EXIT

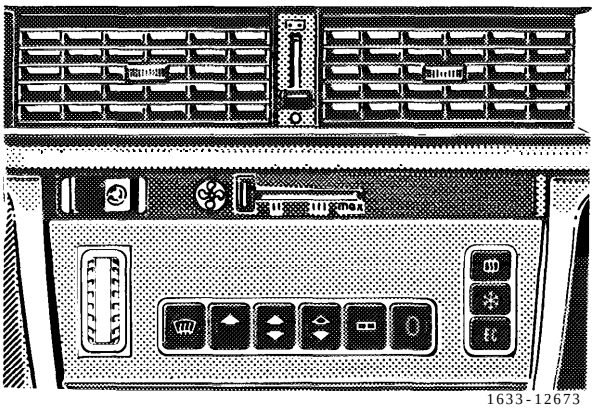
83 Tempmatic climate control

83-020 Operation and components of Tempmatic climate control

A. General information

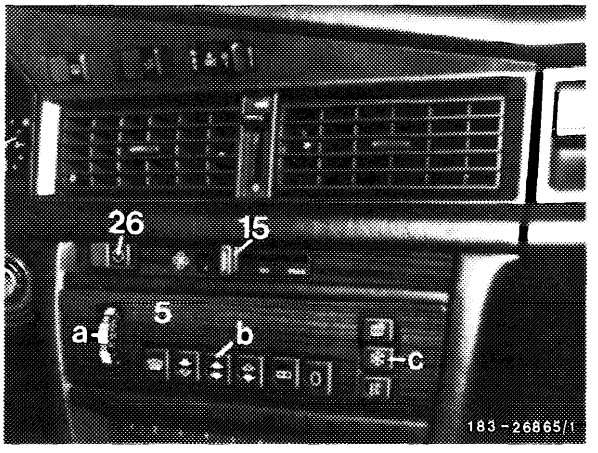
Model 201 has a blend air heating system in combination with air conditioning — **Pempmatic climate** control. The cooling and heating air temperatures are automatically controlled.

For adaptation to weather conditions, a number of functions, including air distribution, can be push-button-controlled (b), independent of in-car temperature. Open, close or adjust dashboard center and side outlets as required.



The blower can be manually adjusted except for modes or

A change from fresh air to recirculated air intake can be made at any time by means of switch (26).



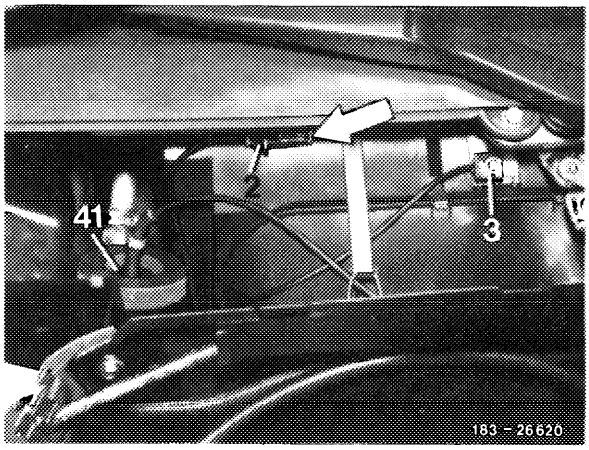
5 Control unit consists of:
a Temperature selector wheel
b Pushbutton switch with 6 functions
c Air conditioning switch (mode buttons)
15 Blower switch
26 Fresh/recirculated air switch

The "cooling" mode requires the pressing of button (c) into position (max. dehumidification) or (normal) and to push one of the buttons of pushbutton switch (b).

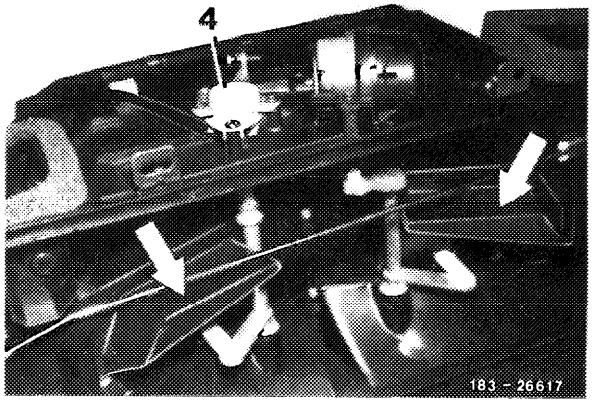
The system operates only with the engine running.

B. Function of temperature control

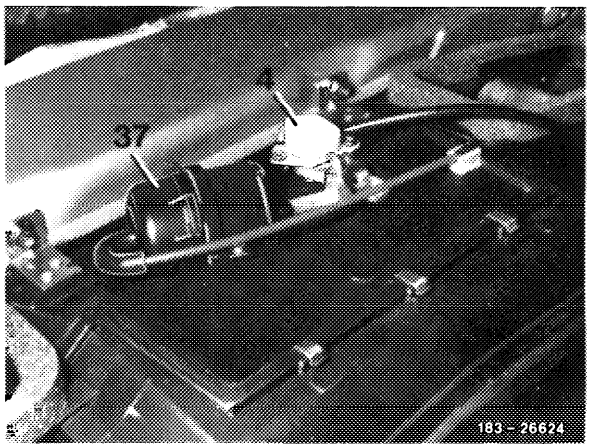
The in-car temperature is controlled by blend air flaps. If “heating” is required, the heater valve is fully opened by a vacuum element (41) and remains fully open during the heating period.



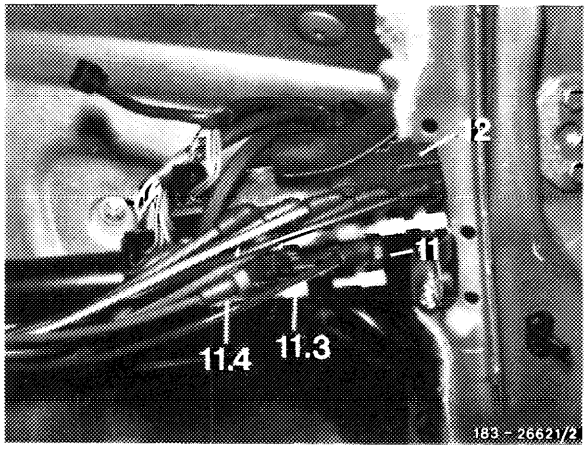
The blend air flaps (arrow) mix unheated air with the heated air, routed through the heat exchanger. The position of the blend air flaps is indicated by a feedback potentiometer for flap position (4) flanged to the shaft of the blend air flaps, and transmitted to the electronic system in the control unit.



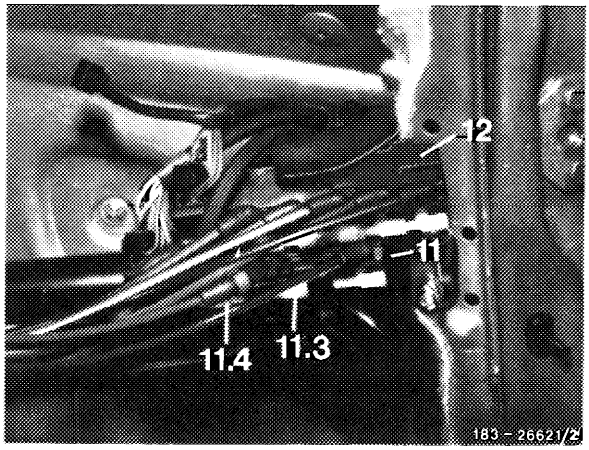
The blend air flaps are operated via levers by a vacuum element (37). The vacuum element is connected to 2 switchover valves.



The switchover valve (11.4) supplies the vacuum element with vacuum through an orifice, so that the blend air flaps are moving toward “cold”. The second switchover valve (11.3) connects the vacuum element to atmosphere also through an orifice, so that the blend air flaps are moved in the direction of “warm” by the spring in the vacuum element. From max. cooling or not heating up to max. heating and vice versa the blend air flaps require approx. 20 seconds each.

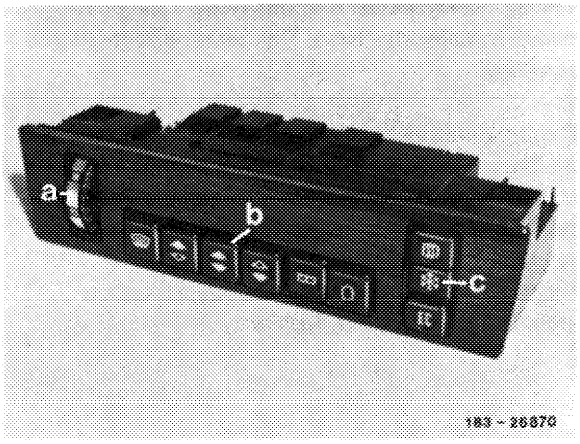


Example:



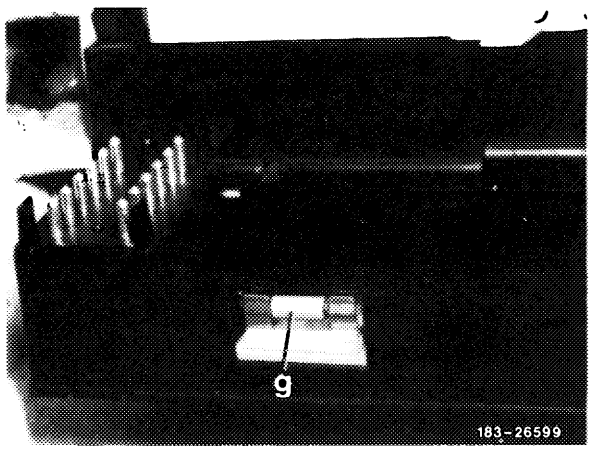
If **there is a temperature difference between in-car sensor and preset value on temperature wheel (e.g. too cold by 0.3 °C) the electronic system** will energize the switchover valve "warm". Valve **(11.3) opens and slowly connects the vacuum element** (37) to atmosphere by an orifice. The spring in vacuum element moves the blend air flaps in direction of "warm" until the feedback potentiometer for flap position (4) indicates the resistance value which corresponds with the temperature difference. The switchover valve (11.3) "warm" will then close and the blend air flaps will stop. Vice versa, the switchover valve (11.4) "cold" is opened. The vacuum element is supplied with vacuum until the proper position of the blend air flaps has been attained. The switchover valve **(11.4)** "cold" will then close. If no heating is required, the heater valve is closed and the blend air flaps are resting against the "cold" stop. In such a case, the temperature in evaporator is probed and the air conditioning system is switched on, if required.

C. Pushbutton switch unit with electronic temperature control



The pushbutton switch unit consists of a temperature wheel (a), a pushbutton switch (b) with 6 push-buttons and a mode switch for air conditioning (c). The pushbutton switch unit houses the electronic system for controlling interior temperature and 1 relay each for connecting the current for the electromagnetic clutch of the refrigerant compressor (air conditioning compressor) and auxiliary coolant pump.

a Temperature wheel
b Pushbutton switch unit with 6 functions (buttons)
c Mode switch for air conditioning system with 3 functions (buttons)



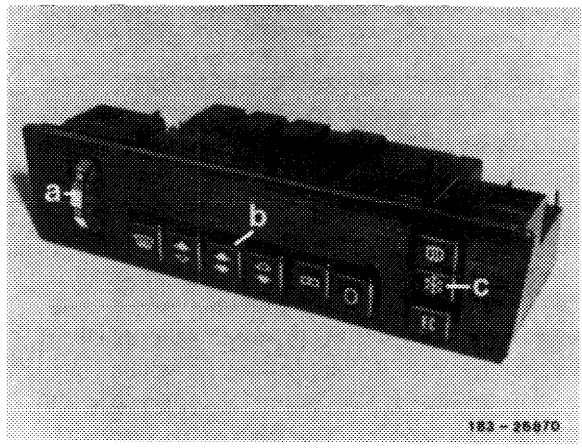
A fuse (g) is located at the rear of the pushbutton switch unit as protection for the electronic system and conductors against short-circuits.

g Fuse, 2 amps

Temperature wheel (a)

The temperature wheel (a) provides stepless interior temperature control in a temperature range from approx. 16 °C to 32 °C. If the temperature wheel is set at the end position “MIN”, the system operates at full cooling capacity, provided the air conditioning system has been switched on. If it is set at the end position “MAX”, the system operates at full heating capacity.

Rotation of the temperature wheel changes the resistance (potentiometer), transmitting the new resistance value into the electronic system of the temperature control.



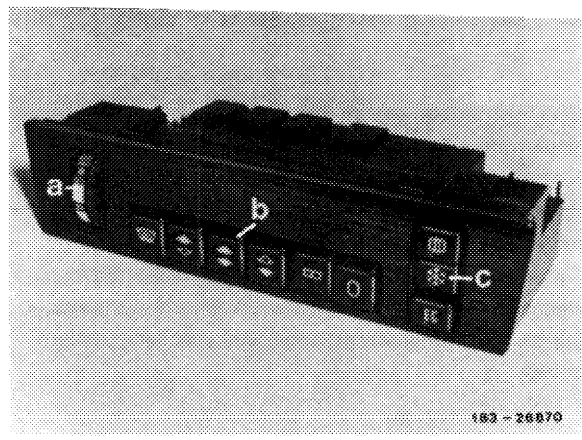
Pushbutton switch (b) with function selection

Function (pushbutton) selection

The blower runs at max. speed in 4th stage at 100 % fresh air supply, provided the switch fresh air/ recirculating air is set to fresh air.

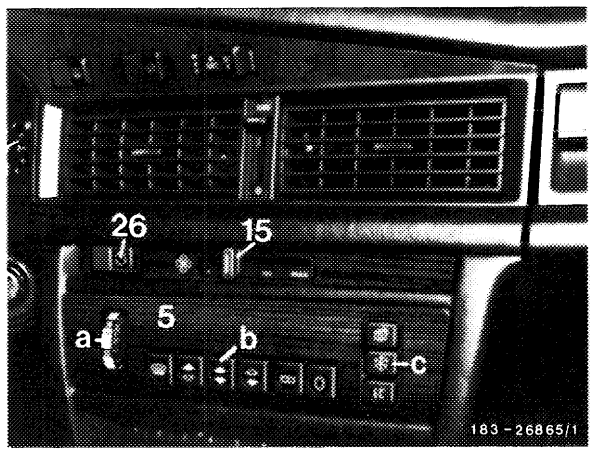
The blower switch and the temperature wheel are bypassed (inoperative) and the recirculating pump runs continuously. The windshield is provided with max. heated air depending on motor temperature. The air feed to center and side outlets can be set manually using the levers. The center outlets should be closed.

The functions of the air conditioning mode switch are bypassed (cancelled) and the air conditioning system operates at max. capacity similar to adjustment , provided the outside temperature is above 0 °C. To guarantee perfect function of “defrost”, the fresh air/recirculating air switch should always be set to fresh air.



Function (pushbutton) selection

The blower runs in the stage to which the blower switch has been set, but at least in 1 st stage. The blower stages can be changed by the blower switch. The heating or cooling capacity is controlled in accordance with nominal value adjustment on the temperature wheel in combination with the mode switch of the air conditioning system (c). If the air conditioning has been switched on, with the switch for fresh air/recirculating air (26) set to fresh air and the temperature difference (preset temperature on temperature wheel in relation to outside temperature) is greater than 8 °C, the system will automatically switch to recirculating air.



The recirculating air mode is also influenced by the interior temperature. From interior temperatures of 25 °C to 50 °C the temperature difference is constantly reduced toward 0 °C. If the temperature difference (outside temperature drops) reduces to approx. 5 °C, the system is again switching to fresh air.

With the heater valve opened, the recirculating pump runs continuously in heating mode.

All the air flow is directed to the windshield. Air flow to center and side outlets can be adjusted manually using the respective levers.

Pushbutton selection

Similar to pushbutton selection except for air distribution, defroster nozzle flaps and legroom flaps opened.

Pushbutton selection

Similar to pushbutton selection except for air distribution, leak air from defroster nozzles, legroom flaps fully opened.

Pushbutton selection

Similar to pushbutton selection except for air distribution. Air out of center and side outlets only. Center and side outlets must be opened manually.

Pushbutton selection

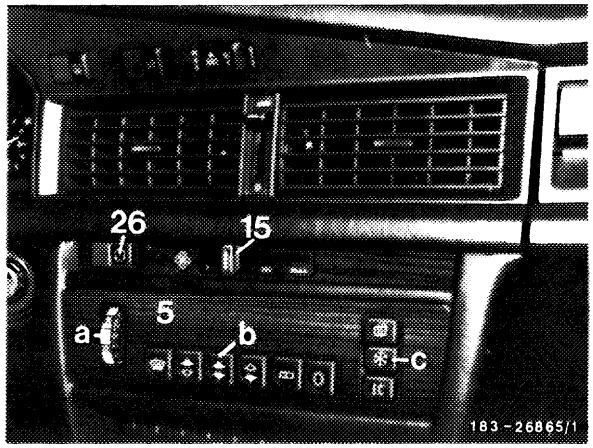
Blower is switched off and the fresh air/recirculating air flap is closed.

Recirculating pump is not running. Temperature control continues operating and the heater valve is opened or closed as required. Air conditioning is switched off.

Note: If none of the selection pushbuttons is depressed, this function conforms to selection .

Air conditioning mode switch (c) with pushbutton selection

Functioning of the air conditioning mode switch requires engagement of one of the selections on the pushbutton switch unit:



Pushbutton selection

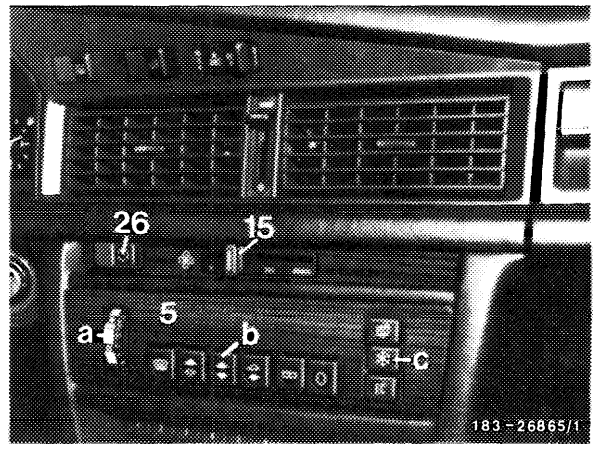
This selection dehumidifies the fresh air, while also dehumidifying the vehicle's interior air.

The refrigerant compressor is constantly switched on and the evaporator temperature is constantly regulated to 0 °C — i-2 °C.

If necessary, the temperature set on the temperature wheel is achieved by additional heating.

Pushbutton selection (normal adjustment)

With this mode selection the refrigerant compressor is also engaged as necessary. During the heating operation and as long as no cooling is required, the system operates (refrigerant compressor off) similar to mode selection . But if the temperature in the vehicle increases by approx. 0.8 °C above nominal value (wheel value), the compressor begins to operate. The air conditioning output is then regulated according to deviation between nominal/actual value.



An additional requirement for engagement of the refrigerant compressor is that the blend air flaps and the heater valve are closed. The outside temperature should also be > 0 °C.

Pushbutton selection (economy)

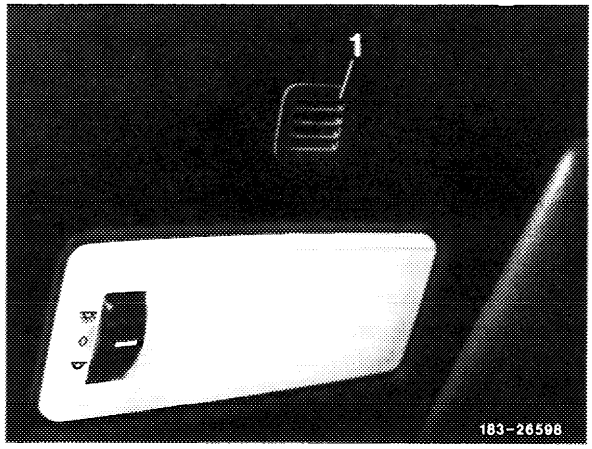
In this position, the refrigerant compressor is switched off and the system operates with 100 % fresh air. If the temperature in the vehicle rises above the value set on the temperature wheel, unheated outside air will be routed into the vehicle.

Note: If none of the air conditioning mode buttons is depressed, it will correspond with selection .

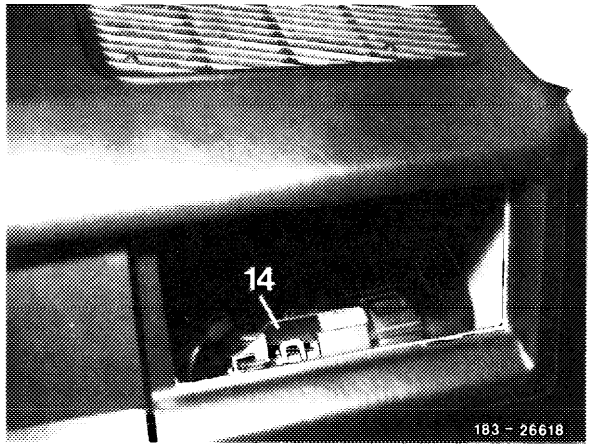
D. Temperature sensor and feedback potentiometer for flap position

In-car temperature sensor

The in-car temperature **sensor** (1) is **located** in roof frame lining, in range of interior lamp.
The resistance of current flow through the in-car temperature sensor is influenced by the temperature of the passenger compartment and fed into the electronic system of the pushbutton switch unit.



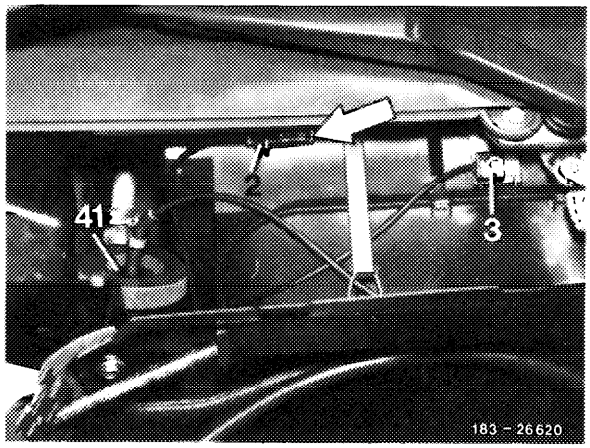
An aspirator blower (14), which is connected to the sensor by a hose and runs with the ignition switched on, provides continuous air flow past the in-car temperature sensor. This increases the accuracy of temperature control inside vehicle.



Location of aspirator blower (14) for In-car temperature sensor

Ambient sensor and temperature sensor for air conditioning

The ambient sensor (2) is located on the top of the evaporator housing. The sensor transmits its resistance value under influence of outside temperature into the electronic system of pushbutton switch unit.
The temperature sensor air conditioning system (3) is located in evaporator housing. It senses the evaporator rib temperature and transmits its resistance into the electronic system of the pushbutton switch unit.



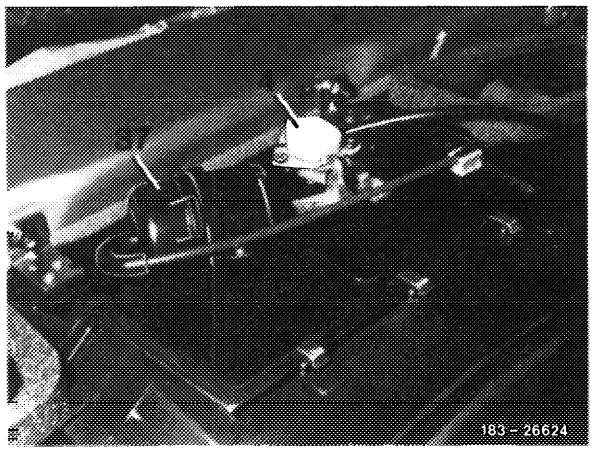
Location of ambient sensor (2) and temperature sensor air conditioning (3)

Note: These temperature sensors have a negative temperature coefficient (NTC) of resistance, allowing the sensor resistance to decrease with increasing temperature. For testing of temperature sensor refer to (83–039).

Feedback potentiometer for flap position

The feedback potentiometer for flap position (4) is located on top of heater box. It is actuated by the vacuum element (37) together with the blend air flap (refer to function of temperature control).

The quality of the temperature control depends on the adjustment of the feedback potentiometer for flap control, particularly during the cooling mode. For testing and adjusting refer to (83–039).

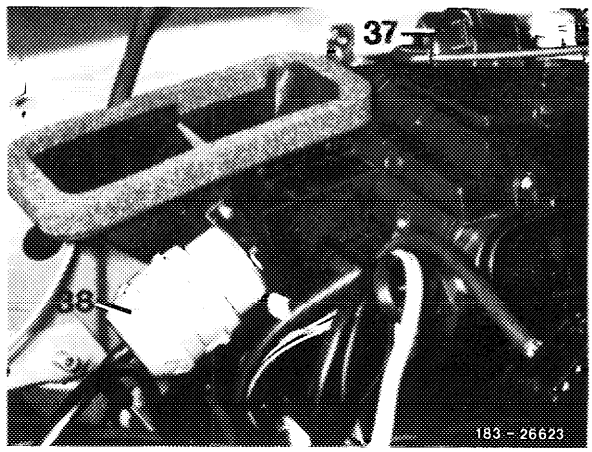


Location of feedback potentiometer for flap position (4)

E. Vacuum elements and switchover valves

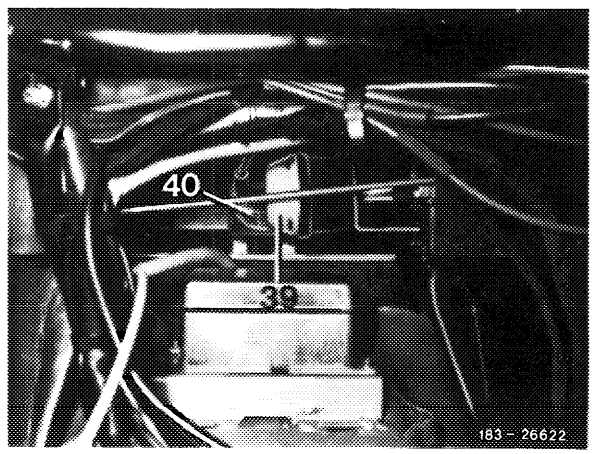
There are 3 vacuum elements on the heater box, of which 2 vacuum elements (38 and 39) actuate the air flaps at top and bottom and 1 vacuum element (37) actuates the blend air flaps.

Without vacuum of vacuum elements (37 and 38) the defroster nozzle flaps are opened and the blend air flaps are in position “full heating”.



Location of vacuum elements for blend air flaps (37) and defroster nozzle flaps (38)

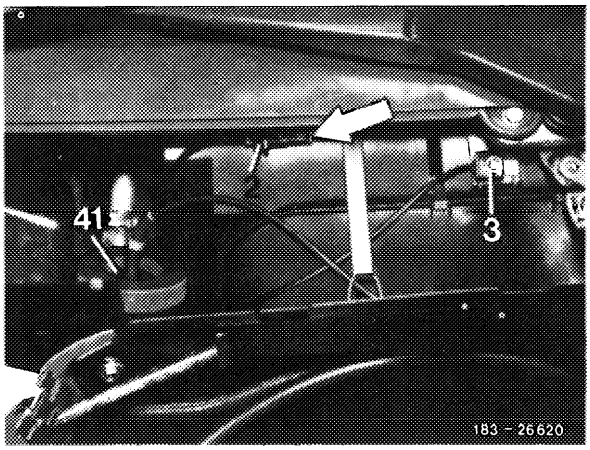
Without vacuum to vacuum elements (39 and 40) the legroom flaps are closed and the fresh air/ recirculating air flap is in the fresh air mode position.



Location of vacuum element for legroom flaps (39) and fresh air/recirculating air flap (40)

The vacuum element (41) with heater valve is located below the air intake grille next to the evaporator housing. The heater valve is actuated by the vacuum element (4 1).

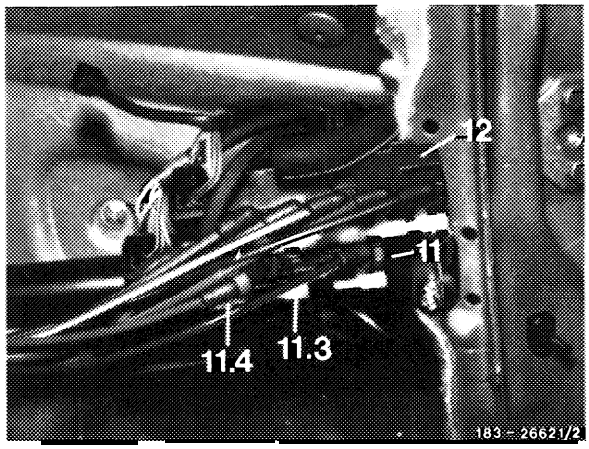
With vacuum applied, the heater valve is “closed”; without vacuum the heater valve is “opened” (refer to vacuum diagram 83-028, section B).



Location of vacuum element (41) with heater valve

Switchover valves

The switchover valves for the vacuum elements, comprising 2 units, switchover valve strip (1 1) 4 connections and switchover valve strip (12) 5 connections, are located one above the other under instrument panel, right.



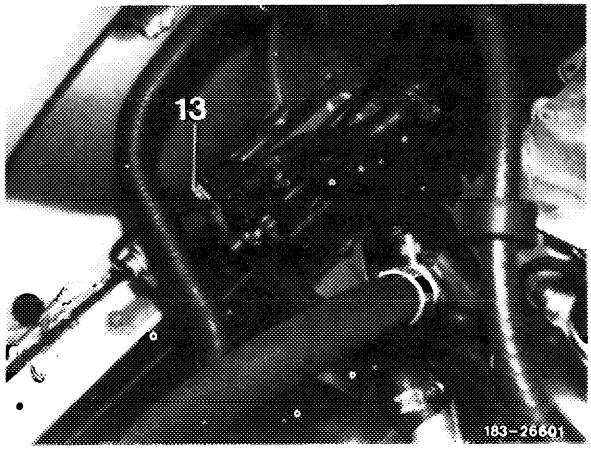
Location of switchover valves

11 Switchover valve strip, 4 connections
12 Switchover valve strip, 5 connections

F. Recirculating pump for hot water

The recirculating pump is located in the return flow of heating water circuit and is running continuously along in heating mode.

As soon as no more heat is required, i.e. when the blend air flaps and the heater valve are closed, the electronic system in pushbutton unit disconnects the recirculating pump. The recirculating pump is also disconnected during pushbutton (mode) selection 8 .

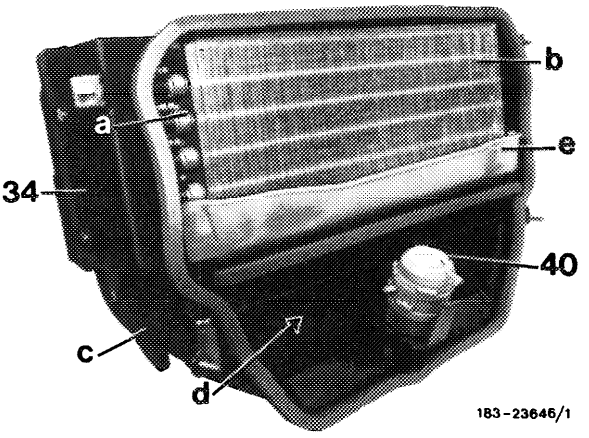


Location of recirculating pump (13)

G. Evaporator housing with evaporator and fresh air/recirculating air flap

The 6-row evaporator with 6 inlets and its housing is located in component compartment, between front wall and bulkhead.

34 Evaporator housing
a Evaporator tube
b Fins
c Condensate water drain hose left (right side mirror image)
d Fresh air/recirculating air flap
e Condensate water tray
40 2-stage vacuum element



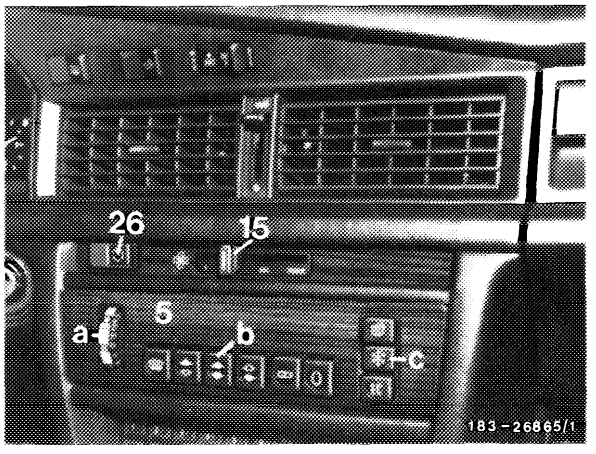
The fresh air/recirculating air flap (d) and the 2-stage vacuum element (40) for the fresh air/recirculating air flap are located on the evaporator housing,

The evaporator tubes and the fins are made of aluminum (a).

H. Blower switch and blower motor

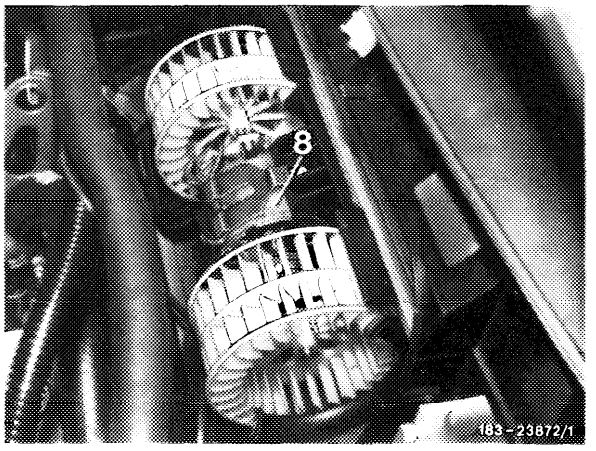
The blower motor is controlled by the 4-speed blower switch. If the speed control lever is against the lefthand stop, the blower motor runs in 1st speed, when one of the pushbuttons is pressed:

The blower can only be switched off with button 0



Location of blower switch (15)

A radial blower with two fan wheels (four-flow) and 123 mm fan diameter is used as blower motor. The power input in 4th blower stage and 13 V battery voltage amounts to approx. 21 amps.

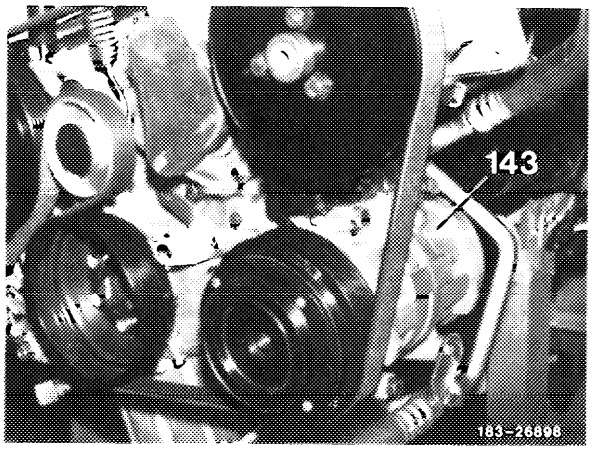


Location of blower motor (8)

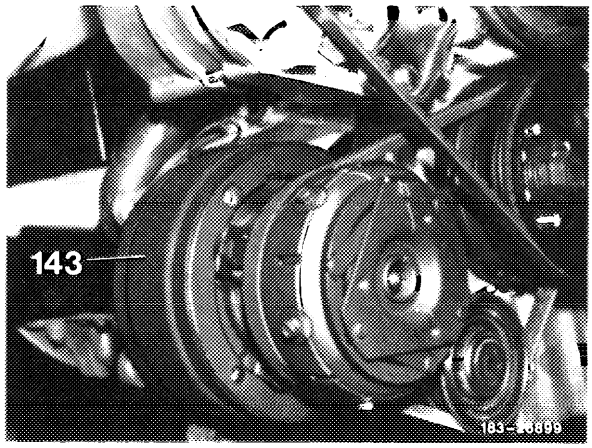
J. Refrigerant (air conditioning) compressor

The diesel engine has a swash plate refrigerant compressor, made by Nippondenso.

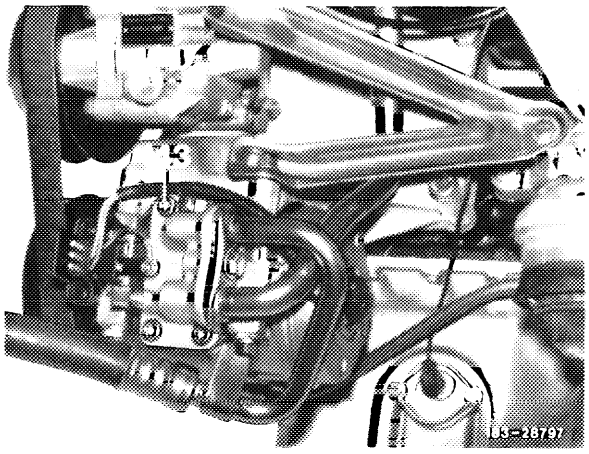
Vehicles with gasoline engine up to model year 84 have a Delco R 4 refrigerant compressor and starting model year 85 the Nippondenso compressor. The filling capacity of air conditioning system is 1 .1 kg refrigerant R 12 on both models.



Location of refrigerant compressor (143) Nippondenso on engine 601



Location of refrigerant compressor (143) Delco R 4 on engine 102 up to model year 84



Location of refrigerant compressor (143) Nippondenso on engine 102 starting model year 85

K. Function and components of compressor cutout

General information

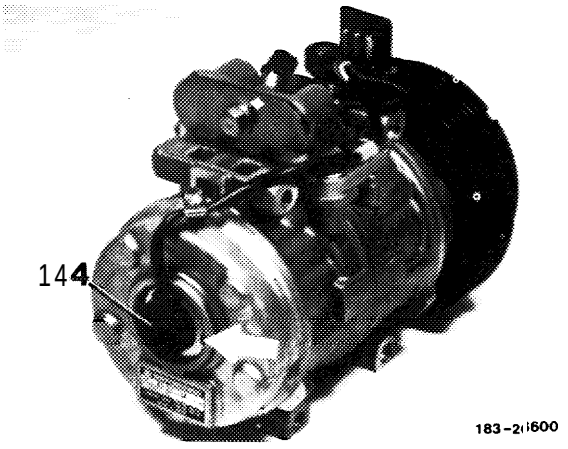
On engine **601** starting model year 84 and on engine 102 starting model year 85 the accessories and therefore the refrigerant compressor are driven by one common V-belt. To ensure continued operation of the accessories in case of a jammed refrigerant compressor the compressor's electromagnetic clutch is switched off by a control unit.

Components of compressor cutout

1. Rpm sensor
2. Control unit
3. Microswitch
   (on vehicles with automatic transmission only)

1. Rpm sensor

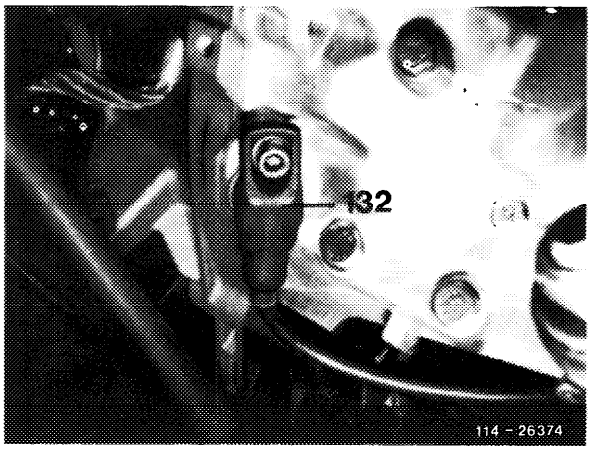
The rpm sensors are measuring the rpm of the engine and the refrigerant compressor. They consist of a magnetic core and a coil. When the ring gear or shaft of refrigerant compressor rotates, an alternating voltage is induced in coils of rpm sensor, which is used as an input signal to the control unit.



Location of rpm sensor for refrigerant compressor (144)

The alternating voltage and thereby the frequency increases or decreases depending on rpm.

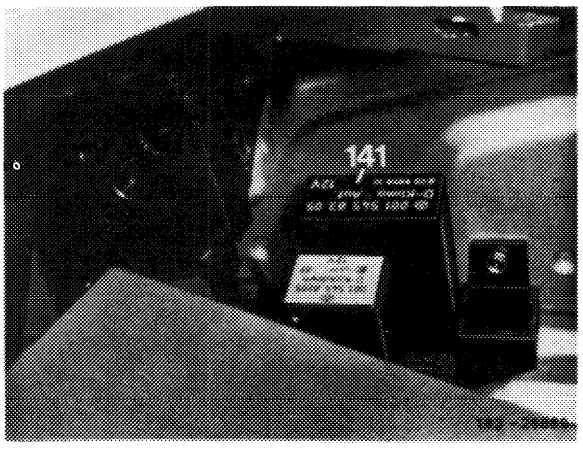
Note: The engine speed of model 201.024 is picked up from terminal TD on line connector of diagnosis plug.



Location of rpm sensor engine 601 on ring gear of flywheel (132)

2. Control unit for compressor cutout

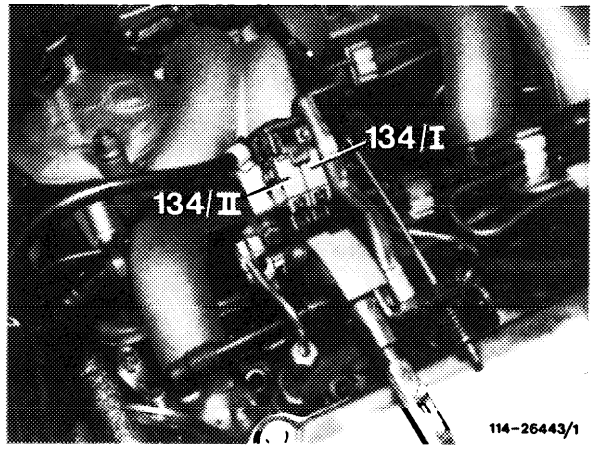
The control unit compares the two speeds (rpm) of engine and refrigerant compressor and will cut out the refrigerant compressor at a difference in speed of approx. 30 %.



Location of control unit for compressor cutout (141)

3. Microswitch on model 201.122 with automatic transmission only

At engine speeds between 1050 and 2150 rpm (/min) with full load, the compressor is cut out by the microswitch via control unit (141) for improved moving-off conditions (improved low engine speed performance).

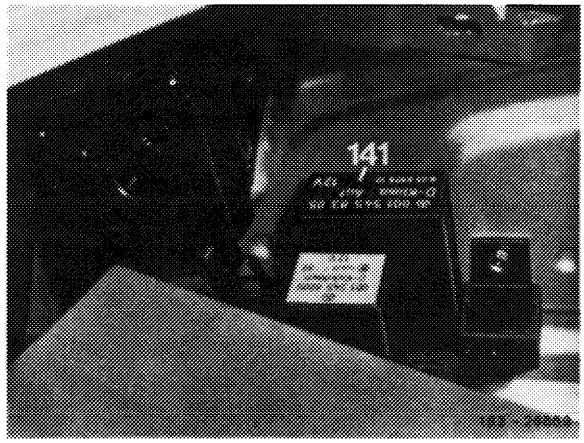


Location of microswitch (134/I) only connected on vehicles with automatic transmission

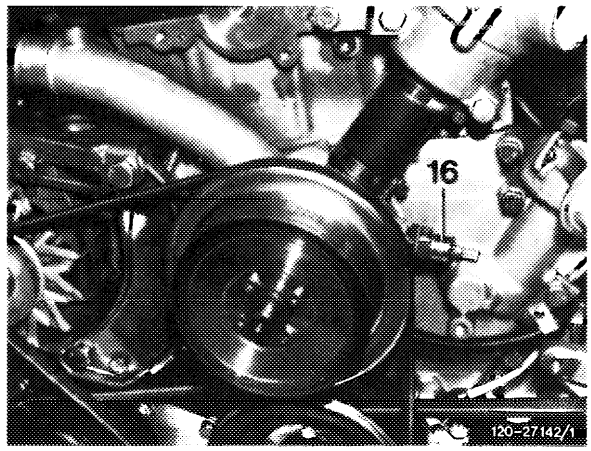
Functional description of compressor cutout

If the ignition and the air conditioning are switched on and the engine is not running, the refrigerant compressor remains switched off.

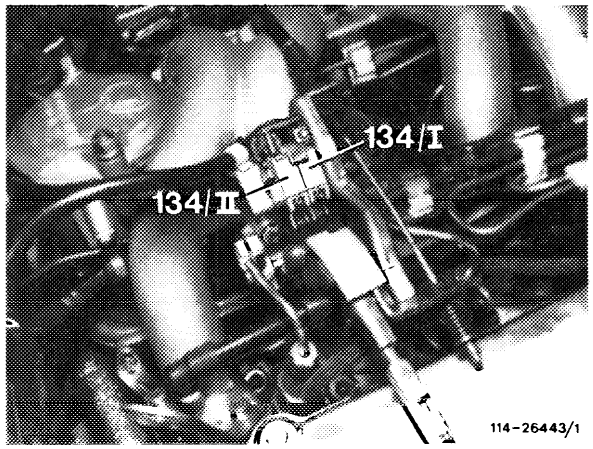
After starting the engine on vehicles up to model year 84 the refrigerant compressor is activated by the control unit (141) as from an engine speed of approx. 500 rpm.
On vehicles as from model year 85 the refrigerant compressor will be activated only after approx. 10 seconds as soon as an engine speed of approx. 600 rpm has been attained (to stabilize the engine speed).
The control unit compares the two speeds of the ring gear and the refrigerant compressor 2 seconds after the compressor comes on (to compensate for clutch slippage during cut-in). If there is an rpm difference of more than 30 % as soon as the compressor comes on, this condition is checked for a period of 200 milliseconds. If the rpm difference equalizes within 200 milliseconds, the compressor remains engaged. If the rpm difference remains (i.e. due to a jammed compressor) the control unit will immediately cut out the compressor. This process is again repeated when the ignition is switched off and the engine is restarted.



To prevent thermic overloading of engine 102, the refrigerant compressor is switched off at approx. 110 °C coolant temperature by temperature switch (23), by switching to ground, via control unit (141). The temperature switch opens at approx. 103 °C and the refrigerant compressor is again on.

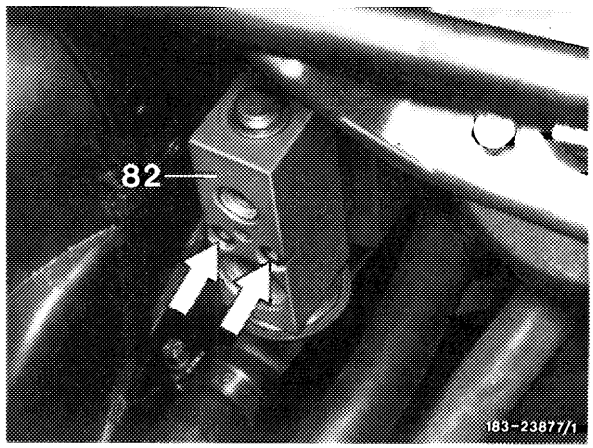


On model 201 .122 with automatic transmission the refrigerant compressor is switched off at full load at approx. 1050 rpm engine speed. After attaining an engine speed of approx. 2 150 rpm the refrigerant compressor is again switched on. If the accelerator pedal is released before an engine speed of 2150 rpm is attained, the control unit will immediately connect the refrigerant compressor. This will improve moving-off conditions of vehicle.



L. Expansion valve and lines

The expansion valve is similar to the block valve used on models 123 and 126, with a cooling capacity of 6.9 kW (6000 kcal/h).

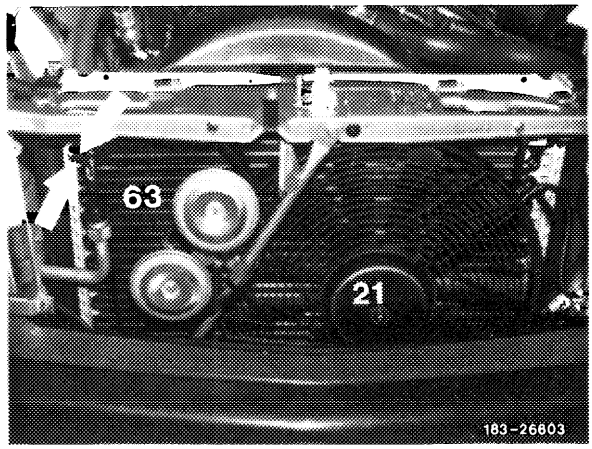


Location of expansion valve (82) on evaporator housing

M. Condenser, auxiliary fan and receiver drier

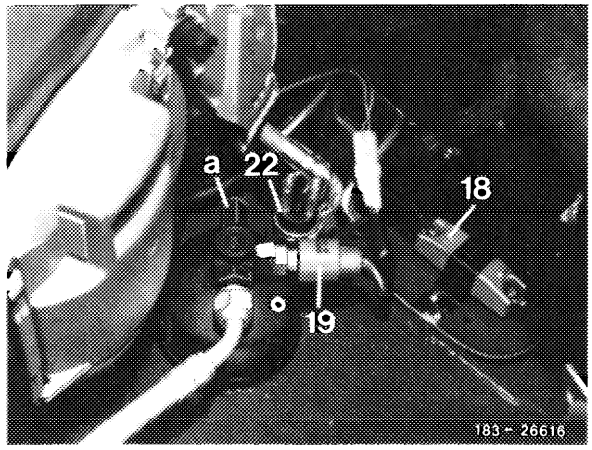
The condenser (63) is attached to a rubber mount on radiator supporting frame. On model 201 .122 it has a block depth of 22 and on model 201.024 of 26 mm. Its tubes having a diameter of 8 mm are made of aluminum. The condenser has a dual flow system, i.e. the refrigerant vapor flows through two parallel lines (arrows).

All models with air conditioning system have an electric auxiliary fan.



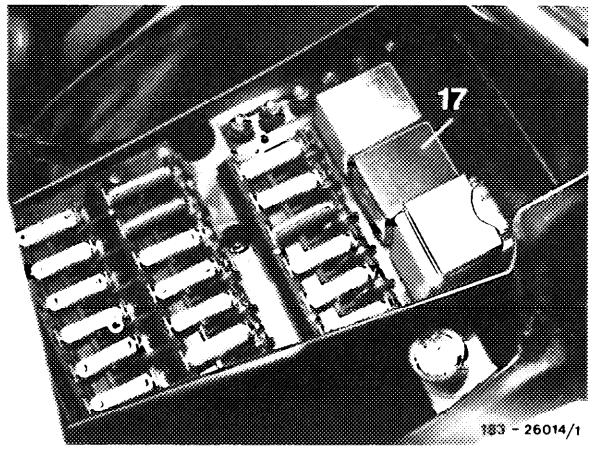
Location of condenser (63) and auxiliary fan (21)

The auxiliary fan is activated for one by the pressure switch (19) in receiver drier, via relay (17) and via pre-resistor (18). In parallel with pressure switch, the auxiliary fan is directly activated by the temperature switch 100 °C (16) on engine via relay (20).

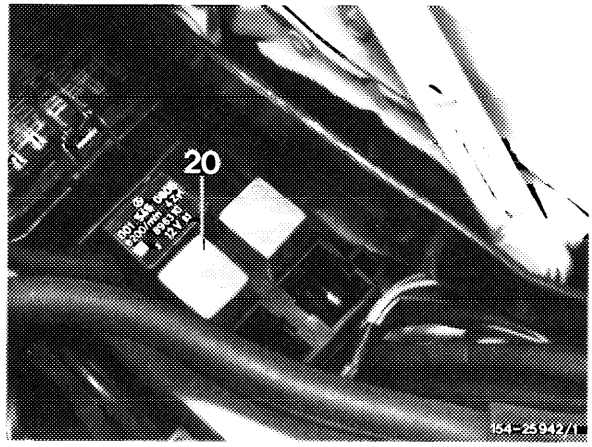


Location of receiver drier and pre-resistor (18) for auxiliary fan

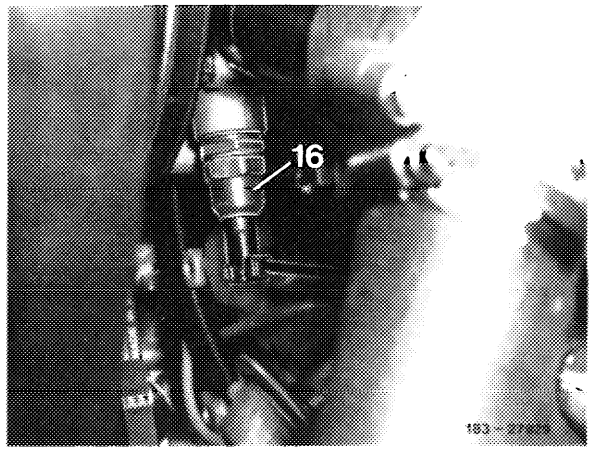
19 Pressure switch for auxiliary fan
22 Pressure switch, refrigerant compressor
a Vacuum valve



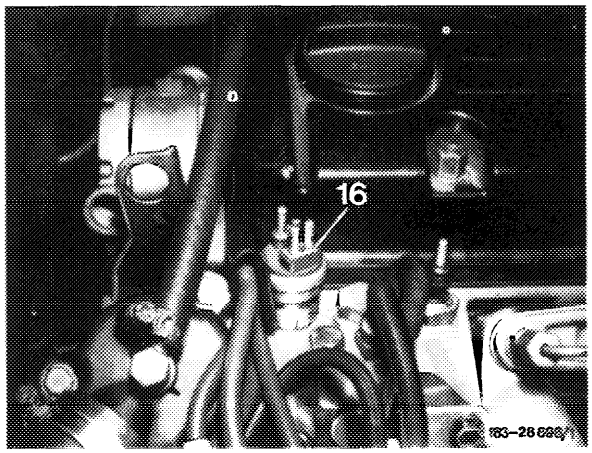
Location of relay (17) for auxiliary fan via pre-resistor (18)



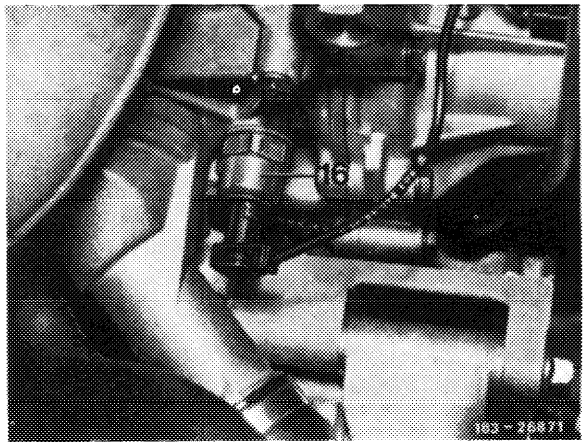
Location of relay (20) for auxiliary fan



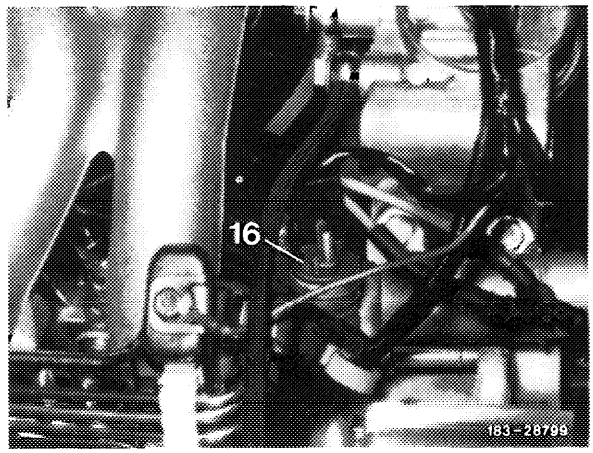
Location of temperature switch 100 °C (16) for auxiliary fan on engine 102 up to model year 84



Location of temperature switch (16) 100 °C for electromagnetic clutch engine fan and 110 °C for auxiliary fan on engine 102 starting model year 85

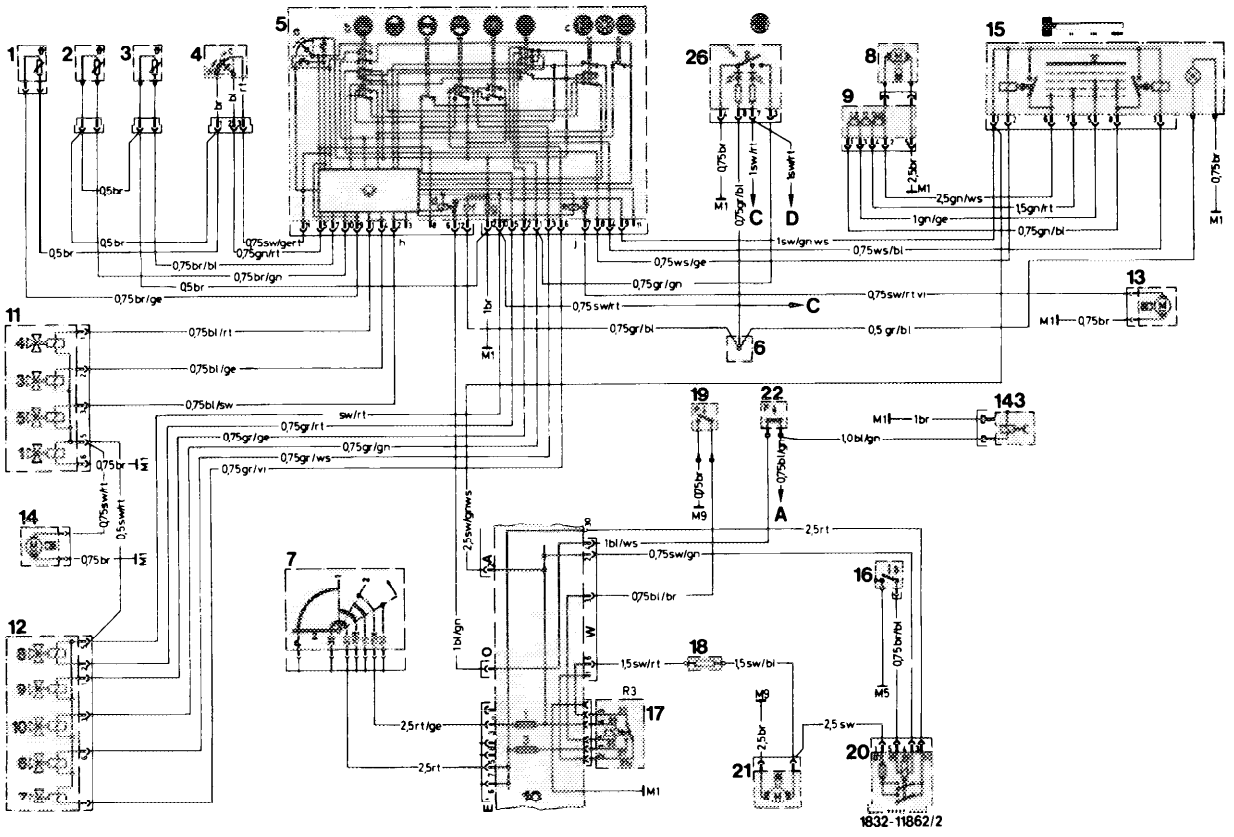


Location of temperature switch 100 °C (16) for auxiliary fan on engine 601 up to model year 84



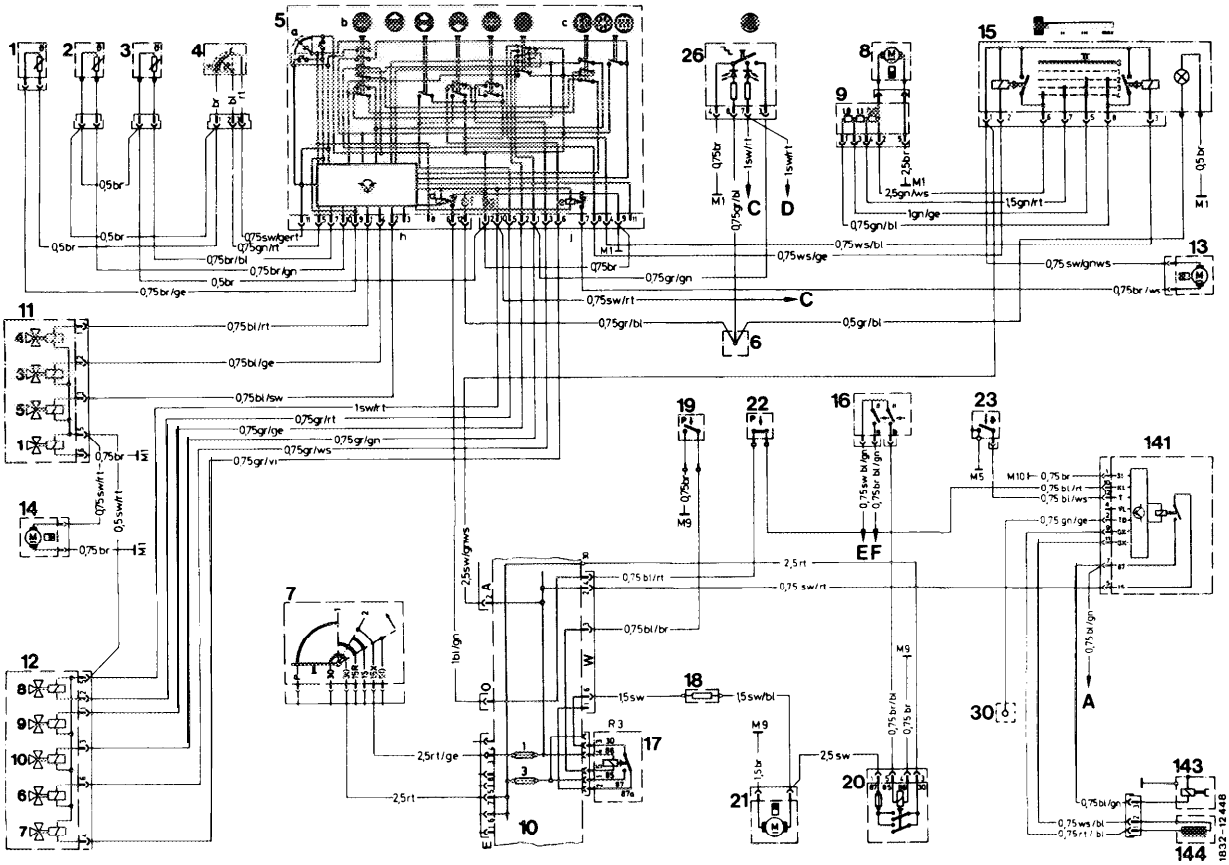
Location of temperature switch (16) 100 °C for electromagnetic clutch engine fan and 110 °C for auxiliary fan on engine 601 starting model year 85

A. Wiring diagrams



Tempmatic control system, model 201.024 up to model year 84

1 In-car temperature sensor
2 Ambient sensor, outside air temperature
3 Temperature sensor, air conditioning
4 Feedback potentiometer for flap position
5 Pushbutton switch unit, consisting of:
a Temperature wheel
b Pushbutton switch unit
c Mode switches for air conditioning
Air conditioning on, controlled via temperature sensor (3) to 0 °C evaporator temperature
Air conditioning controlled via pushbutton switch unit (electronic system)
Air conditioning off
d Relay for refrigerant compressor
e Relay for recirculating pump
f Lights
g Fuse: 2 amps
h 12-pin connector at left side of pushbutton switch unit
i 12-pin connector, at right side of pushbutton switch unit
6 Connector terminal 58d
7 Starter switch
8 Blower motor
9 Pre-resistor, blower motor
10 Electrical center with fuses
Fuse 1 = 16 A
Fuse 3 = 16 A
11 Switchover valve unit,4 connections
11.4 Switchover valve for blend air flaps ("cold")
11.3 Switchover valve for blend air flaps ("warm")
11.5 Switchover valve for heater valve ("closed")
11.1 Switchover valve for heater valve ("open")
12 Switchover valve unit, 5 connections
12.8 Switchover valve for legroom flaps
12.9 Switchovervalve for fresh air/ recirculating air flap (small stroke)
12.10 Switchover valve for fresh air/ recirculating air flap (large stroke)
12.6 Switchover valve for defroster nozzle valves (small stroke)
12.7 Switchover valve for defroster nozzle flaps (large stroke)
13 Recirculating pump
14 Aspirator blower for in-car temoerature sensor
15 Blower switch
16 Temperature switch 100 °C for auxiliary fan
17 Relay auxiliary fan pre-resistor
18 Pre-resistor auxiliary fan
19 Pressure switch auxiliary fan On 20 bar/Off 15 bar
20 Relay auxiliary fan
21 Auxiliary fan
22 Pressure switch refrigerant compressor On 2.6 bar/Off 2.0 bar
26 Switch, fresh air/recirculating air
143 Electromagnetic clutch Refrigerant compressor
A To electronic control unit (CIS-E) terminal 19
C To hazard warning switch (connection terminal 15)
D From seat belt indicator, terminal 8 (connection terminal 15)
M1 Common ground (behind instrument cluster)
M5 Ground connection, engine (unit screwed into engine)
M9 Ground connection, front left (near headlight)
M10 Ground connection, battery



Tempmatic control system, model 201.024 starting model year 85

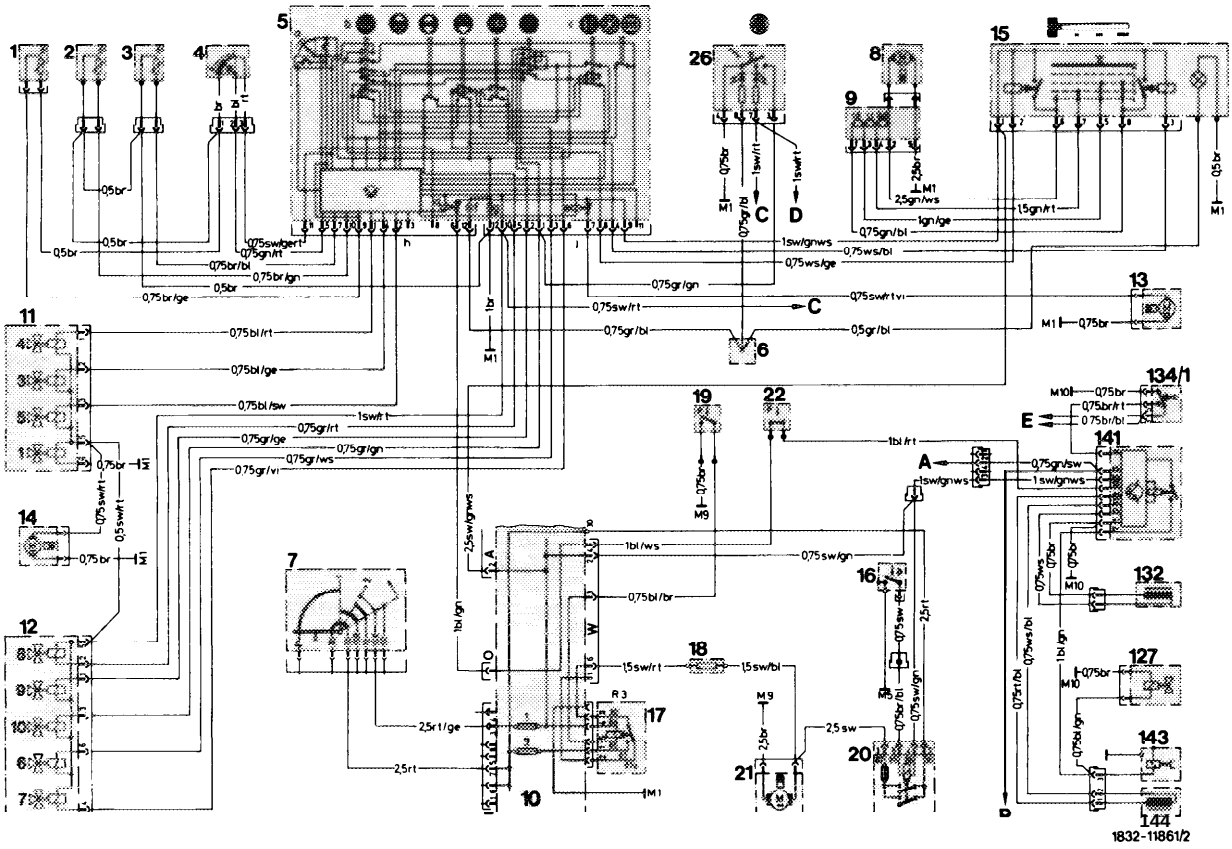
1 In-car temperature sensor
2 Ambient sensor, outside air temperature
3 Temperature sensor, air conditioning
4 Feedback potentiometer for flap position
5 Pushbutton switch unit, consisting of:
- a Temperature wheel
- b Pushbutton switch unit
- c Mode switches for air conditioning
  - Air conditioning on, controlled via temperature sensor (3) to 0 °C evaporator temperature
  - Air conditioning controlled via pushbutton switch unit (electronic system)
  - Air conditioning off
- d Relay for refrigerant compressor
- e Relay for recirculating pump
- f Lights
- g Fuse: 2 amps
- h 12-pin connector at left side of pushbutton switch unit
- i 12-pin connector, at right side of pushbutton switch unit

6 Connector terminal 58d
7 Starter switch
8 Blower motor
9 Pre-resistor, blower motor
10 Electrical center with fuses
Fuse 1 = 16 A
Fuse 3 = 16 A
11 Switchover valve unit,4 connections
- 11.4 Switchover valve for blend air flaps (“cold”)
- 11.3 Switchover valve for blend air flaps (“warm”)
- 11.5 Switchover valve for heater valve (“closed”)
- 11.1 Switchover valve for heater valve (“open”)

12 Switchover valve unit, 5 connections
- 12.8 Switchover valve for legroom flaps
- 12.9 Switchover valve for fresh air/ recirculating air flap (small stroke)
- 12.10 Switchover valve for fresh air/ recirculating air flap (large stroke)
- 12.6 Switchover valve for defroster nozzle valves (small stroke)
- 12.7 Switchover valve for defroster nozzle flaps (large stroke)

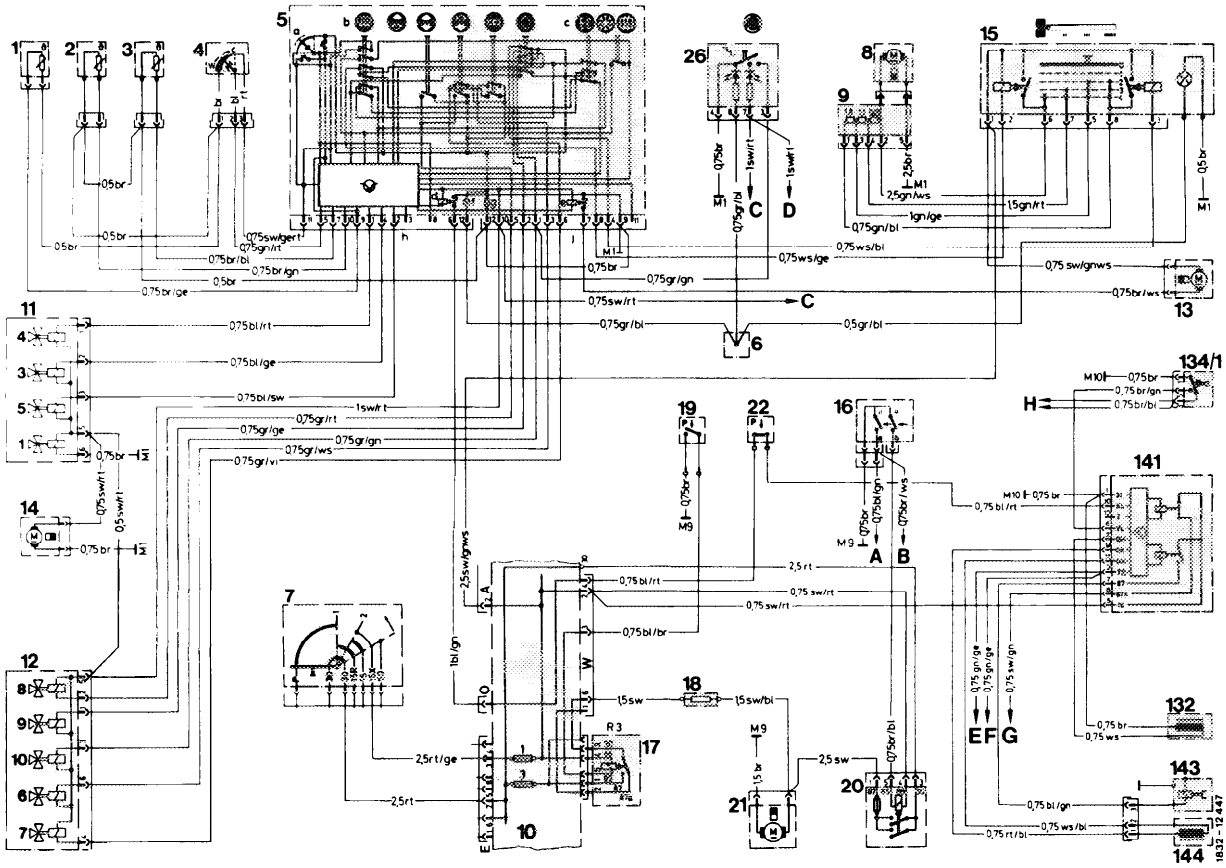
13 Recirculating pump
14 Aspirator blower for in-car temperature sensor
15 Blower motor
16 Temperature switch
- a 100 °C for electromagnetic clutch, engine fan
- b 110 °C for auxiliary fan

17 Relay auxiliary fan pre-resistor
18 Pre-resistor auxiliary fan
19 Pressure switch auxiliary fan
On 20 bar/Off 15 bar
20 Relay auxiliary fan
21 Auxiliary fan
22 Pressure switch refrigerant compressor
On 2.6 bar/Off 2.0 bar
23 Temperature switch 110 °C for compressor cutout
26 Switch, fresh air/recirculating air
30 Socket (diagnosis) with line connector TD
141 Control unit compressor cutout
143 Electromagnetic clutch Refrigerant compressor
144 Rpm sensor, refrigerant compressor
A To electronic control unit (CIS-E) terminal 19
C To hazard warning switch (connection terminal 15)
D From seat belt indicator, terminal 8 (connection terminal 15)
E To electrically heated windshield washer nozzle (terminal 15)
F To electromagnetic clutch engine fan
M1 Common ground (behind instrument cluster)
M5 Ground connection, engine (unit screwed into engine)
M9 Ground connection, front left (near headlight)
M10 Ground connection, battery



Tempmatic control system, model 201 ,122 up to model year 84

1 In-car temperature sensor
2 Ambient sensor, outside air temperature
3 Temperature sensor, air conditioning
4 Feedback potentiometer for flap position
5 Pushbutton switch unit, consisting of:
a Temperature wheel
b Pushbutton switch unit
c Mode switches for air conditioning
Air conditioning on, controlled via temperature sensor (3) to 0 °C evaporator temperature
Air conditioning controlled via pushbutton switch unit (electronic system)
Air conditioning off
d Relay for refrigerant compressor
e Relay for recirculating pump
f Lights
g Fuse: 2amps
h 12-pin connector at left side of pushbutton switch unit
i 12-pin connector, at right side of pushbutton switch unit
6 Connector terminal 58d
7 Preglow start switch
8 Blower motor
9 Pre-resistor, blower motor
10 Electrical center with fuses
Fuse 1 = 16 A
Fuse 3 = 16 A
11 Switchover valve unit,4 connections
11.4 Switchover valve for blend air flaps ("cold")
11.3 Switchover valve for blend air flaps ("warm")
11.5 Switchover valve for heater valve ("closed")
11.1 Switchover valve for heater valve ("open")
12 Switchover valve unit, 5 connections
12.8 Switchover valve for legroom flaps
12.9 Switchover valve for fresh air/ recirculating air flap (small stroke)
12.10 Switchover valve for fresh air/ recirculating air flap (large stroke)
12.6 Switchover valve for defroster nozzle valves (small stroke)
12.7 Switchover valve for defroster nozzle flaps (large stroke)
13 Recirculating pump
14 Aspirator blower for in-car temperature sensor
15 Blower motor
16 Temperature switch 100 °C for auxiliary fan
17 Relay auxiliary fan pre-resistor
18 Pre-resistor auxiliary fan
19 Pressure switch auxiliary fan
On 20 bar/Off 15 bar
20 Relay auxiliary fan
21 Auxiliary fan
22 Pressure switch refrigerant compressor
On 2.6 bar/Off 2.0 bar
26 Switch, fresh air/recirculating air
127 Switchover valve rpm stabilization (with automatic transmission only)
132 Rpm sensor ring gear for flywheel
134/1 Microswitch for compressor cutout at full load (connected only on vehicles with automatic transmission)
141 Control unit compressor cutout
143 Electromagnetic clutch Refrigerant compressor
144 Rpm sensor, refrigerant compressor
A To 4-pin plug connection, interior
B To relay kickdown limit, terminal 2
C To hazard warning switch (connection terminal 15)
D From seat belt indicator, terminal 8 (connection terminal 15)
E To switchover valves for EGR (California only)
M1 Main ground (behind instrument cluster)
M5 Ground connection, engine (unit screwed into engine)
M9 Ground connection, front left (near headlight)
M10 Ground connection, battery



Tempmatic control system, model 201 ,122 starting model year 85

1 in-car temperature sensor
2 Ambient sensor, outside air temperature
3 Temperature sensor, air conditioning
4 Feedback potentiometer for flap position
5 Pushbutton switch unit, consisting of:
- a Temperature wheel
- b Pushbutton switch unit
- c Mode switches for air conditioning
  - Air conditioning on, controlled via temperature sensor (3) to 0 °C evaporator temperature
  - Air conditioning controlled via pushbutton switch unit (electronic system)
  - Air conditioning off
- d Relay for refrigerant compressor
- e Relay for recirculating pump
- f Lights
- g Fuse: 2amps
- h 12-pin connector at left side of pushbutton switch unit
- i 12-pin connector, at right side of pushbutton switch unit

6 Connector terminal 58d
7 Preglow starter switch
8 Blower motor
9 Pre-resistor, blower motor
10 Electrical center with fuses
Fuse 1 = 16 A
Fuse 3 = 16 A

11 Switchover valve unit,4 connections
- 11.4 Switchover valve for blend air flaps (“cold”)
- 11.3 Switchover valve for blend air flaps (“warm”)
- 11.5 Switchover valve for heater valve (“closed”)
- 11.1 Switchover valve for heater valve (“open”)

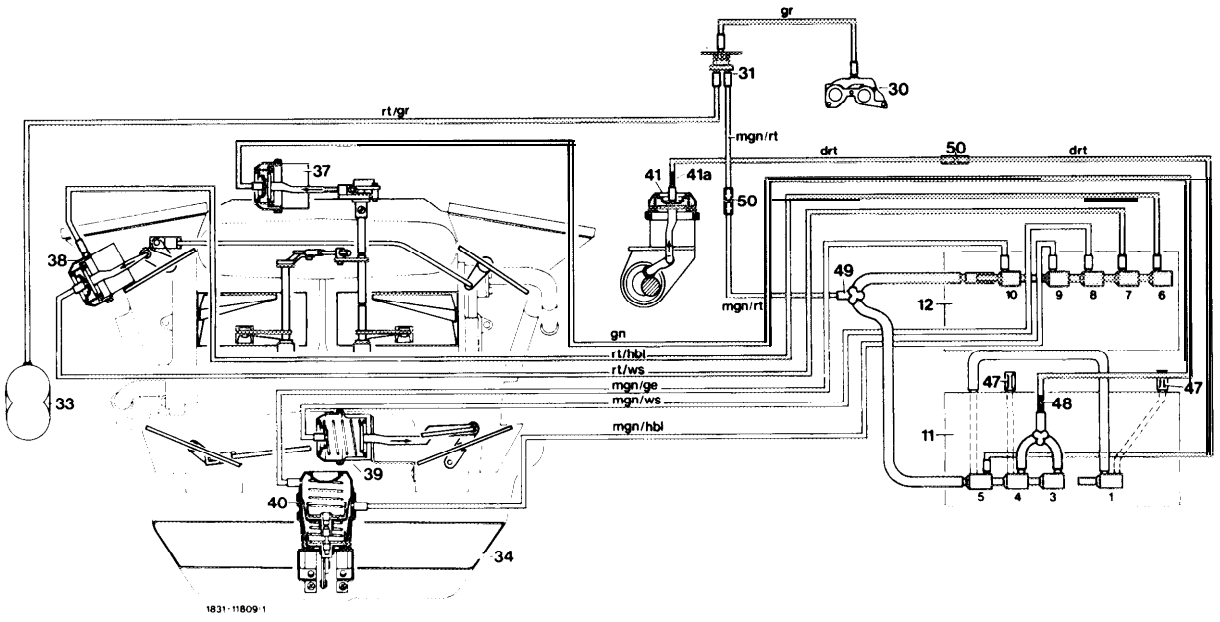
12 Switchover valve unit, 5 connections
- 12.8 Switchover valve for legroom flaps
- 12.9 Switchover valve for fresh air/ recirculating air flap (small stroke)
- 12.10 Switchover valve for fresh air/ recirculating air flap (large stroke)
- 12.6 Switchover valve for defroster nozzle valves (small stroke)
- 12.7 Switchover valve for defroster nozzle flaps (large stroke)

13 Recirculating pump
14 Aspirator blower for in-car temperature sensor
15 Blower motor
16 Temperature switch
- a 100 °C for electromagnetic clutch, engine fan
- b 110 °C for auxiliary fan

17 Relay auxiliary fan pre-resistor
18 Pre-resistor auxiliary fan
19 Pressure switch auxiliary fan
On 20 bar/Off 15 bar
20 Relay auxiliary fan
21 Auxiliary fan

22 Pressure switch refrigerant compressor
On 2.6 bar/Off 2.0 bar
26 Switch, fresh air/recirculating air
132 Rpm sensor ring gear for flywheel
134/1 Microswitch for compressor cutout at full load (connected only on vehicles with automatic transmission)
141 Control unit compressor cutout
143 Electromagnetic clutch Refrigerant compressor
144 Rpm sensor, refrigerant compressor
A To electromagnetic clutch engine fan
B To control unit emission control, terminal 6
C To hazard warning switch (connection terminal 15)
D From seat belt indicator, terminal 8 (connection terminal 15)
E To control unit emission control, terminal 4
F To control unit electronic idle speed control terminal 10
G To kickdown switch
H To switchover valves for EGR
MI Main ground (behind instrument cluster)
M5 Ground connection, engine (unit screwed into engine)
M9 Ground connection, front left (near headlight)
M10 Ground connection, battery

B. Vacuum diagram



Mode selection cooling – fresh air

11 Swrtchover valve unit, 4 connectrons
- 11.5 Swrtchover valve for heater valve (“closed”)
- 11.4 Swrtchover valve for blend air flaps (“cold”)
- 11.3 Swrtchover valve for blend air tlaps (“warm”)
- 11.1 Swrtchover valve for heater valve (“open”)

12 Switchover valve unit, 5 connectrons
- 12.10 Swrtchover valve for fresh air/ recirculating air flap (large stroke)
- 12.9 Swrtchover valve for fresh air/ recirculating air flap (short stroke)
- 12.8 Swrtchover valve for legroom flaps
- 12.7 Swrtchover valve for defroster nozzle flaps (large stroke)
- 12.6 Swrtchover valve for defroster nozzle flaps (short stroke)

30 Vacuum connection on intake manifold
31 Check valve
33 Vacuum reservoir
34 Evaporator housing with fresh air/ recirculating air flap
37 Vacuum element for blend air flaps (“cold”)
38 Vacuum element for defroster outlet flaps (flaps “closed”)
39 Vacuum element for legroom flaps (flaps “closed”)
40 Vacuum element for fresh air/ recirculating air flap (flap “open”)
41 Vacuum element for heater valve (heater valve “closed”)
41a Orifice
47 Closing cap
48 Orifice (vented within 20 seconds)
49 3-point distributor
50 Connecting hose

bl = blue
drt = dark red
ge = yellow
gn = green
gr = grey
hbl = light blue
mgn = middle green
rt = red
ws = white

83-035 Testing refrigerating capacity of air conditioning system (quick test)

Data

Difference between coldest and warmest outlet temperature max. (cutting out/cutting in time of refrigerant compressor)	3 °C
Coldest air outlet temperature out of center nozzle (center outlet)	3.5 °C

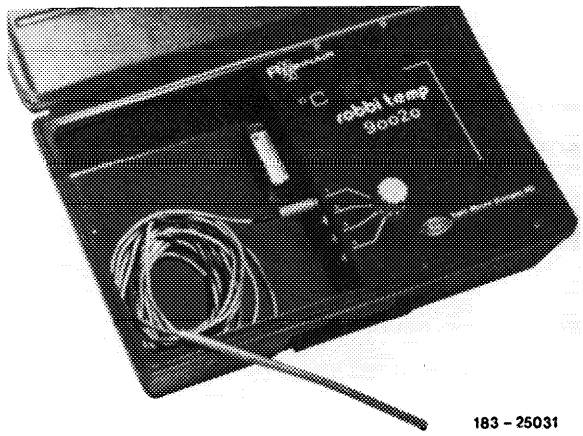
Conventional tools

2 thermometers	-20 °C to + 70 °C

Digital temperature measuring instrument with 4 measuring probes

Robbi temp	90020
Air temperature measuring probe (4.5 m cable length)	90023

Supplier e.g.:
Switzerland: Kent-Moore (Europe) AG
P.O. Box, Cl-l-6340 Baar
Germany: Fa. Kälte-Fischer
Postfach 266, Augsburger Str. 289-291
D-7000 Stuttgart 60

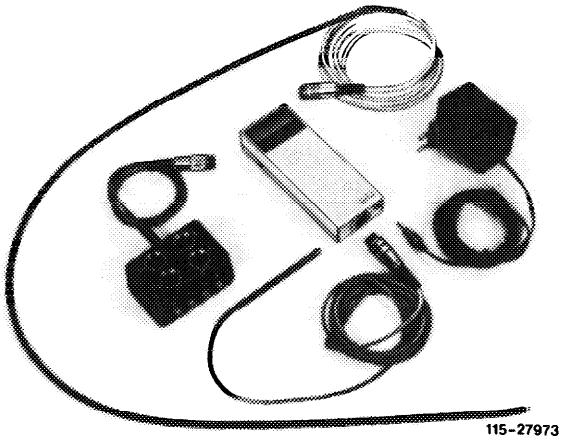


183 - 25031

Digital temperature measuring instrument with 4 measuring probes

Therm	2263-2
Measuring point changeover switch with 4 connections	2235-4
Air temperature measuring probe (3 m cable length)	w 453-5

Supplier e.g.:
Germany: Ahlborn Meß- und Regelungstechnik in der Eichenfeldstraße I-3, D-81 50 Holzkirchen


115-27973

Quick test

For air conditioning systems free of complaints. Test after minor repairs, longer stationary periods or the like.

Test procedure for ambient (interior) temperatures from +20 °C to +40 °C. Check values can be read after approx. 5 minutes.

Test conditions

1 The vehicle should not be in the sunlight during test.

2 Check tension of V-belt for compressor drive.

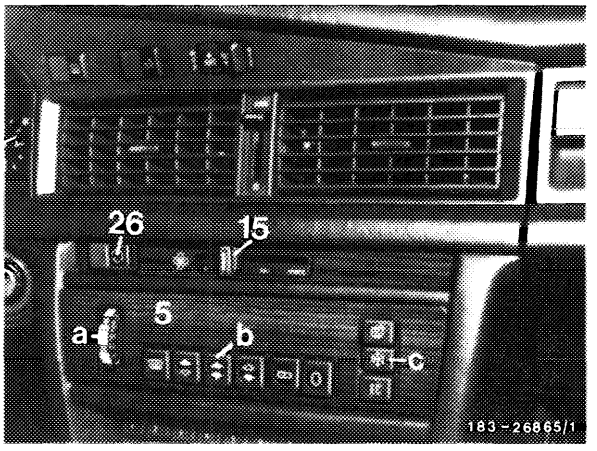
3 Check auxiliary fan for function, while switching on ignition and bypassing the two flat plugs on pressure switch (19), or connecting 1 -pin connector of 100 °C switch to ground. Pay attention to direction of rotation of auxiliary fan (clockwise).

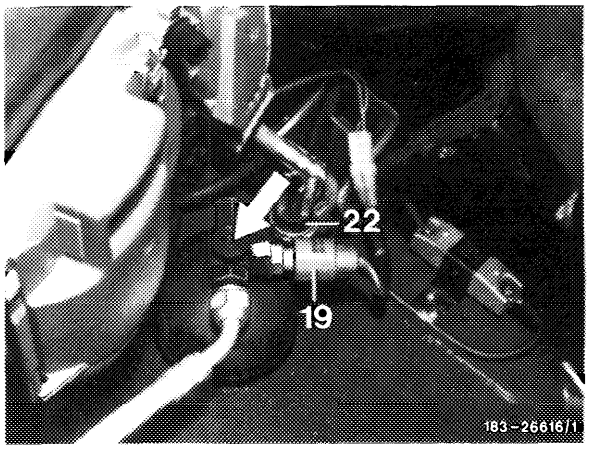
4 Check fluid level in air conditioning system; for this purpose, pull one line from pressure switch (22), run engine at idle (>700/min) and engage air conditioning system by means of function selection ⓜ. Clean sight-glass (arrow) in receiver drier. Watch sight-glass while simultaneously plugging line on pressure switch (22). Refrigerant should rise shortly after switching on electromagnetic clutch and should then flow free of bubbles (i.e. refrigerant no longer visible).

Attention1
In the event of major refrigerant losses or an empty system, the voltage for the refrigerant compressor is interrupted by the pressure switch (22). When the pressure increases to 0.6 bar above the cutout pressure, the circuit is again closed.

5 Check whether the heater shuts off in selector wheel position “MI N”. For this purpose, let engine run at idle and engage air conditioning system with function selection ❄. Set temperature selector wheel (a) to “MIN”. Refrigerant compressor should be on after 20 seconds at the latest.

Note: If the refrigerant compressor is not engaging, bridge lines from pressure switch (22) and check fluid level according to item 4. If the refrigerant compressor is still not engaging, test entire system with socket box and volt-ohmmeter, refer to 83-039. On model 201.024 starting model year 85 and on model 201 .122 there may be an additional fault on compressor cutout, for testing refer to 83-040.





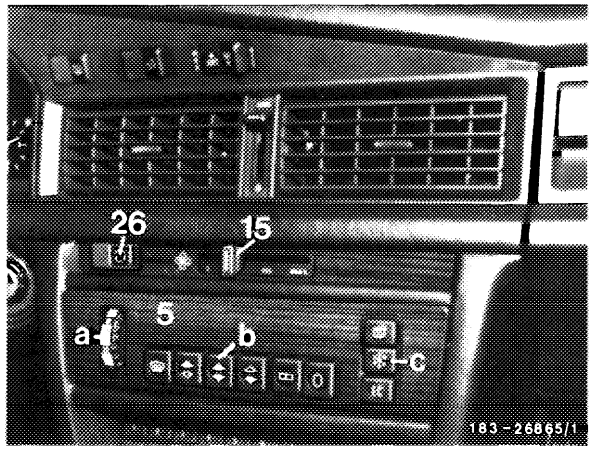
Testing

1 Set temperature selector wheel (a) to 'MIN".

2 Switch on function selection ⊜ of pushbutton switch (b) and function selection ⊜ of switch air conditioning system (c).

3 Set blower switch (15) to 2nd blower stage.

4 Open center and side outlets and switch off switch (26) (fresh air).



5 Insert one thermometer into lefthand or right-hand center outlet (25).

6 Position one thermometer for ambient temperature (room temperature) approx. 2 m from driver's side outside vehicle.

7 Open window and close vehicle doors. Run engine at approx. 2000/min.

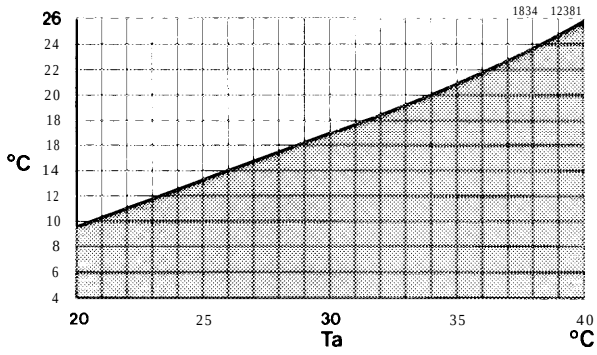


Diagram for model 201.024

Ta = Outside temperature "C

8 After approx. 5 minutes read air outlet temperature at center outlet and outside temperature and compare with data of diagrams.

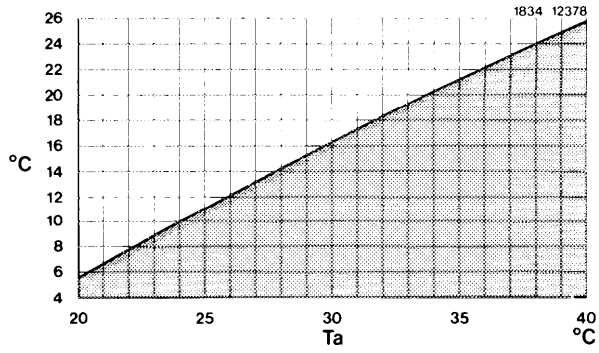


Diagram for model 201 .122

Ta = Outside temperature °C

Attention!

The air outlet temperature on center outlet should not be below +3.5 °C. If the value is less than specified, check temperature sensor of air conditioning system and renew, **if required, refer to 83-I 33 or test electric lines from temperature sensor for air conditioning to pushbutton switch unit for ground short. If there is no remedy, renew pushbutton switch unit.**

83-036 Testing refrigerating capacity and suction/high pressure of air conditioning system

Data

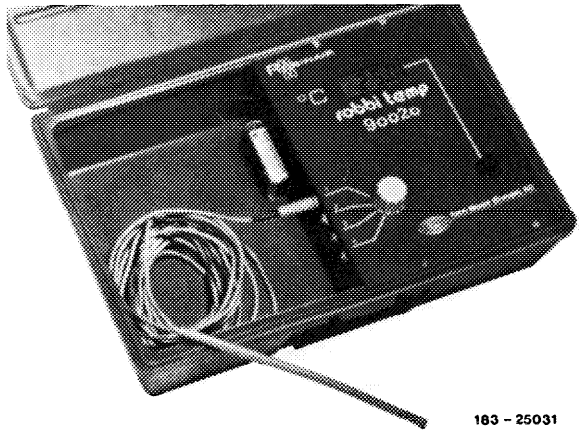
Difference between coldest and warmest outlet temperature max. (cutting out/cutting in time of refrigerant compressor)	3 ° C
Coldest air outlet temperature out of center nozzle (center outlet)	3.5 °C

Conventional tools

1 suction pressure gauge	or assembly tester	1 bar vacuum to 10 bar gauge pressure
1 high pressure gauge		O-40 bar gauge pressure
2 thermometers		**-20 °C to + 70 "c**
1 hygrometer		

Digital temperature measuring instrument with 4 measuring probes
Robbi temp 90020
Air temperature measuring probe 90023
(4.5 m cable length)

Supplier e.g.:
Switzerland: Kent-Moore (Europe) AG
P.O. Box, CH-6340 Baar
Germany: Fa. Kälte-Fischer
Postfach 266, Augsburger Str. 289-291
D-7000 Stuttgart 60



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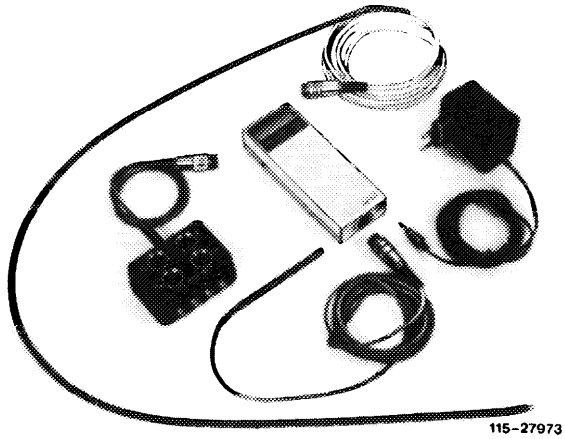
Digital temperature measuring instrument with 4 measuring probes

Therm 2263-2
Measuring point changeover switch with 4 connections 2235-4
Air temperature measuring probe (3 m cable length) w 453-5

Supplier e.g.:
Germany: Ahlborn Meß- und Regelungstechnik in der Eichenfeldstraße 1-3, D-81 50 Holzkirchen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Functional test

In the event of complaints on air conditioning system or for trouble diagnosis.

For a checkup in workshop in the event of complaints owing to insufficient cooling capacity or for a trouble diagnosis on air conditioning systems, proceed according to test method applicable for ambient temperatures from +20 °C to +40 °C.
All test values can be read after 10 minutes constant operation.

Test conditions

1 The vehicle should not be in the sunlight during test.

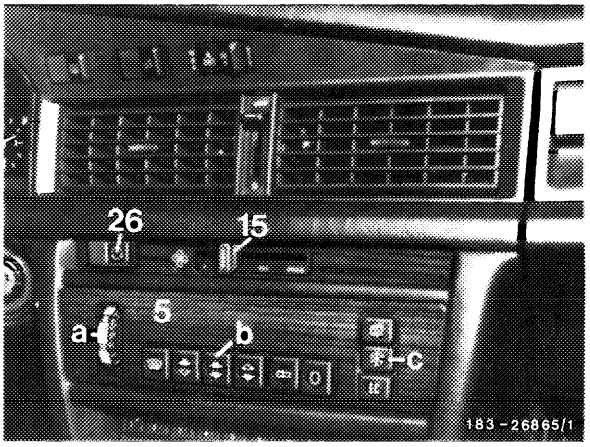
2 Check tension of V-belt for compressor drive.

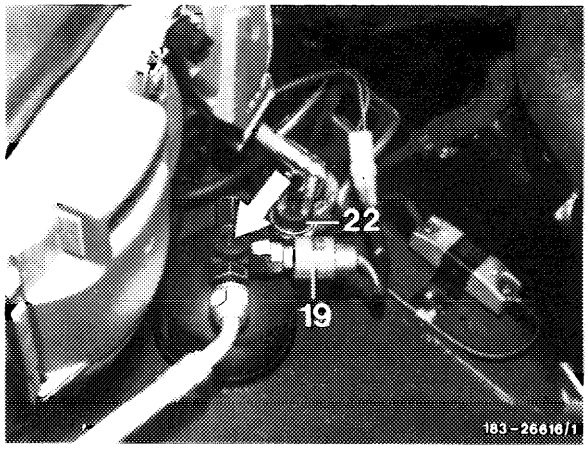
3 Check auxiliary fan for function, while switching on ignition and bypassing the two flat plugs on pressure switch (19), or connecting 1 -pin connector of 100 °C switch to ground. Pay attention to direction of rotation of auxiliary fan (clockwise).

4 Check fluid level in air conditioning system; for this purpose, pull one line from pressure switch (22), run engine at idle (>700/min) and engage air conditioning system by means of function selection . Clean sight-glass (arrow) in receiver drier. Watch sight-glass while simultaneously plugging line on pressure switch (22). Refrigerant should rise shortly after switching on electromagnetic clutch and should then flow free of bubbles (i.e. refrigerant no longer visible).

Attention!
In the event of major refrigerant losses or an empty system, the voltage for the refrigerant compressor is interrupted by the pressure switch (22). When the pressure increases to 0.6 bar above the cutout pressure, the circuit is again closed.

5 Check whether the heater shuts off in selector wheel position “MI N”. For this purpose, let engine run at idle and engage air conditioning system with function selection . Refrigerant compressor should be on after 20 seconds at the latest.



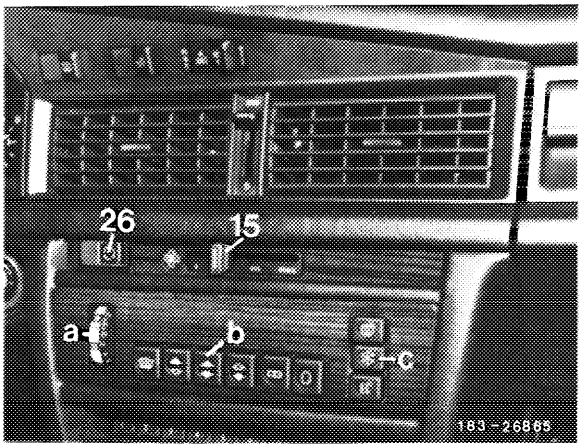


Note: If the refrigerant compressor is not engaging, bridge lines from pressure switch (22) and check fluid level according to item 4. If the refrigerant compressor is still not engaging, test entire system with socket box and volt-ohmmeter, refer to 83-039. On model 201.024 starting model year 85 and on model 201 .122 there may be an additional fault on compressor cutout, for testing refer to 83-040.

Testing

1 Set temperature selector wheel (a) to 'MI N".

2 Switch on function selection ⊖ of pushbutton switch (b) and function selection ⊖ of switch air conditioning system (c).



3 Set blower switch (15) to 4th blower stage.

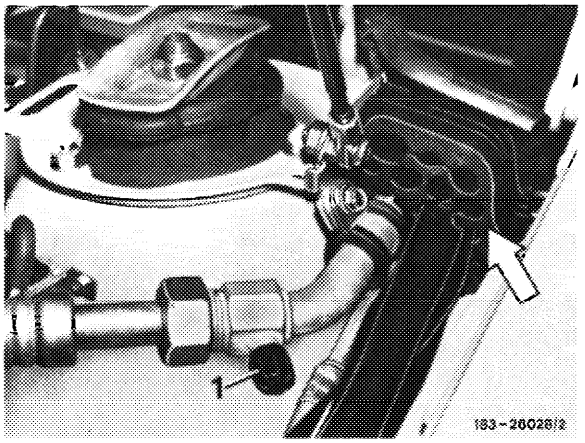
4 Open center and side outlets and switch off switch (26) (fresh air).

5 Insert one thermometer into lefthand or right-hand center outlet.

6 Position one thermometer for ambient temperature (room temperature) approx. 2 m from driver's side.

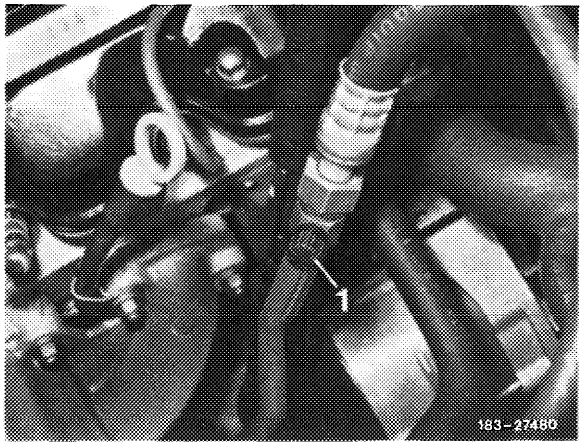
7 Place a hygrometer into tray of center console.

8 Unscrew closing caps (1). Then connect hose line of suction pressure or high pressure gauge to service valves. Make sure that the connecting nipple of the hose lines has a pressure pin in center.

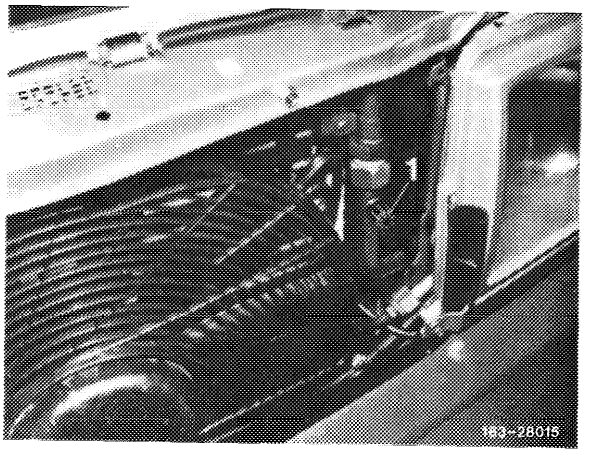


1 Closing cap of suction line on all models

9 Open window and close vehicle doors.

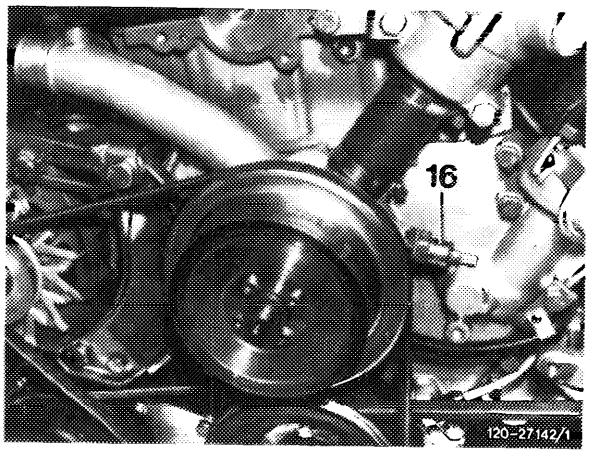


1 Closing cap on pressure line engine 102 up to model year 84

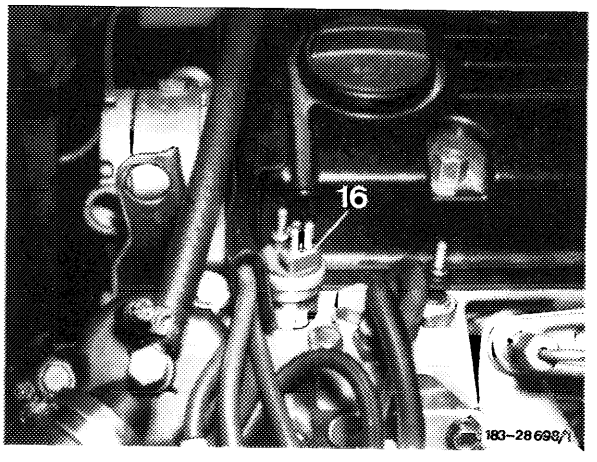


1 Closing cap on pressure line engine 601 and engine 102 starting model year 85

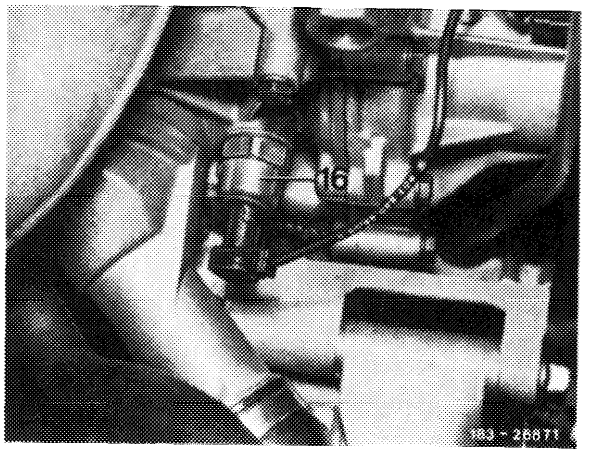
13 Pull 1 -pin connector from temperature switch 100 °C (16) and connect to ground, so that the auxiliary fan runs along during entire test procedure.



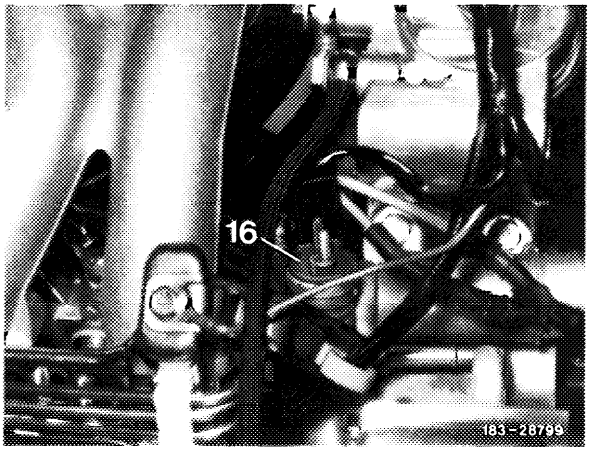
16 Temperature switch 100 °C engine 102 up to model year 84



16 Temperature switch 100 °C engine 102 starting model year 85



16 Temperature switch 100 °C engine 601 up to model year 84



16 Temperature switch 100 °C engine 601 starting model year 85

14 Run engine at approx. 2000 rpm.

15 After operating engine for approx. 10 minutes, read values on thermometers and pressure gauges, as well as on hygrometer.

Note: Specified values, refer to diagram, are max. values and must not be exceeded.

16 Check intake and high pressure in dependence of ambient temperature, using the diagrams for this purpose. Also check air outlet temperature (mean value of two cold air outlet temperatures) also according to diagram values. (The difference between the coldest and the warmest outlet temperature should not be higher than 3 °C). Check temperature sensor, if required, renew, if necessary (refer to 83–133) or connect new pushbutton switch unit for a tryout.

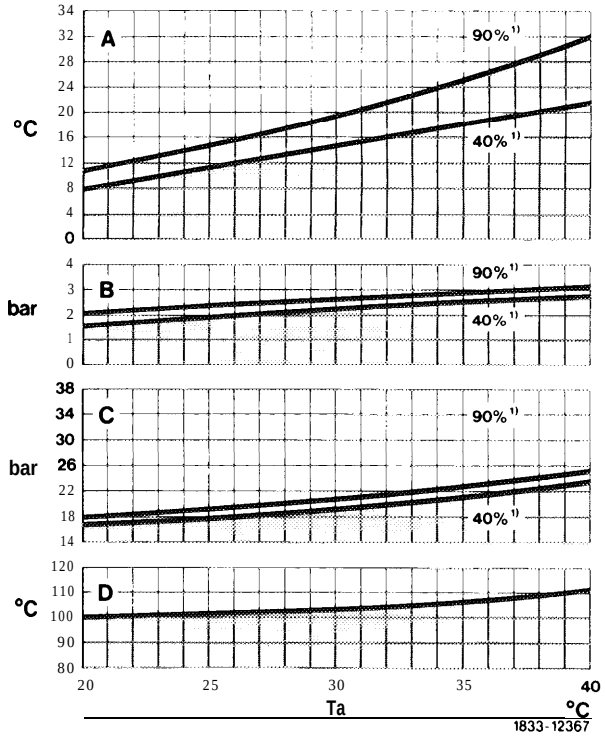


Diagram for model 201.024

1) Relative humidity
Ta Outside temperature (°C)
A Air outlet temperature (°C)
B Pressure in front of compressor (bar)
C Pressure following compressor (bar)
D Coolant temperature (°C)

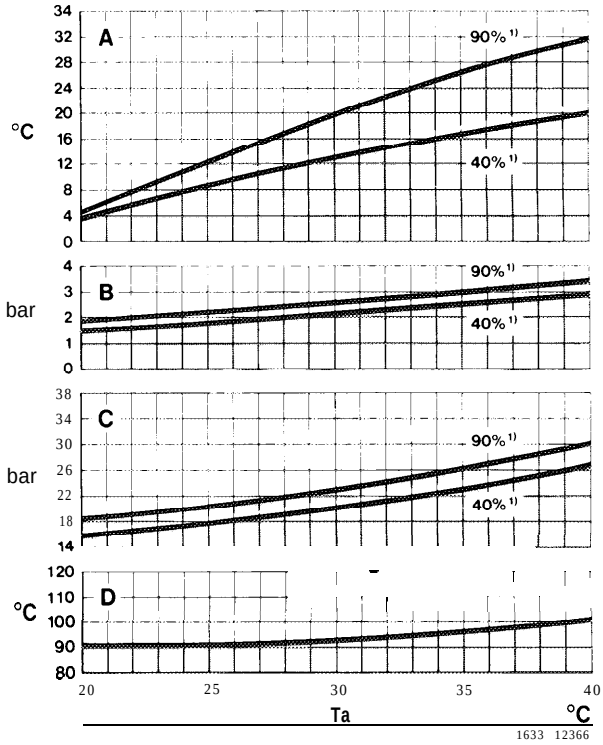


Diagram for model 201 .1 22

1)Relative humidity
Ta Outside temperature (°C)
A Air outlet temperature (°C)
B Pressure IN front of compressor (bar)
C Pressure following compressor (bar)
D Coolant temperature (°C)

17 Check cutout temperature, setting blower switch (15) to stage 1 for this purpose. Run engine at approx. 2000 rpm. Following 3rd cutout of electromagnetic clutch the air outlet temperature at center outlet should not be less than approx. +3.5 °C.

Note: If the respective value is less than specified, check temperature sensor of air conditioning system and renew, if required, refer to 83-133 or test electric lines from temperature sensor of air conditioning system to pushbutton switch unit for ground short. If there is no remedy, renew pushbutton switch unit.

18 Take hose lines from service valves and close service valves again with closing caps.

19 Plug 1 -pin connector to temperature switch 100 °C(16).

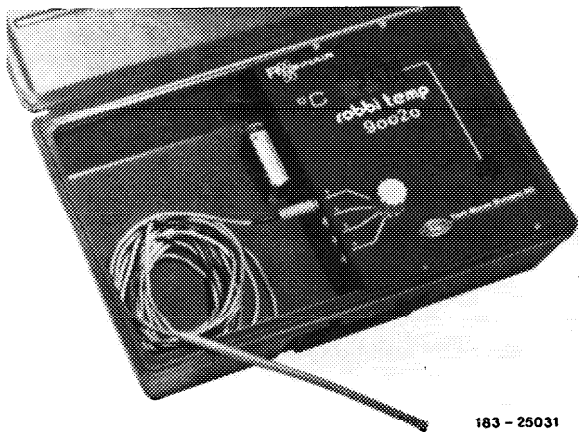
20 Remove thermometer and hygrometer from vehicle.

83-038 Testing control quality at different temperature adjustments, as well as heating capacity

Conventional tools

Digital temperature measuring instrument with 4 measuring probes
Robbi temp 90020
Air temperature measuring probe 90023
(4.5 m cable length)

Supplier e.g.:
Switzerland: Kent-Moore (Europe) AG
P.O. Box, CH-6340 Baar
Germany: Fa. Kälte-Fischer
Postfach 266, Augsburger Str. 289-291
D-7000 Stuttgart 60



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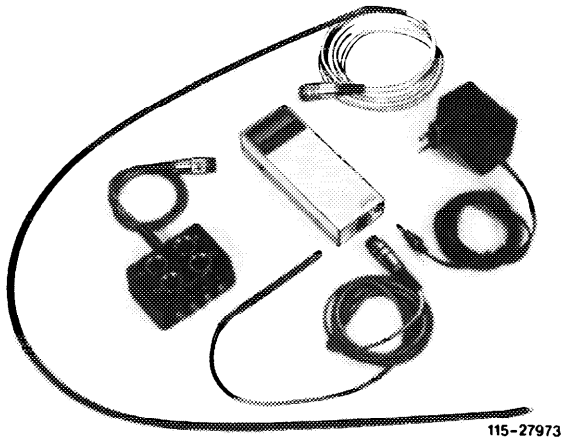
Digital temperature measuring instrument with 4 measuring probes
Therm 2263-2

Measuring point changeover switch with 4 connections 2235-4
Air temperature measuring probe w 453-5
(3 m cable length)

Supplier e.g.:
Germany: Ahlborn Meß- und Regelungstechnik in der Eichenfeldstraße I-3, D-81 50 Holzkirchen.


115-27973

Data

Adjustment of temperature wheel	Temperature to be attained at headroom level °C
Engage prior to "MIN"	16 ± 1
22	22 ± 1
Engage prior to "MAX"	30 ± 2

Note

Perform test not in workshop, but on cooled-out vehicle parked overnight in the open air. In-car temperature < 20 °C.

Test conditions

1 Outside temperature < 15 °C (possibly in the morning).

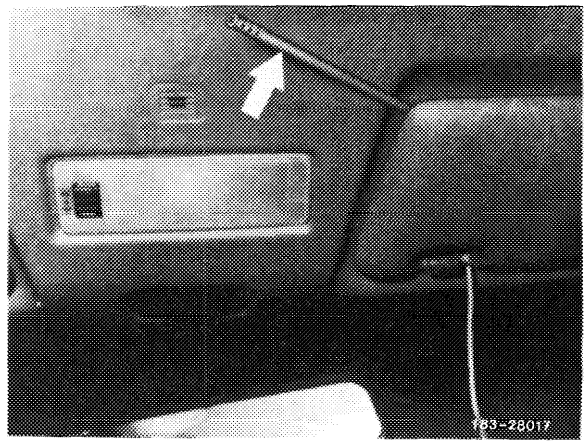
2 Driving time up to starting measurements approx. 10 minutes. At outside temperatures < 0 °C a longer measuring drive will be required.

3 Windows and sliding roof closed.

4 Do not run engine to operating temperature first.

Testing control quality

1 Apply measuring probe at sun vizor (right) (arrow) and connect to measuring instrument. Then switch on measuring instrument.



2 Engage mode selection of pushbutton switch unit (b) and mode selection of switch air conditioning (c).

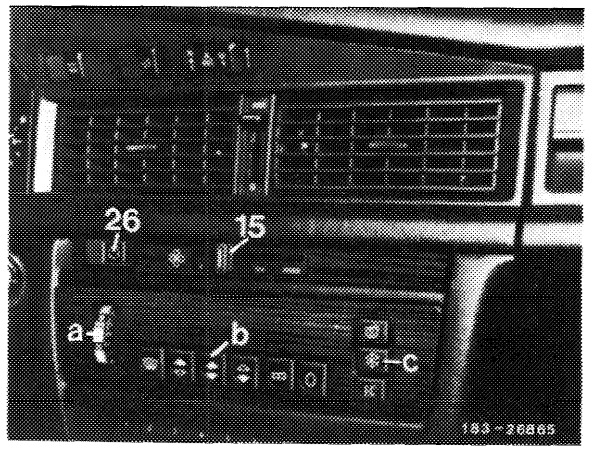
3 Set blower switch (15) to stage I I and switch off switch (26) (fresh air).

4 Close center outlet.

5 Set temperature wheel (a) to 22.

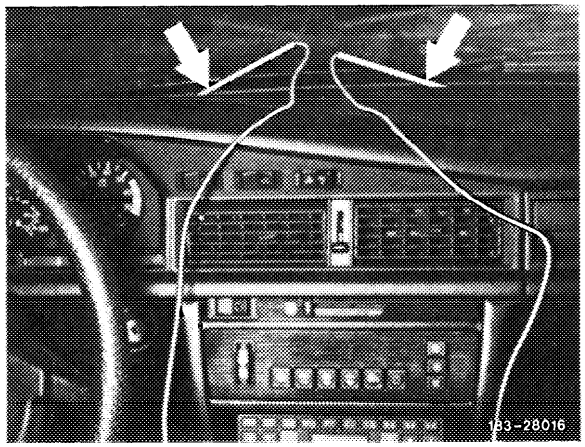
6 Start engine and drive off immediately (approx. 30-35 mph).

7 After approx. 1 O-l 5 minutes, read temperature on measuring instrument. Nominal value 22 ± 1 °C. If the temperature is not attained, test system with socket box volt and ohmmeter (refer to 83–039).



Note: Depending on complaint, test temperature prior to "MIN" engaged (corresponds to 16 ± 1 °C) or prior to "MAX" (corresponds to 30 ± 2 °C). Following each adjustment of temperature selector wheel, wait for approx. 7 minutes. If during adjustment prior to "MAX" the temperature is not attained, check heating capacity.

Checking heating capacity

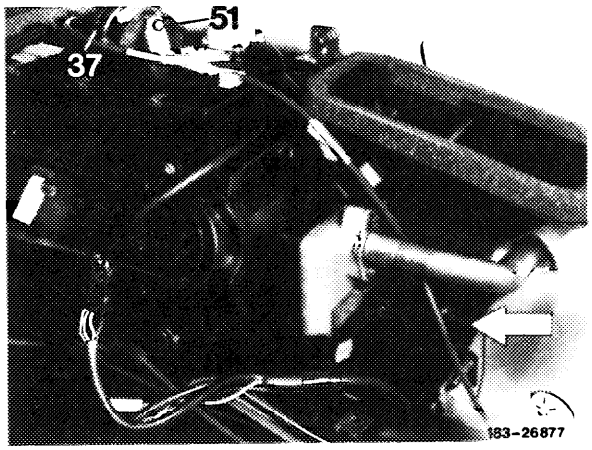


1 Plug one measuring probe (arrow) each into left-hand and righthand defroster nozzle.

2 Engage mode selection of pushbutton switch unit.

3 Run engine at operating temperature at approx. 2000 rpm for 5 minutes. Nominal value: > 55 °C.

Note: If the temperature is not attained, check whether the blend air flaps are fully open (perceived by the air coming out of righthand outlet, arrow) and recondition, if required. If in order, renew heater valve for a tryout and flush cooling system, if required. If there is no remedy, renew heat exchanger.



EXIT

83-039 Testing system with socket box, volt and ohmmeter, and remedies

Special tools

Socket box	Test table for socket box
124 589 00 21 00	124 589046300

Note

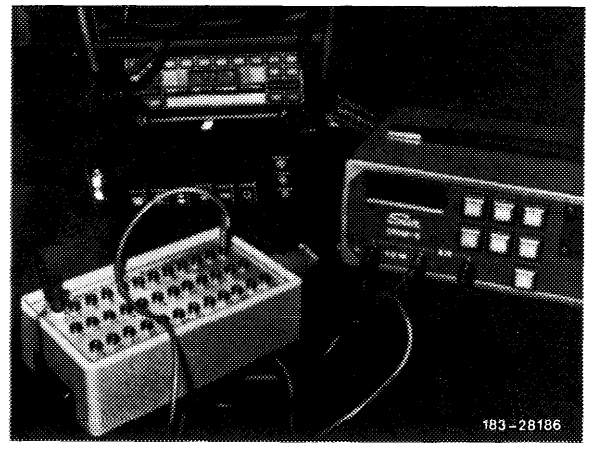
Perform test program if cause of trouble is unknown or if the in-car temperature set on temperature wheel is not attained.

Prior to starting the following test, check fuses 1 and 3 in electric center.

Preparations for test

1 **Remove pushbutton switch unit (refer to 83-I 12).**

2 **Connect socket box to harness for pushbutton switch unit by connecting the line of socket box marked red with lacing of harness marked red (pushbutton switch unit remains disconnected up to test step 3).**

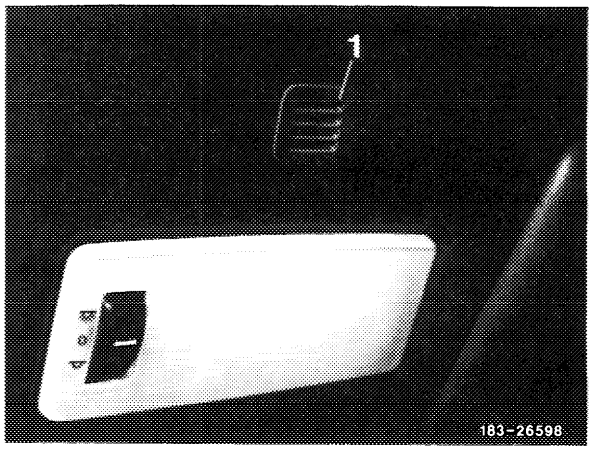


Test program

Test step 1

Testing in-car temperature sensor (1) with lines.

Ohmmeter on sockets	Ambient temperature in °C	Nominal value in kΩ
1 and 21	+15	15.2 – 17.2
	+20	11.5 – 13.5
	+25	9.5 – 10.5
	+30	7.5 – 8.5
	+35	6.0 – 7.0
	+40	4.5 – 5.5
	+45	3.5 – 4.5



Yes	No

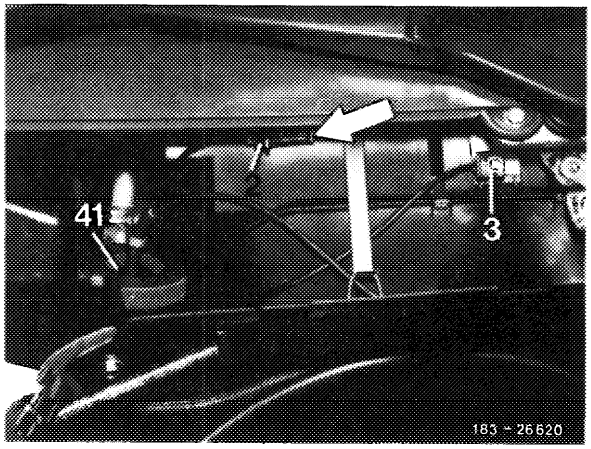
1. Test line 9 of lefthand connector and line 12 of righthand connector for interruption or line 9 of lefthand connector for ground short.

2. Renew in-car temperature sensor (1) (83–130).

Test step 2

Testing outside temperature sensor (2) with lines.

Ohmmeter on sockets	Ambient temperature in °C	Nominal value in kΩ
1 and 22	+15	4.0 – 4.6
	+20	3.1 – 3.9
	+25	2.4 – 3.0
	+30	1.9 – 2.3
	+35	1.6 – 2.0
	+40	1.4 – 1.6
	+45	1.1 – 1.3



Yes	No

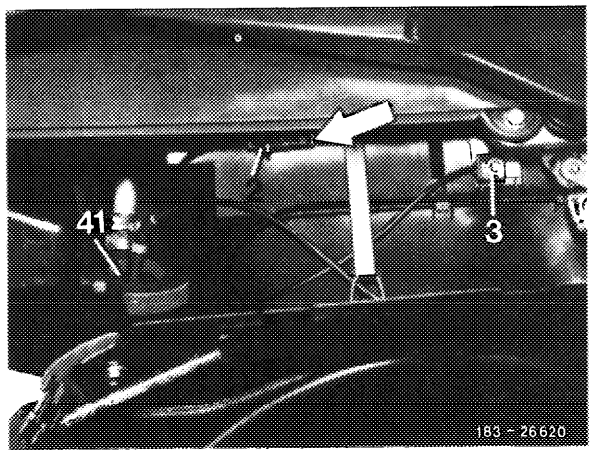
1. Test line 10 of lefthand connector for interruption or ground short..

2. Renew outside temperature sensor (2) (83–132).

Test step 3
Testing temperature sensor air conditioning system (3) with lines.

Ohmmeter on sockets	Ambient temperature in °C	Nominal value in kΩ
1 and 19	0	57 – 67
	+5	46 – 54
	+10	37 – 45
	+15	31 - 36
	+20	24 – 28
	+25	20 – 24
	+30	14 - 16
	+35	13 - 15

Yes | No



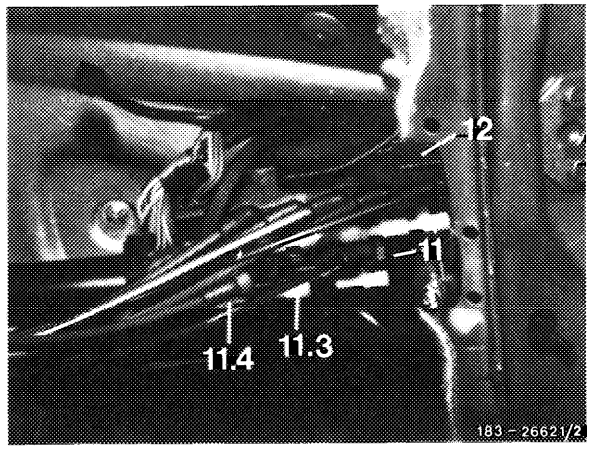
1. Test line 7 of lefthand connector for interruption or ground short.

2. Renew temperature sensor air conditioning system (3) (83-193).

Test step 4
Testing switchover valve unit with 4 connections (11) and lines for interruption or ground short.

Ohmmeter on sockets	Nominal value in Ω
10 and 12 10 and 14 10 and 16	60 – 70

Yes | No



1. Test lines 1, 2 and 4 of lefthand connector for interruption or ground short.

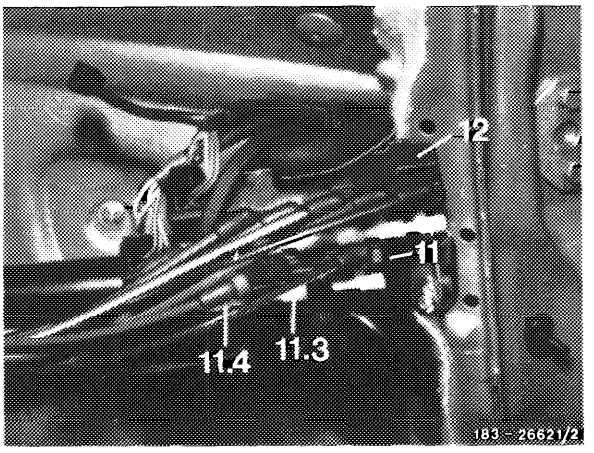
2. Renew switchover valve unit with 4 connections (11) (83-I 53).

Test step 5

Testing switchover valve unit with 5 connections (12) and lines for interruption or ground short.

Ohmmeter on sockets	Nominal value in Ω
10 and 2	
10 and 3	
10 and 5	60 — 70
10 and 6	
10 and 12	

Yes | No

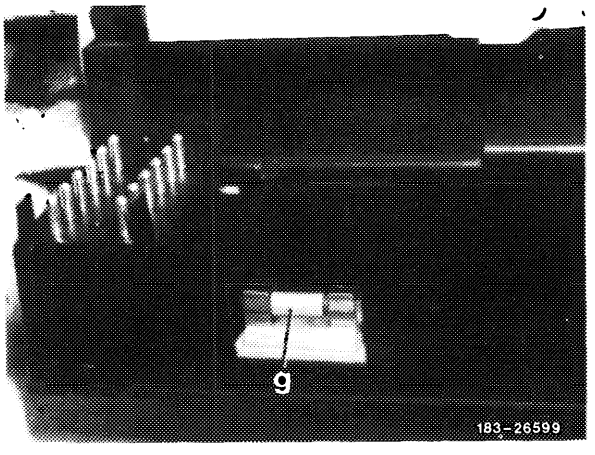


1. Test lines 1, 2, 3, 5 and 6 of righthand connector for interruption or ground short.

2. Renew switchover valve unit with 5 connections (83—153).

Preparations for test step 6-9

Test fuse (g) on pushbutton switch unit with ohmmeter in installed condition. Then connect both connectors from socket box to pushbutton switch unit, while plugging line with red adhesive tape to lefthand plug of pushbutton switch unit. Let engine run at idle.



Test step 6
Testing voltage supply for pushbutton switch units (input).

Voltmeter on socket	Nominal value
1 – 10 +	> 11 V

Yes	No

Fuse No. 11 defective or line interrupted.

Test step 7
Testing voltage supply for blower switch, recirculating pump and refrigerant compressor (input).

Voltmeter on socket	Nominal value
1 –* 9 –**	
9 +* 10 +**	> 11 v

*up to model year 84 **starting model year 85

Yes	No

Fuse No. 1 defective or line interrupted.

Test step 8
Testing voltage supply for recirculating pump.

Voltmeter on socket	Mode selection button	Nominal value
1 –* 7 –**		
7 +* 10 +**		> 11 v

*up to model year 84 **starting model year 85

Yes	No

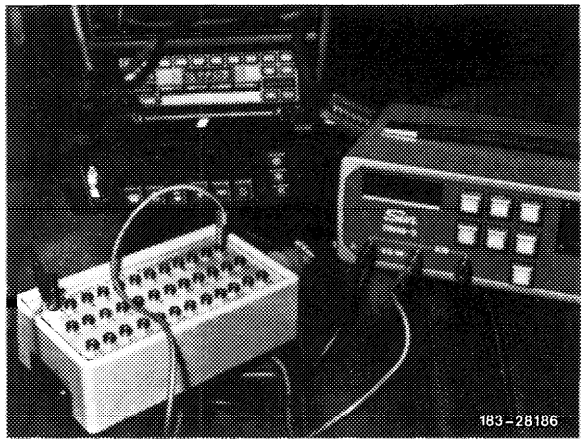
Test step 9
Testing voltage supply for refrigerant compressor.

Voltmeter on socket	Mode selection buttons	Nominal value after 20 s
1–* 18–**		> 11 v
18+*10+**	Engage temp. wheel at "MI N"	

*up to model year 84 **starting model year 85

Yes	No

Preparation for test step **10–20**
Connect positive of voltmeter to socket 10. Positive of voltmeter remains connected to socket 10 up to test step 19.



Test step 10
Testing voltage supply for blower switch stage 1 to max.

Voltmeter on socket	Mode selection button	Nominal value
4		> 11 v

Yes	No

Test step 11
Testing voltage supply for blower switch stage max.

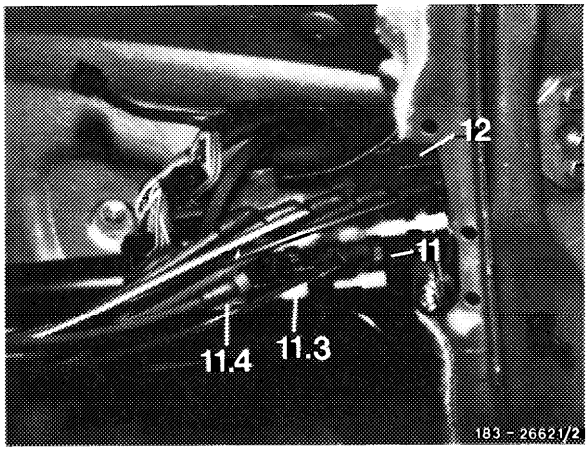
Voltmeter on socket	Mode selection button	Nominal value
8		> 11 V

Yes	No

Test step 12
Testing voltage supply for switchover valve of blend air flaps “cold” (11.4).

Voltmeter on socket	Mode selection button	Nominal value after 10 s
13	Engage temp. wheel at “MI N”	> 11 V

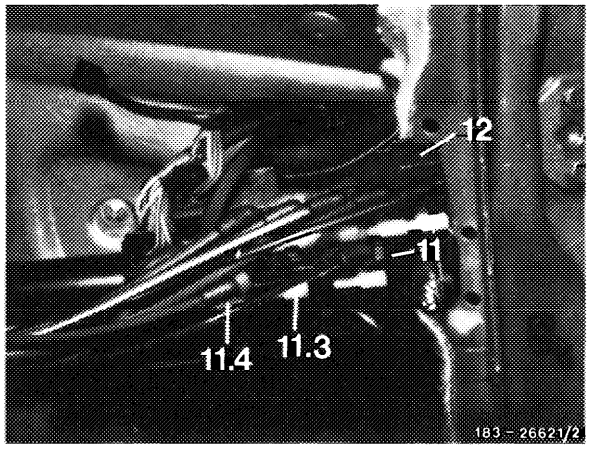
Yes	No



Test step 13
Testing voltage supply for switchover valve of blend air flaps “warm” (11.3).

Voltmeter on socket	Mode selection button	Nominal value after 10 s
16	Engage temp. wheel at “MAX”	> 11 V

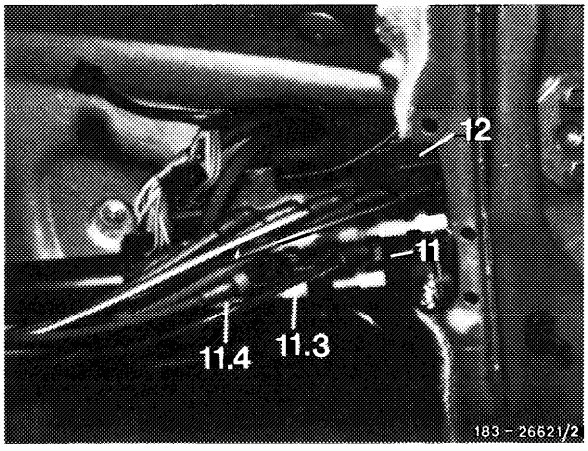
Yes	No



Test step 14
Testing voltage supply for switchover valve of heater valve (11.5).

Voltmeter on socket	Mode selection button	Nominal value after 10 s
14	Engage temp. wheel at “MI N”	> 11 v

Yes	No



Test step 15
Testing voltage supply for switchover valve of legroom flaps (12.8).

Voltmeter on socket	Mode selection button	Nominal value each
5	then	> 11 v

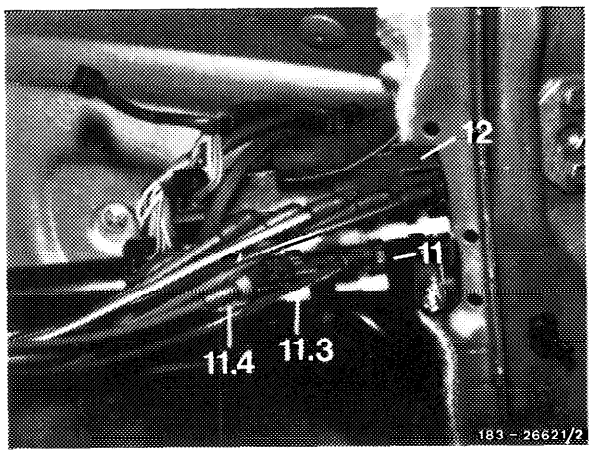
Yes	No

Test step 16

Testing voltage supply for switchover valve of fresh air/recirculating air flap, short stroke (12.9).

Voltmeter on socket	Mode selection button	Nominal value
2		> 11 v

Yes	No

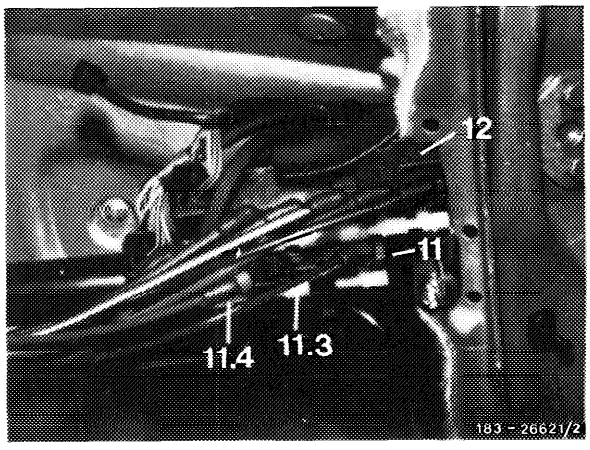


Test step 17

Testing voltage supply for switchover valve of fresh air/recirculating air flap, long stroke (12.10).

Voltmeter on socket	Mode selection buttons	Nominal value after 10 s
12	Engage temp. wheel at "MIN"	> 11 v

Yes	No



Test step 18

Testing voltage supply for switchover valve of defroster nozzle flaps, short stroke (12.6).

Voltmeter on socket	Mode selection button	Nominal value
3		> 11 v

Yes	No

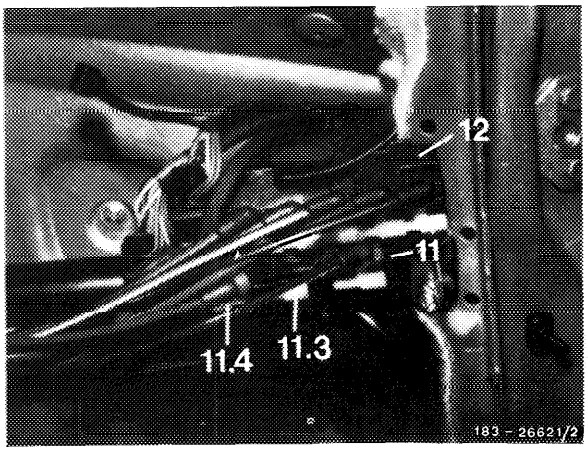
Test step 19

Testing voltage supply for switchover valve of defroster nozzle flaps, long stroke (12.7).

Voltmeter on socket	Mode selection button	Nominal value
6		> 11 V

Yes	No

Exchange push-button switch unit.



Test step 20
Testing potentiometer for flap position (4).

Voltmeter on socket	Mode selection button	Nominal value each after 40 s
17+ / 1–	 Engage temp. wheel at "MIN",	3.9 – 4.4 v
	then at "MAX"	0.3 – 1.2 V

Yes

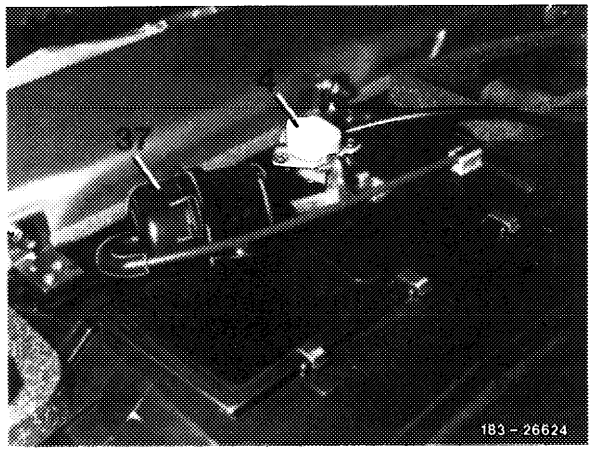
No

1. Renew pushbutton switch unit for tryout.

2. Adjust potentiometer for flap position, renew if required (83–134).

Attention!
If there is no voltage change, test heater vacuum system for leaks (83-045). If the vacuum system is leaktight, renew switch-over valve unit with 4 connections (83-I 53).

End of test

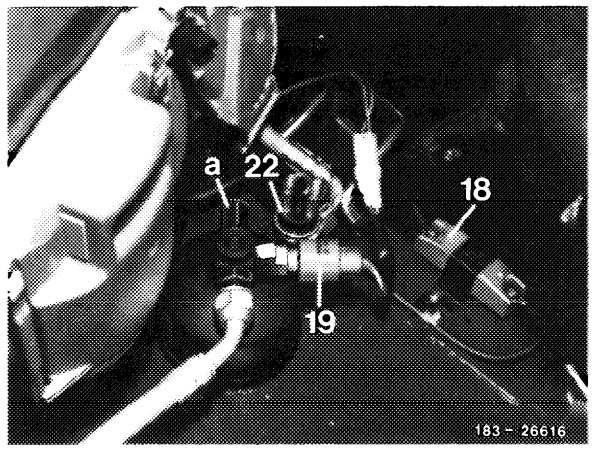


A. Testing with electromagnetic clutch of refrigerant compressor not connected

Attention!
A prerequisite for test is perfect functioning of refrigerant compressor activation.
For this purpose:

- Switch on ignition, push mode selection button and for air conditioning system.

- Connect voltmeter to blue/white line (input) of pushbutton refrigerant compressor (22) and up to model year 84 to vehicle ground, starting model year 85 to positive. Nominal value: battery voltage. If there is no voltage, test air conditioning system according to wiring diagram (refer to 83-028).



- Connect voltmeter to blue/red line (output) of pushbutton switch refrigerant compressor (22) and up to model year 84 to vehicle ground, starting model year 85 to positive. Nominal value: battery voltage.
If there is no voltage, test high pressure of air conditioning system. Renew pushbutton switch (22) at a pressure of > 3 bar.
Refill air conditioning system at a pressure of < 2 bar and eliminate leak.

Testing **voltage supply** for **control unit compressor cutout (141)**

Pull control unit (141) from 12-pin connector. Connect voltmeter to terminal 5 + and terminal 1 – of 12-pin connector.

Nominal value: battery voltage

Yes	No

Test harness according to wiring diagram (refer to 13-028) and recondition, if required.

Testing control voltage for refrigerant compressor of pushbutton switch refrigerant compressor (22) to control unit (141)

Connect voltmeter to terminal 10+* 5+** 1−* 10−**
of 12-pin connector.
*up to model year 84 **starting model year 85

Nominal value: battery voltage

Yes	No

Test harness from terminal 10 to pressure switch (22) and recondition, if required.

Testing electromagnetic clutch refrigerant compressor and supply line

Bridge terminal 5 and 7 on 12-pin connection. Start engine for a short moment and check whether refrigerant compressor is running.

Yes	No

Test electromagnetic clutch of refrigerant compressor and renew, if required (refer to 83-526) or recondition supply line for refrigerant compressor.

Testing rpm sensor refrigerant compressor (144)

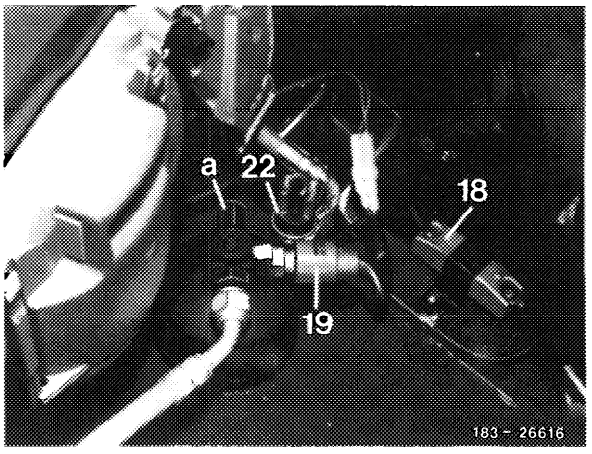
Connect voltmeter to terminal 9 and 11 of 12-pin connector and set voltmeter to alternating voltage ~. Terminal 5 and 7 of 12-pin connection remain bridged.

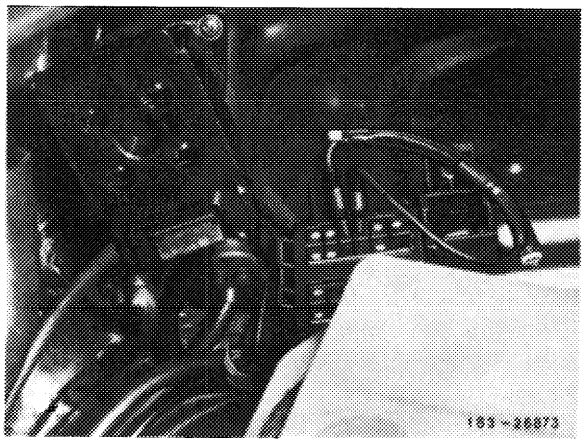
Run engine at idle speed (approx. 750 rpm).

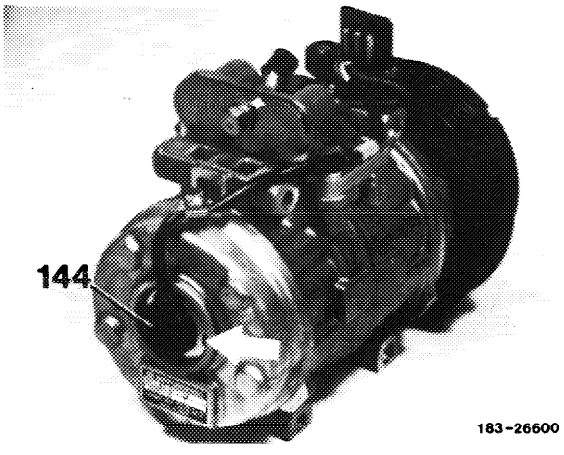
Nominal value: min. 0.3 V ~

Yes	No

Stop engine and test resistance of rpm sensor (144) on terminal 9 and 11.
Nominal value: 530 to 650 Ω, renew rpm sensor, if required (refer to 83-516).







Model 201 with gasoline engine

Testing transistorized rpm signal (TD)

Connect voltmeter to terminal 1 and 2 of 12-pin connector and set voltmeter to DC. Run engine at idle speed (approx. 750 rpm).
Nominal value: approx. 8.5 V

Model 201 with diesel engine

Testing rpm sensor on starter ring gear

Connect voltmeter to terminal 1 and 2 of 12-pin connector and set voltmeter to AC. Run engine at idle speed (approx. 750 rpm).

Nominal value: approx. 4 V ~[1])

[1]) Increasing voltage at increasing engine speed

Yes | No

Model 201 with gasoline engine
Eliminate interruption to line connector of diagnosis socket.

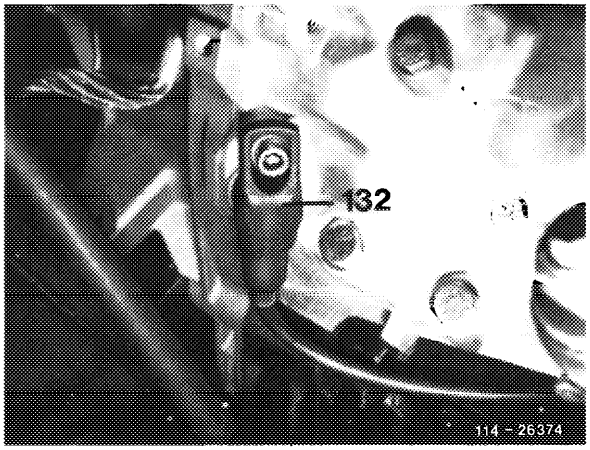
Model 201 with diesel engine
Stop engine and test resistance of rpm sensor (132) on terminal 1 and 2.

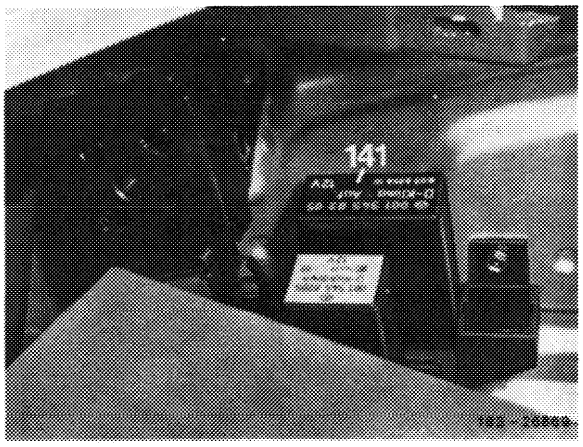
Nominal value: 1.9 ± 0.2 kΩ, renew rpm sensor, if required (refer to 83-517).

Renewing control unit (141).

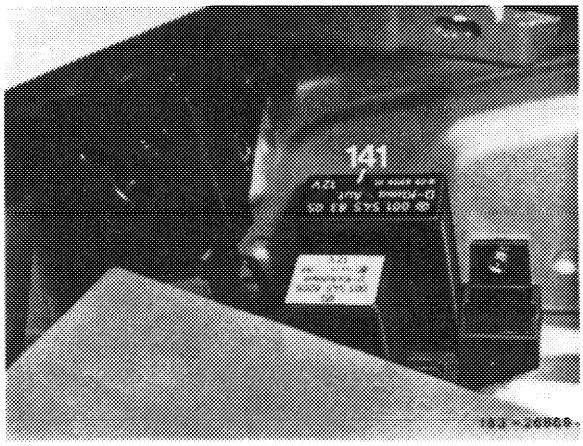
Testing air conditioning for function.

End of test





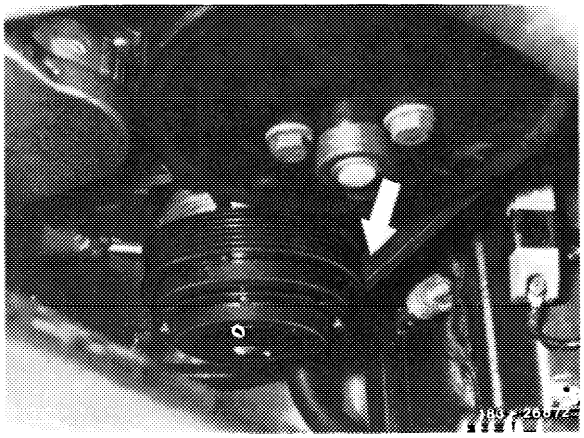
B. Testing cutout of electromagnetic clutch of refrigerant compressor via control unit compressor cutout (141)



Run engine at idle speed.

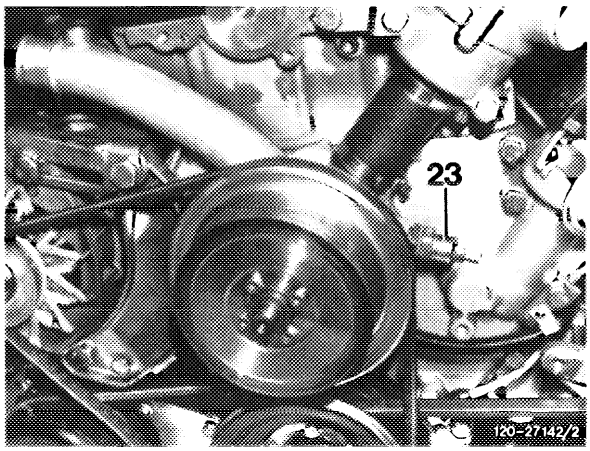
2 Engage temperature wheel to “MIN”, set blower to stage 4 and adjust mode selection buttons and

3 Spray with a water jet in-between V-belt and pulley of electromagnetic clutch of refrigerant compressor until the refrigerant compressor is switched off, while applying intermittent acceleration. If the refrigerant compressor is not switched off by control unit (141), renew control unit.



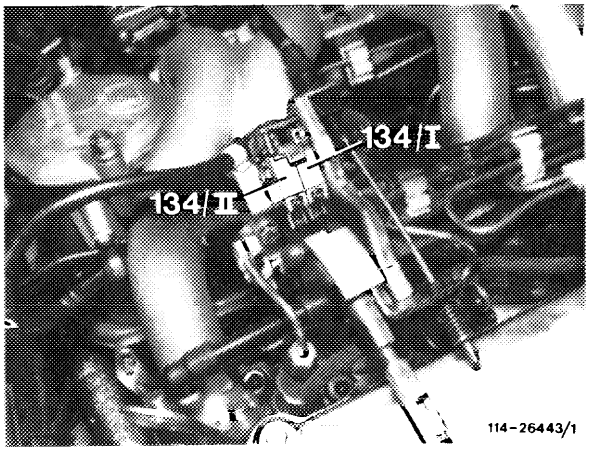
Attention!
Following cutout of refrigerant compressor, the compressor may be started again via control unit (141) after stopping and renewed starting of engine.

4 On model 201 with gasoline engine, check whether the refrigerant compressor is switched off by temperature switch **110** °C **(23).** For this purpose, start engine again, pull 1 -pin connector from temperature switch **110** °C (23) and connect to ground.



The refrigerant compressor must be switched off immediately. If required, eliminate line interruption or renew control unit (141).

5 On model 201 with diesel engine and automatic transmission, check whether refrigerant compressor is switched off by microswitch 134/1, as follows:
Run engine at idle. Watch electromagnetic clutch of refrigerant compressor and apply full throttle for a short moment. The electromagnetic clutch must remain switched off up to 2150 rpm and then switch on again. If the electromagnetic clutch is not switched off, renew microswitch 134/1 or control unit 141.

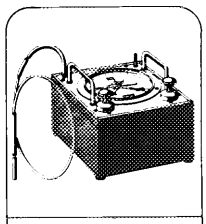


83-045 Testing vacuum system for blend air flaps, fresh air/recirculating air flap, defroster nozzle flaps, legroom flaps and heater valve for leaks

Data

Permissible leaking per vacuum circuit (without vacuum reservoir)	30 mbar/min at 400 mbar vacuum
Permissible leaking of check valve	60 mbar in 10 min at 300 mbar vacuum
Permissible leaking of remaining components	20 mbar/min at 300 mbar vacuum

Special tools



201 589 13 21 00

Self-made tool

1 blind plug	0009871145

Note

The vacuum test is subdivided into 5 test circuits (A to E). In the event of a given fault (e.g. legroom flaps not opening) the respective circuit can be tested first.

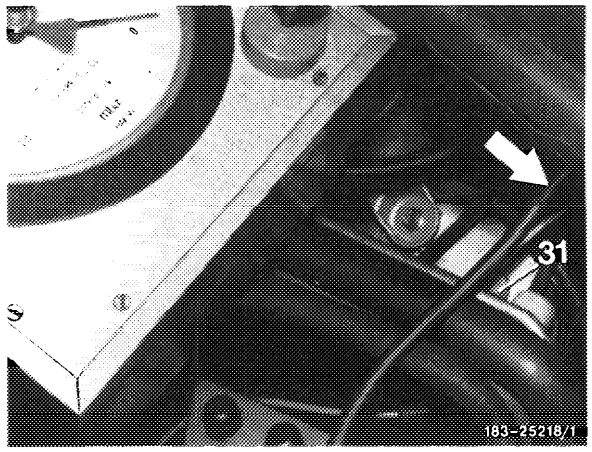
If a leak is suspected in entire vacuum system for heating, start with test step “a” and “b” and then test all the test circuits completely until the faulty vacuum circuit is found.

a) Testing **check valve (31)**

1 Pull vacuum line medium green/red and red/grey (on model 201.024 only) from check valve (31). Connect tester (arrow) to one of the two connections.

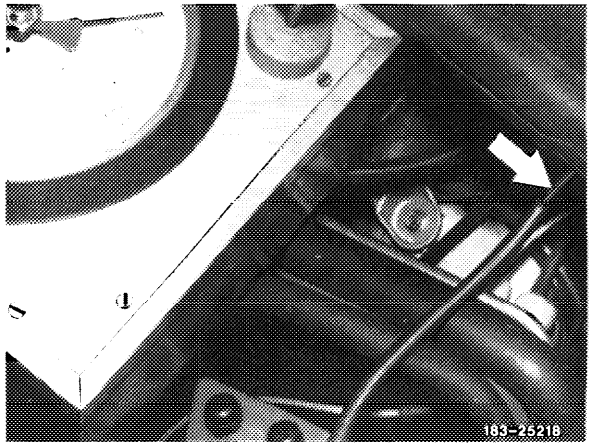
2 On model 201.024, close second connection on check valve with blind plug. Then evacuate with tester and read pressure gauge.

3 If the pressure gauge indicates an increase in pressure, renew check valve.



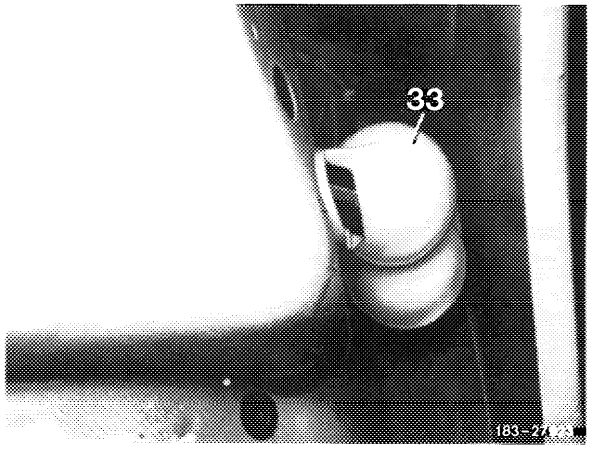
b) Testing vacuum reservoir (33) with vacuum line red/grey (model 201.024 only)

4 Pull vacuum line red/grey from check valve (31) and connect tester (arrow) to vacuum line.



5 Evacuate with tester and read pressure gauge.

6 If readout on pressure gauge changes, remove reservoir (33) and check for leaks. Renew, if required or renew vacuum line red/grey.



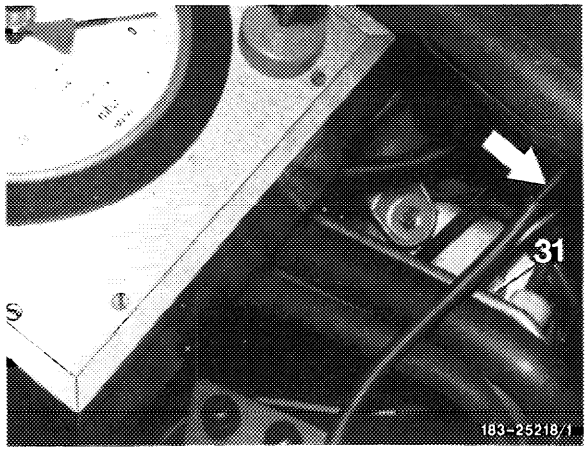
Layout vacuum reservoir (33) under front fender left (model 201.024 only)

Preparing for test

1 Pull vacuum line medium green/red from check valve (31) and connect tester to vacuum line.

2 Switch on ignition.

Note: The tester remains connected during entire test on vacuum line medium green/red.

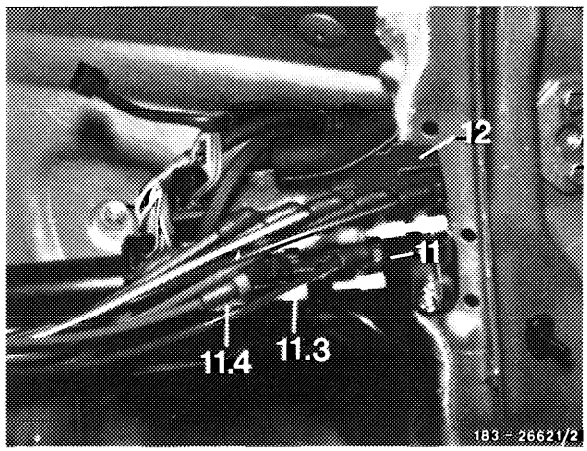


A. Testing vacuum circuit 1, vacuum line medium green/red and input of valve unit 11 and 12

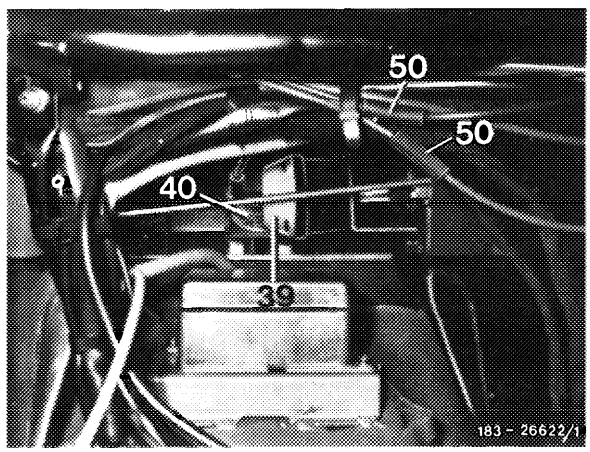
1 Push mode selection button on pushbutton switch unit.

2 Evacuate with tester (approx. 400 mbar) and read pressure gauge.

3 If readout on pressure gauge changes, test switchover valve unit (11) and (12) individually and test vacuum line medium green/red and renew, if required.



Note: If a leak shows up on vacuum unit medium green/red, the leak may also be on connecting hose (50) (maybe pulled off).

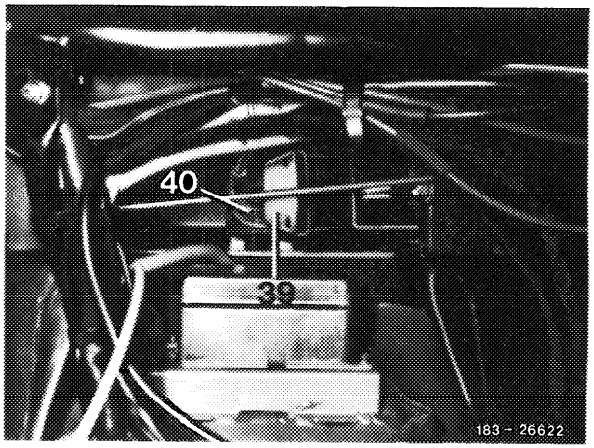


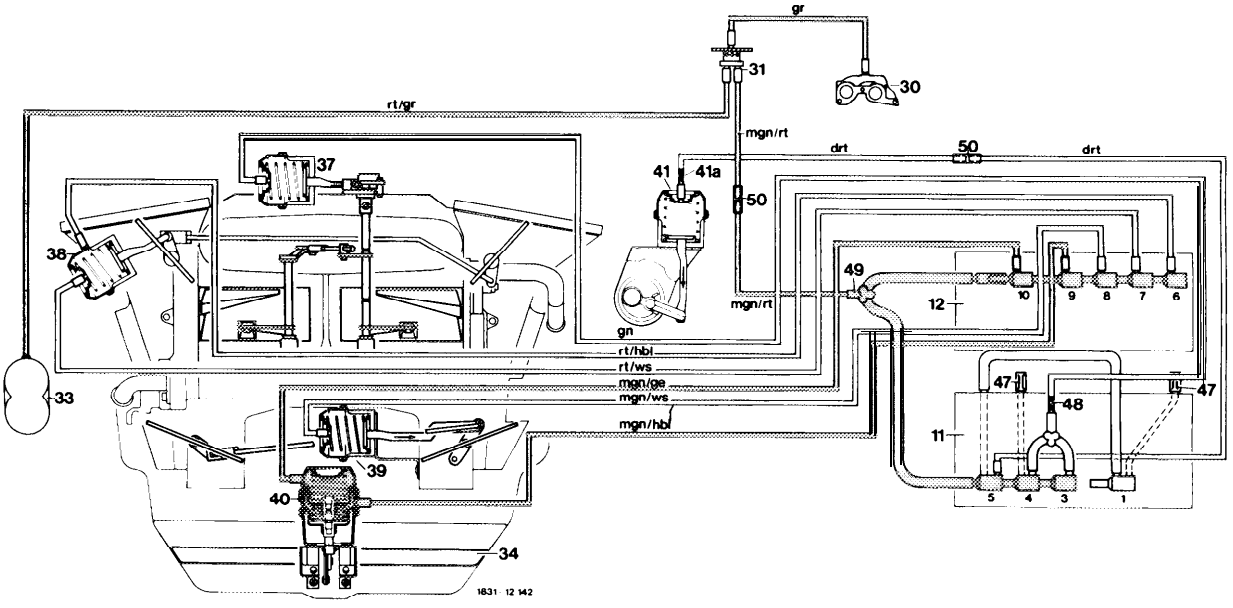
B. Testing vacuum circuit 2, vacuum element (40) for fresh air/recirculating air flap (short and long stroke) with vacuum lines

1 Push mode selection button ● on pushbutton switch unit and engage temperature wheel at "MAX".

2 Evacuate with tester (approx. 400 mbar) and read on pressure gauge.

3 If readout on pressure gauge changes, test vacuum element (40) directly or renew (83-165 section "D") or test vacuum lines medium green/light blue and medium green/yellow, and renew if required.





Vacuum circuit 2, mode selection ● and temperature wheel engaged at "MAX".

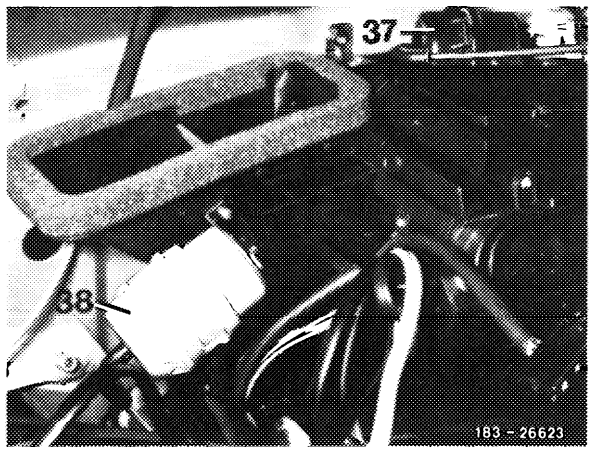
40 Vacuum element for fresh air/recirculating air flap

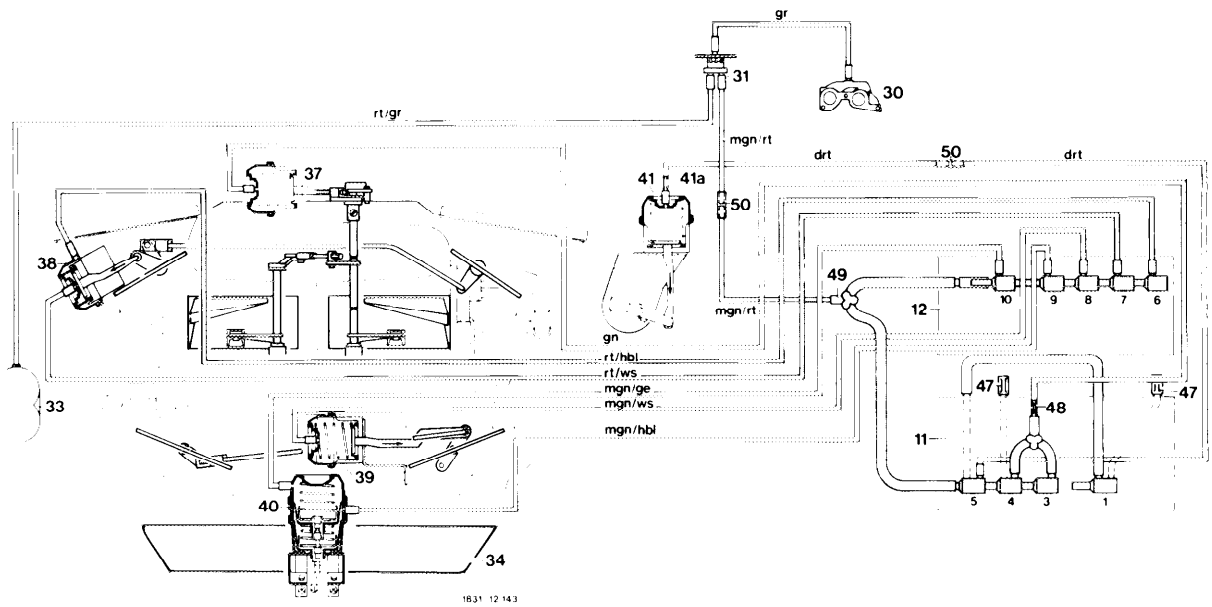
C. Testing vacuum circuit 3, vacuum element (38) for defroster nozzle flaps (short and long stroke) with vacuum lines

1 Push mode selection button on pushbutton switch unit. Temperature wheel remains at “MAX”.

2 Evacuate with tester (approx. 400 mbar) and read pressure gauge.

3 If readout on pressure gauge changes, test vacuum element (38) directly and renew, if required (83-165 section “B”), or test vacuum lines red/light blue and red/white and renew, if required.





Vacuum circuit 3, mode selectton and temperature wheel engaged at “MAX”

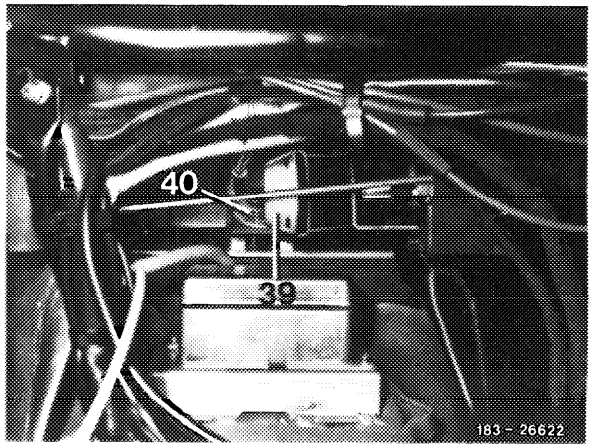
38 Vacuum element for defroster nozzle flaps

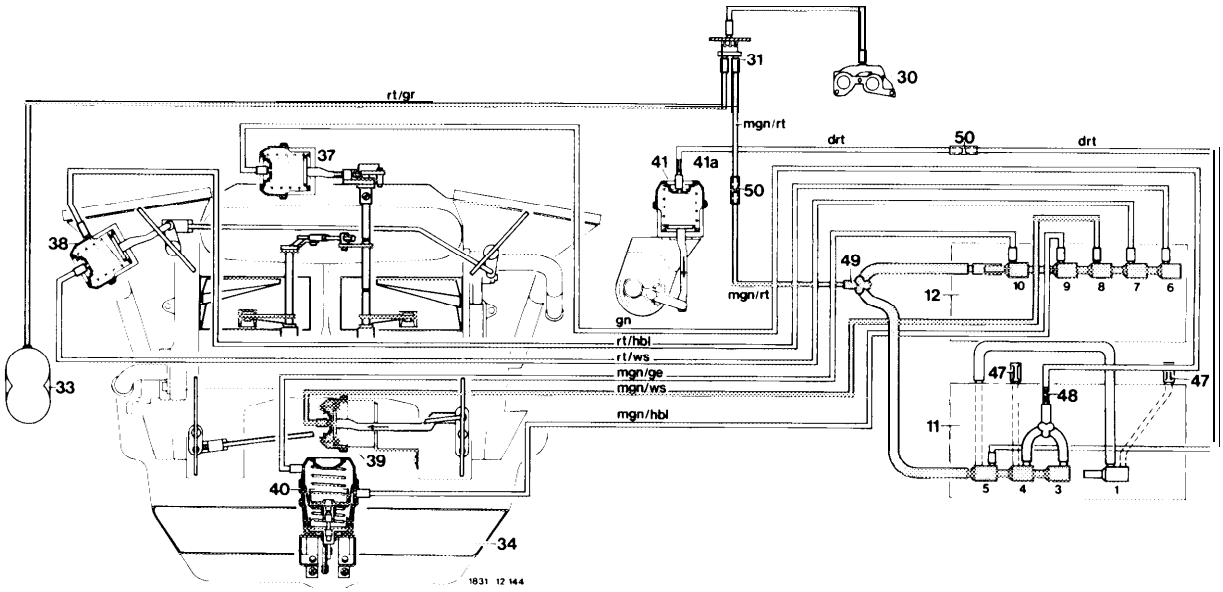
D. Testing vacuum circuit 4, vacuum element (39) for legroom flaps with vacuum lines

1 Push mode selection button ⊖ on pushbutton switch unit, temperature wheel remains engaged at "MAX".

2 Evacuate with tester (approx. 400 mbar) and read pressure gauge.

3 If readout on pressure gauge changes, test vacuum element (39) directly and renew, if required (83-165 section ''C''), or test vacuum line medium green/white and renew, if required.





Vacuum circuit 4, mode selection ⊖ and temperature wheel engaged at "MAX"

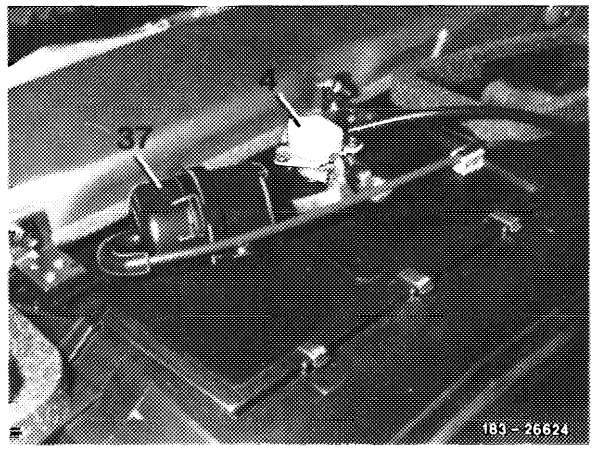
39 Vacuum element for legroom flaps

E. Testing vacuum circuit 5, vacuum element (37 and 41) for blend air flaps and heater valve with vacuum lines

1 Push mode selection button on pushbutton switch unit and set temperature wheel to “MIN” (not engaged).

2 Evacuate with tester, wait for approx. 5 seconds and evacuate again. Repeat approx. 5 times, because the vacuum element (37) is provided with vacuum by way of an orifice. Then read pressure gauge.

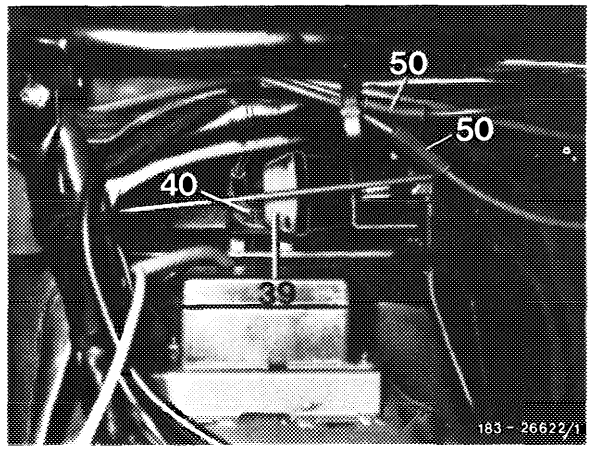
Note: If the temperature difference (preset temperature at temperature wheel in relation to outside temperature) is above 8 °C, the vacuum element (40) for fresh air/recirculating air flap is also provided with vacuum.

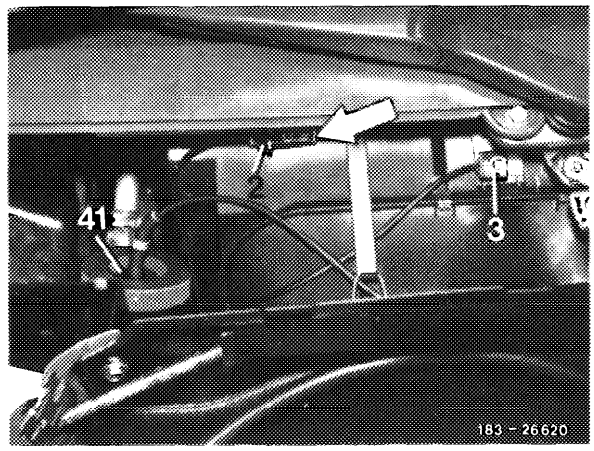


3 If readout on pressure gauge changes:

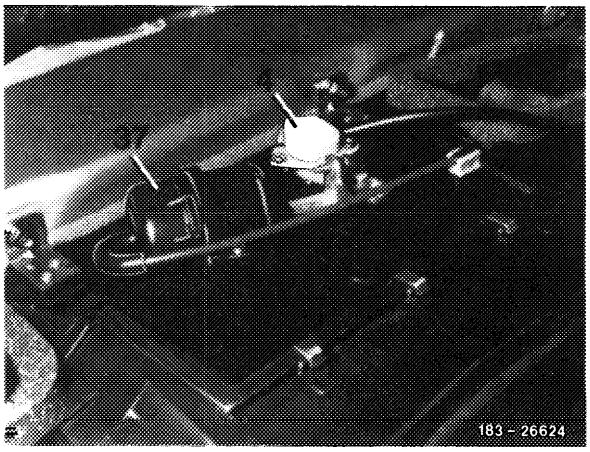
a) Test vacuum element (41) for heater valve directly and renew, if required (83-1 15) or test vacuum line dark red and renew, if required.

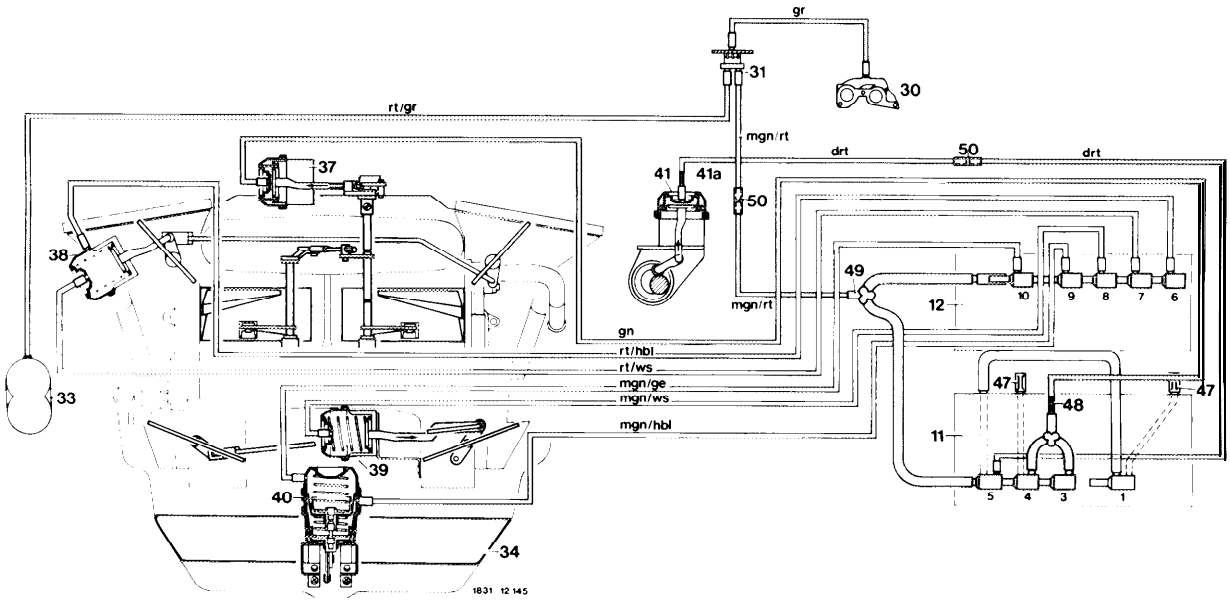
Note: If the vacuum line dark red shows a leak, the leak may also be at connecting hose (50).





b) Test vacuum element (37) directly and renew, if required (83-I 65 section “A”) or test vacuum line green and renew, if required.





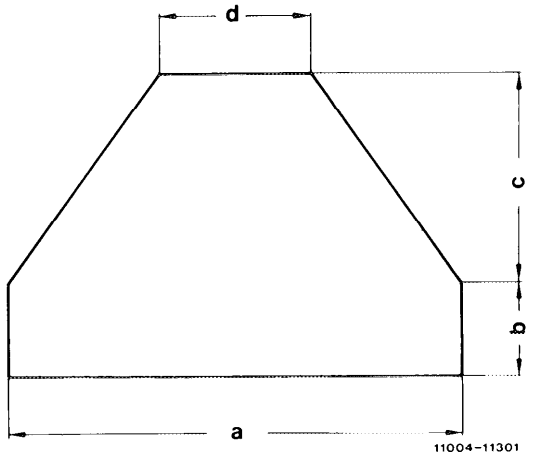
Vacuum circuit 5, mode selection and temperature wheel at “MIN” (not engaged)

37 Vacuum element for blend air flaps
41 Vacuum element for heater valve
50 Connecting hose

83-100 Removal and installation of heater box

Self **-made tool**

Guide plate
Plate thickness approx. 0.8 mm



a 350 mm
b 70 mm
c 180mm
d 120mm

Removal

1 Disconnect battery.

2 Drain coolant.

3 Remove instrument panel (68-I 00).

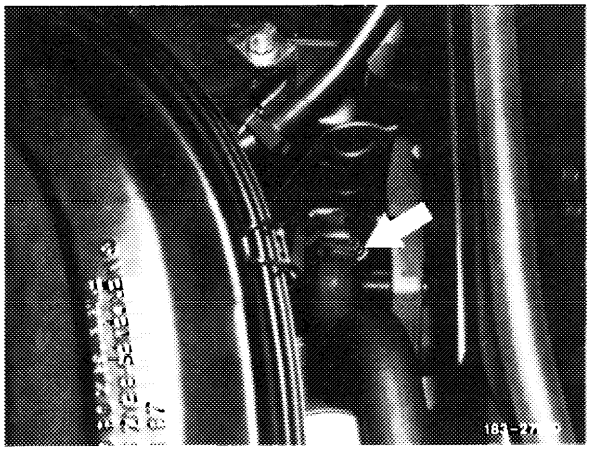
4 Remove pushbutton switch unit (83–112).

5 Remove radio.

6 Remove center console top.

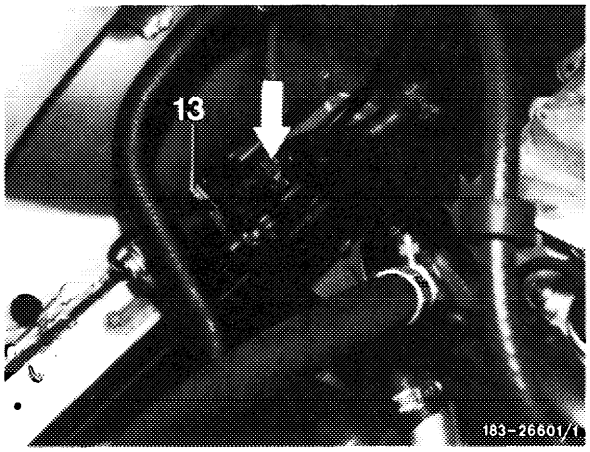
7 Remove cover of air intake (83–140).

8 Disconnect feed hose (arrow) on engine.



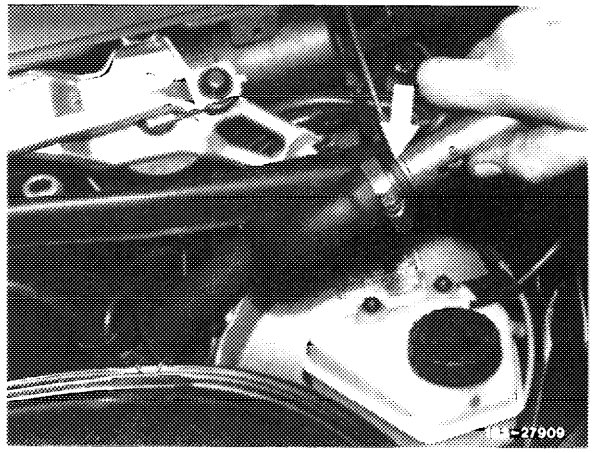
9 Disconnect return hose (arrow) on recirculating pump (13). Then disconnect and connect vacuum line on heater valve for a short moment.

10 Set container under return flow hose.

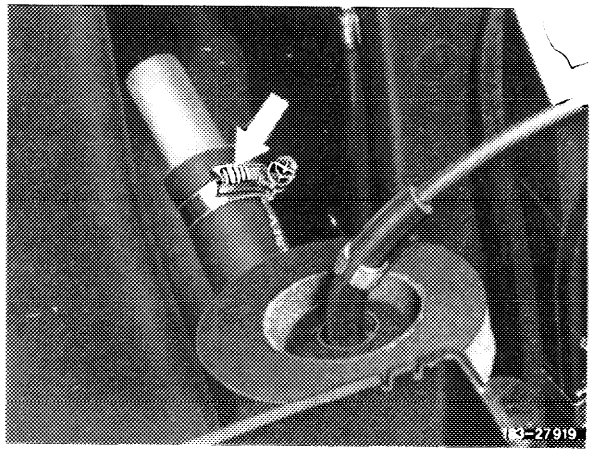


11 Position compression air nozzle (arrow) at feed hose and blow remaining coolant out of heat exchanger.

12 Reconnect feed and return flow hose.

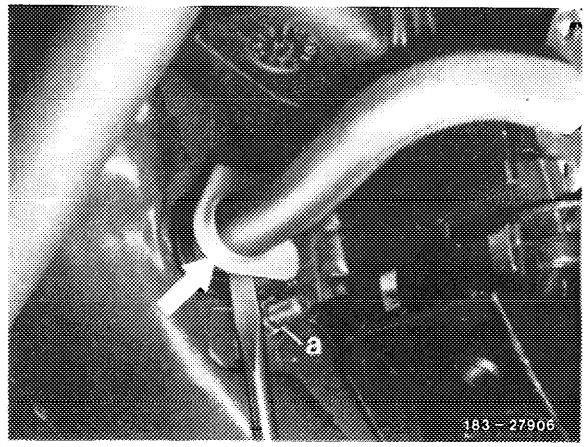


13 Disconnect feed and return flow hose (arrow) on heat exchanger.



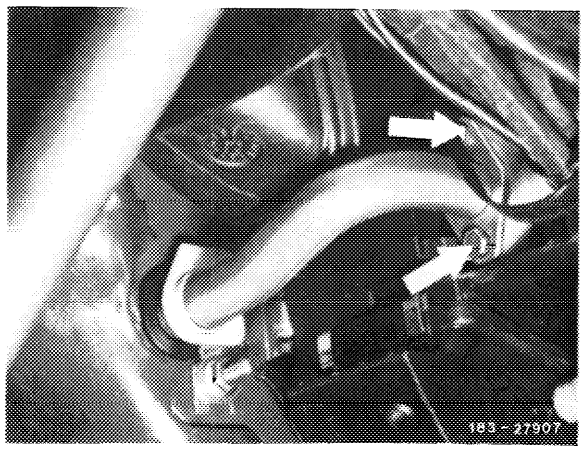
14 Remove pipe holder (arrow) from holding bracket bottom left.

15 Loosen nut (a).



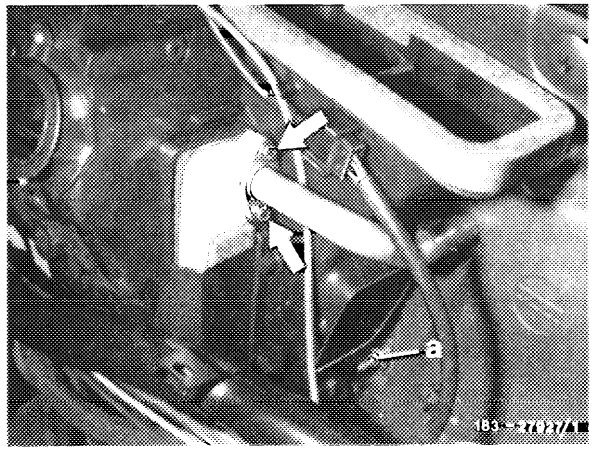
16 Unscrew feed pipe (arrow) on heat exchanger and pull out of front wall toward the rear.

17 Pull lefthand and righthand air duct for lateral venting from heater box.



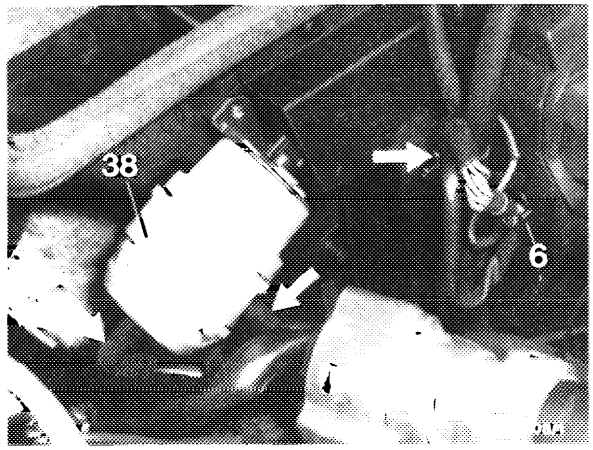
18 Unscrew return flow pipe (arrow) on heat exchanger and pull out of front wall toward the rear.

19 Loosen nut (a).

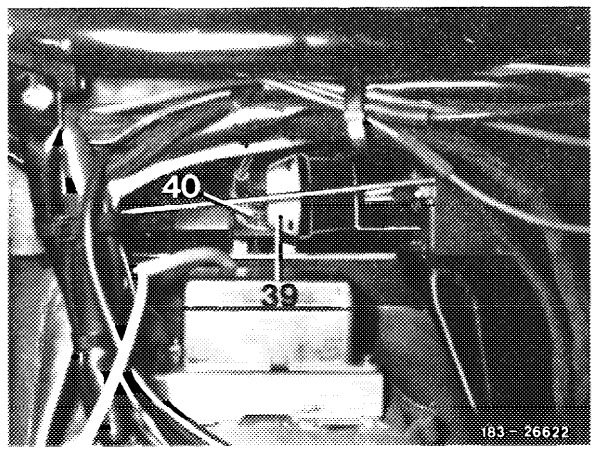


20 Loosen cable strap (arrow) on heater box and pull line connector (6) out of heater box.

21 Pull both vacuum lines (arrow) from vacuum element (38).



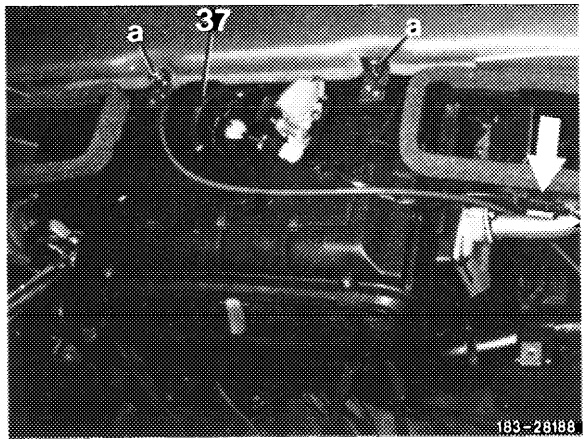
22 Pull vacuum line from vacuum element (39).



23 Pull vacuum line from vacuum element (37). Separate plug connection (arrow).

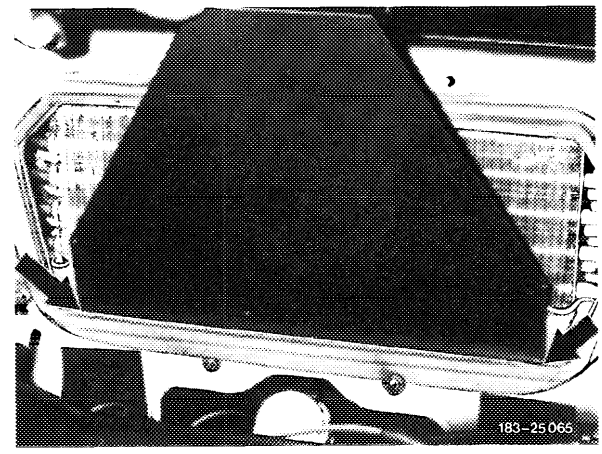
24 Unscrew both nuts (a).

25 Lift heater box out in upward direction.



26 Insert guide plate between front wall and condensate water pan (arrow).

Attention!
Be sure to insert guide plate, so that the condensate water pan is not buckling in downward direction when the heater box is inserted.



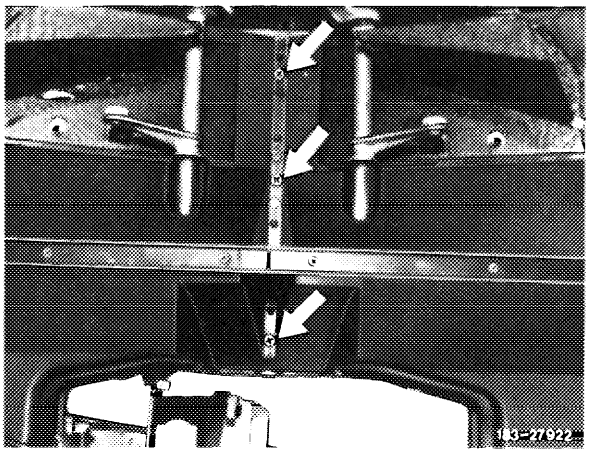
27 Insert heater box. Then pull out guide plate in upward direction.

28 For further installation proceed vice versa.

83-I 10 Removal and installation of heat exchanger

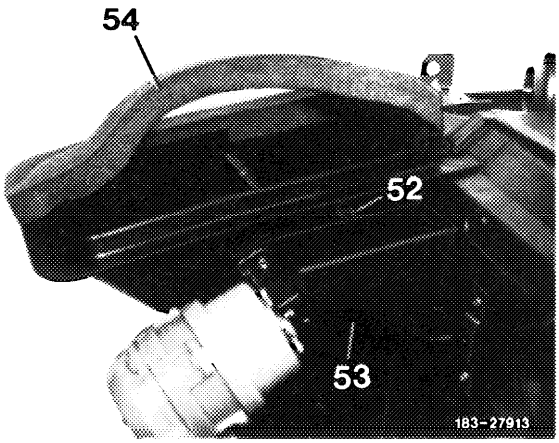
1 Remove heater box (83-100).

2 Unscrew 3 screws (arrow) on heater box.

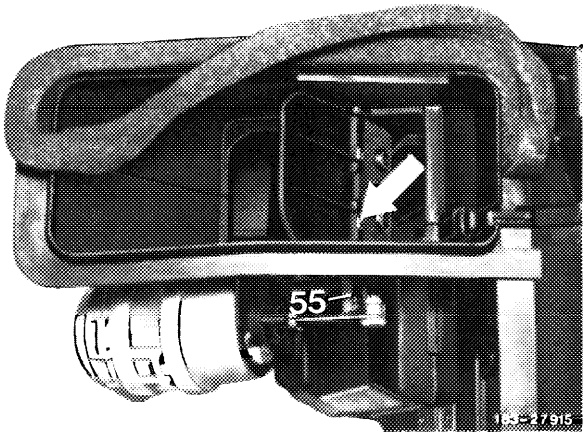


3 Remove rivet (52) and take cover (53) from heater box.

4 Loosen sealing rubber (54) on lefthand and righthand defroster nozzle up to half.

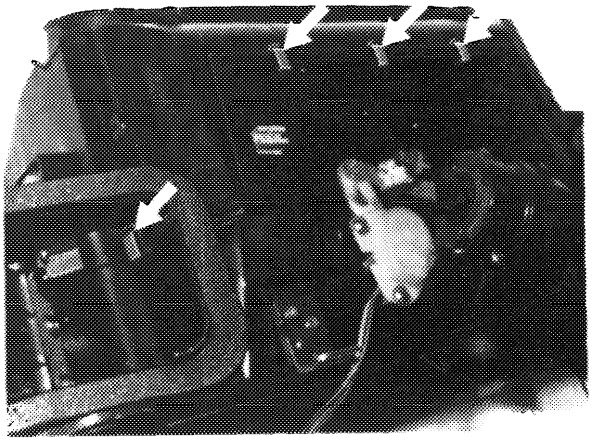


5 Pull shaft (55) partially out of lefthand defroster nozzle while pushing against engaging lug (arrow).

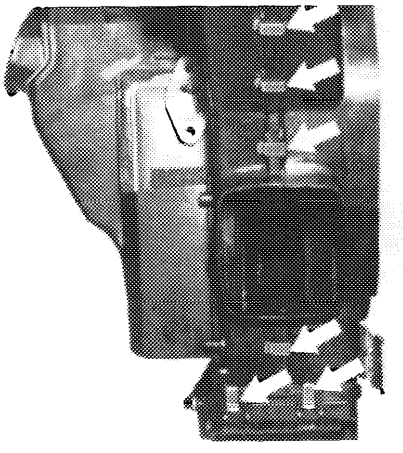


6 Push clamps (arrows) off at parting point of heater box

- top

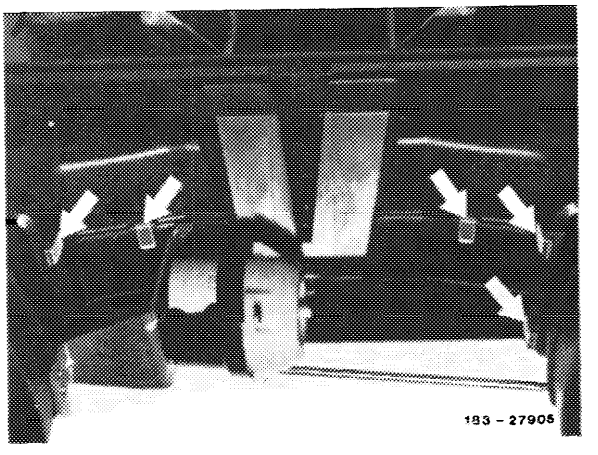


- laterally left and right



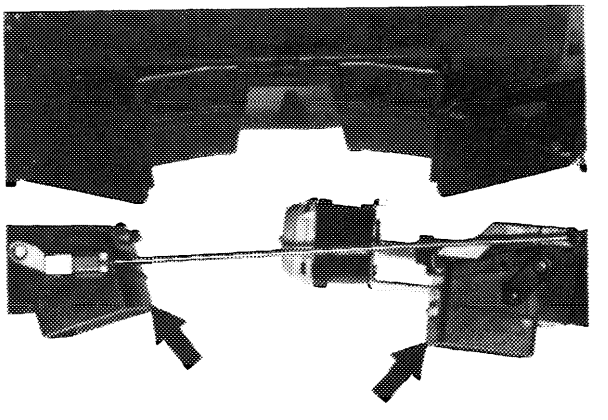
183 - 27904

- bottom



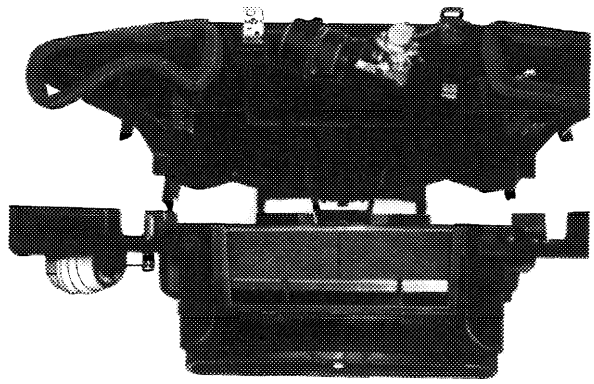
183 - 27905

7 Lift both legroom nozzles (arrow) with connecting rod from heater box.



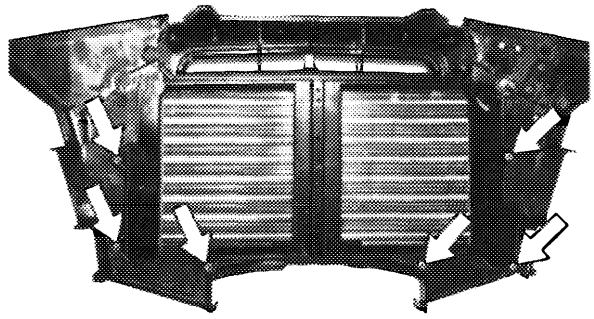
183-27911

8 Pull heater box apart at parting point.



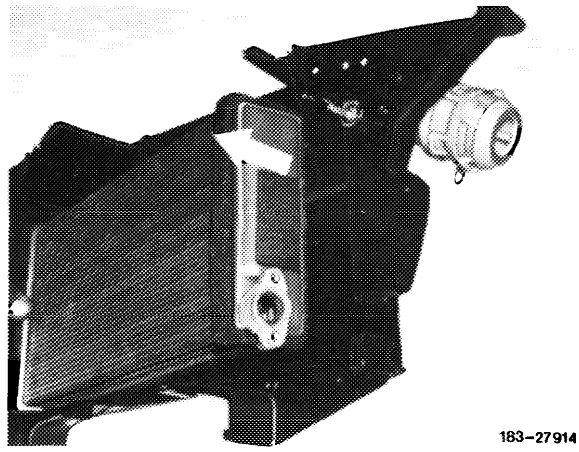
183-27916

9 Unscrew screws (arrow) on holding frame of heat exchanger and lift off holder frame.



183-27917

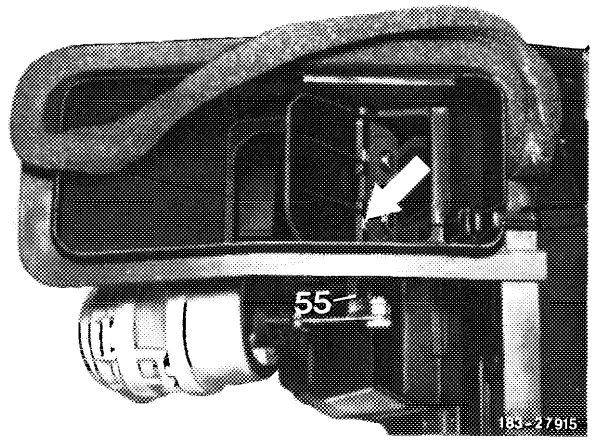
10 Lift heat exchanger out of heater box.



183-27914

11 Install in vice-versa sequence.

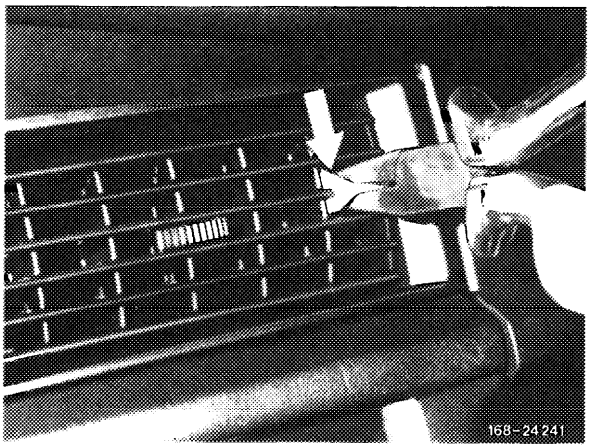
Note: When assembling heater box, make sure that the bearings of the defroster nozzle flaps are correctly seated on housing and that the lug (arrow) of shaft (55) engages at lefthand defroster nozzle flap.



183-27915

A. Removal and installation

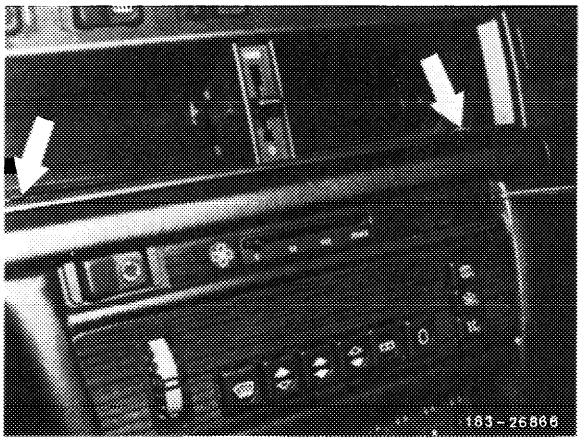
1 Pull out both outlets at instrument panel center.



2 Loosen both screws (arrow) and push center console top slightly down.

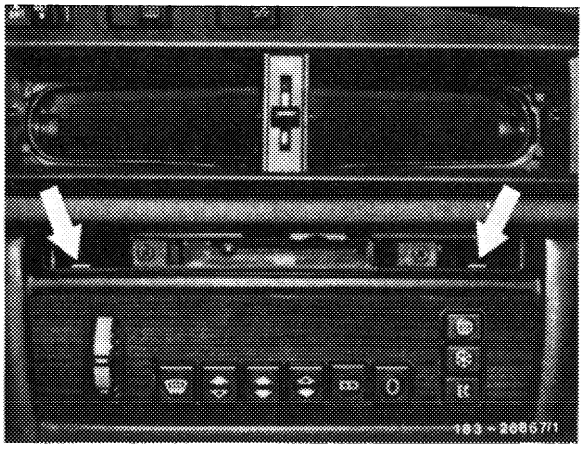
3 Pull knob from blower switch and pull molding for blower switch out of center console.

4 Pull connector from switch fresh air/recirculating air.



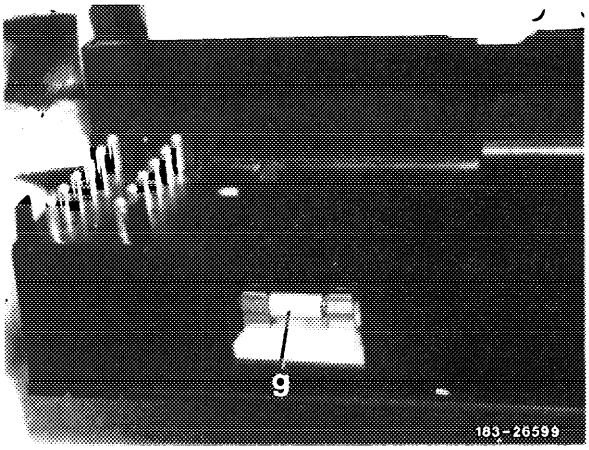
5 Lift both clamps (arrow) with a pointed tool and pull out complete pushbutton switch unit.

6 Pull both 12-pin connectors from pushbutton switch unit.



7 Install in vice-versa sequence, while plugging electric line with red adhesive tape into lefthand connecting plug of pushbutton switch unit.

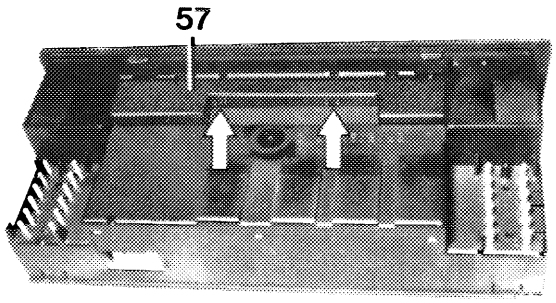
Note: The fuse for electronics in pushbutton switch unit is at the rear on pushbutton switch unit.



9 Fuse 2 amps

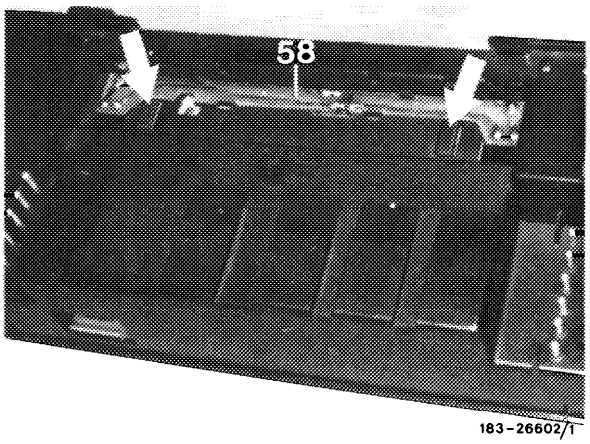
B. Renewing bulbs for lamps

1 Remove cover (57) in upward direction, while pushing against both hooks (arrow).



2 Push both engaging lugs (arrow) slightly down and pull lamp socket (58) out to the rear. Then remove bulbs from lamp socket.

3 Install in vice-versa sequence.

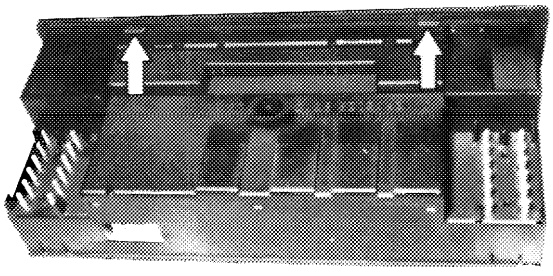


C. Removal and installation of wood panelling

1 Pull both clamps (arrow) in upward direction.

2 Remove wood panelling in forward direction.

3 Install in vice-versa sequence.

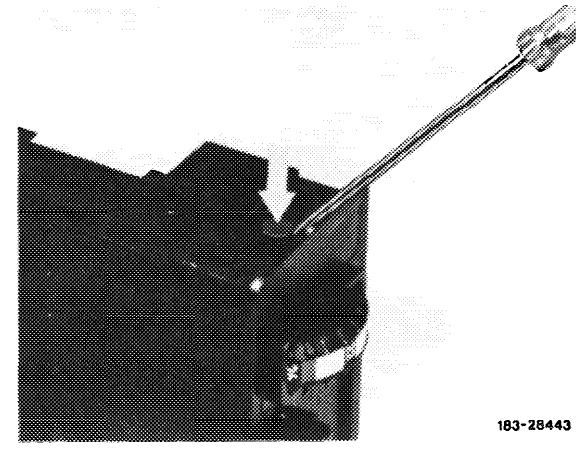


D. Removal and installation of temperature wheel (without potentiometer)

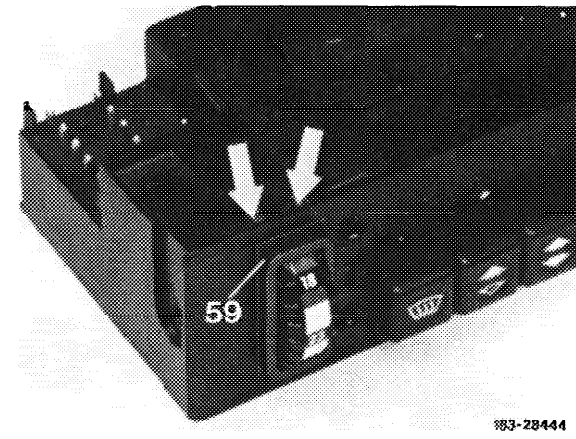
Removal

1 **Remove wooden panelling (refer to section C).**

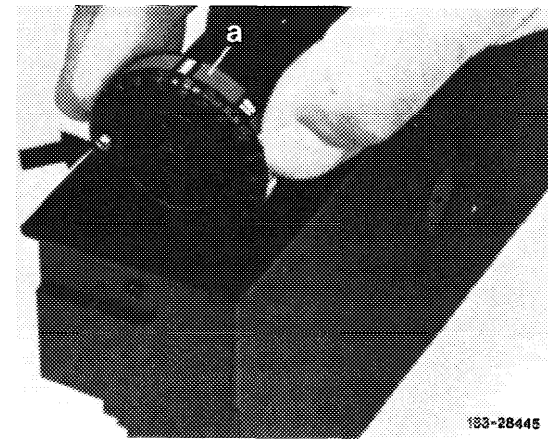
2 Position temperature wheel between "MI N" and 18 °C, then push out drive pin (arrow) with screw-driver.



3 Push engaging lugs (arrow) down and tilt frame (59) forward.



4 Remove temperature wheel (a) from pushbutton switch unit.



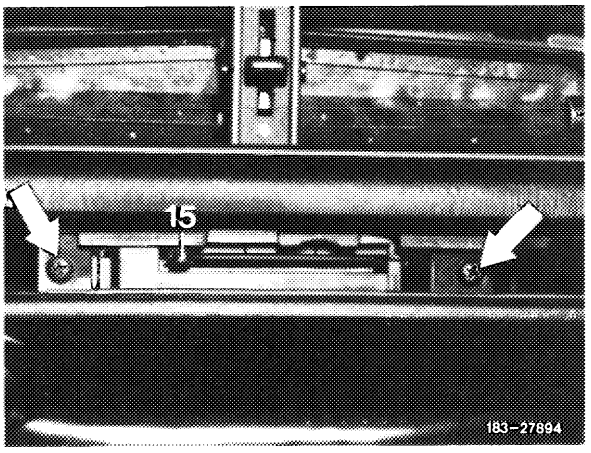
Installation

5 Insert ball (arrow) and temperature wheel (a) in position "MIN" to 18 °C into pushbutton switch unit. Then push drive pin into pushbutton switch unit, while turning temperature wheel until the drive pin engages in wheel. Continue installation in vice-versa sequence.

83-I 13 Removal and installation of blower switch

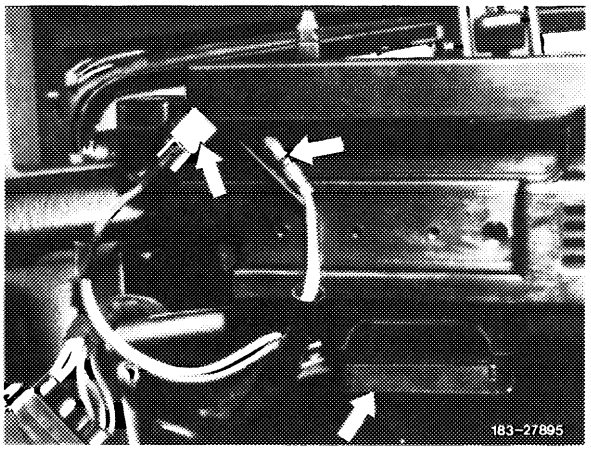
1 Remove pushbutton switch unit (83-I 12, section A).

2 Unscrew both screws (arrow) and remove blower switch (15) through opening for pushbutton switch unit.



3 Pull electric connector, glow bulb socket and light conductor (arrow) from blower switch.

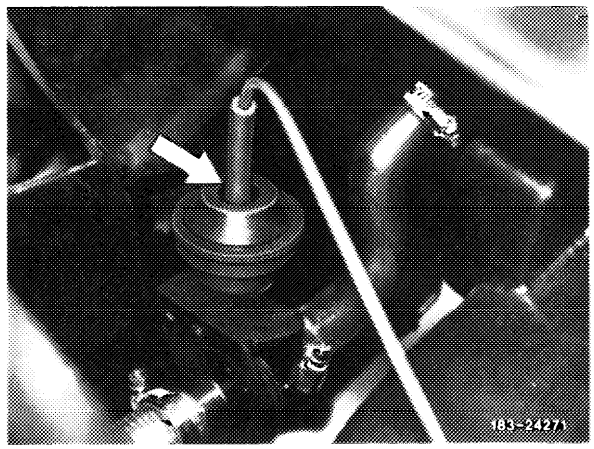
4 Install in vice-versa sequence.



83-I 15 Removal and installation of heater valve

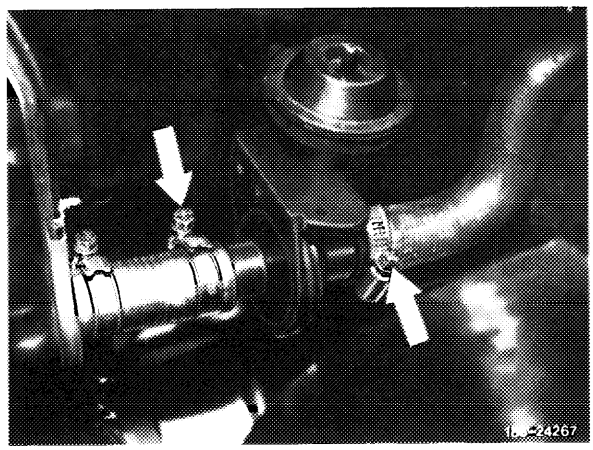
1 Remove cover on air inlet (83–140).

2 Pull off vacuum line (arrow) on heater valve.



3 Loosen hose clamps (arrow) on heater valve.

4 Pull off hoses and remove heater valve.



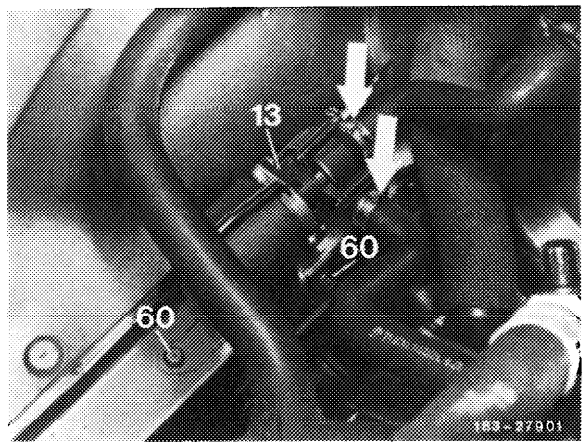
5 Install in vice-versa sequence.

Attention!
When inserting heater valve, the letters “water inlet” should face front wall.

83-117 Removal and installation of recirculating pump

1 Partially drain coolant.

2 Disconnect both hose straps (arrow) on recirculating pump (13).



3 Separate electric plug connection.

4 Unscrew both screws (60).

5 install in vice-versa sequence.

6 Fill in coolant and check cooling system for leaks.

83-120 Removal and installation of blower motor

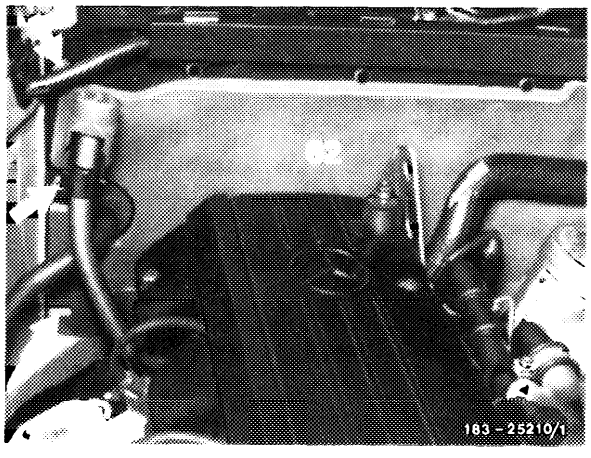
Data

Current input at 13 V ± 0.2 V 4th stage	21 A
Blower speed	rpm (1/min)
Detent 1	1800
Detent 2	2600
Detent 3	3500
Detent 4	4100
Air volume at 12 V (kg/h)	550

Removal

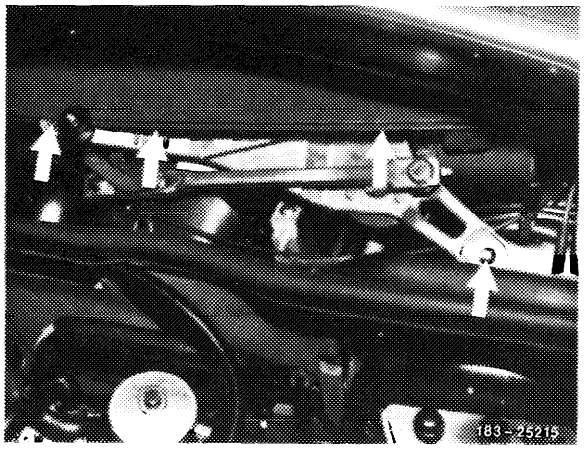
1 Remove cover on air inlet (83-I 40).

2 Loosen bulkhead (62), unscrewing screws (arrow) at left and right for this purpose. Then pull bulkhead forward up to engine.



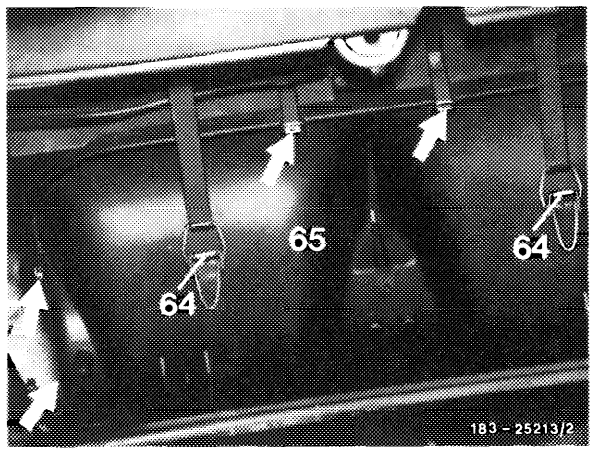
3 Remove wiper arm.

4 Unscrew screws (arrow) on wiper linkage and put wiper linkage with motor aside.



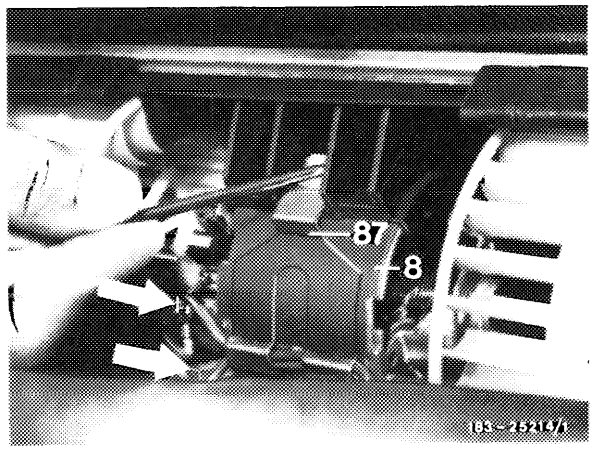
5 Loosen clamping straps (64) and unclip clamps (arrow) laterally and on top.

6 Lift out cover (65) in upward direction.



7 Unclip holding strap (87) with a pointed tool (e.g. tracer pin).

8 Pull off flat plug (arrow) and lift out blower motor (8).

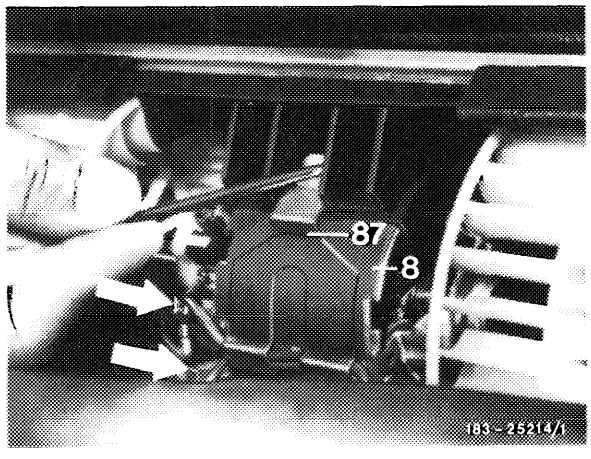


Installation

9 Insert blower motor (8) into holder in such a manner that the connections are pointing in driving direction and that the motor housing is held in motor holder.

10 Install in vice-versa sequence.

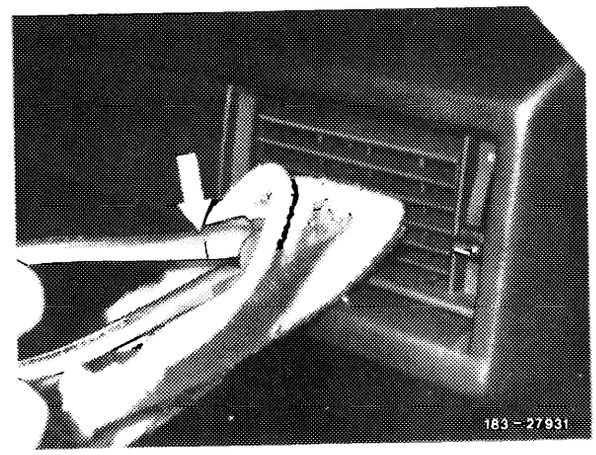
11 Test blower motor for function, paying special attention to noises, since fan wheels may wipe against housing.



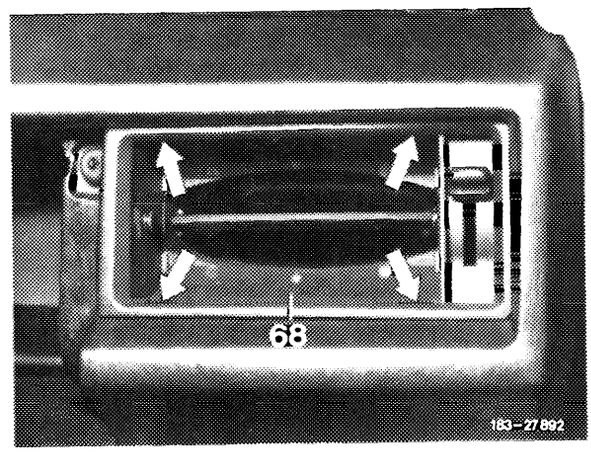
83–122 Removal and installation of aspirator blower for in-car temperature sensor

1 Remove **glove** box.

2 Pull righthand lateral outlet from instrument panel by means of flat pliers (arrow).



3 Push frame (68) for outlet out of instrument panel, while slightly raising the four detent lugs (arrow).

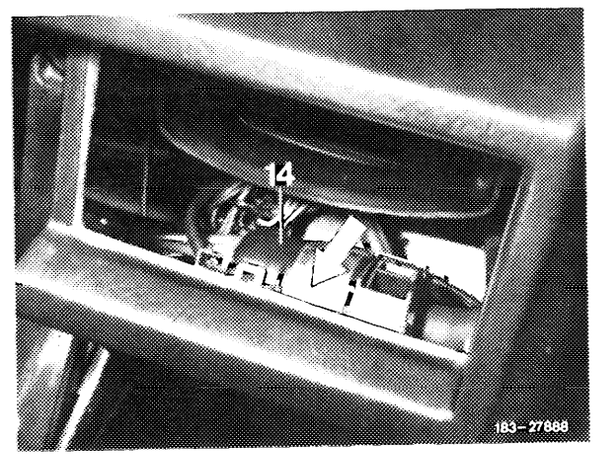


4 Unclip aspitator blower (14) from holder (arrow).

5 Pull hose and 2-pin connector from venting blower.

Install in vice-versa sequence.

6 Check aspirator blower for function, switch on ignition for this purpose.



83-I 30 Removal and installations, testing of in-car temperature sensor

Test values

Sensor temperature in °C approx.	Resistance in kΩ
+20	11.5 to 13.5
+25	9.5 to 10.5
+30	7.5 to 8.5
+35	6.0 to 7.0
+40	4.5 to 5.5
+45	3.5 to 4.5

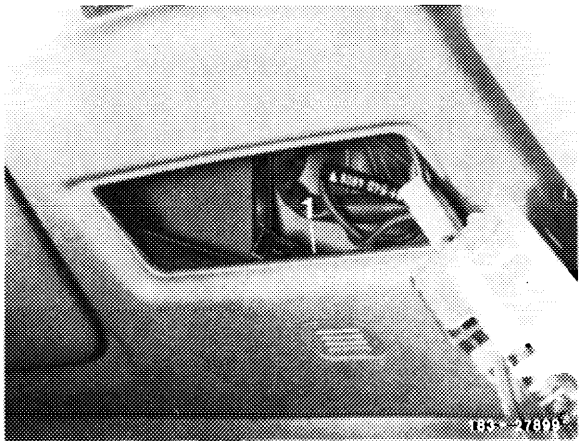
1 Pull out dome lamp.

2 Force off in-car temperature sensor (1) in upward direction.

3 Pull 2-pin connector and vent hose from in-car temperature sensor.

4 Test temperature sensor with ohmmeter.

5 Install in vice-versa sequence.

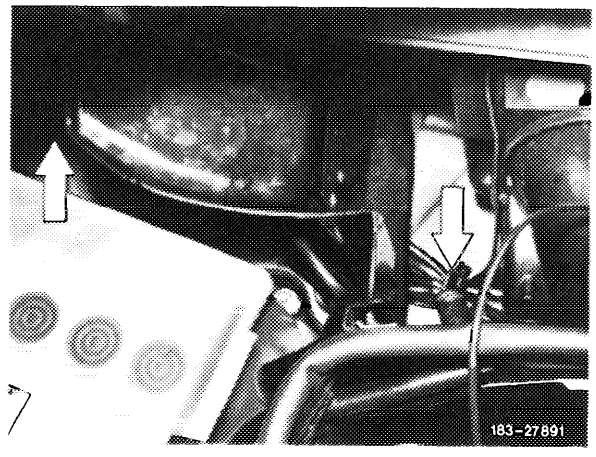


Test **values**

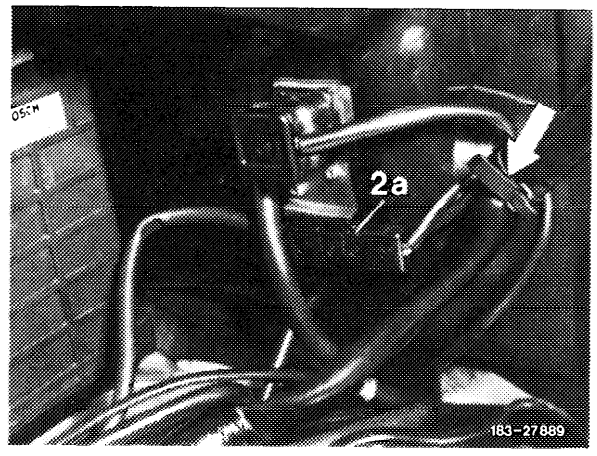
Sensor temperature in °C approx.	Resistance in kΩ
+20	3.1 to 3.9
+25	2.4 to 3.0
+30	1.9 to 2.3
+35	1.6 to 2.0
+40	1.4 to 1.6
+45	1.1 to 1.3

1 Remove heater valve (83-I 15).

2 Loosen cable strap (arrow).



3 Loosen cable strap (arrow) and separate 2-pin plug connection (2a).

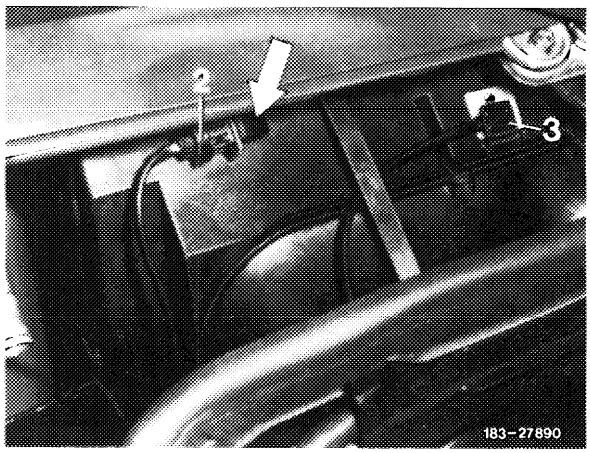


4 Pull outside temperature sensor (2) from holder.

5 Test temperature sensor with ohmmeter.

6 Install in vice-versa sequence.

Note: Opening of outside temperature sensor (arrow) should face evaporator housing.



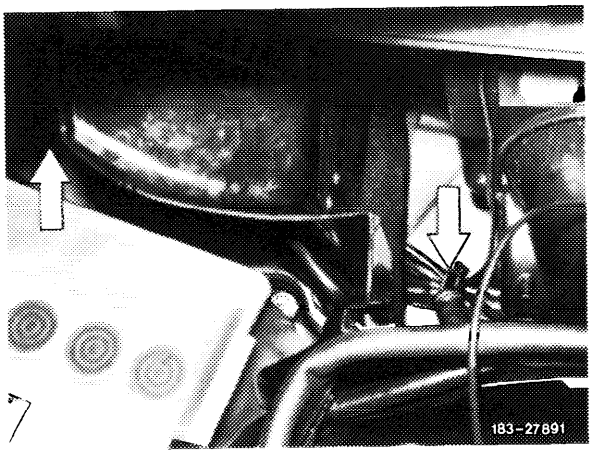
83–133 Removal and installation, testing of temperature sensor for air conditioning system

Test values

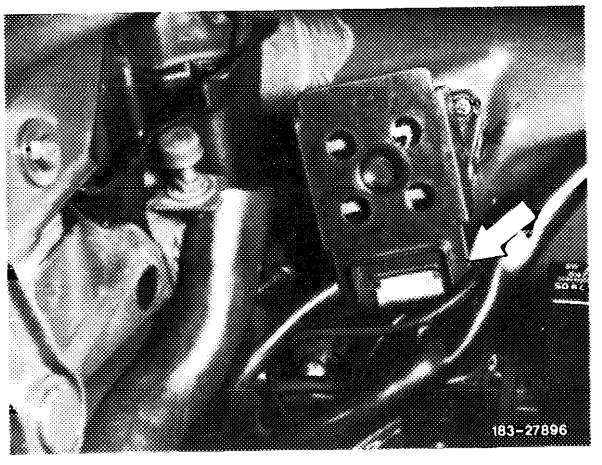
Sensor temperature in °C approx.	Resistance in kΩ
± 0	57 to 67
+ 5	46 to 54
+10	37 to 45
+15	30 to 36
+20	24 to 28
+25	20 to 24
+30	14 to 16
+35	13 to 15

1 Remove heater valve (83-I 15).

2 Loosen cable straps (arrow).



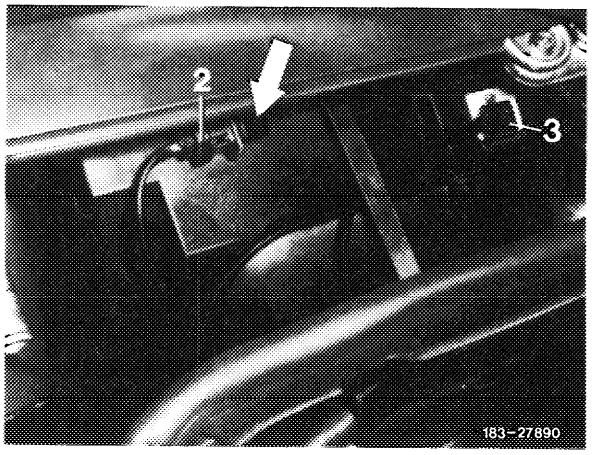
3 Separate 2-pin plug connection (arrow).



4 Pull temperature sensor (3) out of guide tube.

5 Test temperature sensor with ohmmeter.

6 Install in vice-versa sequence.



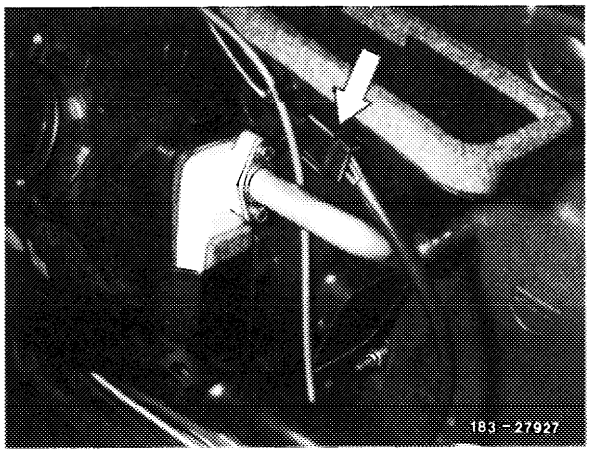
Special tools

Socket box	Test cable for socket box
124 589 00 21 00	124 589 04 63 00

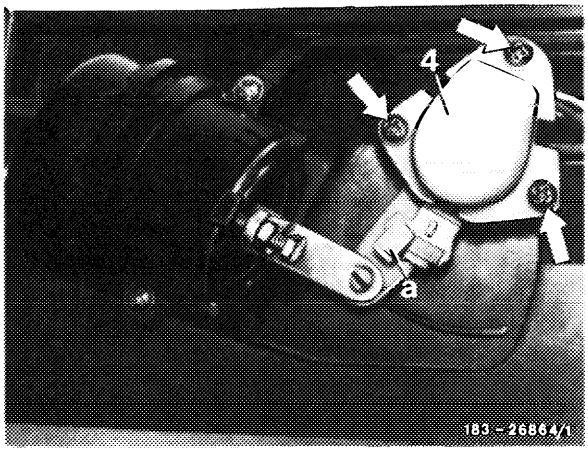
Removal

1 Remove instrument panel (68-100).

2 Separate 3-pin plug connection (arrow).



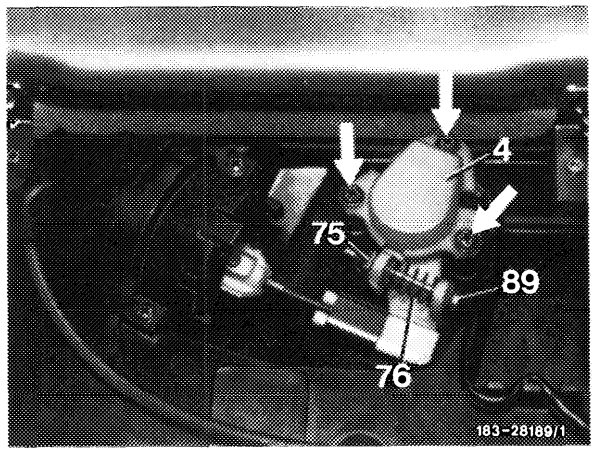
3 On version 1, unscrew 3 screws (arrow) and pull potentiometer for flap position (4) from lever (a) of blend air flaps.



1 st version

4 On 2nd version, unscrew screw (89). Then remove nut (75) and spring (76).

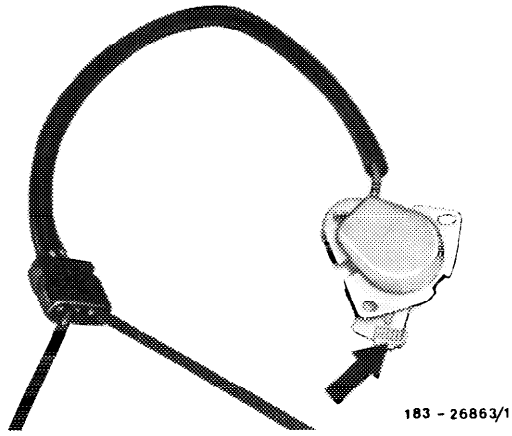
5 Unscrew 3 screws (arrow) and lift off potentiometer for flap position (4).



2nd version

Testing

6 Connect ohmmeter to terminal 1 and 2 of potentiometer for flap position and slowly move lever (arrow) from stop to stop. The resistance should be from approx. 8 Ω to 4.4 ± 1 kΩ without interruption. Renew return potentiometer, if required.



Installation

7 Mount potentiometer for flap position depending on version on heater box and connect.

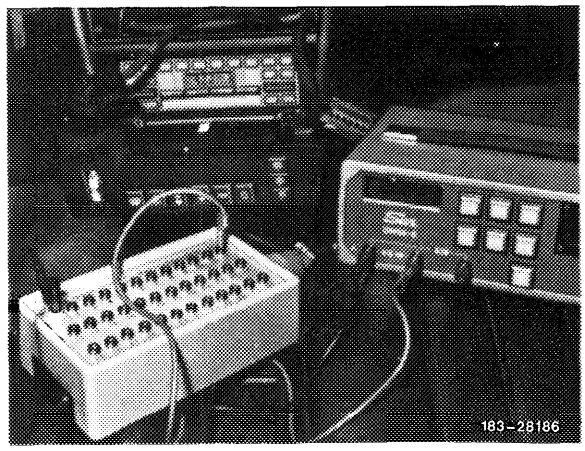
Adjustment

8 Connect control unit and socket box, while plugging electric lines with red adhesive tape to lefthand connecting plug of control unit.

9 Connect voltmeter positive to socket 17 and connect ground to socket 1 of socket box.

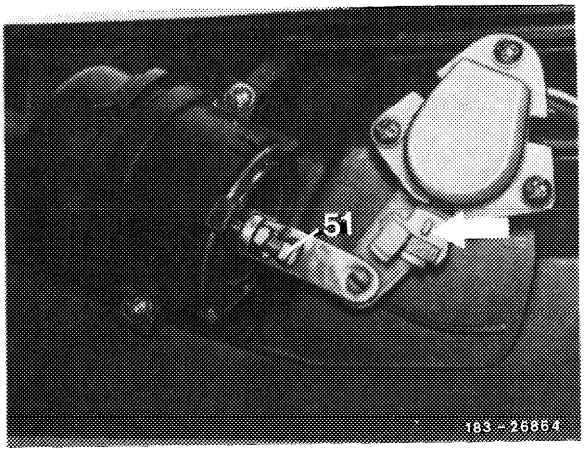
10 Close oil line for oil pressure gauge and run engine at idle speed.

11 Engage temperature wheel at “MIN” and wait for approx. 60 seconds.



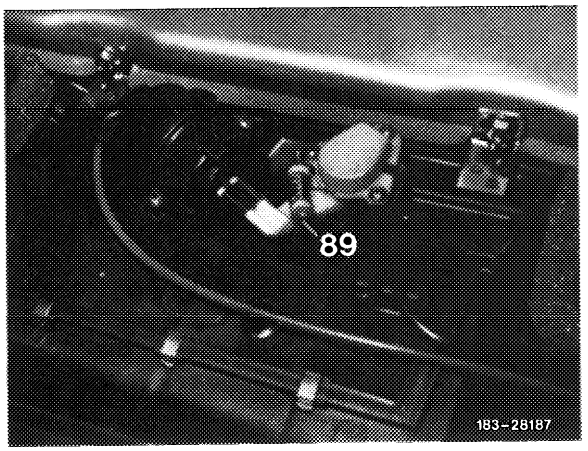
12 Set voltage to 4 ± 0.1 bar.

On 1st version adjust to the left or right by bridging segment on lever (arrow) of potentiometer for flap position, adjust stop screw (51) slightly, if required.



1 st version

10 On 2nd version, turn adjusting screw (89) to the left or right.



2nd version

11 Engage temperature wheel at “MAX”, wait for approx. 60 seconds and test voltage 0.3-l .2 V.

Attention!
If the voltage is not attained, check whether the blend air flaps can be moved from position “full heating” to “full cooling”. For this purpose, disconnect connecting rod from vacuum element and move on lever of potentiometer from stop to stop.

12 Install instrument panel.

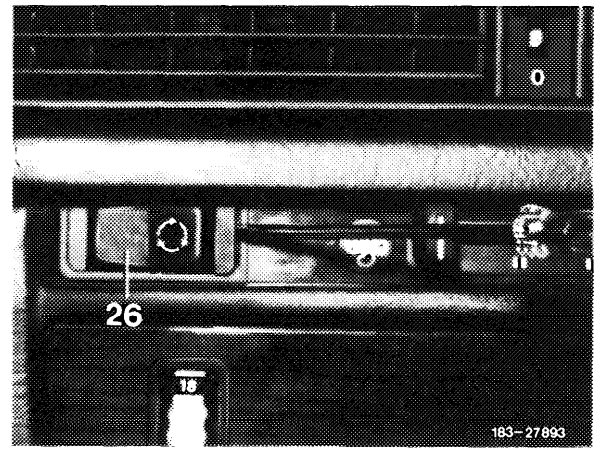
13 Check heater for function.

83-138 Removal and installation, testing of switch for fresh air/recirculating air flap

1 Unclip the springs at left and right on switch (26) by means of a flat, wedge-shaped tool and pull out switch.

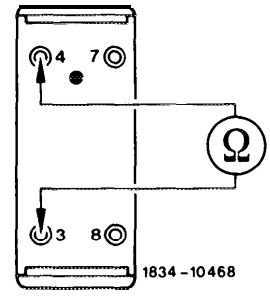
2 Pull connector from switch.

Install in vice-versa sequence.

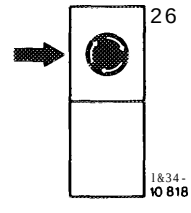


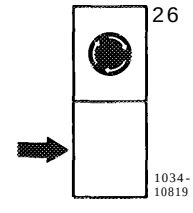
Testing

Connect ohmmeter to terminal 3 and 4.



Switch 26		Nominal value
Push symbol (arrow, top)	ON	= 0 to 1 Ω
Push without symbol (arrow, below)	OFF	= ∞



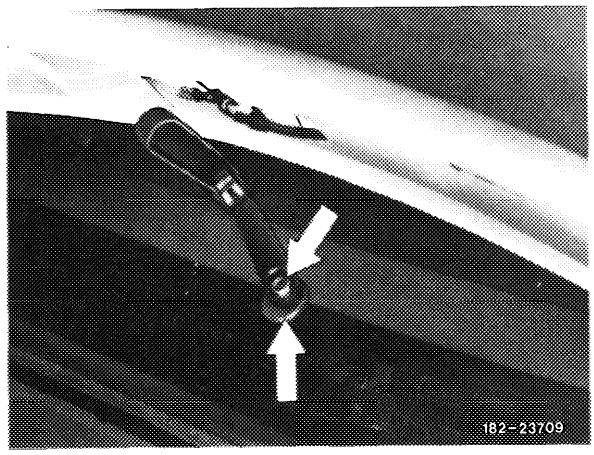


83-140 Removal and installation of cover at air inlet

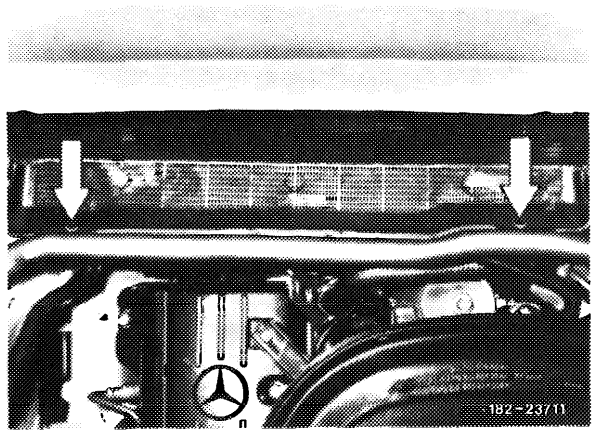
1 Open engine hood to 90° position.

2 Open cover on wiper arm, unscrew nut underneath and pull off wiper arm (upper arrow).

3 Push round cover from wiper shaft (lower arrow).



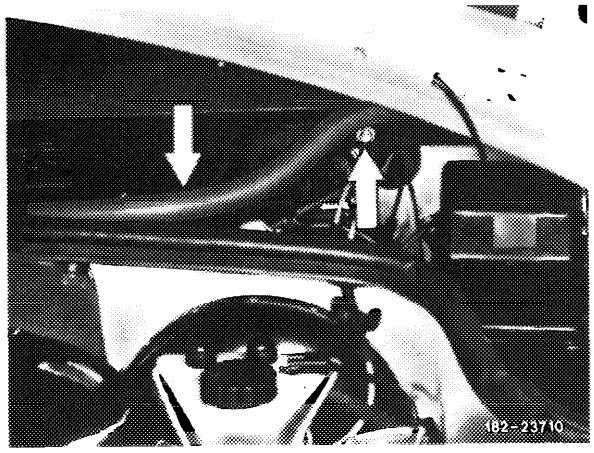
4 Push out clips on partition.



5 Pull rubber seal at left and right from cover at air inlet and unscrew screws (arrow).

6 Pull out cover at air inlet from lower trimstrip at windshield pane and remove.

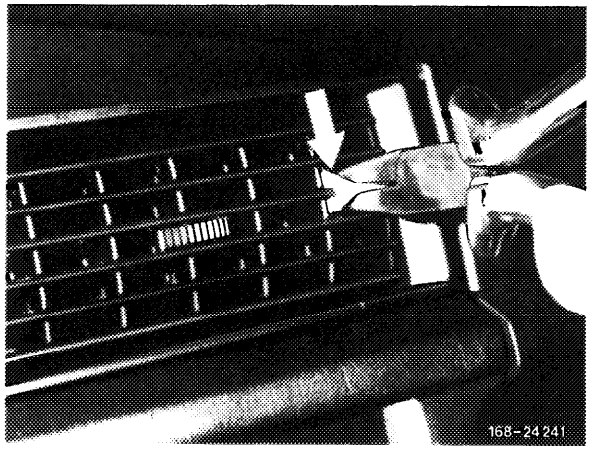
7 Install in vice-versa sequence.



83-150 Removal and installation of outlets on instrument panel outside and center

1 **Pad flat pliers with a rag and pull outlet at left and right out of mount.**

2 Install in vice-versa sequence.

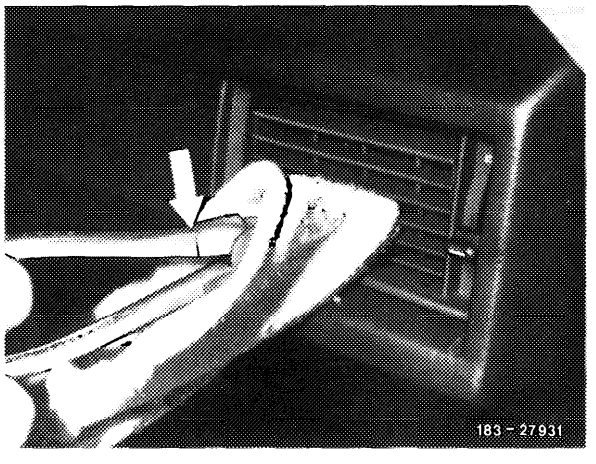


83-153 Removal and installation of switchover valve unit with 4 or 5 connections

Removal

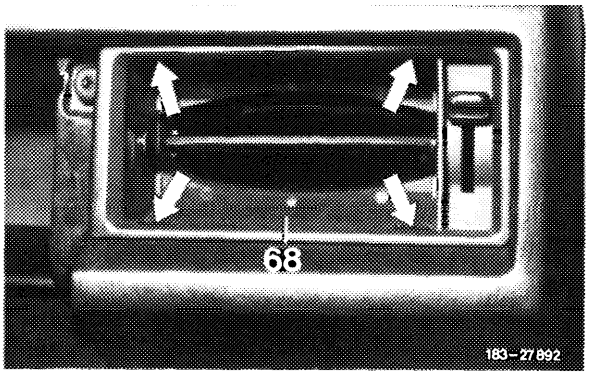
1 Install glove box.

2 Pull righthand lateral outlet from instrument panel.



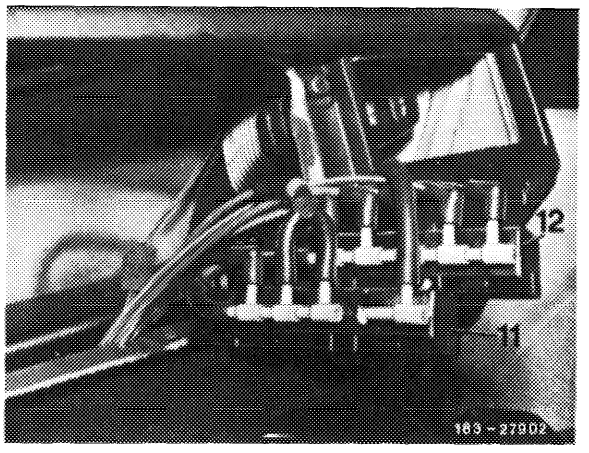
3 Push frame (68) for lateral outlets out of instrument panel while slightly lifting the four detent lugs (arrow).

4 Remove venting blower (83-122).

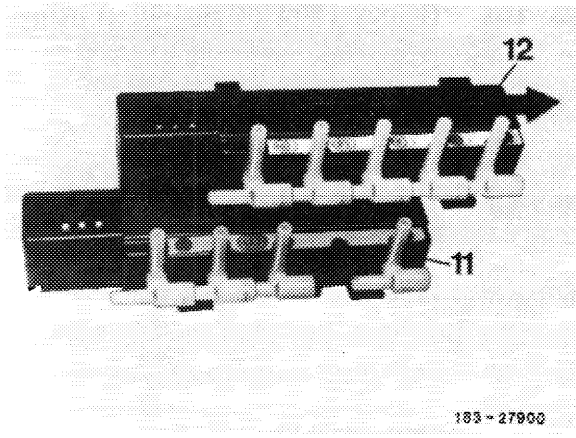


5 Unclip switchover valve units (11 and 12) from holder.

6 Pull vacuum lines and both 6-pin connectors from switchover valve units.



7 Force switchover valve unit (12) to the right (arrow) from switchover valve unit (1 1).



installation

8 Slip switchover valve unit (12) up to stop on switchover valve unit (11).

9 Plug vacuum lines according to respective color identification of switchover valves on pertinent switchover valves (also refer to vacuum diagram 83-028, section B).

10 Plug 6-pin connector with red adhesive tape to switchover valve unit (11).

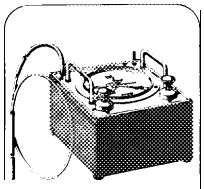
11 For further installation proceed vice versa.

83-165 Removal and installation of vacuum elements

Data

Permissible leaking of vacuum elements	20 mbar/min at 300 mbar vacuum
Plug-on length of connections	10–12 mm

Special tools



201 589 13 21 00

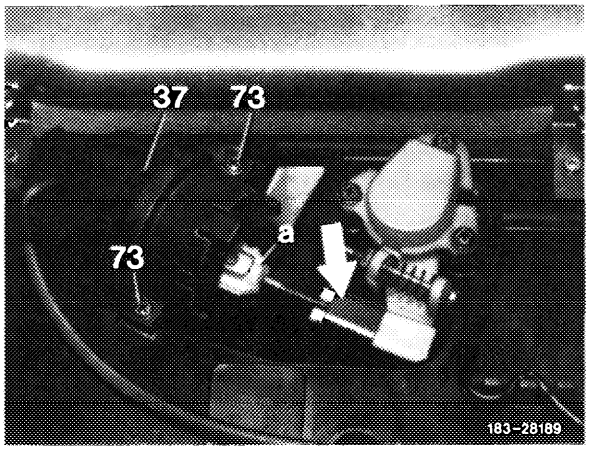
Socket box

124 589 00 21 00

Test cable for socketbox

124 58904 63 00

A. Vacuum element (37) for blend air flaps



Removal

1 Remove instrument panel (68-100).

2 Pull vacuum line from vacuum element (37).

3 Unclip clamp (arrow) from connecting rod (a).

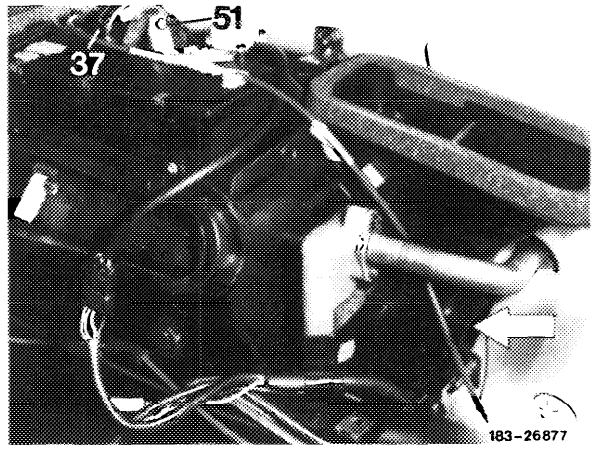
4 Unscrew both screws (73).

Installation

5 Fasten vacuum element to heater box and mount connecting rod.

6 Connect vacuum tester to vacuum element (37) and evacuate with tester to approx. 400 mbar vacuum.

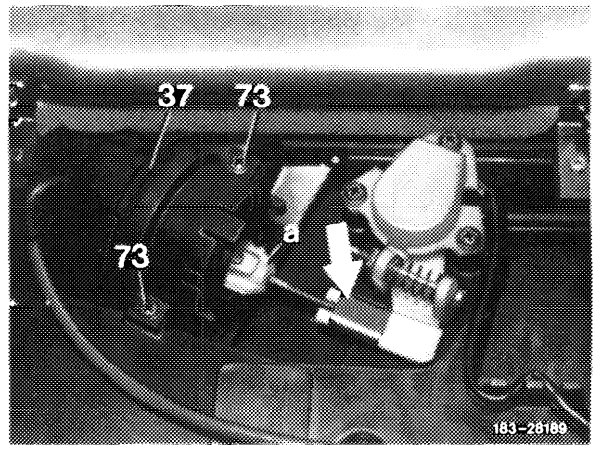
7 On 1 st version, check whether stop screw (51) rests against vacuum element (37). Simultaneously, the blend air flaps (noticed by the air coming out of lateral outlets at the right, arrow) must be closed. Adjust stop screw (51), if required.



1 st version

8 On 2nd version, check whether the blend air flaps (noticed by the air coming out of lateral outlets, right) are closed. If required, turn connecting rod (a) to the left or right.

9 Disconnect vacuum tester and connect vacuum line green to vacuum element (37).



2nd version

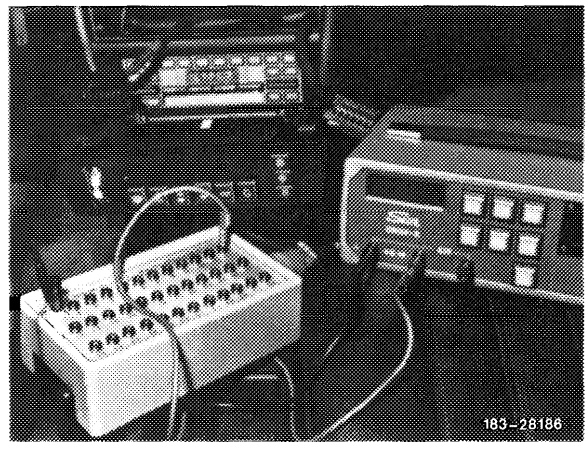
10 Connect socket box on control unit, while plugging electric lines with red adhesive tape to lefthand connecting plug of control unit.

11 Connect voltmeter + to socket 17 and — to socket 1 of socket box.

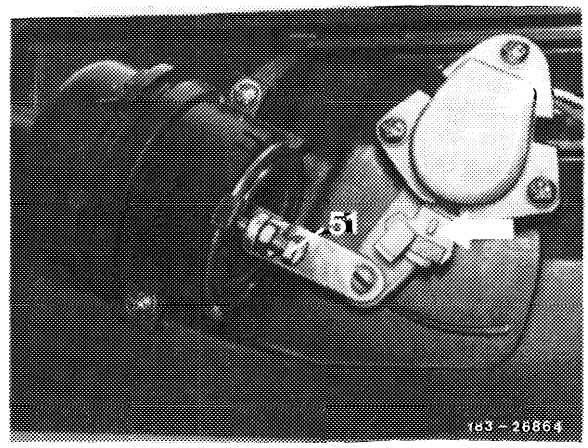
12 Close oil line for oil pressure gauge and run engine at idle speed.

13 Engage temperature wheel at “MIN” and wait for approx. 60 seconds.

14 Set voltage to 4 ± 0.1 V:

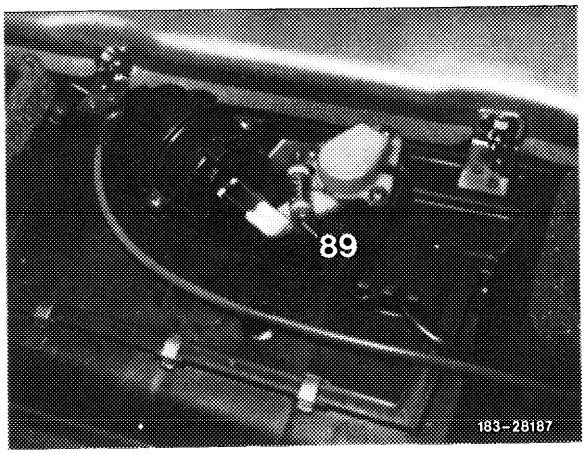


On 1st version adjust to the left or right by bridging the segment on lever (arrow) of potentiometer for flap position. Slightly adjust stop screw (51), if required.



1 st version

15 On 2nd version, turn adjusting screw (89) to the left or right.



2nd version

16 Engage temperature wheel at “MAX”, wait for approx. 60 seconds and test voltage 0.3-l .2 V.

Note: If the voltage is not attained, check whether the blend air flaps are moving from position “full heating” to “full cooling”. Make blend air flaps operable, if required.

17 Close socket box on control unit.

18 Install instrument panel.

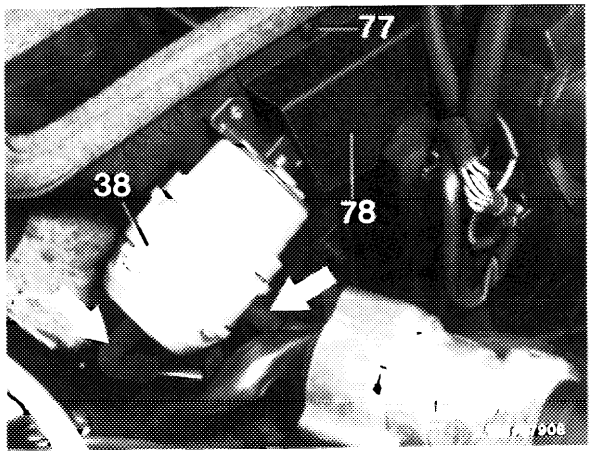
19 Check heater for function.

B. Vacuum element (38) for defroster nozzle flaps

1 Remove instrument cluster.

2 Pull both vacuum lines from vacuum element (38).

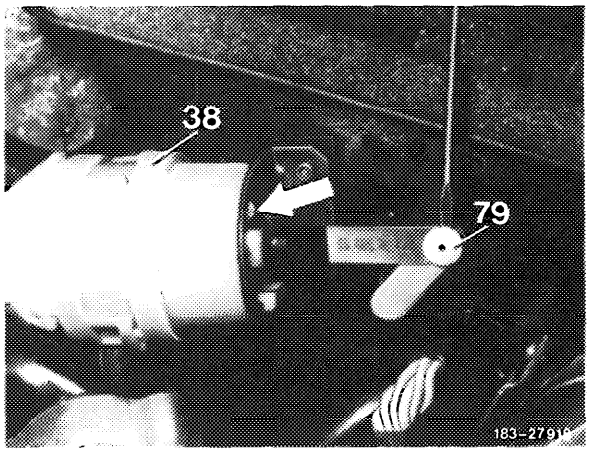
3 Take out rivet (77) and remove cover (78).



4 Remove clamp (79).

5 Push down detent (arrow) of bayonet lock while simultaneously turning vacuum element (38) to the left.

Install in vice-versa sequence.

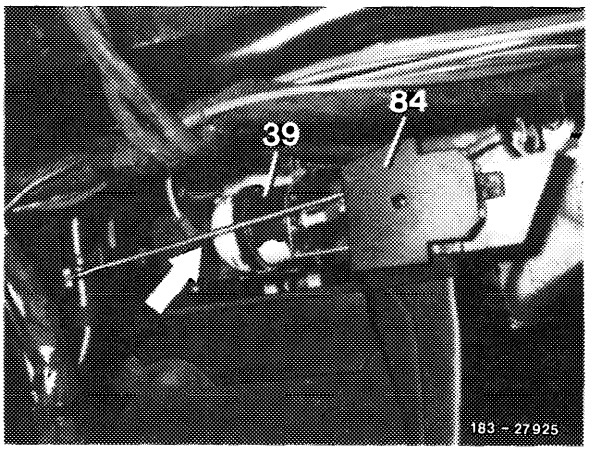


C. Vacuum element (39) for legroom flaps

1 Remove center console top (68-200).

2 Pull vacuum line (arrow) from vacuum element (39).

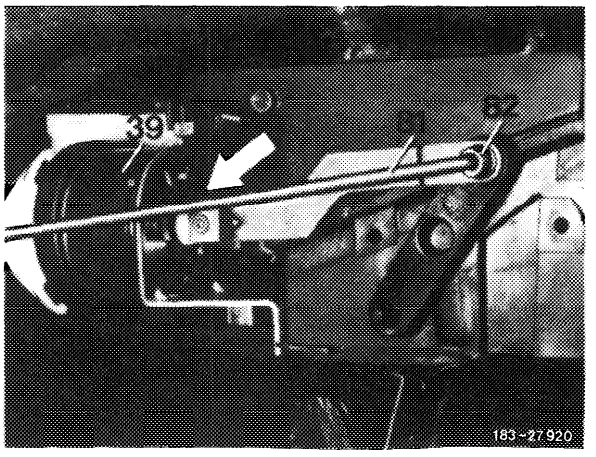
3 Push off cover (84).



4 Pull connecting rod (81) and clip (82) from lever for legroom flaps.

5 Push down detent (arrow) of bayonet lock while simultaneously turning vacuum element (39) to the left.

Install in vice-versa sequence.

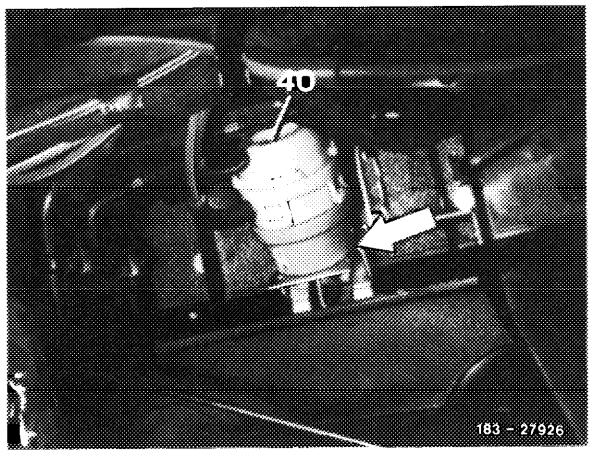


D. Vacuum element (40) for fresh air/recirculating air flap

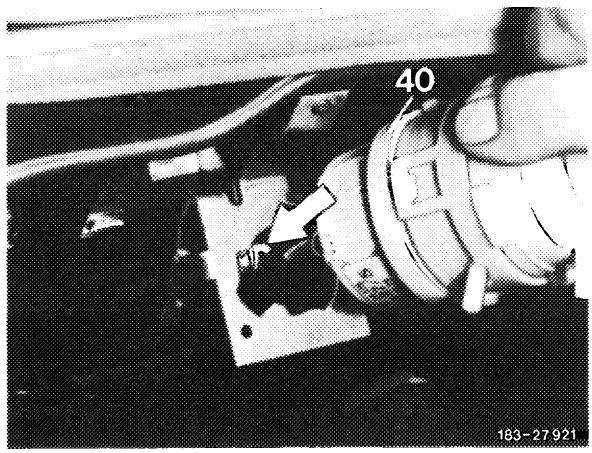
1 Remove vacuum element (39) for legroom flaps (refer to 83-I 65, section C).

2 Pull both vacuum lines from vacuum element (40).

3 Turn vacuum element (40) to the left while slightly lifting vacuum element with a screwdriver (arrow).



4 Push connecting rod of vacuum element from clip (arrow).



5 Connect vacuum lines (medium green/yellow) top and (medium green/light blue) in center to vacuum element (40).

6 Continue installation in vice-versa sequence.

EXIT

Data

Resistance of rpm sensor	590 ± 60 Ω

Conventional tool

Pliers for locking ring J2 (inside lock)	e.g. Hazet D-5630 Remscheid

1 Remove refrigerant compressor (83-522).

2 Loosen line and plug housing on refrigerant compressor.

3 Open plug housing and remove both plug pins for rpm sensor.

4 Remove locking ring (arrow) and pull out rpm sensor (144).

5 Install in vice-versa sequence, while checking sealing ring on refrigerant compressor for rpm sensor. Renew, if required. Moisten sealing ring with cold-flowing oil.

6 Let refrigerant vapor flow into refrigerant compressor on service valve (arrow). A bottle or filling cylinder pressure of above 4 bar gauge pressure is required.

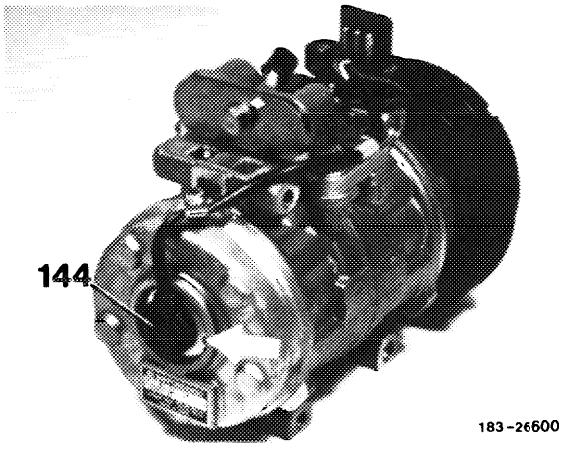
7 In installation position of refrigerant compressor, rotate compressor shaft several times manually in direction of rotation.

8 Check refrigerant compressor for leaks by means of leak test.

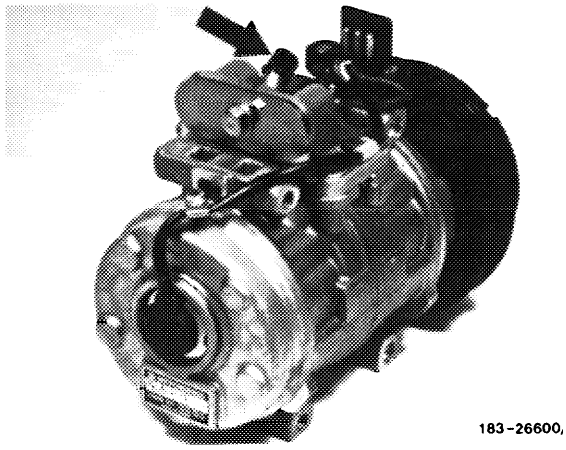
9 Connect valve on service unit or on filling cylinder again and remove hose line on service valve.

10 Install refrigerant compressor (83-522).

11 Evacuate air conditioning system, fill again, and check for function and leaks (83–036).



183-26600


183-26600,

83-517 Removal and installation of rpm sensor on starter ring gear (model 201.122)

Data

Resistance of rpm sensor	1.8 ± 0.2 kΩ

Conventional tool

Hex. socket wrench 5 mm

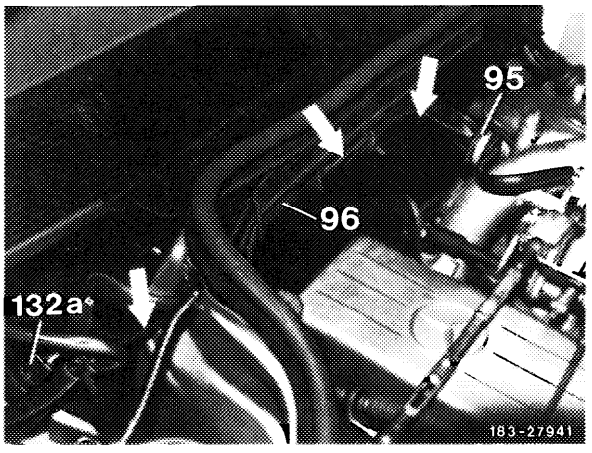
1 Remove air cleaner housing.

2 Remove rear engine compartment panelling, below.

3 Separate 2-pin plug connection (132a).

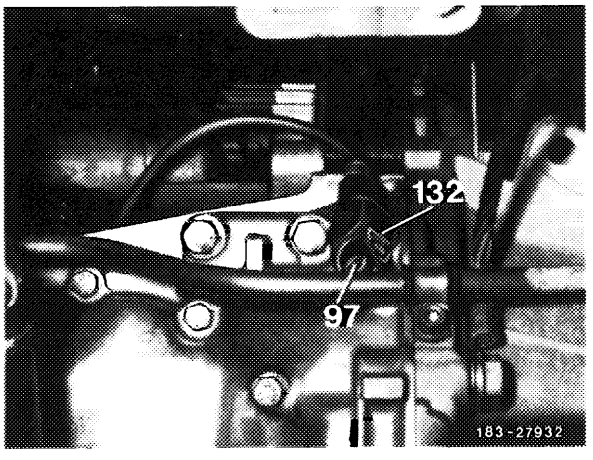
4 Remove clamp (95).

5 Open line cover (96) and expose line of rpm sensor (arrows).



6 Unscrew screw (97) and pull rpm sensor (132) out of oil pan.

Install in vice-versa sequence.



83–520 Checking oil level in refrigerant compressor

Oil filling capacity

Oil type cold-flowing oil (for approved refrigerant compressor oil types refer to Specifications for Service Products, page No. 362)

Oil capacity, fresh oil, in refrigerant compressor	Delco refrigerant compressor	170 cc
	Nippondenso refrigerant compressor	120 cc

Jobs on refrigerant system

During each repair job on refrigerant system renew container of receiverdrier on principle.

Procedure	Quantity of compressor oil to be filled in, including 10 cc oil for receiverdrier
1. Repair or slow loss of refrigerant	
Refilling refrigerant:	
Up to 400 g (no leak showing up)	Do not fill in compressor oil.
Completely fill system owing to leaks and renew receiver-drier.	20 cc fresh oil
Renew refrigerant compressor and receiver-drier. Drain oil from removed compressor and measure quantity. Also drain oil from new compressor.	Same quantity as from removed compressor and fill an additional 10 cc (for receiverdrier) into new compressor, drained oil of new compressor can be used.
Recondition refrigerant compressor (e.g. front shaft seal) and renew container of receiver-drier. For this purpose, drain refrigerant slowly (suction end).	Fill 20 cc of fresh oil into compressor.
2. **Sudden discharge of system (e.g. broken line or accident)**	
Renew defective part and receiver-drier as described under 1. and 3., including specified quantity of oil.	Fill in additional 40 cc compressor oil.

Note

Upon evacuation (approx. 30 minutes) fill air conditioning system with approx. 200 g refrigerant R 12 and check for leaks. Then drain refrigerant again and evacuate again (approx. 15 minutes).
Then fill system with specified quantity of refrigerant and test air conditioning system for function.

3. Replacing components	
Renew condenser	20 cc of fresh oil
Renew evaporator	40 cc of fresh oi l
Renew receiver-drier	10 cc of fresh oil
Suction line from evaporator to compressor and pressure line from compressor to condenser	10 cc of fresh oil each

Note

If the refrigerant compressor is reconditioned or renewed, pay attention to quantity of cold-flowing oil to be filled in.
For details refer to oil capacity while working on refrigerant system. But be sure to install a new receiver-drier each time.

If up to 400 g refrigerant are lost over a longer period, no cold-flowing oil need be added. If more than 400 g of fresh refrigerant are filled in, check air conditioning system for leaks. If refilling is required, add approx. 20 cc of cold-flowing oil into system prior to evacuating.

Checking and correcting oil capacity of refrigerant compressor

1 Remove refrigerant compressor (83-522).

2 If the refrigerant compressor is renewed, drain oil from refrigerant compressor while holding refrigerant compressor Delco R 4 with shaft end in upward direction and holding refrigerant compressor Nippondenso with pressure and suction hole in downward direction and letting the oil run out through pressure and suction hole for approx. 10 minutes. Accelerate draining of the oil by rotating drive shaft (coupling) several times.

3 Drain oil from new refrigerant compressor as described under item 2.

4 Check how much oil has run out of original refrigerant compressor and out of pipe line.

5 Fill similar quantity of fresh oil into new refrigerant compressor through suction hole, plus an additional 10 cc for new receiver-drier.

6 When reconditioning refrigerant compressor (e.g. front shaft seal) renew receiver-drier and add an additional 20 cc of fresh oil into compressor.

7 Install refrigerant compressor (83–522).

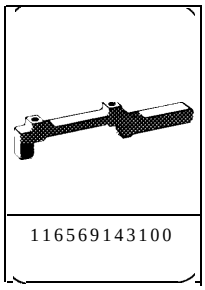
83-522 Removal and installation of refrigerant compressor

A. Delco refrigerant compressor engine 102

Oil filling capacity	
Oil type cold-flowing oil (for approved refrigerant compressor oil types refer to Specifications for Service Products, page No. 362)	
Oil capacity, fresh oil, in refrigerant compressor	170 cc

Tightening torques	Nm
Screws M 12 refrigerant compressor on carrier	60 + 10
Screw pipe line on refrigerant compressor	50 ± 3
Hose line from evaporator to pipe line 7/8''	29–37
Hose line from pipe line to condenser 7/8''	29–37

Special tools



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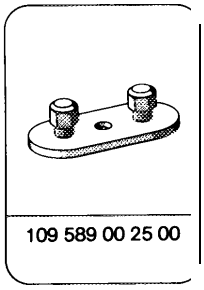

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Conventional tools

Double open-end wrench 1/2'' x 9/16'', 5/8'' x 3/4'', 7/8'' x 15/16'', 1'' x 11/8''
Socket 14 mm, 3/8'' square

Assembly tester with 3 filling hoses or evacuating and filling equipment for air conditioning system	e.g. Christof Fischer Augsburger Str. 289, D-7000 Stuttgart 60

Note

If the refrigerant compressor must be renewed or reconditioned, fill in oil according to job No. 83–520.

If the refrigerant compressor is renewed owing to inside damage (e.g. blocking or damage on valve plates), additionally renew pipe line on compressor, expansion valve and receiver-drier. In addition, check function and direction of rotation of auxiliary fan (clockwise) by means of 20 bar and 100 °C switch.

Removal

1 Mask both front fenders.

2 Disconnect battery.

3 Remove engine compartment panelling, below.

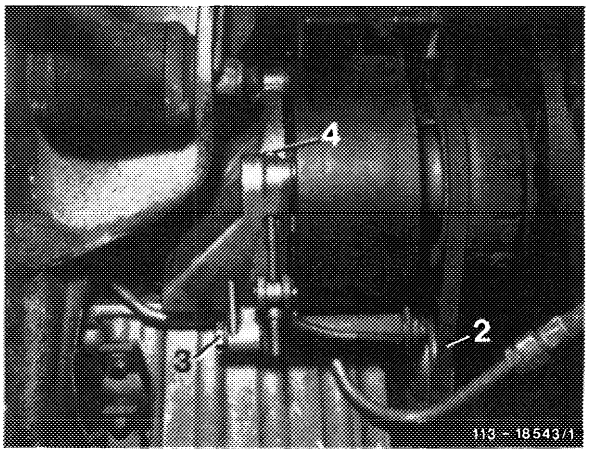
4 Remove alternator.

5 Drain air conditioning system.

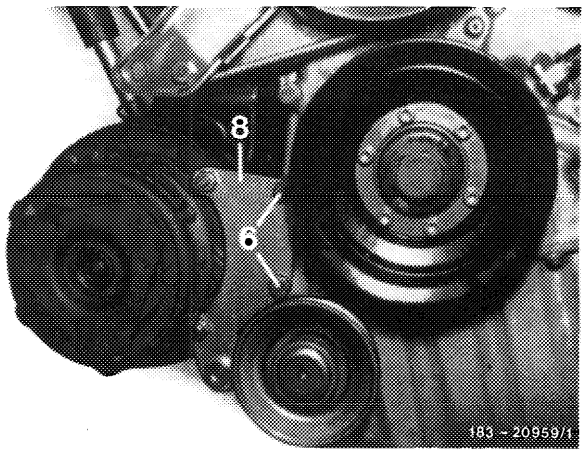
6 Pull plug from electromagnetic clutch.

7 Loosen screw (3).

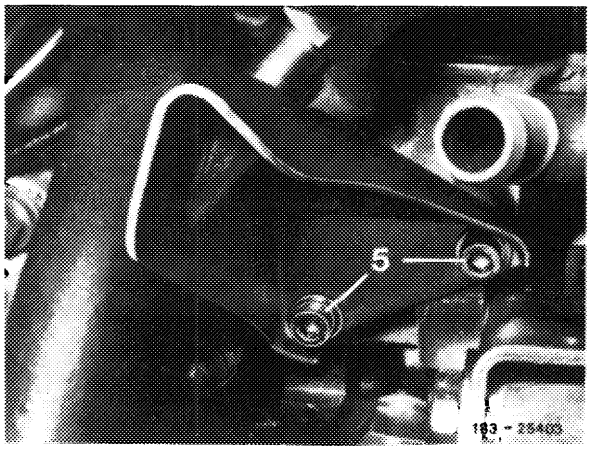
8 Loosen tensioning screw (7) and remove V-belt (2).



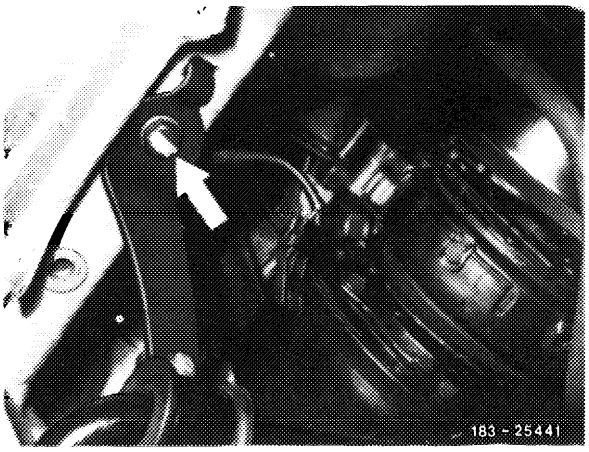
9 Unscrew screws (6) on holder (8).



10 Unscrew screws (5) on holder of pipe line.



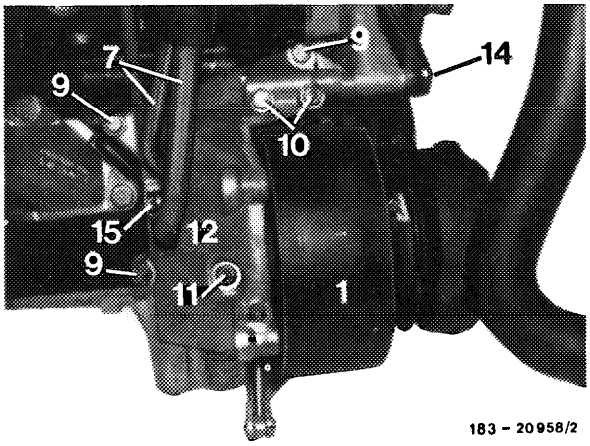
11 Unscrew screw (arrow) left and right on **torsion** bar and pull torsion bar in downward direction.



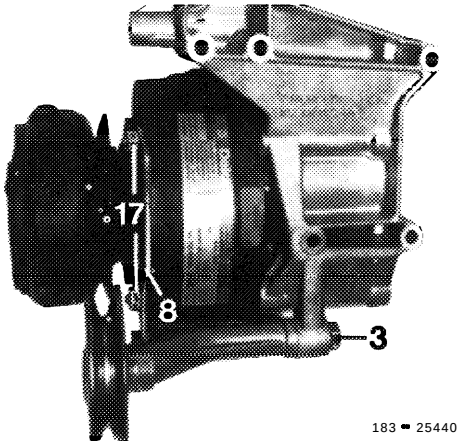
12 Unscrew screw (15) from pipeline.

13 Unscrew screws (9 to 11 and 14) on carrier for refrigerant compressor.

14 Remove refrigerant compressor (11) with carrier (12) in downward direction.



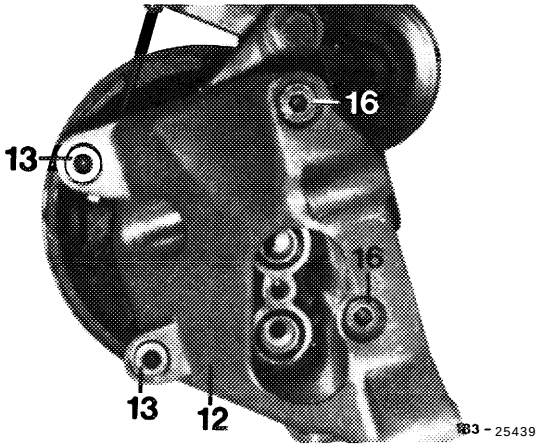
15 Unscrew nuts (17) and screw (3) on holder (8).



16 Unscrew screws (13 and 16) and **remove refrigerant compressor from carrier (12).**

17 If the refrigerant compressor is renewed, refer to section "Testing oil level in refrigerant **compressor" (83-520).**

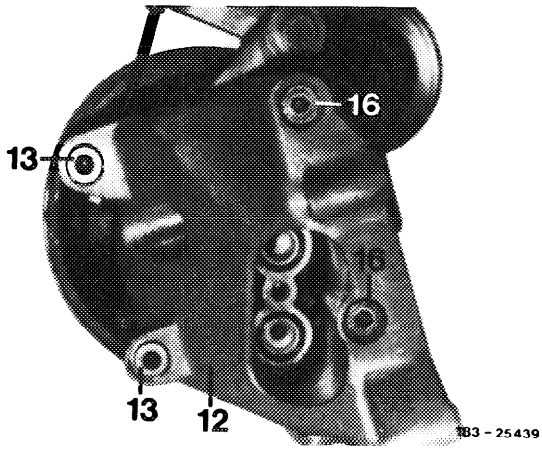
18 When working on electromagnetic clutch or on shaft seal, close connections on refrigerant compressor with pressure-testing plate.



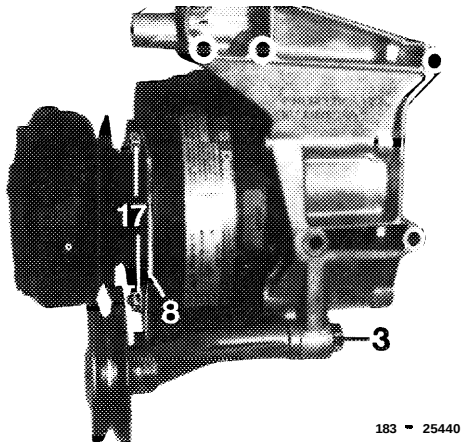
Installation

19 Check O-rings on refrigerant compressor and renew, if required.

20 Screw carrier (12) to refrigerant compressor by means of screws (13 and 16).

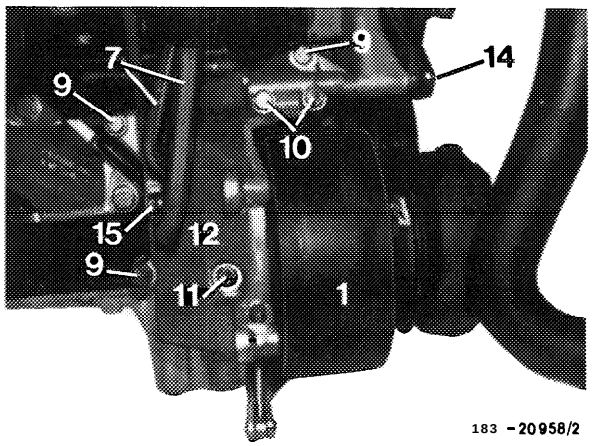


21 Mount holder (8) on carrier with screw (3) and nuts (17).

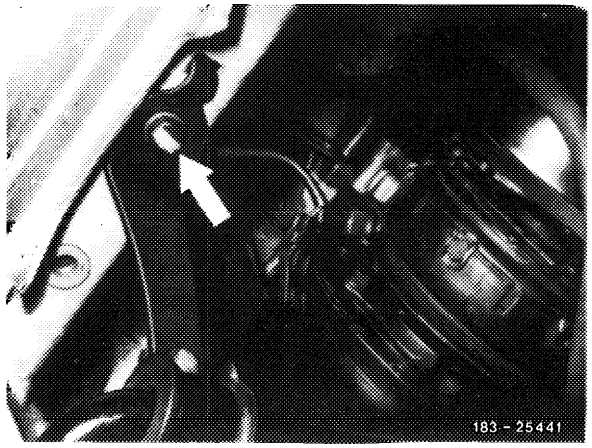


22 Install refrigerant compressor with carrier from below and mount to engine block by means of screws (9 to 11 and 14).

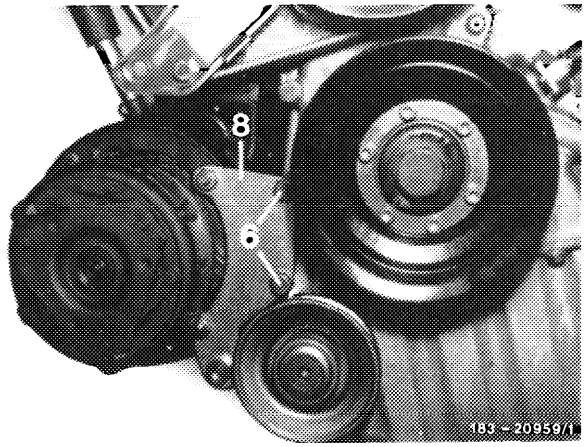
23 Mount pipe line with screw (15).



24 Mount torsion bar, top, with screws (arrow).

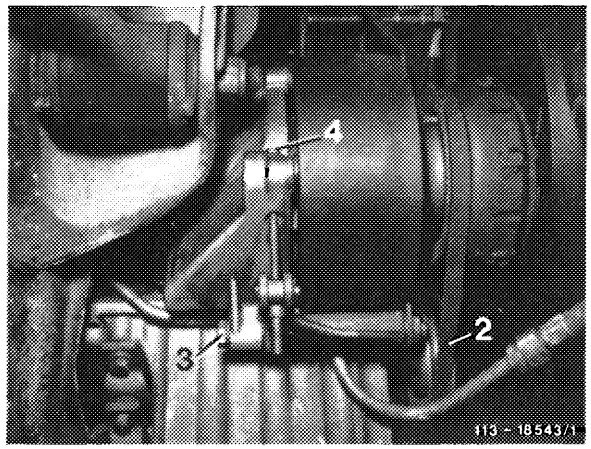


25 Mount holder (8) with screws (6).



26 Mount V-belt (2) and tension with tensioning screw (4).

27 Tighten screw (3).



28 Screw screws (5) to holder for pipe line.

29 Insert plug on electromagnetic clutch.

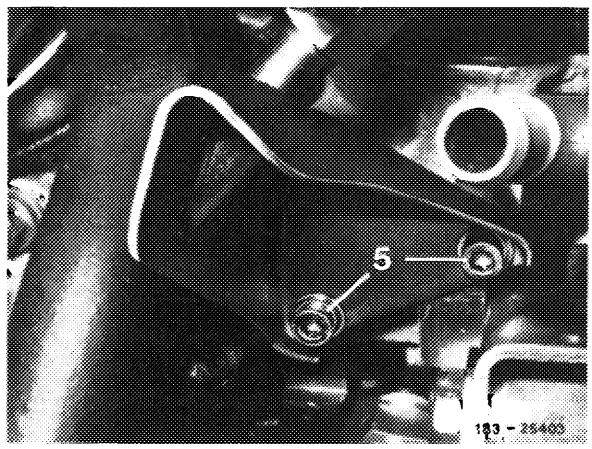
30 Install alternator.

31 Renew receiver-drier (83–530).

32 Connect battery.

33 Evacuate air conditioning system and refill.

34 Install engine compartment panelling, below.



Attention!
When filling oil into refrigerant compressor, handle like a new refrigerant compressor, i.e. during initial operation of engine, run for min. 4 minutes at **idle speed** only.

35 Check air conditioning system for function and leaks (83–036).

B. Nippondenso refrigerant compressor engine 601

Oil filling capacity

Oil type cold-flowing oil (for approved refrigerant compressor oil types refer to Specifications for Service Products, page No. 362)	
Oil capacity in new refrigerant compressor in cc	120

Tightening torques	Nm
Screw, carrier to crankcase M 8 x 40 / M 8 x 60	23 ± 2.3
Screw, compressor to carrier M 8 x 95	23 ± 2.3
Suction or pressure hoses on refrigerant compressor	23 ± 2.3

Spare part

Closing plate for refrigerant compressor	601 131 00 21

Conventional tools

Open-end wrench
Socket 10 mm, 13 mm (3/8'' square)

Note

Bores and screws with metric threads, hose connections as before with inch threads.

If the refrigerant compressor must be renewed or reconditioned, fill in oil according to job No. 83-520.

If the refrigerant compressor is renewed owing to inside damage (e.g. blocking or damage on valve plates), additionally renew pipe line on compressor, expansion valve and receiver-drier. In addition, check function and direction of rotation of auxiliary fan (clockwise) by means of 20 bar and 100 °C switch.

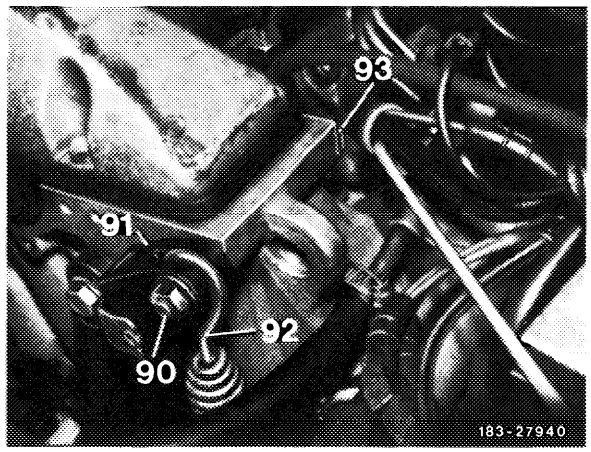
Removal

1 Mask both front fenders.

2 Drain air conditioning system.

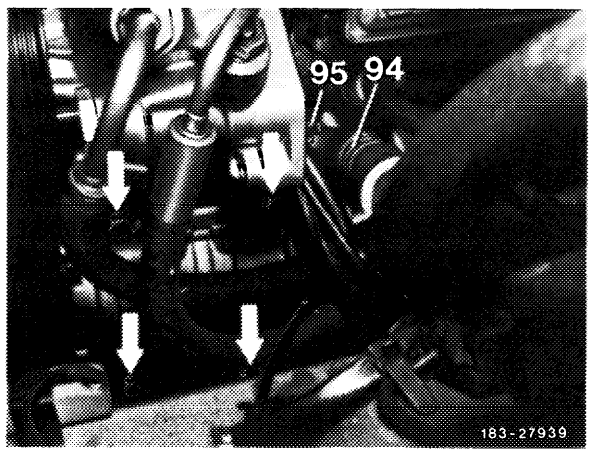
3 Remove air cleaner and air scoop.

4 Slacken V-belt and remove. For this purpose, unscrew flange nut (90). Insert a mandrel into spring tensioning lever (91) and push against force of draw spring (92), while pulling back screw (93). Load spring tensioning lever and remove V-belt.



5 Pull plug from refrigerant compressor.

6 Disconnect hose line (94) from refrigerant compressor, unscrewing screw (95) for this purpose. Then mount connections to refrigerant compressor with closing plate (refer to special tools) and available screw (95).



7 Unscrew four screws (arrow) on refrigerant compressor and remove refrigerant compressor in upward direction.

Installation

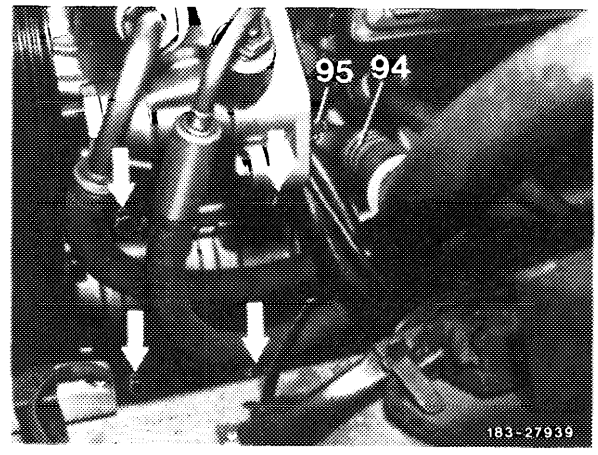
Attention!
New refrigerant compressors are filled with refrigerant. Slowly drain refrigerant at service valve prior to installing new refrigerant compressor.

8 Correct oil level (83–520).

9 If refrigerant compressor is not renewed, check O-rings at connections and renew, if required.

10 Screw refrigerant compressor to carrier (arrows).

11 Connect hose line (94) to refrigerant compressor.



12 Insert plug on refrigera nt compressor.

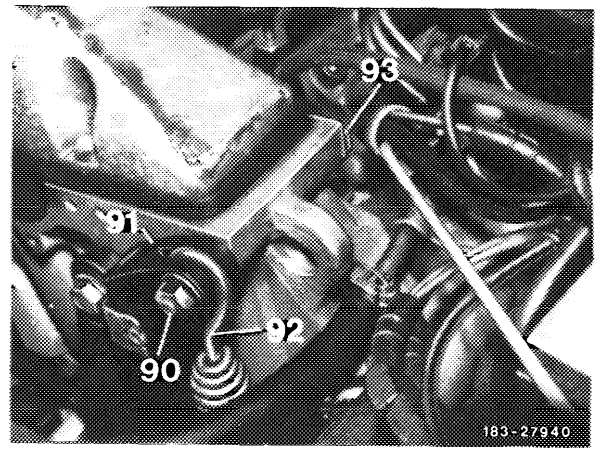
13 Mount V-belt. Push spring tensioning lever (91) back with a mandrel, slip screw (93) through spring tensioning lever and screw on nut (90).

14 Install air scoop and air cleaner.

15 Renew receiver-drier (83–530).

16 Evacuate air conditioning system and refill.

17 Check air conditioning system for function and leaks (83–036).

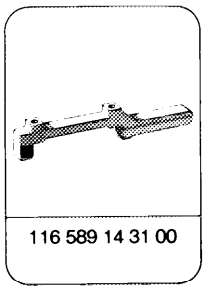


A. Delco refrigerant compressor engine 102

Data

Designation	Delco radial 4-cylinder
Max. speed rpm (l/min)	7000
Power input at max. compressor speed kW (HP)	approx. 6.3 (8.5)
Cylinder capacity	164 cc
Oil filling capacity	
Oil type cold-flowing oil (for approved refrigerant compressor oil types refer to Specifications for Service Products, page No. 362)	
Oil capacity, fresh oil, in refrigerant compressor	170 cc
Tightening torques	Nm
Screws (8) pulley clutch body	11
Screw M 10 x 30 pipe line to refrigerant compressor	50 ± 3
Nut (1) to drive shaft	13
Screws (5 and 6) M 12 refrigerant compressor to carrier	60 + 10
Hose line (14) from evaporator to pipe line 7/8''	29-37
Hose **line** (15) from pipe line to condenser 3/4''	24-28

Special tools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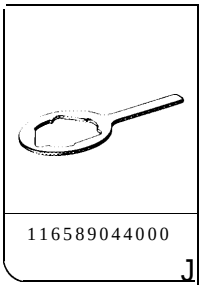
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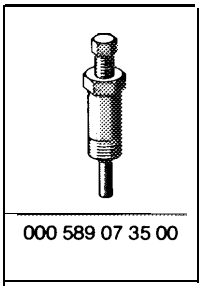
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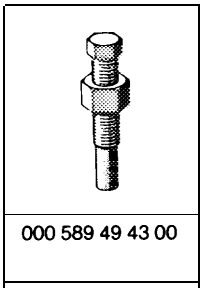
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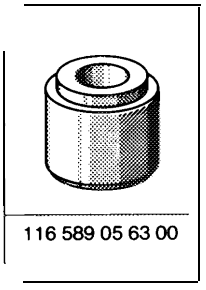
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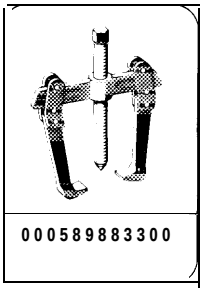

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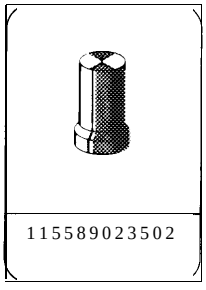

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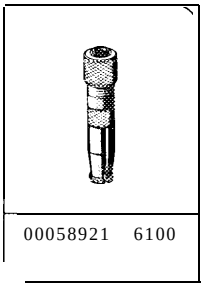

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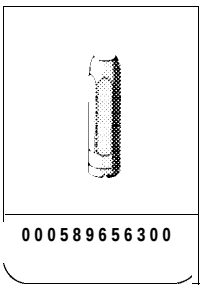

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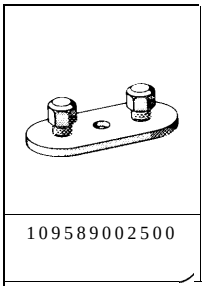

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Conventional tools

Socket **14** mm, 3/8'' square	e.g. Hazet, D-5630 Remscheid
Slip gauge (set)	e.g. Hazet, D-5630 Remscheid Order No. 2147
Langbeck pliers 72 J (internal lock)	e.g. Hazet, D-5630 Remscheid Order No. 1846a-1
Pliers for locking ring A 2 (outside lock)	e.g. Hazet, D-5630 Remscheid Order No. 1846 c-2
Double open-end wrench 1/2'' x 9/16'', 5/8'' x 3/4'', 7/8'' x 15/16'', 1" x 1 1/8''	

Self-made tool

Remover for O-ring

a) Renewing shaft seal of refrigerant compressor

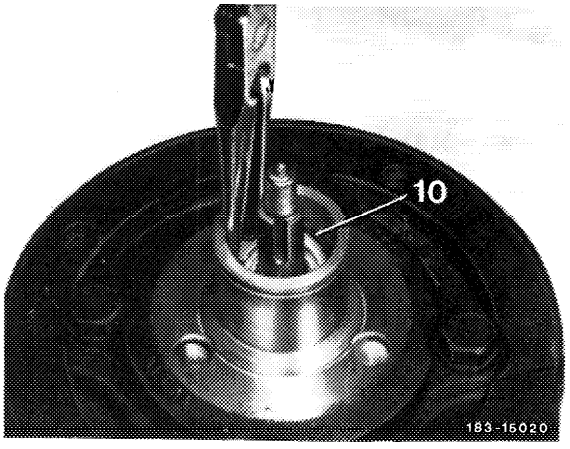
Removal

1 Drain air conditioning system.

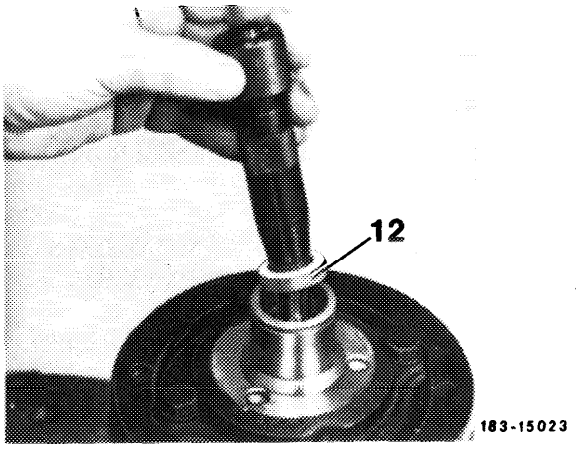
2 Remove refrigerant compressor (83-522).

3 Remove spring plate (83-526).

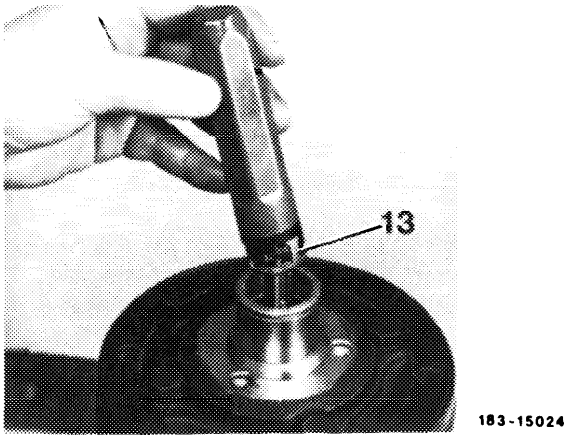
4 Remove locking ring (10) for shaft seal.



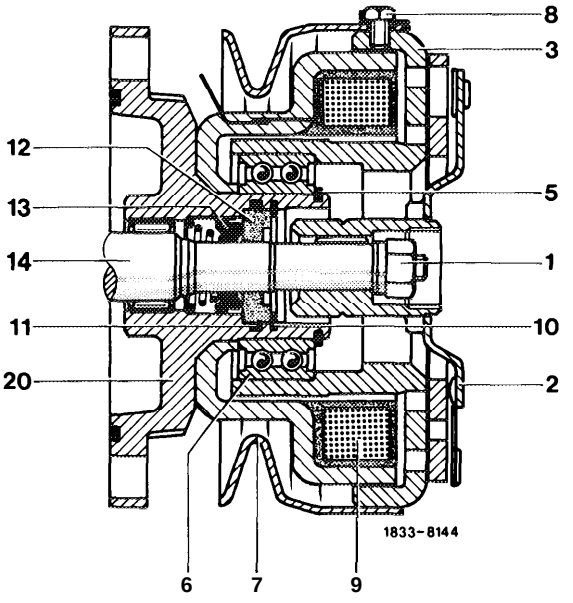
5 Remove slip ring (12) by means of remover and installer.



6 Remove shaft seal (13) by means of remover and installer. Keep pushing against tool, turn tool to the right to contact lug of shaft seal with detents on tool. Remove complete shaft seal from shaft by straight pulling.



7 Remove O-ring (11) from inside bore in housing cover. A wire, bent to a hook, can be used for this purpose.



1 Nut on drive shaft
2 Spring plate
3 Coupling member
5 Locking ring
6 Bearing for coupling member
7 Pulley
8 Screw with lock
9 Magnetic coil
10 Locking ring
11 O-ring
12 Slip ring
13 Shaft seal
14 Drive shaft
20 Housing cover

8 Check whether parts of the old shaft seal are still in bore of housing cover. Clean bore prior to inserting new seal.

9 Dip new sealing parts into clean cold-f lowing oil. Insert O-ring (11) into groove of housing cover.

10 Insert shaft seal (13) into tool and slip on shaft. Keep turning tool to the right until shaft seal engages in shaft. Only then turn the tool to the left for disengagement on lugs of shaft seal and remove.

11 Introduce slip ring (12) into bore by means of tool until ring touches shaft seal. Make sure that the O-ring **(11)** is not pushed out of groove.

Attention!
Sealing surface of slip ring (12) must be protected against any kind of damage, e.g. scratches.

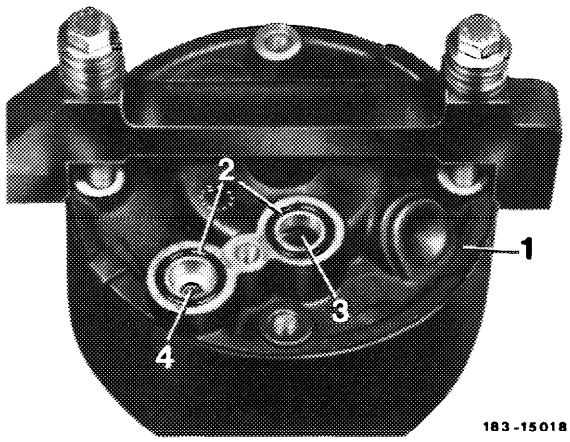
12 Introduce locking ring (10) with flat side facing downwards until the locking ring rests on slip ring. Then push against locking ring with lock pliers or a screwdriver until locking ring snaps into groove.

13 Install spring plate (83-526).

b) Checking refrigerant compressor for external leaks

Note: When working on shaft seal it wi II be of advantage to drain all the cold-flowing oil from refrigerant compressor. Determine drained quantity of cold-flowing oil and fill same quantity of fresh oil into refrigerant compressor. For details refer to Checking oil level in refrigerant compressor (83–520).

14 Check installed sealing rings (2) on refrigerant compressor (1) for condition, renew if required and provide with cold-f lowing oil.



1 Refrigerant compressor
2 Sealing ring
3 Suction connection
4 Pressure connection

15 Screw pressure-testing plate (3) with available hex. screw to refrigerant compressor (1).

16 Connect inner connection of pressure-testing plate with hose line (4) of service unit.

17 Let refrigerant vapor flow into refrigerant compressor. A bottle or filling cylinder pressure of above 4 bar gauge pressure is required.

18 In installation position of refrigerant compressor, rotate compressor shaft in direction of rotation manually several times.

19 Check refrigerant compressor with leak tester for leaks.

20 Close valve on service unit or on filling cylinder again and remove hose line from pressure-testing plate.

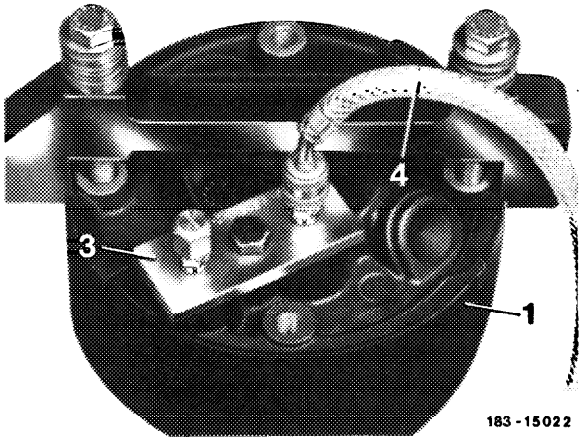
21 Remove pressure-testing plate again, but only directly before attachment of pipe line.

22 For details concerning oil filling capacity of refrigerant compressor refer to “Checking oil level in refrigerant compressor” (83-520).

23 Renew receiver-drier (83-530).

24 Install refrigerant compressor (refer to 83-522).

25 Evacuate air conditioning system and fill again, also check for function (83-036).



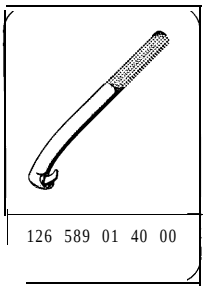
B. Nippondenso refrigerant compressor engine 601

Data, test values

Designation 10 P 15 G, 5 double piston swash plate compressor	
Displacement cc	153
Nominal output kcal/h	5200 at 14.7 bar
Power input kW	3.1
Max. rpm 1/min	8000
Nominal rpm 1/min	7000
Oil filling capacity (fresh oil) cc	120

Tightening torques	Nm
Screw carrier to cylinder head M 10 x 30	30 ± 3.0
Screw compressor to holder M 8 x 90	20 ± 2.5
Nut M 8 to compressor shaft	16 ± 1.0

Special tools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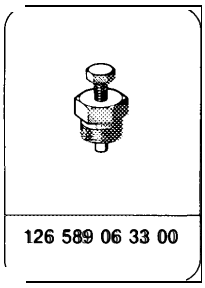
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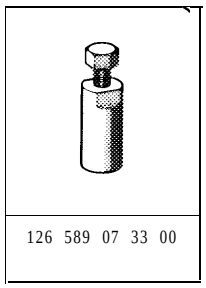
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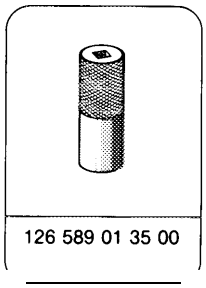
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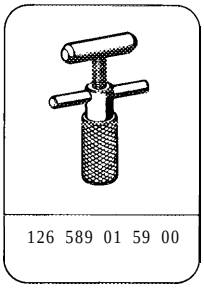
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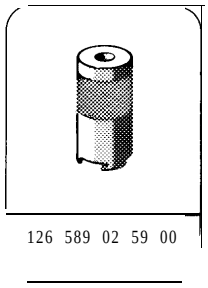
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Spare part

Closing plate for refrigerant compressor	601 131 00 21

Conventional tools

Pliers for locking ring J 3 (inner)	e.g. Hazet, D-5630 Remscheid

Slip gauge (set)	e.g. Hazet, D-5630 Remscheid
Socket 12 mm, 13 mm (3/8'' square)	e.g. Hazet, D-5630 Remscheid
Double open-end wrench 12 x 14, 17 x 19, 24 x 26	e.g. Hazet, D-5630 Remscheid

Note

Bores and screws with metric threads, hose connections as before with inch threads.

Renewing shaft seal of refrigerant compressor

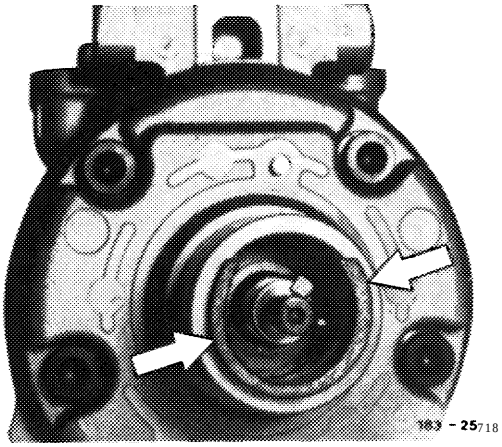
Removal

1 Drain air conditioning system.

2 Remove refrigerant compressor (83-522).

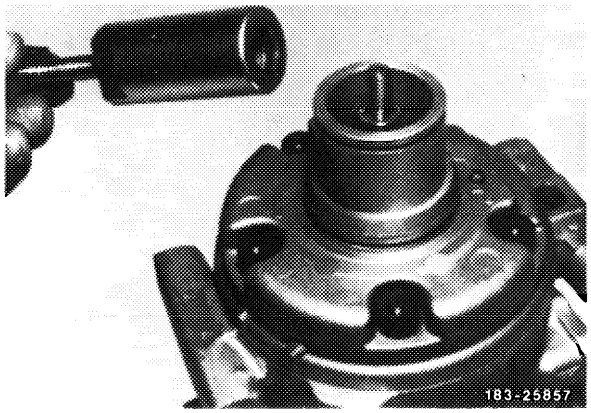
3 Remove spring plate (83-526).

4 Push out dust seal (arrow) with a screwdriver.



5 Plug key puller on compressor shaft and rotate by half a turn.

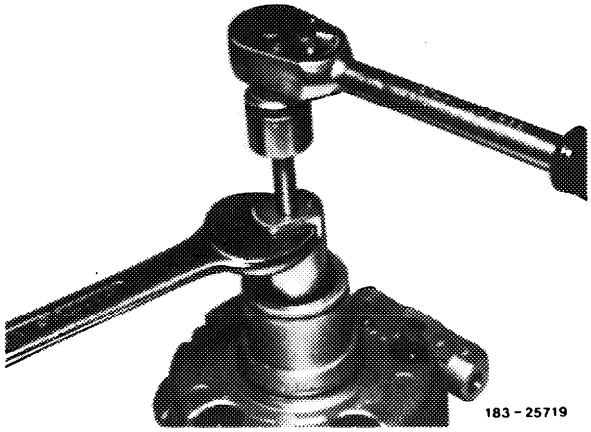
Attention!
Pay attention to inclination of refrigerant compressor to prevent loss of oil.



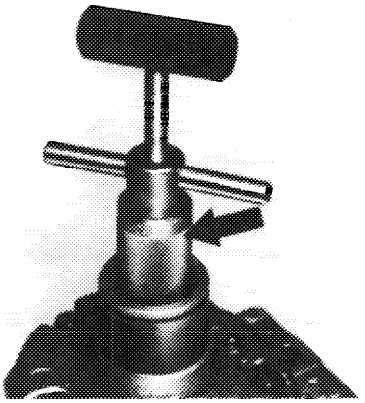
6 Pull out key and remove.

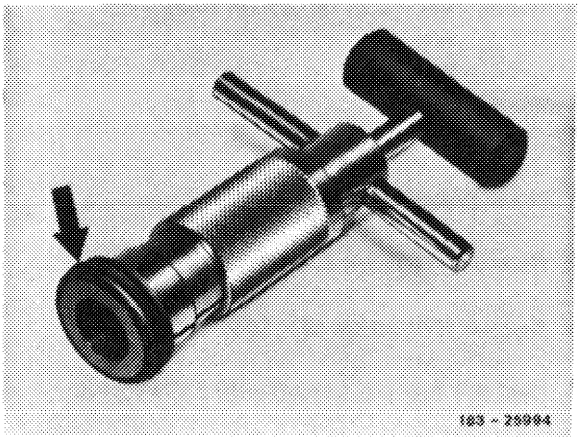
7 Remove locking ring by means of circlip pliers (J 3).

8 Apply cold-flowing oil to inner bore of refrigerant compressor.

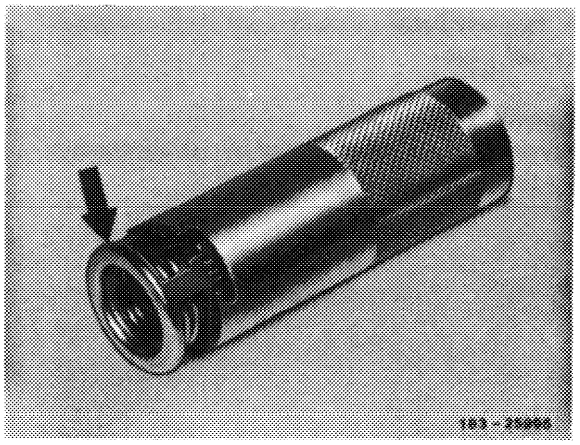


9 Insert sealing plate-assembly tool against shaft and push holding ring (arrow) down up to mark. Pull out sealing plate and remove from tool.



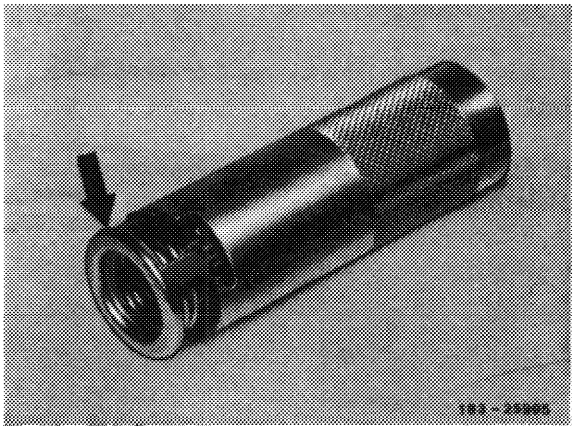


10 Introduce assembly tool for shaft seal against shaft, push in, turn to the right and remove shaft seal.



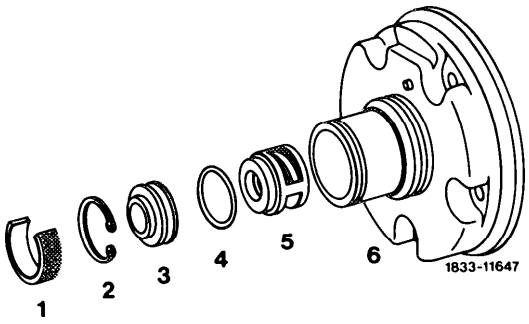
Installation

Attention!
The crankshaft seal on coupling side of refrigerant compressor is available as a complete unit only and must also be installed as such. Never install new and used parts together.
Newly installed shaft sealing sets need not be removed again immediately owing to a slight leak. The carbon ring is lapped together with the inside of the sealing plate. Its fit is getting better during running-in time of shaft seal.



11 Fasten shaft seal on assembly tool and moisten with cold-flowing oil.

12 Insert shaft seal and loosen special tool by turning to the left.

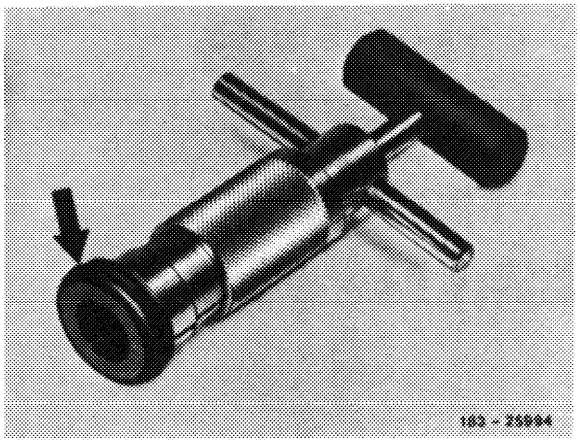


1 Dust seal
2 Locking ring
3 Sealing plate
4 O-ring
5 Shaft seal
6 Head part, front

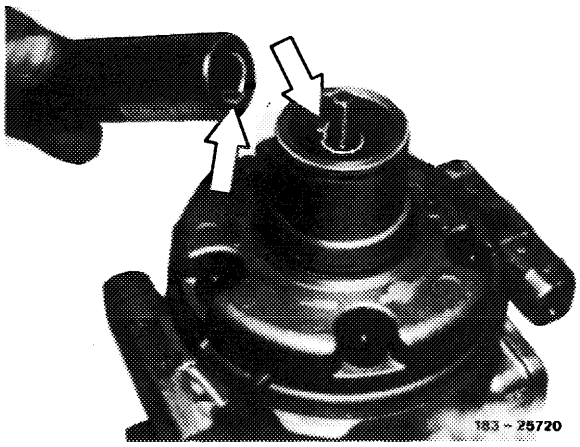
13 Fasten sealing plate to assembly tool (Fig.) and lubricate with cold-flowing oil.

14 Insert sealing plate and mount locking ring.

Attention!
Tapered surface of locking rings must be front end.

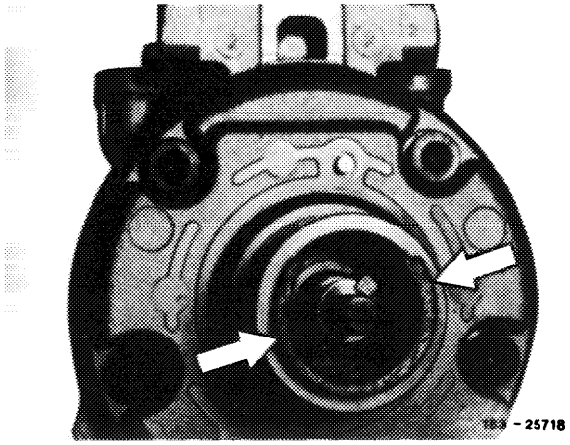


15 Mount key and push in (arrows).



16 Push in dust seal (arrows).

17 Install spring plate (83–526).



18 Let refrigerant vapor flow into refrigerant compressor at service valve (arrow). A bottle or filling cylinder pressure of above 4 bar gauge pressure is required.

19 In installation position of refrigerant compressor rotate compressor shaft several times manually in direction of rotation.

20 Test refrigerant compressor with leak tester for leaks.

21 Close valve on service unit or on filling cylinder again and remove hose line on service valve.

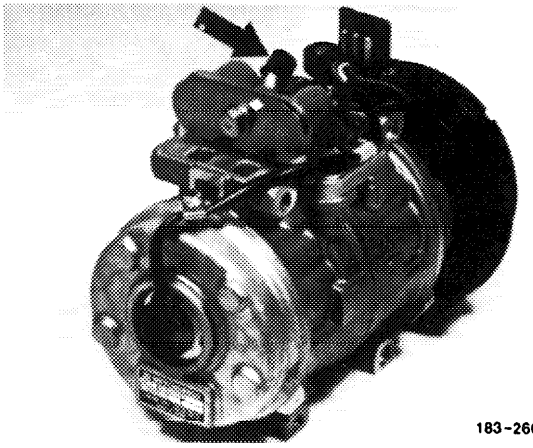
22 Install refrigerant compressor (83-522).

23 Renew receiver-drier (83-530).

24 Correct oil quantity (83–520), while adding an additional 10 cc of fresh oil into compressor.

25 Leak test and evacuate.

26 Evacuate air conditioning system and refill, also check for function (83-036).



183-26600/1

83–526 Removal and installation of electromagnetic clutch

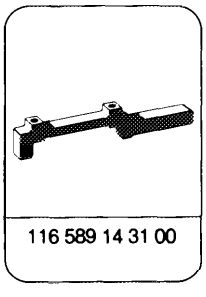
A. Delco refrigerant compressor engine 102

Data, test values

Electromagnetic clutch 12 V	Delco 4.9 inch
Power input in amps at 13.5 V	cold 3.9 warm 3.4

Tightening torques	Nm
Screws (8) pulley-clutch body	11
Screw M 10 x 30 pipe line on refrigerant compressor	50 ± 3
Nut (1) on drive shaft	13
Screws (5 and 6) M 12 refrigerant compressor on carrier	60 + 10
Hose line (14) from evaporator to pipe line 7/8''	29-37
Hose line (15) from pipe line to condenser 7/8''	29-37

Special tools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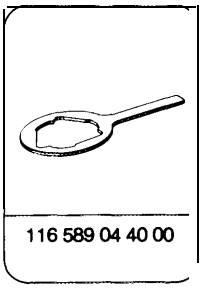
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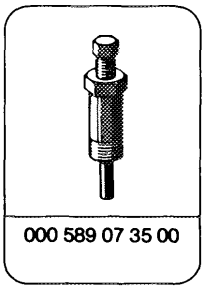
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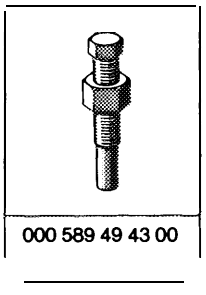
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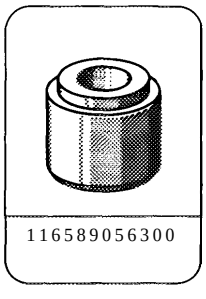
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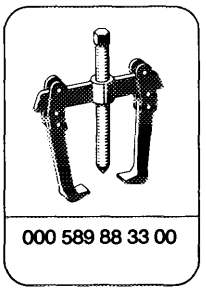
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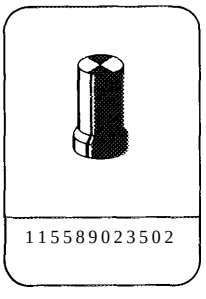
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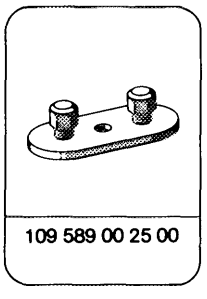

109 589 00 25 00

Conventional tools

Socket **14** mm, 3/8'' square	e.g. Hazet, D-5630 Remscheid
Slip gauge (set)	e.g. Hazet, D-5630 Remscheid Order No. 2147
Langbeck pliers 72 A (inner lock)	e.g. Hazet, D-5630 Remscheid Order No. 1846 a-l
Pliers for locking ring J 2 (outer lock)	e.g. Hazet, D-5630 Remscheid Order No. 1846 c-2

Self -made tool

Remover for O-ring

Note

Removal and installation of spring plate, of coupling member with pulley and magnetic coil, as well as of shaft seal can be performed only with refrigerant compressor removed.

The coupling member with bearing, the pulley and the magnetic coil are together one assembly group. If a part of this assembly group must be renewed, remove entire group (refer to 83-526, section b).

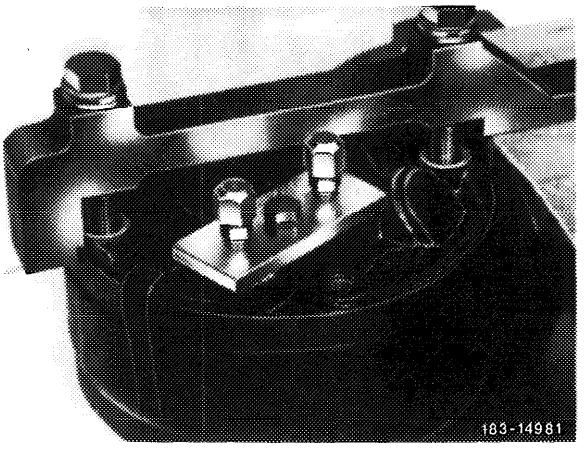
a) Spring plate

Removal

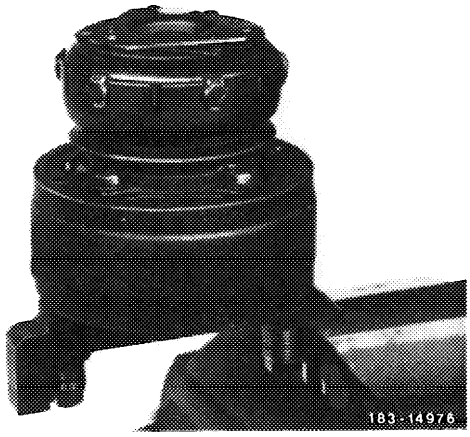
1 Drain air conditioning system.

2 Remove refrigerant compressor (83-522).

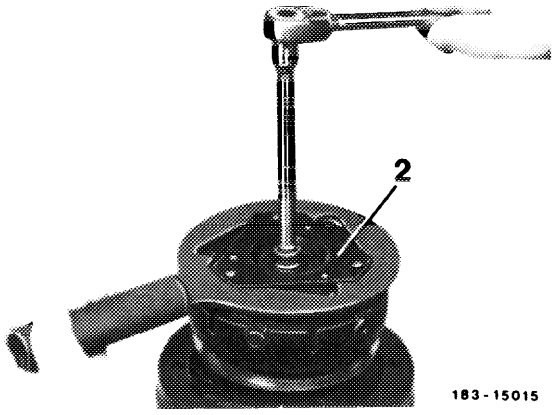
3 Close openings by means of pressure-testing plate. Then fasten holding device on refrigerant compressor and clamp into vise.



4 Loosen refrigerant compressor from holding device and fasten again with drive shaft in upward direction.

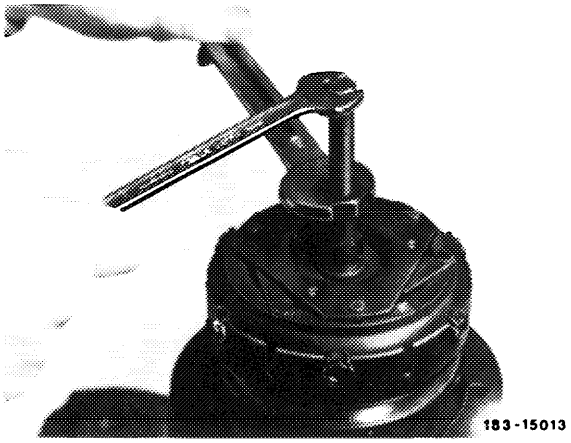


5 Prevent turning of spring plate (2) with holding wrench, unscrew nut from shaft, using socket 14 mm for this purpose.



6 Screw remover into hub, hold tool with wrench and tighten central screw.

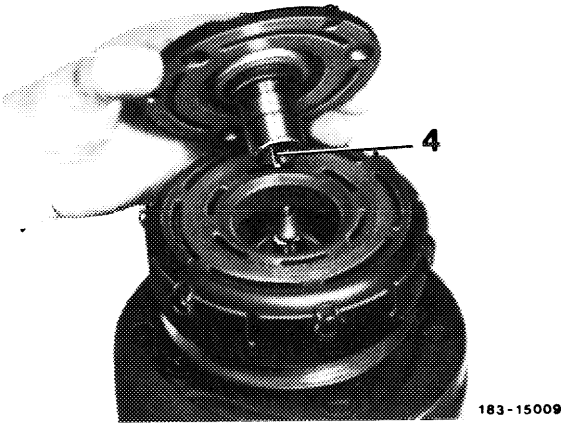
7 Remove key from shaft.



Installation

8 Clean friction surface of spring plate and of coupling member.

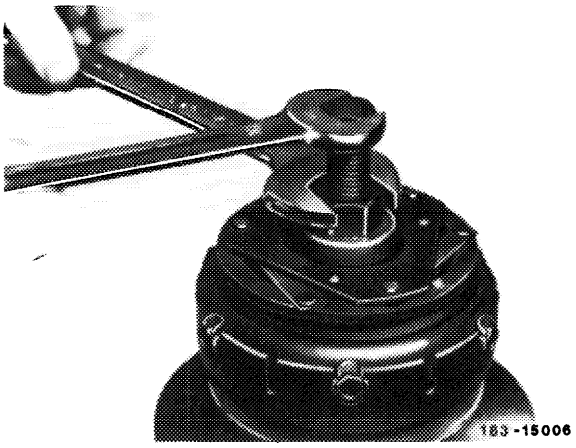
9 Insert key (4) into groove of hub with approx. 5 mm projection.



10 Place spring plate on shaft in such a manner that key and key groove are in alignment.

11 Place spacer on spring plate. Insert installer through spacer and screw installation tool on shaft end.

12 Hold hex. head of tool in place and screw in center screw, until a clearance of approx. 0.5-l mm is obtained between the friction surfaces of the spring plate and the coupling member.



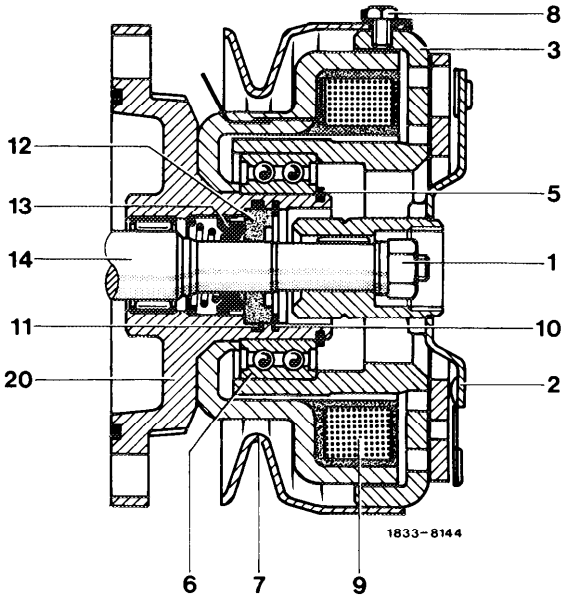
13 Remove installer and spacer.

14 Screw new nut on shaft (smaller diameter of nut in direction of shaft shoulder) and tighten. Check clearance once again.

15 Renew receiver-drier (83–530).

16 Install refrigerant compressor (83-522).

1 Nut on drive shaft
2 Spring plate
3 Coupling member
5 Locking ring
6 Bearing for coupling member
7 Pulley
8 Screw with lock
9 Magnetic coil
10 Locking ring
11 O-ring
12 Slip ring
13 Shaft seal
14 Drive shaft
20 Housing cover

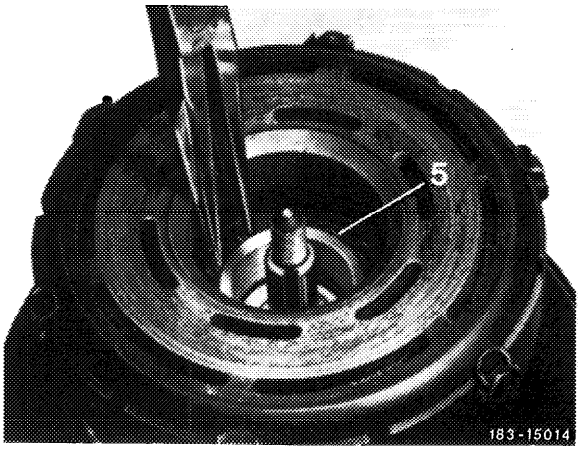


b) Removal and installation of coupling member with pulley, magnetic coil and bearing

Removal

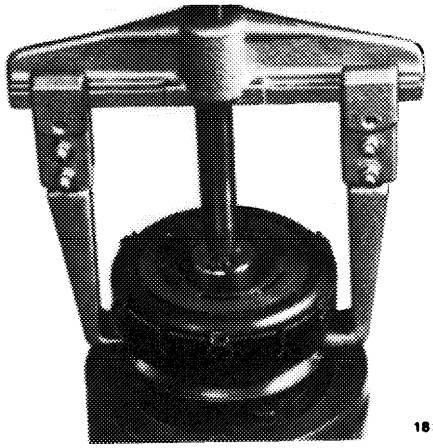
17 Remove spring plate (83-526, section a, item 1 to 7).

18 Remove lock (5). Mark location of magnetic coil terminals.

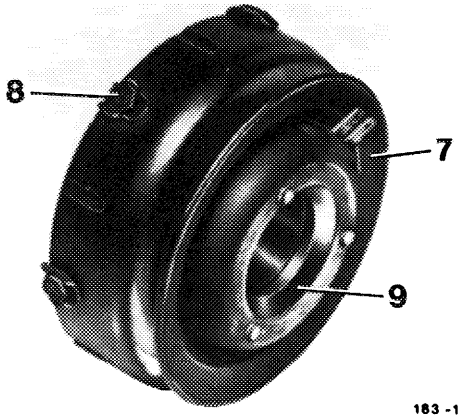


19 Insert guide piece over shaft on head part of refrigerant compressor.

20 Pull off assembly group with puller.

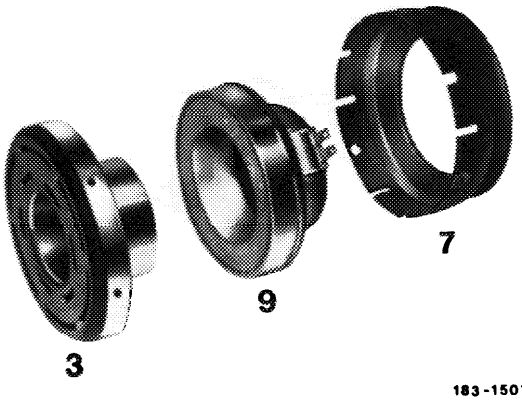


21 Bend away locks on hex. head screws and remove the 6 screws (8) with locks.



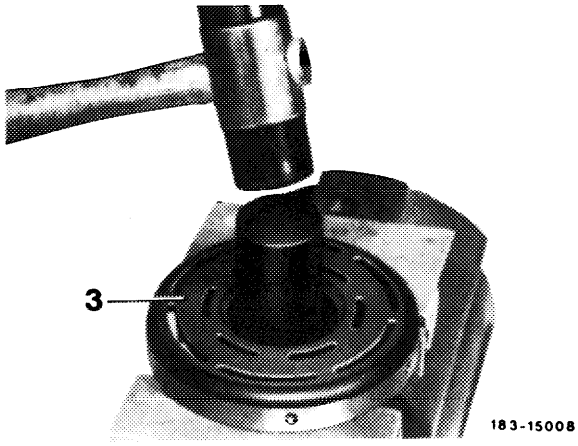
22 Remove pulley from coupling member and take magnetic coil out of pulley.

Note: If bearing (6) of magnetic body (3) must be renewed, perform items 22 to 24.



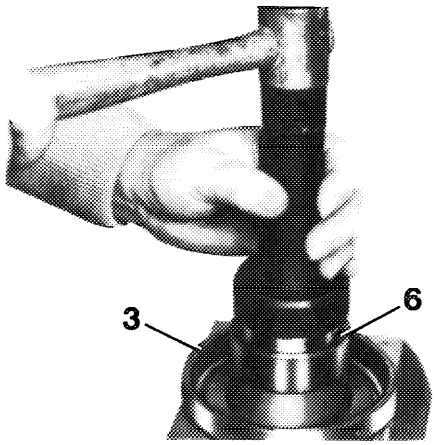
Removal of bearing

23 Place coupling member (3) on wooden support and press out bearing (6). Removal of bearing does not require elimination of notches.



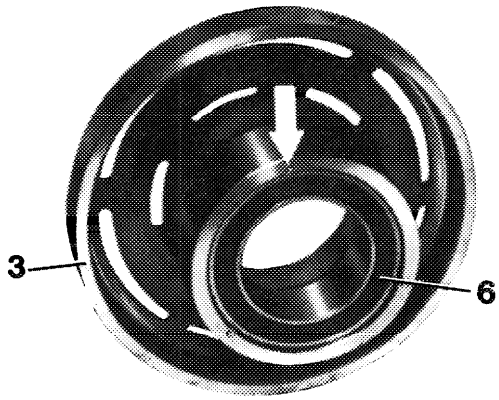
Installation of bearing

24 Align new bearing (6) accurately on bore and then press in.



183-15010

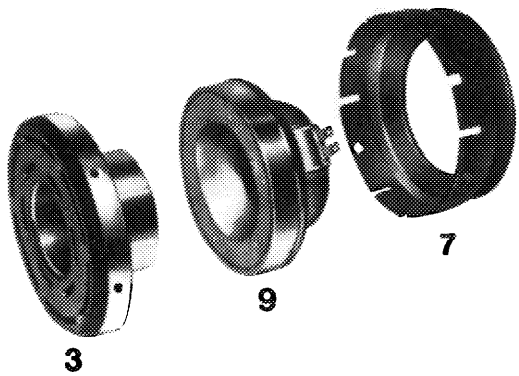
25 Punch-mark bearing at three points 120° away from each other as a safety measure. Do not punch too deeply, since this may distort outer race of bearing. Do not use old notches again!



183-15019

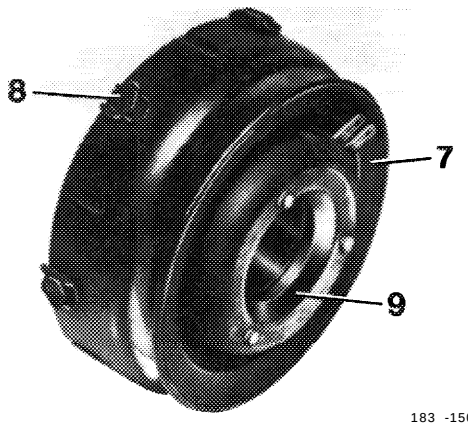
Installation

26 Insert magnetic coil (9) into pulley (7).



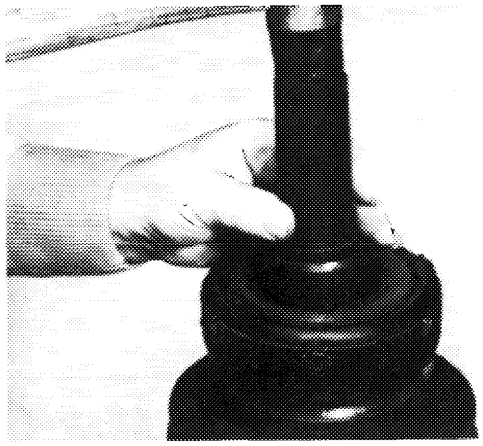
183-15011

27 Slip coupling member (3) into pulley (7) and screw on provisionally with new locks and screws (8). Provide threads of screws with Loctite.



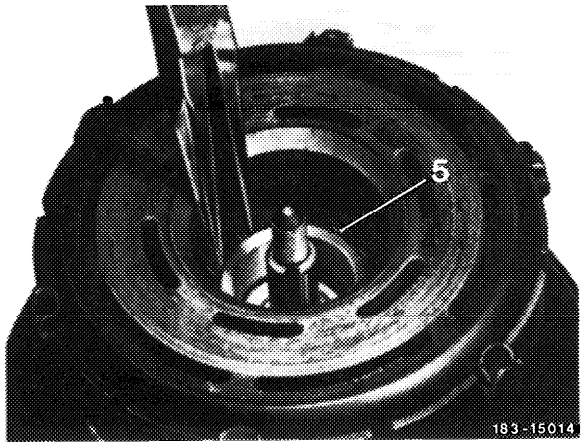
183-15012

28 Place complete assembly group on front housing cover. Before pressing on completely, make sure that the terminals of the magnetic coil are in correct position in relation to refrigerant compressor and that the three projections on back of magnetic coil are in alignment with the three depressions in housing cover.



29 Insert locking ring (5) for assembly group.

30 Clean friction surface of spring plate and of coupling member.

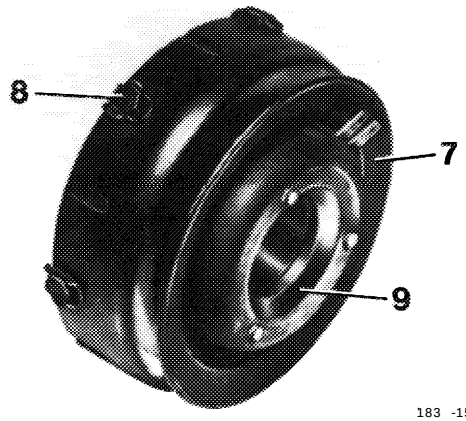


31 Rotate pulley with coupling member to check pulley for alignment. Slightly readjust pulley, if required.

32 Tighten screws (8) of pulley – coupling member. Secure screw heads in the same manner as the screws were secured prior to removal.

33 Renew receiver-drier (83–530).

34 Install refrigerant compressor (83-522).



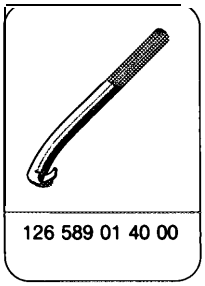
B. Nippondenso refrigerant compressor (engine 601)

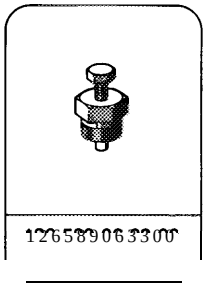
Data, test values

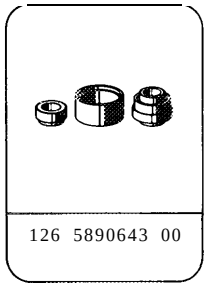
Designation	Electromagnetic clutch 12 V
Power input In amps at 13.5 V	cold 4.2 warm 3.75

Tightening torques	Nm
Screw carrier to crankcase M 8 x 60 and M 8 x 40	23 ± 2.3
Screw compressor to carrier M 8 x 95	23 ± 2.3
Nut M 8 to compressor shaft	16 4 1.0

Special tools





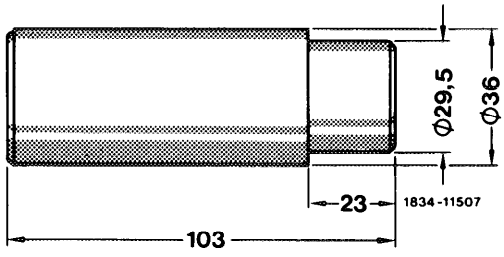


Conventional tools

Pliers for locking ring A 2 (outer)	e.g. Hazet, D-5630 Remscheid
Slip gauge (set)	e.g. Hazet, D-5630 Remscheid
Socket 12 mm, 13 mm (3/8'' square)	e.g. Hazet, D-5630 Remscheid
Double open-end wrench 12 x 14, 17 x 19, 24 x 26	e.g. Hazet, D-5630 Remscheid

Self -made tool

Bearing mandrel (rotating part), not required for assembly with hand lever press



Note

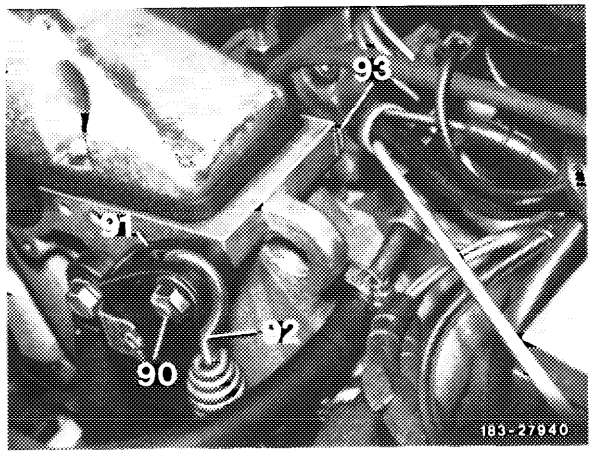
Bores and screws with metric threads, hose connections as before with inch threads.

a) Spring plate

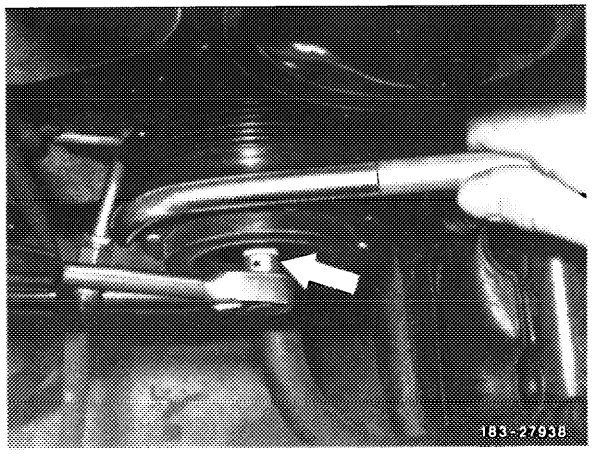
Removal

1 Remove fan and fan cover.

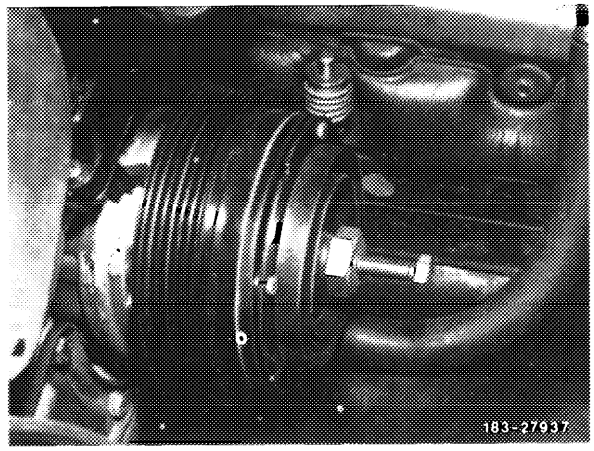
2 Slacken V-belt and remove, as follows:
Unscrew collar nut (90). Place a mandrel into spring tensioning lever (91) and pull back against force of draw spring (92).
Release spring tensioning lever and remove V-belt.



3 Position holding rod for spring plate and unscrew nut (arrow).



4 Screw puller (arrow) into spring plate and pull off spring plate.



Installation

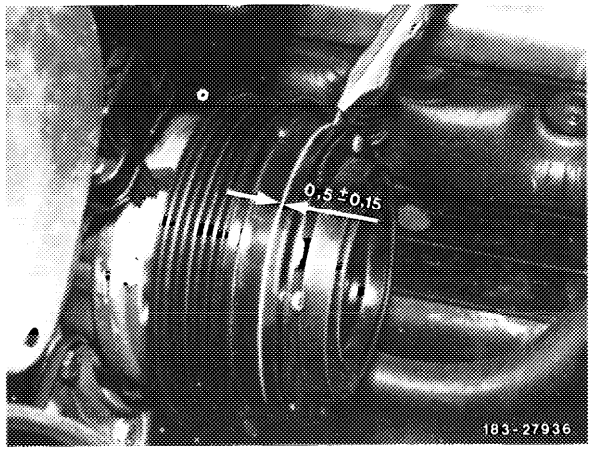
5 Plug spring plate on compressor shaft and tighten with nut.

6 Check gap dimension with valve gauge and correct with spacing washer, if required.

7 Install V-belt.

8 Install fan cover and fan.

9 Check air conditioning system for function (83-036).

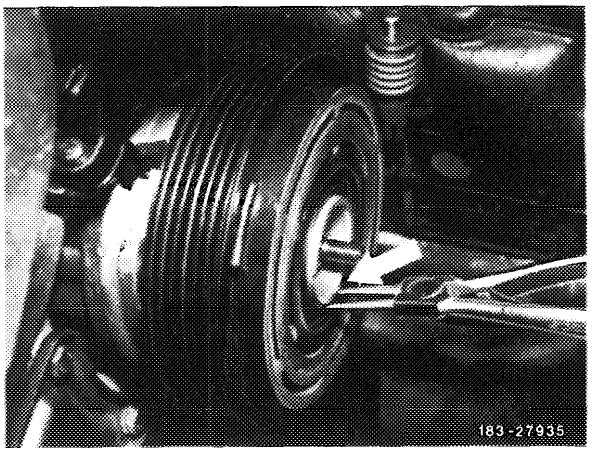


b) V-belt pulley

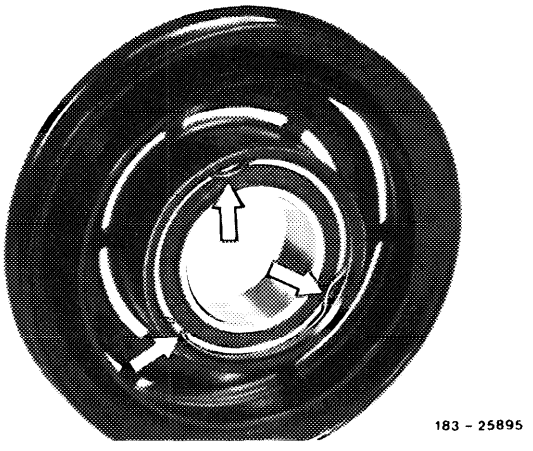
Removal

1 Remove spring plate (refer to section a).

2 Remove locking ring in front of V-belt pulley (arrow) and knock off V-belt pulley with plastic hammer.

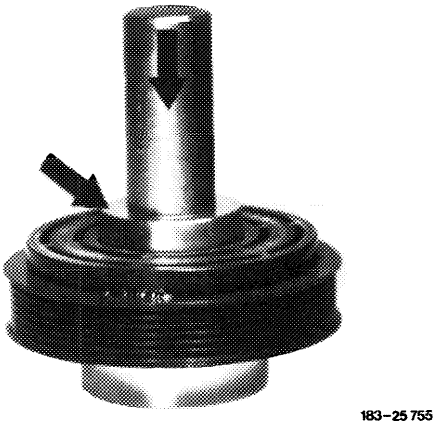


3 Renew antifriction bearing according to condition. Remove locking ring from antifriction bearing (arrow).



4 Force out antifriction bearing with special tools (arrows).

5 Force in new antifriction bearing with special tools.



Installation

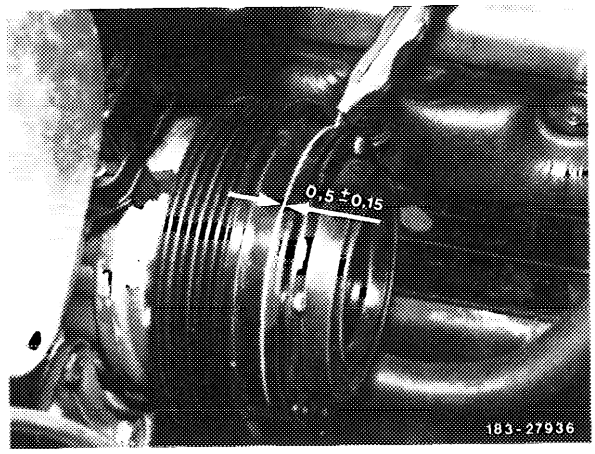
Attention!
If the same pulley is installed again, clean friction surface of pulley. In the event of damage on friction surface (e.g. caused by overheating) renew pulley together with spring plate.

6 Mount V-belt **pulley and install locking ring.**

7 Mount spacing washer and spring plate on compressor shaft. Tighten nut (arrow).

8 Check gap dimension with valve gauge or correct with spacing washer, if required.

9 Check air conditioning system for function (83–036).



c) Magnetic coil

Data

Nominal value approx.	warm	3.75 A
	cold	4.2 A

For testing magnetic coil, refer to 83-040.

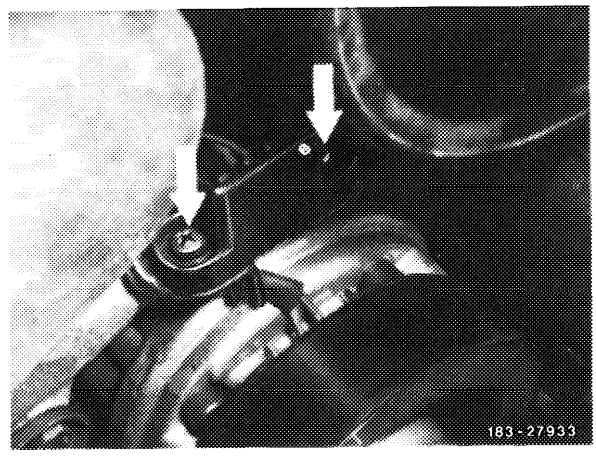
Removal

1 Remove spring plate and V-belt pulley (refer to section a and b).

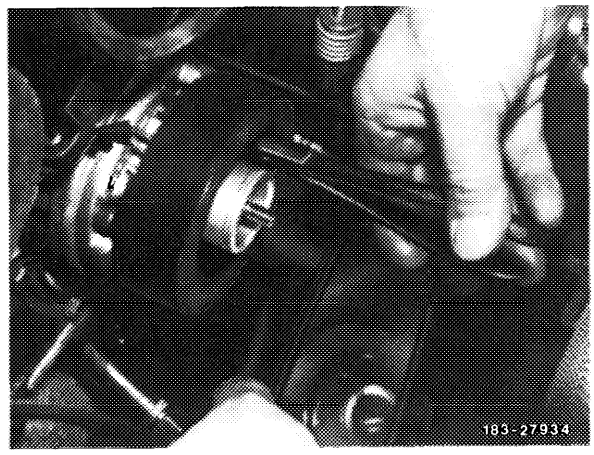
2 Pull plug from refrigerant compressor.

3 Unscrew both screws (arrow) from plug housing, open plug housing and remove line (blue).

4 Disconnect grounding cable of magnetic coil from refrigerant compressor.



5 Remove locking ring of magnetic coil and remove coi I.



Installation

Attention!
Tapered surface of locking rings must be front end.

6 Mount magnetic coil (pay attention to fitted pin) and install locking ring (arrow).

7 Install V-belt pulley (refer to section b).

8 Slip spacing washer on compressor shaft and mount spring plate (refer to section a).

9 Test air conditioning system for function (83-040).

83-528 Removal and installation of condenser

Data

Version	Aluminum pipe and aluminum fins

Tightening torques	Nm
Hose line (101) to condenser	29-37
Hose line (102) to condenser	15-18

Conventional tool

Inch wrench

Note

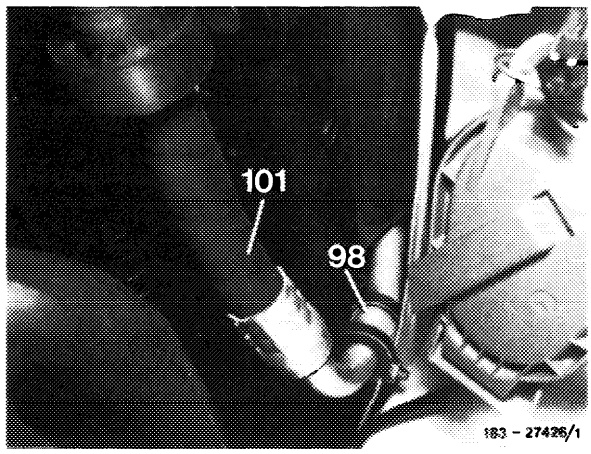
If the condenser is not reinstalled immediately, blow through condenser with refrigerant R 12 or nitrogen. Then close connections with plug. When renewing condenser, fill 20 cc of new compressor oil into condenser.

Removal

1 Drain air conditioning system.

2 On model 201.024, drain coolant and remove radiator.

3 On model 201.024, remove clamp (98) from hose line (101).

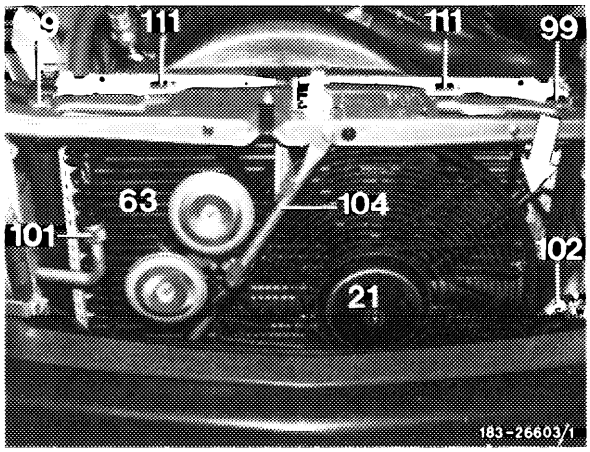


4 Unscrew hose lines (101 and 102) from condenser (63).

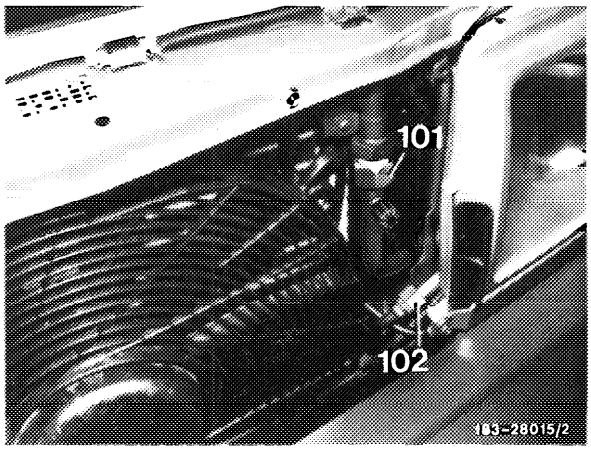
5 On model 201 .122, remove clamps (111), lift radiator out of lower support and put radiator aside in direction of engine.

6 Remove cable strap (arrow).

7 Unclip both clamps (99) on radiator supporting frame and lift out condenser (63) in upward direction.



Condenser model 201.024



Condenser model 201.122

Installation

8 Insert condenser (63) into grommets on front cross member. Continue installation in vice-versa sequence, while moistening threads for hose lines (101 and 102) with cold-flowing oil.

9 Renew receiver-drier (83–530).

10 Evacuate air conditioning system and refill, check for leaks and function (83–036).

83-530 Removal and installation of receiver-drier

Data

Version	Steel housing with sight-glass
Pressure relief valve (a)	Lets refrigerant blow off at 40 ± 5 bar. Closes at max. 5 bar below opening pressure
Pressure switch (19) in receiver-drier for auxiliary fan and electromagnetic clutch of engine fan	Cutout pressure: 15 ± 0.5 bar Cut-in pressure: 20 ± 0.5 bar
Pressure switch (22) in receiver-drier for refrigerant compressor	Cutout pressure: 2 ± 0.2 bar gauge pressure Cut-in pressure: max. 0.6 bar above cutout pressure

Tightening torque	Nm
Hose lines to receiver-drier	15-18

Note

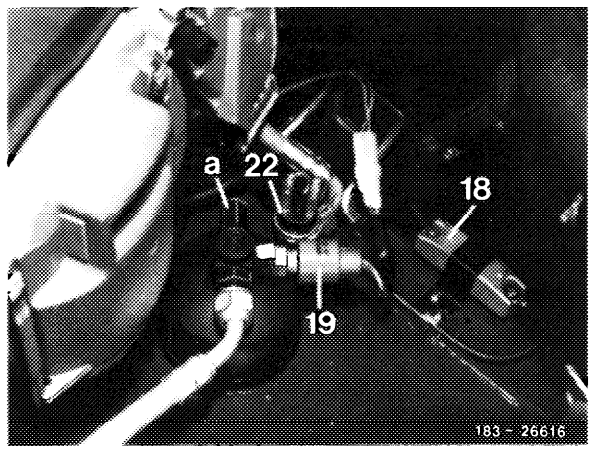
In the event of trouble on air conditioning system as the result of leaks, contamination or icing-up, when exchanging or reconditioning refrigerant compressor, as well as on air conditioning systems which are without refrigerant, a new receiver-drier must be generally installed. In accordance with extent of contamination, blow out air conditioning system prior to installing new receiver-drier with refrigerant R 12 or nitrogen.

Removal

1 Drain air conditioning system.

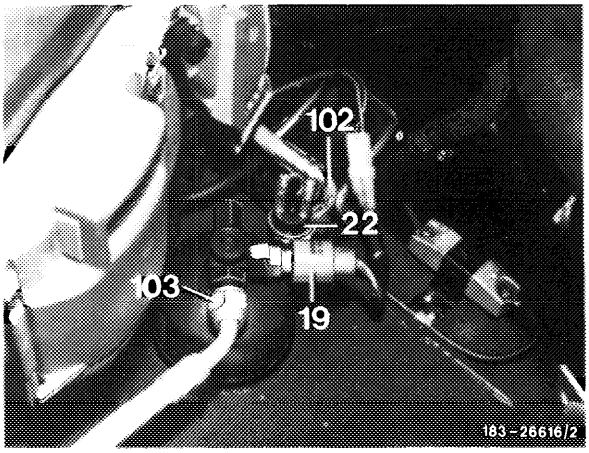
2 Pull plug from pressure switches (22 and 19).

3 Unscrew both pressure switches from receiver-drier.



4 Unscrew hose lines (102 and 103 from receiver-drier. Close connections blind.

5 Unscrew two screws on receiver-drier and lift out receiver-drier.



Installation

6 Prior to installation of new receiver-drier, fill 10 cc of fresh compressor oil into lateral connection (83–520).

7 For installation proceed vice versa, while moistening threads for hose lines (102 and 103) with cold-flowing oil.

8 Evacuate air conditioning system and fill up again, check for leaks and function (83-036).

83-53 1 Checking or removing and installing pressure switch for refrigerant compressor in receiverdrier

Data

Pressure switch (22) in receiver-drier	Cutout pressure: Cut-in pressure:	2 + 0.2 bar gauge pressure max. 0.6 bar above cutout pressure

Tightening torque	Nm
Pressure switch	20 ± 4

Note

To remove pressure switch (22), drain refrigerant of air conditioning system.

Testing pressure switch (22)

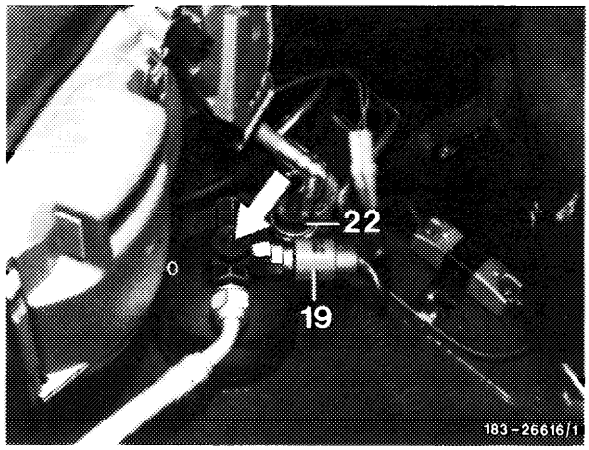
Test cut-in pressure (air conditioning system filled with refrigerant).

1 Run engine and switch on air conditioning system.

2 If the electromagnetic clutch of refrigerant compressor is not attracting, test the two flat plugs on pressure switch for voltage (do not pull plug from pressure switch [22]).

3 If the two plugs of pressure switch are connected to voltage and the electromagnetic clutch of refrigerant compressor is not attracting, there is a fault on model 201.024 on coil of electromagnetic clutch or on electric line between pressure switch and magnetic coil. On model 201 .122 and on model 201.024 starting model year 1985 there may also be a fault on compressor cutout (for checking, refer to 83–040).

4 If only flat plug of pressure switch is connected to voltage, there is not enough refrigerant in air conditioning system (refer to sight-glass, arrow) or the pressure switch (22) is defective.



5 To check refrigerant level, pull the two electric plugs from pressure switch and connect to each other (bypass). Run air conditioning system for approx. 2-3 minutes at 1000 rpm, then shortly after adding electromagnetic clutch, check whether refrigerant flows free of bubbles past sight-glass of receiver-drier.

6 The pressure switch is defective while quantity of refrigerant is adequate (high pressure $>$ 3 bar).

7 Switch off ignition.

Testing **cutout pressure**

8 Connect pressure gauge (service unit or pertinent tool) to service valve (pressure end).

9 Pull both electric plugs from pressure switch and connect ohmmeter to pressure switch.

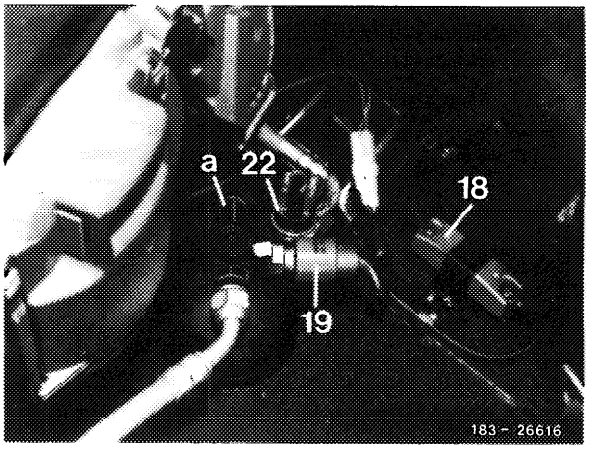
10 Drain refrigerant, at approx. 2 $\pm$ 0.2 bar gauge pressure the cutout point of pressure switch must be indicated by ohm meter (ohm meter to infinite).

Removing pressure switch

11 Drain air conditioning system.

12 Pull off electric lines and unscrew pressure switch (22) from receiver-drier.

13 Close connection on receiver-drier with plug.



Installing pressure switch

14 Moisten O-ring and threads of pressure switch with cold-flowing oil.

15 Screw pressure switch (22) into receiver-drier and plug on electric lines.

16 Evacuate air conditioning system, fill again and check for function and leaks (83-036).

83-532 Testing or removing and installing pressure switch for auxiliary fan in receiver-drier

Data

Pressure switch (19) in receiver-drier	Cutout pressure:	15 ± 0.5 bar
	Cut-in pressure:	20 ± 0.5 bar

Tightening torque	Nm
Pressure switch (19)	10 ± 2

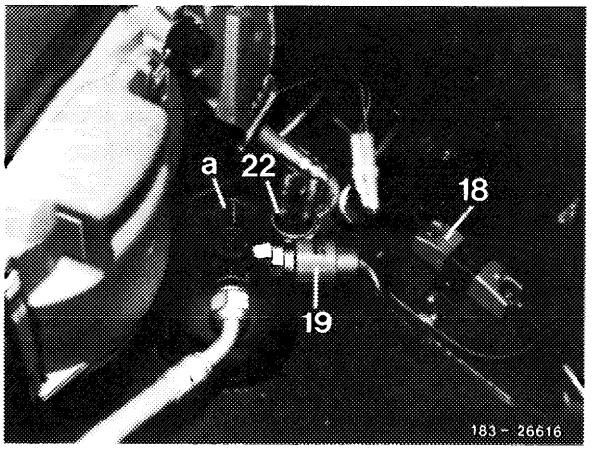
Note

To remove pressure switch (19), drain refrigerant of air conditioning system.

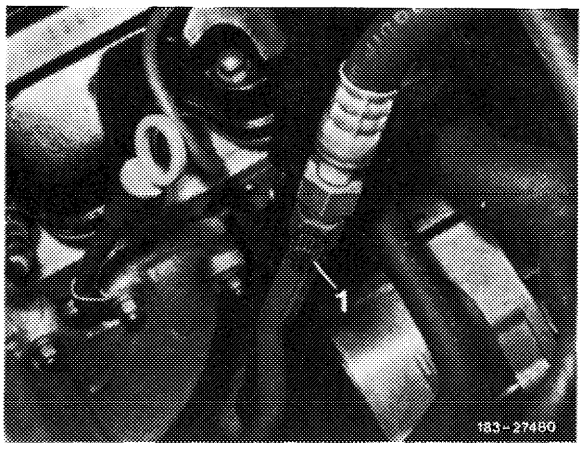
Testing pressure switch (19)

Switch on ignition and connect the two plugs of pressure switch (19) with each other (bypass). If the auxiliary fan prior to condenser is not switching on, the fault is outside pressure switch (19) – refer to circuit diagram 83-028.

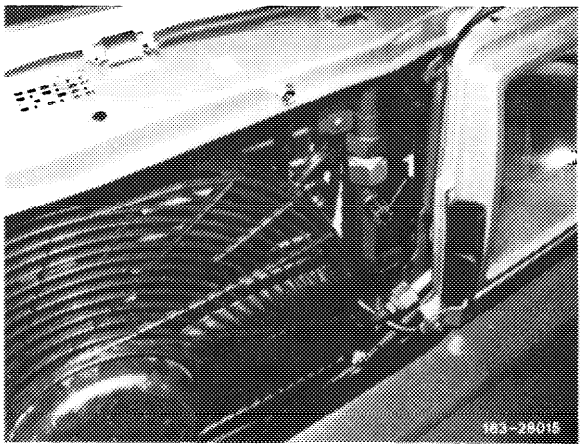
Testing **cut-in pressure** (air conditioning system filled with refrigerant).



1 Unscrew closing cap (1) from pressure line. Then connect hose line of high-pressure gauge to service valve. Make sure that the connecting nipple of hose line has a pressure pin in center.



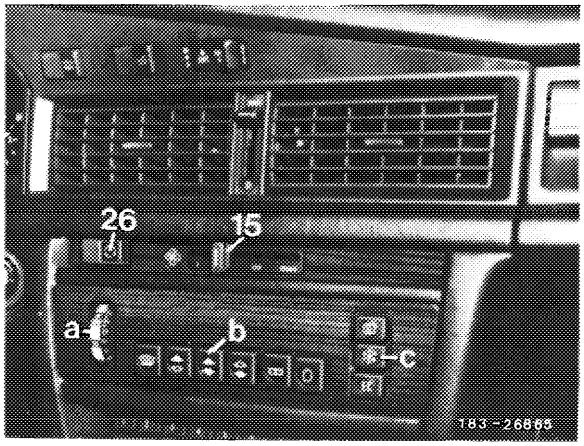
1 Closing **cap on pressure line**
Engine 102 up to model year 84



1 Closing cap on pressure line
Engine 601 and engine 102 starting model year 85

2 Engage temperature wheel (a) at "MI N".

3 Switch on mode selection of pushbutton switch (b) and mode selection of switch for air conditioning (c).

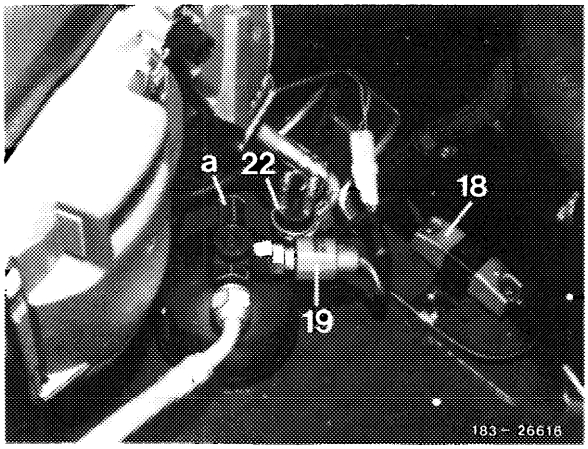


4 Set blower switch (15) to 4th blower stage.

5 Let engine run at idle until pressure of refrigerant has attained 18 ± 0.5 bar (corresponds with a pressure on pressure switch (19) of 20 ± 0.5 bar), let engine speed increase slowly, if required. If the auxiliary fan is not switching on, the pressure switch (19) is defective.

Testing cutout pressure

6 Run engine at idle speed until pressure of refrigerant has attained 12 ± 0.5 bar (corresponds with a pressure on pressure switch (19) of 15 ± 0.5 bar), pull a plug from pressure switch (22), if required. If the auxiliary fan is not switching off, the pressure switch (19) is defective.

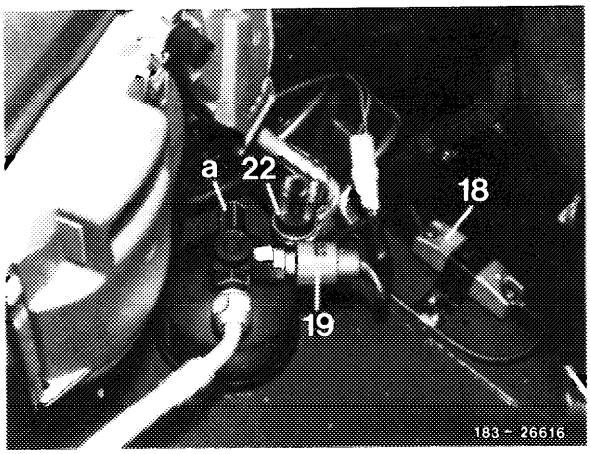


Removing pressure switch (19)

5 Drain air conditioning system.

6 Pull off electric lines and unscrew pressure switch (19) from receiver-drier.

7 Close connection on receiver-drier with plug.



installing pressure switch

8 Moisten O-ring and threads of pressure switch with cold-flowing oil.

9 Screw pressure switch (19) into receiver-drier and plug on electric lines.

10 Evacuate air conditioning system, fill again and check for function (83–036).

83-534 Removal and installation of expansion valve

Data

Version	Thermostatic valve with outer pressure compensation

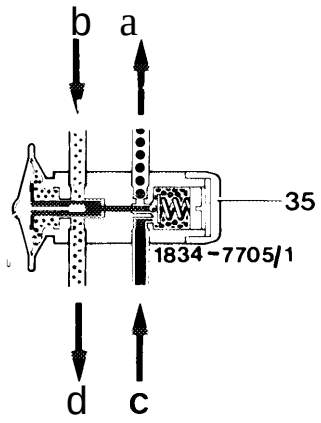
Tightening torques	Nm
Screws M 5 expansion valve to evaporator	6-10
Screw M 6 hose lines to expansion valve	7-13

Conventional tools

Hex. socket wrench 3 and 4 mm

Note

If expansion valve is heavily contaminated, renew receiver-drier and expansion valve (83-530 and 83-534).



Injection valve (diagram)

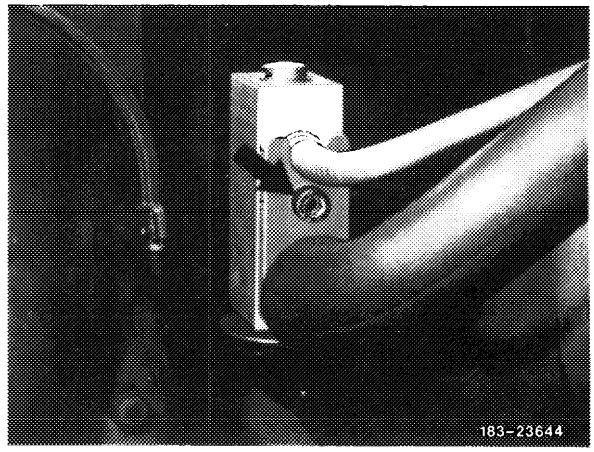
a To evaporator
b From evaporator
c From receiver-drier
d To compressor
35 Expansion valve

Removal

1 Drain air conditioning system.

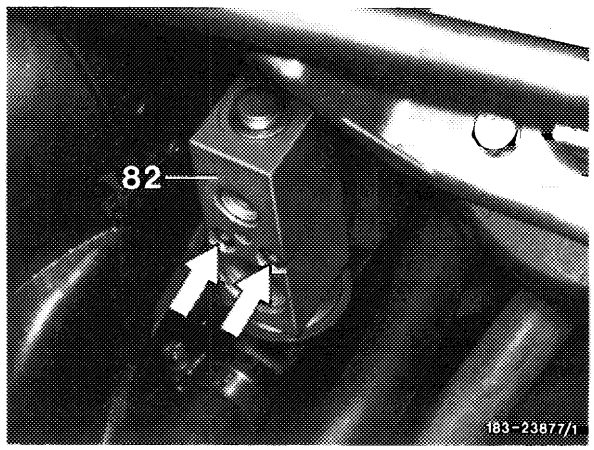
2 Remove cover on air inlet (83–140).

3 Unscrew screw (arrow) and pull lines out of expansion valve.



4 Unscrew both screws (arrows) and remove expansion valve (82).

5 Close connections with plugs.



Installation

6 Install in vice-versa sequence, while testing O-rings on evaporator pipes, as well as on pipe lines, and moisten with cold-flowing oil.

7 Renew receiver-drier (83–530).

8 Evacuate air conditioning system, fill again, and check for function and leaks (83-036).

83-538 Removal and installation of evaporator

Data

Version	Pipes and fins made of aluminum
Face/depth	6.0 dm^2 /96 mm

Note

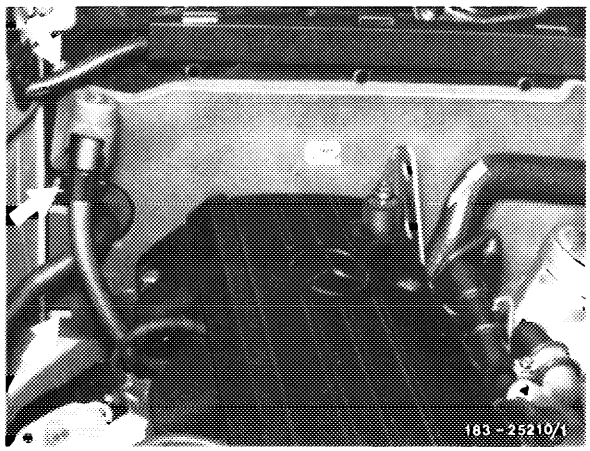
If expansion valve shows heavy contamination, renew receiver-drier and expansion valve (83-530 and 534). When renewing evaporator, add 40 cc of fresh compressor oil into evaporator.

Removal

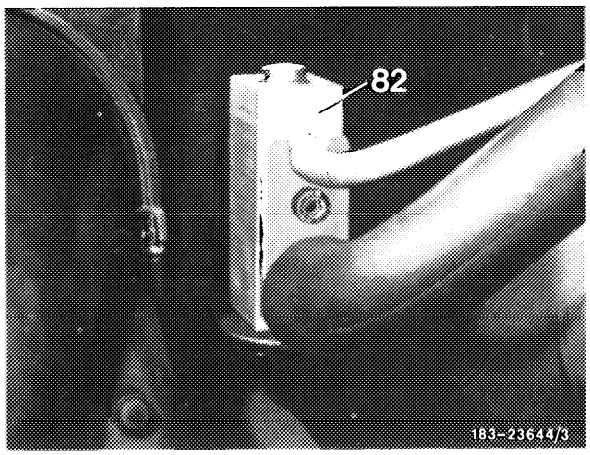
1 Drain air conditioning system.

2 Remove cover on air intake (83-l 40).

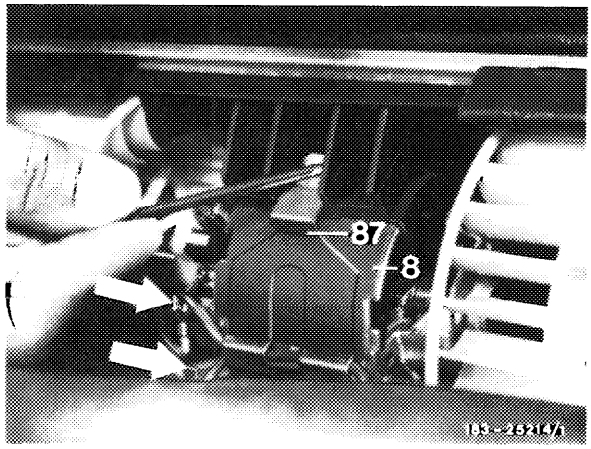
3 Loosen bulkhead (62), while pulling screws (arrow) at left and right on bulkhead forward up to engine for this purpose.



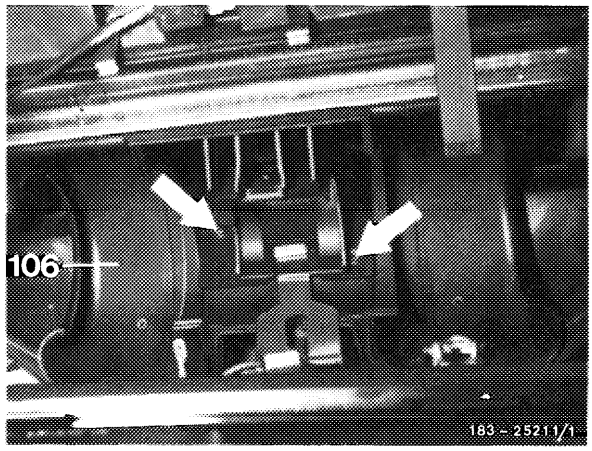
4 Remove expansion valve (82) (83-534).



5 Remove blower motor (8) (83-120).

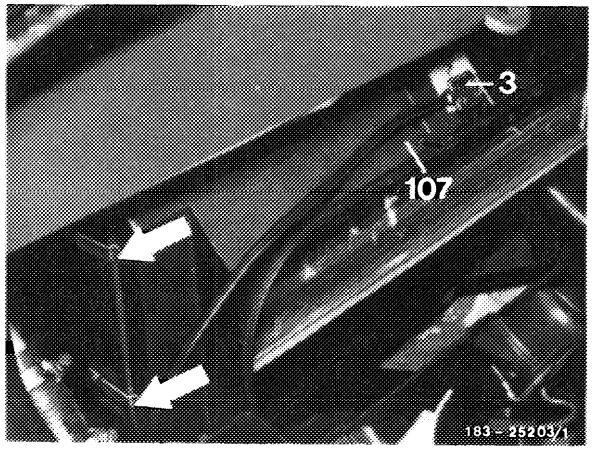


6 Unscrew screws (arrow) and lift out lower part of housing (106).

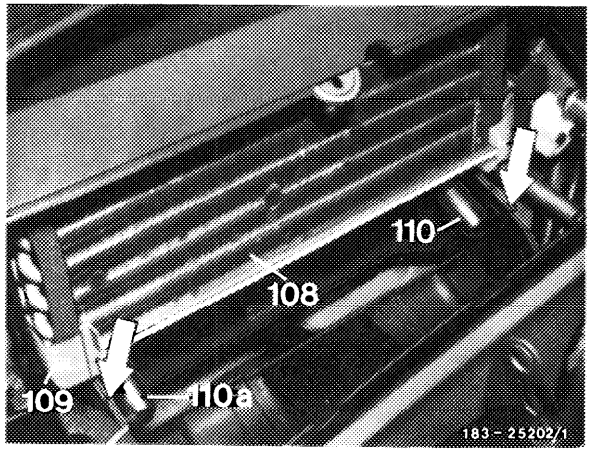


7 Pull temperature sensor (3) out of guide tube.

8 Unclip clamps (arrow) laterally left and right from frame (107) and remove frame.



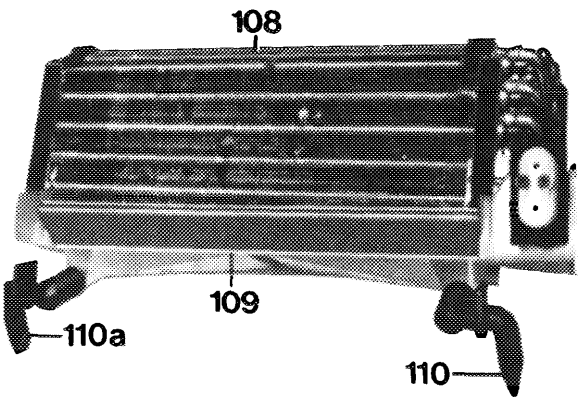
9 Lift evaporator (108) with pan (109) and condensate water drain hoses (110 and 110a) out of evaporator housing.



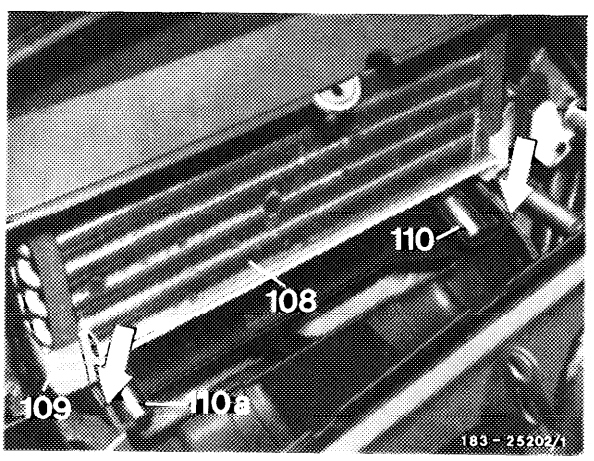
Installation

10 **Clean** pan (109) inside while checking **whether condensate water drain hoses (110 and 110a) have perfect passage.**

11 insert evaporator (108) into pan (109).

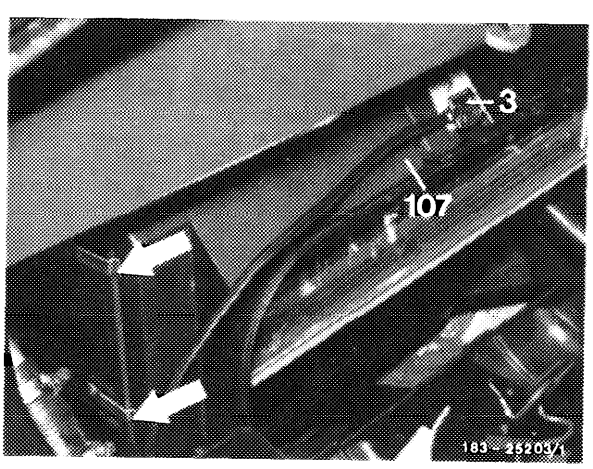


12 **Insert evaporator with pan into evaporator housing. Then mount rubber grommets (arrow) of condensate water drain hoses (110 and 110a).**



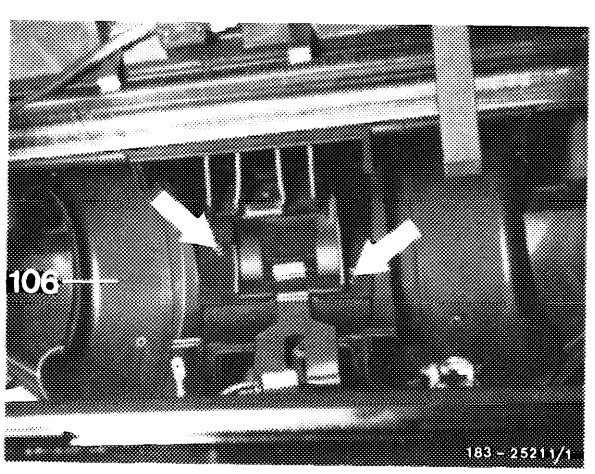
13 Flange frame (107) to evaporator housing and fasten with clips (arrow).

14 Insert temperature sensor (3) into guide tube up to stop.



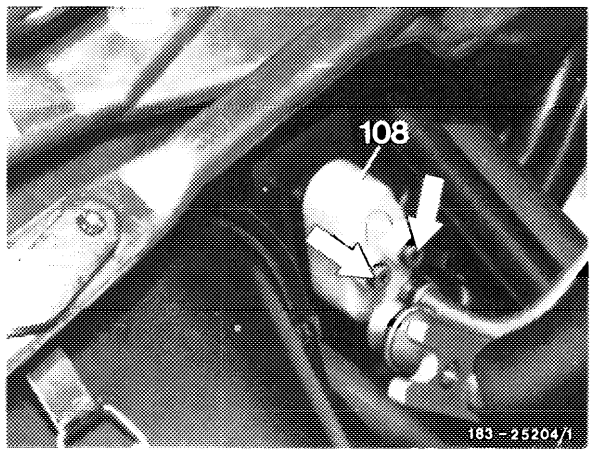
15 Mount lower part of housing (106) by means of screws (arrow).

16 Install blower motor (83-I 20).



17 Remove closing cap (108) of new evaporator from evaporator pipes unscrewing both screws (arrow) for this purpose.

18 Install expansion valve (83-543).

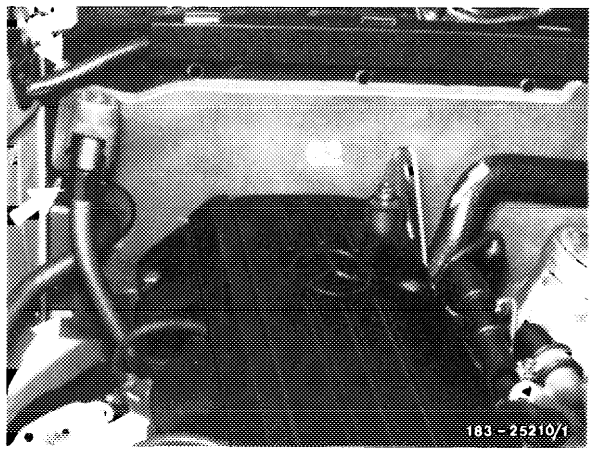


19 Mount bulkhead (62) and fasten with screws (arrow).

20 Install cover at air inlet (83–140).

21 Renew receiver-drier (83–530).

22 Evacuate air conditioning system, fill again and check for function and leaks (83–036).



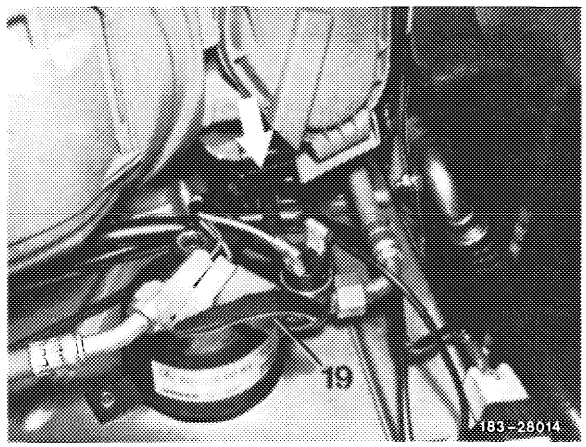
83-546 Removal and installation of auxiliary fan

Data

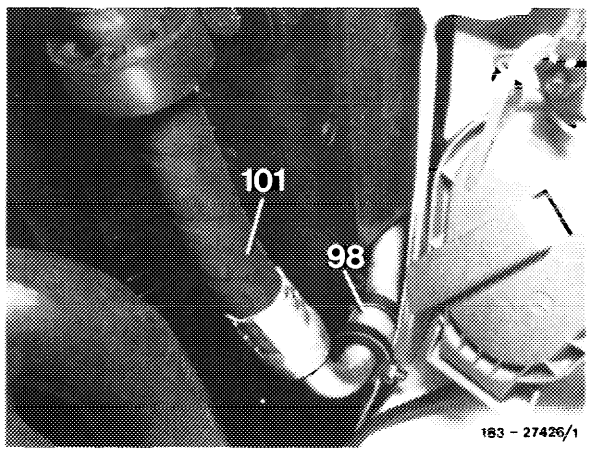
Power input at 13 V ± 0.2 V	17.5 A
Fan speed at 13 V ± 0.2 V	2300 rpm

Removal

1 Separate 2-pin connector (arrow).



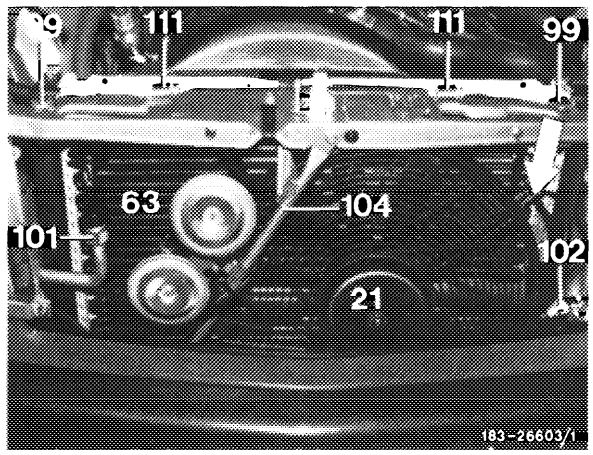
2 Remove clamp (98) on model 201.024.



3 Disconnect both horns and remove strut (104).

4 Loosen radiator and condenser, removing clips (99 and 111) for this purpose. Pull out radiator and condenser at lower holder and put aside as far as possible in direction of engine.

Attention!
Hoses of radiator and condenser remain connected.

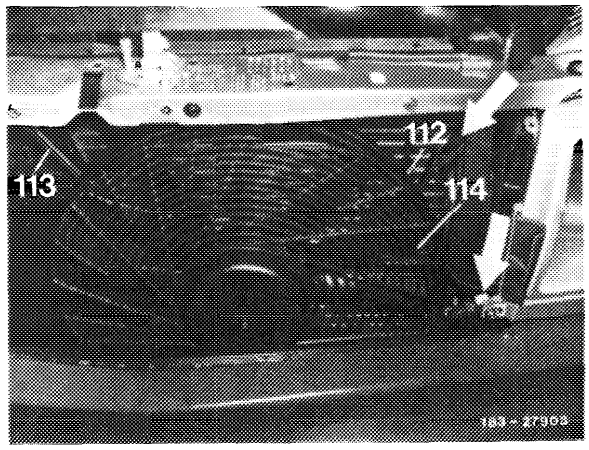


6 Loosen both cable straps (arrow) from condenser.

7 Unscrew screw (112) and remove holder (113).

8 Remove auxiliary fan to the right and then in forward direction.

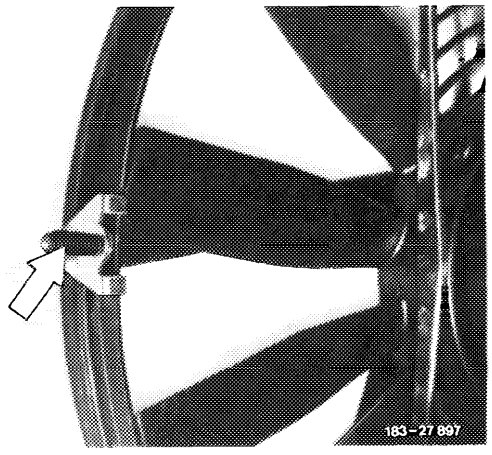
9 Unclip protective grille (114) from auxiliary fan and remove lower holder.



Installation

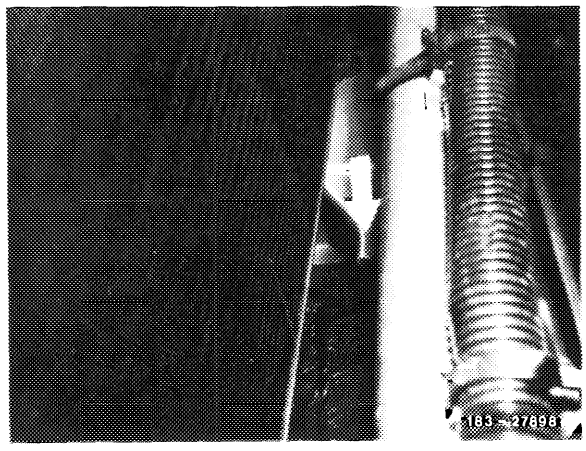
10 Pull rubber mount from lower holder of auxiliary fan and wind approx. 5 layers of insulating tape around bolt (arrow). Then slip rubber mount on holder.

Note: The insulating tape makes sure that the rubber mount will not fall off when mounting auxiliary fan.



11 Insert auxiliary fan and slip rubber mount into holder on cross member (arrow).

12 For further installation proceed vice versa.



13 Check auxiliary fan for function, switching on ignition for this purpose and bridging both connections of pressure switch (19), but do not separate connections of pressure switch and harness.

14 Check direction of rotation of auxiliary fan. Fan rotates clockwise. If direction of rotation is wrong, interchange sockets in 2-pin connector (arrow).