Workshop Manual

Golf Variant 2007 ➤
Golf Variant 2010 ➤
Jetta 2005 ➤
Jetta 2011 ➤

Heating, air conditioning

Edition 04.2010

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

Repair Group

80 - Heating

87 - Air conditioning system

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

Contents


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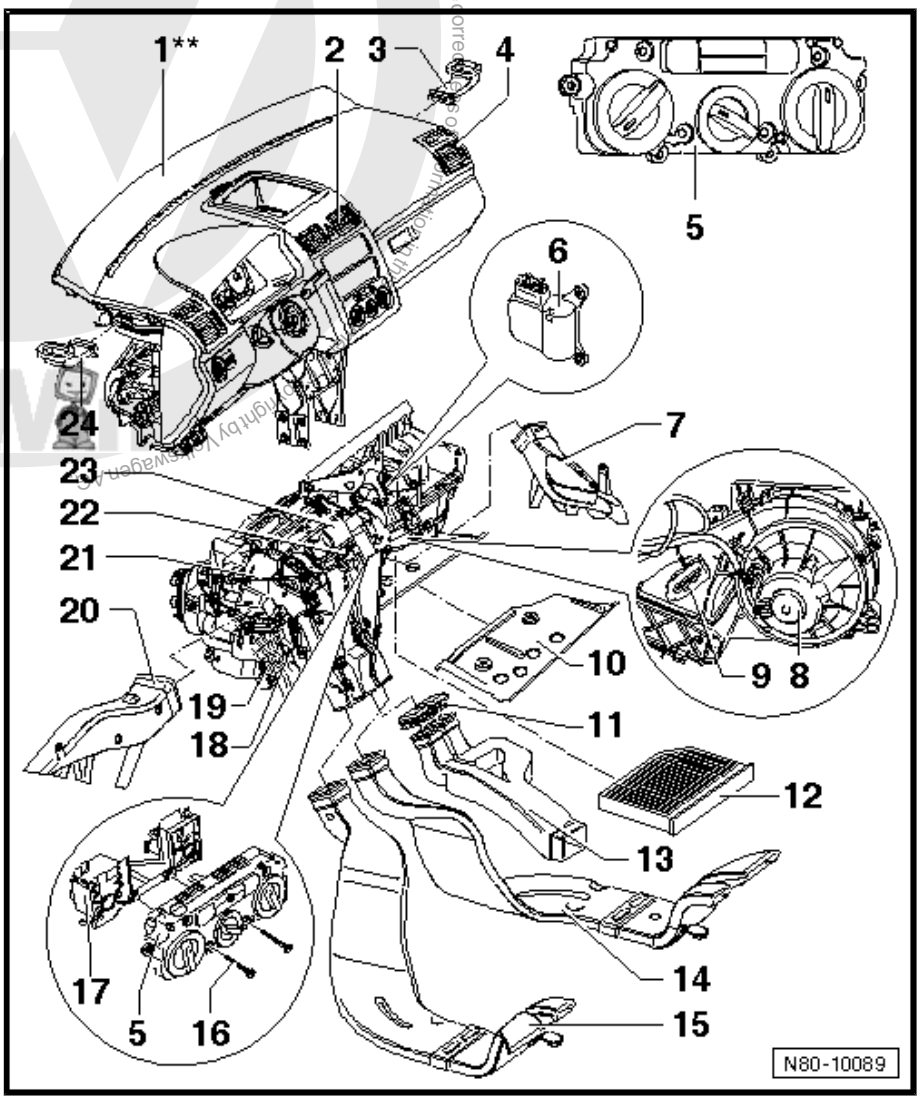
80 – Heating

1 Repairing heating system

1.1 Heater - passenger compartment (Golf Variant 2007►, Golf Variant 2010► und Jetta 2005►)

Disconnect battery before removing components marked ** ⇒ Rep. gr. 27 .



1 - Dash panel**

2 - Centre vents

- ❑ Removing vent ⇒ page 7 .

3 - Right side vent

4 - Right vent

- ❑ Removing vent ⇒ page 8 .

5 - Controls for fresh and heated air

- ❑ With fresh air and air recirculation flap switch -E159- .
- ❑ For vehicles with supplementary heating having instant heating button -E537- .
- ❑ Removing controls ⇒ page 14 .

6 - Fresh air and air recirculation flap control motor -V154-

- ❑ Removing ⇒ page 19

7 - Right footwell vent

- ❑ Removing and installing ⇒ page 9

8 - Fresh air blower -V2-

- ❑ Removing ⇒ page 5

9 - Fresh air blower series resistor with overheating fuse -N24-

- ❑ Removing and installing ⇒ page 6

10 - Baffle plate for heater unit

- ❑ Removing ⇒ page 3

11 - Sealing cap

- ❑ Fitted only in vehicles without air duct to vent in rear centre console.

12 - Dust and pollen filter

- ❑ With activated charcoal filter
- ❑ Removing and installing ⇒ page 6

13 - Connecting piece

- ❑ For centre console air duct.
- ❑ To remove, centre console must be removed ⇒ Rep. gr. 68 .

14 - Air duct for right rear footwell

- ❑ Removing and installing ⇒ page 8

15 - Air duct for left rear footwell

- ❑ Removing and installing ⇒ page 8

16 - Securing bolt

- ❑ Qty. 8
- ❑ Various lengths.

17 - Adapter for controls

- ❑ Removing and installing ⇒ page 18

18 - Auxiliary air heater element -Z35-

Vehicles ► 1K-7M 119 726

- ❑ With auxiliary air heater control unit -J604- .
- ❑ Checking: with vehicle diagnosis, testing and information system -VAS 5051- (or later model), under Heating, ventilation, air conditioning; Systems capable of self-diagnosis; Auxiliary heating; Electrical components.
- ❑ Removing and installing ⇒ page 26

Vehicles 1K-7M 119 726 ►

- ❑ A 3-speed auxiliary air heater element -Z35- is fitted here; it is controlled by the respective engine control unit via relays.
- ❑ Installed only in vehicles with diesel engines without supplementary heater.
- ❑ Removing and installing ⇒ page 27

19 - Heat exchanger

- ❑ After renewing heat exchanger, renew coolant completely ⇒ Rep. gr. 19 .
- ❑ Removing and installing ⇒ page 19

20 - Left footwell vent

- ❑ Removing and installing ⇒ page 9

21 - Bowden cable for temperature flap

- ❑ Removing and installing ⇒ page 18

22 - Flexible shaft

- ❑ Removing and installing ⇒ page 17

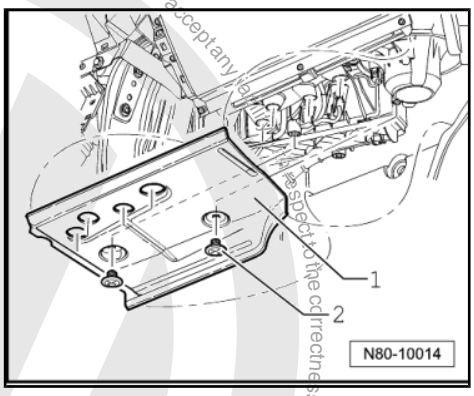
23 - Heater unit

- ❑ Removing and installing ⇒ page 31
- ❑ Dismantling and assembling ⇒ page 35

24 - Left side vent

Removing heater unit baffle plate

– Remove plastic bolts -2- and remove baffle plate -1-.

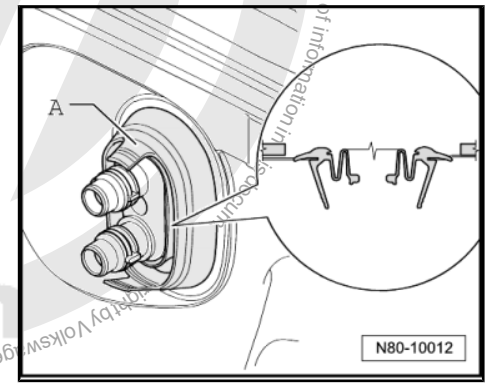


Installation position of seal between heater unit and engine compartment

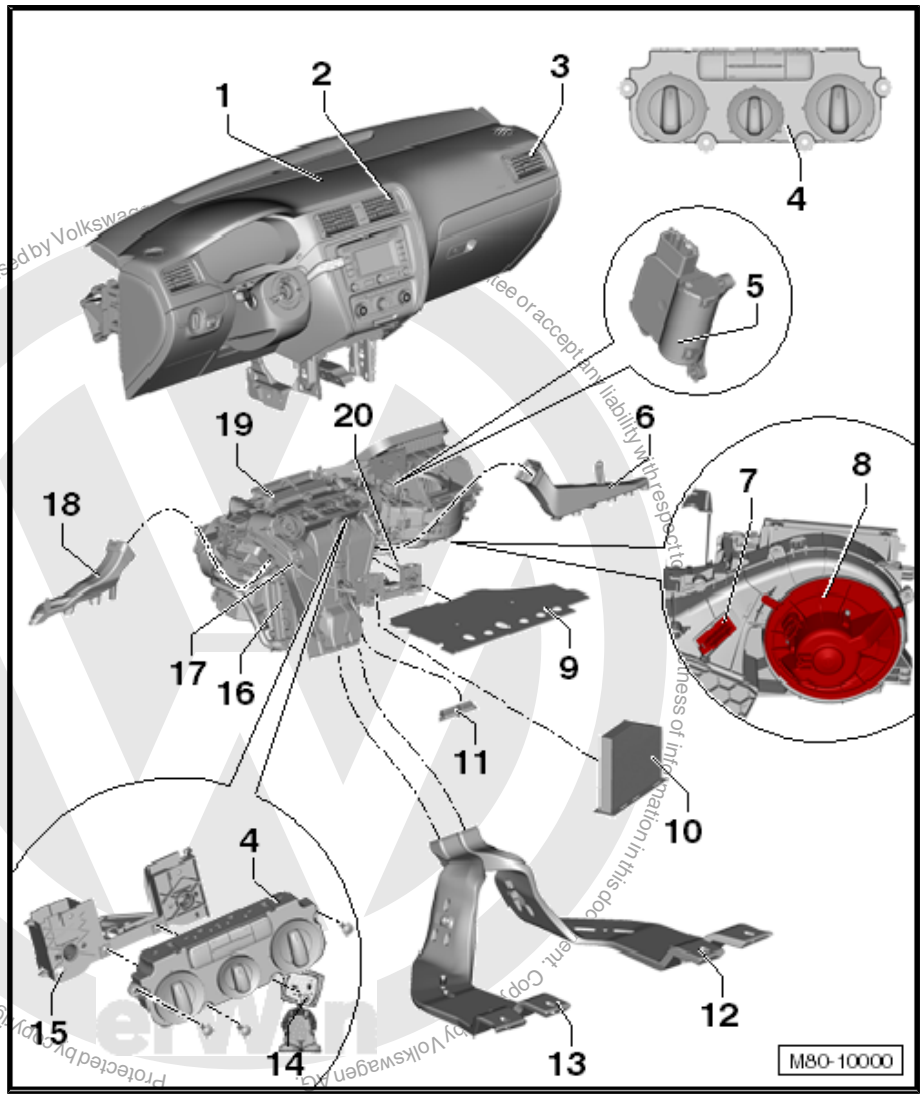
– First insert seal between heater unit and engine compartment -A- in bulkhead and then attach to heat exchanger.

Note

To prevent water from entering vehicle interior, installation position must be observed.



1.2 Heater - passenger compartment (Jetta 2011►)



1 - Dash panel

2 - Centre vents

- ❑ Removing vent ⇒ page 10 .

3 - Right side vent

- ❑ Removing ⇒ page 12

4 - Controls for fresh and heated air

- ❑ With fresh air and air recirculation flap switch -E159- .
- ❑ For vehicles with supplementary heating having instant heating button -E537- .
- ❑ Removing controls ⇒ page 14 .

5 - Fresh air and air recirculation flap control motor -V154-

- ❑ Removing ⇒ page 19

6 - Right footwell vent

- ❑ Removing and installing ⇒ page 9

7 - Fresh air blower series resistor with overheating fuse -N24-

- ❑ Removing and installing ⇒ page 6

8 - Fresh air blower -V2-

- ❑ Removing ⇒ page 5

9 - Baffle plate for heater unit

- ❑ Removing ⇒ page 5

10 - Dust and pollen filter

- ❑ With activated charcoal filter
- ❑ Removing and installing ⇒ page 6

11 - Sealing cap

- ❑ Fitted only in vehicles without air duct to vent in rear centre console.

12 - Air duct for right rear footwell

- ❑ Removing and installing ⇒ page 8

13 - Air duct for left rear footwell

- ❑ Removing and installing ⇒ page 8

14 - Securing bolt

- ❑ Qty. 8
- ❑ Various lengths.

15 - Adapter for controls

- ❑ Removing and installing ⇒ page 18

16 - Heat exchanger

- ❑ After renewing heat exchanger, renew coolant completely ⇒ Rep. gr. 19 .

❑ Removing and installing ⇒ page 23

17 - Bowden cable for temperature flap

❑ Removing and installing ⇒ page 18

18 - Left footwell vent

❑ Removing and installing ⇒ page 9

19 - Heater unit

❑ Removing and installing ⇒ page 31

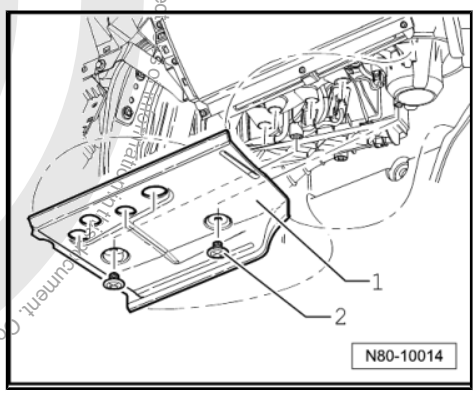
❑ Dismantling and assembling ⇒ page 35

20 - Flexible shaft

❑ Removing and installing ⇒ page 17

Removing heater unit baffle plate

– Remove plastic bolts -2- and remove baffle plate -1-.

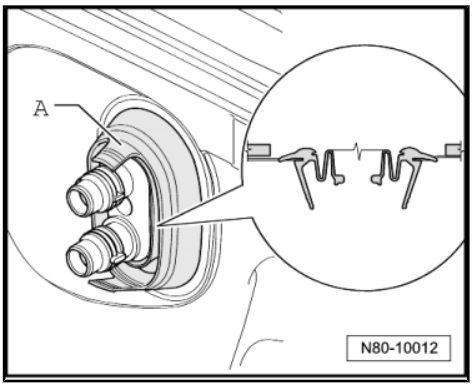


Installation position of seal between heater unit and engine compartment

– First insert seal between heater unit and engine compartment -A- in bulkhead and then attach to heat exchanger.

Note

To prevent water from entering vehicle interior, installation position must be observed.



1.3 Removing fresh air blower -V2-

1.3.1 Removing

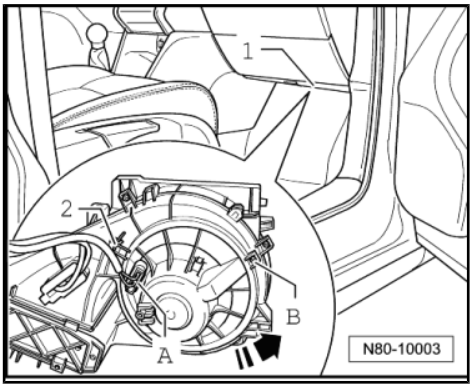
Fresh air blower -V2- is accessible from footwell on front passenger side.

– Removing heater unit baffle plate ⇒ page 3 .

– Pull connector -A- off fresh air blower -V2- .

– Remove bolt -B- for fresh air blower -V2- (1 Nm).

– Release catch -2-, turn fresh air blower -V2- in direction of -arrow- and remove.



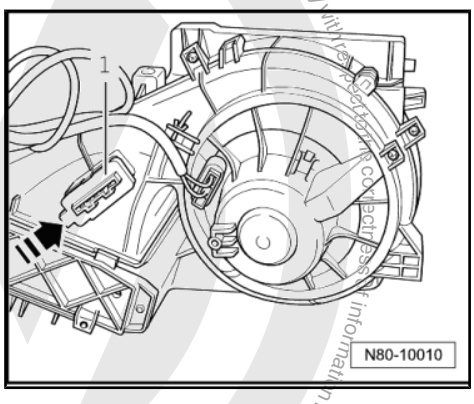
1.4 Removing and installing fresh air blower series resistor with overheating fuse - N24-

Removing

> **WARNING**
>
> *Danger of burn injuries.*
>
> *The fresh air blower series resistor with overheating fuse -N24- can be hot.*
>
> *Before removing fresh air blower series resistor with overheating fuse -N24- , let it cool off.*

First carry out the following work:

- Removing heater unit baffle plate ⇒ page 3 .
- Pull connector -1- off fresh air blower series resistor with overheating fuse -N24- .
- Press catch in direction of -arrow- and remove fresh air blower series resistor with overheating fuse -N24- from heater unit.



Installing

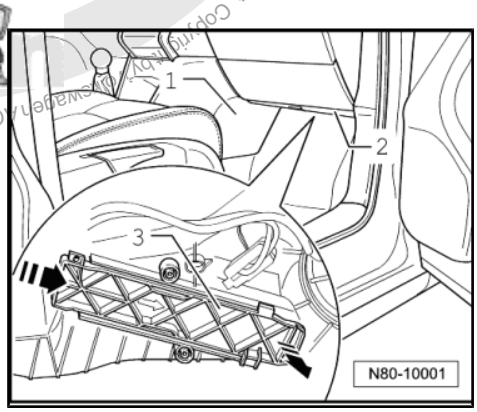
Install in reverse order.

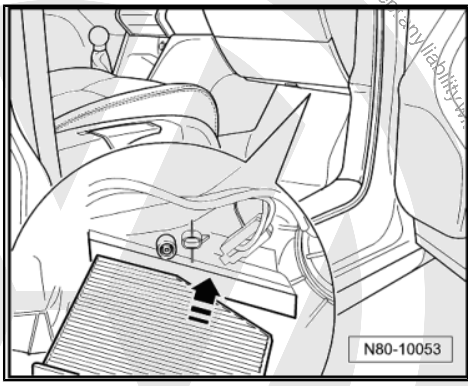
1.5 Removing and installing dust and pollen filter

Removing

- Remove footwell cover -1- on front passenger side.
- Remove baffle plate -2- from heater unit ⇒ page 3 .
- Release cover -3- in direction of arrow.
- Remove dust and pollen filter from heater unit downwards.

Installing





Install in reverse order.

Note

Observe installation position of dust and pollen filter.

1.6 Removing vent (Golf Variant 2007►, Golf Variant 2010► und Jetta 2005►)

Removing centre vents ⇒ page 7 .

Removing and installing left or right vent ⇒ page 8 .

Removing and installing right and left rear footwell air ducts ⇒ page 8 .

Remove right footwell vent ⇒ page 9 .

Removing left footwell vent ⇒ page 9 .

Removing and installing side vent ⇒ page 10 .

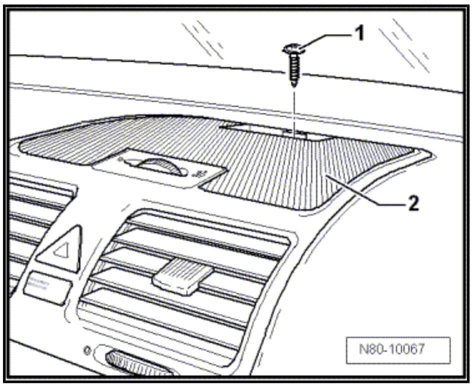
1.6.1 Removing and installing centre vent

Removing

– Vehicles with Climatronic, photosensor must be removed ⇒ page 78 .

– Remove bolt -1-.

– Remove cover -2- (models with Climatronic only).



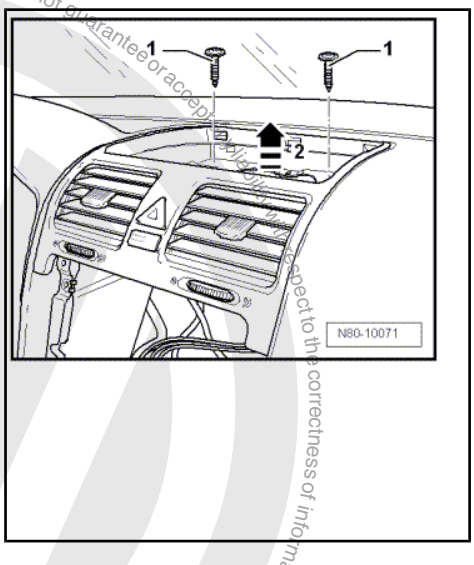
Note

For vehicles without Climatronic, bolts are beneath a trim mat.

– Remove securing bolts -1-.
– Remove compartment from dash panel.
– Remove centre vent -2- upwards in direction of -arrow-.
– Disconnect connectors on centre vents.

Installing

Install in reverse order.



1.6.2 Removing and installing right or left vent

Note

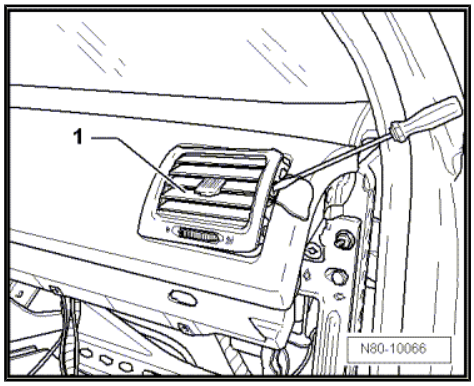
- *Removal of vents on both sides is identical, but one is a mirror image of the other.*
- *To avoid damage to dash panel, use a pad when levering out components.*

Removing

– Using an appropriate tool, lever out vent -1-.
– Disconnect connector on vent.

Installing

Install in reverse order.



1.6.3 Removing and installing right and left rear footwell air ducts

Note

Removal of air ducts on both sides is identical, but one is a mirror image of the other.

Removing

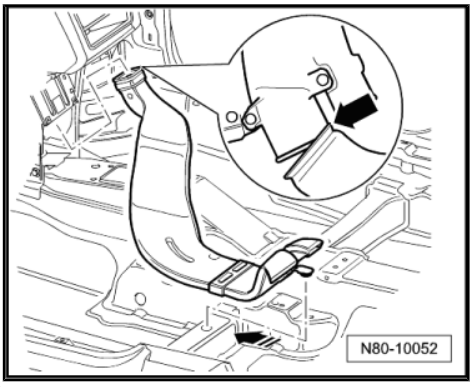
– Remove driver or front passenger seat ⇒ Rep. gr. 72 .

– Remove centre console ⇒ Rep. gr. 68 .
– Raise floor covering, unclip rear footwell air duct from underbody and pull off heater unit.

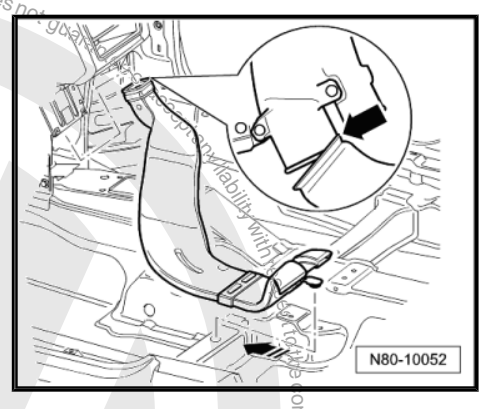
Installing

Note

When installing rear footwell air duct, ensure that it is first pushed onto heater unit -arrow- and then clipped to underbody.



Install in reverse order.



1.6.4 Removing right footwell vent

Removing

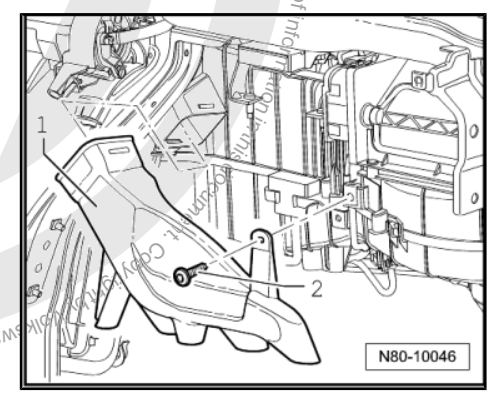
– Remove glove compartment ⇒ Rep. gr. 68 .
– Remove securing bolt -2- and remove right footwell vent -1-.

Installing

Install in reverse order.

Note

If vehicle has glove compartment cooling, ensure that cooling hose is properly seated.



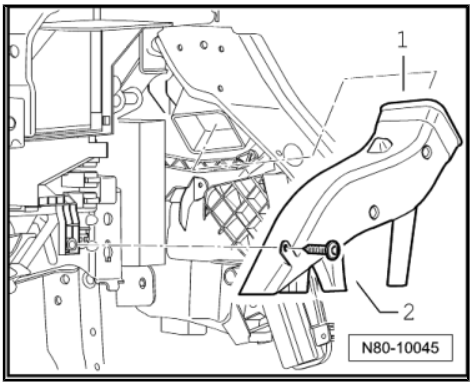
1.6.5 Removing and installing left footwell vent

Removing

– Remove compartment on driver passenger side ⇒ Rep. gr. 68 .
– Remove securing bolt -2- and remove left footwell vent -1-.

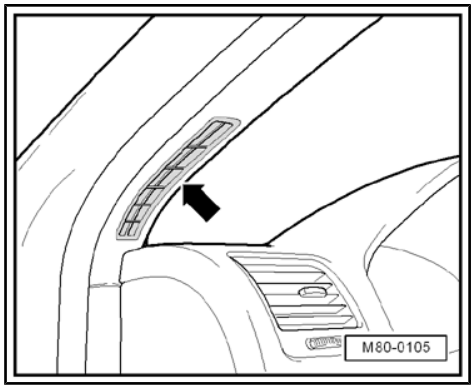
Installing

Install in reverse order.



1.6.6 Removing and installing side vents

Side window vents -arrow- are installed in A-pillar trim.



– Remove left or right A-pillar trim, as appropriate ⇒ Rep. gr. 70 .

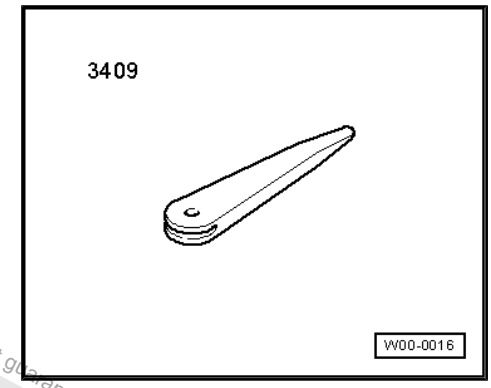
1.7 Removing vent (Jetta 2011►)

1.7.1 Removing and installing centre vent

Removing

Special tools and workshop equipment required

- Removal wedge -3409-



– Switch off ignition.

– Remove centre trim of dash panel ⇒ General body repairs, interior; Rep. gr. 68 ; Removing and installing centre trim of dash panel .

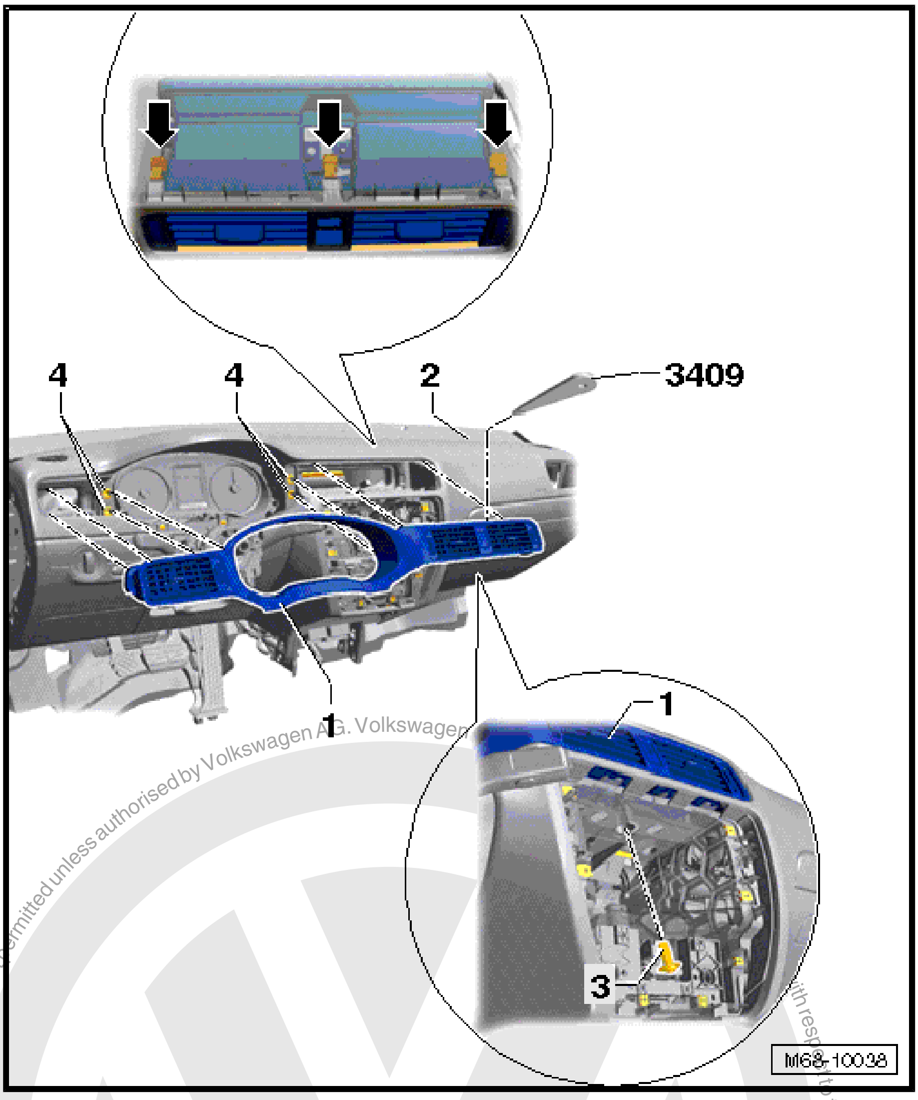
– Remove Radio, if fitted ⇒ Communication; Rep. gr. 91 ; Removing and installing radio units and navigation systems .

Vehicles with radio navigation systems

– Remove radio navigation system ⇒ Communication; Rep. gr. 91 ; Removing and installing radio units and navigation systems .

For all vehicles

– Height adjustment: move steering wheel to lowest position.



– Reach adjustment: move steering wheel so that the steering wheel is as far into the passenger compartment as possible.
– Release gap cover from mounting in upper part of trim with wedge -3409- . The complete steering column trim must not be removed.
– Remove bolt -3- (1.5 Nm).
– Release clips of centre vent -arrows- using wedge -3409- and pull out dash panel insert trim with centre vent -1- slightly.
– Release clips of left vent using wedge -3409- and pull out dash panel insert trim with centre vent -1- slightly.
– Release fasteners -4- of dash panel insert trim -1- using wedge -3409- and pull out slightly.
– Remove dash panel insert trim with centre and left vents -1- from dash panel -2-, disconnect wiring harness to hazard warning light switch -E3- when doing this.

Installing

Install in reverse order.

Note

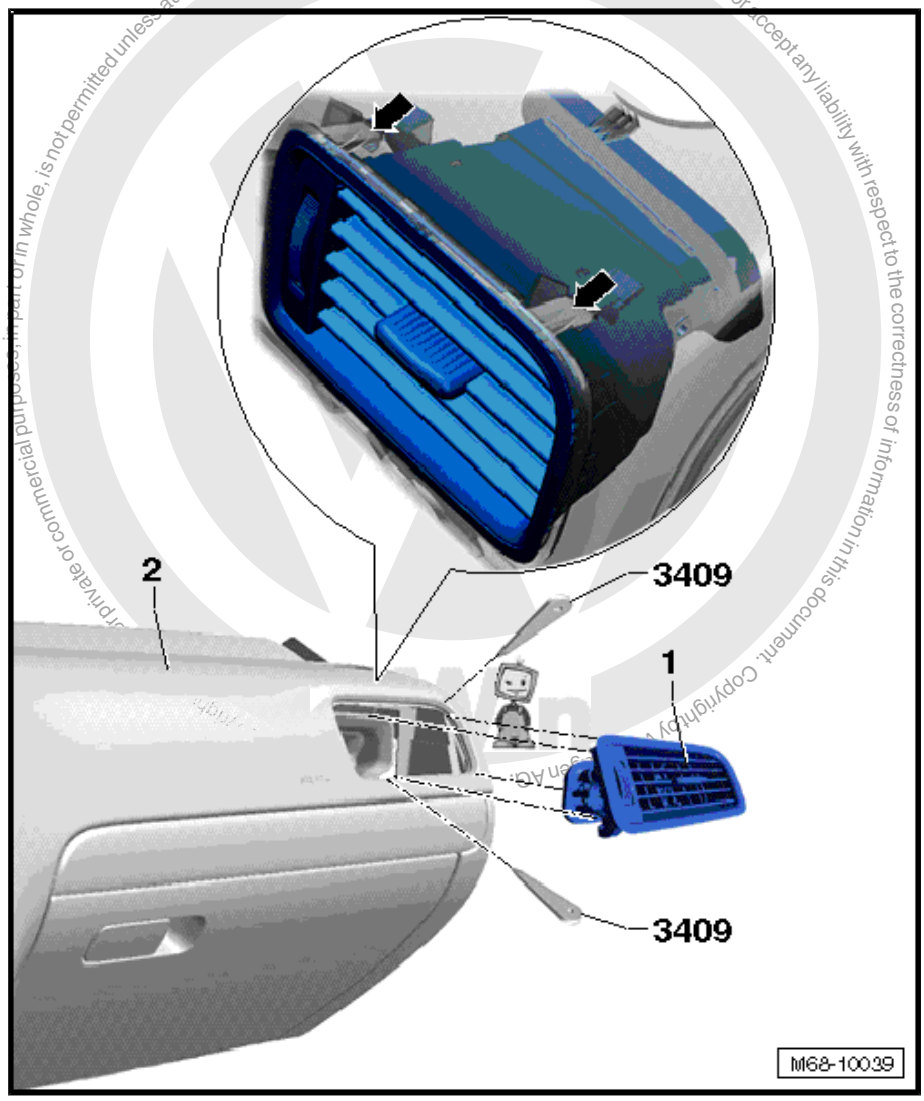
Before installing, check all securing elements for damage and replace as necessary.

1.7.2 Removing and installing right dash panel vent

Removing

– Release upper and lower clips -arrows- of right vent using wedge -3409- and pull vent out slightly.

– Remove right dash panel vent -1- from dash panel -2-.



Installing

– Installation is carried out in reverse order.

Note

Before installing, check all securing elements for damage and replace as necessary.

1.7.3 Removing and installing right and left rear footwell air ducts

Note

Removal of air ducts on both sides is identical, but one is a mirror image of the other.

Removing

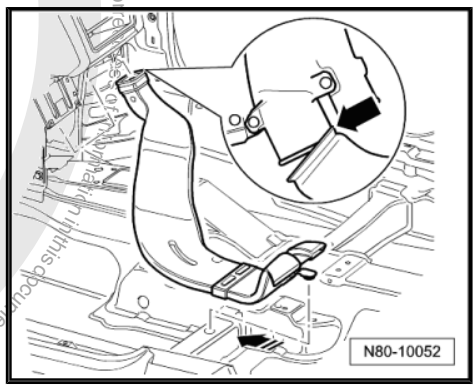
– Remove driver or front passenger seat ⇒ Rep. gr. 72 .
– Remove centre console ⇒ Rep. gr. 68 .
– Raise floor covering, unclip rear footwell air duct from underbody and pull off heater unit.

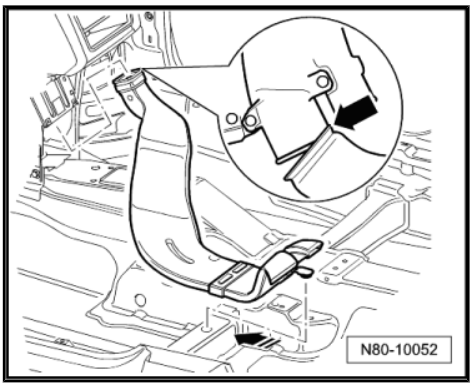
Installing

Note

When installing rear footwell air duct, ensure that it is first pushed onto heater unit -arrow- and then clipped to underbody.

Install in reverse order.





1.7.4 Removing right footwell vent

Removing

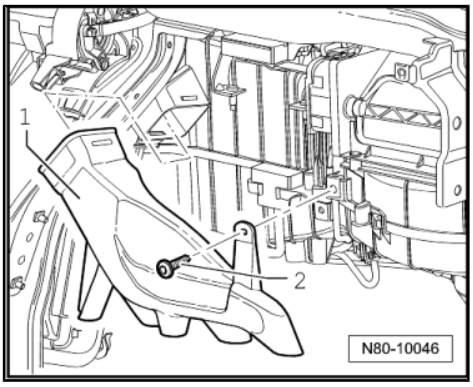
– Remove glove compartment ⇒ Rep. gr. 68 .
– Remove securing bolt -2- and remove right footwell vent -1-.

Installing

Install in reverse order.

Note

If vehicle has glove compartment cooling, ensure that cooling hose is properly seated.

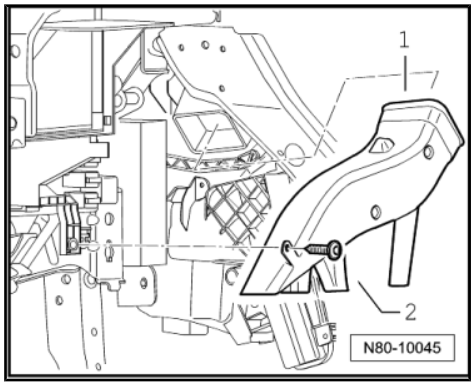


1.7.5 Removing and installing left footwell vent

Removing

– Remove compartment on driver passenger side ⇒ Rep. gr. 68 .

– Remove securing bolt -2- and remove left footwell vent -1-.



Installing

Install in reverse order.

1.8 Removing and installing controls for heated and fresh air

Connectors on controls for heated and fresh air (Golf Variant 2007►, Golf Variant 2010► und Jetta 2005►) ⇒ page 15

Connectors on controls for heated and fresh air (Jetta 2011►) ⇒ page 16

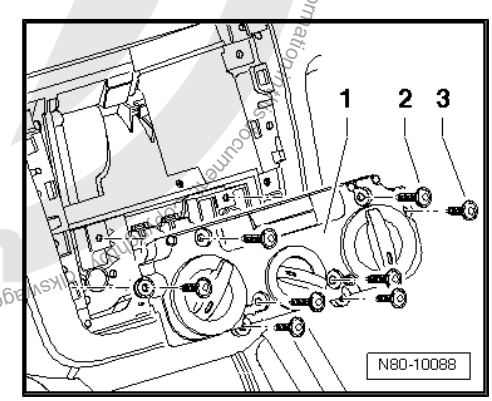
Removing

Note

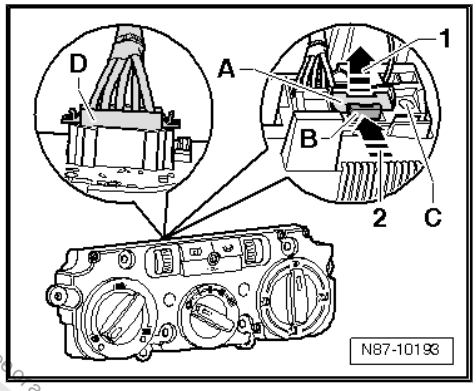
- *The control consists of 2 separable housings. Before removing controls, set rotary knobs to the following positions:*
- *Heater control to „cold“*
- *Blower to „0“*
- *Vent direction to „footwell“*

– Remove radio ⇒ Rep. gr. 91 .

– Models with no radio trim, removing centre part of dash panel ⇒ Rep. gr. 68 .



– Remove bolts -2- (4.2 x 45) and -3- (4.2 x 16) and remove the controls -1- from centre console.
– Release connector catch -A- by pulling it in direction of arrow -1-.
– Push connector catch -B- towards connector -arrow 2- and remove connector -C-.
– Release connector catch -D- and remove connector -D-.



Note

Figure shows Climatic version. The procedure for releasing connector is the same.

Installing

Install in reverse order. Note: the rotating knobs must be in the same position as when removed.

1.9 Connectors on controls for heated and fresh air (Golf Variant 2007►, Golf Variant 2010► und Jetta 2005►)

1.9.1 Pin assignment for multi-pin connectors on back of controls for heated and fresh air

Special tools and workshop equipment required

♦ Auxiliary measuring set -V.A.G 1594 C-

16-pin connector is vacant.

5-pin connector, T5 in current flow diagram

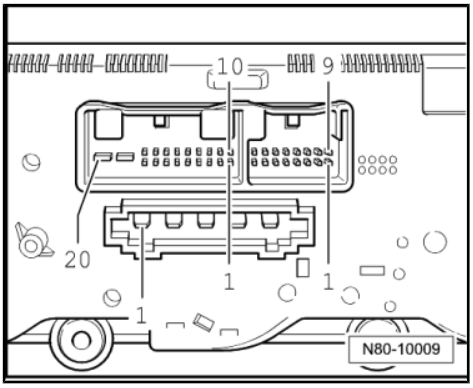
1 - Blower 3rd speed

2 - Blower 2nd speed

3 - Blower 1st speed

4 - Bower 4th speed

5 - X terminal



20-pin connector, T20c in current flow diagram

3 - Fresh air and air recirculation flap control motor -V154-

6 - Fresh air and air recirculation flap control motor -V154-

7 - With auxiliary air heater control unit -J604-

8 - Rear window

11 - Heated driver seat control unit -J131-

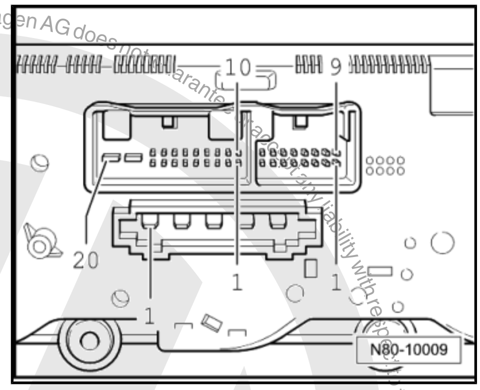
15 - Heated front passenger seat control unit -J132-

16 - Terminal 75, seat heating (optional)

18 - Terminal 30

19 - Terminal 15

20 - Terminal 31

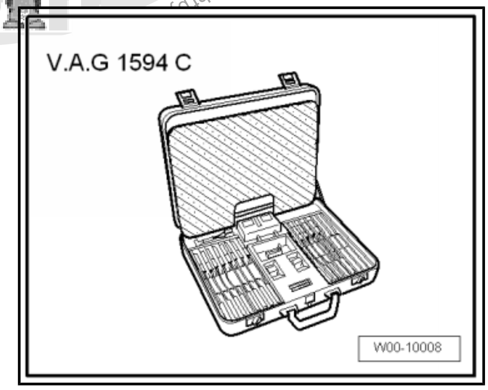


1.10 Connectors on controls for heated and fresh air (Jetta 2011►)

1.10.1 Pin assignment for multi-pin connectors on back of controls for heated and fresh air

Special tools and workshop equipment required

- Auxiliary measuring set -V.A.G 1594 C-



16-pin connector is vacant.

5-pin connector, T5 in current flow diagram

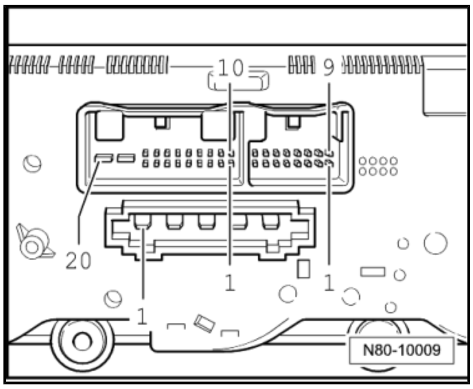
1 - Blower 3rd speed

2 - Blower 2nd speed

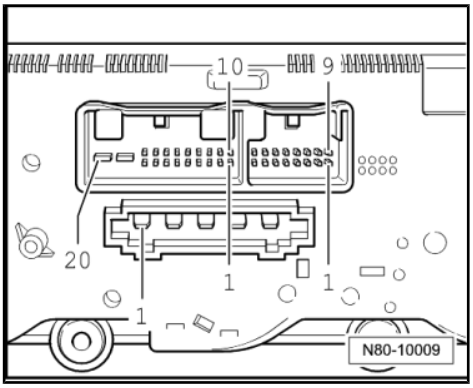
3 - Blower 1st speed

4 - Bower 4th speed

5 - X terminal



20-pin connector, T20c in current flow diagram



3 - Fresh air and air recirculation flap control motor -V154-

5 - Auxiliary heater (optional)

6 - Fresh air and air recirculation flap control motor -V154-

7 - With auxiliary air heater control unit -J604-

8 - Rear window

11 - Left seat heating (optional)

12 - LED for heated rear window

14 - LED for auxiliary heater

15 - Right seat heating (optional)

17 - Terminal 58d

18 - Terminal 30

19 - Terminal 15

20 - Terminal 31

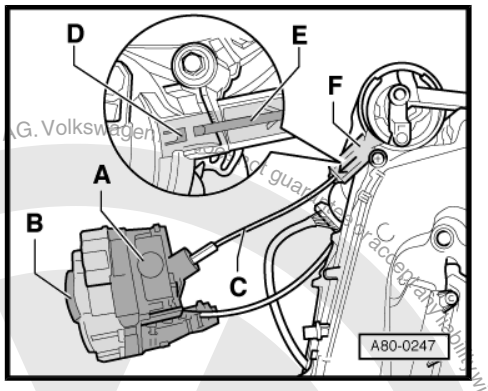
1.11 Removing and installing flexible shaft for air distribution

Removing

– Remove glove compartment ⇒ Rep. gr. 68 .

– Move flexible shaft to following position:

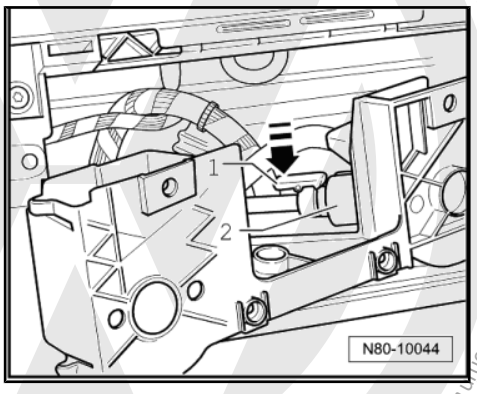
– Turn rotary switch for air distribution -B- until catch in shaft -D- is visible in gears -F-.



– Remove controls for fresh and heated air ⇒ page 14 .

– Reach into centre console and release locking lug -1- by pressing in direction of -arrow-.

– Pull flexible shaft out of adapter -2-.



Note

When flexible shaft is installed, the adapter and the rotary knobs of the controls for heated and fresh air must be aligned in a specific position to one another. Otherwise the system will malfunction ⇒ page 17 .

1.11.1 Checking

Flexible shaft for air distribution flap actuator:

– Run fresh air blower at highest speed. If air flows out of defroster vent in the „defrost“ position, and no air flows out of footwell vent, then the flexible shaft is correctly installed. Otherwise, remove flexible shaft from adapter. Position controls for heated and fresh air on adapter and turn rotary knob for air

distribution $^{1}/_{2}$ turn (180°). Then reconnect flexible shaft. Repeat check.

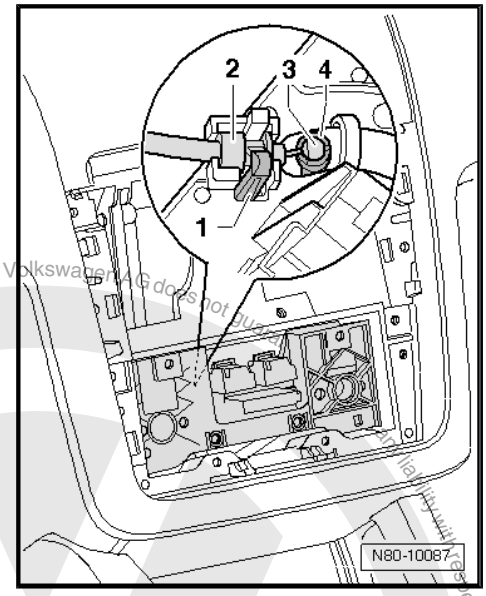
1.12 Removing and installing Bowden cable for temperature flap

1.12.1 Removing

– Remove controls for fresh and heated air ⇒ page 14 .

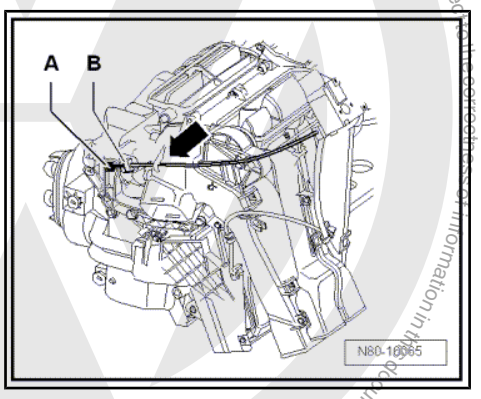
– Reach into centre console and release locking lug -1- of Bowden cable sleeve -2-. Take Bowden cable sleeve out of mounting.

– Release ball of Bowden cable -3- from operating lever.



– Remove driver side footwell trim ⇒ Rep. gr. 68 .

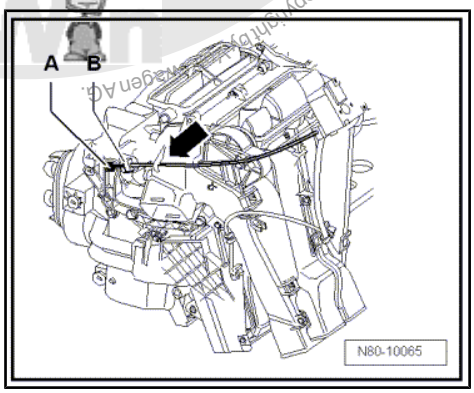
– Unclip Bowden cable from control unit for temperature flap -A- and heater unit -B-.



1.12.2 Installing

Install in reverse order. Ensure that Bowden cable lies under hook -arrow-.

– Check whether temperature knob can be easily turned from „Cold“ to „Warm“.



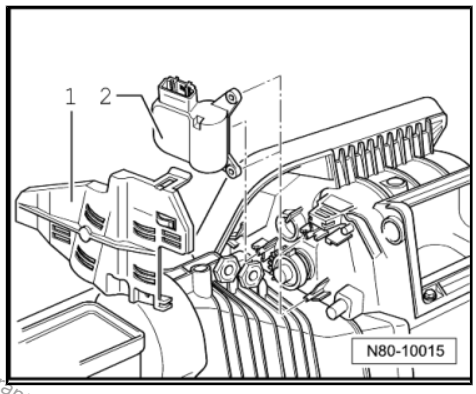
1.13 Removing and installing fresh air and air recirculation flap control motor -V154-

1.13.1 Removing

Note

The position of the air recirculation flap must not be changed.

– Remove glove compartment ⇒ Rep. gr. 68 .
– Remove cover -1-.
– Disconnect connector from fresh air and air recirculation flap control motor -V154- -2-.
– Remove fresh air and air recirculation flap control motor -V154- -2- from mounting.



1.13.2 Installing

Install in reverse order.

Note

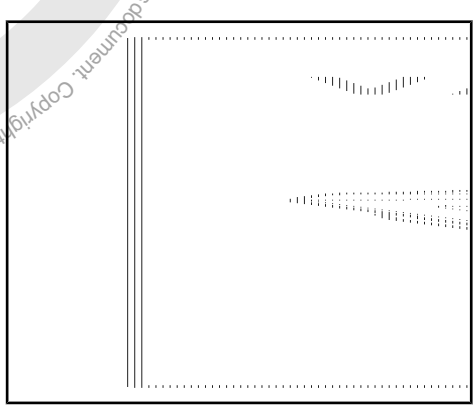
After installing fresh air and air recirculation flap control motor -V154- , check operation of air recirculation flap.

– Checking: ⇒ Vehicle diagnostic, testing and information system VAS 5051
– Renewing: initiate basic setting using vehicle diagnosis, testing and information system -VAS 5051B- ⇒ page 55 .

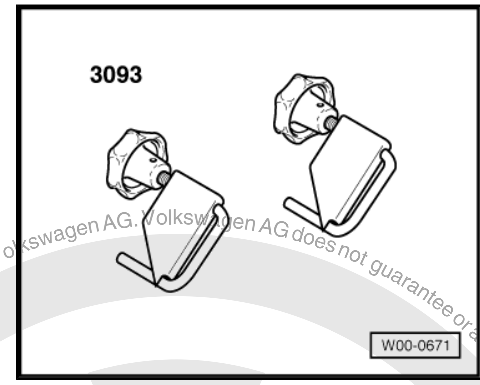
1.14 Removing and installing heat exchanger (Golf Variant 2007►, Golf Variant 2010► und Jetta 2005►)

Special tools and workshop equipment required

♦ Drip tray for workshop hoist -VAS 6208-



♦ Hose clamps up to 40 mm Ø -VAS 3093-

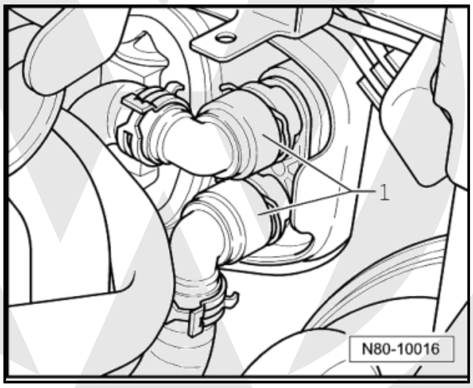


♦ Compressed air gun, commercially available

1.14.1 Removing

– Remove bulkhead in plenum chamber ⇒ Rep. gr. 50 .

– Place drip tray -VAS 6208- beneath engine.

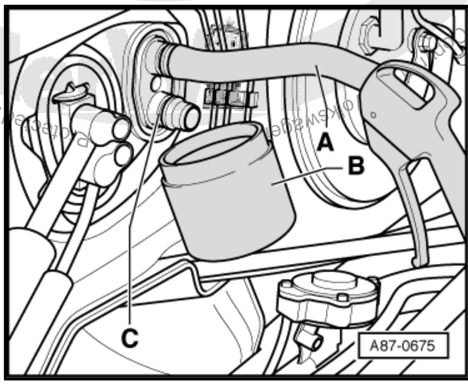


> ⚠ WARNING
>
> *Danger of scalding injuries.*
>
> *When the engine is warm, the coolant temperature may be above 100 °C. The cooling system is pressurised.*
>
> *If necessary, release pressure and reduce temperature before carrying out repairs.*

– Clamp off coolant hoses -1- with hose clamps up to 40 mm Ø -VAS 3093- and disconnect coolant hoses to heat exchanger.

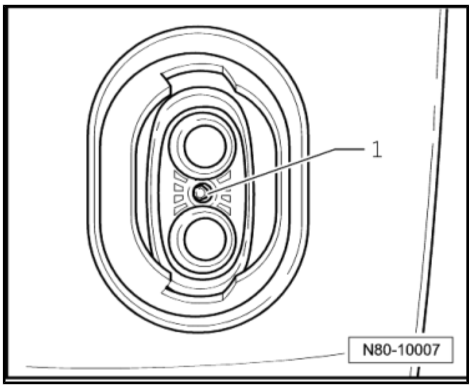
– Push a piece of hose -A- onto upper union of heat exchanger.

– Hold a container -B- under lower connection -C-.



– Using a compressed air pistol, carefully blow coolant out of heat exchanger into container -B-.

– Undo bolt (6 mm hexagon socket head) -1- from union flange between heat exchanger unions.

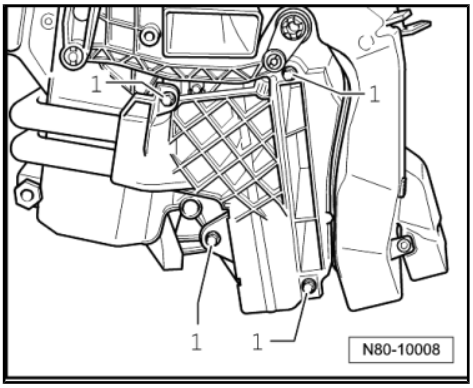


Note

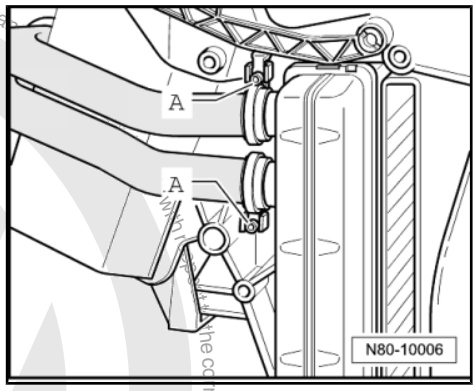
This makes it possible to move the coolant pipes in order to remove heat exchanger.

– Remove driver side footwell trim ⇒ Rep. gr. 68 .

– Remove left footwell vent ⇒ page 9 .
– Remove bolts -1- and remove heat exchanger cladding.
– Cover carpet in area under heat exchanger with waterproof foil and water absorbing paper.



– Open hose clips -A- and pull coolant pipes out of heat exchanger.
– Take heat exchanger out of heater unit.



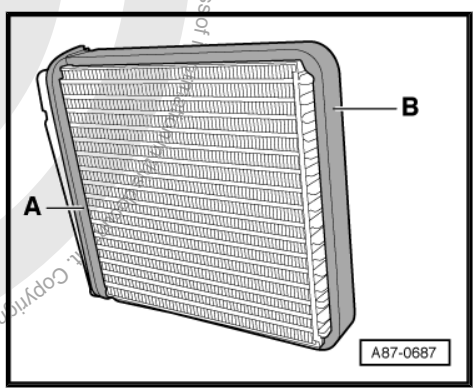
1.14.2 Installing

Install in reverse order. Note the following when doing this:

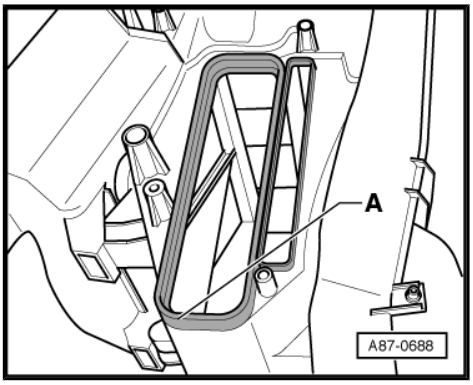
– Check seals attached to heat exchanger -A- and -B-. Install heat exchanger only with undamaged seals.

Note

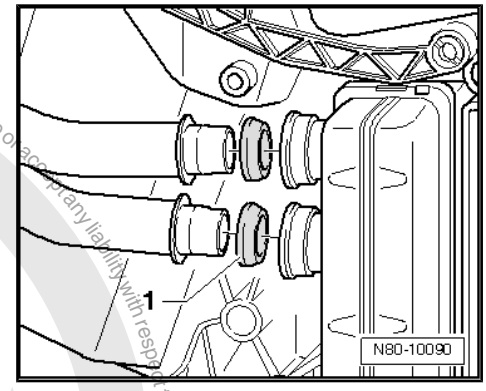
- *An improperly bonded seal can roll up when heat exchanger is pushed into heater unit.*
- *If seal is damaged or improperly attached, cold air can flow past heat exchanger.*



– Check heater unit for cleanliness through shaft -A- for heat exchanger while heat exchanger is removed.
– If necessary, remove dirt or residue of leaked coolant from heater unit, e.g. after removing a leaking heat exchanger.
– Slide heat exchanger into heater unit.



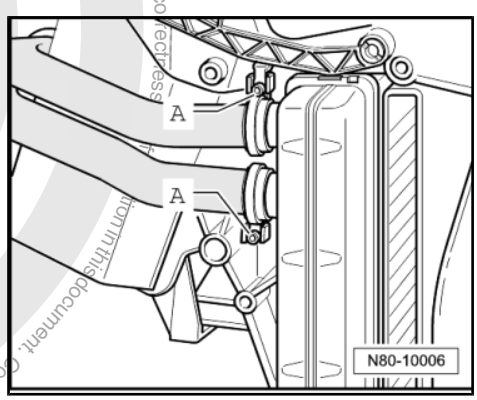
– Moisten seals -1- with coolant before installing.
– Seat seals -1- into unions on heat exchanger.



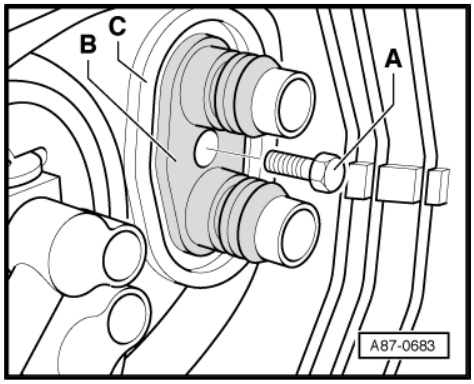
Note

- *Ensure that seals are installed in the proper direction as shown in figure.*
- *Renew deformed hose clips.*

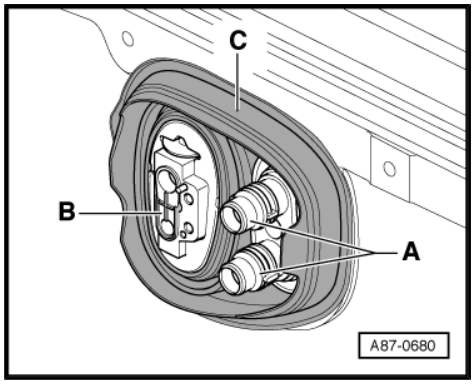
– Connect coolant pipes to heat exchanger.
– During assembly, hose clips -A- must turn easily on coolant pipes.
– Hose clips -A- must be installed as shown in figure.
– Tighten hose clips -A- to 2.0 Nm.
– Check seating of both clips -A- after tightening screws. They must fully enclose the flange on the heat exchanger and the coolant pipe and they must not contact other components.



– Screw bolt -A- into union flange -B- ensuring that bolt actually screws into intended securing point.



– Check grommet -C- is seating correctly in bulkhead.
– If necessary, seal flanges for coolant pipes to heat exchanger -A- and for expansion valve (to evaporator, only vehicles with air conditioning system) -B- at apertures in grommet -C- with silicone adhesive sealant against water intrusion.



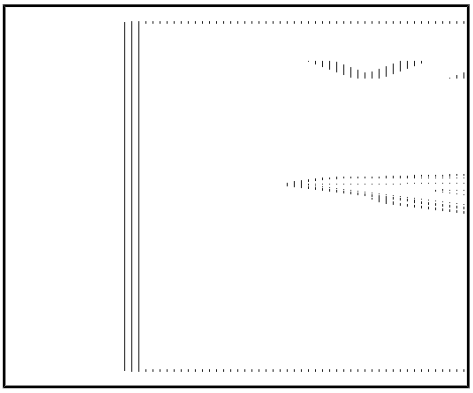
Note

- *Always renew seals.*
- *Renew deformed hose clips.*
- *After renewing heat exchanger, renew coolant completely ⇒ Rep. gr. 19 .*
- *Check coolant circuit is not leaking. Pay particular attention to unions/connections between coolant pipes and heat exchanger.*

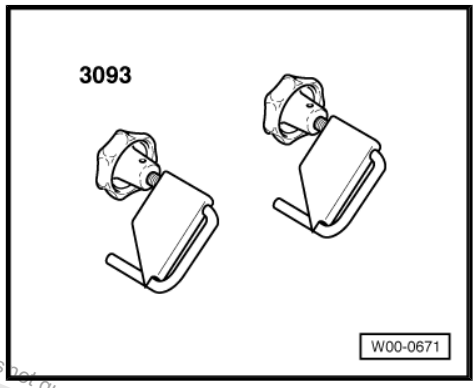
1.15 Removing and installing heat exchanger (Jetta 2010►)

Special tools and workshop equipment required

- Drip tray for workshop hoist -VAS 6208-



- Hose clamps up to 40 mm Ø -VAS 3093-



- Compressed air gun, commercially available

1.15.1 Removing

– Remove bulkhead in plenum chamber ⇒ Rep. gr. 50 .

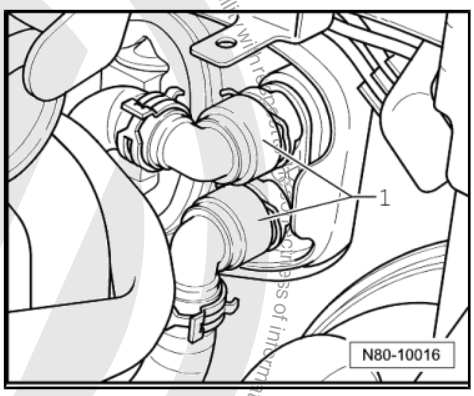
– Place drip tray -VAS 6208- beneath engine.

WARNING

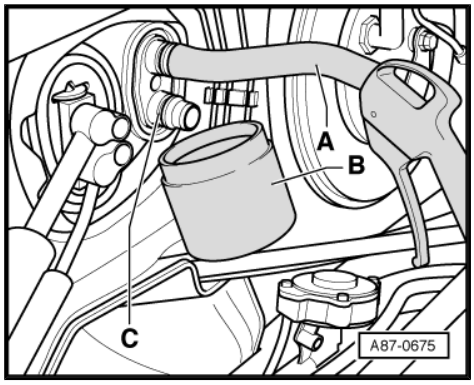
Danger of scalding injuries.

When the engine is warm, the coolant temperature may be above 100 °C. The cooling system is pressurised.

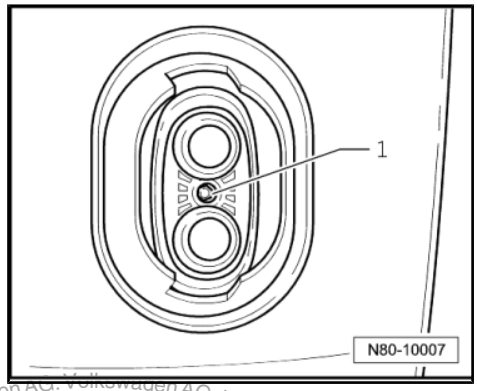
If necessary, release pressure and reduce temperature before carrying out repairs.



– Clamp off coolant hoses -1- with hose clamps up to 40 mm Ø -VAS 3093- and disconnect coolant hoses to heat exchanger.
– Push a piece of hose -A- onto upper union of heat exchanger.
– Hold a container -B- under lower connection -C-.



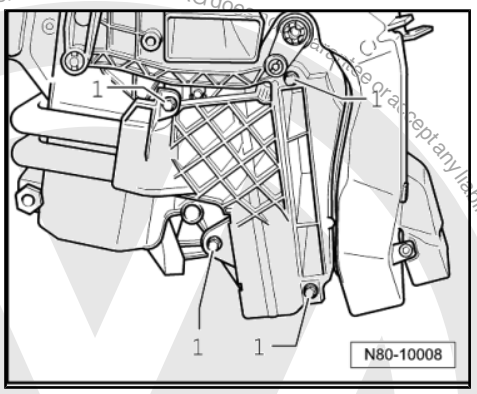
– Using a compressed air pistol, carefully blow coolant out of heat exchanger into container -B-.
– Undo bolt (6 mm hexagon socket head) -1- from union flange between heat exchanger unions.



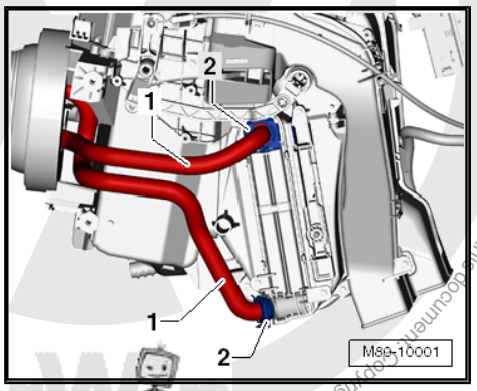
Note

This makes it possible to move the coolant pipes in order to remove heat exchanger.

– Remove driver side footwell trim ⇒ Rep. gr. 68 .
– Remove left footwell vent ⇒ page 9 .
– Remove bolts -1- and remove heat exchanger cladding.
– Cover carpet in area under heat exchanger with waterproof foil and water absorbing paper.



– Remove clips -2- and pull coolant pipes -1- out of heat exchanger.
– Take heat exchanger out of heater unit.



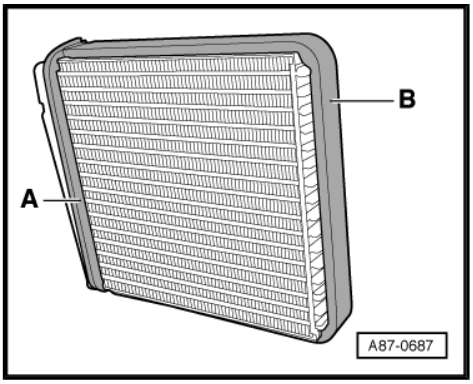
1.15.2 Installing

Install in reverse order. Note the following when doing this:

– Check seals attached to heat exchanger -A- and -B-. Install heat exchanger only with undamaged seals.

Note

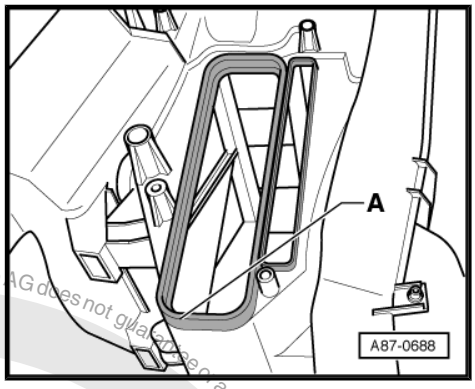
- *An improperly bonded seal can roll up when heat exchanger is pushed into heater unit.*
- *If seal is damaged or improperly attached, cold air can flow past heat exchanger.*



– Check heater unit for cleanliness through shaft -A- for heat exchanger while heat exchanger is removed.

– If necessary, remove dirt or residue of leaked coolant from heater unit, e.g. after removing a leaking heat exchanger.

– Slide heat exchanger into heater unit.

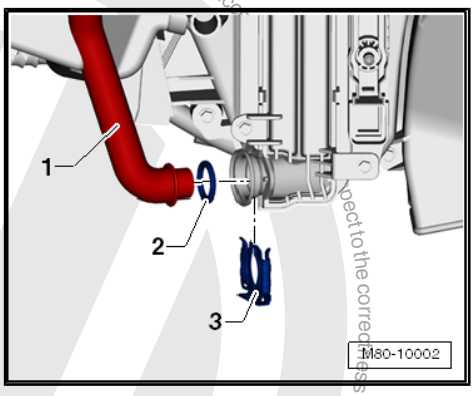


– Moisten seals -2- with coolant before installing.

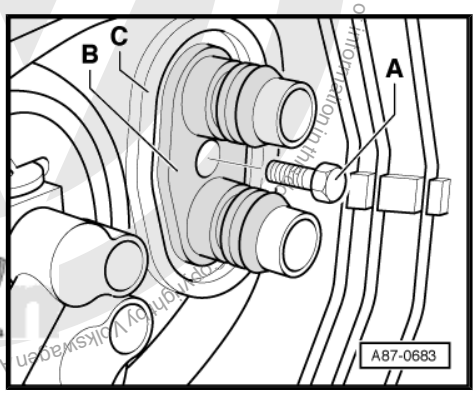
– Seat seals -2- onto unions of coolant pipes -1-.

– Connect coolant pipes to heat exchanger.

– Install clips -3-.

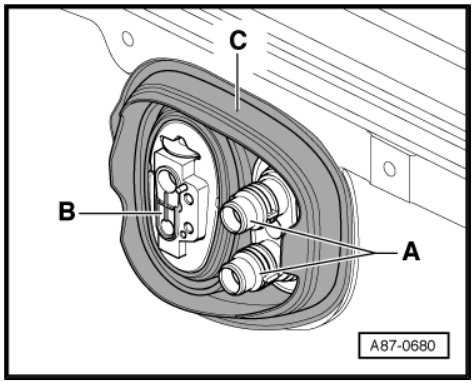


– Screw bolt -A- into union flange -B- ensuring that bolt actually screws into intended securing point.



– Check grommet -C- is seating correctly in bulkhead.

– If necessary, seal flanges for coolant pipes to heat exchanger -A- and for expansion valve (to evaporator, only vehicles with air conditioning system) -B- at apertures in grommet -C- with silicone adhesive sealant against water intrusion.



Note

- *Always renew seals.*
- *Renew deformed hose clips.*
- *After renewing heat exchanger, renew coolant completely ⇒ Rep. gr. 19 .*
- *Check coolant circuit is not leaking. Pay particular attention to unions/connections between coolant pipes and heat exchanger.*

1.16 Removing and installing auxiliary air heater element -Z35- , vehicles ► 1K-7M 119 726

Note

Installed only in vehicles with diesel engines without auxiliary coolant heater.

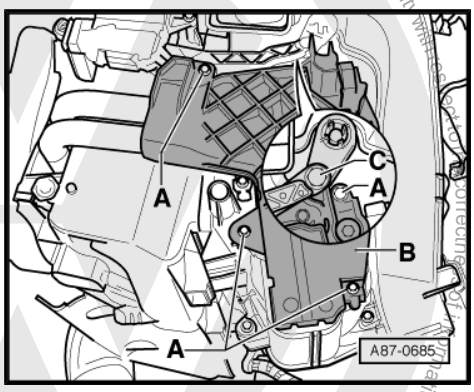
1.16.1 Removing

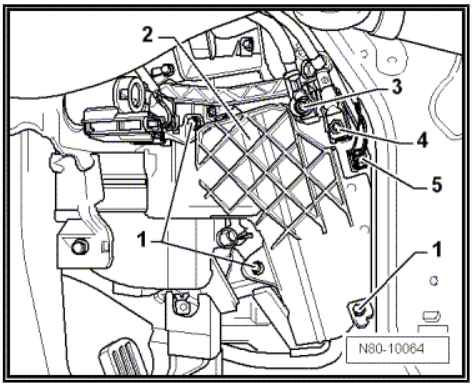
– Remove driver side footwell trim ⇒ Rep. gr. 68 .

– Remove left footwell vent ⇒ page 9 .

Note

If the lever -C- to temperature flap is positioned so that the upper bolt -A- is not accessible. Change position of temperature flap at heater and fresh air controls. On vehicles with Climatronic, at control and display unit e.g. setting „Hi“.





– Remove bolts -1- from cover -2-.

– Remove bolts -1- from cover -2-.

Caution

Danger of short circuit.

Disconnect battery before performing repair work.

– Remove securing nut for voltage supply -3- and earth connection -4- (6 ±1 Nm).

– Disconnect connector -5- from auxiliary air heater element -Z35- .

WARNING

Danger of burn injuries.

The auxiliary air heater element -Z35- may be hot.

Before removing auxiliary air heater element -Z35- , allow it to cool off.

– Pull auxiliary air heater element -Z35- out of heater unit.

1.16.2 Installing

Install in reverse order.

1.17 Checking, removing and installing auxiliary air heater element -Z35- , vehicles 1K-7M 119 727 ►

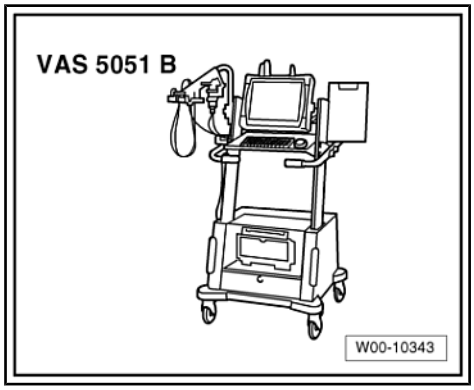
1.17.1 Checking auxiliary air heater element -Z35- with peripherals

Auxiliary air heater element -Z35- with peripherals (load signal for alternator terminal DF, low heat output relay -J359- , high heat output relay -J360- , intake manifold temperature sender -G72- , coolant temperature sender -G62-) can be read via the engine control unit self-diagnosis.

1.17.2 Checking auxiliary air heater element -Z35-

Special tools and workshop equipment required

- Vehicle diagnosis, testing and information system -VAS 5051B- with 100 A pick-up clamp -VAS 5051B/7-



1.17.3 Test conditions

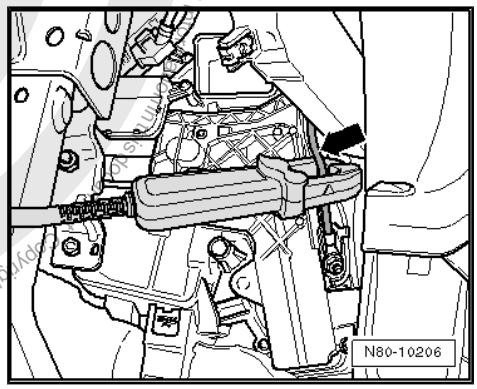
- Intake temperature less than 19° C
- Coolant temperature less than 80° C
- Passenger compartment temperature about 20° C
- Battery voltage greater than 11 V
- Alternator load not greater than 50 % (terminal DF)
- Engine speed greater than 450 rpm
- Turn rotary knob for interior temperature to end position for maximum temperature

1.17.4 Test procedure

– Remove left footwell vent ⇒ page 9 .

– Remove centre console trim from left footwell.

– Measure current consumption on earth wire -arrow- using vehicle diagnosis, testing and information system -VAS 5051B- and 100 A pick-up clamp -VAS 5051B/7- .



Low heat output: ≈ 30 amps

Medium heat output: ≈ 60 amps

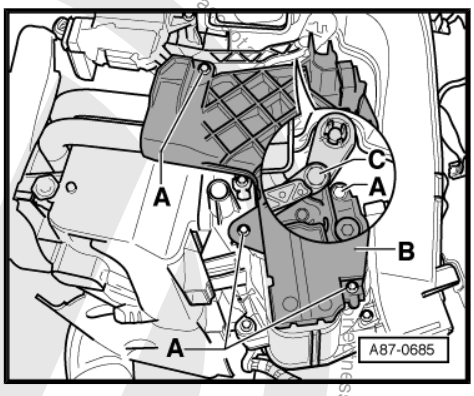
High heat output: ≈ 80 amps

1.17.5 Removing and installing

Removing

– Remove driver side footwell trim ⇒ Rep. gr. 68 .

– Remove left footwell vent ⇒ page 9 .



Note

If the lever -C- to temperature flap is positioned so that the upper bolt -A- is not accessible, Change position of temperature flap at heater and fresh air controls. On vehicles with Climatronic, at control and display unit e.g. setting „Hi“.

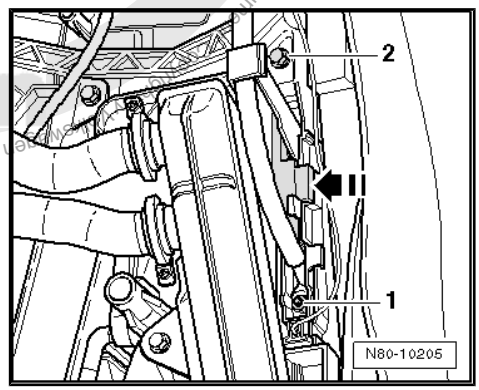
– Disconnect battery ⇒ Rep. gr. 27 .
– Remove bolts -A- from cover -B-.

Caution

Danger of short circuit.

Disconnect battery before performing repair work.

– Remove nut -1- 9 ±1 Nm.
– Release locking device of connector strip -arrow-.



WARNING

Danger of burn injuries.

The auxiliary air heater element -Z35- may be hot.

Before removing auxiliary air heater element -Z35- , allow it to cool off.

– Undo bolt -2- 1.4 Nm and pull auxiliary air heater element -Z35- out of blower box.

Installing

Note

Ensure that the earth wire is in proper position.

Install in reverse order.

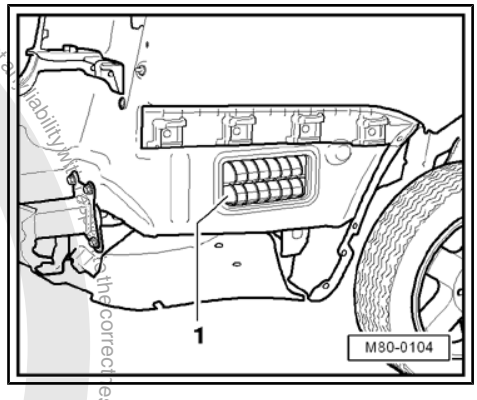
1.18 Checking ventilation

Note

- *The stale air escapes via ventilation openings in the luggage compartment trim.*
- *If the ventilation is to function properly, the exhaust openings must not be covered.*
- *The ventilation frames are located in the rear side panels behind the bumper.*

1.18.1 Checking

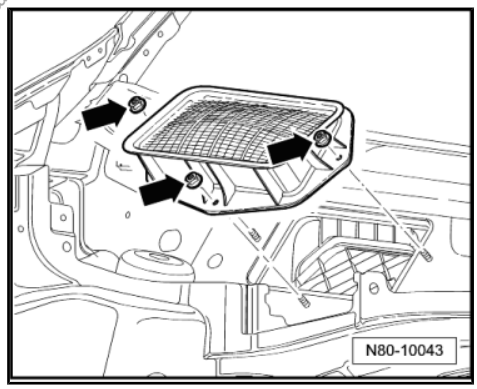
– Remove rear bumper ⇒ Rep. gr. 63 .
– Sealing lips -1- in ventilation frames on both sides of vehicle must be free to move and close by themselves.
– Note installation position.



1.19 Removing and installing air intake grille (Golf Variant 2007►, Golf Variant 2010► und Jetta 2005►)

1.19.1 Removing

– Remove plenum chamber cover ⇒ Rep. gr. 64 .
– Remove securing nuts -arrows- and remove air intake grille upwards.



1.19.2 Installing

Install in reverse order.

Note

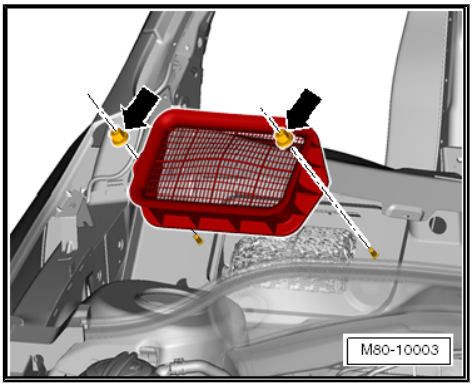
Seal must seat properly on air intake grille.

1.20 Removing and installing air intake grille (Jetta 2010►)

1.20.1 Removing

– Remove plenum chamber cover ⇒ Rep. gr. 64 .

– Remove securing nuts -arrows- and remove air intake grille upwards.



1.20.2 Installing

Install in reverse order.

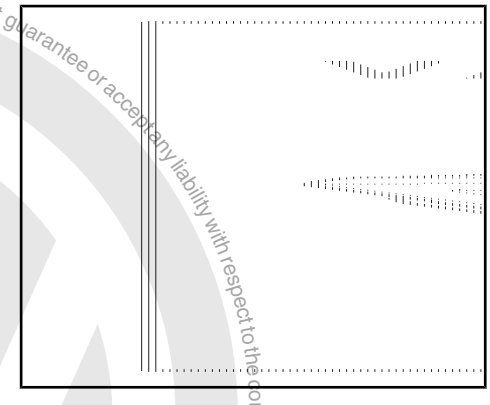
Note

Seal must seat properly on air intake grille.

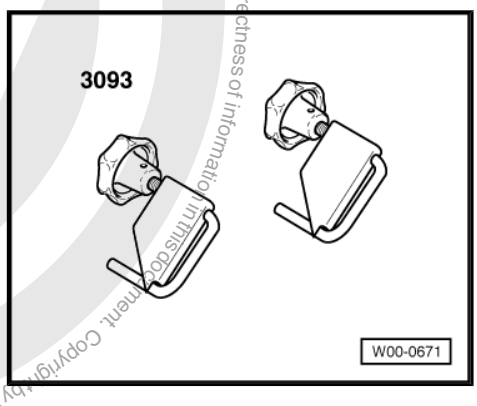
1.21 Removing and installing heater unit

Special tools and workshop equipment required

♦ Drip tray for workshop hoist -VAS 6208-



♦ Hose clamps up to 40 mm Ø -VAS 3093-



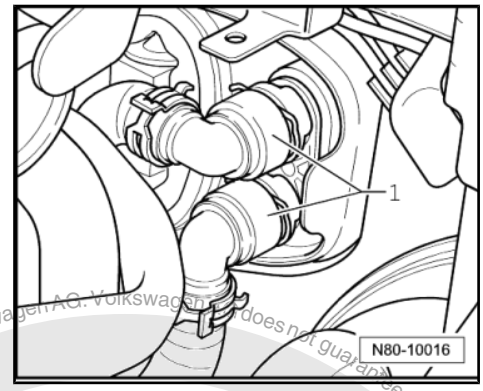
♦ Compressed air gun, commercially available

1.21.1 Removing

Note

To improve access, depending on engine version, additional components, e.g. engine cover must be removed ⇒ Rep. gr. 10 .

- Remove dash panel ⇒ Rep. gr. 70 .
- Remove bulkhead in plenum chamber ⇒ Rep. gr. 50 .
- Remove left and right rear footwell air ducts ⇒ page 8 .
- Place drip tray -VAS 6208- beneath engine.
- Mark coolant hoses -1-.



WARNING

Danger of scalding injuries.

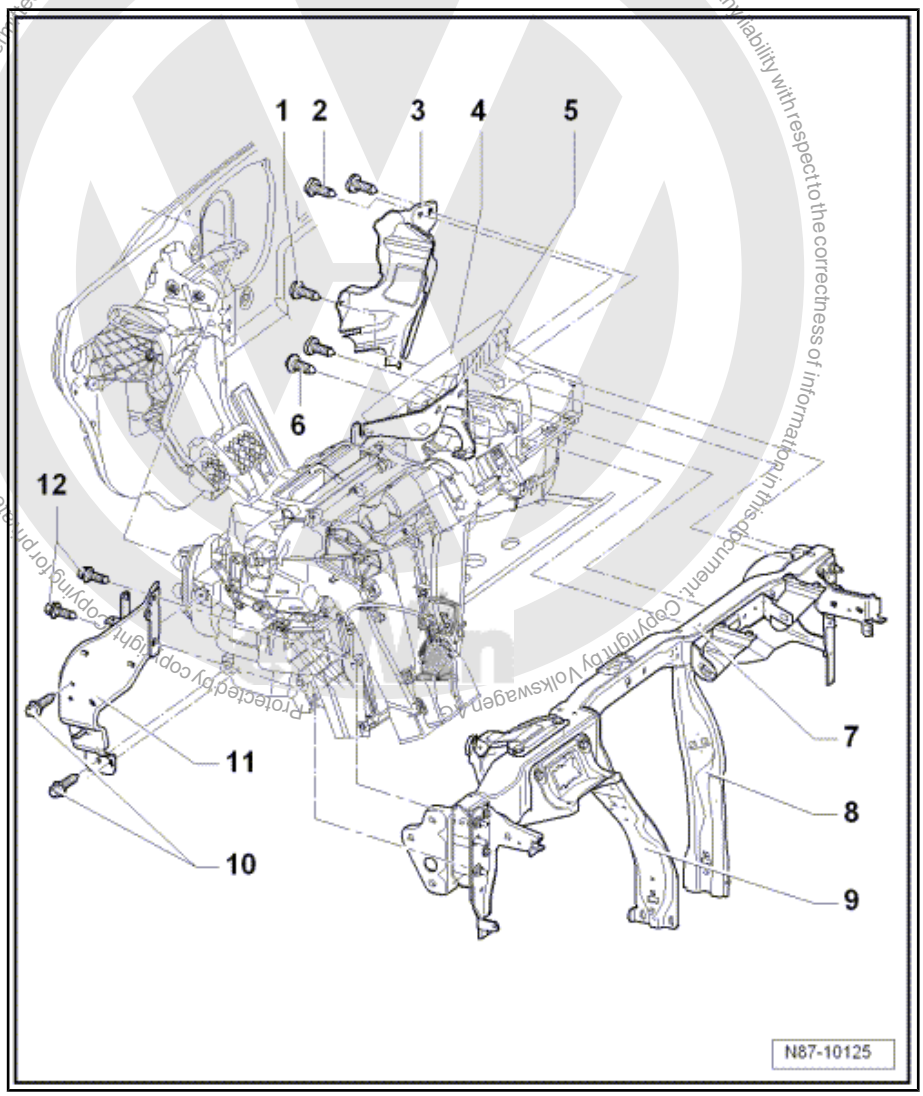
When the engine is warm, the coolant temperature may be above 100 °C. The cooling system is pressurised.

If necessary, release pressure and reduce temperature before carrying out repairs.

- Clamp off coolant hoses -1- with hose clamps up to 40 mm Ø -VAS 3093- and disconnect coolant hoses to heat exchanger.
- Carefully blow remaining coolant out through unions of heat exchanger using a compressed air pistol.
- Cover carpet in interior of vehicle with a waterproof foil and water absorbing paper.

Note

During removal, note lengths and locations of bolts for later installation.



1 - Bolt

- ❑ 4 Nm

2 - Bolts

- ❑ Qty. 2
- ❑ 4 Nm

3 - Cable retainer

4 - Heater unit

- ❑ Removing:
- – Disconnect connectors on heater unit.

Note

- – Undo bolts ⇒ Item 6 (page 33) from bracket ⇒ Item 5 (page 33) .
- – Remove supports ⇒ Item 8 (page 33) and ⇒ Item 9 (page 33) .
- – Remove bolts ⇒ Item 10 (page 33) and ⇒ Item 12 (page 34) and remove bracket ⇒ Item 11 (page 34) .
- – Undo bolts ⇒ Item 1 (page 33) and ⇒ Item 2 (page 33) from cable retainer ⇒ Item 3 (page 33) .

Note

- – Remove heater unit.

Installing:

Install in reverse order. Note the following when doing this:

Note

- – Second mechanic must guide both coolant pipes though seal in engine compartment, from engine compartment, to heat exchanger when installing heater unit ⇒ page 34 .
- – Fill with coolant ⇒ Rep. gr. 19 .

5 - Bracket

6 - Bolts

- ❑ 8 Nm

7 - Assembly carrier

8 - Right support

9 - Left support

10 - Bolts

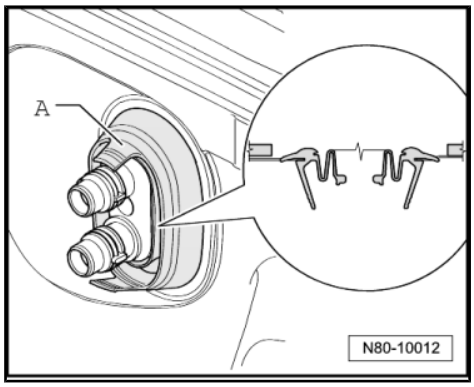
- ❑ Qty. 2
- ❑ 8 Nm

11 - Bracket

12 - Bolts

- ❑ Qty. 2
- ❑ 8 Nm

Seal between heater unit and engine compartment

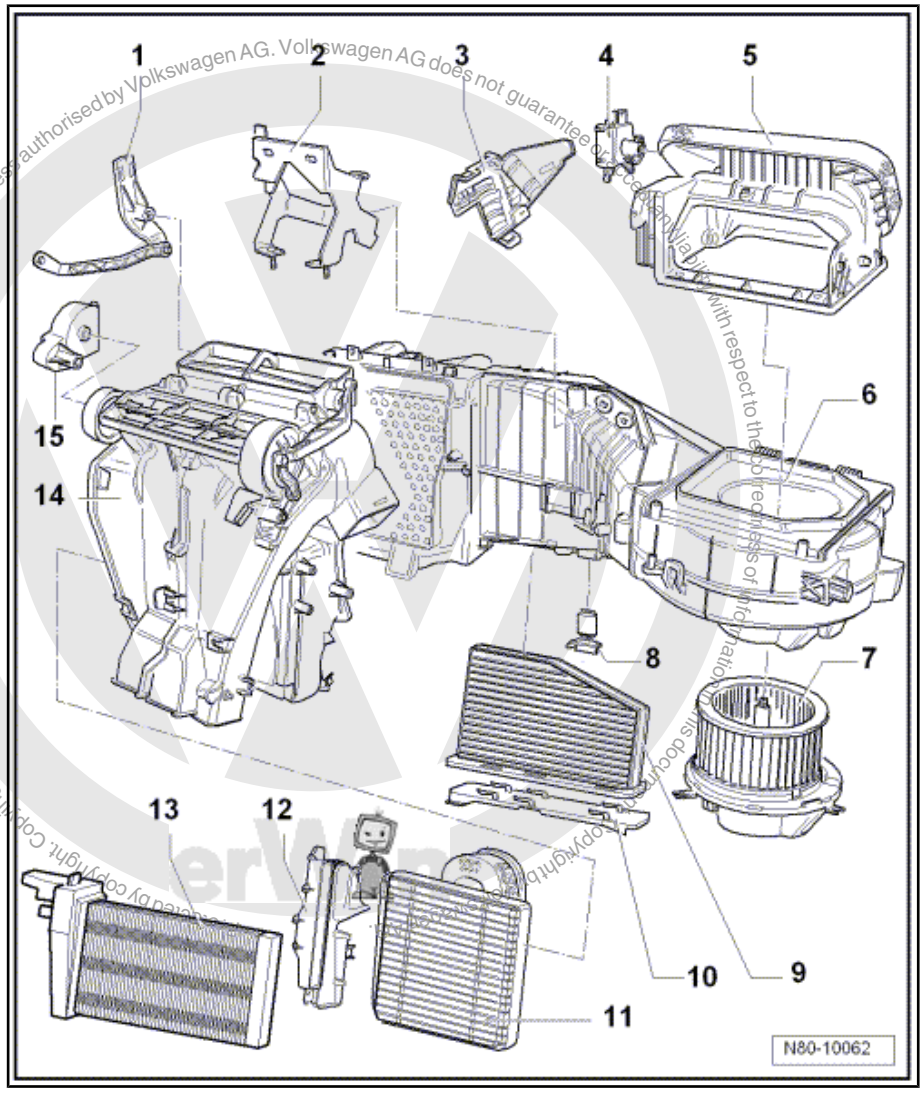


Note

Observe position of seal -A- during installation.

2 Dismantling and assembling heater unit

2.1 Dismantling and assembling heater unit



1 - Temperature flap actuator

- ❑ Removing and installing ⇒ page 36

2 - Bracket

3 - Cover

4 - Fresh air and air recirculation flap control motor -V154-

- ❑ Checking: vehicle diagnosis, testing and information system -VAS 5051B- .
- ❑ Removing and installing ⇒ page 79
- ❑ Renewing: initiate basic setting using vehicle diagnosis, testing and information system -VAS 5051B- ⇒ page 55 .

5 - Air intake housing

- ❑ With air recirculation flap

6 - Heater unit

7 - Fresh air blower -V2-

- ❑ Removing and installing ⇒ page 5

8 - Fresh air blower series resistor with overheating fuse -N24-

- ❑ Removing and installing ⇒ page 6

9 - Dust and pollen filter

- ❑ Removing and installing ⇒ page 6

10 - Cover

- ❑ For dust and pollen filter.

11 - Heat exchanger

- ❑ Removing and installing heat exchanger (Golf Variant 2007►, Golf Variant 2010► und Jetta 2005►) ⇒ page 19 .
- ❑ Removing and installing heat exchanger (Jetta 2010►) ⇒ page 23 .
- ❑ After renewing heat exchanger, renew coolant completely ⇒ Rep. gr. 19 .

12 - Heat exchanger trim

13 - Auxiliary air heater element -Z35-

Vehicles ► 1K-7M 119 726

- ❑ With auxiliary air heater control unit -J604- .

- ❑ Checking: with vehicle diagnosis, testing and information system -VAS 5051- (or later model), under Heating, ventilation, air conditioning; Systems capable of self-diagnosis; Auxiliary heating; Electrical components.
- ❑ Removing and installing ⇒ page 26

Vehicles 1K-7M 119 726 ➤

- ❑ A three-level auxiliary air heater element -Z35- is fitted here; it is controlled by the respective engine control unit via relays.
- ❑ Installed only in vehicles with diesel engines without supplementary heater.
- ❑ Removing and installing ⇒ page 27

14 - Air distribution housing

15 - Air distribution flap actuator

- ❑ Removing and installing ⇒ page 36

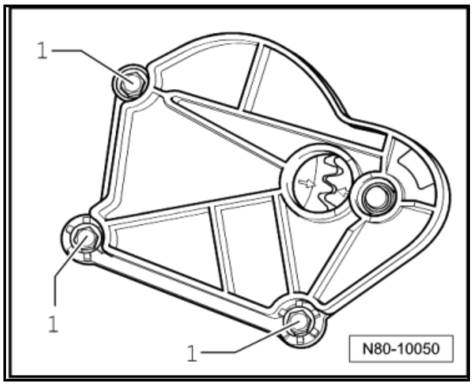
2.2 Removing and installing air distribution flap actuator

2.2.1 Removing

– Remove dash panel ⇒ Rep. gr. 70 .

– Unclip flexible shaft from adapter for controls ⇒ page 50 .

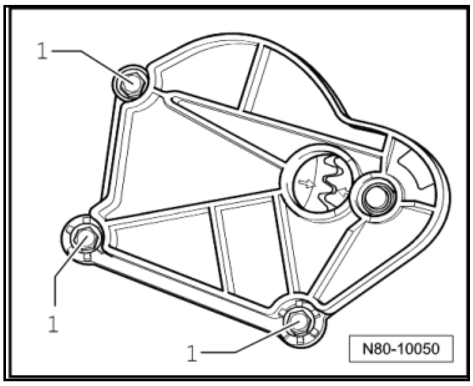
– Remove bolts -1- and remove air distribution flap actuator.



2.2.2 Installing

– Arrows on gears must align.

– Position air distribution flap actuator and tighten bolts -1-.



Note

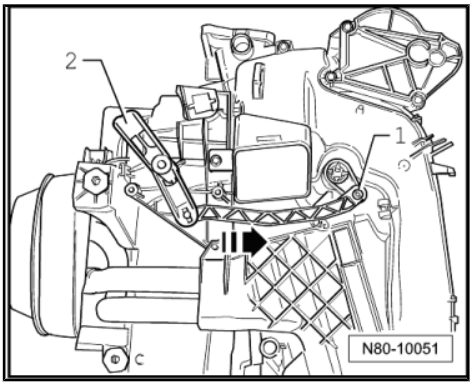
After installation, check operation of air distribution flap *⇒ page 50* *.*

2.3 Removing and installing temperature flap actuator

2.3.1 Removing

– Remove driver side footwell trim ⇒ Rep. gr. 68 .

– Remove left footwell vent ⇒ page 9 .
– Unclip cable on temperature flap actuator -2-.
– Release catch -1- and press temperature flap actuator in -direction of arrow- to stop.
– Pull off temperature flap actuator.



2.3.2 Installing

Install in reverse order.

Note

After installation, check operation of temperature flap. Temperature knob of control for heated and fresh air must move freely and without jerking from „cold“ position to „warm“ position.

87 – Air conditioning system

1 Notes on repair work to vehicles with air conditioning and on handling refrigerant

Note

- *Notes on repair work to vehicles with air conditioning and on handling refrigerant can be found in ELSA under repair group ⇒ Rep. gr. 00 ; Technical information "Air conditioning system - with refrigerant R134a VW" .*
- *Notes on tools for repairs to vehicles with air conditioning and on handling refrigerant can be found in ELSA under repair group ⇒ Rep. gr. 00 ; Technical information "Air conditioning system - with refrigerant R134a VW" .*
- *The version in ELSA under the Internet button is no longer valid.*

Additional information:

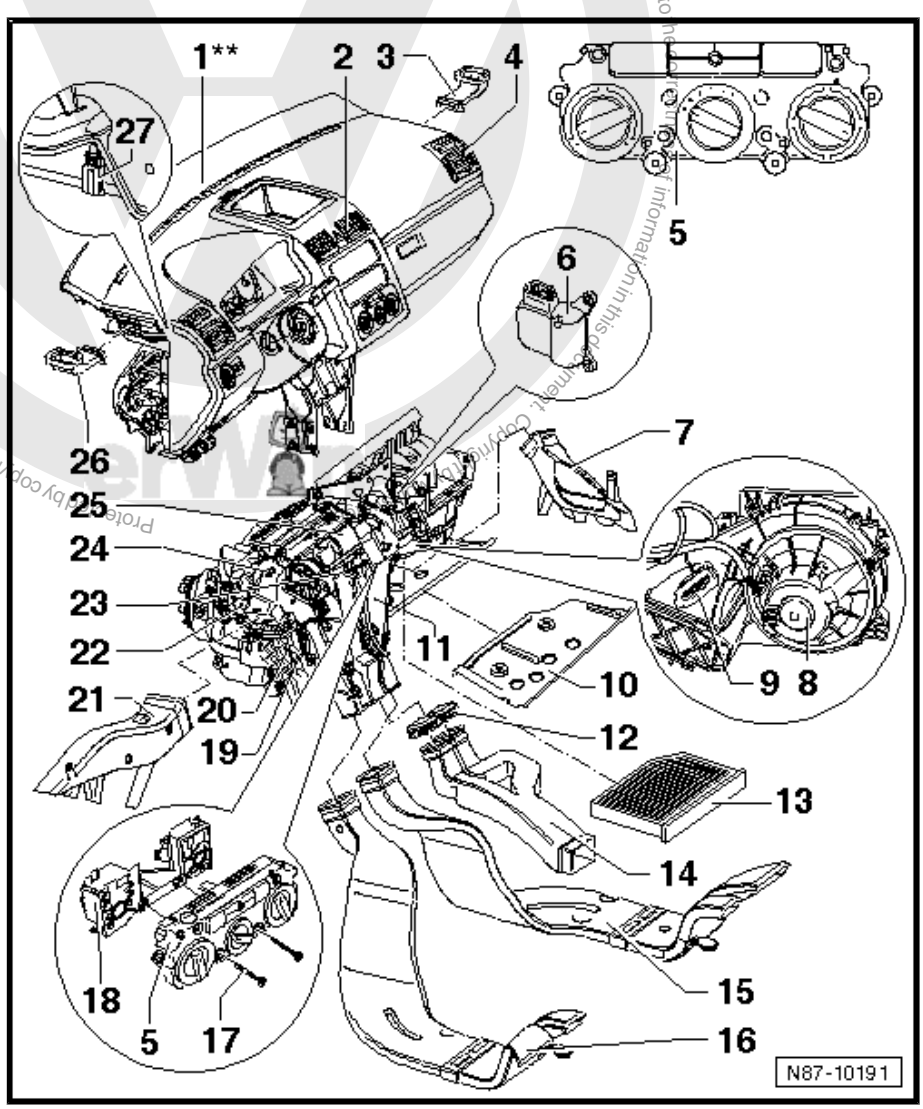
- ⇒ Current flow diagrams, Electrical fault finding and Fitting locations
- Repairs to evacuated refrigerant circuit that can only be carried out by specially trained mechanics at specialist service stations ⇒ Service Organisation Handbook (SOH) Volume 1a; Chapter 6.4 Workshop Equipment; Tools .

2 Air conditioning system with manual controls, Climatic

2.1 Air conditioning system and heater - passenger compartment (Golf Variant 2007►, Golf Variant 2010► und Jetta 2005►)

Note

- *Disconnect battery before removing components marked ** ⇒ Rep. gr. 27 .*
- *A label indicates the type and quantity of refrigerant used.*



1 - Dash panel**

2 - Centre vents

- ❑ Removing and installing ⇒ page 7

3 - Right side vent

4 - Right vent

- ❑ Removing and installing ⇒ page 8

5 - Heating and air conditioning controls, Climatic

- ❑ With fresh air and air recirculation flap switch -E159- .
- ❑ With heated rear window button -E230- .
- ❑ With fresh air blower switch -E9-
- ❑ With air conditioning system control unit -J301- .
- ❑ For vehicles with supplementary heating having instant heating button -E537- .
- ❑ Removing and installing ⇒ page 48

6 - Air recirculation flap control motor -V113-

- ❑ Checking: vehicle diagnosis, testing and information system -VAS 5051B- .
- ❑ Removing and installing ⇒ page 51
- ❑ Renewing: initiate basic setting using vehicle diagnosis, testing and information system -VAS 5051B- ⇒ page 55 .

7 - Right footwell vent

- ❑ Removing and installing ⇒ page 9

8 - Fresh air blower -V2-

- ❑ Removing and installing ⇒ page 5

9 - Fresh air blower series resistor with overheating fuse -N24-

- ❑ Removing and installing ⇒ page 6

10 - Baffle plate for heater unit

- ❑ Removing ⇒ page 3

11 - Evaporator temperature sensor -G308-

- ❑ Removing and installing ⇒ page 77

12 - Sealing cap

- ❑ Fitted only in vehicles without air duct to vent in rear centre console.

13 - Dust and pollen filter

- ❑ With activated charcoal filter
- ❑ Removing and installing ⇒ page 6

14 - Connecting piece

- ❑ For centre console air duct.
- ❑ To remove, centre console must be removed ⇒ Rep. gr. 68 .

15 - Air duct for right rear footwell

- ❑ Removing and installing ⇒ page 8

16 - Air duct for left rear footwell

- ❑ Removing and installing ⇒ page 8

17 - Securing bolt

- ❑ Qty. 8

18 - Adapter for controls

19 - Auxiliary air heater element -Z35-

- ❑ Only in vehicles with diesel engines without auxiliary coolant heater.
- ❑ Removing and installing ⇒ page 26

20 - Heat exchanger

- ❑ Removing and installing heat exchanger (Golf Variant 2007►, Golf Variant 2010► und Jetta 2005►) ⇒ page 19 .
- ❑ After renewing heat exchanger, renew coolant completely ⇒ Rep. gr. 19 .

21 - Left footwell vent

- ❑ Removing and installing ⇒ page 9

22 - Temperature flap control motor -V68-

- ❑ Checking: vehicle diagnosis, testing and information system -VAS 5051B- .
- ❑ Removing and installing ⇒ page 51
- ❑ Renewing: initiate basic setting using vehicle diagnosis, testing and information system -VAS 5051B- ⇒ page 55 .

23 - Flexible shaft

- ❑ Removing and installing ⇒ page 50 .

24 - Footwell vent temperature sender -G192-

- ❑ Removing and installing ⇒ page 53

25 - Heater and air conditioning unit

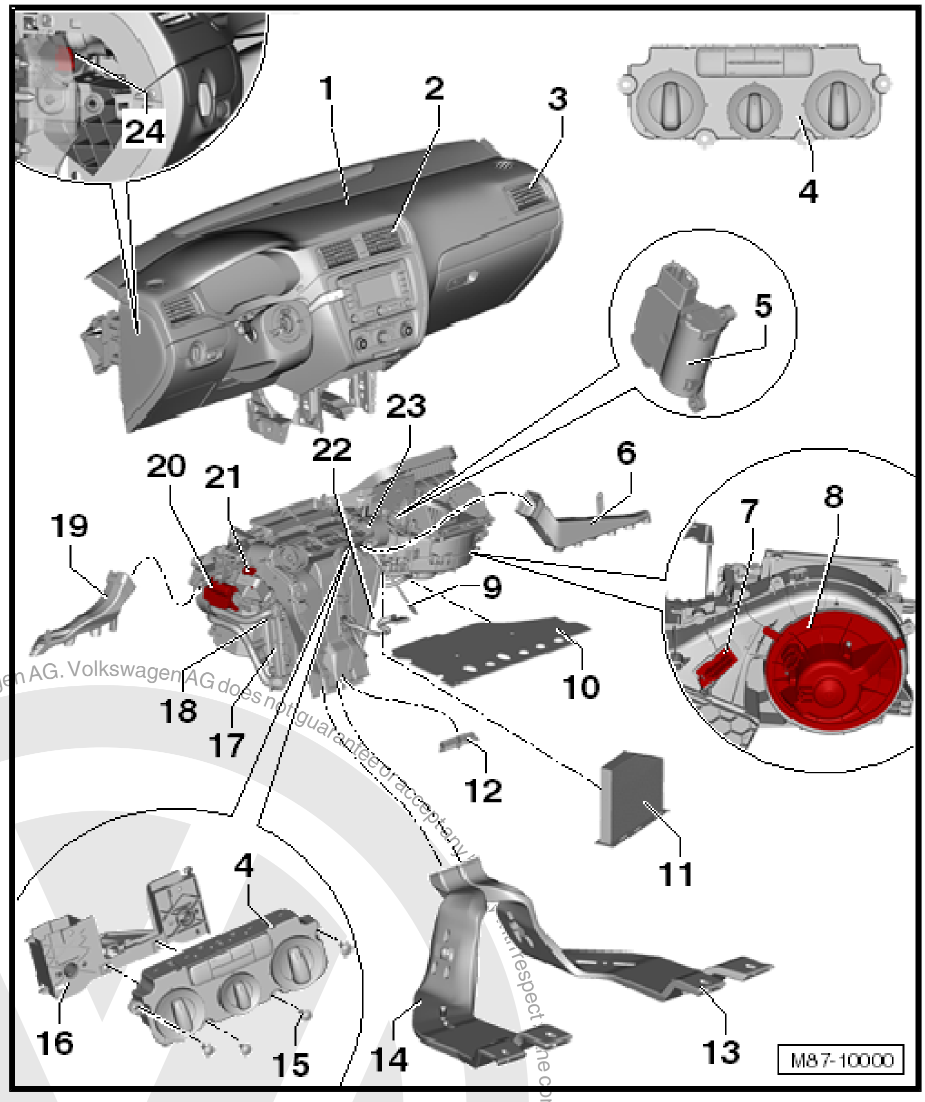
- ❑ Removing and installing ⇒ page 42
- ❑ Dismantling and assembling ⇒ page 47

26 - Left side vent

27 - Centre vent temperature sender -G191-

- ❑ Removing and installing ⇒ page 54

2.2 Air conditioning system and heater - passenger compartment (Jetta 2011►)



1 - Dash panel

2 - Centre vents

- ❑ Removing and installing ⇒ page 10

3 - Right vent

- ❑ Removing and installing ⇒ page 12

4 - Heating and air conditioning controls, Climatic

- ❑ With fresh air and air recirculation flap switch -E159- .
- ❑ With heated rear window button -E230- .
- ❑ With fresh air blower switch -E9-
- ❑ With air conditioning system control unit -J301- .
- ❑ For vehicles with supplementary heating having instant heating button -E537- .
- ❑ Removing and installing ⇒ page 48

5 - Air recirculation flap control motor -V113-

- ❑ Checking: vehicle diagnosis, testing and information system -VAS 5051B- .
- ❑ Removing and installing ⇒ page 51
- ❑ Renewing: initiate basic setting using vehicle diagnosis, testing and information system -VAS 5051B- ⇒ page 55 .

6 - Right footwell vent

- ❑ Removing and installing ⇒ page 9

7 - Fresh air blower series resistor with overheating fuse -N24-

- ❑ Removing and installing ⇒ page 6

8 - Fresh air blower -V2-

- ❑ Removing and installing ⇒ page 5

9 - Flexible shaft

- ❑ Removing and installing ⇒ page 50 .

10 - Baffle plate for heater unit

- ❑ Removing ⇒ page 3

11 - Dust and pollen filter

- ❑ With activated charcoal filter
- ❑ Removing and installing ⇒ page 6

12 - Sealing cap

- ❑ Fitted only in vehicles without air duct to vent in rear centre console.

13 - Air duct for right rear footwell

- ❑ Removing and installing ⇒ page 8

14 - Air duct for left rear footwell

- ❑ Removing and installing ⇒ page 8

15 - Securing bolt

- ❑ Qty. 8

16 - Adapter for controls

17 - Auxiliary air heater element -Z35-

- ❑ Only in vehicles with diesel engines without auxiliary coolant heater.
- ❑ Removing and installing ⇒ page 26

18 - Heat exchanger

- ❑ Removing and installing ⇒ page 23
- ❑ After renewing heat exchanger, renew coolant completely ⇒ Rep. gr. 19 .

19 - Left footwell vent

- ❑ Removing and installing ⇒ page 9

20 - Temperature flap control motor -V68-

- ❑ Checking: vehicle diagnosis, testing and information system -VAS 5051B- .
- ❑ Removing and installing ⇒ page 51
- ❑ Renewing: initiate basic setting using vehicle diagnosis, testing and information system -VAS 5051B- ⇒ page 55

21 - Footwell vent temperature sender -G192-

- ❑ Removing and installing ⇒ page 53

22 - Evaporator temperature sensor -G308-

- ❑ Removing and installing ⇒ page 77

23 - Heater and air conditioning unit

- ❑ Removing and installing ⇒ page 42
- ❑ Dismantling and assembling ⇒ page 47

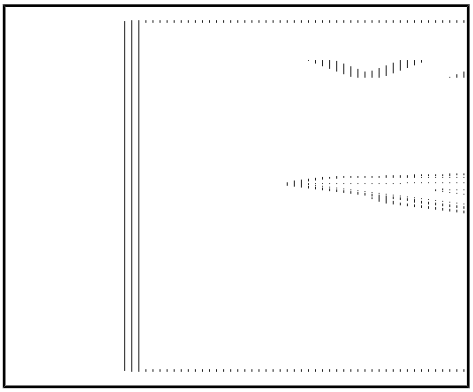
24 - Centre vent temperature sender -G191-

- ❑ Removing and installing ⇒ page 54

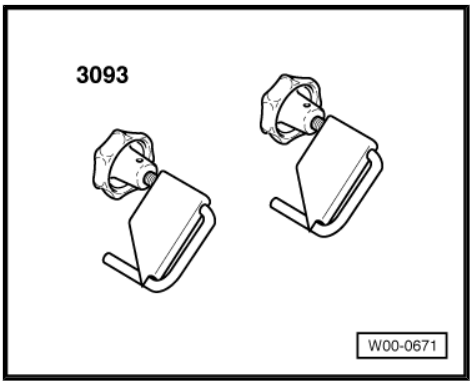
2.3 Removing and installing heater and air conditioner unit (Climatic)

Special tools and workshop equipment required

- Drip tray for workshop hoist -VAS 6208-



- Hose clamps up to 40 mm Ø -VAS 3093-



- Compressed air gun, commercially available

2.3.1 Removing

Note

To improve access, depending on engine version, additional components, e.g. engine cover must be removed ⇒ Rep. gr. 10 .

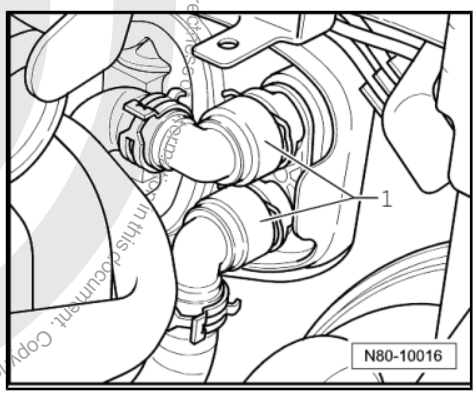
– Extract refrigerant, e.g. with air conditioner service station -VAS 6007A- before opening refrigerant circuit. Comply with notes ⇒ page 38 .
– Remove dash panel ⇒ Rep. gr. 70 .
– Remove bulkhead in plenum chamber ⇒ Rep. gr. 50 .
– Remove left and right rear footwell air ducts ⇒ page 8 .
– Place drip tray -VAS 6208- beneath engine.
– Mark coolant hoses -1-.

WARNING

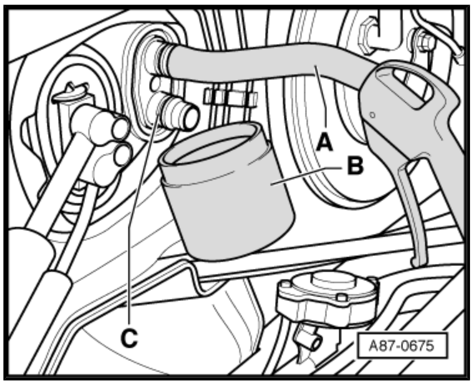
Danger of scalding injuries.

When the engine is warm, the coolant temperature may be above 100 °C. The cooling system is pressurised.

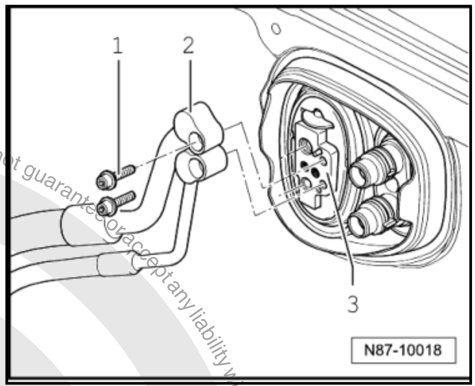
If necessary, release pressure and reduce temperature before carrying out repairs.



- Clamp off coolant hoses -1- with hose clamps up to 40 mm Ø -VAS 3093- and disconnect coolant hoses to heat exchanger.
- Push a piece of hose -A- onto upper union.
- Hold a container -B- under lower connection -C-.



- Carefully blow remaining coolant out through unions of heat exchanger using a compressed air pistol.



WARNING

Danger of freezing injuries.

If refrigerant circuit has not been evacuated, refrigerant will escape.

Extract refrigerant before opening refrigerant circuit. If the refrigerant circuit is not opened within 10 minutes after it has been evacuated, pressure may develop in coolant circuit due to re-evaporation. Extract refrigerant again.

- From engine compartment, undo bolts (12 Nm) -1- for refrigerant lines -2-.
- Take refrigerant lines out of expansion valve -3-.

Note

- ♦ *Seal open connections for lines.*
- ♦ *To seal open connections of expansion valve, use, for example, sealing cap of a spare expansion valve.*

- Cover carpet in interior of vehicle with a waterproof foil and water absorbing paper.

Note

During removal, note lengths and locations of bolts for later installation.

1 - Bolt

- ❑ 4 Nm

2 - Bolts

- ❑ Qty. 2
- ❑ 4 Nm

3 - Cable retainer

4 - Heater and air conditioning unit

- ❑ Removing:

– Take condensation water drainage hose off heater and air conditioner unit ⇒ page 79 .

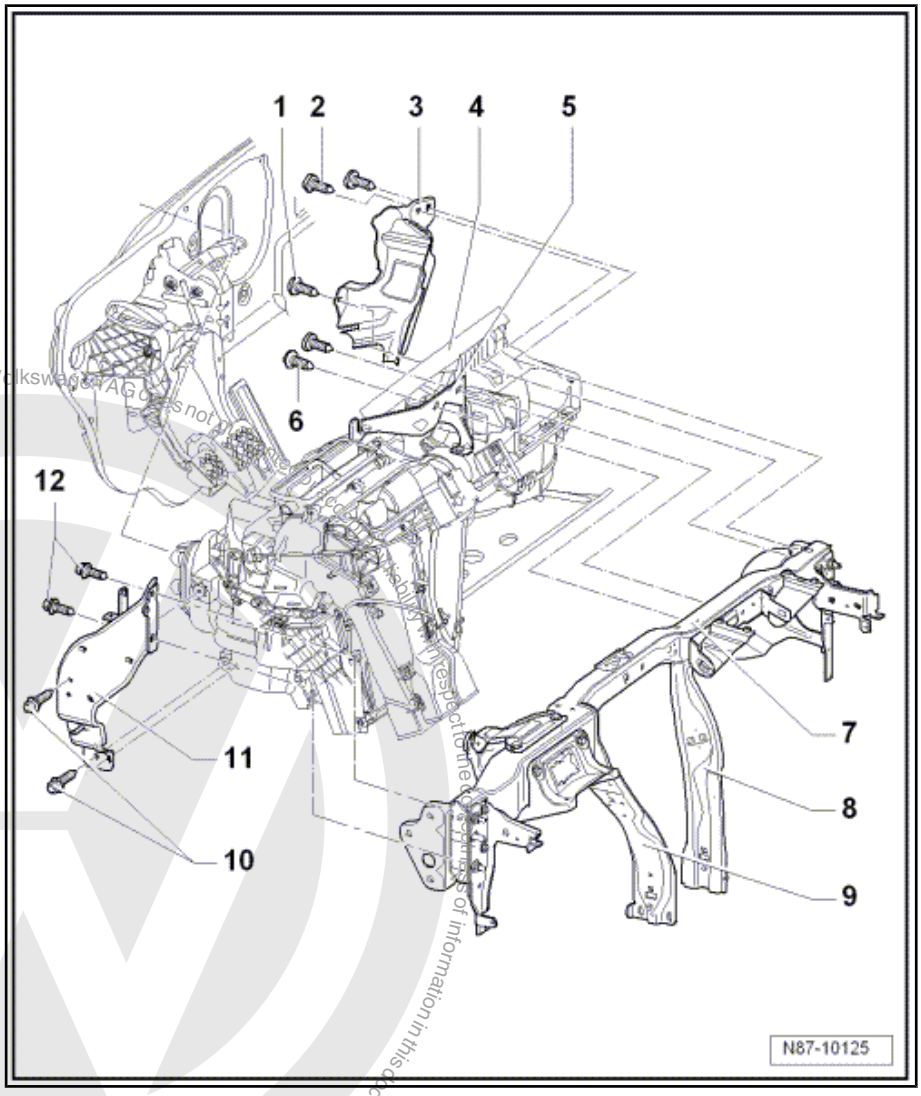
– Disconnect connectors from heater and air conditioner unit.

Note

– Undo bolts ⇒ Item 6 (page 45) from bracket ⇒ Item 5 (page 45) .

– Remove supports ⇒ Item 8 (page 46) and ⇒ Item 9 (page 46) .

– Remove bolts ⇒ Item 10 (page 46) and ⇒ Item 12 (page 46) and remove bracket ⇒ Item 11 (page 46) .



– Undo bolts ⇒ Item 2 (page 45) and ⇒ Item 1 (page 45) from cable retainer ⇒ Item 3 (page 45) .

Note

– Remove heater and air conditioning unit.

Installing:

Install in reverse order. Note the following when doing this:

Note

– Second mechanic must guide both coolant pipes though seal in engine compartment, from engine compartment, to heat exchanger when installing heater unit ⇒ page 46 .

– When installing, ensure that condensation water drainage hose is correctly seated ⇒ page 79 .

– Fill with coolant ⇒ Rep. gr. 19 .

5 - Bracket

6 - Bolts

- ❑ 8 Nm

7 - Assembly carrier

8 - Right support

9 - Left support

10 - Bolts

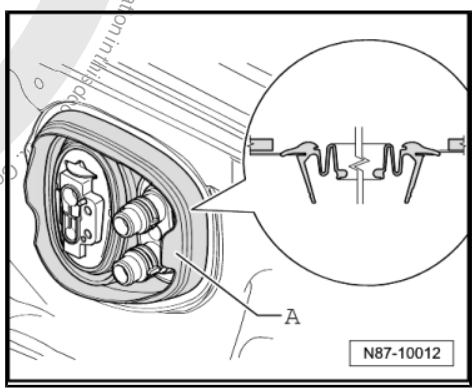
- ❑ Qty. 2
- ❑ 8 Nm

11 - Bracket

12 - Bolts

- ❑ Qty. 2
- ❑ 8 Nm

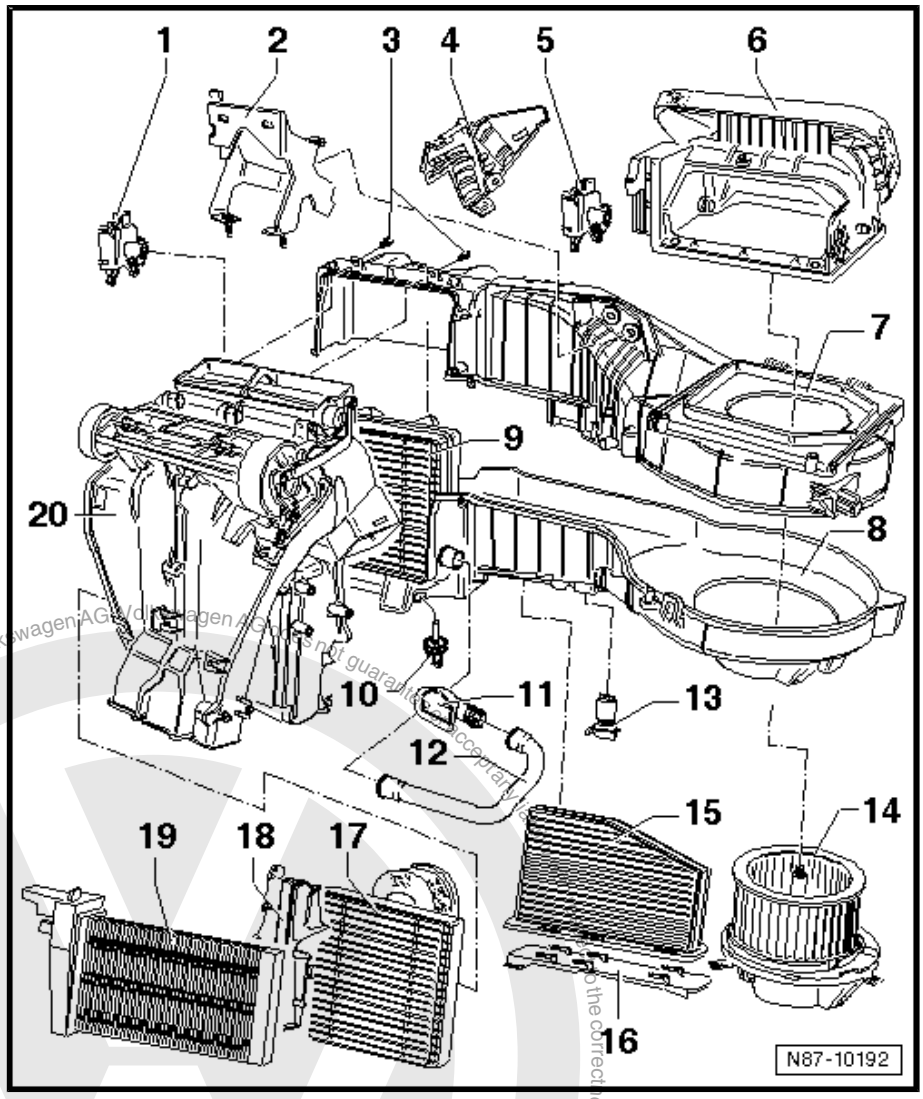
Heater and air conditioning unit/engine compartment seal



Note

Observe position of seal -A- during installation.

2.4 Dismantling and assembling heater and air conditioning unit (Climatic)



1 - Temperature flap control motor -V68-

- ❑ Checking: vehicle diagnosis, testing and information system -VAS 5051B- .
- ❑ Removing and installing ⇒ page 51
- ❑ Renewing: initiate basic setting using vehicle diagnosis, testing and information system -VAS 5051B- ⇒ page 55 .

2 - Bracket

3 - Bolts

- ❑ Bolts must be removed to separate air distribution housing from evaporator housing.

4 - Cover

5 - Air recirculation flap control motor -V113-

- ❑ Checking: vehicle diagnosis, testing and information system -VAS 5051B- .
- ❑ Removing and installing ⇒ page 51
- ❑ Renewing: initiate basic setting using vehicle diagnosis, testing and information system -VAS 5051B- ⇒ page 55 .

6 - Air intake housing

- ❑ With air recirculation flap

7 - Evaporator housing - upper part

- ❑ Dismantling and assembling evaporator housing ⇒ page 75

8 - Evaporator housing - lower part

- ❑ Dismantling and assembling evaporator housing ⇒ page 75

9 - Evaporator

- ❑ Removing and installing ⇒ page 99

10 - Evaporator temperature sensor -G308-

- ❑ Removing and installing ⇒ page 77

11 - Connection for glove compartment cooling

12 - Cooling hose for glove compartment

13 - Fresh air blower series resistor with overheating fuse -N24-

- ❑ Removing and installing ⇒ page 6

14 - Fresh air blower -V2-

- ❑ Removing and installing ⇒ page 5

15 - Dust and pollen filter

- ❑ With activated charcoal filter
- ❑ Removing and installing ⇒ page 6

16 - Cover

- ❑ For dust and pollen filter.

17 - Heat exchanger

- ❑ After renewing heat exchanger, renew coolant completely ⇒ Rep. gr. 19 .
- ❑ Removing and installing heat exchanger (Golf Variant 2007►, Golf Variant 2010► und Jetta 2005►) ⇒ page 19 .
- ❑ Removing and installing heat exchanger (Jetta 2010►) ⇒ page 23 .

18 - Heat exchanger cladding

19 - Auxiliary air heater element -Z35-

- ❑ Only in vehicles with diesel engines without supplementary heater.
- ❑ Removing and installing ⇒ page 26

20 - Air distribution housing

2.5 Removing and installing heating and air conditioning controls, Climatic

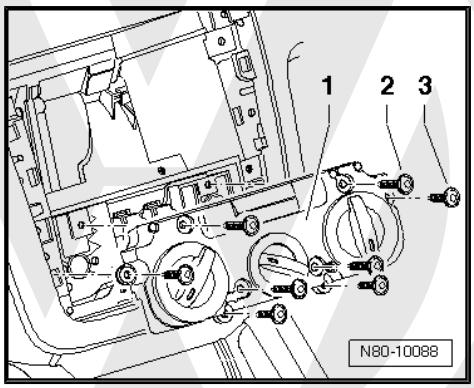
2.5.1 Removing

Note

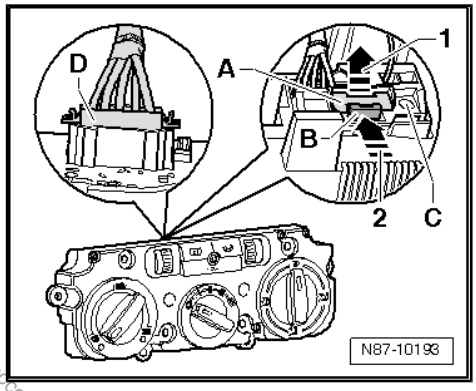
- ♦ *The control consists of 2 separable housings. Before removing controls, set rotary knobs to the following positions:*
- ♦ *Heater control to „cold“*
- ♦ *Blower to „0“*
- ♦ *Vent direction to „footwell“*

– Remove radio ⇒ Rep. gr. 91 .

– Models with no radio trim, removing centre part of dash panel . ⇒ Rep. gr. 68



– Remove bolts -2- (4.2 x 45) and -3- (4.2 x 16) and remove the controls -1- from centre console.
– Release connector catch -A- by pulling it in direction of arrow -1-.
– Push connector catch -B- towards connector -arrow 2- and remove connector -C-.
– Release connector catch -D- and remove connector -D-.



2.5.2 Installing

Install in reverse order. Note: the rotating knobs must be in the same position as when removed.

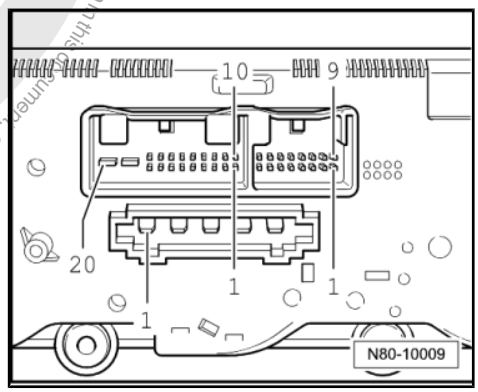
2.6 Connections on controls for heating and air conditioning, Climatic

2.6.1 Pin assignment for multi-pin connectors on back of controls for heating and air conditioning, Climatic

Special tools and workshop equipment required

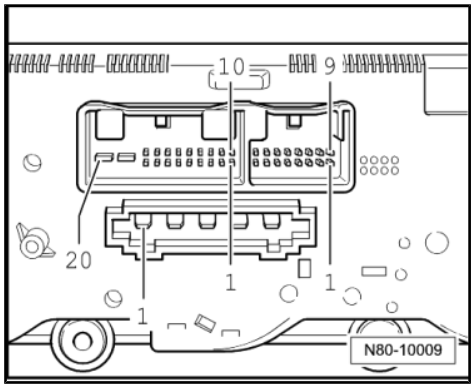
♦ Test adapter -V.A.G 1598/47-

20-pin connector, T20c in current flow diagram



3 - Centre vent temperature sender -G191-
5 - High-pressure sender -G65-
7 - CAN, low
8 - CAN, high
12 - Right seat heating (optional)
13 - Left seat heating (optional)
15 - Terminal 75, seat heating (optional)
16 - Air conditioning system compressor regulating valve -N280-
19 - Terminal 30A
20 - Terminal 31

16-pin connector, T16e in current flow diagram



1 - Temperature flap control motor -V68- , warm

2 - Evaporator output temperature sender -G263-

4 - Footwell vent temperature sender -G192-

5 - Temperature flap control motor potentiometer -G92-

7 - + 5 V for temperature flap control motor potentiometer -G92-

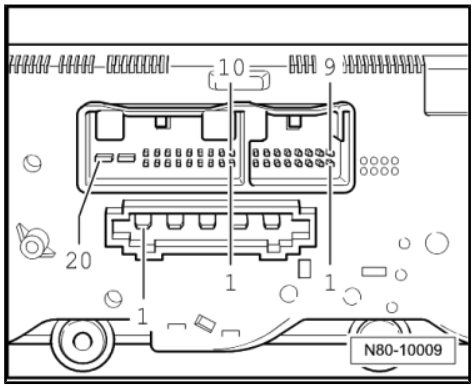
8 - Ground for temperature flap control motor potentiometer -G92- , centre vent temperature sender -G191- , footwell vent temperature sender -G192- and evaporator output temperature sensor -G263-

9 - Air recirculation flap control motor -V113- , open

10 - Air recirculation flap control motor -V113- , closed

11 - Temperature flap control motor -V68- , cold

5-pin connector, T5 in current flow diagram



1 - Blower 3rd speed

2 - Blower 2nd speed

3 - Blower 1st speed

4 - Bower 4th speed

5 - X terminal

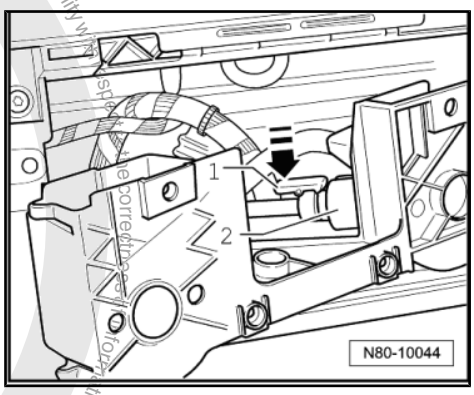
2.7 Removing and installing flexible shaft

2.7.1 Removing

– Remove heating and air conditioning controls, Climatic ⇒ page 48.

– Carefully pull out adapter for controls.

– Press in locking lug -arrow- of flexible shaft and pull out flexible shaft.



Note

When flexible shaft is installed, the adapter and the rotary knobs of the controls for heater and air conditioning system (Climatic) must be aligned in a specific position to one another. Otherwise the system will malfunction.

2.7.2 Checking

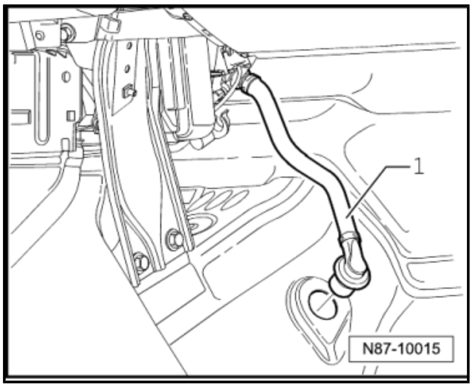
Flexible shaft for air distribution flap actuator:

– Run fresh air blower at highest speed. If air flows out of defroster vent in the „defrost“ position, and no air flows out of footwell vent, then the flexible shaft is correctly installed. Otherwise, remove flexible shaft from adapter. Position controls for Climatic heating and air conditioning system on adapter

and turn rotary knob for air distribution $^1/_2$ turn (180°). Then reconnect flexible shaft. Repeat check.

2.8 Checking condensation water drainage hose on heater and air conditioner unit

– Remove footwell cover on front passenger side .



Note

- *It must be possible to push condensation drain hose -1- onto the heater and air conditioning unit connection without tension.*
- *The condensation drain hose must be fitted securely to the connection for condensation drainage of the heater and air conditioner unit.*

2.9 Removing and installing air recirculation flap control motor -V113-

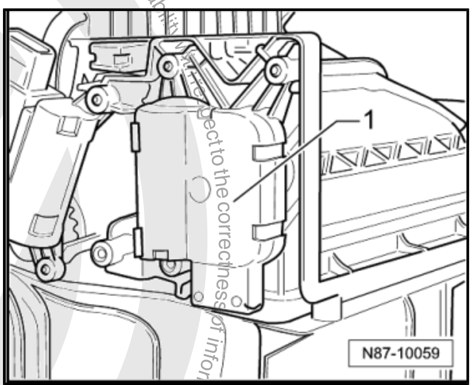
2.9.1 Removing

– Remove glove compartment ⇒ Rep. gr. 68 .

– Remove cover for control motors.

– Disconnect connector on air recirculation flap control motor -V113- -1-.

– Pull off air recirculation flap control motor -V113- -1-.



2.9.2 Installing

Install in reverse order.

Note

- *After installation, check operation of air recirculation flap.*
- *Initiate „basic setting“ function using vehicle diagnosis, testing and information system -VAS 5051B-* *⇒ page 55* *.*

2.10 Removing and installing temperature flap control motor -V68-

2.10.1 Removing

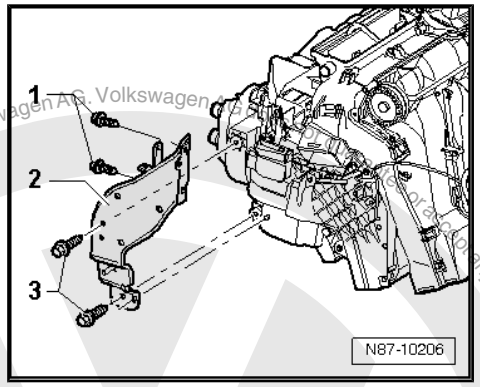
– Remove left footwell vent ⇒ page 9 .

– Remove left trim panel in footwell ⇒ Rep. gr. 68 .

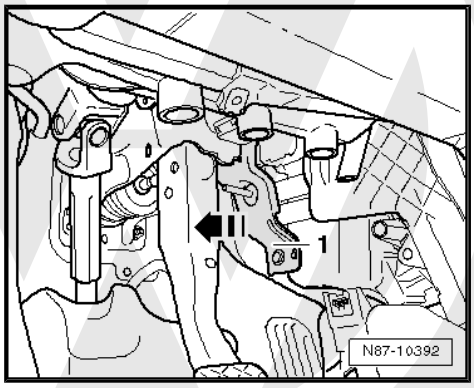
– Remove data bus diagnosis interface -J533- ⇒ Rep. gr. 97 .
– Remove bolts -3- (9 ± 1.3 Nm).

Do not remove bolts -1-.

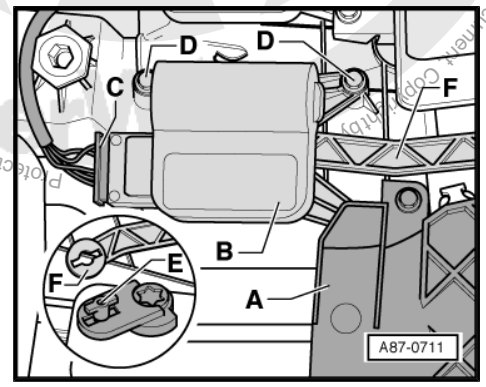
– Do not remove bracket -2-.



– Press bracket -1- in direction of brake pedal -arrow- and secure it there with a cable tie.



– Mark connector -C- to control motor (danger of interchanging with other connectors of same construction).
– Disconnect connector -C- on temperature flap control motor -V68- .
– Remove cover -A-.
– Remove securing bolts -D- (1.4 Nm) and remove temperature flap control motor -V68- -B-.
– Release control motor lever -E- from connecting rod -F-.



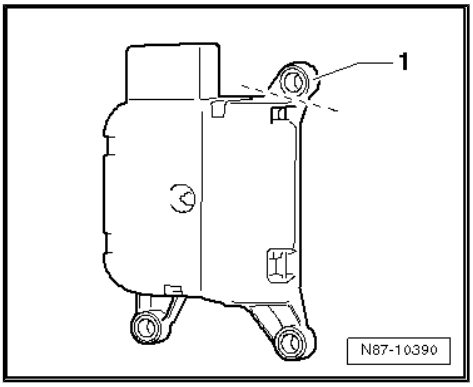
2.10.2 Installing

Note

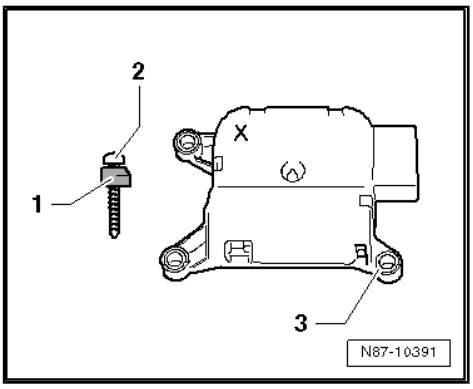
Optimised control motors are marked with an „X“.

To ease assembly, use a ≈ 2 mm shorter oval-head bolt -N 103 254 01- .

– Separate bracket -1- from old temperature flap control motor -V68- , e.g. using side cutting pliers.



– Position new temperature flap control motor -V68- , marked with an „X“, with shortened oval-head screw -2- and cut-off bracket -1- on bracket -3- on blower box.



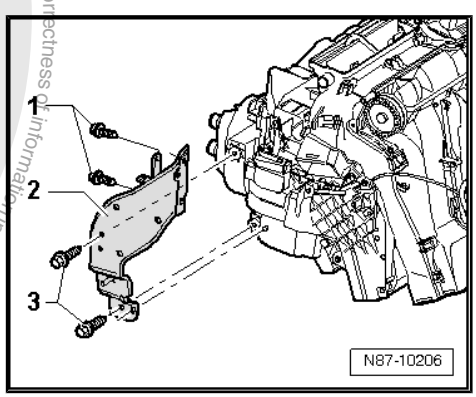
Note

- *After installation, check operation of left temperature flap.*
- *Initiate „basic settings“ function using vehicle diagnosis, testing and information system -VAS 5051- or successor model* *⇒ page 55* .

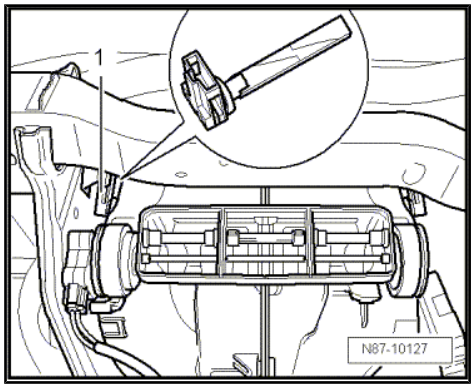
2.11 Removing and installing footwell vent temperature sender -G192-

2.11.1 Removing

– Remove dash panel ⇒ Rep. gr. 70 .
– Remove data bus diagnosis interface -J533- ⇒ Rep. gr. 97 .
– Remove left footwell vent ⇒ page 9 .
– Remove bolts -1- and -3- (9 ± 1.3 Nm).



– Remove bracket -2-.
– Pull connector off footwell vent temperature sender -G192- -1-.
– Turn footwell vent temperature sender -G192- 90° and remove it from housing.



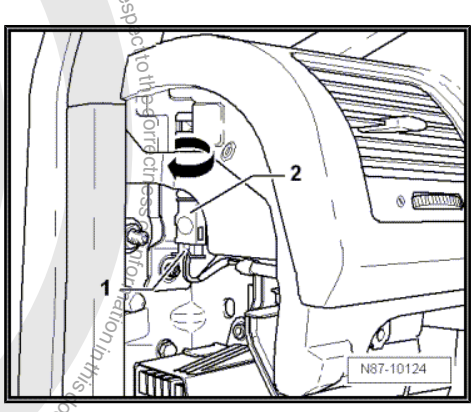
2.11.2 Installing

Install in reverse order.

2.12 Removing and installing centre vent temperature sender -G191-

2.12.1 Removing

– Remove cover on left of dash panel ⇒ Rep. gr. 70 .
– Pull connector off centre vent temperature sender -G191- -1-.
– Turn centre vent temperature sender -G191- -2- 90° in direction of -arrow- and remove from dash panel.



2.12.2 Installing

Install in reverse order.

3 Climatronic air conditioning with automatic regulation

Note

- *Pressing the AUTO button will cancel all settings which deviate from automatic operation.*
- *Deviations from automatic operation ⇒ relevant Owner's Manual.*
- *In „ECON" operation, only the air conditioner compressor is switched to almost zero delivery. The heating and ventilation operations continue to be controlled electronically.*

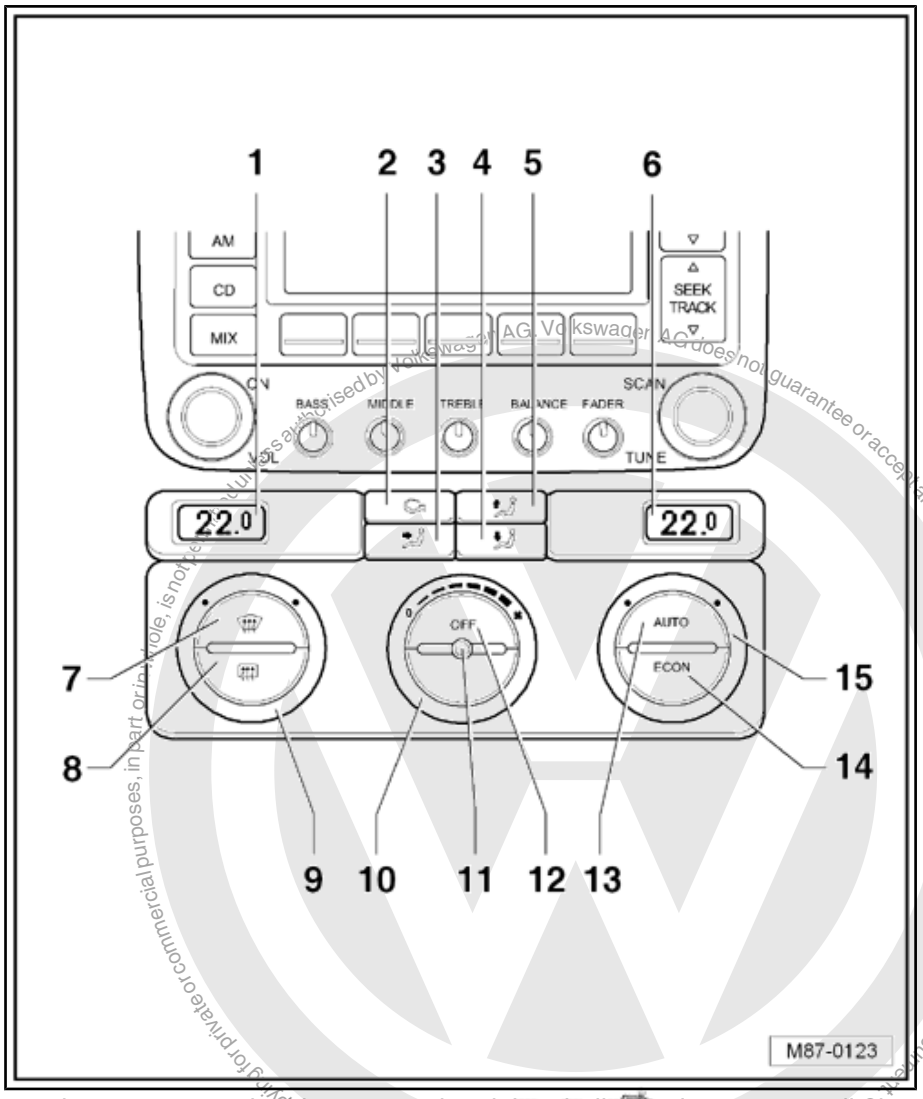
3.1 Procedure for checking and adjusting components

Select „guided fault finding" on the vehicle diagnosis, testing and information system -VAS 5051B- .

After all control units have been read:

– Press „GoTo" button.
– Select „Function/component selection".
– Select „Body".
– „Heating, ventilation, air conditioning (Repair group 01; 80… 87)".
– Select „01-On Board Diagnostic (OBD) capable systems".
– Select „Climatronic" or „Climatic".
– Select „Functions".
– „Basic setting"
– „Coding Climatronic control unit".
– „Check cooling output."
– „Read measured value block"

3.2 Function of operating and display unit for Climatronic air conditioning system -E87- (Golf Variant 2007►, Golf Variant 2010► und Jetta 2005►)



1 - Display for selected left interior temperature

2 - Air recirculation button

- ❑ Pressing the air recirculation button will prevent polluted air from entering the interior.

3 - Centre air distribution button

4 - Lower air distribution button

5 - Upper air distribution button

6 - Display for selected right interior temperature

7 - Windscreen defrost button

8 - Rear window heating button

9 - Rotary knob for interior temperature, left

10 - Blower regulator

- ❑ Turn to change blower speed.

11 - Interior temperature sensor

12 - Off button for heating, ventilation and air conditioning operation

13 - AUTO button

- ❑ Pressing AUTO button causes the Climatronic to maintain the selected interior temperature completely automatically. With this setting, the vent air temperature, the blower speed and the air distribution are controlled automatically.

14 - ECON button

- ❑ Pressing the ECON button will set the air conditioner compressor to near-zero delivery. The heating and ventilation operations continue to be controlled electronically.

15 - Rotary knob for interior temperature, right

3.3 Removing and installing operating and display unit for Climatronic air conditioning system -E87- with Climatronic control unit -J255- (Golf Variant 2007►, Golf Variant 2010► und Jetta 2005►)

Note

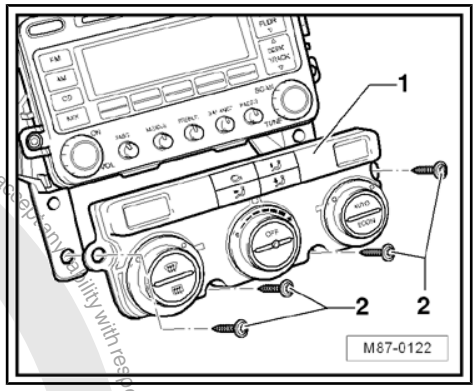
The Climatronic control unit -J255- and the operating and display unit for Climatronic air conditioning system -E87- are a single component which cannot be dismantled.

3.3.1 Removing

– Remove dash panel centre trim ⇒ Rep. gr. 68 ; .

– Undo bolts -2- and remove operating and display unit for Climatronic air conditioning system -E87- -1- from dash panel.

– Disconnect connectors on operating and display unit for Climatronic air conditioning system -E87- .



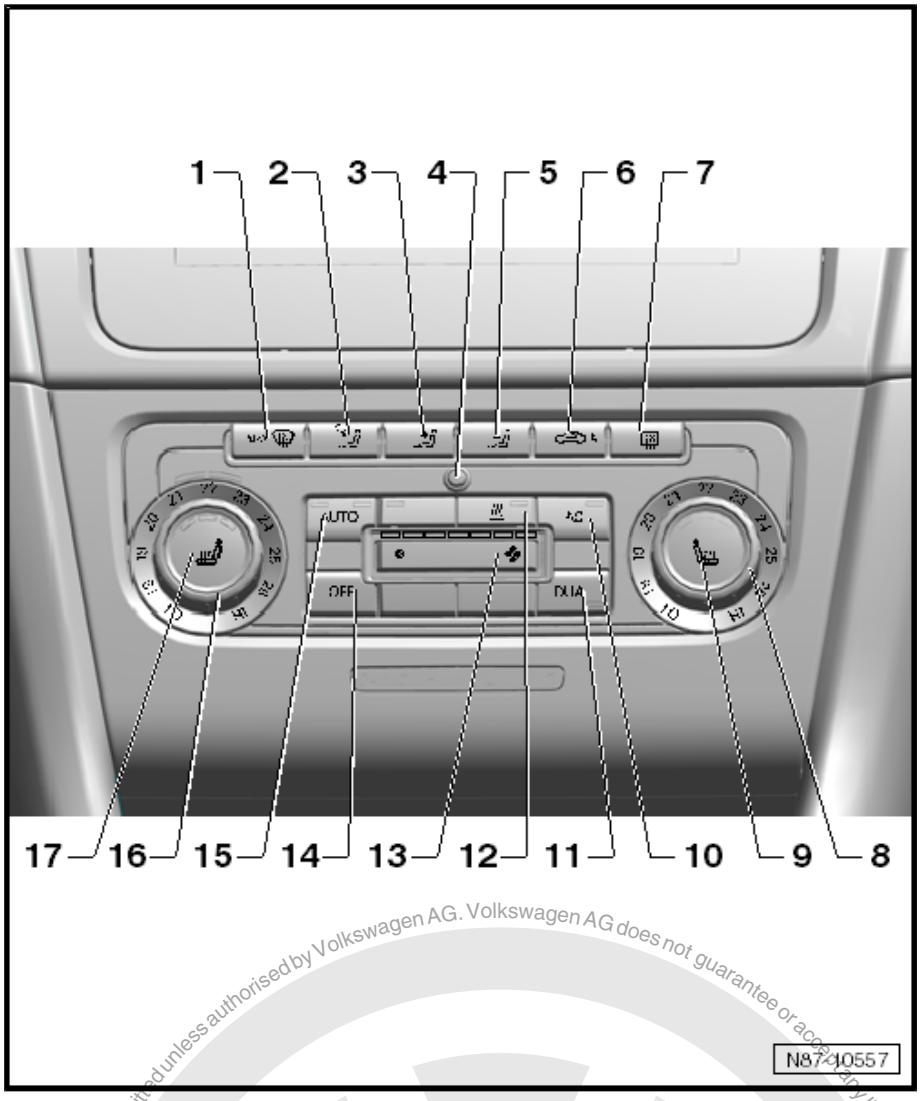
3.3.2 Installing

Install in reverse order.

3.4 Function of operating and display unit for Climatronic air conditioning system -E87- (Jetta 2011►)

Note

- *A warning lamp in the instrument panel controls will indicate that the selected function is active. In addition, the display of the radio or of the radio navigation system will indicate the selected function for a short period when a button is pressed or a regulator is operated.*
- *You can switch between °C and °F in the radio or radio navigation system display via the main menu in the dash panel insert. Press rocker switch in windscreen wiper lever (or in multifunction steering wheel) to call up main menu. Then select Settings, Units and Temperature.*
- *If a new operating and display unit for Climatronic air conditioning system -E87- with Climatronic control unit -J255- is installed, the basic setting and an adaptation („Compressor first run“) must be carried out in the Guided Fault Finding or in the Guided Functions.*



1 - Defrost function button for windscreen

2 - Upper air distribution button

3 - Centre air distribution button

4 - Interior temperature sensor

5 - Lower air distribution button

6 - Button for air recirculation mode or for automatic recirculation mode

- ❑ Pressing the button for air recirculation mode will switch on the air recirculation mode and prevent polluted air from entering the interior.
- ❑ Pressing the air recirculation mode button again will activate the automatic recirculation mode.

7 - Rear window heating button

8 - Rotary knob for interior temperature, right

9 - Button for right seat heating (optional)

10 - AC button

- ❑ Press AC button to switch cooling on and off.
- ❑ The warning lamp in the button lights up when the air conditioner compressor is switched on.

11 - DUAL button

- ❑ If the lamp in the button is on, the left and right temperatures may be adjusted independently.
- ❑ If the Dual button is pressed (the warning lamp goes out), the passenger side will assume the temperature setting for the driver side.

12 - Instant heating button -E537-

Note

13 - Blower regulator

- ❑ Press briefly to change blower speed.

14 - Air conditioner OFF button

- ❑ Switches Climatronic on or off

15 - AUTO button

- ❑ Pressing AUTO button causes the Climatronic to maintain the selected interior temperature completely automatically. With this setting, the vent air temperature, the blower speed and the air distribution are controlled automatically.

16 - Rotary knob for interior temperature

17 - Button for seat heating (optional)

3.5 Removing and installing operating and display unit for Climatronic air conditioning system -E87- with Climatronic control unit -J255- (Jetta 2011►)

Note

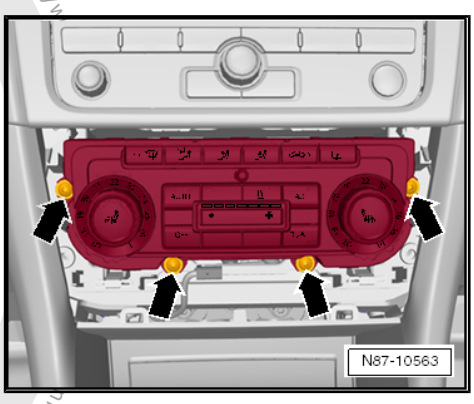
- *The Climatronic control unit -J255- and the operating and display unit for Climatronic air conditioning system -E87- are a single component which cannot be dismantled.*
- *If a new operating and display unit for Climatronic air conditioning system -E87- with Climatronic control unit -J255- is installed, the basic setting and an adaptation („Compressor first run“) must be carried out in the Guided Fault Finding or in the Guided Functions.*

3.5.1 Removing

– Remove air conditioning system/heater control panel trim ⇒ Rep. gr. 68 .

– Undo bolts -arrows- (1.5 ± 0.2 Nm) and remove operating and display unit for Climatronic air conditioning system -E87- from dash panel.

– Disconnect connectors on operating and display unit for Climatronic air conditioning system -E87- .



3.5.2 Installing

Note

If a new operating and display unit for Climatronic air conditioning system -E87- with Climatronic control unit -J255- is installed, the basic setting and an adaptation („Compressor first run“) must be carried out in the Guided Fault Finding or in the Guided Functions.

Install in reverse order. Observe specified toque for bolts (1.5 ± 0.2 Nm).

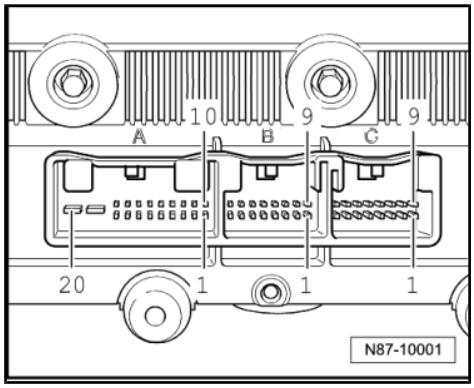
3.6 Connectors on Climatronic control unit -J255-

3.6.1 Pin assignment for multi-pin connectors A, B and C on back of Climatronic control unit -J255-

Special tools and workshop equipment required

- Test adapter -V.A.G 1598/47-

20-pin connector, T20c in current flow diagram -A-



1 - Sunlight penetration photosensor 2 -G134- or sunlight penetration photosensor -G107- , signal

2 - High-pressure sender -G65-

3 - Sunlight penetration photosensor 2 -G134- or sunlight penetration photosensor -G107- , signal

5 - CAN, high

6 - CAN, low

9 - + 5 V for sunlight penetration photosensor 2 -G134- or sunlight penetration photosensor -G107-

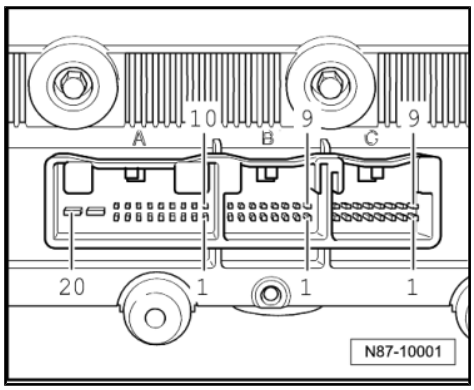
16 - Positive connection (15a) for vehicles with supplementary heating.

17 - Signal earth for sensors

18 - Air conditioning system compressor regulating valve -N280-

20 - Positive connection (15a) or positive connection (30a) for vehicles with auxiliary heater

16-pin connector, T16g in current flow diagram -B-



1 - + 5V for control motors

2 - Potentiometer for left temperature flap control motor -G220-

3 - Potentiometer for right temperature flap control motor -G221-

4 - Potentiometer for defroster flap control motor -G135-

5 - Potentiometer for centre flap control motor -G112-

6 - Air recirculation flap control motor potentiometer -G143-

7 - Potentiometer for air flow flap control motor -G113-

8 - Left footwell vent temperature sender -G261-

9 - Right footwell vent temperature sender -G262-

10 - Fresh air intake duct temperature sensor -G89-

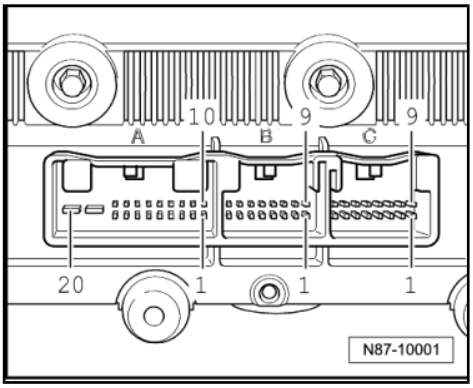
11 - Evaporator temperature sensor -G308-

14 - Signal earth, potentiometer

15 - Left vent temperature sender -G150-

16 - Right vent temperature sender -G151-

16-pin connector, T16f in current flow diagram -C-



1 - Left temperature flap control motor -V158- , cold

2 - Left temperature flap control motor -V158- , warm

3 - Defroster flap control motor -V107- , closed

4 - Defroster flap control motor -V107- , open

5 - Central flap control motor -V70- , chest

6 - Central flap control motor -V70- , footwell

7 - Fresh air and air recirculation flap control motor -V154- , re-circulated air activation

8 - Fresh air and air recirculation flap control motor -V154- , fresh air activation

9 - Air flow flap control motor -V71- , open

10 - Air flow flap control motor -V71- , closed

11 - Right temperature flap control motor -V159- , cold

12 - Right temperature flap control motor -V159- , warm

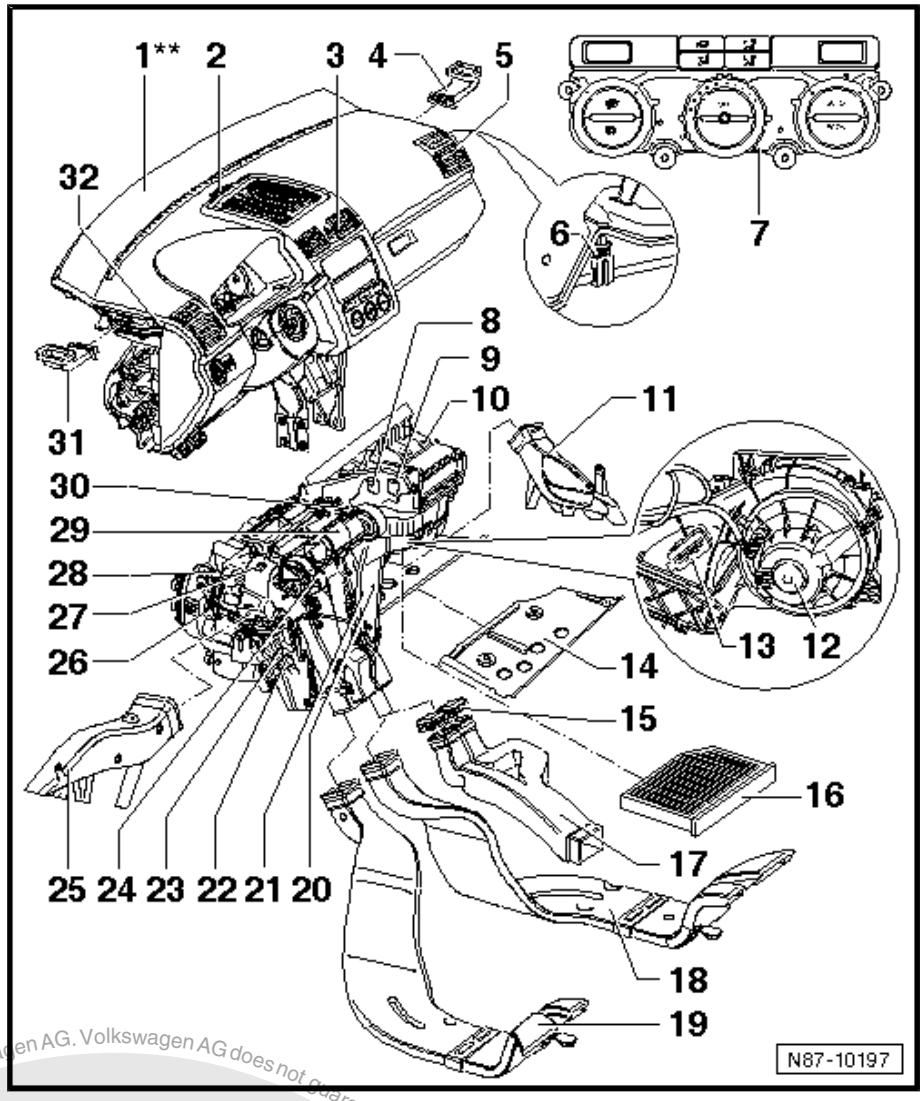
15 - Fresh air blower -V2- (PWM actuated)

16 - Fresh air blower -V2- , feedback signal

3.7 Climatronic - passenger compartment (Golf Variant 2007►, Golf Variant 2010► und Jetta 2005►)

Note

- *Disconnect battery before removing components marked ** ⇒ Rep. gr. 27 .*
- *A label indicates the type and quantity of refrigerant used.*



1 - Dash panel**

- ❑ Removing and installing ⇒ Rep. gr. 70

2 - Sunlight penetration photosensor -G107- or sunlight penetration photosensor 2 -G134-

- ❑ Checking: vehicle diagnosis, testing and information system -VAS 5051B- .
- ❑ Function: controls temperature flap and fresh air blower depending on light intensity
- ❑ Emergency running in event of failure: Climatronic control unit -J255- assumes fixed value
- ❑ Removing and installing ⇒ page 78

3 - Centre vents

- ❑ Removing and installing ⇒ page 7

4 - Right side vent

5 - Vent

- ❑ Removing and installing ⇒ page 8

6 - Right vent temperature sender -G151-

- ❑ Checking: vehicle diagnosis, testing and information system -VAS 5051B- .
- ❑ Removing and installing ⇒ page 78

7 - Climatronic control unit -J255-

- ❑ The Climatronic control unit -J255- and the operating and display unit for Climatronic air conditioning system -E87- are a single component which cannot be dismantled.
- ❑ Checking: vehicle diagnosis, testing and information system -VAS 5051B- .
- ❑ Removing and installing ⇒ page 57
- ❑ Renewing: initiate basic setting using vehicle diagnosis, testing and information system -VAS 5051B- ⇒ page 55 .

8 - Air flow flap control motor -V71-

- ❑ Checking: vehicle diagnosis, testing and information system -VAS 5051B- .
- ❑ Removing and installing ⇒ page 79
- ❑ Renewing: initiate basic setting using vehicle diagnosis, testing and information system -VAS 5051B- ⇒ page 55 .

9 - Fresh air and air recirculation flap control motor -V154-

- ❑ Checking: vehicle diagnosis, testing and information system -VAS 5051B- .
- ❑ Removing and installing ⇒ page 79
- ❑ Renewing: initiate basic setting using vehicle diagnosis, testing and information system -VAS 5051B- ⇒ page 55 .

10 - Fresh air intake duct temperature sensor -G89-

- ❑ Checking: vehicle diagnosis, testing and information system -VAS 5051B- .
- ❑ Function: temperature sensor controls temperature flap and fresh air blower, depending on temperature.

- ❑ Dash panel must be removed to remove and install the fresh air intake duct temperature sensor -G89- ⇒ Rep. gr. 70 .

11 - Right footwell vent

- ❑ Removing and installing ⇒ page 9

12 - Fresh air blower -V2- with fresh air blower control unit -J126-

- ❑ Checking: vehicle diagnosis, testing and information system -VAS 5051B- .
- ❑ Removing and installing ⇒ page 5

13 - Connector

14 - Baffle plate for heater unit

- ❑ Removing ⇒ page 3

15 - Sealing cap

- ❑ Fitted only in vehicles without air duct to vent in rear centre console.

16 - Dust and pollen filter

- ❑ With activated charcoal filter
- ❑ Removing and installing ⇒ page 6

17 - Connecting piece

- ❑ For centre console air duct.
- ❑ To remove, centre console must be removed ⇒ Rep. gr. 68 .

18 - Air duct for right rear footwell

- ❑ Removing and installing ⇒ page 8

19 - Air duct for left rear footwell

- ❑ Removing and installing ⇒ page 8

20 - Evaporator temperature sensor -G308-

- ❑ Checking: vehicle diagnosis, testing and information system -VAS 5051B- .
- ❑ Removing and installing ⇒ page 77

21 - Right temperature flap control motor -V159-

- ❑ Checking: vehicle diagnosis, testing and information system -VAS 5051B- .
- ❑ Removing and installing ⇒ page 82
- ❑ Renewing: initiate basic setting using vehicle diagnosis, testing and information system -VAS 5051B- ⇒ page 55 .

22 - Auxiliary air heater element -Z35-

- ❑ Installed only in vehicles with diesel engines without auxiliary coolant heater.
- ❑ Removing and installing ⇒ page 26

23 - Heat exchanger

- ❑ After renewing heat exchanger, renew coolant completely ⇒ Rep. gr. 19 .
- ❑ Removing and installing heat exchanger (Golf Variant 2007►, Golf Variant 2010► und Jetta 2005►) ⇒ page 19 .

24 - Central flap control motor -V70-

- ❑ Checking: vehicle diagnosis, testing and information system -VAS 5051B- .
- ❑ Removing and installing ⇒ page 83
- ❑ Renewing: initiate basic setting using vehicle diagnosis, testing and information system -VAS 5051B- ⇒ page 55 .

25 - Left footwell vent

- ❑ Removing and installing ⇒ page 9

26 - Left temperature flap control motor -V158-

- ❑ Checking: vehicle diagnosis, testing and information system -VAS 5051B- .
- ❑ Removing and installing ⇒ page 81

- ❑ Renewing: initiate basic setting using vehicle diagnosis, testing and information system -VAS 5051B- ⇒ page 55 .

27 - Left footwell vent temperature sender -G261-

- ❑ Checking: vehicle diagnosis, testing and information system -VAS 5051B- .
- ❑ Removing ⇒ page 76

28 - Defroster flap control motor -V107-

- ❑ Checking: vehicle diagnosis, testing and information system -VAS 5051B- .
- ❑ Removing and installing ⇒ page 80
- ❑ Renewing: initiate basic setting using vehicle diagnosis, testing and information system -VAS 5051B- ⇒ page 55 .

29 - Heater and air conditioning unit

- ❑ Removing and installing ⇒ page 68
- ❑ Dismantling and assembling ⇒ page 71

30 - Right footwell vent temperature sender -G262-

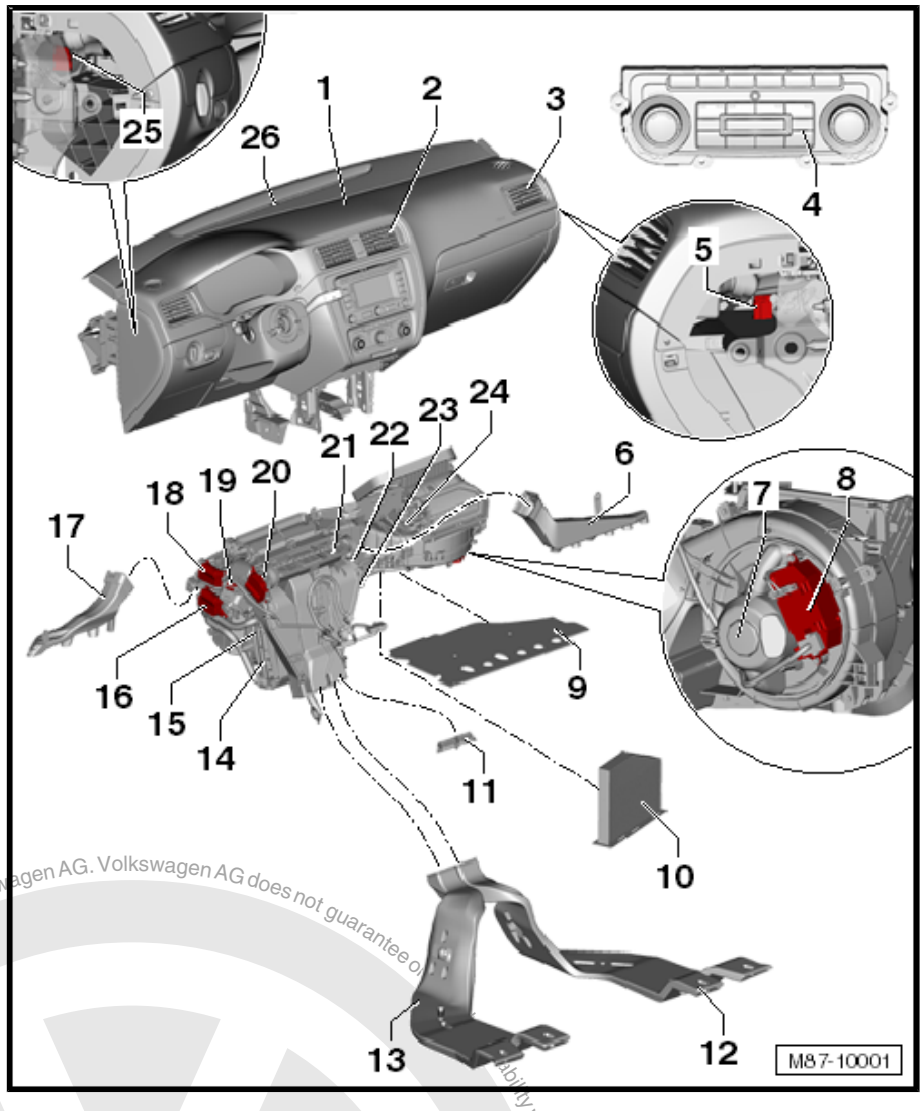
- ❑ Checking: vehicle diagnosis, testing and information system -VAS 5051B- .
- ❑ Removing ⇒ page 77

31 - Left side vent

32 - Left vent temperature sender -G150-

- ❑ Checking: vehicle diagnosis, testing and information system -VAS 5051B- .
- ❑ Removing and installing ⇒ page 78

3.8 Climatronic - passenger compartment (Jetta 2011►)



1 - Dash panel

- ❑ Removing and installing ⇒ Rep. gr. 70

2 - Centre vents

- ❑ Removing and installing ⇒ page 10

3 - Vent

- ❑ Removing and installing ⇒ page 10

4 - Climatronic control unit -J255-

- ❑ The Climatronic control unit -J255- and the operating and display unit for Climatronic air conditioning system -E87- are a single component which cannot be dismantled.
- ❑ Checking: vehicle diagnosis, testing and information system -VAS 5051B- .
- ❑ Removing and installing ⇒ page 59
- ❑ Renewing: initiate basic setting using vehicle diagnosis, testing and information system -VAS 5051B- ⇒ page 55 .

5 - Right vent temperature sender -G151-

- ❑ Checking: vehicle diagnosis, testing and information system -VAS 5051B- .
- ❑ Removing and installing ⇒ page 78

6 - Right footwell vent

- ❑ Removing and installing ⇒ page 9

7 - Fresh air blower -V2-

- ❑ Removing and installing ⇒ page 5 .

8 - Fresh air blower control unit -J126-

- ❑ Checking: vehicle diagnosis, testing and information system -VAS 5051B- .
- ❑ Removing and installing ⇒ page 67

9 - Baffle plate for heater unit

- ❑ Removing ⇒ page 3

10 - Dust and pollen filter

- ❑ With activated charcoal filter
- ❑ Removing and installing ⇒ page 6

11 - Sealing cap

- ❑ Fitted only in vehicles without air duct to vent in rear centre console.

12 - Air duct for right rear footwell

- ❑ Removing and installing ⇒ page 8

13 - Air duct for left rear footwell

- ❑ Removing and installing ⇒ page 8

14 - Heat exchanger

- ❑ After renewing heat exchanger, renew coolant completely ⇒ Rep. gr. 19 .
- ❑ Removing and installing heat exchanger (Jetta 2010►) ⇒ page 23 .

15 - Auxiliary air heater element -Z35-

- ❑ Only in vehicles with diesel engines without auxiliary coolant heater.
- ❑ Removing and installing ⇒ page 26

16 - Left temperature flap control motor -V158-

- ❑ Checking: vehicle diagnosis, testing and information system -VAS 5051B- .
- ❑ Removing and installing ⇒ page 81
- ❑ Renewing: initiate basic setting using vehicle diagnosis, testing and information system -VAS 5051B- ⇒ page 55 .

17 - Left footwell vent

- ❑ Removing and installing ⇒ page 9

18 - Defroster flap control motor -V107-

- ❑ Checking: vehicle diagnosis, testing and information system -VAS 5051B- .
- ❑ Removing and installing ⇒ page 80
- ❑ Renewing: initiate basic setting using vehicle diagnosis, testing and information system -VAS 5051B- ⇒ page 55 .

19 - Central flap control motor -V70-

- ❑ Checking: vehicle diagnosis, testing and information system -VAS 5051B- .
- ❑ Removing and installing ⇒ page 83
- ❑ Renewing: initiate basic setting using vehicle diagnosis, testing and information system -VAS 5051B- ⇒ page 55 .

20 - Right temperature flap control motor -V159-

- ❑ Checking: vehicle diagnosis, testing and information system -VAS 5051B- .
- ❑ Removing and installing ⇒ page 82
- ❑ Renewing: initiate basic setting using vehicle diagnosis, testing and information system -VAS 5051B- ⇒ page 55 .

21 - Air flow flap control motor -V71-

- ❑ Checking: vehicle diagnosis, testing and information system -VAS 5051B- .
- ❑ Removing and installing ⇒ page 79
- ❑ Renewing: initiate basic setting using vehicle diagnosis, testing and information system -VAS 5051B- ⇒ page 55 .

22 - Evaporator temperature sensor -G308-

- ❑ Checking: vehicle diagnosis, testing and information system -VAS 5051B- .
- ❑ Removing and installing ⇒ page 77

23 - Fresh air and air recirculation flap control motor -V154-

- ❑ Checking: vehicle diagnosis, testing and information system -VAS 5051B- .
- ❑ Removing and installing ⇒ page 79
- ❑ Renewing: initiate basic setting using vehicle diagnosis, testing and information system -VAS 5051B- ⇒ page 55 .

24 - Fresh air intake duct temperature sensor -G89-

- ❑ Checking: vehicle diagnosis, testing and information system -VAS 5051B- .
- ❑ Function: temperature sensor controls temperature flap and fresh air blower, depending on temperature.

❑ Dash panel must be removed to remove and install the fresh air intake duct temperature sensor -G89- ⇒ Rep. gr. 70 .

25 - Connector

26 - Connecting piece

❑ For centre console air duct.

❑ To remove, centre console must be removed ⇒ Rep. gr. 68 .

27 - Left footwell vent temperature sender -G261-

❑ Checking: vehicle diagnosis, testing and information system -VAS 5051B- .

❑ Removing ⇒ page 76

28 - Heater and air conditioning unit

❑ Removing and installing ⇒ page 68

❑ Dismantling and assembling ⇒ page 71

29 - Right footwell vent temperature sender -G262-

❑ Checking: vehicle diagnosis, testing and information system -VAS 5051B- .

❑ Removing ⇒ page 77

30 - Left side vent

31 - Left vent temperature sender -G150-

❑ Checking: vehicle diagnosis, testing and information system -VAS 5051B- .

❑ Removing and installing ⇒ page 78

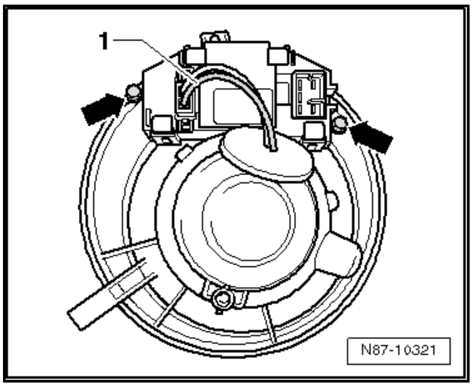
3.9 Removing and installing fresh air blower control unit -J126-

3.9.1 Removing

– Remove fresh air blower -V2- ⇒ page 5 .

– Disconnect connector -1- to fresh air blower -V2- .

– Undo bolts -arrows-.



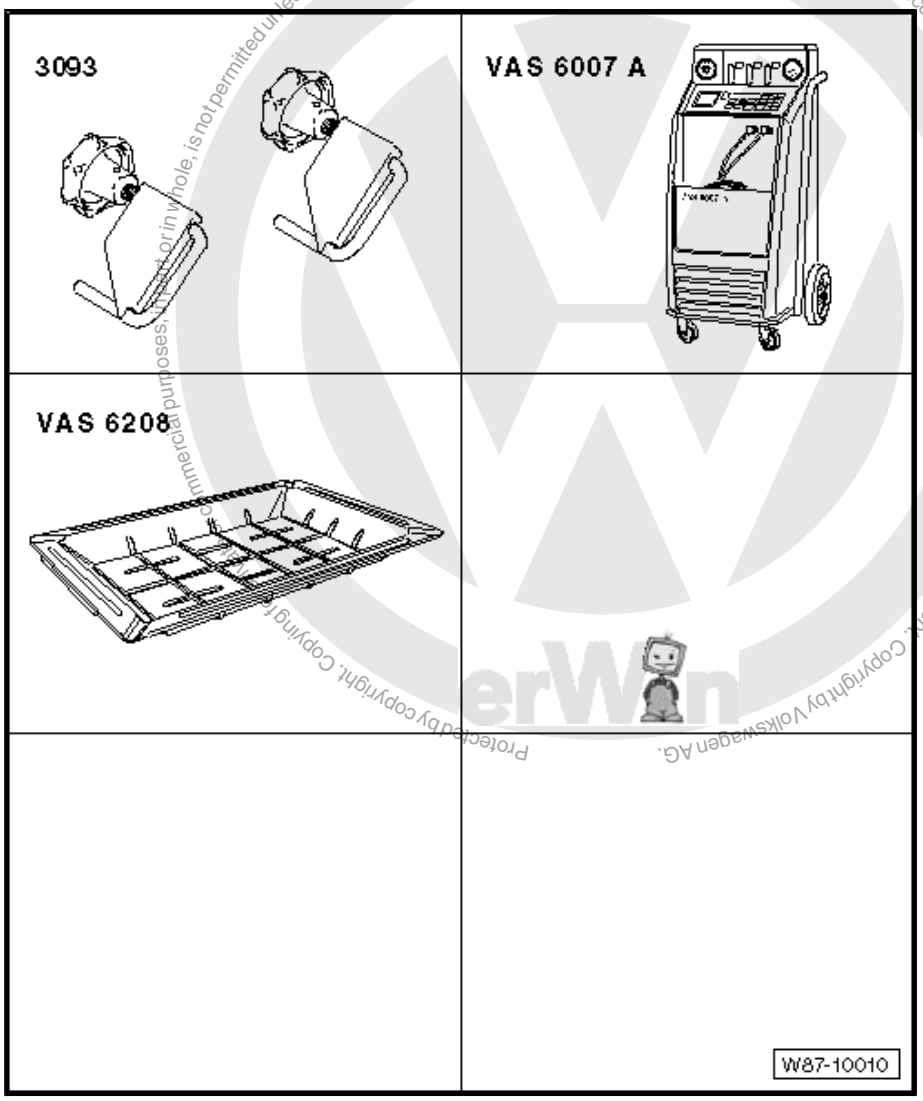
3.9.2 Installing

Install in reverse order.

3.10 Removing and installing heater and air conditioning unit (Climatronic)

Special tools and workshop equipment required

- Hose clamps up to 40 mm -3093-
- E.g. air conditioner service station -VAS 6007A- or later model
- Drip tray for workshop hoist -VAS 6208-



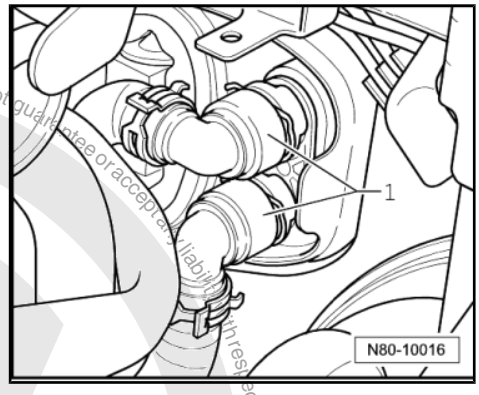
3.10.1 Removing

Note

To improve access, depending on engine version, additional components, e.g. engine cover must be removed ⇒ Rep. gr. 10 .

- Extract refrigerant, e.g. with air conditioner service station -VAS 6007A- before opening refrigerant circuit. Comply with notes ⇒ page 38 .
- Remove dash panel ⇒ Rep. gr. 70 .
- Remove bulkhead in plenum chamber ⇒ Rep. gr. 50 .
- Remove left and right rear footwell air ducts ⇒ page 8 .

– Place drip tray -VAS 6208- beneath engine.
– Mark coolant hoses -1-.



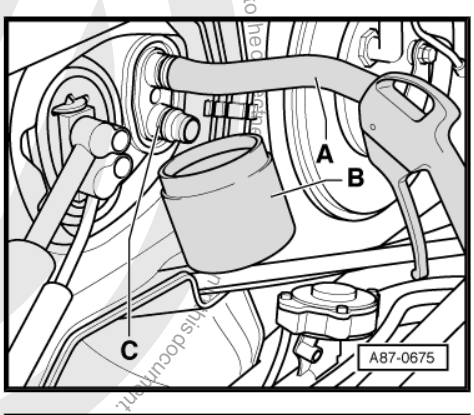
WARNING

Danger of scalding injuries.

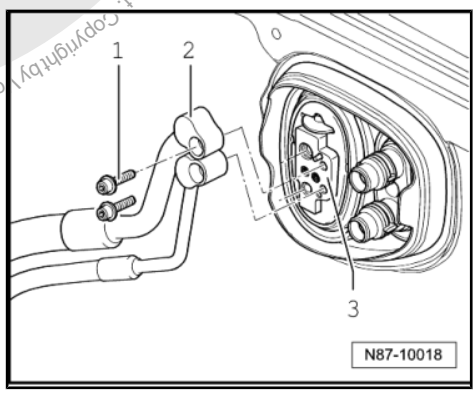
When the engine is warm, the coolant temperature may be above 100 °C. The cooling system is pressurised.

If necessary, release pressure and reduce temperature before carrying out repairs.

– Clamp off coolant hoses -1- with hose clamps up to 40 mm Ø -VAS 3093- and disconnect coolant hoses to heat exchanger.
– Push a piece of hose -A- onto upper union.
– Hold a container -B- under lower connection -C-.



– Carefully blow remaining coolant out through unions of heat exchanger using a compressed air pistol.



WARNING

Danger of freezing injuries.

If refrigerant circuit has not been evacuated, refrigerant will escape.

Extract refrigerant before opening refrigerant circuit. If the refrigerant circuit is not opened within 10 minutes after it has been evacuated, pressure may develop in coolant circuit due to re-evaporation. Extract refrigerant again.

– From engine compartment, undo bolts -1- for refrigerant lines -2-.
– Take refrigerant lines out of expansion valve -3-.

Note

- *Seal open connections for lines.*
- *To seal open connections of expansion valve, use, for example, sealing cap of a spare expansion valve.*

– Cover carpet in interior of vehicle with a waterproof foil and water absorbing paper.

Note

During removal, note lengths and locations of bolts for later installation.

1 - Bolt

- ❑ 4 Nm

2 - Bolts

- ❑ Qty. 2
- ❑ 4 Nm

3 - Cable retainer

4 - Heater and air conditioning unit

- ❑ Removing:

– Take condensation water drainage hose off heater and air conditioner unit ⇒ page 79 .

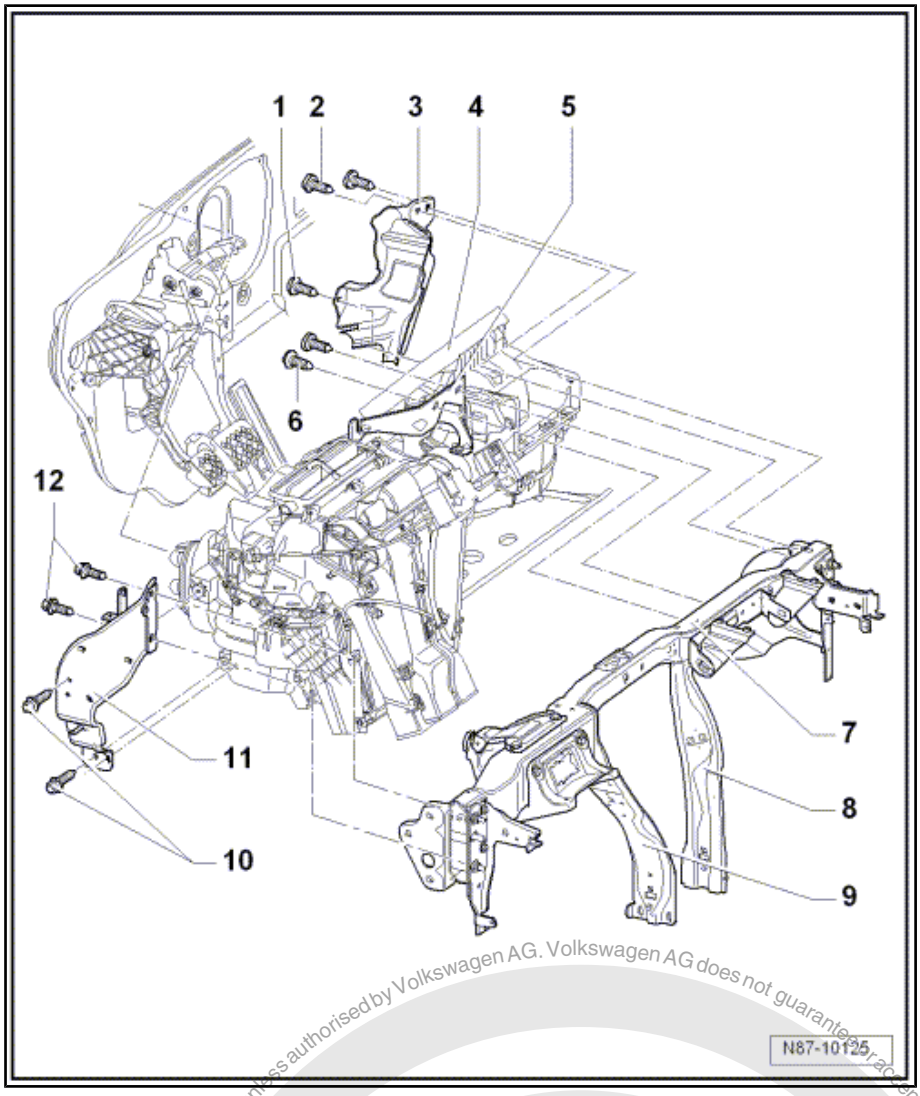
– Disconnect connectors from heater and air conditioner unit.

Note

– Undo bolts ⇒ Item 6 (page 70) from bracket ⇒ Item 5 (page 70) .

– Remove support ⇒ Item 8 (page 70) .

– Remove bolts ⇒ Item 10 (page 70) and ⇒ Item 12 (page 71) and remove bracket ⇒ Item 11 (page 71) .



– Undo bolts ⇒ Item 2 (page 70) and ⇒ Item 1 (page 70) from cable retainer ⇒ Item 3 (page 70) .

Note

– Remove heater and air conditioning unit.

Installing:

Install in reverse order. Note the following when doing this:

– During installation, observe position of heating and air conditioner unit/engine compartment seal ⇒ page 71 .

– When installing, ensure that condensation water drainage hose is correctly seated ⇒ page 79 .

– Fill with coolant ⇒ Rep. gr. 19 .

5 - Bracket

6 - Bolts

- ❑ 8 Nm

7 - Assembly carrier

8 - Right support

9 - Left support

10 - Bolts

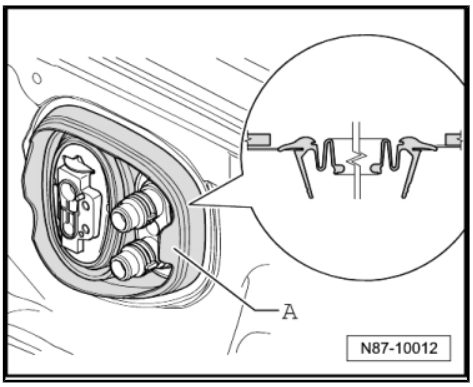
- ❑ Qty. 2
- ❑ 8 Nm

11 - Bracket

12 - Bolts

- ❑ Qty. 2
- ❑ 8 Nm

Heater and air conditioning unit/engine compartment seal

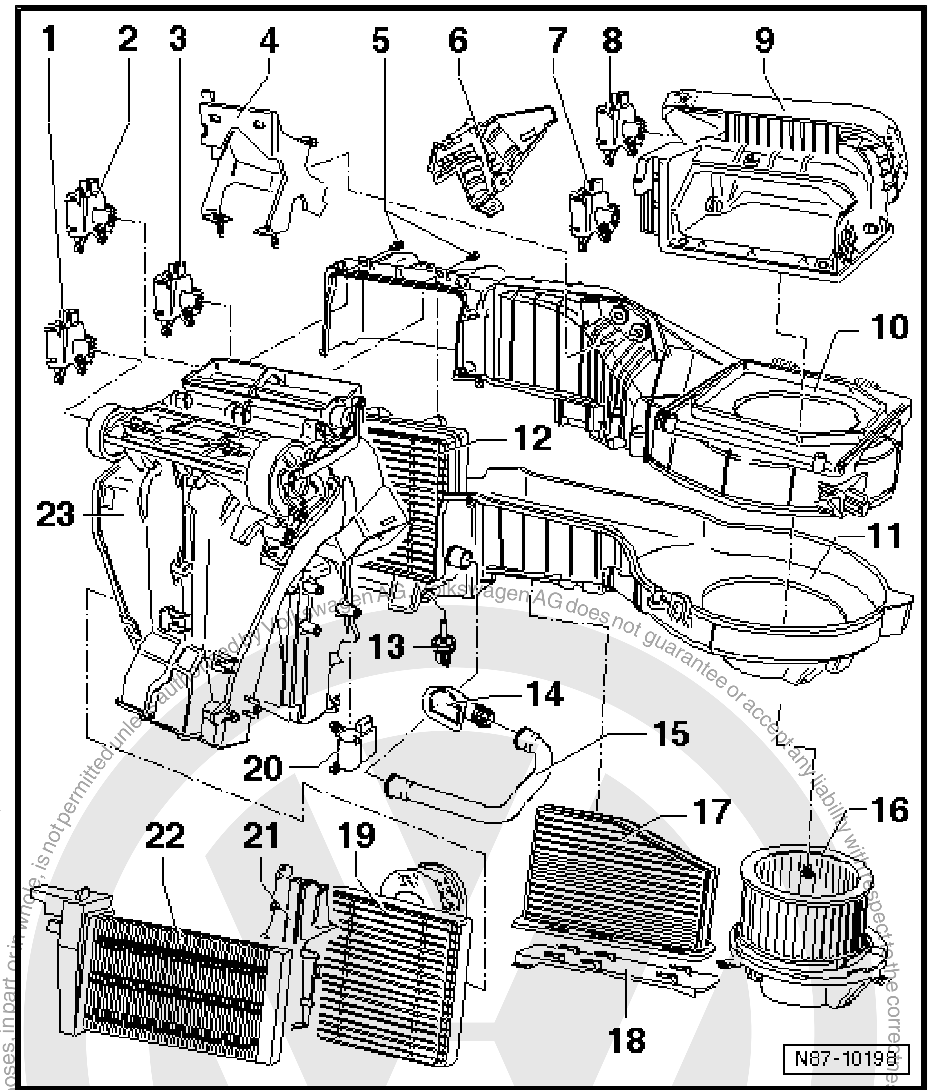


Note

Observe position of seal -A- during installation.

3.11 Dismantling and assembling heater and air conditioning unit (Golf Variant 2007►, Golf Variant 2010► und Jetta 2005►)

Dismantling and assembling heater and air conditioning unit (Jetta 2011►) ⇒ page 73 .



1 - Central flap control motor -V70-

- ❑ Checking: vehicle diagnosis, testing and information system -VAS 5051B- .
- ❑ Removing and installing ⇒ page 83
- ❑ Renewing: initiate basic setting using vehicle diagnosis, testing and information system -VAS 5051B- ⇒ page 55 .

2 - Left temperature flap control motor -V158-

- ❑ Checking: vehicle diagnosis, testing and information system -VAS 5051B- .
- ❑ Removing and installing ⇒ page 81
- ❑ Renewing: initiate basic setting using vehicle diagnosis, testing and information system -VAS 5051B- ⇒ page 55 .

3 - Defroster flap control motor -V107-

- ❑ Checking: vehicle diagnosis, testing and information system -VAS 5051B- .
- ❑ Removing and installing ⇒ page 80
- ❑ Renewing: initiate basic setting using vehicle diagnosis, testing and information system -VAS 5051B- ⇒ page 55 .

4 - Bracket

5 - Bolts

- ❑ Bolts must be removed to separate air distribution housing from evaporator housing.

6 - Cover

7 - Fresh air and air recirculation flap control motor -V154-

- ❑ Checking: vehicle diagnosis, testing and information system -VAS 5051B- .
- ❑ Removing and installing ⇒ page 79
- ❑ Renewing: initiate basic setting using vehicle diagnosis, testing and information system -VAS 5051B- ⇒ page 55 .

8 - Air flow flap control motor -V71-

- ❑ Checking: vehicle diagnosis, testing and information system -VAS 5051B- .
- ❑ Removing and installing ⇒ page 79
- ❑ Renewing: initiate basic setting using vehicle diagnosis, testing and information system -VAS 5051B- ⇒ page 55 .

9 - Air intake housing

- ❑ With air recirculation flap
- ❑ With air flow flap (Climatronic).

10 - Evaporator housing - upper part

- ❑ Dismantling and assembling evaporator housing ⇒ page 75

11 - Evaporator housing - lower part

- ❑ Dismantling and assembling evaporator housing ⇒ page 75

12 - Evaporator

- ❑ Removing and installing ⇒ page 99

13 - Evaporator temperature sensor -G308-

- ❑ Checking: vehicle diagnosis, testing and information system -VAS 5051B- .
- ❑ Removing and installing ⇒ page 77

14 - Connection for glove compartment cooling

15 - Cooling hose for glove compartment

16 - Fresh air blower -V2- with fresh air blower series resistor with overheating fuse -N24-

- ❑ Checking: vehicle diagnosis, testing and information system -VAS 5051B- .
- ❑ Removing and installing ⇒ page 5

17 - Dust and pollen filter

- ❑ With activated charcoal filter
- ❑ Removing and installing ⇒ page 5

18 - Cover

- ❑ For dust and pollen filter.

19 - Heat exchanger

- ❑ After renewing heat exchanger, renew coolant completely ⇒ Rep. gr. 19 .
- ❑ Removing and installing heat exchanger (Golf Variant 2007►, Golf Variant 2010► und Jetta 2005►) ⇒ page 19 .

20 - Right temperature flap control motor -V159-

- ❑ Checking: vehicle diagnosis, testing and information system -VAS 5051B- .
- ❑ Removing and installing ⇒ page 82
- ❑ Renewing: initiate basic setting using vehicle diagnosis, testing and information system -VAS 5051B- ⇒ page 55 .

21 - Heat exchanger cladding

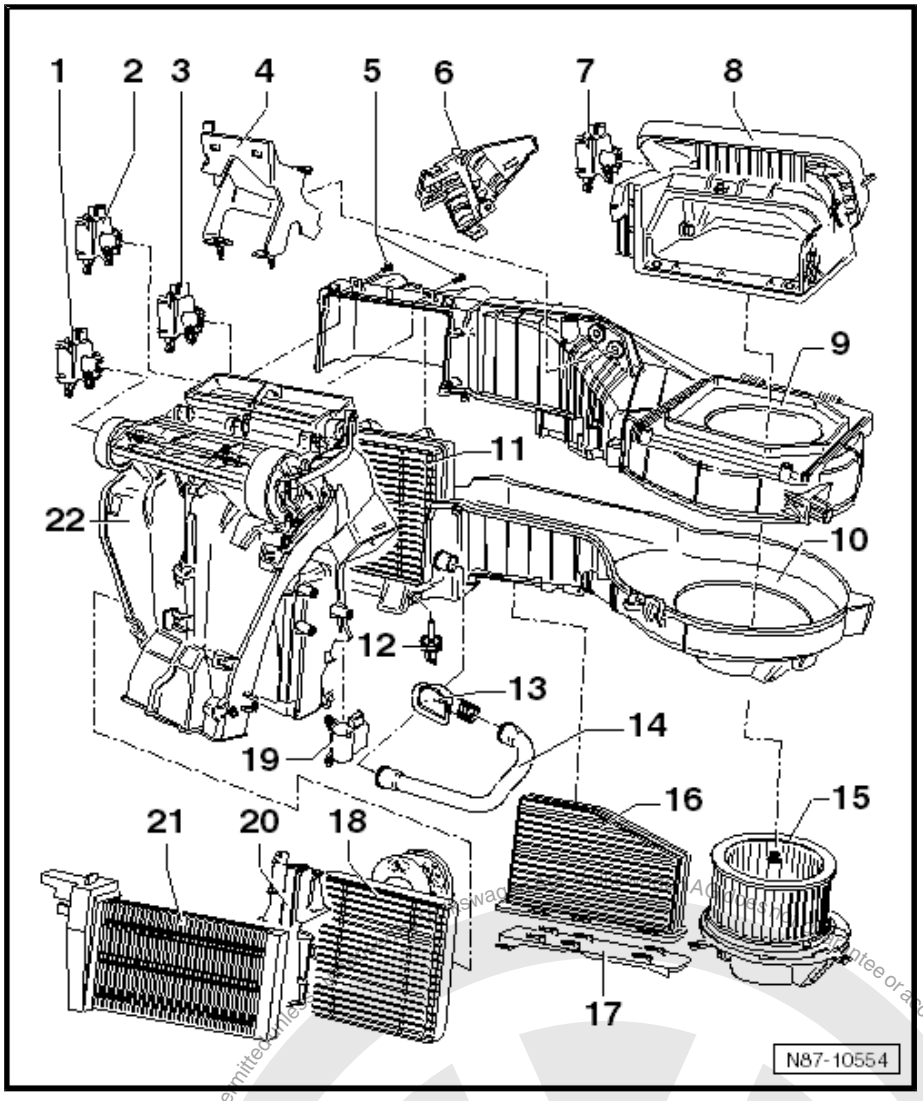
22 - Auxiliary air heater element -Z35-

- ❑ Installed only in vehicles with diesel engines without auxiliary coolant heater.
- ❑ Removing and installing ⇒ page 26 .

23 - Air distribution housing

3.12 Dismantling and assembling heater and air conditioning unit (Jetta 2011►)

Dismantling and assembling heater and air conditioning unit (Golf Variant 2007►, Golf Variant 2010► und Jetta 2005►) ⇒ page 71 .



1 - Central flap control motor -V70-

- ❑ Checking: vehicle diagnosis, testing and information system -VAS 5051B- .
- ❑ Removing and installing ⇒ page 83
- ❑ Renewing: initiate basic setting using vehicle diagnosis, testing and information system -VAS 5051B- ⇒ page 55 .

2 - Left temperature flap control motor -V158-

- ❑ Checking: vehicle diagnosis, testing and information system -VAS 5051B- .
- ❑ Removing and installing ⇒ page 81
- ❑ Renewing: initiate basic setting using vehicle diagnosis, testing and information system -VAS 5051B- ⇒ page 55 .

3 - Defroster flap control motor -V107-

- ❑ Checking: vehicle diagnosis, testing and information system -VAS 5051B- .
- ❑ Removing and installing ⇒ page 80
- ❑ Renewing: initiate basic setting using vehicle diagnosis, testing and information system -VAS 5051B- ⇒ page 55 .

4 - Bracket

5 - Bolts

- ❑ Bolts must be removed to separate air distribution housing from evaporator housing.

6 - Cover

7 - Control motor for fresh air and air recirculation flap and air flow flap -V425-

- ❑ Checking: vehicle diagnosis, testing and information system -VAS 5051B- .
- ❑ Removing and installing ⇒ page 79
- ❑ Renewing: initiate basic setting using vehicle diagnosis, testing and information system -VAS 5051B- ⇒ page 55 .

8 - Air intake housing

- ❑ With air recirculation flap
- ❑ With air flow flap (Climatronic).

9 - Evaporator housing - upper part

- ❑ Dismantling and assembling evaporator housing ⇒ page 75

10 - Evaporator housing - lower part

- ❑ Dismantling and assembling evaporator housing ⇒ page 75

11 - Evaporator

- ❑ Removing and installing ⇒ page 99

12 - Evaporator temperature sensor -G308-

- ❑ Checking: vehicle diagnosis, testing and information system -VAS 5051B- .
- ❑ Removing and installing ⇒ page 77

13 - Connection for glove compartment cooling

14 - Cooling hose for glove compartment

15 - Fresh air blower -V2- with fresh air blower control unit -J126-

- ❑ Checking: vehicle diagnosis, testing and information system -VAS 5051B- .
- ❑ Removing and installing fresh air blower -V2- ⇒ page 5
- ❑ Removing and installing fresh air blower control unit -J126- ⇒ page 67

16 - Dust and pollen filter

- ❑ With activated charcoal filter
- ❑ Removing and installing ⇒ page 6

17 - Cover

- ❑ For dust and pollen filter.

18 - Heat exchanger

- ❑ After renewing heat exchanger, renew coolant completely ⇒ Rep. gr. 19 .
- ❑ Removing and installing heat exchanger (Jetta 2010►) ⇒ page 23 .

19 - Right temperature flap control motor -V159-

- ❑ Checking: vehicle diagnosis, testing and information system -VAS 5051B- .
- ❑ Removing and installing ⇒ page 82
- ❑ Renewing: initiate basic setting using vehicle diagnosis, testing and information system -VAS 5051B- ⇒ page 55 .

20 - Heat exchanger cladding

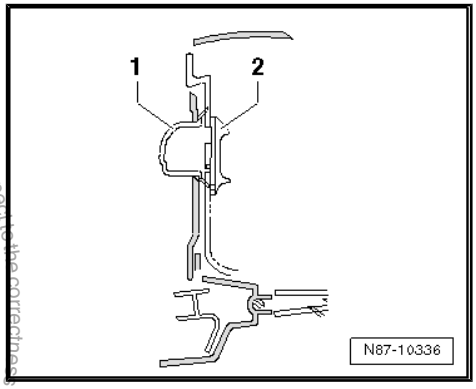
21 - Auxiliary air heater element -Z35-

- ❑ Installed only in vehicles with diesel engines without auxiliary coolant heater.
- ❑ Removing and installing ⇒ page 26 .

22 - Air distribution housing

Installation position of connections for glove compartment cooling

1 - Connecting piece
2 - Valve



3.13 Dismantling and assembling evaporator housing

– Separate evaporator housing from heater and air conditioner unit ⇒ page 71 .

– Disconnect connectors from heater and air conditioner unit.

1 - Evaporator housing - lower part

2 - Evaporator

- ❑ Check insulation. It must be complete.
- ❑ Removing and installing ⇒ page 99

3 - Clip

4 - Evaporator housing - upper part

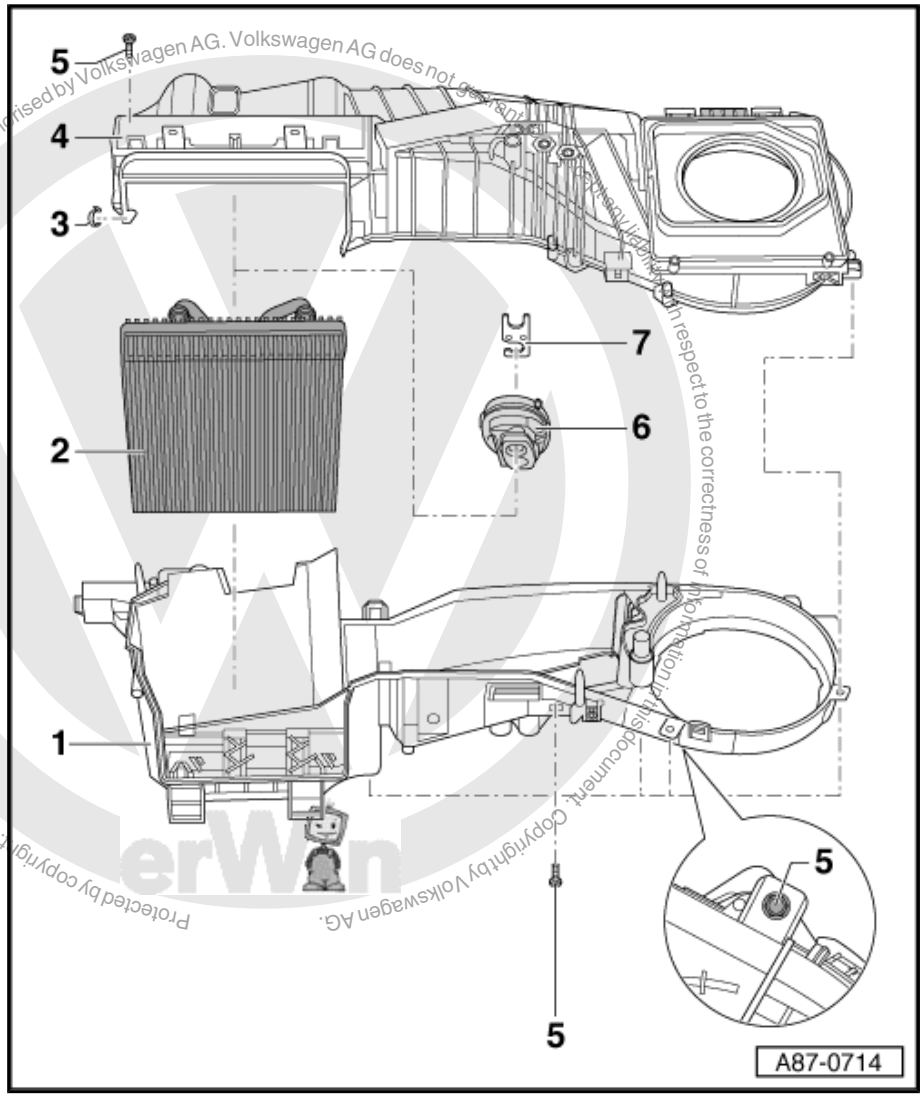
5 - Bolt

6 - Sealing and insulation

- ❑ Heat insulation for expansion valve.
- ❑ Removing and installing ⇒ page 46

7 - Bracket

- ❑ Removing and installing ⇒ page 98



3.14 Removing and installing left footwell vent temperature sender -G261-

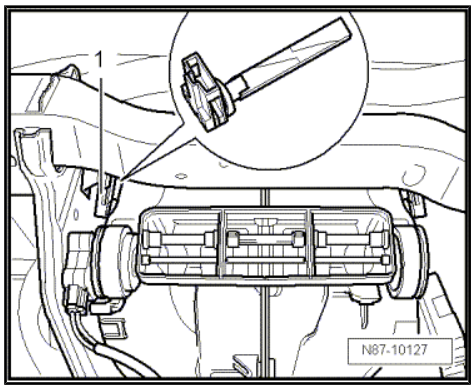
3.14.1 Removing

– Remove dash panel ⇒ Rep. gr. 70

– Undo bolts ⇒ Item 10 (page 70) from bracket ⇒ Item 11 (page 71) .

– Pull connector off left footwell vent temperature sender -G261- -1-.

– Press bracket ⇒ Item 11 (page 71) slightly to left, turn left footwell vent temperature sender -G261- -1- 90° and remove it from housing.



3.14.2 Installing

Install in reverse order.

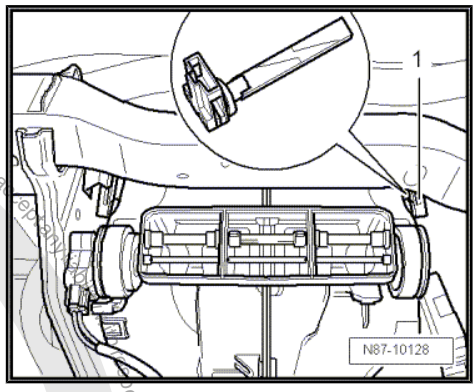
3.15 Removing and installing right footwell vent temperature sender -G262-

3.15.1 Removing

Note

For better illustration, right footwell vent temperature sender -G262- is shown with dash panel removed. The dash panel need not be removed.

- Remove glove compartment ⇒ Rep. gr. 68 .
- Pull connector off right footwell vent temperature sender -G262- -1-.
- Turn right vent temperature sender -G262- -1- 90° and remove it from housing.



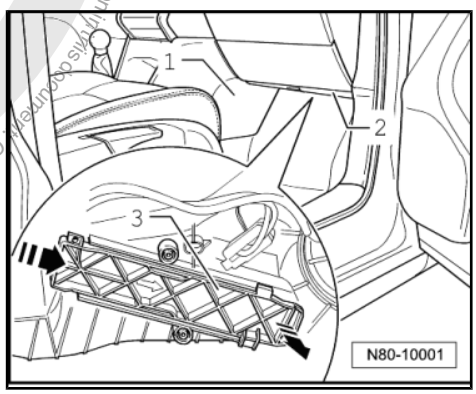
3.15.2 Installing

Install in reverse order.

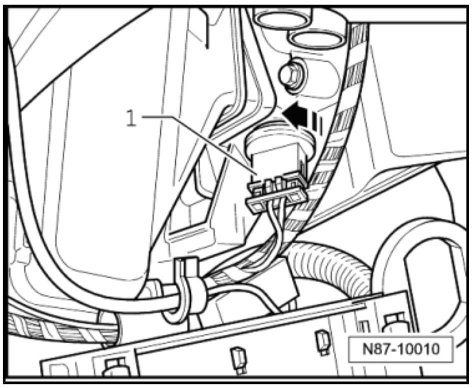
3.16 Removing and installing evaporator temperature sensor -G308-

3.16.1 Removing

- Remove cover -1- in front passenger footwell.



– Pull connector off evaporator temperature sensor -G308- -1-.
– Turn evaporator temperature sender -G308- in -direction of arrow- and pull out.



3.16.2 Installing

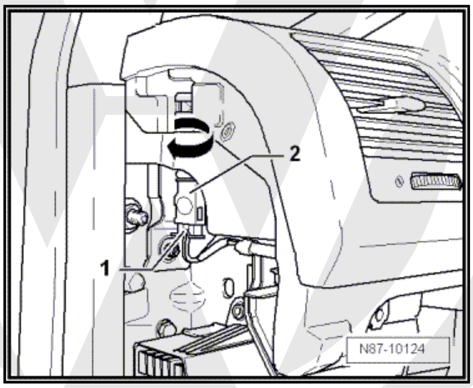
Install in reverse order.

3.17 Removing left vent temperature sender -G150- and right vent temperature sender -G151-

Note

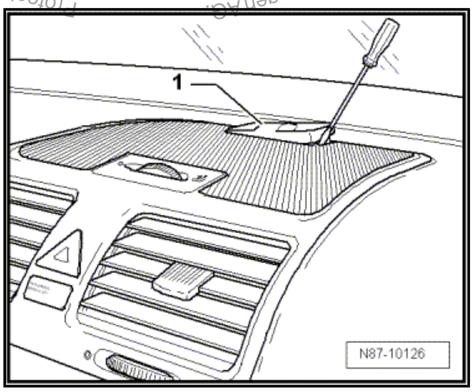
Removal of senders on both sides is identical, but one is a mirror image of the other.

– Remove cover on left or right of dash panel ⇒ Rep. gr. 70 .
– Pull connector -1- off vent temperature sender -2-.
– Turn vent temperature sender -2- 90° in direction of -arrow- and remove it from dash panel.



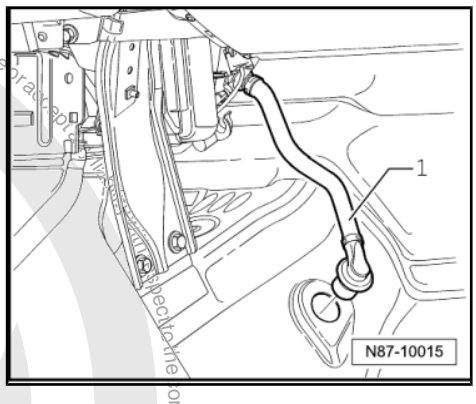
3.18 Removing sunlight penetration photosensor -G107- or sunlight penetration photosensor 2 -G134-

– Unclip sunlight penetration photosensor -1- out of dash panel using an appropriate tool.
– Pull connector off sunlight penetration photosensor.



3.19 Checking condensation water drainage hose on heater and air conditioner unit

– Remove footwell cover on front passenger side .



Note

- *It must be possible to push condensation drain hose -1- onto the heater and air conditioning unit connection without tension.*
- *The condensation drain hose must be fitted securely to the connection for condensation drainage of the heater and air conditioner unit.*

3.20 Renewing control motors for air conditioning regulation

First carry out the following work:

– Switch off all electrical consumers.

– Switch off ignition.

– Remove ignition key.

3.21 Removing and installing fresh air and air recirculation flap control motor -V154-

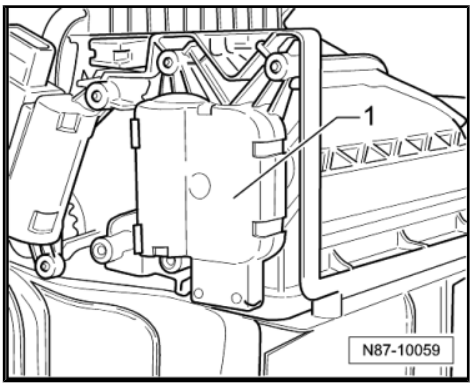
3.21.1 Removing

– Remove glove compartment ⇒ Rep. gr. 68 .

– Remove cover for control motors.

– Disconnect connector on fresh air and air recirculation flap control motor -V154- -1-.

– Separate fresh air and air recirculation flap control motor -V154- -1-.



3.21.2 Installing

Install in reverse order.

Note

- *After installation, check operation of air recirculation flap.*
- *Initiate „basic setting“ function using vehicle diagnosis, testing and information system -VAS 5051B- ⇒ page 55 .*

3.22 Removing and installing air flow flap control motor -V71- or fresh air/recircu-

lated air, air flow flap control motor -V425-

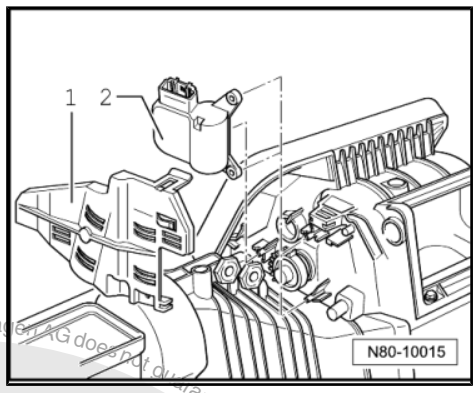
3.22.1 Removing

– Remove glove compartment ⇒ Rep. gr. 68 .

Note

The position of the air flow flap must not be changed.

– Remove cover -1-.
– Remove fresh air and air recirculation flap control motor -V154- ⇒ page 79 .
– Disconnect connector on air flow flap control motor -V71- -2-.
– Pull off air flow flap control motor -V71- -2-.



3.22.2 Installing

Install in reverse order.

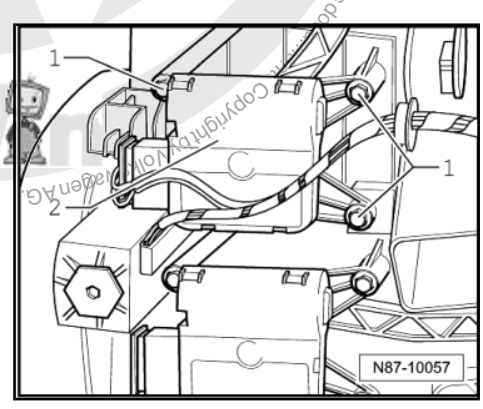
Note

- *After installation, check operation of air flow flap.*
- *Initiate „basic setting“ function using vehicle diagnosis, testing and information system -VAS 5051B- ⇒ page 55 .*

3.23 Removing and installing defroster flap control motor -V107-

3.23.1 Removing

– Remove driver side compartment ⇒ Rep. gr. 68 .
– Remove left footwell vent ⇒ page 9 .
– Remove bracket ⇒ Item 11 (page 71) .
– Disconnect connector on defroster flap control motor -V107- -2-.
– Remove securing bolts -1- remove defroster flap control motor -V107- -2- and unhook strut.



3.23.2 Installing

Install in reverse order.

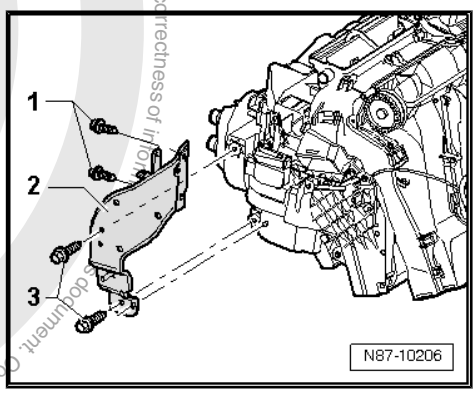
Note

- *After installation, check operation of defroster flap.*
- *Initiate „basic setting“ function using vehicle diagnosis, testing and information system -VAS 5051B- ⇒ page 55 .*

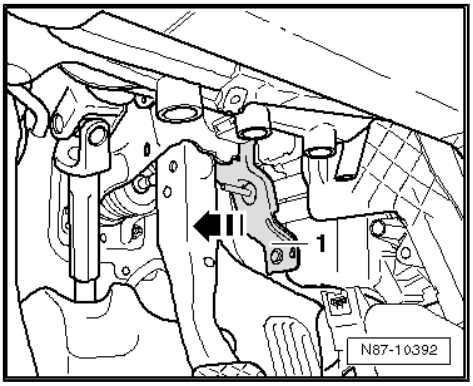
3.24 Removing and installing left temperature flap control motor -V158-

3.24.1 Removing

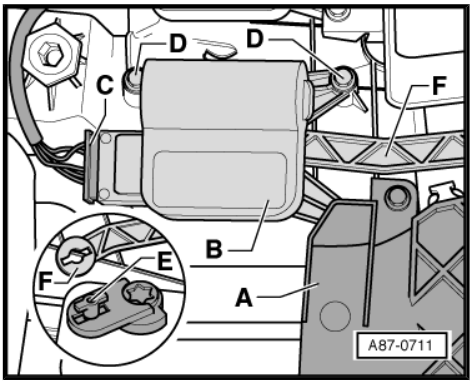
– Remove left footwell vent ⇒ page 9 .
– Remove centre console trim from left footwell.
– Remove data bus diagnosis interface -J533- ⇒ Rep. gr. 97 .
– Remove bolts -3- (9 ± 1.3 Nm).
– Do not remove bolts -1-.
– Do not remove bracket -2-.



– Press bracket -1- in direction of brake pedal and secure it there with a cable tie.



– Mark connector -C- to control motor (danger of interchanging with other connectors of same construction).
– Disconnect connector -C- on left temperature flap control motor -V158- .
– Remove cover -A-.
– Undo securing bolts -D- (1.4 Nm) and remove left temperature flap control motor -V158- -B-.
– Release control motor lever -E- from connecting rod -F-.



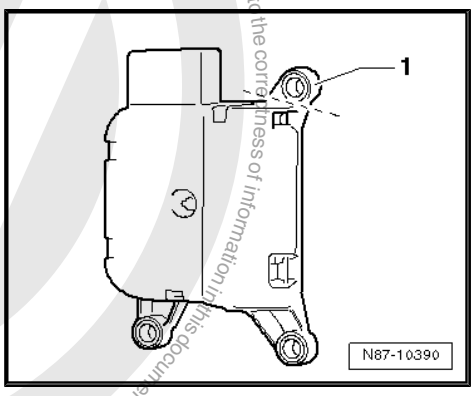
3.24.2 Installing

Note

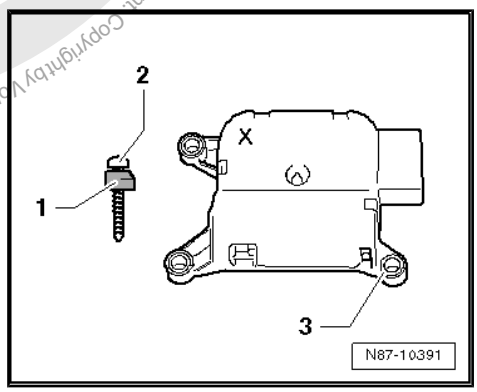
Optimised control motors are marked with an „X“.

To ease assembly, use a ≈ 2 mm shorter oval-head bolt -N 103 254 01- .

– Separate bracket -1- from old left temperature flap control motor -V158- , e.g. using side cutting pliers.



– Position new left temperature flap control motor -V158- , marked with an „X“, with shortened oval-head screw -2- and cut-off bracket -1- on bracket -3- on blower box.



Note

- *After installation, check operation of left temperature flap.*
- *Initiate „basic settings“ function using vehicle diagnosis, testing and information system -VAS 5051- or successor model* ⇒ page 55 .

3.25 Removing and installing right temperature flap control motor -V159-

3.25.1 Removing

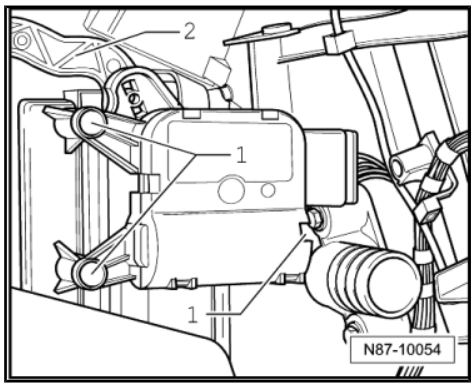
– Remove glove compartment ⇒ Rep. gr. 68 .

– Remove right footwell vent ⇒ page 9 .

– Disconnect connector on right temperature flap control motor -V159- .

– Remove securing bolts -1- and remove right temperature flap control motor -V159- .

– Unhook lever -2- from right temperature flap control motor -V159- .



3.25.2 Installing

Install in reverse order.

Note

- *After installation, check operation of right temperature flap.*
- *Initiate „basic setting“ function using vehicle diagnosis, testing and information system -VAS 5051B- ⇒ page 55 .*

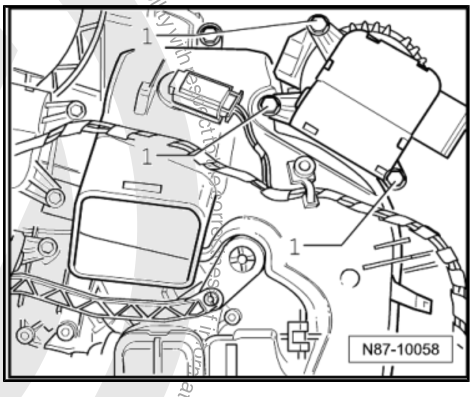
3.26 Removing and installing central flap control motor -V70-

3.26.1 Removing

– Remove dash panel. ⇒ Rep. gr. 70

– Disconnect connector on centre flap control motor -V70- .

– Remove securing bolts -1- and remove central flap control motor -V70- .



3.26.2 Installing

Install in reverse order.

Note

- *After installation, check operation of central flap.*
- *Initiate „basic setting“ function using vehicle diagnosis, testing and information system -VAS 5051B- ⇒ page 55 .*

4 Ancillary bracket for air conditioner compressor

4.1 Removing and installing ancillary bracket for air conditioner compressor (Jetta 2011►)

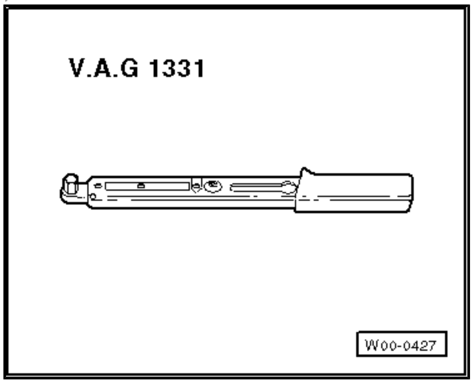
Note

The removal of ancillary bracket for Jetta 2011► is described in ⇒ Rep. gr. 13 .

4.2 Removing and installing ancillary bracket for air conditioner compressor, engine codes BRM and BXE

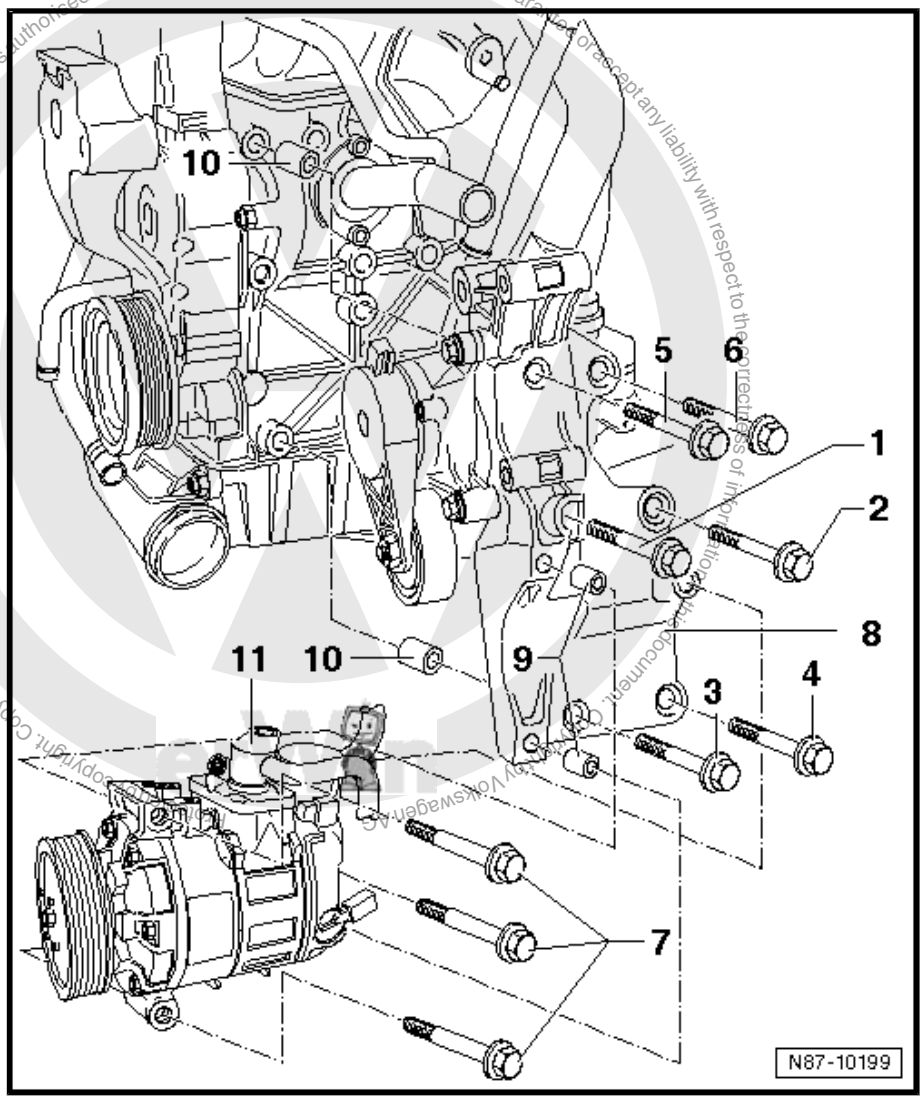
Special tools and workshop equipment required

- Torque wrench -V.A.G 1331/- (5…50 Nm)



Note

- *The ancillary bracket for air conditioner compressor and related components can be removed and installed without the refrigerant circuit being opened.*
- *To remove poly V-belt ⇒ Rep. gr. 13 .*



1 - Hexagon bolt M10×65

- ❑ 50 Nm

2 - Hexagon bolt M10×45

- ❑ 50 Nm

3 - Hexagon bolt M10×45

- ❑ 50 Nm

4 - Hexagon bolt M10x45

- ❑ 50 Nm

5 - Hexagon bolt M10×65

- ❑ 50 Nm

6 - Hexagon bolt M10×65

- ❑ 50 Nm

7 - Hexagon bolt M8x100

- ❑ Qty. 3
- ❑ 25 Nm

8 - Ancillary bracket for alternator and air conditioner compressor

- ♦ Number on ancillary bracket -03G 903 143 A-

Removing

- – Remove alternator ⇒ Rep. gr. 27 .
- – Loosen air conditioner compressor and remove hexagon bolt -7-. Remove air conditioner compressor from ancillary bracket and secure to body with suitable material (e.g. uncoated wire) ⇒ page 86 .
- – Remove bolts -1- to -6- and remove ancillary bracket from cylinder block.

♦ Strictly observe tightening sequence of securing bolts:

- – Tighten hexagon bolts position -1-, -2-, -3-, -4-, -5- and -6- one after the other.

9 - Dowel sleeves

- ❑ Qty. 2
- ❑ Ensure proper seating between ancillary bracket and air conditioner compressor.

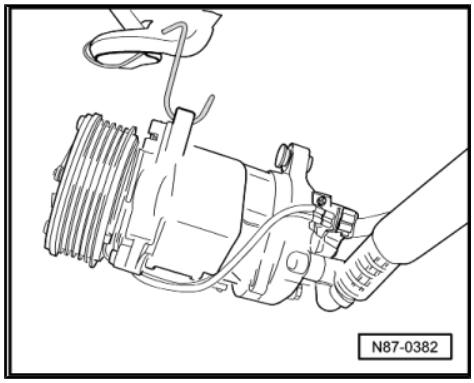
10 - Dowel sleeves

- ❑ Qty. 2
- ❑ Ensure proper seating between ancillary bracket and cylinder block.

11 - Air conditioner compressor

- ❑ Removing and installing ⇒ page 96

Securing air conditioner compressor to body



Poly V-belt routing

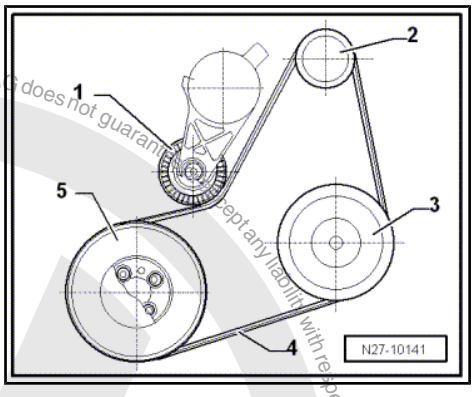
1 - Tensioning roller

2 - Poly V-belt pulley for alternator

3 - Poly V-belt pulley for air conditioner compressor

4 - Poly V-belt

5 - Poly V-belt pulley for crankshaft



If compressor is removed without opening refrigerant circuit, it should be secured to body using suitable material, for example, welding wire.

When doing this, ensure refrigerant hoses on air conditioner compressor are not stressed.

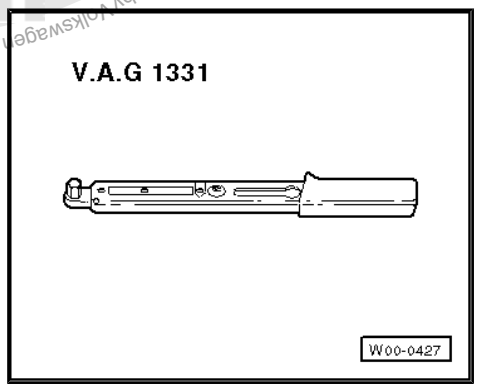
Note

- *When installing poly V-belt, ensure that it is correctly seated on poly V-belt pulley.*
- *Finally, place poly V-belt over pulley of air conditioner compressor.*

4.3 Removing and installing ancillary bracket for air conditioner compressor, engine codes BGP and BGQ

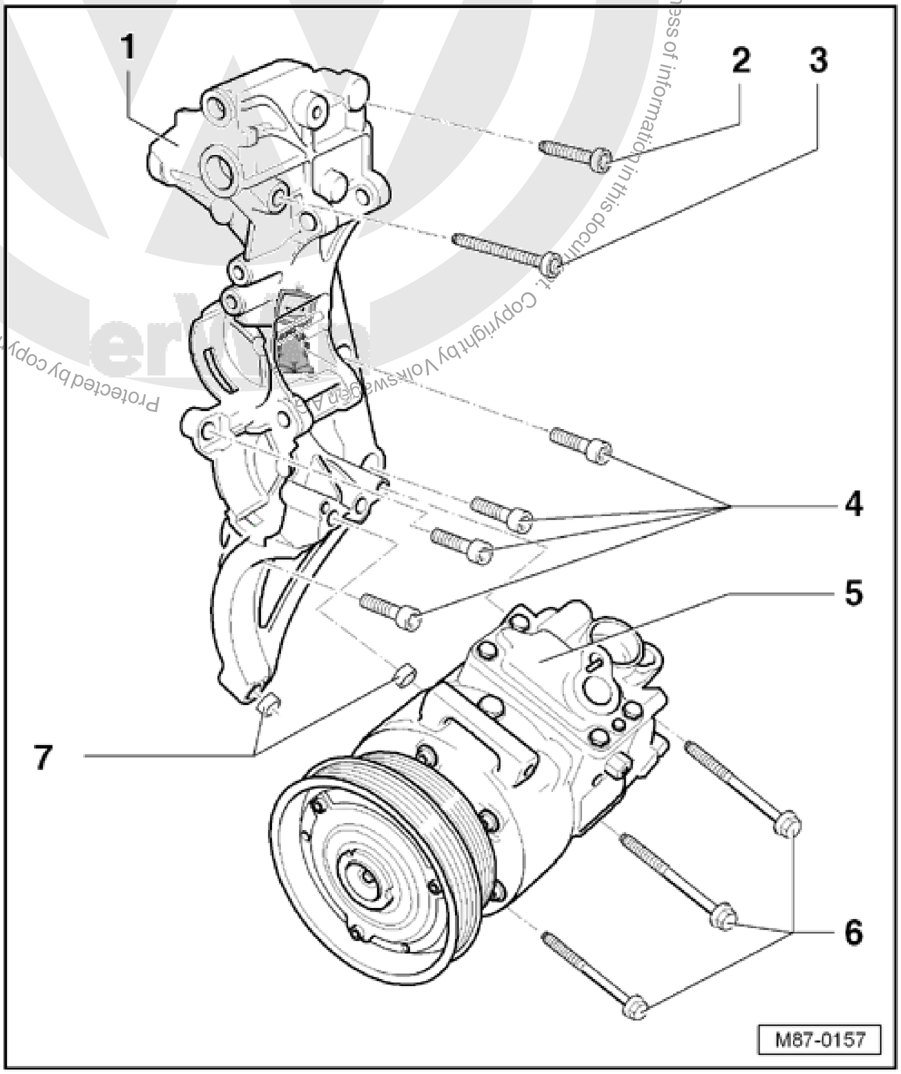
Special tools and workshop equipment required

- Torque wrench -V.A.G 1331/- (5…50 Nm)



Note

- *The ancillary bracket for air conditioner compressor and related components can be removed and installed without the refrigerant circuit being opened.*
- *To remove poly V-belt ⇒ Rep. gr. 13 .*



1 - Ancillary bracket for alternator and air conditioner compressor

- Number on ancillary bracket -07K 903 143 B-

Removing

– Loosen air conditioner compressor and remove hexagon bolt -6-. Remove air conditioner compressor from ancillary bracket and secure to body with suitable material (e.g. uncoated wire) ⇒ page 88 .

– Undo bolts -2, 3 and 4- and remove ancillary bracket -1- from cylinder block.

2 - Multi-point socket head bolt M8x60

❑ 25 Nm

3 - Multi-point socket head bolt M8x110

❑ 25 Nm

4 - Hexagon socket head bolt M8x30

❑ 25 Nm

❑ Qty. 4

5 - Air conditioner compressor

❑ Removing and installing ⇒ page 96

6 - Hexagon bolts M8x85

❑ 25 Nm

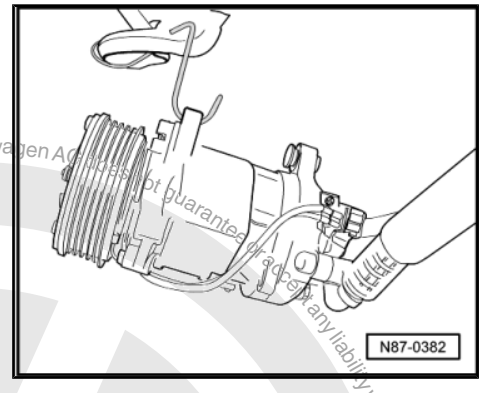
❑ Qty. 3

7 - Dowel sleeves

❑ Qty. 2

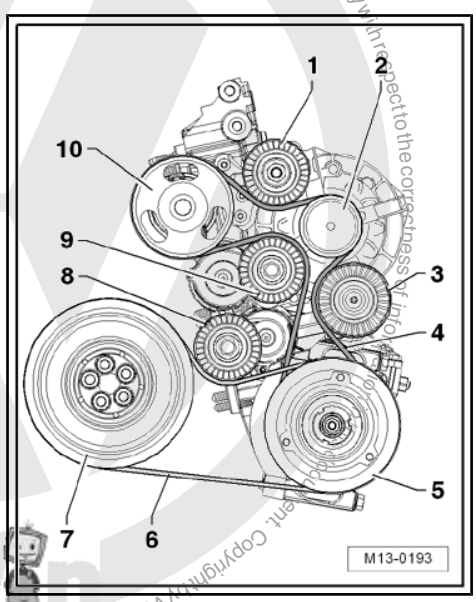
❑ Ensure proper seating between ancillary bracket and air conditioner compressor.

Securing air conditioner compressor to body



Poly V-belt routing

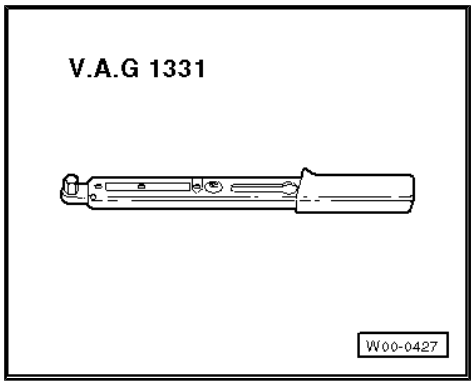
1 - Upper idler pulley
2 - Pulley - Alternator
3 - Lower idler pulley
4 - Poly V-belt for alternator and coolant pump
5 - Pulley - Air conditioner compressor
6 - Poly V-belt for air conditioner compressor
7 - Pulley - Crankshaft
8 - Tensioning roller for air conditioner compressor poly V-belt
9 - Tensioning roller for poly V-belt for alternator and coolant pump
10 - Coolant pump pulley



4.4 Removing and installing ancillary bracket for air conditioner compressor, engine codes BPY, BWA, BSE, BSF, BLR, BLY

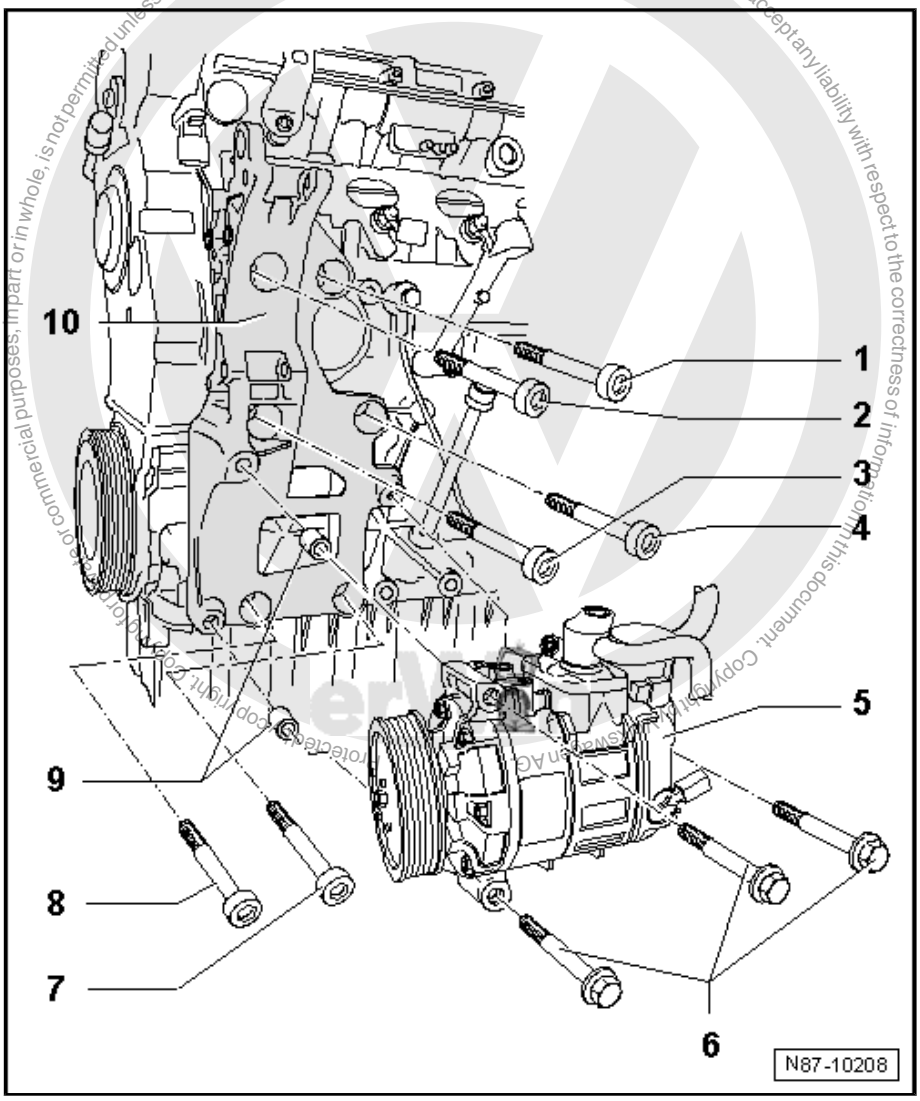
Special tools and workshop equipment required

- Torque wrench -V.A.G 1331/- (5…50 Nm)



Note

- *The ancillary bracket for air conditioner compressor and related components can be removed and installed without the refrigerant circuit being opened.*
- *To remove poly V-belt ⇒ Rep. gr. 13 .*



1 - Socket head flange bolt M10×45

- ❑ Dowel hole
- ❑ Observe different torques:
- ❑ 1.6 l injection engine and 2.0 l FSI engine: 52 Nm
- ❑ 2.0 l turbo FSI engine: 40 Nm

2 - Socket head flange bolt M10×45

- ❑ Observe different torques:
- ❑ 1.6 l injection engine and 2.0 l FSI engine: 52 Nm
- ❑ 2.0 l turbo FSI engine: 40 Nm

3 - Socket head flange bolt M10×45

- ❑ Observe different torques:
- ❑ 1.6 l injection engine and 2.0 l FSI engine: 52 Nm
- ❑ 2.0 l turbo FSI engine: 40 Nm

4 - Socket head flange bolt M10×45

- ❑ Observe different torques:
- ❑ 1.6 l injection engine and 2.0 l FSI engine: 52 Nm
- ❑ 2.0 l turbo FSI engine: 40 Nm

5 - Air conditioner compressor

- ❑ Removing and installing ⇒ page 96

6 - Hexagon bolt M8x100

- ❑ Qty. 3
- ❑ 25 Nm

7 - Socket head flange bolt M10×45

- ❑ Dowel hole
- ❑ Observe different torques:
- ❑ 1.6 l injection engine and 2.0 l FSI engine: 52 Nm
- ❑ 2.0 l turbo FSI engine: 40 Nm

8 - Socket head flange bolt M10×45

- ❑ Observe different torques:
- ❑ 1.6 l injection engine and 2.0 l FSI engine: 52 Nm
- ❑ 2.0 l turbo FSI engine: 40 Nm

9 - Dowel sleeves

- ❑ Qty. 2
- ❑ Ensure proper seating between ancillary bracket and air conditioner compressor.

10 - Ancillary bracket for air conditioner compressor

Number on ancillary bracket -06F 903 143 E/F-

Removing

- Remove alternator ⇒ Rep. gr. 27 .
- Loosen air conditioner compressor and remove hexagon bolt -6-. Remove air conditioner compressor from ancillary bracket and secure to body with suitable material (e.g. uncoated wire) ⇒ page 90 .
- Remove bolts -1- to -4-, -7- and -8- and remove ancillary bracket -10- from cylinder block.

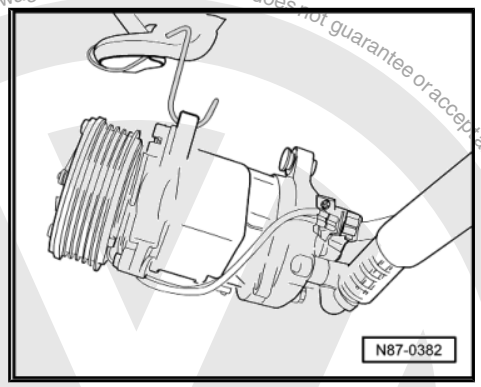
Installing

- Strictly observe tightening sequence of securing bolts:
  - Tighten socket head flange bolts, positions -1- (dowel hole), -7- (dowel hole), -4-, -8-, -3- and -2- one after the other.

Securing air conditioner compressor to body

If compressor is removed without opening refrigerant circuit, it should be secured to body using suitable material, for example, welding wire.

When doing this, ensure refrigerant hoses on air conditioner compressor are not stressed.



Note

- *When installing poly V-belt, ensure that it is correctly seated on poly V-belt pulley.*
- *Finally, place poly V-belt over pulley of air conditioner compressor.*

5 Repair work on refrigerant circuit which may be performed only in appropriate workshops by specially trained mechanics

Special tools and workshop equipment required

- Notes on repair work to vehicles with air conditioning and on handling refrigerant can be found in ELSA under repair group ⇒ Rep. gr. 00 Technical information „Air conditioning system - with refrigerant R134a VW“.
- Notes on tools for repair work to vehicles with air conditioning can be found in ELSA under repair group ⇒ Rep. gr. 00 Technical information „Air conditioning system - with refrigerant R134a VW“.
- The version in ELSA under the Internet button is no longer valid.

Note

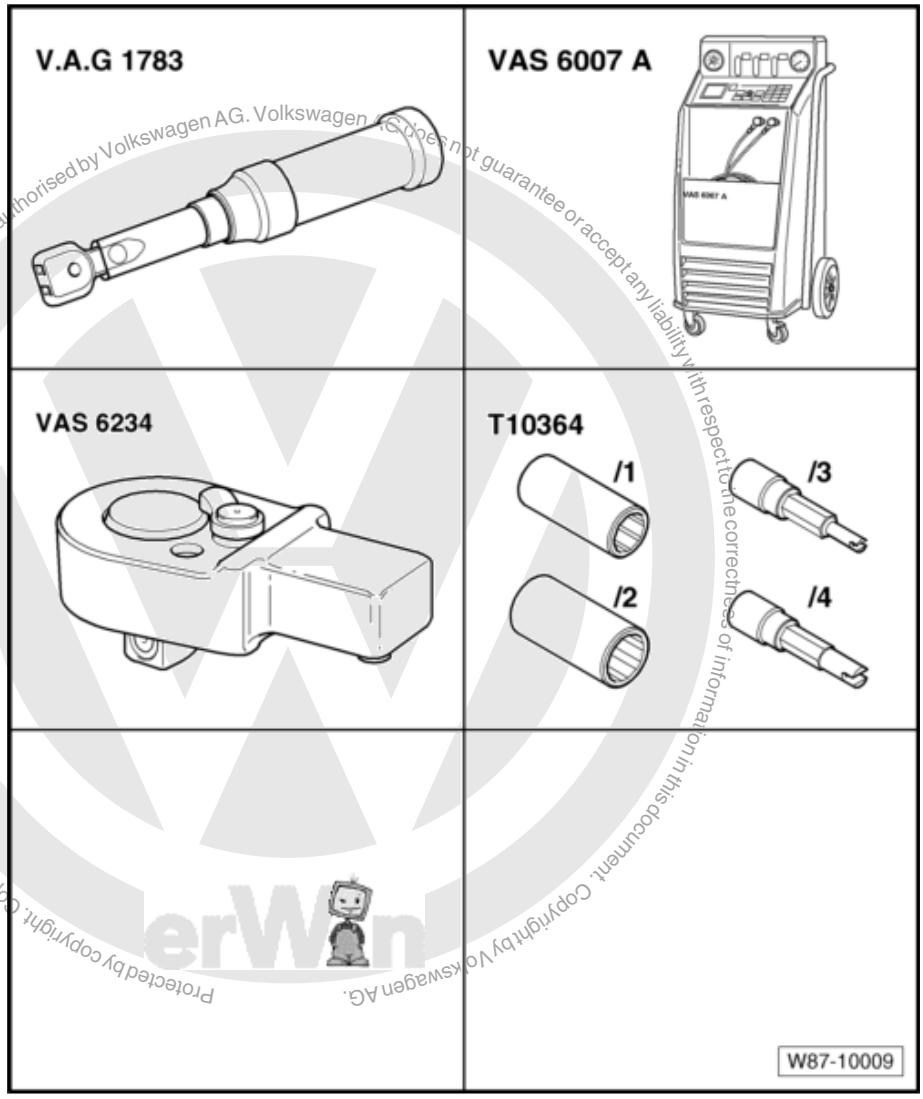
- *The refrigerant must be extracted beforehand, e.g. with air conditioner service station -VAS 6007A- .*
- *The previously used air conditioner service stations can still be used ⇒ Volkswagen Workshop Equipment catalogue.*
- *To prevent the intrusion of moisture, all components of the refrigerant circuit which have been opened must be sealed with suitable plugs.*
- *The colour coding of O-rings for R134a refrigerant circuits has been discontinued. Coloured and black O-rings are used.*
- *Coat threaded connections of refrigerant circuit with polyethylene glycol (PEG) VW part number 294440 before installation.*
- *Under certain conditions, it is no longer necessary to renew the receiver with dryer cartridge each time the refrigerant circuit is opened ⇒ Rep. gr. 00 Technical information „Air conditioning systems - with refrigerant R134a VW“ Renewing parts.*

5.1 Testing equipment and tools

Notes on testing equipment and tools for repair work to vehicles with air conditioning can be found in ELSA under Heating, ventilation, air conditioning system; Air conditioning system with refrigerant R134a ⇒ Rep. gr. 00 ; Technical data.

Special tools and workshop equipment required

- Torque wrench -V.A.G 1783-
- E.g. air conditioner service station -VAS 6007A- (or later model)
- Ratchet insert tool 1/4" - VAS 6234-
- Socket -T10364-



5.2 Renewing refrigerant circuit components

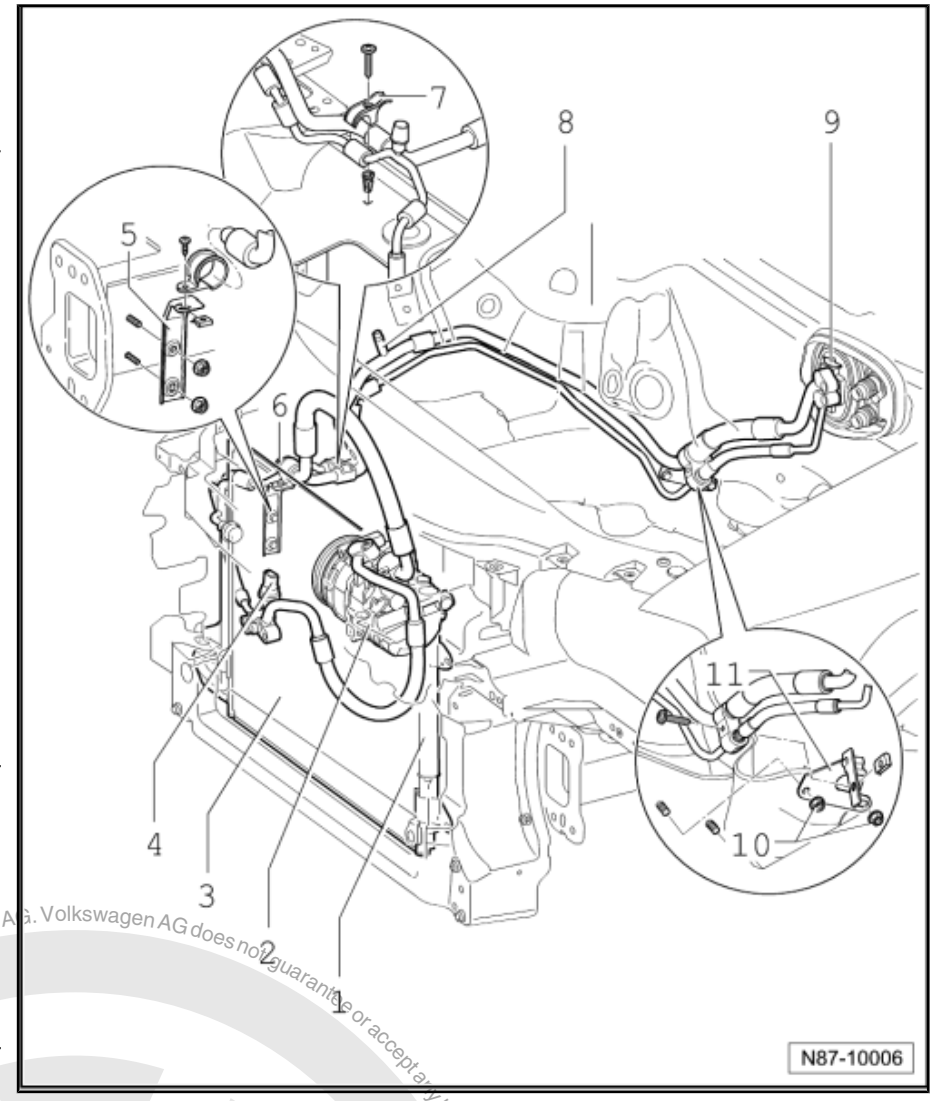
5.2.1 Renewing components of refrigerant circuit (Golf Variant 2007►, Golf Variant 2010► und Jetta 2005►)

WARNING

Danger of freezing injuries.

If refrigerant circuit has not been evacuated, refrigerant will escape.

Extract refrigerant before opening refrigerant circuit. If the refrigerant circuit is not opened within 10 minutes after it has been evacuated, pressure may develop in coolant circuit due to re-evaporation. Extract refrigerant again.



1 - Receiver with dryer cartridge

- ❑ Removing and installing ⇒ page 95

2 - Air conditioner compressor

- ❑ Observe remarks on installation of air conditioner compressor ⇒ page 103 .
- ❑ Removing and installing ⇒ page 96

3 - Condenser

- ❑ Removing and installing ⇒ page 100

4 - High-pressure sender - G65-

Removing ⇒ page 95

5 - Bracket

6 - Evacuating and charging valve

- ❑ High-pressure side
- ❑ Releasing refrigerant into the environment is a punishable offence.
- ❑ Capacities ⇒ page 105

7 - Retainer

8 - Evacuating and charging valve

- ❑ Low-pressure side
- ❑ Releasing refrigerant into the environment is a punishable offence.
- ❑ Capacities ⇒ page 105

9 - Expansion valve

- ❑ Function and removal ⇒ page 98 .

10 - Hexagon nut

- ❑ 20 Nm

11 - Bracket

5.2.2 Renewing components of refrigerant circuit (Jetta 2010►)

1 - Condenser

- ❑ Removing and installing ⇒ page 100

2 - Air conditioner compressor

- ❑ Observe remarks on installation of air conditioner compressor ⇒ page 103 .
- ❑ Removing and installing ⇒ page 96

3 - Hexagon nut

- ❑ 6 Nm

4 - Bracket

5 - High-pressure sender - G65-

- ❑ Removing ⇒ page 95

6 - Expansion valve

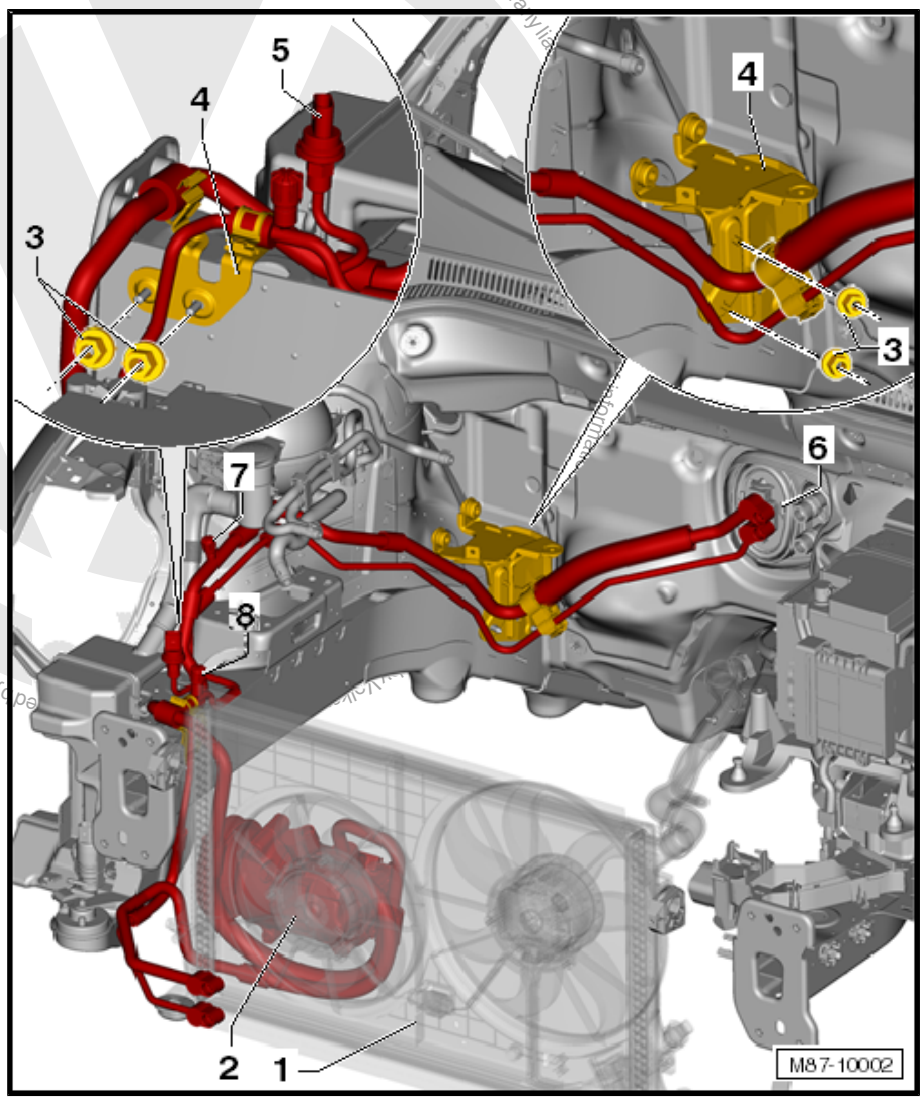
- ❑ Function and removal ⇒ page 98 .

7 - Evacuating and charging valve

- ❑ Low-pressure side
- ❑ Releasing refrigerant into the environment is a punishable offence.
- ❑ Capacities ⇒ page 105

8 - Evacuating and charging valve

- ❑ High-pressure side
- ❑ Releasing refrigerant into the environment is a punishable offence.
- ❑ Capacities ⇒ page 105

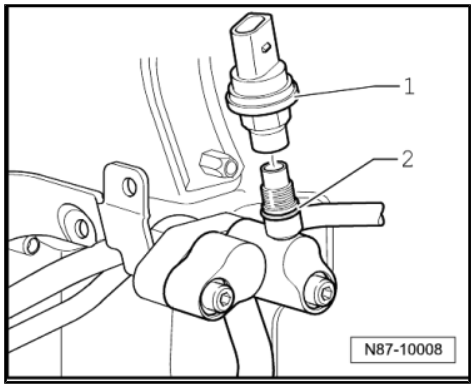


5.3 Removing high-pressure sender -G65- (Golf Variant 2007►, Golf Variant 2010► und Jetta 2005►)

– Remove noise insulation from engine ⇒ Rep. gr. 50 .

– Disconnect connector from high-pressure sender -1-.

– Unscrew high-pressure sender -G65- -1- from refrigerant line connection.



Note

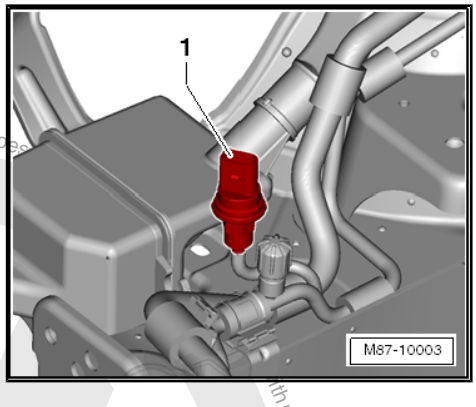
- *Renew O-ring -2-.*
- *Depending on engine version, the high-pressure sender -G65- -1- may be installed in another location near the condenser.*

5.4 Removing high-pressure sender -G65- (Jetta 2011►)

– Remove noise insulation from engine ⇒ Rep. gr. 50 .

– Disconnect connector from high-pressure sender -1-.

– Unscrew high-pressure sender -G65- -1- from refrigerant line connection.



Note

- *Renew O-ring -2-.*
- *Depending on engine version, the high-pressure sender -G65- -1- may be installed in another location near the condenser.*

5.5 Removing and installing receiver with dryer cartridge

Note

Observe notes ⇒ page 92 .

5.5.1 Removing

– Extract refrigerant, e.g. with air conditioner service station -VAS 6007A- before opening refrigerant circuit. Comply with notes ⇒ page 92 .

– Remove front bumper ⇒ Rep. gr. 63 .

WARNING

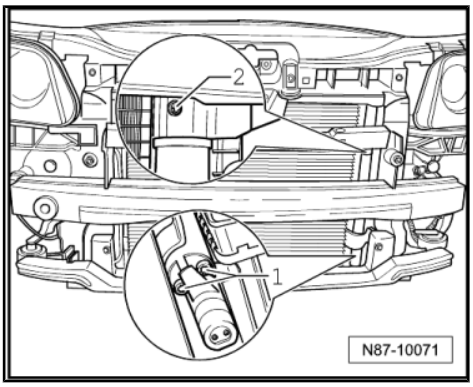
Danger of freezing injuries.

If refrigerant circuit has not been evacuated, refrigerant will escape.

Extract refrigerant before opening refrigerant circuit. If the refrigerant circuit is not opened within 10 minutes after it has been evacuated, pressure may develop in coolant circuit due to re-evaporation. Extract refrigerant again.

– Remove securing bolt -2- and remove retaining clip.

– Remove bolts -1- and pull out receiver with dryer cartridge upwards.



5.5.2 Installing

Install in reverse order.

Note

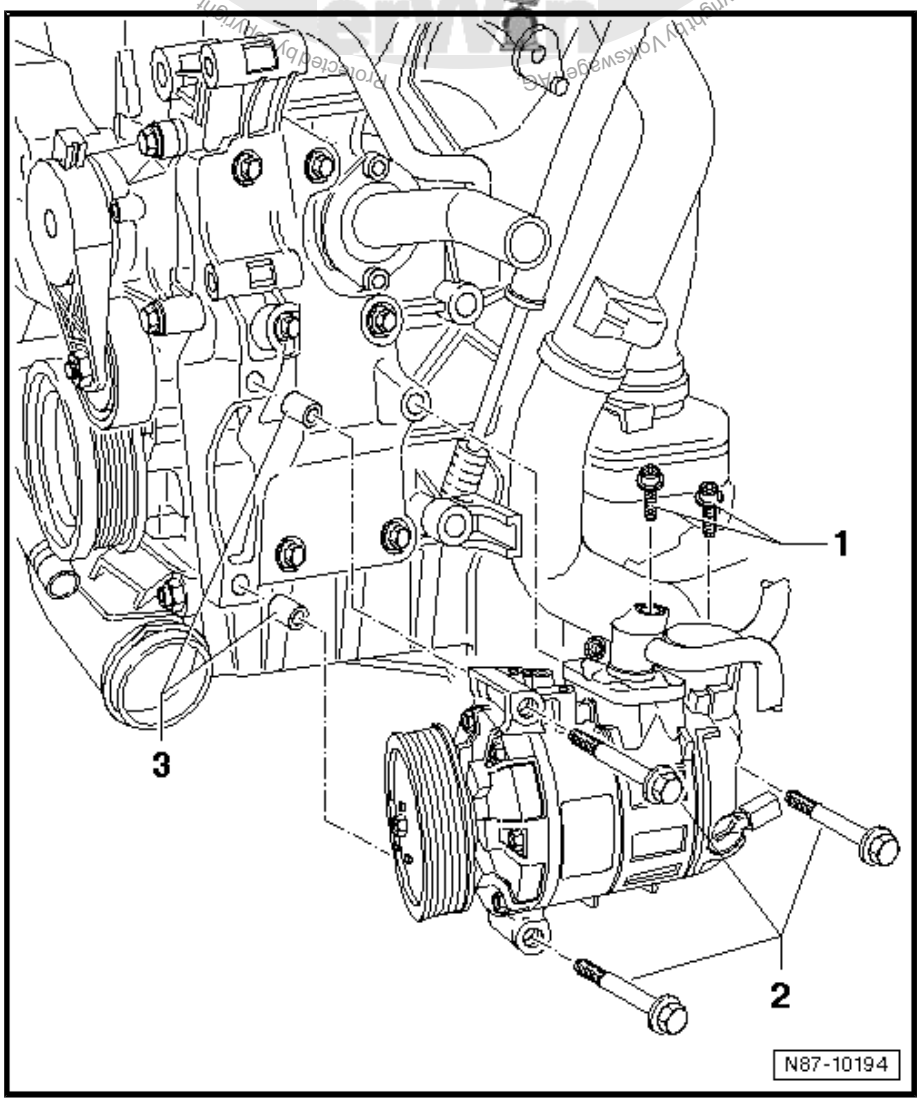
- *First tighten bolts -1- to 4.2 Nm ± 0.7 Nm and then tighten securing bolt -2-.*
- *When installing radiator, ensure that sealing strips on radiator are properly seated.*

5.6 Removing and installing air conditioner compressor

5.6.1 Removing

– Extract refrigerant, e.g. with air conditioner service station - VAS 6007A- before opening refrigerant circuit. Comply with notes ⇒ page 92 .

– Removing poly V-belt ⇒ Rep. gr. 13 .



– Remove noise insulation under engine ⇒ Rep. gr. 50 .

WARNING

Danger of freezing injuries.

If refrigerant circuit has not been evacuated, refrigerant will escape.

Extract refrigerant before opening refrigerant circuit. If the refrigerant circuit is not opened within 10 minutes after it has been evacuated, pressure may develop in coolant circuit due to re-evaporation. Extract refrigerant again.

– Remove bolts (22 Nm ± 1 Nm) -1- from air conditioner compressor and separate refrigerant lines from air conditioner compressor.
– Remove hexagon bolts (25 Nm) -2- and remove air conditioner compressor.

5.6.2 Installing

Note

- *Ensure that dowel sleeves -3- are properly seated.*
- *Observe remarks on installation of air conditioner compressor* ⇒ page 103 .

5.7 Checking high-pressure safety valve on air conditioner compressor

- Function: protects refrigerant circuit against excessive pressure.

WARNING

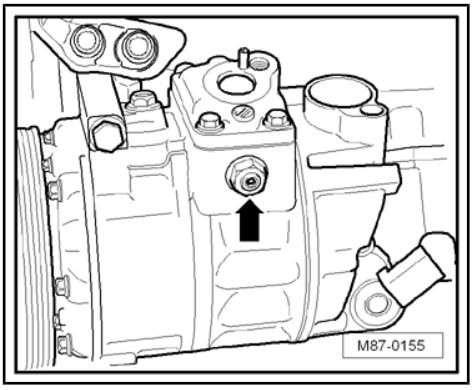
Danger of freezing injuries.

If refrigerant circuit has not been evacuated, refrigerant will escape.

Extract refrigerant before opening refrigerant circuit. If the refrigerant circuit is not opened within 10 minutes after it has been evacuated, pressure may develop in coolant circuit due to re-evaporation. Extract refrigerant again.

Checking high-pressure safety valve on air conditioner compressor (manufacturer Sanden)

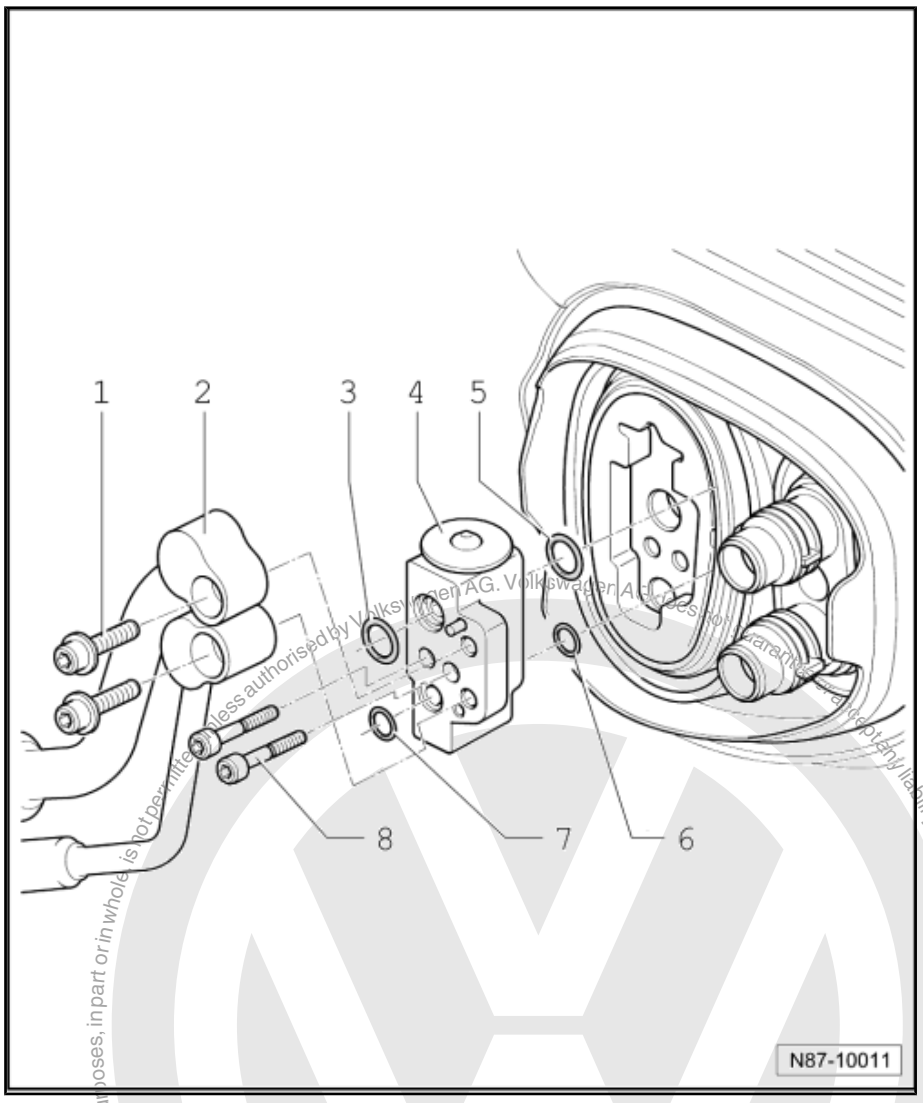
- The high-pressure safety valve -arrow- has operated when refrigerant oil is found in the immediate vicinity.
- In this case, hand over vehicle to a suitable workshop ⇒ page 91 .



5.8 Expansion valve, function and removing

Note

- *The refrigerant must be extracted beforehand, e.g. with air conditioner service station -VAS 6007A- .*
- *The previously used air conditioner service stations can still be used ⇒ Volkswagen Workshop Equipment catalogue.*
- *To prevent the intrusion of moisture, all components of the refrigerant circuit which have been opened must be sealed with suitable plugs.*



1 - Bolts

- ❑ 12 Nm
- ❑ Qty. 2

2 - Refrigerant lines on expansion valve

3 - O-ring

- ❑ 13.7 mm; 2.5 mm

4 - Expansion valve

- ❑ Removing:

– Extract refrigerant, e.g. with air conditioner service station -VAS 6007A- .

WARNING

Danger of freezing injuries.

If refrigerant circuit has not been evacuated, refrigerant will escape.

Extract refrigerant before opening refrigerant circuit. If the refrigerant circuit is not opened within 10 minutes after it has been evacuated, pressure may develop in coolant circuit due to re-evaporation. Extract refrigerant again.

– Remove bolts ⇒ Item 1 (page 98) and pull refrigerant lines ⇒ Item 2 (page 98) out of expansion valve.

– Remove bolts ⇒ Item 8 (page 99) and remove expansion valve.

5 - O-ring

- ❑ 14 mm; 1.82 mm
- ❑ Moisten with refrigerant oil when installing.

6 - O-ring

- ❑ 10.8 mm; 1.82 mm

❑ Moisten with refrigerant oil when installing.

7 - O-ring

❑ 9.5 mm; 2.5 mm

8 - Socket head combi-bolt

❑ 5 Nm

5.8.1 Function

♦ The expansion valve atomises incoming refrigerant and regulates the flow so that, depending on the heat transport, the vapour does not become a gas until it reaches the outlet of the evaporator.

5.9 Removing and installing evaporator

– Remove heater and air conditioning unit:

♦ Vehicles with Climatronic ⇒ page 68

♦ Vehicles with Climatic ⇒ page 42

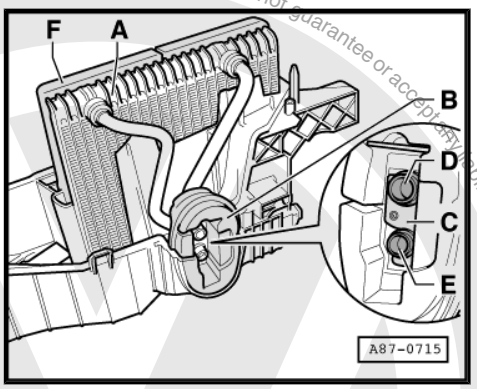
– Dismantle heater and air conditioning unit:

♦ Vehicles with Climatronic ⇒ page 71

♦ Vehicles with Climatic ⇒ page 47

– Dismantle evaporator housing ⇒ page 75

– Pull evaporator -A- out of lower part of evaporator housing.



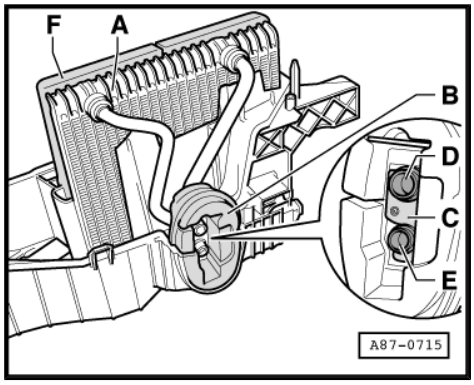
Note

♦ *Before installing evaporator, check condensation water drainage. Clean drainage, if necessary.*

♦ *Before inserting evaporator, clean evaporator housing and, if necessary, evaporator.*

– When inserting evaporator -A- in lower part of evaporator housing and when assembling both parts of housing, ensure that seal -F- is not damaged.

– Before installing evaporator, check seal -F-. It must be bonded in position all round.
– Set bracket -C- and combined seal and insulation -B- on connection pipes of evaporator -D- and -E-.
– Insert evaporator -A- in lower part of evaporator housing as shown in figure.



Note

- *After assembling parts of evaporator housing, check for proper seating of combined seal and insulation -B- at opening for both refrigerant lines -D- and -E-.*
- *Check seating of retainer -C- on both refrigerant lines -D- and -E- for proper seating.*
- *If heat insulation -B- is missing or improperly installed, it may lead to reduced performance of the air conditioning system (due to changes in the set mapped values of the expansion valve through heat radiation).*

5.10 Removing and installing condenser (Golf Variant 2007►, Golf Variant 2010► und Jetta 2005►)

Note

- *The refrigerant must be extracted beforehand, e.g. with air conditioner service station -VAS 6007A- .*
- *The previously used air conditioner service stations can still be used ⇒ Volkswagen Workshop Equipment catalogue.*
- *To prevent the intrusion of moisture, all components of the refrigerant circuit which have been opened must be sealed with suitable plugs.*

First carry out the following work:

– Switch off all electrical consumers.
– Switch off ignition.
– Remove ignition key.
– Extract refrigerant, e.g. with air conditioner service station -VAS 6007A- .

Note

Releasing refrigerant into the environment is a punishable offence.

– Remove front bumper ⇒ Rep. gr. 63 .

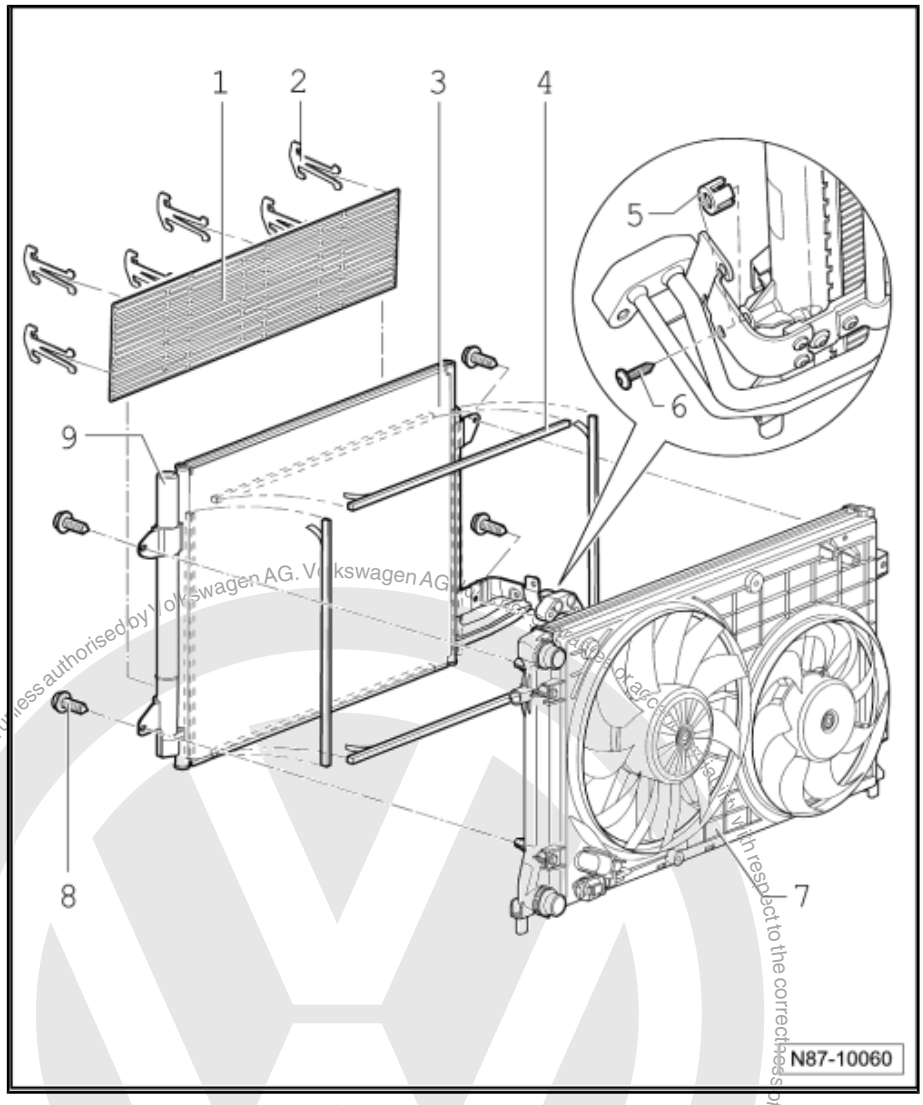
WARNING

Danger of freezing injuries.

If refrigerant circuit has not been evacuated, refrigerant will escape.

Extract refrigerant before opening refrigerant circuit. If the refrigerant circuit is not opened within 10 minutes after it has been evacuated, pressure may develop in coolant circuit due to re-evaporation. Extract refrigerant again.

– Remove refrigerant lines on condenser and seal.



1 - Protective screen

- ❑ Only on vehicles with heavy-duty equipment.
- ❑ Only in vehicles with condensers from manufacturer „Showa“.
- ❑ Position protective screen on 2nd rib from the bottom.

2 - Fastener

- ❑ Qty. 8

3 - Condenser

- ❑ Secured with 4 bolts to radiator

4 - Sealing strip

- ❑ Glue top sealing strip to 6th fin row from top of condenser before installing
- ❑ Glue bottom sealing strip to 1st fin row from bottom of condenser before installing
- ❑ Glue side sealing strips to collector of condenser beginning at first fin row from bottom before installing.

5 - Spacer

Note

6 - Bolt

- ❑ 5 Nm

7 - Radiator

8 - Bolts

- ❑ Qty. 4
- ❑ 5 Nm

9 - Receiver with dryer cartridge

- ❑ Removing and installing ⇒ page 95

5.11 Removing and installing condenser (Jetta 2010►)

Note

- *The refrigerant must be extracted beforehand, e.g. with air conditioner service station -VAS 6007A- .*
- *The previously used air conditioner service stations can still be used ⇒ Volkswagen Workshop Equipment catalogue.*
- *To prevent the intrusion of moisture, all components of the refrigerant circuit which have been opened must be sealed with suitable plugs.*

First carry out the following work:

– Switch off all electrical consumers.

– Switch off ignition.

– Remove ignition key.

– Extract refrigerant, e.g. with air conditioner service station - VAS 6007A- .

Note

Releasing refrigerant into the environment is a punishable offence.

– Remove front bumper ⇒ Rep. gr. 63 .

WARNING

Danger of freezing injuries.

If refrigerant circuit has not been evacuated, refrigerant will escape.

Extract refrigerant before opening refrigerant circuit. If the refrigerant circuit is not opened within 10 minutes after it has been evacuated, pressure may develop in coolant circuit due to re-evaporation. Extract refrigerant again.

– Remove refrigerant lines on condenser and seal.

1 - Protective screen

- ❑ Only on vehicles with heavy-duty equipment.
- ❑ Only in vehicles with condensers from manufacturer „Showa“.
- ❑ Position protective screen on 2nd rib from the bottom.

2 - Fastener

- ❑ Qty. 8

3 - Condenser

- ❑ Secured with 4 bolts to radiator

4 - Sealing strip

- ❑ Glue top sealing strip to 6th fin row from top of condenser before installing.
- ❑ Glue bottom sealing strip to 1st fin row from bottom of condenser before installing.
- ❑ Glue side sealing strips to collector of condenser beginning at first fin row from bottom before installing.

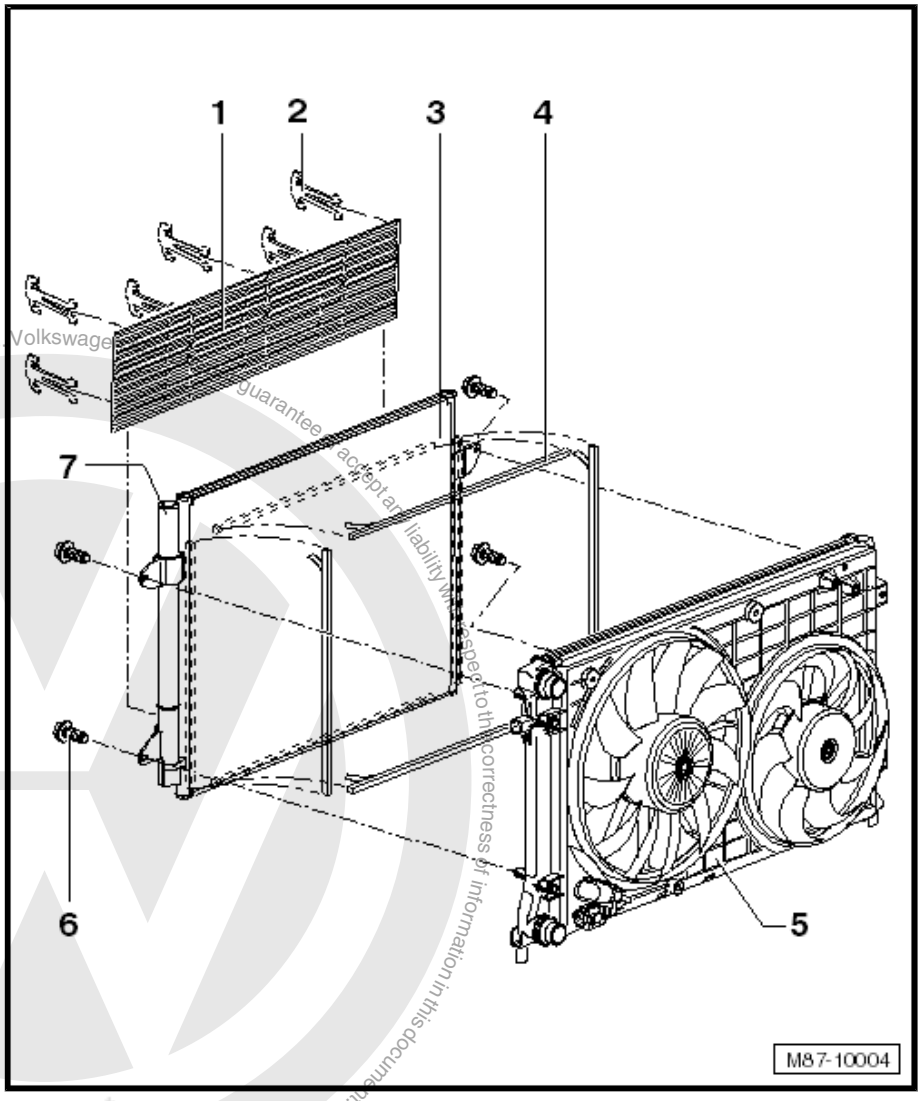
5 - Radiator

6 - Bolts

- ❑ Qty. 4
- ❑ 5 Nm

7 - Receiver with dryer cartridge

- ❑ Removing and installing ⇒ page 95



5.12 Notes on installing air conditioner compressor

5.12.1 Installing

– Only start engine after refrigerant circuit has been assembled.

– After installing a new air conditioner compressor or filling with fresh refrigerant oil (e.g. after blowing out refrigerant circuit), turn AC compressor poly V-belt pulley 10 revolutions by hand before starting engine. This will prevent damage to the air conditioner compressor.

– If possible, only start engine when refrigerant circuit is full.

Note

- *The air conditioner compressor is driven permanently by the poly V-belt pulley (not fitted with a magnetic clutch).*
- *If an air conditioner compressor seizes, the overload protection separates from the air conditioner compressor shaft. A seized air conditioner compressor cannot always be identified by visible deformations in the poly V-belt pulley. Another indication is abraded rubber material around the V-ribbed belt pulley.*
- *The air conditioner compressor has an internal oil circuit to ensure that the air conditioner compressor is not damaged when the refrigerant circuit is empty. This means that about 40 to 50 cm^3 of refrigerant oil remains in the air conditioner compressor.*
- *The engine may be started only when the refrigerant circuit is properly assembled. If, for example, the refrigerant lines are not connected to the air conditioner compressor and the engine is running, the compressor may heat up so much through internal warming that it will be destroyed.*
- *Air conditioning system compressor regulating valve -N280- is not activated when the refrigerant circuit is empty and air conditioner compressor idles with engine.*
- *If it is necessary to start engine with an empty refrigerant circuit:*
- *The refrigerant circuit must be fully assembled.*
- *At least ¼ of the quantity of refrigerant oil specified for this refrigerant circuit must be in the air conditioner compressor.*
- *The engine speed must not exceed 2500 rpm.*
- *Run engine only as long as absolutely necessary.*

Note

Note the following when starting engine for first time after filling refrigerant circuit:

– Start engine with air conditioner compressor switched off (operating mode „Econ“) and wait until idling speed is stable.

– Open dash panel vents.

– Set temperature to „Lo“ on Climatronic operating and display unit -E87- .

– Now switch air conditioner on (operating mode „Auto“) and let air conditioner run for at least 5 minutes with engine at idling speed.

6 Capacities

6.1 Refrigerant R134a

Air conditioner compressor	Manufacturer	Total capacity
PXE16	Sanden	525±25 gram

6.2 Refrigerant oil

The special refrigerant oil (for use with refrigerant circuits R134a only) can no longer be obtained on the refrigerant/machine oil market.

Refrigerant oil can be obtained using following part number for	
Sanden PXE16	G 052 200 A2

Type	Total capacity[1)]
5C0 820 803 A Sanden	110 cm^3 ±10 cm^3
1K0 820 803 R Sanden	110 cm^3 ±10 cm^3

1) This quantity of refrigerant oil is contained in a replacement air conditioner compressor and corresponds to the total capacity.

Important information:

Because refrigerant oil is very hygroscopic, opened containers must be closed immediately after use to prevent moisture from entering.

Because of its chemical properties, refrigerant oil must not be disposed of together with engine or gear oil.

6.2.1 Oil distribution

The oil, which is located in the sump of the air conditioner compressor before the air conditioner system is switched on for the first time, distributes itself through the refrigerant circuit as follows:

- Air conditioner compressor approx. 50 %
- Condenser approx. 10 %
- Suction hose approx. 10 %
- Evaporator approx. 20 %
- Receiver approx. 10 %