TP4i can only be used in combination with the module clock.	22 1000 30 99 00
1 Radio remote control TP4i 12 / 24 volt The radio remote control TP4i can be used on its own or in combination with the mini-clock.	22 1000 31 39 00

Please note!

Control elements must be selected in accordance with the intended use of the *AIRTRONIC* and on the basis of the distinction: air or water heater, simple switching on and off, programme preselection and / or radio remote control. The control elements are supplied with operating instructions. These are intended to be handed over to the customer together with the mounting and operating instructions for the *AIRTRONIC*.

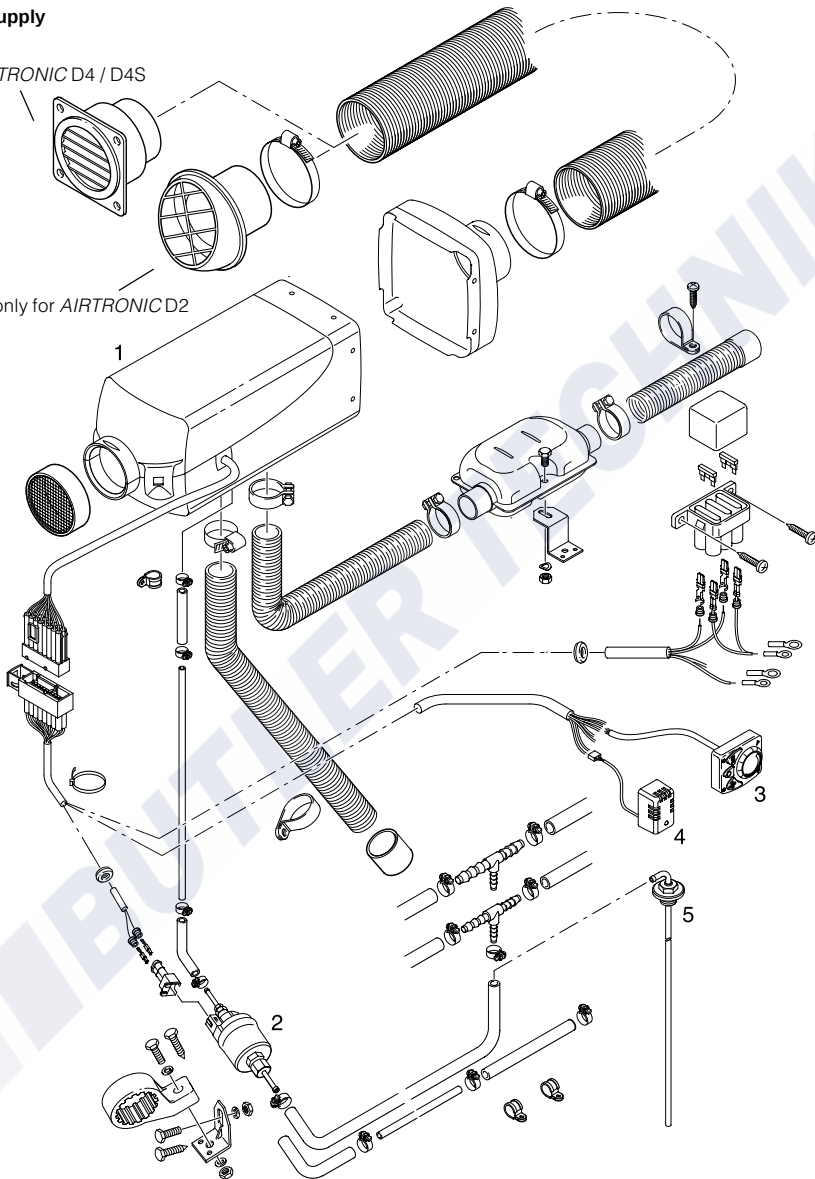


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Scope of supply

only for AIRTRONIC D4 / D4S

only for AIRTRONIC D2



Scope of supply – AIRTRONIC

- ① AIRTRONIC
- ② Dosing pump

Scope of supply – universal mounting kit

Parts without illustration no. are contained in the universal mounting kit.

Optional control elements / accessories

have to be ordered separately (for order number, refer to page 4).

The drawing shows

- ③ Mini controller AIRTRONIC
- ④ Temperature sensor, external
- ⑤ Tank connection

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Technical data

Heater		AIRTRONIC D2				AIRTRONIC D4 / D4S				
Heating medium		Air								
Heat flow settings		Step				Step				
		Power	Fast	Medium	Slow	Power	Fast	Medium	Slow	
Heat flow (watt)	D2 / D4	2200	1800	1200	850	4000	3000	2000	1000	
	D4S					3500	3000	2000	1000	
Hot-air throughput	D2 / D4	105	87	60	42	185	150	110	65	
without counterpressure (kg/h)	D4S					160	140	100	60	
Device guide number	D2 / D4	6 at outflow hood Ø 60 mm 12 at outflow hood Ø 75 mm				3 at outflow hood Ø 75 mm 10 at outflow hood Ø 90 mm				
	D4S					10 at outflow hood Ø 75 mm				
Fuel consumption (l/h)	D2 / D4	0.28	0.23	0.15	0.10	0.51	0.38	0.25	0.13	
	D4S					0.44	0.38	0.25	0.13	
Electrical input (watt)	During operation (12 V and 24 V)	D2 / D4	34	23	12	8	40	24	13	7
		D4S					40	30	16	8
	When starting (12 V and 24 V)	≤100				≤100				
	During control pause "OFF"	4 to 5				4 to 5				
	Rated voltage	12 V or 24 V								
Operating range										
Lower voltage limit		10.5 V and 21 V								
An under-voltage protecting device in the controller turns off the heater at approx. 10.5 V and 21 V		Response time – under-voltage protection: 20 seconds								
Upper voltage limit		16 V and 32 V								
An over-voltage protecting device in the controller turns off the heater at approx. 16 V and 32 V		Response time – over-voltage protection: 20 seconds								
Fuel		Commercial diesel fuel (DIN EN 590)								
For "Fuel quality" and "Fuel at low temperatures", see Operating Instructions page 19										
Permissible ambient temperature	Operation	–40 °C to +70 °C								
	Storage	–40 °C to +85 °C								
Maximum air-intake temperature		+40 °C								
Degree of radio interference suppression		3 for UKW, 4 for KW, 5 for MW / LW								
Weight		approx. 2.7 kg				approx. 4.5 kg				

All technical data ± 10 %

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ATTENTION!

Technical data specified have to be complied with in so far as this can be influenced and the minimum / maximum values may not be exceeded or fallen short of as this may lead to malfunctions of the *AIRTRONIC* and / or of the heating operation and/or to damage to components relevant to the heating.



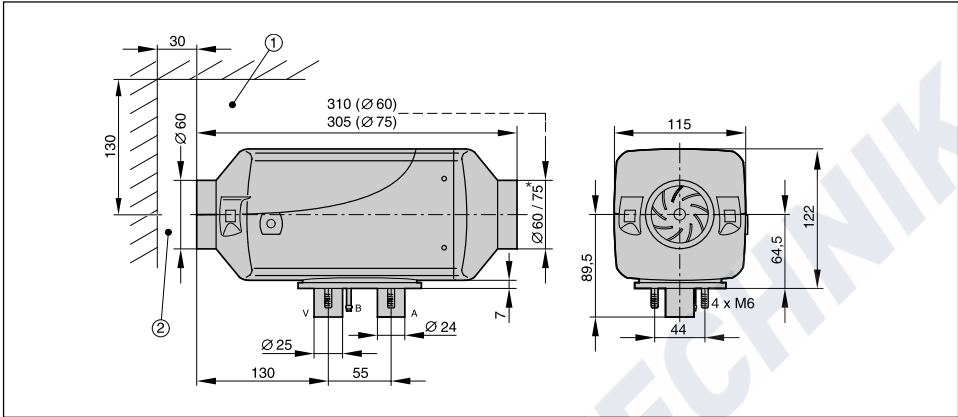
Noise emission inside the vehicle

The highest sound pressure level is < 56 dB (A), measured in the operating setting "Fast", in conformity with 3. GSGV and DIN 45 635 – Part 1.

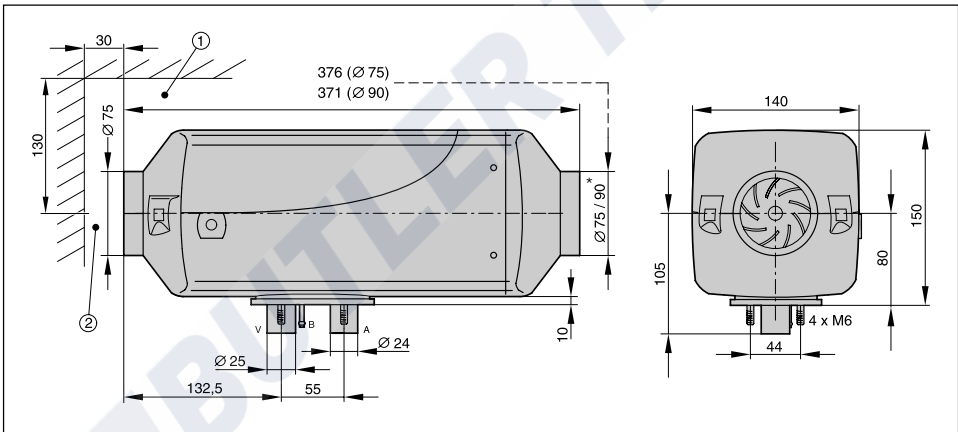


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Principal dimensions AIRTRONIC D2



Principal dimensions AIRTRONIC D4 / D4S



- ① Minimum installation distance (clearance) to open the lid and to dismount the glow plug and the control unit.
- ② Minimum installation distance (clearance) to take in heating air.

A = exhaust gas
B = fuel
V = combustion air

* Outflow hood for AIRTRONIC D2:
– Ø 60 mm, included in extent of delivery
– Ø 75 mm, available as an additional part

Outflow hood for AIRTRONIC D4:
– Ø 90 mm, included in extent of delivery
– Ø 75 mm, available as an additional part

Outflow hood for AIRTRONIC D4S:
– Ø 75 mm, included in extent of delivery
(Outflow hood Ø 90 mm is not permissible)

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Installation

The *AIRTRONIC* is suitable and approved for installation in vehicle spaces used by passengers. Installation in the driver's cab or passenger compartment of coaches with more than 9 seats is not permissible.

When installing in rooms used by persons, exhaust gas, combustion air and fuel lines in these rooms may not have any detachable connections and must be installed ensuring the breaches are splash-proof. Because of that, it is possible to mount the *AIRTRONIC* with its pedestal onto the vehicle floor or onto an outer wall of the vehicle using the flange gasket on the pedestal.

The electronic control unit is integrated in the *AIRTRONIC*, this considerably simplifies wiring during installation.

ATTENTION!

When mounting the *AIRTRONIC*, allow for an adequate clearance for the purpose of taking in the heating air and dismantling the glow plug and control unit.

Installing the *AIRTRONIC* in a vehicle used to transport dangerous substances

When installing the *AIRTRONIC* in vehicles used to transport dangerous substances, the requirements of GGVS / TRS 003 / ADR / ADR 99 have to be complied with in addition to those of the StVZO.

In conjunction with the corresponding electric wiring, the *AIRTRONIC* complies with the regulations GGVS / TRS 003 / ADR / ADR 99 (refer to the circuit diagrams at the end of these instructions).

Detailed information regarding the regulations GGVS / TRS 003 / ADR / ADR 99 is contained in the information sheet with the print number 25 2069 95 13 50.

Please note!

When used for cargo compartment / cargo heating, the standard *AIRTRONIC* control unit has to be replaced by the corresponding TRS 003 control unit (see heater price list or spare parts list).

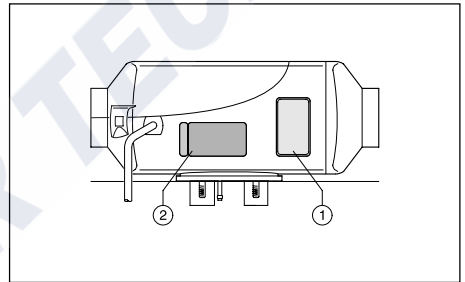
Type plate

The type plate of the *AIRTRONIC* is attached laterally, on the bottom shell.

The type plate must be clearly visible even after the heater has been installed. If necessary, a second type plate (duplicate) containing the details of the original one can be mounted at a point clearly visible after installation, either on the *AIRTRONIC* or on a cover installed in front of the *AIRTRONIC*.

A second type plate is not necessary if the original type plate becomes clearly visible once its cover has been removed without the use of tools.

The second type plate (duplicate) is affixed to the lower jacket shell and can be pulled off. If necessary, the fitting engineer can affix the duplicate in a visible position as described above.



- ① Original type plate
- ② Duplicate type plate

Original type plate

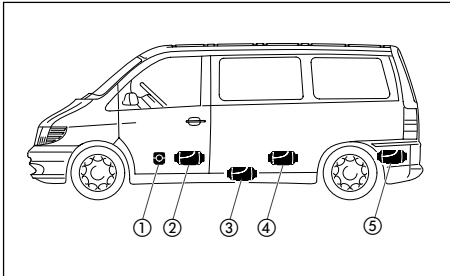
J. EBERSPÄCHER ESSLINGEN MADE IN GERMANY	
Heizgerät Typ	AIRTRONIC D2
Ausführung	D2
Ausführ. - Nr.	25 2069
Fabrik Nr.	
Prüfzeichen	~ S318
Brennstoff	Diesel
Elektr. Werte	34W 12V
Wärmestrom	2200 W
Betriebs- überdruck	-
 	
021516	
Erste Inbetriebnahme	
99 00 01	



Installation point

Point of installation in a passenger car / minivan

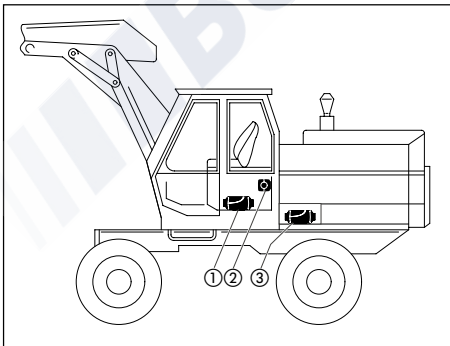
In a passenger car / minivan, the *AIRTRONIC* is preferably built into the passenger compartment or into the boot.
If it is not possible to install the heater in the passenger compartment or boot, the *AIRTRONIC* can also be mounted underfloor onto the vehicle floor.



- ① *AIRTRONIC* in front of the passenger seat
- ② *AIRTRONIC* between the driver's seat and the passenger seat
- ③ *AIRTRONIC* underfloor
- ④ *AIRTRONIC* beneath the rear bench seat
- ⑤ *AIRTRONIC* in the boot

Point of installation in the driver's cab of an excavator

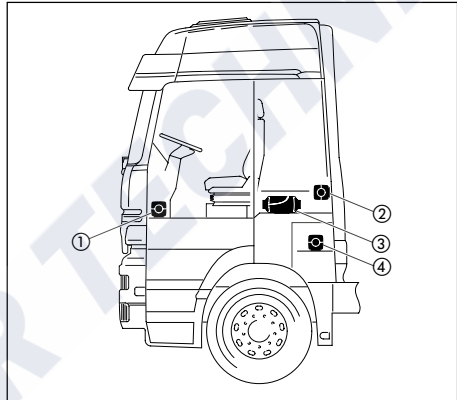
In an excavator, the *AIRTRONIC* is preferably built into the driver's cab. If it is not possible to install the heater in the driver's cab, the *AIRTRONIC* may also be installed in a storage box outside the driver's cab.



- ① *AIRTRONIC* in the box under the driver's seat
- ② *AIRTRONIC* on the rear wall of the driver's cab
- ③ *AIRTRONIC* in the protection box

Point of installation in a lorry

In a lorry, the *AIRTRONIC* is preferably built into the interior of the driver's cab.
If it is not possible to install the heater in the driver's cab, the *AIRTRONIC* can also be installed in the tool box or in a storage box.



- ① *AIRTRONIC* in the passenger footwell
- ② *AIRTRONIC* on the rear wall of the driver's cab
- ③ *AIRTRONIC* underneath reclining seat
- ④ *AIRTRONIC* in the tool box

ATTENTION!

The proposed points of installation given in these mounting instructions are examples.
Other points of installation are also permissible if they comply with the installation requirements specified in these mounting instructions.

Please note!

Further information concerning the installation (e.g. for boats and ships) may be obtained from the manufacturer on request.

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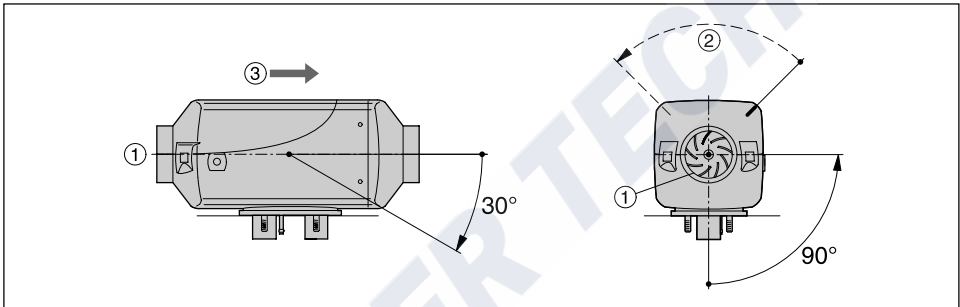
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Permissible mounting positions

The *AIRTRONIC* should preferably be installed in the normal position - as indicated in drawing. Depending on the installation conditions, the *AIRTRONIC* can be mounted according to diagram 1 at a slant of up to max. 30° (direction of flow downwards!), or swivelled around its own longitudinal axis through max. 90° (exhaust pipe vertical, glow plug pointing upwards!). On account of the inclined position of the vehicle or boat while travelling, during heating operations the illustrated normal or maximum positions can vary up to +15° in all directions without impairing the functions of the heater.

Normal position horizontal (exhaust pipe to the bottom) with permissible swivel range



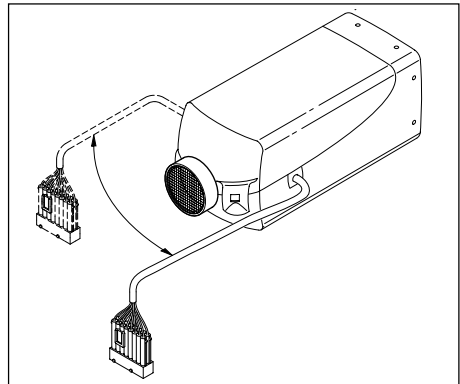
- ① Hot air intake (impeller)
- ② Position of glow plug
- ③ Direction of flow

Wire harness connection, right or left

If necessary, the wire harness connection can also be converted to the opposite side of the heater. To this end, the control unit needs to be dismantled and the bottom half-round wire harness covering unclipped.

The wire harness can now be relayed in the control unit.

Afterwards, reinstall the control unit, put on the shell and while doing so, insert the wire harness bush and the blind plug into the corresponding recesses in the bottom shell.





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Mounting

Drill break-through holes for exhaust gas, combustion air and fuel ducts according to the adjoining hole pattern.

The supporting surface for the heater's foot must be level. Tools can be obtained from the manufacturer for drilling the holes and for levelling the mounting surface.

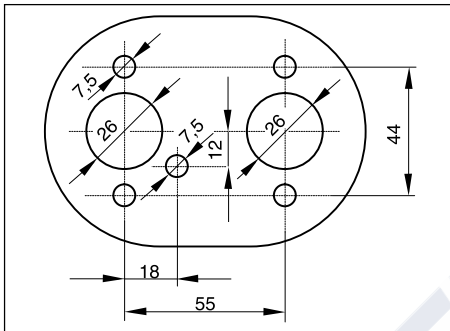
The 10.5 mm diam. hole for the "dosing pump" cable duct is not shown in the hole pattern and must be

drilled in keeping with the existing mounting conditions. An additional reinforcing plate must be used if the plate of the mounting surface is less than 1.5 mm thick.

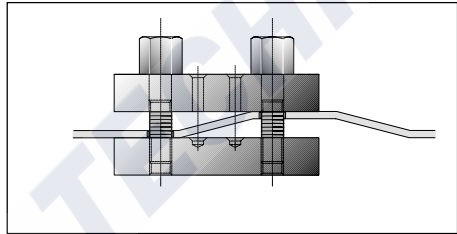
Order No. – Reinforcing plate 20 1577 89 00 03

Order No. – Levelling tool 99 1201 46 53 29

Hole pattern

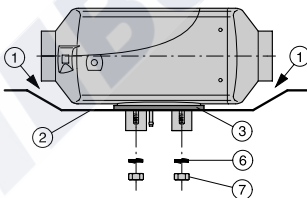


Special tools



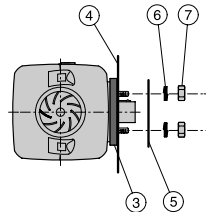
Mounting the AIRTRONIC

Mounting
on the vehicle floor



Tightening torque 5⁺¹ Nm

Mounting
on the vehicle wall
horizontal

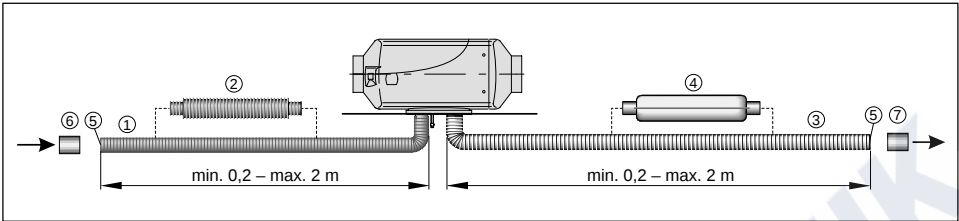


- ① A clearance between the AIRTRONIC and vehicle floor is absolutely necessary – in addition, check that the impeller is running freely
- ② Mounting surface must be level
- ③ Flange seal, must be mounted

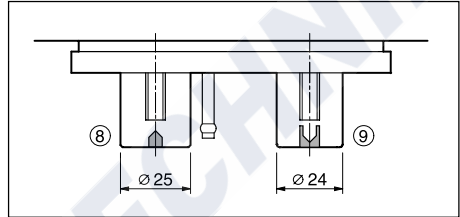
- ④ The vehicle wall must be level
- ⑤ Reinforcing plate (if necessary, see above)
- ⑥ Spring disk
- ⑦ Hexagon nut M6

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Conducting the combustion air / exhaust gas



- ① Combustion air hose, inside diam. = 25 mm
- ② Combustion air silencer, optional
- ③ Exhaust gas pipe, inside diam. = 24 mm
- ④ Exhaust gas silencer
- ⑤ Inlet and outlet opening – in front of the air stream
- ⑥ End sleeve – combustion air
- ⑦ End sleeve – exhaust gas
- ⑧ Combustion air
- ⑨ Exhaust gas



Danger of poisoning and burns!

Every combustion process creates exhaust gas which contains toxic constituents; for this reason and due to the high temperatures occurring, the exhaust gas duct needs to be absolutely carried out in accordance with the specifications of these mounting instructions.

During heating operation, avoid any work in the area of the exhaust gas duct.

In such a case, switch off the *AIRTRONIC* beforehand and wait until all parts have completely cooled down.

If necessary, wear protective gloves.

ATTENTION!

Exhaust gas can possibly reach far more than (on average) 280 °C at the outlet of the *AIRTRONIC* (in case of the malfunction 'overheating' up to max. 400 °C).

Due to this, the entire exhaust gas duct gets very hot and thus has to be laid and mounted such that there is always sufficient clearance to heat-sensitive components. Special attention needs to be paid to fuel lines (plastic or metal) and electric wiring both on the vehicle and on the heater side as well as to brake hoses and similar parts!

Exhaust gas pipes need to be securely fastened to avoid damage resulting from vibrations (recommended guideline: spaced approx. 50 cm).

Conducting the exhaust gas

The exhaust gas pipe must not protrude beyond the external limits of the vehicle.

The exhaust pipe must either slope downwards slightly, or a 5 mm diam. hole must be drilled into the lowest point of the pipe to allow condensate to drain off.

Always fasten the silencer; longer exhaust pipes must always be fastened at intervals of approx. 50 cm.

Arrange the exhaust gas outlet in such a manner that the exhaust gas cannot be immediately drawn in again.

The exhaust gas outlet must lead out into the open air.

The exhaust gas pipe must be arranged in such a manner that exhaust gas cannot enter the vehicle, be drawn in by the vehicle's fan or by the heater fan¹⁾, nor must it impair the function of vital vehicle parts in any way (ensure that an adequate distance is maintained).

Run the exhaust gas pipe in such a manner that it cannot be clogged up by dirt, snow or water (draining hole).

Do not direct the outlet of the exhaust gas pipe against the air-stream.

At the outlet of the exhaust gas pipe, the terminal sleeve with web provided for must have been mounted (statutory regulation).

¹⁾ This requirement is considered to be fulfilled when the end of the exhaust gas pipe is run upwards or to the side, or when the exhaust gas pipe passes underneath the vehicle floor to the vicinity of the side or rear limits of the driver's cab or the passenger compartment.



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Conducting the combustion air

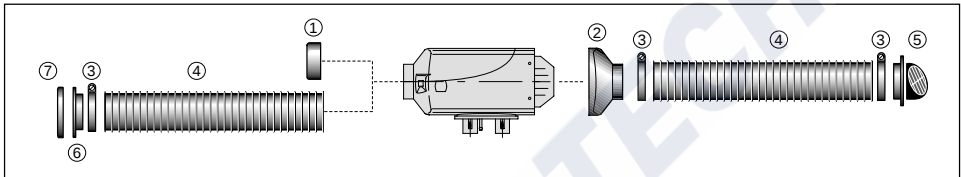
The combustion air must be drawn in from the outside (not from the passenger compartment or boot). The combustion air intake must be arranged in such a manner that it cannot draw in any exhaust gas. Do not position the suction opening of the combustion air hose in the opposite direction of the air-stream. Position the combustion air hose in such a manner that it cannot become clogged with dirt or snow, and any water that may have entered the hose can freely drain out again.

At the inlet of the combustion air hose, the terminal sleeve with web provided for must be mounted (statutory regulation).

Please note!

Small arrows indicating the flow direction (see drawing) have been cast into the connecting pieces so that they can be correctly assigned to combustion air and exhaust gas (see below).

Heating air duct (example)



- ① Protective grille
- ② Outflow hood
- ③ Hose clamp
- ④ Flexible tube
- ⑤ Air outlet, rotatable
- ⑥ Connecting piece
- ⑦ Protective grille

Please note!

When connecting up parts conducting air, please observe the device guide number in the technical specifications (see page 6)!



Danger of burns or injury!

The hoses of the hot air duct and their hot air exhaust must always be laid and mounted in such a manner that no thermal danger arises from them for man, beast or heat-sensitive material due to radiation / contact or due to hot air being directly blown onto them.

The exhaust hood must be pushed on at the hot air exhaust side. If no air hoses have been mounted, a protective grille must be pushed on at the hot air suction side and exhaust side to avoid injuries due to the hot air fan and/or burns due to the heat exchanger.

High temperatures occur on the hot air duct during and also immediately after heating operation. Avoid thus any work in the area of the hot air duct during heating operation. In such a case, switch off the *AIRTRONIC* beforehand and wait until all parts have completely cooled down. If necessary, wear protective gloves.

The heating air intakes have to be arranged in such a manner that, under normal operating conditions, they cannot draw in exhaust fumes from the vehicle's engine and from the *AIRTRONIC*, and that the heating air cannot be polluted by dust, salt fog, etc. In recirculation mode, the recirculated air inlet has to be positioned in such a manner that the outflowing hot air cannot be directly drawn in again. When checking the functions, the mean exhaust temperature after approx. 10 minutes of operation measured approx. 30 cm from the air outlet should not exceed 110 °C at an intake temperature of approx. 20 °C.

ATTENTION!

In the case of a possible malfunction due to overheating, heating air temperatures of up to max. 180 °C and surface temperatures of up to max. 150 °C may occur locally immediately prior to malfunction cut-off. For this reason, only heat-resistant hot air hoses approved by us may be used for the hot air duct!

Fuel supply



Danger of fire and explosion! Poisonous fumes!

Caution when handling fuel. Before filling up and when working on the fuel supply, switch off the vehicle's engine and the *AIRTRONIC*.
Avoid open fire when handling fuel.
Do not smoke; this also applies there where the presence of fuel is only noticeable on account of its characteristic smell.
Do not inhale petrol fumes.

ATTENTION!

Deviations from the instructions contained herein are not permissible as this could result in malfunctions.

Always mount the dosing pump with the delivery side ascending – minimum ascent 15°.

When using plastic pipes and hose connections, always insert appropriate supporting sleeves and hose clamps.

It is not permissible to tap fuel downstream of the vehicle's own feed pump.

If pressures exceeding 0.2 bar and up to max. 4.0 bar occur in the fuel line, a pressure reducer (order No. 22 1000 20 08 00) or a separate tank connection (refer to page 16) have to be used.

If pressures exceeding 4.0 bar occur in the fuel line, or if a return valve is installed in the return pipe (in the tank), a separate tank connection must be used.

Fuel hoses and pipes may only be cut into lengths with a sharp knife. Edges of cuts may not be indented and have to be free of burs.

Never use plastic pipes but always rubber hoses to connect the fuel branch pieces.

Protect dosing pump and filter against excessive heating, do not mount in the vicinity of exhaust silencers and exhaust pipes.

Fuel pipes must be securely mounted to avoid damage and / or the formation of noise resulting from vibrations (recommended guideline: spaced approx. 50 cm).

Never conduct or mount fuel pipes immediately along exhaust pipe ducts of the *AIRTRONIC* or vehicle engine! In case of crossovers, always ensure sufficient thermal distance, if necessary, install heat radiation guard plates.

§§ 45 and 46 StVZO have to be complied with when laying fuel pipes and installing additional fuel tanks.

- The most important extracts thereof:
Fuel pipes need to be executed such that twisting of the vehicle, movements of the engine and similar do not have a detrimental influence on the durability.
They must be protected against mechanical damage.
Fuel carrying parts must be protected against heat interfering with the operation and have to be arranged such that dripping or evaporating fuel can neither collect nor ignite on hot parts or on electrical installations.
In the case of coaches, fuel pipes and fuel tanks may not be situated inside the passenger compartment or driver's cab.
In the case of these vehicles, fuel tanks must be arranged such that in case of a fire, the exits are not immediately endangered.
The fuel may not be conveyed by means of gravitational force or excess pressure in the fuel tank.
Installation specifications for separate fuel tanks:
In the case of coaches, installation in the passenger's compartment or driver's cab is not permissible.
No vehicle's fuel filler neck may be situated within the passenger compartment or driver's cab.

Operation with bio-diesel (PME)

AIRTRONIC D2

AIRTRONIC D2 is not certified for use with bio-diesel. Admixtures of bio-diesel up to a magnitude of approx. 10%, as in some countries, are allowed.

AIRTRONIC D4 / D4S

AIRTRONIC D4 / D4S is certified for operation with bio-diesel as per DIN V 51606 in free-flowing state when installed in "normal horizontal position (exhaust pipe downwards)"; bio-diesel is not permitted for any other installation positions.

When using 100% bio-diesel, *AIRTRONIC* D4 / D4S should be operated with pure diesel fuel twice per year, preferably in the middle and at the end of a winter period, to burn off any possible PME residues: For this purpose, drain your vehicle tank as far as possible (caution: do not forget to leave enough fuel in the tank to get to the next fuel station!) and then fill the tank with pure diesel fuel without bio-admixture.

While using this tank filling, let *AIRTRONIC* D4 / D4S run at the maximum temperature pre-selection stage at least twice or three times for 30 minutes at a time. You can use this for example to pre-heat your vehicle before setting off. After this "diesel operation" of your *AIRTRONIC* D4 / D4S, you can use bio-diesel again as required.

When using mixtures of diesel / bio-diesel with up to 50% bio share, it is not necessary to use pure diesel fuel now and then.

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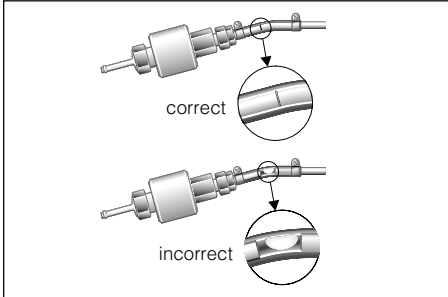
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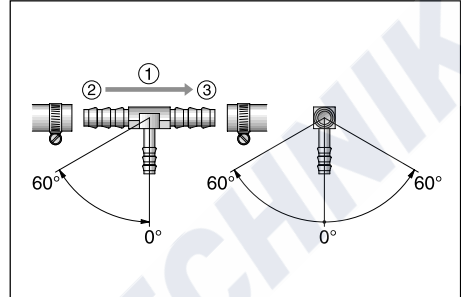
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ATTENTION!

When connecting fuel pipes to a fuel hose, always mount the fuel pipes abutting (see drawing).



When installing a T-piece, always keep to the mounting positions shown in the drawing.

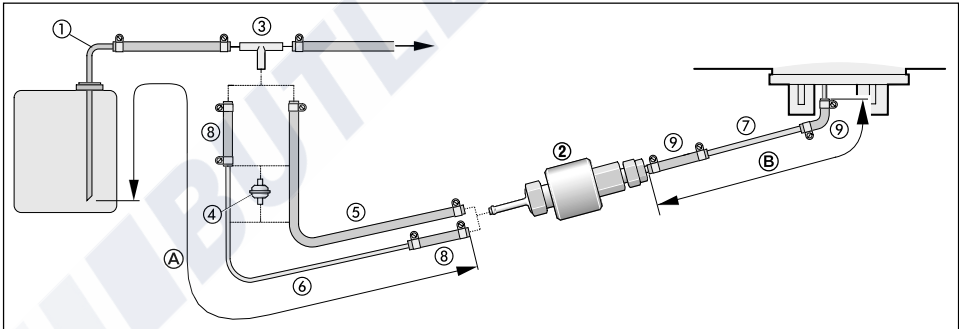


- ① flow direction
- ② from the fuel tank
- ③ to the vehicle engine

Tapping fuel with the T-piece from the fuel supply line

Precondition:

- Fuel lines must be tight.
- A maximum preliminary pressure of 0.2 bar can arise in the fuel lines in any operating mode.



- ① Fuel supply line from the tank fitting to the conveying pump.
- ② Dosing pump: should be installed in the vicinity of the tank.
- ③ T-piece.
- ④ Fuel filter – only required in connection with polluted fuel; supply / run-off must always be vertical.
- ⑤ Fuel hose, 5 x 3 (inside diam. = 5 mm).
- ⑥ Fuel pipe, 4 x 1 or 6 x 2 (inside diam. 2 mm).
- ⑦ Fuel pipe, 4 x 1.25 (inside diam. = 1.5 mm).
- ⑧ Transition piece – Order No. 25 1888 80 01 02; Fuel hose, 5 x 3 (inside diam. 5 mm), approx. 50 mm long – with fuel pipe, 6 x 2.
- ⑨ Fuel hose, 3.5 x 3 (inside diam. 3.5 mm), approx. 50 mm long.

Permissible line lengths

Suction side

A = max. 5 m

Pressure side

B = max. 6 m

With suction line,
inside diam. 2 mm, Pos. 6

B = max. 10 m

With suction line,
inside diam. 5 mm, Pos. 5

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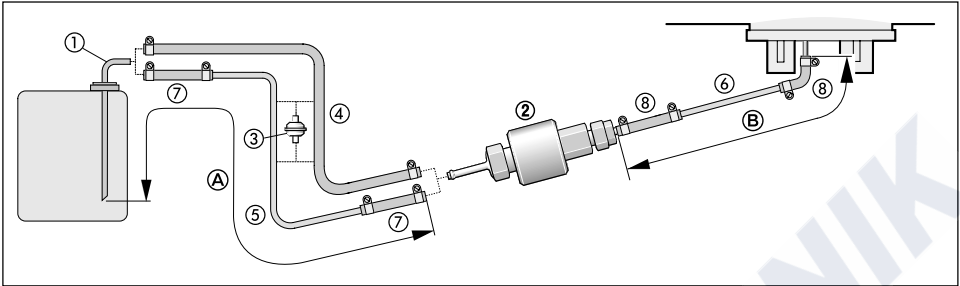
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Fuel tapping with separate tank connection



- ① Separate tank connection, 4 x 1 or 6 x 2 (inside diam. 2 mm) – ascending pipe built into the tank fitting or into the vehicle tank.
- ② Dosing pump: should be installed in the vicinity of the tank.
- ③ Fuel filter – only required in connection with polluted fuel; supply / run-off must always be vertical.
- ④ Fuel hose, 5 x 3 (inside diam. = 5 mm).
- ⑤ Fuel pipe, 4 x 1 or 6 x 2 (inside diam. 2 mm).
- ⑥ Fuel pipe, 4 x 1.25 (inside diam. = 1.5 mm).
- ⑦ Transition piece – Order No. 25 1888 80 01 02; Fuel hose, 5 x 3 (inside diam. 5 mm), approx. 50 mm long – with fuel pipe, 6 x 2.
- ⑧ Fuel hose, 3.5 x 3 (inside diam. 3.5 mm), approx. 50 mm long.

Permissible line lengths

Suction side

A = max. 5 m

Pressure side

B = max. 6 m

With suction line,
inside diam. 2 mm, Pos. 5

B = max. 10 m

With suction line,
inside diam. 5 mm, Pos. 4

Mounting position of the dosing pump

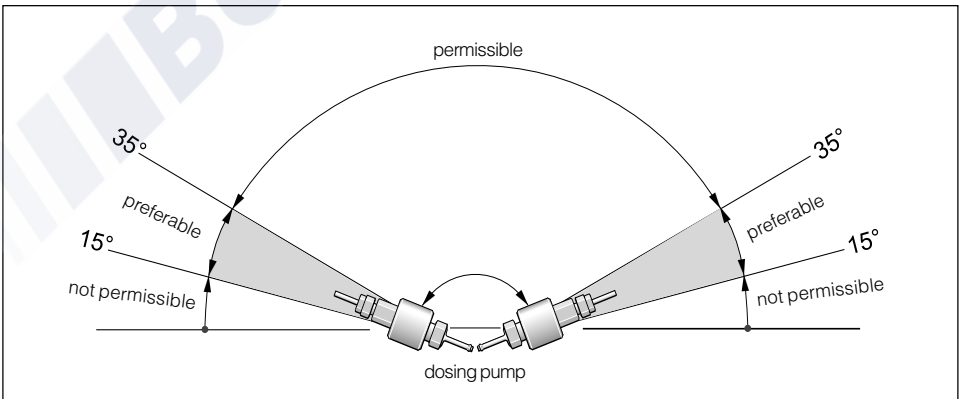
Always mount the dosing pump with the delivery side ascending.

It is absolutely necessary to observe a minimum ascent of 15°!

Any mounting position exceeding a min. ascent of 15° is permissible, however, the mounting positions should preferably range between 15° and 35°.

Please note!

As far as possible, install fuel pipes from the dosing pump to the *AIRTRONIC* in a steadily ascending manner.





Permissible suction and pressure level

Pressure level from the vehicle's tank to the dosing pump: a = max. 3 m

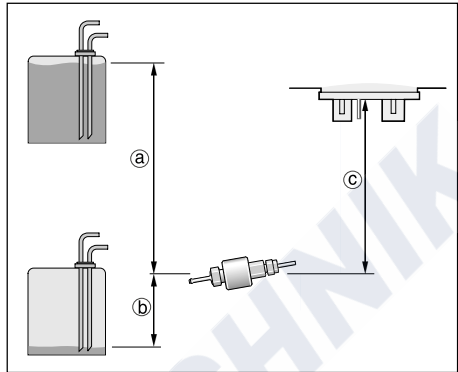
Suction level with a pressureless vehicle tank:
b = max. 1 m

Suction level with a vehicle tank in which fuel tapping produces a vacuum (valve with 0.03 bar in the tank closure):
b = max. 0.4 m

Manometric lift from the dosing pump to the *AIRTRONIC*:
c = max. 2 m

ATTENTION!

Check the tank venting.



Electrical system

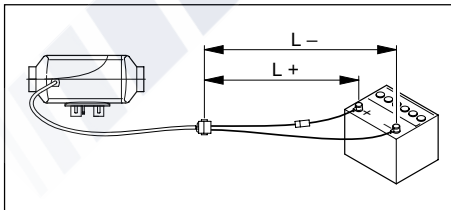
Electrical lines, switchgear and controllers must be positioned in the vehicle in such a manner that perfect performance under normal operating conditions is not impaired (e.g. due to the effects of heat, moisture and similar).

The pilot lamp (incorporated in the control unit) should be within the diver's field of view or it should be readily visible without entailing major effort.

The following cable cross-sections between battery and heater must be maintained to ensure that the maximum permissible voltage loss in the cables of 0.5 V at 12 V, and 1 V at 24 V rated voltage, is not exceeded.

Length of the supply cable "Plus" (L+ red) and "Minus" (L- brown), together

- < 5 m = cable cross section 2.5 mm²
- 5 m – 8 m = cable cross section 4 mm²



If the plus cable is to be connected to the fuse box (e.g. Cl. 30), then the vehicle's own cable from the battery to the fuse box must be taken into account when calculating the total cable length and, if necessary, be newly dimensioned.

Apply contact protection grease to the plug and earth connections outside the interior space.

ATTENTION!

Care needs to be taken that the insulation of electric wiring cannot be damaged due to fraying, kinking, damage, pinching or the effects of heat.

Electrical plug and earth connections have to be free of corrosion and tight.

In the case of watertight plugs, plug chambers which are not used need to be sealed with a blind plug in a dirt and water tight manner.

Apply contact protection grease to plug and earth connections which are not used indoors.

In stationary heating mode, electricity from the vehicle's battery is consumed; this electricity is recharged by the electric generator during a subsequent ride.

If the travelling time up to the next start of the heater is as a rule shorter than the preheating time (short-distance drivers), then the battery needs to be checked at regular intervals (depending on its rating) and possibly recharged. This can either be done out by means of a battery charger or by covering longer distances in between.

Rule of thumb:

minimum travelling time = preheating time

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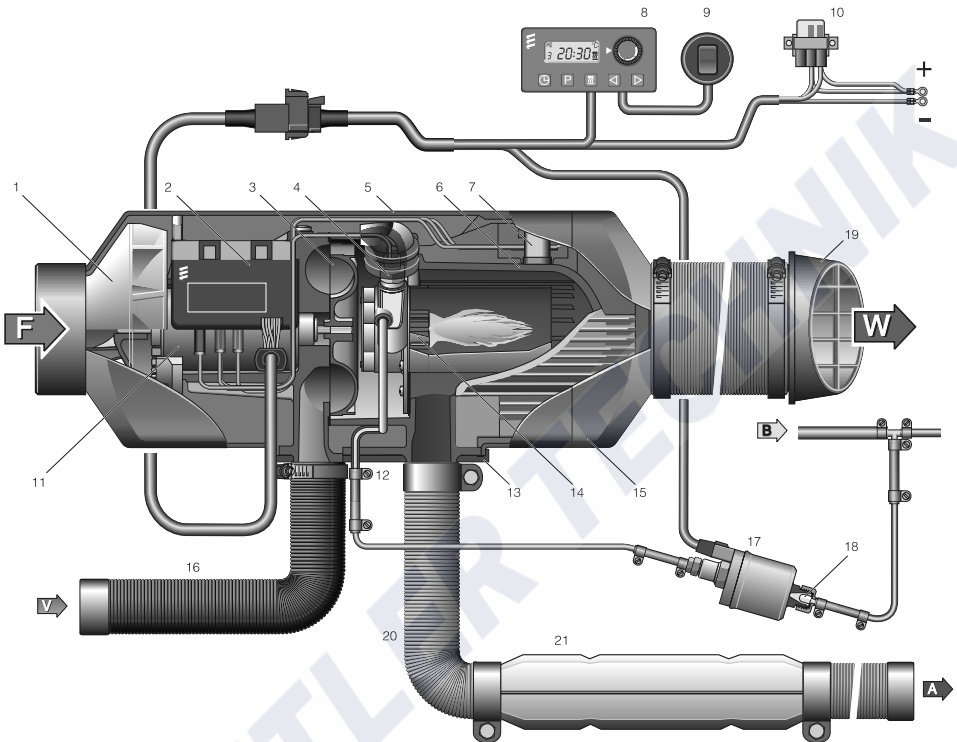
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Sectional drawing



- | | |
|----|--|
| 1 | Hot-air impeller |
| 2 | Control unit |
| 3 | Combustion air impeller |
| 4 | Glow plug |
| 5 | Cover |
| 6 | Heat exchanger |
| 7 | Sensor flame control / overheating |
| 8 | Module clock |
| 9 | Change-over switch 'heating / ventilating' |
| 10 | Fuse carrier with master fuse and fuse 'actuation' |
| 11 | Electric motor |
| 12 | Fuel connection |
| 13 | Flange seal |
| 14 | Combustion chamber |

- | | |
|----|--------------------------------------|
| 15 | Exhaust hood |
| | D2 = Ø 60 mm |
| | D4 = Ø 90 mm |
| | D4S = Ø 75 mm |
| 16 | Combustion air hose |
| 17 | Dosing pump |
| 18 | Cup sieve built into the dosing pump |
| 19 | Exhaust |
| 20 | Flexible exhaust gas pipe |
| 21 | Exhaust silencer |

- | | |
|---|---------------------------|
| F | = fresh air |
| W | = hot air |
| A | = exhaust gas |
| B | = fuel |
| V | = combustion air Function |



D2

Function

Switching on

The pilot lamp in the control element lights up when the heater is switched on.

The glow plug is switched on and the fan will start running at a low speed.

Please note!

If there is still too much residual heat in the heat exchanger from a previous heating operation, first only the fan (cold blowing) will run.

The heater will only start once all the residual heat has been dissipated.

Start

AIRTRONIC D2

Fuel starts to be delivered after approx. 60 seconds. The fuel-air mixture in the combustion chamber ignites. Once the combi-sensor (flame sensor) has detected the flame, the glow plug is switched off after 60 seconds. After another 120 seconds, the *AIRTRONIC* has reached the control stage "POWER" (maximum fuel quantity and maximum fan speed).

AIRTRONIC D4 / D4S

Fuel starts to be delivered after approx. 60 seconds. The fuel-air mixture in the combustion chamber ignites. Once the combi-sensor (flame sensor) has detected the flame, the glow plug is switched off after 80 seconds. The *AIRTRONIC* is in the control mode.

Temperature selection with the control element

The desired indoor temperature is preselected with the rotary control switch. Depending on the heater selected, on the size of the room to be heated and on the prevailing outdoor temperature, this value may range between +10 °C and +30 °C. The control switch setting to be selected is an experimental value.

Control in heating mode

In heating mode, the room temperature and the temperature of the heating air taken in is continuously measured. Control commences if the temperature exceeds the temperature preselected on the control element. 4 control levels have been provided for so that the heat flow supplied by the heater can be accurately adapted to the heating requirements. Each control setting has its own fan speed and fuel quantity. If the adjusted temperature is even exceeded at the lowest control level, then the *AIRTRONIC* is adjusted to the 'OFF' control level and the fan will continue to run for approx. 4 minutes to allow the heater to cool down.

Afterwards the fan will continue to run at the slowest speed (recirculation mode) or will be switched off (fresh air mode) until a renewed start of the heater.

Fan mode

To start the *AIRTRONIC* in fan mode, the change-over switch 'heating / ventilating' needs to be actuated first before the heater is switched on.

Switching off

As soon as the *AIRTRONIC* is switched off, the pilot lamps go out and fuel pumping is switched off. The fan will continue to run for approx. 4 minutes to cool down the heater.

For cleaning, the glow plug is switched off for 40 seconds while the fan is still running.

Special case:

If no fuel has been delivered until switch-off, or if the *AIRTRONIC* is set to the 'OFF' control level, then the *AIRTRONIC* is stopped without the fan continuing to run.

Model GGVS / TRS 003 / ADR / ADR 99

The *AIRTRONIC* is GGVS / TRS 003 / ADR / ADR 99 suitable. If, in conformity with StVZO (D), the *AIRTRONIC* is to be built into road tankers used to transport dangerous substances for the purpose of heating the driver's cab, the GGVS / TRS 003 / ADR / ADR 99 regulations have to be complied with. (More detailed information regarding the GGVS / TRS 003 / ADR / ADR 99 regulations can be found in the information sheet with the print No. 25 2069 95 13 50).

For the wiring, refer to the circuit diagrams at the end of these instructions.

Heating operation at high altitudes

- Up to 1500 m:
Unrestricted heating operation is possible.
- Above 1500 m:
Heating operation is in principle possible for short periods, e.g. when crossing a mountain pass or during a brief stop.
In case of extended stays (e.g. winter camping), the fuel supply has to be adapted to high altitude conditions. Please consult the responsible regional sales agency.

Please note!

The operating instructions included with the control units have to be handed over to the customer.

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Control and safety devices

- If the *AIRTRONIC* does not ignite within 90 seconds after fuel pumping has started, then the start is repeated in the manner described (refer to page 19).
A malfunction cut-off is effected if after a further 90 seconds of fuel pumping the *AIRTRONIC* once again fails to ignite, i.e. fuel pump switches off and the ventilator continues to run for approx. 4 minutes.
- If the flame extinguishes by itself during operation, a renewed start is carried out first. If the *AIRTRONIC* fails to ignite within 90 seconds after fuel pumping has started again or if it does ignite but then extinguishes itself within the next 15 minutes, a malfunction cut-off is effected, i.e. fuel pump switches off and the ventilator continues to run for approx. 4 minutes.
It is possible to override a malfunction cut-off by briefly switching the heater off and on again.
Do not repeat this more than twice in succession!
- In the case of overheating, the flame monitor / overheating sensor will respond, the fuel supply will be interrupted and a malfunction cut-off will be effected.
Once the cause of overheating has been eliminated, the *AIRTRONIC* can be restarted by briefly switching it off and on again.
- If the upper or lower voltage limit is reached, a malfunction cut-off is effected after 20 seconds.
- The *AIRTRONIC* will not start if the glow plug or ventilator motor is defective or if the electrical line to the dosing pump is interrupted.
- In the case of defect sensor – flame monitoring / overheating or interrupted electric lead, the *AIRTRONIC* starts and the malfunction shutdown then takes place during the start phase.
- The speed of the fan motor is continuously monitored.
If the fan motor does not start or if the speed deviates by more than 10%, a malfunction cut-off is effected after 30 seconds.
- When switching off the *AIRTRONIC*, the glow plug is switched on for 40 seconds, while the fan motor is running, (afterglowing) to clean it of any combustion residues.

Forced cut-off in GGVS / TRS 003 / ADR / ADR 99

If it has been installed in vehicles used to transport dangerous substances (e.g. road tankers), the *AIRTRONIC* must be switched off before any hazardous area (refinery, petrol station, etc.) is entered. If this is not complied with, the *AIRTRONIC* will automatically shut down if:

- The vehicle's engine is turned off.
- An accessory unit is switched on (e.g. auxiliary drive for the unloading pump)
- A vehicle door is opened (TMD regulation; only in France).

After cut-off, the fan will briefly continue to run for max. 40 seconds.

In the event of a malfunction, check the following points

If the *AIRTRONIC* does not start when it is switched on:

- Switch off the *AIRTRONIC* and then switch it back on again, but no more than twice in succession.

If the *AIRTRONIC* still does not start, then check:

- Is there fuel in the tank?
- Have any fuses blown?
AIRTRONIC 12 V – main fuse 20 A
AIRTRONIC 24 V – main fuse 10 A
AIRTRONIC 12 / 24 V – fuse, actuation 5 A
- Are all electric wires and connections ok?
- Are the heating-air duct, combustion-air duct or the exhaust-gas duct blocked?

If all the above points are ok, conduct a diagnostic test with the JE-diagnostic instrument or with the module clock as described in the trouble shooting and repair instructions for the *AIRTRONIC*.

Please note!

In order to protect the electric / electronic components of the *AIRTRONIC* while electric welding work is being carried out on the vehicle, the battery's positive pole is to be disconnected and connected to earth.

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D2

The *AIRTRONIC* / control elements must be connected in accordance with the circuit diagrams at the end of these instructions.

Circuit diagrams *AIRTRONIC* – parts list

- 1.1 Burner motor
 - 1.2 Glow plug
 - 1.5 Overheating and flame sensor
 - 2.1 Controller
 - 2.2 Dosing pump
 - 2.7 Main fuse
12 volt = 20 A; 24 volt = 10 A
 - 2.7.1 Fuse, actuation 5 A
 - 5.1 Battery
 - 5.2.1 Battery operating switch d)
(operation e.g. controlled via ignition lock)
- Emergency-shutdown function in the case of GGVS / TRS 003 / ADR / ADR 99 – item 5.2.2 – 5.5
- 5.2.2 Battery separating switch d)
 - 5.3 Accessory drive HA+
 - 5.3.1 Switch auxiliary drive
 - 5.5 Generator D+
- a) Connect the control elements and external sensors according to the "Control Elements" circuit diagram
- rt Supply plus terminal 30
 - ge Switch-on signal S+
 - gr Temperature – actual value
 - wsrt Switch off theft warning system
(Feedback to GGVS / TRS 003 / ADR / ADR 99 switch clock)
 - br Supply minus terminal 31
 - blws Diagnosis
 - grtt Temperature – target value
 - brws Sensor reference signal
- b) Optional
- Fresh-air blower and / or
 - Vehicle fan control
- c) Wiring if operated subject to GGVS / TRS 003 / ADR / ADR 99 (transporters carrying dangerous substances in the utility vehicle sector, e.g. road tanker)
- d) If only one control element is used for items 5.2.1 and 5.2.2, it must be ensured that, if the function 'opening of battery separating switch' is actuated (emergency shutdown-function in the case of GGVS / TRS 003 / ADR / ADR 99 and similar), the switch always breaks contact without delay (without consideration for the heater mode) and breaks all of the heater's circuits from the battery.

Cable ends that are not being used must be isolated. Plug and socket case are shown from the cable entry side.

Circuit diagrams control elements – parts list

- 2.15.1 Sensor, room temperature
 - 2.15.9 Sensor, outside temperature
 - 3.1.9 Change-over switch 'heating / ventilating'
 - 3.1.16 Remote radio control button
 - 3.1.17 *AIRTRONIC* mini controller
 - 3.1.18 *CALLTRONIC* push-button
 - 3.2.8 Module clock (GGVS / TRS 003 / ADR / ADR 99 – potentiometer)
 - 3.2.12 Time switch mini 12 / 24 volts
 - 3.2.14 Time switch mini lightning (only 12 volts)
 - 3.3.6 Remote radio control TP41i, stationary device
 - 3.3.7 Remote radio control TP5, stationary device
 - 3.3.8 *CALLTRONIC* remote control
 - 3.8.3 Antenna
 - 3.9.1 Diagnosis unit, JE diagnosis
- a) Connect the control elements to the heater
- rt Supply plus terminal 30
 - ge Switch-on signal S+
 - gr Temperature – actual value
 - wsrt Switch off theft warning system
(Feedback to GGVS / TRS 003 / ADR / ADR 99 switch clock)
 - br Supply minus terminal 31
 - blws Diagnosis
 - grtt Temperature – target value
 - brws Connection to earth for external temperature sensor and temperature target value
- b) Terminal 15 – necessary when connecting TP4i
- c) Lighting terminal 58
- d) Connection for diagnosis unit
- e) Connection for external temperature sensor
- g) Connection for external heater key
- h) Connection for TP4i remote control
- j) Connection for outside temperature sensor
- l) Connection change-over switch 'heating / ventilating' (optional). How to start: operate change-over switch 'heating / ventilating', then switch on the *AIRTRONIC*.
- z) Lighting terminal 58

Cable ends that are not being used must be insulated. Plug and socket case are shown from the cable entry side.

Cable colours

sw = black	vi = violet
ws = white	br = brown
rt = red	gr = grey
ge = yellow	bl = blew
gn = green	li = purple

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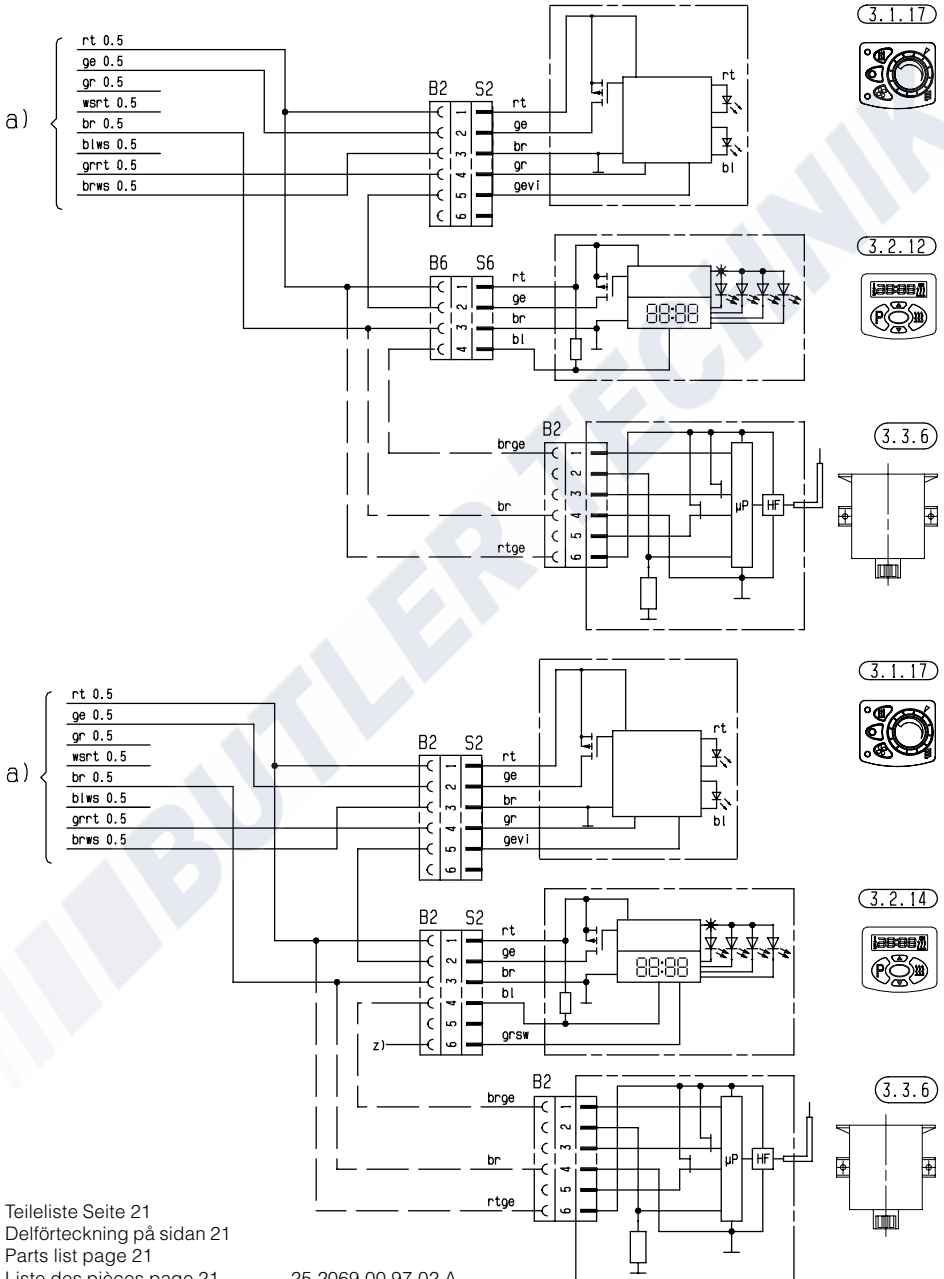
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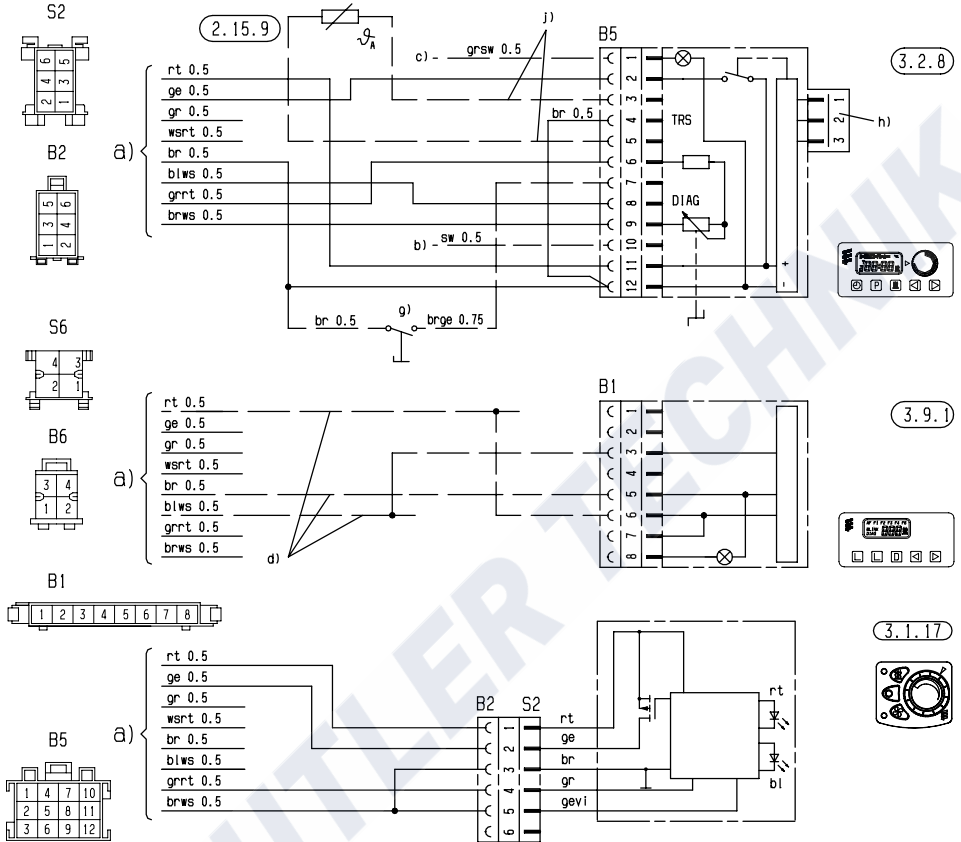
Bedienelemente / Kontrollenheter / Control Elements / Éléments de commande



Teileliste Seite 21
Delförteckning på sidan 21
Parts list page 21
Liste des pièces page 21

D2

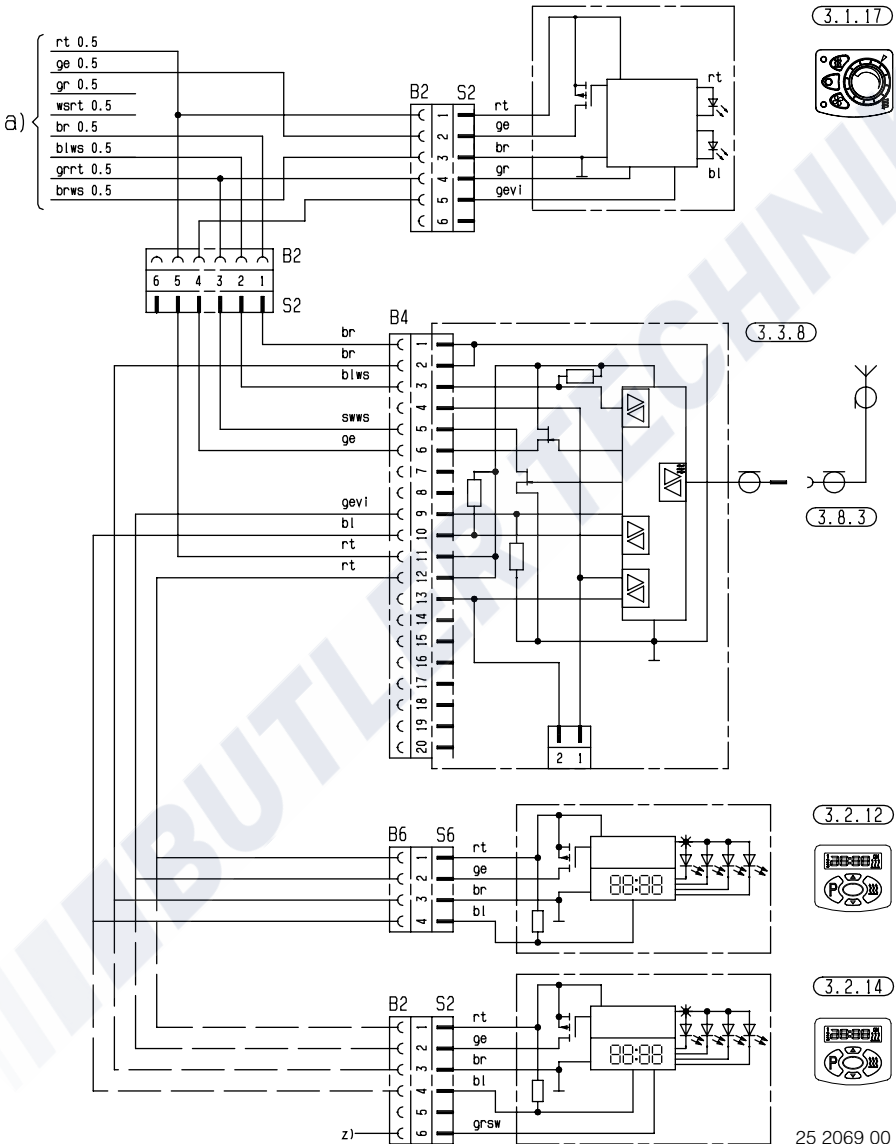
Bedienelemente / Kontrollenhet / Control Elements / Eléments de commande



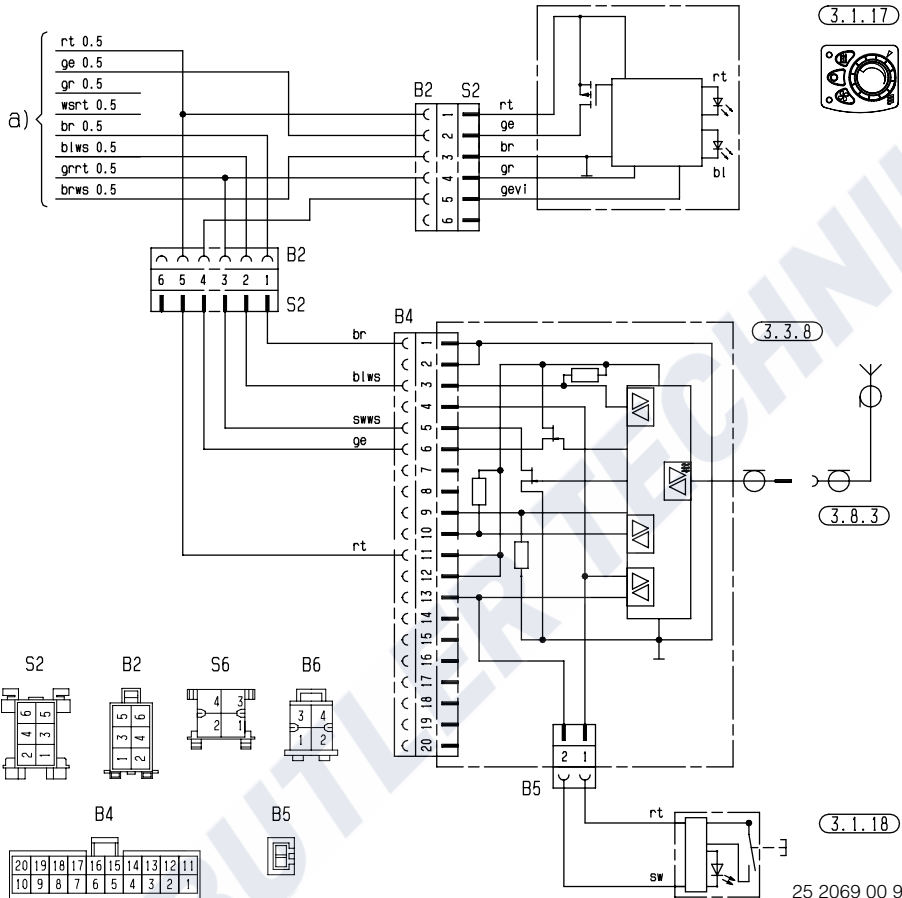
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Bedienelemente / Kontrollenhet / Control Elements / Eléments de commande



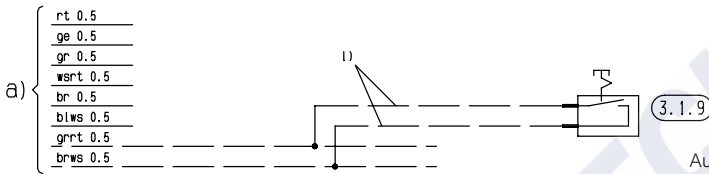
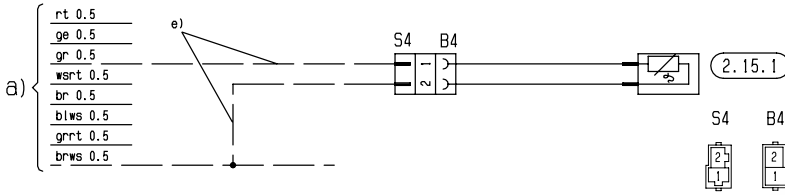
Bedienelemente / Kontrollenheter / Control Elements / Eléments de commande



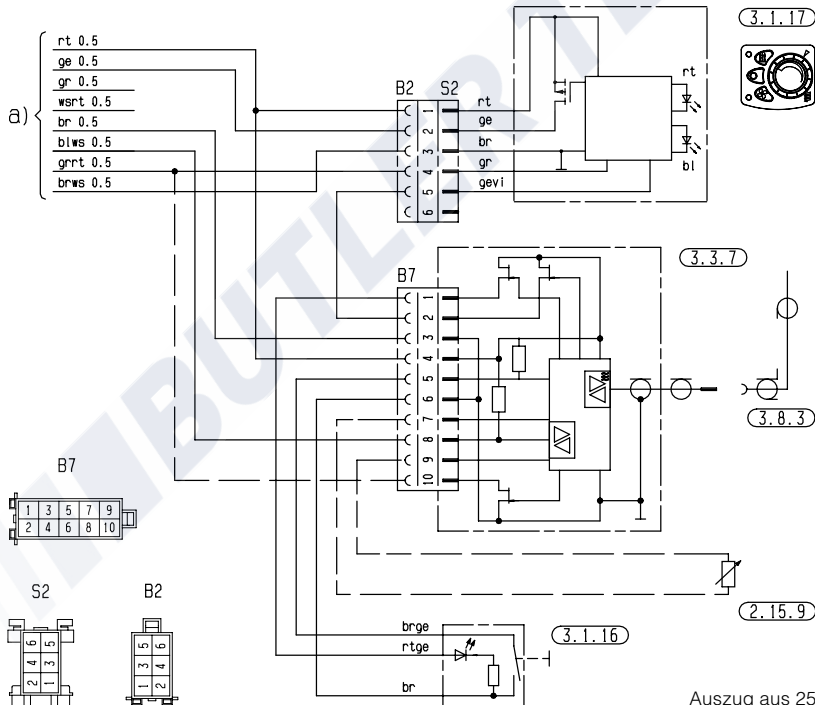
Teilleiste Seite 21
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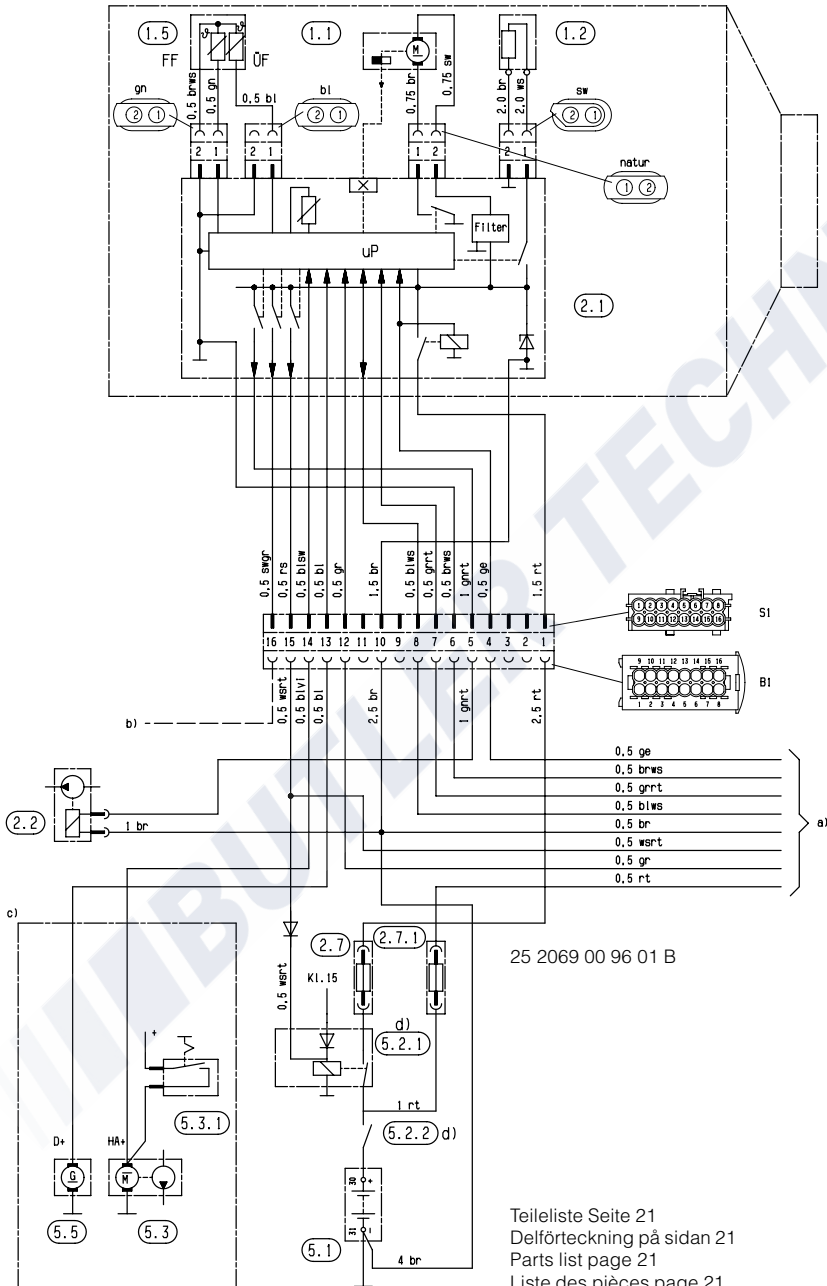


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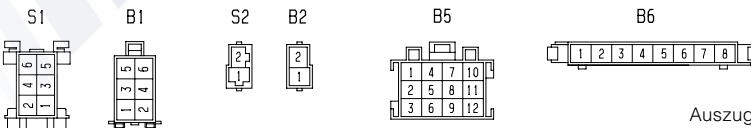
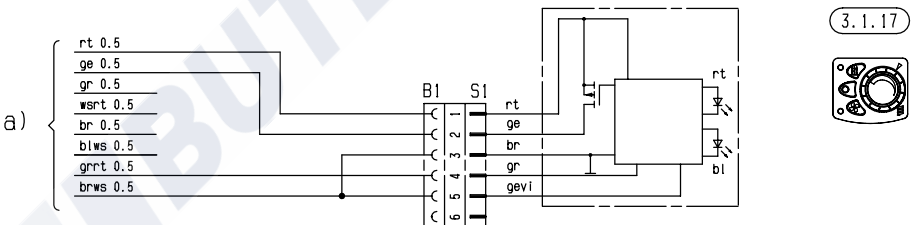
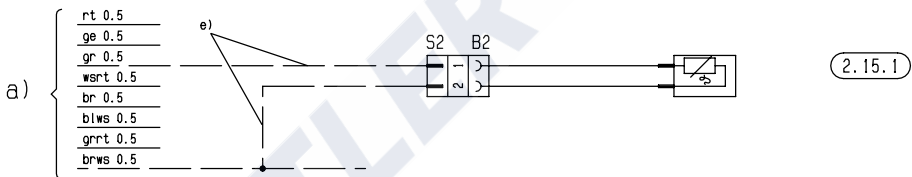
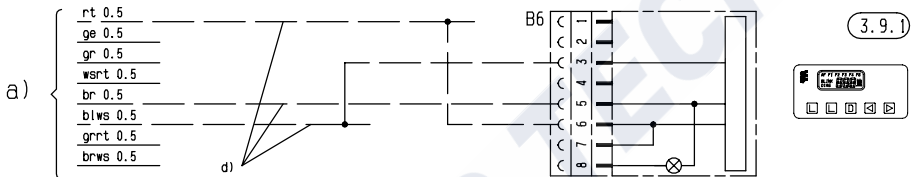
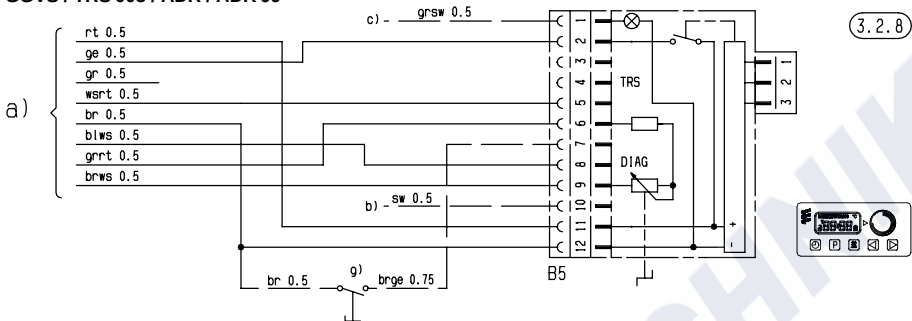
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AIRTRONIC D2 / D4 / D4S – GGVS / TRS 003 / ADR / ADR 99





Bedienelemente / Kontrollenheter / Control Elements / Eléments de commande –
GGVS / TRS 003 / ADR / ADR 99



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