

# Air heater B 3 L C compact / B 3 L P compact D 3 L C compact / D 3 L P compact



Troubleshooting and repair manual

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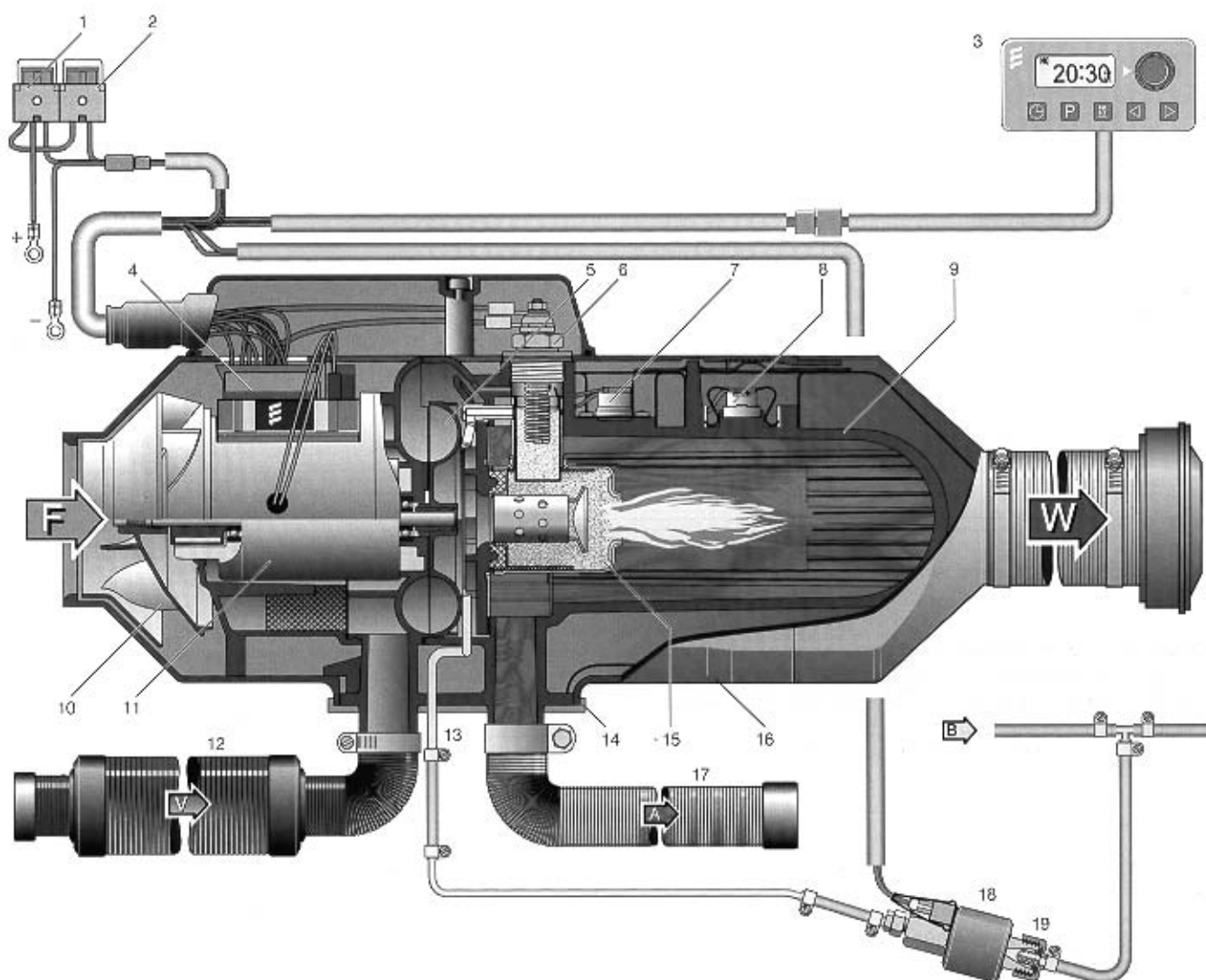
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**This Troubleshooting and repair manual is applicable to the following heater models**

Heater Model	Glow plug (-) pulsed	(+) pulsed / current regulator	(+) pulsed
<b>B 3 L C compact</b>	20 1749 01 - 12 Volt	20 1762 01 - 12 Volt	20 1767 01 - 12 Volt
<b>B 3 L P compact</b>	20 1750 01 - 12 Volt	20 1763 01 - 12 Volt	20 1768 01 - 12 Volt
<b>D 3 L C compact</b>	25 1906 01 - 12 Volt 25 1907 01 - 24 Volt	25 1967 01 - 12 Volt 25 1968 01 - 24 Volt	25 1980 01 - 12 Volt 25 1981 01 - 24 Volt
<b>D 3 L P compact</b>	25 1912 01 - 12 Volt 25 1913 01 - 24 Volt	25 1969 01 - 12 Volt 25 1970 01 - 24 Volt	25 1982 01 - 12 Volt 25 1983 01 - 24 Volt

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**Sectional view** (the positive pulsed version is shown)



**List of Parts**

- |   |                                |             |    |   |   |   |                |
|---|--------------------------------|-------------|----|---|---|---|----------------|
| 1 | Main fuse                      | 12 V - 25 A | 10 | Fresh air blower                              | A | = | Exhaust gas    |
|   |                                | 24 V - 15 A | 11 | Electric motor                                | B | = | Fuel           |
| 2 | Fuse                           | 5 A         | 12 | Combustion air silencer                       | F | = | Fresh air      |
| 3 | Timer                          |             | 13 | Fuel connection                               | V | = | Combustion air |
| 4 | Electronic control unit        |             | 14 | Flange gasket                                 | W | = | Hot air        |
| 5 | Combustion air blower impeller |             | 15 | Combustion chamber                            |   |   |                |
| 6 | Glow plug                      |             | 16 | Outer shell                                   |   |   |                |
| 7 | Overheating sensor             |             | 17 | Exhaust gas pipe                              |   |   |                |
| 8 | Flame sensor                   |             | 18 | Metering pump                                 |   |   |                |
| 9 | Heat exchanger                 |             | 19 | Pot-type strainer, installed in metering pump |   |   |                |



## Description of function

### Switch-on

When switched on, the operation indicator or the green pilot light will illuminate. The glow plug is switched on. The blower will start up and rotate slowly.

#### Note:

If residual heat is still present in the heat exchanger, only the blower will operate (cold air).

When the residual heat has been dissipated, the starting process will commence.

### Starting process

After approximately 35 seconds, fuel delivery will take place. The fuel/air mixture will ignite. The blower and the fuel delivery will be increased progressively. After flame detection and stabilization of combustion, the glow plug will be switched off.

Rapid heating up of the heater takes place on the POWER setting with maximum heat flow until the heat exchanger has reached its operating temperature.

#### Note:

The period of operation on POWER setting with maximum heat flow is temperature-dependent.

### Regulation in Heating mode

In Heating mode, the ambient temperature or the temperature of the heating air drawn in is measured continuously and compared with the setpoint temperature set on the operating control.

If the operating temperature of the heating air drawn in is higher than the required ambient temperature, the heater will switch to LOW setting and will then continue with the blower motor rotating at low RPM. If the heat flow on LOW setting is insufficient, the heater will switch to MEDIUM setting. The blower will continue with the blower motor rotating at low RPM.

In most cases, LOW-MEDIUM-LOW regulation at low RPM will supply the heat required. If the heat flow on MEDIUM setting is insufficient, the heater will revert to the HIGH setting. This will then entail the blower motor running at full RPM.

If, in special cases, even less heat flow should be required than the heater supplies on the LOW setting, the heater will switch to the OFF setting. After controlled after-running, constant after-ventilation will take place at minimum blower speed (only in Air Circulation mode), until Restart takes place.

Restart takes place on MEDIUM setting with the blower motor running at low RPM.

### Switch-off

When the heater is switched off, the operation indicator or the green pilot light and the fuel delivery will switch off. After-running of the blower will take place to cool the heater down.

The glow plug will switch on for 30 seconds during after-running in order to clean out combustion residues.

#### Note:

If there is still no fuel delivery during the starting process, or if the heater is set to OFF, the heater will be shut down immediately without after-running.

### Control and safety features

The flame is monitored by the flame sensor, and the maximum permissible operating temperature by the overheating sensor. Both these features influence the control unit, which switches the heater off in the event of a malfunction.

If the voltage (according to Model) drops below approximately 10.5 or 21 volts, or rises above approximately 15.9 or 31.8 volts, malfunction shutoff will take place.

In the case of a defective glow plug and/or break in the electric supply lead to the metering pump, the heater will not start.

The speed of rotation of the blower motor is monitored continuously. If the blower motor fails to start up, or if its RPM deviates by more than 10 %, the heater will go to malfunction mode after 30 seconds.

#### **Please note!**

When carrying out electric welding on the vehicle, for protection of the control unit the positive pole of the battery should be disconnected and the lead connected to chassis.

## Technical Data

Heating medium	Air				
Heat flow setting	Power / High / Medium / Low / Off				
Fuel	Petrol - commercial grade Diesel - commercial grade				
Heat flow <sup>1)</sup>	B3LC compact / D3LC compact B3LP compact / D3LP compact	Power 3500 3000	High 3200 2500	Medium 1500 1500	Low 1000 W 900 W
Heat throughput w/o back-pressure <sup>1)</sup>	B3LC compact / D3LC compact B3LP compact / D3LP compact	160 140	160 130	80 85	65 kg/h 60 kg/h
Fuel consumption <sup>1)</sup>	B3LC compact B3LP compact D3LC compact D3LP compact	0,47 0,40 0,42 0,36	0,42 0,34 0,37 0,30	0,20 0,20 0,18 0,18	0,13 l/h 0,12 l/h 0,12 l/h 0,11 l/h
Nominal voltage	12 volts		24 volts		
Operating range	10 to 14 volts		20 to 28 volts		
Lower voltage limit	10,5 volts (9,5 V)		21 volts (19 V)		
An undervoltage protection installed in the control unit shuts the heater off when the voltage limit is undershot.					
Upper voltage limit	15,9 volts (15,2 V)		31,8 volts (30,4 V)		
An overvoltage protection installed in the control unit shuts the heater off when the voltage limit is exceeded.					
Values in brackets apply to when the glow plug is switched on. The voltage values must be present for longer than 20 seconds.					
Electrical power consumption <sup>1)</sup>	at start				
B3LC compact / D3LC compact		12 V = 270 W			
B3LP compact / D3LP compact		12 V = 260 W			
D3LC compact		24 V = 240 W			
D3LP compact		24 V = 230 W			
in operation					
B3LC compact / D3LC compact		Power 36	High 36	Medium 12	Low 8 W
B3LP compact / D3LP compact		26	22	15	8 W
Interference suppression	3, additional suppression measures possible				
Weight	approx. 6 kg				
Ambient temperature	D3LC compact D3LP compact		B3LC compact B3LP compact		
Heater	in operation		-40 °C to +70 °C		
Heater	out of operation		-40 °C to +85 °C		
Metering pump	in operation		-40 °C to +50 °C		

<sup>1)</sup> at nominal voltage

all data ± 10 %



## Check values

Motor speed	B3LC compact	B3LP compact
	D3LC compact	D3LP compact
• Power	4200 RPM	3500 RPM
• High	4200 RPM	3200 RPM
• Medium	2200 RPM	2200 RPM
• Low	1800 RPM	1600 RPM
• Settling	1000 RPM with internal temperature sensor 0 RPM with external temperature sensor	

## Switching value

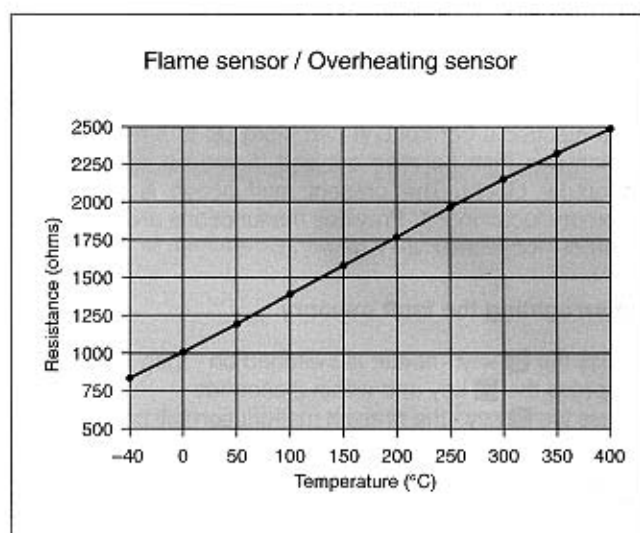
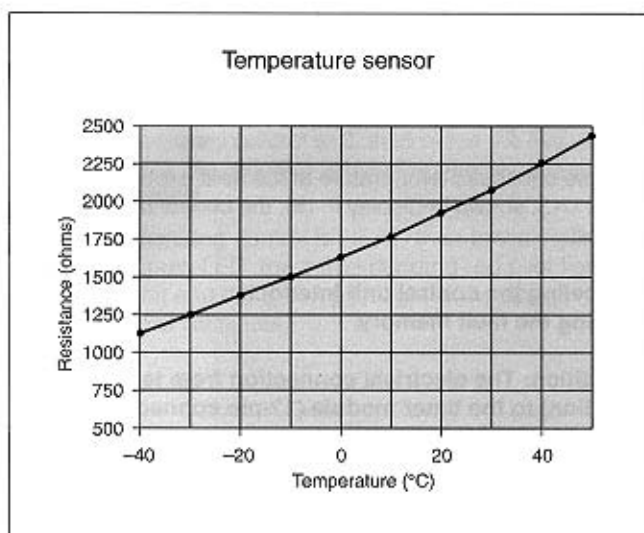
Safety thermal cutout switch 140 °C - 200 °C

## Exhaust gas value

CO<sub>2</sub> in exhaust gas on High 9 - 11 Vol. %  
Smoke spot number acc. to Bacharach ≤ 4

## Resistance values

Metering pump 12 volt	approx. 10 Ω
Metering pump 24 volt	approx. 36 Ω
Glow plug 12 volt	approx. 0.6 Ω
Glow plug 24 volt	approx. 2 Ω
Operating control / setpoint pot.	1740 - 2180 Ω (±80 Ω)



## In the event of malfunctions, please check the following first of all:

- Defective wiring (short-circuits, open circuit).
- Corroded contacts.
- Check fuses.
- Check electric leads, joints, connections.
- Battery voltage on heater start less than 10 volts / 20 volts.
- Mechanical damage to components.
- Check fuel tank level.
- When changing over to Winter mode: is summer diesel fuel still in the line?
- Check exhaust and combustion air ducts.
- Heating air duct and intake filter OK?

## Fault diagnosis with the display module

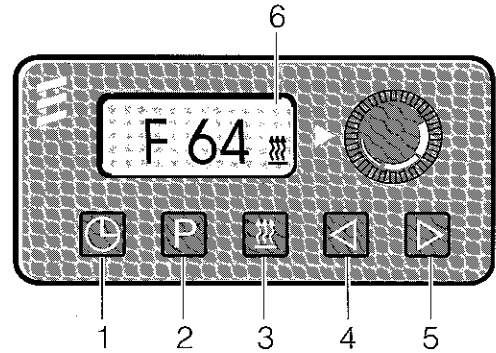
Order No. timer (D) - display 22 1000 30 38 00

Order No. timer (GB) - display 22 1000 30 40 00

If, when the heater is switched on or while the heater is in operation, a malfunction is detected by the control unit, this will be displayed within 15 seconds by the timer (modular clock) in the form of F followed by a 2-digit number.

Display readout: for example **F 64** (present fault) and blinking heater symbol

The fault code, description of malfunction and comments/remedy are described on page 8 to page 10.



- |               |                              |
|---------------|------------------------------|
| 1 Time of day | 4 Reverse                    |
| 2 Select      | 5 Forward                    |
| 3 Heat        | 6 Readout with fault display |

### Interrogating the fault memory in the control unit with the timer (modular clock)

The electronic control unit can store up to 5 malfunctions, which can then be read out and displayed with the timer (modular clock). The present malfunction is written into memory location F 1. Previous malfunctions are written into memory locations F 2 - F 5.

### Interrogating the fault memory

Press the key - heater is switched on - then  
Depress the key and within 2 seconds  
Press the key - the present malfunction will be displayed, for example AF 64.

Pressing the key and the key will call up the stored malfunctions (max. 5 malfunctions).

The fault code, description of malfunction and comments/remedy are described on page 8 to page 10.

### Please note!

If the heater is not operated with the timer, fault code interrogation can be carried out using the diagnostic unit. Instructions are delivered with the diagnostic unit.

- Diagnostic unit, order no. 22 1512 89 00 00
- For heaters using an 8-pin plug for the Mini-timer control elements:  
additional adapter cable, order no. 22 1000 30 20 00
- For Compact heaters using a 14-pin plug:  
additional adapter cable, order no. 22 1000 30 69 00

### Locking the control unit

#### Overheating

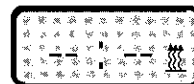
In case of excess temperature at the heat exchanger (error 013, shown in display F 15), the control unit is locked.

#### Canceling the control unit interlock, erasing the fault memory.

**Condition: The electrical connection from terminal 15 (ignition) to the timer module (12-pin connector, terminal jack 10) is in place.**

Press the key - the present malfunction F 15 or F 50 will be displayed - then  
Depress the key and within 2 seconds  
Press the key. The timer (modular clock) has now entered the "Interrogate Fault memory" routine.  
Continue operation:  
Switch ignition off (Terminal 15).  
Press the key and the key simultaneously; in addition, switch the ignition on (Terminal 15) and wait until the following appears in the display:

Readout in display after ignition ON



Blinking readout, Heater symbol not blinking

After 3 seconds, the control unit lock-out will be defeated; the heater will then start.

Readout in display after heater started



Readout: No fault present, Heater symbol

## Checking the operating control with the test unit

Test Unit Order No.: 22 1509 89 00 00

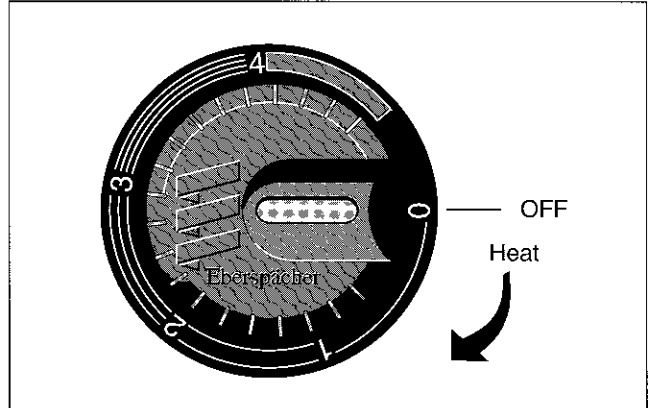
### Before testing

Connect the correct voltage (12 volts or 24 volts) to the test unit, connecting positive to the red connecting socket and negative to the blue connecting socket. Ensure that the voltage is correct, otherwise the components connected may be destroyed.

### Testing the operating control

12 V operating control Order No. 25 1895 71 00 00  
 24 V operating control Order No. 25 1896 71 00 00

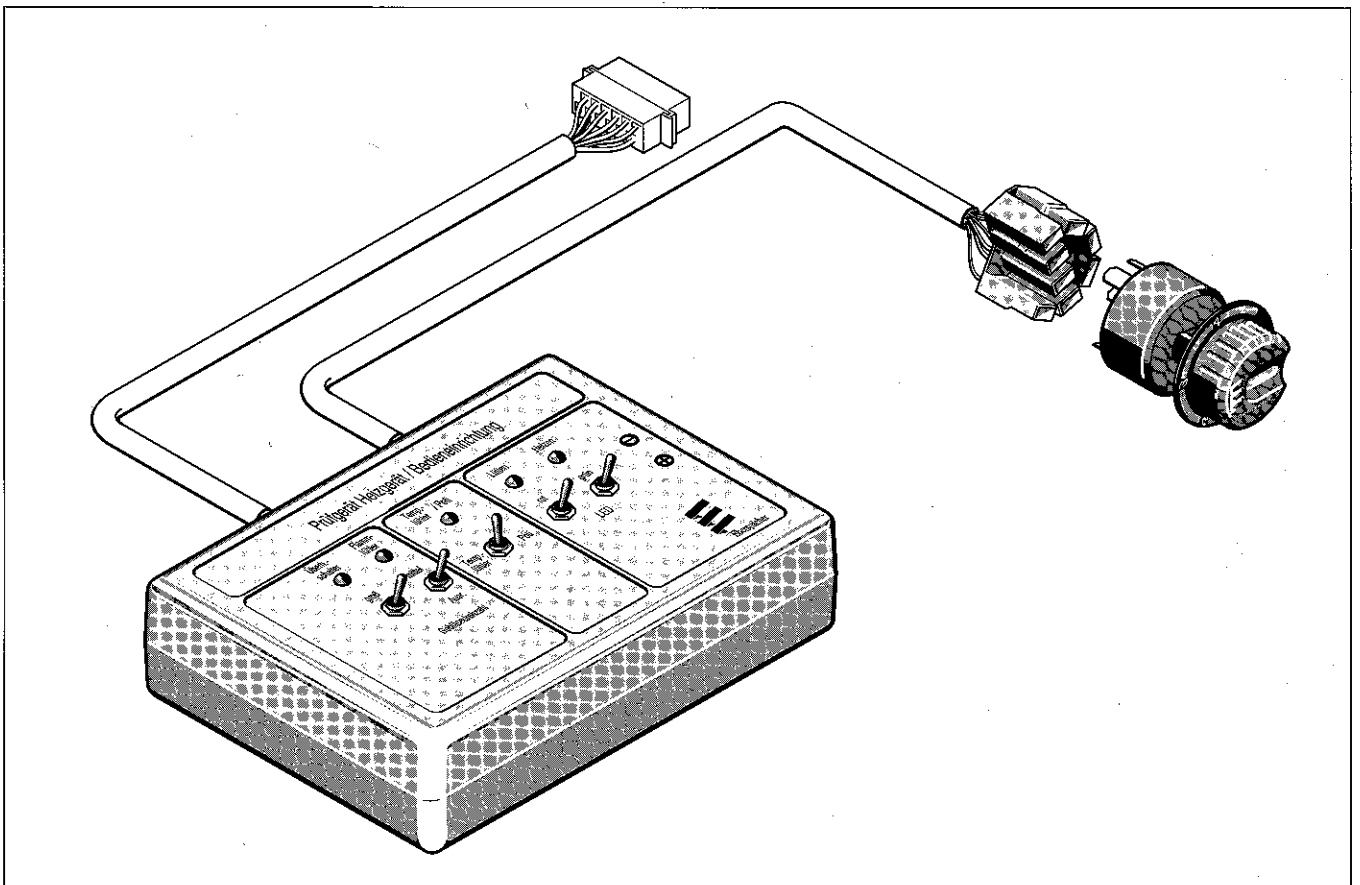
- Pull the plug connector off the operating control.
- Connect the cable section from the test unit to the operating control.
- Turn the knob of the operating control to HEAT; the corresponding LED in the test unit must illuminate.
- Set the operating control to 0, then press the key with the red LED; the red pilot light in the operating control must illuminate.
- Set the operating control to HEAT, then press the key with the green LED; the corresponding red pilot light in the test unit and the green pilot light in the operating control must illuminate.



### Check setpoint value potentiometer of operating control

- Set the 'Temp.sensor / Pot.' switch in the test unit to 'Pot.' Position and slowly turn the knob of the operating control. The green 'Temp.sensor / Pot.' LED must illuminate continuously.

In the event of malfunction, replace the operating control.



<b>Fault Code</b>	<b>Description of fault</b>	<b>Comment / Remedy</b>
000	no malfunction	---
004	Warning Output Short-circuit	Check connection of control unit, Compartment 1 to fresh air blower relay for ground short. If OK --> replace control unit.
005	Warning Output, anti-theft alarm system Short-circuit	Check connection of control unit, Compartment 2 to elec. Disconnecter relay or anti-theft alarm system for ground short. If OK -> replace control unit.
009	TRS shut-off	TRS disconnection by signal change from (+) to (-) at the control unit connection, compartment 10 (D+) or positive signal to control unit connection, compartment 12 (HA+).
010	Overvoltage shut-off	Voltage btw. Compartment 5 and 11 on control unit > 15.9 (15.2) volts or 31.8 (30.4) volts.
011	Undervoltage shut-off	Voltage btw. Compartment 5 and 11 on control unit < 10.5 (9.5) volts or 21 (19) volts. Values in brackets with glow plug switched on.
012	Overheating	Check connection from control unit to overheating sensor for continuity. For overheating values, see Graph on page 5. Check heating air ducts for obstruction; clear obstruction if necessary.
013	Heat exchanger overtemperature	Flame sensor signals temperature at heat exchanger > 340 °C. Resistance value at flame sensor > 2270 Ω Overheating sensor faulty. For flame sensor values, see Graph on page 5.
015	Heat exchanger overtemperature Excessive occurrence of overheating	Control unit lock out - shutdown due to fault. Excessive temperature at heat exchanger (fault code 013) Cause of overheating: heating air ducts obstructed; clear obstruction if necessary. Defeat control unit lock-out by clearing fault memory with the timerv, the diagnostic unit or PC
020	Open circuit or short circuit at glow plug	Check glow plug, replace if necessary. Setpoint value: approx. 0,6 or 2 Ω Check connection from control unit Compartment 6 and 9 to glow plug for continuity. If OK --> replace control unit. Check control unit Compartment 9 as far as glow plug. Check glow plug for short-circuit of filament, replace if necessary. If OK --> replace control unit.





<b>Fault Code</b>	<b>Description of fault</b>	<b>Comment / Remedy</b>
021	Glow plug overload	24 volt equipment only: A 12 volt glow plug is fitted. Test glow plug for short circuit or examine for carbon deposits on the element. Change if necessary.
025	Diagnostic output short-circuit	Check connection of control unit Compartment 4 to diagnostic connector plug for short-circuit to positive.
033	Burner motor or governor defective; RPM deviation	RPM deviation > $\pm 10\%$ of setpoint value for > 30 seconds. For check values, see page 5. <ul style="list-style-type: none"><li>• RPM too low: blower obstructed. Check blower free-running, if necessary remove foreign matter. RPM still too low --&gt; replace blower. Check motor supply lead (1 br/1 sw) and control unit output for short-circuit --&gt; replace blower or control unit.</li><li>• RPM too high: solenoid in blower impeller defective or absent --&gt; replace blower. RPM sensor in control unit defective -&gt; replace control unit.</li></ul>
047	Metering pump short-circuit	Check connection of control unit Compartment 3 to metering pump for short-circuit --> check metering pump, replace if necessary.
048	Metering pump open circuit	Check connection of control unit Compartment 3 to metering pump for open circuit -> check metering pump, replace if necessary. Check negative supply of metering pump (1 br) to ground.
051	Flame present when switched on	After 15 minutes cold air blowing Resistance value at flame sensor > 57 °C (1220 $\Omega$ ) For flame sensor values, see Graph page 5.
052	No start, safety time overshoot	No flame detected in start phase. Flame sensor value < 100 °C (1380 $\Omega$ ). Check flame sensor, replace if necessary. For flame sensor values see Graph page 5. Check fuel supply, glow plug, exhaust gas and combustion air ducts.
053	Flame abort on Power setting / Start	Heater has fired (flame detected) and signals flame abort in a setting or during Start. Check fuel delivery and fuel supply. Check exhaust gas and combustion air ducts. If combustion OK --> check flame sensor, replace if necessary. For flame sensor values, see Graph page 5.
054	Flame abort on High setting	
055	Flame abort on Medium setting	
056	Flame abort on Low setting	

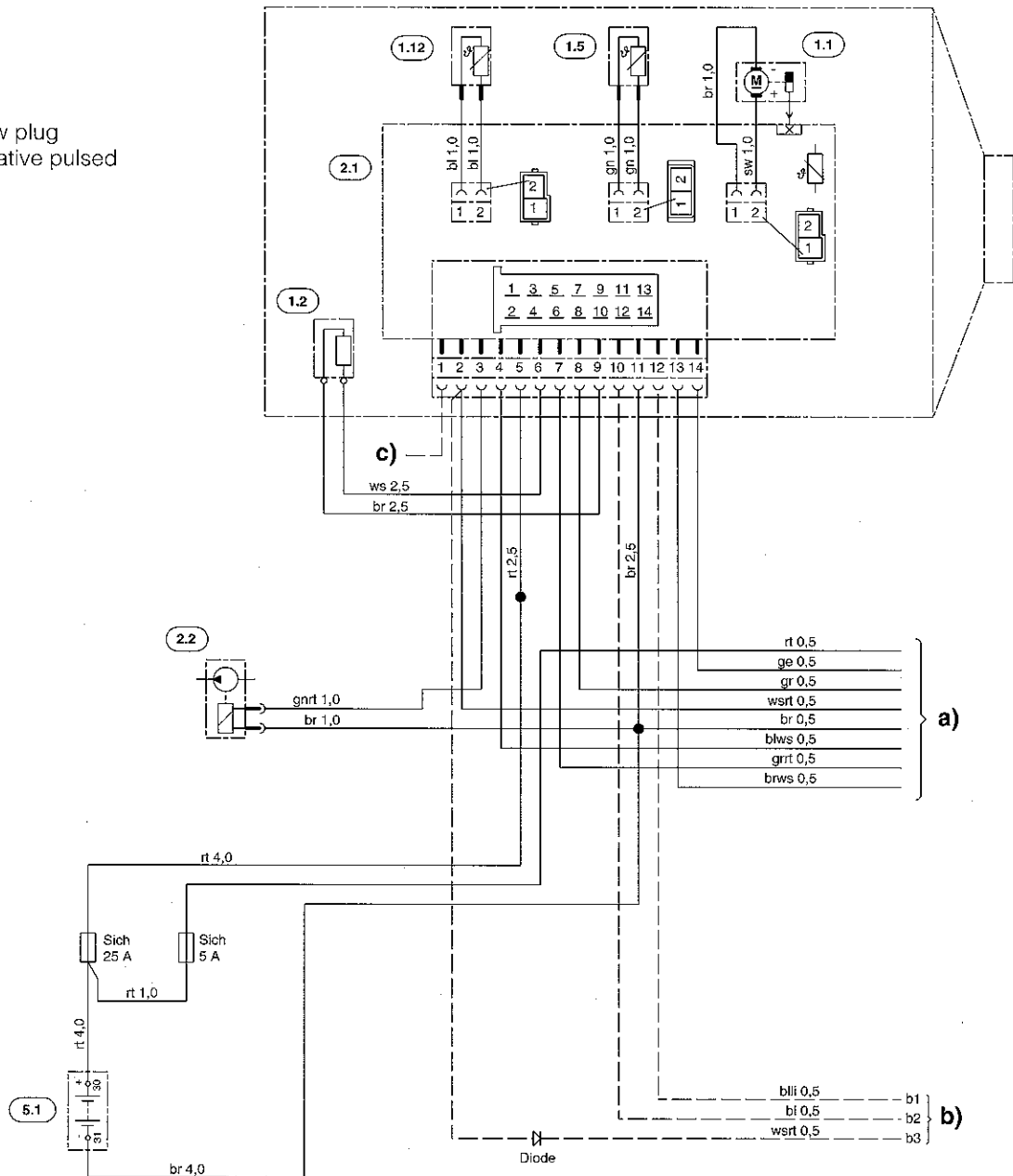
Fault code	Description of fault	Comment/Remedy
060	External temperature control sensor open circuit	Temperature control sensor signals temperature value outside control range. Check connecting leads 0.5 gr and 0.5 br/ws. Resistance value between 8 and 13 > 2800 Ω (open circuit) Resistance value between 8 and 13 < 280 Ω (short-circuit) Temperature sensor values see Graph on page 5.
061	External temperature control sensor short-circuit	
062	Setpoint value pot. open circuit	Potentiometer of operating control signals setpoint value outside control range. Check connecting leads. Resistance value between 7 and 13 > 2800 Ω (open circuit) Resistance value between 7 and 13 < 280 Ω (short-circuit) Standard values: 1740 Ω - 2180 Ω (±80 Ω)
063	Setpoint value pot. short-circuit	
064	Flame sensor open circuit	Flame sensor signals temperature value outside measuring range. Check connecting leads. Resistance value > 3200 Ω (open circuit) Resistance value < 200 Ω (short-circuit) Flame sensor values, see Graph page 5.
065	Flame sensor short-circuit	
071	Overheating sensor open circuit	Overheating sensor signals temperature value outside measuring range. Check connecting lead. Resistance value > 3200 Ω (open circuit) Resistance value < 200 Ω (short-circuit) Overheating sensor values, see Graph page 5.
072	Overheating sensor short-circuit	
090	Watchdog - Reset (internal malfunction / Reset)	Internal malfunction in microprocessor/memory → replace control unit. Control unit malfunction due to interference voltages from vehicle electrical system. Possible causes: Flat battery, charger → eliminate interference voltages. Internal fault in microprocessor/memory detected → replace control unit.
091	External interference voltage (external malfunction / Reset)	
092	Control unit defect (ROM fault)	
093	Control unit defect (RAM fault)	
094	Control unit defect (EEPROM fault)	
096	Control unit defective internal temperature sensor defective	Replace control unit or use external temperature sensor.
097	Control unit defective Oscillator or undervoltage fault	Replace control unit.
099	Control unit defective internal glow plug transistor defect	Replace control unit.



**Circuit diagram, Heater** (see page 15 for operating panel)

**Model**

- 20 1749 01
  - 20 1750 01
  - 25 1906 01
  - 25 1907 01
  - 25 1912 01
  - 25 1913 01
- } Glow plug  
negative pulsed



**List of parts**

- 1.1 Burner motor
- 1.2 Glow plug
- 1.5 Overheating sensor
- 1.12 Flame sensor
- 2.1 Electronic control unit
- 2.2 Metering pump
- 5.1 Battery

- a) Connection, operating controls and external sensor in accordance with Circuit Diagram page 15
- rt Supply positive terminal 30
- ge Switch-on signal S+
- gr Temperature actual value
- wsrt + battery isolating switch Stop
- br Supply negative terminal 31
- blws Diagnostic
- grrt Temperature setpoint value
- brws Reference signal sensor

- b) Only with cable harness 22 1000 30 61 00
- b1 HA+ auxiliary drive for TRS units only
- b2 D+ alternator, for TRS units only
- b3 + battery isolating switch Stop
- Disable anti-theft alarm system
- c) Optional
- Fresh air blower, vehicle blower control

**Cable colours**

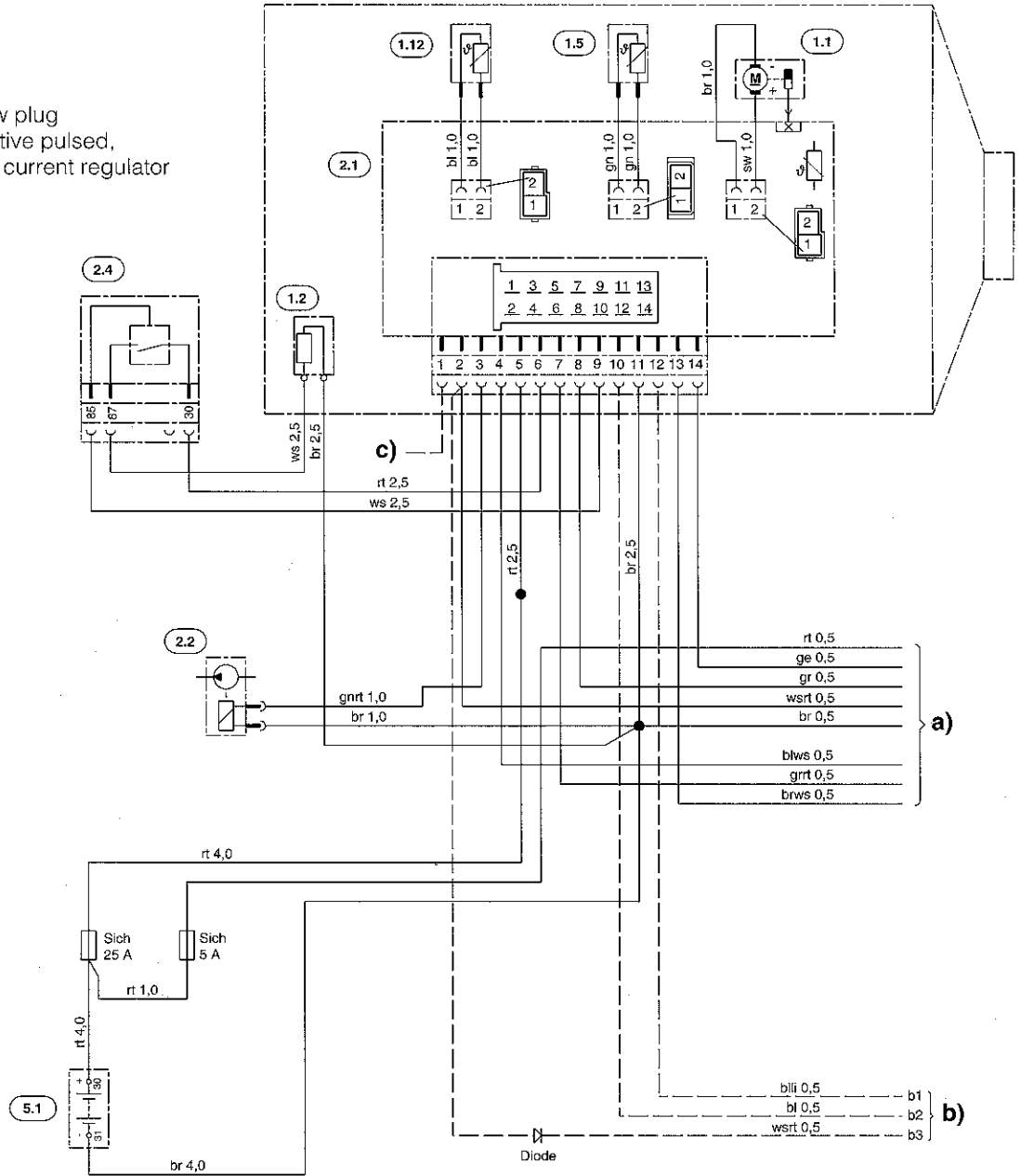
- |    |       |    |        |
|----|-------|----|--------|
| sw | black | ws | white  |
| rt | red   | ge | yellow |
| gn | green | vi | violet |
| br | brown | gr | grey   |
| bl | blue  | li | lilac  |

1895 601 c

**Circuit diagram, Heater** (see page 15 for operating panel)

**Model**

- 20 1762 01
  - 20 1763 01
  - 25 1967 01
  - 25 1968 01
  - 25 1969 01
  - 25 1970 01
- Glow plug  
positive pulsed,  
with current regulator



**List of parts**

- 1.1 Burner motor
- 1.2 Glow plug
- 1.5 Overheating sensor
- 1.12 Flame sensor
- 2.1 Electronic control unit
- 2.2 Metering pump
- 2.4 Current regulator
- 5.1 Battery

- a) Connection, operating controls and external sensor in accordance with Circuit Diagram page 15
- rt Supply positive terminal 30
  - ge Switch-on signal S+
  - gr Temperature actual value
  - wrst + battery isolating switch Stop
  - br Supply negative terminal 31
  - blws Diagnostic
  - grrt Temperature setpoint value
  - brws Reference signal sensor

- b) Only with cable harness 22 1000 30 79 00
- b1 HA+ auxiliary drive for TRS units only
  - b2 D+ alternator, for TRS units only
  - b3 + battery isolating switch Stop
- c) Optional
- Fresh air blower, vehicle blower control

**Cable colours**

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

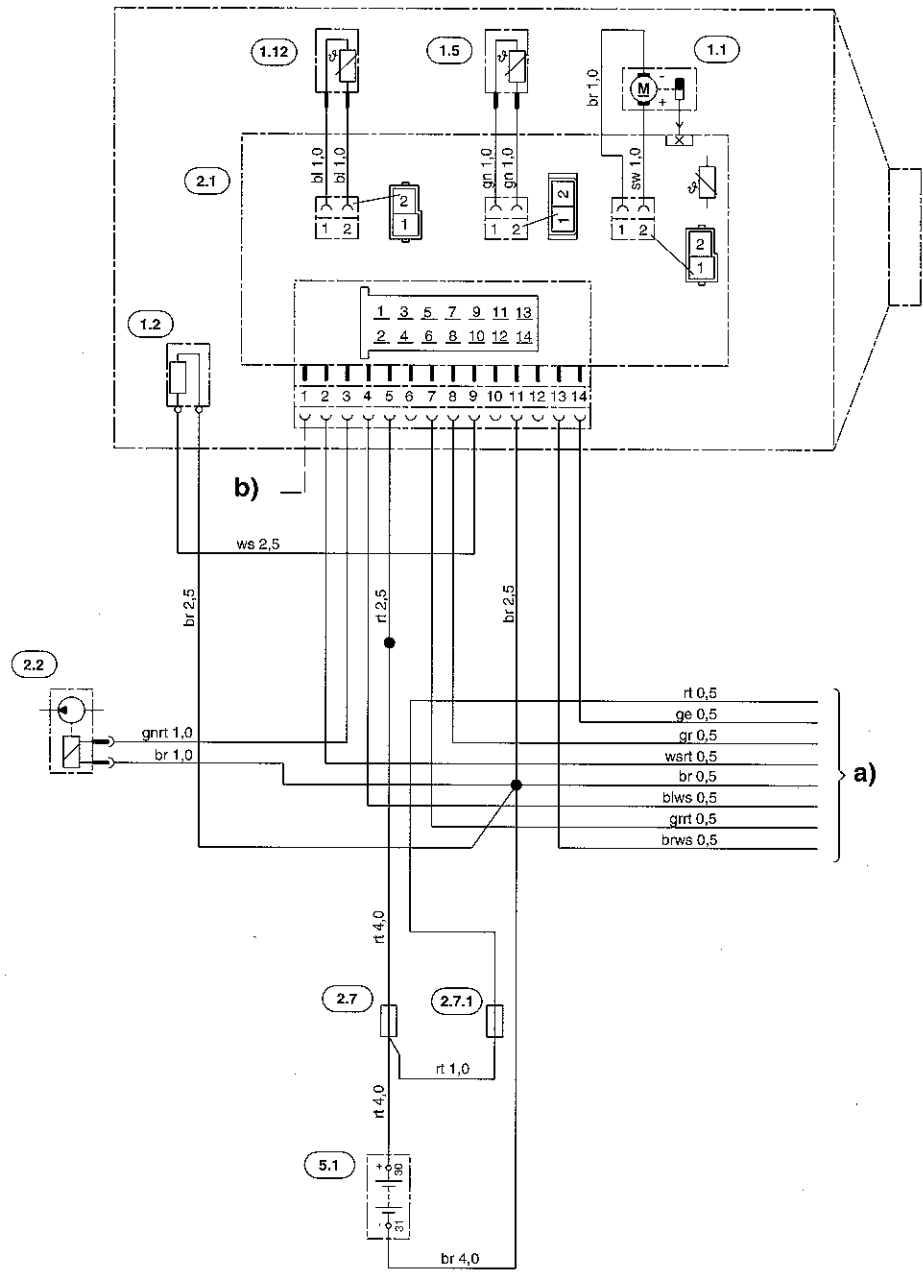
1965 601 b



**Circuit diagram, Heater, standard model** (see page 15 for operating panel)

**Model**

- 20 1767 01
  - 20 1768 01
  - 25 1980 01
  - 25 1981 01
  - 25 1982 01
  - 25 1983 01
- } Glow plug  
positive pulsed



**List of parts**

- 1.1 Burner motor
- 1.2 Glow plug
- 1.5 Overheating sensor
- 1.12 Flame sensor
- 2.1 Electronic control unit
- 2.2 Metering pump
- 2.7 Main fuse 12 V = 25 A, 24 V = 15 A
- 2.7.1 Fuse 5 A
- 5.1 Battery

- br Supply negative terminal 31
- blws Diagnostic
- gnrt Temperature setpoint value
- brws Reference signal sensor

- b) Optional
- Fresh air blower, vehicle blower control

**Cable colours**

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

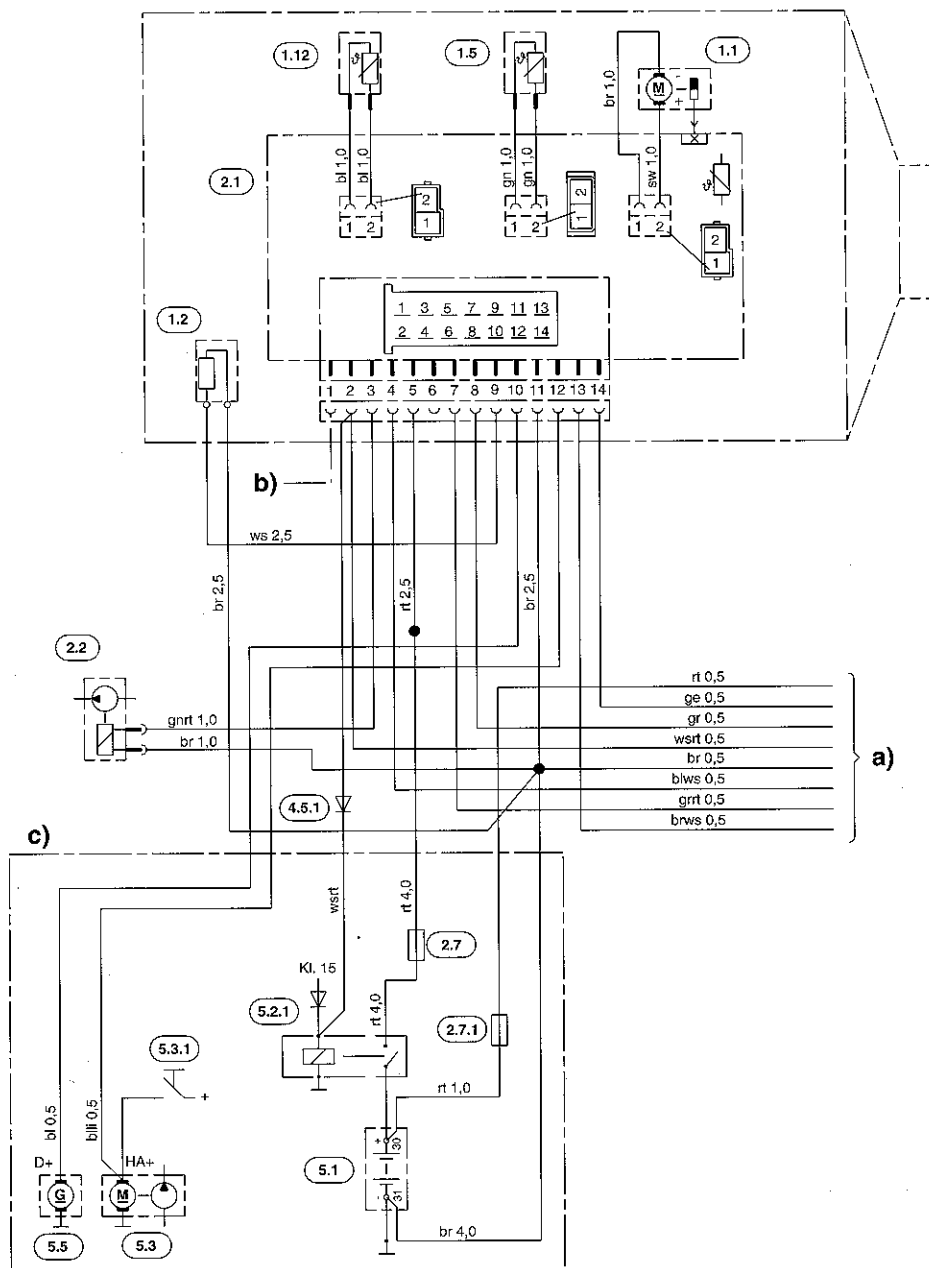
- a) Connection, operating controls and external sensor in accordance with Circuit Diagram page 14
- rt Supply positive terminal 30
- ge Switch-on signal S+
- gr Temperature actual value
- + battery isolating switch Stop
- wsrt Disable anti-theft alarm system

1976 601 b

**Circuit diagram, Heater, TRS model** (see page 15 for operating panel)

**Model**

- 20 1767 01
  - 20 1768 01
  - 25 1980 01
  - 25 1981 01
  - 25 1982 01
  - 25 1983 01
- } Glow plug  
positive pulsed



**List of parts**

- 1.1 Burner motor
- 1.2 Glow plug
- 1.5 Overheating sensor
- 1.12 Flame sensor
- 2.1 Electronic control unit
- 2.2 Metering pump
- 2.7 Main fuse 12 V = 25 A, 24 V = 15 A
- 2.7.1 Fuse 5 A
- 5.1 Battery
- 5.2.1 Battery isolating switch
- 5.3 Auxiliary drive HA+
- 5.3.1 Switch, auxiliary drive
- 5.5 Generator D+

- br Supply negative terminal 31
- blws Diagnostic
- grrt Temperature setpoint value
- brws Reference signal sensor

- b) Optional  
Fresh air blower, vehicle blower control
- c) TRS: for vehicles carrying hazardous loads  
(e.g. tanker lorry)

**Cable colours**

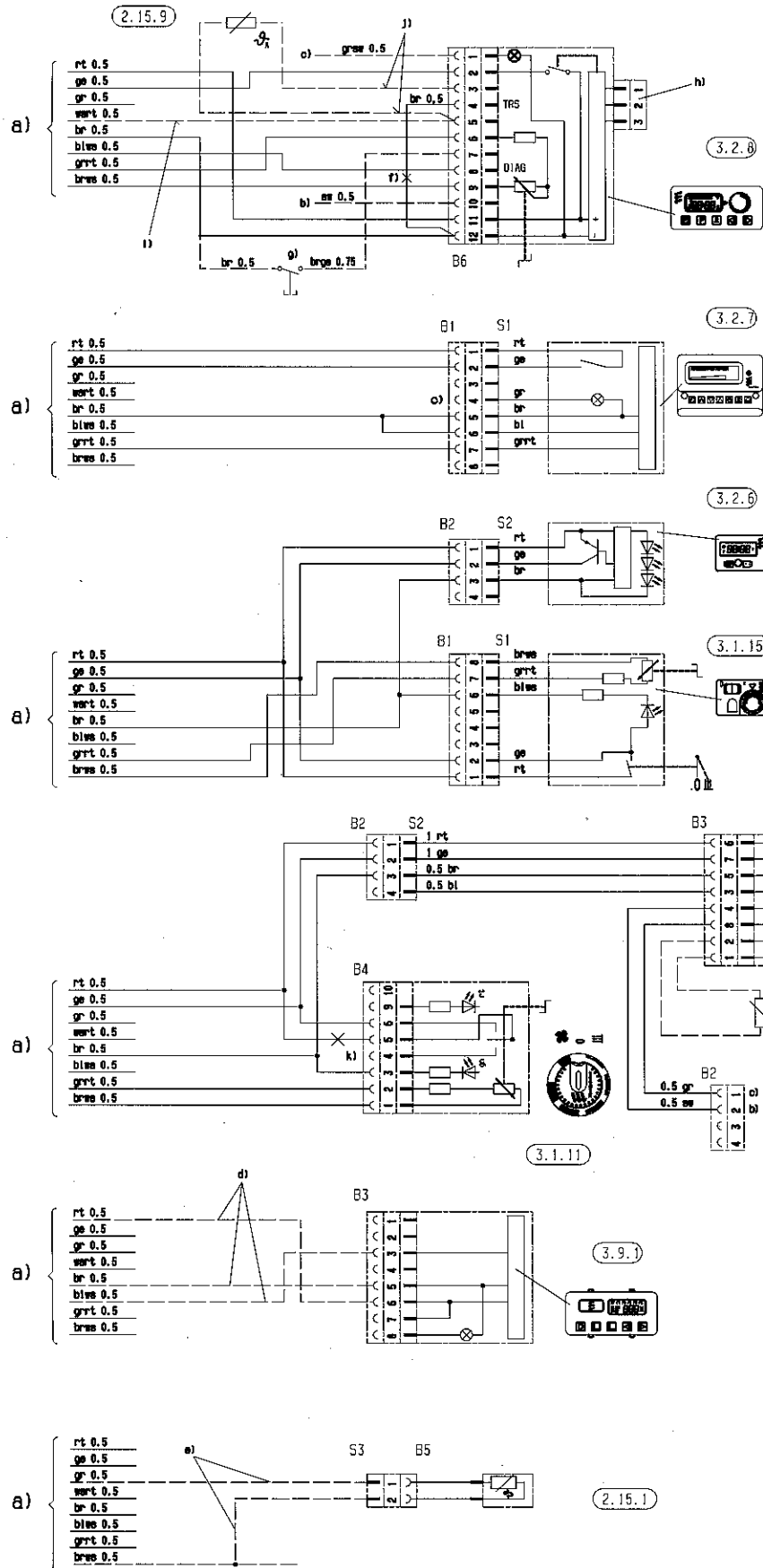
- a) Connection, operating controls and external sensor in accordance with Circuit Diagram page 14
- rt Supply positive terminal 30
- ge Switch-on signal S+
- gr Temperature actual value
- wsrt + battery isolating switch Stop
- Disable anti-theft alarm system

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

1976 602 a



### Circuit diagram, operating controls

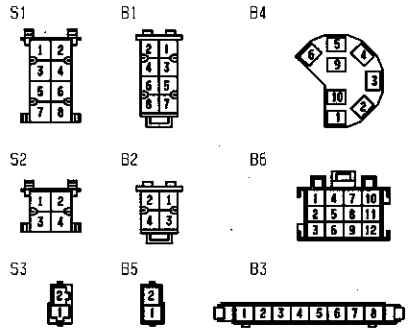


### List of parts

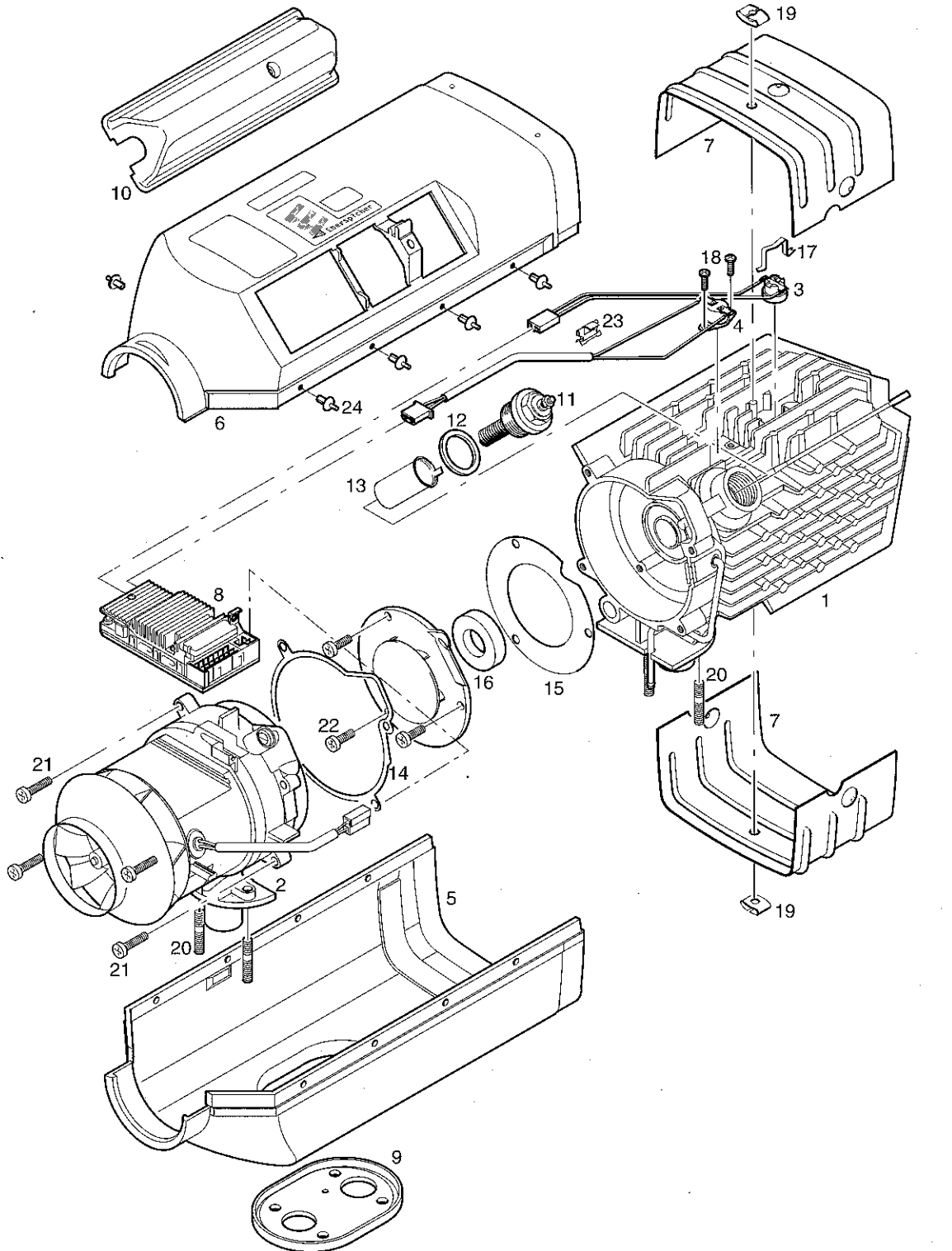
- 2.15.1 Ambient temperature sensor
- 2.15.9 Outside temperature sensor
- 3.2.5 Timer, rectangular ) not permissible
- 3.2.6 Timer, miniature ) with TRS
- 3.2.7 Timer, rectangular )
- 3.2.8 Timer, rectangular
- TRS potentiometer
- 3.1.11 Operating control, round
- 3.1.15 Operating control, miniature, less sensor
- 3.9.1 Diagnostic unit, JE diagnosis
- a) Connection, operating controls to heater
- rt Supply positive terminal 30
- ge Switch-on signal S+
- gr Temperature actual value
- wart + battery isolating switch Stop
- br Disable anti-theft alarm system
- blws Supply negative terminal 31
- grtt Diagnostic
- brws Temperature setpoint value
- Reference signal sensor
- b) Terminal 15
- c) Illumination Terminal 58
- d) Connection, diagnostic unit for fault code output
- e) Connection, outside temperature sensor
- f) Cable jumper (0.5 br) - omitted with TRS
- g) Connection, external heating key
- h) Connection, radio module
- i) Connection, acknowledgement from control unit (TRS only)
- j) connection, outside temperature sensor (not on TRS)
- k) For timer connection, cut lead here

### Cable colours

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



## Repair Instructions



- |   |                         |    |               |    |                  |
|---|-------------------------|----|---------------|----|------------------|
| 1 | Heat exchanger          | 9  | Flange gasket | 17 | Clip             |
| 2 | Blower                  | 10 | Cap           | 18 | Oval head screw  |
| 3 | Flame sensor            | 11 | Glow plug     | 19 | Locking device   |
| 4 | Overheating sensor      | 12 | Seal ring     | 20 | Stud             |
| 5 | Jacket half, bottom     | 13 | Plug strainer | 21 | Oval head screw  |
| 6 | Jacket half, top        | 14 | Gasket        | 22 | Oval head screw  |
| 7 | Insulating shell        | 15 | Gasket        | 23 | U-clip           |
| 8 | Electronic control unit | 16 | Seal ring     | 24 | Body-bound rivet |





## Repair steps

- 1 Remove/install glow plug
- 2 Remove/install plug strainer
- 3 Remove/install electronic control unit
- 4 Detach cap  
Detach discharge hood  
Detach jacket half
- 5 Detach insulating shells
- 6 Detach/attach overheating sensor
- 7 Detach/attach flame sensor
- 8 Detach combustion air blower from heat exchanger
- 9 Clean heat exchanger

### 1 Removing / installing glow plug

Slacken socket head cap screw and detach cap.

#### Caution!

The glow plug connector is live - therefore pull the 14-pin plug connector off the control unit.

Slacken glow plug connector and unscrew glow plug.

**Important!** When replacing the glow plug, always use a fresh seal washer.  
Order No. of seal washer 25 1830 01 01 01

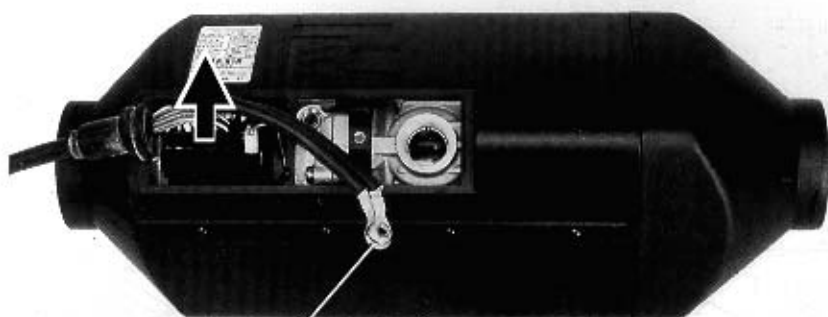
### 2 Removing / installing plug strainer

Extract plug strainer from the plug socket with pliers. Blow off plug vent with compressed air (diesel version only).

When installing the plug strainer, note position of lug or parting line, see Drawing 1 or Drawing 2. Carefully insert plug strainer to its fullest extent.

For diesel version:

Passage for plug vent (2 mm dia.) must be unobstructed.



3

0



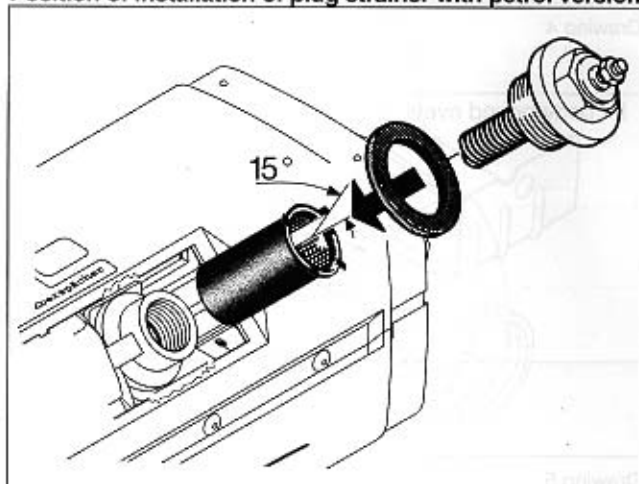
1

2

- 1 Glow plug
- 2 Plug strainer
- 3 Glow plug connector

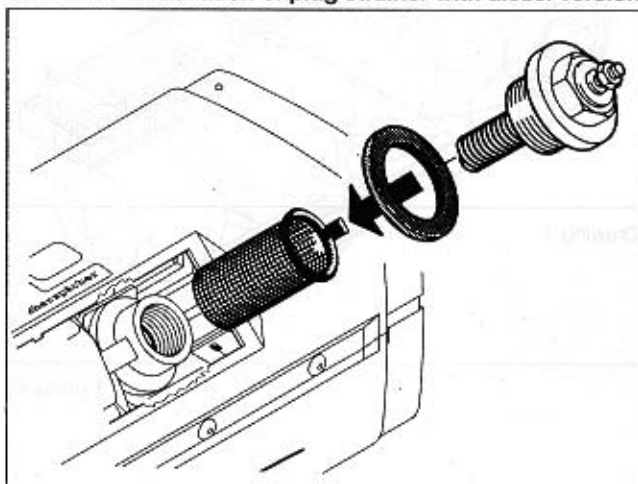
Figure 1

### Position of installation of plug strainer with petrol version



Drawing 1

### Position of installation of plug strainer with diesel version



Drawing 2

### 3 Removing / installing electronic control unit

Extract both plug connector housing from the control unit. Release control unit and withdraw from its guide. Then, pull off both plug connector housings on the rear of the control unit.

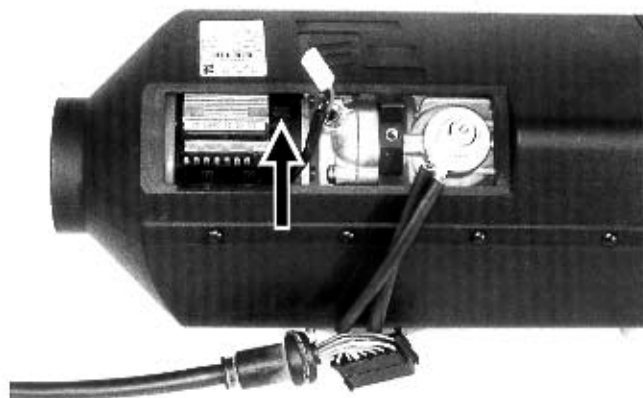


Figure 2

### 4 Detaching cap, detaching discharge hood, detaching jacket half

Slacken socket-head cap screw and detach cap. Detach discharge hood with screwdriver. Remove body-bound rivets and detach jacket halves.

Use fresh body-bound rivets when re-assembling.

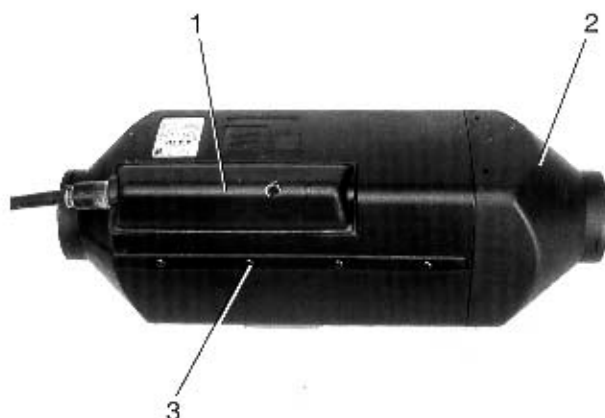
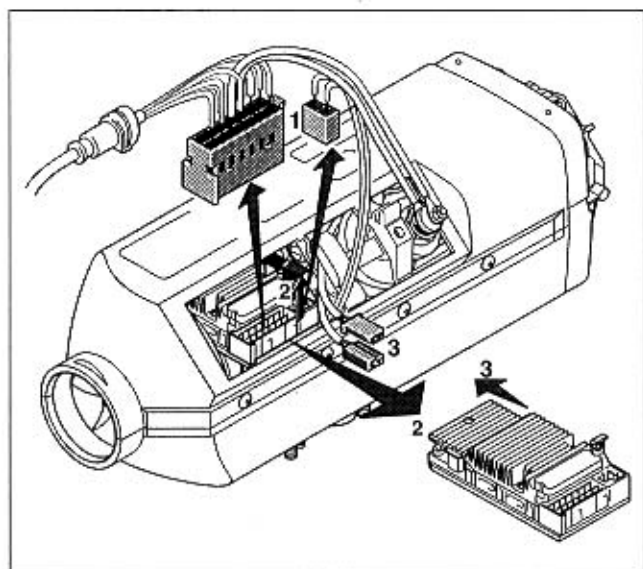
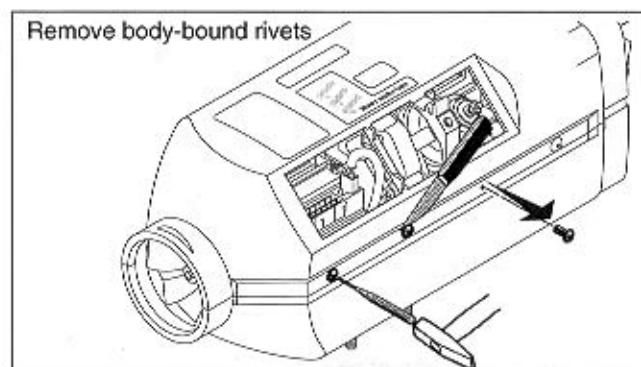


Figure 3

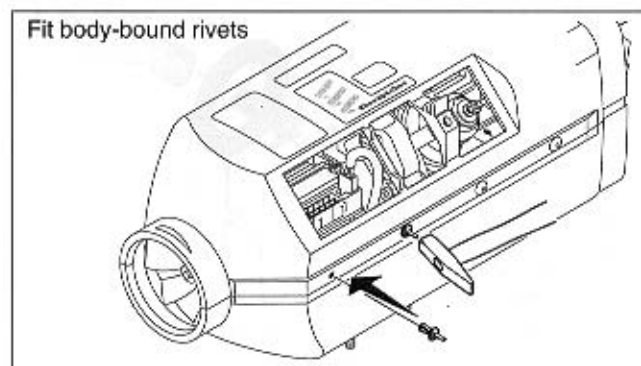
- 1 Cap with socket-head cap screw
- 2 Discharge hood
- 3 Body-bound rivets



Drawing 3



Drawing 4



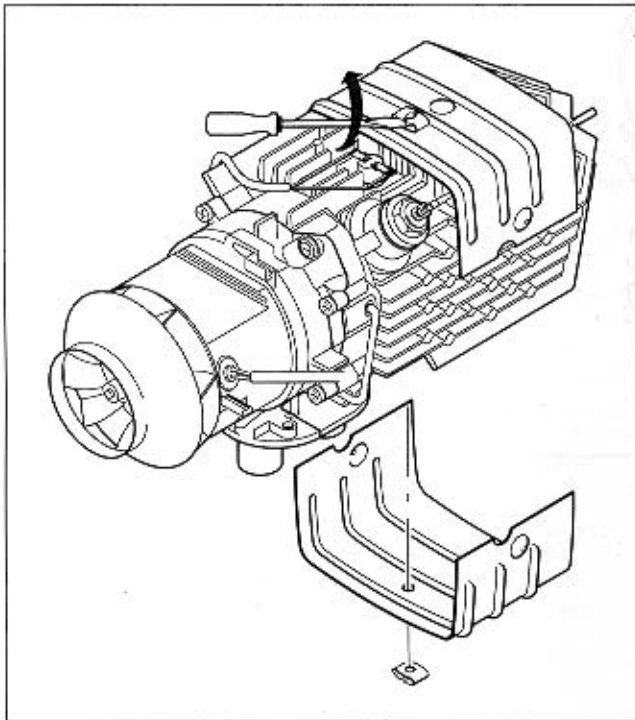
Drawing 5

## 5 Detaching insulating shells

Preceding operations:  
 Detach cap.  
 Detach cable harness.  
 Detach discharge hood.  
 Detach jacket halves.

Release Duo-Clip locking devices with screwdriver and detach insulating shells.

Use fresh locking devices when installing.



Drawing 6

## 6 Detaching / attaching overheating sensor

Detach top insulating shell.

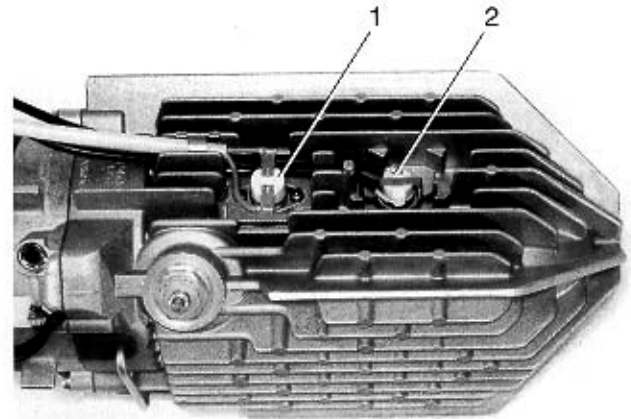
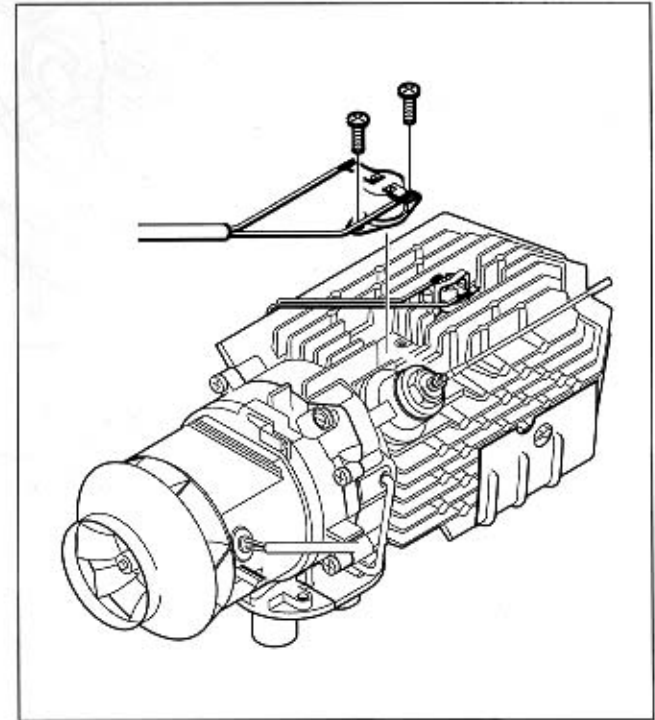


Figure 4

- 1 Overheating sensor
- 2 Flame sensor

Pull plug connector housing off the control unit. Expose overheating sensor cable.  
 Unscrew two oval head screws and detach overheating sensor.



Drawing 7

## 7 Detaching / attaching flame sensor

Detach top insulating shell.

Detach plug connector housing from control unit, expose flame sensor cable.

Detach retaining spring from flame sensor.

## 8 Detaching combustion air blower from the heat exchanger

Preceding operations:

Detach cap.

Detach cable harness.

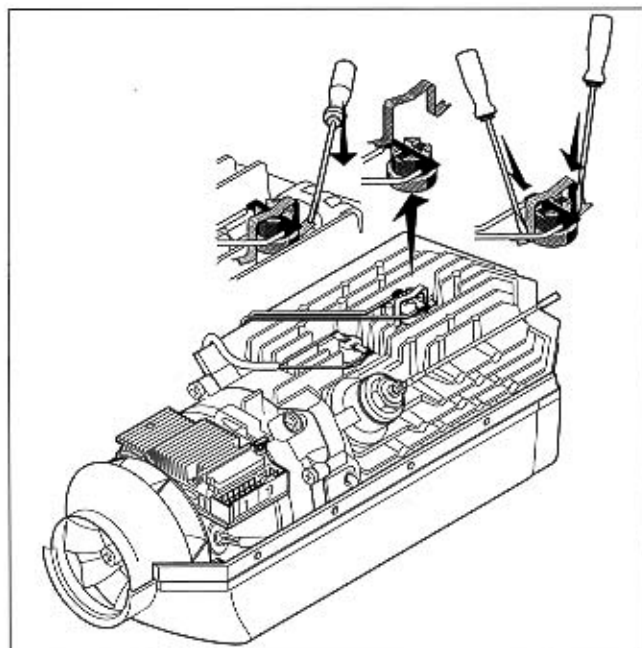
Detach discharge hood.

Detach jacket halves.

Pull off the plug connector housing of the flame sensor cable section and the plug connector housing of the overheating sensor cable section on the control unit.

Unscrew four oval head screws from the blower. Detach combustion air blower from the heat exchanger.

**Renew gasket.**



Drawing 8

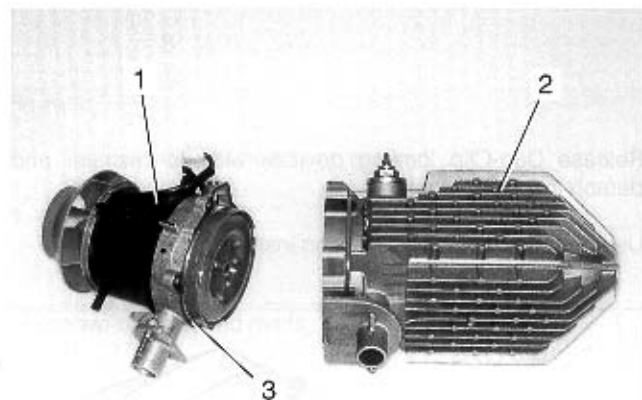


Figure 5

- 1 Combustion air blower
- 2 Heat exchanger
- 3 Gasket

## 9 Cleaning the heat exchanger

Unscrew the cover of the heat exchanger.  
 Remove gasket and seal ring.  
 Renew gasket, check seal ring, renew if necessary.

- 1 Cover
- 2 Gasket
- 3 Seal ring

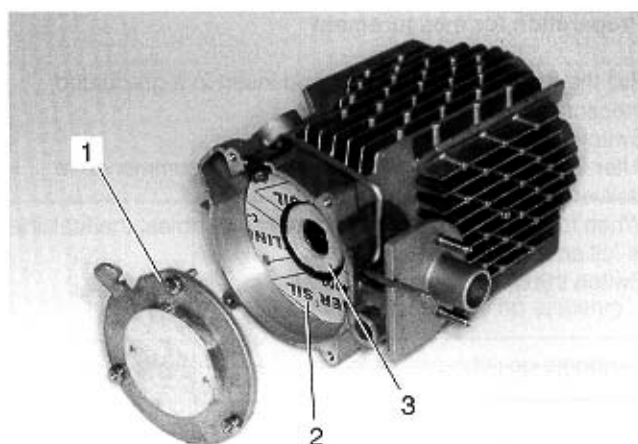
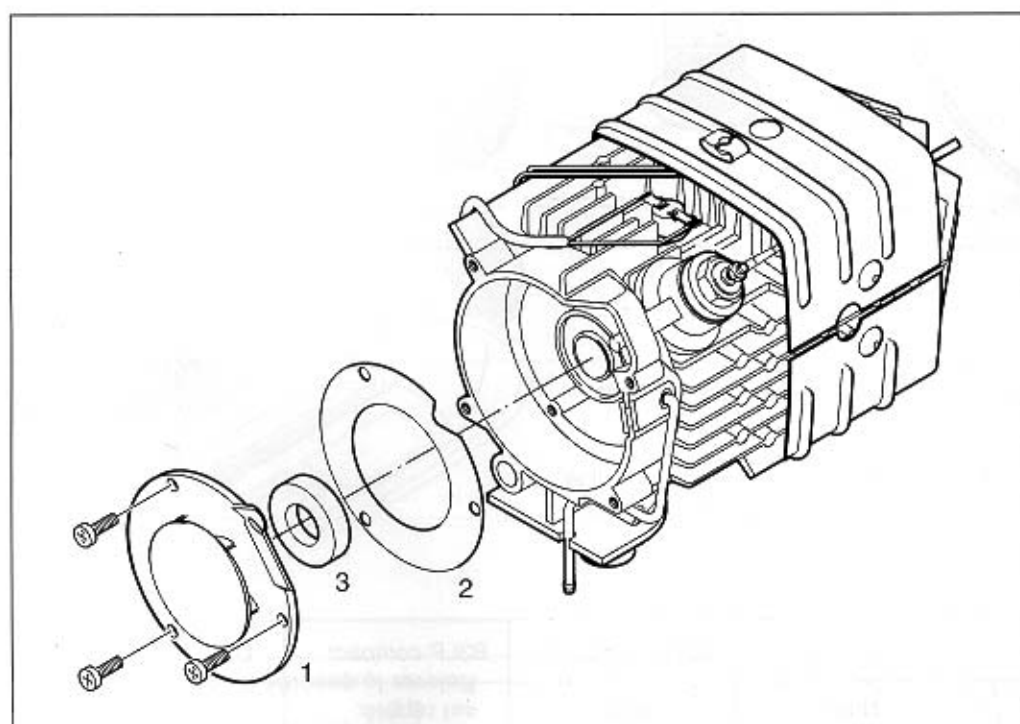


Figure 6



Drawing 9

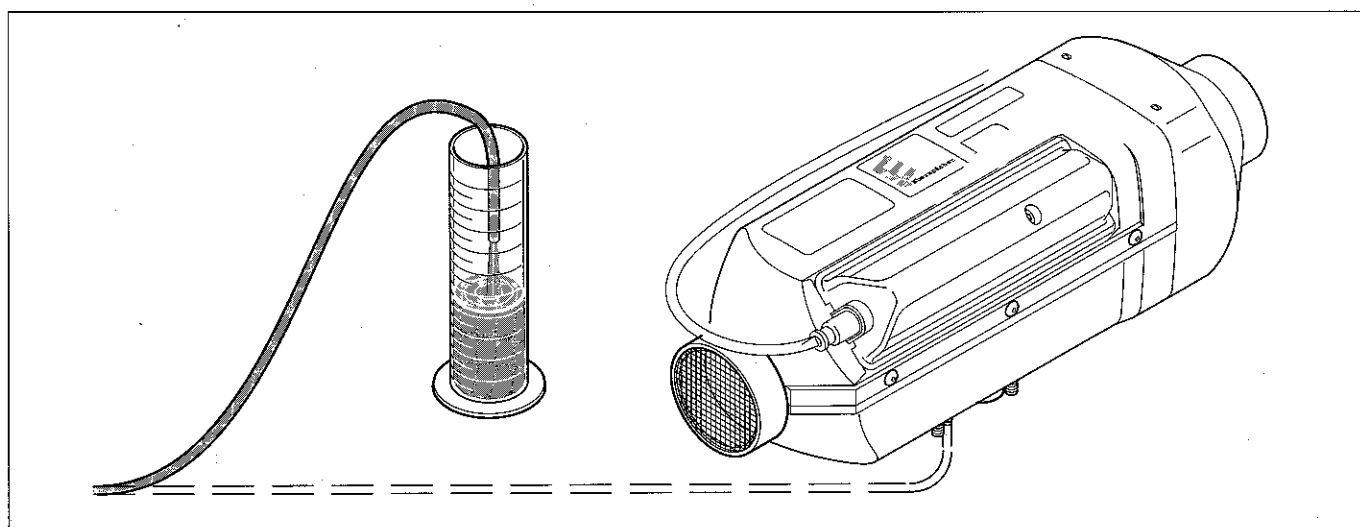
## Measurement of fuel delivery

### Preparation for measurement

Pull the fuel line off the heater and insert in a graduated measuring glass (20 cm<sup>3</sup> size).  
 Switch the heater on.  
 After 25 seconds, the metering pump will commence to deliver the fuel.  
 When fuel emerges uniformly and free bubbles, the fuel line is full and vented.  
 Switch the heater off and empty the measuring glass.

### Measurement

Switch heater on.  
 Fuel delivery commences approximately 25 seconds after switching on. Hold the graduated measuring glass at glow plug height during measurement. After 90 seconds of fuel delivery, it will shut off automatically.  
**Switch heater off, otherwise restart will take place.**  
**Read off quantity of fuel delivered in the graduated measuring glass.**



Drawing 10

### Evaluation

Compare the quantity of fuel with the values in the table below.

If the measured quantity of fuel is over the maximum value or under the minimum value, the metering pump must be replaced.

Heater Model		B3LC <i>compact</i>	B3LP <i>compact</i>	D3LC <i>compact</i>	D3LP <i>compact</i>
Fuel quantity (cm <sup>3</sup> / 90 s)	- Nom.	10.5	8.5	8.3	7.2
	- Max.	12.5	9.8	9.5	8.3
	- Min.	9.5	7.3	7.1	6.2