Audi A8 1994 ➢

#Heating

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List of Workshop Manual Repair GroupsList of Workshop Manual Repair GroupsList of Workshop Manual Repair Groups

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#Heating

Repair Group

01 - Self-diagnosis

80 - Heating

Technical information should always be available to the foremen and mechanics, because their careful and constant adherence to the instructions is essential to ensure vehicle road-worthiness and safety. In addition, the normal basic safety precautions for working on motor vehicles must, as a matter of course, be observed.

Contents

01 - Self-diagnosis

1 - Self-diagnosis

1.1 - Self-diagnosis

1.2 - Technical data of self-diagnosis

Features

- The fault memory is a non-volatile memory and thus independent of the power supply.
- The data transfer between control unit and fault reader V.A.G 1551 or vehicle system tester V.A.G 1552 is carried out in the "Rapid data transfer" operating mode .

1.3 - Function

The Thermotronic control unit -J214 is equipped with a fault memory.

After evaluating the data, the Thermotronic control unit -J214 distinguishes between up to 7 different faults => Fault table on Pages 6 and stores these until the fault memory is erased following its interrogation.

1.4 - Fault recognition

If faults occur in the monitored sensors or components, these faults are recorded in the fault memory together with an indication of the type of fault.

Always commence fault finding by starting self-diagnosis and interrogating the stored faults. The following units are available for interrogation of the stored data:

- Fault reader V.A.G 1551
- Vehicle system tester V.A.G 1552

The displayed fault information can then be checked against the fault table, which indicates possible fault causes and enables appropriate repair measures to be taken.

Notes on fault rectification:

- If a fault condition exists for more than a predetermined period, the fault is stored as a static fault. If the fault condition is then no longer detected for a predetermined period, the fault is re-classified as a sporadic fault. This process is continuously repeated. Sporadic faults are also identified as such (the letters /SP appear on the display).
- If a sporadic fault does not occur for a predetermined period, it is automatically erased.

Self-diagnosis is only possible using fault reader V.A.G 1551 or vehicle system tester V.A.G 1552, mode 1, "Rapid data transfer".

Self-diagnosis is not restricted to the storage, interrogation and erasing of fault messages and final control diagnosis. Further functions are provided by way of the measured value block and control unit identification.

Mode -2- (flash code output) is not envisaged for electronic climate/heating control. Modes -3- (self-test) and -4- (dealership identification) only apply to the fault reader V.A.G 1551 and vehicle system tester V.A.G 1552 and are described in the appropriate manuals.

Notes:

- This workshop manual describes self-diagnosis using the fault reader V.A.G 1551.
- Self-diagnosis can also be performed in the same manner with the vehicle system tester V.A.G 1552. In order to be able to furnish proof of faults in the event of subsequent queries it is appropriate, before erasing the fault memory, to connect up to fault reader V.A.G 1551 and print out the faults found (V.A.G 1552 has no printer).

Selectable functions

Fault reader V.A.G 1551 or vehicle system tester V.A.G 1552		Ignition on, engine stopped	Engine idling	Page
Address words				
08	Electronic climate/heating control	yes	yes	
00	Automatic test sequence	yes	yes	
Functions				
01	Interrogating control unit version	yes	yes	2
02	Interrogating fault memory	yes	yes	5
03	Final control diagnosis	yes	yes	8
05	Erasing fault memory	yes	yes	10
06	End of output	yes	yes	10
08	Reading measured value block	yes	yes	11

Note:

Component fitting locations =>Pages 32 onwards.

1.5 - Safety precautions

Note the following points if testers and measuring instruments have to be used during a road test:

Attention!
- **The testers and measuring instruments must always be secured on the back seat and operated from there by a second person.**
- **If testers and measuring instruments are operated from the front passenger seat, the occupant could be injured by the passenger's airbag in an accident.**

1.6 - Connecting fault reader V.A.G 1551 and selecting electronic climate/heating control.

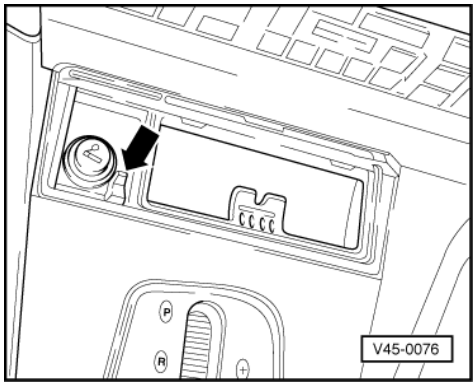
Test prerequisites:

- Supply voltage of electrical system OK
- Fuses OK

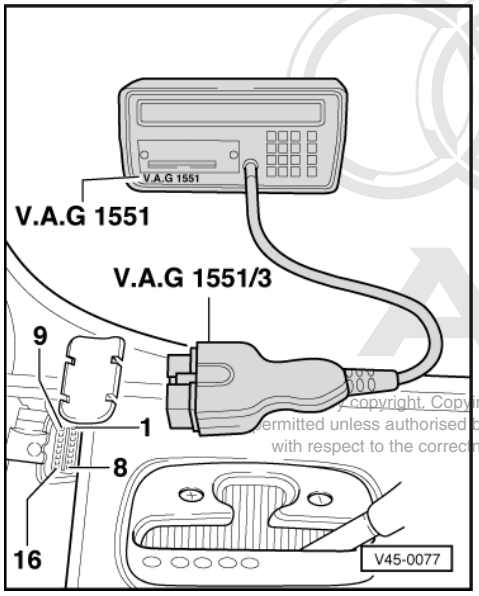
=> Binder "Current flow diagrams, Electrical fault-finding and Fitting locations"

- Release ashtray insert at front of centre console and remove insert.

- Unclip plug cover in bottom of ashtray housing.



- -> Release ashtray in centre console by pressing small lever -arrow-.
- Remove ashtray from centre console and remove cover for diagnosis plug.



- -> Make sure the ignition is switched off, then connect fault reader V.A.G 1551 using test lead V.A.G 1551/3.

-> Indicated on display:

```
V.A.G - SELF DIAGNOSIS     HELP
1 - Rapid data transfer 1)
2 - Flash code output 1)
```

1) appears alternately

Note:

If the display remains blank, test the voltage supply and wiring using the current flow diagram.

Depending on the function required, see table of selectable functions => Page 2 .

- Switch on ignition.

or

- Start the engine.
- Press PRINT key to switch on printer (indicator lamp in key lights up).
- Enter "1" to select "Rapid data transfer".

-> Indicated on display:

```
Rapid data transfer     HELP
Insert address word XX
```

- Enter "08" for address word "Electronic climate/heating control".

-> Indicated on display:

```
Rapid data transfer     Q
08 Electronic climate/heating control
```

- Confirm input with Q key.

-> Indicated on display: Indicated on display:

```
Rapid data transfer
Tester sends address word 08
```

- Wait until next display appears.

-> The display on fault reader V.A.G 1551 will show the control unit identification (example):

```
4D0819045     D2-Heater     D ..
```

Note:

The control unit identification can be printed out by pressing the PRINT key on fault reader V.A.G 1551.

Control unit identification (example)

- 4D0 819 045	Part-No.; assignment => Parts list
- D2 heater	Audi A8 Heating
- D ..	Data status (software status) of control unit

- Press ⇒-key.

-> Indicated on display:

```
Rapid data transfer     HELP
Select function XX
```

Notes:

```
Rapid data transfer     HELP
Control unit does not answer!
```

-> Indicated on display:

- Print out possible cause of trouble by pressing HELP key.

```
Rapid data transfer     HELP
K-line not switched to positive
```

Use current flow diagram to check wiring of diagnosis plug =>Page 16 .

```
Rapid data transfer
No signal from control unit
```

```
Rapid data transfer
Communication problem
```

-> If this display appears at the start of/during the program, then faults have occurred and data exchange between the fault reader V.A.G 1551 and the control unit -J214 is no longer possible.

- Use current flow diagram to check wiring of diagnosis plug =>Page 16 .

- After remedying possible causes of trouble enter "08" again for address word "Electronic climate/heating control" => Page 4 .

2 - Interrogating fault memory

2.1 - Interrogating fault memory

- Connect fault reader V.A.G 1551 (V.A.G 1552) and select electronic climate/heating control with the "Address word" 08.
  (Connect fault reader => Page 2 .)

-> Indicated on display:

```
Rapid data transfer     HELP
Select function XX
```

- Enter "02" for function "Interrogating fault memory".

-> Indicated on display:

```
Rapid data transfer     Q
02 - Interrogating fault memory
```

- Confirm input with Q key.

-> Indicated on display:

```
No fault recognised!
```

- Press "key.

Notes:

- If no fault has been detected despite complaints having been received about the heater (e.g. system control not OK, speed of fresh-air blower cannot be regulated):
  - 1. Read measured value block (Function 08) =>Page 11 .
  - 2. Perform final control diagnosis (Function 03)=> Page 8 .
  - 3. Check function of pump valve unit => Page 58 .

- Actuation of fresh-air blower -V2 and actuation of air-distribution flaps are not monitored by the Thermotronic control unit -J214.

-> Indicated on display:

```
X fault(s) recognised!
```

If the printer is switched on the stored faults will be displayed and printed out in sequence.

Note:

If the printer is switched off press, ⇒ -key to display next fault.

Notes:

- If fault(s) was/were detected:
  - 1. Rectify the fault.
  - 2. Interrogate fault memory (function 02).
  - 3. Erase fault memory (function 05).
  - 4. End output (function 06).

- Press ⇒-key.

As is in the case with "no fault detected", the program returns to the initial position after pressing the ⇒-key.

-> Indicated on display:

```
Rapid data transfer     HELP
Select function XX
```

- End output (Function 06) =>Page 10 .
- Switch off ignition and detach diagnosis connector.

2.2 - Fault table

Notes:

- All the faults detected by the Thermotronic control unit -J214 and displayed by V.A.G 1551/V.A.G 1552 on interrogating the content of the fault memory are listed in the following in ascending order of fault codes.
- The fault code is only printed out in "Rapid data transfer" mode if the printer of V.A.G 1551 is switched on. Example: Fault code (5-digit) 00737.
- Faults are displayed as being sporadic if they only occur from time to time or if the fault memory has not been erased following fault rectification. (The content of the fault memory is retained until it is erased, "non-volatile memory".)
- Sporadic faults are marked "/SP" on the display.
- If defective components are displayed on reading out the fault memory, use current flow diagram to additionally check component wiring for short circuit and open circuit.

=> Binder "Current flow diagrams, Electrical fault-finding and Fitting locations"

- Check the appropriate plug contacts before replacing a component.
- Additionally check power supply and earth connections before replacing Thermotronic control unit -J214.

=> Binder "Current flow diagrams, Electrical fault-finding and Fitting locations"

- Once repairs have been completed, the fault memory is always to be interrogated again with fault reader V.A.G 1551 and erased.

Output on printer of V.A.G 1551	Possible cause of trouble	Fault remedy
00000 No fault recognised!	If no fault is detected in spite of complaints about the electronic heating control, implement functions "Final control diagnosis 03" and "Reading measured value block 08" in addition to checking function of pump valve unit =>Page 58	
00737 Heat regulation valve, left -N175	- Open circuit in wiring to power supply to -N175	- Use current flow diagram to service power supply
Open circuit/Short to earth/SP Short to positive/SP	- Open circuit in wiring or short circuit between Thermotronic control unit -J214 and -N175	- Use current flow diagram to locate and rectify open circuit or short circuit
	- -N175 defective	- Check function of heat regulation valve, left -N175 (in pump valve unit) =>Electrical testing, test step 3.2, Page 15 onwards.

Output on printer of V.A.G 1551	Possible cause of trouble	Fault remedy
00738 Heat regulation valve, right -N176	- Open circuit in wiring to power supply to -N176	- Use current flow diagram to service power supply

Open circuit/Short to earth/SP Short to positive/SP	- Open circuit in wiring or short circuit between Thermotronic control unit -J214 and -N176	- Use current flow diagram to locate and rectify open circuit or short circuit
	- -N176 defective	- Check function of heat regulation valve, right -N176 (in pump valve unit) =>Electrical testing, test step 3.3, Page 15 onwards.

Output on printer of V.A.G 1551	Possible cause of trouble	Fault remedy
00739 Coolant circulation pump -V50 1)	- Open circuit in wiring to power supply to -V50	- Use current flow diagram to service power supply
Open circuit/Short to earth 2) Short to positive	- Open circuit in wiring or short circuit between Thermotronic control unit -J214 and -V50	- Use current flow diagram to locate and rectify open circuit or short circuit
	- -V50 defective	- Check function of coolant circulation pump -V50 (in pump valve unit) =>Electrical testing, test step 3.1, Page 15

1) Sporadic faults are not stored for the coolant circulation pump -V50. Faults are only displayed as long as they are static (power supply via terminal 75).

2) The fault type "Open circuit/short to earth" is only detected when the coolant circulation pump -V50 is not in operation (both rotary temperature switches on "cold" stop).

Output on printer of V.A.G 1551	Possible cause of trouble	Fault remedy
00756 Vent temperature sender, left -G150	- Open circuit in wiring or short circuit between -G150 and Thermotronic control unit -J214.	- Use current flow diagram to locate and rectify open circuit or short circuit
Short to earth/SP Open circuit/Short to positive/SP	- -G150 defective	- Check vent temperature sender, left -G150 =>Electrical testing, test step 1.3, Page 14
00757 Vent temperature sender, right, -G151	- Open circuit in wiring or short circuit between -G151and Thermotronic control unit -J214.	- Use current flow diagram to locate and rectify open circuit or short circuit
Short to earth/SP Open circuit/Short to positive/SP	- -G151 defective	- Check vent temperature sender, right -G151 =>Electrical testing, test step 1.3, Page 14

Output on printer of V.A.G 1551	Possible cause of trouble	Fault remedy
65535 Control unit defective	- Open circuit in wiring or contact resistance in power supply/in earth connection to Thermotronic control unit -J214.	- Use current flow diagram to check and repair wiring to control unit.

Output on printer of V.A.G 1551	Possible cause of trouble	Fault remedy
	- Thermotronic control unit - -J214 defective	- Replace Thermotronic control unit -J214 => Page 37

3 - Final control diagnosis

3.1 - Final control diagnosis

Notes:

- Fitting locations of components actuated =>Page 19 onwards.
- The final control diagnosis can be performed more than once if necessary.
- Faults in final controls are stored in the fault memory.

Starting final control diagnosis

- Connect fault reader V.A.G 1551 (V.A.G 1552) and select electronic climate/heating control with the "Address word" 08.
  (Connecting fault reader => Page 2 .)
- Switch on ignition.
- Interrogate fault memory => Page 5 .

-> Indicated on display:

```
Rapid data transfer     HELP
Select function XX
```

- Enter "03" to select the function "Final control diagnosis".

-> Indicated on display:

```
Rapid data transfer     Q
03 - Final control diagnosis
```

- Confirm input with Q key.

-> Indicated on display:

```
Final control diagnosis
Heat regulation valve, left -N175
```

- Next component can be selected by pressing the ⇒-key. Function and sequence =>Table of final controls actuated, Page 9 .

Notes:

- Final control diagnosis can be terminated by pressing the C-key.
- Interrogating fault memory on completion of final control diagnosis => Page 5 .

-> Indicated on display:

```
Function unknown or cannot
be implemented at present.
```

Final control diagnosis is over.

- Press ⇒-key.

-> Indicated on display:

```
Rapid data transfer     HELP
Select function XX
```

- Repeat final control diagnosis if applicable or end output (Function 06) =>Page 10 .

Final controls actuated

Notes:

- Checking function of heat regulation valves -N175/-N176 and coolant circulation pump -V50 =>Checking function of pump valve unit,Page 58 .
- Switching of the heat regulation valves -N175/-N176 and the running noise of the coolant circulation pump -V50 can only be heard directly at the pump valve unit in a noisy environment.

Indicated on display	Desired function	Fault remedy
Heat regulation valve, left	- Heat regulation valve, left -N175 - -N175 is switched on and off every 2 seconds.	- Use current flow diagram to check wiring between heat regulation valve, left -N175 and Thermotronic control unit -J214 for open circuit or short to earth. - Check power supply for heat regulation valve, left -N175 => Electrical testing, test step 2.2, Page 15 onwards. - Replace Thermotronic control unit -J214 => Page 37

Indicated on display	Desired function	Fault remedy
Heat regulation valve, right -N176	- Heat regulation valve, right - -N176 is switched on and off every 2 seconds.	- Use current flow diagram to check wiring between heat regulation valve, right -N176 and Thermotronic control unit -J214 for open circuit or short to earth. - Check power supply of heat regulation valve, right -N176 => Electrical testing, test step 2.3, Page 15 onwards. - Replace Thermotronic control unit -J214 => Page 37

Indicated on display	Desired function	Fault remedy
Coolant circulation pump -V50	- Coolant circulation pump -V50 is switched on and off every 2 seconds.	- Use current flow diagram to check wiring between coolant circulation pump -V50 and Thermotronic control unit -J214 for open circuit or short to earth. - Check power supply for coolant circulation pump -V50 => Electrical testing, test step 2.1, Page 15 - Replace Thermotronic control unit -J214 => Page 37

4 - Erasing fault memory, end of output

4.1 - Erasing fault memory, end of output

Prerequisite:

- Fault memory interrogated.

Erasing fault memory

-> Indicated on display:

```
Rapid data transfer      HELP
Select function XX
```

- Enter "05" for function "Erasing fault memory".

-> Indicated on display:

```
Rapid data transfer       Q
05 - Erase fault memory
```

- Confirm input with Q key.

-> Indicated on display:

```
Rapid data transfer
Fault memory erased!
```

- Press ⇒-key.

-> Indicated on display:

```
Rapid data transfer      HELP
Select function XX
```

Notes:

-> Indicated on display:

```
Attention!
Fault memory not interrogated
```

- Sequence has not been correctly followed.

- Interrogate fault memory.
- Rectify any faults.

- Fault memory is not erased if, for example, ignition is switched off between interrogating and erasing fault memory.

End output

Note:

The fault memory has been interrogated and erased.

-> Indicated on display:

```
Rapid data transfer      HELP
Select function XX
```

- Enter "06" for function "End of output".

-> Indicated on display:

```
Rapid data transfer     Q
06 - End output
```

- Confirm input with Q key.

-> Indicated on display:

```
Rapid data transfer     HELP
Insert address word XX
```

- Switch off ignition and detach diagnosis connector.

5 - Reading measured value block

5.1 - Reading measured value block

Notes:

- The measured value block provided contains four measured values.
- The current valid actual or specified value is displayed.
- A second mechanic is required if display values are to be read out whilst driving.
- Pay attention to safety precautions => Page 2 .

Prerequisites:

- Fault memory interrogated => Page 10 .
- Engine still idling after interrogation of fault memory.

Starting measured value block reading

- Open all dash-panel vents and set rotary air-distribution control to "dash-panel vents".
- Set rotary blower switch to speed 2.

-> Indicated on display:

```
Rapid data transfer     HELP
Select function XX
```

- Enter "08" for function "Reading measured value block".

-> Indicated on display:

```
Rapid data transfer      Q
08 - Reading measured value block
```

- Confirm input with Q key.

-> Indicated on display:

```
Reading measured value block      Q
Enter display group number XXX
```

- Enter display group number "001" and confirm entry with the Q-key.

-> Indicated on display:

```
Reading meas. value block     1
1     2     3     4
```

Measured block value display 4 fields.

Notes:

- If the printer is switched on, the current display can be printed out on the record slip.

- The measured values in display fields 1 and 2 are governed by the rotary temperature control, engine temperature and ambient temperature settings..
- The specified values in display fields 3 and 4 can be infinitely varied by turning the rotary temperature controls.
- If specified values are not attained, check function of pump valve unit=>Page 58 .

- Press ⇒-key if specified values are attained.

-> Indicated on display:

```
Rapid data transfer      HELP
Select function XX
```

Display field	Significance	Explanatory notes
1	Measured value of vent temperature sender, left -G150 in oC	- Checking=> Electrical testing, test step 1.2, Page 14
2	Measured value of vent temperature sender, right -G151 in oC	- Checking=> Electrical testing, test step 1.3, Page 14
3	Specified temperature value at sender, left -G150 is governed by position of left rotary temperature control (drivers' side): ▪ Display 0 oC = Rotary temperature control on "cold" stop ▪ Display91 oC = Rotary temperature control on "warm" stop	
4	Specified temperature value at sender. right -G151 is governed by position of right rotary temperature control (passengers' side): ▪ Display 0 oC = Rotary temperature control on "cold" stop ▪ Display91 oC = Rotary temperature control on "warm" stop	

Notes:

- The temperature at the vent temperature senders -G150 and -G151 is regulated by opening and closing the heat regulation valves -N175 and -N176; checking function of valves -N175 and -N176 =>Page 58 .
- In the event of a fault at the vent temperature's senders, the corresponding valve -N175 or -N176 is actuated by the Thermotronic control unit -J14 as a function of the position of the rotary temperature switch.

6 - Electrical testing

6.1 - Electrical testing

6.2 - Wiring and component check with test box V.A.G 1598/19

Special tools, testers and auxiliary items required

- Test box V.A.G 1598/18
- Hand-held multimeter V.A.G 1526 or V.A.G 1526 A
- Adapter cable set V.A.G 1594 A

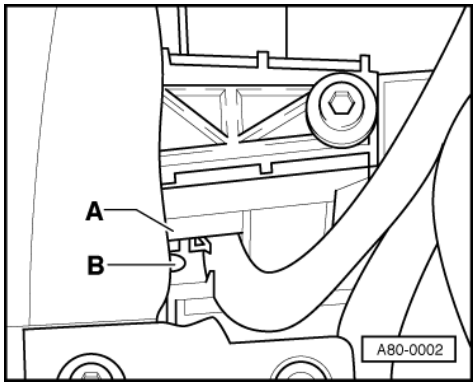
Test prerequisite:

- All fuses OK:

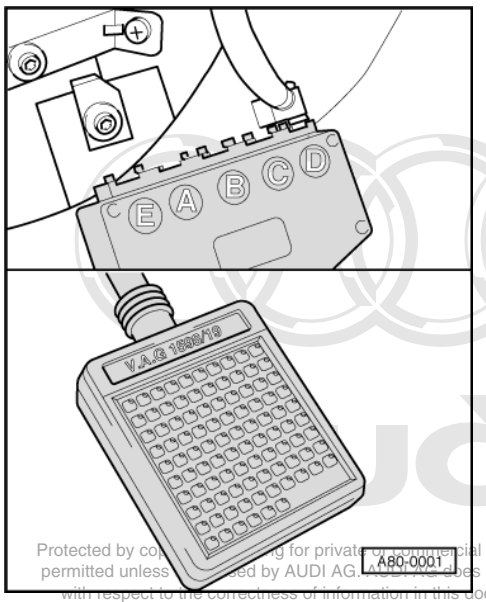
=> Binder "Current flow diagrams, Electrical fault-finding and Fitting locations"

- Switch off ignition.
- Open all dash-panel vents and set rotary air-distribution control to "dash-panel vents".
- Set rotary blower switch to speed 2.

- Removing side trim for centre console on passenger's side:



- -> Press back catch -B- and detach connector -A- at Thermotronic control unit -J214.



- -> Attach connector of Thermotronic control unit -J214 in position -D- on test box V.A.G 1598/19.

Notes:

- The contact numbers of the connectors and the socket numbers in the test box are identical.
- To connect the test equipment to the test box, use auxiliary cables from adapter cable set V.A.G 1594 A.
- Actuation of fresh-air blower -V2 by way of the fresh-air blower series resistor with overheating fuse -N24 does not form part of electrical testing; check if necessary in line with current flow diagram.

Test step 1

(Power supply for control unit -J214, vent temperature senders -G150 and -G151):

Select measuring range on hand-held multimeter V.A.G 1526: Resistance measurement (20 kω)					
Test step	V.A.G 1598/19 socket	Testing of	▪ Test prerequisites - Additional work	Specified value	Remedies if specified values are not attained
1.1	3 D + 12 D	Power supply to control unit -J214	▪ Ignition switched on	- Approx. battery voltage	- Use current flow diagram to locate and rectify open circuit in wiring or contact resistance in power supply/earth connection.
1.2	9 D + 11 D	Vent temperature sender, left -G150	- Measure temperature at sender fitting location	- Governed by temperature at sender fitting location	- Use current flow diagram to locate and rectify open circuit or contact resistance
1.3	9 D + 10 D	Vent temperature sender, right -G151		=> Table, Page 14	- Replace sender

Temperature-dependent resistances of sensors/senders:

Temperature measured at sender fitting location oC	Resistance of senders -G150 and -G151 kω	Resistance of temperature sensor -G17 kω
- 40	-	34,7
- 30	-	18,1
- 20	28,7	9,95
-10	16,2	5,59
0	9,40	3,28
5	7,27	2,54
10	5,66	1,99
15	4,45	1,57
20	3,50	1,25
25	2,79	1,00
30	2,23	0,80

Temperature measured at sender fitting location oC	Resistance of senders -G150 and -G151 kω	Resistance of temperature sensor -G17 kω
35	1,80	0,65
40	1,45	0,53
50	0,97	0,36
60	0,67	0,25
70	0,47	-
80	0,33	-

Test step 2

(power supply for coolant circulation pump -V50; heat regulation valves, left -N175 and right -N176):

Select measuring range on hand-held multimeter V.A.G 1526: Voltage measurement (20 V =)					
Test step	V.A.G 1598/19 socket	Testing of	▪ Test prerequisites - Additional work	Specified value	Remedies if specified values not attained
2.1	8 D + 12 D	Power supply for coolant circulation pump -V50 and wiring to control unit -J214	▪ Ignition switched on	- Approx. battery voltage	- Use current flow diagram to service power supply to control unit -J214 (via -V50). Replace pump valve unit
2.2	4 D + 12 D	Power supply for heat regulation valve -N175 left and wiring to control unit -J214	▪ Ignition switched on	- Approx. battery voltage	- Use current flow diagram to service power supply to control unit -J214 (via -N175). Replace pump valve unit

Select measuring range on hand-held multimeter V.A.G 1526: Voltage measurement (20 V =)					
Test step	V.A.G 1598/19 socket	Testing of	▪ Test prerequisites - Additional work	Specified value	Remedies if specified values not attained
2.3	1 D + 12 D	Power supply for heat regulation valve -N176 right and wiring to control unit -J214	▪ Ignition switched on	- Approx. battery voltage	- Use current flow diagram to service power supply to control unit -J214 (via -N176). Replace pump valve unit

Test step 3

(Coolant circulation pump -V50, heat regulation valve, left -N175 and heat regulation valve, right -N176):

Select measuring range on hand-held multimeter V.A.G 1526: Current measurement (20 A =)					
Test step	V.A.G 1598/19 socket	Testing of	▪ Test prerequisites - Additional work	Specified value	Remedies if specified values not attained
3.1	8 D + 12 D	Function of coolant circulation pump -V50	▪ Ignition switched on ▪ Fresh-air blower running at speed 3 ▪ Engine warm	- Coolant pump running - Temperature at vents increases - Current input less than 2.5 A	- Use current flow diagram to check wiring -of pump -V50 for interchange Replace pump valve unit

Note on test step 3.1:

Both heat regulation valves open, both heat exchangers become warm.

Notes on test steps 3.2 and 3.3:
- Heat regulation valves -N175 and -N176 are open in rest position.
- If complaints have been received about lack of heat output and no fault in this test/with regard to function of pump valve unit (=> Page 58), use current flow diagram to check for interchanged wiring to -V50 and to the valves -N175/-N176.

Select measuring range on hand-held multimeter V.A.G 1526: Current measurement (20 A =) Jumper between sockets 8D and 12D					
Test step	V.A.G 1598/19 socket	Testing of	▪ Test prerequisites - Additional work	Specified value	Remedies if specified values not attained
3.2	4 D + 12 D	Function of heat regulation valve, left -N175	▪ Ignition switched on ▪ Coolant pump running ▪ Fresh-air blower running at speed 3 ▪ Engine warm	- Temperature at vents "left" decreases 1) - Current input less than 3,5 A	- Use current flow diagram to check -wiring of valve -N175 for interchange Replace pump valve unit
3.3	1 D + 12 D	Function of heat regulation valve, right -N176	▪ Ignition switched on ▪ Coolant pump running ▪ Fresh-air blower running at speed 3 ▪ Engine warm	- Temperature at vents "right" decreases 1) - Current input less than 3,5 A	- Use current flow diagram to check -wiring of valve -N176 for interchange Replace pump valve unit

1) Coolant in heat exchanger is cooled, heat regulation valve closed.

6.3 - Checking wiring of diagnosis plug

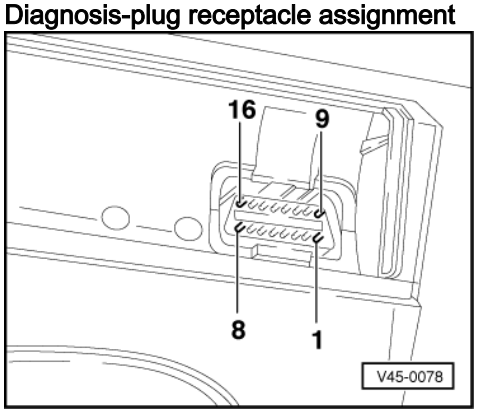
Special tools, testers and auxiliary items required
- Test box V.A.G 1598/18
- Hand multimeter V.A.G 1526 or V.A.G 1526 A
- Adapter cable set V.A.G 1594 A

Notes:
- Switch off ignition before checking wiring.
- Diagnosis plug is beneath ashtray insert at front of centre console. Junction for diagnosis line (K-line) takes the form of a spot weld in the wiring loom:

=> Binder "Current flow diagrams, Electrical fault-finding and Fitting locations"
- Wiring colours for all vehicle systems connected via junction to receptacle 7 of diagnosis plug:

=> Binder "Current flow diagrams, Electrical fault-finding and Fitting locations"
- Attaching connector of Thermotronic control unit -J214 in position -D- on test box V.A.G 1598/19 =>Page 12 onwards.

Diagnosis-plug receptacle assignment



4 - -> Earth connection for V.A.G 1551/1552
7 - K-line (data line between fault reader and the various vehicle systems with self-diagnosis capability)
16 - Power supply for V.A.G 1551/1552

Notes:

- The diagnosis plug wiring is routed by way of a spot weld in the wiring loom to the various control units

=> Binder "Current flow diagrams, Electrical fault-finding and Fitting locations"

- The diagnosis line is connected to receptacle 7 of the Thermotronic control unit -J214 connector.
-

```
Rapid data transfer
Communication problem
```

-> If the adjacent display appears at start of or during self-diagnosis:
- Consecutively detach connectors to control units of other vehicle systems with self-diagnosis.
- Once the connector to a given vehicle system has been detached, enter address word "08" again.
- If control unit identification is then displayed, replace the last control unit to be disconnected from the diagnosis line.

80 - Heating

1 - Servicing heating

1.1 - Servicing heating

1.2 - Contact corrosion!

Contact corrosion can occur if unsuitable connecting elements (bolts, nuts, washers ...) are used.

For this reason, all the fastening components have been subjected to special surface treatment. These components can be identified by their greenish surface finish.

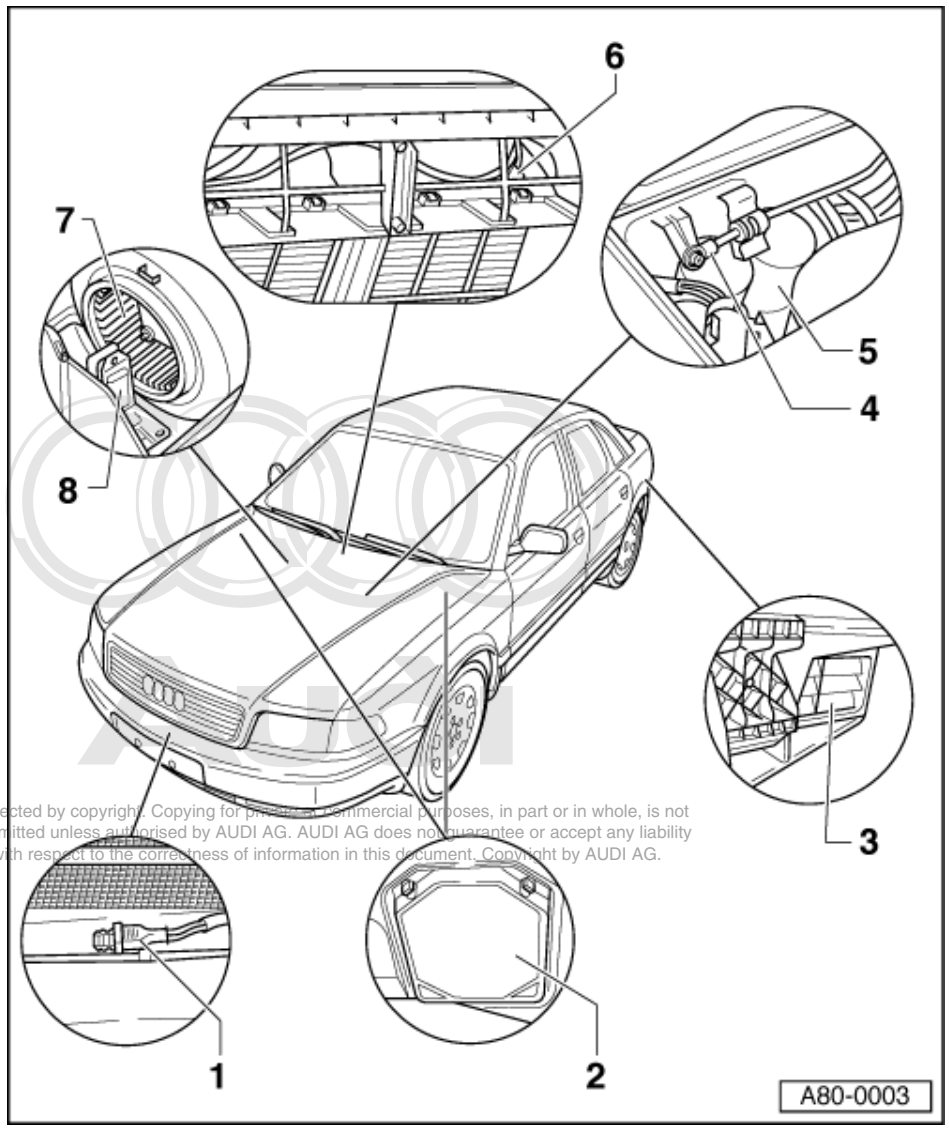
In addition to this, all rubber and plastic parts and all adhesives are made of non-electrically conductive materials.

If you are not sure whether used parts can be refitted, always fit new parts.

Attention!
- **Use only genuine Audi A8 Parts!**
- **Accessories must be approved by AUDI AG!**
- **Damage resulting from contact corrosion is not covered by the warranty!**

2 - Components in engine compartment

2.1 - Components in engine compartment



1 Ambient temperature sensor -G17

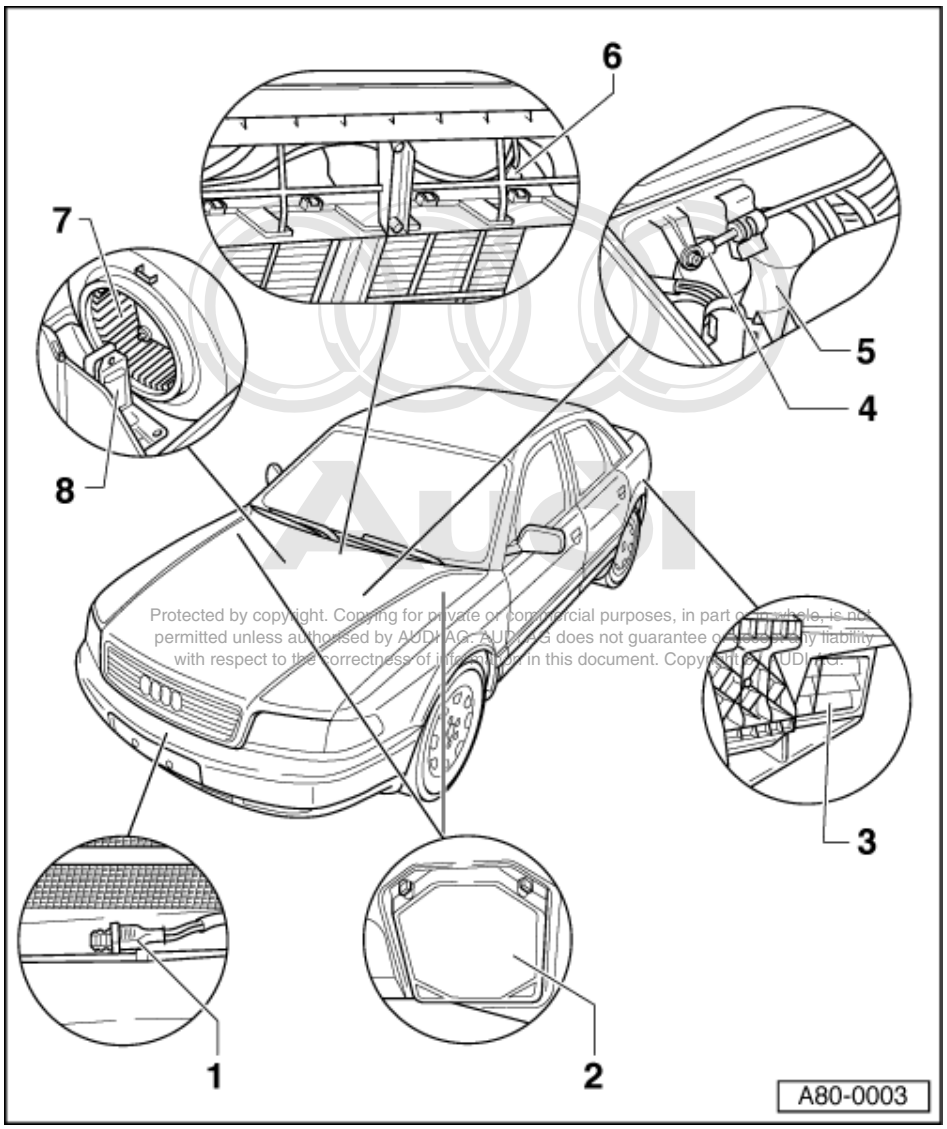
- ◆ Not connected to heating control system
- ◆ Removal:
- \- Removing bumper:

=> General body repairs; Repair group 63; Front bumper; Removing and installing front bumper Front bumper Removing and installing front bumper

- \- Detach connector at temperature sensor and unclip it from holder in air duct.
- ◆ Resistance values
  =>Page 14

2 Dust and pollen filter

- ◆ Removing and installing
  => Page 30

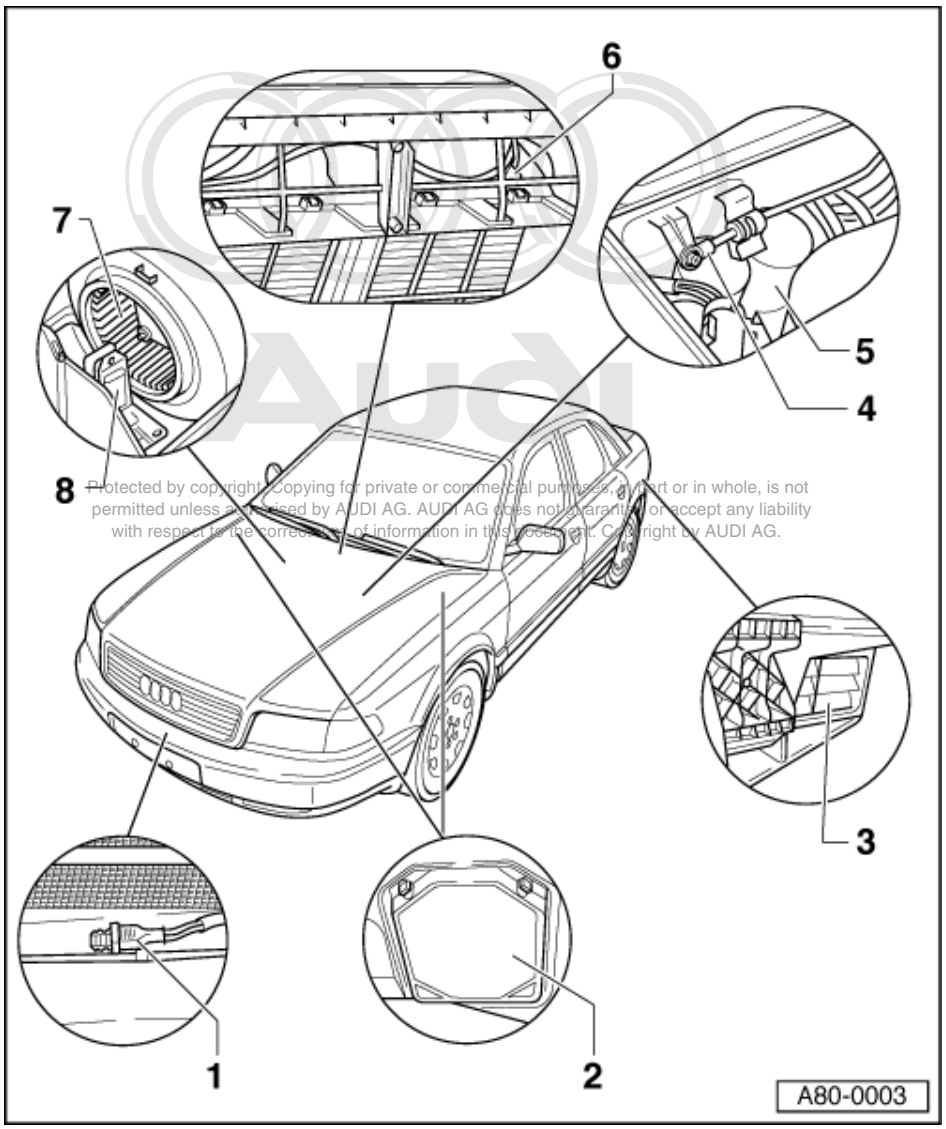


3 Through-flow exit vents

- Sealing lips of vent frame must move freely and close automatically
- The passenger compartment ventilation will only function properly if the air ducts are not blocked by the luggage compartment trim (to the rear shelf)

4 Bowden cable

- To air flow flap (fresh-air shutoff flap)
- Removing and installing
  => Page 22
- Removing and installing air flow flap =>Page 24

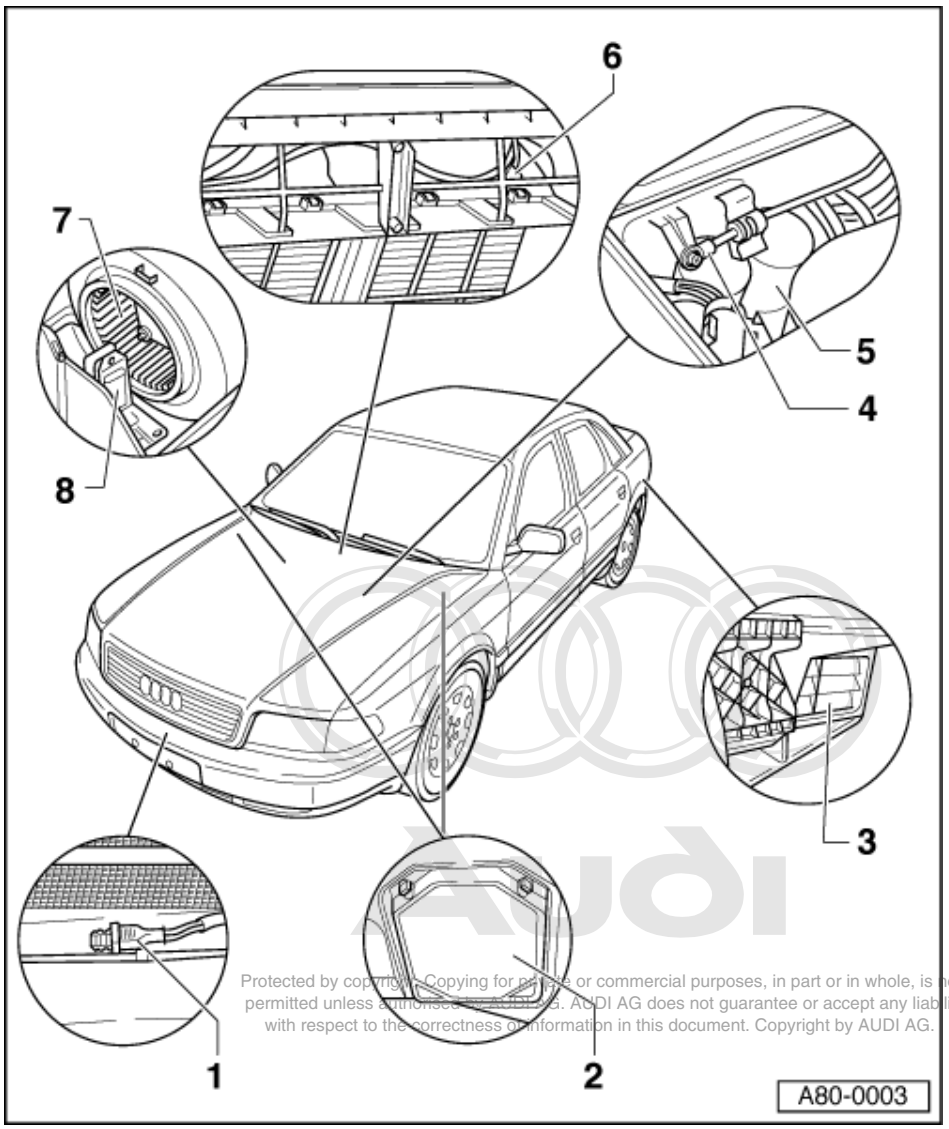


5 Pump valve unit

- Consists of heat regulation valves -N175/-N176 and coolant circulation pump -V50
- Check function =>Page 15 .
- Removing and installing
  => Page 27
- Replacing => Page 29

6 Air recirculation opening

- Sealed off with 2 foam blocks on vehicles with no AC =>Fig. 1,Page 70
- Check foam blocks if complaints are received about moisture in passenger compartment
- Holder for coolant pipes to passenger-side heat exchanger is difficult to assemble without being previously reworked if trim panel (with air recirculation opening) is in position => Page 40



7 Fresh-air blower -V2

- Removing and installing
  => Page 25

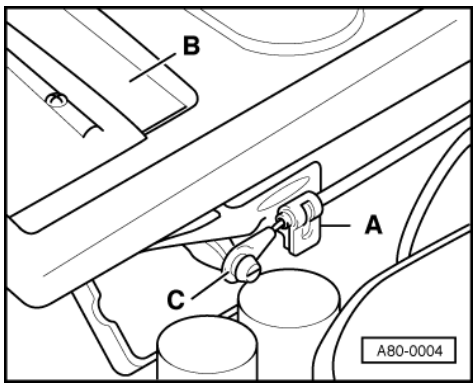
8 Fresh-air blower series resistor -N24

- Removing and installing
  => Page 27

2.2 - Removing and installing Bowden cable for air flow flap (fresh-air shutoff flap)

Removing

- Remove plenum chamber cover.
- Remove grille over air flow flaps.



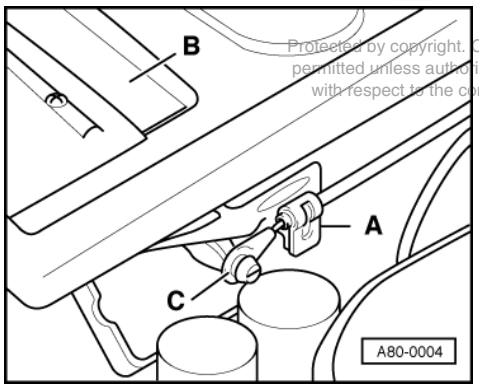
- -> Prise off securing clip -A-.
- Carefully detach Bowden cable from lever arm.
- Removing drivers' shelf and centre section of dash panel:

=> General body repairs; Repair Group 70; Dash panel: Removing and installing drivers' shelf Dash panel: Removing and installing drivers' shelf

=> General body repairs; Repair group 70; Dash panel; Removing and installing centre console and handbrake lever trim Dash panel Removing and installing centre console and handbrake lever trim

- Detaching heater control from centre section of dash panel =>Page 37 .
- Detaching Bowden cable from heater control =>Page 37 onwards.

Installing

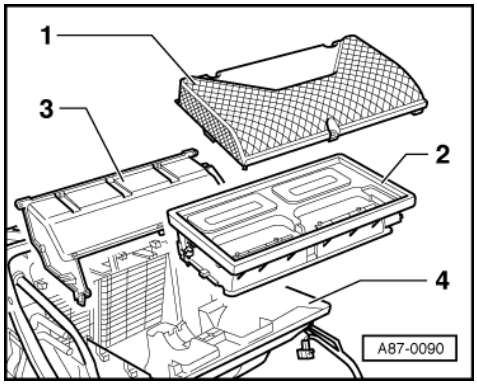


- -> Install Bowden cable, paying attention to correct side and collar -C-.
- Set Bowden cable so that air flow flap -B- is closed without pretension in "0" setting of rotary blower switch.
- Make sure that actuation of rotary blower switch does not kink Bowden cable.

Notes:

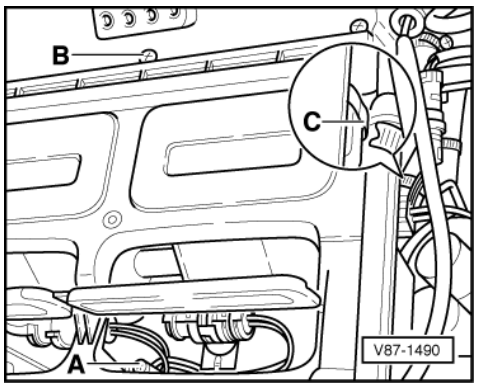
- Renew stiff Bowden cables.
- Connection diagram for Bowden cables =>Page 44 .

2.3 - Removing and installing intake duct with air flow flap.



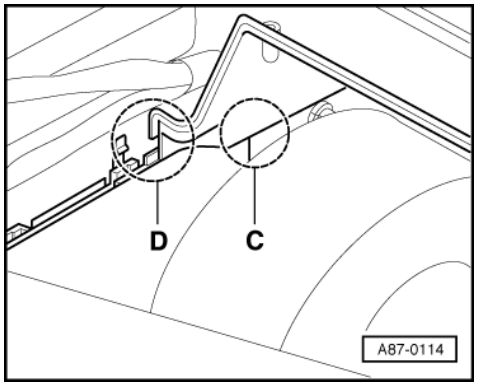
Removing

- Remove plenum chamber cover.
- -> Remove grille -1- over air flow flaps.
- Switch off ignition.
- Removing Bowden cable for air flow flap => Page 22 .



- -> Screw out bolts -A- and -B-.
- Prise off securing clip -C-.
- Remove intake duct (-item 2- in Fig A 87-0090).

Installing

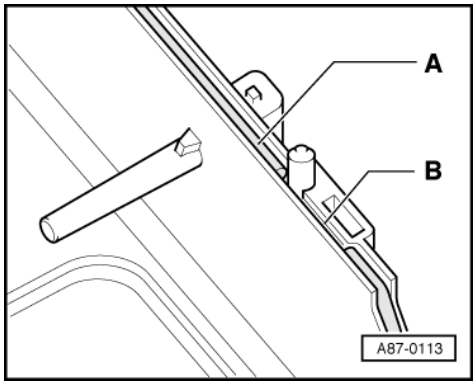


Installation is carried out in the reverse order to removal, noting the following:

- -> Before fitting intake duct carefully seal housing joint in areas -C- and -D- with silicone adhesive sealant (black) D 176 001 A3.
- Interrogate and erase fault memory.

- Perform a functional test on system.

Notes:



- -> If complaints have been received about moisture (misting of windscreen, odour) a dia. 3 mm sponge rubber sealing strip -A- must be fitted as far as point -B- in each case in addition to performing the sealing measures described above. Do not insert strip in areas -B- where groove is narrower.
- Use is to be made of soft dia. 3 mm sponge rubber sealing strip available from specialist dealers.

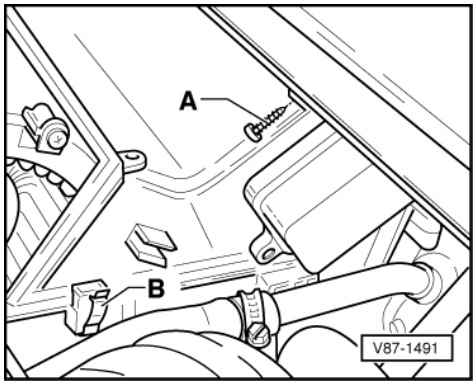
2.4 - Removing and installing trim panel with air recirculation opening

- Removing windscreen wipers and cowl panel trim:

=> Electrical system; Repair Group 92; Servicing windscreen wipers Servicing windscreen wipers

=> Electrical system; Repair Group 92; Servicing windscreen washer system Servicing windscreen washer system

- Removing intake duct with air flow flap => Page 24



- -> Screw out bolts -A-.
- Prise off securing clip -B-.
- Remove trim panel.

2.5 - Removing and installing fresh-air blower -V2

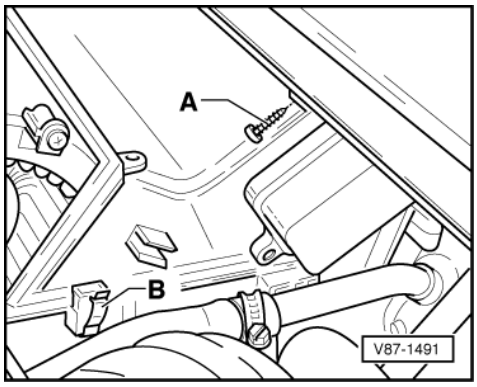
Removing

- Remove plenum chamber cover.
- Removing windscreen wipers and cowl panel trim:

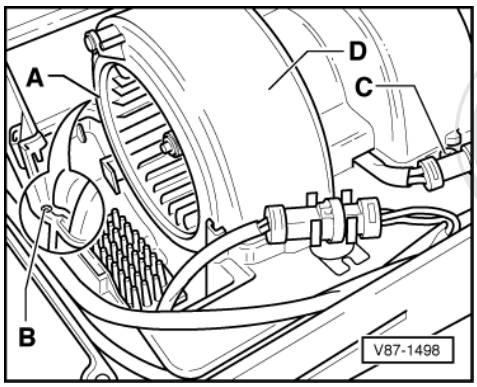
=> Electrical system; Repair Group 92; Servicing windscreen wipers Servicing windscreen wipers

=> Electrical system; Repair Group 92; Servicing windscreen washer system Servicing windscreen washer system

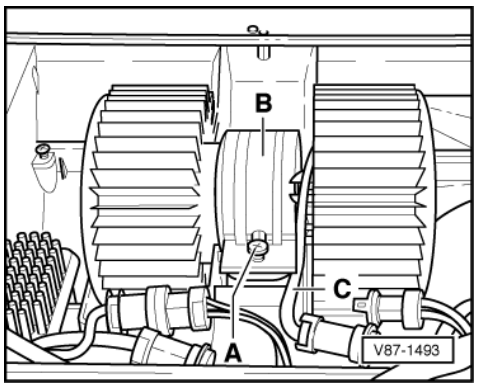
- Removing intake duct with air flow flap => Page 24 .



- -> Screw out bolts -A-.
- Prise off clips -B- and detach trim panel with air recirculation opening from heater.



- -> Remove the two air duct rings -A-.
- Screw out bolts -B- and -C-.
- Remove air duct -D-.



- -> Screw out bolts -A- and remove bracket -B-.
- Remove fresh-air blower -V2.

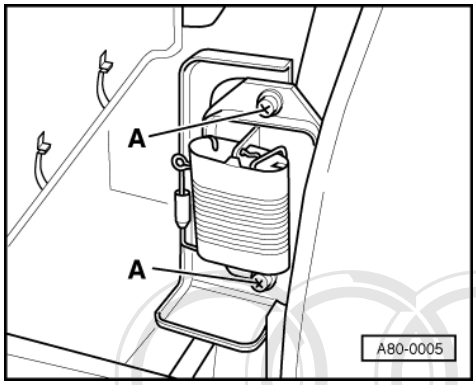
Installing

Installation is carried out in the reverse order to removal, noting the following:

- Before installing trim panel; check correct positioning of the two foam blocks in the air recirculation opening.
- On installation, pay attention to correct routing of wiring -C-.

2.6 - Removing and installing fresh-air blower series resistor -N24

- Remove plenum chamber cover.
- Removing intake duct with air flow flap => Page 24 .



- -> Screw out bolts -A-.

2.7 - Removing and installing pump valve unit

Special tools, testers and auxiliary items required

- Collector V.A.G 1306

Removing

- Switch off ignition.
- Remove brake servo.

=> FWD and 4WD Running Gear; Repair Group 47; Exploded view: Brake servo/brake master cylinder; Removing and installing brake servo Exploded view: Brake servo/brake master cylinder Removing and installing brake servo

Notes:

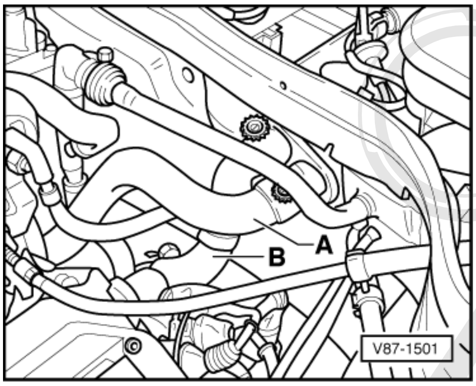
- If coolant circulation pump -V50 is noisy, check that cooling system has been completely bled before removing pump valve unit (air in coolant circuit may be source of noise)

=> Engine Mechanical Components; Repair Group 19

- On RHD vehicles, remove E-box/plenum chamber connection point.

- Open cap on coolant expansion tank.
- Place collector V.A.G 1306 below engine.
- Drain coolant circuit:

=> Engine Mechanical Components; Repair Group 19



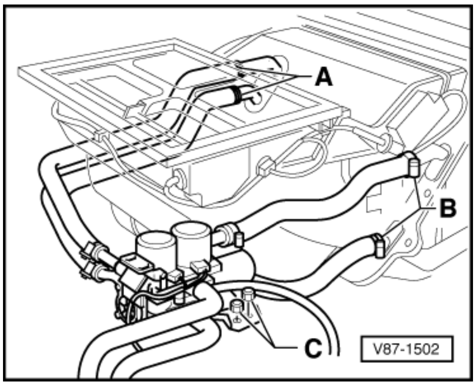
- -> Mark positions of coolant hoses -A- and -B-.
- Detach coolant hoses -A- and -B- from engine to pump valve unit.

Note:

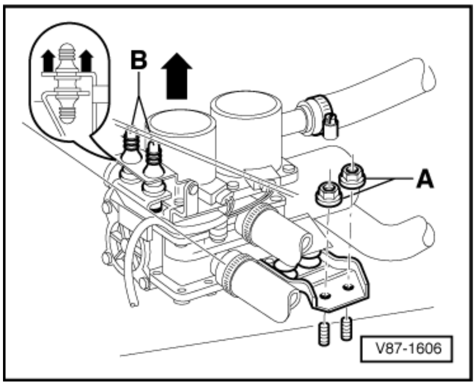
Fig shows arrangement in 8-cylinder engine.

- Removing intake duct with air flow flap => Page 24 .
- Hold coolant hose -A- over a vessel.
- Use compressed-air gun to carefully blow coolant out of pump valve unit through coolant hose -B-.

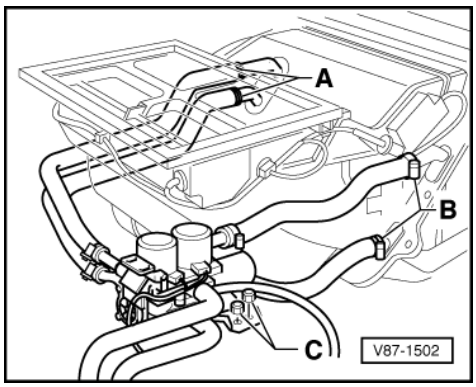
- Detach connectors to pump valve unit.
- Removing reinforcement plate (plenum chamber) =>Page 30 .



- -> Mark coolant hoses -A- and -B-.
- Detach coolant hoses between coolant pipes and heat exchangers.
- Unscrew nuts -C-.



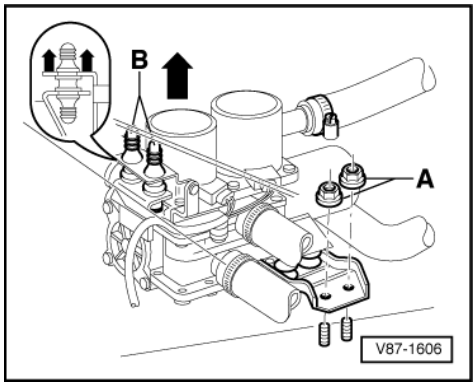
- -> Detach pump valve unit from rubber mounts -B-.



- -> Pull pump valve unit to the right until the two clips at the coolant hoses -A- (at pump valve unit) become accessible.
- Mark coolant hoses -A-.
- Detach pump valve unit.

Installing

Installation is carried out in the reverse order to removal, noting the following:



- -> Tighten nuts -A- to 10 Nm.
- Ensure coolant hoses are correctly connected to the heat exchanger:
  - Lower hose = coolant feed
  - Upper hose = coolant return
- Connect coolant hoses to engine, paying attention to their markings.

Notes:

- Coolant circuit must be bled before starting up coolant circulation pump -V50 of pump valve unit.
- Dry running of the pump valve unit will destroy it.

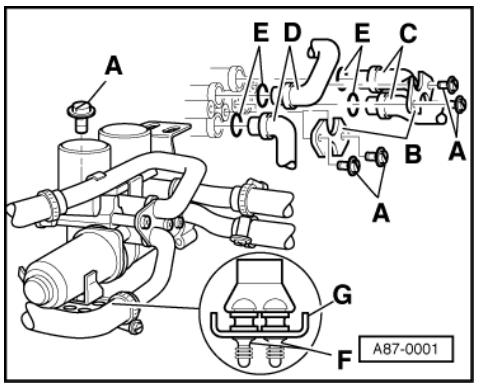
- Bleed coolant circuit before attaching two-way connector to pump valve unit

=> Engine Mechanical Components; Repair Group 19

- Following installation, check correct positioning of sleeve between engine compartment and plenum chamber.

Replace pump valve unit

- Removing pump valve unit =>Page 27 .



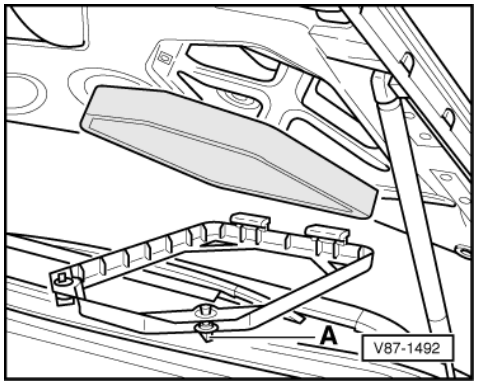
- -> Screw out bolts -A-.
- Remove bracket -B-.
- Detach coolant pipes:
  - Pipes -C- to passengers'-side heat exchanger
  - Pipes -D- to drivers'-side heat exchanger

Notes:

- Renew O-ring seals -E-.
- Insert rubber mount -F- in pump valve unit and bracket -G- as shown.

2.8 - Removing and installing dust and pollen filter.

A dust and pollen filter is located under the bonnet on the left and right.



- -> Press in 2 rapid-action fasteners -A- of retaining frame slightly and turn them through approx. 90o.
- Remove dust and pollen filter.

Notes:

- Replacement interval for dust and pollen filter:

=> Maintenance brochure

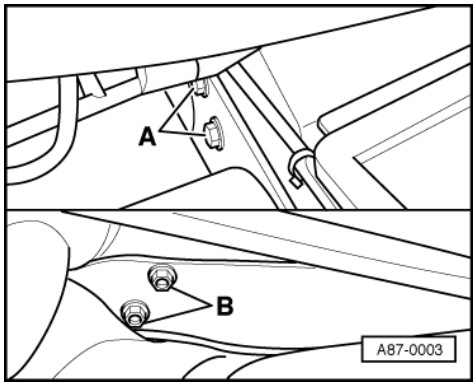
- Filters with ACF-layer may also be fitted.

=> Air Conditioner; Repair Group 87; Servicing components for control and regulation of fully automatic AC; Removing and installing dust and pollen filter. Servicing components for control and regulation of fully automatic AC Removing and installing dust and pollen filter.

2.9 - Removing and installing reinforcement plate (plenum chamber)

- Remove intake hose (between air cleaner and engine).

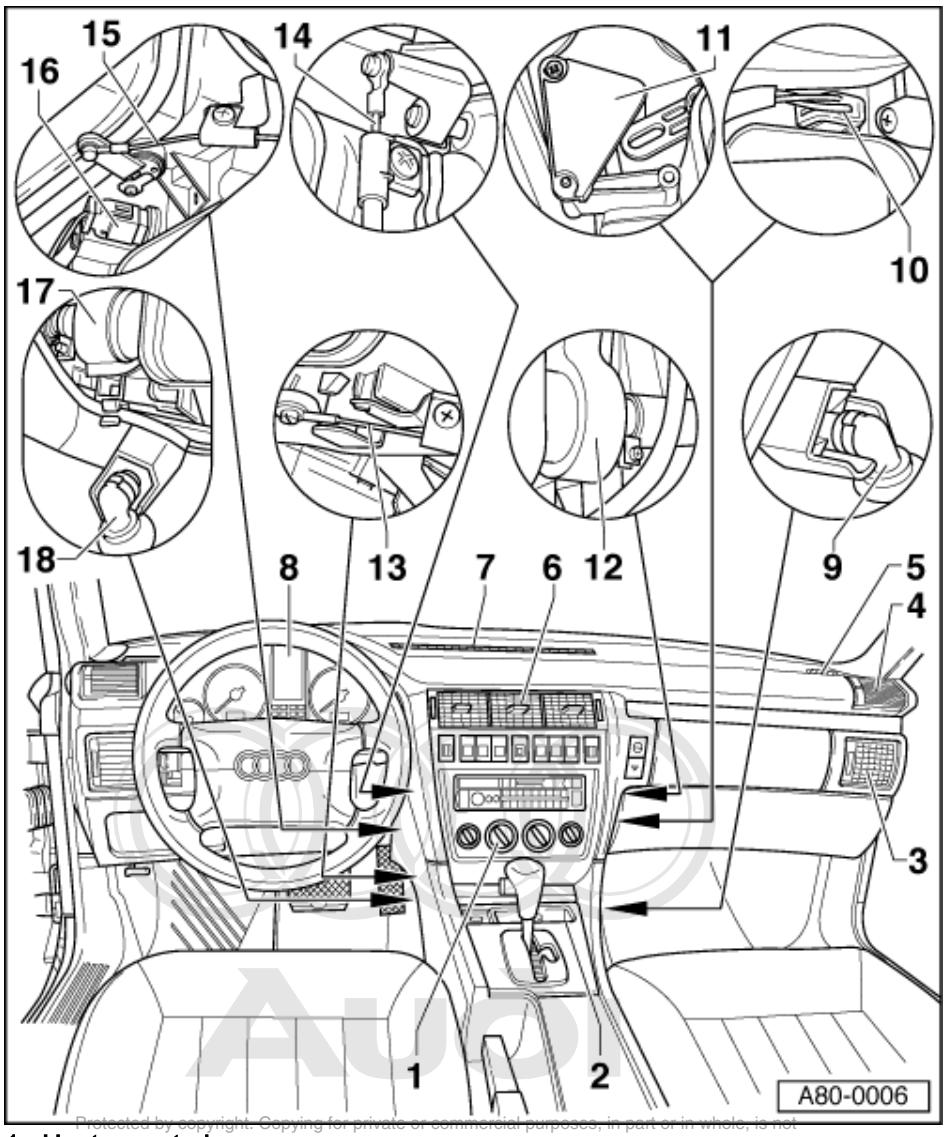
- Unfasten insulating mat from front wall of plenum chamber.



- -> Screw out bolts -A- and nuts -B-.
- Remove reinforcement plate.

3 - Components in passenger compartment

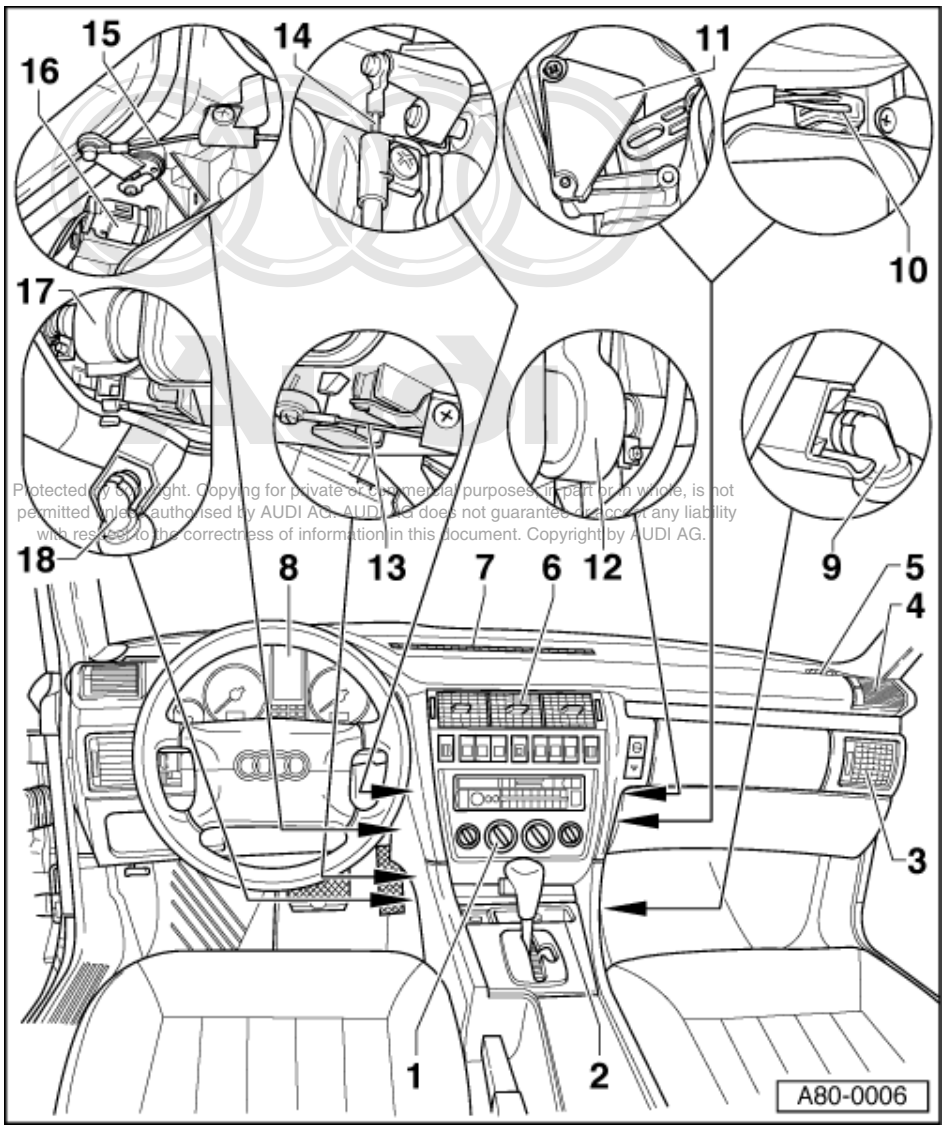
3.1 - Components in passenger compartment



1 **Heater control**
- With Thermotronic control unit-J214
- With fresh-air blower switch -E9
- Removing and installing
  => Page 37
- Replacing glass-base lamp for heater control installation =>Page 39
- Removing and installing fresh-air blower switch -E9 =>Page 39
- Connection diagram for Bowden cables =>Page 44

2 **Diagnosis plug**

3 **Dash-panel vent**
- Bottom left/right
- Removing and installing
  => Page 47



4 Dash-panel vent

- Top left/right
- Removing and installing
  => Page 46

5 Defrost vent

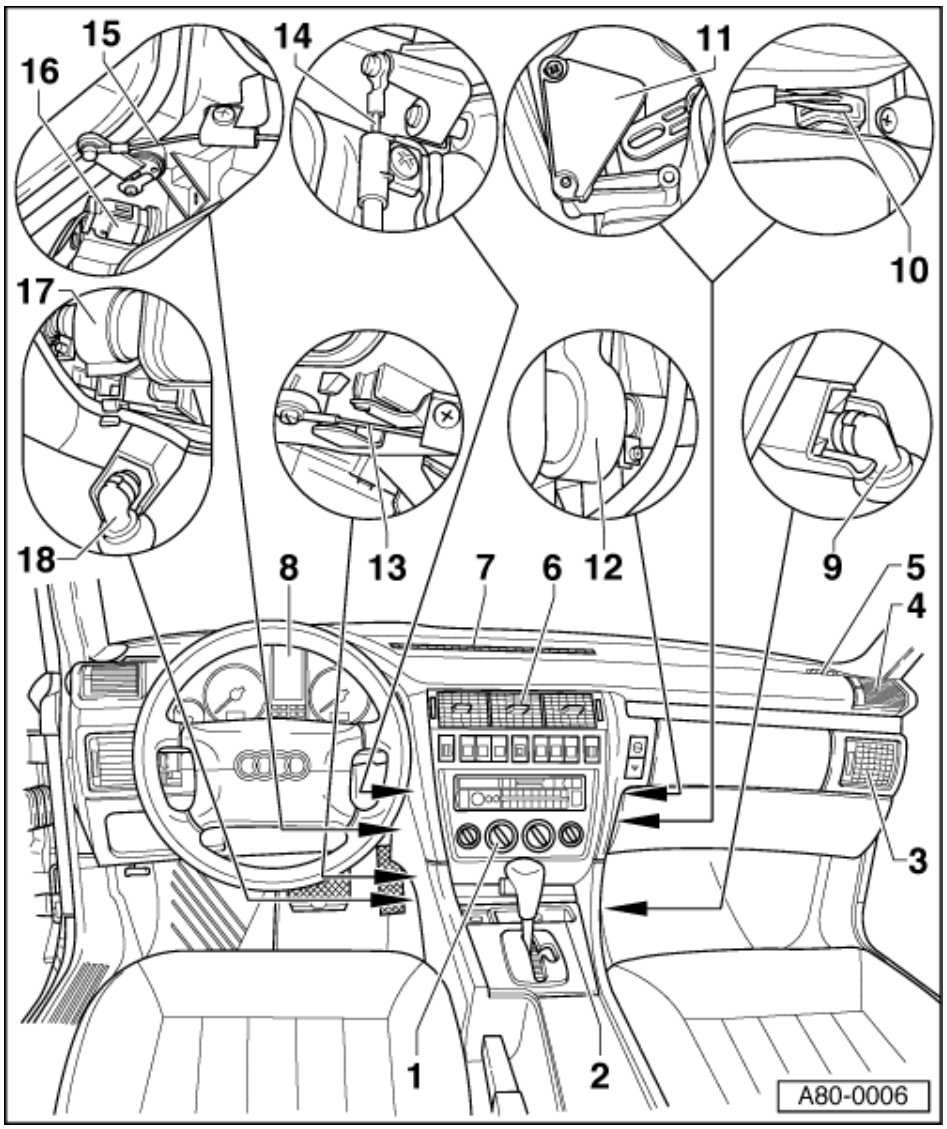
- For left/right side window
- Removing and installing
  => Page 47

6 Dash-panel vent

- Centre
- Removing and installing
  => Page 46

7 Defrost vent

- For windscreen



8 Auto-check system

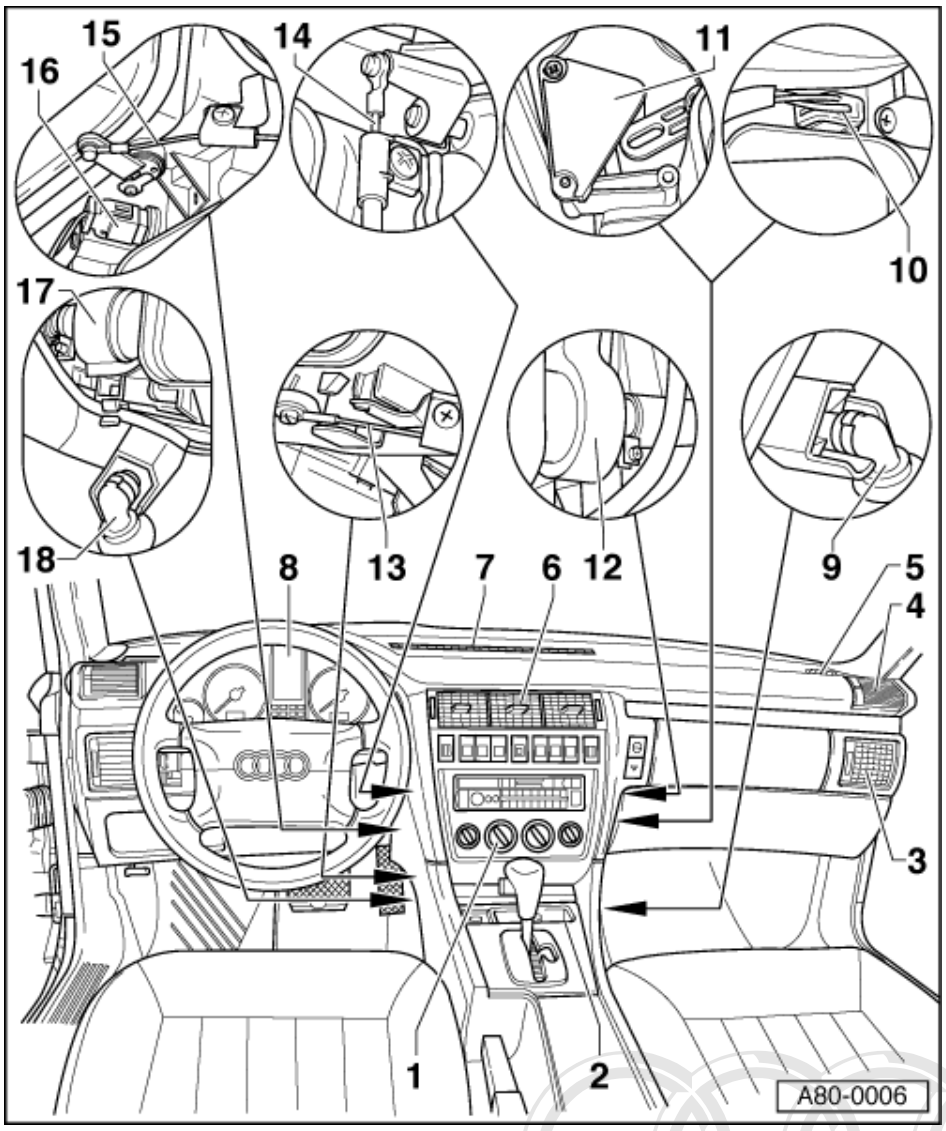
- With ambient temperature indicator -G106
- On vehicles with automatic gearbox, ambient temperature is only displayed with gear engaged.
- In the event of incorrect temperature display check measured values of ambient temperature sensor - G17 =>Page 14

9 Condensate drain hose with valve

- Passengers' side
- Checking, removing and installing => Page 48

10 Vent temperature sender, right, -G151

- Removing and installing => Page 53
- Checking =>Page 14 .



11 Stop

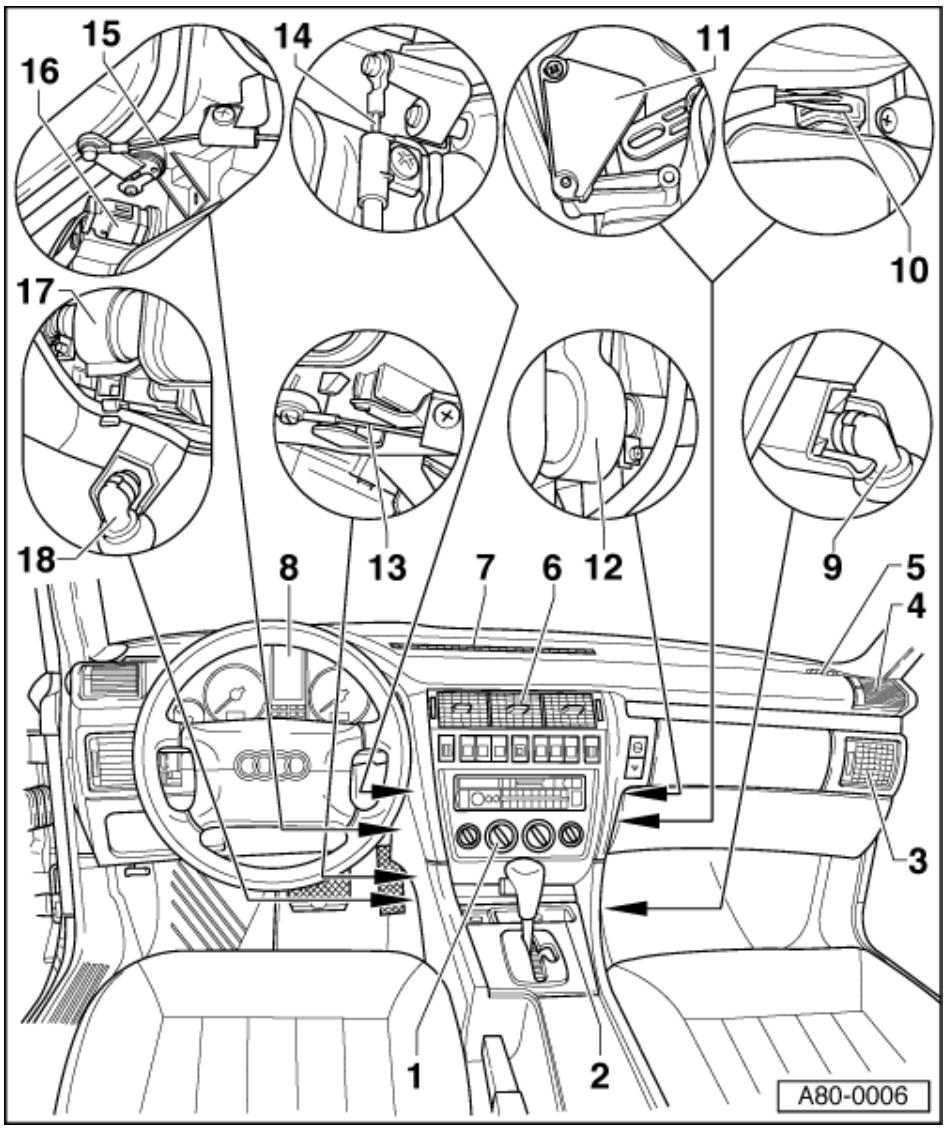
- For temperature flap
- Temperature flap is held in position "warm air to centre dash-panel vent"
- Checking =>Page 43 .

12 Heating system heat exchanger

- On right
- Removing and installing
  => Page 49

13 Bowden cable

- To flaps for footwell vents
- Removing and installing
  => Page 42
- Adjusting linkage between driver's and passenger's side => Page 43



14 Bowden cable

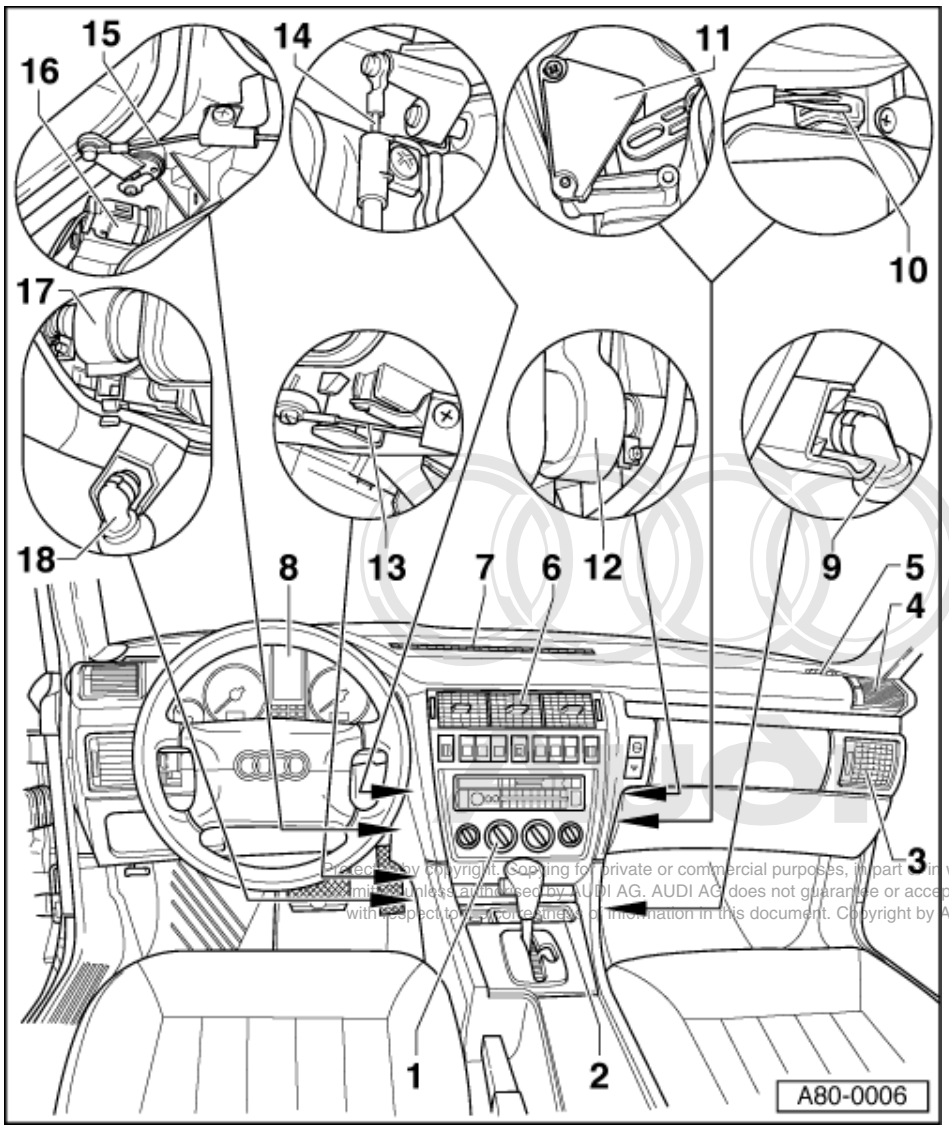
- To defrost flap
- Removing and installing
  => Page 41

15 Bowden cable

- To flaps on left and right for centre vent
- Removing and installing
  => Page 40
- Driver's and passenger's centre vent flaps are connected by way of a linkage
- Adjusting linkage between driver's and passenger's side => Page 43

16 Vent temperature sender, left -G150

- Removing and installing
  => Page 53
- Checking =>Page 14 .



17 Heating system heat exchanger

- On left
- Removing and installing
  => Page 52

18 Condensate drain hose with valve

- Driver's side
- Checking, removing and installing
  =>Page 48

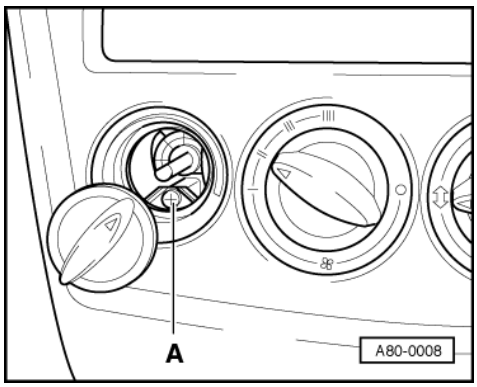
3.2 - Removing and installing heater control

Notes:

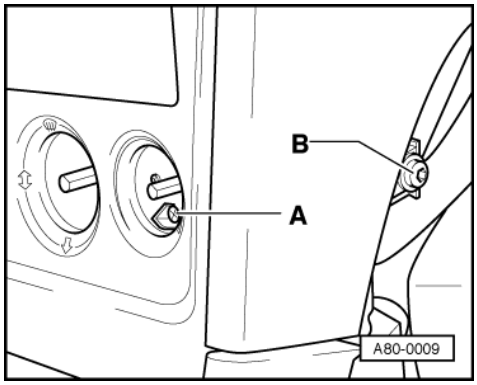
- The Thermotronic control unit -J214 forms a unit with the heater control.
- The fresh-air blower switch -E9 is screwed to the heater control => Page 39 .

Removing

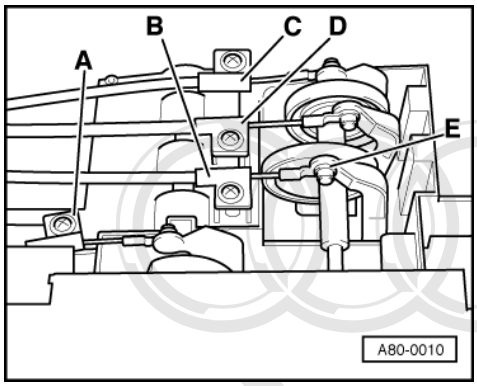
- Interrogate fault memory before removing heater control => Page 5 .



- -> Pull rotary switch off heater control.
- Screw out bolts -A-.
- Removing side trim for centre console side trim:



- -> Screw out bolts -B-.
- Removing centre section of dash panel:

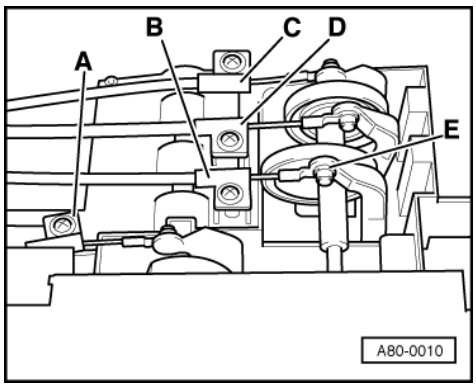


- -> Screw out bolts at Bowden cable support brackets -A-...-D-.
- Carefully detach Bowden cable from lever arm.
- Detach connector to Thermotronic control unit -J214 and fresh-air blower switch -E9.

Installing

Installation is carried out in the reverse order to removal, noting the following:

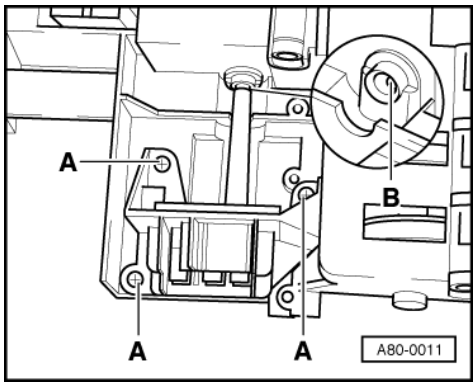
- Renew stiff Bowden cables.
- Pay attention to colour coding of Bowden cables -A-... -D- =>Connection diagram, Page 44 .



- -> When connecting Bowden cables, make sure collar -E- is in contact with lever.
- Fit Bowden cable support brackets so that Bowden cables -A-...-D- are not kinked on actuation.

3.3 - Removing and installing fresh-air blower switch -E9

- Removing heater control =>Page 37 .



- -> Screw out bolts -A-.

Note:

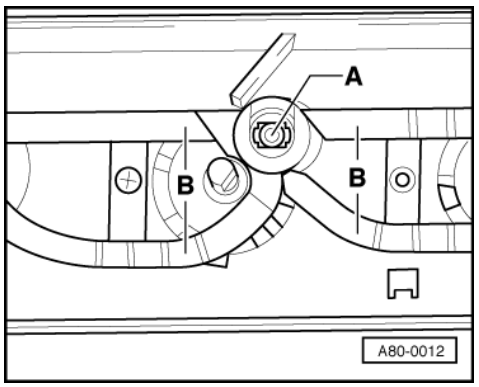
Pay attention to spring -B- when fitting fresh-air blower switch.

3.4 - Replacing glass-base lamp for heater control illumination

Special tools, testers and auxiliary items required

- Puller for dia. 5 mm lamps (available from electronic equipment dealers)

- Pull rotary switch at fresh-air blower, switch off heater control.



- -> Pull glass-base lamp -A- out of ist socket (do not turn)
- If no suitable lamp puller is available, detach heater control from centre section of dash panel =>Removing and installing heater control, Page 37 .
- Carefully pull glass-base lamp out of its socket.

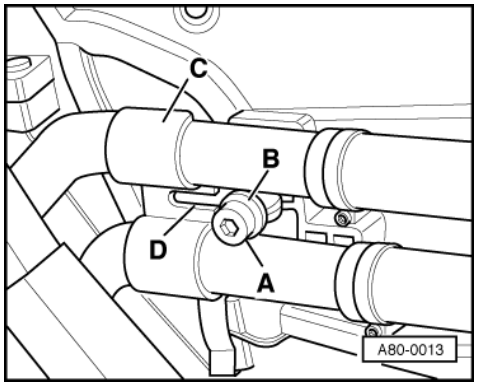
Note:

The heater-control rotary switches are illuminated by means of optical fibres -B-.

3.5 - Removing and installing holder for coolant pipes

Note:

The holder for coolant pipes to the passenger-side heat exchanger is difficult to install with the trim for the air recirculation flap in position. The holder is to be reworked to facilitate assembly.



- -> After removing trim for air recirculation flap, fit a suitable washer -B- to bolt -A-.
- Screw in bolt approx. two turns.
- Make the hole in the coolant pipe holder -C- into a slot.
- Protect areas reworked -D- against corrosion.

=> Binder "Surface treatment/chemical materials"

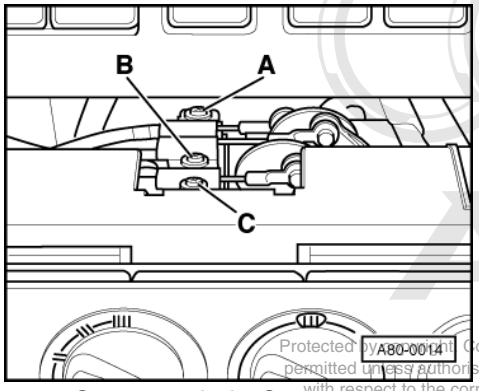
- Fit holder -C- as shown.

3.6 - Removing and installing Bowden cable to flaps for centre dash-panel vents

Removing

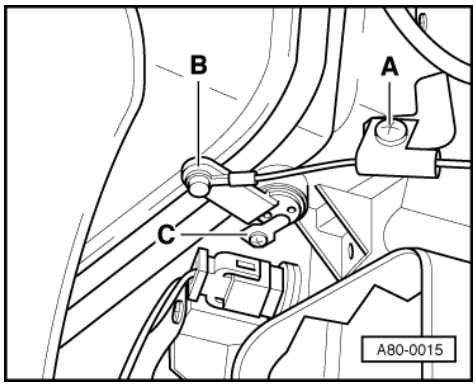
- Pay attention to/ask customer for code on vehicles with coded radio.

- Remove radio.



- -> Screw out bolt -C-.
- Carefully detach Bowden cable from lever arm.
- Removing drivers' side trim at centre console:

- Remove driver's footwell vent.



- -> Screw out bolt -A-.
- Carefully detach Bowden cable from lever arm -B-.

Installing

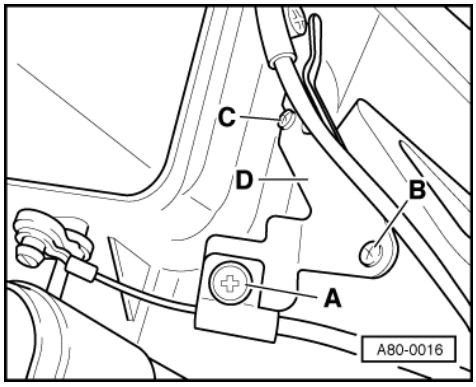
Installation is carried out in the reverse order to removal, noting the following:

- Secure lever arm -B- with locking plate -C- to prevent it from slipping.

Note:

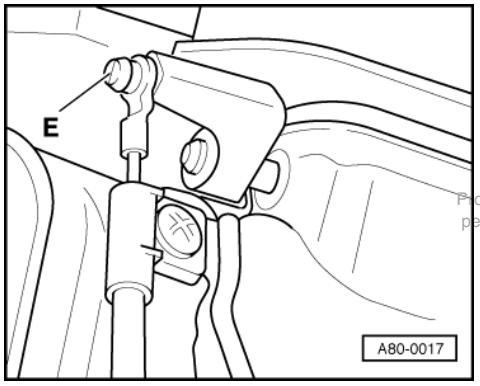
Connection diagram for Bowden cables =>Page 44 .

3.7 - Removing and installing Bowden cable from/to the defrost flap



- Detaching heater control from centre section of dash panel =>Page 37 .
- Removing centre section of dash panel and support for dash panel (at transmission tunnel) on driver's side:

- -> Screw out bolts -A- and -B-.
- Screw out bolt -C- and detach bracket -D- from heater.

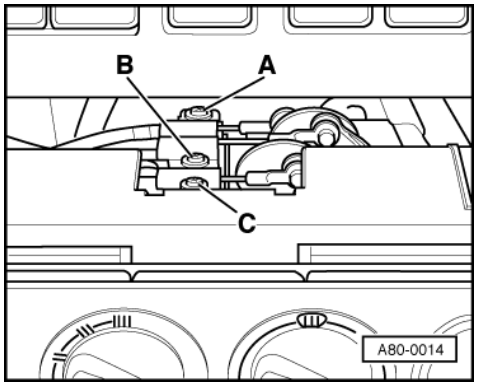


- -> Carefully detach Bowden cable from/to the lever arm -E-.

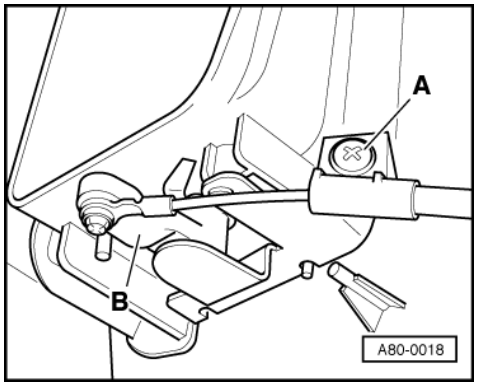
Note:
Connection diagram for Bowden cables =>Page 44 .

3.8 - Removing and installing Bowden cable to flaps for footwell vents

- Pay attention to/ask customer for code on vehicles with coded radio.



- Remove radio.
- -> Screw out bolt -A-.
- Carefully detach Bowden cable from lever arm.
- Removing drivers' side trim at centre console:



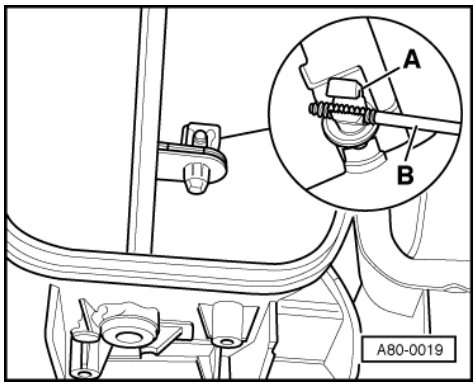
- -> Screw out bolt -A-.
- Carefully detach Bowden cable from lever arm -B-.

Note:

Connection diagram for Bowden cables =>Page 44 .

3.9 - Adjusting linkage between flaps for driver's and passenger's footwell vents

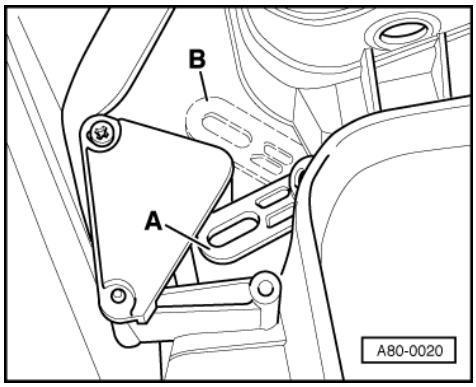
- Removing driver's and passenger's footwell vents.



- -> Unfasten clip -A- at passenger's footwell flap.
- Set linkage -B- so that flaps move evenly and close without pretension on actuating rotary air-distribution control.

3.10 - Checking stop for temperature flap

- Removing side trim for centre console on passenger's side.

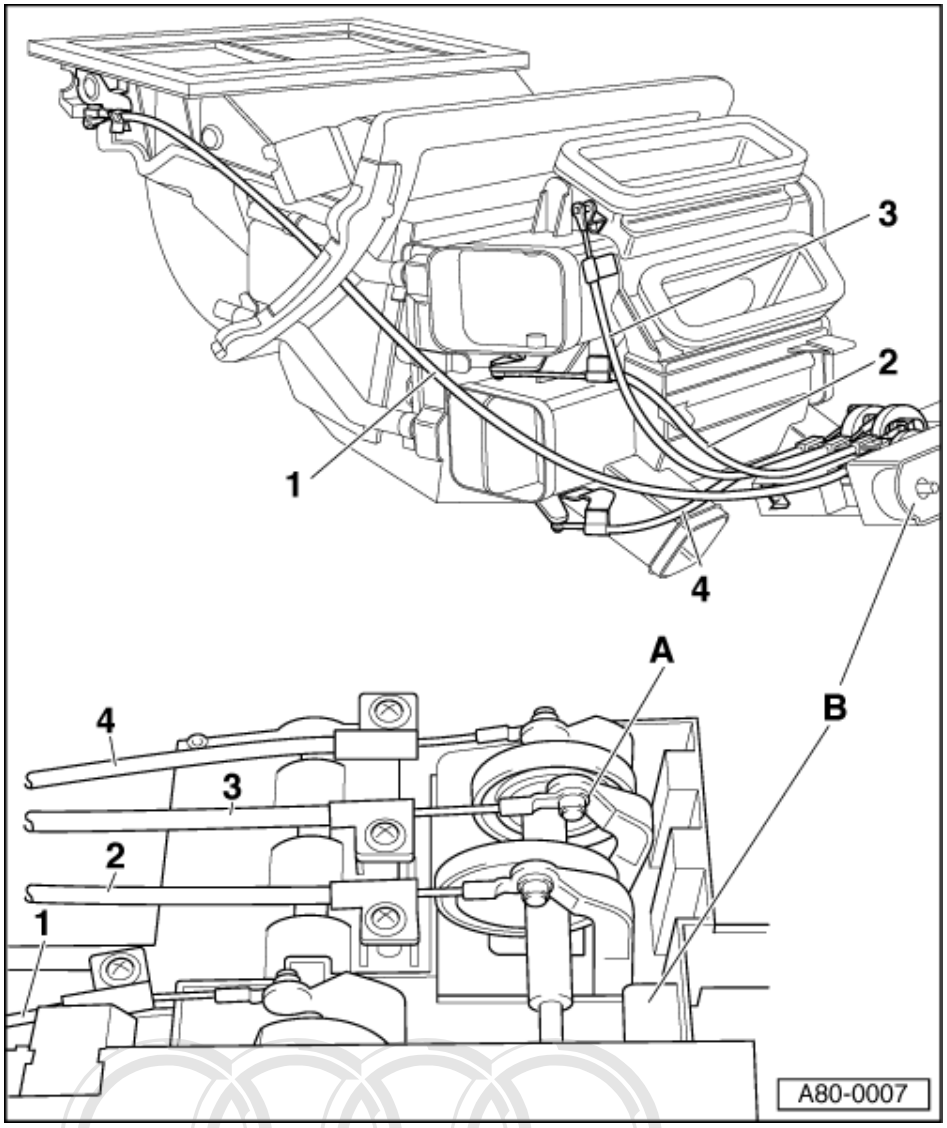


- -> Check whether lever is in position -A-.

Note:

Only cold air emerges from the centre dash-panel vents when lever is in position -B-.

3.11 - Connection diagram for Bowden cables

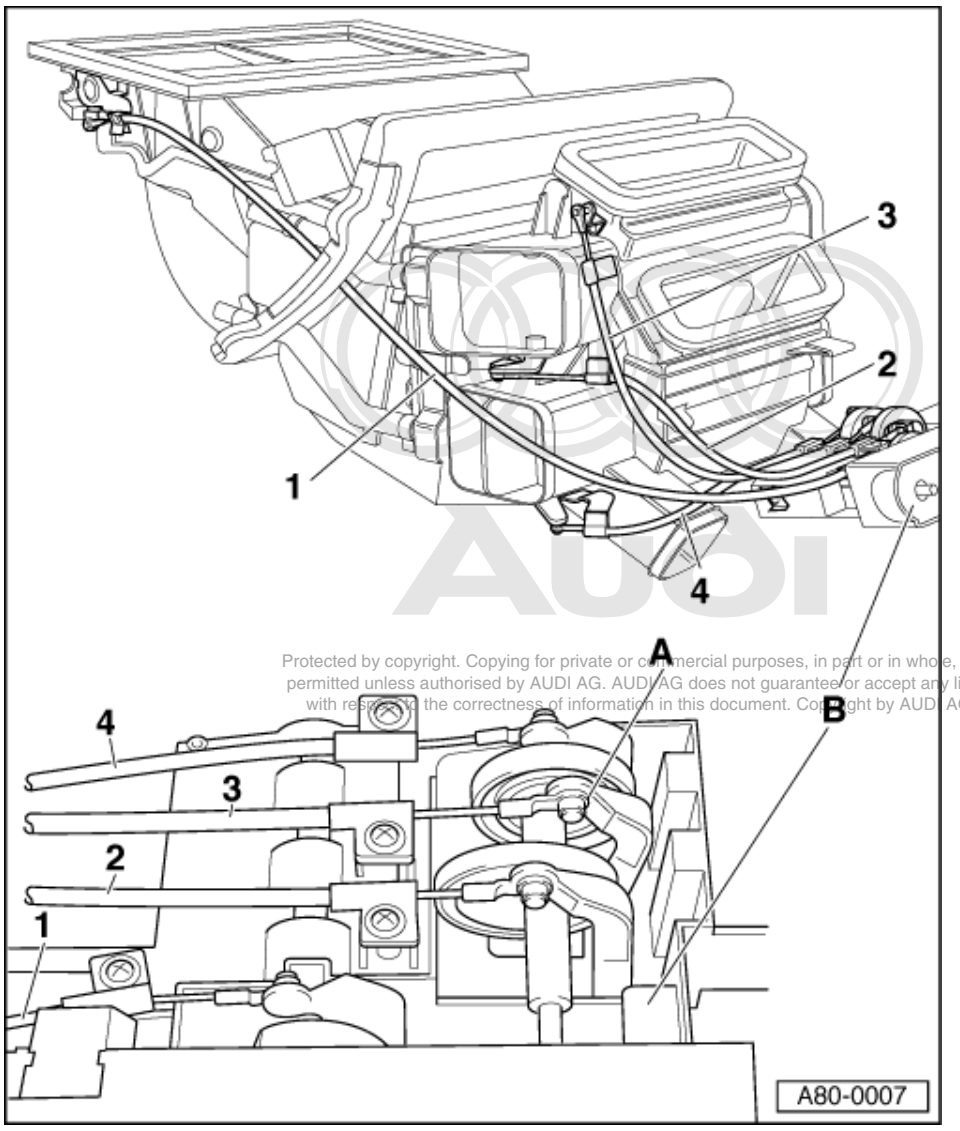


Notes:

- Fit Bowden cables, paying attention to correct side; collar -A- must be in contact with lever.
- Check freedom of movement of Bowden cables and flaps before and after assembly.
- After assembly, make sure Bowden cables and support brackets are not kinked on actuating rotary switches.
- Removing and installing heater control -B- =>Page 37 .

1 Bowden cable

- To air flow flap (fresh-air shutoff flap)
- No colour code
- Removing and installing => Page 22



2 Bowden cable

- To flaps on left and right for centre vent
- Colour code: green
- Removing and installing
  => Page 40

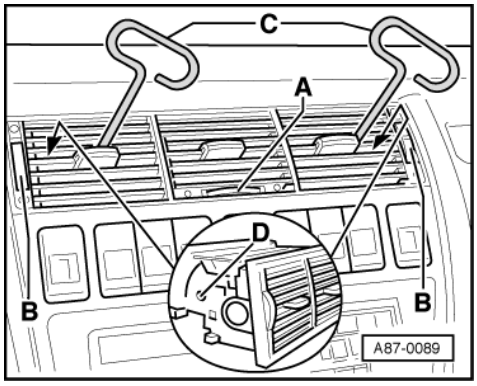
3 Bowden cable

- To defrost flap
- Colour code: red
- Removing and installing
  => Page 41

4 Bowden cable

- To flaps for footwell vents
- Colour code: blue
- Removing and installing
  => Page 42

3.12 - Removing and installing centre dash-panel vent

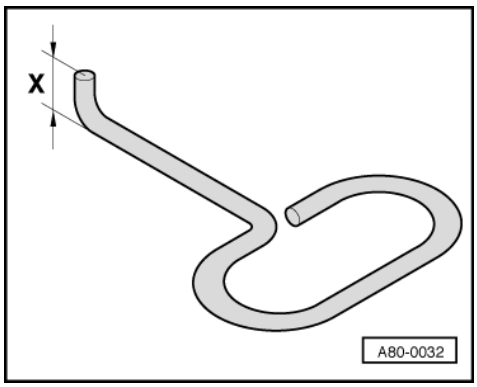


- -> Insert auxiliary tool -C- in holes of dash-panel vents -D-.
- Evenly pull the dash-panel vents out of the dash-panel centre section.

Note:

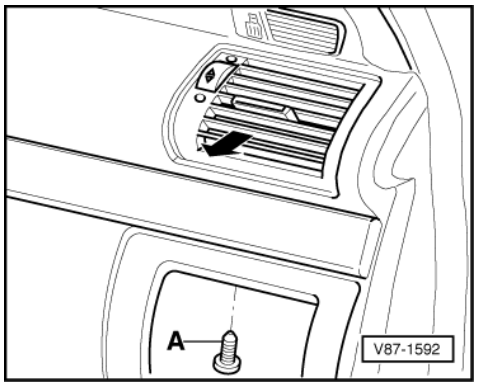
Do not hook auxiliary tools -C- onto the slats of the dash-panel vents, as slats could snap off.

Making auxiliary tool for removal of dash-panel vents



- -> Bend a 3 mm dia wire ø into the shape illustrated.
  - Dimension x = 6 mm

3.13 - Removing and installing top left/right dash-panel vent

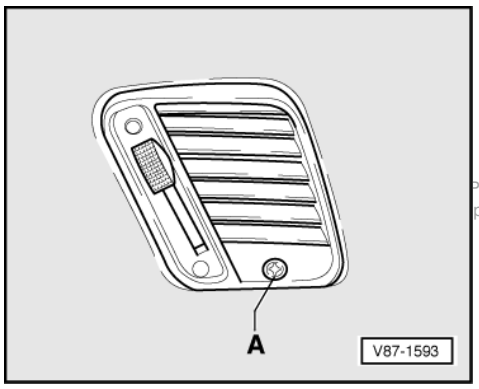


- Removing bottom left/bottom right dash-panel vent =>Page 47 .
- -> Screw out bolt -A-.
- Use auxiliary tools to pull dash-panel vents out of dash panel.

Note:

Making auxiliary tool =>Page 46 .

3.14 - Removing and installing defrost vent for left/right side window



- -> Screw out bolt -A-.

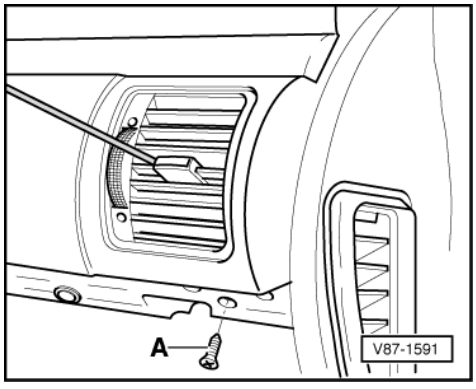
Note:

If there is no bolt -A-, then defrost vent is clipped into dash panel.

- Pull defrost vent out of dash panel.

3.15 - Removing and installing bottom left/right dash-panel vent

- Removing glove box and driver's shelf:



- -> Screw out bolt -A-.
- Use auxiliary tools to pull dash-panel vents out of dash panel.

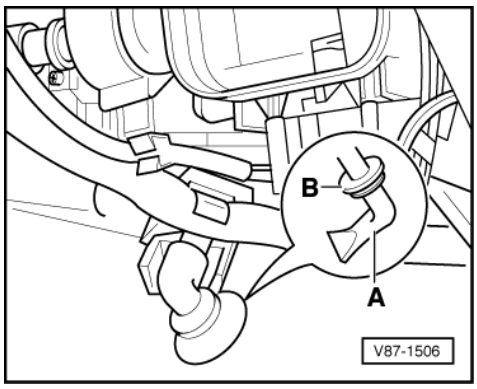
Note:

Making auxiliary tool =>Page 46 .

3.16 - Checking, removing and installing condensate drain hose with valve

Checking

- Removing drivers' side or passengers' side trim for centre console:



- -> It must be possible to attach condensate hose -A- to heating connection without pretension.
- Cross-section of condensate hose must not be restricted by insulating mat.

- Rework insulating mat if necessary.

- When fitted, condensate drain valve must not make contact with heat shield.

- With valve removed, check whether there is sufficient clearance between transmission-tunnel floor panel and heat shield.

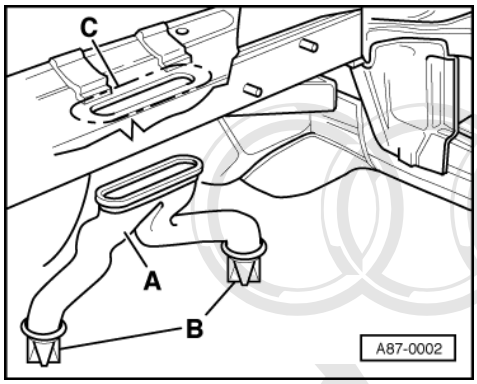
- Condensate drain valve must not be gummed up with wax or underseal; it must close properly.

- Condensate drain hose must be firmly positioned on connection for condensate drain at heater.

- Secure condensate drain hose with hose clamp if necessary.

- In the event of moisture in passenger compartment:

- Use piece of wire, for example, to check heater condensate drains for dirt and clean if necessary.



- -> Check for contamination of water drain hose -A-, associated valve -B- and area beneath heater -C-.
- If applicable, remove E-box/plenum chamber connection point.

Note:

Fig. shows valve and water drain hose with assemblies removed.

- If no fault is found:

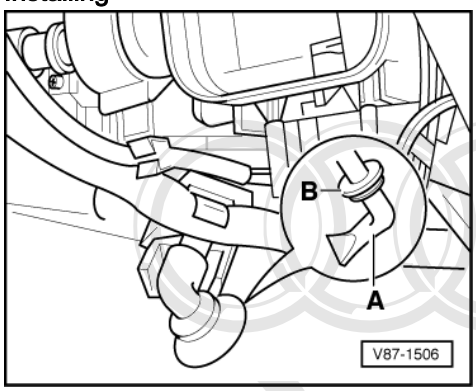
- Check passenger-compartment through-flow exit vents (via luggage compartment) => Page 20 .
- Check intake duct seal => Page 25 .

Removing

- Removing drivers' or passengers' side trim of centre console:

- Disconnect condensate drain hose from heater.
- Pull condensate drain hose out of transmission tunnel.

Installing



- -> Press condensate drain valve -A- through floor panel of transmission tunnel.
- Fully engage ribbed section -B- in transmission tunnel panel.

3.17 - Removing and installing heating-system heat exchanger

Special tools, testers and auxiliary items required

- Hose clamps 3093 or 3094
- Collector V.A.G 1306

Removing right heat exchanger

Note:

Pay attention to sequence on RHD vehicles: Remove left heat exchanger first.

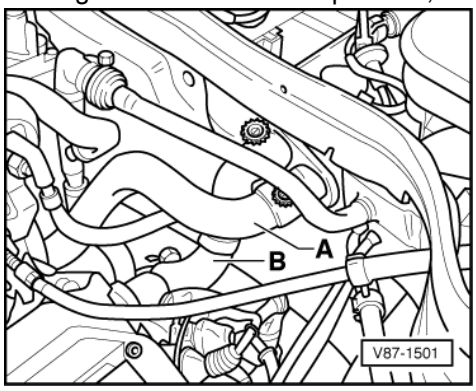
- Switch off ignition.
- Removing windscreen wipers and cowl panel trim:

=> Electrical system; Repair Group 92; Servicing windscreen wipers Servicing windscreen wipers

=> Electrical system; Repair Group 92; Servicing windscreen washer system Servicing windscreen washer system

- Open cap on coolant expansion tank.
- Place collector V.A.G 1306 below engine.
- Drain coolant circuit:

=> Engine Mechanical Components; Repair Group 19



- -> Mark positions of coolant hoses -A- and -B-.
- Detach coolant hoses -A- and -B- from engine to pump valve unit.

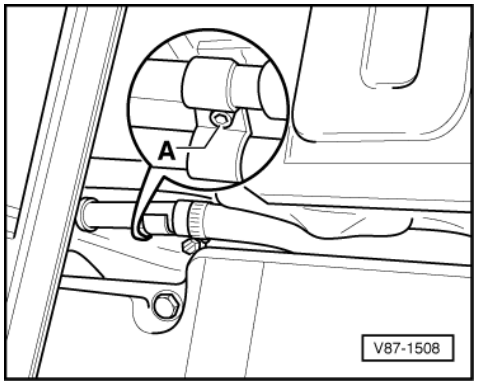
Note:

Fig shows arrangement in 8-cylinder engine.

- Hold coolant hose -A- over a vessel.
- Use compressed-air gun to carefully blow coolant out of pump valve unit and heat exchangers by way of coolant hose -B-.
- Detach connectors to pump valve unit.
- Removing reinforcement plate (plenum chamber) =>Page 30 .

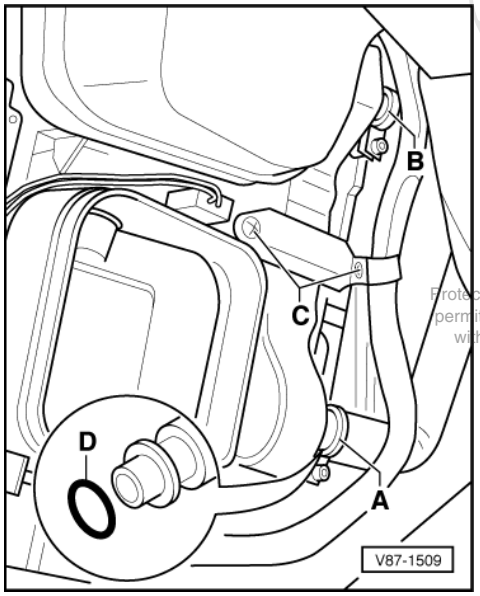
Note:

To ensure that coolant is blown out of both heat exchangers, alternately pinch off upper coolant hose to one of the two heat exchangers.



- -> Slacken off bolt -A- for coolant pipe holder (in plenum chamber) approx 2 turns.
- Removing glove box and side trim of centre console:

- Remove footwell vent.

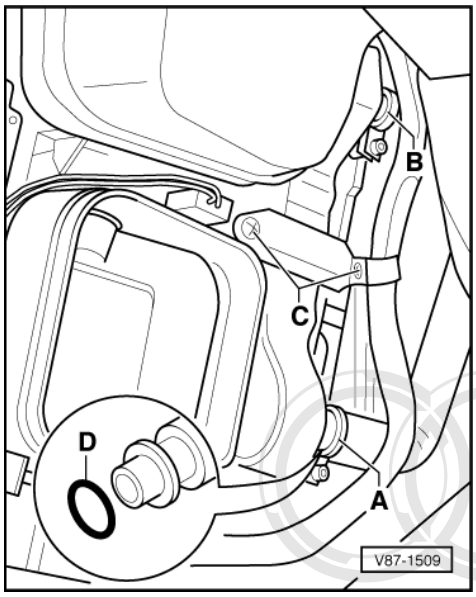


- Cover carpet in area beneath heat exchanger with impermeable sheeting and absorbent paper.
- -> Remove clamps -A- and -B-.
- Push both coolant pipes towards "plenum chamber".
- Screw out bolts -C-.
- Remove bracket.

- Pull out heat exchanger.

Installing

Installation is carried out in the reverse order to removal, noting the following:



- -> Secure all hose connections with hose clamps of latest design:

=> Parts list

- Always replace gaskets and seals -D-.
- Checking cooling system for leaks before installing side trim

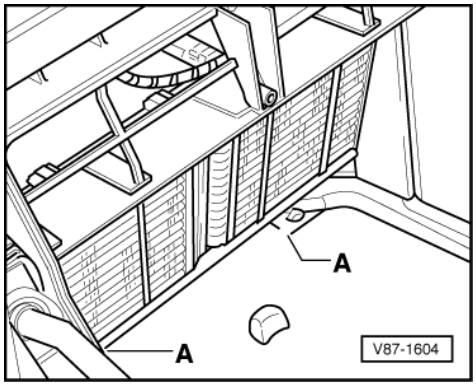
=> Engine Mechanical Components; Repair Group 19

Notes:

- Coolant circuit must be bled before starting up coolant circulation pump -V50 of pump valve unit.
- Dry running of the pump valve unit will destroy it.

- Bleed coolant circuit before attaching two-way connector to pump valve unit

=> Engine Mechanical Components; Repair Group 19



- -> Before installing heat exchanger, check openings -A- of condensate drain for dirt and clean if necessary.

Notes:

- Condensate drain valve must not be gummed up with wax or underseal; it must close properly.

- Fig. shows drain openings with heat exchangers in position.

Cleaning:

- Heat exchangers removed: Reach through opening in heat exchangers and clean condensate drains using for example, a piece of wire.
- Heat exchangers fitted: Clean condensate drains from outside using, for example, a piece of wire.

Removing left heat exchanger

- Removing windscreen wipers and cowl panel trim:

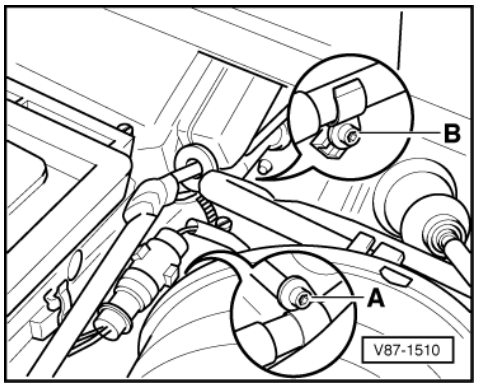
=> Electrical system; Repair Group 92; Servicing windscreen wipers Servicing windscreen wipers

=> Electrical system; Repair Group 92; Servicing windscreen washer system Servicing windscreen washer system

- Removing right heat exchanger => Page 49 .

Note:

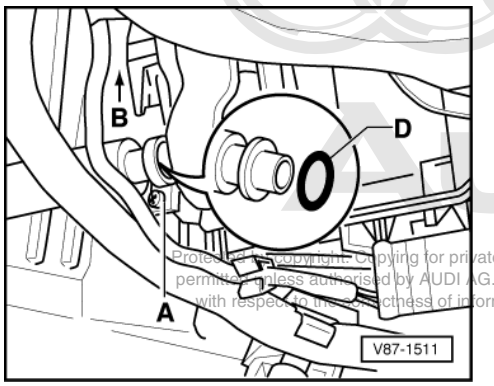
Pay attention to sequence on RHD vehicles: Remove left heat exchanger first and also E-box/plenum chamber connection point.



- Removing driver's shelf and side trim of centre console:

- -> Slacken off bolts -A- and -B- of clamp-type clips for coolant pipes approx. 2 turns.
- Remove footwell vent.

- Cover carpet in area beneath heat exchanger with impermeable sheeting and absorbent paper.



- -> Remove clips -A- and -B-.
- Push both coolant pipes towards "plenum chamber".
- Pull out heat exchanger towards passengers' side.

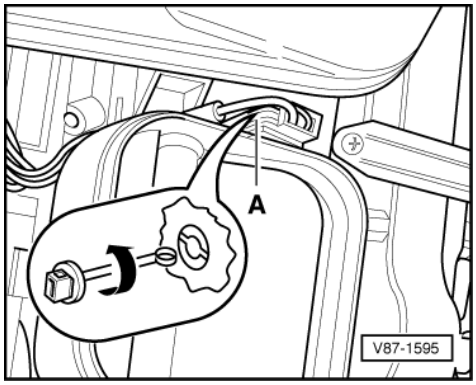
Installing

Installation is carried out in the reverse order, when doing this note the following:

- Further installation operations => Page 51 .

3.18 - Removing and installing vent temperature sender

- Removing glove box, driver's shelf and side trim of centre console:
- Remove drivers or passenger's footwell vents.



- -> Turn vent temperature sender -A- approx. 90o.

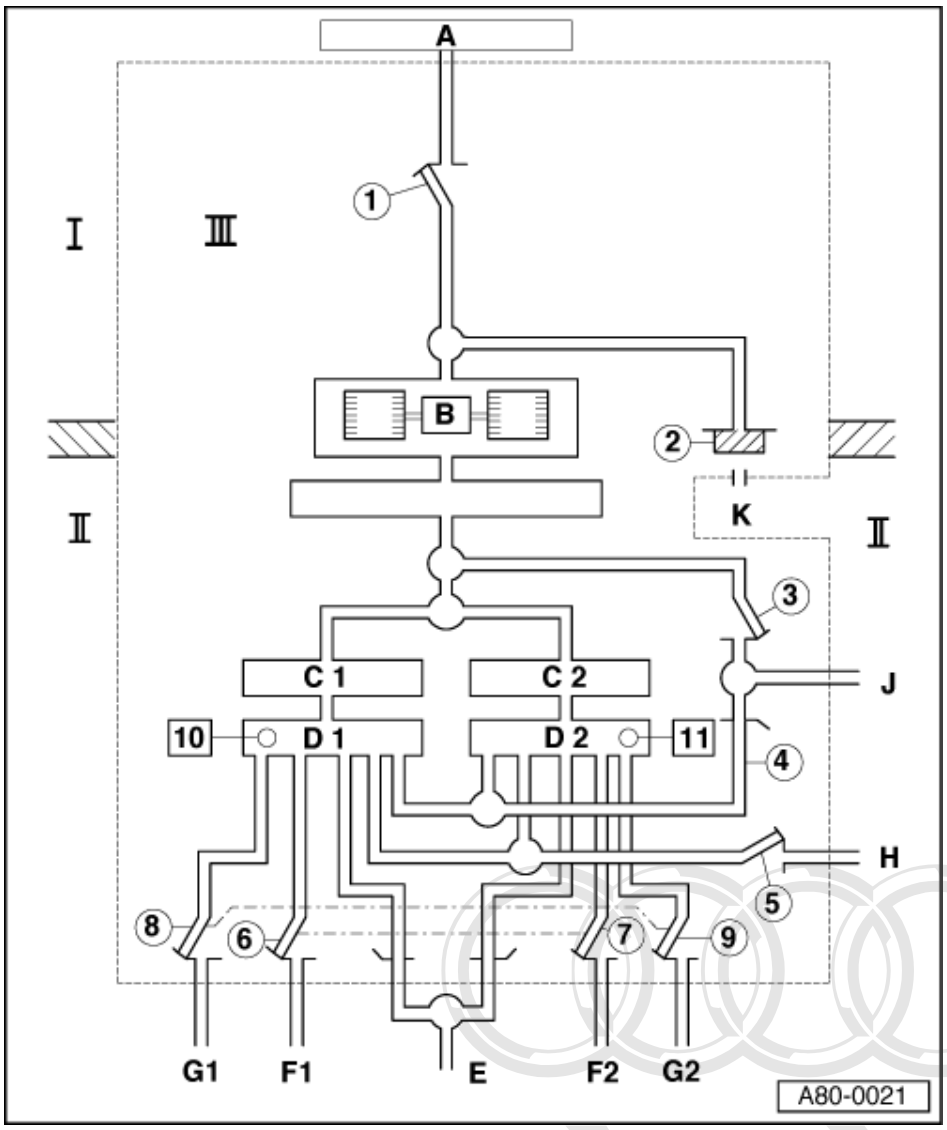
Note:

Fig shows vent temperature sender, right -G151.

- Pull out vent temperature sender.

4 - Block diagram of air distribution

4.1 - Block diagram of air distribution



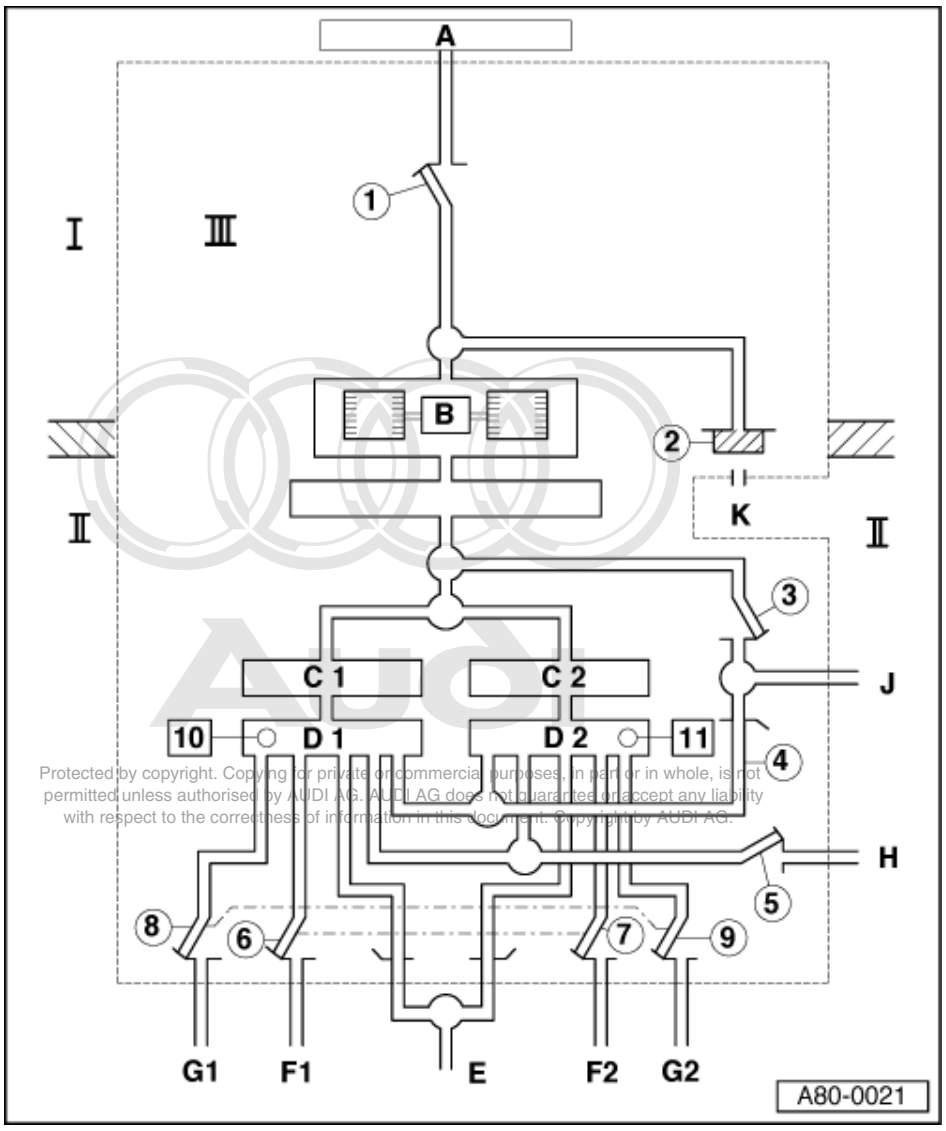
Note:

Fitting locations of individual components => Page 19 . onwards.

I - Engine compartment (plenum chamber)
II - Passenger compartment
III - Heater
A - Dust and pollen filter

- Installed in bonnet

B - Fresh-air blower -V2
C1 - Left heating system heat exchanger



C2 - Right heating system exchanger

D1 - Left mixing chamber

- Driver's side

D2 - Right mixing chamber

- Passengers' side

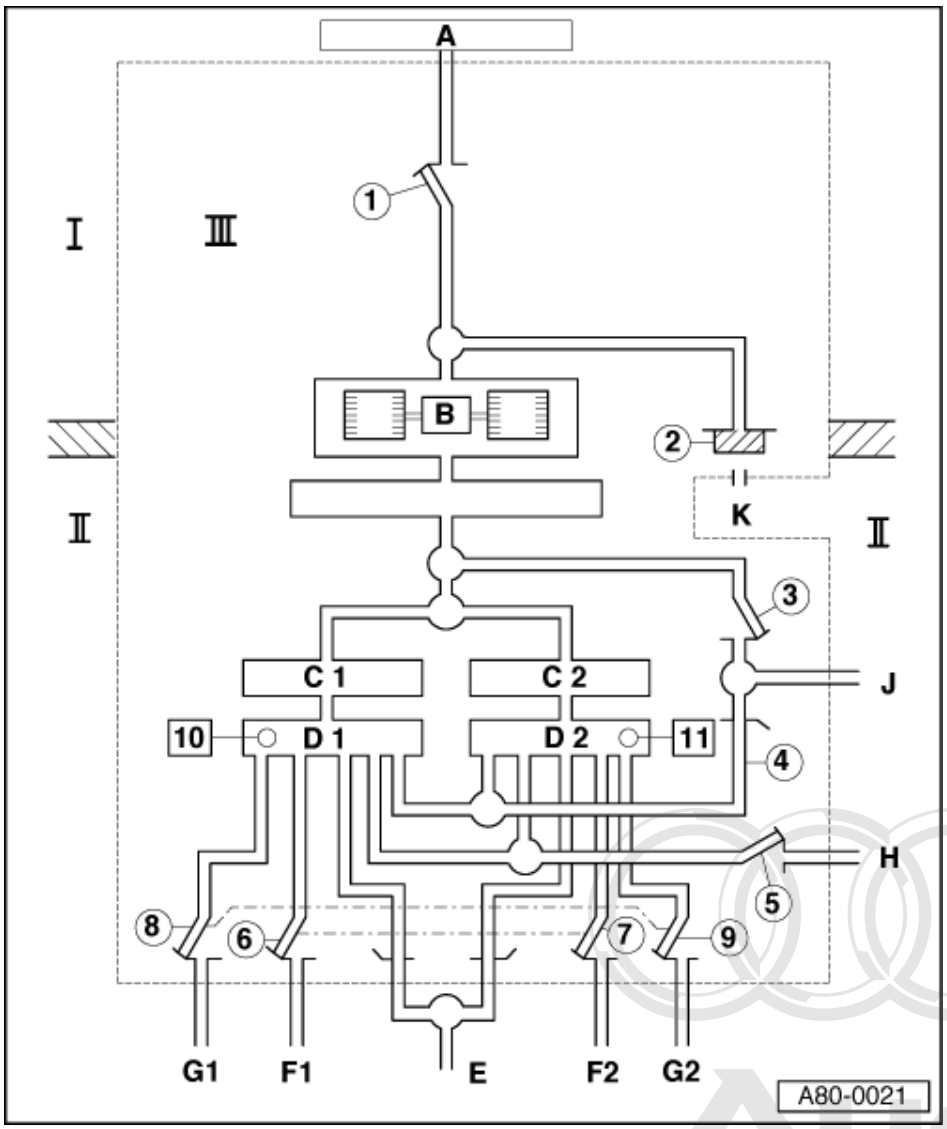
E - Air duct to rear vent, rear centre

F1 - To left footwell vents

- Driver's side and rear

F2 - To right footwell vents

- Passenger's side and rear



G1 - To left dash-panel vent and B-pillar vent

- Driver's side

G2 - To right dash-panel vent and B-pillar vent

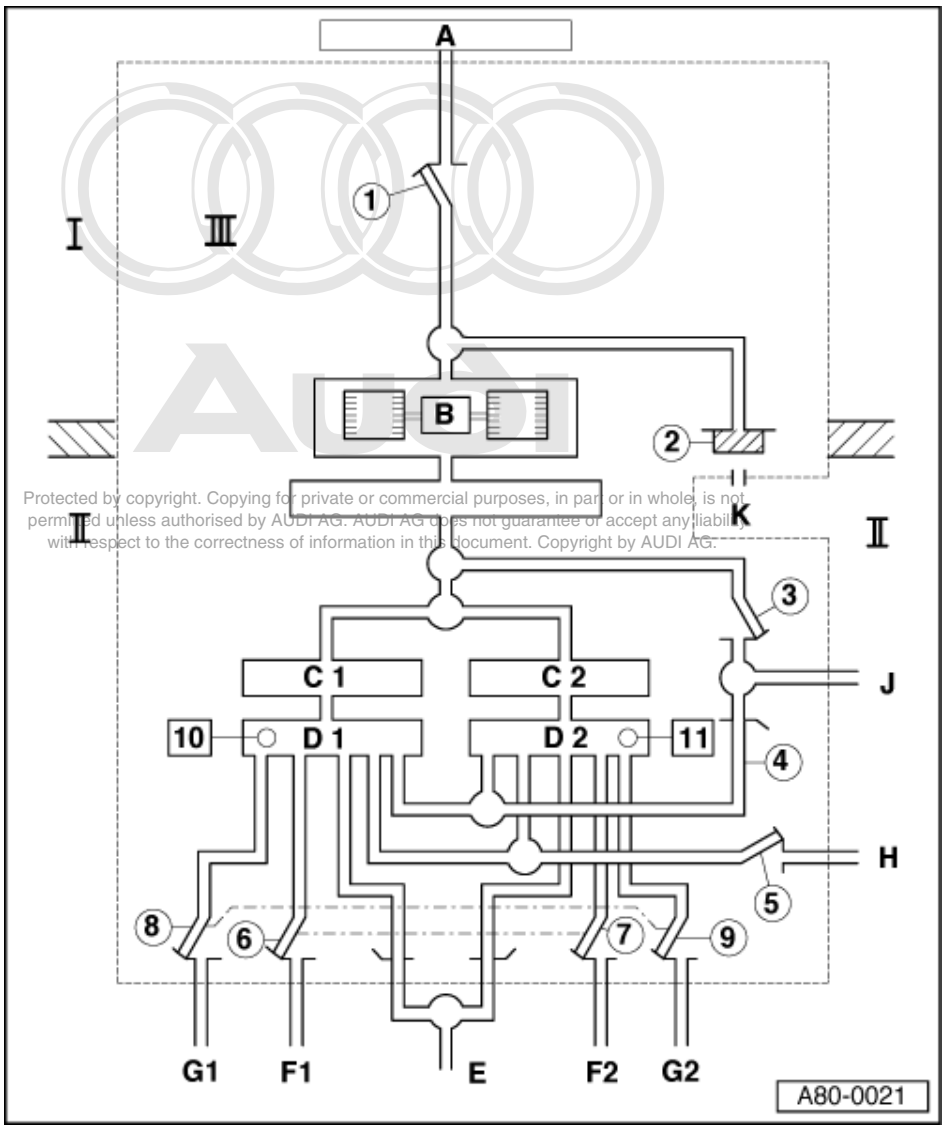
- Passengers' side

H - To defrost vents

J - To centre dash-panel vent

K - Trim panel with air recirculation opening

- Sealed off by foam blocks
- Check position of foam blocks if moisture is found in vehicle



1 **Air flow flap (fresh-air shutoff flap)**

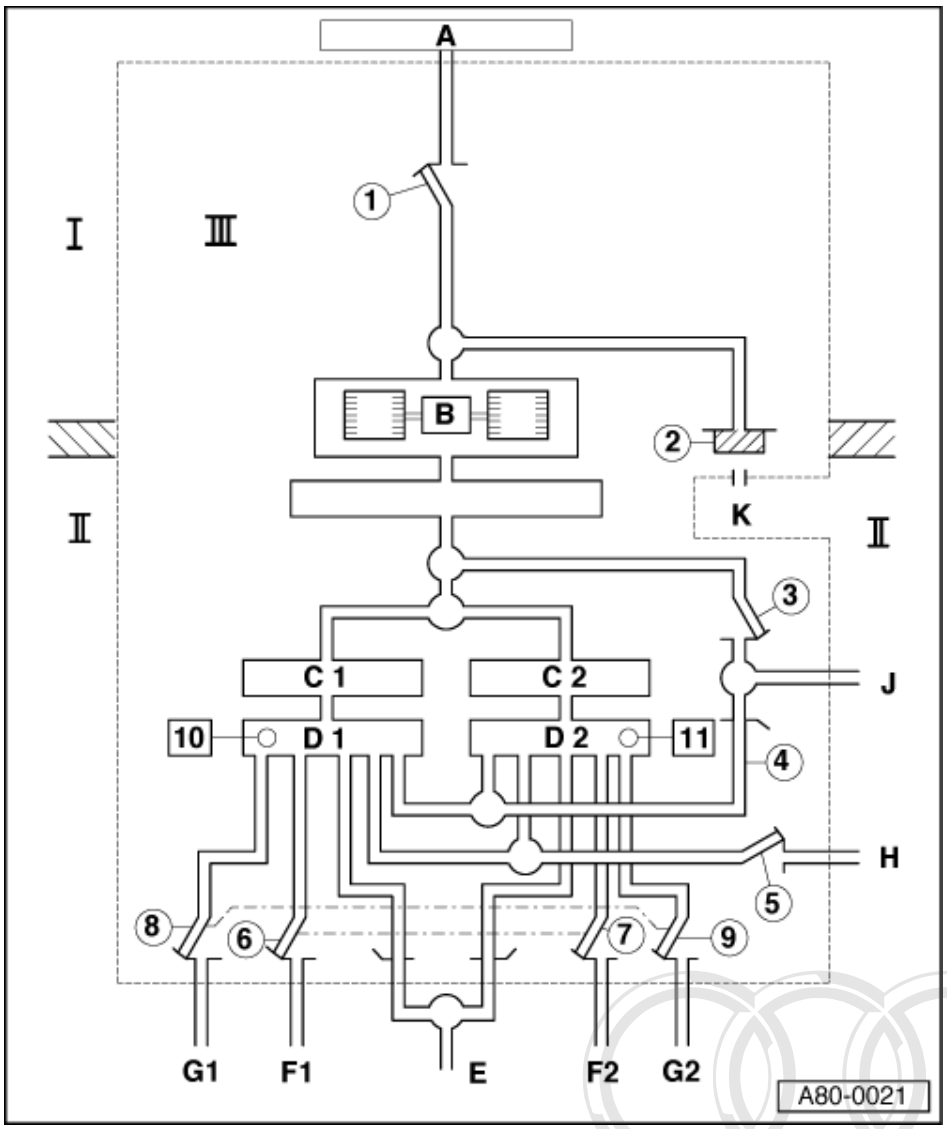
2 **Foam blocks**
- 2 x
- For sealing off air recirculation opening -K- in trim panel

3 **Cold air duct**
- Sealed off with temperature flap-item 4- open

4 **Temperature flap**
- Stop keeps flap open
  => Page 43

5 **Defrost flap**

6 **Left footwell flap**
- Connected via linkage to right footwell flap



7 Right footwell flap
8 Flap for centre left vent
- Driver's dash-panel vent
- Connected via linkage to flap for right vent

9 Flap for centre right vent
- Passenger's dash-panel vent

10 Vent temperature sender, left -G150
11 Vent temperature sender, right, -G151

5 - Checking heat output and function of pump valve unit

5.1 - Checking heat output and function of pump valve unit

This test is designed to check the function of the pump valve unit (heat regulation valves -N175 and -N176 as well as coolant circulation pump -V50).

- If temperatures determined are above specified value => Page 60 .

- If temperatures determined are below specified value (inadequate heat output):

- Check function of heat regulation valves -N175/-N176 and coolant circulation pump -V50 => Electrical testing, test step 3,Page 15 .

If no fault is found:

- Check whether coolant hoses (from engine and heating-system heat exchanger to pump valve unit) have been interchanged => Page 27 or

=> Engine Mechanical Components; Repair Group 19

- Check for interchanged wiring to coolant circulation pump -V50

=> Binder "Current flow diagrams, Electrical fault-finding and Fitting locations"

Special tools, testers and auxiliary items required

- Fault reader V.A.G 1551 (or vehicle system tester V.A.G 1552) with cable V.A.G 1551/3

Test prerequisites:

- Coolant circuit properly bled:

=> Engine Mechanical Components; Repair Group 19

- All air ducts, covers and seals are OK and properly fitted.
- Air throughput of dust and pollen filter not impaired by dirt.
- Engine warm
- Vehicle not exposed to sunlight.
- Function of fresh-air blower -V2 OK

Checking

- Interrogate fault memory => Page 5 , and rectify any faults stored.
- Erase fault memory => Page 10 .
- Close bonnet.
- Start the engine.

- Select function "Reading measured value block" (function 08)=>Page 11 .

-> Indicated on display:

```
Reading measured value block     Q
Enter display group number: XXX
```


- Enter display group number "001" and confirm entry with the Q-key.

-> Indicated on display:

```
Reading meas. value block     1
1     2     3     4
```

- Open all dash-panel vents.
- Set rotary blower switch to speed 4.
- Measure the air temperature around cowl panel trim (ambient temperature).

Notes:

- Temperature displayed by ambient temperature indicator -G106 is not to be used as ambient temperature for this check.
- Ambient temperature indicator -G106 does not indicate increase in temperature if vehicle is stationary.

- Seth both rotary temperature controls to left stop.
- Check display in fields 3 and 4.
  - Specified value 0 oC

(coolant circulation pump -V50 not in operation).

- Check display in fields 1 and 2.
  - Specified value after approx. 3 minutes:
    Ambient temperature plus max. 15 oC
- Set driver's rotary temperature control to right stop.
- Check display in display field 3.
  - Specified value: 91 oC
- Check display in field 1 (temperature reading increases).
  - Specified value after approx. 3 minutes:
    approx. engine temperature
    (Coolant temperature minus max. 10 oC;
    Pump -V50 in operation, valve -N175 open)
- Check display in field 2 (temperature reading remains roughly constant).
  - Temperature increase less than 15 oC
    (Valve -N176 closed)
- Set passenger's rotary temperature control to right stop.
- Check display in display field 4.
  - Specified value: 91 oC

- Check display in field 2 (temperature reading increases).
  - Specified value: approx. engine temperature
    (Coolant temperature minus max. 10 oC;
    Pump -V50 in operation, valves -N175 and -N176 open)
- Seth both rotary temperature controls so that reading in display fields 3 and 4 is approx. 25 oC above ambient temperature.
- Check display in fields 1 and 2.
  - Specified value after 3 minutes:
    Permissible deviation max 5 oC between actual value and specified value (in display fields 3 and 4)
- Seth both rotary temperature controls to left stop.
- Check display in fields 3 and 4.
  - Specified value 0 oC
    (coolant circulation pump -V50 not in operation).
- Check display in fields 1 and 2.
  - Specified value after approx. 3 minutes:
    Approx. ambient temperature plus max. 15 oC

Establishing cause of increased temperature at vents

Air temperature is too high with rotary temperature switches set to left stop (more than 15 oC aboveambient temperature).
Pinch off one of the coolant hoses between engine and pump valve unit with hose clamps 3093/3094.
Repeat test.

▪ Are required temperature values attained?

↓ no

↓
Establish and, if applicable, rectify cause of increased air temperature
(warmer air being drawn in by fresh-air blower from engine compartment due, for example, to absence of or faulty seals)

↓ yes

↓
Remove hose clamps 3093/3094 at coolant hose.

↓
- Connect test box V.A.G 1598/19 to wiring loom to Thermotronic control unit -J214 => Electrical testing, Page 15 .

↓

Continued t

▪ Is operation of valves -N175/-N176 and pump -V50 OK?

↓ no

↓ yes

↓
Establish and rectify cause of malfunction.

↓
Jumper sockets 4D and 12D as well as sockets 1D and 12D (valves -N175 and -N176 closed).
↓
Repeat test (engine running, rotary blower switch set to speed 4).
↓
Measure air temperature at driver's and passenger's dash-panel vents with temperature measuring instrument V.A.G 1558.
↓
▪ Are the specified temperatures attained (ambient temperature plus max 15 oC).

↓ yes
↓
Replace Thermotronic control unit -J214 => Page 37 .
↓
- Repeat functional test.

↓ no
↓
Replace pump valve unit => Page 29 .
↓
- Repeat functional test.

6 - Removing and installing heating

6.1 - Removing and installing heating

Removing

- Place covers over driver's and passenger's seats.
- Switch on ignition.
- Set rotary air-distribution switch to defrost setting.
  - Heater air duct to windscreen and flaps for dash-panel vents closed.
- Removing centre console:

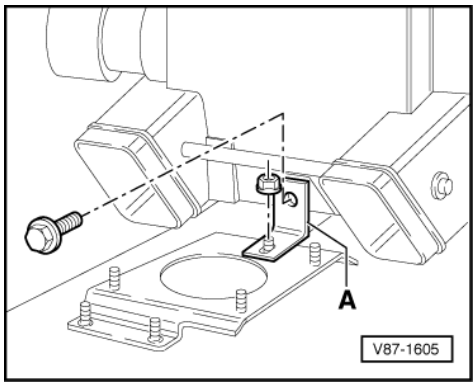
=> General body repairs, Interior; Repair group 70; Dash panel; Removing and installing centre console and handbrake lever trim Dash panel Removing and installing centre console and handbrake lever trim

- Pay attention to/ask customer for code on vehicles with coded radio.
- Disconnect earthing strap at battery with ignition switched off.
- Removing dash panel:

- Removing airbag control unit:

=> Electrical system; Repair Group 96; Removing and installing airbag control unit. Removing and installing airbag control unit.

- Removing heater control =>Page 37 .



- -> Remove bracket -A-.
- Remove plenum chamber cover.

- Detach cover for E-box/plenum chamber connection point.

Note:

On RHD vehicles, remove E-box/plenum chamber connection point.

- Detach connector to pump valve unit.
- Removing intake duct with air flow flap => Page 24 .
- Detach all air ducts to heater.
- Removing windscreen wipers and cowl panel trim:

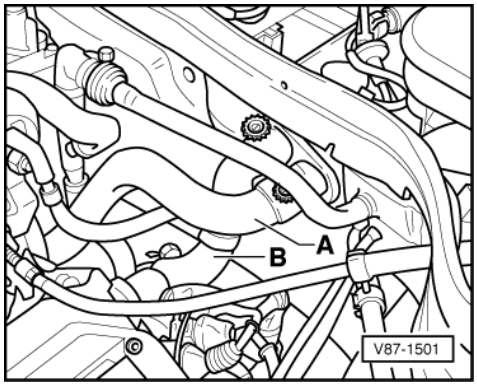
=> Electrical system; Repair Group 92; Servicing windscreen wipers Servicing windscreen wipers

=> Electrical system; Repair Group 92; Servicing windscreen washer system Servicing windscreen washer system

- Removing reinforcement plate (plenum chamber) =>Page 30 .

- Open cap on coolant expansion tank.
- Place collector V.A.G 1306 below engine.
- Drain coolant circuit:

=> Engine Mechanical Components; Repair Group 19



- -> Mark positions of coolant hoses -A- and -B-.
- Detach coolant hoses -A- and -B- from engine to pump valve unit.

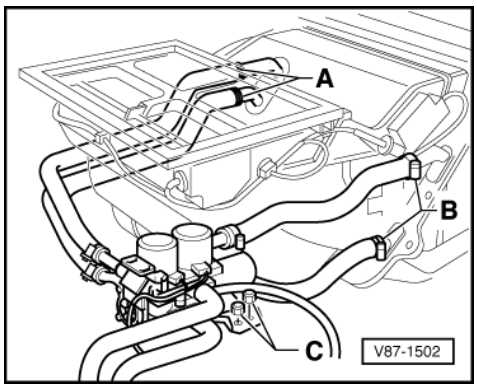
Note:

Fig shows 8-cylinder engine arrangement.

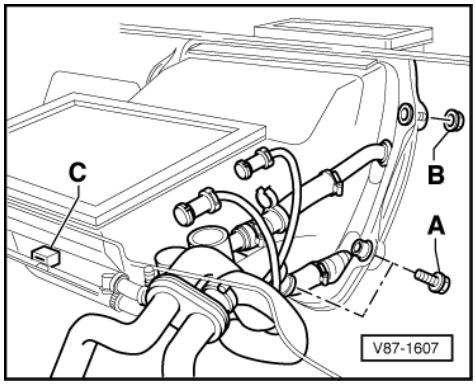
- Hold coolant hose -A- over a vessel.
- Use compressed-air gun to carefully blow coolant out of pump valve unit and heat exchangers by way of coolant hose -B-.

Note:

To ensure that coolant is blown out of both heat exchangers, alternately pinch off upper coolant hose to one of the two heat exchangers.



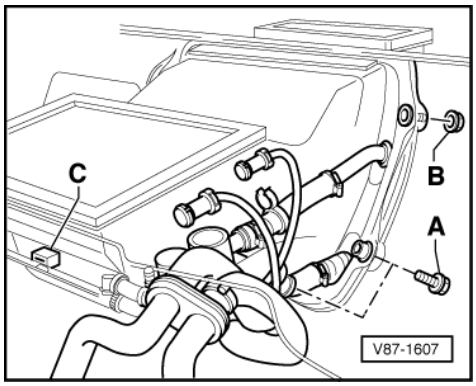
- -> Mark coolant hoses -A- and -B-.
- Detach coolant hoses from pump valve unit to heat exchangers at coolant pipes.
- Detach connectors to heater.
- Disconnect condensate drain hoses from heater.



- -> Screw out bolts -A- (in passenger compartment).
- Unscrew nuts -B- (in passenger compartment).
- Remove heater towards passenger compartment.

Installing

Installation is carried out in the reverse order to removal, noting the following:

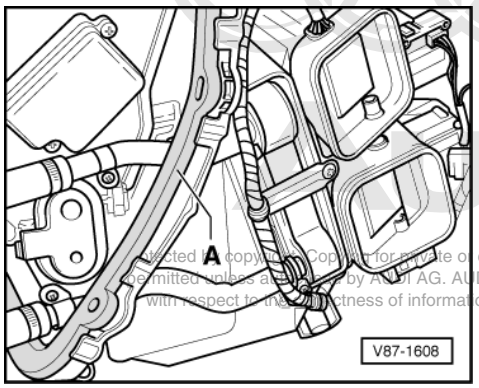


Notes:

- Replace seals and gaskets.
- Secure all hose connections with hose clamps of latest design:

=> Parts list

- -> Check for proper connection of damper element -C-.
- Ensure proper connection of coolant hoses to heat exchanger:
  - Lower hose = coolant feed



- Upper hose = coolant return
-> Replace gasket -A- between plenum chamber and heater.

Note:

When inserting heater take care not to jam the wiring to the positioning motors (in plenum chamber) or damage gasket -A- at stud bolts.

- Connect coolant hoses to engine, paying attention to markings.
- Checking cooling systems for leaks before installing side trim

=> Engine Mechanical Components; Repair Group 19

Notes:

- Coolant circuit must be bled before starting up coolant circulation pump -V50 of pump valve unit.
- Dry running of the pump valve unit will destroy it.

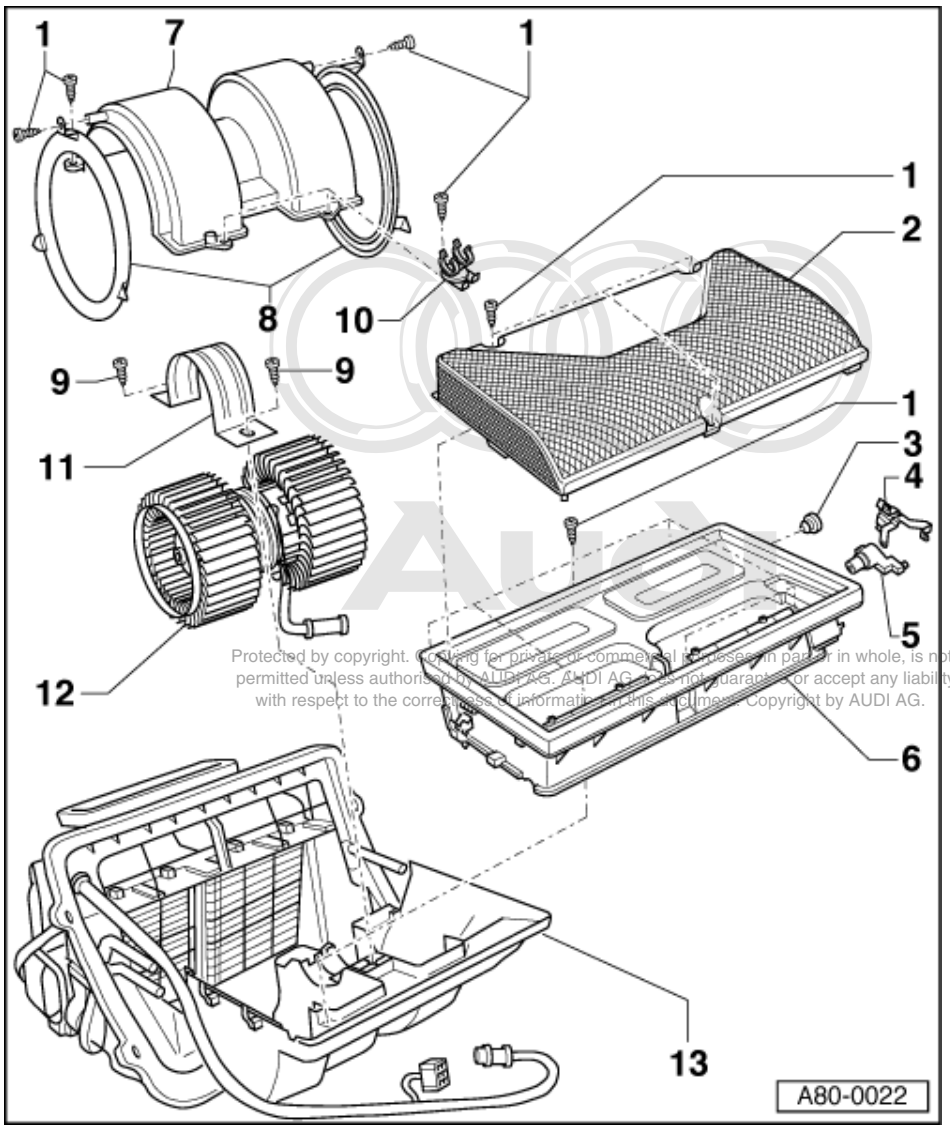
- Bleed coolant circuit before attaching two-way connector to pump valve unit

=> Engine Mechanical Components; Repair Group 19

- Following installation, check correct positioning of sleeve between engine compartment and plenum chamber.
- Checking proper connection of condensate drain hoses at heater => Page 48 .

7 - Dismantling and assembling heating

7.1 - Dismantling and assembling heating

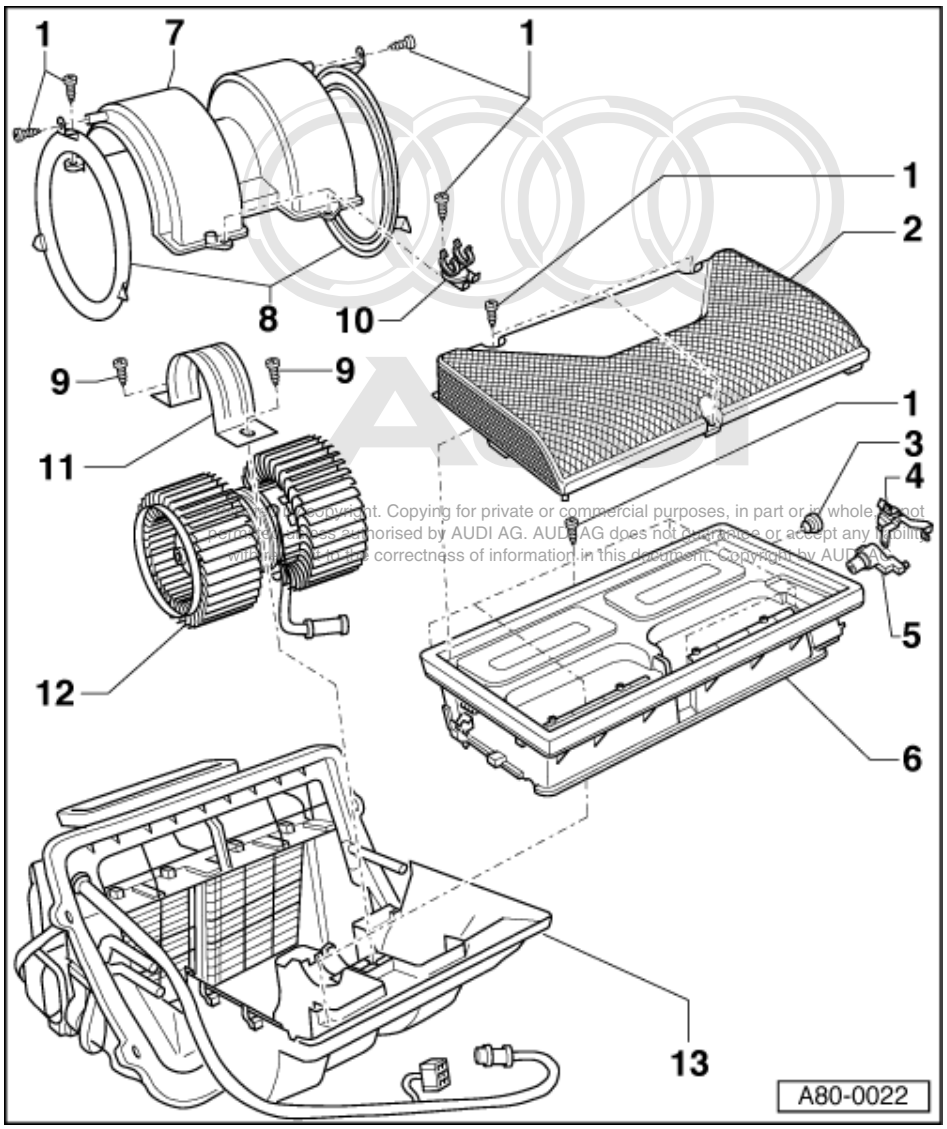


7.2 - Removing and installing grille, fresh-air blower and covers in plenum chamber.

Note:

Removing and installing heating =>Page 61 .

1 Countersunk screw
2 Grille
3 Plug
4 Holder
- For lever at air flow flap



5 Lever

- For Bowden cable to air flow flap

6 Intake duct

- With air flow flap and gasket
- Removing and installing
  => Page 24
- Dismantling and assembling => Fig. 2

7 Housing

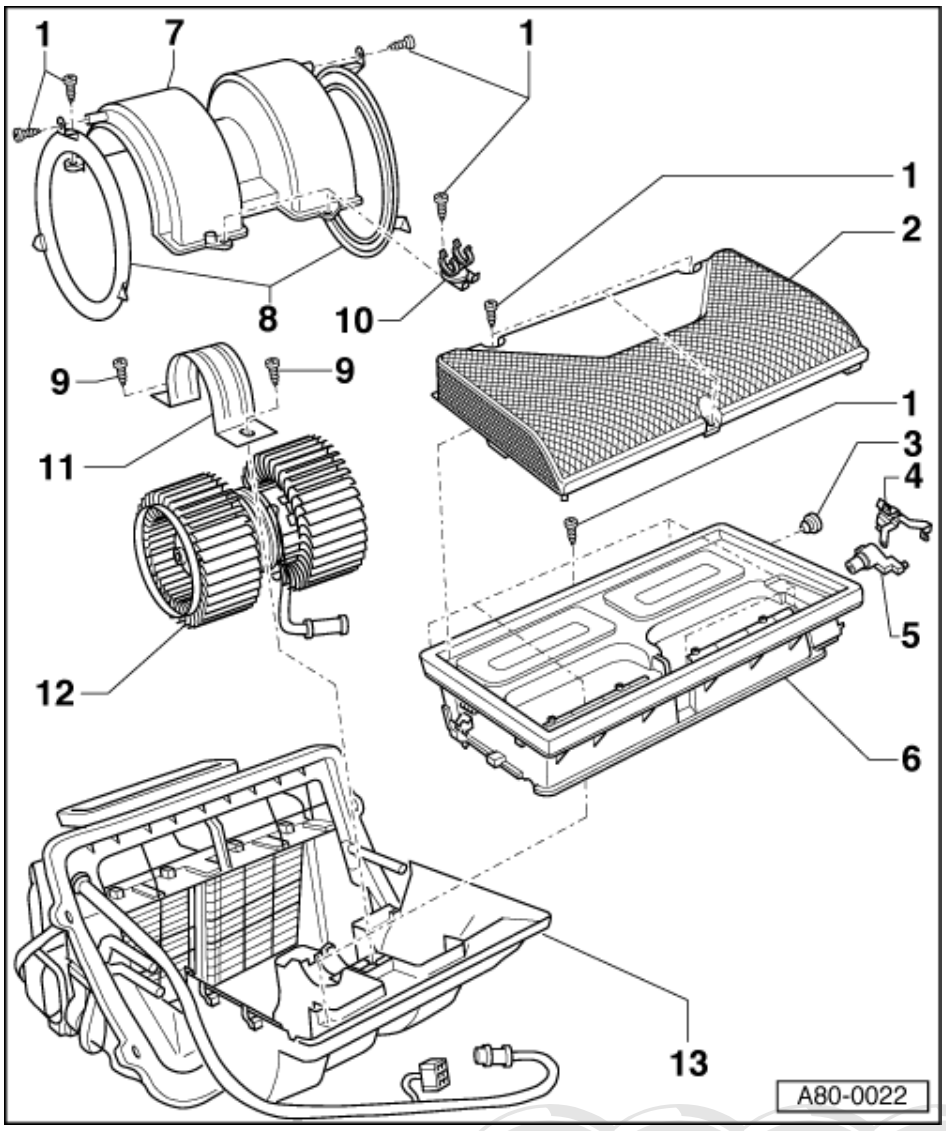
- For Fresh-air blower -V2

8 Ring for air duct

9 Countersunk screw

10 Holder

- For plug-in coupling



11 Holder

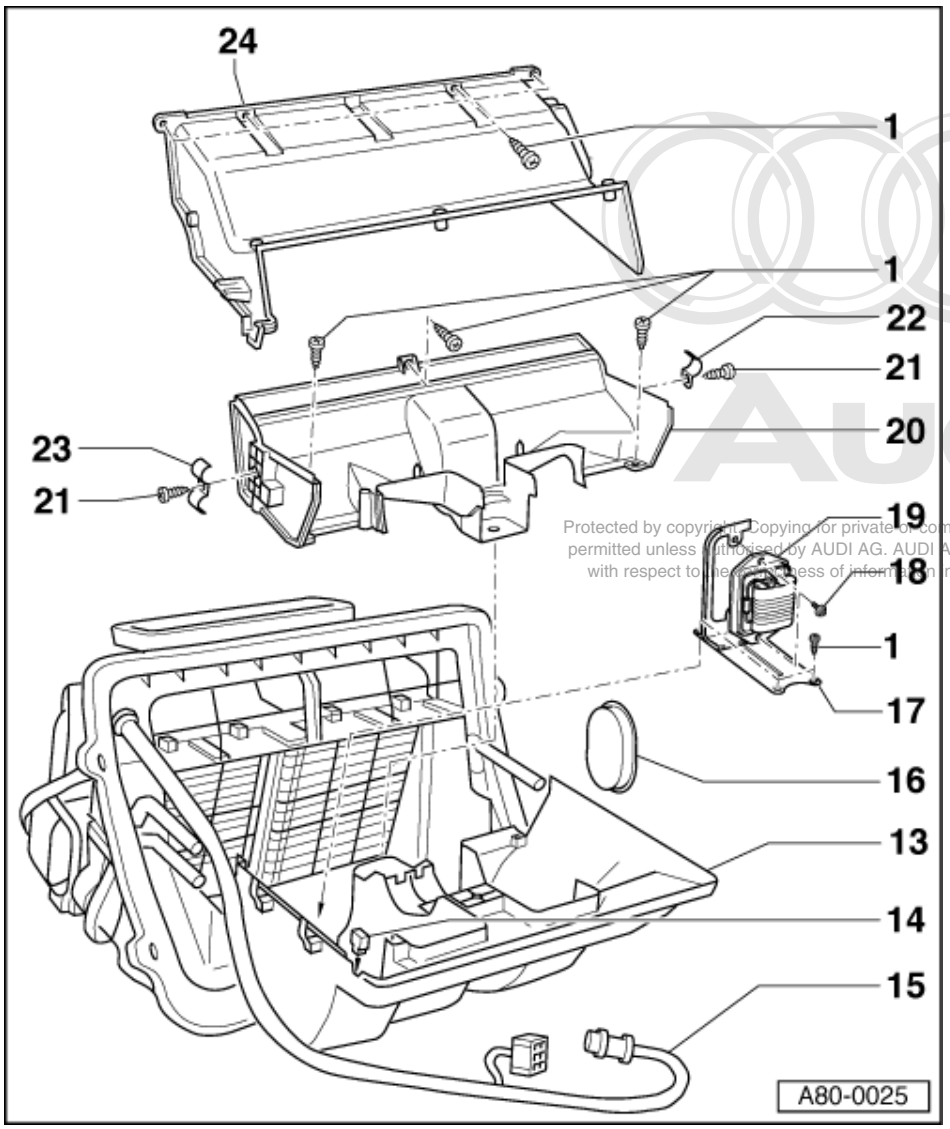
- For Fresh-air blower -V2

12 Fresh-air blower -V2

- Removing and installing
  => Page 25

13 Bottom part of housing

- With air distributor housing
- Dismantling and assembling => Page 71
- Dismantling and assembling air distributor housing => Page 74



14 Filling piece

- 04.94 ä permanently connected to bottom part of housing

15 Heater wiring loom

- Heater electrical connections:

=> Binder "Current flow diagrams, Electrical fault-finding and Fitting locations"

16 Plug

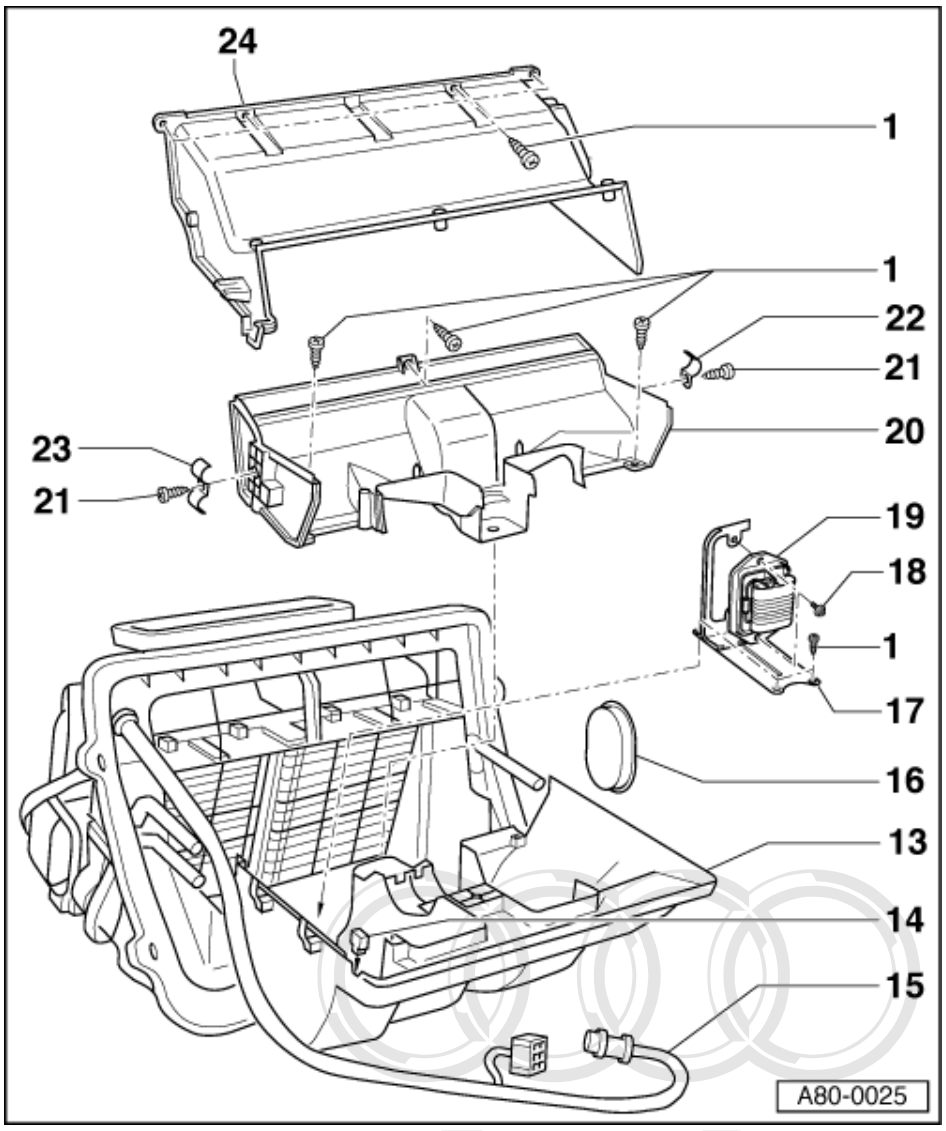
17 Holder

- For fresh-air blower series resistor -N24

18 Screw

19 Fresh-air blower series resistor -N24

20 Cover



21 Screw

22 Pipe holder

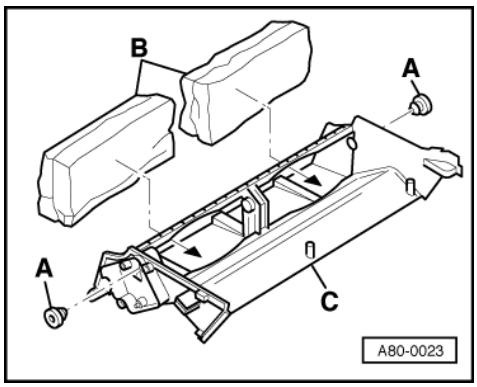
- For coolant pipes for left heat exchanger

23 Pipe holder

- For coolant pipes for right heat exchanger
- Removing and installing => Page 40

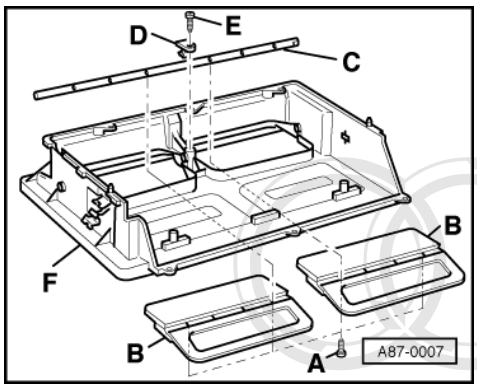
24 Cover

- With air recirculation opening
- Removing and installing => Page 25
- Dismantling and assembling => Fig. 1



-> Fig.1 Dismantling and assembling cover

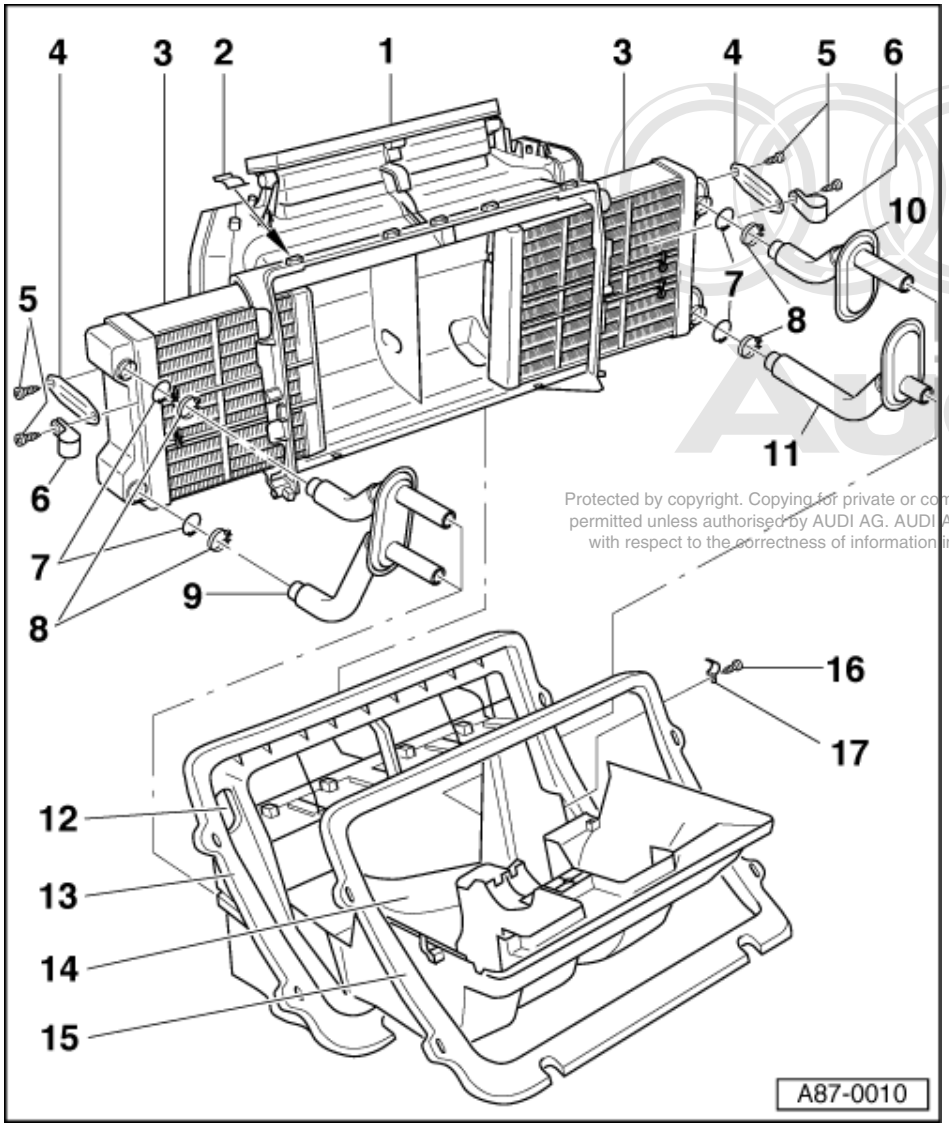
A - Plug
B - Foam blocks
C - Trim panel with air recirculation opening (opening intended for AC)



-> Fig.2 Dismantling and assembling intake duct

A - Screw
B - Air flow flap
C - Shaft
D - Holder
E - Screw
F - Intake duct with gasket (to bonnet)

7.3 - Dismantling and assembling bottom part of housing and air distributor housing



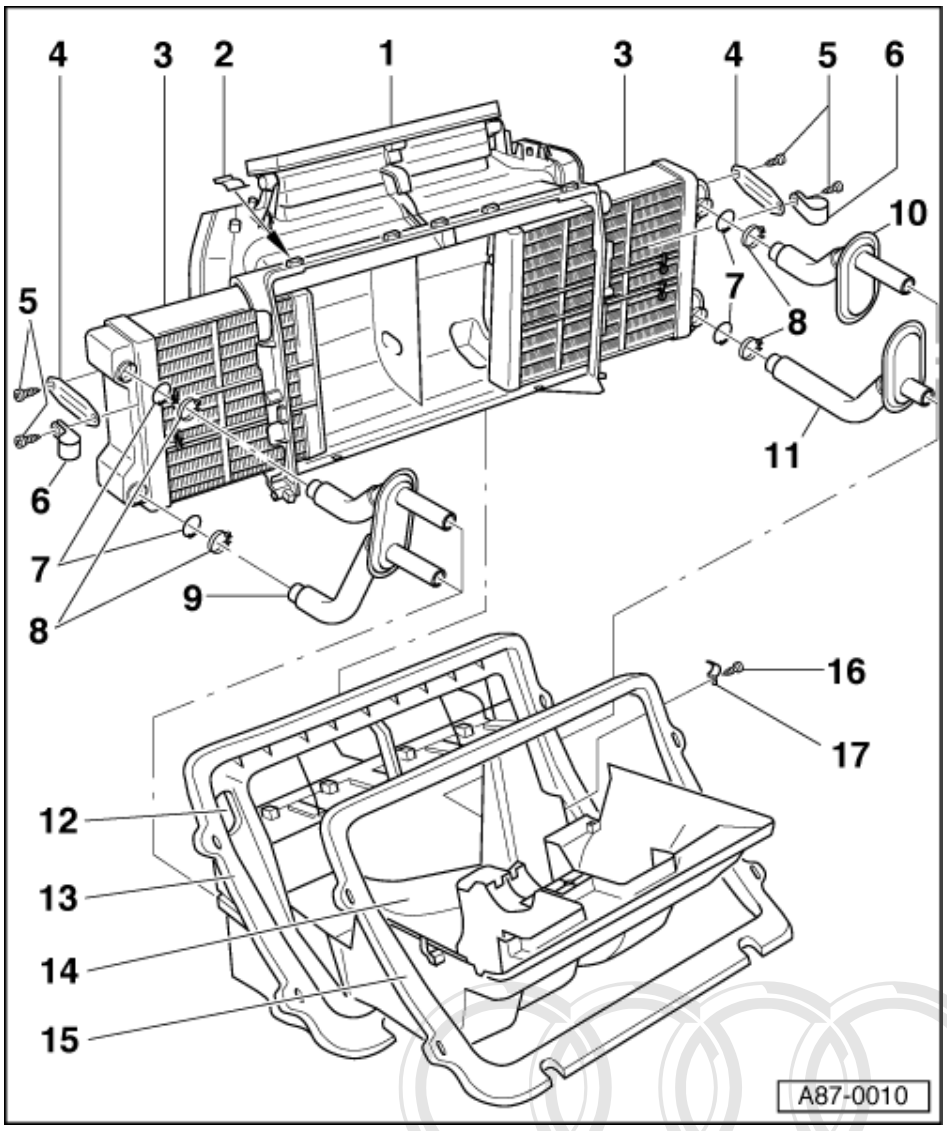
1 Air distributor housing

- Dismantling and assembling => Page 74

2 Clamp

3 Heating system heat exchanger

- Removing and installing right heat exchanger => Page 49
- Removing and installing left heat exchanger => Page 52



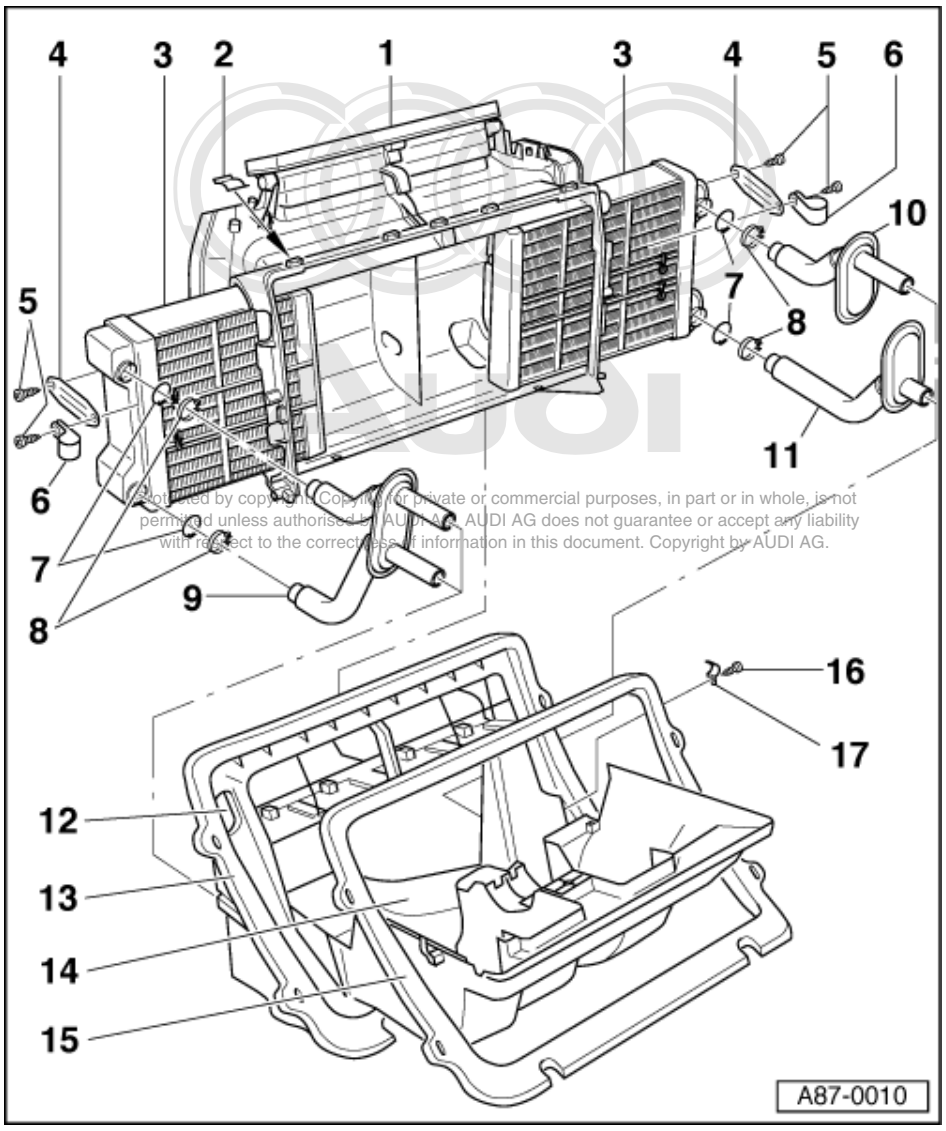
4 Holder
5 Countersunk screw
6 Holder
- For wiring loom (with AC only)

7 O-Ring seal
- Replace

8 Clip
- Replace
- Ensure proper attachment

9 Right coolant pipe
- With double socket

10 Top left coolant pipe
- With socket



11 Bottom left coolant pipe

- With socket

12 Opening

- For wiring loom

13 Bottom part of housing

14 Insulating mat

- With AC only

15 Gasket

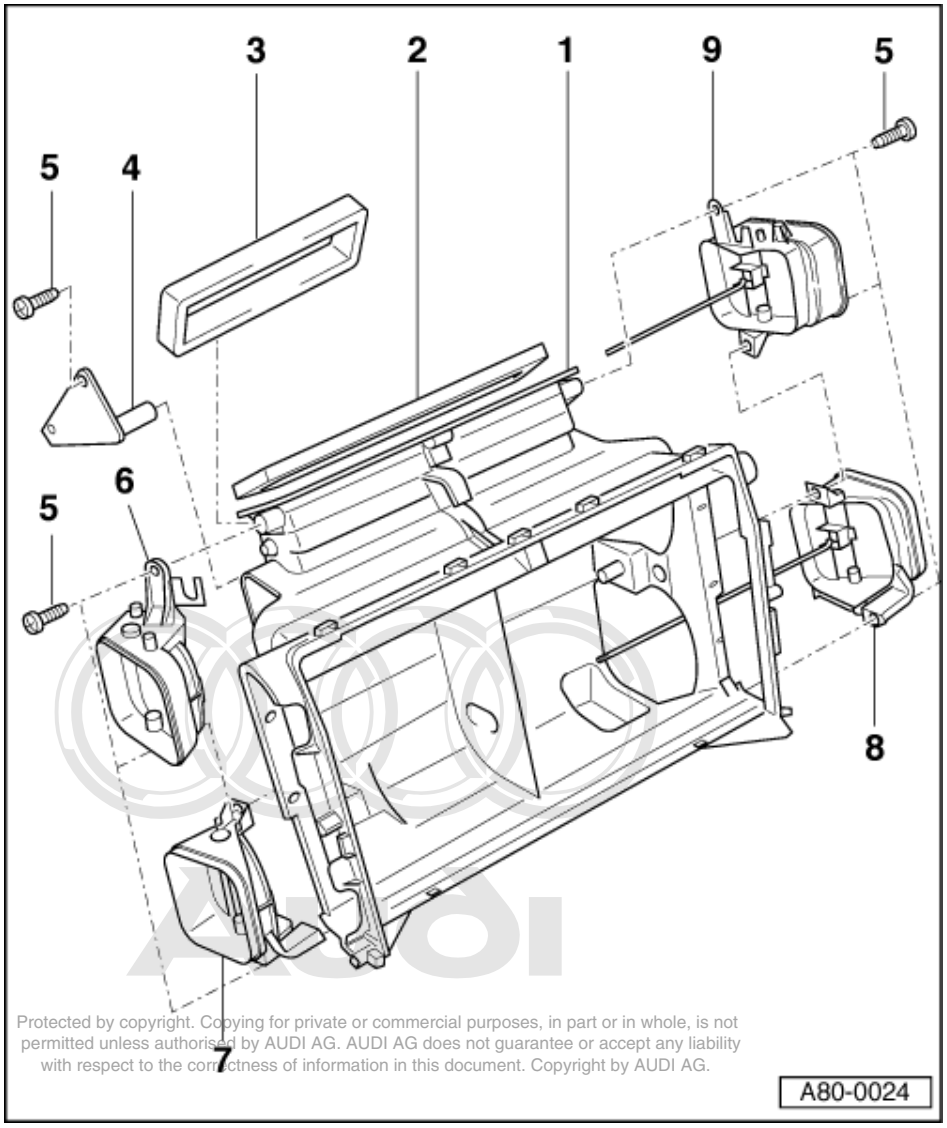
- Replace

16 Screw

17 Pipe holder

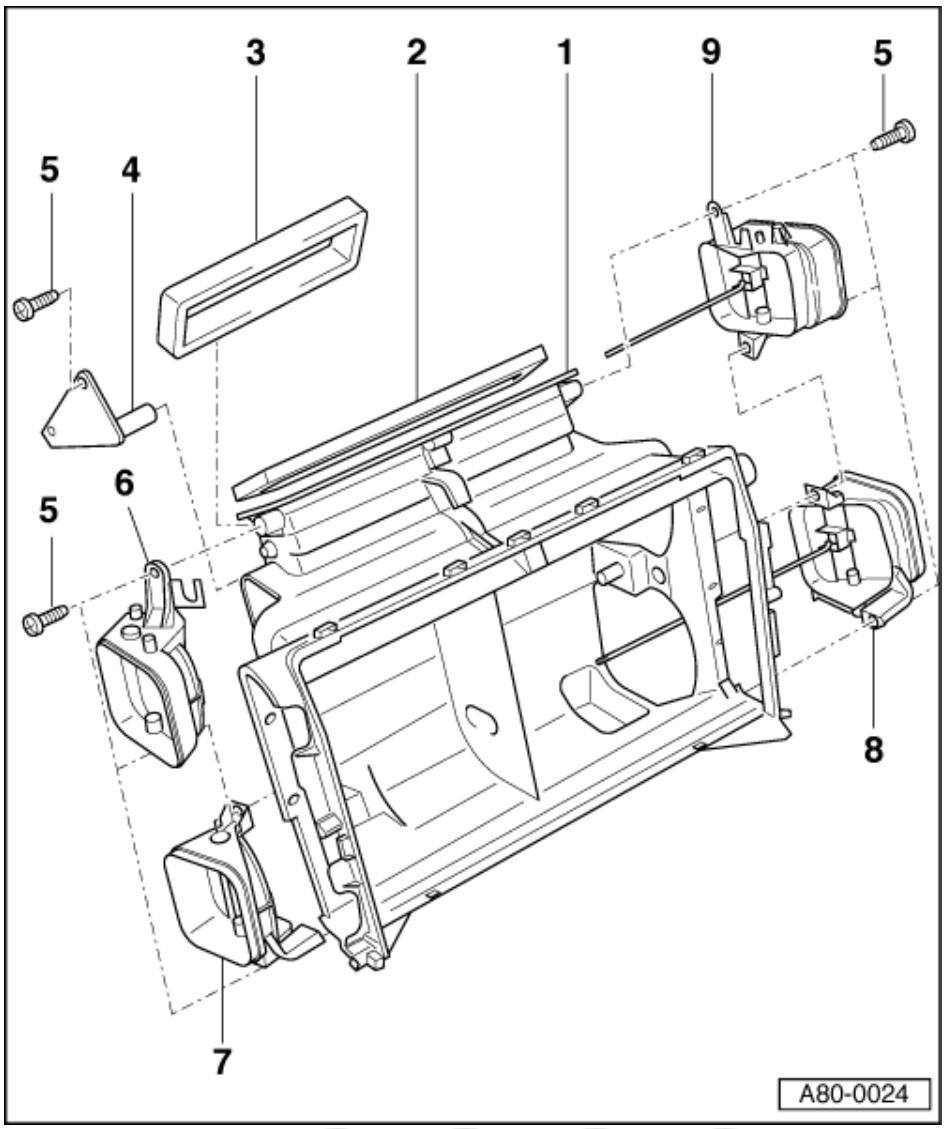
- For bottom left coolant pipe

7.4 - Dismantling and assembling air distributor housing



1 **Air distributor housing**
2 **Gasket**
3 **Gasket**
4 **Stop**
- For temperature flap
- Checking =>Page 43 .

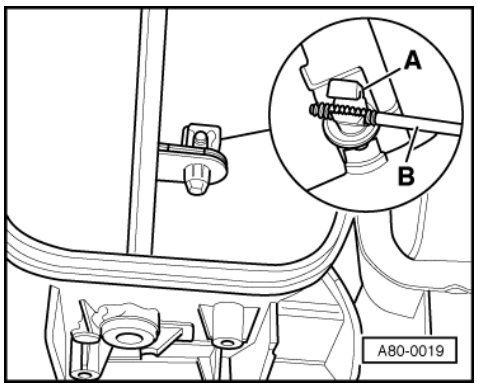
5 **Countersunk screw**
6 **Air duct**
- With shutoff flap to centre right vent
- Adjusting linkage => Fig. 1



7 Air duct
- With shutoff flap to right footwell vent
- Adjusting linkage => Fig. 1

8 Air duct
- With shutoff flap to left footwell vent
- Adjusting linkage => Fig. 1

9 Air duct
- With shutoff flap to centre left vent
- Adjusting linkage => Fig. 1



-> Fig.1 Adjusting linkage between flaps

- Unfasten clip -A- at right footwell flap.
- Set linkage -B- so that flaps move evenly and close without pretension on actuating rotary switches.

Note:

Adjustment of linkage for centre left and right vents involves removing left and right footwell vents