Workshop Manual
OCTAVIA

Heating, Air Conditioning

Service Department. Technical Information

S00.5102.50.20 Edition 08.96

Printed in Czech Republic

List of Supplements to OCTAVIA Workshop Manual

Edition: 03.01

Heating and Air Conditioning

Replaces List of Supplements - Edition: 07.99

Supple-ment	Edition	Subject	Article Number
	08.96	Basic Edition of Workshop Manual	S00.5102.50.20
1	08.98	Climatronic - Air Conditioning with Automatic Control	S00.5102.51.20
2	01.99	High-pressure Sender for Air Conditioning -G65-	S00.5102.52.20
3	07.99	Modifications for Model Year 00	S00.5102.53.20
4	03.01	Modifications for Model Year 01	S00.5102.54.20
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Printed in CR
S00.5102.54.20

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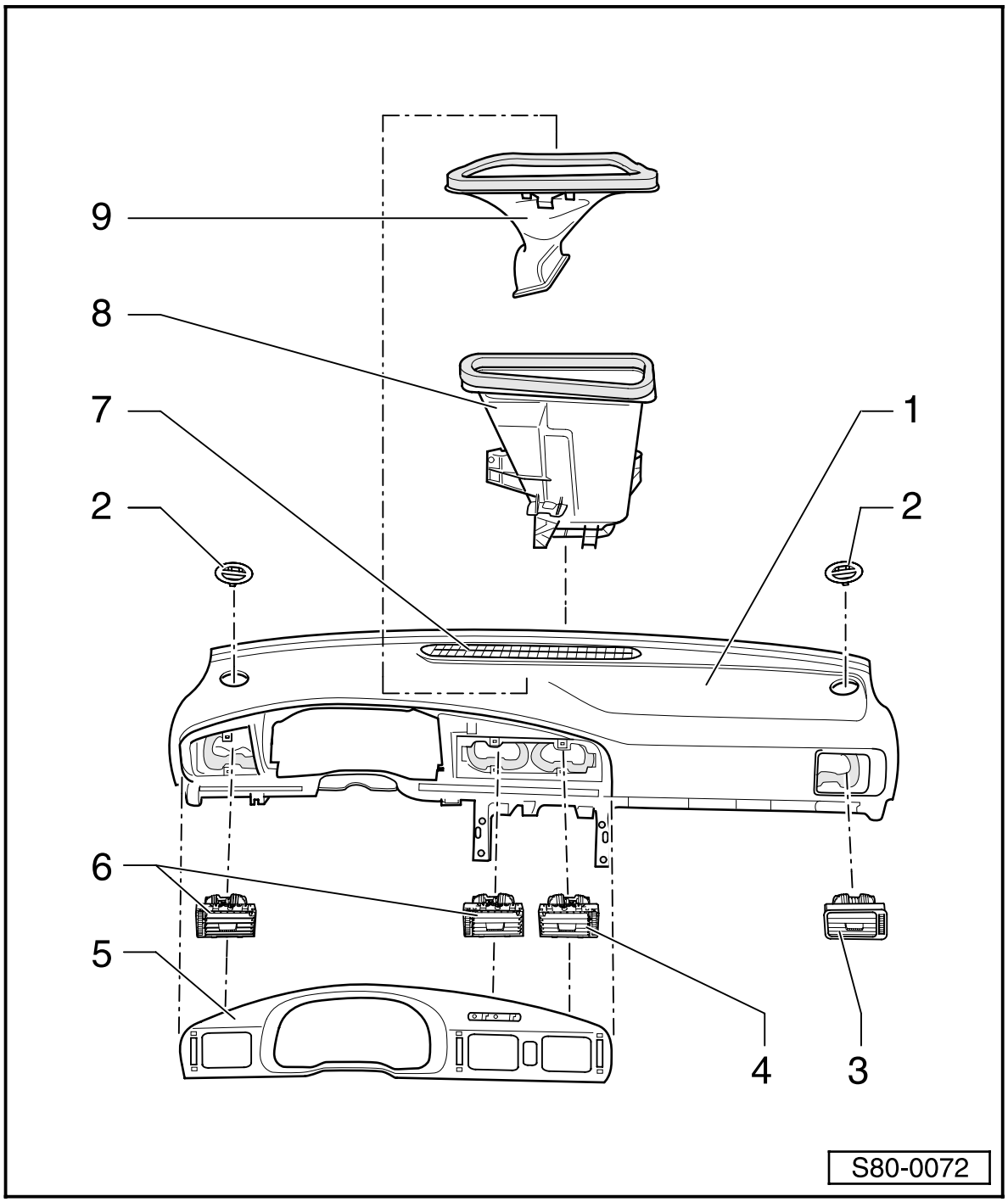
Servicing heating system

Dash panel vents and air guide ducts



Note:

The air in the passenger compartment flows out of the car through 2 ventilation frames (in the right of the luggage compartment in the area of the bumper) ⇒ page 80-3.

1 - Dash panel

- With integrated air guide ducts for defroster nozzles and dash panel vents.
- Removing and installing

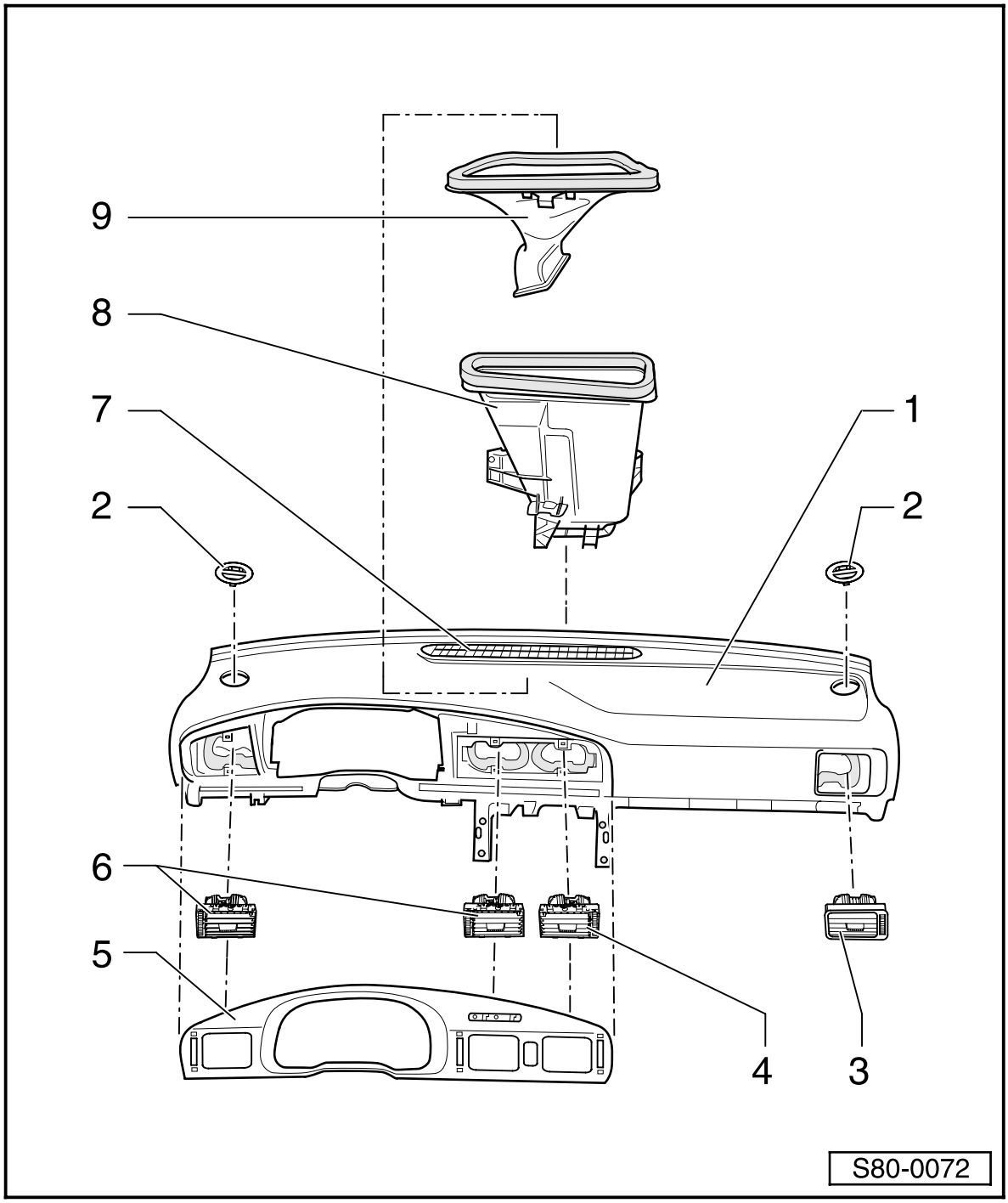
⇒ General Body Repairs; repair group 70

2 - "Side window" defroster nozzle

- Clipped in place

3 - "Right" dash panel vent

- Removing and installing ⇒ page 80-3.



4 - "Centre right" dash panel vent
- ♦ Removing and installing
  ⇒ page 80-3.

5 - Trim panel for dash panel inserts
- ♦ Removing and installing

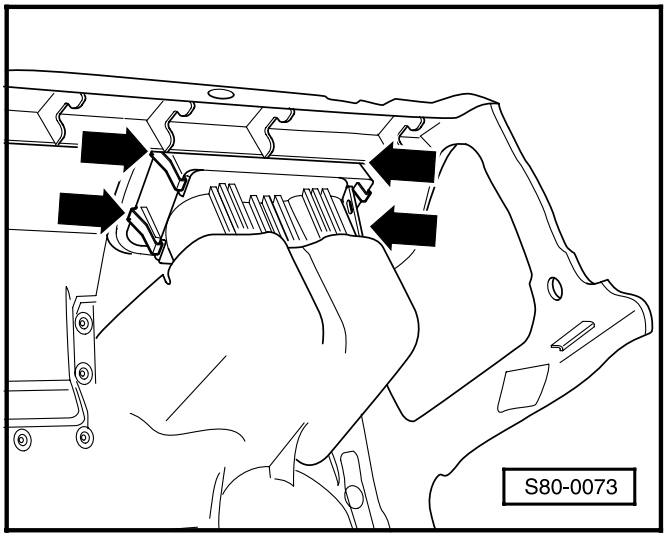
⇒ General Body Repairs; repair group 70

6 - "Left" and "centre left" dash panel vents
- ♦ Removing and installing
  ⇒ page 80-3.

7 - "Windscreen" defroster nozzle

8 - Air guide duct to dash panel vents
- ♦ Bolted to heating system, with catch at top.

9 - Air guide duct to defroster nozzles
- ♦ Removing and installing
  ⇒ page 80-4.



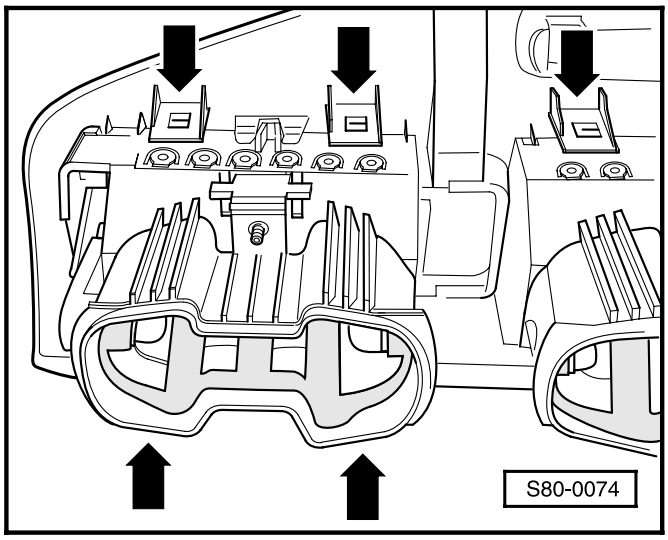
Removing and installing “right” dash panel vent

- Remove glove box and right trim panel of dash panel.

⇒ General Body Repairs, repair group 70.

◄- Apply pressure to securing clips -arrows- by hand or with a screwdriver.

Removing and installing “centre” and “left” dash panel vents



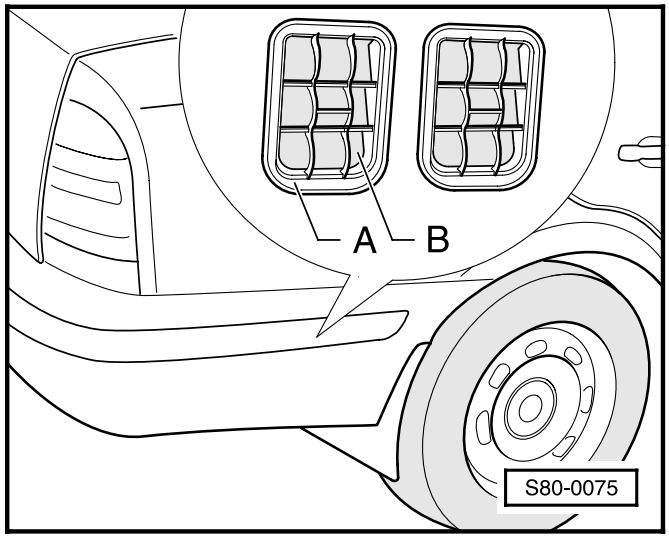
- Remove trim panel for dash panel insert.

⇒ General Body Repairs; repair group 70.

◄- Release catches -arrows-.

Note:

Only the left and centre left dash panel vents are identical.



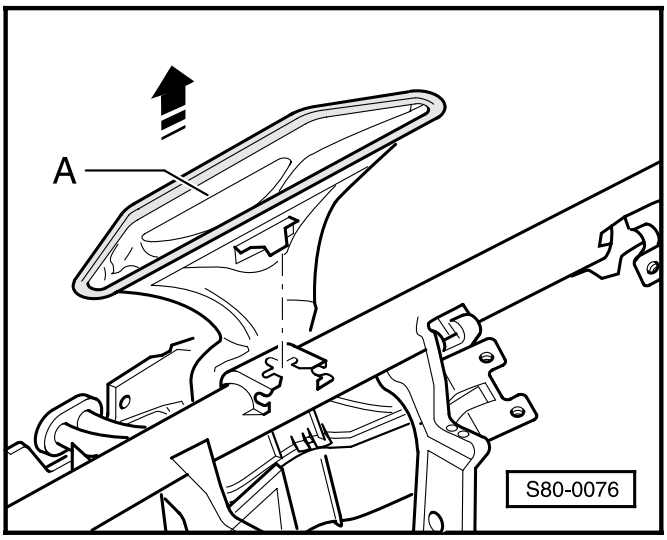
Inspecting ventilation frames

◄- The sealing lips -B- in the ventilation frame -A- must not be blocked and must close automatically.

Note:

- *This illustration shows the ventilation frames with the rear bumper installed.*
- *2 ventilation frames (on right side only) are installed for forced ventilation.*
- *The air guides formed by the trim panel of the luggage compartment must not be covered over if ventilation of the passenger compartment is to operate properly.*

Removing and installing air guide duct to defroster nozzles

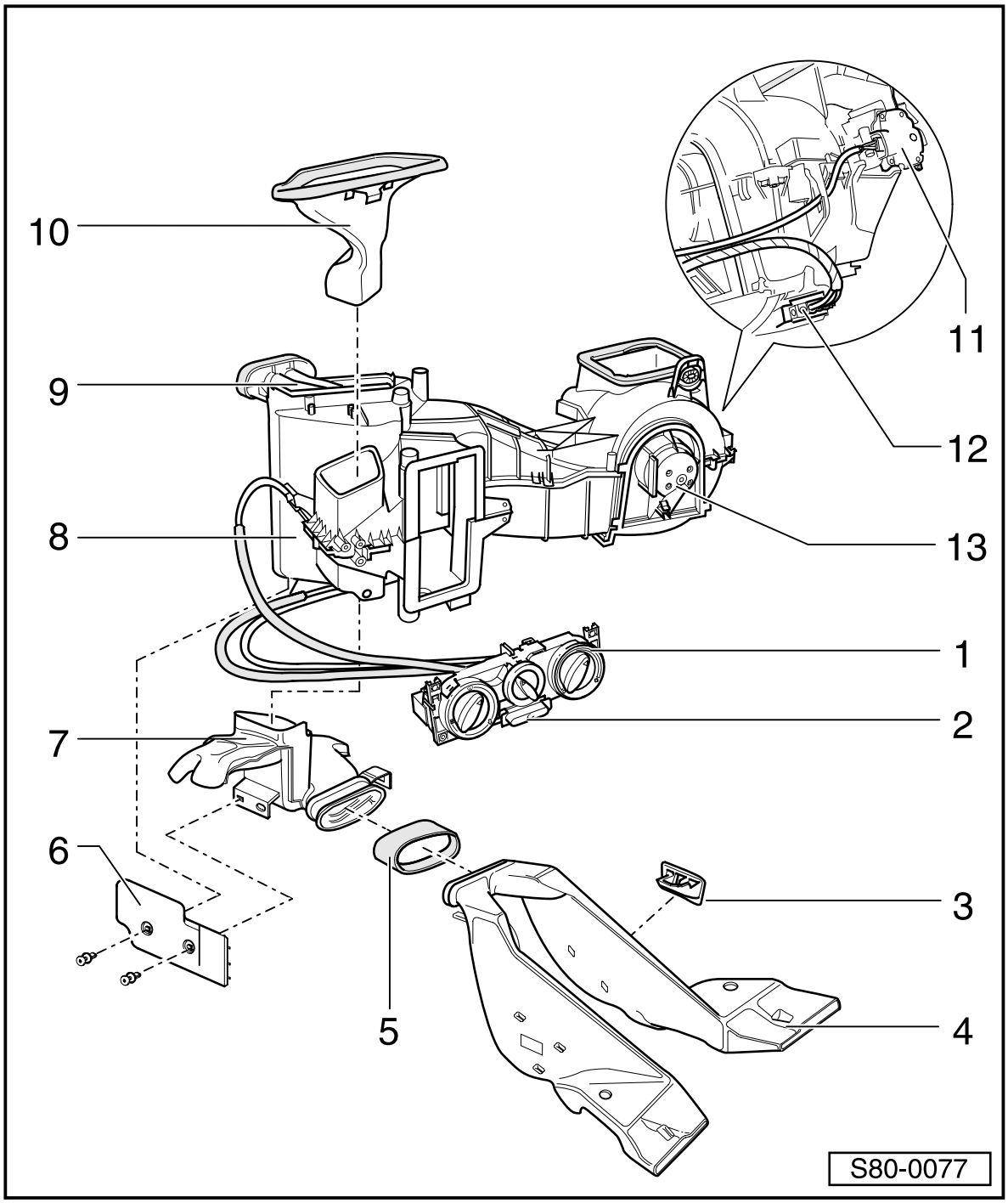


- Remove dash panel

⇒ General Body Repair; repair group 70

◄ - Remove air guide duct -A- by lifting up.

Heating system, heater controls and air guide ducts



Note:

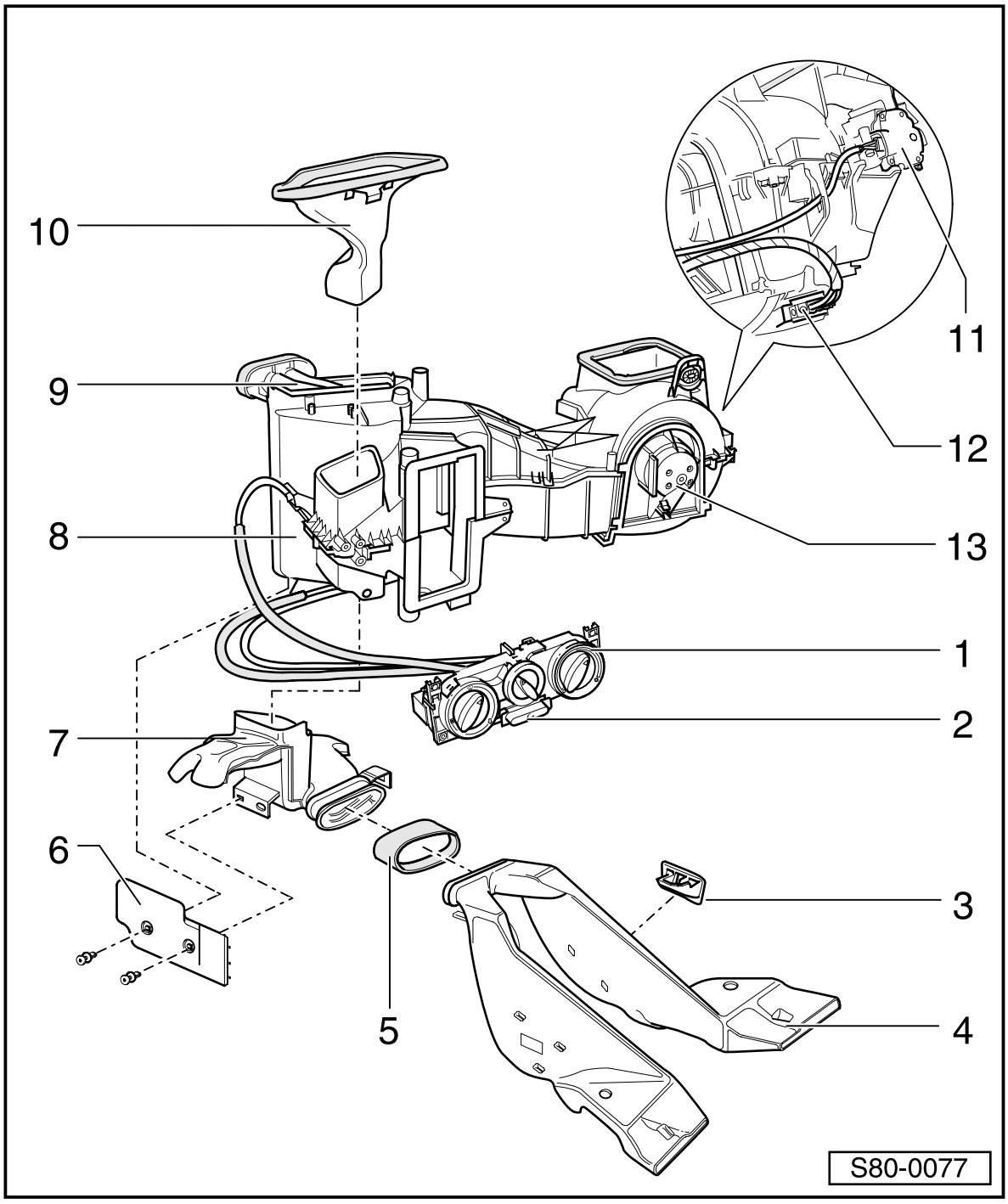
The fresh air is drawn in through a dust and pollen filter; removing and installing ⇒ page 80-16.

1 - Heater controls

- Removing and installing ⇒ page 80-7.
- Detaching and attaching bowden cables ⇒ page 80-7.
- Adjusting bowden cables ⇒ page 80-8.
- Connection diagram for bowden cables ⇒ page 80-8.
- Replacing bulb ⇒ page 80-10.

Note:

At the start of production, a bulb is used for illuminating the rotary switches. Production will be converted to LEDs at a subsequent date; these will then no longer be replaceable.



2 - Switch for fresh and recirculated air flap -E159
- Testing operation ⇒ page 80-13

Notes:

- *The switch is a fixed element of the heater controls.*
- *No recirculated air operation is possible in the "defrost mode" (the recirculated air mode is switched off about 15° before the air distribution rotary switch reaches the end position "air supply to windscreen".*

3 - Driver side footwell vent

4 - Rear duct

5 - Connection piece to rear duct

6 - Left cover for footwell vent

7 - Footwell vent
- Removing and installing ⇒ page 80-15.

8 - Heater unit
- Removing and installing ⇒ page 80-17
- Detaching, attaching and adjusting Bowden cables ⇒ page 80-8
- Connection diagram for Bowden cables ⇒ page 80-8

9 - Heat exchanger
- Removing and installing ⇒ page 80-19
- On vehicles with mapped cooling, in all-metal version because of higher temperatures

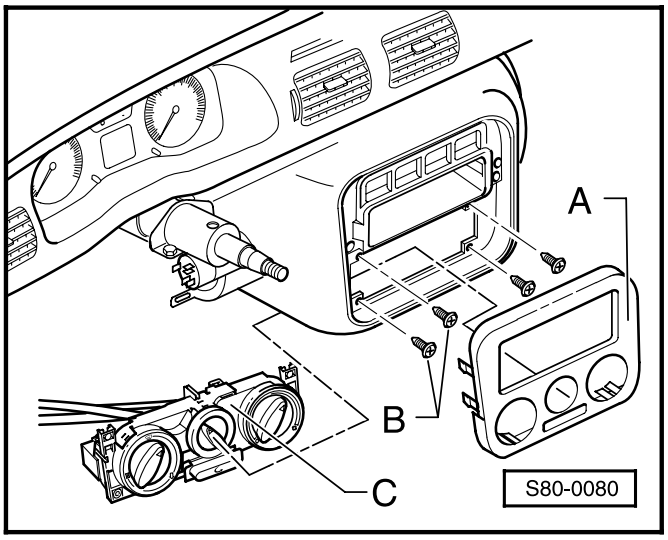
10 - Air guide duct to defroster vents
- Removing and installing ⇒ page 80-4

11 - Fresh air/recirculated air flap motor -V154-
- Testing operation ⇒ page 80-13
- Removing and installing ⇒ page 80-12

12 - Series resistor for fresh air blower -N24-
- Removing and installing ⇒ page 80-11

13 - Fresh air blower -V2-
- Removing and installing ⇒ page 80-11

Removing and installing heater controls



- Remove centre console.

⇒ Body Fitting Work; Repair Group 68

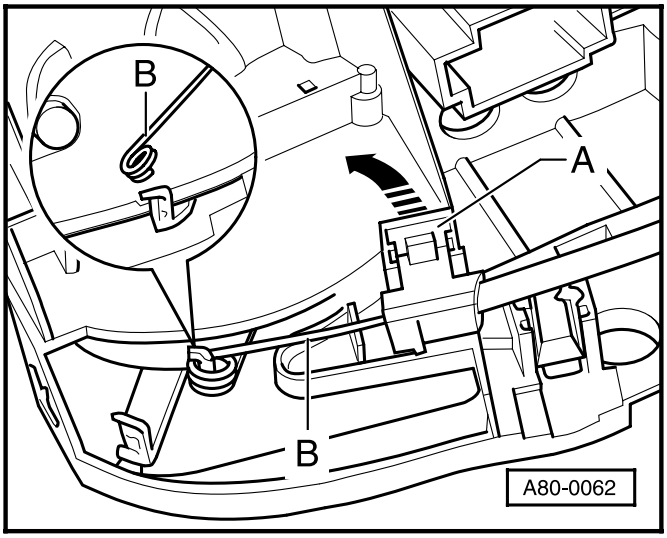
◄- Pull off trim panel for centre part of dash panel -A-.

- Remove screws -B-.

- Separate plug connections.

- Take heater control -C- down and out.

Detaching and attaching Bowden cables of heater controls



- Remove heater controls.

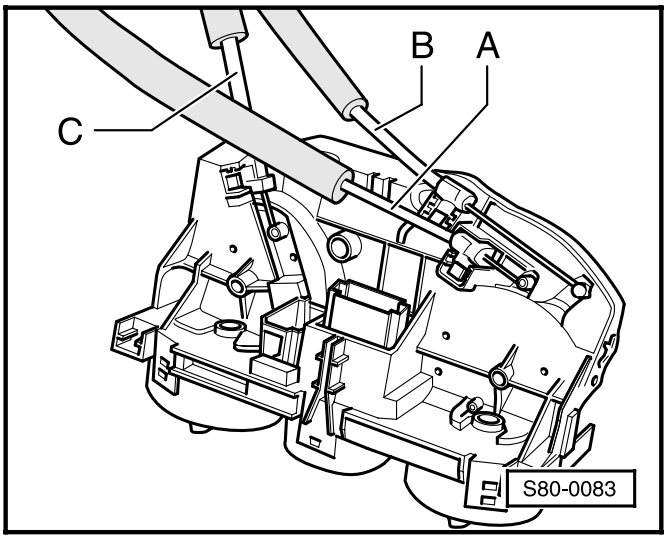
◄- Unclip support bracket -A- on Bowden cable.

- Detach Bowden cable.

Notes:

- *Inspect Bowden cables before installing; replace any cables which are stiff or damaged.*
- *Attach wire cable -B- the right way round (coil facing down).*

Connection diagram for bowden cables at heater controls



◄ - Bowden cable -A- to footwell/defroster flap.

Colour: green

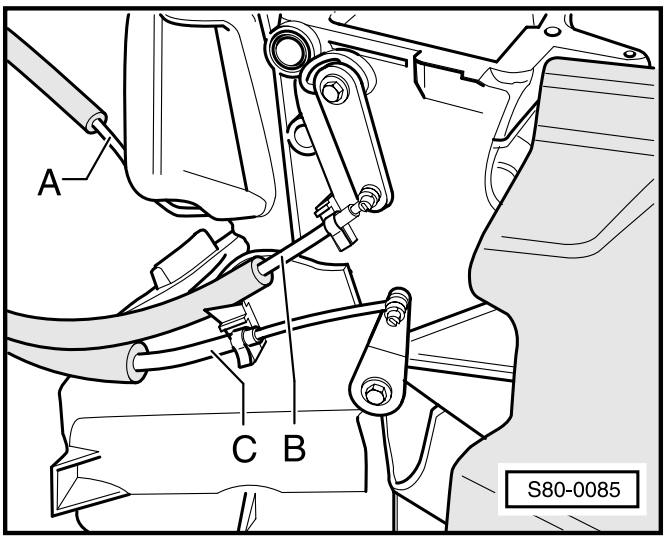
- Bowden cable -B- to central flap.

Colour: yellow

- Bowden cable -C- to temperature flap.

Colour: beige

Connection diagram for bowden cables at heater



◄ - Bowden cable -A- to footwell/defroster flap.

Colour: green

- Bowden cable -B- to central flap.

Colour: yellow

- Bowden cable -C- to temperature flap.

Colour: beige

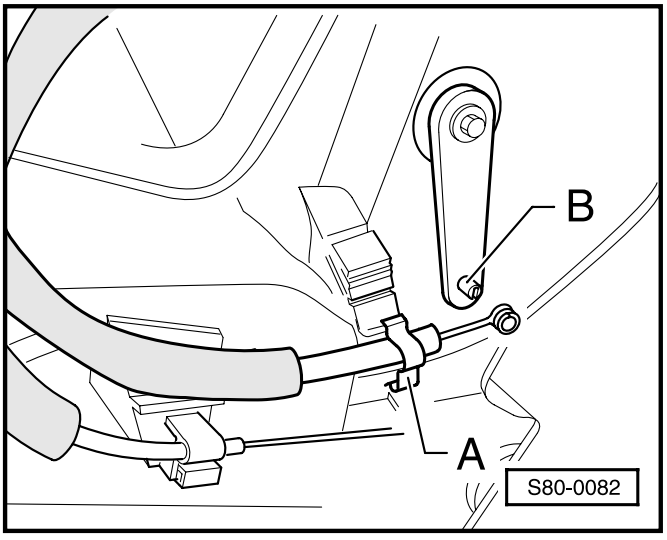
Detaching, attaching and adjusting bowden cables at heater

Detaching bowden cables

- Remove footwell vent ⇒ page 80-15.

◄ - Lever off securing clip -A-.

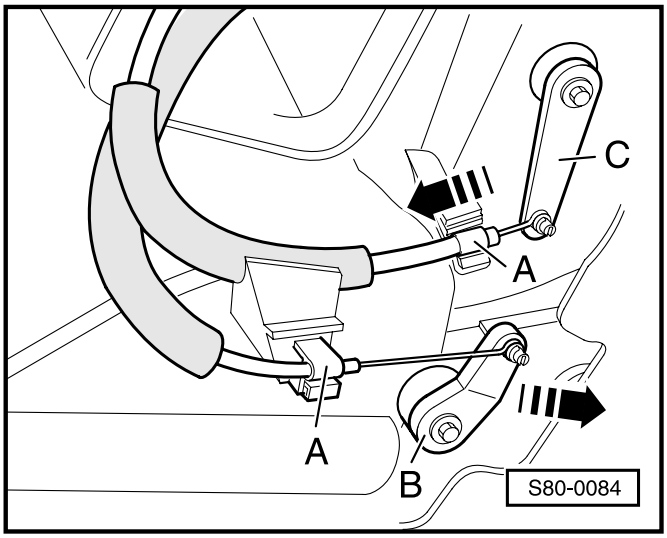
- Carefully take bowden cable off lever arm -B-.



Notes:

- *Inspect bowden cables before installing; replace any bowden cable which does not operate freely or is damaged.*
- *After installing the bowden cable, turn rotary switch to both end stops (should reach both end stops).*

Attaching bowden cable to temperature flap and adjusting

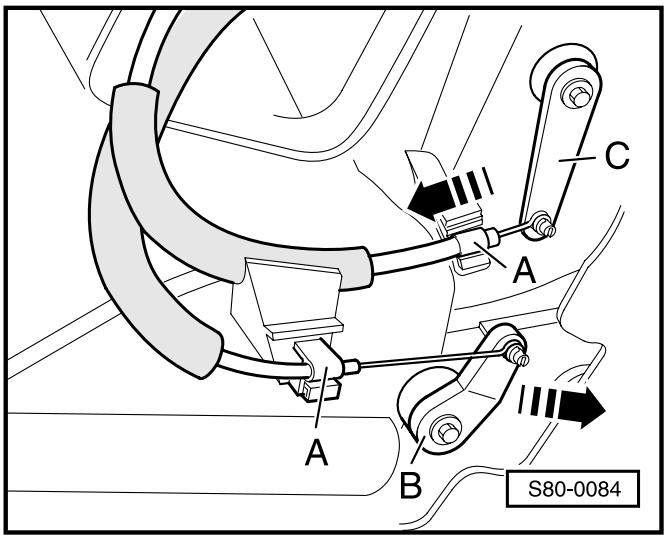


- Turn rotary switch for temperature flap as far as the stop in “cold” position.

◄ - Attach bowden cable to the lever for the temperature flap -B-.

- Press lever for temperature flap -B- slightly in direction of arrow.
- Fix bowden cable sheath in place with securing clip -A-.
- Turn rotary switch for temperature flap to both end stops (should reach both end stops).

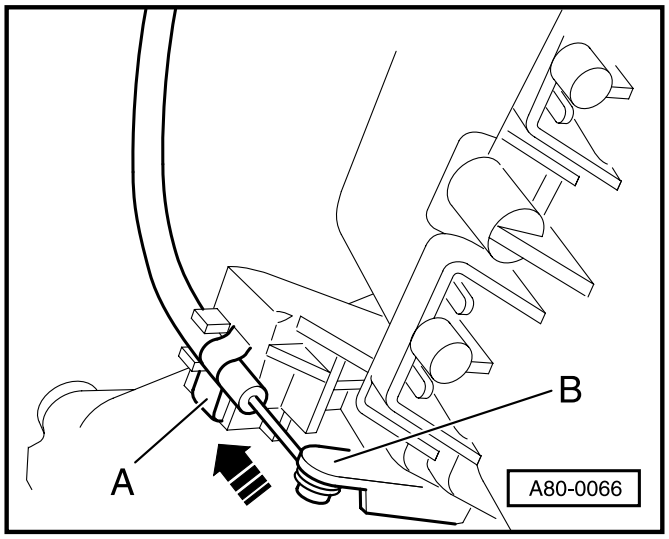
Attaching bowden cable to central flap and adjusting



- Turn rotary switch for air distribution to the stop in position “air flow to windscreen”.

◄ - Attach bowden cable to the lever for the central flap -C-.

- Press lever for central flap -C- slightly in direction of arrow.
- Fix bowden cable sheath in place with securing clip -A-.
- Turn rotary switch for air distribution to both end stops (should reach both end stops).



Attaching bowden cable to footwell/defroster flap and adjusting

- Turn rotary switch for air distribution as far as the stop in position “air flow to windscreen”.

◄ - Attach bowden cable to lever for footwell/defroster flap -B-.

- Press lever for footwell/defroster flap -B- slightly in direction of arrow.

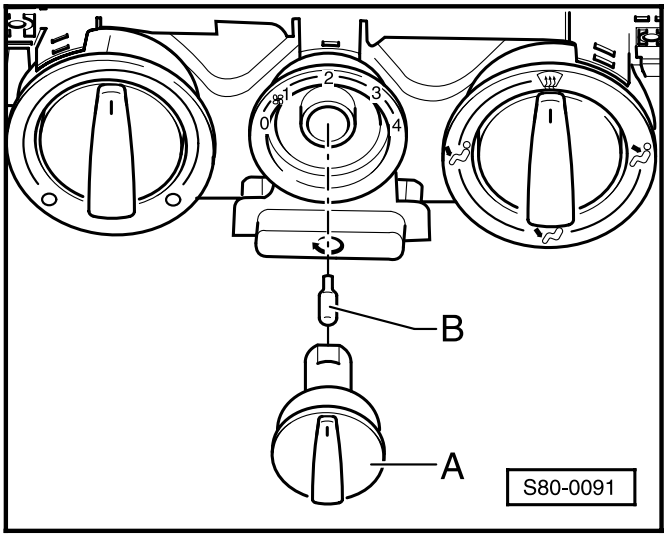
- Fix bowden cable sheath in place with securing clip -A-.

- Turn rotary switch for air distribution to both end stops (should reach both end stops).

Replacing bulb for heater controls

Notes:

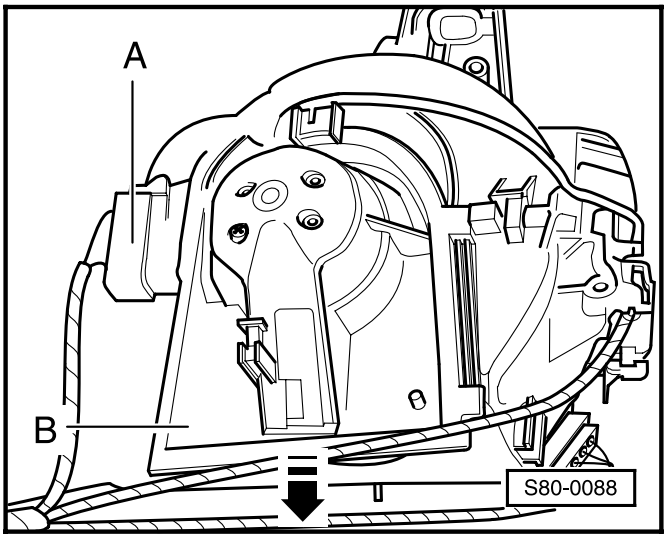
- *Place e.g. a thick cloth between rotary knob and the jaws of the pliers to avoid the rotary knob being damaged, or use pliers with plastic or rubber jaws.*
- *At start of production, a bulb is used for illuminating the rotary switches. This will be converted to LEDs at a later date; these will then no longer be replaceable.*



◄ - Use pliers to pull rotary knob -A- off the rotary switch for fresh air blower.

- Use pointed pliers or a bulb puller to pull bulb -B- out of the socket.

Removing and installing fresh air blower -V2

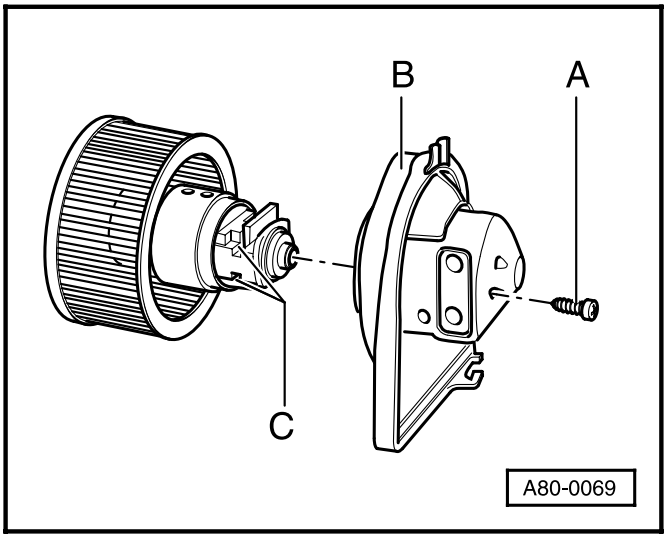


- Remove series resistor -N24 ⇒ page 80-11.

◄ - Pull fresh air blower -B- down and out of the heater.

- Unplug connector -A- from the fresh air blower.

Separating fresh air blower -V2 and base plate



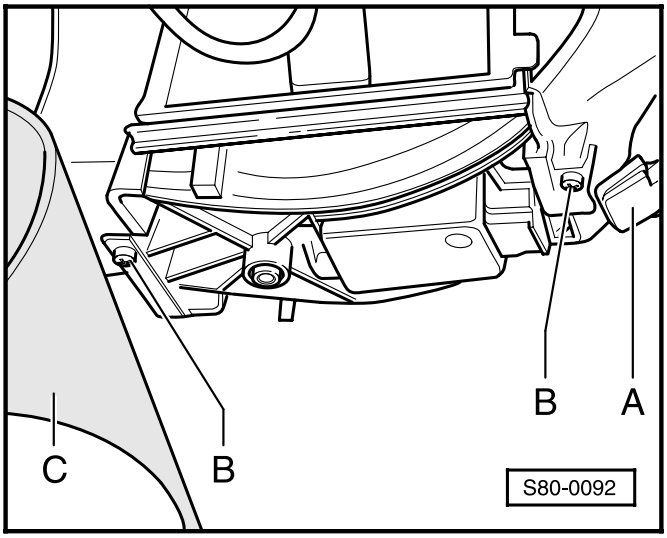
◄ - Remove screw -A-.

- Pull fresh air blower out of the base plate -B-.

Notes:

- *When installing fresh air blower in the base plate, ensure the connector -C- is correctly installed.*
- *After installing fresh air blower, ensure it is correctly located in the heater.*

Removing and installing series resistor for fresh air blower -N24

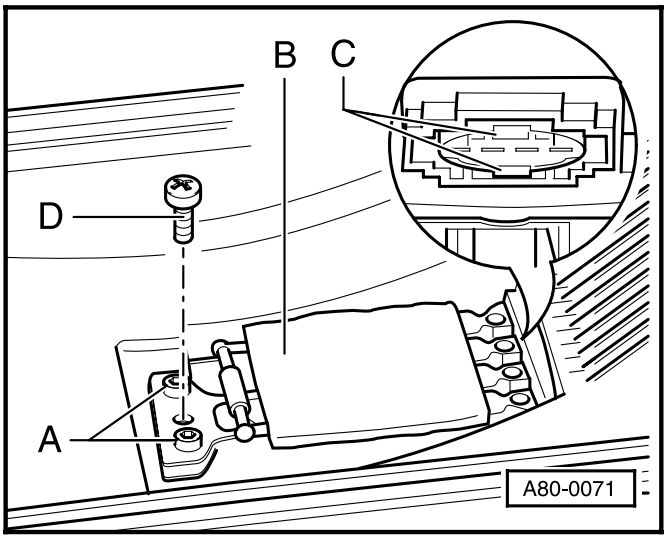


- Remove screw clip for foam cover.

◄ - Fold foam cover -C- to the side.

- Take connector -A- off the series resistor.

- Remove screw -B- and take off resistor mount.



Removing series resistor from the resistor mount

◄ - Drill or shear off the securing screws -A-.

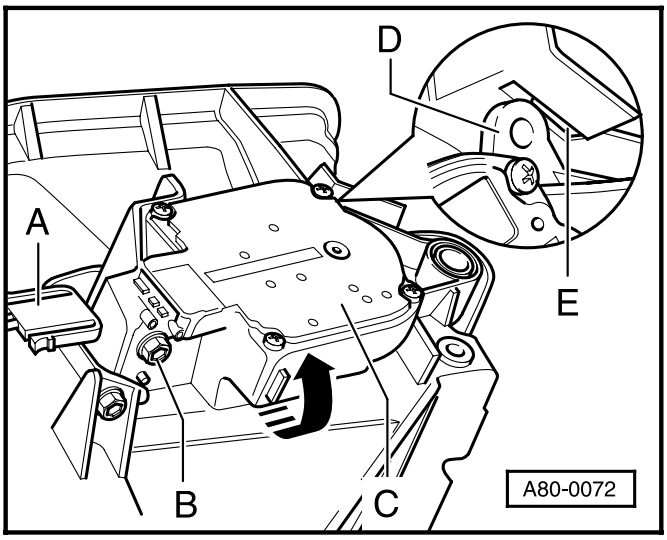
- Press back catches -C-.

- Remove series resistor -B-.

Note:

When installing series resistor, attach with 3.2 x 10 mm self-tapping screws -D-.

Removing and installing positioning motor for fresh air and recirculated air flap -V154



Removing

- Remove glove box.

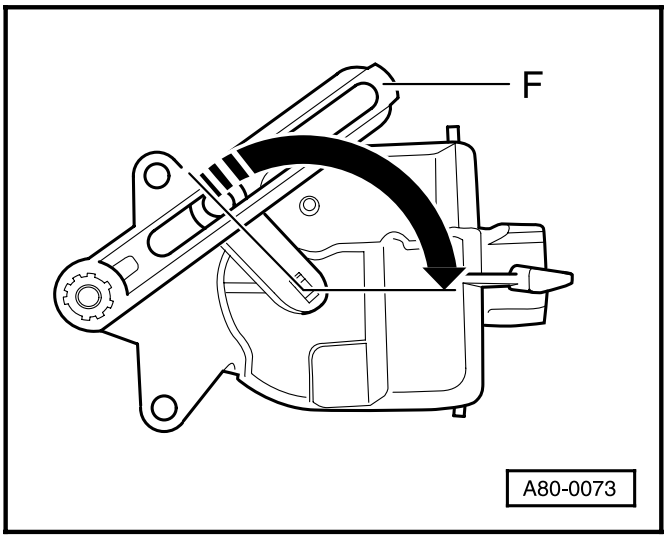
⇒ General Body Repairs; repair group 70

- Set fresh air and recirculated air flap to “re-circulated air” (if possible).

◄ - Unplug connector -A-.

- Remove bolt -B-.

- Push positioning motor down until the tongue -D- is clear of the slot -E- and push positioning motor to the outside -direction of arrow-.



Installing

- Set fresh air and recirculated air flap manually to “fresh air”.

- Plug in connector -A-.

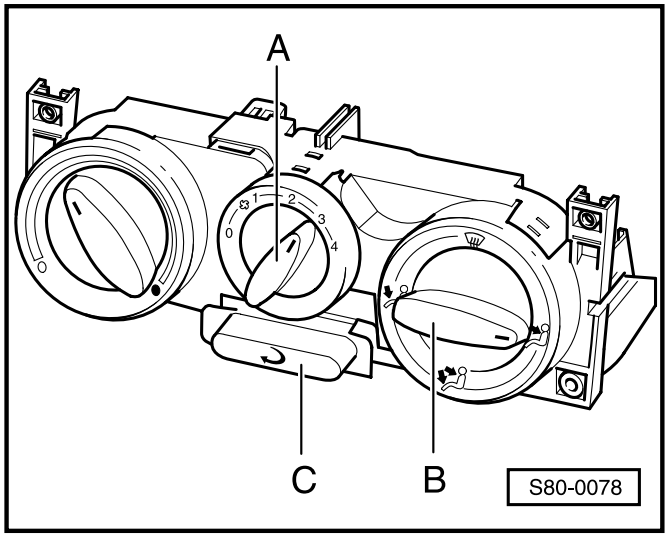
◄ - Operate the fresh air and recirculated air switch and switch ignition on and off in order to move lever -F- on positioning motor into centre position -direction of arrow-.

- Tilt positioning motor down about 45° and install.

Testing operation of the positioning motor for fresh air and recirculated air flap -V154 and of switch -E159

Notes:

- *No recirculated air operation is possible in the position "air supply to windscreen" (switch -E159- is blocked mechanically by the rotary switch) to ensure that misted windows are cleared as rapidly as possible.*
- *Otherwise, the windows might mist up in the recirculated air mode (the moisture in the air in the passenger compartment increases and then condensates on the windows).*



Testing operation of switch -E159 and of positioning motor -V154

- Switch on ignition.

◄ - Set rotary switch -A- for fresh air blower -V2 to stage 3.

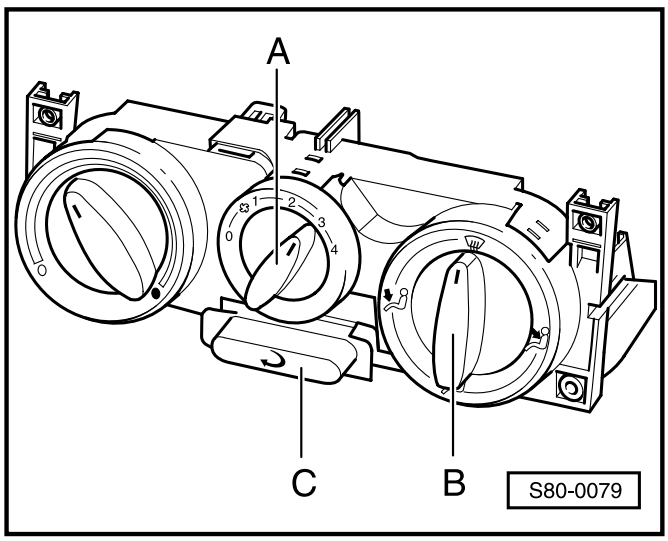
- Turn rotary switch -B- for air distribution to the "air supply to dash panel vents" position.

- Do not operate switch -C- for fresh and recirculated air flap -E159-.

- The air is drawn in through the dust and pollen filter (fresh air mode, indicator lamp in switch must not come on).

- Operate switch -C- (recirculated air mode, indicator lamp in switch should come on).

  The air is drawn in from the area of the front passenger footwell (recirculated air).



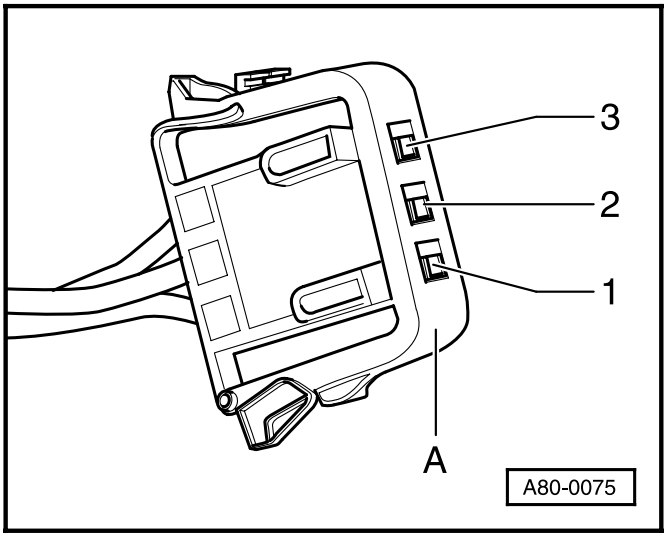
◄ - Turn rotary switch -B- for air distribution as far as the stop in position "air supply to windscreen".

  Indicator lamp in switch -C- should go out, the fresh air and recirculated air flap moves into fresh air position (switch -C- operated by rotary switch -B-).

Notes:

- *If the controls operate properly and the windows nevertheless mist up:*
  - *Inspect dust and pollen filter for dirt ⇒ page 80-16.*
  - *Inspect forced ventilation ⇒ page 80-3.*
- *If the controls do not operate properly, test switch -E159.*

Testing operation of switch -E159



- Remove glove box.

⇒ General Body Repairs; repair group 70.

◄- Unplug connector -A- from positioning motor for fresh air and recirculating air flap -V154.

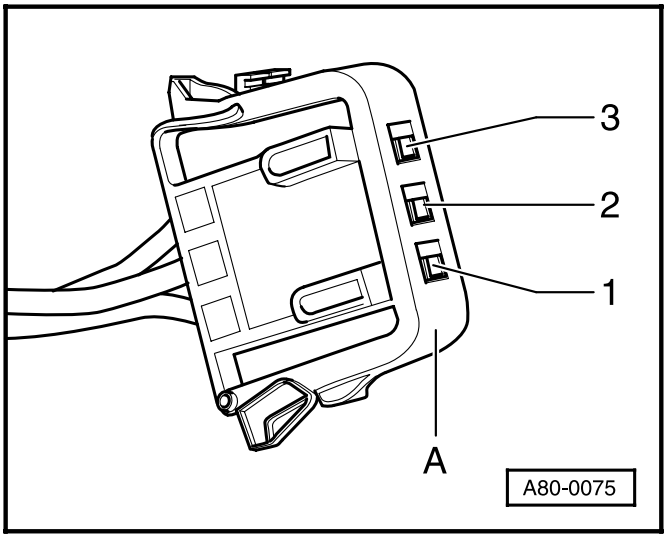
- Switch on ignition.
- Turn rotary switch for air distribution into “air supply to dash panel vents” position.
- Do not operate switch -E159 (not pressed in).

  Fresh air mode, indicator light in switch must not come on.
- Connect voltage tester V.A.G 1527 B between contacts 1 and 3 at connector -A-.

  Indicator lamp in voltage tester should come on.
- Operate switch -E159 (press).

  Recirculating air mode, indicator light in switch should come on.

  Indicator light in voltage tester should go out.



◄- Connect voltage tester between contact 2 and 3 at connector -A-.

  Indicator light in voltage tester should come on.

- Turn rotary switch for air distribution as far as the stop in position “air supply to windscreen”.

  Indicator light in switch and in voltage tester should go out.

Notes:

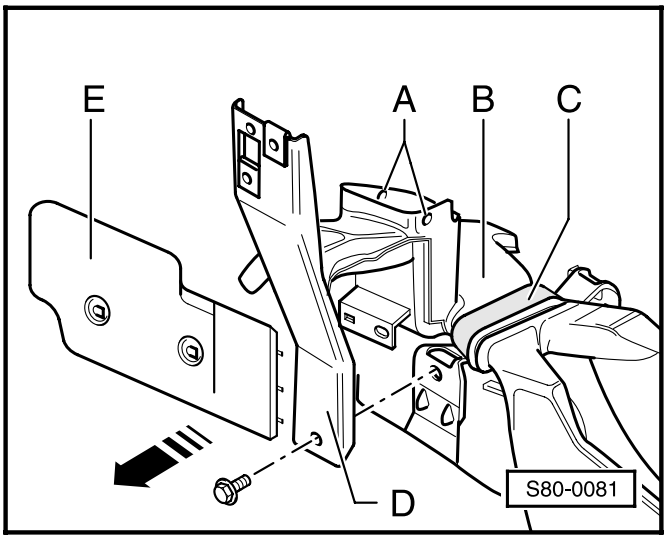
- If n*o fault can be found during this test:*
  - *Inspect fresh air and recirculating air flap to ensure it operates freely.*
  - *Replace positioning motor -V154.*
- *If the controls do not operate properly:*
  - *Test cable connection between -E159 and -V154 for open circuit and short circuit.*
  - *Test voltage supply and earth connection to switch -E159.*
  - *Replace heater* controls.

Removing and installing footwell vent

- Remove centre console.

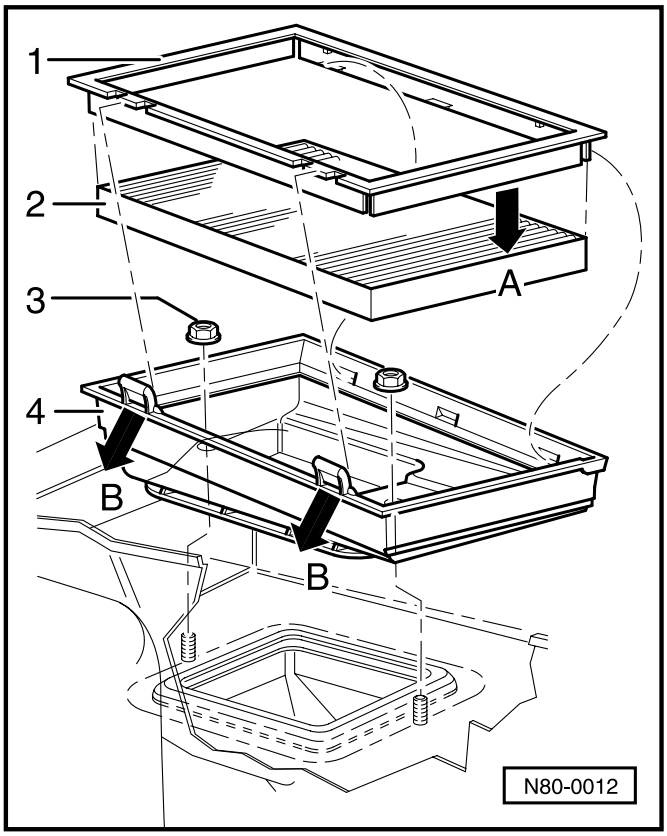
⇒ General Body Repairs; repair group 68

- Remove left cover below dash panel.



◄- Remove left cover for footwell vent -E- (2 expanding clips, 2-piece).

- Remove support -D-.
- Remove connection piece -C- between footwell vent and rear duct.
- Press footwell vent -B- down out of the catches -A- and remove in direction of arrow.



Removing and installing dust and pollen filter

◄ 1 - Surround

2 - Filter element

3 - Plastic nut

4 - Filter housing with gasket

Removing

- Remove right cover of plenum chamber
⇒ General Body Repairs; repair group 66

- Press catches of filter housing in direction of arrow -B- and remove filter element together with surround.

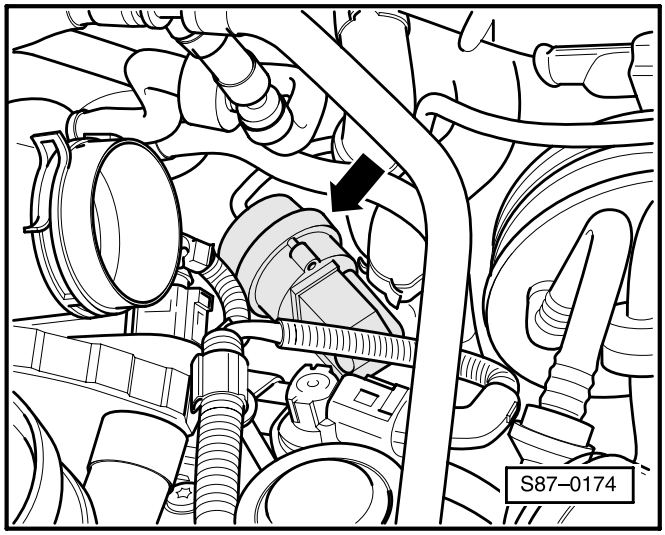
Installing

- The surround should engage in the first lamellar segment of the filter element -arrow A-.

Removing and installing coolant shutoff valve

Models with mapped cooling

Removing



◄ The coolant shutoff valve -arrow- is located in the engine compartment in the area of the heat exchanger flange.

- Remove intake hose.
- Release pressure in coolant circuit by opening the cap at the coolant expansion reservoir.
- Pinch off coolant hoses upstream and downstream of coolant shutoff valve with MP 7-602.
- Detach vacuum hose from coolant shutoff valve.
- Place collecting vessel below coolant shutoff valve and detach coolant hoses.

Installing

Installation is performed in the reverse order.

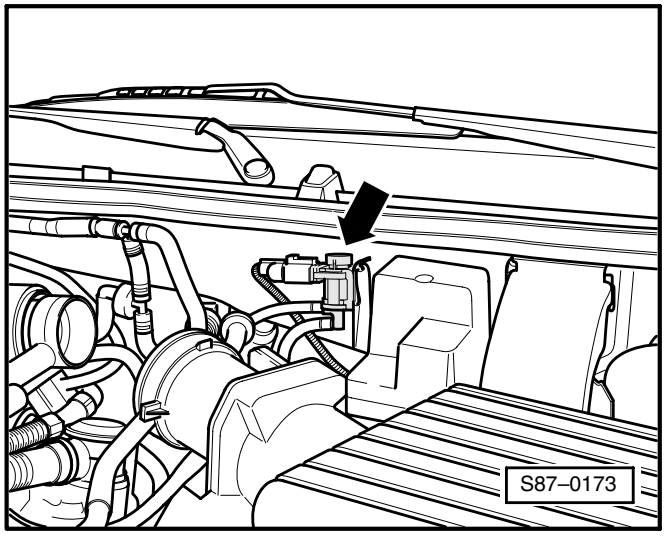
- After installing, replenish coolant and pay attention to specification of coolant additive.

⇒ Inspection and Maintenance

Two-way valve for coolant shutoff valve -N147-

Models with mapped cooling

Testing



◄ - Unplug connector at valve -arrow-.

- Measure resistance between the contacts of the valve.

  Specification: 31 ... 39 Ω

If the specification is not achieved:

- Replace valve.

If the specification is achieved:

- Inspect wiring according to current flow diagram, repair if necessary.

⇒ Current Flow Diagrams, Electrical Fault Finding and Fitting Locations binder

If the wiring is o.k.:

Models without air conditioning and models with air conditioning with manual control

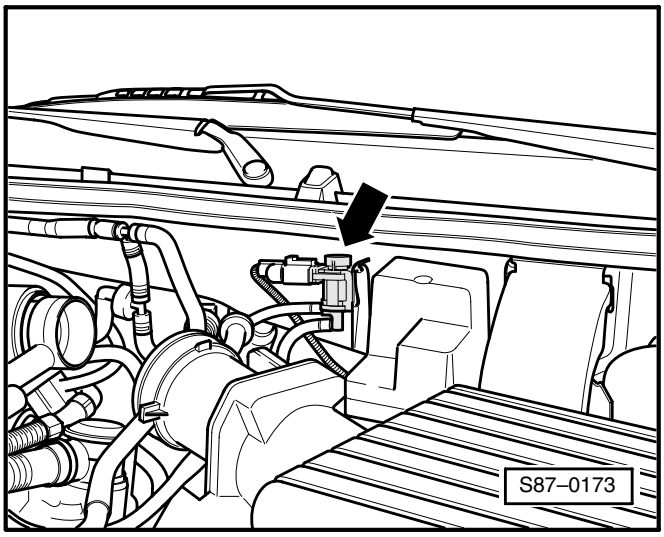
- Test heater controls

⇒ Current Flow Diagrams, Electrical Fault Finding and Fitting Locations binder; replace if necessary ⇒ page 80-7.

Models with Climatronic

- Test Climatronic control unit ⇒ page 87-51 (interrogate fault memory); replace if necessary ⇒ page 87-79.

Removing



◄- Unplug connector at valve -arrow-.

- Detach vacuum hoses from valve.

- Release valve and take out.

Installing

Installation is performed in the reverse order.

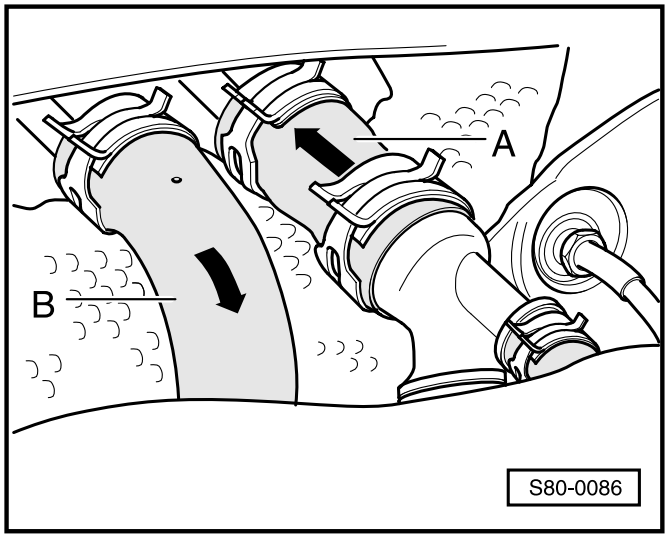
Removing and installing heater unit

- Remove dust and pollen filter together with housing ⇒ page 80-16.

- If radio set equipped with anti-theft coding, determine coding.

- Disconnect battery.

- Release pressure in coolant circuit by opening the cap at the coolant expansion reservoir.



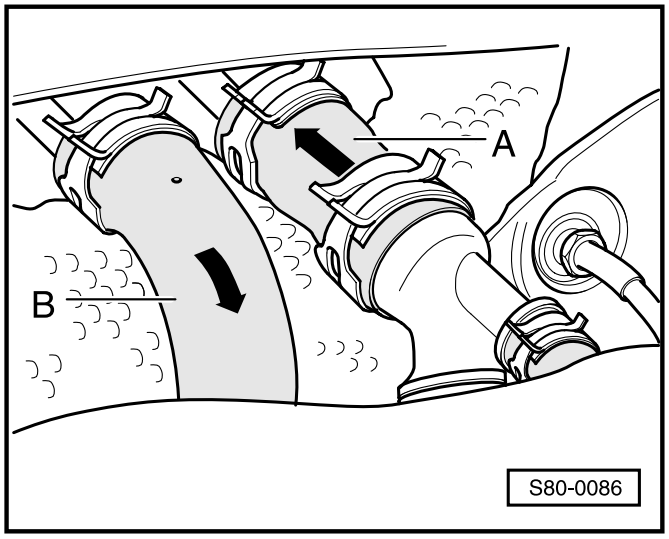
◄ - Pinch off both coolant hoses to the heat exchanger of the heating system (e.g. with V.A.G 3094) and take off.

Notes:

♦ *Connect the coolant hoses the right way round:*

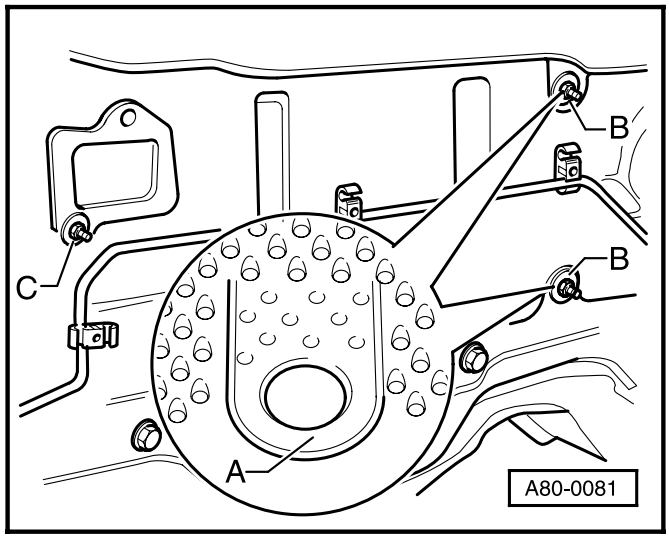
- *Coolant hose -A- feed from cylinder head*

- *Coolant hose -B- return flow to water pump*



♦ *Bleed coolant circuit.*
⇒ Engine, Mechanical Components; repair group 19

◄ - Place container below the connection for the hose -B- and carefully blow the coolant out of the heat exchanger through the connection for hose -A- (using compressed air).



◄ - Fold up the pre-punched points -A- of the heat insulating mat and remove the hexagon nuts and washers -B- located behind (tightening torque 15 Nm).

- Remove hexagon nut and washer -C-.

Note:

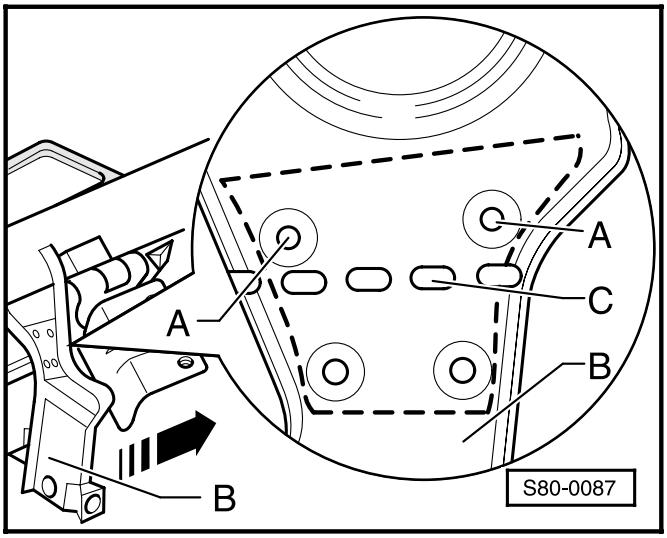
A seal should be fitted at the washers of the hexagon nuts.

- Remove dash panel.
⇒ General Body Repairs; repair group 70

- Remove footwell vent ⇒ page 80-15.

- Remove front passenger airbag unit.
⇒ Electrical System; repair group 96

- Cover over all opened connectors and air guide ducts of the heater unit to prevent any swarf in getting in.

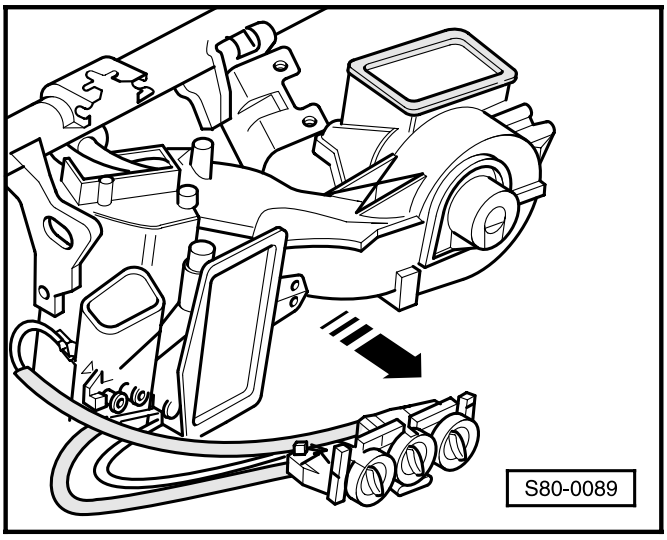


◄- Drill off support for the dash panel with a 7 mm drill at the points marked with -A- (connection points).

- Bend part -B- of support at the specified breaking point -C- to the side in direction of arrow.

Note:

After installing heater unit, bend back part -B- into its original position and bolt the shaped section marked with broken lines to the holes -A- (e.g. M 6 x 10).

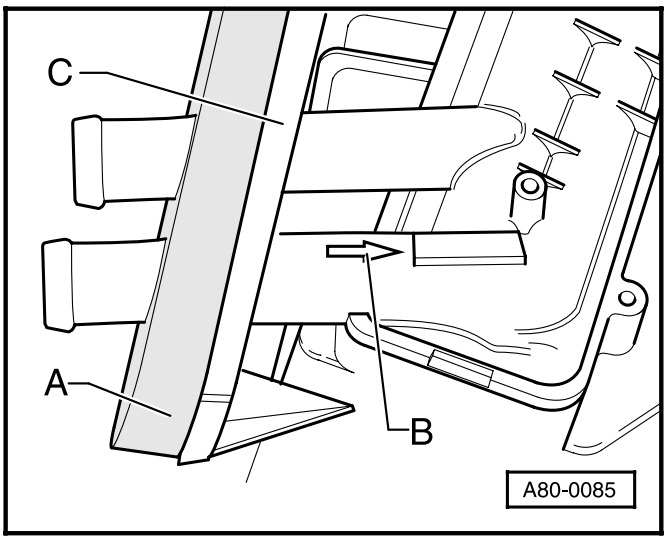


- Separate electrical connection between car and heater unit (plug connection and bolted-on earth cable at A pillar).

◄- Remove heater unit in direction of arrow.

Notes re installing:

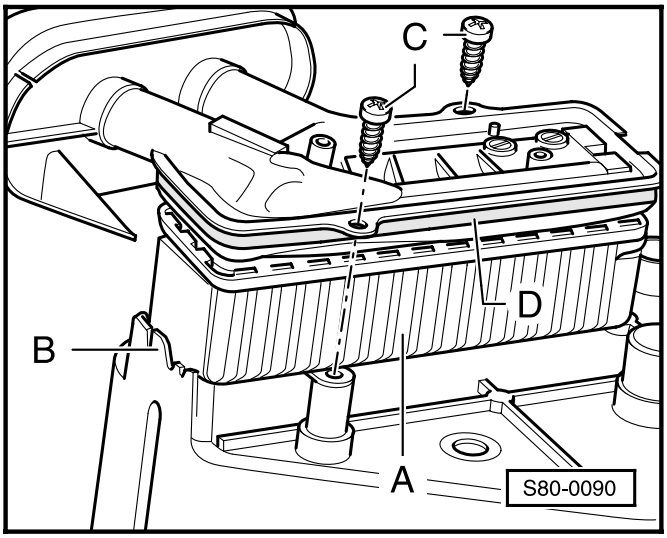
- *Inspect all the seals and gaskets on heater unit for signs of damage before installing and replace any damaged seals and gaskets.*
- *When inserting the heater unit, inspect the seal at the intake duct; it should be making contact with the body.*



◄♦ *Replace gasket -A- at heat exchanger and ensure it is correctly located at the contact surface -C-.*

- *The flow direction of the coolant is indicated on the connection of the heat exchanger (arrow -B-).*
- *All the cable straps which have to be taken off for removing the heater unit, should be fitted on again at the same point after assembly.*

Removing and installing heat exchanger of heating system

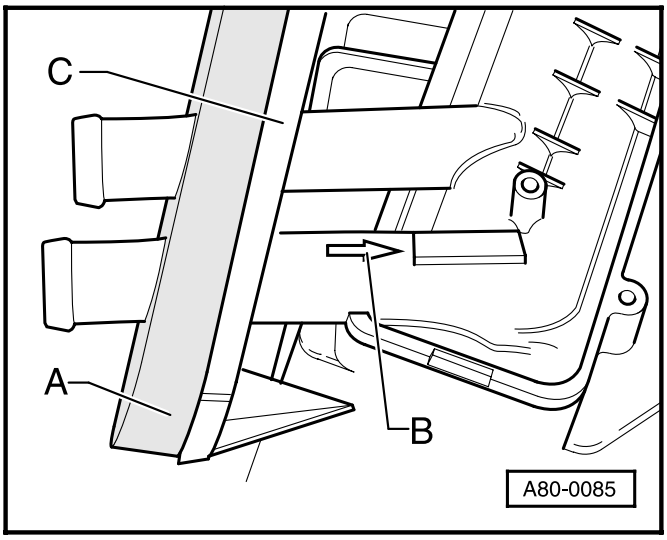


- Remove heater unit ⇒ page 80-17.

◄ - Push back catches -B- and pull the heat exchanger -A- out of the heater unit.

Notes:

- *If the heat exchanger does not engage properly when being installed in the heating flap box, it should be attached with 2 suitable screws -C- (e.g. 3.2 x 20 mm self-tapping screws).*
- *Ensure that the gasket -D- is correctly installed; it must not be visible after installation.*



◄ ♦ *Replace gasket -A- and ensure that it is correctly installed at the contact surface -C-.*

- *The flow direction of the coolant is marked at the connection of the heat exchanger (arrow -B-).*

Safety precautions when working on vehicles with air conditioning and when handling refrigerant R 134a

The components and the pipe system of the air conditioning are filled with the refrigerant R 134a (Tetrafluorethane CH_2F-CF_3). This refrigerant will also be familiar from the trade designations H-FCR 134a or SUVA 134a available from Dupont (other trade designations may be common in other countries).

Observe the following safety precautions in respect of refrigerant R 134a (additional precautions and regulations may apply in individual countries):

Should it be necessary to drain the refrigerant circuit for carrying out repairs to the vehicle, hand over the vehicle to an air conditioning service centre workshop!

Reason:

Only service centre workshops have available the suitable service stations in order to professionally extract the refrigerant.

If the refrigerant circuit is opened in a service centre workshop, avoid any contact with liquid refrigerant or with refrigerant vapours. Should refrigerant flow out despite observing all the necessary safety precautions, do not inhale the gas/air mixture which is produced. For this reason, always switch on the extraction facilities available and protect your hands with rubber gloves and your eyes with eye protection.

Reason:

The intensive effect of refrigerant on unprotected parts of the body produces frostbite. Refrigerant gas is heavier than air, colourless and odourless and thus displaces the oxygen present in the air without this being perceptible.

Notes:

- *It is recommended to keep a bottle of eye wash for rinsing out eyes close at hand. If liquid refrigerant gets into your eyes, rinse out your eyes thoroughly with water for about 15 minutes.*
- *After this, treat your eyes with eye drops and consult a doctor immediately even if your eyes are not painful. The doctor should be advised that the frostbite has been caused by refrigerant R 134a.*
- *If refrigerant gets onto other parts of your body despite observing all the necessary safety precautions, these should also be thoroughly rinsed with cold water immediately for at least 15 minutes.*

Work on the refrigerant circuit of the air conditioning system should only be carried out in well ventilated areas. Refrigerant must not be stored in lower-level areas (e.g. cellars) and in related exit passages or window sills.

Reason:

Refrigerant is colourless and odourless. In addition, it is heavier than air and thus displaces the oxygen. This produces the risk of suffocation in poorly ventilated areas or in assembly pits, without the persons present being able to sense the danger beforehand.

Remedy:

When working on the refrigerant circuit, ensure that there is no assembly pit, shafts or cellar entrances within a surrounding area of 5 m. Switch on the available extraction equipment.

It is not permitted to carry out any welding or brazing/soldering work on parts of the filled air conditioning system. This also applies to welding and brazing/soldering work on the vehicle if there is a risk of heating parts of the air conditioning system. When carrying out repair spray-painting, the temperature of the components in the drying oven or in its preheating zone must not rise above max. 80°C.

Reason:

The heating up of components produces a severe overpressure in the system which can result in the pressure relief valve opening. During electric welding, invisible ultraviolet rays are released which penetrate the refrigerant hoses and decompose the refrigerant.

Remedy:

Damaged or leaking parts of the air conditioning system must not be repaired by welding or brazing/soldering but should always be replaced. Extract the refrigerant from the refrigerant circuit beforehand using the service station (hand over vehicle to a service centre workshop).

Although refrigerant is not a fire hazard, it is not permitted to smoke, or to carry out welding or brazing/soldering work in an area in which refrigerant is present.

Reason:

Because of the high temperature produced by a naked flame or by hot bodies, the refrigerant gas is chemically split. Inhaling the toxic split products which are produced results in an irritating cough and in nausia.

Containers filled with refrigerant (e.g. filling cylinder of the service station) must in no account be rapidly heated or exposed to the direct rays of the sun.

On no account fill a container completely with liquid refrigerant. An adequately large expansion area (gas cushion) has to be available otherwise the container will rupture if the temperature rises, with disastrous consequences.

Refrigerant must on no account be filled into systems and containers in which air is present.

Remedy:

Evacuate systems and containers before filling with refrigerant.

Refrigerant must not be drained into the environment but must be extracted from the refrigerant circuit using an extraction or service station. The extracted refrigerant is then re-processed locally or returned to the manufacturer for disposal in conformity with environmental regulations (other or additional regulations may apply in individual countries). For this reason, handle the vehicle to a service centre workshop (such workshops have available the necessary facilities and tools).

After emptying the air conditioning system, interrupt the voltage supply to the magnetic coupling -N25- (e.g. unplug connector from A/C pressure switch -F129-).

Reason:

Interrupting the voltage supply prevents the compressor being switched on inadvertently while the refrigerant circuit is empty.

Description of the air conditioning system, inspection and repairwork

Operating principle of the air conditioning system

The temperature in the passenger compartment is determined by the heat radiated through the windows and by the heat transmitted by metal parts. It is necessary to remove part of the heat which exists in order to create comfortable temperatures on very warm days for the well being of the occupants.

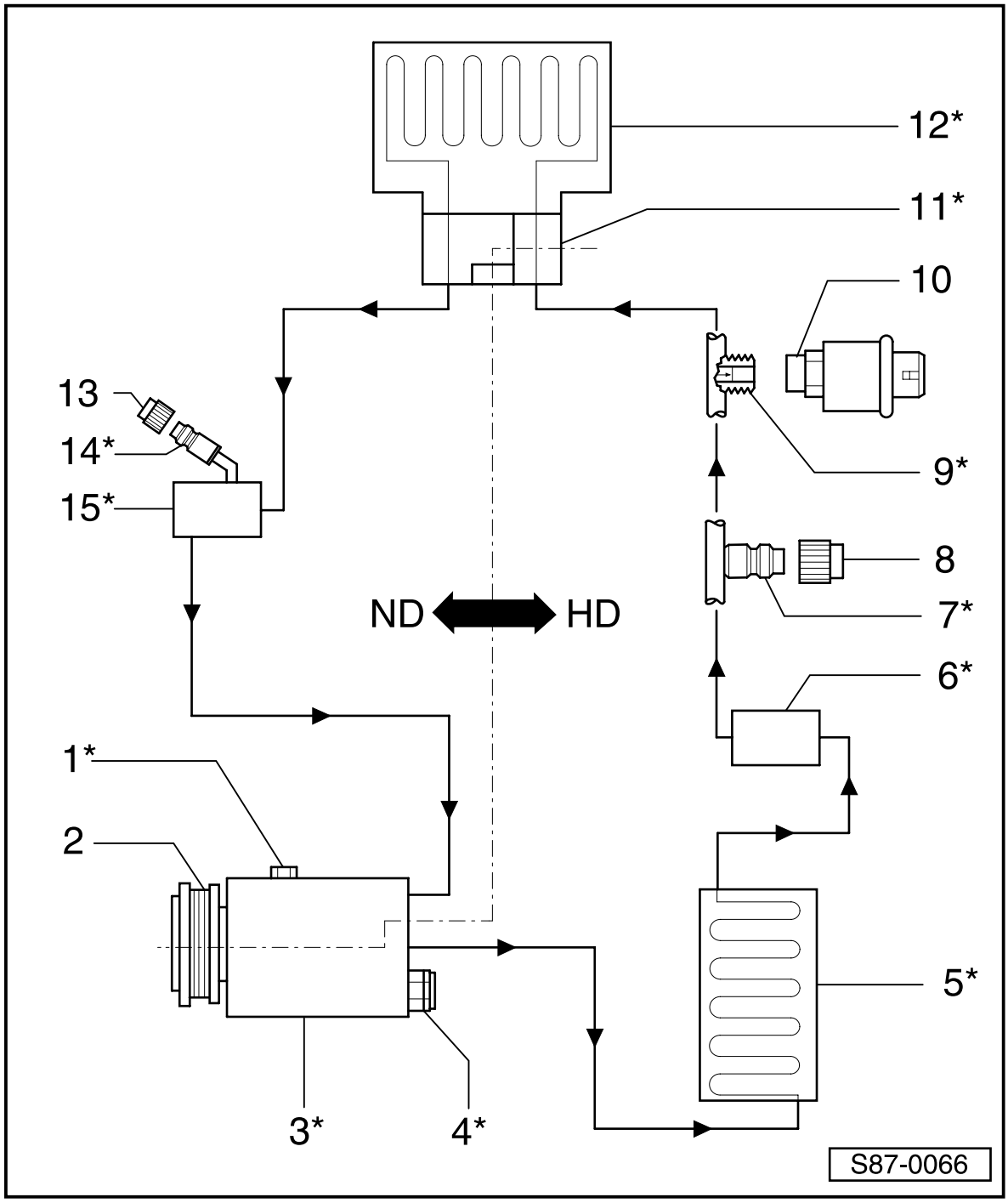
As it is known that heat flows towards colder temperature areas, a component is installed in the car which produces low temperatures, this being the evaporator. This component continuously evaporates liquid refrigerant. The heat which it requires for this is drawn from the air which flows through the evaporator.

The refrigerant gas together with the heat which it has absorbed is pumped out of the evaporator by the compressor. The compression work of the compressor increases the heat content and the temperature of the refrigerant. It is now considerably higher than the temperature of the surrounding air.

The higher-temperature refrigerant together with its heat content flows to the condenser where, because of the temperature difference between refrigerant and surrounding air, the refrigerant transfers heat through the condenser to the surrounding air and is therefore liquefied.

The refrigerant is thus a means of transporting heat. As it is needed again, it is pumped back to the evaporator.

Design of the refrigerant circuit



Note:

- *All the components of the air conditioning system marked with a * as well as all the refrigerant hoses and refrigerant pipes can be repaired or replaced only in service centre workshops for the refrigerant first of all has to be extracted with a service station.*

HD = high pressure side

ND = low pressure side

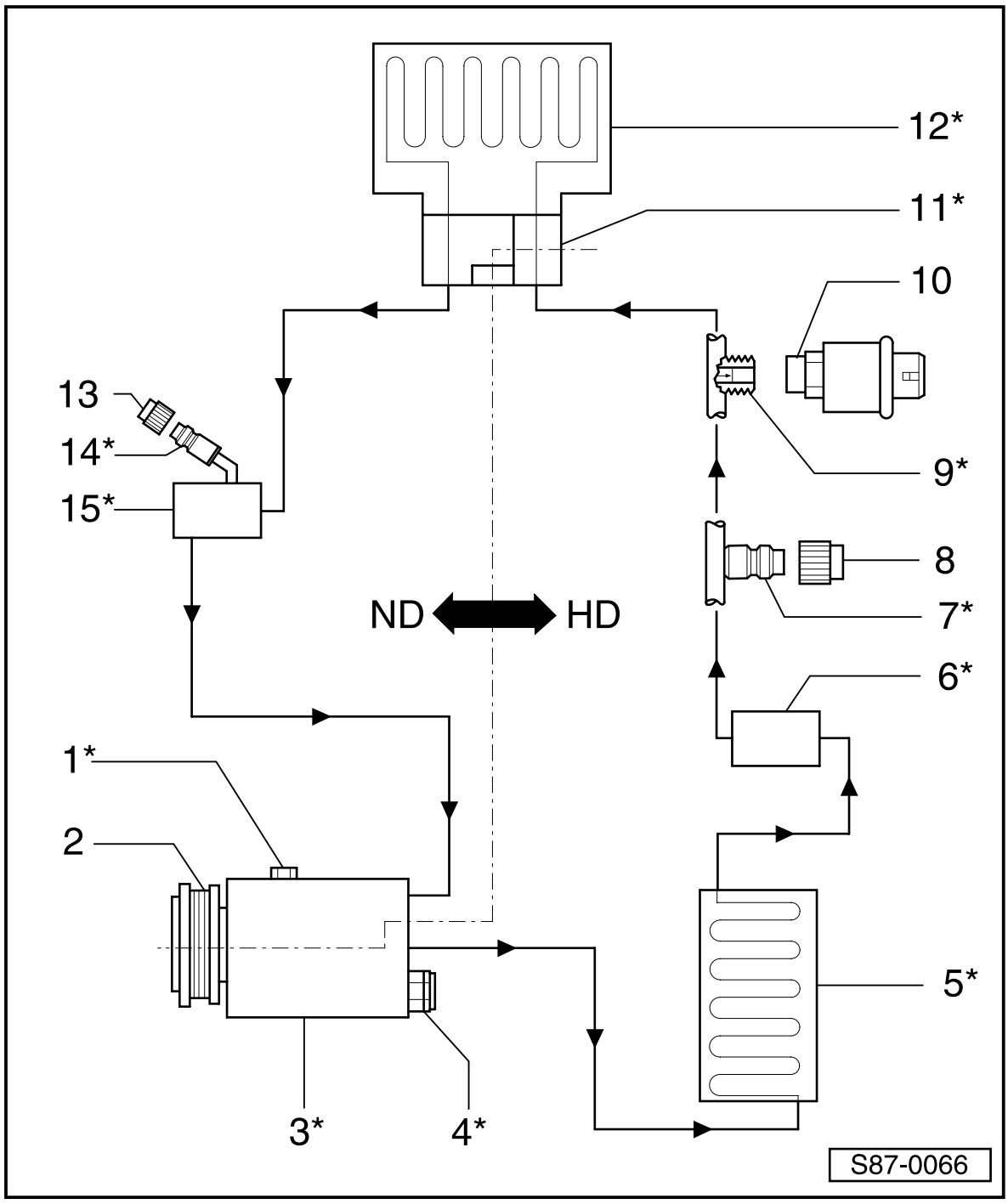
1 - Oil drain plug *

2 - Magnetic coupling -N25

3 - Compressor *

4 - Pressure relief valve *

5 - Condenser *



6 - Receiver with drier*

7 - Valve for extracting, filling and measuring*
- ♦ High-pressure side

8 - Cap

9 - Connection with valve*

10 - Air conditioning pressure switch -F129- or high-pressure sender -G65-

11 - Expansion valve*

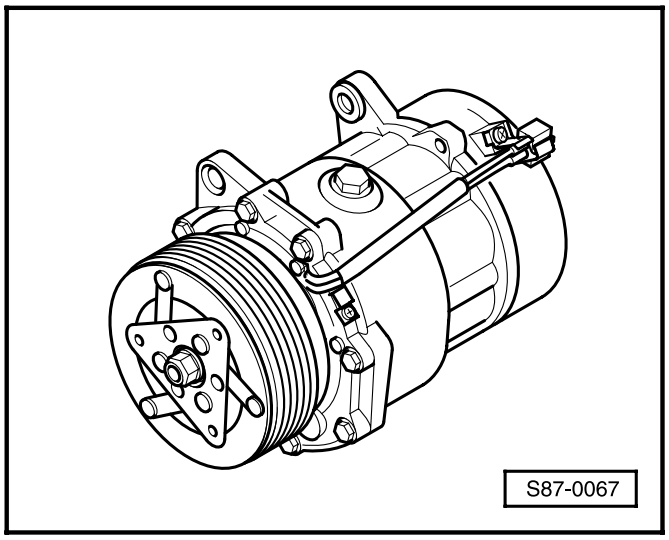
12 - Evaporator*

13 - Cap

14 - Valve for extracting, filling and measuring*
- ♦ Low-pressure side

15 - Pre-volume*

Parts of the refrigerant circuit

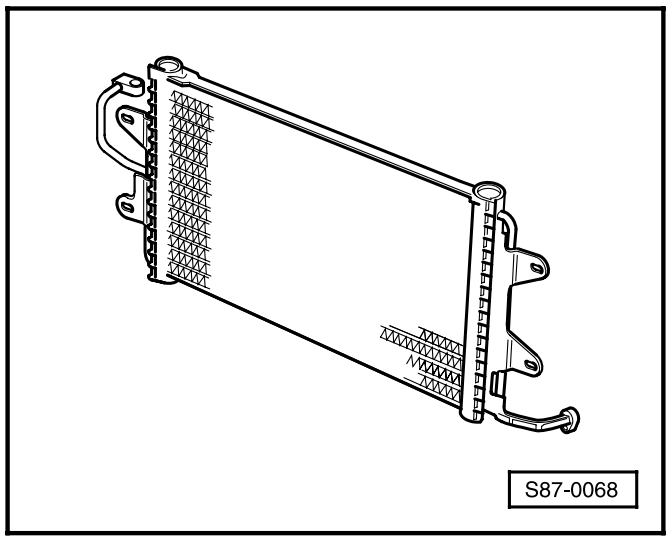


◄ **Compressor**

The compressor is belt-driven from the vehicle engine.

A magnetic coupling -N25- attached to the compressor, creates power flow between belt pulley and compressor shaft when the air conditioning is switched on.

The compressor draws in refrigerant gas from the evaporator, compresses it and passes it onto the condenser.



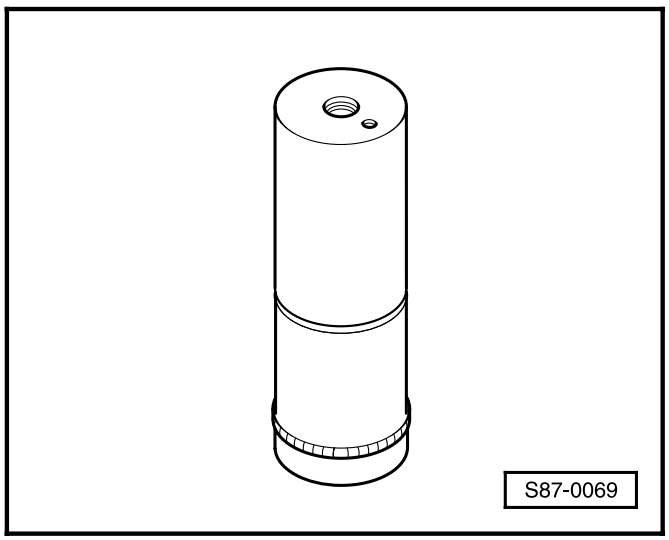
Note:

The compressor contains refrigerant oil which can be mixed with refrigerant R 134a at all temperatures.

◄ **Condenser**

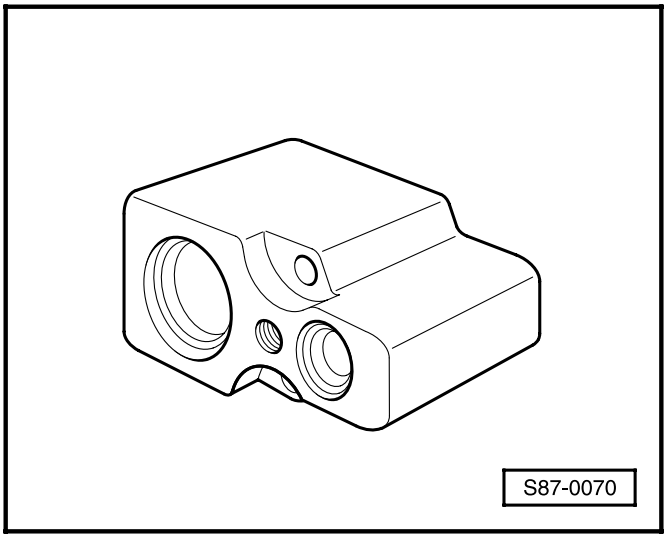
The condenser transfers heat from the compressed refrigerant gas to the surrounding air.

The refrigerant gas condenses when this is done to form a liquid.



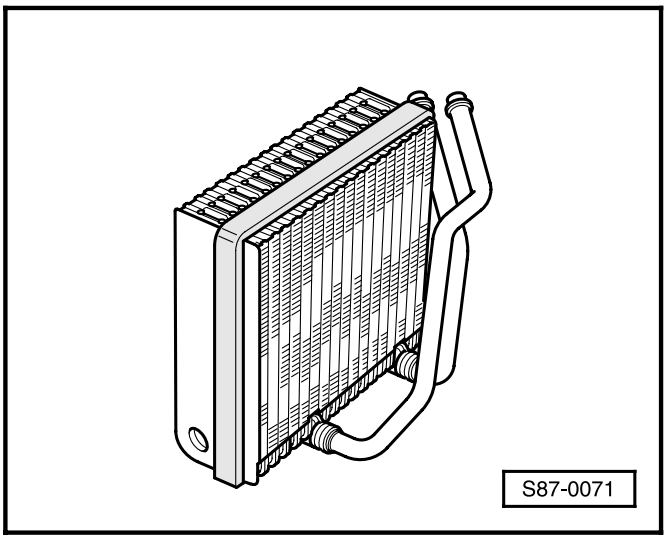
◄ **Receiver**

The receiver gathers the liquid drops and then passes them in an uninterrupted flow to the expansion valve. Moisture which has penetrated into the refrigerant circuit during removal and installation work, is absorbed in the receiver by a drier.



◄ **Expansion valve**

The expansion valve atomises the inflowing refrigerant and regulates the flow as a function of the different pressures so that the vapour, depending on the heat transport, does not become gaseous until it reaches the outlet of the evaporator.



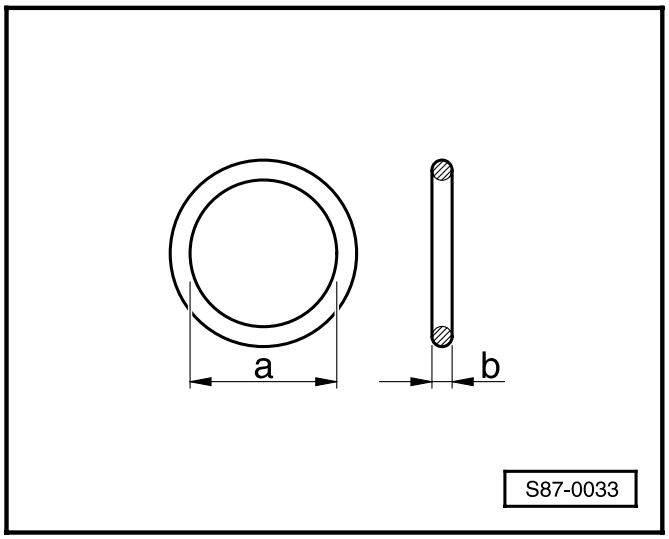
◄ **Evaporator**

The liquid refrigerant evaporates in the evaporator. The heat required for this is drawn from the air as it passes the evaporator ribs. The air cools down as this happens. The refrigerant evaporates and is drawn in by the compressor together with the heat which it has absorbed in the form of a gas.

Pipes and hoses of the refrigerant circuit

The mixture of refrigerant oil and refrigerant R 134a attacks certain metals (e.g. copper) and alloys and dissolves certain hose materials.

For this reason, use only genuine replacement parts.



◄ **O-ring seals**

These rings provide a seal at the connection points between the individual components of the refrigerant circuit.

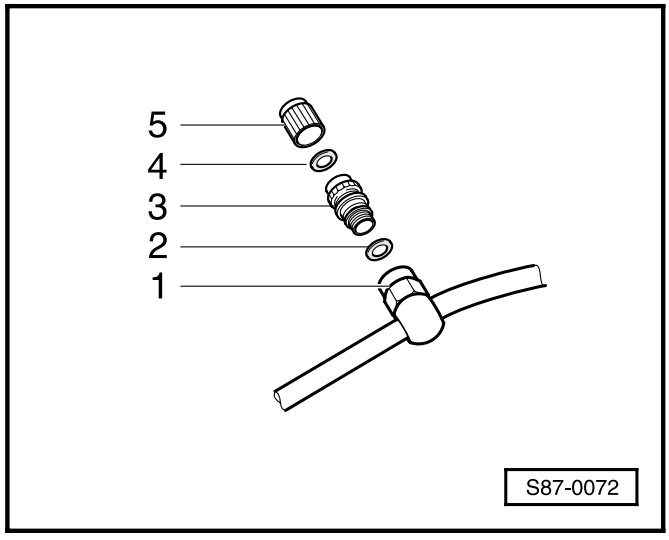
Only O-rings which are resistant to refrigerant R 134a and the related refrigerant oils, may be used.
Always use genuine replacement parts.

O-ring seals:

- Always use only once and then replace.
- Pay attention to the correct diameter -a- and -b-.
- Moisten with refrigerant oil before inserting.

Connections for quick-coupling adapters at refrigerant circuit

- Only valves and connections which are resistant to refrigerant R 134a and the related refrigerant oils, may be used.
- Different connections (outer diameter) for the high pressure and low pressure sides ensures there is no risk of mixing up the connections.
- After disconnecting the quick-coupling adapter, screw on the caps again to prevent any dirt getting in.



◄ **Connection with high pressure valve**

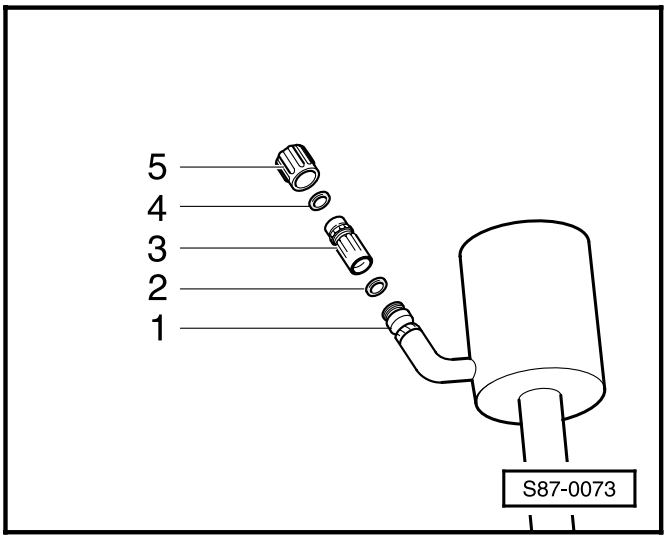
1 - Base with female thread

2 - O-ring:
10.8 mm; 1.8 mm

3 - Valve
with groove for O-ring and M8x1 female thread for cap

4 - O-ring:
10.8 mm; 1.8 mm

5 - Cap



◄ **Connection with low pressure valve**

1 - Base with male thread and groove for O-ring

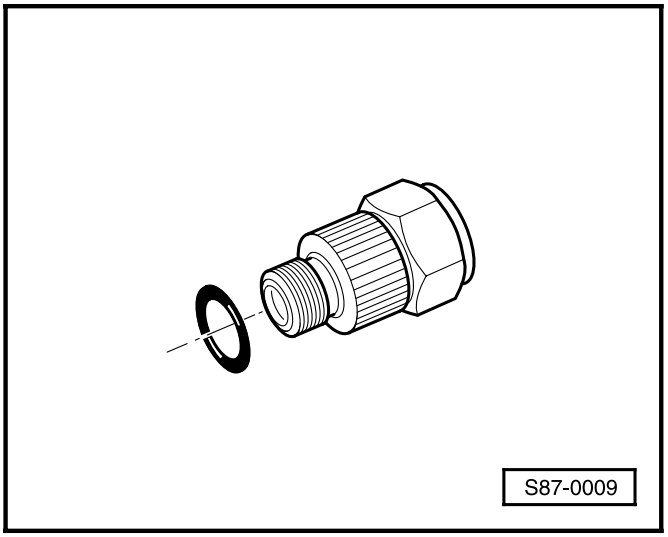
2 - O-ring:
7.6 mm, 1.8 mm

3 - Valve:
female thread for M8x1 cap

4 - O-ring for cap:
7.6 mm; 1.8 mm

5 - Cap

Parts for protecting refrigerant circuit



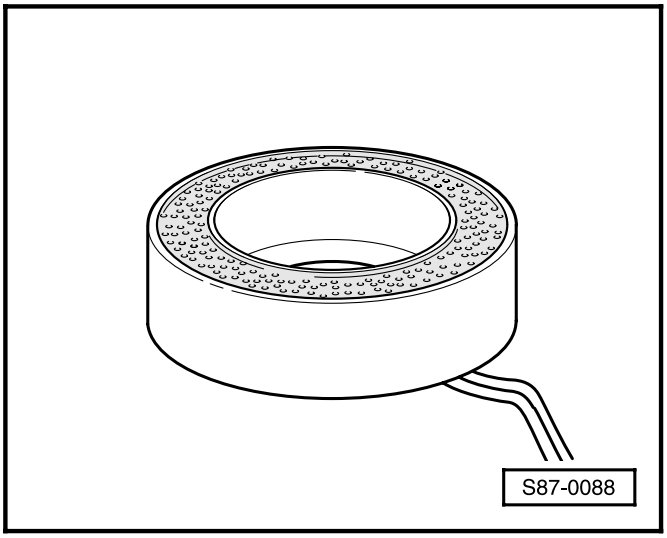
◄ **Pressure relief valve**

The pressure relief valve is located at the compressor and opens if an excess pressure exists. The refrigerant does not flow out completely. A plastic washer stuck onto the valve indicates whether the valve has opened (is pushed off).

Opening pressure: 40 ± 4 bar
Closing pressure: 32.5 bar

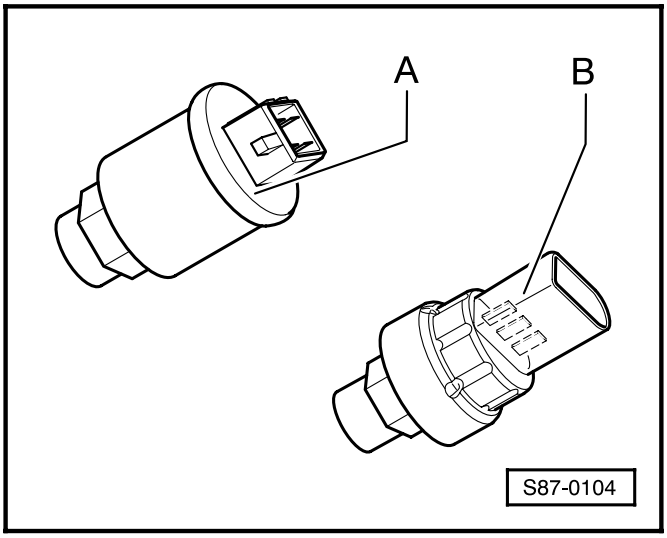
Note:

If the pressure relief valve has opened, determine the cause for the excess pressure in the system and rectify.



◄ **Coil for magnetic coupling -N25-**

- An overheating protection is installed in the magnetic coil. The overheating protection interrupts the magnetic coil as soon as the magnetic coupling is heats to an excessive extent (about 180 °C) (e.g. if the compressor is stiff).
- A protective diode is also integrated in the magnetic coil (reduces voltage peaks which may arise when the magnetic coupling is switched off).



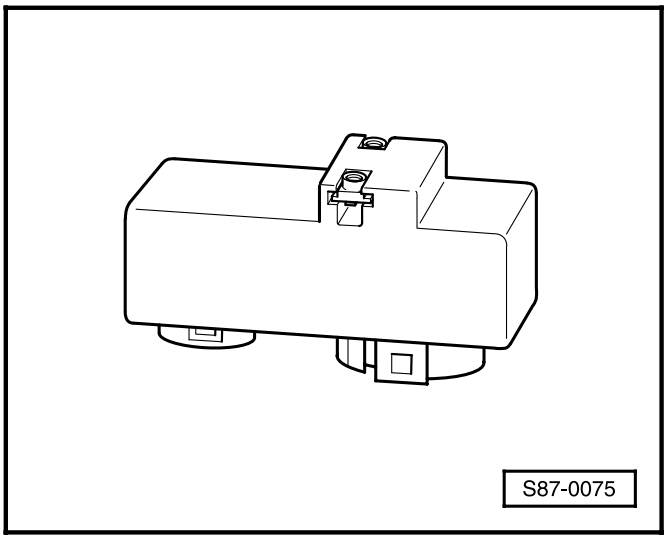
Refrigerant circuit switch

◄ **Position A: Air conditioning pressure switch -F129-**

- Switches magnetic clutch -N25- off through radiator fan control unit -J293- at a pressure of 3.2 MPa (32 bar).
- Switches magnetic clutch -N25- off through radiator fan control unit -J293- at insufficient pressure (0.12 MPa/1.2 bar), for example loss of refrigerant.
- Switches the radiator fan into stage 2 through the radiator fan control unit at a pressure of 1.6 MPa/16 bar (ensures optimal working pressures of refrigerant.

Position B: High-pressure sender -G65-

The high-pressure sender -G65- detects the pressure in the refrigerant circuit and passes on the pressures detected to the engine control unit. The latter actuates the necessary steps through the radiator fan control unit -J293-.

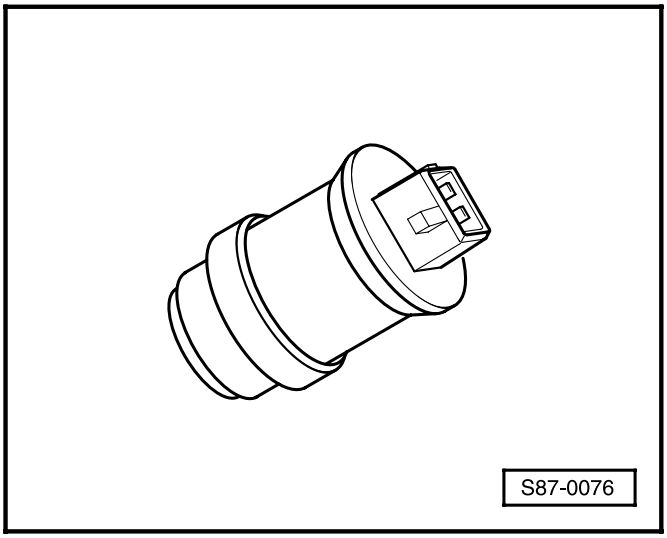


- In the event of a pressure rise in the refrigerant circuit, switches the radiator fan -V7- into the next higher stage.
- In the event of an excessively high pressure, switches off the magnetic clutch -N25- (for example if engine cooling inadequate).
- In the event of insufficient pressure, switches off the magnetic clutch -N25- (for example if loss of coolant).

◄ **Radiator fan control unit -J293-**

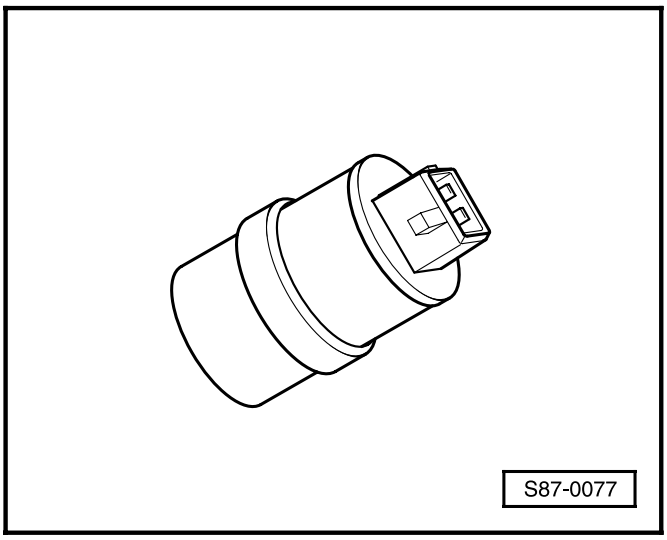
The following are operated through the control unit:

- Magnetic clutch -N25-
- Radiator fan -V7- (stages 1 and 2)



◄ **Coolant temperature overheating warning switch -F14-**

Switches the magnetic clutch -N25- off through the radiator fan control unit if coolant temperature is 119 °C, and on again at a temperature of 112 °C (engine overheating protection).



◄ **Outside temperature switch -F38-**

Switches off the magnetic coupling through the radiator fan control unit at a temperature of 2 °C and switches it on again at 5 °C (anti-icing protection for evaporator).

Properties of refrigerant R 134a

Colour

Refrigerant in the form of the vapour and liquid is colourless like water, as a gas it is invisible.

Vapour pressure

In a completely filled and closed container, vaporous refrigerant evaporates at the surface in the quantity which becomes liquid again as the vapour particles combine. This state of equilibrium is produced under pressure and is frequently termed vapour pressure. The vapour pressure is temperature-dependent.

Temperature in °C	Pressure (bar gauge)
-30	0
-20	0,3
-10	1,0
0	1,9
+10	3,1
+20	4,7
+30	6,7
+40	9,1
+50	12,2
+60	15,8
+70	20,2

Solubility of the refrigerant oil

A small quantity of the special refrigerant oil (poly-alkylene-glycol-oil) required for the compressor for lubricating cylinder walls, also flows within the refrigerant circuit and mixes with the refrigerant R 134a.

Displacement of air by gaseous refrigerant

Refrigerant gas is heavier than air and therefore spreads at floor level. It gathers in inspection pits and displaces the air which is present at such points.

Environmental compatibility

Refrigerant R 134a, to the extent that it reaches the Earth's atmosphere, contributes to an intensification of the greenhouse effect.

The greenhouse effect of refrigerant R 134a is significantly less than that of refrigerant R 12.

Toxicity

Refrigerant is non-toxic up to a temperature of 101 °C and - provided proper attention is paid to the instructions for handling refrigerant R 134a - it does not have any detrimental effects on the human body. It is odourless, does not have any irritant effect and is thus panic-proof.

Gaseous or vaporous refrigerant does not affect food and therefore does not render them toxic or unsuitable for consumption.

Reaction to plastics

Refrigerant acts as a solvent for certain plastics. Such dissolved plastics may be separated out when they cool in the expansion valve and thus block the valve.
For this reason, always use only genuine replacement parts!

Reaction to metals

In its pure state, refrigerant R 134a is chemically stable and does not attack iron or aluminium.
Impurities in the refrigerant, e.g. compounds of chlorine, can result, however, in certain metals and plastics being attacked. This can lead to blockages, leaks or deposits at the piston of the compressor.

Critical temperature/critical pressure

The refrigerant R 134a remains chemically stable up to a gas pressure of 39.5 bar (this equals a temperature of 101 °C); above this temperature the refrigerant decomposes (refer to Combustibility).

Water content

Water is soluble in liquid refrigerant only in quite small quantities. In contrast, refrigerant vapour and water vapour mix to the same ratio.

Any water present in the refrigerant circuit is transported as droplets if the drier in the receiver is saturated. Proper operation of the drier is therefore no longer assured. This water flows as far as the nozzle of the expansion valve and is transformed into ice, which in turn reduces the efficiency of the cooling system.

Water destroys the air conditioning system because acids are produced at high pressures and temperatures in combination with other impurities.

Combustibility

Refrigerant is non-combustible. In contrast, it has a fire-retardant or fire-extinguishing effect. Refrigerant is decomposed by flames and glowing surfaces. Refrigerant is also split by UV light (as produced during electric welding). In this case, toxic split products (fluorocarbon and traces of carbonyl fluoride and fluorine) are produced, although the irritation of the mucous membranes does provide sufficient and timely warning.

Filling factor

A vapour space has to be present within the reservoir. The liquid expands as the temperature rises and the space filled with vapour becomes smaller. At a certain point in time there will only be liquid present in the reservoir. After this moment, only a slight rise in temperature is sufficient to produce very high pressures in the reservoir because the liquid wishes to expand further but there is no more space available for this. The forces which are produced in such a case are sufficiently large to cause the reservoir to burst. To ensure that the reservoir is not overfilled, specifications are laid down in the compressed gas recirculations in respect of how many kilograms of refrigerant may be poured in for each litre of internal volume of the reservoir. This “filling factor”, multiplied by the inner volume, produces the permissible filling capacity, this being 1.15 kg/ltr. in the case of refrigerant R 134a.

Detection of leaks

The refrigerant circuit may develop a leak, for example as a result of external damage. Detecting minor leaks is only possible using an electronic leak detector, because of the small quantity of refrigerant which flows out.

Properties of the refrigerant oil

An oil with special properties also circulates in the refrigerant circuit for lubricating the compressor.

The principal properties are the high solubility with refrigerant, good lubrication properties, freedom from acids and absence of moisture.

The poly-alkylene-glycol (PAG) oils which are suitable for the refrigerant R 134a, are highly hygroscopic (water-absorbent) and cannot be mixed with other oils. For this reason, any opened containers should be sealed again immediately to prevent moisture getting in. Refrigerant oil ages as a result of moisture and acids, becomes dark, viscous and aggressive to metals.

Notes:

- *None of the oils used for refrigerant circuits containing refrigerant R 12 may be used for refrigerant circuits filled with refrigerant R 134a*
- *Because of its chemical properties, the refrigerant oil must not be disposed of together with engine oil or gear oil. Refrigerant oil has to be disposed of separately as toxic waste.*

Important information regarding work on refrigerant circuit

- Never pour refrigerant R 12 into an air conditioning system designed for refrigerant R 134a. Likewise, do not pour refrigerant R 134a into air conditioning systems which use refrigerant R 12 because materials of the components used in the respective circuits are matched to the relevant refrigerant.
- In the same way, the refrigerant oils developed for refrigerant circuits operating with R 134a and R 12, must not be mixed.
- The components of the refrigerant circuit for refrigerant R 134a are identified by the inscriptions on green stickers or are designed to eliminate any risk of confusion with components for refrigerant R 12 (e.g. different thread).
- On no account may different refrigerants be mixed with each other.
- Keep the workbay and all tools clean.
- Wear eye protection and protective gloves when handling refrigerant and nitrogen.
- Switch on the available extraction equipment.
- Use only the service station to drain the refrigerant circuit and do not open screw unions or replace faulty components until this has been done.
- Seal open components and hoses immediately airtight with caps to prevent moisture and dirt getting in.
- Use only materials and tools which have been designed for refrigerant R 134a.
- Seal opened containers of refrigerant oil immediately to protect the oil from moisture.
- Blow through the refrigerant circuit with compressed air and nitrogen if:
  - moisture or dirt have got into the refrigerant circuit (e.g. after an accident),
  - the refrigerant oil is dark and viscous,
  - too much refrigerant oil is present in the circuit after changing the compressor,
  - the compressor has to be replaced because of an “internal” damage (e.g. noisy or no capacity).

- O-ring seals
  - Use only seals which are resistant to refrigerant R 134a and to the relevant refrigerant oil
  - Use seals only once
  - Oil with refrigerant oil (PAG oil) before installing
  - Pay attention to the correct inner diameter
- When blowing through components with compressed air nitrogen, always extract the gas mixture which flows out of the components with suitable extraction equipment (workshop extraction equipment).
- After completing repairwork, screw the caps onto the filler valves.
- The refrigerant circuit must not be purged with purging product R 11.
- Do not add any refrigerant to a filled refrigerant circuit (if it is unclear how much refrigerant is already in the circuit, empty system, evacuate and re-fill).

Detecting leaks in refrigerant circuit with leak detector

Notes:

- *Minor leaks in a circuit containing refrigerant R 134a can only be detected with special leak detectors (e.g. V.A.G 1796).*
- *Carry out leak detection in accordance with the instructions for use of the equipment available from the trade.*
- *If the refrigerant circuit is completely empty, pour in about 100 g refrigerant before carrying out leak detection work.*

Service station for draining, evacuating, filling and for measuring pressure of refrigerant circuit

When carrying out repairs to the refrigerant circuit, it is necessary to open the circuit. Beforehand, the refrigerant has to be properly extracted, and the refrigerant circuit filled again after repairs are being completed.

Special equipment is available from the trade for refrigerant R 134a for such operations, e.g. V.A.G 1770 and V.A.G 1771.

The adapters required to connecting the service stations to the refrigerant circuit should be included with the parts supplied with the service station.

All essential information regarding working with the service station is contained in the relevant operating instructions.

There are service stations which clean the extracted refrigerant and use it again for filling the system.

The extracted refrigerant must not be used for filling the system if

- a compressor damage exists (with the exception of leaks and external damage),
- dark, sticky deposits are found in the circuit,
- any doubts exist regarding the composition of the extracted refrigerant.

Draining

The refrigerant circuit should be drained if

- parts of the refrigerant circuit are to be removed,
- doubts exist regarding the quantity of refrigerant in the circuit,
- safety measures necessitate this.

Evacuating

Before the empty refrigerant circuit can be filled, it must be evacuated, in other words all the air eliminated.
Moisture is also withdrawn from the circuit during this process.

The pressure gauge of the service station must indicate an absolute pressure of 10 mbar (= 0.990 bar vacuum) and hold this at a constant level for at least 1 hour after the service station is switched off. In this case, the refrigerant circuit is leaktight and can be filled.

Note:

If the pressure changes during this time, there is either a leakage in the refrigerant circuit or residues of moisture or refrigerant are still present in the circuit.

Remedy

- Pour 100 g of refrigerant into the circuit and find the leak point with a leak detector and rectify.
- Once again evacuate the refrigerant circuit and repeat the pressure test.

The refrigerant circuit must not be filled until the vacuum remains constant.

Filling system

Capacity of refrigerant R 134a ⇒ page 87-20, Capacities

The quantity of refrigerant oil which was extracted should be filled into the system again. This instruction applies only in the case where no other components except the receiver was replaced or the refrigerant circuit was not cleaned with compressed air and nitrogen ⇒ page 87-18, Cleaning refrigerant circuit with compressed air and nitrogen.
Capacity ⇒ page 87-20, Capacities.

Test operation of the air conditioning system and test pressures in the refrigerant circuit as necessary.

Measuring pressure

Appropriate adapters are required for the connection of the pressure gauges to the high and low pressure sides (extraction and filling valve).

Cleaning refrigerant circuit with compressed air and nitrogen

- Compressed air and nitrogen should be used in order to be able to force out moisture and other impurities as well as aged refrigerant oil as cleanly as possible, with the minimal loss of refrigerant and without polluting the environment.
- First of all, blow out old refrigerant oil and dirt using compressed air and then remove the moisture from components by injecting nitrogen.
- Compressed air and nitrogen cannot blow through the compressor and the expansion valve.
- Always blow through components in the opposite direction of the flow of the refrigerant.
- Use the appropriate adapters for connecting the pressure hose to the refrigerant circuit.
- The refrigerant circuit should be first of all cleaned with compressed air and then with nitrogen if
  - dirt or other impurities are present in the circuit,
  - the vacuum gauge does not indicate a constant readout when evacuating a leaktight refrigerant circuit (moisture is present in the circuit and builds up pressure),
  - the refrigerant circuit was open beyond normal removal and installation time (e.g. following an accident),

- pressure and temperature measurements in the circuit indicate that there is likely to be moisture in the circuit,

- uncertainty exists regarding the quantity of refrigerant oil in the refrigerant circuit,

- the compressor had to be replaced because of an internal damage (e.g. noisy or no capacity).

Important!

Carry out work only with pressure reducers for nitrogen cylinders. The gas mixture flowing out of the components should be extracted using suitable extraction equipment.

Blowing through refrigerant circuit with compressed air nitrogen

- Connect modified filler hose with appropriate adapters to workshop compressed air system and to the component to be cleaned.

- Switch on extraction system and extract impurities and refrigerant oil with suction hose.

- Continue injecting compressed air into components until no further dirt and refrigerant oil flows out (e.g. check with absorbent paper or white cloth.

- Connect pressure reducer to nitrogen cylinder (low pressure = 2 bar gauge) and remove moisture from individual components by injecting nitrogen through nitrogen pressure hose and the appropriate adapters (extraction system must be running).

- As it is not possible to provide any accurate figures regarding the quantity of refrigerant oil which remains in the compressor, all the oil should be drained from the compressor and the compressor re-filled with refrigerant oil. The quantity corresponds to that which is present in the replacement compressor ⇒ page 87-20, Capacities.

Notes:

- *It is only possible to drain the oil from the compressor through the filler opening and the compressor therefore has to be removed.*
- *After no further refrigerant oil flows out of the compressor, rotate the compressor by hand and drain the remaining oil.*

The receiver should be replaced each time the refrigerant circuit is opened and should be kept closed for as long as possible in order to minimise the amount of moisture absorbed in the drier.

Capacities

Refrigerant circuit

750^{+50} g refrigerant R 134a

Note:

When filling refrigerant circuit, always fill up to the upper tolerance limit (refrigerant remains in the filling hoses).

Refrigerant oil

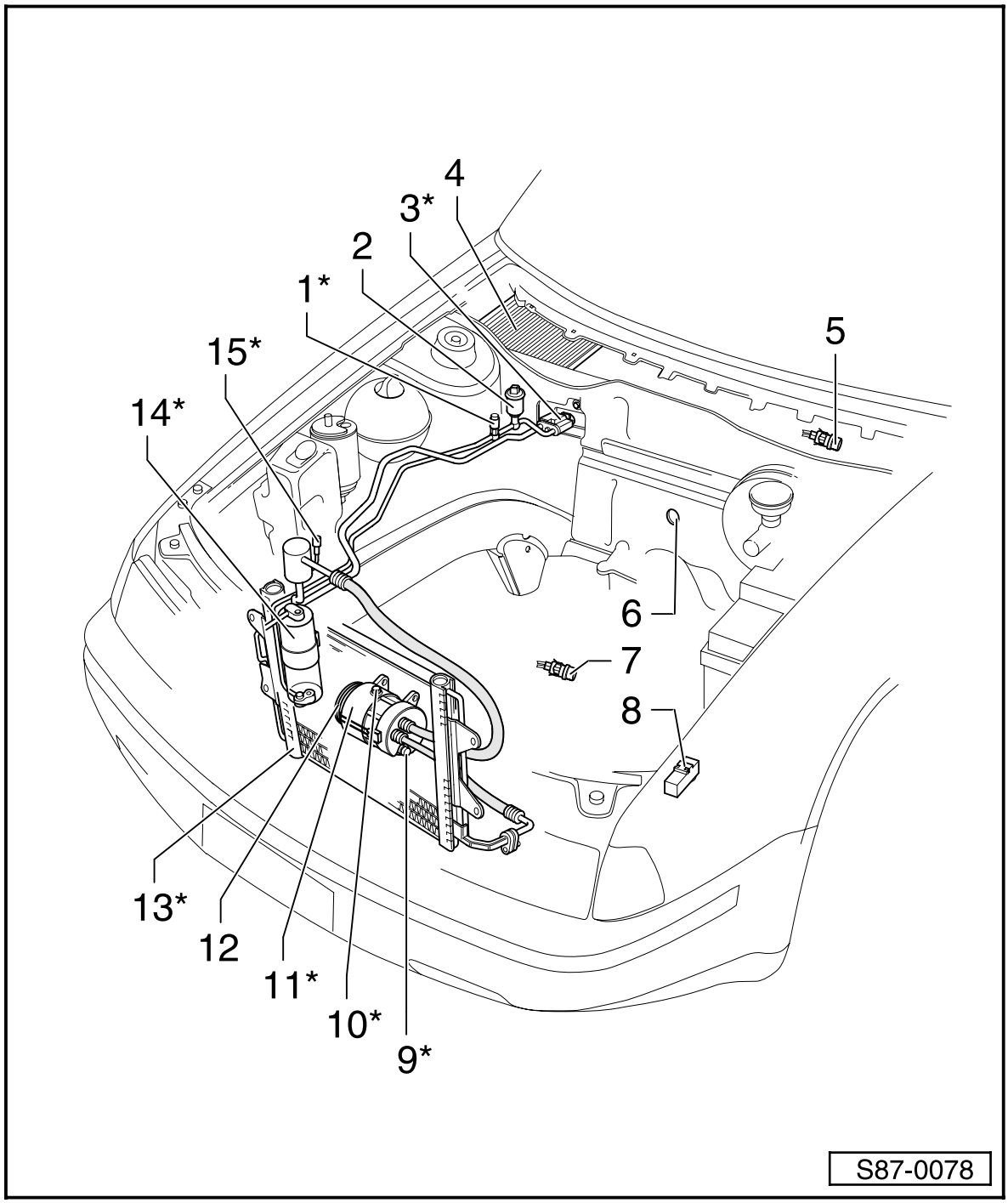
For Sanden or Zexel compressor: 135 ± 15 cm^3 PAG oil
(Order No. G 052 154 A2).

Oil distribution

The oil which was in the oil pan of the compressor before the air conditioning is first switched on, is distributed in the refrigerant circuit as follows:

Compressor	approx. 50 %
Condenser	approx. 10 %
Suction hose	approx. 10 %
Pressure hose	-
Evaporator	approx. 20 %
Receiver/drier	approx. 10 %

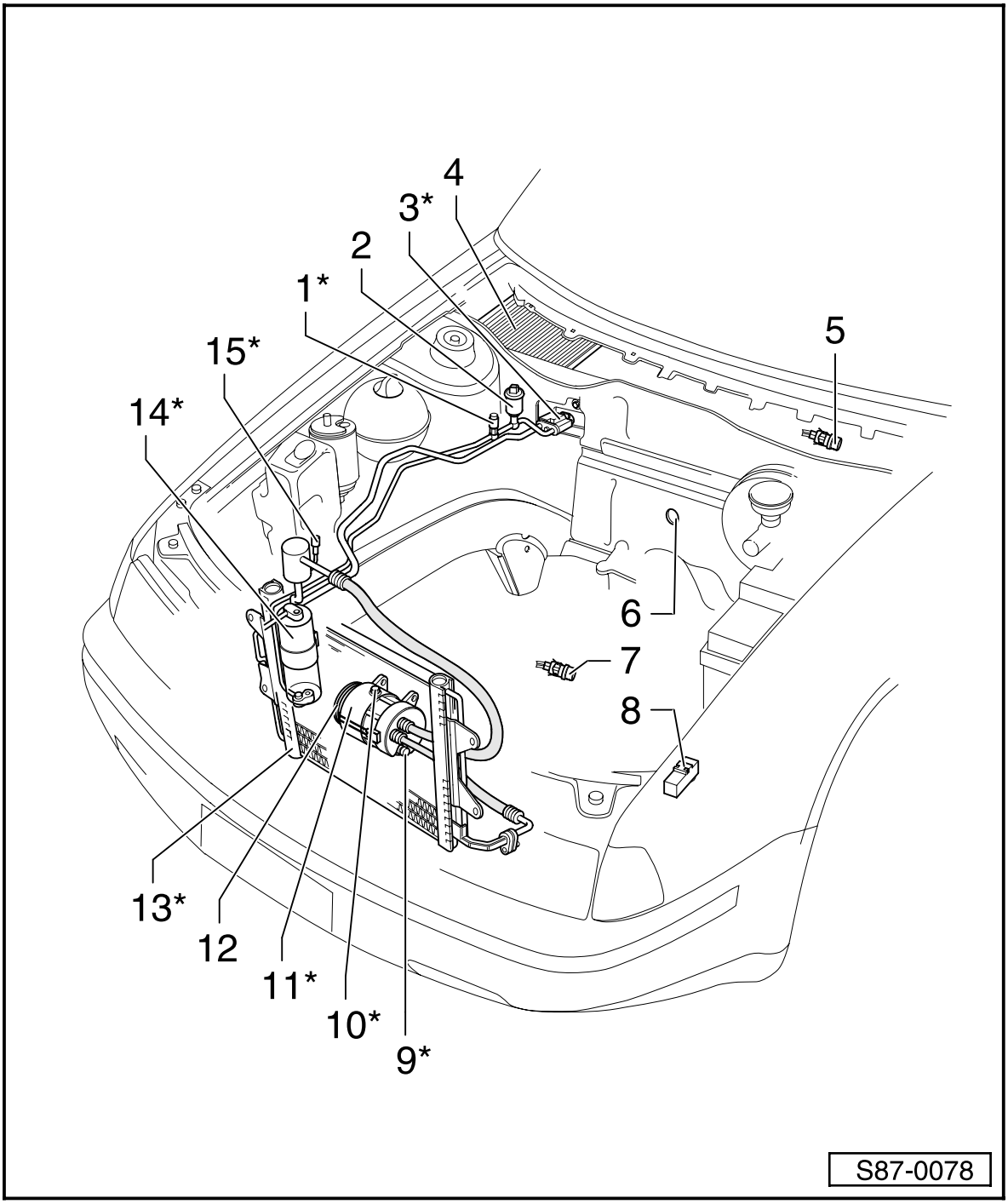
Servicing air conditioning and heating - engine compartment (manual control)



Notes:

- *All the components of the air conditioning system marked with * as well as all the refrigerant hoses and refrigerant lines can only be serviced or replaced in service centre workshops as the refrigerant has to be extracted first of all with a service station.*
- *Observe safety precautions when working on models with air conditioning system and when handling refrigerant R 134a.*
- *Pay attention to notes regarding work on refrigerant circuit.*

1 - Extraction and filling valve*
- High-pressure side
- For extracting, filling and measuring
- Always fit on cap with seal



2 - Air conditioning pressure switch -F129- or high-pressure sender -G65-

- -G65- is fitted in place of -F129- on models from Model Year 99 with 1.6-ltr./74 kW engine
- -G65- is fitted to all models as of Model Year 2000
- -F129- (4-pin plug connection), operation, removing and installing, testing ⇒ page 87-24
- -G65- (3-pin plug connection), operation ⇒ page 87-11, removing and installing, testing ⇒ page 87-25

3 - Expansion valve*

- Removing and installing heat insulation ⇒ page 87-26
- Detaching and attaching refrigerant lines ⇒ page 87-26
- Removing and installing ⇒ page 87-26

4 - Dust and pollen filter

- Below plenum chamber cover
- Removing and installing ⇒ page 80-16

5 - Ambient temperature switch -F38-

- Switches off magnetic clutch -N25- if ambient temperature is too low (off at 2 °C for models up to Model Year 99, off at 0 °C for models from Model Year 2000, on at 5 °C)
- Clipped into place in left of plenum chamber

6 - Condensation drain valve
- Testing, removing and installing ⇒ page 87-27

7 - Coolant temperature warning switch (+119 °C) -F14-
- In refrigerant circuit
- -F14- switches the magnetic clutch -N25- off if coolant temperature is excessively high (off at 119 °C, on at 112 °C)
- 1.6 l/74 kW up to MY 1998 and all models from MY 1999

8 - Radiator fan control unit -J293-
- Bolted on below battery rack
- The magnetic clutch -N25- of the compressor is also operated through this control unit

9 - Pressure blow-off valve*
- O-ring: 8.6 mm; 1.8 mm
- Tightening torque: 10 Nm
- Testing ⇒ page 87-28

10 - Oil drain plug*
- O-ring: 8.8 mm; 1.5 mm
- Tightening torque: 15 Nm

Notes:

For draining the refrigerant oil:

- *Remove compressor.*
- *Remove oil drain plug.*
- *Rotate compressor at the clutch plate of the magnetic clutch in order to accelerate draining of the oil.*

11 - Compressor*
- Removing and installing compressor bracket ⇒ Engine, Mechanical Components
- Detaching and attaching compressor at bracket ⇒ page 87-28
- Detaching and attaching refrigerant lines ⇒ page 87-29
- Removing and installing compressor ⇒ page 87-29

Notes:

- *Removing and installing ribbed V-belt.*

⇒ Engine, Mechanical Components

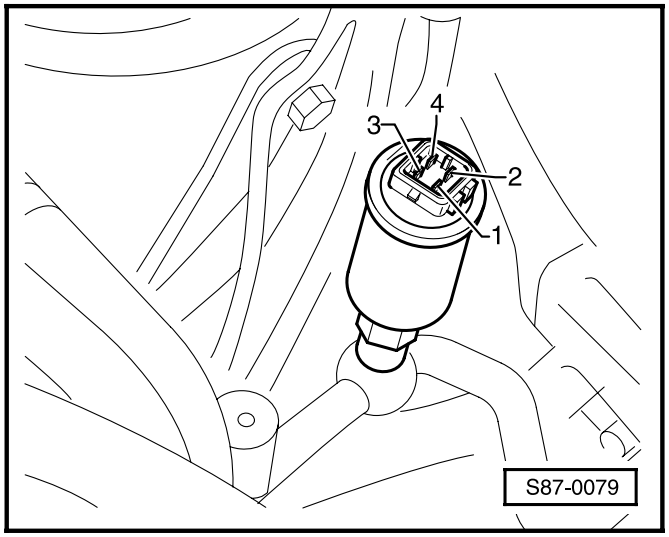
- *Mark direction of running of poly V-belt before removing; if belt is fitted on again to run in the opposite direction, it may be destroyed.*
- *The piston stroke of the compressor is variable and is set in line with the refrigerant capacity requested.*
- *If a new compressor has been installed or fresh refrigerant oil poured into the compressor (e.g. after blowing through refrigerant circuit and draining the compressor at the oil drain plug), rotate compressor about 10 turns by hand after it is installed (in order to avoid compressor damage when it is started).*

12 - Magnetic clutch -N25-
- Servicing ⇒ page 87-32

13 - Condenser*
- Removing and installing ⇒ page 87-31

14 - Receiver with drier*
- Removing and installing ⇒ page 87-30
- Replace each time refrigerant circuit is opened

15 - Extraction and filling valve*
- Low-pressure side
- For extracting, filling and measuring
- Always use cap with seal



Air conditioning pressure switch -F129-

Note:

If the vehicle is equipped with air conditioning with automatic control (Climatronic), the air conditioning pressure switch -F129- is tested by the self-diagnosis ⇒ page 87-47.

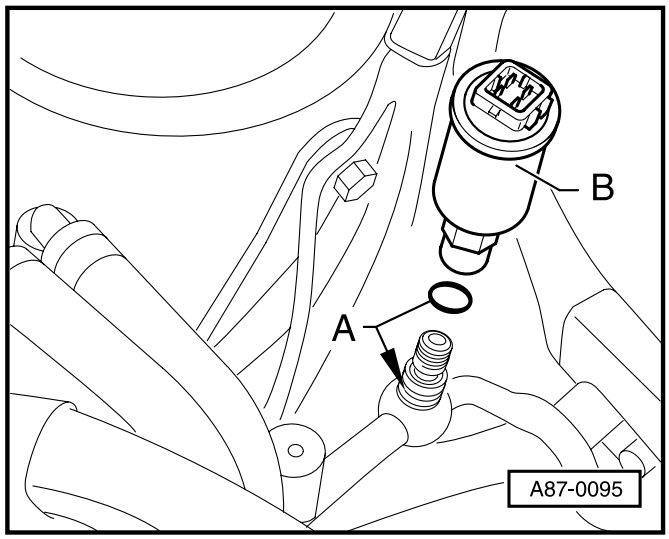
Functions

◄ ♦ Low/high-pressure switch (switch between contacts 1 and 2) switches the compressor off if insufficient or excess pressure exists in refrigerant circuit.

- Switching pressures (in bar gauge):
  - Opens at 1.2 bar (compressor off) and closes at 2.4 bar (compressor on).
  - Opens at 32 bar (compressor off) and closes at 24 bar (compressor on).

♦ High-pressure switch (switch between contacts 3 and 4) switches the radiator fan -V7- to stage 2.

- Switching pressures (in bar gauge):
  - Closes at 16 bar (fan stage 2 switched on).
  - Opens at 12.5 bar (fan stage 2 switched off).



Removing and installing

◄ - Separate 4-pin connector and remove pressure switch -B- (5 Nm).

Note:

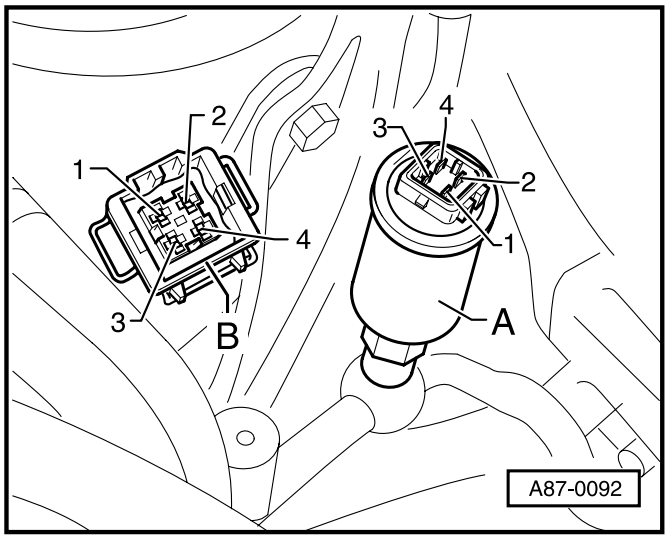
The refrigerant circuit remains closed, connection with valve.

- Replace O-ring seal -A- (10.8 mm; 1.8 m).

Testing operation:

Test conditions

- Air conditioning not operating
- Fresh air blower switch -E9- in position ”1”
- Air conditioning switch -E35- pressed (on)



◄ - Unplug connector -B- of switch -A- and bridge contacts 1 and 2 at connector -B-.

- Switch on ignition.

Notes:

- *If the magnetic clutch clicks when the ignition is switched on and off, either the pressure in the refrigerant circuit is too low (refrigerant circuit empty) or the switch is faulty.*
- *Hand over vehicle to a service centre workshop for testing the pressures in the refrigerant circuit.*

Test conditions

- Air conditioning operating
- Fresh air blower switch -E9- in position ”1”
- Air conditioning switch -E35- pressed (on)

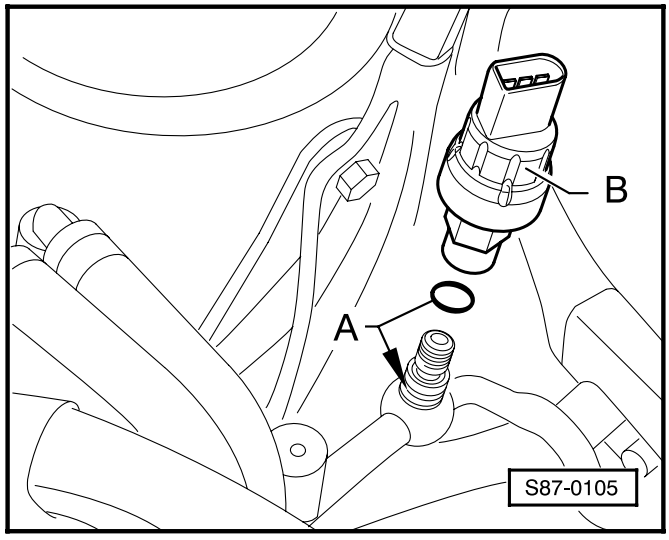
- Remove pressure switch and connect again to the wiring loom.

- Switch on ignition.

Note:

In this state, the magnetic clutch must not click, otherwise the pressure switch -F129- is faulty (although air conditioning is operating).

Air conditioning high-pressure sender -G65-



Removing and installing

◄ - Separate 3-pin connector and remove pressure switch -B- (5 Nm).

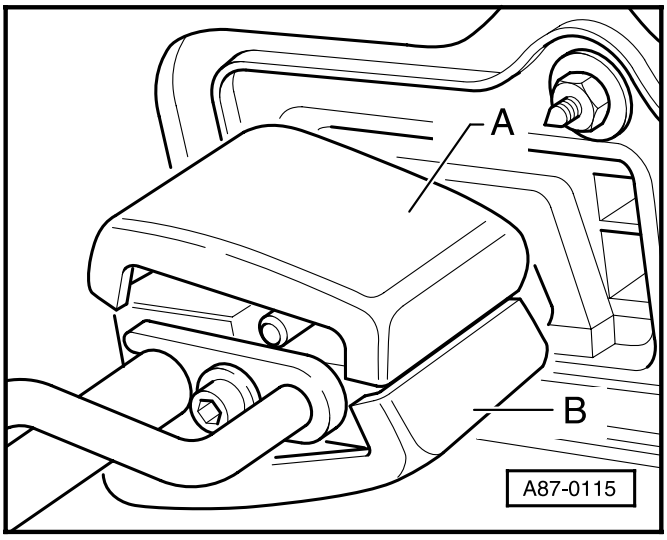
- Replace O-ring seal -A- (10.8 mm; 1.8 mm).

Note:

The refrigerant circuit remains closed, connection with valve.

Testing operation:

The high-pressure sender -G65- is the information provider for the radiator fan control unit -J293- and for the engine control unit. It can only be tested by means of the self-diagnosis of the engine control unit ⇒ 1.6-ltr./74 kW Engine, Simos 2 Fuel Injection and Ignition System, Repair Group 01, Self-Diagnosis.



Removing and installing heat insulation for expansion valve

◄- Compress the two half shells -A- and -B- of the heat insulation sufficiently until the two catches hook in place.

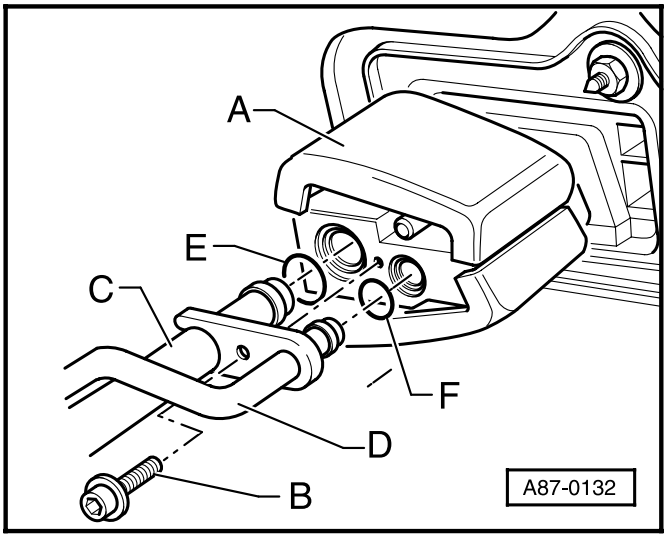
Note:

If the heat insulation is missing or is not properly installed, this can result in a reduction in the capacity of the air conditioning system (change in the set control characteristic curve as a result of radiated heat).

Detaching and attaching refrigerant lines at expansion valve

(This should only be carried out in a service centre workshop!)

- Drain refrigerant circuit.



- Remove heat insulation -A- ⇒ page 87-26.

◄- Remove screw -B- (8 Nm) and take off refrigerant lines -C- and -D-.

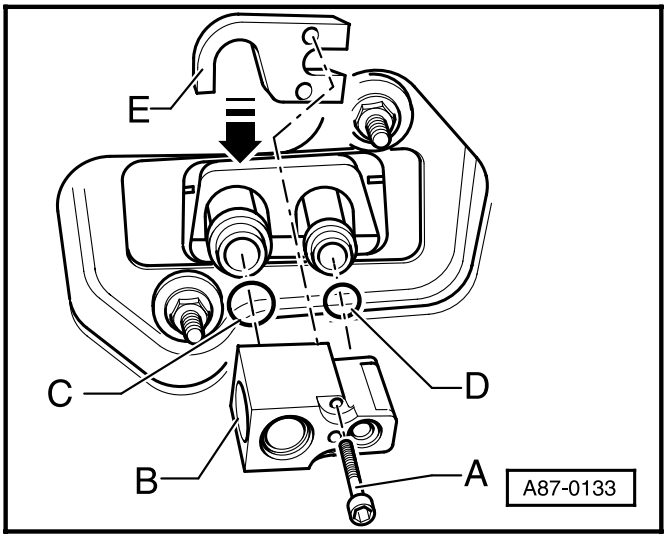
Notes:

- *Replace both O-ring seals -E- (16.7 mm; 1.8 mm) and -F- (7.6 mm; 1.8 mm).*
- *Seal open refrigerant lines and connections at the expansion valve.*
- *Install refrigerant lines free of stress.*

Removing and installing expansion valve

(This work should only be carried out in a service centre workshop!)

- Drain refrigerant circuit.



- Detach refrigerant lines at the expansion valve ⇒ page 87-26.

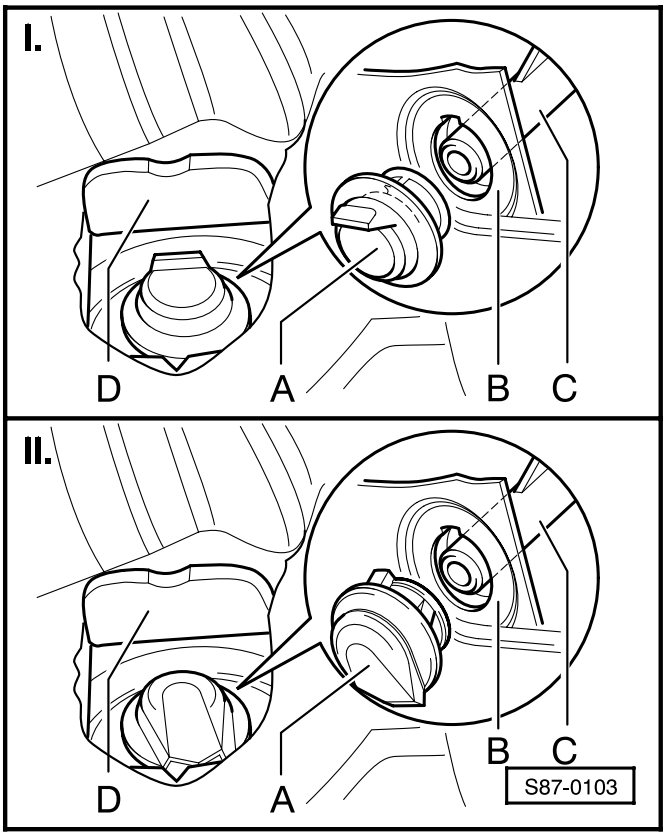
◄- Remove screws -A- (8 Nm).

- Take off expansion valve -B- and threaded plate -E-.

Notes:

- *Replace both O-ring seals -C- (14.0 mm; 1.8 mm) and -D- (10.8 mm; 1.8 mm).*
- *Seal open connections at evaporator.*
- *If the heat insulation is missing or is not properly installed, this can result in a reduction in the capacity of the air conditioning system (change in the set control characteristic curve as a result of radiated heat).*

Inspecting condensation drain, removing and installing valve



Inspecting

◄ ● **Version -I.-:**

- Condensation drain valve -A- must not be blocked by sticky residues and must close; the drain opening must be at the bottom.

● **Version -II.-:**

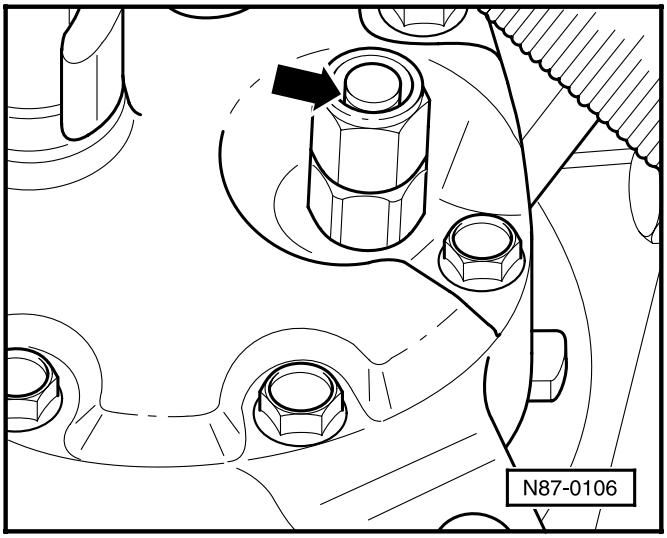
- Note: Water drain openings must not be blocked by impurities and must be positioned at the bottom.

Removing and installing

- Open flap -D- of heat insulating mat (at prestamped point) and remove condensation drain valve.

Notes:

- *Remove condensation drain valve -A- by taking down and out of floor panel; ensure it is correctly installed in the cross panel -B- when re-fitted.*
- *The condensation drain valve must not be touching the flap of the heat insulating mat -D- when installed.*
- *The condensation drain valve must not be blocked by wax or underbody sealant (version -I.-) or must not be blocked by impurities (version -II.-).*
- *If a complaint exists regarding moisture in passenger compartment, check to ensure condensation drain -C- is correctly located in the condensation drain valve -A-.*
- *If valve -A- is replaced, fit only valve of version -II.-.*



Inspecting vacuum relief valve at compressor

◄ ♦ Task: to protect the refrigerant circuit from excessively high pressures.

♦ The pressure relief valve indicates whether the valve has opened. If this is the case, a small plate stuck onto the valve -arrow- is pushed out.
In such cases, the vehicle should be handed over to a service centre workshop.

Disconnecting and connecting compressor from bracket

Notes:

♦ *After taking off compressor, attach to the compressor bracket e.g. with a wire; do not allow it to hang from the refrigerant pipes*

♦ *Do not drain refrigerant circuit and do not disconnect refrigerant hoses from the compressor.*

♦ *Mark direction of running of ribbed V-belt before removing; if belt is fitted on to run in the opposite direction, it may be destroyed.*

- Remove ribbed V-belt.

⇒ *Engine, Mechanical Components; repair group 13*

- Remove cover at bottom and separation between engine compartment and right wheelhouse.

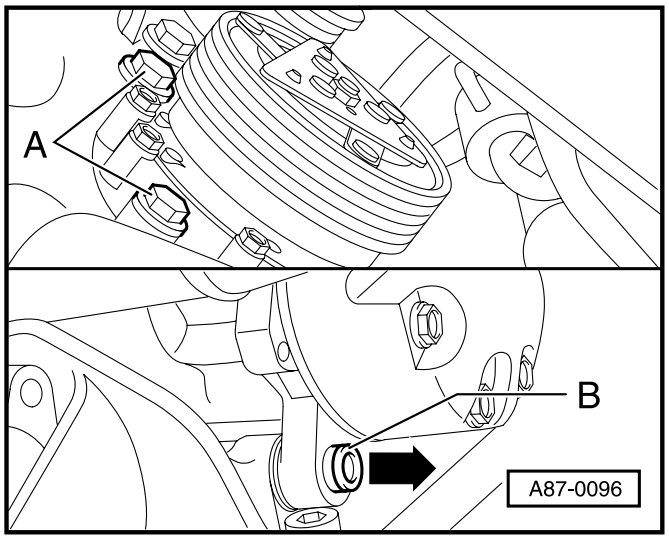
⇒ General Body Repairs; repair group 66

- Take power assisted steering pump off the bracket.

⇒ Running Gear, repair group 48

Note:

Only necessary on engines with PAS pump located at bottom (e.g. 1.6-ltr. 74 kW; 1.8-ltr. 92 kW).



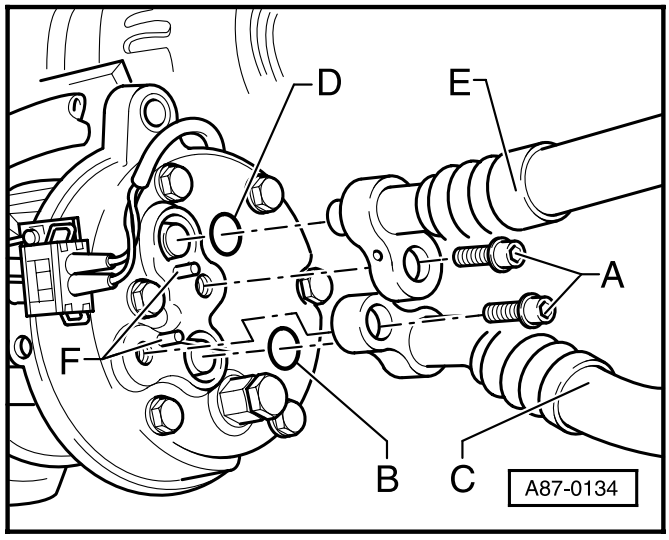
◄ - Remove bolts -A- (tightening torque 45 Nm).

Notes:

- *Push threaded bush -B- fully into the hole of the compressor before installing the compressor.*
- *When installing the ribbed V-belt, ensure that it is correctly fitted onto the belt pulley.*

Disconnecting and connecting refrigerant pipes at compressor

(Carry out only in service station workshop!)



- Drain refrigerant circuit.

◄ - Remove bolts -A- (tightening torque 20 Nm).

- Replace O-ring seals -B- (10.8 mm; 1.8 mm) and -D- (14.3 mm; 2.4 mm).

Notes:

- *The refrigerant pipe -C- runs to the condenser.*
- *The refrigerant pipe -E- comes from the expansion valve.*
- *When fitting on the refrigerant pipes, ensure the dowel pins -F- are correctly located.*
- *All opened refrigerant pipes and connections at the compressor.*

Removing and installing compressor

(Carry out only in service station workshop!)

- Drain refrigerant circuit.

- Disconnect refrigerant pipes from compressor ⇒ page 87-29.

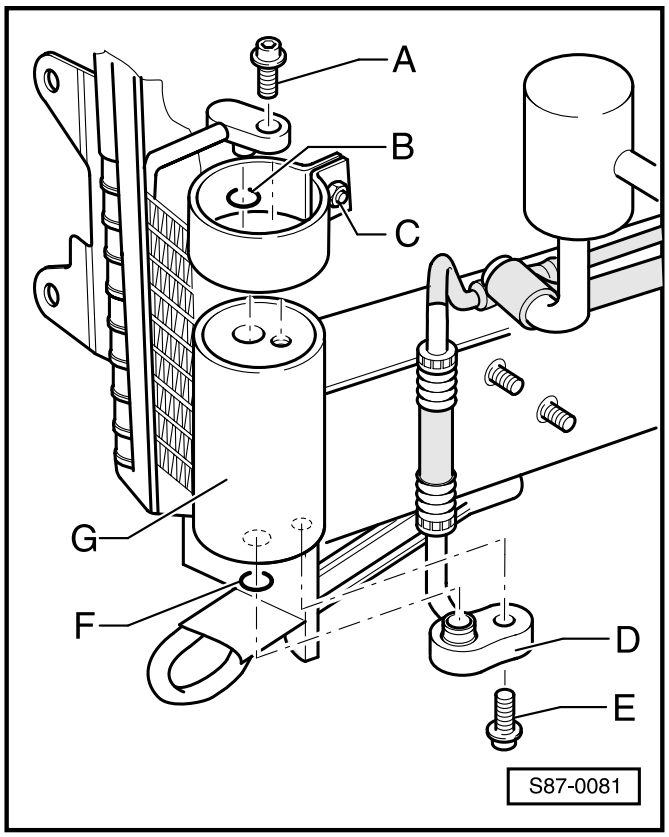
- Disconnect compressor from bracket and fit on ⇒ page 87-28.

Note:

- *Before first operating the compressor:*
  - *Rotate compressor about 10 revolutions by hand.*
  - *Start engine with compressor switched off.*
  - *Wait until idling speed has stabilised.*
  - *Only now, switch on the compressor and allow it to run at idling speed for at least 10 minutes.*

Removing and installing receiver

(Carry out only in service station workshop!)



- Drain refrigerant circuit.

◄ - Remove bolt -E- (tightening torque 15 Nm).

- Take off refrigerant pipes -D-.
- Remove hexagon nut -C-.
- Remove bolt -A- (tightening torque 15 Nm).
- Pull receiver -G- down out of its mounting.

Notes:

- *Replace both O-ring seals -F- and -B- (10.8 mm; 1.8 mm).*
- *Keep receiver closed for as long as possible. Do not remove caps until just before installing (the receiver contains a desiccant bag which will become saturated with moisture and thus unusable within a short time if the receiver is left open.*

Removing and installing condenser

(Carry out only in service station workshop!)

- Drain refrigerant circuit.

- Take condenser together with radiator off the lock carrier.

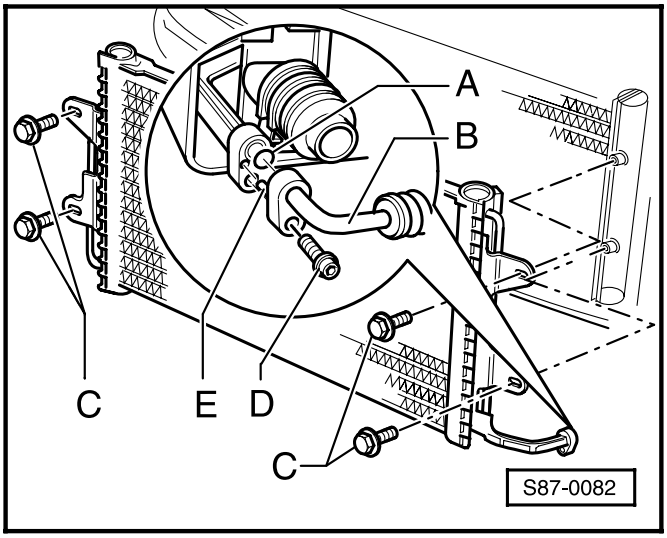
⇒ General Body Repairs; repair group 50; replacing lock carrier.

- Take off receiver ⇒ page 87-30.

◄ - Remove bolt -D- (tightening torque 15 Nm).

- Take off refrigerant pipes -B-.

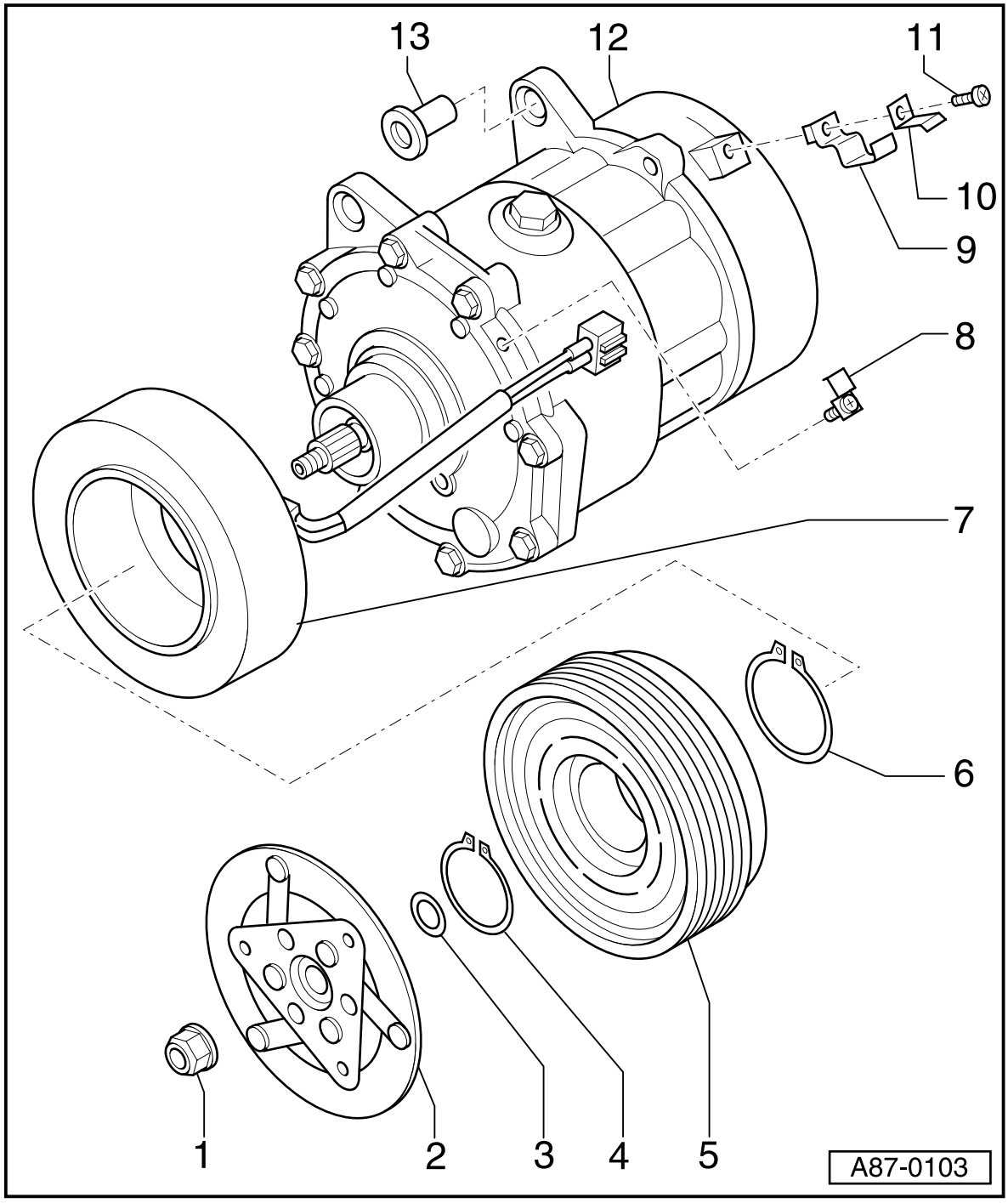
- Remove bolts -C- (tightening torque 8 Nm).



Notes:

- *Replace O-ring seal -A- (10.8 mm; 1.8 mm).*
- *When fitting on the refrigerant pipe, ensure the dowel pin -E- is correctly located.*

Servicing magnetic clutch -N25- (manual control and Climatronic)



Notes:

- *Detach compressor from bracket for servicing the magnetic clutch (do not open refrigerant circuit).*
- *Removing and installing ribbed V-belt.*

⇒ Engine, Mechanical Components

- *Before removing the ribbed V-belt, mark its direction of running.*

Special tools, testers and aids required

- Counterholder MP 9-601
- Insertion tool MP 9-400

1 - Hexagon nut

- Self-locking, replace
- Tightening torque: 15 Nm
- Removing and screwing on ⇒ Fig. 1

2 - Clutch pulley
- Removing ⇒ Fig. 2

3 - Shims
- For setting size of gap between clutch pulley and belt pulley
- Size of gap: 0.4 to 0.8 mm
- Inspecting and setting size of gap ⇒ Fig. 6

4 - Circlip
- Replace
- Install the right way round (flat side facing toward compressor)
- Ensure correctly located in groove

5 - Belt pulley
- With interference-fit bearing
- Do not replace bearing
- Pulling off ⇒ Fig. 3
- Fitting on ⇒ Fig. 5
- Clean contact surface before installing

6 - Circlip
- Replace
- Install the right way round (flat side facing toward compressor)
- Ensure correctly located in groove

7 - Solenoid coil
- Installing ⇒ Fig. 4

Notes:
- *An overheating protection is integrated in the solenoid coil. The overheating protection interrupts the coil as soon as the magnetic clutch heats up excessively (approx. 180 °C) (for example if the compressor is stiff).*
- *A protective diode is also integrated in the coil (reduces voltage peaks which may arise when the magnetic clutch is switched off).*

8 - Bracket with bolt

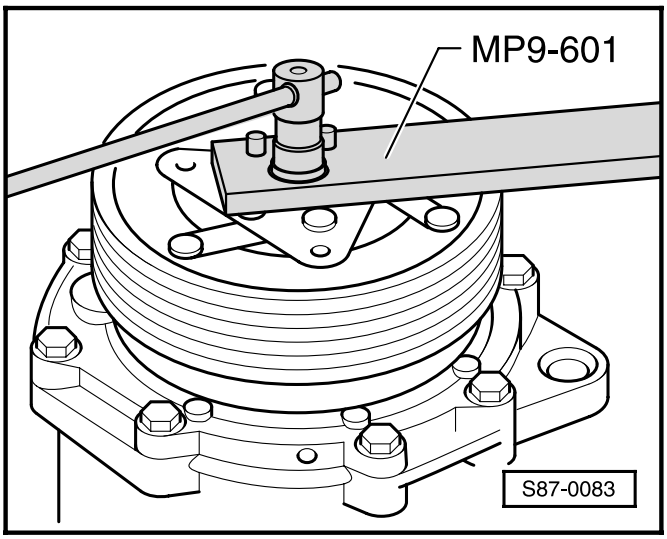
9 - Bracket

10 - Bracket

11 - Bolt

12 - Compressor

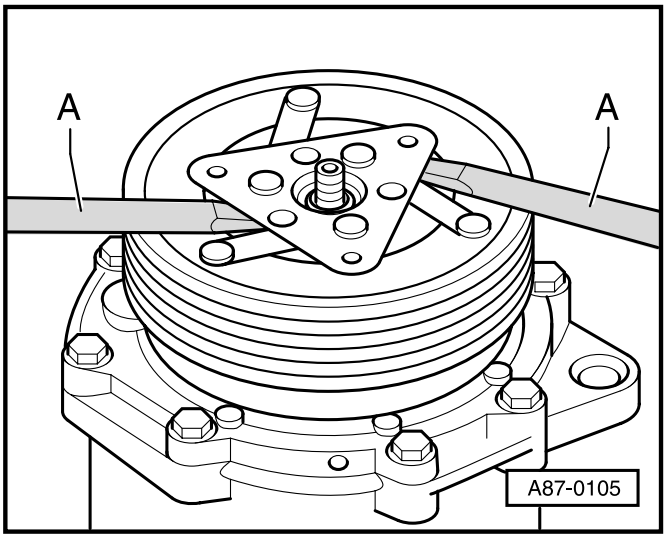
13 - Sliding bush
- With thread



◄ **Fig. 1 Removing and fitting on hexagon nut.**

Tightening torque 15 Nm.

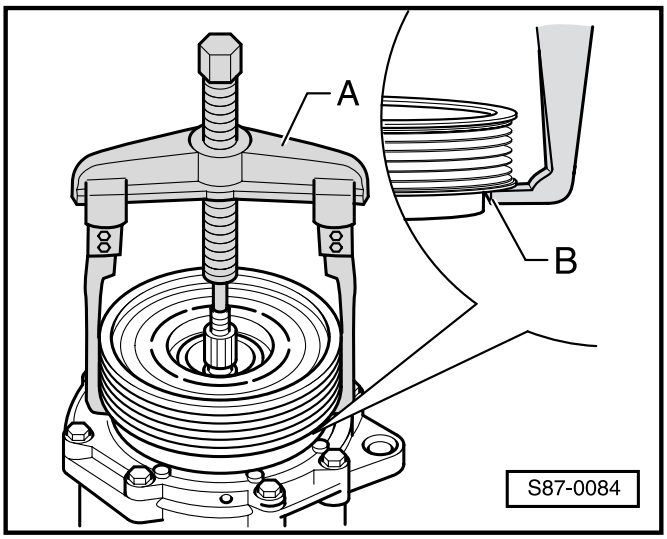
Notes:
- *Self-locking, replace.*
- *Use MP 9-601 with pin diameter 6 mm.*



◄ **Fig. 2 Pulling off coupling plate.**

Note:

If coupling plate is tight, lever off carefully with two screwdrivers -A-.

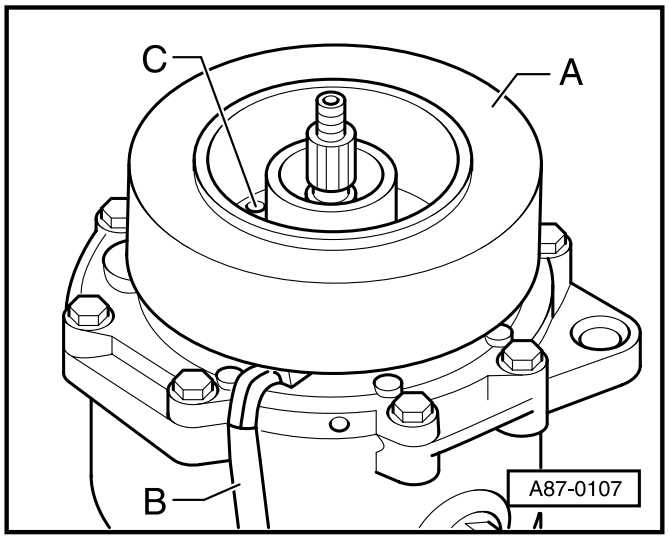


◄ **Fig. 3 Pulling off belt pulley**

- Insert two-legged puller -A- at shoulder -B- and pull off belt pulley.

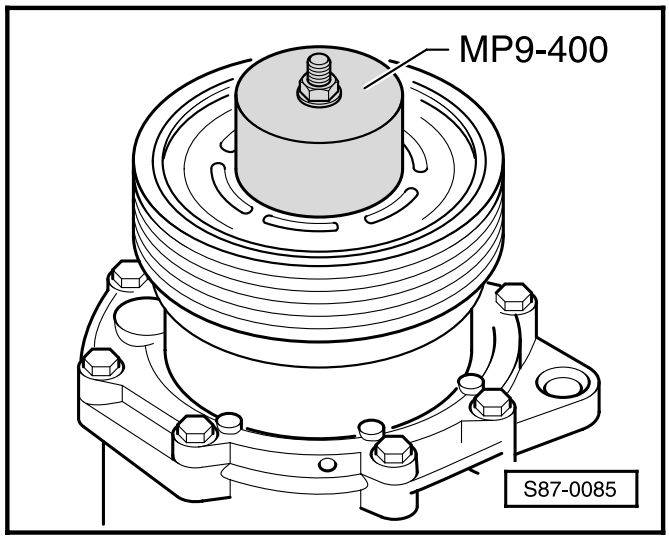
Notes:

- *Ensure the puller is correctly located at the shoulder -B- in order to avoid damaging the belt pulley when it is removed.*
- *Clean contact face before installing.*



◄ **Fig. 4 Installing magnetic coil**

- Position stud -C- in recess of magnetic coil -A-.
- Ensure the wiring -B- to the magnetic coil -A- is correctly routed.

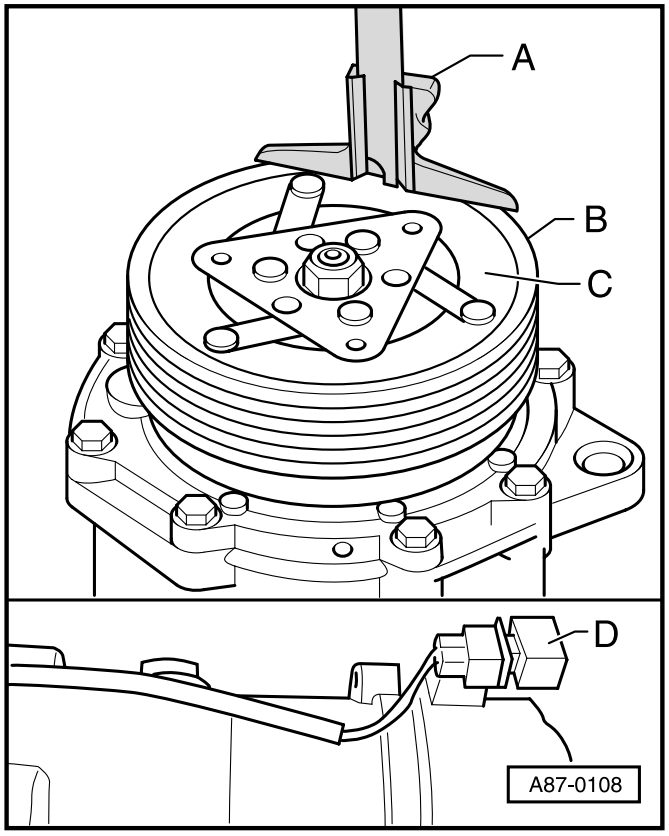


◄ **Fig. 5 Fitting on belt pulley**

- Position belt pulley flat and use MP 9-400 for fitting on.

Note:

Tighten the bolt of MP 9-400 only by hand onto the compressor shaft.



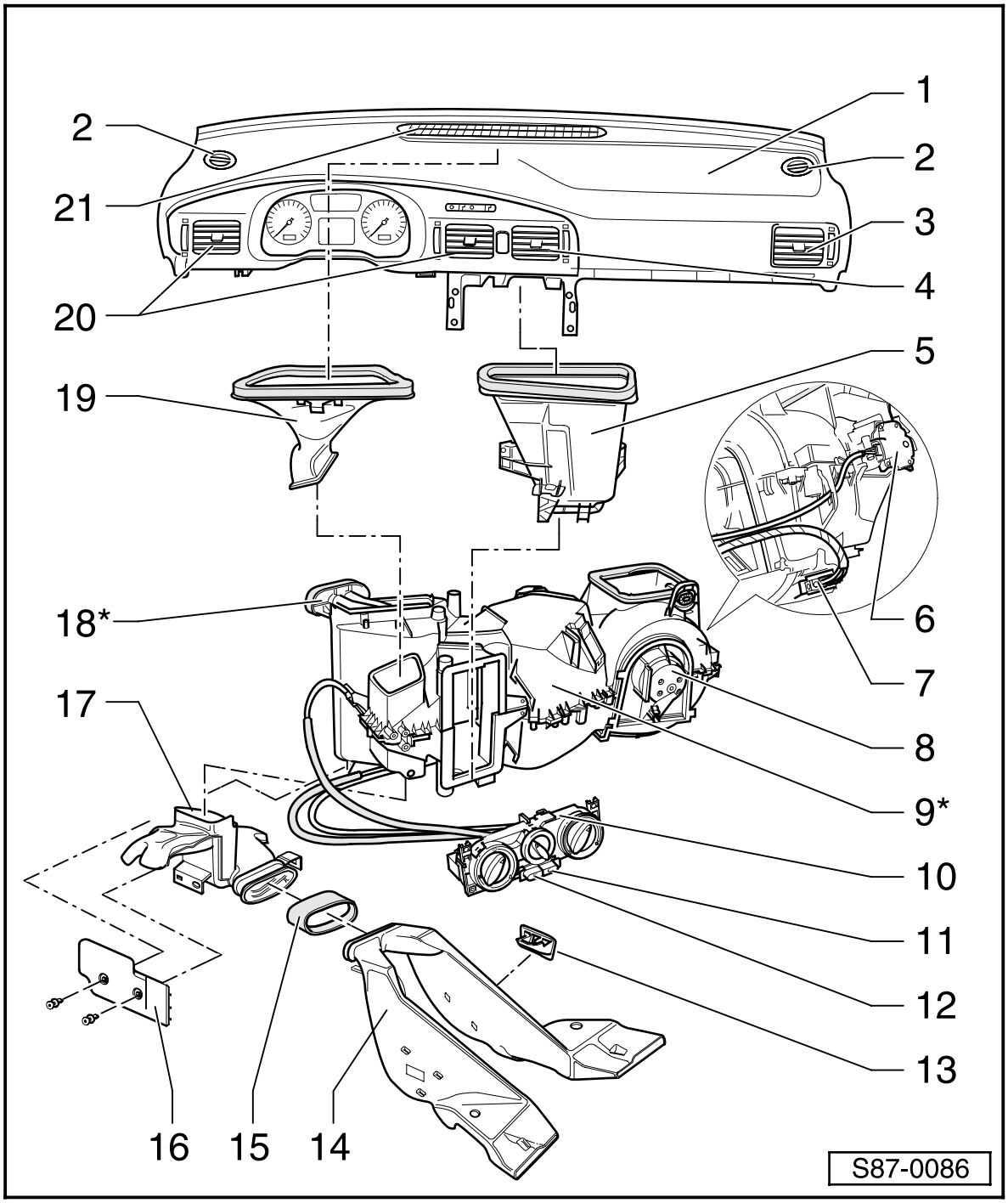
◄ **Fig. 6 Inspecting and setting size of gap**

- Measure dimension “1” between belt pulley and clutch plate (-B- and -C-) with depth gauge -A- (at 3 points).
- Apply 12 V voltage to 2-pin connector -D- (ensure correct polarity of voltage).
- Measure dimension “2” between belt pulley and clutch plate (-B- and -C-) with depth gauge -A- (at 3 points).
- Size of gap (difference between measurements “1” and “2”):
  0.4 to 0.8 mm.

Notes:

- *The size of the gap must be within the tolerance around the entire circumference.*
- *The size of the gap can also be measured with the compressor installed.*
- *If the size of the gap is not within the permissible tolerance range, take off clutch plate and adjust size of gap by removing or inserting spacers.*

Servicing air conditioning and heating - passenger compartment (manual control)



Notes:

- *Parts marked with * can only be serviced in service centre workshops as the refrigerant has to be extracted first of all using a service station.*
- *Observe safety precautions when working on models with air conditioning and when handling the refrigerant R 134a.*
- *Pay attention to notes regarding work on the refrigerant circuit.*
- *The fresh air is drawn in through a dust and pollen filter; removing and installing ⇒ page 80-16.*
- *The passenger compartment is ventilated through 2 ventilation frames (in the left and right of the luggage compartment in the area of the bumper) ⇒ page 80-3.*

1 - Dash panel
- ♦ Removing and installing

⇒ Body Fitting Work; Repair Group 70

2 - Outer dash panel vent
- ♦ Clipped in place

3 - „Right“ dash panel vent
- ♦ Removing and installing ⇒ page 80-3

4 - „Centre right“ dash panel vent
- ♦ Removing and installing ⇒ page 80-3

5 - Air guide duct to dash panel vent
- ♦ Screwed onto heater, held by catch at top

6 - Fresh air/recirculated air flap motor -V154-
- ♦ Testing operation ⇒ page 80-13
- ♦ Removing and installing ⇒ page 80-12

7 - Fresh air blower series resistor -N24-
- ♦ Removing and installing ⇒ page 80-11

8 - Fresh air blower -V2-
- ♦ Removing and installing ⇒ page 80-11

9 - Air conditioner*
- ♦ Removing and installing ⇒ page 87-38
- ♦ Detaching, attaching and adjusting Bowden cables ⇒ page 80-8
- ♦ Connection diagram for Bowden cables ⇒ page 80-8
- ♦ Disassembling and assembling ⇒ page 87-42

10 - Heater controls
- ♦ Removing and installing ⇒ page 80-7
- ♦ Detaching and attaching Bowden cables ⇒ page 80-7
- ♦ Adjusting Bowden cables ⇒ page 80-8
- ♦ Connection diagram for Bowden cables ⇒ page 80-8
- ♦ Replacing bulb ⇒ page 80-10

11 - Fresh air/recirculated air flap switch -E159-
- ♦ Testing operation ⇒ page 80-13

Notes:
- ♦ *The switch is firmly attached to the heater control.*
- ♦ *No recirculated air mode possible in „Defrost“ mode (recirculated air mode is switched off about 15° before air distribution rotary switch reaches end position of „air flow to windscreen“).*

12 - AC switch -E35-

Notes:
- ♦ *The switch is firmly attached to the heater control.*
- ♦ *Perform operational test according to current flow diagram.*

13 - Footwell vent passenger side

14 - Rear duct

15 - Connection piece to rear duct

16 - Left cover for footwell vent

17 - Footwell vent
- ♦ Removing and installing ⇒ page 80-15

18 - Heat exchanger*
- ♦ Removing and installing ⇒ page 87-40
- ♦ On models with mapped cooling in all-metal version because of higher temperatures

19 - Air guide duct to defroster vents
- ♦ Removing and installing ⇒ page 80-4

20 - „Left“ and „Centre left“ dash panel vents
- ♦ Removing and installing ⇒ page 80-3

21 - „Windscreen“ defroster vent

Removing and installing air conditioner (manual control)

(Can only be carried out in service centre workshops!)

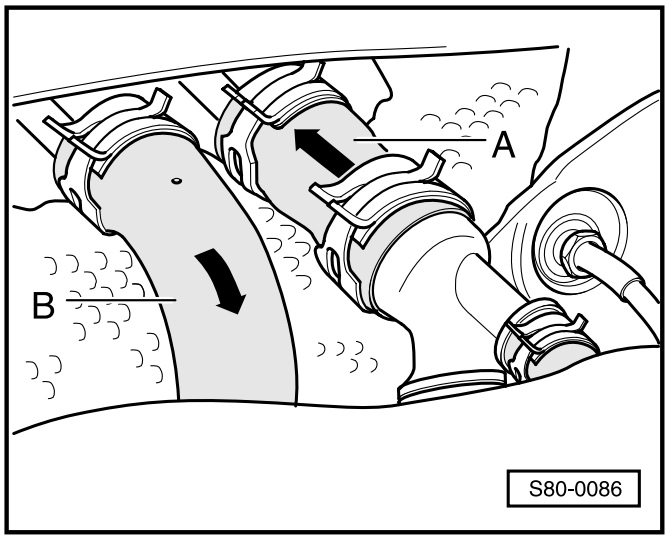
- Drain refrigerant circuit.

- Remove dust and pollen filter together with housing ⇒ page 80-16.

Notes:

- *Before disconnecting the battery, determine the coding of radio set fitted with anti-theft code.*
- *When the battery is again connected, please check the vehicle equipment:*
  - Perform coding of radio
  - Reset time of clock
  - Initialise power windows.

⇒ Inspection and Maintenance



- Disconnect battery.

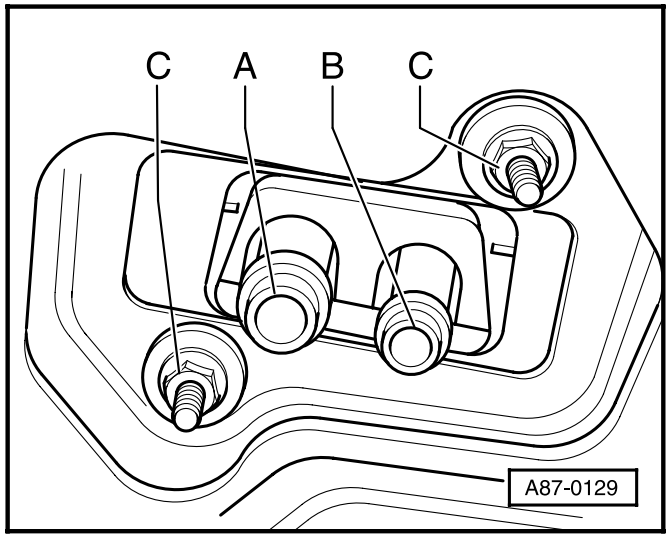
- Release pressure in the coolant circuit by opening the cap at the coolant expansion reservoir.

◄- Pinch off both coolant hoses to the heat exchanger of the air conditioner (e.g. with V.A.G 3094) and detach.

Notes:

- *Connect the coolant hoses the right way round:*
  - *Coolant hose -A- feed from cylinder head.*
  - *Coolant hose -B- return flow to water pump.*
- *Bleed refrigerant circuit*

⇒ Engine, Mechanical Components; Repair Group 19



- Position a vessel below the connection for hose -B- and carefully blow refrigerant out of the heat exchanger (with compressed air) through the connection for the hose -A-.

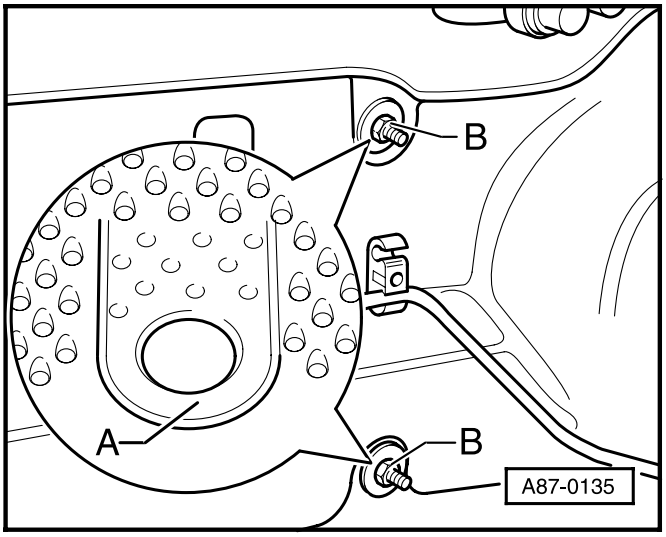
- Remove expansion valve ⇒ page 87-26.

◄- Seal refrigerant lines and open connections -A- and -B- at the evaporator.

- Remove two hexagon nuts with washer -C- (tightening torque 15 Nm).

Note:

A seal has to be fitted with the washers of the hexagon nuts to provide a proper seal.



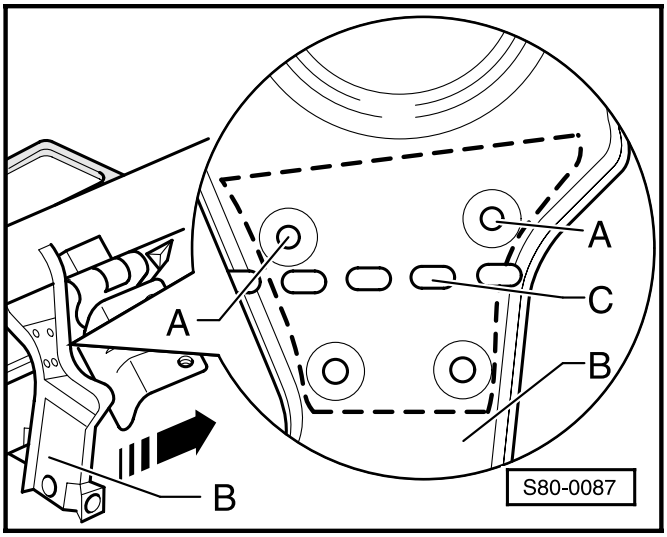
◄- Fold up the pre-punched points -A- of the heat insulation mat and remove the hexagon nuts and washers -B- behind them (tightening torque 15 Nm).

- Remove dash panel.
⇒ General Body Repairs, repair group 70

- Remove footwell vent ⇒ page 80-15.

- Remove passenger airbag unit.
⇒ Electrical System; repair group 96

- Cover over all the opened connectors and air guide ducts of the air conditioner to prevent the ingress of swarf.



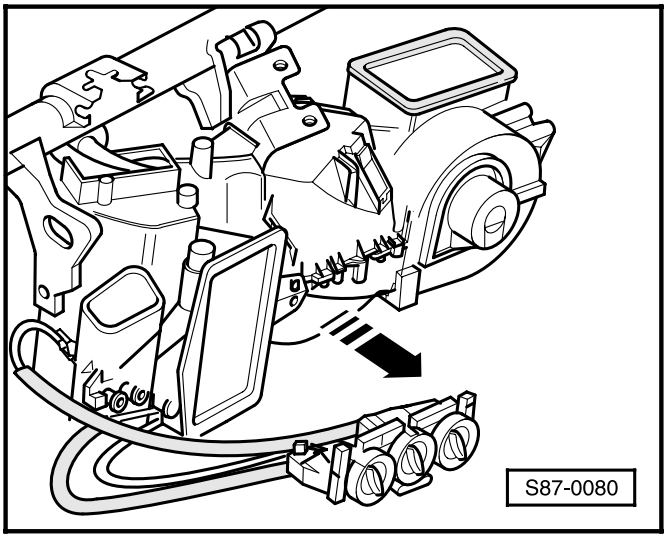
◄- Drill off support for dash panel at the points marked with -A- (connection points) with a 7 mm drill.

- Bent part -B- of the support at the specified breaking points -C- to the side in direction of arrow.

Note:

After installing the he ater unit, bend back the part -B- into its original position and bolt the shaped piece marked in broken lines to the holes -A- (e.g. M 6 x 10).

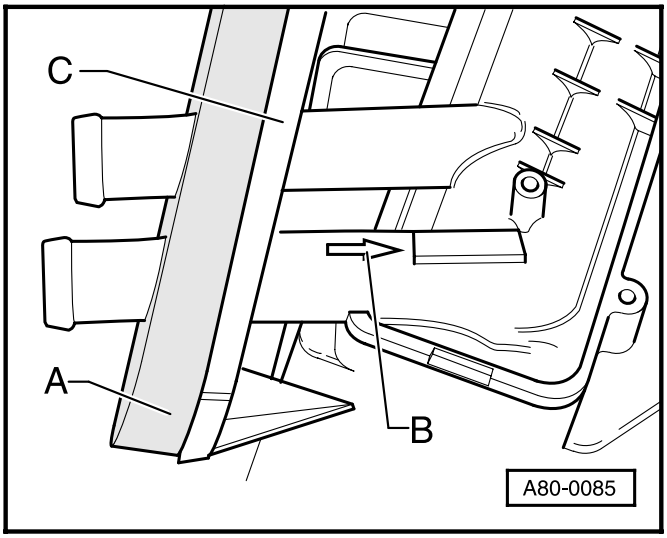
- Separate electrical connection between vehicle and air conditioner (plug connection and bolted-on earth cable at A pillar).



◄- Remove air conditioner in direction of arrow.

Notes re installing:

- *Inspect all gaskets and seals at air conditioner before installing and replace any damaged gasket or seal.*
- *When installing the air conditioner, inspect the gasket at the intake duct; it must be making contact with the vehicle body.*



◄ ♦ *Replace gasket -A- at heat exchanger and ensure that it is correctly located on the contact surface -C-.*

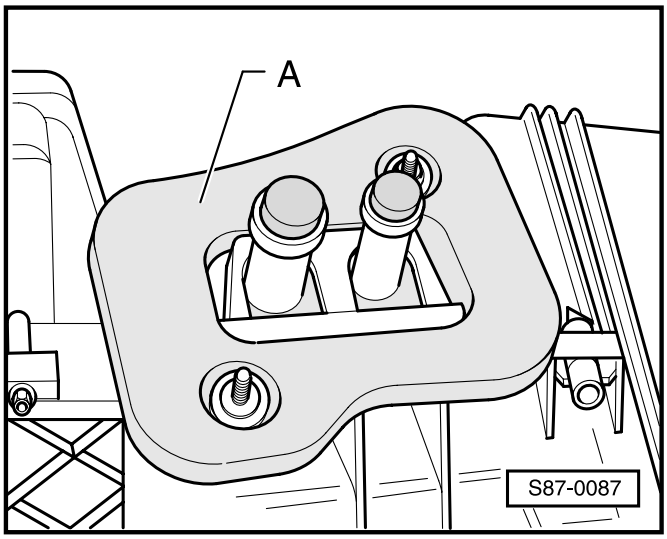
♦ *The flow direction of the coolant is marked at the connection of the heat exchanger (arrow -B-).*

♦ *All the cable straps which had to be taken off in order to remove the air conditioner, should be fitted on again after assembly at the same point.*

♦ *Replace both O-ring seals for the refrigerant pipes and the expansion valve.*

♦ *Install refrigerant pipes free of stress.*

♦ *Inspect condensation drain and condensation drain valve to ensure they are correctly installed.*

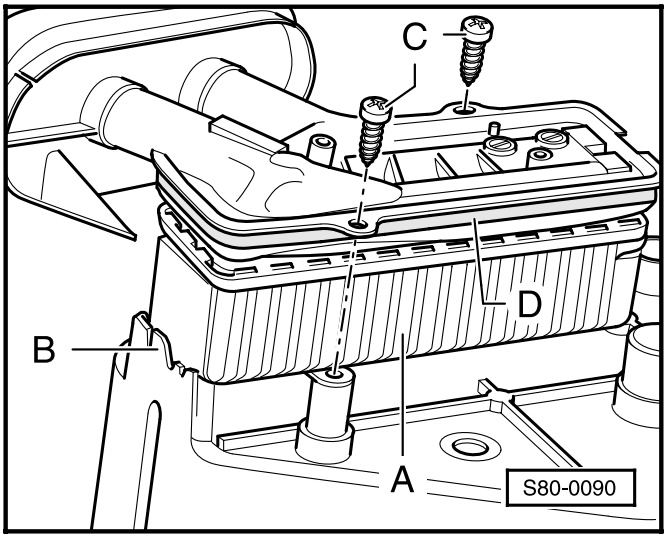


◄ ♦ *Replace gasket -A- and ensure it is correctly fitted onto the evaporator connection flange.*

Removing and installing heat exchanger of air conditioner

(Carry out only in service station workshop!)

- Remove air conditioner ⇒ page 87-38.

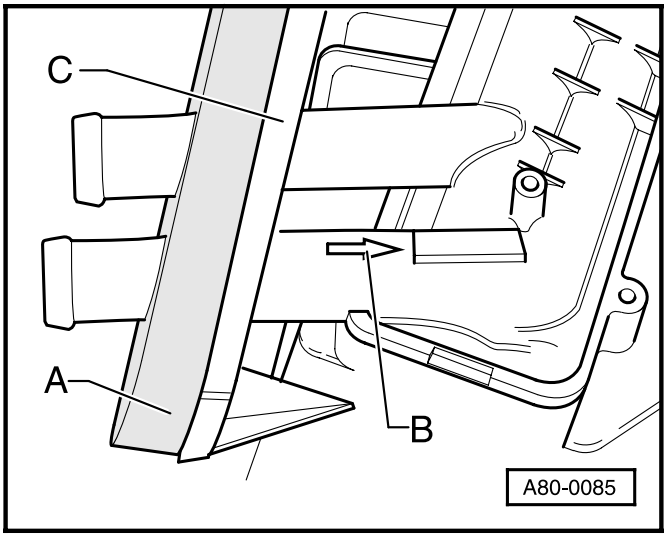


◄ - Press back catches -B- and pull heat exchanger -A- out of the air conditioner.

Notes:

♦ *If the heat exchanger does not properly engage when installing in heating flap box, it should be attached with 2 suitable screws -C- (e.g. 3.2 x 20 mm self-tapping screws).*

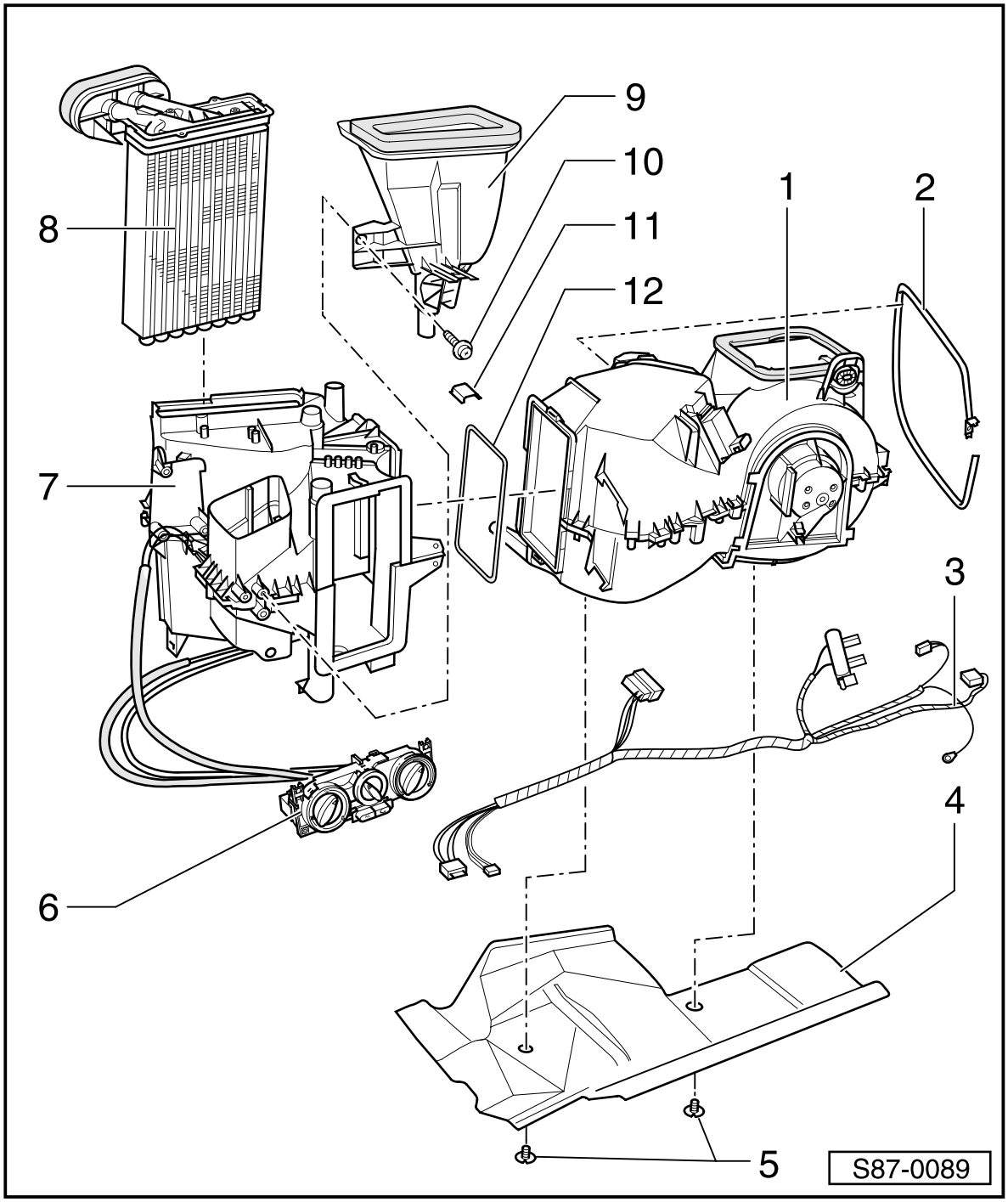
♦ *Ensure the gasket -D- is correctly installed; it must not be visible after being installed.*



◄ ♦ *Replace gasket -A- and check to ensure it is correctly seated on the contact face -C-.*

♦ *The flow direction of the coolant is marked at the connection of the heat exchanger (arrow -B-).*

Disassembling and assembling air conditioner (manual control)



- Removing air conditioner ⇒ page 87-38

1 - Evaporator housing
- ♦ Disassembling and assembling ⇒ page 87-44

2 - Tensioning strap
- ♦ Ensure correctly routed ⇒ Fig. 1

3 - Air conditioning wiring harness

4 - Cover panel
- ♦ Attached to evaporator housing with tensioning strap item 2 and the two screw clips item 5

5 - Screw clip

6 - Heater controls
- Detaching and attaching Bowden cables ⇒ page 80-7
- Adjusting Bowden cables ⇒ page 80-8
- Connection diagram for Bowden cables ⇒ page 80-8
- Changing a bulb ⇒ page 80-10

7 - Heater flap box
- Do not disassemble
- Detaching, attaching and adjusting Bowden cables ⇒ page 80-8
- Connection diagram for Bowden cables ⇒ page 80-8

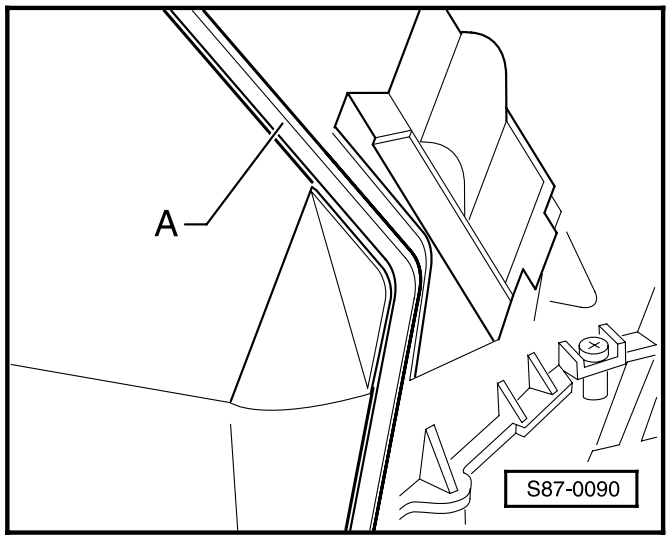
8 - Heat exchanger
- Removing and installing ⇒ page 87-40
- On models with mapped cooling in all-metal version because of higher temperatures

9 - Air guide duct to dash panel vents
- Screwed onto air conditioner, held by catch at top

10 - Screw

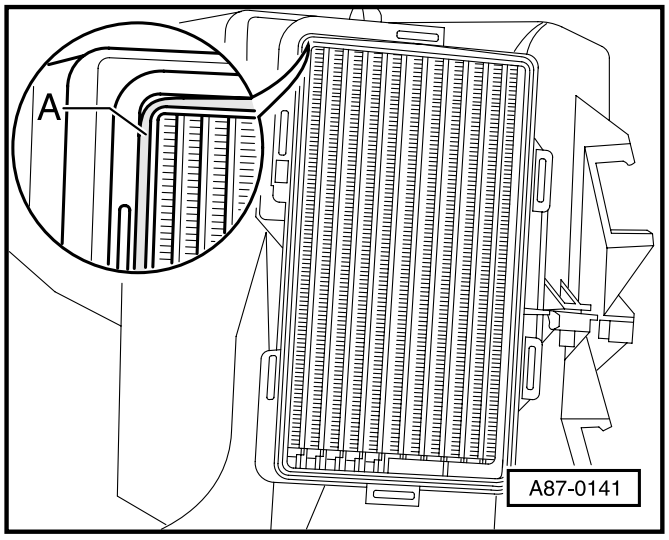
11 - Retaining clamp
- Lever out with screwdriver

12 - Gasket
- Install at evaporator housing ⇒ Fig. 2



◄ **Fig. 1 Positioning tensioning strap**

Notes:
- *Ensure the tensioning strap -A- is correctly positioned around the evaporator housing.*
- *The tensioning strap holds the cover at the evaporator housing.*

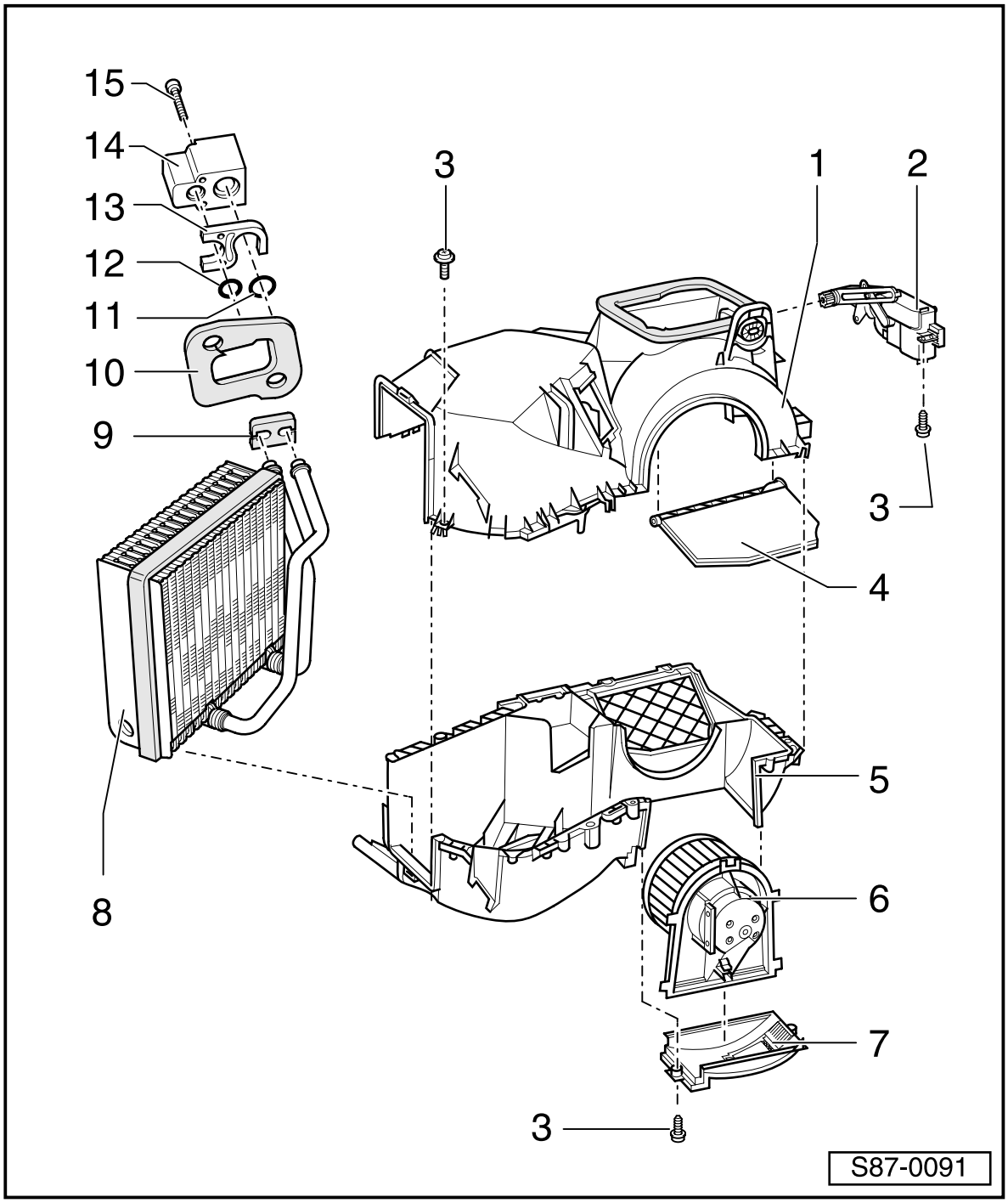


◄ **Fig. 2 Installing gasket at evaporator housing**

Note:

The gasket -A- must be inserted into the slot of the evaporator housing all round.

Disassembling and assembling evaporator housing (manual control)



- Disassembling and assembling air conditioner ⇒ page 87-42

1 - Top part of evaporator housing
- ♦ Assembling evaporator housing ⇒ Fig. 1
- ♦ Inspect gasket at inlet shaft; replace if damaged (seals off inlet shaft to passenger compartment)

2 - Positioning motor for fresh air and recirculated air flap -V154
- ♦ Inspecting operation ⇒ page 80-13
- ♦ Removing and installing ⇒ page 80-12

3 - Bolt

4 - Fresh air/recirculated air flap

5 - Bottom part of the evaporator housing
- Assembling evaporator housing ⇒ Fig. 1.

6 - Fresh air blower -V2
- Removing and installing ⇒ page 80-11.

7 - Series resistor for fresh air blower -N24
- Removing and installing ⇒ page 80-11.

8 - Evaporator
- Attaching seal to coolant pipes ⇒ Fig. 2.
- Attaching seal to evaporator ⇒ Fig. 3.

9 - Seal
- Attaching seal to coolant pipes ⇒ Fig. 2.

10 - Seal
- Replace.
- Attaching seal to evaporator housing ⇒ Fig. 4.
- Seals off connection area of refrigerant pipes to engine compartment.

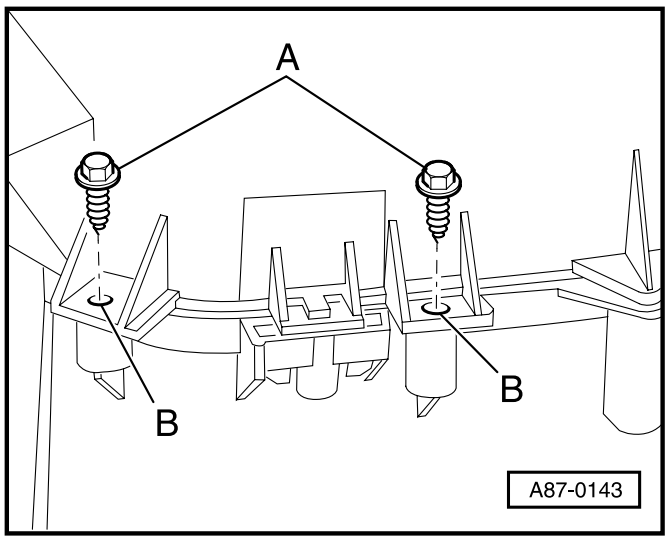
11 - O-ring seal
- Removing and installing ⇒ page 87-26.

12 - O-ring seal
- Removing and installing ⇒ page 87-26.

13 - Threaded plate

14 - Expansion valve
- Disconnecting and connecting refrigerant pipes ⇒ page 87-26.
- Removing and installing ⇒ page 87-26.
- Removing and installing heat insulation ⇒ page 87-25.

15 - Bolt
- Tightening torque: 8 Nm

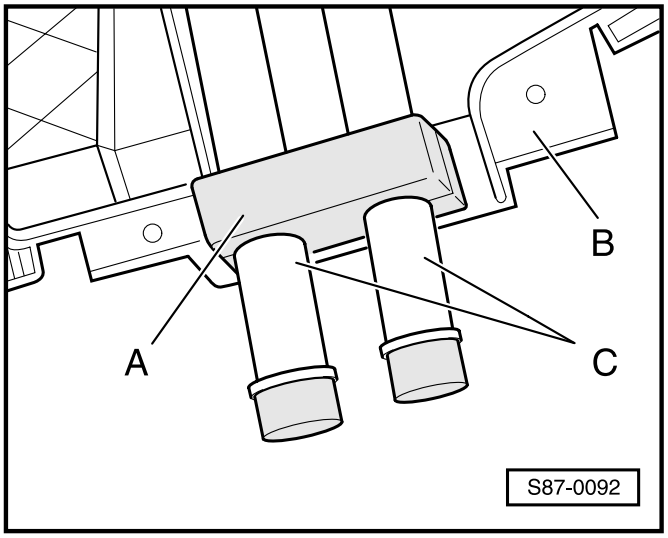


◄ **Fig. 1 Assembling evaporator housing**

- Use suitable bolts -A- to screw together the two halves of the housing at the attachment points -B- provided.

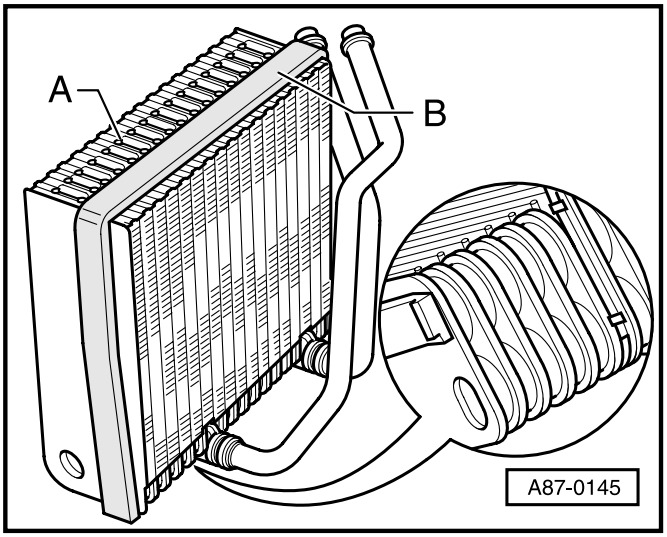
Note:

The attachment points -B- are provided around the entire circumference.



◄ **Fig. 2 Attaching seal to refrigerant pipes of evaporator**

- The refrigerant pipes -C- should be sealed off to the two halves of the housing -B- with seal -A-.

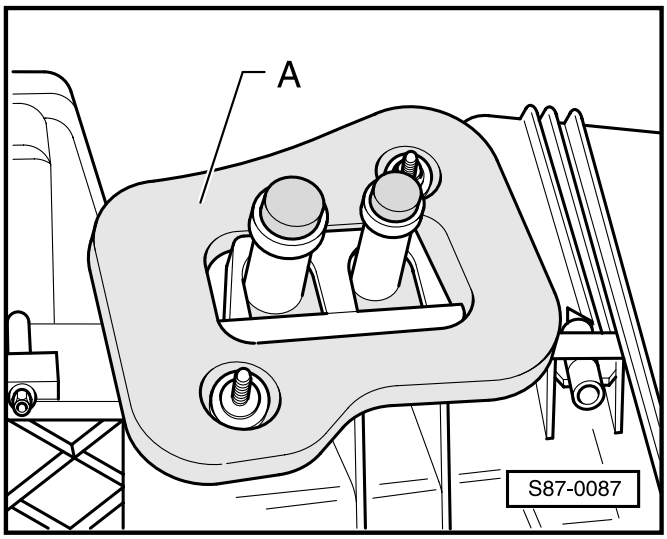


◄ **Fig. 3 Attaching seal to evaporator**

- The evaporator -A- should be sealed off to the evaporator housing at the top and at both sides with the seal -B-.

Note:

No seal should be fitted to the bottom of the evaporator (to allow the condensation to drain off).



◄ **Fig. 4 Attaching seal to evaporator housing**

- Replace gasket -A- and ensure it is correctly fitted onto the evaporator connection flange.

Climatronic (air conditioning with automatic control) - self-diagnosis

Note:

Certain components and operations of the Climatronic are not checked by the self-diagnosis (for example the temperature sensor blower V42). If a complaint exists but no fault is detected after interrogating fault memory, continue the check on a complaint-related basis.

Function

The Climatronic control unit receives information from electrical and electronic components (information senders) and this is processed in the control unit in line with the set values. The output signals of the control unit then operate the electrical components (control elements).

The Climatronic control unit -J255- is located behind the operating and display unit -E87-. Both components together form a single unit which cannot be disassembled.
The control unit features a fault memory, which can be read with the vehicle system tester V.A.G 1552, to enable the cause of a problem to be rapidly determined if a component fails or if an open circuit exists in the wiring.

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

If a fault which has a lasting effect on the operation of the Climatronic is stored, the readout of the display or the operating and display unit -E87- at the Climatronic control unit -J255- flashes for about 15 seconds after the ignition is switched on. The Climatronic control unit is able to maintain the set mode in the emergency running phase no matter what kind of fault occurs.

At the start of fault finding, initiate self-diagnosis and interrogate the stored information with the vehicle system tester V.A.G 1552.

The fault information displayed is used to refer to a fault table with information regarding the possible causes in order to perform specific repair measures.

Vehicle system tester V.A.G 1552 is used for self-diagnosis. Self-diagnosis can also be performed with fault reader V.A.G 1551.
The information below relates only to the vehicle system tester V.A.G 1552.

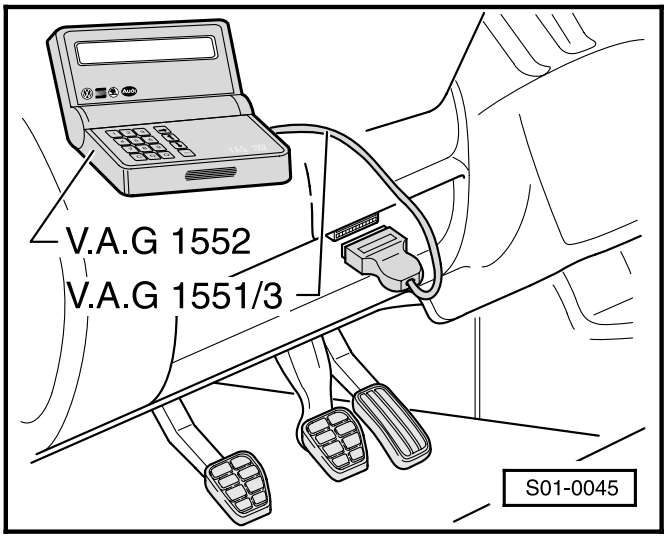
Technical data of self-diagnosis

Memory:	Permanent memory
Data output:	Vehicle system test
01 Interrogating control unit version:	yes
02 Interrogating fault memory:	yes
03 Final control diagnosis:	yes
04 Basic setting:	yes
05 Erasing fault memory:	yes
06 Ending output:	yes
07 Coding control unit:	yes
08 Reading measured value block:	yes

Test requirements for self-diagnosis

- All fuses o.k. according to CFD
- Battery voltage at least 9 V
- Battery negative terminal inspected for tight connection

Connecting vehicle system tester V.A.G 1552 and selecting Climatronic control unit



Special tools, testers and aids required

- Vehicle system tester V.A.G 1552
- Diagnostic cable V.A.G 1551/3

◄ - Connect vehicle system tester V.A.G 1552 using the cable V.A.G 1551/3.

Test of vehicle systems Select function XX	HELP

◄ Readout in display:

Note:

If no readout appears in the display:
⇒ Operating instructions of vehicle system tester

- Switch on ignition.

Test of vehicle systems Enter address word XX	HELP

◄ Readout in display:

- Press keys 0 and 8 for the address word „AC/ Heating electronics“ and confirm entry with the key Q.

1J1907044 CLIMATRONIC Coding 01000	SXX WSC XXXXX

◄ The control unit identification appears in the display, e.g.:

- 1J1907044 = Part No. of control unit
- Climatronic = System designation
- SXX = Software version
- Coding: 01000
- WSC = Workshop code

If the coding does not agree with the appropriate version in the vehicle:
⇒ page 87-63, Coding control unit.

Notes:

Test of vehicle systems HELP Control unit does not answer!

◄ ♦ *If one of the following fault messages appears in the display, the possible causes of the fault can be printed out by pressing the HELP key.*

Test of vehicle systems HELP K wire not switching to positive!

◄ *(The ignition must be switched on!)*

Test of vehicle systems → No signal from control unit!

◄ ♦ *Faults have occurred at the beginning or during the program (external sources of interference?).*

Test of vehicle systems → Fault in communication build-up

◄ - *Inspect diagnostic cables and also voltage supply and earth connection.*

- After rectifying the possible causes of the fault, once again enter address word 08 for „AC/Heating electronics“ and confirm entry with the key Q.

1J1907044 CLIMATRONIC SXX Coding 01000 WSC XXXXX

◄ The control unit identification appears in the display.

- Press → key.

Test of vehicle systems HELP Select function XX

◄ Readout in display:

Note:

A list of the possible functions is displayed after pressing the HELP key.

List of available functions

The program of V.A.G 1552 returns to the initial position after the → key is pressed.

Interrogating fault memory

- Connect vehicle system tester V.A.G 1552 and select the Climatronic control unit with the address word 08.
(Connecting vehicle system tester and selecting Climatronic control unit ⇒ page 87-49.)

Test of vehicle systems HELP Select function XX	◄ Readout in display:

- Press keys 0 and 2 for the function „Interrogate fault memory“ and confirm the entry with the key Q.

X faults recognized!	◄ The number of stored faults or „No fault recognized!“ appears in the display.

If no fault is stored:

- *Press the → key.*

If one or several faults are stored:

The faults stored are displayed one after the other.

Test of vehicle systems HELP Select function XX	◄ The following readout then appears in the display:

- Look for and rectify the faults displayed by referring to fault table ⇒ Fault table, page 87-51.

Fault table

Notes:

- *All the possible faults which can be detected by the Climatronic control unit -J255- and displayed on V.A.G 1552, are listed below arranged according to the fault code.*
- *If faults occur only occasionally, these are displayed as „sporadically occurring fault“ („SP“).*
- *The fault type may also appear additionally in the fault table.*
- *After completing repairs, always once again erase and re-interrogate the fault memory with the vehicle system tester V.A.G 1552.*
- *If a complaint exists regarding the Climatronic, but it was not possible to detect any fault, perform the function „Final control diagnosis 03“ ⇒ page 87-59 or the function „Read measured value block 08“ ⇒ page 87-64. If the display flashes although no fault has been detected, initiate one after the other the function „Code control unit 07“ and the function „Basic setting 04“ ⇒ page 87-61. It may then be necessary to carry out fault finding on a complaint-related basis without self-diagnosis.*

Readout on V.A.G 1552	Possible cause of fault	Rectifying fault
00000 No fault recognized!	If „No fault recognized!“ appears after completing repairs, self-diagnosis is ended. If the display nevertheless flashes, select one after the other the following functions: 07 - Code control unit ⇒ page 87-63 04 - Initiate basic setting ⇒ page 87-61	

Readout on V.A.G 1552	Possible cause of fault	Rectifying fault
00281 Road speed sender -G68-[1)]		
	Short circuit or open circuit at cable or at plug connections for road speed signal from engine control unit to Climatronic control unit	- Test road speed signal in measured value block 001 ⇒ page 87-64. - Test wiring and plug connections to control unit according to CFD.
	Speedometer sender -G22- faulty (only if speedometer -G21- also not operating)	- Check speedometer reading.
Cannot be tested at present	This display only appears if final control diagnosis has been performed before interrogating the fault memory. This fault is erased in the fault memory of the control unit after the ignition is switched off. If -G68- is faulty, the fault again appears when driving.	
00532 Supply voltage		
Signal too large	Alternator faulty	- Test supply voltage (voltage at terminal 15) with function 08 „Read measured value block“ ⇒ page 87-64. - Test alternator: ⇒ Current Flow Diagrams, Electrical Fault Finding and Fitting Locations
Signal too small	Wiring or plug connections to Climatronic control unit -J255- faulty	- Test supply voltage (voltage at terminal 15) with function 08 „Read measured value block“ ⇒ page 87-64. - Repair wiring or plug connections according to CFD. - Test alternator: ⇒ Current Flow Diagrams, Electrical Fault Finding and Fitting Locations

[1)] A fault is detected by the speedometer sender -G22- and not by the road speed sender -G68-. The fault is only detected if no road speed signal is measured during 5 driving cycles (start, driving at more than 15 km/h, switching off engine) within 4 minutes after start of engine.

Readout on V.A.G 1552	Possible cause of fault	Rectifying fault
00538 Reference voltage		
Signal too large Signal too small	Short circuit or open circuit at cables or plug connections	- Test cables and plug connections to Climatronic control unit -J255- according to current flow diagram. - Test operation of AC control motors by selecting 03 „Final control diagnosis“ ⇒ page 87-59.
	Potentiometer -G92- or potentiometer -G112- or potentiometer -G113- or potentiometer -G114- faulty	- Separate plug connections of the stated components one after the other, erase fault memory ⇒ page 87-62, and once again interrogate ⇒ page 87-51. - If the fault „Reference voltage“ is now no longer detected, replace the appropriate positioning motor, which leads to the fault after it is plugged in to the plug housing.
	Climatronic control unit -J255- faulty	- Replace control unit -J255- if necessary, then select the following functions one after the other: 07 „Code control unit“ ⇒ page 87-63 04 „Basic setting“ ⇒ page 87-61.
00576[1)] Terminal 15		
Signal too large	Voltage regulator at alternator faulty	- Test alternator. ⇒ Current Flow Diagrams, Electrical Fault Finding and Fitting Locations binder
	Cables or plug connections to Climatronic control unit -J255- faulty	- Test cables and plug connections to Climatronic control unit according to current flow diagram.
Signal too small	Battery discharged	- Test battery. ⇒ Electrical System; Repair Group 27
	Alternator faulty	- Test alternator. ⇒ Current Flow Diagrams, Electrical Fault Finding and Fitting Locations binder
	Cables or plug connections to Climatronic control unit -J255- faulty	- Test cables and plug connections to Climatronic control unit according to current flow diagram.

[1)] Applies to models from 08.00.

Readout on V.A.G 1552	Possible cause of fault	Rectifying fault
00603 Footwell/Defrost flap motor -V85-[1]	Short circuit or open circuit at wiring or plug connections to footwell / Defrost motor -V85-	- Perform final control diagnosis ⇒ page 87-59. - Test -V85- with 08 „Read measured value block“ ⇒ page 87-64. - Test wiring and plug connections according to current flow diagram.
	-V85- faulty	- Replace -V85- ⇒ page 87-84. - Then, perform function 04 „Basic setting“ ⇒ page 87-61.
00606[2] Two-way valve for coolant shutoff valve -N147- Short to earth Open/short circuit to positive	Short circuit or open circuit at the wiring or plug connections to the two-way valve for coolant shutoff valve -N147-	- Test wiring and plug connections according to current flow diagram.
	Climatronic control unit -J255- not, or incorrectly coded	- Code control unit ⇒ page 87-63.
	-N147- faulty	- Replace -N147- ⇒ page 87-16.1.
00705[2] Radiator fan stage 1 relay -J279- Short to positive	Short to positive at wiring or plug connections to radiator fan control unit -J293-	- Test wiring and plug connections to radiator fan control unit -J293- according to current flow diagram.
	-J293- faulty	- Replace -J293-. ⇒ Current Flow Diagrams, Electrical Fault Finding and Fitting Locations binder
Open/short circuit to earth	Open circuit or short circuit to earth at wiring or plug connections to radiator fan control unit -J293-	- Test wiring and plug connections to radiator fan control unit -J293- according to current flow diagram.
	-J293- faulty	- Replace -J293-. ⇒ Current Flow Diagrams, Electrical Fault Finding and Fitting Locations binder
00706[2] Radiator fan stage 2 relay -J513-	refer to fault code 00705	

[1] This fault is detected in Basic setting 04, Final control diagnosis 03 and in the normal mode. Both end stops must be reached.

[2] Applies to models from 08.00.

Readout on V.A.G 1552	Possible cause of fault	Rectifying fault
00779 Temp. sensor outside temp. -G17-		
Open/short circuit to positive	Short circuit to positive or open circuit in wiring or plug connections to outside temperature sensor -G17-	- Test -G17- with 08 „Read measured value block“ ⇒ page 87-64. - Test wiring and plug connections according to current flow diagram.
Short circuit to earth	Short circuit to earth at wiring or plug connections to outside temperature sensor -G17-	- Test -G17- with 08 „Read measured value block“ ⇒ page 87-64. - Test wiring and plug connections according to current flow diagram.
	-G17- faulty	- Replace -G17-. ⇒ Electrical System; Repair Group 90
00787 Temp. sensor fresh air intake duct -G89-		
Open/short circuit to positive	Short circuit to positive or open circuit in wiring or plug connections to fresh air intake duct temperature sensor -G89-	- Test -G89- with 08 „Read measured value block“ ⇒ page 87-64. - Test wiring and plug connections according to current flow diagram.
Short circuit to earth	Short circuit to earth at wiring or plug connections to fresh air intake duct temperature sensor -G89-	- Test -G89- with 08 „Read measured value block“ ⇒ page 87-64. - Test wiring and plug connections according to current flow diagram.
	-G89- faulty	- Replace -G89- ⇒ page 87-74.

Readout on V.A.G 1552	Possible cause of fault	Rectifying fault
00792 AC pressure switch -F129-[1)]	Short circuit or open circuit in wiring or plug connections to AC pressure switch -F129-	- Test -F129- with 08 „Read measured value block“ ⇒ page 87-64. - Test wiring and plug connections according to current flow diagram.
	Incorrect filling of refrigerant circuit	- Hand over vehicle to a service centre workshop.
	Poor engine cooling	- Test engine cooling. ⇒ Engine, Mechanical Components; Repair Group 19
	-F129- faulty	- Replace -F129- ⇒ page 87-24.
Cannot be tested at present	This readout only appears if final control diagnosis has been performed before interrogating the fault memory and the pressure switch could not be checked (e.g. at a measured outside temperature below 12 °C). This fault is erased in the fault memory of the control unit after the ignition is switched off.	
00797 Sunlight penetration photo sensor -G107-		
Open/short circuit to positive	Short circuit to positive or open circuit at wiring or plug connections to sunlight penetration photo sensor -G107-	- Test -G107- with 08 „Read measured value block“ ⇒ page 87-64. - Test wiring and plug connections according to current flow diagram.
Short circuit to earth	Short circuit to earth at wiring or plug connections to sunlight penetration photo sensor -G107-	- Test -G107- with 08 „Read measured value block“ ⇒ page 87-64. - Test wiring and plug connections according to current flow diagram.
	-G107- faulty	- Replace -G107- ⇒ page 87-74.

[1)] This fault cannot be detected at an outside temperature below 12 °C, or if -G17- and -G89- fail. The switch is a triple switch. The 0.2 MPa (2 bar)/3.2 MPa (32 bar) switching part is tested, but not the 1.6 MPa (16 bar) switching part.

Readout on V.A.G 1552	Possible cause of fault	Rectifying fault
00818 Evaporator outlet temperature sender		
Open/short circuit to positive	Short circuit to positive or open circuit at wiring or plug connections to evaporator outlet temperature sender -G263-	- Test wiring and plug connections according to current flow diagram.
Short circuit to earth	Short circuit to earth at wiring or plug connections to evaporator outlet temperature sender -G263-	- Test wiring and plug connections according to current flow diagram.
	-G263- faulty	- Replace -G263- ⇒ page 87-84.1.
00819 High-pressure sender -G65-		
Short to positive	Short circuit to positive at wiring or plug connections to high-pressure sender -G65-	- Test wiring and plug connections to high-pressure sender -G65- according to current flow diagram.
	-G65- faulty	- Replace -G65- ⇒ page 87-25.
Open/short circuit to earth	Short circuit to earth or open circuit at wiring or plug connections to high-pressure sender -G65-	- Test wiring and plug connections to high-pressure sender -G65- according to current flow diagram.
	Open circuit or short circuit to positive or to earth at wiring or plug connections between -G65- and Climatronic control unit -J255-	- Test wiring and plug connections to high-pressure sender -G65- according to current flow diagram.
	-G65- faulty	- Replace -G65- ⇒ page 87-25.
	Climatronic control unit -J255- faulty	- Replace Climatronic control unit -J255- ⇒ page 87-15. - Then, select the following functions one after the other: 07 „Code control unit“ ⇒ page 87-63, 04 „Basic setting“ ⇒ page 87-61.

Readout on V.A.G 1552	Possible cause of fault	Rectifying fault
01044 Control unit incorrectly coded	Climatronic control unit -J255- not, or incorrectly coded	- Code control unit ⇒ page 87-63.
01087 Basic setting not performed	Basic setting was not performed, or incorrectly	- Perform function 04 „Basic setting“ ⇒ page 87-61.
01206 Stationary time signal[1)]	Dash panel insert is faulty	- Test dash panel insert and replace if necessary.
	Short circuit or open circuit at wiring or plug connections to Climatronic control unit -J255-	- Test stationary time signal with 08 „Read measured value block“ ⇒ page 87-64. - Test wiring and plug connections according to current flow diagram.
	Climatronic control unit -J255- faulty	- Replace Climatronic control unit -J255- ⇒ page 87-15. - Then, select the following functions one after the other: 07 „Code control unit“ ⇒ page 87-63, 04 „Basic setting“ ⇒ page 87-61.

1) The permanent stationary time signal is supplied by the dash panel insert. The Climatronic control unit -J255- analyses the time measurement after the engine is switched off in order to replace the measured values of the outside temperature sensor -G17- and of the fresh air intake temperature sensor -G89- with the temperatures used during last engine operation after the vehicle is stopped (ignition off) and then re-started. The measured values would otherwise be falsified when the engine is not running by the heat radiated. The stationary time signal is supplied only after engine start.

Readout on V.A.G 1552	Possible cause of fault	Rectifying fault
01271 Temperature flap motor -V68-[1)]		
	Short circuit or open circuit in wiring or plug connections to temperature flap motor -V68-	- Test -V68- with 08 „Read measured value block“ ⇒ page 87-64. - Test wiring and plug connections according to current flow diagram.
	-V68- was installed without having performed function 04 „Basic setting“	- Test end position of motor -V68- when installed ⇒ page 87-59.
	-V68- is blocked	- Perform function 03 „Final control diagnosis“ ⇒ page 87-59.
	-V68- is faulty	- Replace -V68- ⇒ page 87-82 and perform function 04 „Basic setting“ ⇒ page 87-61.
01272 Central flap motor -V70-[1)]		
	Short circuit or open circuit in wiring or plug connections to central flap motor -V70-	- Test -V70- with 08 „Read measured value block“ ⇒ page 87-64. - Test wiring and plug connections according to current flow diagram.
	-V70- was installed without having performed function 04 „Basic setting“	- Test end position of motor -V70- when installed ⇒ page 87-59.
	-V70- is blocked	- Perform function 03 „Final control diagnosis“ ⇒ page 87-59.
	-V70- is faulty	- Replace -V70- ⇒ page 87-83 and perform function 04 „Basic setting“ ⇒ page 87-61.

[1)] This fault is detected in Basic setting 04, Final control diagnosis 03 and in the normal mode. Both end stops must be reached.

Readout on V.A.G 1552	Possible cause of fault	Rectifying fault
01273 Fresh air blower -V2-	Short circuit or open circuit in wiring or plug connections to fresh air blower -V2-	- Test -V2- with 08 „Read measured value block“ ⇒ page 87-64. - Test wiring and plug connections according to current flow diagram.
	Blower control unit -J126- or fresh air blower -V2- faulty	- Perform function 03 „Final control diagnosis“ ⇒ page 87-59. - Replace -J126- ⇒ page 87-74 or -V2- ⇒ page 87-85.
01274 Fresh air flap motor -V71-[1)]	Short circuit or open circuit in wiring or plug connections to fresh air blower -V71-	- Test -V71- with 08 „Read measured value block“ ⇒ page 87-64. - Test wiring and plug connections according to current flow diagram.
	-V71- is blocked	- Perform function 03 „Final control diagnosis“ ⇒ page 87-59.
	-V71- faulty	- Replace -V71- ⇒ page 87-74 and perform function 04 „Basic setting“ ⇒ page 87-61.

1) This fault is detected in Basic setting 04, Final control diagnosis 03 and in the normal mode. Both end stops must be reached.

Readout on V.A.G 1552	Possible cause of fault	Rectifying fault
01296[1)] Middle outlet temperature sender -G191-		
Open/short circuit to positive	Short circuit or open circuit at wiring or plug connections to middle outlet temperature sender -G191-	- Test -G191- with 08 „Read measured value block“ ⇒ page 87-64. - Test wiring and plug connections according to current flow diagram.
Short circuit to earth	Short circuit to earth at wiring or plug connections to middle outlet temperature sender -G191-	- Test -G191- with 08 „Read measured value block“ ⇒ page 87-64. - Test wiring and plug connections according to current flow diagram.
	-G191- faulty	- Replace -G191- ⇒ page 87-84.1.
01297 Footwell outlet temperature sender -G192-		
Open/short circuit to positive	Short circuit or open circuit at wiring or plug connections to footwell outlet temperature sender -G192-	- Test -G192- with 08 „Read measured value block“ ⇒ page 87-64. - Test wiring and plug connections according to current flow diagram.
Short circuit to earth	Short circuit to earth at wiring or plug connections to footwell outlet temperature sender -G192-	- Test -G192- with 08 „Read measured value block“ ⇒ page 87-64. - Test wiring and plug connections according to current flow diagram.
	-G192- faulty	- Replace -G192- ⇒ page 87-74.

1) Applies only to models with mapped cooling.

Readout on V.A.G 1552	Possible cause of fault	Rectifying fault
65535 Control unit defective		
	Wiring or plug connections to Climatronic control unit -J255- faulty	- Test wiring and plug connections according to CFD.
	Climatronic control unit faulty	- Test Climatronic control unit -J255- with 08 - „Read measured value block“ ⇒ page 87-64. - Replace Climatronic control unit -J255-. After this, select one after the other the following functions: 07 - Code control unit ⇒ page 87-63, 04 - Initiate basic setting ⇒ page 87-61.

Final control diagnosis

Notes:

Final control diagnosis has to be performed when the engine is not running, ignition switched on and Climatronic switched off (pushbutton for „Blower slower“ ⇒ page 87-73, item 17).

- *To obtain meaningful results, final control diagnosis should be carried out at an ambient temperature shown in the display of the operating and display unit of at least 12 °C.*
- *No control of the Climatronic system takes place during final control diagnosis.*
- *Final control diagnosis can be repeated several times, if necessary.*

- Connect the vehicle system tester V.A.G 1552 and select the Climatronic control unit with the address word „08“.
(Connecting vehicle system tester and selecting Climatronic control unit ⇒ page 87-49).

Test of vehicle systems Select function XX	HELP

◄ Readout in display:

- Press keys 0 and 3 for the function „Final control diagnosis“ and confirm the entry with the key Q.

Final control diagnosis
Self-test

◄ Readout in display:

The following tests are performed:

- ♦ Readout of display of operating and display unit -E87- ⇒ page 87-60.
- ♦ Function test of the 4 positioning motors.
- ♦ Test of the current path to fresh air blower -V2-.
- ♦ Test of switching operation of magnetic clutch -N25- of control unit.
- ♦ Test of all the sensors.

The test procedure is completed after about 30 seconds.

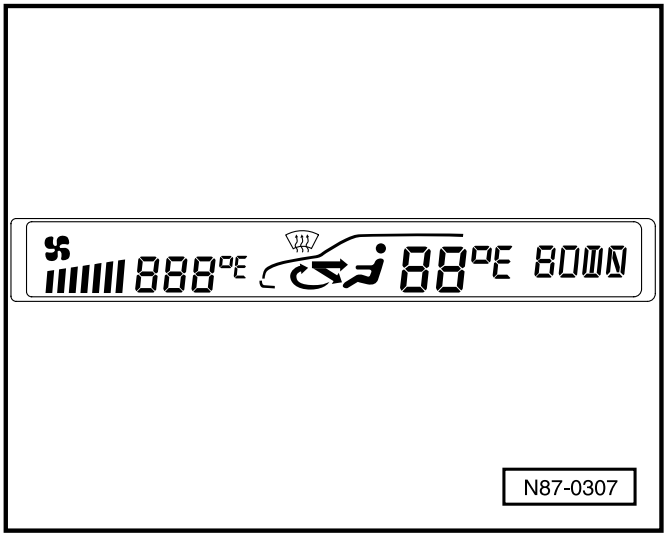
Function is unknown or cannot be carried out at the moment! →

◄ Readout in display:

- If „Function is unknown or cannot be carried out at the moment“ appears in the display, final control diagnosis is completed.
- Press the → key.

Note:

After completion of final control diagnosis, interrogate fault memory ⇒ page 87-51.



Testing readout of display of operating and display unit -E87-

◄ Complete readout in display

Note:

All the segments in the display appear during the duration of final control diagnosis 03. If this is not the case, replace the Climatronic control unit -J255-.

Basic setting

Note:

If the display flashes after „Ignition on“ although no fault was indicated by the function 02 „Interrogate fault memory“, perform the function 07 „Code control unit“ and then the function 04 „Basic setting“.

- Connect vehicle system tester V.A.G 1552 and select the Climatronic control unit with the address word 08.
  (Connecting vehicle system tester and selecting Climatronic control unit ⇒ page 87-49.)

- Interrogate fault memory ⇒ page 87-51 and rectify any faults displayed.

- Erase fault memory ⇒ page 87-62.

- Check coding ⇒ page 87-63 and correct, if necessary.

Test of vehicle systems Select function XX

◄ Readout in display (function selection):

- Press keys 0 and 4 for the function „Basic setting“ and confirm the entry with the key Q.

Basic setting HELP Enter display group number XXX

◄ Readout in display:

- Press the key 0 three times for display group number 000 and confirm the entry with the key Q.

Note:

When all the positioning motors are moved as far as the end positions, the Climatronic control unit -J255- stores the values of the potentiometer and thus adopts the basic settings of all the positioning motors.

System in basic setting 0 XXX XXX XXX XXX

◄ Readout in display:

Note:

The movements of the four positioning motors can be followed in the display. The changes to the feedback values, however, do not provide any indication of a faulty positioning motor.

Basic setting Q Enter display group number 000

◄ Readout in display:

- Confirm the entry with the key Q.

Basic setting 0 → 0 0 0 0

◄ Readout in display:

If the readout is 0, basic setting is completed. Faults detected by the system are stored in the fault memory.

- Press → key.

Test of vehicle systems HELP Select function XX

◄ Readout in display:

- Press the keys 0 and 2 for the function „Interrogate fault memory“ and confirm the entry with the key Q.

X faults recognized!

◄ The number of stored faults or „no fault recognized“ appears in the display.

- Press → key.

  The faults stored are displayed one after the other.

- After the last fault has been displayed, rectify the faults according to the fault table ⇒ page 87-51.

- Press → key.

Test of vehicle systems HELP Select function XX

◄ Readout in display:

Erasing fault memory

Requirement:

- Fault memory has been interrogated.

Erasing fault memory

Test of vehicle systems HELP Select function XX

◄ Readout in display:

- Press the keys 0 and 5 for the function „Erase fault memory“ and confirm the entry with the key Q.

Test of vehicle systems → Fault memory is erased!

◄ Readout in display:

- Press → key.

Test of vehicle systems HELP Select function XX

◄ Readout in display:

Ending output

Test of vehicle systems Select function XX	HELP

◄ Readout in display:

- Press the keys 0 and 6 for the function „End output“ and confirm the entry with the key Q.

Test of vehicle systems Enter address word XX	HELP

◄ Readout in display:

- Switch off ignition.
- Separate the plug connections to the vehicle system tester V.A.G 1552.

Coding control unit

Notes:

- *Each replacement „Climatronic control unit -J255-“ has to be coded after being installed.*
- *Each time after coding the control unit, carry out the basic setting (function 04).*
- *If the coding displayed does not match the vehicle or the equipment, the control unit has to be coded.*
- *The display of the operating and display unit -E87- flashes for 15 seconds if the control unit -J255- has not been coded.*

- Connect vehicle system tester V.A.G 1552 and select the Climatronic control unit with the address word 08.
(Connecting vehicle system tester and selecting Climatronic control unit ⇒ page 87-49.)

Test of vehicle systems Select function XX	HELP

◄ Readout in display:

- Press keys 0 and 7 for the function „Code control unit“ and confirm the entry with the key Q.

Code control unit	Q
Enter code number XXXXX	(0-32000)

◄ Readout in display:

- Enter code number as shown in the table and confirm with the key Q.

Code number	Models
01000	up to MY 2000 all countries
11000	from MY 2001 all engines except 1.6 l/75 kW
11010	from MY 2001 Engine 1.6 l/75 kW

1J1907044	SXX →
Coding 01000	WSC XXXXX

◄ The control unit identification and the part number appear in the display.

- Press → key.

Test of vehicle systems	HELP
Select function XX	

◄ Readout in display:

Note:

The Climatronic control unit uses the code which is entered and which appears in the display, only after the ignition has been switched off once.

Reading measured value block

Note:

- *The Climatronic control is in operation during the function „Read measured value block“.*

- Connect vehicle system tester V.A.G 1552 and select address word 08 „Climatronic control unit“ ⇒ page 87-49.

Test of vehicle systems	HELP
Select function XX	

◄ Readout in display:

- Press keys 0 and 8 for the function „Read measured value block“ and confirm the entry with the key Q.

Read measured value block Enter display group number XXX

◄ Readout in display:

- Enter the desired display group number.

Read measured value block Enter display group number 001	Q

◄ Readout in display:

- Confirm the entry with the key Q.

Read measured value block		1	→
1	2	3	4

◄ Readout in display:

Notes:

- *Explanation of the readouts in the individual display blocks ⇒ page 87-66, List of available display group numbers.*
- *After completing the function „Read measured value block“, interrogate fault memory ⇒ page 87-51.*
- *If the specified values are achieved in all the display blocks:*

- Press → key.

Test of vehicle systems Select function XX	HELP

◄ Readout in display:

Note:

Proceed as follows in order to switch to another display group:

Display group	V.A.G 1552
higher	Press ↑ key
lower	Press ↓ key
skipping	Press key C

List of available display group numbers

Display group number	Display block	Designation
001	1	Compressor, magnetic clutch -N25- (code number 1 up to 17 states reason for switching off N25) **Code: 0** N25 is not switched off. **Code: 1** N25 is switched off by AC pressure switch -F129- because of excessively high pressure in refrigerant circuit. **Code: 2** N25 is switched off because the fresh air blower -V2- or the fresh air blower control unit -J126- is faulty. **Code: 3** N25 is switched off by the AC pressure switch -F129- because of insufficient pressure in the refrigerant circuit. **Code: 4** Is not displayed. **Code: 5** N25 is switched off for 4 seconds (not a fault). Code 5 appears only for 5 seconds. If display remains, test engine speed signal. **Code: 6** N25 is switched off, ECON mode (not a fault). **Code: 7** N25 is switched off because the delivery of the fresh air blower was switched off at the fan button (not a fault). **Code: 8** N25 is switched off because the ambient temperature is below 3 °C (to prevent icing-up, not a fault). If necessary, test temperature sensor -G17- and -G89-. **Code: 9** Is not displayed. **Code: 10** N25 is switched off because the voltage in the electrical system is less than 9.5 V. **Code: 11** N25 is switched off because a coolant temperature of more than 118 °C was detected (as a protection against overheating of engine). **Code: 12** N25 is switched off by the automatic gearbox control unit or by the engine control unit through the Climatronic control unit -J255-. **Code: 13** N25 is switched off because the supply voltage (terminal 15) is more than 17 V. **Code: 14** N25 is switched off in order to prevent icing-up of evaporator (not a fault). Test -G263-, if necessary. **Code: 15** N25 is switched off because no or incorrect coding of Climatronic control unit -J255-. **Code: 16** N25 is switched off because of fault in cable connections to magnetic clutch -N25-. **Code: 17** N25 is switched off because of fault at high-pressure sender -G65-.

Display group number	Display block	Designation
001	2	Engine speed detected (code 0 - no) (code 1 - yes) Possibly: on off
	3	Vehicle speed (readout 0 to 255 km/h)
	4	Stationary time (code 0 up to 240 - time for „Ignition off“ in minutes) (code 250 - battery was disconnected) (code 255 - transmission fault)
002	1	Temperature flap positioning motor -V68- (code of measured value: 0 up to 255) (permissible variation from specification ± 2)
	2	Temperature flap positioning motor -V68- (specification: 0 up to 255)
	3	Temperature flap positioning motor -V68- Flap stop: cold (code 0 up to 149 - V68 faulty) (code 150 up to 250 - V68 is o.k. provided basic setting 04 has been performed) (code 251 up to 255 - V68 faulty)
	4	Temperature flap positioning motor -V68- Flap stop: warm (code 0 up to 4 - V68 faulty) (code 5 up to 100 - V68 is o.k. provided basic setting 04 has been performed) (code 101 up to 255 - V68 faulty)
003	1	Central flap positioning motor -V70- (code of measured value: 0 up to 255) (permissible variation from specification ± 2)
	2	Central flap positioning motor -V70- (specification: 0 up to 255)
	3	Central flap positioning motor -V70- Flap stop: air to dash panel vents (code 0 up to 149 - V70 faulty) (code 150 up to 250 - V70 is o.k. provided basic setting 04 has been performed) (code 251 up to 255 - V70 faulty)
	4	Central flap positioning motor -V70- Flap stop: air to footwell/Defrost vents (code 0 up to 4 - V70 faulty) (code 5 up to 100 - V70 is o.k. provided basic setting 04 has been performed) (code 101 up to 255 - V70 faulty)

Display group number	Display block	Designation
004	1	Footwell/Defrost flap positioning motor -V85- (code of measured value: 0 up to 255) (permissible variation from specification ± 2)
	2	Footwell/Defrost flap positioning motor -V85- (specification: 0 up to 255)
	3	Footwell/Defrost flap positioning motor -V85- Flap stop: air to footwell (code 0 up to 149 - V85 faulty) (code 150 up to 250 - V85 is o.k. provided basic setting 04 has been performed) (code 251 up to 255 - V85 faulty)
	4	Footwell/Defrost flap positioning motor -V85- Flap stop: air to windscreen (code 0 up to 4 - V85 faulty) (code 5 up to 100 - V85 is o.k. provided basic setting 04 has been performed) (code 101 up to 255 - V85 faulty)
005	1	Fresh air flap positioning motor -V71- (code of measured value: 0 up to 255) (permissible variation from specification ± 2)
	2	Fresh air flap positioning motor -V71- (specification: 0 up to 255)
	3	Fresh air flap positioning motor -V71- Flap stop: fresh air into passenger compartment (code 0 up to 149 - V71 faulty) (code 150 up to 250 - V71 is o.k. provided basic setting 04 has been performed) (code 251 up to 255 - V71 faulty)
	4	Fresh air flap positioning motor -V71- Flap stop: recirculated air into passenger compartment (code 0 up to 4 - V71 faulty) (code 5 up to 100 - V71 is o.k. provided basic setting 04 has been performed) (code 101 up to 255 - V71 faulty)
006	1	Value in °C computed by the Climatronic control unit -J255-, which appears in the display of the operating and display unit -E87-. The value is calculated from the temperature measurements of the fresh air intake duct temperature sensor -G89- and of the outside temperature sensor -G17-. The value is lower than the measured values of -G17- and -G89- display if the vehicle is parked. If the measured values of the temperature sensors -G17- and -G89- display the current value, this is not a fault. The values harmonise during a lengthy trip. -G17- or -G89- is faulty if an extremely abnormal value is shown.
	2	Intake air temperature sender -G89- (current measured value in °C)
	3	Outside temperature sensor -G17- (current measured value in °C)
	4	Sunlight penetration photo sensor -G107- (measured value in %, from 0 up to 120)

Display group number	Display block	Designation
007	1[1]	Middle outlet temperature sender -G191- (current measured value in °C)
	2	Footwell outlet temperature sender -G192- (current measured value in °C)
	3	Dash panel temperature sensor -G56- (current measured value in °C)
	4[1]	Evaporator outlet temperature sender -G263- (current measured value in °C)
008	1	Fresh air blower -V2- (specification in V) Off: 0 V One blower bars: 3.6 V Seven blower bars: 12 V
	2	Fresh air blower -V2- (actual value, measured in V) Permissible variation from specification ± 0.8 V
	3	Terminal 15 (measured value: voltage in V)
	4	Is not displayed.
009[4]	1	Two-way valve for coolant shutoff valve -N147- (on/off)[2]
	2	Is not displayed.
	3	Is not displayed.
	4	Is not displayed.
010[3][4]	1	Position of temperature flap switch (off/on)
	2	Heater (off/on)
	3	Windscreen wipers (off/on)
	4	Coolant temperature display
011[4]	1	Display lighting (depends on position of lighting rheostat -E20-) (measured value in %, from 0 up to 100)
	2	Engine speed increase request (off/on)
	3	Is not displayed.
	4	Is not displayed.

1) Only for models with mapped cooling

2) Valve -N147- is closed in the „on“ position.

3) Ignore values at present.

4) Applies to models from MY 2001.

Note:

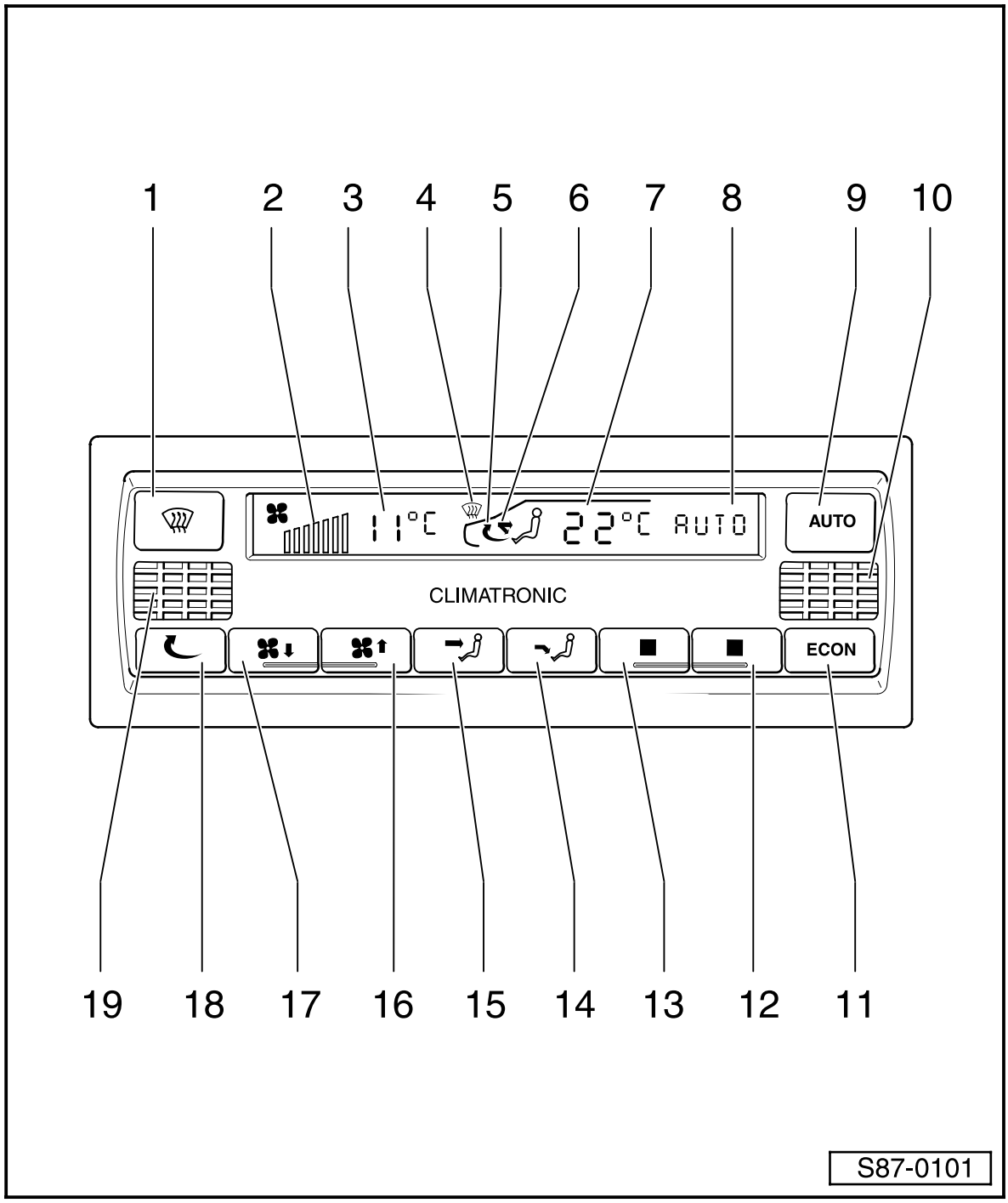
After completing the function „Read measured value block“, interrogate fault memory ⇒ page 87-51.

Climatronic - air conditioning with automatic control

Notes:

- *When the „AUTO“ button is pressed, all the settings which vary from the automatic mode, are cancelled.*
- *In the „ECON“ mode only the compressor is switched off, the heating and ventilation mode continues to be controlled electronically.*
- *If a variation is made from the automatic mode before switching off the ignition, the functions selected remain permanently stored. Only the *Recirculated air mode“ function is cancelled 20 minutes after switching off the ignition.*
- *Variations from automatic mode ⇒ Owner’s Manual.*
- *If all the symbols in the display panel of the operating and display unit of the Climatronic -E87- flash after the ignition is switched on, there is a fault in the system. In this case, first of all interrogate the fault memory ⇒ page 87-51.*

Function of Climatronic operating and display unit -E87-



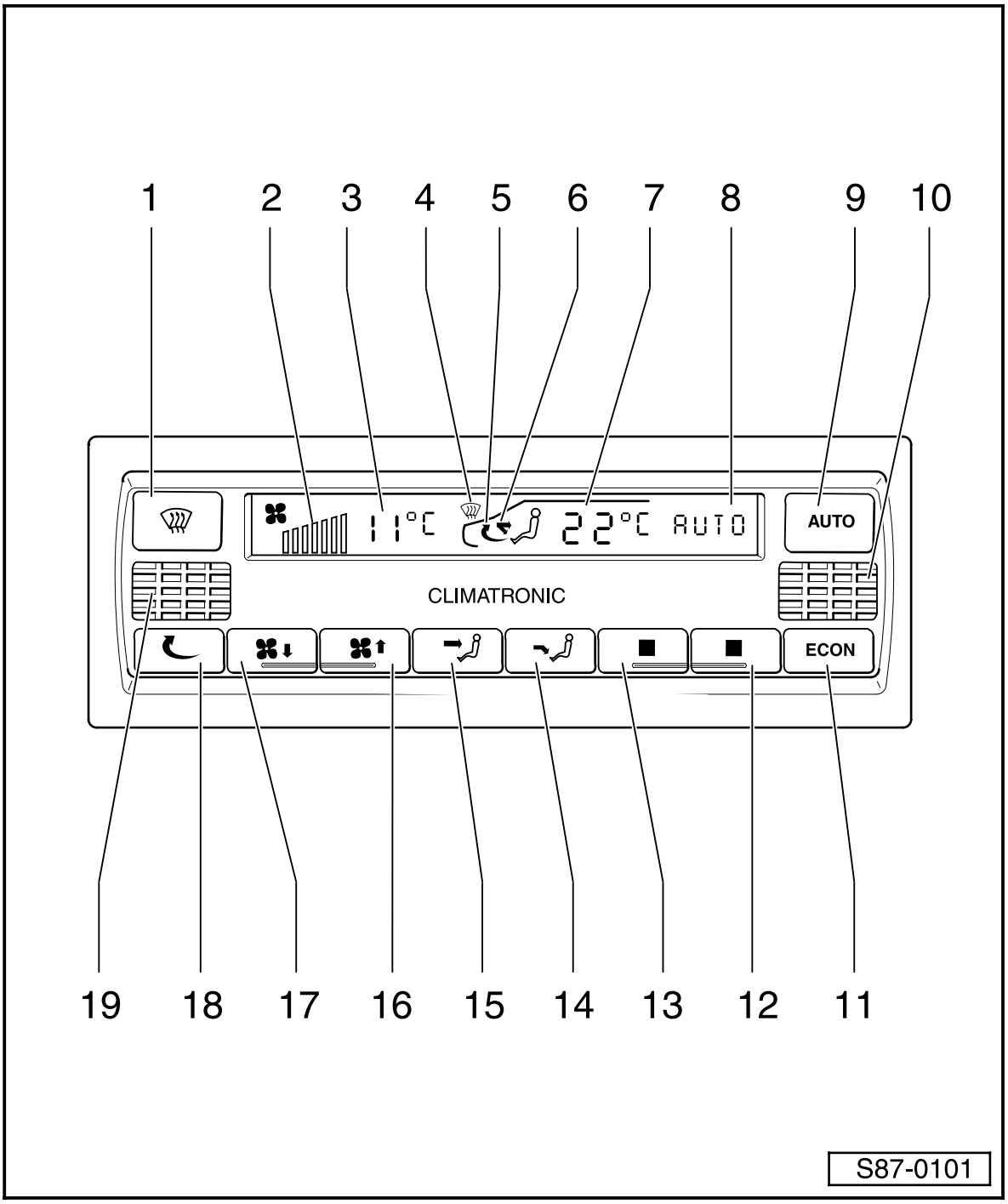
1 - Pushbutton for defrosting windscreen

2 - Display of blower stage

- In the automatic mode -8- an average blower stage is displayed irrespective of the actual blower speed.

3 - Display of ambient temperature

- If the road speed drops below 15 km/h and the coolant temperature is higher than 70 °C, no change occurs to the temperature displayed. In other words, it is not the actual measured ambient temperature which is displayed as this could be falsified at low speeds by the heat dissipated by the vehicle engine.



4 - Display for defrosting windscreen

5 - Display for recirculated air mode

6 - Display for air flow direction

- When pushbutton -14- is pressed, the display for air flow to footwell appears or goes out.
- When pushbutton -15- is pressed, the display for air flow to head appears or goes out.

7 - Display of selected interior temperature

- Switching over from Celsius to Fahrenheit and vice versa:
  Press and hold pushbutton -11- and then press pushbutton -9-. The appropriate unit of measurement for the temperature appears in the display.

8 - Display

„AUTO“: for automatic mode

- In the automatic mode, the Climatronic maintains the selected interior temperature fully automatically.
  In this case, the temperature of the air flowing out, the blower speed and the air distribution are varied automatically.

„ECON“: for cooling system off

- In the ECON mode, only the compressor is switched off; the heating and ventilation continue to be controlled automatically.

„OFF“: entire system switched off

- Switch off with pushbutton -17-.

9 - Pushbutton for „automatic mode“

10 - Dash panel temperature sensor -G56- and blower for temperature sensor -V42-

- Installation point for right-hand steering models

11 - „ECON“ pushbutton

- In the „ECON“ mode, only the compressor is switched off; the heating and ventilation continue to be controlled automatically.

12 - Pushbutton for „warmer“

13 - Pushbutton for „colder“

14 - Pushbutton for „air directed to footwell“

15 - Pushbutton for „air directed to head“

16 - Pushbutton for „blower faster“

17 - Pushbutton for „blower slower“

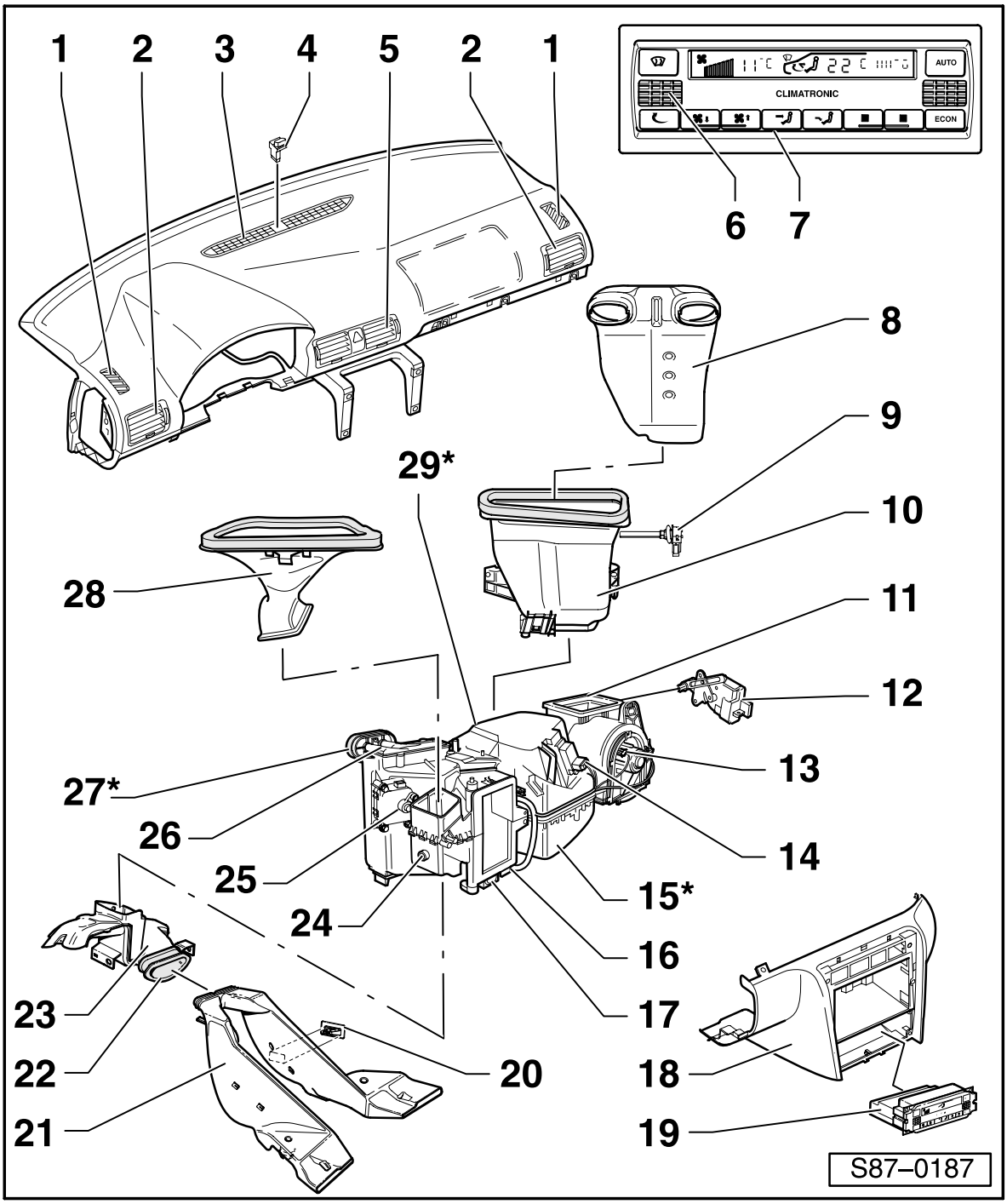
- Switching off air conditioning:
  Press pushbutton often enough until the display „OFF“ appears (blower speed: 0).

18 - Pushbutton for „fresh air/recirculated air“

19 - Dash panel temperature sensor -G56- and blower for temperature sensor -V42-

- Installation point for left-hand steering models

Climatronic passenger compartment



Important!

Disconnect the battery earth strap before commencing any work in the electrical system.

Notes:

- *Before disconnecting the battery, determine the code of radio sets fitted with anti-theft coding.*
- *When the battery is re-connected:*
  - encode radio,
  - re-set clock,
  - initialise all power windows.

⇒ Inspection and Maintenance

- *Parts marked with * can only be serviced in service centre workshops as the refrigerant must first of all be extracted with a service station.*

1 - Side window defroster vent
- Removing: lever out carefully

2 - Outer dash panel vent
- Removing: lever out carefully

3 - Windscreen defroster vent
- Removing: lever out carefully, unplug connector from sunlight penetration photo sensor -G107-

4 - Sunlight penetration photo sensor -G107-
- Task: controlling temperature flap and fresh air blower in line with intensity of sunlight
- Emergency mode if it fails: control unit -J255- adopts fixed value
- Testing: by self-diagnosis
- Removing and installing ⇒ Fig. 1

5 - Centre dash panel vent
- Unit with warning light switch
- Removing: lever out carefully, unplug connector from warning light switch

6 - Dash panel temperature sensor -G56- with temperature sensor blower -V42-
- The control -J255-, operating display unit -E87- and dash panel temperature sensor -G56- with temperature sensor blower -V42- are a single component which cannot be dismantled
- Testing: by self-diagnosis
- Task: controlling temperature flap and fresh air blower in line with temperature
- Emergency mode if -G56- fails: continuous operating with assumed value of +24 °C
- After replacing:
  „Code control unit“ function 07 ⇒ page 87-63 and then perform „Basic setting“ function 04 ⇒ page 87-61

7 - Operating and display unit -E87-
- The control -J255-, operating display unit -E87- and dash panel temperature sensor -G56- with temperature sensor blower -V42- are a single component which cannot be dismantled
- Testing: by self-diagnosis
- Operation and function ⇒ page 87-71
- Removing and installing ⇒ page 87-79
- After replacing:
  „Code control unit“ function 07 ⇒ page 87-63 and then perform „Basic setting“ function 04 ⇒ page 87-61

8 - Intermediate piece for centre dash panel vent
- Only with Climatronic
- Located in air guide duct for dash panel vents
- Remove and install together with dash panel

9 - Centre outlet temperature sender -G191-
- Models with mapped cooling
- Removing and installing, testing ⇒ page 87-84.1

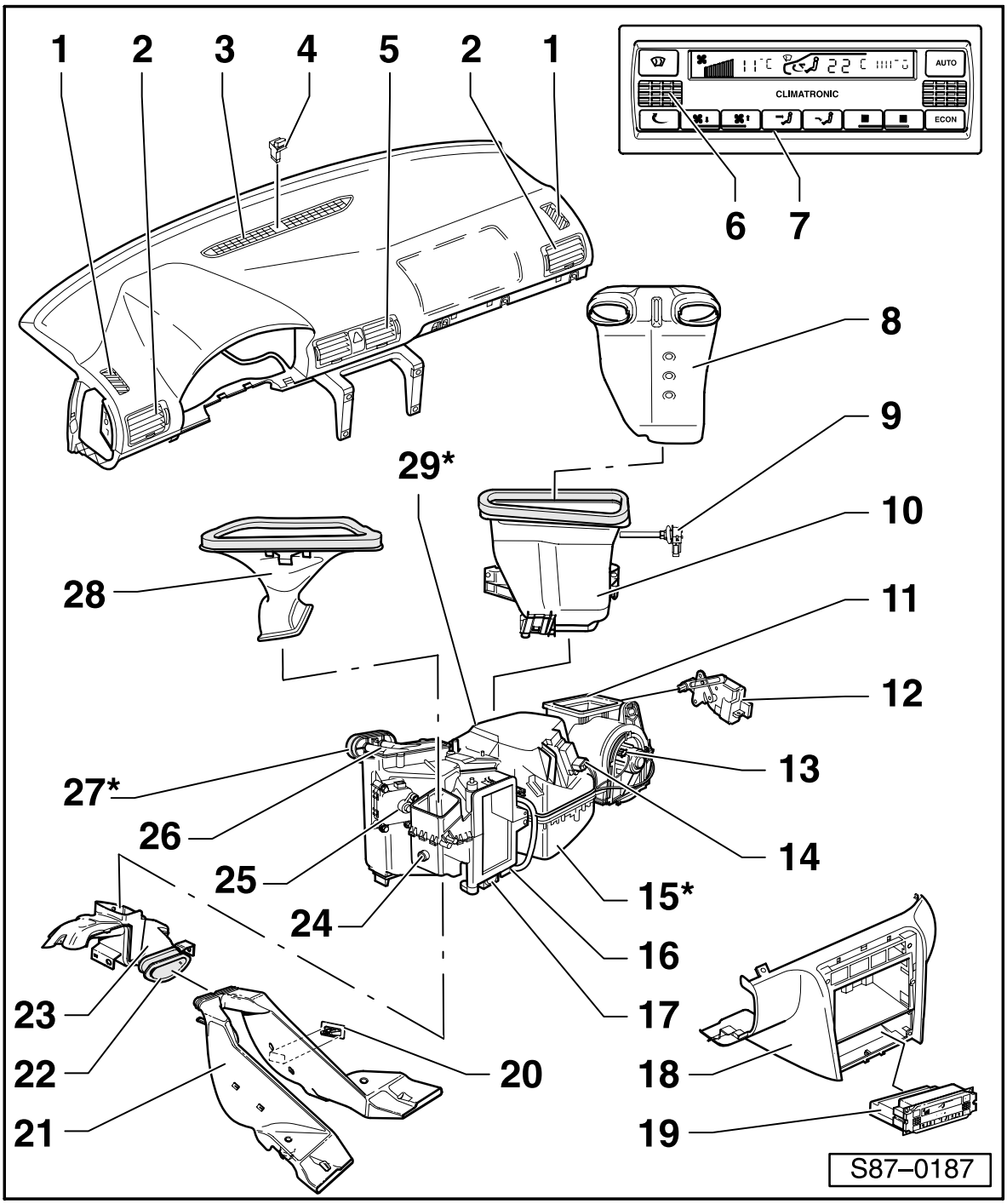
10 - Air guide duct for dash panel vents
- Screwed to junction box, attached by catch at top

11 - Fresh air intake duct temperature sensor -G89-
- Task: controlling temperature flap and fresh air blower in line with temperature
- Emergency mode if it fails: outside temperature sensor -G17- performs task
- Testing: by self-diagnosis
- Replacing:
- Remove glove box.

⇒ Body Fitting Work; Repair Group 70; Removing and installing dash panel

- Turn temperature sensor through 90° and pull out.
- When installing, moisten rubber seal with oil.

12 - Fresh air flap motor -V71-
- Operates fresh and recirculated air flap at the same time
- Testing: by self-diagnosis
- Replacing ⇒ page 87-80
- Setting:
  Perform function 04 „Basic setting“ ⇒ page 87-61



13 - Fresh air blower -V2-
- Testing: by self-diagnosis
- Removing ⇒ Fig. 2

14 - Blower control unit -J126-
- Task: controlling delivery of fresh air blower steplessly in line with voltages
- Testing: by self-diagnosis
- Replacing ⇒ Fig. 3

15 - Air conditioner*
- With heat exchanger
- With evaporator
- Removing and installing ⇒ page 87-84

16 - Temperature flap motor -V68-
- Testing: by self-diagnosis
- Replacing ⇒ page 87-82
- Setting:
  Perform function 04 „Basic setting“ ⇒ page 87-61

17 - Central flap motor -V70-
- Testing: by self-diagnosis
- Replacing ⇒ page 87-83
- Setting:
  Perform function 04 „Basic setting“ ⇒ page 87-61

18 - Centre part of dash panel
- ♦ Removing and installing

⇒ Body Fitting Work; Repair Group 70; Removing and installing dash panel

19 - Climatronic control unit -J255-
- ♦ The control -J255-, operating display unit -E87- and dash panel temperature sensor -G56- with temperature sensor blower -V42- are a single component which cannot be dismantled
- ♦ Testing: by self-diagnosis
- ♦ Removing and installing ⇒ page 87-79
- ♦ Setting:
  „Code control unit“ function 07 ⇒ page 87-63 and then perform „Basic setting“ function 04 ⇒ page 87-61

20 - Footwell vent
- ♦ Only front passenger side

21 - Rear duct

22 - Connection piece to rear duct

23 - Footwell vent
- ♦ Removing and installing ⇒ page 80-15

24 - Footwell outlet temperature sender -G192-
- ♦ Task: controlling Defrost/footwell air distribution and delivery of fresh air blower in line with outlet temperature
- ♦ Emergency mode if it fails: operation continues with assumed value of +80 °C coolant temperature
- ♦ Testing: by self-diagnosis
- ♦ Removing and installing ⇒ Fig. 4

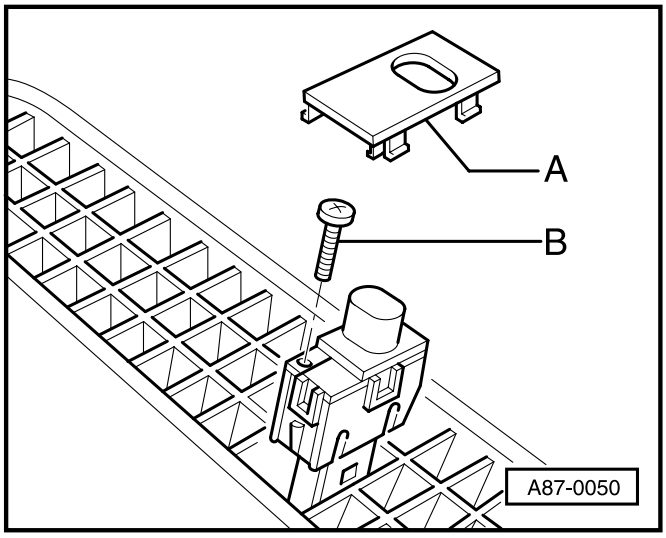
25 - Footwell/Defrost flap motor -V85-
- ♦ Testing: by self-diagnosis
- ♦ Replacing ⇒ page 87-84
- ♦ Setting:
  Perform function 04 „Basic setting“ ⇒ page 87-61

26 - Heat exchanger*
- ♦ After removing, replace coolant complete
- ♦ Removing and installing ⇒ page 87-40

27 - Heat exchanger/cross wall gasket*
- ♦ Pay attention to installation position ⇒ page 87-40

28 - Air guide duct to defroster vents
- ♦ Removing and installing ⇒ page 80-4

29 - Evaporator outlet temperature sender -G263-*
- ♦ Models from 03.01
- ♦ Removing and installing, testing ⇒ page 87-84.2

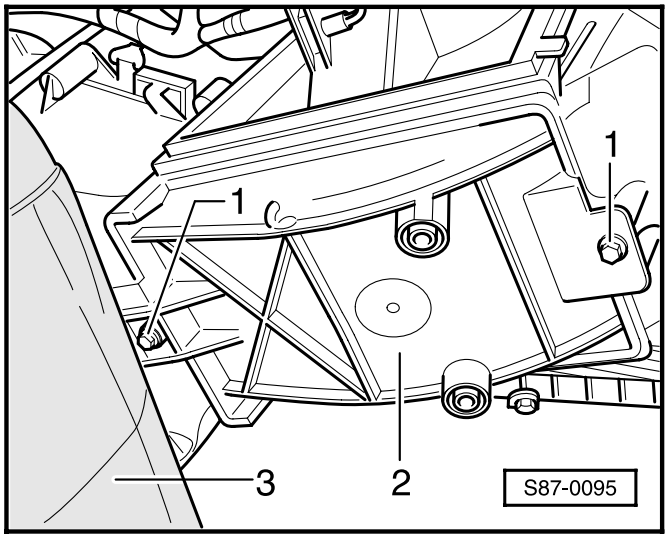


◄ **Fig. 1 Removing and installing sunlight penetration photo sensor -G107-**

- Carefully lever off, -A-.
- Remove screw -B-.
- Unplug connector and take out photo sensor.

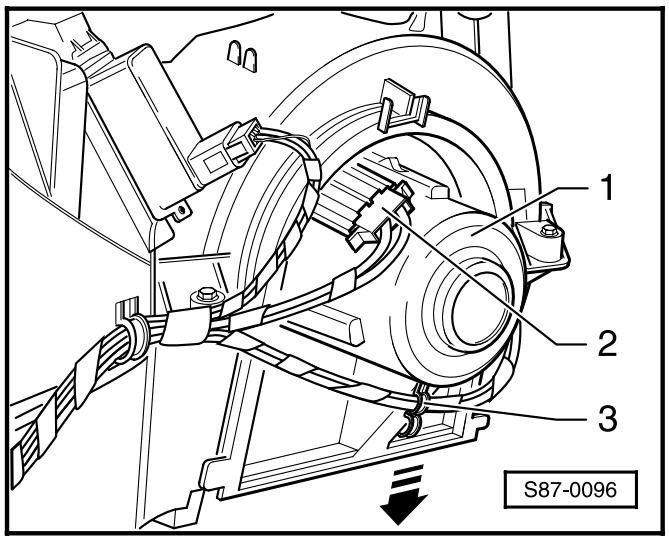
Installing

Installation is performed in the reverse order.

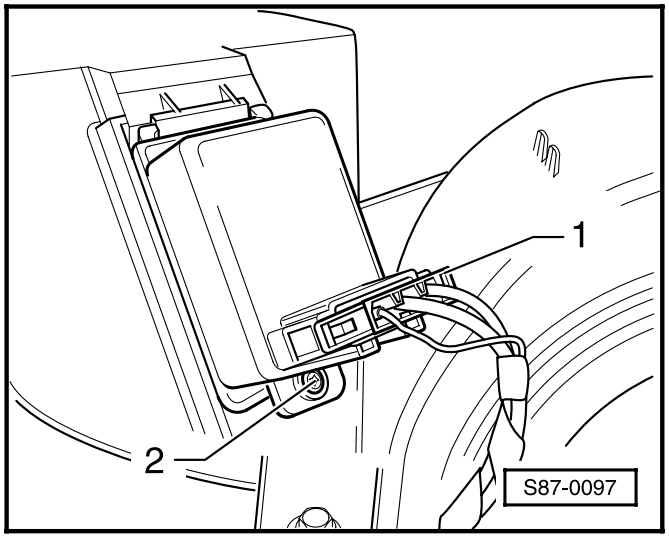


◄ **Fig. 2 Removing fresh air blower -V2-**

- Remove glove box.
⇒ Body Fitting Work; Repair Group 70; Removing and installing dash panel
- Remove foam cover -3- below air conditioner.
- Remove bolts -1-.
- Take off cover -2-.

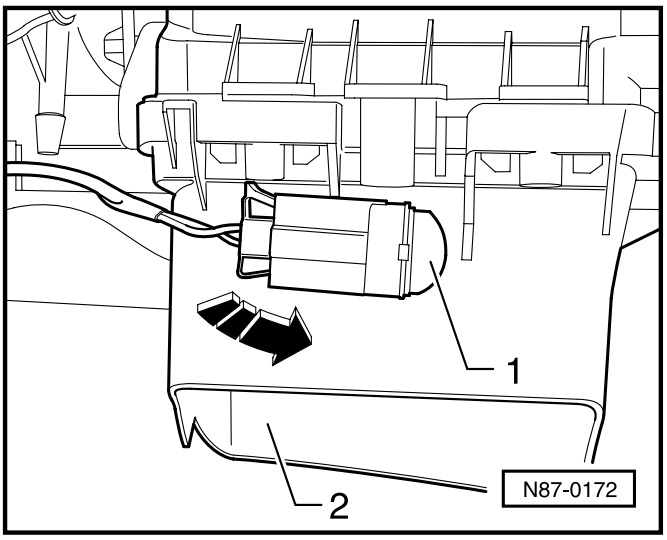


◄ - Separate plug connection -2- at fresh air blower.
- Take wiring loom out of fixture -3-.
- Pull fresh air blower -1- down and out -in direction of arrow-.



◄ **Fig. 3 Replacing fresh air blower control unit -J126-**

- Remove glove box.
⇒ Body Fitting Work; Repair Group 70; Removing and installing dash panel
- Unplug connector -1- and remove screw -2- (catch at top).



◄ **Fig. 4 Removing and installing footwell vent temperature sender -G192-**

Removing

- Remove left bottom part of dash panel.

⇒ Body Fitting Work; Repair Group 70; Removing and installing dash panel

- Unplug connector at footwell vent temperature sender -G192-.

- Turn footwell vent temperature sender -1- 90° and pull out of the housing -2-.

Installing

When installing, moisten rubber seal of the footwell vent temperature sender -G192- with oil.

Removing and installing operating and display unit -E87- together with Climatronic control unit -J255-

Warning!

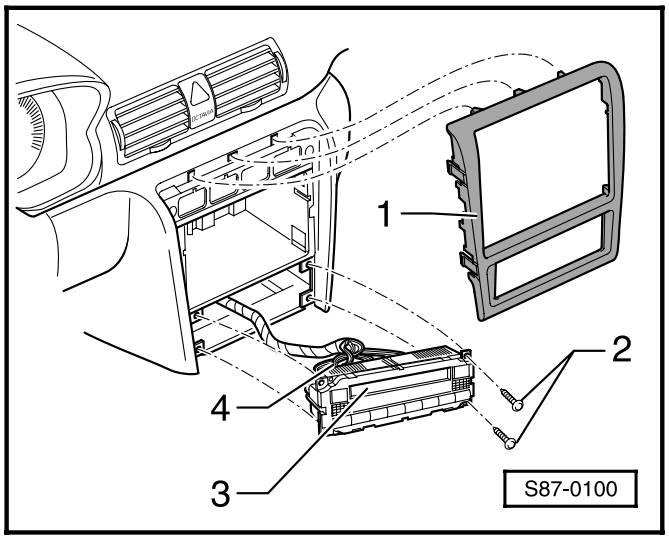
Disconnect earth strap of battery before performing any work on the electrical system.

Notes:

- *Before disconnecting the battery, determine the coding of radio set fitted with anti-theft coding.*
- *When the battery is re-connected, check the vehicle equipment:*
  - Perform coding of radio
  - Re-set time
  - Initialise power windows

⇒ Inspection and Maintenance

- *Control unit -J255- and operating and display unit -E87- are a single unit and cannot be disassembled.*



Removing

◄ - Use a screwdriver and a base to unclip trim surround -1-.

- Remove the screws from the centre part of the dash panel.
- Pull operating and display unit together with control unit -3- forward.
- Release plug connections -4- and separate.

Installing

- Installation is carried out in the same way in the reverse order.
- „Code control unit“ function 07 ⇒ page 87-63 and then „Initiate basic setting“ function 04 ⇒ page 87-61.

Replacing positioning motors for air conditioning control

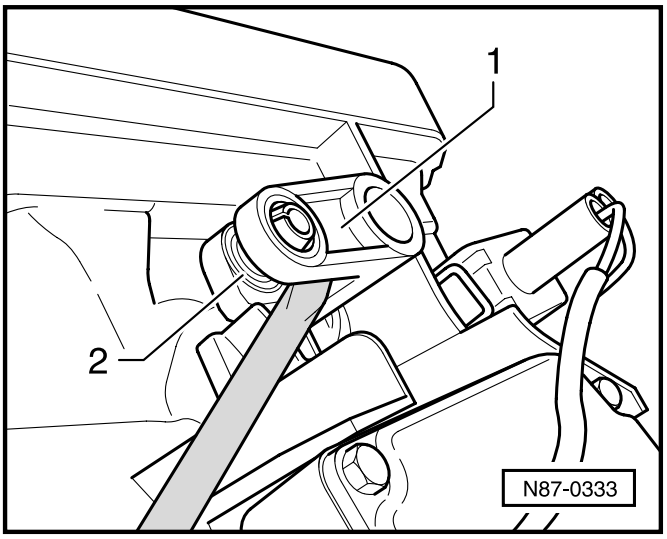
Warning!

Disconnect earth strap of battery before performing any work on the electrical system.

Notes:

- *Before disconnecting the battery, determine the coding of radio set fitted with anti-theft coding.*
- *When the battery is re-connected, check the vehicle equipment:*
  - Perform coding of radio
  - Re-set time
  - Initialise power windows
- *When installing the positioning motors, ensure that the wiring looms are correctly routed.*
  They should be installed so that they do not come into contact with any moving parts (for example the levers of the positioning motors).
- *After installing a new positioning motor, perform the function 04 „Basic setting“ ⇒ page 87-61.*

Removing and installing air flow flap positioning motor -V71-



Note:

The positioning motor for the air flow flap also operates the fresh and recirculated air flap.

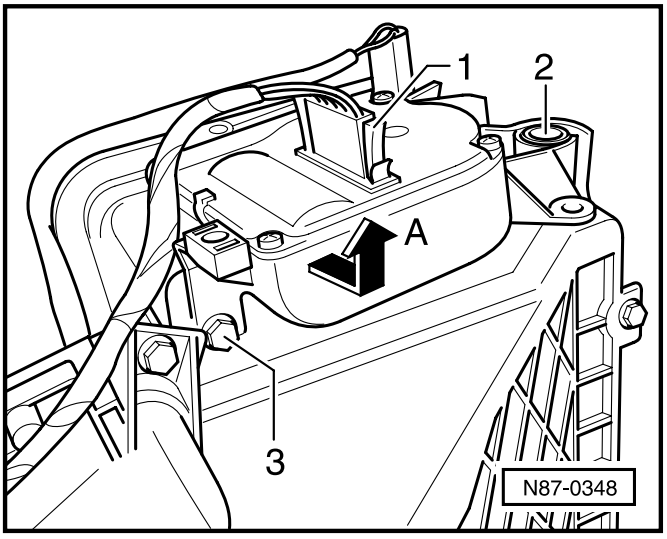
Removing

- Remove glove box.

⇒ Body Fitting Work; Repair Group 70; Removing and installing dash panel

- Detach cover below air conditioner on right.

◄- Use a screwdriver to carefully unclip operating rod for air flow flap -1- from the lever -2-.

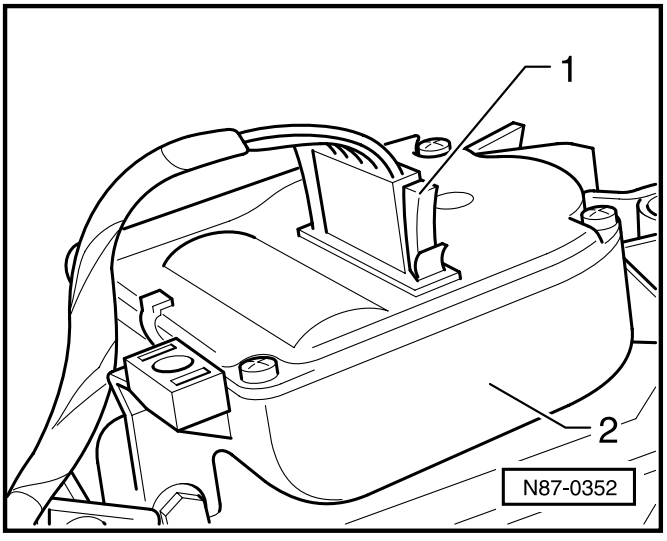


◄- Separate plug connection -1-.

- Unscrew bolt attaching motor -3-.

The positioning motor is guided in the housing of the air conditioner. In order to avoid damage:

- Move positioning motor down and at the same time pull it out of the shaft of fresh air/ recirculated air flap -2- -arrow A-.



Installing

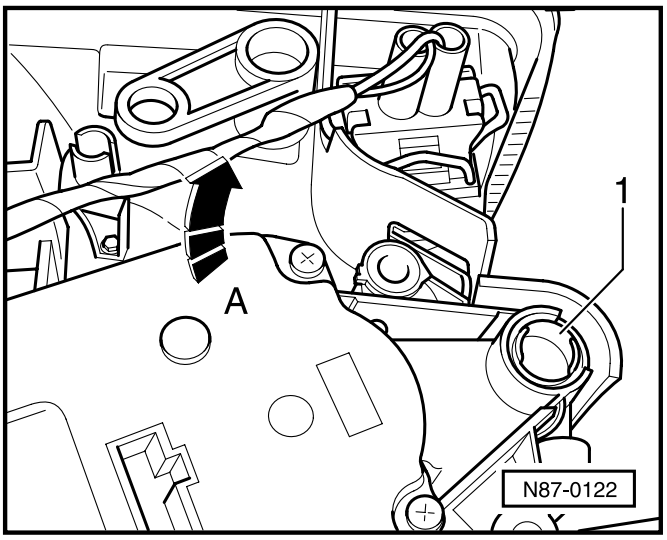
A new positioning motor is supplied in the „recirculated air“ position. To facilitate installation of the motor, please perform the following steps first of all:

◄- Plug in connector -1- at positioning motor -2-.

- Switch on ignition.

- Operate fresh air/recirculated air pushbutton.

- When middle position is reached, unplug connector -1- from positioning motor -2-.



◄- Insert positioning motor into shaft of fresh air/recirculated air flap -1-.

If it is not possible to insert the motor into the shaft of fresh air/recirculated air flap -1-, remove fresh air blower -V2- ⇒ page 87-78, Fig. 2, and position the flap manually.

- Turn positioning motor in direction of arrow A and bolt tight.

- Clip operating rod for air flow flap into place.

- Initiate basic setting function 04 ⇒ page 87-61.

Removing and installing temperature flap positioning motor -V68-

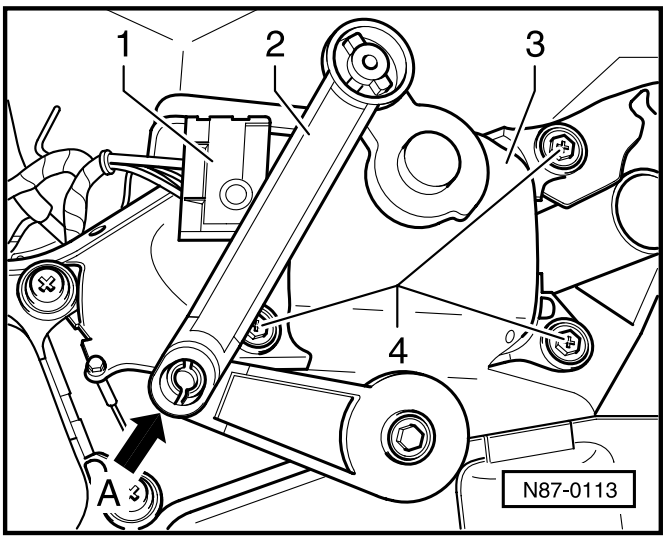
First of all, carry out the following steps:

- Remove glove box, trim surround for dash panel insert and bottom part of dash panel on left.
⇒ Body Fitting Work; Repair Group 70; Removing and installing dash panel

- Remove centre console.
⇒ Body Fitting Work; Repair Group 68; Removing and installing centre console

- Remove centre part of dash panel.
⇒ Body Fitting Work; Repair Group 70; Removing and installing dash panel

- Remove footwell vent ⇒ page 80-15.



Removing

- Separate plug connection -1-.

◄- Use a screwdriver to carefully unclip operating rod -2- from lever -arrow A-.

- Unscrew bolts -4- attaching motor.

- Take out positioning motor -3-.

Installing

- Installation is performed in the same way in the reverse order.

- Initiate basic setting function 04 ⇒ page 87-61.

Removing and installing central flap positioning motor -V70-

First of all, perform the following steps:

- Remove glove box, trim surround for dash panel insert and bottom part of dash panel on left.

⇒ Body Fitting Work; Repair Group 70; Removing and installing dash panel

- Remove centre console.

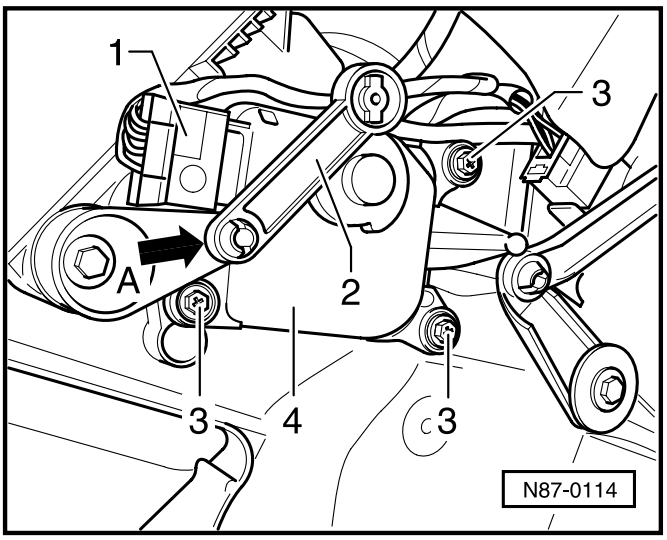
⇒ Body Fitting Work; Repair Group 68; Removing and installing centre console

- Remove centre part of dash panel.

⇒ Body Fitting Work; Repair Group 70; Removing and installing dash panel

- Remove footwell vent ⇒ page 80-15.

Removing



- Separate plug connection -1-.

◄ - Use a screwdriver to carefully unclip operating rod -2- from lever -arrow A-.

- Unscrew bolts -3- attaching motor.

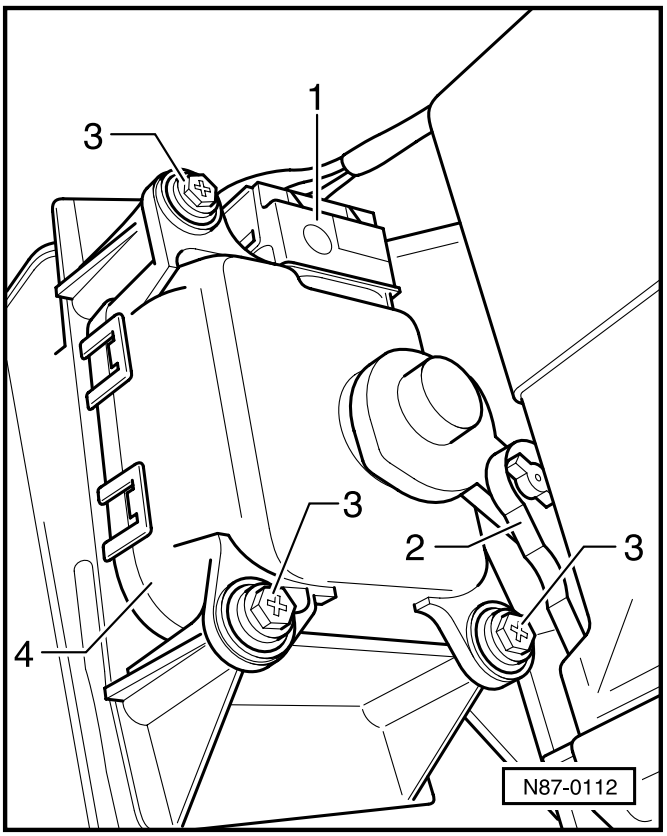
- Turn operating rod -2- and take it off from positioning motor -4-.

- Take out positioning motor.

Installing

- Installation is performed in the same way in the reverse order.

- Initiate basic setting function 04 ⇒ page 87-61.



Removing and installing footwell/defrost flap positioning motor -V85-

Removing

- Remove bottom part of dash panel on left.
⇒ Body Fitting Work; Repair Group 70; Removing and installing dash panel

◄- Separate plug connection -1-.

- Unscrew bolts -3- attaching motor.

- Take positioning motor -4- off the operating rod -2- by turning it.

- Take positioning motor -4- off the housing.

Installing

- Installation is performed in the same way in the reverse order.

- Initiate basic setting function 04
⇒ page 87-61.

Removing and installing air conditioner

Removing and installing the air conditioner of the Climatronic system is essentially identical to that of the air conditioning system with manual control ⇒ page 87-38.

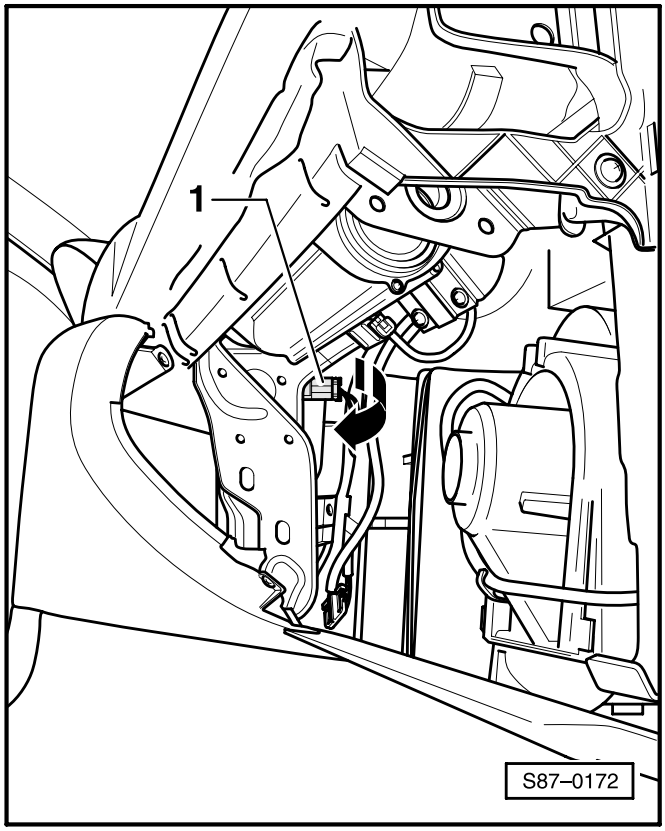
The only difference is that the operating and display unit -E87- has to be removed in place of the heater controls (cables).

- After installing the air conditioner, initiate basic setting function 04 ⇒ page 87-61.

Centre outlet vent sender -G191-

Models with mapped cooling

Removing



- Remove glove box.

⇒ Body Fitting Work; Repair Group 70; Removing and installing dash panel

- Unplug connector.

◄ - Turn sender -1- through 90° -arrow- and remove.

Installing

Installation is performed in the reverse order.

Testing

- Measure resistance between the contacts of the sender.

  Specification at 25 °C:
  9.7 ... 10.3 kΩ

If the specification is not achieved:

- Replace centre outlet temperature sender.

If the specification is achieved:

- Test wiring according to current flow diagram; repair if necessary.

⇒ Current Flow Diagrams, Electrical Fault Finding and Fitting Locations

If the wiring is o.k.:

- Test Climatronic control unit ⇒ page 87-51 (interrogate fault memory); replace if necessary ⇒ page 87-79.

Evaporator outlet temperature sender -G263-

Models from 03.01

Removing

The evaporator outlet temperature sender is located at the rear of the evaporator housing.

- Remove air conditioner ⇒ page 87-84.
- Unplug connector.
- Turn sender through 90° and remove.

Installing

Installation is performed in the reverse order.

Testing

- Measure resistance between the contacts of the sender.

  Specification at 25 °C:
  960 ... 1056 Ω

If the specification is not achieved:

- Replace evaporator outlet temperature sender.

If the specification is achieved:

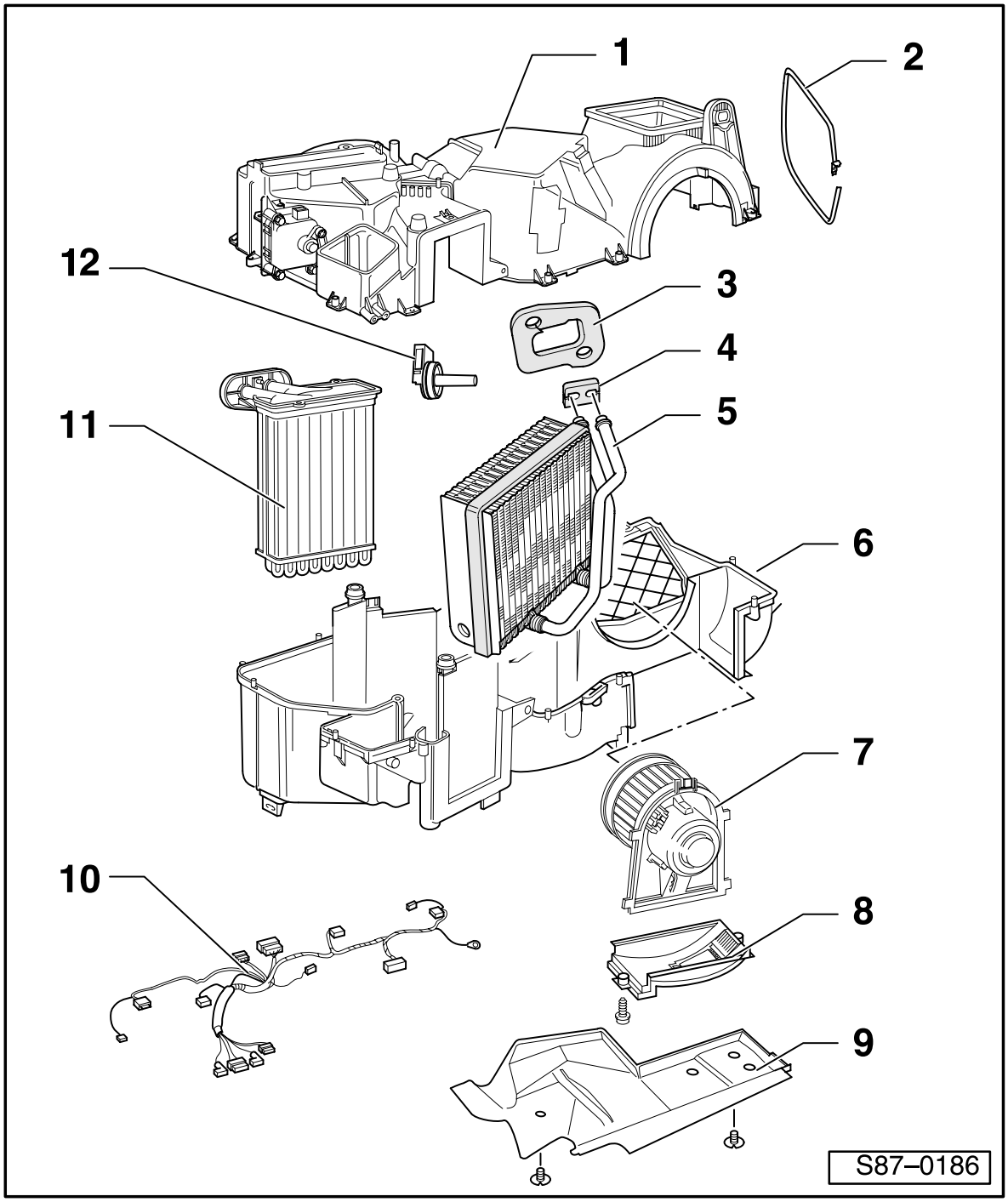
- Test wiring according to current flow diagram; repair if necessary.

⇒ Current Flow Diagrams, Electrical Fault Finding and Fitting Locations

If the wiring is o.k.:

- Test Climatronic control unit ⇒ page 87-51 (interrogate fault memory); replace if necessary ⇒ page 87-79.

Disassembling and assembling evaporator housing



Removing and installing air conditioner ⇒ page 87-84.

1 - Top part of evaporator housing
- Separating and assembling evaporator housing ⇒ Fig. 1

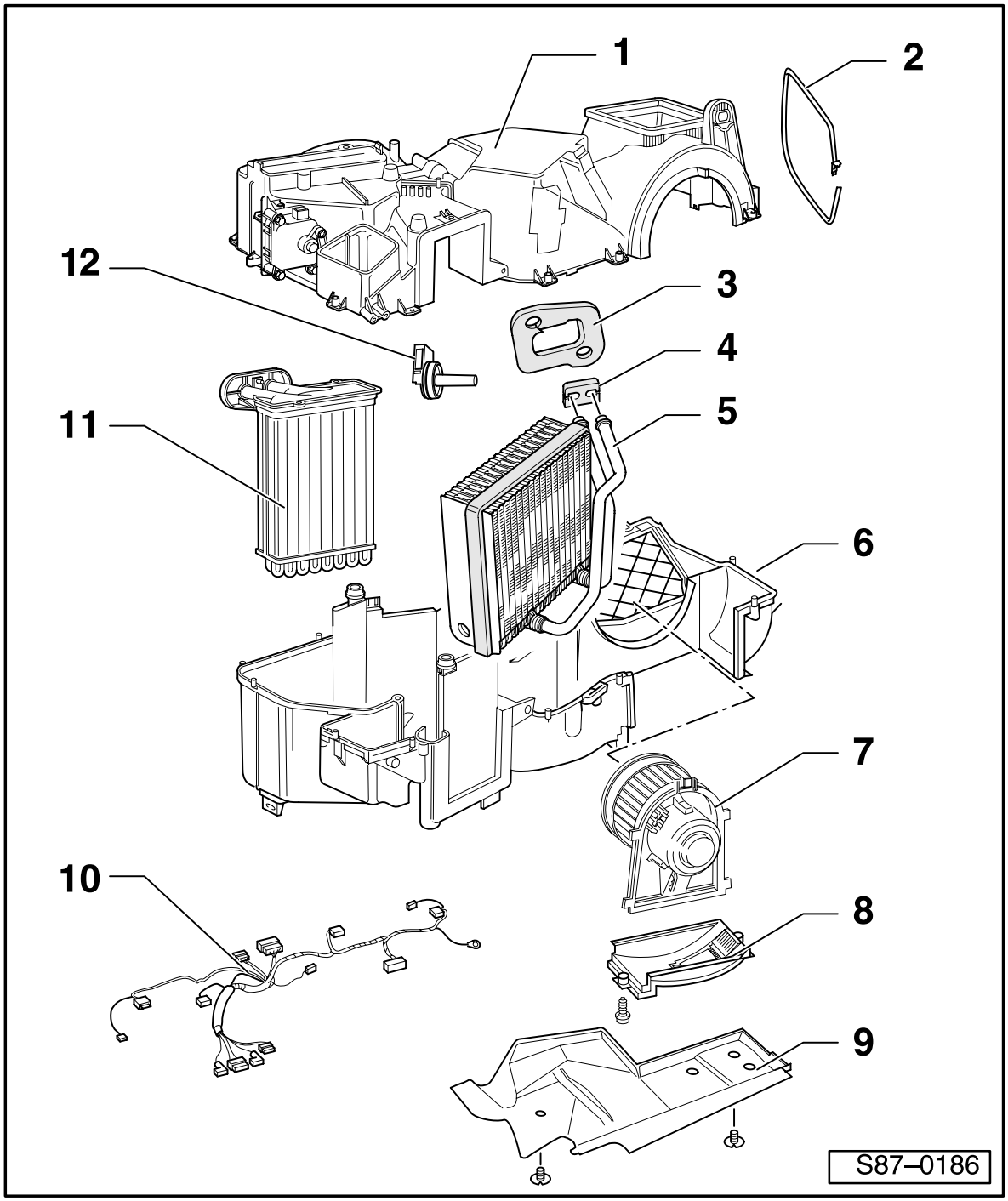
2 - Tensioning strap for cover
- Ensure correctly routed ⇒ Fig. 2

3 - Seal
- Replace

- Attaching seal to evaporator housing ⇒ Fig. 5

4 - Seal
- Attaching seal to refrigerant lines ⇒ Fig. 3

5 - Evaporator
- Attaching seal to refrigerant lines ⇒ Fig. 3
- Attaching seal to evaporator ⇒ Fig. 4



6 - Bottom part of evaporator housing
- Separating and assembling evaporator housing ⇒ Fig. 1

7 - Fresh air blower -V2-
- Removing and installing ⇒ page 87-78, Fig. 2

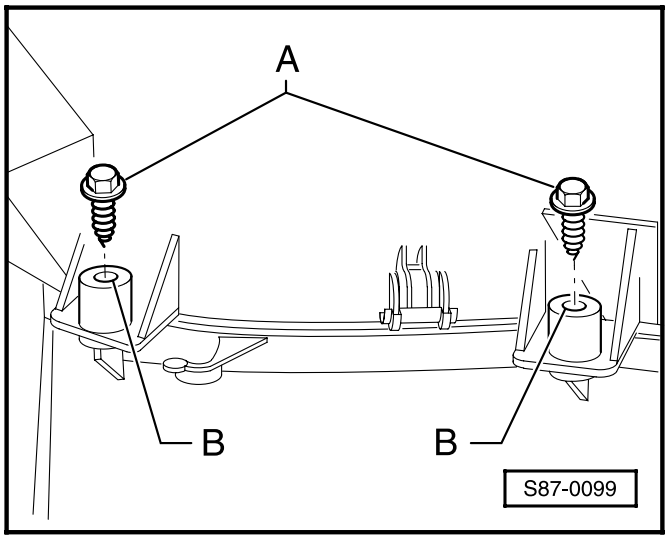
8 - Cover for fresh air blower -V2-
- Screwed on

9 - Foam cover
- Screwed on and attached with tensioning strap -2-
- Must rest firmly against evaporator housing

10 - Air conditioner wiring loom
- When installing, ensure clearance to moving parts ⇒ Fig. 6

11 - Heat exchanger
- After replacing, fill system complete with fresh coolant
- Removing and installing ⇒ page 87-40

12 - Evaporator outlet temperature sender -G263-
- Models from 03.01
- Removing and installing, testing ⇒ page 87-84.2

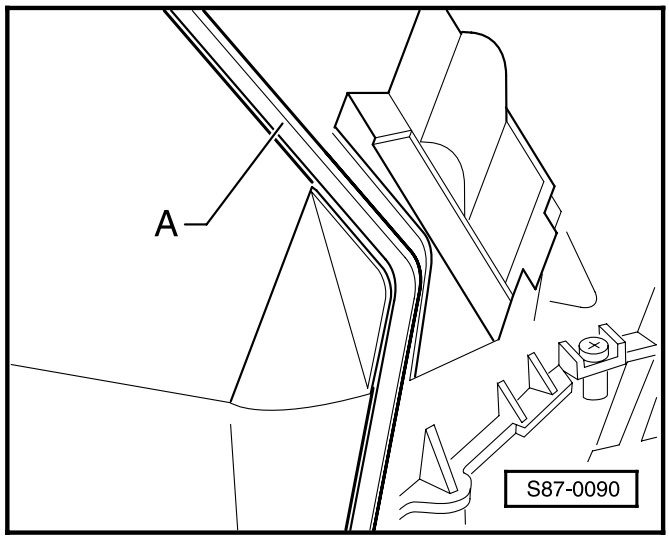


◄ **Fig. 1 Separating and assembling evaporator housing**

- The two halves of the housing should be fitted together at the attachment points provided -B- using the original bolts -A-.

Note:

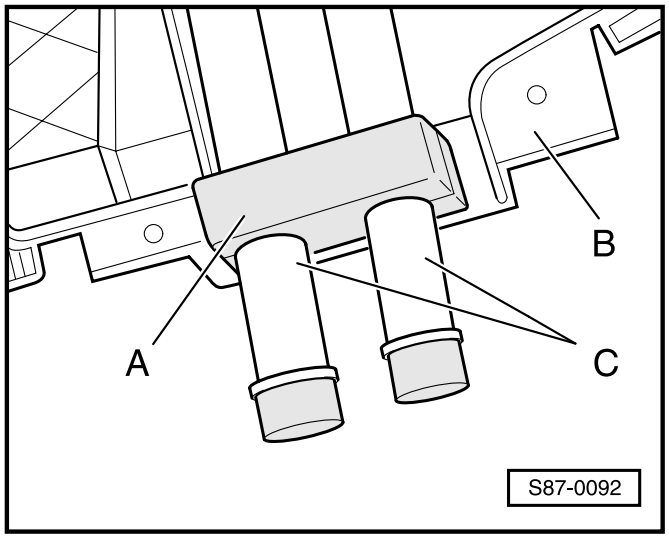
The bolt points -B- are provided around the entire circumference.



◄ **Fig. 2 Routing tensioning strap**

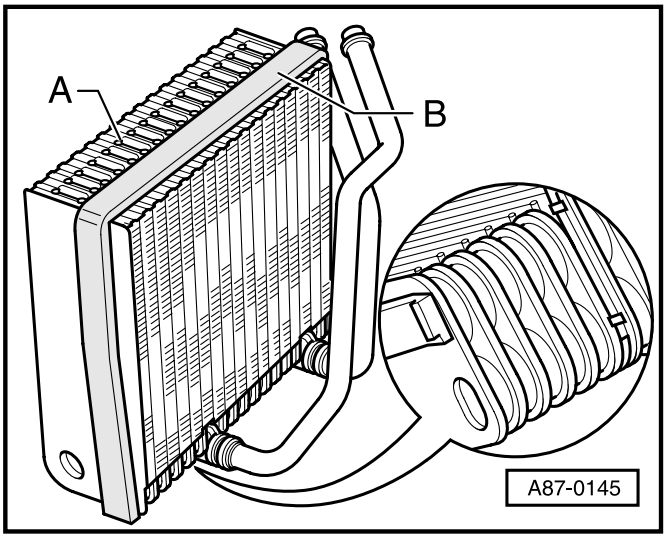
Notes:

- *Ensure the tensioning strap -A- is correctly routed around the evaporator housing.*
- *The tensioning strap has to hold the cover tight against the evaporator housing.*



◄ **Fig. 3 Attaching gasket to refrigerant lines of evaporator**

- The refrigerant lines -C- should be sealed to the two housing halves -B- with the gasket -A-.

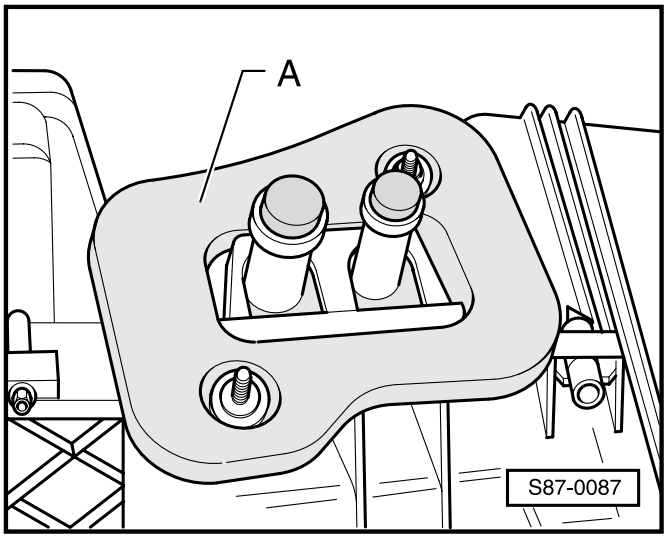


◄ **Fig. 4 Attaching gasket to evaporator**

- The evaporator -A- is sealed at the top and on both sides with the gasket -B- to the evaporator housing.

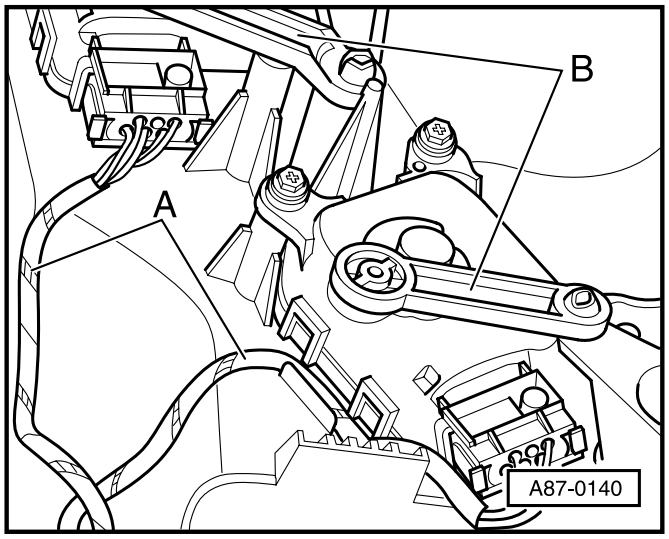
Note:

No gasket is fitted to the bottom part of the evaporator (to allow the condensation to flow off).



◄ **Fig. 5 Attaching gasket to evaporator housing**

- Replace gasket -A- and ensure it is correctly installed on the connection flange of the evaporator.

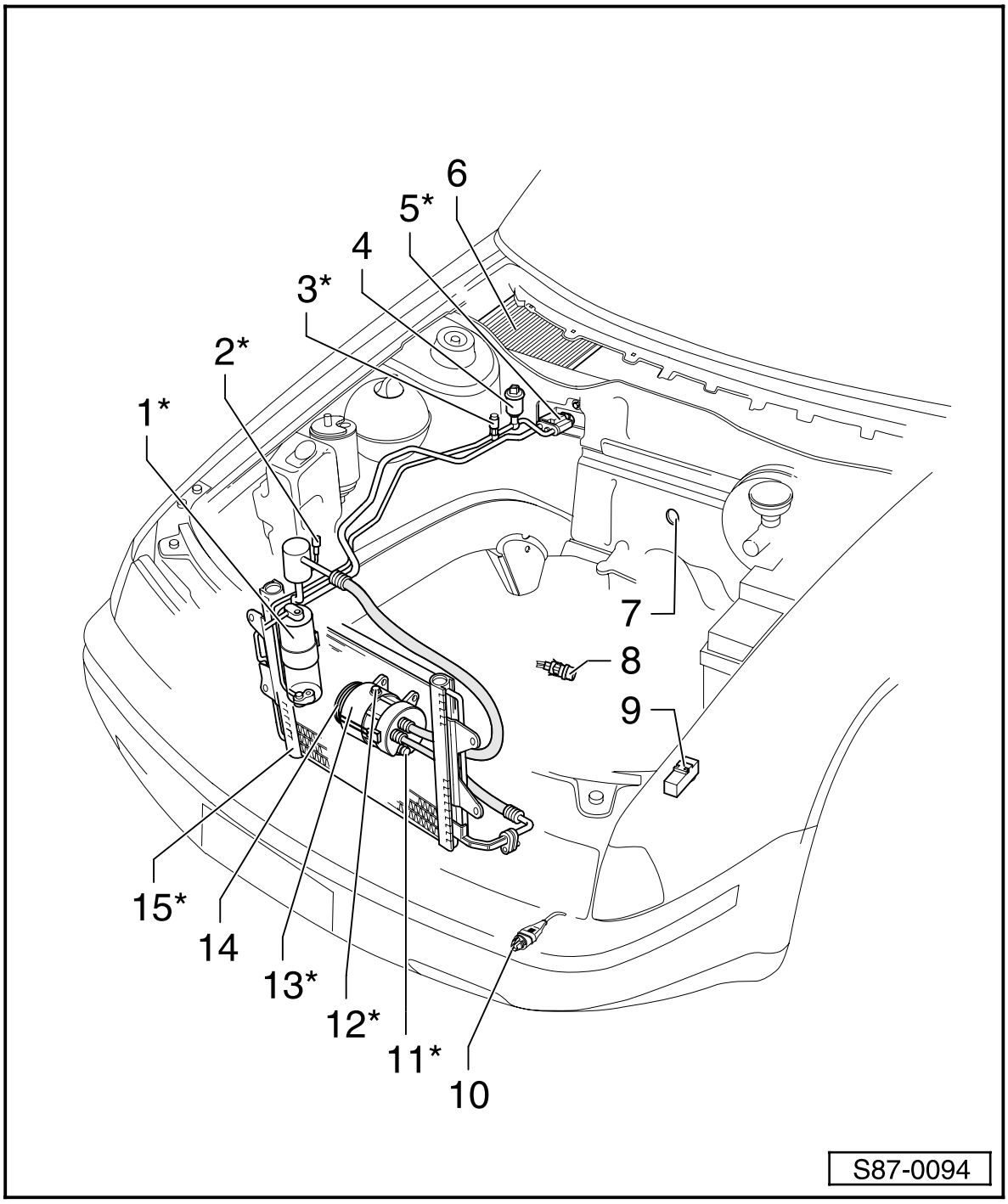


◄ **Fig. 6 Installing air conditioner wiring loom**

Notes:

- *Install the wiring loom -A- so that it cannot come into contact with any moving parts (e.g. levers -B- of positioning motors).*
- *Route wiring loom so that it does not rattle.*

Climatronic - engine compartment



Notes:

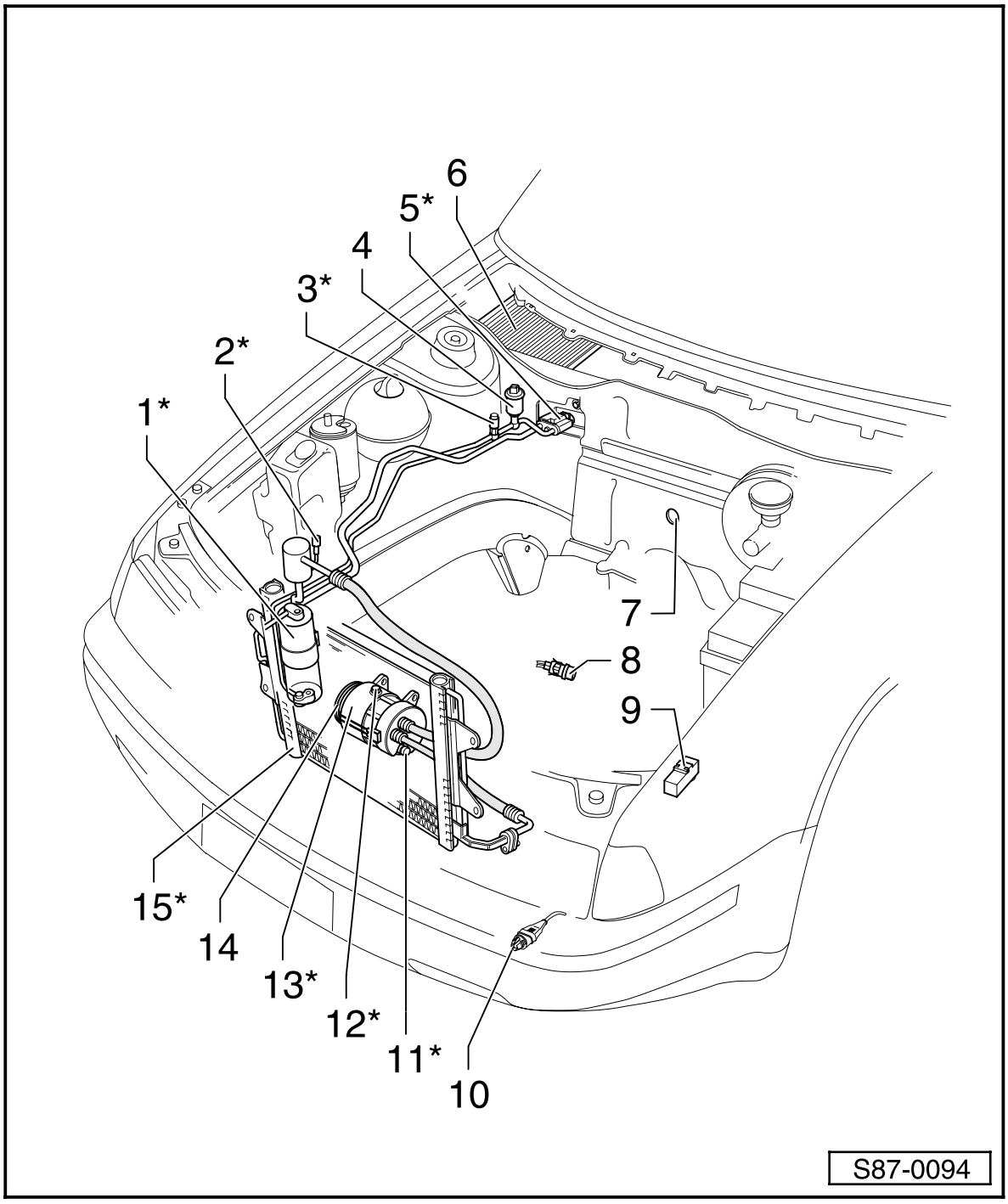
- *All parts of the air conditioning system as well as all refrigerant hoses and refrigerant lines marked with * can only be serviced in service centre workshops as the refrigerant has to be extracted first of all using a service station.*
- *Observe safety precautions when working on models with air conditioning and when handling the refrigerant R 134a.*
- *Pay attention to notes regarding work on the refrigerant circuit.*

1 - Receiver with drier*

- Removing and installing ⇒ page 87-30
- Replace the receiver each time the refrigerant circuit is opened

2 - Extraction and filling valve*

- Low-pressure side
- For extracting, filling and measuring
- Always fit on cap with seal



3 - Extraction and filling valve*
- High-pressure side
- For extracting, filling and measuring
- Always screw on cap with seal

4 - Air conditioning pressure switch -F129- or high-pressure sender -G65-
- -G65- is fitted in place of -F129- on models from Model Year 99 with 1.6-ltr./74 kW engine
- -G65- is fitted to all models as of Model Year 2000
- -F129- (4-pin plug connection), operation, removing and installing, testing ⇒ page 87-24
- -G65- (3-pin plug connection), operation ⇒ page 87-11, removing and installing, testing ⇒ page 87-25

5 - Expansion valve*
- Removing and installing heat insulation ⇒ page 87-26
- Detaching and attaching refrigerant lines ⇒ page 87-26
- Removing and installing ⇒ page 87-26

6 - Dust and pollen filter
- Below plenum chamber cover
- Removing and installing ⇒ page 80-16

7 - Condensation drain valve
- Inspecting, removing and installing ⇒ page 87-27

8 - Coolant temperature warning switch (+119 °C) -F14-
- In refrigerant circuit
- -F14- switches magnetic clutch -N25- off if coolant temperature too high (off at 119 °C, on at 112 °C)
- 1.6-ltr./74 kW ➤ Model Year 98 and all models ➤ Model Year 99

9 - Radiator fan control unit -J293-
- Bolted on below battery rack
- The magnetic clutch -N25- of the compressor is also operated through this control unit

10 - Ambient temperature sensor -G17-
- Task: operating temperature flap and fresh air blower as a function of the ambient temperature
- Emergency mode in the event of failure: fresh air intake duct temperature sensor -G89- performs this task. If both sensors are faulty, air conditioning continues operating with assumed value of +10 °C; no recirculated air mode is possible; readout in display of operating and display unit -E87-: „-“.
- Testing: by self-diagnosis
- Bolted to longitudinal member at front left

11 - Pressure relief valve*
- O-ring seal: 8.6 mm; 1.8 mm
- Tightening torque: 10 Nm
- Testing ⇒ page 87-28

12 - Oil drain plug*
- O-ring seal: 8.8 mm; 1.5 mm
- Tightening torque: 15 Nm

Notes:

For draining refrigerant oil:

- *Remove compressor.*
- *Remove oil drain plug.*
- *Rotate compressor at clutch plate of magnetic clutch in order to accelerate the flowing out of the oil.*

13 - Compressor*
- Removing and installing compressor bracket ⇒ Engine, Mechanical Components
- Detaching and attaching compressor at bracket ⇒ page 87-28
- Detaching and attaching refrigerant lines ⇒ page 87-29
- Removing and installing compressor ⇒ page 87-29

Notes:

- *Removing and installing ribbed V-belt.*

⇒ *Engine, Mechanical Components*

- *Mark direction of running of ribbed V-belt before removing; if the belt is fitted on to run in the opposite direction, it may be damaged.*
- *The piston stroke of the compressor is variable and depends on the refrigerant capacity requested.*
- *If a new compressor is installed or if fresh refrigerant oil is poured into the compressor (e.g. after cleaning refrigerant circuit and emptying compressor through oil drain plug), the compressor should be rotated by hand approx. 10 revolutions after being installed (in order to avoid compressor damage when first operated).*

14 - Magnetic clutch -N25-
- Servicing ⇒ page 87-32

15 - Condenser*
- Removing and installing ⇒ page 87-31