

# HYDRONIC<sup>\*</sup> B 5 W S and D 5 W S

Technical Description  
Mounting Instructions



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Documentation  
for installation\*

## Engine-independent water heater

### HYDRONIC B 5 W S for petrol

	Order No.
HYDRONIC B 5 W S – 12 V Universal mounting kit	20 1793 05 00 00 20 1777 80 00 00
HYDRONIC B 5 W S – 12 V As a complete package	20 1794 05 00 00

### HYDRONIC D 5 W S for diesel

	Order No.
HYDRONIC D 5 W S – 12 V Universal mounting kit	25 2100 05 00 00 20 1777 80 00 00
HYDRONIC D 5 W S – 12 V As a complete package	25 2101 05 00 00
HYDRONIC D 5 W S – 24 V Universal mounting kit	25 2146 05 00 00 25 2009 80 00 00



## Contents

	Page
Items supplied .....	2, 3
Control elements, optional .....	2
Government regulations and safety instructions concerning installation .....	4
Technical data .....	5
Sectional drawing .....	6
Principal dimensions / Installation .....	7
Mounting instructions / mounting example .....	8

	Page
Permissible mounting positions .....	9
Connection to the cooling water circuit .....	10 – 12
Conducting the combustion air / exhaust gas .....	13
Fuel supply .....	14 – 17
Circuit diagrams .....	18 – 21
Function .....	22
Controls and safety devices .....	23
ADR / TRS 003 / TMD – mode of operation .....	23

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

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## Items supplied

Quantity / Designation	Order No.
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1 <i>HYDRONIC</i> B 5 W S – 12 volt	20 1793 05 00 00
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To be additionally ordered:

1 Universal mounting kit	20 1777 80 00 00
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or

1 <i>HYDRONIC</i> B 5 W S – 12 volt As a complete package*	20 1794 05 00 00
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1 <i>HYDRONIC</i> D 5 W S – 12 volt	25 2100 05 00 00
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To be additionally ordered:

1 Universal mounting kit	20 1777 80 00 00
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or

1 <i>HYDRONIC</i> D 5 W S – 12 volt As a complete package*	25 2101 05 00 00
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1 <i>HYDRONIC</i> D 5 W S – 24 volt	25 2146 05 00 00
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To be additionally ordered:

1 Universal mounting kit	25 2009 80 00 00
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\* The complete package consists of:

1 *HYDRONIC* B 5 W S or D 5 W S

1 Universal mounting kit

## Optional extras

1 Check valve, Ø 18 mm	254 00 070
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1 Check valve, Ø 20 mm	254 00 074
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1 Comfort mounting kit for engines from 2.5 l cubic capacity	24 0132 00 00 00
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The comfort mounting kit includes the following:

1 thermostat, Ø 18 mm

1 T-piece, Ø 18 mm

1 check valve, Ø 18 mm

1 water hose, Ø 18 mm

10 hose clamps

Please refer to the Extra Parts Catalogue for other additional parts.

## Attention!

Before switching on or preprogramming the heating, put the vehicle's heating lever (provided the vehicle is equipped with one) to "HOT" (maximum position) and the fan to "slowest speed" (low current consumption).

For vehicles with automatic heating, put the heating lever to "MAX." and the desired damper position to "OPEN" before switching off the ignition.

## Control elements, optional

Quantity / Designation	Order No.
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1 Change-over switch	22 1000 31 89 00
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'heating / ventilating' 12 / 24 volt  
Can only be used in combination with a control element.

1 Mini-clock – 12 / 24 volt	22 1000 31 31 00
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The mini-clock can be combined with the TP 41 / TP 41i radio remote control.

1 Module clock – 12 / 24 volt with temperature preselection	22 1000 30 34 00
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The module clock can be combined with the TP 4 / TP 4i radio remote control.

1 Mounting parts for the module clock – only required when installed with a shade	25 1482 70 01 00
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1 TP 41 radio remote control	22 1000 31 35 00
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TP 41i radio remote control 12 / 24 volt	22 1000 31 39 00*
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The TP 41 / TP 41i radio remote control can be used on its own or in combination with the mini-clock – Order No. 22 1000 31 31 00.

1 TP 4 radio remote control	22 1000 30 63 00
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TP 4i radio remote control 12 / 24 volt	22 1000 30 99 00*
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The TP 4 / TP 4i radio remote control can only be used in combination with the module clock.

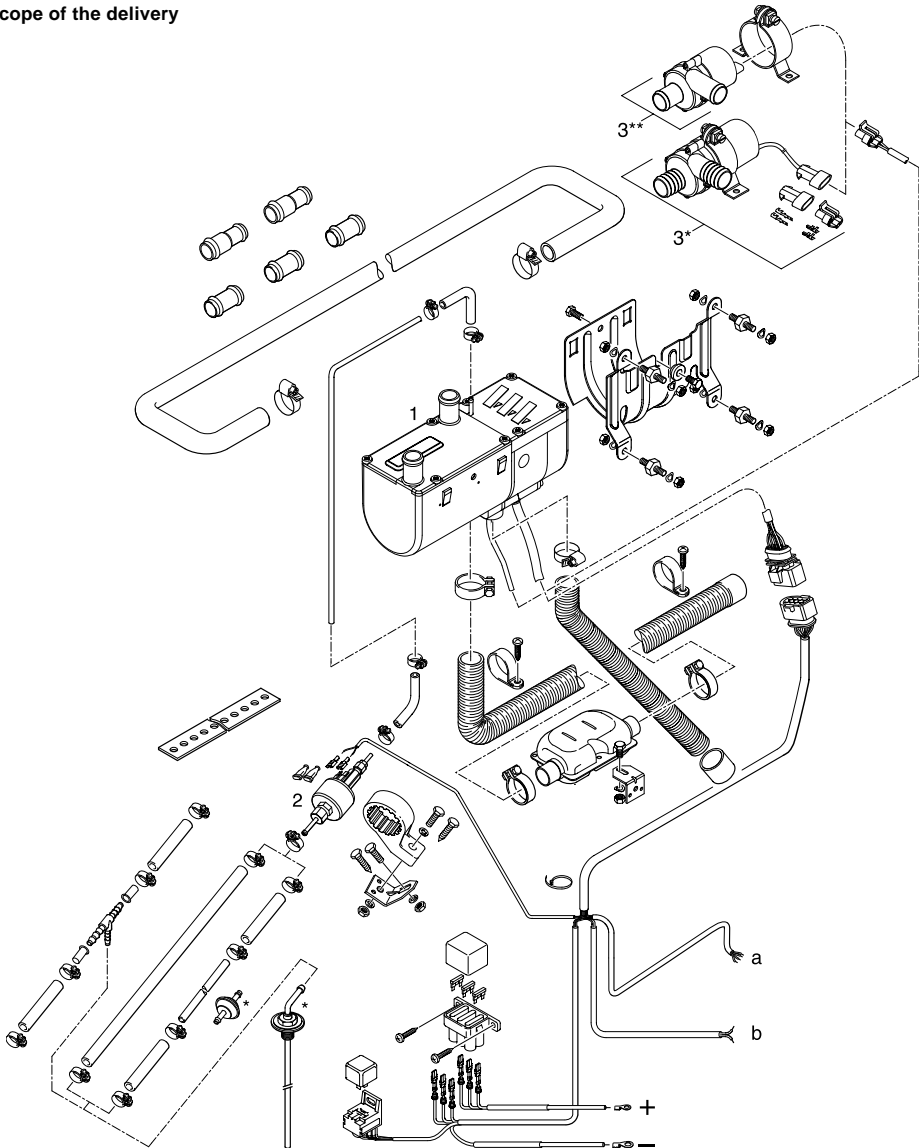
\* Outside Germany only the I-version radio remote controls may be permissible

## Please note!

Control elements must be selected in accordance with the intended use of the *HYDRONIC* 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 *HYDRONIC*.



## Scope of the delivery



① Heater *HYDRONIC B 5 W S / D 5 W S*

② Dosing pump

③ Water pump

\* Part only contained in scope of supply of *HYDRONIC 24 V* and in kit 25 2009 80 00 00.

\*\* Part only contained in scope of supply of *HYDRONIC 12 V*.

Parts without drawing number are included in the universal mounting kit.


a = drive control elements


b = drive fan



## Statutory regulations concerning the installation of the *HYDRONIC*

- 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.

*HYDRONIC* B 5 W S  S 288

*HYDRONIC* D 5 W S  S 274

- 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. ADR / TRS 003 / TMD 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 (Section 7.4a of Annex VIII 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).



## Safety instructions concerning the installation and repair of the *HYDRONIC*

### Danger of burns and injury!

Before commencing any work on the *HYDRONIC*, disconnect the vehicle battery.

Always switch off the *HYDRONIC* prior to any repair work and allow hot components to cool down.

### ATTENTION !

### Important instructions for the installation and repair of the *HYDRONIC*

When mounting or repairing the heater, only original accessories and original spare parts may be used. Changes to the *HYDRONIC* 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.

Fuel pipes and exhaust pipes must be safely fastened, to avoid damage from vibrations (recommendation: at intervals of approx. 50 cm).

Ensure that the insulation of electrical lines cannot be damaged due to abrasion, kinking, squeezing or by exposure to heat.

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 *HYDRONIC*. 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 *HYDRONIC* 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 *HYDRONIC*' as well as 'Important instructions concerning the installation' have been printed directly in the corresponding sections of these mounting instructions.

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## Technical data

Heater		B 5 W S		D 5 W S	
Heating medium		Water, glycol compounds			
Heat flow settings		Large	Small	Large	Small
Heat flow (watt)		5000	1500	5000	2300
Fuel consumption (l/h)		0.69	0.20	0.62	0.27
Electrical input (watt)	During operation	37	10	37	10
	When starting	< 110		< 100	
	During after running	8		8	
Rated voltage		12 V		12 V	24 V
Operating range		10.2 V		10.2 V	20.4 V
Lower voltage limit An under-voltage protecting device in the controller turns off the heater at approx. 10 V (after 20 seconds)		16 V		16 V	32 V
Upper voltage limit An over-voltage protecting device in the controller turns off the heater at approx. 16 V (after 20 seconds)					
Permissible working pressure		up to 2.5 bar excess pressure			
Water throughput of water pump against 0.1 bar		800 l/h		800 l/h	950 l/h
Electric power consumption water pump		16 W		16 W	12 W
Min. water flow rate of heater		300 l/h			
Fuel For “Fuel quality” and “Fuel at low temperatures” see Operating Instructions		Commercial petrol (acc. to DIN 51600 and DIN EN 228)		Commercial diesel fuel (acc. to DIN EN 590) PME (acc. to DIN V 51606) only at D 5 W S, 24 V	
Permissible ambient temperature					
Operation – <i>HYDRONIC</i>		–40 °C to +80 °C		–40 °C to +80 °C	
Operation – Dosing pump		–40 °C to +20 °C		–40 °C to +80 °C	
Storage – <i>HYDRONIC</i> / Dosing pump		–40 °C to +105 °C			
Degree of radio interference suppression		5 for VHF / SW / MW 2 for LW			
Weight without water and add on pieces including water pump and dosing pump		approx. 2.3 kg approx. 2.9 kg			

All technical data ± 10 %

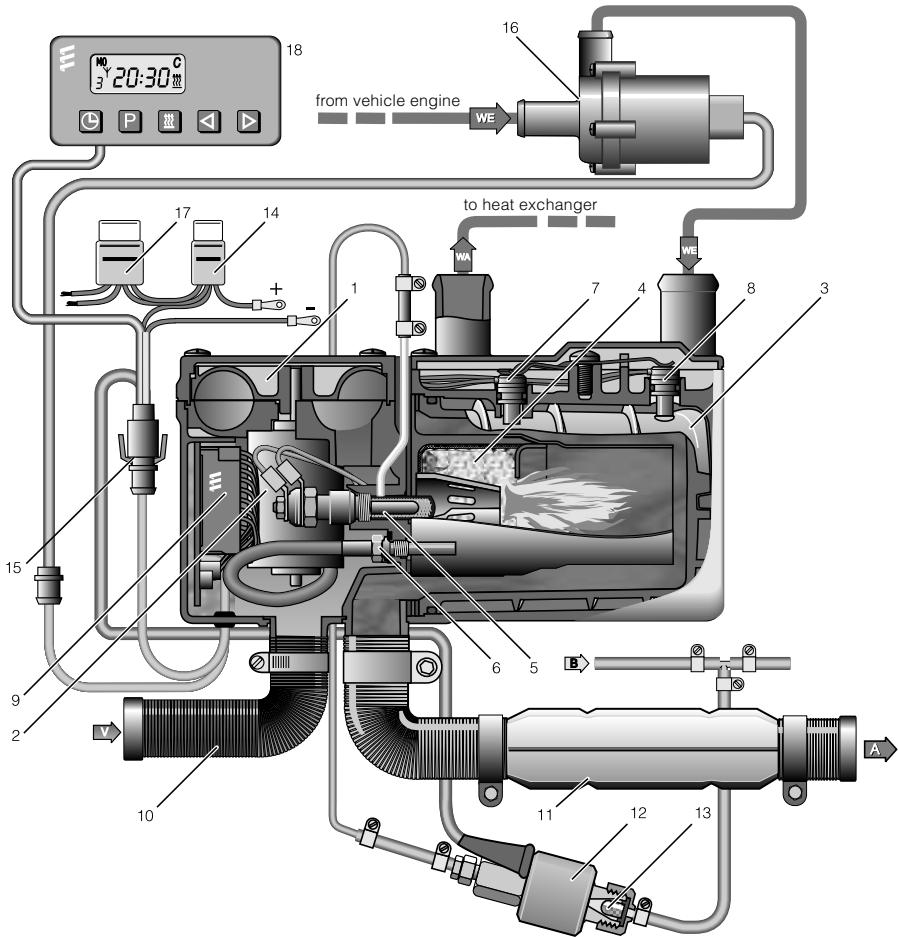
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**Sectional drawing** (shown here is the *HYDRONIC B 5 W S*)



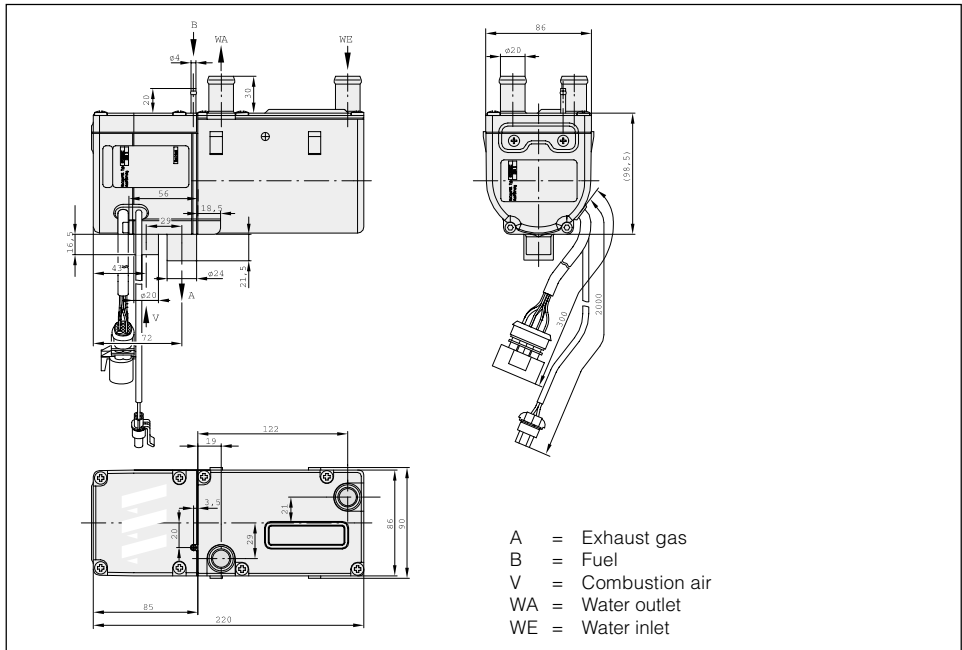
- 1 Combustion air blower
- 2 Electric motor
- 3 Heat exchanger
- 4 Combustion chamber
- 5 Glow plug
- 6 Flame sensor
- 7 Temperature probe
- 8 Overheating sensor
- 9 Controller

- 10 Combustion air tube
- 11 Exhaust piping with exhaust muffler
- 12 Dosing pump
- 13 Cup strainer, built into dosing pump
- 14 Main fuse / fuse holder
- 15 Intersection / 8-channel connector
- 16 Water pump
- 17 Relay, vehicle fan
- 18 Module clock

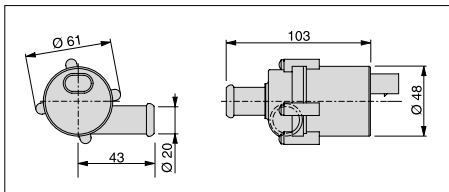
- A = Exhaust gas
- B = Fuel
- V = Combustion air
- WA = Water outlet
- WE = Water inlet

### Principal dimensions

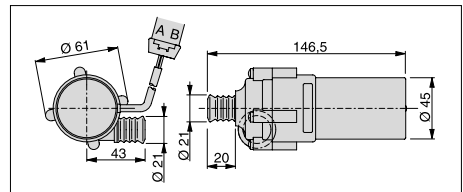
## HYDRONIC



### Water pump - 12 volt



**Water pump - 24 volt**



## Mounting the heater and water pump

Point of installation is the engine compartment. Mount the heater as deeply as possible so that heat exchanger and water pump can deaerate automatically. Observe permissible mounting positions as well as operating and storage temperatures.

Installation of the heater in the passenger compartment, driver's cab, working cabin, seating compartment and generally in rooms used by people is not permissible. When installing the heater in special-purpose vehicles (e.g. ambulance) valid regulations have to be complied with.

## Type plate

The type plate must be clearly visible after the heater has been installed. If necessary, a second type plate (duplicate) with the same details as the original one can be mounted at a clearly visible point on the air heater or a cover in front of the air heater.

A second type plate is not necessary if the original type plate is clearly visible under a cover that can be removed without having to use tools. The type plate is mounted on the basic unit.

## Mounting instructions

The heaters are used in combination with the in-vehicle heating system to preheat the engine, to defrost the windows.

They are connected to the vehicle's cooling water system, electrical system and fuel system.

The heaters can be wired to operate as add-heaters, thereby raising the heating capacity of the vehicle's own heater to a comfortable level – especially in vehicles whose engines have been optimized in terms of combustion.

### ATTENTION!

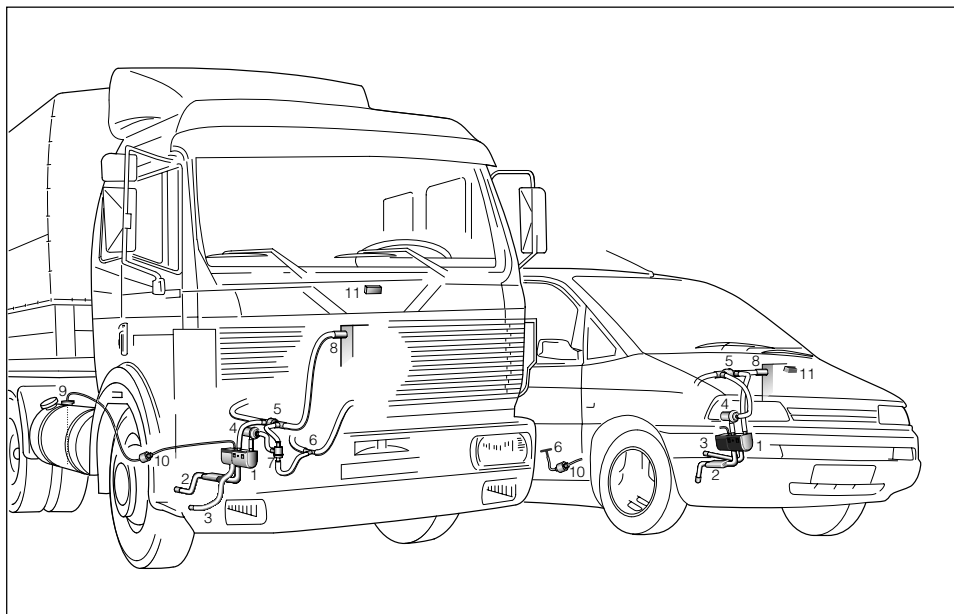
The proposed points of installation given in these mounting instructions are examples.

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.

## Mounting example



- ① Heater
- ② Exhaust piping with exhaust muffler
- ③ Combustion air tube
- ④ Water pump
- ⑤ Check valve
- ⑥ T-piece (water circulation system)
- ⑦ Thermostat
- ⑧ Vehicle's heat exchanger with fan
- ⑨ Tank connection / T-piece (fuel)
- ⑩ Dosing pump
- ⑪ Module clock



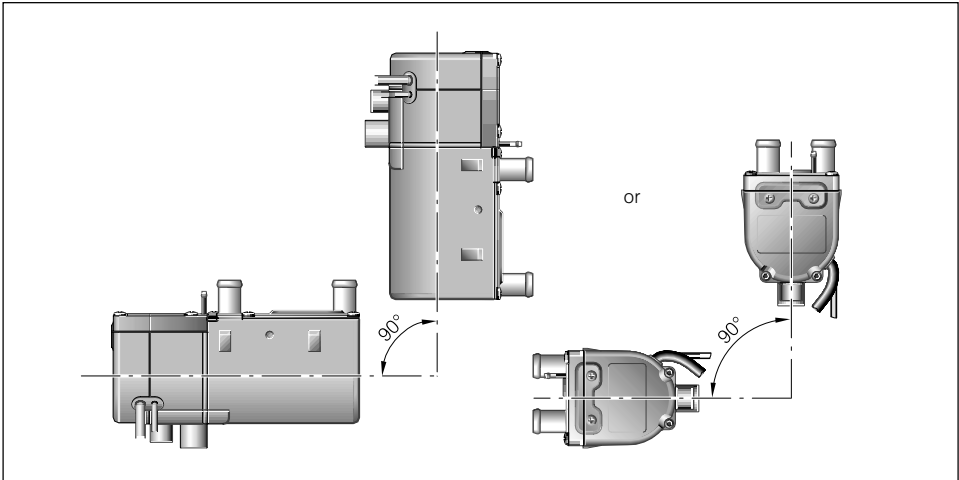
## Permissible mounting positions

The heater and the water pump are to be installed in the standard position.  
Depending on prevailing installation conditions, the heater and the water pump can be tilted as shown in the drawing.

The maximum permissible deviations from the normal position are indicated in the drawing.  
Please consult the manufacturer if wider deviations are necessary.

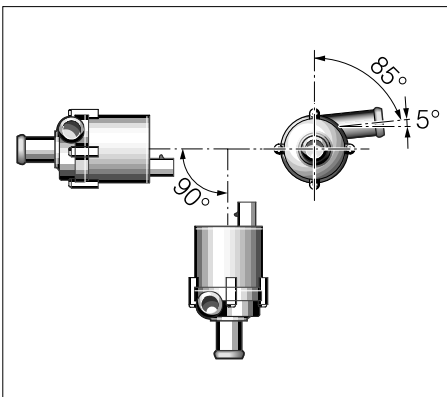
### HYDRONIC

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



### Water pump

Normal position horizontal with permissible swivel range.



#### Note:

The outlet nozzle must be pointing 5° upward, as shown in the drawing.

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## Connection to the cooling water circuit

A careful deaeration of the water cycle (including heater) after installation of the heater is necessary for the perfect functioning of the device:

1. Fill heater and water hoses with coolant after installation, but before connection to the cooling water cycle. The vent screw must remain open during filling. If water issues from the opening of the vent screw, the heater is deaerated. Close the vent screw again.
2. Afterwards, the entire cooling system must be deaerated to remove any bubbles in accordance with the engine manufacturer's instructions.

The pressure in the water cycle must be limited to max. 2.5 bar excess pressure inside a pressure control valve (e.g. radiator filler cap).

### Attention!

During operation with auxiliary heating, the vehicle's heating valve must always be kept completely open either electrically or mechanically.

Recommendation:

Use switches with final position contact ("break contact") for all heating cycles.

## Please note!

If the heater is integrated in a vehicle engine's cooling system, it is part of this cooling system.

The following points thus need to be taken into account:

- The heater must always be mounted beneath the min. cooling water level (coolant recovery bottle, radiator, vehicle heat exchanger) in such a manner that it works in the direction of flow of the engine cooling cycle. After installation, the entire cooling system including the heater must be deaerated to remove any bubbles in accordance with the engine manufacturer's instructions. This also applies after every interference with the cooling water system (repair, exchange of cooling water). All water connections (clamps) have to be perfectly tightened and retightened after the vehicle has been driven for 2 hours or approx. 100 km. Any water-carrying pipes must be protected against chafing and excessive temperatures (radiant heat from exhaust pipes). To prevent corrosion, the cooling water must contain at least 10% antifreeze all the year round. The coolant must contain sufficient antifreeze for low temperatures.
- Operating the heater with frozen coolant is dangerous and thus inadmissible.

When refilling coolant, only use the one authorized by the vehicle manufacturer. Compare the vehicle's operating instructions. Mixing it with unauthorized coolant may lead to damage to the engine and heater. Before remounting a heater into another vehicle, rinse all water carrying parts of the heater with clear water.

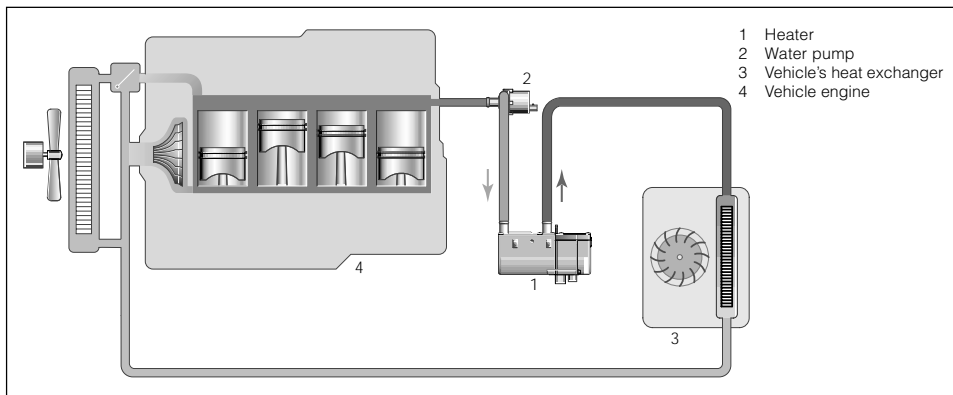
## There are several possibilities:

### 1. Inserting heater into inflow line – this arrangement is the simplest one

Cut open the inflow line running from the vehicle engine to the heat exchanger and insert the heater and the water pump.

### Characteristic heating curve:

With the stationary heating switched on, the heat is first fed to the vehicle engine. After the cooling water temperature has reached approx. 30 °C, the heat is also fed to the passenger compartment, depending on the fan position selected.





## 2. Inserting the check valve into the inflow line

Cut open the inflow line running from the vehicle engine to the heat exchanger and insert the check valve.

Insert the heater and the water pump into the water circulation system as shown in the drawing.

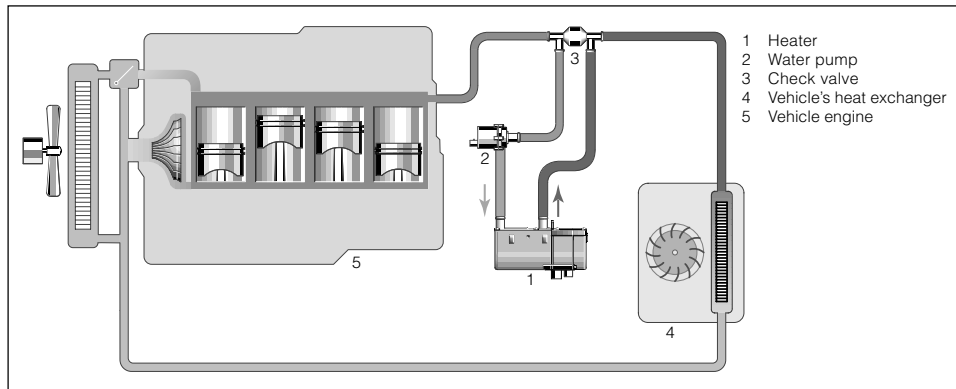
Check valve Ø 18 mm – Order No. 254 00 070

Check valve Ø 20 mm – Order No. 254 00 074

### Characteristic heating curve as for water cycle "1"

#### Advantage:

No loss of efficacy of engine heating with the stationary heating switched off.



## 3. Integrating the deluxe installation kit into the water circulation system

Deluxe installation kit, Order No. 24 0132 00 00 00

Cut open the inflow line running from the vehicle engine to the heat exchanger and insert the check valve.

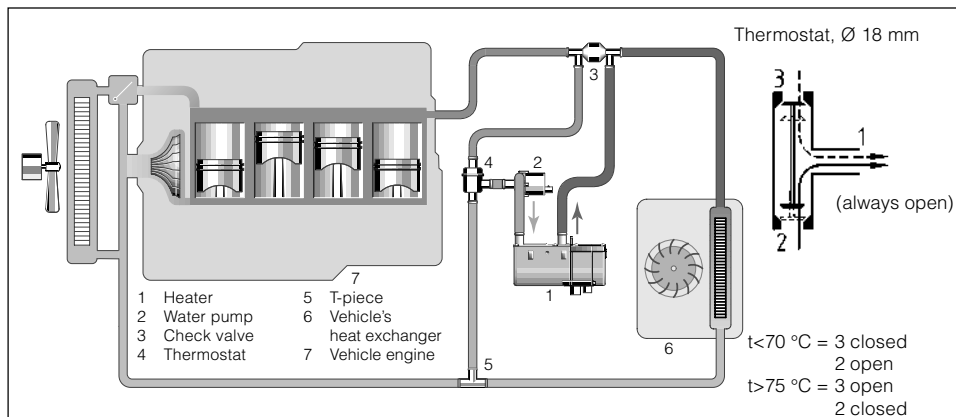
Cut open the return line running from the heat exchanger to the vehicle engine and insert the T-piece. Insert the heater, thermostat and water pump into the water circulation system as shown in the drawing.

### Characteristic heating curve:

First, up to a cooling water temperature of approx. 70 °C the heat of the auxiliary heating is only fed to the passenger compartment = small cycle, fast heating up. If the cooling water temperature continues to rise, the thermostat gradually changes over to the large cycle = additional preheating of engine (full change-over is reached at 75 °C).

#### Please note!

Execute connections 1, 2 and 3 as described in the drawing.



#### 4. Water cycle with combination valve

##### Mounting the combination valve – 5 connections

If the water flow pipe and water return pipe from the vehicle engine to the heat exchanger in the engine compartment have been spaced apart, the combination valve with 5 connections and one T-piece have to be used.

Cut open the inflow line running from the vehicle engine to the heat exchanger and insert the combination valve.

Cut open the return line running from the heat exchanger to the vehicle engine and insert the T-piece.

##### Mounting the combination valve – 6 connections

If the water flow pipe and water return pipe from the vehicle engine to the heat exchanger in the engine compartment have been installed parallel to each other, the combination valve with 6 connections (without T-piece) may be used.

Cut open the inflow and return lines running from the vehicle engine to the heat exchanger and insert the combination valve.

Combination valve with 5 connections:

Order No. 330 00 177

and additional

T-piece Ø 20 for return line:

Order No. 20 1673 80 11 00

Combination valve with 6 connections:

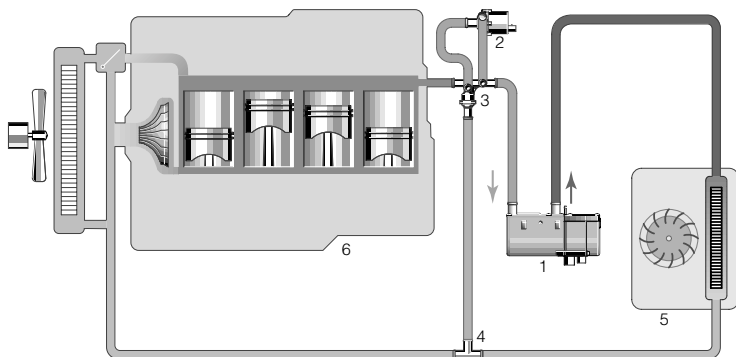
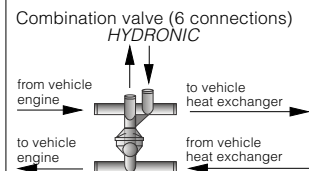
Order No. 330 00 176

##### Characteristic heating curve:

With the stationary heating switched on, the heat is exclusively fed to the passenger compartment = small cycle, fast heating up.

Once the vehicle engine is put into operation – at low speed – a part of the heat is fed to the vehicle engine (partial cycle) which leads to a shortening of the vehicle engine's warm-up period.

At increased engine speeds (> 2000 rpm), the entire heat is distributed to the passenger compartment and vehicle engine = large cycle, auxiliary heating function, further shortening of the warm-up period.



- 1 Heater
- 2 Water pump
- 3 Combination valve (5 connections)
- 4 T-piece
- 5 Vehicle's heat exchanger
- 6 Vehicle engine



## Conducting the combustion air / exhaust gas

### Conducting the combustion air

The combustion air must be drawn in from the outside (not from the passenger compartment or boot).

As described in these mounting instructions, the heater is installed inside the engine compartment. If the air intake fitting for the combustion air is situated in an area where the combustion air does not reach temperatures exceeding 25 °C, and where neither road spray nor dust / dirt are to be expected, the combustion air intake is already complete. If this is not the case, a flexible hose with an inner diameter of 20 mm and up to 1.5 m long has to be connected to take the combustion air from an area complying with this condition.

The inlet opening of the combustion air pipe may in that case not be built in against the air stream and must be installed in such a manner that it cannot be clogged by dirt and snow and that penetrated water may run off.

Push on the end sleeves so that a 16 mm diameter ball cannot be inserted (requirement of StVZO "Technical Demands Expected of Heaters").

### Conducting the exhaust gas

The items supplied include a flexible exhaust hose with an inner diameter of 24 mm and 1000 mm long. It must be cut apart at a suitable place and the exhaust silencer inserted (compare diagram on page 3); the exhaust tailpipe ⑤ should be much shorter than the exhaust pipe ③. If necessary, the exhaust hose pipe may be shortened or extended up to a maximum length of 2 m.

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 fan<sup>1)</sup>, 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 position the outlet opening of the exhaust gas against the air stream.

An end sleeve crossed with a web must be mounted on the end of the exhaust gas pipe so that a 16 mm diameter ball cannot be inserted (requirement of StVZO "Technical Demands Expected of Heaters").

<sup>1)</sup> 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.



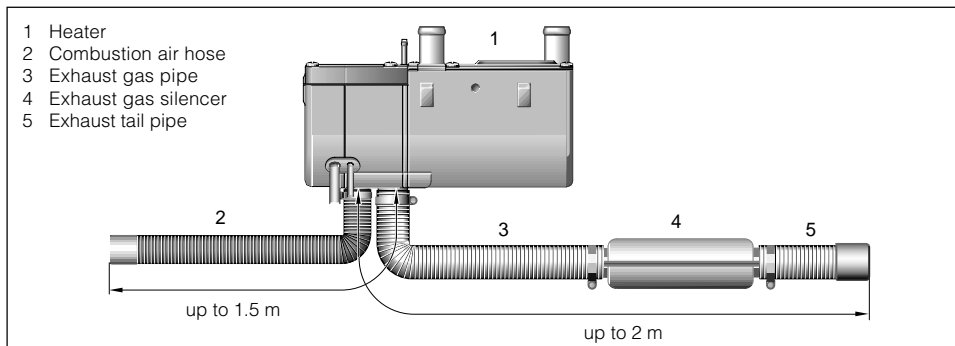
### Danger of poisoning and burns!

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 *HYDRONIC* beforehand and wait until all parts have completely cooled down.

If necessary, wear protective gloves.



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## Fuel supply

### Operation with bio-diesel (PME) – **HYDRONIC D 5 W S - 24 V**

HYDRONIC D 5 W S - 24 V is certified for operation with bio-diesel as per DIN V 51606 in free-flowing state (decreases at temperatures under 0 °C).

#### 1. Tapping fuel with the T-piece from the fuel supply line

Precondition:

Fuel lines must be tight.

A maximum preliminary pressure of 0.3 bar can arise in the fuel lines in any operating mode.

#### Important!

Deviations from the instructions given here are impermissible, otherwise functional disorders can arise.

Tapping fuel from the supply line downstream of the delivery pump is prohibited in cars, since pressures of up to 10 bars can occur.

Before the air heater is turned on it is first necessary to start up the vehicle's engine so that the fuel lines can be filled.

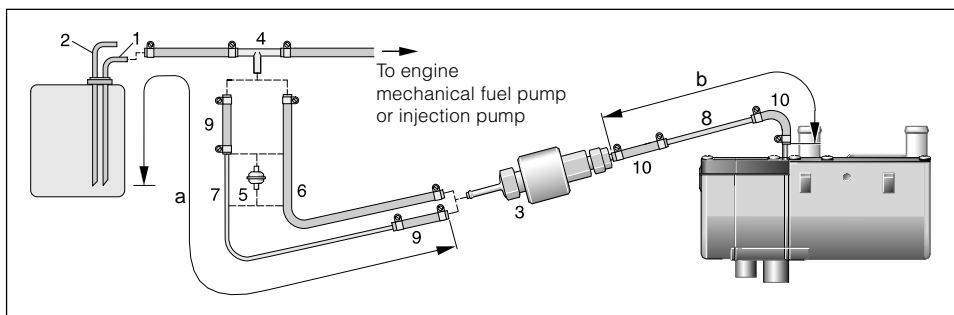


**Danger of fire and explosion!  
Poisonous fumes!**

Caution when handling fuel. Before filling up and when working on the fuel supply, switch off the vehicle's engine and the *HYDRONIC*.  
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.



- ① Inflow line running from tank fitting to engine – insert T-piece into inflow line upstream of delivery pump
- ② Return line running
- ③ Dosing pump
- ④ T-piece
- ⑤ Fuel filter – only required if fuel is contaminated
- ⑥ Fuel hose, 5 x 3 (inner diameter = Ø 5 mm) – *HYDRONIC B 5 W S* only
- ⑦ Fuel pipe, 6 x 2 (inner diameter = Ø 2 mm)
- ⑧ Fuel pipe, 4 x 1,25 (inner diameter = Ø 1,5 mm)
- ⑨ Fuel hose, 5 x 3 (inner diameter = Ø 5 mm), approx. 50 mm long
- ⑩ Fuel hose, 3,5 x 3 (inner diameter = Ø 3,5 mm), approx. 50 mm long

#### Permissible line lengths

##### Suction side

a = max. 2 m

##### Pressure side

b = max. 4 m for petrol

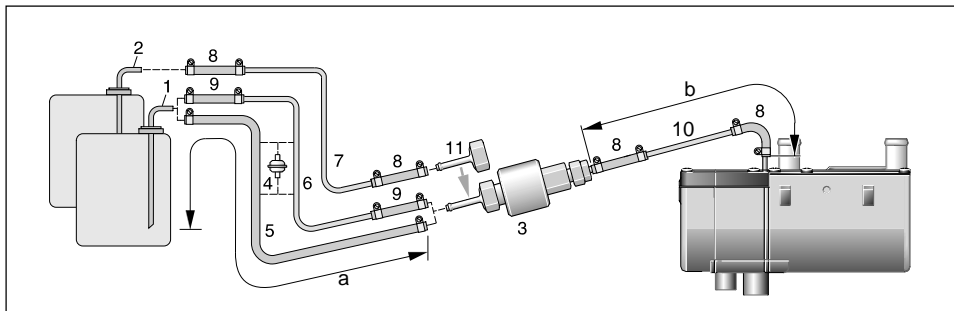
b = max. 6 m for diesel

## 2. Tapping fuel with rising tank connection installed in the vehicle tank or in the tank fitting

If it is not possible to install a separate rising pipe in cars with fuel injected engines the return line can be tapped by means of a T-piece.

Condition:

- No valve may be installed in the return line in the tank.
- The pressure inside the return line may reach a max. of 2 bar. In case of pressures above 0,3 and up to 2 bar a pressure reducer (add-on part, order No. 20 1645 89 30 00) must be installed in front of the dosing pump.



- ① Tank connection for metal tank, inner diameter = Ø 2 mm, external diameter = Ø 6 mm, order no. 25 1226 89 50 00
- ② Tank connection for tank fitting, inner diameter = Ø 2 mm, external diameter = Ø 4 mm, order no. 20 1645 89 35 00
- ③ Dosing pump
- ④ Fuel filter – only required if fuel is contaminated
- ⑤ Fuel hose, 5 x 3 (inner diameter = Ø 5 mm) – *HYDRONIC B 5 W S* only
- ⑥ Fuel pipe, 6 x 2 (inner diameter = Ø 2 mm)
- ⑦ Fuel pipe, 4 x 1 (inner diameter = Ø 2 mm)
- ⑧ Fuel hose, 3,5 x 3 (inner diameter = Ø 3,5 mm), approx. 50 mm long
- ⑨ Fuel hose, 5 x 3 (inner diameter = Ø 5 mm), approx. 50 mm long
- ⑩ Fuel pipe, 4 x 1,25 (inner diameter = Ø 1,5 mm)
- ⑪ Connecting piece, external diameter = 4 mm

### Permissible line lengths

#### Suction side

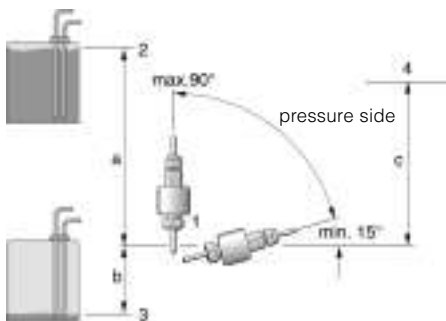
a = max. 2 m

#### Pressure side

b = max. 4 m for petrol

b = max. 6 m for diesel

## Mounting position of the dosing pump Permissible suction and pressure level of the dosing pump



- ① Dosing pump
- ② Maximum fuel level
- ③ Minimum fuel level
- ④ Connection on the heater

## Mounting position of the dosing pump

Mount the dosing pump in the vehicle with the pressure side rising by at least 15° and maximum 90°. If possible the fuel lines from the dosing pump to the heater should rise continuously.

## Permissible suction and pressure level

Pressure level from the vehicle's tank to the dosing pump: a = max. 3000 mm

Suction level with a pressureless vehicle tank:

b = max. 500 mm for petrol

b = max. 1000 mm for diesel

Please note: Check the tank venting.

Suction level with a vehicle tank in which fuel tapping produces a vacuum (valve with 0.03 bar in the tank closure):

b = max. 150 mm for petrol

b = max. 400 mm for diesel

Pressure level from the dosing pump to the heater:  
c = max. 2000 mm

D

S

GB

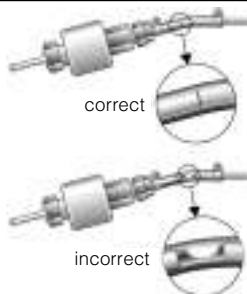
F



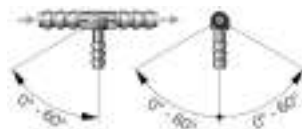
## Important!

- A pressure reducer (Order No. 20 1645 89 30 00) or a separate tank connection (see page 13) must be used if the pressure in the fuel line exceeds 0.2 bar to maximum 2.0 bar.
- A separate tank connection if the pressure in the fuel line exceeds 2.0 bar or if the return line incorporates a check valve.
- Fuel tapping in a car **after the conveying pump is prohibited!**
- Fuel hoses and pipes must be cut to length with a sharp knife; the cut-off point must not be dented and must be burr-free.
- Protect the fuel line, filter and dosing pump from impermissible heat, and do not mount in the vicinity of silencers and exhaust gas pipes.
- Always fasten the fuel pipes at intervals of approx. 50 cm.
- Always use a rubber hose to connect the fuel branching piece – never use a plastic pipe.
- The fuel pipe must always be butt-jointed where there is a connection between fuel pipes and a fuel hose (see Drawing A).
- When incorporating a T-piece ensure that the mounting position indicated on Drawing B is observed.
- §§ 45 and 46 of StVZO also apply correspondingly to the fuel lines and additional heater tanks.

Drawing A:

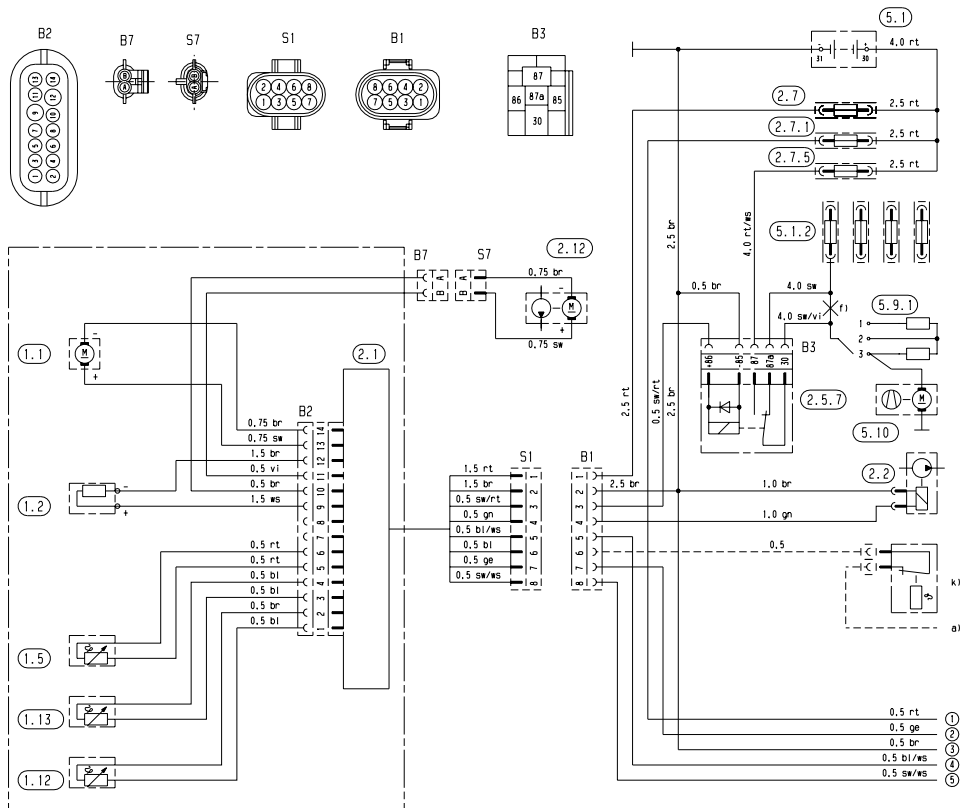


Drawing B:



## Circuit diagram

### HYDRONIC B 5 W S / D 5 W S – 12 volt



## Parts list

- 1.1 Burner motor
- 1.2 Glow plug
- 1.5 Overheating and flame sensor
- 1.12 Flame sensor
- 1.13 Temperature probe

- 2.1 Controller
- 2.2 Dosing pump
- 2.5.7 Relay, vehicle fan
- 2.7 Main fuse 20 A
- 2.7.1 Fuse, actuation 5 A
- 2.7.5 Fuse, vehicle fan 25 A
- 2.12 Water pump

- 5.1 Battery
- 5.1.2 Fuse strip in vehicle
- 5.9.1 Switch, vehicle fan
- 5.10 Vehicle fan

- a) for auxiliary heating option connect to D+
- f) cut open wire
- g) only with petrol
- h) only with diesel
- k) switch (auxiliary heating, e.g. outside temperature < 5 °C or change-over switch for summer / winter)

Length 'plus' + length 'minus':  
 < 5 m: cross section 4 mm<sup>2</sup>  
 > 5 m < 8 m: cross section 6 mm<sup>2</sup>

Cable ends that are not being used must be isolated.

Plug and socket case are shown from the cable entry side.

## Cable colours

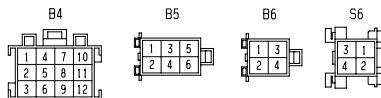
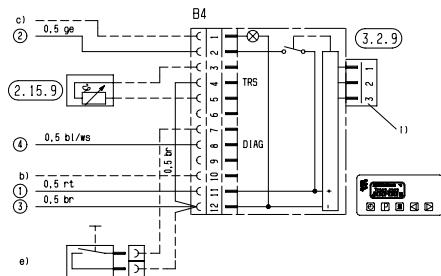
sw = black  
 ws = white  
 ge = yellow  
 gn = green  
 vi = violet  
 br = brown  
 gr = grey  
 bl = blew  
 li = purple

20 1777 00 96 01 B



## Circuit diagram

### Control elements – 12 volt



## Parts list

2.15.9 Sensor, outside temperature

3.1.9 Change-over switch 'heating / ventilating'

3.1.16 Key button, radio remote control

3.2.6 Timer, mini-clock

3.2.9 Timer, module clock

3.2.12 Timer, mini-clock

3.3.6 TP 41 / TP 41i radio remote control (receiver)

- b) Connect to terminal +15 if heating operation > 2 hrs (with the ignition switched on) is desired
- c) Lighting terminal 58
- d) Stationary ventilation (optional)
- e) External switch ON / OFF (optional)
- i) Connection radio module receiver TP 4 / TP 4i

Length 'plus' + length 'minus':

< 5 m: cross section 4 mm<sup>2</sup>

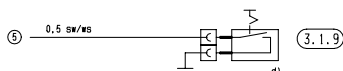
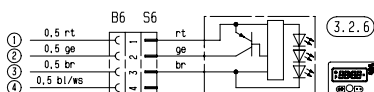
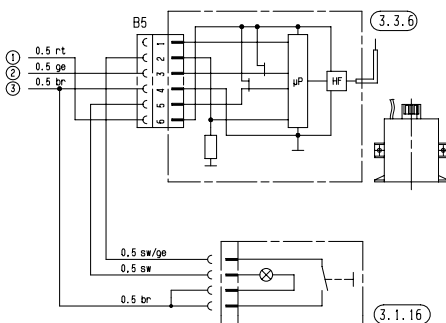
> 5 m < 8 m: cross section 6 mm<sup>2</sup>

Cable ends that are not being used must be insulated.

Plug and socket case are shown from the cable entry side.

## Please note:

For vehicles with automatic heating or airconditioning, vehicle fan control must be in accordance with our vehicle-related workshop information. If no workshop information is available, the vehicle manufacturer's instructions with regard to the connection and / or point of intersection for the fan control must be adhered to.



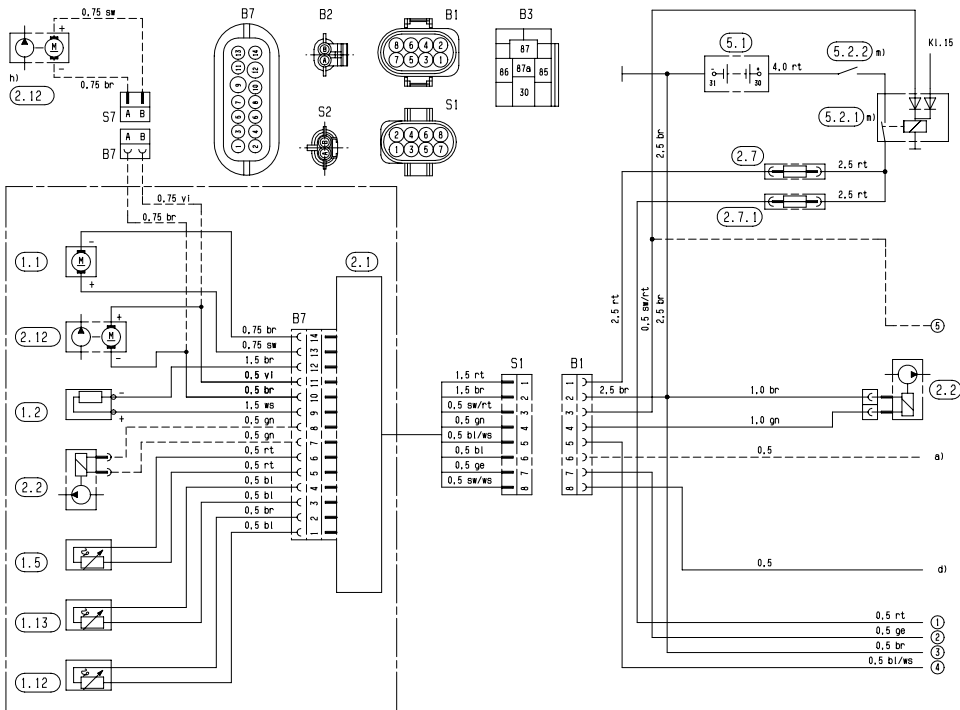
20 1777 00 97 01 A

## Cable colours

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

## Circuit diagram

**HYDRONIC D 5 W S – 24 volt, ADR / TRS 003 / TMD**



25 2147 00 97 01 B

## Parts list

- 1.1 Burner motor
- 1.2 Glow plug
- 1.5 Overheating sensor

- 1.12 Flame sensor
- 1.13 Temperature probe

- 2.1 Controller
- 2.2 Dosing pump
- 2.7 Main fuse 15 A
- 2.7.1 Fuse, actuation 5 A
- 2.12 Water pump

- 5.1 Batterie
- 5.2.1 Battery operating switch m) (operation e.g. controlled via ignition lock)
- 5.2.2 Battery separating switch m) (Emergency-shutdown function in the case of ADR / TRS 003 / TMD)

- a) for auxiliary heating option connect to D+
- d) Secondary drive input for TRS units
- h) external water pump
- m) 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 ADR, TRS 003, TMD 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.

Length 'plus' + length 'minus':  
 < 5 m: cross section 4 mm<sup>2</sup>  
 > 5 m < 8 m: cross section 6 mm<sup>2</sup>

Cable ends that are not being used must be isolated.

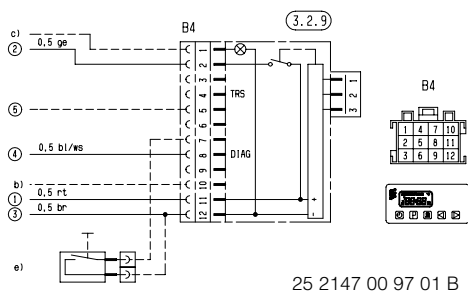
Plug and socket case are shown from the cable entry side.

## Cable colours

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

## Circuit diagram

### Control elements – 24 volt, ADR / TRS 003 / TMD



## Parts list

### 3.2.9 Timer, module clock, TRS

- b) Connect to terminal +15
- c) Lighting terminal 58
- e) External switch ON / OFF (optional)

Length 'plus' + length 'minus':  
 < 5 m: cross section 4 mm<sup>2</sup>  
 > 5 m < 8 m: cross section 6 mm<sup>2</sup>

Cable ends that are not being used must be insulated.

Plug and socket case are shown from the cable entry side.

### Please note:

For vehicles with automatic heating or airconditioning, vehicle fan control must be in accordance with our vehicle-related workshop information. If no workshop information is available, the vehicle manufacturer's instructions with regard to the connection and / or point of intersection for the fan control must be adhered to.

### Cable colours

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

D

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F

Function

Depending on the wiring, the heater can be operated as purely stationary heater or as combined stationary and auxiliary heater to compensate for an insufficient output of heat by the vehicle engine.

Stationary heating operation

Switching on

The pilot lamp in the control unit lights up when the heater is switched on (switch, timer ...). The water pump starts and after a fixed programme with prerinsing and preheating, combustion air fan, glow plug and fuel dosing pump set combustion going. Once a stable flame has formed, the glow plug is switched off by a timer.

Heating operation

Depending on the heat requirement, the heater may be adjusted to the following levels:  
"LARGE" or "SMALL".

The temperature thresholds have been fixed programmed in the electronic control device. If the heat requirement at level "SMALL" is so low that the cooling water temperature reaches 85 °C, the device goes into the control interval. This is followed by the fan continuing to run for approx. 130 seconds. The pilot lamp also lights up during the control interval and the water pump continues to run up to the next controlled start.

Check the following points in the event of faults:

The heater does not start when it is switched on:

Turn-off the heater and then switch it on again, but not more than twice in succession.

If the heater still does not start:

Is there fuel in the tank?

Has the fuse blown?

Are all electrical lines and connections ok?

Is the combustion-air duct or exhaust-gas duct blocked?

**Conduct a diagnostic test with the JE diagnostic instrument or the module clock as described in "Trouble Shooting and Repairs Instructions" for the *HYDRONIC B 5 W S / D 5 W S*.**



## Controls and safety devices

- If the heater does not ignite within 90 seconds after fuel pumping has started, then the start procedure must be repeated in the described manner.  
A fault shut-down is effected if the air heater once again fails to ignite after 90 seconds of fuel pumping.  
After an excessive number of unsuccessful attempts to start the heater, the control will be locked\*.

- A renewed start must be completed if the flame extinguishes itself during operation. A fault shut-down is effected if the air heater fails to ignite within 90 seconds after renewed fuel pumping or if it does ignite but then extinguishes itself within the next 15 minutes.

It is possible to override a fault shut-down by briefly switching the heater off and then on again.

**Do not repeat this more than twice in succession!**

- In case of overheating (lack of water, badly vented cooling water cycle), the overheating sensor will respond, the fuel supply will be interrupted and a fault shut-down is effected. Once the cause of overheating has been eliminated, the device can be restarted by switching it off and on again (condition: device has sufficiently cooled down, cooling water temperature < 70 °C).  
After an excessive number of switching-offs due to overheating the control will be locked\*.

- A fault shut-down is effected when the upper or lower voltage limit is reached.

- The air heater will not start if the glow plug is defective or if the electrical line to the dosing pump is interrupted.

- The rotating speed of the fan motor is continuously monitored. A fault shut-down is effected after 60 seconds if the fan motor does not start, if it is blocked or if the rotating speed drops below 40 % of the desired speed.

\* Reading off errors and cancelling of locking:

1. by means of the built-in module clock (3.2.9 in the circuit diagram)
2. if other control elements have been built in, by means of connecting the diagnostic device 22 1512 89 00 00 instead of these other control elements.

Operation and list of errors see operating instructions for the diagnostic device and / or the trouble-shooting and repair instructions *HYDRONIC B 5 W S / D 5 W S*.

### Stationary ventilation with change-over switch 'heating / ventilating'

Stationary ventilation means that it is possible to directly control the vehicle fan by means of the heating device preselector or – even more effectively – via the radio remote control TP4 / TP41, thus bypassing the heating operation. This serves the purpose of ventilating the passenger compartment shortly before departure with fresh air as it often heats up considerably during summer time (separate wiring).

### ADR / TRS 003 / TMD – mode of operation

#### Please note!

The *HYDRONIC D 5 W S* – 24 volt is suitable and certified for installation in vehicles used to transport dangerous substances according to the regulations in accordance with ADR / TRS 003 / TMD (detailed information is contained in an information sheet with print no. 25 2069 95 13 50).

#### Forced cut-off in ADR / TRS 003 / TMD mode

When vehicles are used to transport dangerous substances (e.g. road tankers), the heater must be switched off before entering the hazardous area (refinery, petrol station, etc.). If this is not observed, then the heater will automatically shut-down when:

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

After shut-down the fan will continue to run for max. 40 seconds.

#### Please note!

- The controller must be protected while electric welding work is being completed on the vehicle by disconnecting the "plus" pole from the battery and connecting it to the chassis.

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