Air heaters D 1 L E

Troubleshooting and Repair Manual

® Eberspächer

The Troubleshooting and Repair Manual is valid for the following heater versions:

D 1 L E

25 1790 05 00 00 – 12 V
25 1791 05 00 00 – 24 V

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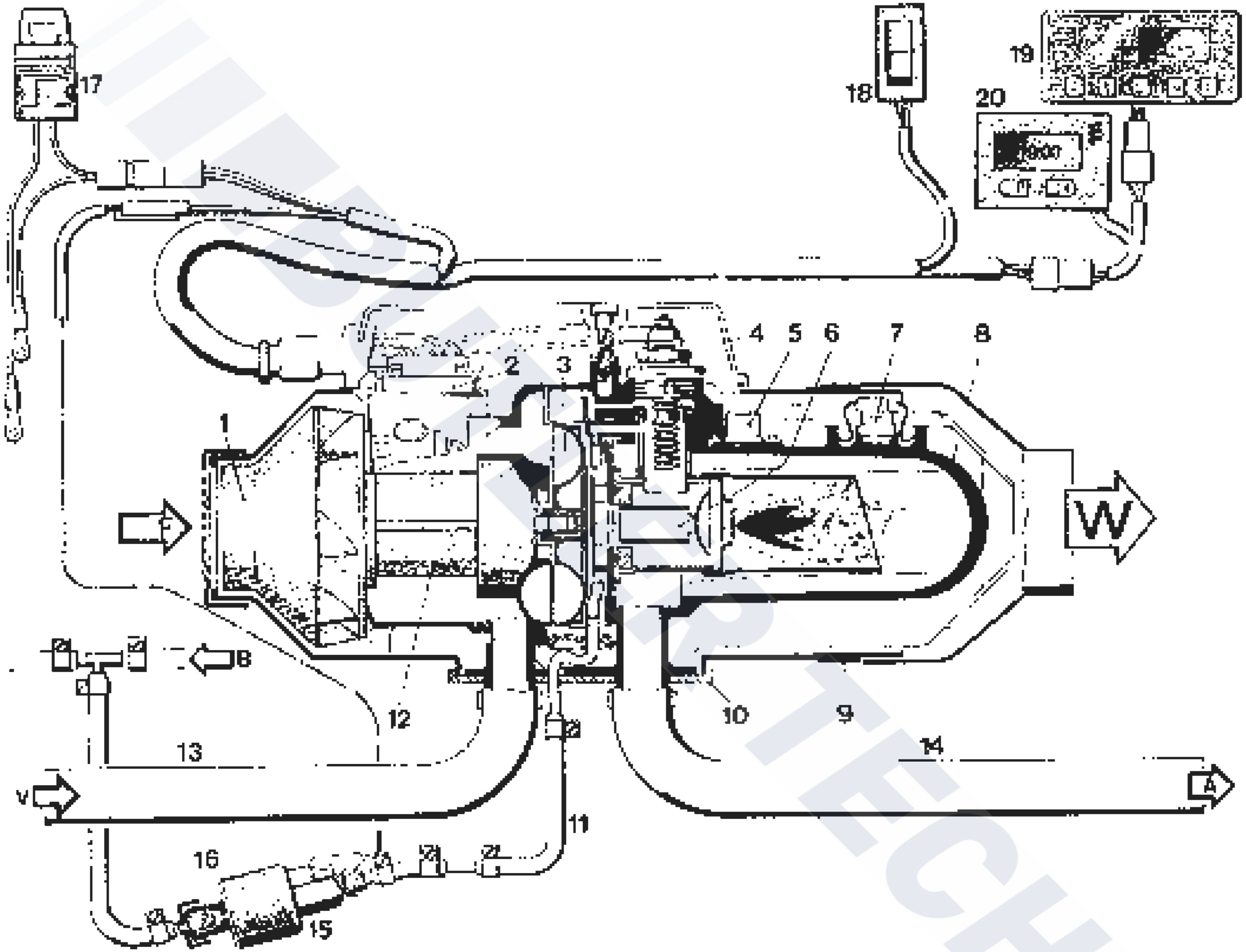


Parts list

1 Heating air blower wheel
2 PCB with control unit
3 Combustion air blower wheel
4 Glow plug
5 Safety thermal cutout switch
6 Combustion chamber
7 Flame sensor
8 Heat exchanger
9 Outer jacket
10 Flange seal
11 Fuel line
12 Blower motor
13 Combustion air intake hose
14 Exhaust hose
15 Fuel metering pump
16 Fuel filter
17 Main fuse 25 A
18 ON/OFF switch
19 Timer
20 Minitimer

F = fresh air
V = combustion air
B = fuel
W = hot air
A = exhaust

Description of operation/operating instructions

Control elements

1 On/Off switch
2 Minute timer
(additional part, optional, see p. 30). The timers can be used to switch the heater on directly using the timer, or to preset the switch-on time.

Mode of operation

Procedure after switch-on

Switch-on: Set On/Off switch to "On". The pilot light in the On/Off switch comes on.

Further procedure is automatic:

after about 8 secs.	Blower "On"
	Heater plug/glow plug "On"
After about 60 secs.	Fuel metering "On"
When a stable flame has been obtained:	Glow plug off

The heater now operates at full heating capacity (1800 W), and the air heated by the heat exchanger passes through the air outlet into the space to be heated.

Switch-off: or timer — Set On/Off switch to "Off". The pilot light goes off.

The blower continues to operate to cool the heater and finally shuts down automatically after about 3 minutes.

Controls and safety equipment

The flame is monitored by the flame sensor (4) and the max. permissible temperature by the safety thermal cutout switch (5).
Both affect the electronic control unit, which shuts down the heater in the event of faults.

1. If the heater fails to ignite within 180 seconds of the start of fuel pumping, or if the flame goes out by itself during combustion, a fault shutdown takes place, with the blower motor continuing to operate for about 3 minutes, and the glow plug is also "On" during the first 30 seconds. The fault shutdown can be cancelled by switching off and then back on.

2. In the event of overheating, the safety thermal cutout switch (5) responds, the fuel supply is interrupted and fault shutdown follows with the blower motor continuing to operate, as described above.
Once the cause of the overheat has been removed, the heater can be restarted by switching it off and then back on again.

3. If, during start or operation, a short circuit or interruption occurs in glow plug, fuel metering pump or flame monitor, a fault shutdown takes place, with only the blower motor continuing to operate as described above.

4. The operation of the blower motor is monitored and if it simply fails to start or if the motor speed drops below the minimum value, fault shutdown takes place.

5. When the heater is switched off, the glow plug is switched on during the blower run-down for about 30 seconds (after-glow) to clean off combustion residues.

The heater must always be switched off when the tank is being filled.

The heater must not be operated in garages.

In the event of trouble, first check the following:

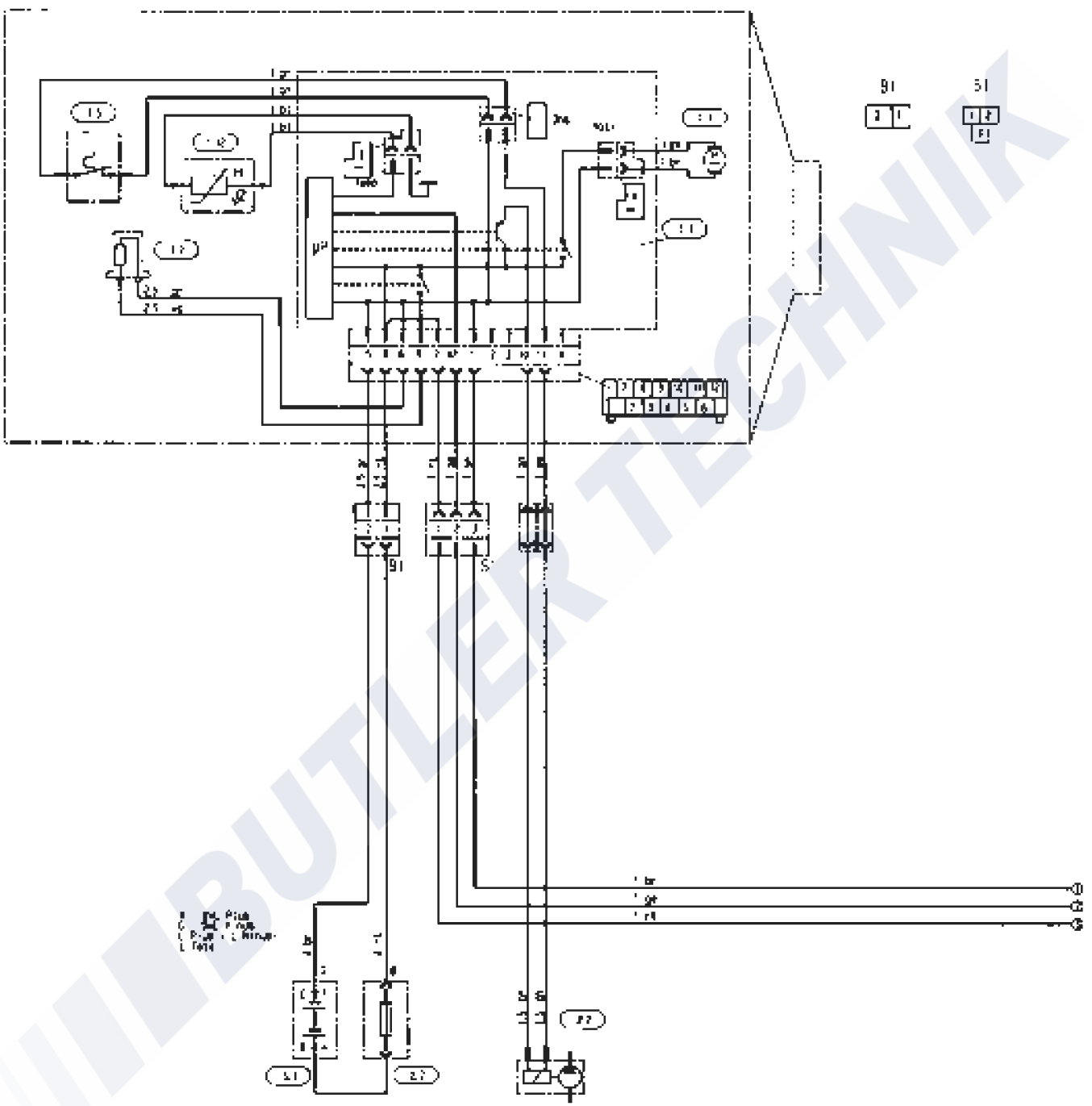
Fuel in the tank?
When changing over to winter operation:
Is there still summer-quality diesel fuel in the lines?
Fuses OK?
Electrical lines and connections OK?
Combustion air and exhaust piping systems free?

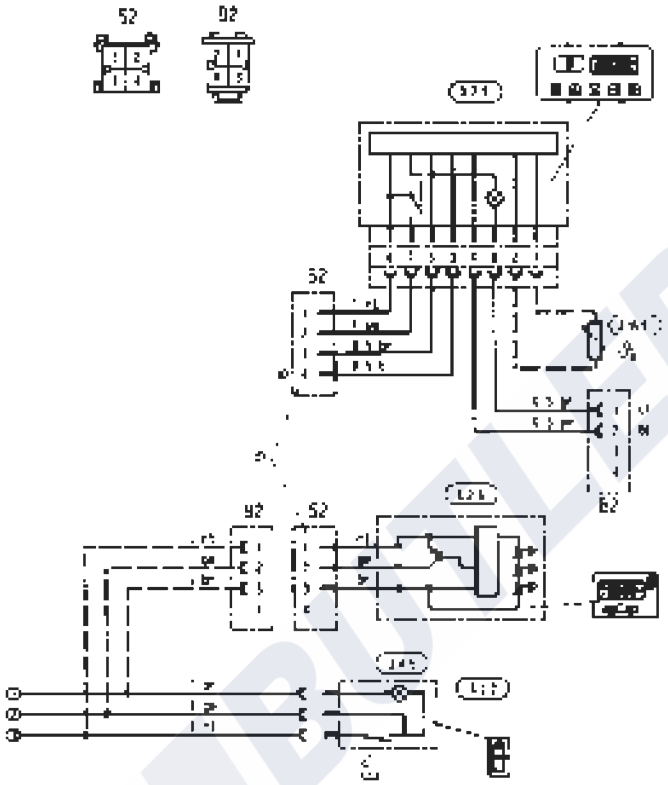
When combustion produces soot, check the following:
Combustion air and exhaust piping systems clogged?
  Remove cause of clogging.

Fuel metering pump conveying too much or too little?
  Measure fuel quantity, replacing fuel metering pump if necessary. Clean the gauze strainer in the metering pump.

Deposits in heat exchanger?
  Clean heat exchanger or replace if necessary.

Wiring diagram

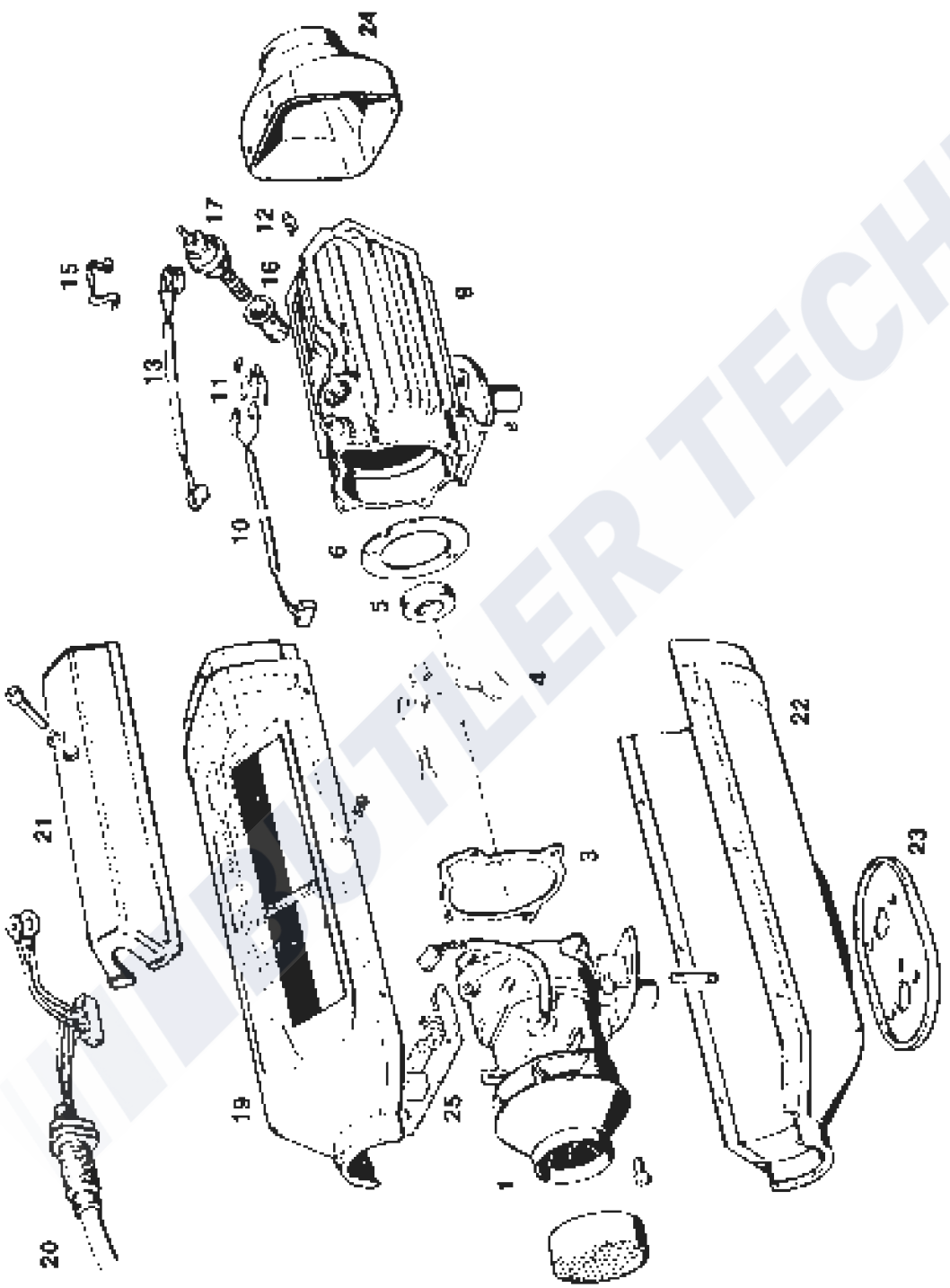




rt	=	red	gn	=	green
br	=	brown	ge	=	yellow
ws	=	white	gr	=	grey
sw	=	black	bl	=	blue

Parts list

1.1	Blower motor
1.2	Glow plug
1.5	Safety thermal cut-out switch
1.7	PCB with control unit
1.12	Flame monitor
2.2	Fuel metering pump
2.7	Main fuse 25 A
2.15.x	Sensor, external temperature
3.1.2	"Heating" switch (continuous operation)
3.2.5	Timer
3.2.6	Timer
3.4.5	Switch on pilot light
4.1	Battery
a)	Test operation, digital timer [illegible]
b)	to terminal 15
c)	lighting terminal 58
d)	optional



Parts list

Repair steps

1. Removing/fitting the glow plug
2. Removing/fitting the plug filter
3. Removing/fitting the PCB with control unit
4. Removing/fitting the air outlet section
5. Removing/fitting the upper casing half
6. Removing/fitting the safety thermal cutout switch
7. Removing/fitting the flame sensor
8. Removing the blower from the heat exchanger
   Changing the seals on the heat exchanger
9. Changing the seals on the blower

1. Removing/fitting the glow plug

Unscrew cap,
Detach glow plug connector,
Unscrew glow plug.

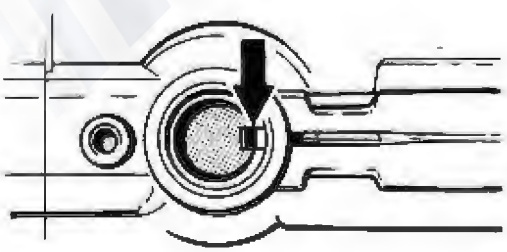
2. Removing/fitting the plug filter

Remove the plug filter from the plug connection using pliers.

When putting the plug filter back in, ensure correct positioning of the lug.

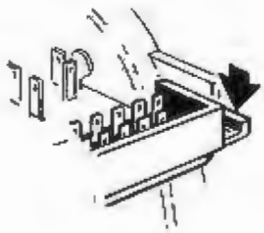
Carefully slide in the plug filter as far as it will go.

Installation position of plug filter in D 1 L E



3. Removing/fitting the PCB with control unit

Detach plug from the PCB.
Press down the lug.
Pull out the PCB.



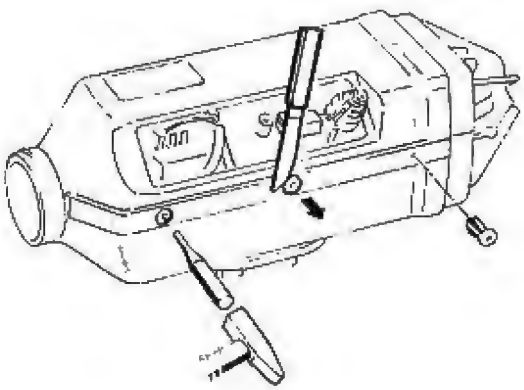
Protect the PCB with control unit from static discharge:

- only use in garages
- avoid surfaces with plastic coating
- prevent yourself from becoming statically charged or, if so, contact earth to ensure discharge.

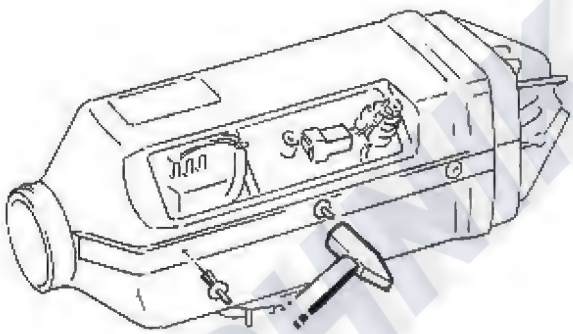
4. Removing the air outlet section

5. Removing/fitting the upper casing half

To remove the body-bound rivet, knock the pin through with a small drift.
Prise out the rivet with a knife.

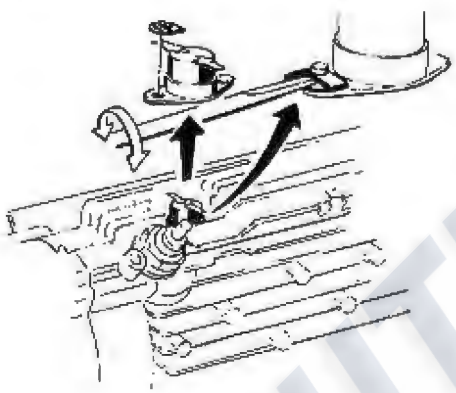


Use a new rivet for reassembly.

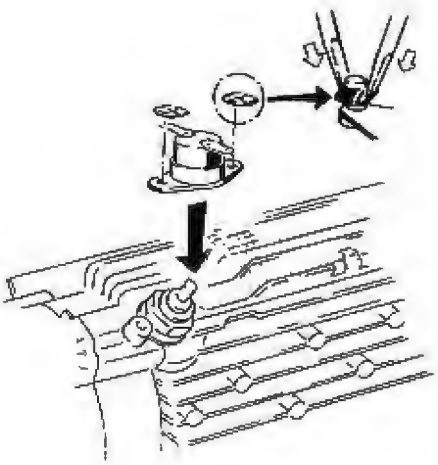


Remove the upper casing half

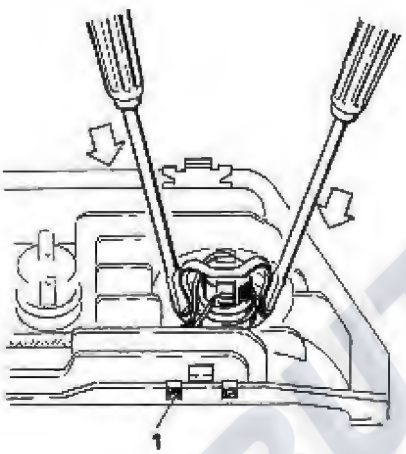
6. Removing the safety thermal cutout switch



Fit the safety thermal cutout switch,
using new clamping springs.



Fitting the flame sensor

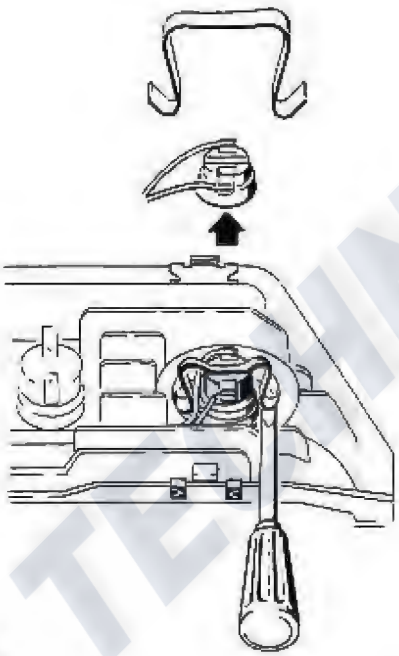


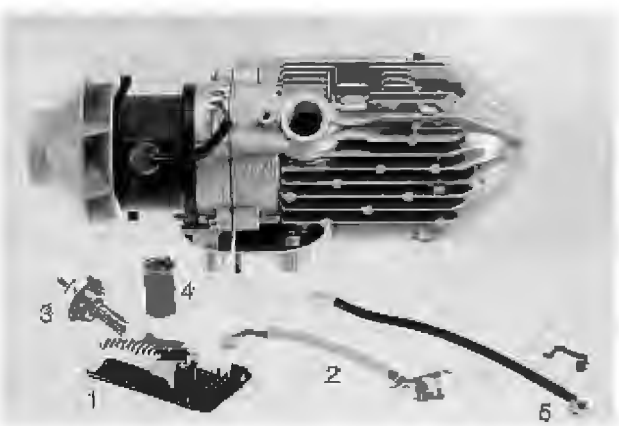
1 spacer clamps for the casing halves

Removed parts

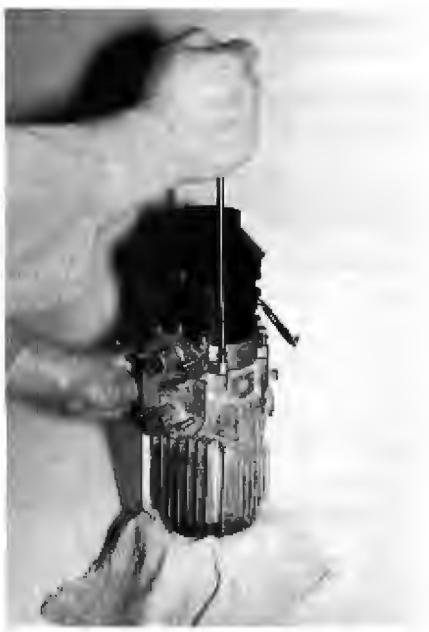
1 PCB with control unit
2 Safety thermal cutout switch
3 Glow plug
4 Plug filter
5 Flame sensor

7. Removing the flame sensor





8. Unscrewing the blower from the heat exchanger



Change the seals on the heat exchanger.
Unscrew the flange (1) from the heat exchanger.
Fit new seals (2) and (3) as illustrated.

Remove the blower

9. Replacing the seals on the blower

Remove/scrape the old seal from the blower flange.
Affix new seal (self-adhesive).

Note:
When fitting the combustion air blower/heat exchanger into the lower casing half, care must be taken that the fastening hooks of the blower engage in the slots of the casing half, otherwise the blower wheel might catch.

Measuring the fuel quantity

IMPORTANT: only measure the fuel quantity when the battery is sufficiently charged. At least 11/22 V and max. 13/26 V should be applied at the control unit during measurement.

1. Preparation

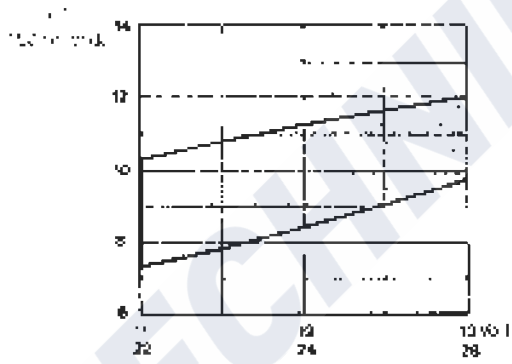
Remove electrical line from glow plug. Caution: [illegible] fuel ground. Detach the fuel line from the heater and place it in a measuring glass (15 or 20 cm³ capacity). Connect a [illegible] to the 12 pin plug, terminals [illegible] of the control unit. Switch on the heater. After about [illegible] seconds the metering pump starts to pump fuel. When the fuel is coming out smoothly and free of bubbles, the fuel line is [illegible].
Switch off the heater and empty the measuring glass.

2. Measurement

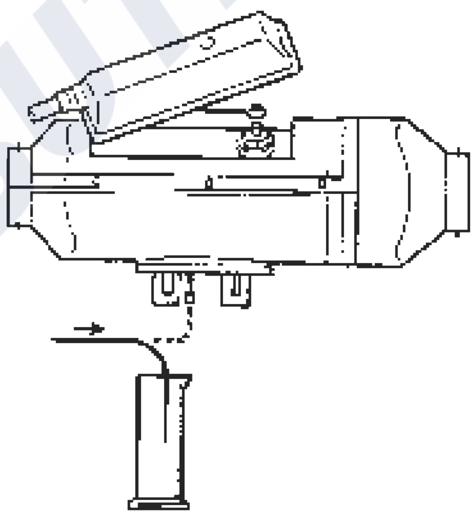
Switch on the heater.
Fuel delivery commences approx. [illegible] secs. after switching on.
Hold the measuring glass at the plug level during measurement. Read off the voltage at the voltmeter.
Fuel pumping stops automatically after 180 secs.
Switch the heater off.
Read off the fuel quantity in the measuring glass.

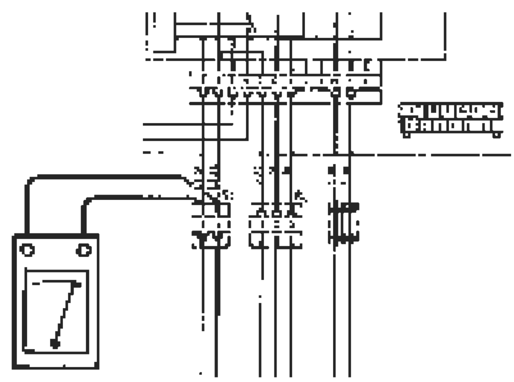
3. Evaluation

Transpose the values obtained to the graph. The fuel quantity is OK when the intersection of the two lines is within the limit curves.
If the intersection is outside the limit curves, the metering pump must be replaced.



Connect voltmeter to control unit





Testing the heater and the components

[illegible]

1. Testing the burner motor

[illegible]

2. Testing the safety thermal cutout switch

[illegible]

3. Testing the flame sensor

[illegible]