Wasser-Heizgeräte
Water Heaters
Chauffages à eau
Caldaie ad acqua
Calefactores por agua
Vattenvärmare

6/1991

Betriebsanweisung
Operating Instructions
Instructions d'utilisation
Istruzioni d'impiego
Instrucciones de manejo
Bruksanvisning

BBW 46 S
(Benzin/Petrol/Essence/Benzina/Gasolina/Bensin)

DBW 46 S
(Diesel/Diesel/Diesel/Gas-oil/Gasolio/Gas-oil/Diesel)

Webasto

(D)

Inhalt

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Innehåll

Using the water heaters

The water heaters of WEBASTO BBW 46 S and DBW 46 S work in conjunction with the heating system of the vehicle
○ to heat the interior of vehicles,
○ to defrost windscreens and windows and
○ to pre-heat water-cooled motor engines.

If the water heater operates independently of the vehicle engine or of the heating sytem of the vehicle, the following Operating instructions must be interpreted by analogy.

Dependant upon the equipment specified or the installation the heater is switched on and off with a choice of different operating components:
○ digital timer 1527,
○ radio control Telestart T4.

Please consult your Service centre for the system installed in your vehicle.
The description of the operating components is explained on pages 18 to 21.

You can operate also the heater without concern over a long time period. The water heaters BBW 46 S and DBW 46 S are classified as ecologically beneficial, as a result of the low fuel consumption, the limited noxious gas emmission and the silent operation.

Types of heater

BBW 46 S –
Water heater with fuel »Petrol«.

DBW 46 S –
Water heater with fuel »Diesel«.

The water heaters are designed for 12 volts.

Safety informations

1. Within the scope of the StVZO (Road Traffic Licensing Act), a General Design Approval has been granted by the Federal Road Transport Office for the water heaters with the official test symbols:
∿ S 226 for BBW 46 S,
∿ S 227 for DBW 46 S.

2. The heater must be installed according to the "Installation Instructions" and must be examined, if installed at a later date, by an officially recognized expert or tester (TÜV) according to Art. 19, para. 2, of the StVZO, presenting him with the "Operation Instructions" and the "Installation Instructions". A new operating licence for the vehicle must be obtained from the administrative authority (Motor Vehicle Licensing Centre) on the basis of this expert advice.
If using the heater in other installations, the installation must be examined by an officially recognized expert or tester (TÜV).
The year of commissioning must be permanently marked on the heater nameplate.

3. The heaters are approved for heating motor vehicle engines and driver's cabs. The use of the heater in special vehicles is not permissible. The heater is not licensed for the installation in vehicles transporting dangerous goods (TRS).

4. Due to danger of poisonning and suffocation, the heater must not be operated in closed areas such as garages or workshops without exhaust venting by suction, not even with time pre-selection and remote control.

5. Danger of explosion: the heater must be switched off at filling stations and pumps!

6. The water circuit of the heater should be filled all-season with a mixture of 10 % good quality antifreeze (such as Bluecol) and water (as an anti-corrosive composition). Attention to the respective provisions of engine manufacturers when filling the mixture of water and antifreeze. Cooling water additions must not attack metals, plastics and rubber and not form deposits.

7. The opening pressure of the vehicle cooling system – generally indicated on the radiator cap – must be between 0.4 and 2.0 bars (6 and 30 p.s.i.) excess working pressure (also applies to separate heating circuits).

8. When carrying out electric welding work on the vehicle, the main power cables (positive and negative) must be detached from the vehicle battery and the positive cable connected to earth, in order to protect the electronic components (control unit and digital timer or Telestart).

9. In the vicinity of the control unit the temperature must not exceed 85°C (storage temperature), e.g when painting the vehicle. Permanent damage to the electronics may result from excessive temperatures.

10. The water circuit should be bled after the installation of the heater or after replacing the components of circuit.

11. The heaters "General Design Approval" and thus the General Operating License of the vehicle are void, if the installation of the heater is not approved. The same applies to improperly performed repairs or those where others than genuine spare parts were used.

Technical Data

Unless limit values are indicated, the following technical data are subject to the normal tolerances for heaters of approx. ± 10 %, at an ambient temperature of + 20°C and at rated voltage.

Heater	Function	BBW 46 S	DBW 46 S
Heat output	Full heat Red. heat	4.6 kW (4 000 kcal/h) 2.3 kW (2 000 kcal/h)	
Fuel		Petrol *	Diesel/fuel oil EL **
Fuel consumption	Full heat Red. heat	0.67 l/h 0.33 l/h	0.58 l/h 0.29 l/h
Nominal voltage		12 volts	
Operating voltage range		10 . . . 15 volts	
Rated input (heater and water circulating pump)	Start Full heat Red. heat	100 watts 44 watts 33 watts	100 watts 44 watts 33 watts

*** Fuel for BBW 46 S (Petrol):**
The fuel described by the manufacturer of the vehicle may be used. Both leaded or unleaded can be used.

**** Fuel for DBW 46 S (Diesel):**
The fuel described by the manufacturer of the vehicle may be used. Fuels similar to the extra-light (EL) heating oil which is available in Germany may also be used, provided they conform to DIN 51603.
Any negative effects caused by additives are not known.

Attention to the respective provisions of vehicle manufacturers, if the fuel is supplied from the vehicle tank.

At temperatures below about 0°C a winter grade Diesel oil should be used. Alternatively, a mixture of Diesel oil or Paraffin or Gasoline may be used, in accordance with the table given below, **whereby the proper ratio of mixture is to be adhered to.** Additives to improve flow properties may be used.

When changing to low-temperature fuels, the heater must be run for approximately 15 minutes to ensure that the fuel pump and fuel lines are filled with the new fuel.

Ratio of mixture for separate fuel tank:

Temperature range °C	Summer diesel fuel or EL fuel oil (%)	Paraffin or petrol addition (%)	Winter diesel fuel (%)	Paraffin or petrol [1] addition (%)
0 to − 5	70	30	100	−−
− 5 to −15	50	50	100	−−
−15 to −20	−−	−−	70	30
below −20	special arctic diesel oil or 100 % paraffin			

Functional description

The heater is switched on and off, dependent on equipment, with
○ digital timer (see page 18).
○ remote control Telestart T4 (see page 21).
An operating indicator light is incorporated to show that the heater is on.
When the water temperature rises to approx. 78°C, the heater switches from full heat to reduced heat (see „heating process"). In this heating mode the heater operates noiselessly. Current and fuel consumption are reduced.
After switching off, a purge cycle continues (see "Switching off").

Switching on: Before the heater is switched on, the vehicle heater control must be set to "warm" and the vehicle heating fan must be set to the slowest position to minimise current consumption!
After switching on the heater starts only if the water temperature is dropped to below 70°C. Otherwise the heater is positioned in the function mode »control pause«.

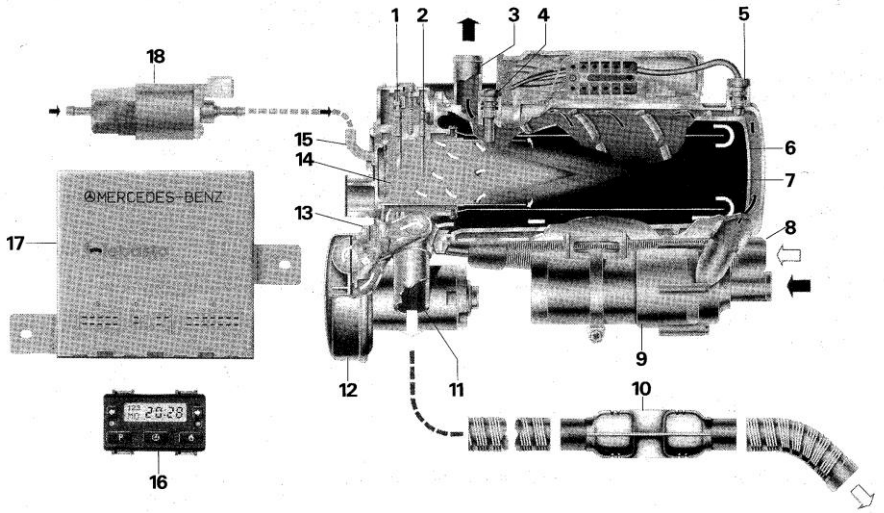
The heaters BBW 46 S (petrol) and DBW 46 S (diesel) operate in two different starting processes.

Petrol-heater BBW 46 S: When the heater is switched on, the operation indicator light comes on. Water circulating pump and glow plug (1) start. The combustion air fan (12) switches to »reduced heat«. After approx. 30 seconds the dosing pump (18) is switched on with reduced power.
After combustion is established, the glow plug is switched off. After 15 seconds the heater runs in Full heat.

Diesel-heater DBW 46 S: When the heater is switched on, the operation indicator light comes on. Water circulating pump and glow plug (1) start. After approx. 30 seconds the dosing pump (18) is switched on with full power.
After a fuel supply of 10 sec. the combustion air fan (12) and also the dosing pump (18) are switched to Reduced heat.
After combustion is established, the glow plug is switched off. After 20 seconds the heater runs in Full heat.

Heating process: After approx. 35 seconds combustion commences. The automatically controlled heating process begins showing the heating operations »full heat / reduced heat / control pause«.
The vehicle heating fan does not come on until the coolant circuit is sufficiently warm. When the water temperature rises to approx. 78°C, the heater switches to »reduced heat« for reducing consumption.
After the water temperature has reached to approx. 86°C, the heater switches automatically to »control pause« (combustion is interrupted, the water circulating pump continues to run). When the water temperature drops to below 70°C, the heater starts automatically with process »Full heat«.

Switching off: When the heater is turned off, the combustion stops by interruption of fuel supply. However, the water circulating pump and the combustion air fan continue to run for cooling the heater (purge cycle) and is switched off automatically after max. 140 seconds.
It is permissible to switch the heater on again during the purge cycle.



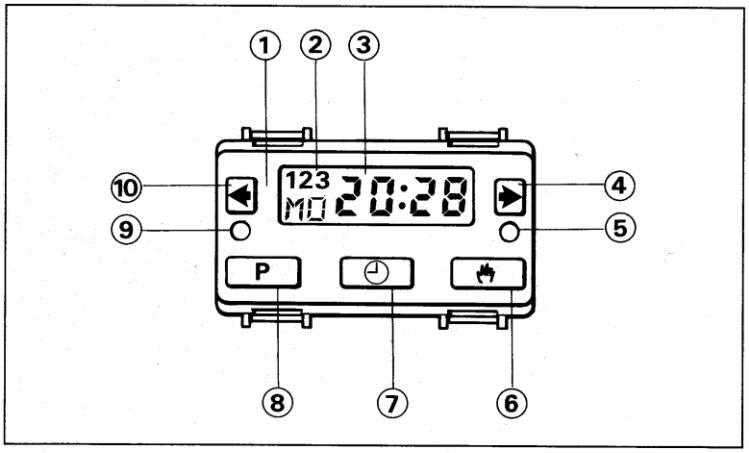
1 Glow plug
2 Flame detector
3 Water outlet pipe
4 Temperature sensor
5 Temperature fuse
6 Heat exchanger
7 Burner tube
8 Combustion air silencer
9 Water circulating pump
10 Exhaust silencer
11 Exhaust gaz outlet pipe
12 Combustion air fan
13 Combustion air adjusting
14 Ceramic evaporator
15 Fuel connection
16 Digital timer 1527
17 Electronic control unit 1571
18 Dosing pump

Since the outer appearance is the same, the heaters BBW 46 S and DBW 46 S are identified at burner cap inscribed "Benzin" (= Petrol) or "Diesel".
Both heaters may be operated only with the appropriate fuel (EL fuel oil may also be used for the diesel heater), and only with the appropriate electrical wiring.

Description of digital timer

The digital timer with pre-selection of days is used for switching on and off the heater. The timer has the following functions:

- ○ Indication of time.
- ○ Indication of days.
- ○ Pre-selection of 3 different periods; each period can be programmed with day and time in advance.
- ○ Operation indicator of heater.
- ○ Fault-code indicator of heater.



Operation with pre-selection

Programming heater's starting time:
Three different pre-selection times may be set.
The heater can be exactly programmed to come on at any time:

- ○ within the next 24 hours, to set 1 minute accurately,
- ○ within all desired days of 1 week.

Technical data of digital timer 1527

Nominal voltage: 12 volts.
Voltage range: 9 . . . 15 volts.
Operating temperature range:
– 40 °C . . . + 85 °C.
Current input without switchings: approx. 1 mA.
Pre-selection time with "immediate heating and pre-selection": 60 minutes.

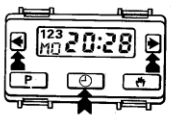
① Indication of day
② Symbols of pre-selection
③ Time display
④ Button "setting forwards"
⑤ Operation indicator light
⑥ Button "immediate heat"
⑦ Button "time"
⑧ Button "pre-selection time"
⑨ Switching on control
⑩ Button "setting backwards"

1. Reading the time

Press button [🕘] . The existing time is indicated (symbol » : « flashs) and also the existing week-day (if it is set, see 3.).
If any pre-selection time is activated, this activated pre-selection time is indicated within 3 seconds (symbol » : « has stopped) and also the approriate week-day (if it is set, see 5.), when button [🕘] is released.

2. Setting the time

If the present time is not right or »8:88« flashs: Press button [🕘] and at the same time one of the both setting keys ◀ (backwards) or ▶ (forwards). When the setting key is pressed a longer time, the digits are running faster. By a short touch of button the time can be set in minutes steps.

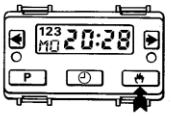


3. Setting the week-day

When the time is set, press button [🕘] a longer time.

After 3 seconds the indication ① flashs (or »– –«).
Set the week-day with the both setting keys ◀ and ▶ . If the keys are not pressed during a time of 3 seconds, a permanent indication is shown and the time can be set.

Remark: If the week-day is not set, only pre-selection times for the next 24 hours can be programmed.



4. Switching on heater immediately (heating)

Press button [🔥] . The green operation indicator ⑤ lights.
Switching off heater: press button [🔥] again.

5. Programming the pre-selection time

Three different pre-selection times can be set.

Operation indicator ⑨ lights not.
Description:

Pre-selection program 1: press button [P] once; the digit 1 ② is indicated. The pre-selection time is present for 20 seconds in the display and it can be set with the both setting keys ◀ or ▶ . Approx. 3 seconds after the last setting time the display ① flashs (or »– –«). Now set the week-day with the both setting keys ◀ and ▶ .

Remark: When the pre-selection time may be set every day at the same time, the setting of every week-day must not done. In this case select the symbol »– –« (is indicated after »SO«).
The indication goes out after 20 seconds when the button is released.
The pre-selection time is activated.

(continue to page 20)

(continued from page 19)

Pre-selection program 2 and 3: operate the same as „pre-selection program 1" but take the symbols 2 and 3 (press button [P] twice or thrice).

The operation indicator ⑨ lights.
Description:

By pressing button [P] the activated pre-selection time is indicated. The programming process can be made like above (see position 5.).
If an other pre-selection time may be programmed, press button [P] several times until the desired digit is indicated in the display ② .
The pre-selection time is activated.

6. Activating the pre-selection time

Press button [P] until the desired digit is indicated, see ② .
The yellow switching on control ⑨ shows the activated pre-selection time (= time of switching on of the heater).

7. Resetting the pre-selection time

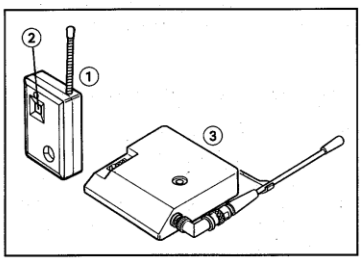
Press button [P] four times. The pre-selection time is extinguished.

8. Operation indicator light ⑤ goes out during heating process

If a fault lock-out of the heater occurs, the display shows the indication »F« and the green operation indicator light goes out.

Press button [🔥] for elimination of fault lock-out.
The commissioning of heater is descriped in position 4.

Operation with remote control Telestart T4



The remote control Telestart is used for wireless switching on and off the heater by means of a separate transmitter (UHF radio remote control). A general approval has been given for the operation in Germany.

The remote control Telestart operates the heater up to a distance of 1000 meter. The maximum distance is possible in undeveloped area and with an excellent installation position. A built-up area diminishes the distance of the remote control.

Telestart with digital timer:
The Telestart T4 is tuned to the digital timer 1527 (see page 18), using with the heaters BBW 46 S and DBW 46 S.

When the heater is switched on by Telestart, the digital timer reduces the heating period to 60 minutes. Before the end of this 60 minutes the heating period can be prolonged by pressing the start button ② of the transmitter for 60 minutes once more.
When the heating time is over it is permissible to switch the heater on again.

The heater can be switched off only with the digital timer.

Operating the Telestart:
○ Press button ② for at least 2 seconds. Thereby hold up vertically the aerial of the transmitter ① and to the direction of the receiver ③.

○ The green operation indicator lamp in the transmitter housing lights up. After releasing the button the indicator light flashs a time of 6 seconds. During this transmitting period the aerial must have a perfect transmission.

Attention: The security of switching on reduces the shielding of transmitter during the transmitting period.

See also "Operating and Installation Instructions of Remote control Telestart T4" (order no. 770825).

Fault lock-out

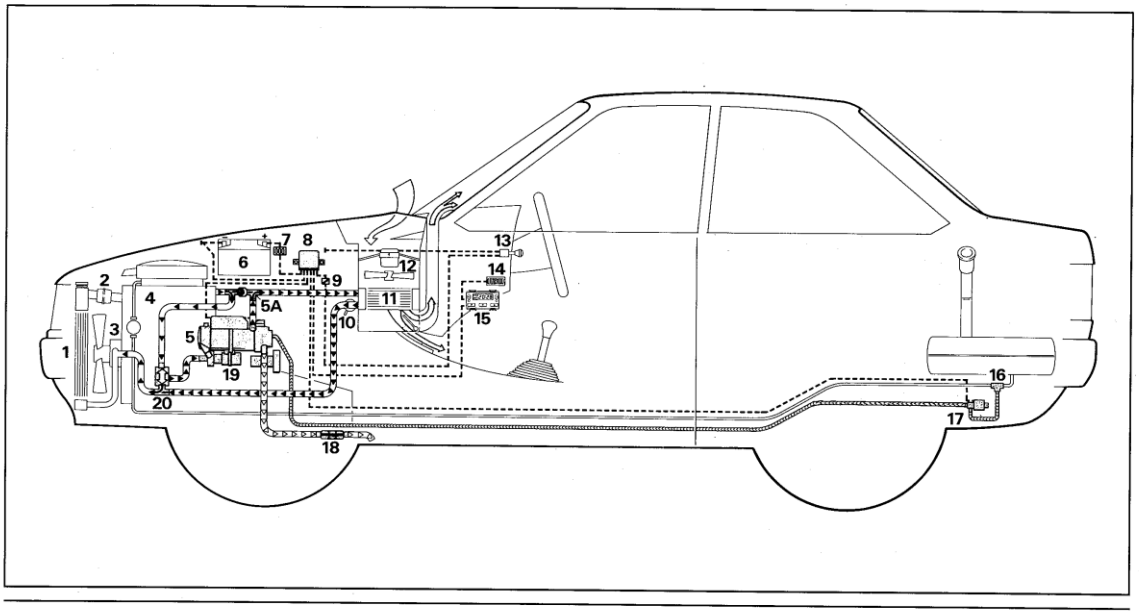
The heater switches off itself (fault lock-out), when
○ the combustion is not established – even after automatic repeat starting,
○ the flame goes out several times during heating process (e.g. if the fuel supply is cut out),
○ undervoltage or overvoltage take place (see following "Important informations"),
○ the heater becomes excessively hot (see following "Important informations"),
○ a part of the following components is defective (short-circuit or interruption):
– combustion air fan (12),
– dosing pump (18) / temperature fuse (5),
– glow plug (1),
– flame detector (2),
– temperature sensor (4).
In all cases (with exception of a defect of combustion air fan) the heater goes to purge cycle and thereafter to fault lock-out.
The operation indicator light extinguishes in the digital timer 1527, if the heater switches to fault lock-out. After pressing the button »immediate heating« the fault is indicated by "F" (Fault).
Elemination of fault lock-out: switch off the heater and switch on again. If the heater still does not come on and the fault-code "F" is indicated in the digital timer, consult a Webasto Service Centre.

Important informations:
○ If overheating occurs the heater is switched off by interruption of temperature fuse. At all events the cause of overheating must be eleminated and, if necessary, coolant must be refill described by the manufacturer. Thereafter the temperature fuse (see figure, page 17) must be replaced (use only the same spare part).
○ Before the temperature sensor or temperature fuse should be replaced, reduce the overpressure in the coolant circuit by opening the radiator cap.
○ The electronic control unit switches the heater to fault lock-out after purge cycle when the undervoltage protection drops to 9.5 (± 0.5) volts within a period of more than 20 seconds (e.g. when the starter motor is switched on and the vehicle battery is unloaded).
○ If overvoltage of 16 (± 0.5) volts occurs within a period of more than 20 seconds, the heater switches to fault lock-out after purge cycle.

Maintenance of heater

○ During non-heating periods, the heater should be operated for about 10 minutes every four weeks, with the controls of the vehicle heater set to warm position and slowest blower running. This will help to avoid starting difficulties at the beginning of the heating season.
○ When the vehicle coolant is changed and the coolant circuit must be bled (attention to the provisions of vehicle manufacturers), the heater should be operated for a short time with the controls of the vehicle heater set to warm position and slowest blower running (see also "Safety Informat.", page 14). After them the coolant circuit must be checked described by the manufacturer.
○ The heater should be checked at a Webasto Service Centre at regular intervals, at the latest, however, at the beginning of the heating period (when the heater is used frequently due to weather conditions).

= Kabelbaum	wiring harness	faisceau de câbles	fascio cavi	mazo de cables	kablage
= Kraftstoffleitung	engine fuel supply line	tubulure carburant	tub. combustib. veicolo	cond. de carburante	fordonets bränsledning
= Brennstoffleitung	heater fuel supply line	tubulure combustible	tub. combustib. caldaia	cond. de combustible	bränsledning, värmare
= Abgasleitung	exhaust pipe	tubulure d'échappement	tub. dei fumi di scarico	cond. de gases de salida	avgasledning
= Wasserkreislauf	water circuit	circuit d'eau	circuito acqua	circuito de agua	kylsystem



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