

HYDRONIC^{*} B 4 W SC and B 5 W SC

Technical Description
Mounting Instructions



Eberspächer®

Documentation
for installation*

J. Eberspächer
GmbH & Co. KG
Eberspächerstr. 24
D - 73730 Esslingen

Telefon (zentral)
(0711) 939 - 00
Telefax
(0711) 939 - 0500

www.eberspaecher.com

Engine-independent water heater for petrol

	Order No.		Order No.
HYDRONIC B 4 W SC – 12 V Universal mounting kit	20 1824 05 00 00 20 1824 80 00 00	HYDRONIC B 5 W SC – 12 V Universal mounting kit	20 1820 05 00 00 20 1820 80 00 00
HYDRONIC B 4 W SC – 12 V As a complete package	20 1821 05 00 00	HYDRONIC B 5 W SC – 12 V As a complete package	20 1823 05 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, 8
Mounting instructions / mounting example	8

	Page
Permissible mounting positions	9
Type plate	9
Connection to the cooling water circuit	10 – 12
Conducting the combustion air / exhaust gas	13
Fuel supply	14 – 17
Circuit diagrams	18 – 23
Function	24
Controls and safety devices	25

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

Subject to change

D

S

GB

F

Items supplied

Quantity / Designation	Order No.
------------------------	-----------

1 <i>HYDRONIC</i> B 4 W SC – 12 volt	20 1824 05 00 00
--------------------------------------	------------------

To be additionally ordered:

1 Universal mounting kit	20 1824 80 00 00
--------------------------	------------------

or

1 <i>HYDRONIC</i> B 4 W SC – 12 volt	20 1821 05 00 00
As a complete package*	

1 <i>HYDRONIC</i> B 5 W SC – 12 volt	20 1820 05 00 00
--------------------------------------	------------------

To be additionally ordered:

1 Universal mounting kit	20 1820 80 00 00
--------------------------	------------------

or

1 <i>HYDRONIC</i> B 5 W SC – 12 volt	20 1823 05 00 00
As a complete package*	

* The complete package consists of:

1 Heater

1 Universal mounting kit

Optional extras

1 Check valve, Ø 18 mm	254 00 070
------------------------	------------

1 Check valve, Ø 20 mm	254 00 074
------------------------	------------

1 Comfort mounting kit (B 5 W SC only) for engines from 2.5 l cubic capacity	24 0132 00 00 00
---	------------------

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.

Control elements, optional

Quantity / Designation	Order No.
------------------------	-----------

1 Mini-clock – 12 / 24 volt	22 1000 31 31 00
-----------------------------	------------------



The mini-clock can be combined with the TP41i radio remote control.

1 Module clock – 12 / 24 volt	22 1000 30 34 00
-------------------------------	------------------



The module clock can be combined with the TP4i radio remote control.

1 Mounting parts for the module clock – only required when installed with a shade	25 1482 70 01 00
---	------------------

1 Change-over switch 'heating / ventilating' 12 / 24 volt	22 1000 31 89 00
---	------------------



Can only be used in combination with a control element.

1 Remote radio control TP5	22 1000 32 01 00
----------------------------	------------------



The bi-directional remote radio control TP5 can be used on its own for remote control of the heating in the vehicle.

1 TP4i radio remote control 12 / 24 volt	22 1000 30 99 00
--	------------------



The TP4i radio remote control can only be used in combination with the module clock.

1 TP41i radio remote control 12 / 24 volt	22 1000 31 39 00
---	------------------



The TP41i radio remote control can be used on its own or in combination with the mini-clock.

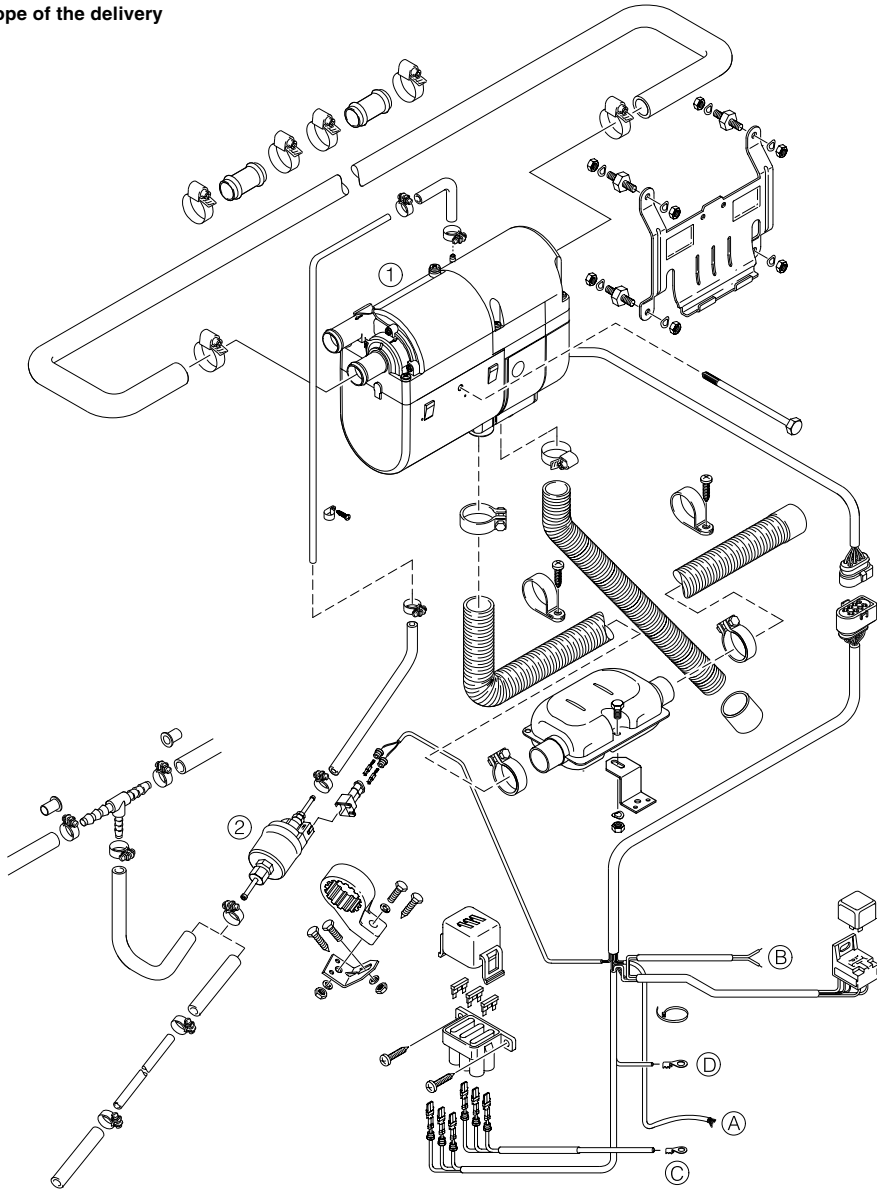
Please note!

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*.

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.

Scope of the delivery



① HYDRONIC B 4 W SC / B 5 W SC

② Dosing pump



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

- A Cable harness "control elements"
- B Cable harness "fan control"
- C Positive cable
- D Negative cable



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 4 W SC  S 288
HYDRONIC B 5 W SC  S 288

- 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.
- 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.
- Heaters have to be installed in accordance with the mounting instructions. The installation must be checked by an officially approved specialist or inspector for road traffic, a motor vehicle specialist or an employee in accordance with paragraph 7.4 a of the Annex to the StVZO, and must be certified on the confirmation of acceptance included in the copy of the general model approval (ABG) according to
 - § 20 StVZO in case of a type approval of vehicles;
 - § 32 StVZO in case of an individual approval;
 - § 19 StVZO in case of an appraisal.
 For case c), the vehicle manufacturer, vehicle model and vehicle identification number must also be specified.
The validity of the model approval depends on this. The confirmation of acceptance must be carried in the vehicle.
- For vehicles not subject to the StVZO, it is necessary to observe the specific regulations and mounting instructions applicable to the given vehicle.
- 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. KG.

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.
- The confirmation of acceptance has been enclosed with the documents for the *HYDRONIC*.



Technical data

Heater		B 4 W SC		B 5 W SC	
Heating medium		Water, coolant			
Heat flow settings		Large	Small	Large	Small
Heat flow (watt)		4300	1500	5000	1500
Fuel consumption (l/h)		0.6	0.2	0.69	0.2
Average electrical power consumption (watt)	During operation	48	22	50	22
	When starting	120			
	During after running	21			
Rated voltage		12 V			
Operating range		10,2 V			
Lower voltage limit An under-voltage protecting device in the controller turns off the heater at approx. 10 V					
Upper voltage limit An over-voltage protecting device in the controller turns off the heater at approx. 16 V		16 V			
Permissible working pressure		up to 2.5 bar excess pressure			
Water throughput of water pump against 0.1 bar		900 l/h ± 100 l/h			
Min. water flow rate of heater		250 l/h			
Fuel For “Fuel quality” and “Fuel at low temperatures” see Operating Instructions		Commercial petrol (DIN EN 228)			
Permissible ambient temperature	Operation	−40 °C to +80 °C			
	Storage	−40 °C to +125 °C			
Degree of radio interference suppression		2 for LW 3 for VHF / SW / MW			
Weight including control device, water pump and dosing pump		approx. 2.7 kg			

All technical data ± 10 %

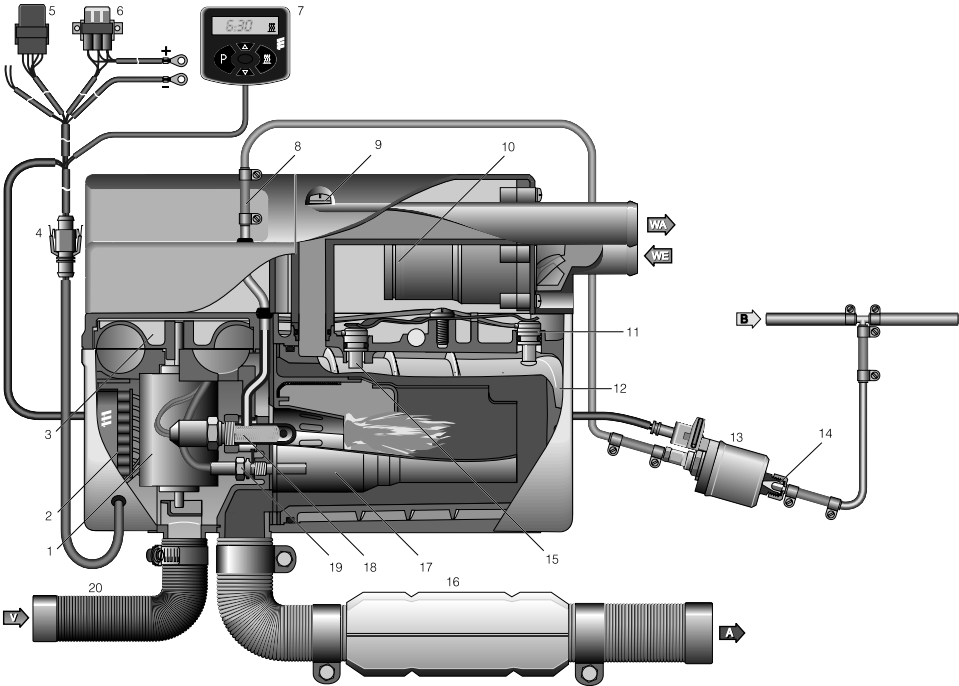
D

S

GB

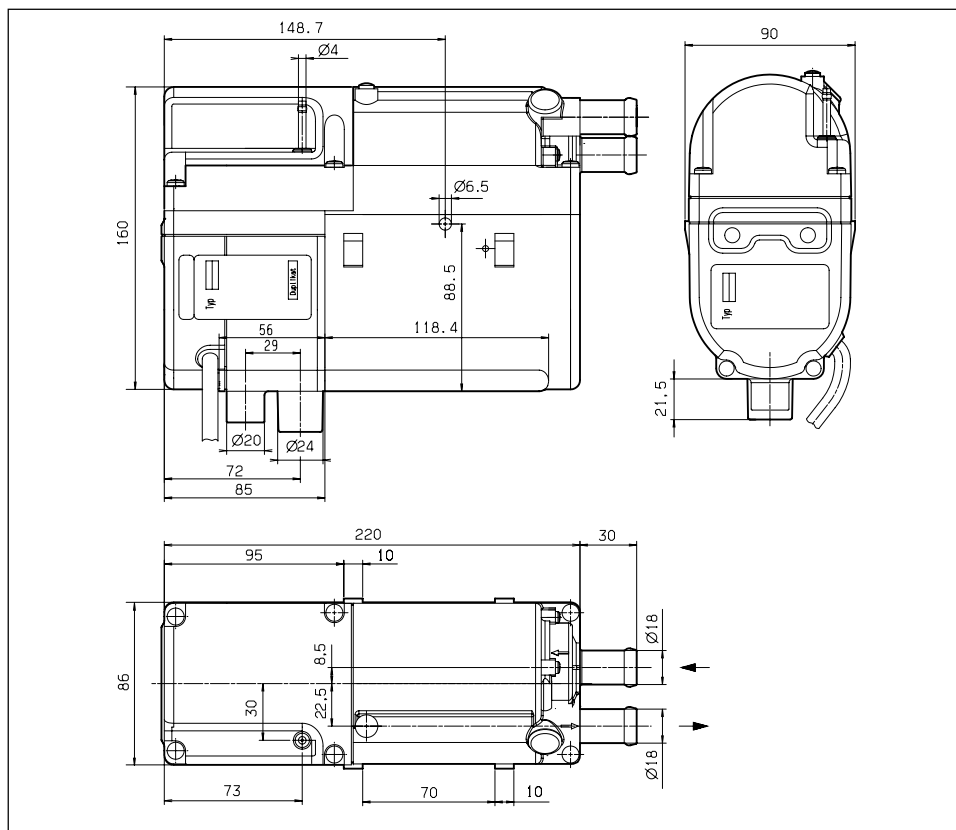
F

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



- | | | | | | |
|----|------------------------------------|----|--------------------------------------|----|------------------|
| 1 | Electric motor | 11 | Overheating sensor | A | = Exhaust gas |
| 2 | Controller | 12 | Heat exchanger | B | = Fuel |
| 3 | Combustion air blower | 13 | Dosing pump | V | = Combustion air |
| 4 | Intersection / 8-channel connector | 14 | Cup strainer, built into dosing pump | WA | = Water outlet |
| 5 | Fan relay | 15 | Temperature probe | WE | = Water inlet |
| 6 | Fuse carrier | 16 | Exhaust pipe with silencer | | |
| 7 | Mini-clock | 17 | Combustion chamber | | |
| 8 | Fuel connection | 18 | Glow plug | | |
| 9 | Vent screw | 19 | Flame sensor | | |
| 10 | Water pump | 20 | Combustion air tube | | |

Principal dimensions



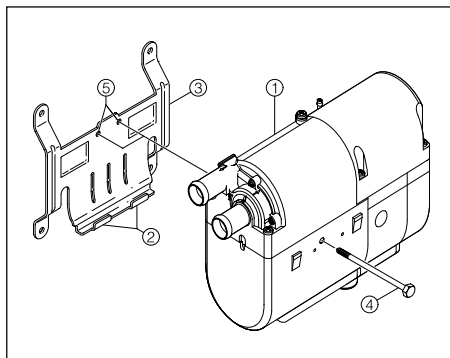
Mounting the heater onto the holder

- Insert heater in retaining lugs on holder.
- Screw heater onto holder with fastening screw ($6^{+0.5}$ Nm).

Note:

Depending on the installation space, it is possible to move the heater inside the holder and to secure it with screws in one of the two fastening threads.

- ① HYDRONIC
- ② Retaining lugs
- ③ Holder
- ④ Fastening screw
- ⑤ Fastening threads



D

S

GB

F

Mounting instructions

The heater, in conjunction with the vehicle's heating system, is used to preheat the engine, to heat the passenger compartment and to defrost the window panes.

The heater is connected to the vehicle's cooling-water circulation, electrical system and fuel system. If it is wired accordingly, the heater will operate as additional heater, thereby increasing the heat flow of the vehicle's own heating – in particular in the case of motors with optimised fuel consumption – to a comfortable level.

(It is not permissible) to install the heater inside vehicles used for the transport of hazardous substances, inside the passenger compartment, driver's cab, working cabin, seating compartment (troop carrier, mini busses, motorbusses*) and generally in rooms used by people is not permissible. When installing the heater in special-purpose vehicles valid regulations have to be complied with.

* Vehicles with more than 9 seats.

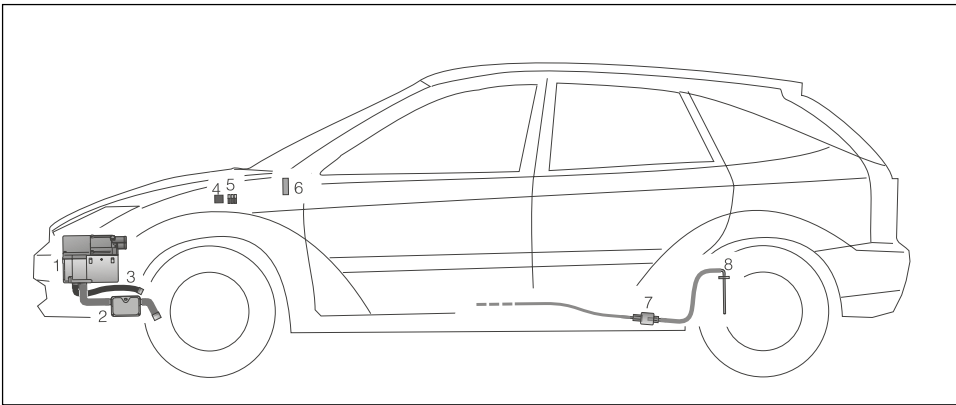
Mounting the heater

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.

Please note!

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

Mounting example



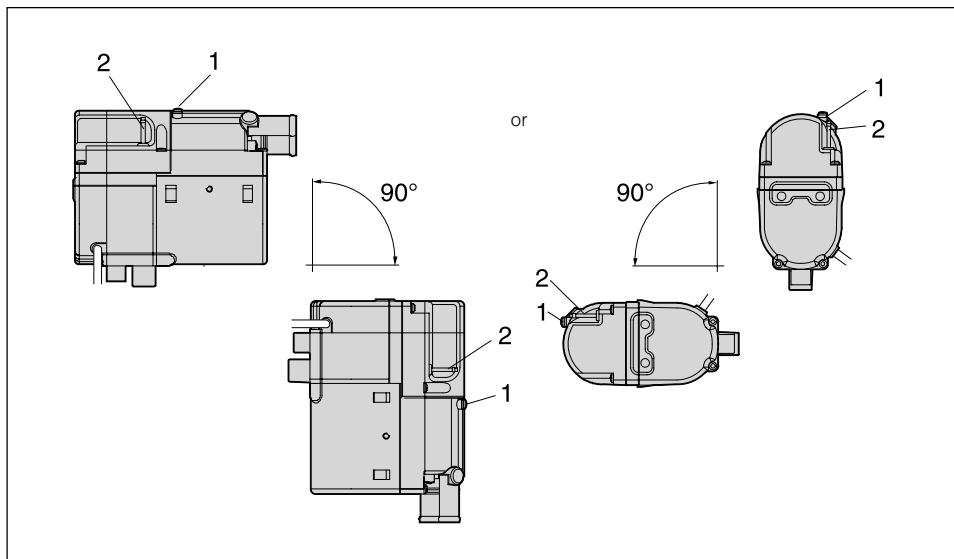
- ① *HYDRONIC*
- ② Exhaust pipe with silencer
- ③ Combustion air tube
- ④ Fan relay

- ⑤ Fuse carrier
- ⑥ Mini-clock
- ⑦ Dosing pump
- ⑧ Rising pipe

Permissible mounting positions

The heater is to be installed in the standard position. Depending on prevailing installation conditions, the heater 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.



- ① Vent screw – always on top
- ② Fuel connection



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.

D

S

GB

F

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.

There are several possibilities:

1. Most simple execution:

Cut open the cooling water hose from the engine to the vehicle's heat exchanger and insert the heater in between the two.

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!

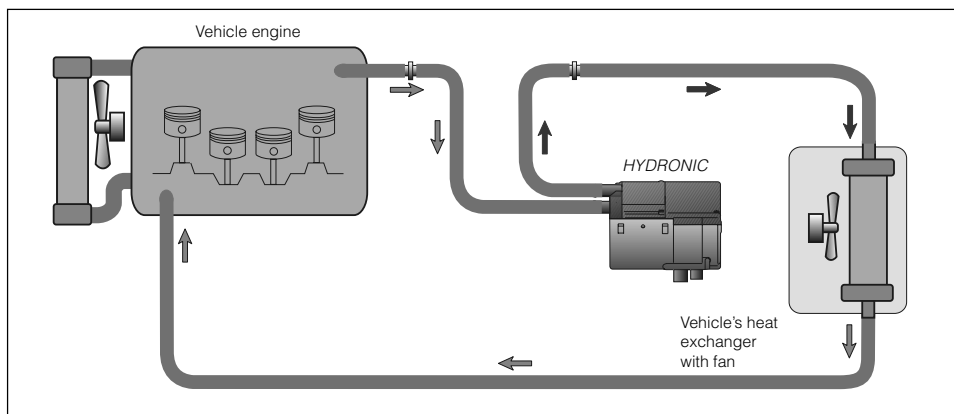
During operation with auxiliary heating, the vehicle's heating valve must always be kept completely open either electrically or mechanically.

Recommendation:

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

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.



D

S

GB

F

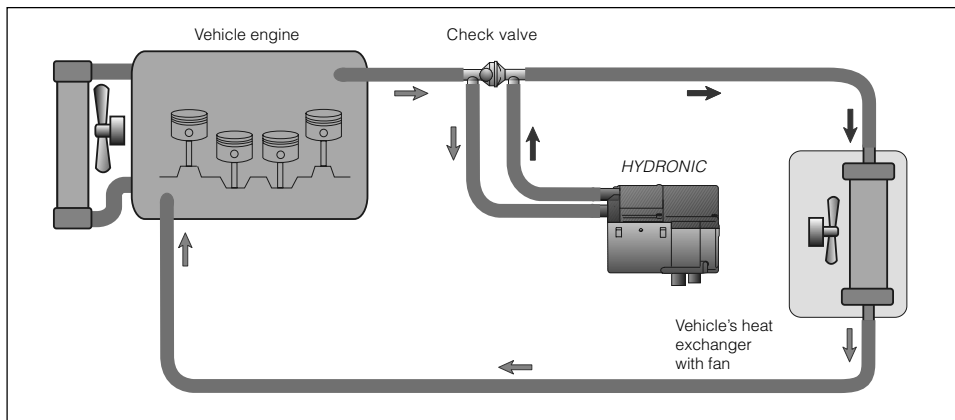


2. As “1”, but check valve parallel to the heater in the pipe from the engine to the vehicle’s heat exchanger

Characteristic heating curve as for water cycle “1”

Advantage:

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



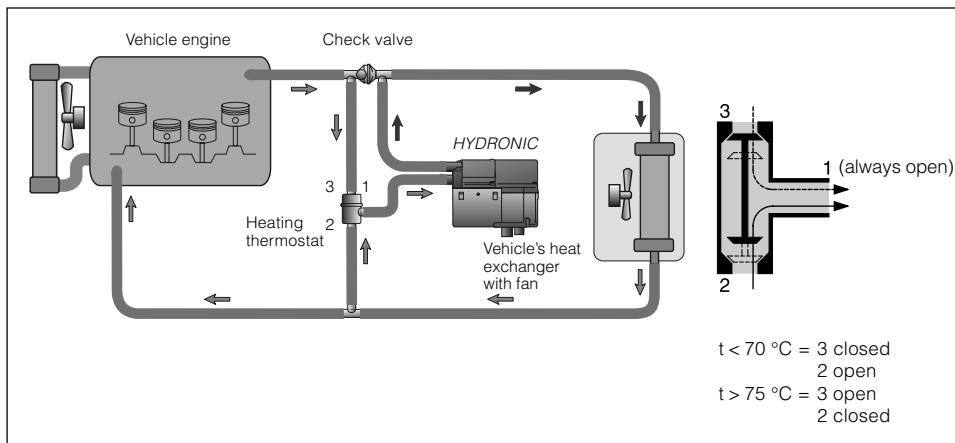
**3. Water cycle with comfort accessory package –
B 5 W SC only
Order No. 24 0132 00 00 00**

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

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.

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.

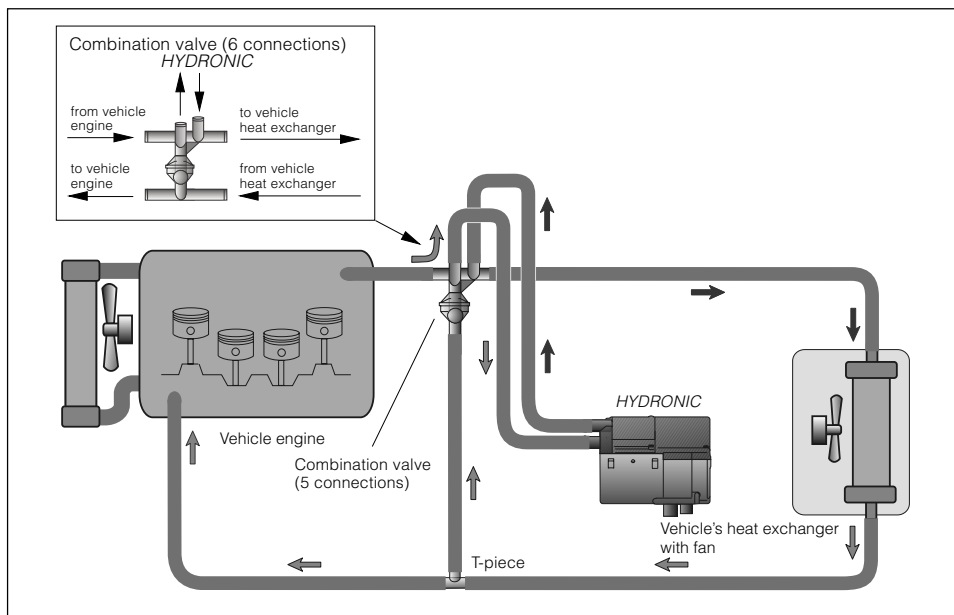
Mounting the combination valve – 6 connections

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.

Water cycle with combination valve:

5 connections order No. 330 00 177

6 connections order No. 330 00 176



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). 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 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 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").

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.



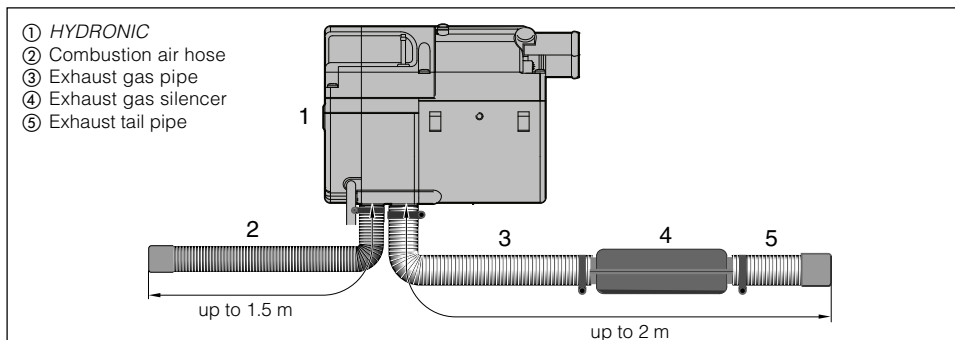
Danger of poisoning and burns!

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.



Fuel supply

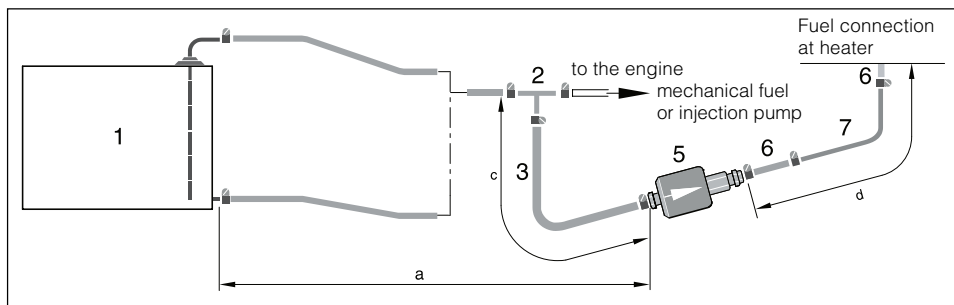
Deviations from the instructions given here are impermissible, otherwise functional disorders can arise.

1. For cars with carburetor engines with mechanical fuel pump

Fuel tapping from the fuel supply line to the engine.

Precondition:

The fuel supply line from the tank to the engine must be tight so that the flow of fuel is not interrupted when the engine stops.



- ① Tank (vehicle's tank or separate tank)
- ② Fuel branch
- ③ Fuel hose, inner diameter 5 mm, order No. 360 75 350
- ⑤ Fuel dosing pump (15° up to vertically up)
- ⑥ Fuel hose, inner diameter 3.5 mm, order No. 360 75 300
- ⑦ Fuel pipe: plastic pipe, inside diameter 1.5 mm order No. 090 31 118

Dimension a = max. 2 m
 Dimension c = max. 300 mm
 Dimension d = max. 4 m

2. For cars with fuel injected engines

The fuel tapping from the fuel supply line of cars after the conveying pump is generally prohibited as pressures up to 10 bar do occur.

The following possibilities exist:

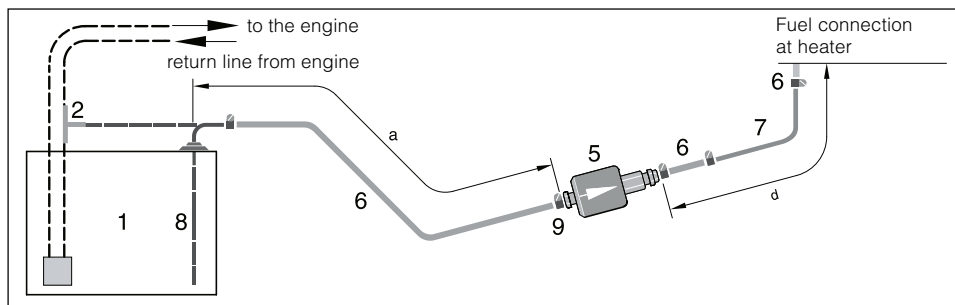
2.1 Fuel tapping from the tank with separate rising pipe. For cars the rising pipe can, if possible, be built into the tank fitting.

2.2 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:

1. No valve may be installed in the return line in the tank.

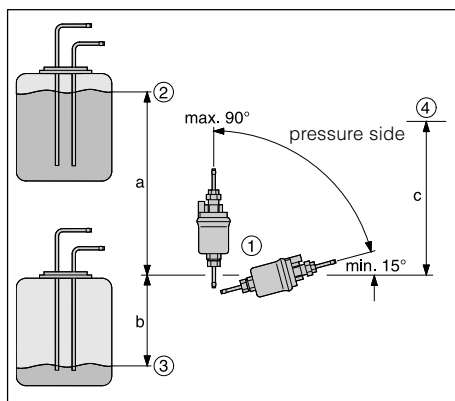
2. The pressure inside the return line may reach a max. of 2 bar. In case of pressures above 0.3 and up to 2 bar a pressure reducer (add-on part, order No. 20 1645 89 30 00) must be installed in front of the dosing pump.



- ① Tank (vehicle's tank or separate tank)
 - ② Fuel branch
 - ⑤ Fuel dosing pump (15° up to vertically up)
 - ⑥ Fuel hose, inner diameter 3.5 mm, order No. 360 75 300
 - ⑦ Fuel pipe: plastic pipe, inside diameter 1.5 mm order No. 090 31 118
 - ⑧ Rising pipe, inside diameter 2 mm outside diameter 4 mm
 - ⑨ Connecting piece, outside diameter 4 mm
- } order No. 20 1645 89 35 00

Dimension a = max. 2 m
Dimension d = max. 4 m

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

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

Pressure level from the dosing pump to the heater:

c = max. 2000 mm

D

S

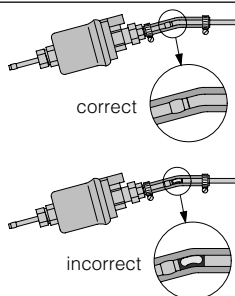
GB

F

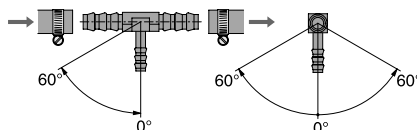
Important!

- 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.

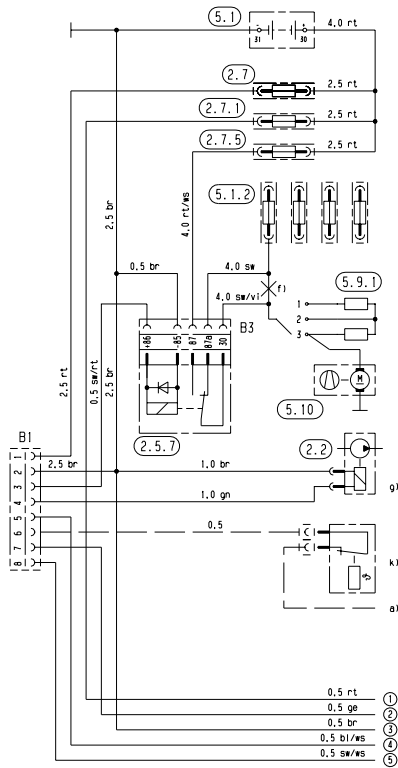
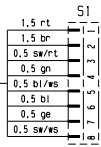
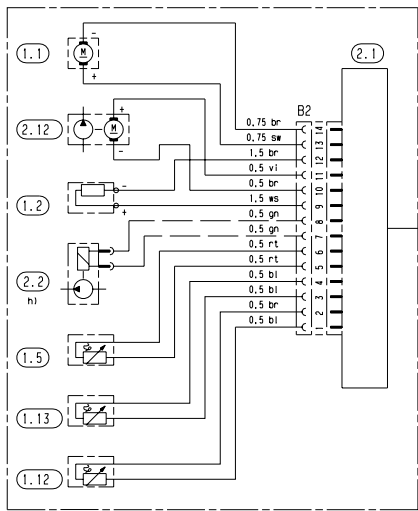
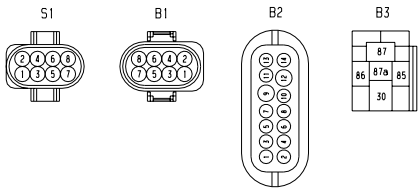
Drawing A:



Drawing B:



Circuit diagram
HYDRONIC B 4 W SC / B 5 W SC



25 1920 00 96 01 D



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 Batterie
- 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 mm²

> 5 m < 8 m: cross section 6 mm²

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 = blue
- li = purple

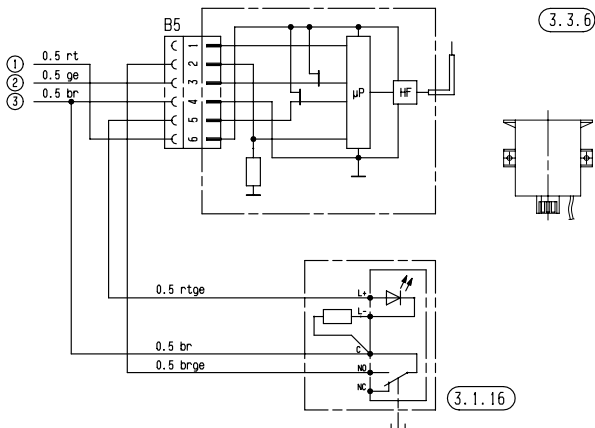
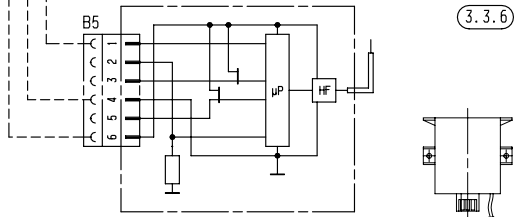
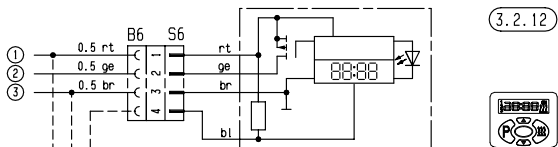
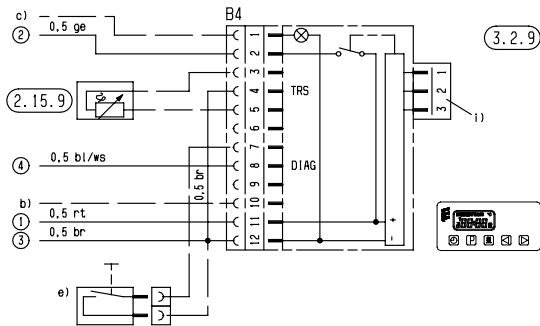
D

S

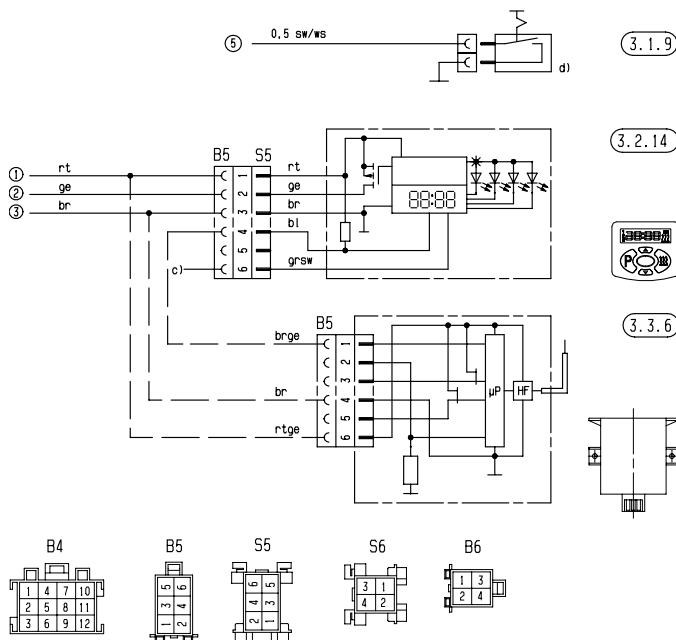
GB

F

Circuit diagram
Control elements – part 1



D
S
GB
F



Cable colours

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

25 1920 00 97 01 C

Parts list

2.15.9 Sensor, outside temperature

3.1.9 Change-over switch 'heating / ventilating'

3.1.16 Key button, radio remote control

3.2.9 Timer, module clock

3.2.12 Timer, mini-clock 12 / 24 volts

3.2.14 Timer, mini-clock lightning (only 12 volts)

3.3.6 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 by means of vehicle fan (optional)
- e) External switch ON / OFF (optional)
- i) Connection radio module receiver TP4i

Length 'plus' + length 'minus':

< 5 m: cross section 4 mm²

> 5 m < 8 m: cross section 6 mm²

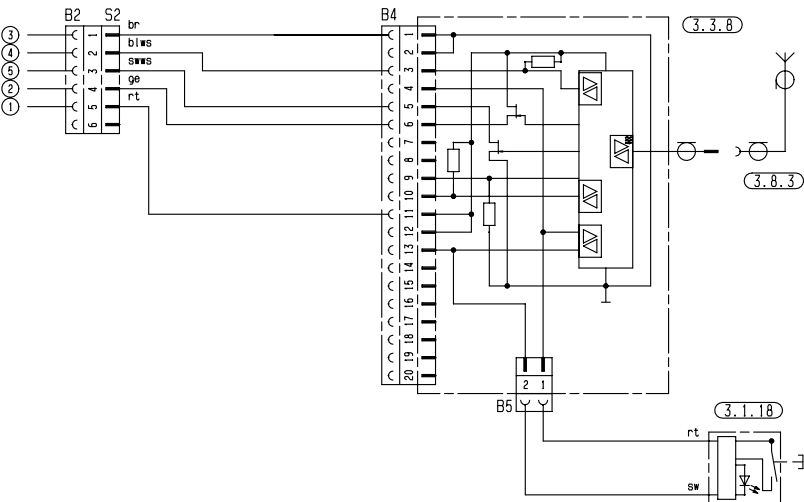
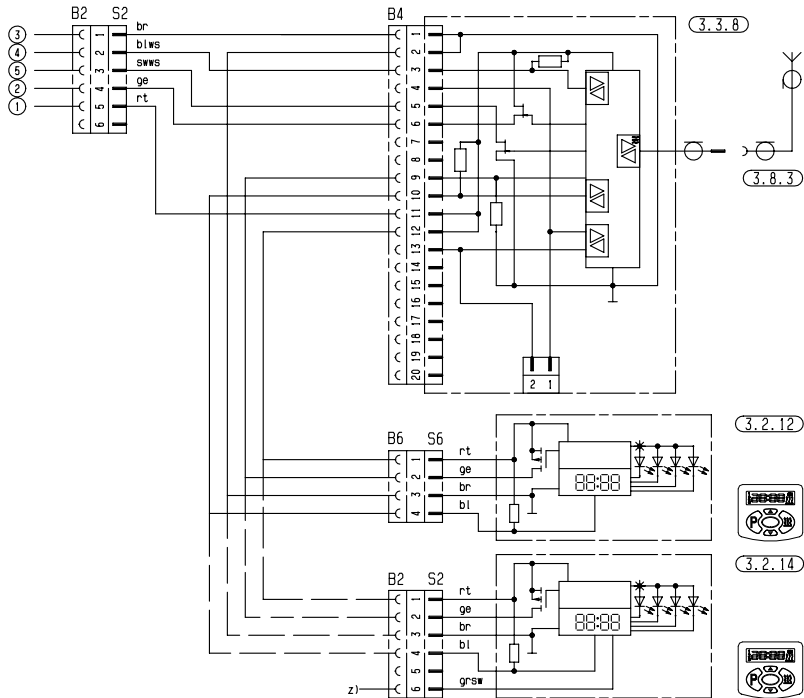
Cable ends that are not being used must be insulated.

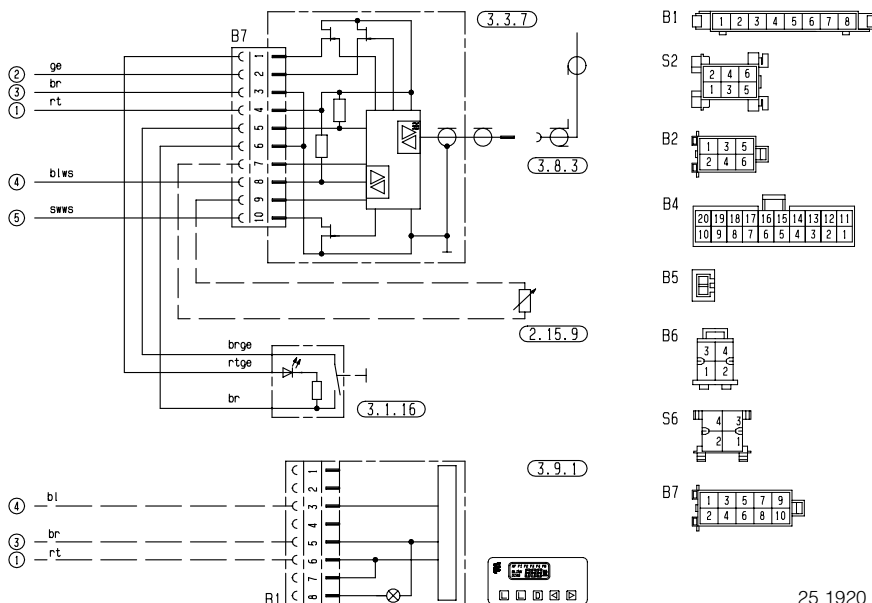
Plug and socket case are shown from the cable entry side.

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.

Circuit diagram
Control elements – part 2





25 1920 00 97 02 A

Parts list

2.15.9 Sensor, outside temperature

3.1.16 Key button, radio remote control

3.1.18 *CALLTRONIC* push-button

3.2.12 Timer, mini-clock 12 / 24 volts

3.2.14 Timer, mini-clock lightning (only 12 volts)

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

z) Lightning terminal 58

Length 'plus' + length 'minus':

< 5 m: cross section 4 mm²

> 5 m < 8 m: cross section 6 mm²

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
bl = blew
li = purple

D

S

GB

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

SMALL

OFF (control interval)

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 4 W SC / B 5 W SC.

D

S

GB

F



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 4 W SC / B 5 W SC*.

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 TP4i / TP41i, 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).

Please note!

- To prevent corrosion, the coolant must contain at least 10 % antifreeze all the year round.
- 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.

D

S

GB

F