

# HYDRONIC

## Technical Description, Installation, Operating and Maintenance Instructions.



Heater	Order No.	Heater	Order No.
Hydronic D 4 W SC – 12 V	25 2096 05 00 00	Hydronic D 5 W SC – 12 V	25 2098 05 00 00
Hydronic D 4 W SC – 12 V as a complete package	25 2097 05 00 00	Hydronic D 5 W SC – 12 V as a complete package	25 2099 05 00 00
		Hydronic D 5 W SC – 24 V	25 2147 05 00 00

## Engine-independent water heater for diesel and petrol.



**Eberspächer**  
A world of comfort

# 1 Introduction

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# 1 Introduction

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## Concept of this manual

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

### 1 Introduction

This section contains important introductory information about installing the heater and about the structure of the manual.

### 2 Product information

Here you will find information about the scope of supply, the technical data and the dimensions of the heater.

### 3 Installation

Here you will find important information and instructions referring to installation of the heater.

### 4 Operation and function

Here you will find information about the operation and function of the heater.

### 5 Electrics

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

### 6 Troubleshooting / maintenance / service

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

### 7 Environment

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

### 8 Lists

Here you will find the list of abbreviations.

# 1 Introduction

## Special text structure, presentation and picture symbols

This manual uses special text structures and picture symbols to emphasize different contents. Please refer to the following examples for their meanings and appropriate action.

### Special text formats and presentations

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

### Picture symbols



#### Regulation!

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



#### Danger!

This picture symbol with the remark "Danger!" refers to the risk of a fatal danger to life and limb. Under certain circumstances, failure to comply with these instructions can result in severe or life-threatening injuries.



#### Caution!

This picture symbol with the remark "Caution" refers to a dangerous situation for a person and / or the product. Failure to comply with these instructions can result in injuries to people and / or damage to machinery.

#### Please note!

These remarks contain recommendations for use and useful tips for installation of the heater.

## Important information before starting work

### Range of application of the heater

The water heater operating independently of an engine is intended for installation in the following vehicles:

- All kinds of vehicles
- Construction machinery
- Agricultural machinery
- Boats, ships and yachts

#### Please note!

Only the Hydronic D5 W SC – 24 volt heater is approved for installation in vehicles used for the transport of dangerous goods according to ADR.

For installation of the heater in vehicles used for the transport of dangerous goods, the ADR regulations must also be observed.

Detailed information on the ADR regulations is given in the information sheet, Print No. 25 2161 95 15 80.

### Intended purpose of the heater (via the vehicle's own heat exchanger)

- Pre-heating, de-misting windows
- Heating and keeping the following warm:
  - Driver and working cabs
  - Freight compartments
  - Ships cabins
  - Passenger and crew compartments
  - Vehicle engines and units

On account of its functional purpose, the heater is **not** approved for the following applications:

- Long-term continuous operation, e.g. for heating of:
  - Residential rooms
  - Garages
  - Work huts, weekend homes and hunting huts
  - Houseboats, etc.



#### Caution!

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

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



# 1 Introduction

## Statutory regulations

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

Hydronic EC-e100 0023

EMC-e1031075



### Regulation!

#### Directive 2001 / 56 / EC of the European Parliament and the Council

##### • Arrangement of the heater

- Parts of the structure and other components near the heater must be protected from excessive heat exposure and possible fuel or oil contamination.
- The heater must not pose a fire hazard even when it overheats. This requirement is deemed to be fulfilled if adequate clearance is ensured for all parts during installation, sufficient ventilation is provided and fireproof materials or heat shields are used.
- The heater may not be installed in the passenger compartment of Class M<sub>1</sub>, M<sub>2</sub>, M<sub>3</sub> and N vehicles. However, a heater in a hermetically sealed enclosure which also complies with the aforementioned conditions may be used.
- The factory nameplate or duplicate must be affixed so that it can still be easily read when the heater is installed in the vehicle.
- All appropriate precautions must be taken when arranging the heater to minimise the risk of injuries to persons or damage to other property carried in the vehicle.

##### • Fuel supply

- The fuel intake connection must not be located in the passenger compartment and must be sealed with a properly closing lid to prevent any fuel leaks.
- In heaters for liquid fuel where the heater fuel is separate from the vehicle fuel, the type of fuel and intake connection must be clearly identified.
- A warning sign is to be fixed to the intake connection indicating that the heater must be switched off before refuelling.

##### • Exhaust system

- The exhaust outlet must be arranged so as to prevent any penetration of exhaust fumes into the vehicle interior through the ventilation system, warm air intakes or open windows.

##### • Combustion air intake

- The air for the heater’s combustion chamber must not be sucked in from the vehicle’s passenger compartment.
- The air intake must be arranged or protected in such a way that it cannot be blocked by other objects.

##### • Operating status display

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

# 1 Introduction



## Regulations!

### Additional regulations for certain vehicles named in Directive 94 / 55 / EC (ADR Framework Directive)

#### Scope

This annex applies to vehicles to which the special provisions of Directive 94 / 55 / EC for combustion heaters and their installation apply.

#### Definition of terms

The vehicle designations "EX / II", "EX / III", "AT", "FL" and "OX" according to Chapter 9.1 of Annex B of Directive 94 / 55 / EC are used for the purposes of this annex.

#### Technical specifications

#### General regulations (vehicles EX / II, EX / III, AT, FL and OX)

##### Avoid heating and ignition

Combustion heaters and their exhaust pipes must be designed, arranged, protected or covered to avoid any unacceptable risk of heating or ignition of the load. This requirement is met if the fuel tank and the exhaust system of the heater comply with the requirements described in the "fuel tank" and "exhaust system and exhaust pipe layout" sections. Compliance with these requirements must be checked on the complete vehicle.

##### Fuel tank

Fuel tanks for supply of the heater must conform to the following regulations:

- In the event of a leakage, the fuel must be drained to the floor without coming into contact with any hot vehicle parts or the vehicle's load;
- Fuel tanks which contain petrol must be equipped with a flame arrester or hermetically sealed cap at the filler neck.

##### Exhaust system and exhaust pipe layout

The exhaust system and the exhaust pipes must be laid or protected so that dangerous heating or ignition of the vehicle's load cannot occur. Parts of the exhaust system located directly under the fuel tank (diesel fuel) must be positioned at a distance of at least 100 mm from the tank or be protected by a heat shield.

##### Switch on combustion heater

The combustion heater may only be switched on manually! Automatic switching on via a programmable switch is not allowed.

#### EX / II and EX / III vehicles

Combustion heaters for gaseous fuel are not allowed.

#### FL vehicles

Combustion heaters must at least be able to be taken out of service by the procedures named in the following:

- a) Switching off manually in the driver's cab
- b) Shutdown of the vehicle's engine; in this case the heater may be switched back on manually by the vehicle driver;
- c) Starting up an installed fuel pump in the vehicle for transported dangerous goods.

#### After running of the combustion heater

After running of the switched off combustion heater is permitted. In the cases named in the "FL vehicles" section under letters b) and c), the supply of combustion air must be interrupted by suitable means following an after-running period of 40 seconds maximum. Only combustion heaters whose heat exchangers are verifiably not damaged by the reduced after-running time of 40 seconds beyond their usual operating period may be used.

#### Please note!

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



# 1 Introduction

## Safety instructions for installation and operation



### Danger!

#### Risk of injury, fire and poisoning!

- Disconnect the vehicle battery before starting any kind of work.
- Before working on the heater, switch the heater off and let all hot parts cool down.
- The heater may not be operated in enclosed spaces, e.g. in the garage or in a multi-storey car park.



### Caution!

#### Safety instructions for installation and operation!

- The heater must only be installed by a JE partner authorised by the manufacturer according to the instructions in this manual and possibly according to special installation recommendations; the same applies to any repairs to be carried out in the case of repairs or guarantee claims.
- Repairs by non-authorised third-parties and / or with non-original spare parts are dangerous and are therefore not allowed. They result in expiry of the type-approval of the heater; consequently, when installed in motor vehicles they can cause expiry of the vehicle's operating licence.
- The following measures are not allowed:
  - Changes to components relevant to the heater.
  - Use of third-party components not approved by J. Eberspächer GmbH & Co. KG.
  - Installation or operation not conforming to the statutory regulations, safety instructions or specifications relevant for safe operation as stated in the installation instructions and operating instructions. This applies in particular to the electrical wiring, fuel supply, combustion air system and exhaust system.
- Original accessories and original spare parts only may be used for installation or repairs.
- Only the control units approved by Eberspächer may be used to operate the heater. Use of other control units can cause malfunctions.
- Before the heater is installed again in another vehicle, rinse the heater parts carrying water with clear water.
- When carrying out electric welding on the vehicle, the positive cable at the battery should be disconnected and placed at ground to protect the control box.
- The heater must not be operated where there is a risk of an accumulation of flammable vapours or dust, e.g. close to
  - Fuel depot
  - Coal depot
  - Wood depot
  - Grain depot, etc.
- The heater must be switched off when refuelling.
- If the heater is installed in a safety casing or similar, its installation box must not be used as storage space and must be kept clear. In particular fuel canisters, oil cans, spray cans, gas cartridges, fire extinguishers, cleaning rags, items of clothing, paper etc. must not be stored or transported on or next to the heater.
- Defective fuses may be replaced by fuses with the prescribed rating only.
- If fuel leaks from the heater fuel system, arrange for the damage to be repaired immediately by a JE service partner.
- When topping up the coolant, only use the coolant permitted by the vehicle manufacturer, see the vehicle operating manual. Any blending with unapproved coolant can cause damage to the engine and heater.
- The after-running of the heater must not be prematurely interrupted e.g. by pressing the battery isolating switch, except for an emergency stop.

## Accident prevention

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

## 2 Product information

### Scope of supply

Quantity / Designation	Order No.
1 Hydronic D 4 W SC – 12 V	25 2096 05 00 00
To be ordered separately:	
1 Universal installation kit	25 1917 80 00 00
1 Control unit**	–
or	
1 Hydronic D 4 W SC – 12 V as a complete package*	25 2097 05 00 00
To be ordered separately:	
1 Control unit**	–
or	
1 Hydronic D 5 W SC – 12 V	25 2098 05 00 00
To be ordered separately:	
1 Universal installation kit	25 1917 80 00 00
1 Control unit**	–
or	
1 Hydronic D 5 W SC – 12 V as a complete package*	25 2099 05 00 00
To be ordered separately:	
1 Control unit**	–
1 Hydronic D 5 W SC – 24 V	25 2147 05 00 00
To be ordered separately:	
1 Universal installation kit	25 2009 80 00 00
1 Control unit**	–

\* The complete package contains:  
1 Heater  
1 Universal installation kit

\*\* Control units, see price list / accessories catalogue.

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

#### Scope of supply for petrol heater

##### Figure No. Designation

1	Heater
2*	Metering pump

\* with Hydronic D 5 W SC-24 V only

#### Scope of supply for universal installation kit

##### Figure No. Designation

3	Exhaust silencer
4	Cable harness, heater
5	Lead harness, positive
6	Bracket, heater
7	Water hose
8	Flexible exhaust pipe
9	Cable tie
10*	Bracket, metering pump
11*	Pipe, 6 x 2
12	Combustion air hose
13*	Hose, 5 x 3
14*	Pipe, 4 x 1
15*	Tank connection
16*	Fuel filter
17	Hose, 3,5 x 3

\* Included in installation kit 25 2009 80 00 00 only.

#### Cable harnesses

(A) Lead harness, “control units”

(B) Lead harness, “fan activation”

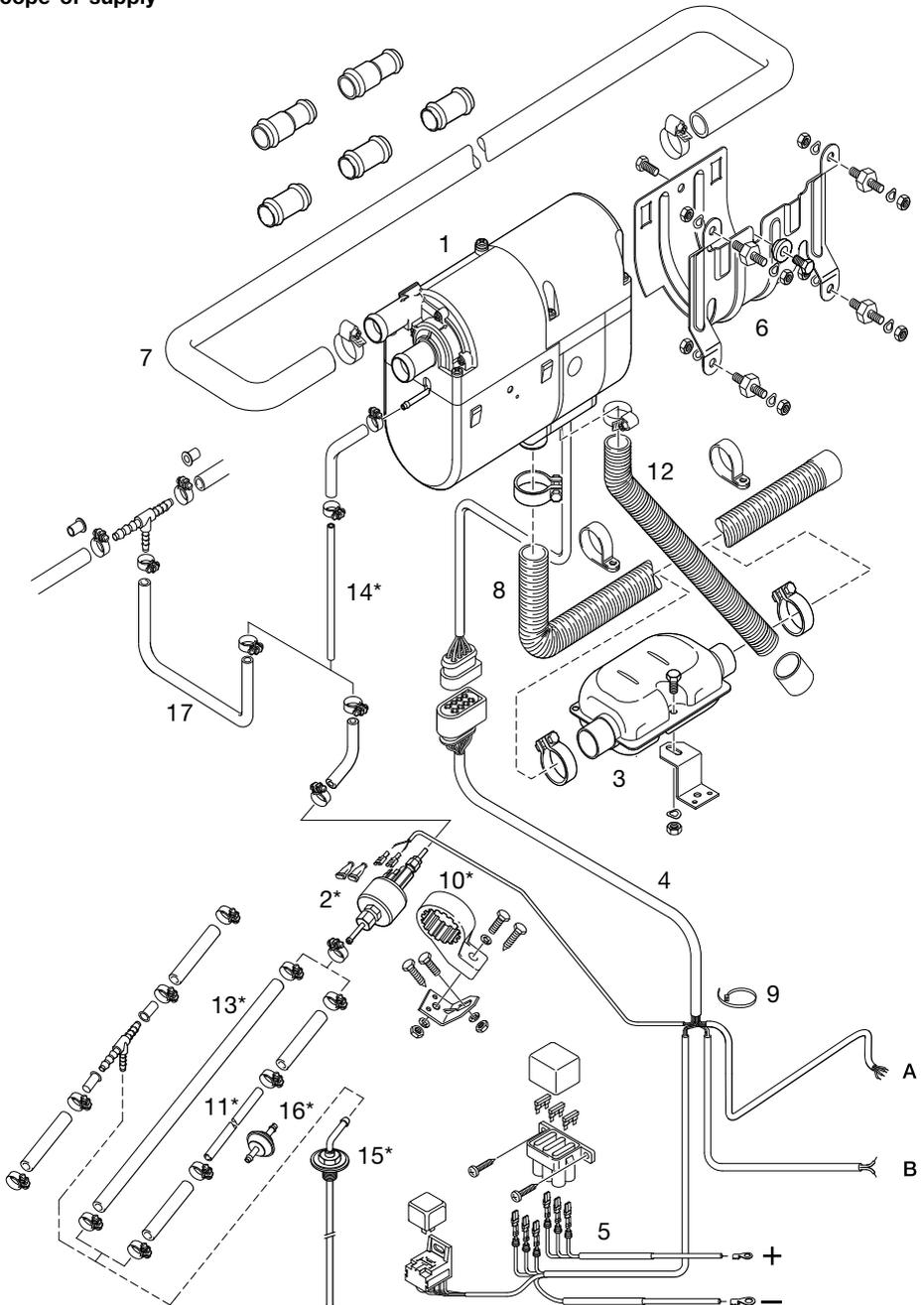
#### Please note!

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

## 2 Product information



### Scope of supply



## 2 Product information

Technical data / diesel heaters	Hydronic D 4 W SC		Hydronic D 5 W SC	
Heating medium	Water, coolant			
Control of the heat flow	High	Low	High	Low
Heat flow (watt)	4300	2400	5000	2400
Fuel consumption (l/h)	0.53	0.27	0.62	0.27
Average elec. power consumption (watt)				
during operation	48	23	50	23
while starting	120			
Rated voltage	12 volt		12 volt	24 volt
Operating range				
• Lower voltage limit: An undervoltage protection installed in the control box switches off the heater if the voltage limit is reached.	10.2 volt		10.2 volt	20.4 volt
• Upper voltage limit: An overvoltage protection installed in the control box switches off the heater if the voltage limit is reached.	16 volt		16 volt	32 volt
Allowable operating pressure	up to 2.5 bar overpressure			
Water volume in the heater	0.18 l			
Water flow rate of the water pump against 0.1 bar	500 l/h ±70 l/h		900 l/h ±100 l/h	
Minimum water flow rate of the heater	250 l/h		300 l/h	
Fuel – see also “Diesel Heater Fuel Quality” page 30	Diesel – commercially available (EN 590) FAME for diesel engines according to EN 14 214 – for Hydronic D 5 W SC – 24 volt only			
Allowable ambient temperature	in operation		without operation	
Heater	–40 °C to +80 °C		–40 °C to +105 °C	
Control box	–40 °C to +80 °C		–40 °C to +105 °C	
Metering pump	–40 °C to +20 °C		–40 °C to +105 °C	
Interference suppression class	5 to DIN 57879 / Part 1 VDE 0879			
Weight – without coolant and attachments	approx. 2.7 kg		approx. 2.9 kg with metering pump approx. 2.7 kg without metering pump	

**Please note!**

If no limit values are given, the technical data listed is with the usual heater tolerances of ± 10 % at nominal voltage, 20 °C ambient temperature and Esslingen reference altitude.



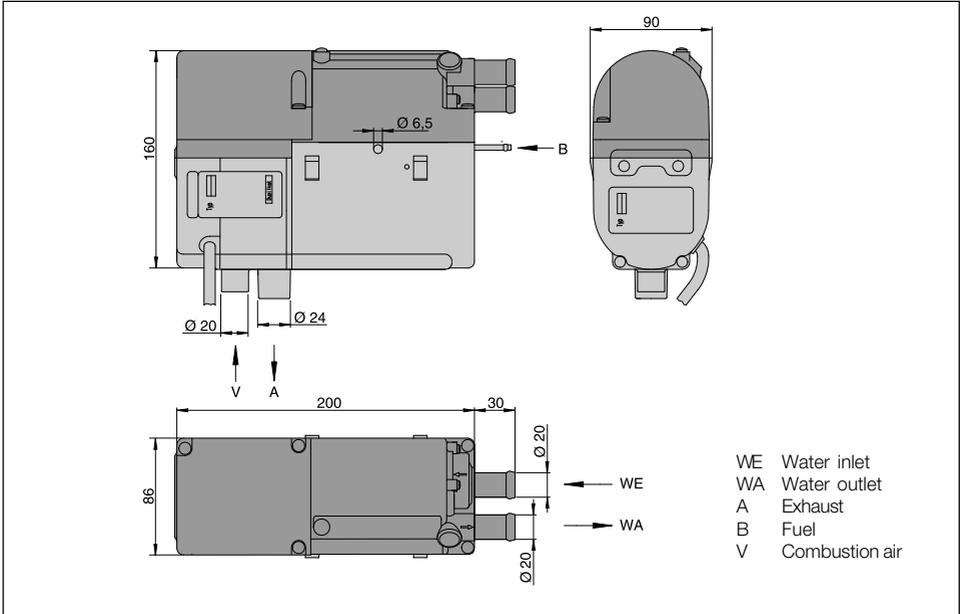
**Caution!**

**Safety instructions for technical data!**

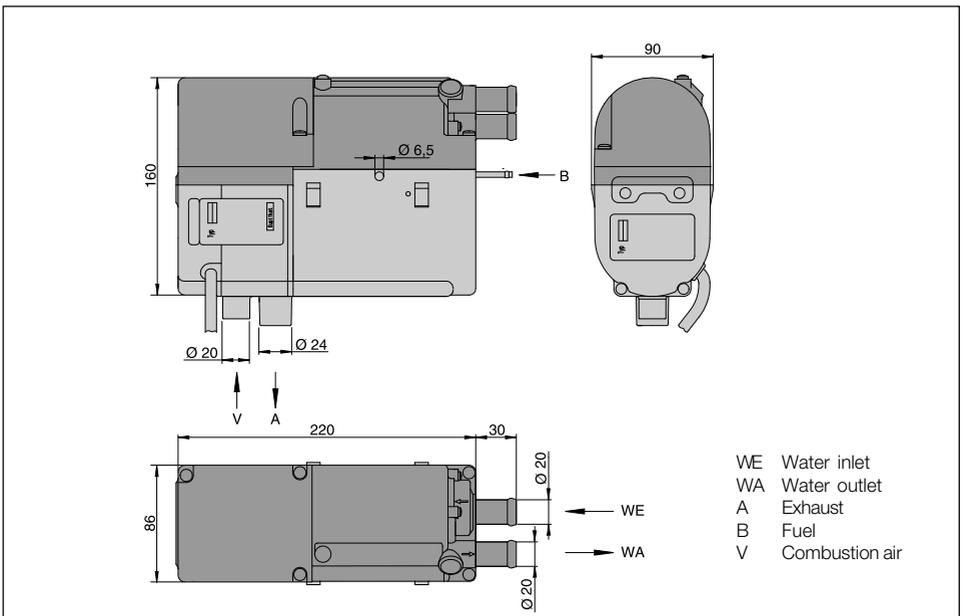
Failure to comply with the technical data can result in malfunctions.

## 2 Product information

### Main dimensions D 4 W SC



### Main dimensions D 5 W SC



### 3 Installation

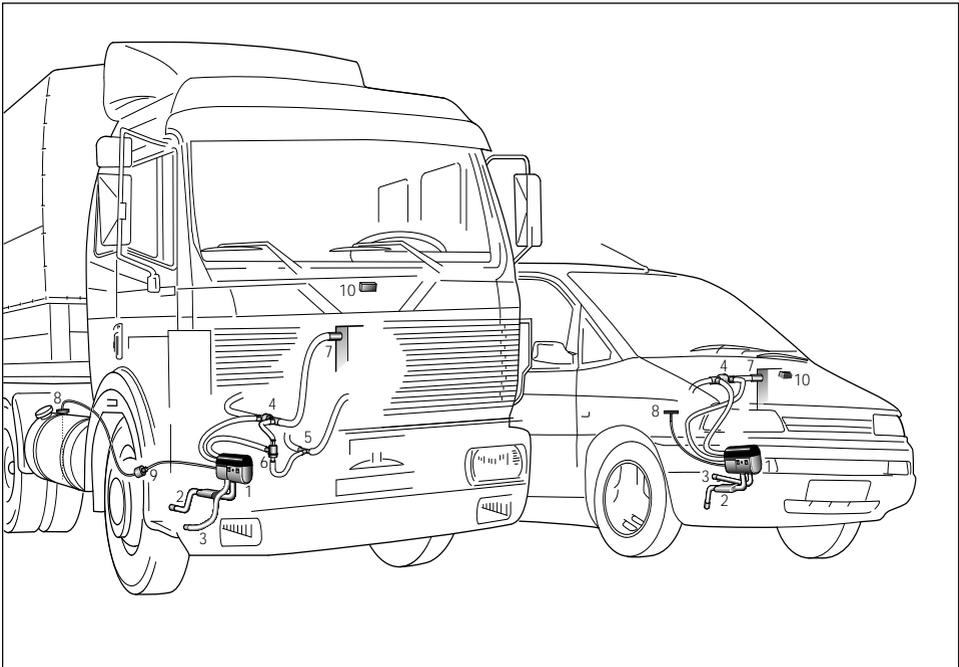
#### Installation and mounting position

The heater is installed in the engine compartment. The heater must be installed below the min. cooling water level (header tank, radiator, vehicle's heat exchanger) so that the heat exchanger of the heater and water pump can vent independently.

#### Please note!

- Observe the regulations and safety instructions for this chapter, given on page 4 – 7.
- The positions suggested in the installation instructions are examples. Other installation locations are possible if they comply with the installation requirements stated in these installation instructions.
- Further installation information (e.g. for boats and ships) is available from the manufacturer on request.
- Note and observe the permissible installation positions as well as the operating and storage temperatures.

#### Installation example



- |   |                                    |    |                                      |
|---|------------------------------------|----|--------------------------------------|
| 1 | Heater                             | 6  | Thermostat                           |
| 2 | Exhaust pipe with exhaust silencer | 7  | Vehicle heat exchanger with blower   |
| 3 | Combustion air hose                | 8  | Tank connection / T-piece (fuel)     |
| 4 | Non-return valve                   | 9  | Metering pump (24 volt version only) |
| 5 | T-piece (water circuit)            | 10 | Module timer                         |

### 3 Installation

#### Permissible installation positions

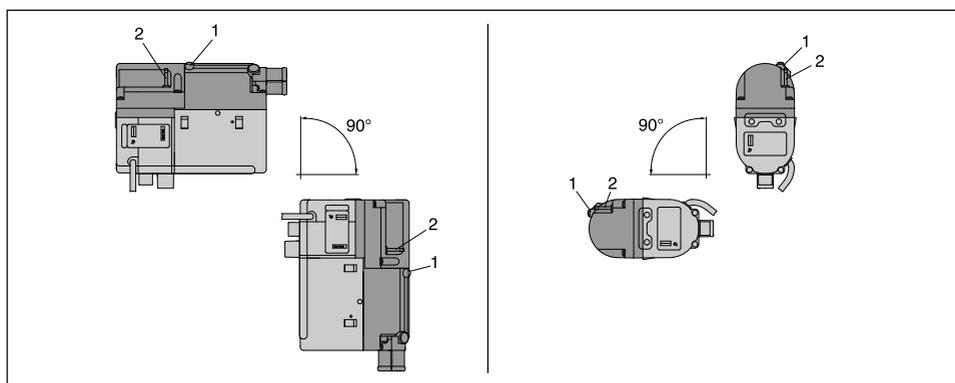
The heater should preferably be installed in the normal position, horizontally with the exhaust connection facing downwards.

Depending on the installation conditions, the heater can be installed within the permissible swivel ranges, see sketch.

In heating mode, the normal and maximum installation positions shown can differ by up to +15° in all directions for a short time. These differences, caused by tilted positions of the vehicle, do not have any negative effects on the heater's function.

#### Normal position with permissible swivel ranges

- Swivel range swung by up to max. 90° downwards from the normal position – the water pipe sockets are pointing downwards.
- Swivel range swung from the normal position by up to max. 90° about the longitudinal axis – the water pipe sockets are horizontal.



- 1 Vent screw – must always be at the top
- 2 Fuel connection

#### Installation and fixing

Insert the heater in the heater bracket and fasten with fixing screws (tightening torque  $6^{+0.5}$  Nm). Fix the heater bracket with the installed heater in a suitable position in the engine compartment, if possible with rubber buffer.

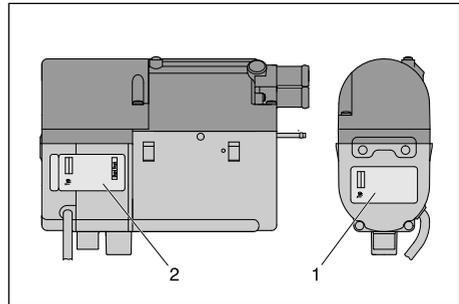
### 3 Installation

#### Nameplate

The nameplate and the 2nd nameplate (duplicate) is fixed to the side, on the lower jacket shell. The 2nd nameplate (duplicate) is attached to the lower jacket shell; it is removable and, if necessary, can be stuck onto a clearly visible place on the heater or in the area of the heater.

**Please note!**

The regulations and safety instructions to be observed for this chapter are stated on page 5.



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



## 3 Installation

### Connection to the cooling water circuit

The heater is integrated in the cooling water circuit, in the water flow hose from the vehicle engine to the heat exchanger; for which there are four installation options.

The installation options are described on pages 19 – 21.



#### **Danger!** **Risk of injuries and burns!**

It is possible for the coolant and components of the coolant circuit to get very hot.

- Parts conveying water must be routed and fastened in such a way that they pose no temperature risk to man, animals or material sensitive to temperature from radiation / direct contact.
- Before working on the coolant circuit, switch the heater off and wait until all components have cooled down completely, if necessary wear safety gloves.

#### **Please note!**

- When installing the heater, please note the direction of flow of the cooling water circuit.
- Fill the heater and water hoses with coolant before connecting them to the cooling water circuit; to do this, open the vent screw on the heater.
- Route the water hoses without any kinks, and in a rising position if possible.
- When routing the water pipes, maintain sufficient clearance from hot vehicle parts.
- Protect all water hoses / water pipes from chafing and from extreme temperatures.
- Secure all hose connections with hose clips (tightening torque = 1.5 Nm).
- Re-tighten the hose clips after the vehicle has been running for 2 hours or has travelled 100 km.
- The minimum water flow rate is only guaranteed if the temperature difference of the heating medium does not exceed 10 K between water inlet and water outlet during heating.
- Only overpressure valves with an opening pressure of min. 0.4 – max. 2 bar may be used in the coolant circuit.
- The coolant liquid must contain at least 10 % antifreeze all year round as corrosion protection.
- The cooling liquid must contain sufficient antifreeze for low temperatures.
- Before commissioning the heater or after changing the cooling liquid, the whole coolant circuit including heater must be vented free of bubbles according to the instructions issued by the vehicle manufacturer.
- Top up using only coolant approved by the vehicle manufacturer.

### 3 Installation

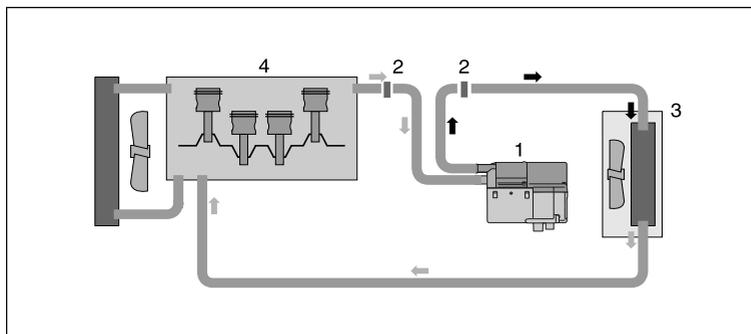
#### Connection to the cooling water circuit

##### Integrate heater in the water flow hose from the vehicle engine to the heat exchanger, "inline connection"

Cut the water flow hose from the vehicle engine to the heat exchanger. Use connectors and water hoses to connect the heater to the water flow hose.

##### Heating characteristics

If the heater is switched on, the heat is fed to the vehicle's own heat exchanger and to the vehicle's engine. After the cooling water has reached a temperature of approx. 30 °C – depends on the selected blower setting – the vehicle blower switches on and the heat is then also fed to the passenger compartment.



##### Integrate the heater and non-return valve in the cooling water circuit

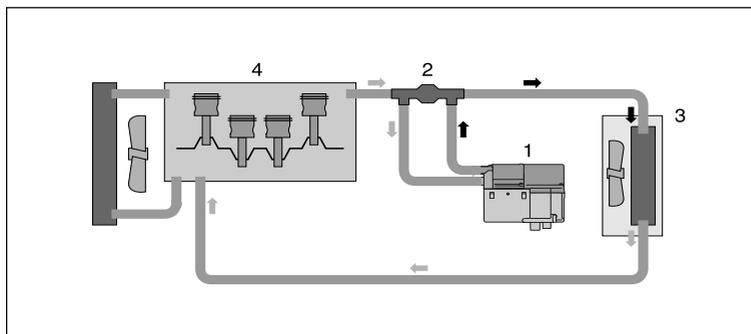
Cut the water flow hose from the vehicle engine to the vehicle's heat exchanger and insert the non-return valve. Use water hoses to connect the heater to the non-return valve.

##### Heating characteristics

If the heater is switched on, the heat is initially fed via the heater's own heat exchanger to the vehicle's engine only. After the cooling water has reached a temperature of approx. 30 °C – depends on the selected blower setting – the vehicle blower switches on and the heat is then also fed to the passenger compartment.

##### Advantage of the "inline connection" water circuit

No loss of vehicle heating effectiveness if heater is switched off.



##### Please note!

Non-return valve must be ordered separately, please refer to the additional parts catalogue for the Order No.

- 1 Heater
- 2 Non-return valve
- 3 Heat exchanger
- 4 Vehicle engine

### 3 Installation

#### Connection to the cooling water circuit

##### Integrate the heater, non-return valve, thermostat and T-piece in the cooling water circuit (for Hydronic B 5 W SC / D 5 W SC only)

Cut the water flow hose from the vehicle engine to the vehicle's heat exchanger and insert the non-return valve. Cut the water return hose from the heat exchanger to the vehicle engine and insert the T-piece. Use water hoses to connect the heater and the thermostat to the non-return valve and the T-piece – as shown in the sketch.

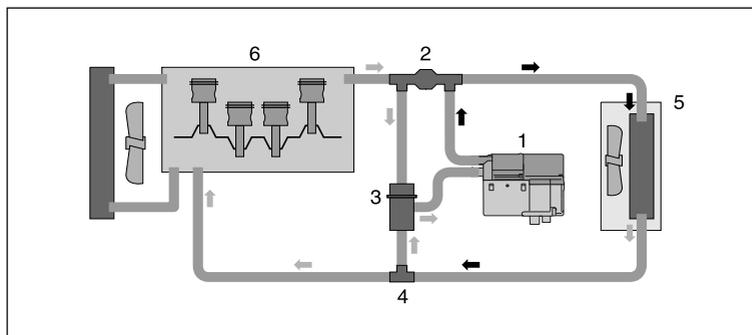
#### Heating characteristics

##### Small cooling water circuit

Initially, up to a cooling water temperature of approx. 70 °C, the heater's heat is fed to the heat exchanger only – fast heating of the inside of the vehicle.

##### Large cooling water circuit

If the cooling water temperature continues to rise, the thermostat slowly switches over to the large circuit (full switchover is reached at approx. 75 °C) – heating of the inside of the vehicle and additional engine pre-heating.



- 1 Heater
- 2 Non-return valve
- 3 Thermostat
- 4 T-piece
- 5 Heat exchanger
- 6 Vehicle engine

#### Please note!

The thermostat, non-return valve and T-piece must be ordered separately, please refer to the additional parts catalogue for the Order No.

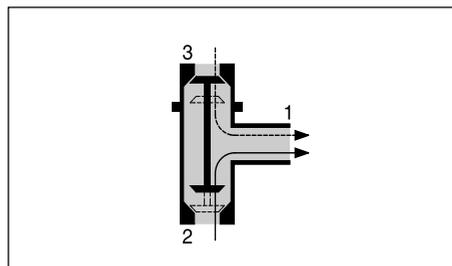
#### Function of the thermostat

At a cooling water temperature < 70 °C – small cooling water circuit:

- Socket 1 – open (to the heater)
- Socket 2 – open (to the T-piece)
- Socket 3 – closed (to the non-return valve)

At a cooling water temperature > 75 °C – large cooling water circuit:

- Socket 1 – open (to the heater)
- Socket 2 – closed (to the T-piece)
- Socket 3 – open (to the non-return valve)



- 1 Socket, to the heater
- 2 Socket, to the T-piece
- 3 Socket, to the non-return valve

#### Please note!

Use the connections Item 1, 2 and 3 – as shown in the sketch – to integrate the thermostat in the water circuit.

### 3 Installation

#### Connection to the cooling water circuit

##### Integrate the heater and combination valve with thermostat function in the cooling water circuit

##### Using the combination valve with 5 connections

Order No. 25 2014 80 72 00

If the water flow line and water return line from the vehicle engine to the heat exchanger are laid separately in the engine compartment, the combination valve with 5 connections and an additional T-piece must be used.

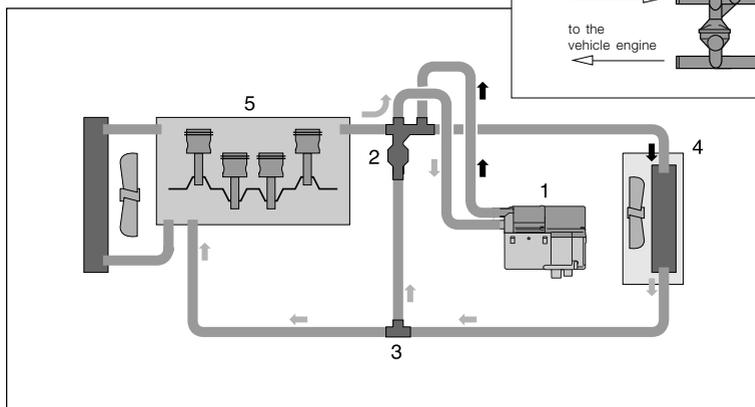
##### Using the combination valve with 6 connections

Order No. 25 2014 80 62 00

If the water flow line and water return line from the vehicle engine to the heat exchanger are laid in parallel in the engine compartment, the combination valve with 6 connections (without T-piece) must be used.

#### Install combination valve with 5 connections

Cut the water flow hose from the vehicle engine to the vehicle's heat exchanger and insert the combination valve. Cut the water return hose from the heat exchanger to the vehicle engine and insert the T-piece. Use water hoses to connect the heater to the combination valve and T-piece – as shown in the sketch.



#### Heating characteristics in parking heater mode

##### Small cooling water circuit with heat discharge in the vehicle interior

Initially, up to a cooling water temperature of approx. 67 °C, the heater's heat is fed to the heat exchanger only – fast heating of the inside of the vehicle.

##### Small cooling water circuit with heat discharge to the vehicle engine

From a cooling water temperature of approx 67 °C, part of the heater's heat is also passed to the vehicle's engine. This causes slow heating of the engine circuit, without rapid cooling of the "small cooling water circuit" for interior heating.

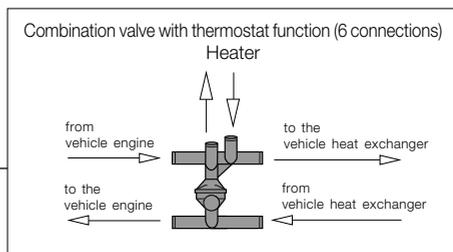
#### Heating characteristics in auxiliary heater mode

##### Large cooling water circuit

While the vehicle's engine is running the heat is uniformly distributed between the heat exchanger and the vehicle engine – further shortening of the heating up phase and heating of the inside of the vehicle.

#### Install combination valve with 6 connections

Cut the water flow hose and the water return hose from the vehicle engine to the vehicle's heat exchanger and insert the combination valve. Use water hoses to connect the heater to the combination valve – as shown in the sketch.



- 1 Heater
- 2 Combination valve (5 connections)
- 3 T-piece
- 4 Heat exchanger
- 5 Vehicle engine



## 3 Installation

### Exhaust system

(For exhaust system diagram see page 23)

#### Mounting the exhaust system

The universal installation kit includes a flexible exhaust pipe, inner  $\varnothing$  24 mm, 1000 mm long and an exhaust silencer.

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

Fasten the exhaust silencer to a suitable position in the vehicle.

Lay the flexible exhaust pipe from the heater to the exhaust silencer and fasten with pipe clips.

Fix a short exhaust pipe end (with end sleeve) to the exhaust silencer with a pipe clip.



#### Caution!

##### Safety instructions!

The whole exhaust system gets very hot while the heater is running and immediately afterwards. This is why the exhaust system must be routed according to these installation instructions.

- The exhaust outlet must end in the open air.
- The exhaust pipe may not protrude beyond the lateral limits of the vehicle.
- Install the exhaust pipe sloping slightly downwards. If necessary, make a drain hole with an approx.  $\varnothing$  of 5 mm at the lowest point as a condensation outlet.
- Important functional parts of the vehicle may not be impaired (maintain sufficient clearance).
- Mount the exhaust pipe with sufficient clearance to heat-sensitive parts. Pay particular attention to fuel pipes (made of plastic or metal), electrical cables and brake hoses etc.!
- Exhaust pipes must be securely fixed (recommended clearance of 50 cm) to avoid damage due to vibrations.
- Lay the exhaust system so that the outflowing exhaust gases are not sucked in as combustion air.
- The mouth of the exhaust pipe must not become clogged with dirt and snow.
- The mouth of the exhaust pipe must not point in the direction of travel.
- Always fix the exhaust silencer to the vehicle.



#### Danger!

##### Risk of injuries and burns!

Every type of combustion produces high temperatures and toxic exhaust fumes.

This is why the exhaust system must be routed according to these installation instructions.

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

#### Please note!

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

### 3 Installation

#### Combustion air system

##### Installing the combustion air system

The heater – as described in these installation instructions – is installed in the engine compartment. It is not necessary to install a combustion air hose if the intake connection for the combustion air is in an area in which the combustion air does not get hotter than 25 °C and in which neither spray water or dust / dirt are to be expected. Otherwise, a flexible combustion air hose, inner Ø 20 mm up to 1.5 m long must be installed in order to take the combustion air from an area which fulfils the conditions named above.

##### Please note!

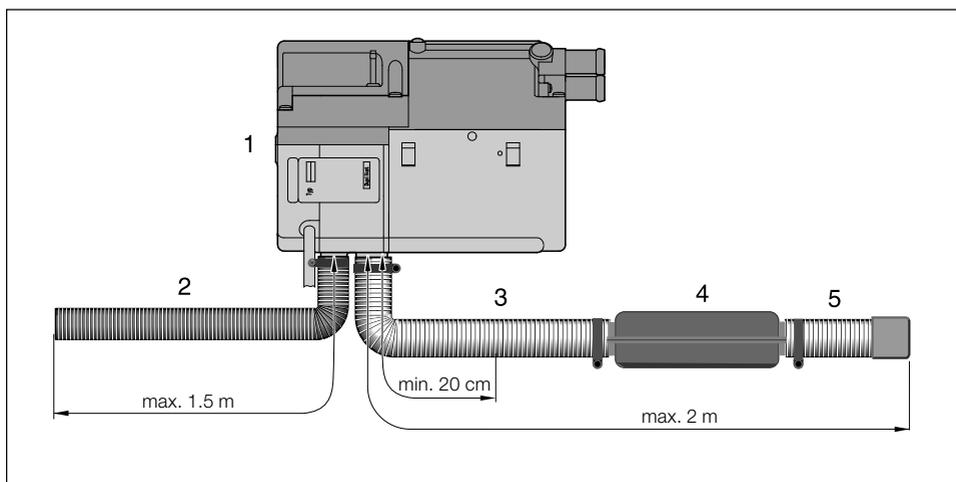
Comply with the regulations and safety instructions for this chapter given on page 4 – 7.



##### Caution!

##### Safety instructions for the combustion air system!

- The combustion air opening must be free at all times.
- Lay the combustion air intake to ensure that exhaust fumes cannot be sucked in as combustion air.
- Arrange the combustion air intake so that it is not directed against the wind blast or airstream.
- Do not allow the combustion air intake to become clogged with dirt and snow.
- Install the combustion air intake system sloping slightly downwards. If necessary, make a drain hole approx. Ø 5 mm at the lowest point to drain off condensation.



- 1 Heater
- 2 Combustion air hose
- 3 Exhaust pipe
- 4 Exhaust silencer
- 5 Exhaust pipe end with end sleeve

## 3 Installation

### Fuel supply

#### Installing the metering pump, laying the fuel pipes and installing the fuel tank

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

Deviations from the instructions stated here are not allowed.

Failure to comply can result in malfunctions.



#### **Danger!**

#### **Risk of fire, explosion, poisoning and injuries!**

Caution when handling fuel.

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

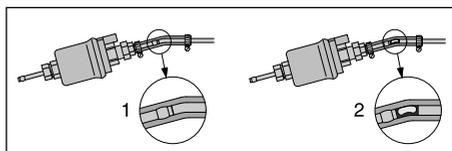


#### **Caution!**

#### **Safety instructions for laying the fuel pipes!**

- Use a sharp knife only to cut fuel hoses and pipes to length. Interfaces must not be crushed and must be free of burrs.
- Wherever possible, lay the fuel pipes from the metering pump to the heater with a continuous rise.
- Fuel pipes must be securely fixed to avoid damage and / or noise due to vibrations (recommended guideline value: clearance of around 50 cm).
- Fuel pipes must be protected against mechanical damage.

- Route the fuel pipes so that any distortion of the vehicle, engine movements etc. cannot have any lasting effect on the service life.
- Parts carrying fuel must be protected from interfering heat.
- Never route or fasten the fuel lines to the heater or vehicle exhaust system. When systems cross, always ensure there is a sufficient heat clearance. If necessary, attach heat deflection plates.
- Dripping or evaporating fuel must never be allowed to collect on hot parts or ignite on electric systems.
- When connecting fuel pipes with a fuel hose, always install the fuel pipes with a butt joint to prevent any bubbles from forming.



- 1 Correctly laid lines
- 2 Incorrectly laid lines – bubbles form

#### **Safety instructions for fuel pipes and fuel tanks in buses and coaches**

- In buses and coaches, fuel lines and fuel tanks may not be routed through the passenger compartment or driver's cab.
- Fuel tanks in buses and coaches must be positioned in such a way that the exits are not in immediate danger if a fire occurs.

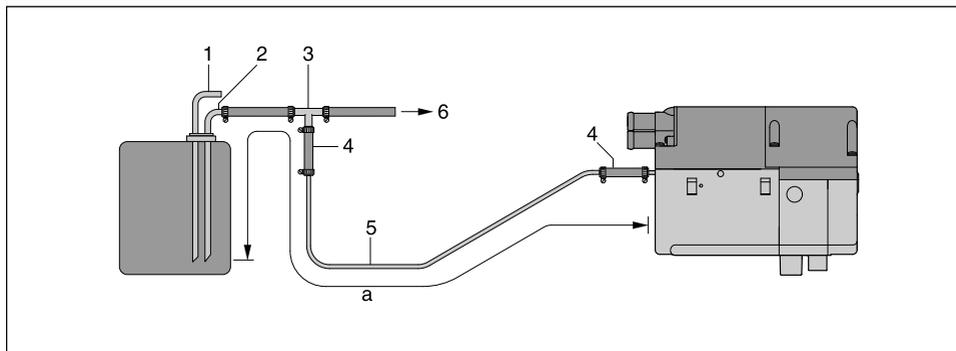
#### **Please note!**

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

### 3 Installation

#### Fuel supply for 12 volt heaters

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



- 1 Fuel return pipe from tank connection
- 2 Fuel flow line from tank connection – insert T-piece in the fuel flow line upstream of the fuel pump.
- 3 T-piece
- 4 Fuel hose, 3,5 x 3 (di = Ø 3,5 mm), approx. 50 mm long
- 5 Fuel hose, 4 x 1 (di = Ø 2 mm)
- 6 To the vehicle engine, mechanical fuel or injection pump.

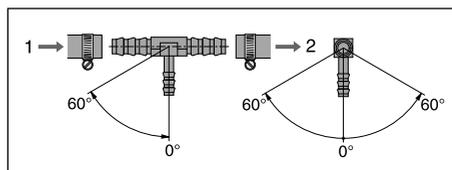
#### Allowable pipe length

#### Intake side

a = max. 5 m

#### Installation position of the T-piece

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

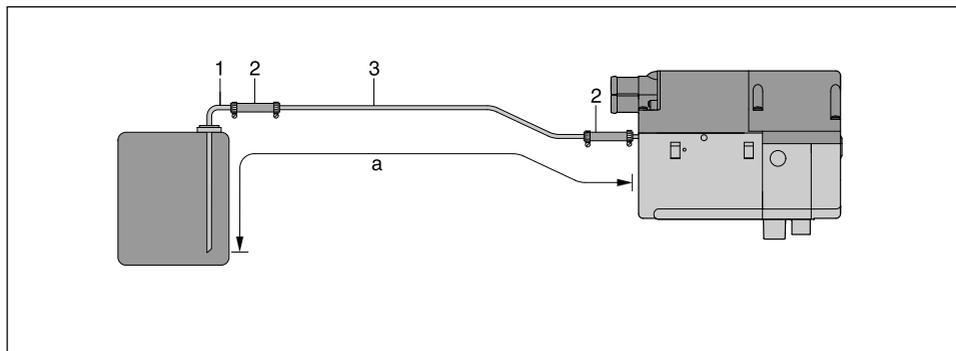


- 1 Direction of flow – from the fuel tank
- 2 Direction of flow – to the vehicle engine

### 3 Installation

#### Fuel supply for 12 volt heaters

Fuel feed point with tank connection riser pipe,  
installed in the tank fitting



- 1 Tank connection for tank fitting,  
di = Ø 2 mm, da = Ø 4 mm
- 2 Fuel hose, 3,5 x 3 (di = Ø 3,5 mm),  
approx. 50 mm long
- 3 Fuel hose, 4 x 1 (di = Ø 2 mm)

#### Allowable pipe length

**Intake side:**  
a = max. 5 m

#### Permissible suction and pressure head

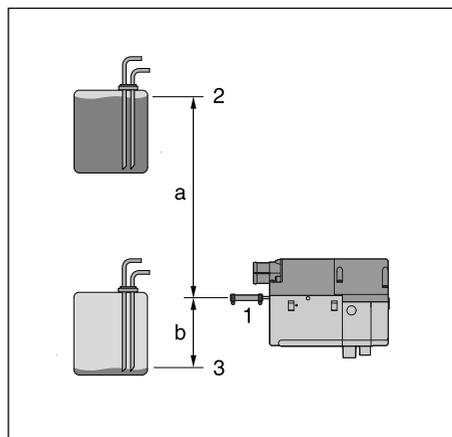
Pressure head from vehicle tank to the heater:  
a = max. 3000 mm

Suction head in pressure-less vehicle tank:  
b = max. 1000 mm

Suction head in a vehicle tank in which negative pressure occurs during extraction (valve with 0.03 bar in the tank cap):  
b = max. 400 mm

**Please note!**

Check tank ventilation.

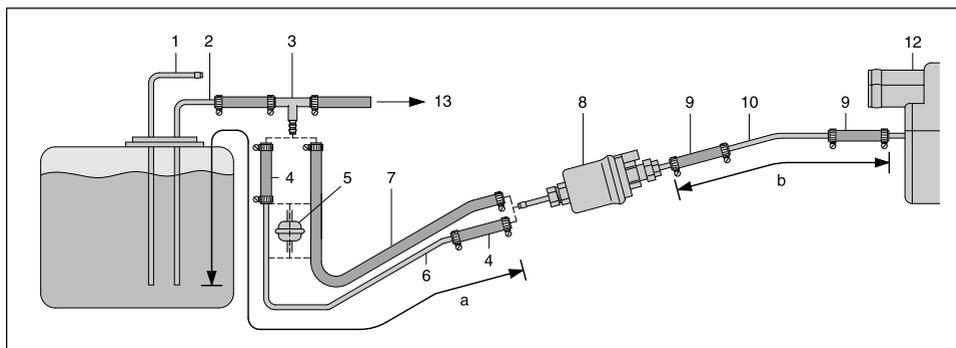


- 1 Connection at the heater
- 2 Max. fuel level
- 3 Min. fuel level

### 3 Installation

#### Fuel supply for 24 volt heaters

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



- 1 Return line
- 2 Flow line from the tank fitting to the vehicle engine – insert T-piece in the flow line upstream of the fuel pump
- 3 T-piece
- 4 Fuel hose, 5 x 3 (di = Ø 5 mm), approx. 50 mm long
- 5 Fuel filter – required for contaminated fuel only
- 6 Fuel hose, 6 x 2 (di = Ø 2 mm)
- 7 Fuel hose, 5 x 3 (di = Ø 5 mm)
- 8 Metering pump
- 9 Fuel hose, 3.5 x 3 (di = Ø 3.5 mm), approx. 50 mm long
- 10\* Fuel hose, 4 x 1.25 (di = Ø 1.5 mm)
- 11 Fuel hose, 4 x 1 (di = Ø 2 mm)
- 12 Heater
- 13 To the vehicle engine, mechanical fuel or injection pump

\* For diesel heaters, if necessary, a fuel pipe, 4 x 1 (di = Ø 2 mm) can also be used for the fuel pipe, 4 x 1.25 (di = Ø 1.5 mm), Item (10). The pipe length details remain unchanged. The fuel pipe, 4 x 1 must be ordered separately, please refer to the spare parts list or additional parts catalogue for the Order No.

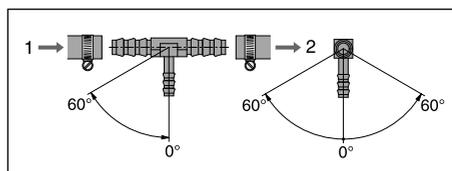
#### Permissible pipe lengths

**Intake side**  
a = max. 5 m

**Delivery side**  
b = max. 6 m

#### Installation position of the T-piece

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

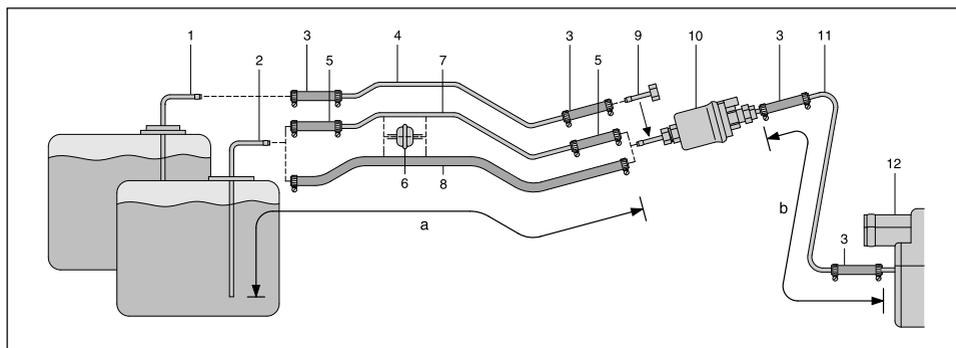


- 1 Direction of flow – from the fuel tank
- 2 Direction of flow – to the vehicle engine

### 3 Installation

#### Fuel supply for 24 volt heaters

Fuel feed point with tank connection riser pipe,  
installed in the tank fitting



- 1 Tank connection for tank fitting,  $d_i = \text{Ø } 2 \text{ mm}$ ,  $d_a = \text{Ø } 4 \text{ mm}$ , Order No. 20 1645 89 35 00
- 2 Tank connection for metal tank,  $d_i = \text{Ø } 2 \text{ mm}$ ,  $d_a = \text{Ø } 6 \text{ mm}$ , Order No. 25 1226 89 50 00
- 3 Fuel hose, 3,5 x 3 ( $d_i = \text{Ø } 3.5 \text{ mm}$ ), approx. 50 mm long
- 4 Fuel hose, 4 x 1 ( $d_i = \text{Ø } 2 \text{ mm}$ )
- 5 Fuel hose, 5 x 3 ( $d_i = \text{Ø } 5 \text{ mm}$ ), approx. 50 mm long
- 6 Fuel filter – required for contaminated fuel only
- 7 Fuel hose, 6 x 2 ( $d_i = \text{Ø } 2 \text{ mm}$ )
- 8 Fuel hose, 5 x 3 ( $d_i = \text{Ø } 5 \text{ mm}$ )
- 9 Connection fitting,  $d_a = 4 \text{ mm}$
- 10 Metering pump
- 11\* Fuel hose, 4 x 1.25 ( $d_i = \text{Ø } 1.5 \text{ mm}$ )
- 12 Heater

\* For diesel heaters, if necessary, a fuel pipe, 4 x 1 ( $d_i = \text{Ø } 2 \text{ mm}$ ) can also be used for the fuel pipe, 4 x 1.25 ( $d_i = \text{Ø } 1.5 \text{ mm}$ ), Item (11). The pipe length details remain unchanged. The fuel pipe, 4 x 1 must be ordered separately, please refer to the spare parts list or additional parts catalogue for the Order No.

#### Permissible pipe lengths

**Intake side**  
a = max. 5 m

**Delivery side**  
b = max. 6 m



#### Caution!

#### Safety instructions for the fuel supply

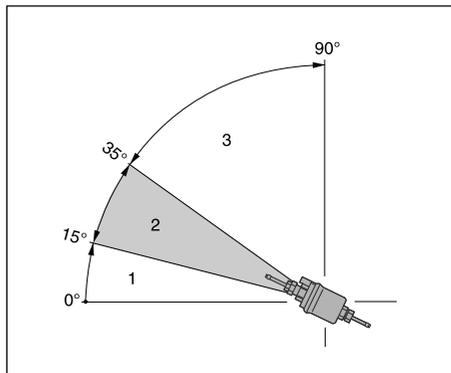
- The fuel may not be discharged by means of gravity or overpressure in the fuel container.
- It is not permitted to extract fuel downstream of the vehicle's own fuel pump.
- If the pressure in the fuel line is more than 0.2 bar up to max. 4.0 bar, use a pressure reducer (Order No. 22 1000 20 08 00)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

## 3 Installation

### Fuel supply for 24 V heaters

#### Installation position of the metering pump

Always install the metering pump with the delivery side rising upwards. Any mounting position over  $15^\circ$  is allowed, although a mounting position between  $15^\circ$  and  $35^\circ$  is preferable.



- 1 Installation position within range  $0^\circ - 15^\circ$  is not allowed
- 2 Preferred installation position within range  $15^\circ - 35^\circ$
- 3 Installation position within range  $35^\circ - 90^\circ$  is allowed

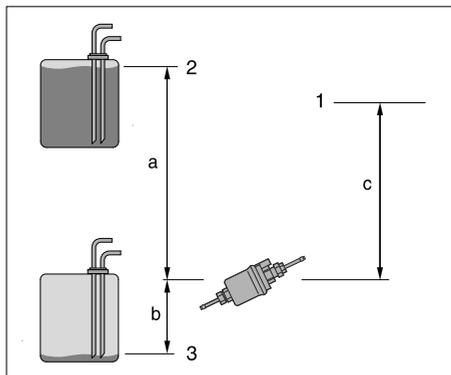
#### Permissible suction and pressure head of the metering pump

Pressure head from vehicle tank to metering pump:  
 $a = \text{max. } 3000 \text{ mm}$

Suction head in pressure-less vehicle tank:  
 $b = \text{max. } 1000 \text{ mm}$

Suction head in a vehicle tank in which negative pressure occurs during extraction (valve with 0.03 bar in the tank cap):  
 $b = \text{max. } 400 \text{ mm}$

Pressure head from the metering pump to the heater:  
 $c = \text{max. } 2000 \text{ mm}$



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

#### Please note!

Check tank ventilation.



#### Caution!

#### Safety instructions for installing the metering pump!

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



## 3 Installation

### Fuel supply

#### Fuel quality for diesel heaters

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

#### Fuel for special cases

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

#### Fuel for low temperatures

Refineries and fuel service stations automatically adjust the fuel to normal winter temperatures (winter diesel). This means that difficulties can only arise if there is an extreme drop in temperature, as is the case for the vehicle engine too. Please also refer to the vehicle manual.

If the heater is run from a separate tank, please comply with the following rules: For temperatures above 0 °C, any kind of diesel fuel as per DIN EN 590 can be used.

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

Temperature	Winter diesel	Additive
0 °C to -25 °C	100 %	–
-25 °C to -40 °C	50 %*	50 % kerosene or petrol

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

#### Please note!

- Additions of used oil are **not** allowed!
- After refuelling with winter or cold diesel or the listed blends, the fuel lines and the metering pump must be filled with the new fuel by letting the heater run for 15 minutes!

#### Operation with biodiesel (FAME for diesel engines according to DIN EN 14214)

##### Hydronic D 5 W SC – 24 volt

The heater is approved for operation with biodiesel up to a temperature of -8° C (the flowability reduces at temperatures below 0 °C).

#### Please note!

- When using 100 % biodiesel, the heater should be operated twice a year with diesel fuel (in the middle and at the end of a heating period) to burn off any possibly accumulated biodiesel residues.  
To do so, let the vehicle tank run almost empty and fill with diesel fuel without adding any biodiesel. While running on this tank filling, switch the heater on 2 to 3 times for 30 minutes at a time at the highest temperature setting.
- When operating with diesel / biodiesel mixtures of up to 50 % biodiesel, intermediate operation with pure diesel fuel is not necessary.

##### Hydronic D 4 W SC – 12 volt and Hydronic D 5 W SC – 12 volt

are not approved for running on biodiesel. The addition of up to 10 % biodiesel is allowed.

## 4 Operation and function

### Operating instructions

The heater is operated by a control unit. Detailed operating instructions are supplied with the control unit.

#### Please note!

You will be issued the operating instructions by the installation workshop.

### Important instructions for operation

#### Safety checks before starting up the heater

After a lengthy stoppage (summer months), check all components for secure fit (tighten screws where necessary).

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

#### Before switching on

Before switching on or pre-programming heating mode, switch the vehicle's heating lever to "WARM" (maximum setting) and the blower to "slow level" (low electricity consumption). In vehicles with automatic heating, before switching off the ignition, switch the heating lever to "MAX" and the required damper position to "OPEN".

#### Parking / cab ventilation with "heat / ventilate" changeover switch

Parking / cab ventilation means: possible activation of the vehicle blower directly via the heater's preselection timer or – even more useful – via the EasyStart R/R radio remote control by bypassing heating mode, in order to ventilate the often over-heated vehicle interior with fresh air just before driving away (separate wiring).

#### Heating at high altitudes

When using the heater at high altitudes, please note:

- Heating at altitudes up to 1500 m:
  - Unlimited heating possible.
- Heating at altitudes over 1500 m:
  - You can use the heater at this altitude for short periods (e.g. driving through a mountain pass or taking a break in your journey).
  - for longer stays, e.g. winter camping, it is necessary to adjust the fuel supply to the altitude, please contact a JE partner for further details and advice.

#### Please note!

The installation of an altitude kit (Order No. 22 1000 33 22 00) enables diesel heaters to be operated at altitudes over 1500 m, even for lengthy stays.

### Initial commissioning of the heater

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

- After installation of the heater, the coolant circuit and the whole fuel supply system must be vented carefully. Comply with the instructions issued by the vehicle manufacturer.
- Open the coolant circuit before the trial run (set the temperature control to "WARM").
- During the heater trial run, all water and fuel connections must be checked for leaks and secure, tight fit.
- If faults occur while the heater is running, use a diagnostic unit to determine and correct the cause of the fault.

### Functional description

#### Switching on (parking heater mode)

When the heater is switched on, the operating display in the control unit lights up. The water pump starts up. After a defined program run, the combustion air fan, glow plug and metering pump start and start up the combustion. Once a stable flame has formed, the glow plug switches off under time control.

#### Heating mode

Depending on the heat requirements, the heater runs at the following levels:

HIGH – LOW – OFF (pause mode).

The temperature thresholds are permanently programmed in the electronic control box. If the heating requirement in the "LOW" stage is so small that the cooling water temperature reaches 85 °C, the heater controls in pause mode. An after-run of approx. 120 seconds follows, the heater then switches off (pause mode). The control lamp lights up and the water pump continues running, even in pause mode.

#### Please note!

Depending on the connection, the heater can be operated as a parking heater or as a combined parking and auxiliary heater to compensate for insufficient heat output from the vehicle engine (for details of wiring, see circuit diagram).



## 4 Operation and function

### Control and safety devices

- If the heater does not ignite within 90 seconds after the fuel starts to pump, the start is repeated. If the heater still does not ignite after another 90 seconds of fuel being pumped, the heater is automatically shut down. After an impermissible number of failed start attempts, the controller is locked.\*
- If the flame goes off by itself during operation, the heater is restarted. If the heater still does not ignite within 90 seconds after the fuel pump has been restarted, or ignites and but goes off again within 15 minutes, a safety lock-out occurs. The shutdown on faults can be cancelled by briefly switching off and on again.
- In the event of overheating (e.g. water shortage, poorly ventilated cooling water circuit), the overheating sensor triggers, the fuel feed is interrupted and the heater is automatically shut down. Once the cause of the overheating has been eliminated, the heater can be re-started by switching it off and on again (provided that the heater has sufficiently cooled, cooling water temperature < 70 ° C). After the heater has been shut down due to overheating an unacceptable number of times, the control box is locked\*.
- If the lower or upper voltage limit is reached, the heater is automatically shut down.
- The heater does not start up if the glow plug is defective or if the electric cable to the metering pump is interrupted.
- The speed of the blower motor is continuously monitored. If the blower motor does not start up, if it is blocked or if the speed falls below 40 % of the desired speed, the heater is automatically shut down after 60 sec.

\* Cancellation of the lock or reading out errors is possible:

- with the module timer / EasyStart T timer
- with the radio remote control TP5 / EasyStart R+.

For other control units by connecting:

- the diagnostic unit
- the customer service program KD2000 / EDiTH.

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

#### Please note!

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

#### Emergency shutdown – EMERGENCY OFF

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

- Switch the heater off at the control unit or
- Remove the fuse or
- Disconnect the heater from the battery.

## 5 Electrics

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### Heater wiring



#### Caution!

#### Safety instructions!

The heater is to be connected up electrically according to the EMC directives. EMC can be affected if the heater is not connected up correctly. For this reason, comply with the following instructions:

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

#### Please note!

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

- Electrical leads, switch and control gear must be positioned in the vehicle so that they can function perfectly under normal operating conditions without impairment (e.g. due to heat exposure, moisture, etc.).
- The following cable cross sections are to be used between the battery and heater. This ensures that the max. permissible voltage drop in the cables does not exceed 0.5 V for 12 V or 1 V for 24 V rated voltage.  
Cable cross-sections for a cable length (plus cable + minus cable) of:
  - up to 5 m = cable cross-section 4 mm<sup>2</sup>
  - from 5 m to 8 m = cable cross-section 6 mm<sup>2</sup>
- If the positive cable is to be connected to the fuse box (e.g. terminal 30), the vehicle's cable from the battery to the fuse box must also be included in the calculation for the total cable length and re-dimensioned if necessary.
- Insulate unused cable ends.



## 5 Electrics

### Parts list for circuit diagram, 12 volt heater

- 1.1 Burner motor
- 1.2 Glow plug
- 1.5 Overheating sensor
- 1.12 Flame sensor
- 1.13 Temperature sensor
  
- 2.1 Control box
- 2.2 Fuel metering pump
- 2.5.7 Relay, vehicle blower
- 2.7 Main fuse, 20 A
- 2.7.1 Fuse, activation 5 A
- 2.7.5 Fuse, vehicle blower 25 A
- 2.12 Water pump
  
- 5.1 Battery
- 5.1.2 Fuse block in the vehicle
- 5.9.1 Switch, vehicle blower
- 5.10 Vehicle blower
  
- a) For auxiliary heating option, connect to D+
- f) Disconnect cable
- g) For petrol only
- g) For diesel only
- k) Switch (auxiliary heating, e.g. outside temperature  
< 5 °C or summer / winter changeover)

### Cable colours circuit diagrams

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

Connectors and bush housings are shown from the cable inlet side.

**Please note!**

See page 32 for circuit diagram.



## 5 Electrics

### Parts list for circuit diagrams, 24 volt heater and 24 volt heater, ADR mode

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

- 1.12 Flame sensor
- 1.13 Temperature sensor

- 2.1 Control box
- 2.2 Fuel metering pump
- 2.7 Main fuse, 15 A
- 2.7.1 Fuse, activation 5 A
- 2.12 Water pump

- 5.1 Battery
- 5.2.1 Battery main switch m)  
(operation, e.g. controlled by the ignition lock)
- 5.2.2 Battery isolating switch m)  
(Emergency Off function for ADR / ADR99)

- a) For auxiliary heating option, connect to D+
- d) Auxiliary drive input for TRS devices
- f) Disconnect cable
- h) Water pump, external
- k) Switch, auxiliary heating (e.g. outside temperature < 5 °C or summer / winter changeover)
- m) If only one switching element is used for items 5.2.1 and 5.2.2, it is important to ensure that on activating the „open the battery isolating switch“ function (Emergency OFF function for ADR / ADR99), the switch always breaks contact immediately (regardless of the heater condition) and all the heater's circuits are disconnected from the battery.

“Positive” length + “Negative” length:

– 5 m: Cross-section 4 mm<sup>2</sup>

– 5 m – 8 m: Cross-section 6 mm<sup>2</sup>

Insulate unused cable ends.

Connectors and bush housings are shown from the cable inlet side.

**Please note!**

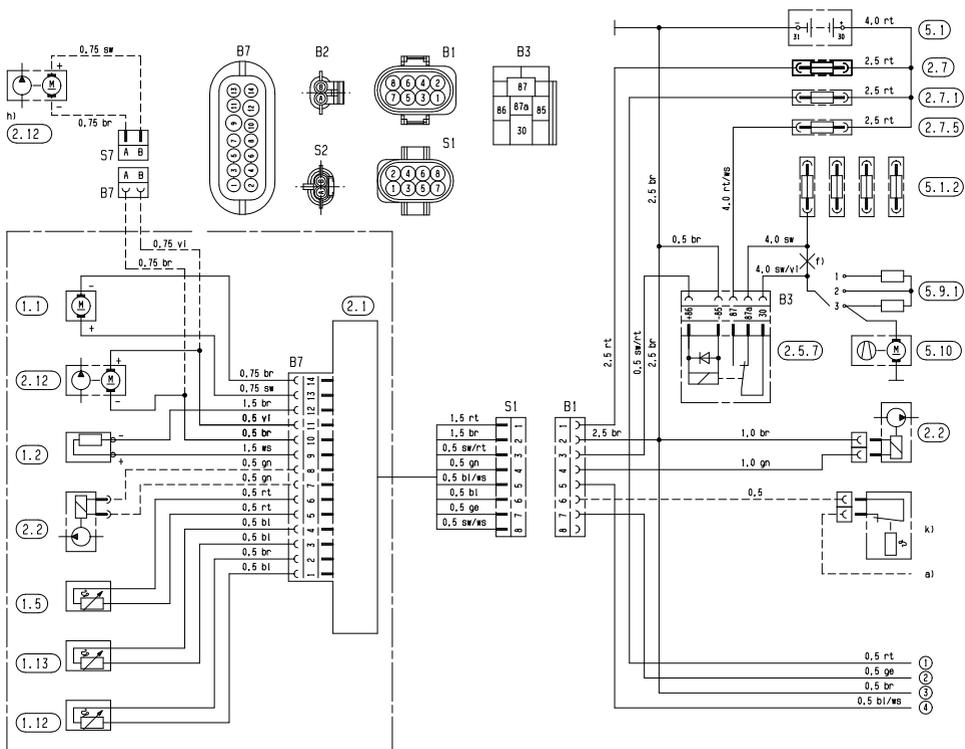
For circuit diagrams, see page 34 and 35

#### Cable colours

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

# 5 Electrics

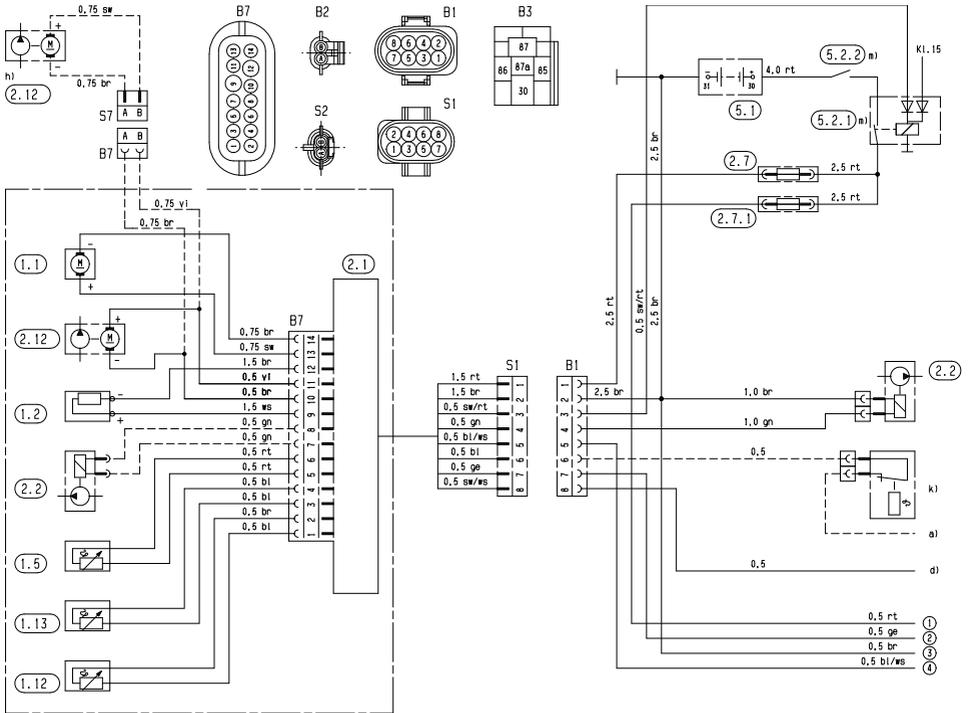
## Circuit diagram, 24 volt heater





# 5 Electrics

## Circuit diagram, 24 volt heater, ADR mode



## 5 Electrics

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### Parts list for circuit diagram, EasyStart R+ / R / T and EasyStart T – ADR control units

- 2.15.1 Room temperature sensor  
(with EasyStart R+ included in scope of supply,  
with EasyStart T and EasyStart R optional)
- 2.15.9 Temperature sensor (outside temperature)  
(optional)
  
- 3.1.7 "ON / OFF" button (optional)
- 3.1.9 "heat / ventilate" switch (optional)
- 3.1.16 Radio remote control button
  
- 3.2.15 EasyStart T timer
  
- 3.3.9 EasyStart R radio remote control (stationary  
unit)
- 3.3.10 EasyStart R+ radio remote control (stationary  
unit)
  
- 3.6.1 Lead harness
  
- 3.8.3 Antenna
  
- c) Terminal 58 (lighting)
- d) Parking / cab ventilation with vehicle blower  
(optional)
- e) EasyStart T timer connection
- g) External "ON / OFF" button (optional)

### Cable colours circuit diagrams

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

Connectors and bush housings are shown from the cable inlet side.

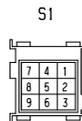
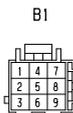
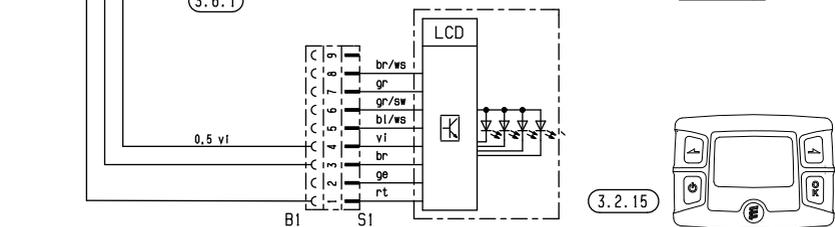
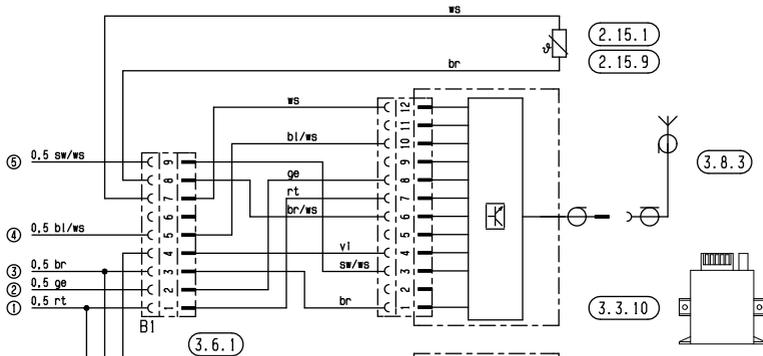
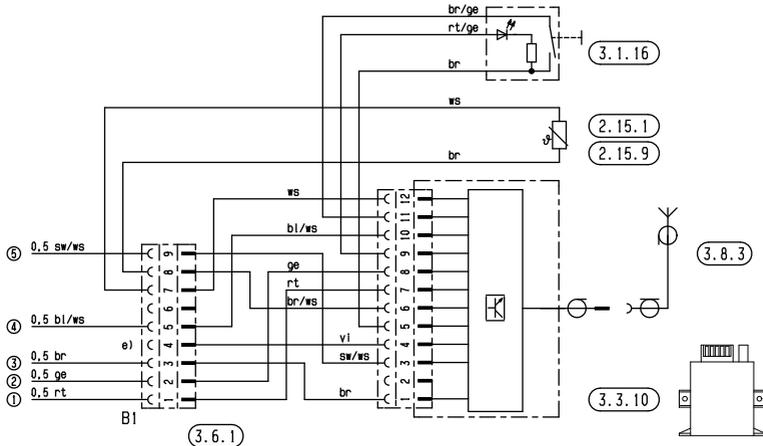
**Please note!**

For circuit diagrams, see page 37 – 40.

# 5 Electrics



## Circuit diagram for EasyStart R+ control unit

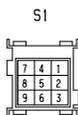
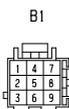
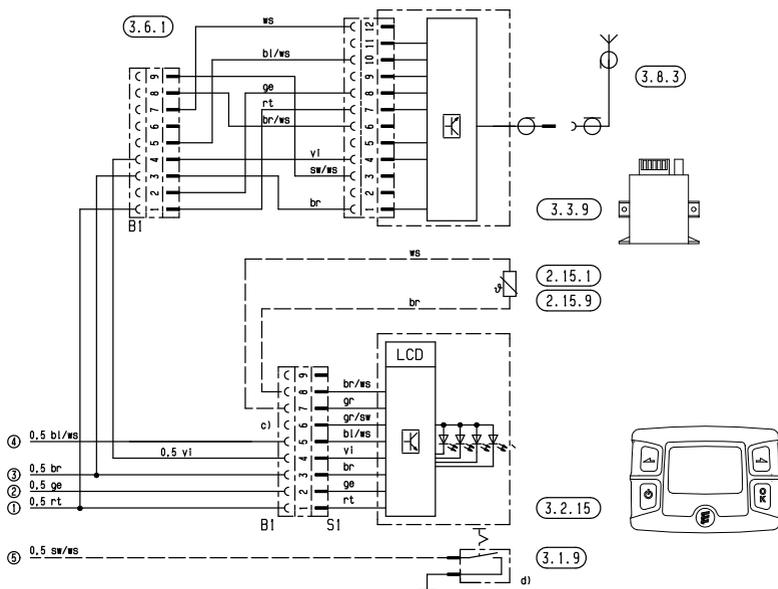
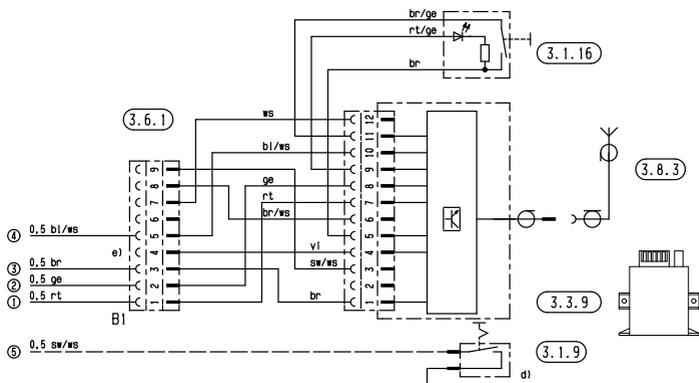


See page 36 for parts list

25 2217 00 97 01 C

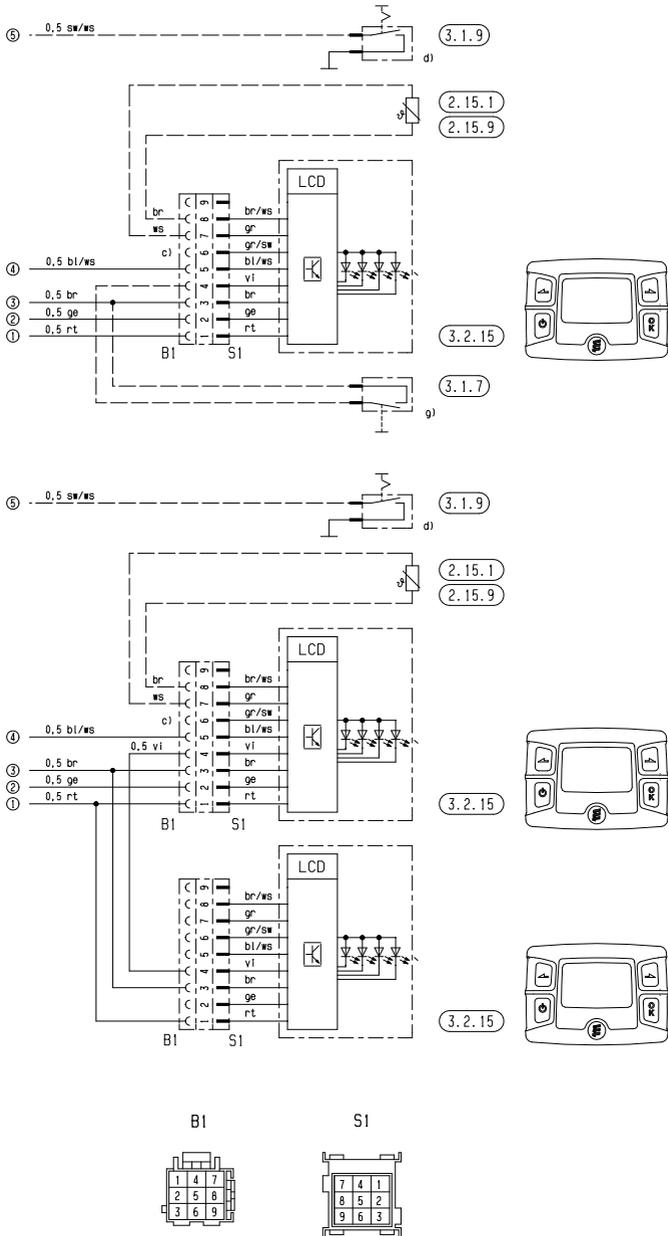
# 5 Electrics

## Circuit diagram for EasyStart R control unit



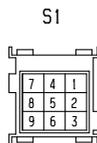
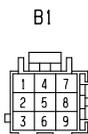
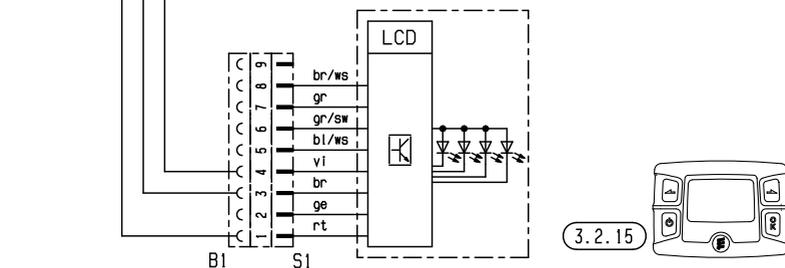
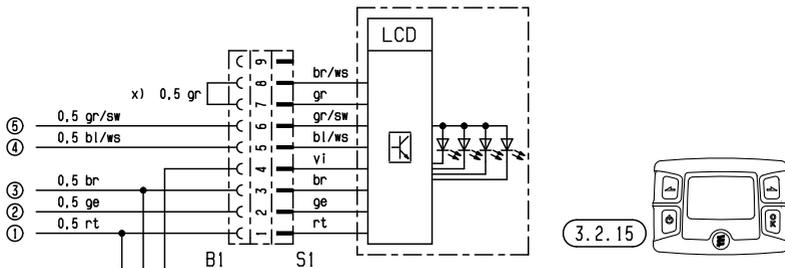
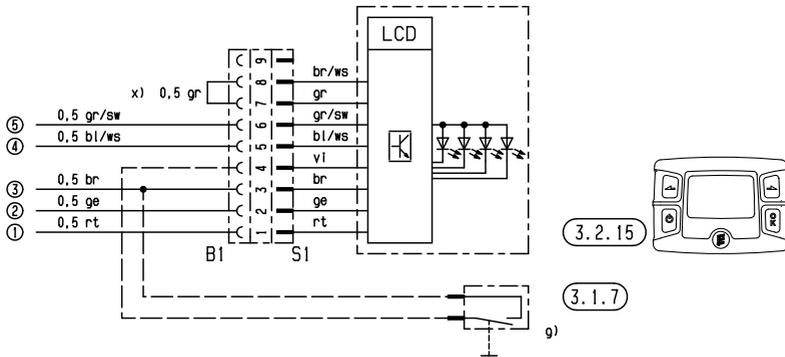
# 5 Electrics

## Circuit diagram for EasyStart T control unit



# 5 Electrics

## Circuit diagram for EasyStart T – ADR control unit





## 6 Troubleshooting / maintenance / service

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### If any faults occur, please check the following items

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

### Troubleshooting

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

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

**Please note!**

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

### Maintenance instructions

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

### Service

If you have any technical queries or problems with your pre-heater, dial the following service phone number from within Germany:

Hotline  
Tel. 0800 / 12 34 300

Fax hotline  
Tel. 01805 / 26 26 24

Outside of Germany, please contact the respective Eberspächer national representative.

## 7 Environment

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### Certification

The high quality of Eberspächer's products is the key to our success. To guarantee this quality, we have organised all work processes in the company along the lines of quality management (QM). Even so, we still pursue a large number of activities for continuous improvement of product quality in order to keep pace with the similarly constantly growing requirements made by our customers.

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

This quality is to be considered in a total sense.

It affects products, procedures and customer / supplier relationships.

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

Eberspächer has already qualified for the following standards:

**Quality management as per DIN EN ISO 9001:2000 and ISO/TS 16949:1999**

**Environment management system as per DIN EN ISO 14001:1996**

### Disposal

#### Disposal of materials

Old devices, defect components and packaging material can all be separated and sorted into pure-grade fractions so that all parts can be disposed of as required in an environment-friendly manner recycled where applicable.

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

#### Dismantling the heater

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

#### Packaging

The packaging of the heater can be kept in case it has to be sent back.

### EC Declaration of Conformity

With regard to the product named in the following

#### Hydronic heater type

we herewith confirm that it conforms with the prime safety requirements stipulated in the directives of the EU Council for harmonisation of the legal regulations of the member states with regard to electromagnetic compatibility (89 / 336 / EEC).

This declaration applies to all heaters produced according to the Hydronic production drawings – which are an integral part of this declaration.

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

- EN 50081 – 1 Basic form interference emission
- EN 50082 – 1 Basic form of interference immunity
- 72 / 245 / EEC – Modification status 2005 / 83 / EC interference suppression in motor vehicles.



## 8 Lists

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### List of abbreviations

#### **ADR**

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

#### **EC type-approval**

Permit awarded by the Federal Vehicle Office for the production of a heater for installation in motorised vehicles.

#### **EMC directive**

Electromagnetic compatibility.

#### **JE-partner**

J. Eberspächer partner.

#### **FAME**

FAME for diesel engines according to DIN EN 14 214.

**[www.eberspaecher.com](http://www.eberspaecher.com)**

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**Eberspächer®**